CONSTRUCTING LANDSCAPES

Rethinking, Identifying and Applying
the Landscape of Marseille to 21st Century Architectural Design

Marianna Filippou

Marianna Filippou
BENV GA05 MArch Thesis, Bartlett School of Architecture, UCL
Unit 21, Year 5, 2016

Thesis Supervisor: Andrew Barnett, Hopkins Architects
Design Tutors: Abigail Ashton & Andrew Porter, Unit 21

CONTENTS

00
Abstract

00 Abstract

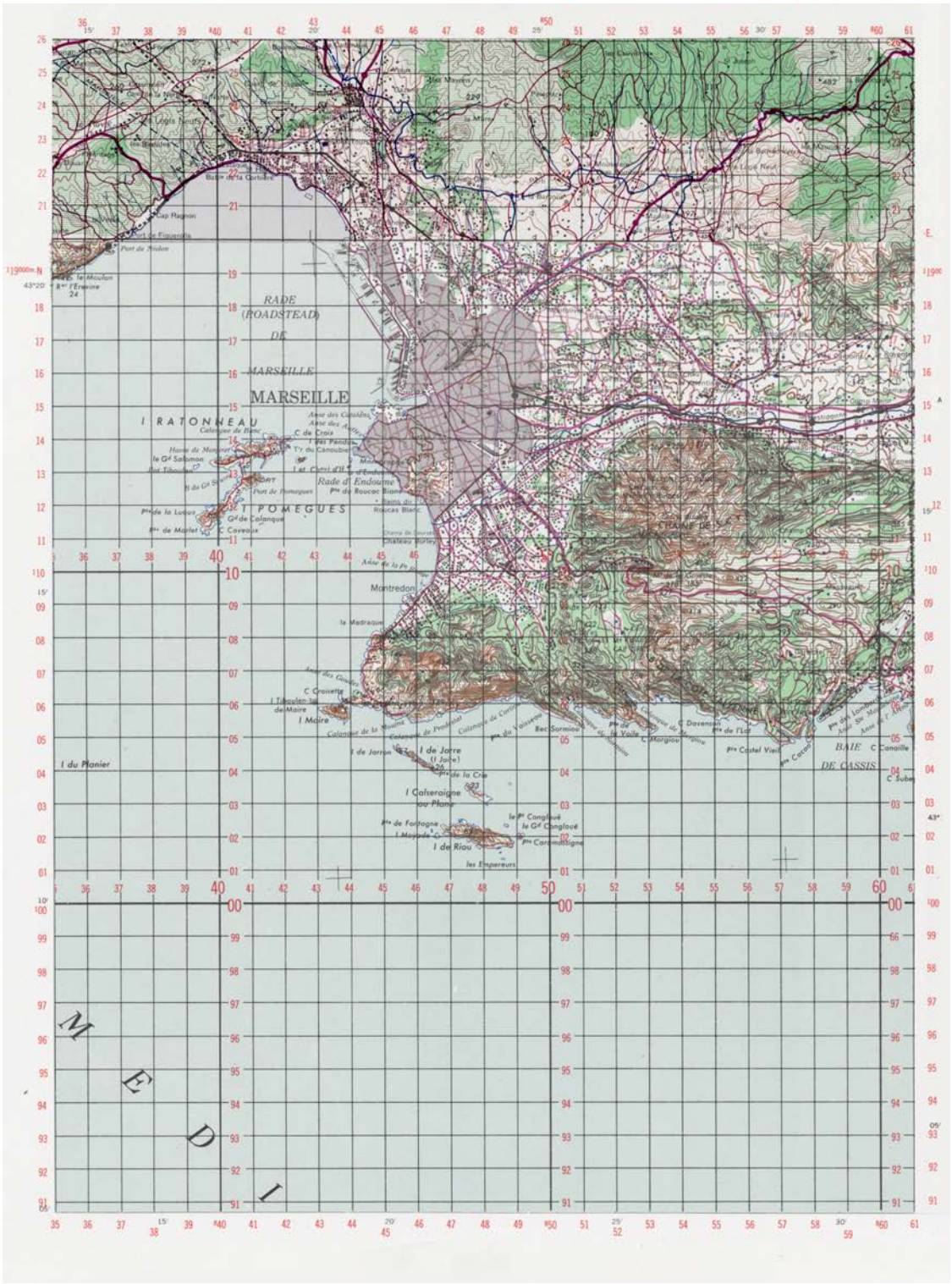
Landscape in one form or other, has always been a focus of architectural discourse and historically, the object of interest in both academia and practice. As architects we see the landscape as the ground for architectural propositions by investigating its existing conditions and the processes that may be applied for its evolution.

This thesis will investigate the term landscape by looking initially at the specifics of Marseille as a city surrounded by a range of mountains that act as physical borders and a geologically rich and scenic background. It's topography contains the city while it also defines it's form within it. Landscape is often perceived as the opposite of the city, an escape from it and a dimensionally opposite element. Although we do not in fact immediately think of the city as a landscape we will explore the extent to which, and the opportunity for these two terms to be seen as one.

The aim is to investigate the main qualities of the landscape in nature and it's relationship with architecture. Its translation into an architectural language will be the main focus of this study questioning the image of the landscape's qualities in architecture and their aesthetic similarities. We will explore how this relationship has managed to shift from an idea to practice through the use of digital design technology in the 21st century. This analysis will be demonstrated by three examples of innovative structural systems and materials that have been used in that era for the construction of landscapes as buildings.

The city of Marseille will be used as a device in order to approach it's specific landscape culturally and architecturally. The city will be analysed in its cultural context and specific environment in order to set the ground for an architectural proposal on a specific site in the historic city. The proposal will seek an appropriate structural system and materiality analysed and applied from the examined case studies. The proposal will be presented as a landscape building in measurable scale and context appropriated through the image and experience of Marseille.

Fig. 01: Map of Marseille, U.S. Army Service, 1943


RADE
(ROADSTEAD)
DE
MARSEILLE
MARSEILLE
I RATONNEAU
I POMEGUES
Rade d'Endoume
Montredon
BAIE
DE CASSIS
I du Planier
I Maire
I de Jarre
I Calseraigne
ou Plane
I de Riou
les Empereurs
M
E
D
I

0 I

Introduction

01 Introduction

Traditionally, we speak of landscape and architecture as two separate entities. Academics and architects have been thinking of natural landscape as a familiar and commonplace entity of diversity and complexity, that is not manufactured, engineered or produced. The word landscape as we know it developed from the technical term landschap used by Dutch painters in the seventeenth century (fig. 01). Originally referring to paintings of a natural scenery, landscape came to apply to any artistic rendering of a natural scene, and with its very form 'to landscape' the word took on the meaning to construct physically a natural scene.[1]

Such interpretations suggest that landscape is not raw nature but a chosen or imagined view of nature that is depicted or constructed by a writer, painter, sculptor, landscape architect, or architect. Whether written, painted, sculpted or constructed, all landscapes signify an interrelationship between the individual, society, and nature: landscape is nature and culture viewed in new ways.

The landscape in focus in this study is the city of Marseille, a city of cultural and natural complexity. The city is introduced through it's geography, geology and urban structure investigating its relationship with its topography and cultural image. Marseille's context sets ground for new interpretations of the term landscape that acts as a tool of knowing the city. In contrast to traditional perceptions, landscape is seen as part of the urban fabric, not separate from it.

The intention is to extend the established definition of the term landscape by introducing the wide range of attitudes towards it that exist today in architectural history and design disciplines. Our attention will be drawn to the physical qualities of landscape that have been interesting architects for centuries. Their interest lies within its immeasurable scale, its blurring boundaries and its capacity to redefine itself in response to nature. Landscapes can make architects think that buildings can expand and evolve, especially when positioning a one-to-one correspondence between landscape and architecture.

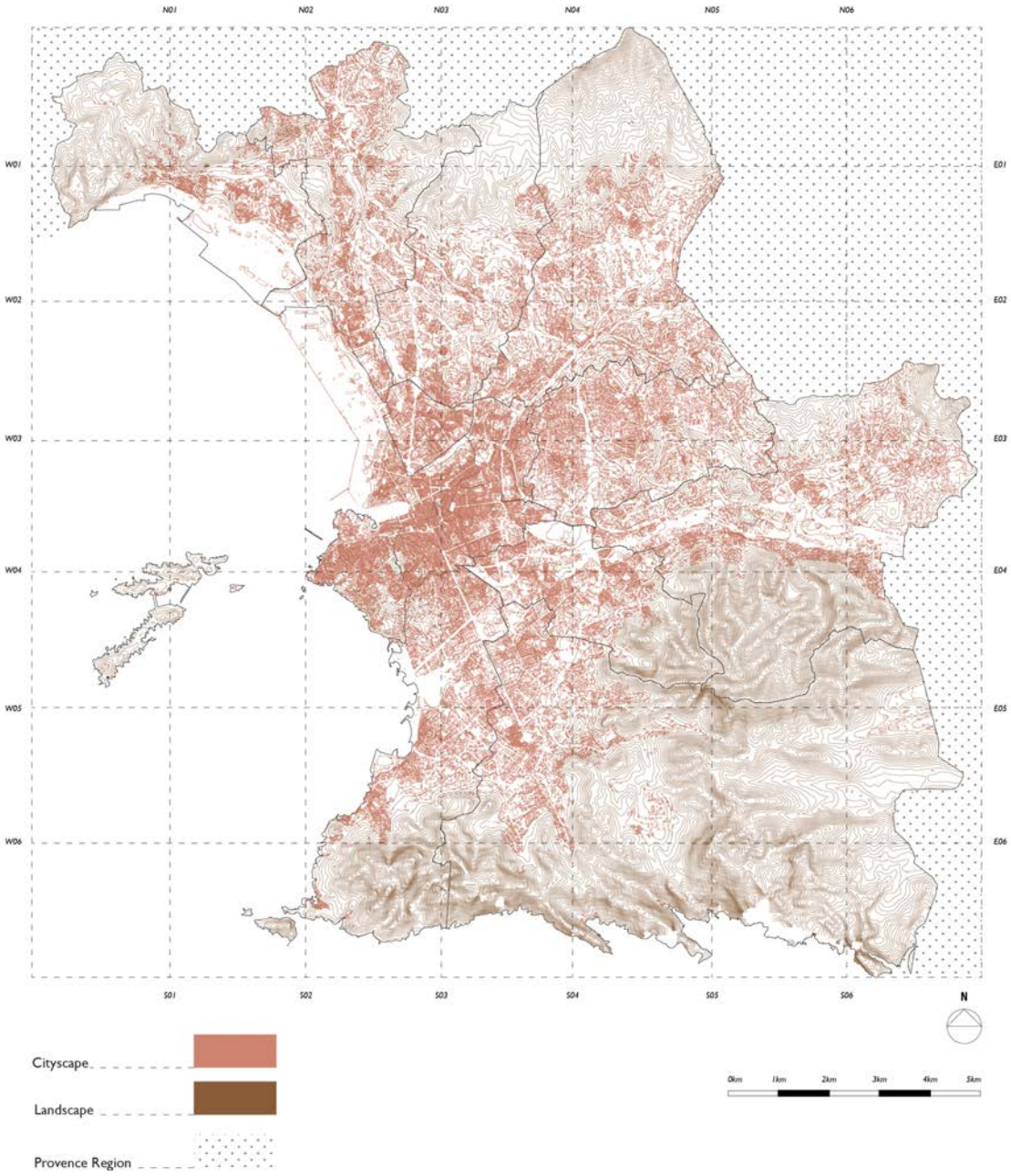
Fig. 02: Jan Siberechts, View of a House and its Estate in Belsize, Middlesex, 1696

Jan Siberecht was the founding father of British landscape painting introducing a new genre of painting in Britain. He concentrated on bird's eye views of the country side. This painting depicts an estate in North London in 1696. This era signifies the change in focus where landscape became the main subject in art and did not just act as a background.

This thesis will demonstrate how developments in technology have enabled architects of the 21st century to apply these qualities in their built work. Moving from the history and theory of landscape, this article will present three architectural precedents that have used landscape qualities to construct a new architectural language through their materiality and form. The case studies will be analysed in terms of their architectural intentions, their unique structural systems and the landscape qualities they have explored. This breakdown allows for clear distinctions and comparisons to be made about their response to the materials used and their behaviour as constructed landscapes.

Finally, the knowledge and understanding of the previous analysis will inform the design of a proposed structure for the city of Marseille. The proposal will seek to explore another type of landscape, defining its scale and structural system in relation to the case study analysis. The work will be presented in the context of Marseille as an extension of the city aiming to respond to its specific site highlighting its spatial qualities.

02
Context


N01
N02
N03
N04
N05
N06
W01
W02
W03
W04
W05
W06
E01
E02
E03
E04
E05
E06
S01
S02
S03
S04
S05
S06
N
Cityscape
Landscape
Provence Region
0km
1km
2km
3km
4km
5km

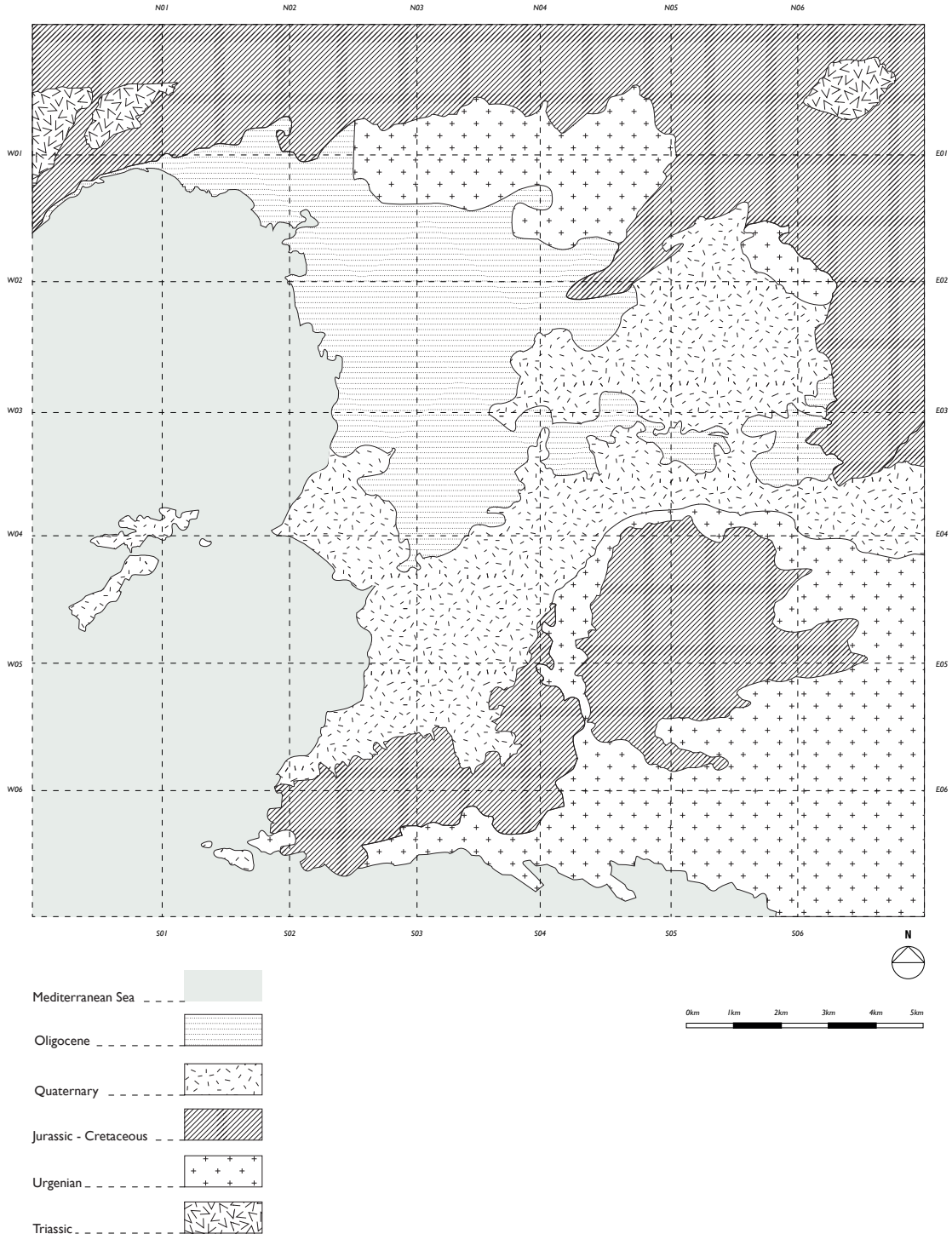
02.1 Understanding the City of Marseille as Landscape

Marseille is one of the largest Mediterranean port cities, characterised by its cultural complexity and its trading activity on the coastline. The character of Marseille has been determined to a great extent by its geographic location. Its natural harbour, sheltered by a semicircle of limestone hills on the Gulf of Lion and close to the estuary of the Rhône River, offers the link of the Mediterranean seaways with northern Europe across a land that is largely elevated. The city's physical borders are directly defined by mountain ranges in the North, East and South and by the sea in the West (fig.02). In the middle of this broad depression a series of limestone peaks rise, offering great panoramas of the city. Marseille's dramatic change of topography within a few hundred metres from the coast, immediately forms the essence of a landlocked city.

Fig. 03 : Contoured map of Marseille - Marseille's cityscape merging with the surrounding landscape.

This physical isolation draws attention to the city of Marseille as a rich operating topographical system. The city's expansion from the historic harbour towards the mainland has formed an ambiguous relationship between the city and the natural landscape as Marseille's topography not only contains the city but certainly defines its form within it. The city of Marseille is entirely shaped by the landscape that surrounds it resulting in an architecture merged with the existing topography rather than developments of inserted volumes. It "appears as an extension of the horizontal, a constructed plane that emerges as an improbable, fluctuating figure."[2] The architecture is incorporated as a landscape where the buildings are devices that act by inserting, densifying and preserving the ground formations at the same time.[3]

In an urban context, the term landscape generally brings to mind ideas of nature, beauty, scenery, something other than the city. At first, it is typical to conjure up images of particularly benevolent scenes - gently meandering river meadows, rural farm fields, cottage cutting-gardens, or even great aristocratic gardens. Less bucolic images may also be embraced, images of a Sublime and Picturesque nature: storms on the horizon, moving dramatically up the rugged mountain valley; great carvenous waterfalls and rivers in flood; gloomy forests with broken branches, fallen trunks and a sense of infinite dimensions.[4]


N01
N02
N03
N04
N05
N06
W01
W02
W03
W04
W05
W06
E01
E02
E03
E04
E05
E06
S01
S02
S03
S04
S05
S06
N
Mediterranean Sea
Oligocene
Quaternary
Jurassic - Cretaceous
Urgenian
Triassic
0km
1km
2km
3km
4km
5km

Although such images are not always of wholly natural features, gardens and rural fields are so easily equated with the larger natural landscape because their aesthetic, physical and temporal aspects closely resemble and are caught within the process of the natural world. Thus, unlike buildings, landscape constructions tend to 'naturalise' themselves over time, masking their artifice and rendering invisible their underlying ideology. [5]

A first impression of landscape will most likely resemble the above in one way or another. When asked about landscape architecture, however, images of untouched, natural landscapes that have been farmed (by farmers) or gardened (by homeowners) can be thought of, suggesting that the landscape architect's role is in the construction of scenery, in the composition of landscape elements so that a harmonious view will be presented. [6] Landscape architects in their work with roads, new built developments, tourist sites, forestry management, and so on, can be thought of making things appear to fit together, putting things in place, screening out the undesirable while preserving and framing the scenic moment.

Outside the world of agriculture, landscape can also be thought of as an object of contemplation. It is presented and conceived as something to be beheld, typically from a distance. As such, landscape exists largely as a visual image, a picture, that is dense with semantic value. Thus, many landscape architects have emerged in contemporary society as scenic mediators whose work remains inscribed upon the all too precious image of the picturesque.[7]

The experience of the landscape of Marseille will be increasingly critical of the above view of landscape and landscape architectural work. For a variety of historical and cultural reasons, Marseille presents a landscape that exceeds and challenges traditional notions of scene, garden and design. While these latter terms still have great currency in the region, the larger landscape that defines the city remains self-consciously shaped, presented less as a scene of contemplation or identity than an active and productive system. Granted, the ranges of mountains geographically isolating the city and the beaches are pervasively scenic and carry the essence of Marseille, but these are of relatively small and precious dimension compared to the everyday, working landscape. Grids of interconnection, lines and arcs of pure circulation, endless geometries, limestone mines, roads, tracks, roofs and plots of all possible dimensions and agendas.

Fig. 04 Geologic Map of Marseille - Landscape formations.

Fig 05: The landmarks of Marseille

01. Rue du Vallon des Auffes
02. Monument aux Morts d'Orient
03. Palais des Congres du Pharo
04. View from Palais des congres du Pharo
05. Cathedral la Major
06. La Vielle Charite
07. Place Sadi Carno
08. Jardins des Vestiges - Roman Remains
09. Quai du Port
10. Quai des Belges
11. Quai de Rive Neuve
12. Basilique Notre-Dame de la Garde
13. Eglise Saint Vincent de Paul
14. Escalier Gare Saint Charles
15. Longchamp Palace

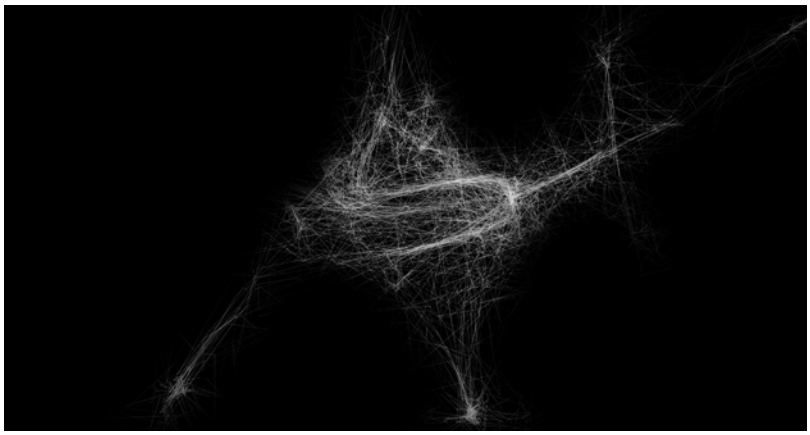


Fig 06: Geotags of the most visited locations by cruise boat passengers over then past decade.

This is Marseille's landscape at work, an infrastructure of pure, cultural presence. The entire city is an enormous working quarry, an operational network of exchange, movement and transmutation. Consequently, Marseille's landscape can be appreciated less as a scenic space and more as one of time, event, production and network.[8]

The transformation of the natural to a cultural landscape across the land has resulted in constantly producing, circulating, consuming, moving, transforming the constructed land. Thus, whereas Marseille has an extraordinary share of truly remarkable natural scenes and designed coasts, there is clearly another form of landscape at work here, one that is perhaps formed by the city's state of flux rather than it's scenic nature.

Therefore, this is a landscape not of visuality, but of expansive and busy inhabitation. It is not a landscape of space, enclosure and place, but a landscape of transiency, mobility, flux and change. It is the everyday landscape of every Marseille citizen not the remote get-away, the gardenesque escape, or the scenic place of contemplation. It is the site of both labour and dream of people manipulating, investing and living the land. This landscape not only reflects the passages of time and life but also suggests alternative passes and possibilities.

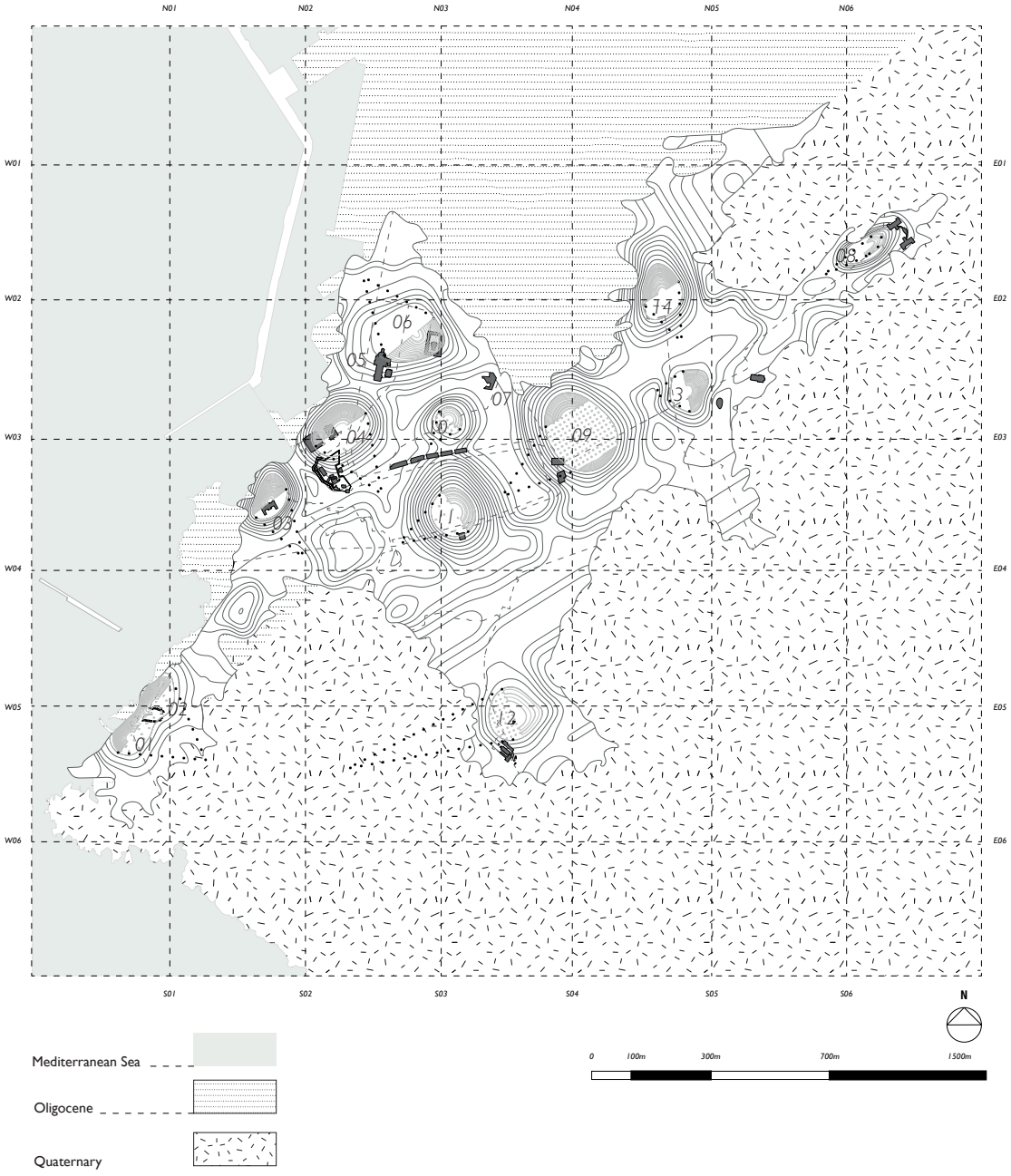


Fig 07: Isolating the most visited locations in the City of Marseille by cruise passengers who reach the number of 1.4 per year.

01. Rue du Vallon des Auffes
02. Monument aux Morts d'Orient
03. Palais des Congres du Pharo
04. View from Palais des congres du Pharo
05. Cathedral la Major
06. La Vielle Charite
07. Place Sadi Carno
08. Longchamp Palace
09. Quai du Port
10. Quai des Belges
11. Quai de Rive Neuve
12. Basilique Notre-Dame de la Garde
13. Eglise Saint Vincent de Paul
14. Escalier Gare Saint Charles

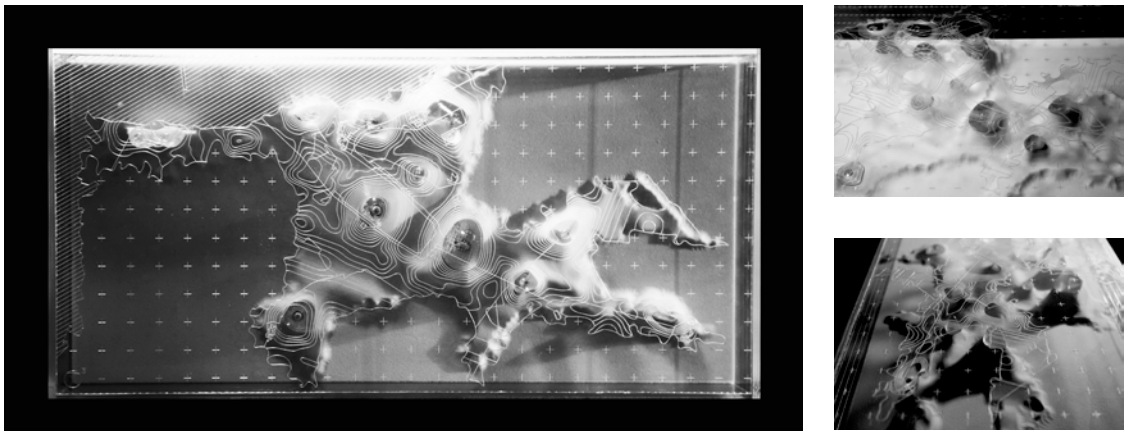


Fig. 08-10: Physical model of Marseille's reconstructed topography.

Marseille in particular, is a hub where exports and imports are constantly taking place being one of the largest Mediterranean ports of commerce, tourism and migration. Apart from the enormous amount of migrating populations who pass by or settle in the multicultural city of Marseille, cruise passengers arriving yearly reach the number of 1.4 million. Some of them become part of the city for days and others for just a few hours. Surveys have been done tracking cruise passengers over the past 10 years. Their routes within the landscape of Marseille define the most visited locations and establish the city's landmarks. A new landscape is formed within the boundary of these routes that contains the most significant cultural monuments of the historic centre. Figure 08 demonstrates a reconstruction of Marseille's topography according to a hierarchical system of the collected data. Peaks rise from a flat surface suggesting the intensity each location has been visited by visitors the past decade. Here, landscape in the form of a topography is used as a tool to physically represent the concept of a cultured landscape in flux such as the city of Marseille.

Fig. 11: Physical model of Marseille's reconstructed topography.

Fig. 12: Looking East towards the Basilique Notre-Dame de la Garde, the highest natural elevation in Marseille.

Fig. 13: Looking Southwest towards the Old historic harbour and the Basilique Notre-Dame de la Garde.

02.2 Appropriating the Landscape

Historically, there have been several classifications of landscape as a way of knowing the city. Tom Turner (1982-3 for), for example, identified three categories: The artist's landscape (scenery), the geographer's landscape (a tract of land) and the designer's landscape (a planned park or garden). Edward Relph (1981) identified six meanings of landscape, also linked to different disciplines (landscape as object, features in an area, record of history, townscape, meaning of environments, and ideology of ownership). Meinig (1979) extended the role to ten "versions of the same scene". In tracing the evolution of contemporary meanings of landscape, Swaffield and O' Connor (1986) distinguished between landscapes conceived (i.e. mental conceptions of land), landscapes perceived (i.e. phenomena defined by eye) and 'holistic landscape (i.e integrated understanding). The latter classification is recognising that landscape knowledge can be grounded in different dimensions of human existence: mind, eye, imagination, body and hand (action). These dimensions are not mutually exclusive, but provide a framework for different ways of knowing landscape.[9]

There are different approaches that can lead one to appropriate the city of Marseille as a landscape. The use of geographical and geological maps are the first body of research that can inform about the rich topography of the city.[10] Two dimensional depictions of the landscape in contoured maps can provide information about the morphology of the mountain ranges, their relationship with the city and the use of land. It is evident how the city organically blends in with the landscape and vice versa. Maps are a scientific method of reading a landscape from home but knowledge is limited to an image and does not extend into physically experiencing the topographic scene.

The relationship between the landscape and the urban fabric of the city can immediately be experienced by approaching the city by boat. The port is located in the West and is surrounded by lofty views in all directions that act as physical borders. In addition, the central train station sits on the top of a limestone hill offering a great panorama towards the South. Most strategically located is the Basilique Notre-Dame de la Garde at the highest natural elevation in Marseille, a 150m limestone outcrop on the south side of the Old Port of Marseille. Settlers and visitors of Marseille are constantly experiencing the undulations of the ground as they circulate around the city. Routes taken within a few hundred metres from the port either lead to naturally shaped beaches or high hills that offer breathtaking panoramas of the city and the Mediterranean sea.

Fig. 14-15: Roofscapes of Marseille

Fig. 16: Juctions of tiled Marseille Roofs

Fig. 17: Traditional terracotta Tiles of Marseille

Being physically exposed to the landscape of Marseille forms a different layer of knowledge about it. It becomes less of a purely aesthetic background, an idealised landscape. The city becomes a cultured landscape that one can engage with, neglecting the fine line between the natural and the construct. The opposing relationship between the cartographical and the physical approach of knowing landscape leads us into questioning the way we experience the city and architecture itself. Maps of landscapes offer similar information as plans and sections do for buildings, lacking the third dimension and our physical exposure to them. Our inhabitation of space is what fully informs us about its quality and so does our being physically exposed to a natural landscape.

It might be thought that one primary aim of architecture is the experience of space, it's impact with light, weather, time, the user. The ability to fully experience and record a building lies within it's measurable scale. The vastness of landscape in nature is what can be seen as an immeasurable quantity and a ground on to which architecture can only be situated. Landscapes have always set the ground for architectural development. It is possible to use the brutality of architectural intervention in the landscape as a means of confrontation, but it can also be reduced to methods of adaptation.[11] One possibility of bringing the landscape into connection with architecture is to transform its tangible elements into architecture itself. It's only been a few decades that growing construction technologies have enabled architects to manufacture artificial landscapes in the form of buildings. William Curtis said that 'making landscapes is about capturing space, a non-place lacking civic or rural identity'[12]. Key questions are raised such as how to make a landscape balance the need for images of nature with the realities of high technology.[13] Such questions can be answered by identifying the physical qualities of landscape and the possibility of adapting them in architectural propositions.

02.3 The Qualities of a Landscape

Landscape continues to be central to architectural debate but it is a clear sign that we no longer rely to the classical relationships between building and ground, or on the conventional definitions of the ground as delimited, stable, horizontal, determined and homogeneous. This relationship has been developed as a result of high technology in architectural design and construction, the ability not only to site architecture to landscape but to appropriate it as an idea within it.[14]

The relationship of landscape and architecture could be defined, at one level, as the art of the extended horizontal surface. It is, in fact, slightly misleading to refer to surface in landscape. Landscape's matter is spread out in the horizontal dimension, but landscapes are never, strictly speaking, pure surfaces. Landscape configurations form a compact and highly differentiated section - in comparison to a conventional building section - that of weaving, warping, folding, oozing, interlacing or knotting together.[15] Landscape surfaces are better described as multi-layered spaces, made up of dynamic strata, overlapping and generating geological volumes. These are architectures of overlapping surfaces: 'lands over the lands'.[16]

However, landscape surfaces are always differentiated by their material and performative characteristics - in landscape, performance is a direct outcome of material. Slope, porosity, hardness, soil chemistry, consistency, etc., all these variables influence the life that a surface will support, and its own development in time. Much more than a formal model, landscape's physical qualities are important to architecture and urbanism as a model of process. Landscapes like cities are loosely structure frameworks that grow-in and change over time according to their environment.

As surface has become a primary instrument in architectural design, an obvious attraction has emerged in contemporary architectural practice. More recently, it has been extended to topographic surfaces that are folded, warped, bent or striated.[17] By careful attention to these surface conditions, materiality and performance, architects have been able to activate space and produce new spatial qualities, challenging traditional space making.[18]

Landscape has a particular spatial vocabulary - 'matrix, corridors and patches'[19], for example - that describes movement, connectivity and exchange. Landscape corridors are pathways for information exchange, while patches and corridors form larger networks of nodes and paths that allow communication, interaction

and adaptation. This idea links landscape to infrastructure and architectural design through a logic of connectivity and feedback. [20] This condition of fluidity is one of the key physical qualities of landscape that can be applied in architectural design. Circulation then becomes the design approach while the architecture is moulded around and between the user's trajectories. Thus, rather than a partitioning of spaces or parcelling of uses, what defines space is an articulation of activities in a preferably free, fluid space that would not be bound to strict geometric schemes but rather would be of a freer configuration.

It is not just the movement of the user that defines space but the movement of space itself. A regular rising and falling, or movement to alternating sides is another quality of landscape surface. Its characteristic of extending in all directions reaching different levels in height and depth as a singular body formulates a dynamic architectural language. A new contract is formed between the horizontal and the vertical dimensions that seem to merge and erase the fine line that separates them. New dynamics propose topological shapes such as reliefs, waves, folds, sheared volumes and enveloping surfaces. Architecture then becomes a complex artificial topography conceived of as a single and thick surface where the ground is no longer a series of flat planes but a more continuity of fluctuations.

It is not new that architects have been utilising the language of natural forms (mound, wave, mountain, etc.) and systems for reading landscape (model,grid, and topographical drawing) but only within the 21st century their ability to bring the experience of landscape to the space of architecture has changed fundamentally with the development of computer technology. Utilising the way in which designers and computers explore landscape, architects have started to create structures that translate that technological view into spatial forms. These forms reveal new and at times unexpected views of landscape that are systematised emphasising the experiential relationship of landscape in architecture.

This new relationship of landscape, architecture and technology will be analysed in this study with the use of three case studies that are chosen according to the different technologies that has been introduced and the physical qualities of landscape that have been explored in each case. Concrete, timber and ceramics are the three materials used for the finish of the three different buildings all performing uniquely as a structure, spatial experience and visual effect. Their definition as landscapes will be analysed further, focusing on the language and image of landscape represented in each structural system. Sanaa's Rolex Learning Centre will be analysed as a concrete landscape, FOA's Yokohama International Port Terminal as a timber landscape and EMBT's Santa Caterina Market as a ceramic landscape. The range of case studies which are demonstrated here have challenged old perception and give good cause for confidence in the future exercise of architecture. This analysis will identify appropriate structural systems for a proposed scheme in the city of Marseille.

03
Methodology

03.1 Case Study 01: Concrete Landscape

Fig.18: Rolex Learning Centre Aerial View

Rolex Learning Centre, designed by the Tokyo based architecture practice SANAA, is located centrally on the EPFL campus in Lausanne, Switzerland since 2010. Essentially, it appears as a single continuous structure that spreads horizontally over a site of 88.000sqm. It is rectangular in plan (166.5m x 121.5m) touching the ground lightly, leaving an expanse of open space beneath the ground floor which draws the users from all sides towards a central entrance. Its four glazed elevations have an organic shape, undulating gently keeping the floor an roof in parallel as they rise from the ground. [21]

Structure

The structure seems like a simple single storey building that expands over a 195m x 141m rectangular site with a concrete finish and a continuous glazed facade. However, the engineering and construction of the Rolex Learning Centre is highly experimental and innovative. 'To achieve the structure's extreme spans and porosity required a shift in the way technology was applied and it was to bridges that the team turned.' Essentially, the building is made up of thin layers that create an organic and light form. The overview (Fig. 20) illustrates the construction of the landscape and the parallel roof. The main structural materials are steel, timber and concrete poured into a very precise formwork creating a polished finish on the underside of the building. The ground floor is a free curved surface made of reinforced concrete with 600mm thickness and an 80m maximum span. The reinforced concrete slab leaves the ground and gently rises.[22]

Above the hollow plinth slender steel columns arranged on a 9x9m grid (Fig. 25) support the steel beams (fig. 20_ 07)of the reinforced concrete roof structure in parallel to the floor. To follow the geometry of the undulating forms it required 1400 different moulds for concrete. The concrete pouring involved delivering concrete continuously over a period of two days, to achieve the complex task of creating one continuous flowing roofspace.[23]

The building appears as a single structure, including the roof, held aloft on Sanaa's trademark white steel columns of unbelievable slenderness. The floor, undercroft and basement provide a concrete anchor to stabilise the form, while the curved glass facades (fig. 20_05), including those that wrap around the patios, also act as structural elements.

Fig. 19: South Elevation. Sections of full height glazing wrap around the facade of the single storey building.

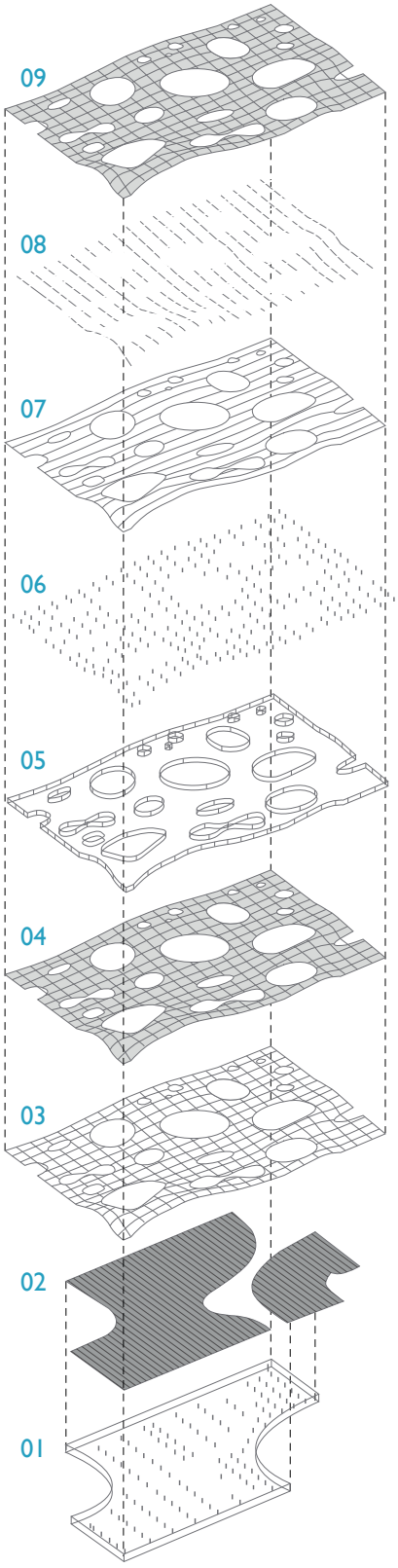
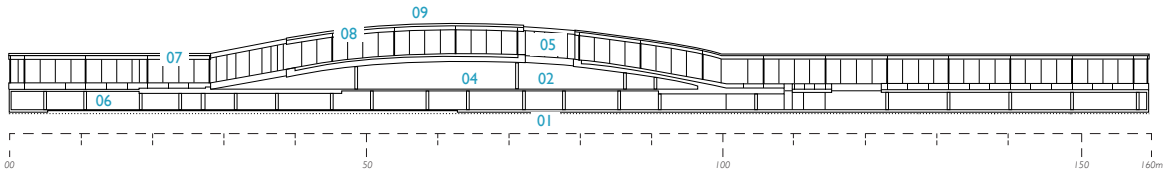


Fig. 20: Rolex Learning Centre, Structural System Diagram

01 Reinforced Concrete Mat Slab
02 Reinforced Concrete Flat Slab
03 Steel Frame
04 Reinforced Concrete Shell
05 Curved Glazing
06 Steel Circular Columns on a 9x9m grid
07 Steel Roof Frame
08 Timber Beams
09 Reinforced Concrete Roof

Fig. 21: Cross Section



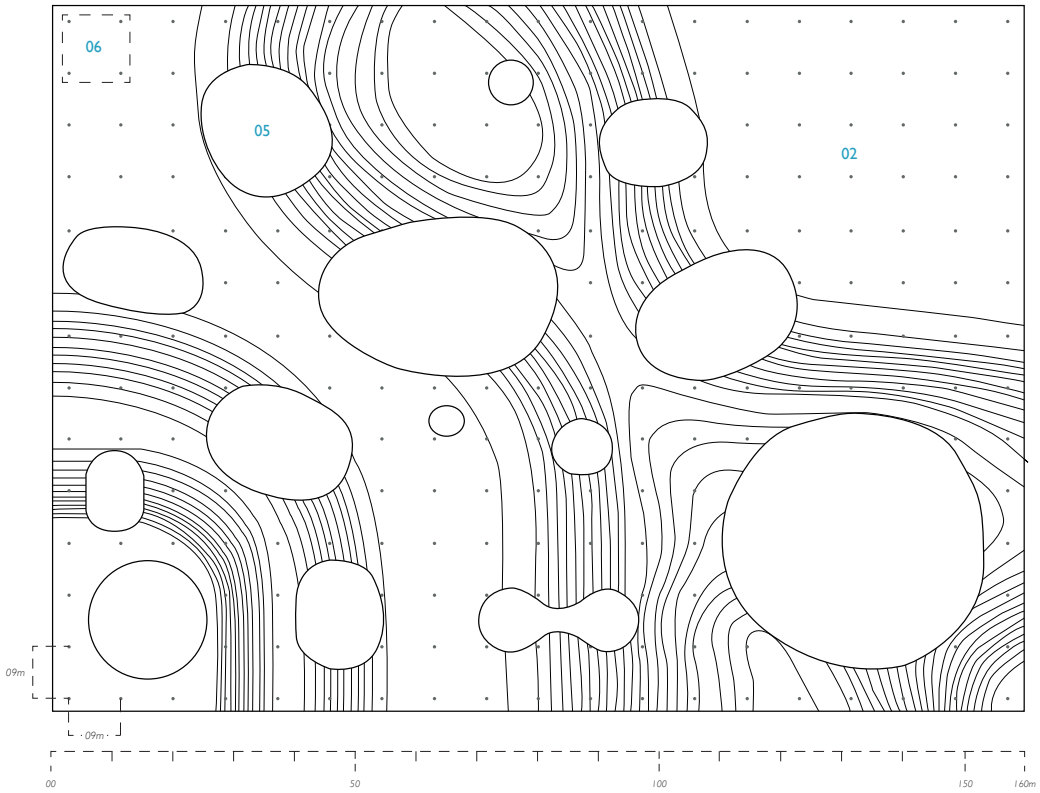
01 Reinforced Concrete Mat Slab
02 Reinforced Concrete Flat Slab
03 Steel Frame
04 Reinforced Concrete Shell
05 Curved Glazing
06 Steel Circular Columns on a 9x9m grid
07 Steel Roof Frame
08 Timber Beams
09 Reinforced Concrete Roof

Fig. 22: Pre-stressed steel cables for the construction of the reinfroced concrete floor slab.

Fig. 23: Steel frame roof structure with vertical timber beams resting on the reinforced concrete slab.

Fig. 24: Interior View of Circular Steel Columns and Curved Glazing.

Fig. 25: Ground Plan



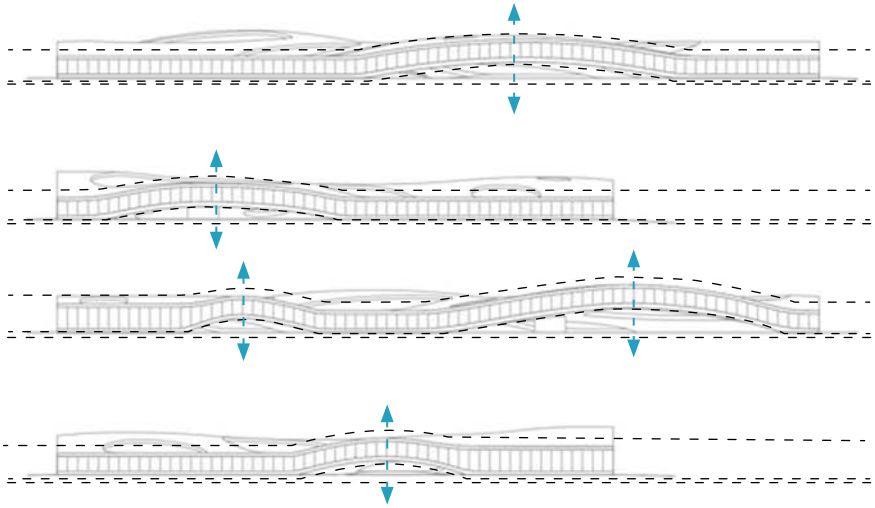


Fig. 26: North, East, South and West Elevations. The concrete slab gently rises from the ground.

Landscape Qualities

Inside, the hills, valleys and plateaus formed by the undulations often make the edges of the building invisible, though there are no visual barriers between one area and the next. Instead of steps and staircases, there are gentle slopes and terraces. The large open space is defined by its artificial geography. It groups silent and calm zones along its hills and slopes, rather than offering traditional cloistered study rooms. Clearly, but without dividing walls, one area of activity gives way to another. Visitors stroll up the gentle curves, or perhaps move around the space on one of the specially designed horizontal lifts, elegant glass boxes, whose engineering is adapted from everyday lift design. As well as providing social areas and an impressive auditorium, the building lends itself to the establishment of quiet zones and silent zones, acoustically separated areas created through changes in height. The slopes, valleys and plateaus within the building, as well as the shapes made by the patios, all contribute to these barrier-free delineations of space. In addition, clusters of glazed or walled 'bubbles' make small enclosures for small groups to meet or work together in.[24]

The topography lends an extraordinary fluidity to the building's flexible open plan – a flow that is emphasised by fourteen voids (fig. 25) in the structure, of varying dimensions. These are glazed and create a series of softly rounded external patios, as the architects describe them. The patios are social spaces and provide a visual link between the inside and the outside. They are very much part of the building. From the higher areas, visitors may enjoy views not only of the campus but, spectacularly, of Lake Geneva and the Alps.

03.2 Case Study 02: Timber Landscape

Yokohama International Passenger Terminal, realised by the London based Foreign Office Architects in 2002, is located in Osanbashi Pier, Tokyo bay. It is a three level facility of a gently curved form cladded in timber decking that extends from the external occupied roof into the levels below. The form of the structure was conceived primarily in section, with a complex series of surfaces that curve and fold into a navigable, inhabitable architectural topography. The striking appearance of the terminal was made possible only by tremendous advances in computer-aided design that informed the architects and made construction possible after 7 years of design. [25]

Fig. 27: Yokohama International Port Terminal, Aerial View

Structure

The building is organised in three levels (fig. 29). A first floor parking garage (level 1), a spacious middle floor (level 2) containing the terminal's administrative and operational areas, including ticketing, customs, immigration, restaurants, shopping, and waiting areas and a top external roof level (level 3). A unique structural system made of steel trusses (fig. 29_03&06) and concrete faceted planes (fig.29_02&05) supports the building. The strength of the materials minimises the need for vertical supports and allows for a mostly open floor plan, while the height of the structure allows for a variety of ceiling conditions in the interior spaces. The abundance of non-orthogonal walls, floors, and ceilings creates a controlled sense of ambiguity between the vertical and horizontal planes that is accentuated by similarly unconventional fixtures and details. Level 2 and 3 are cladded in thin timber boards (fig. 29_ 04&07), layering the structural materials and creating a sense of continuity and expression.[26]

Fig. 28: Timber Landscape

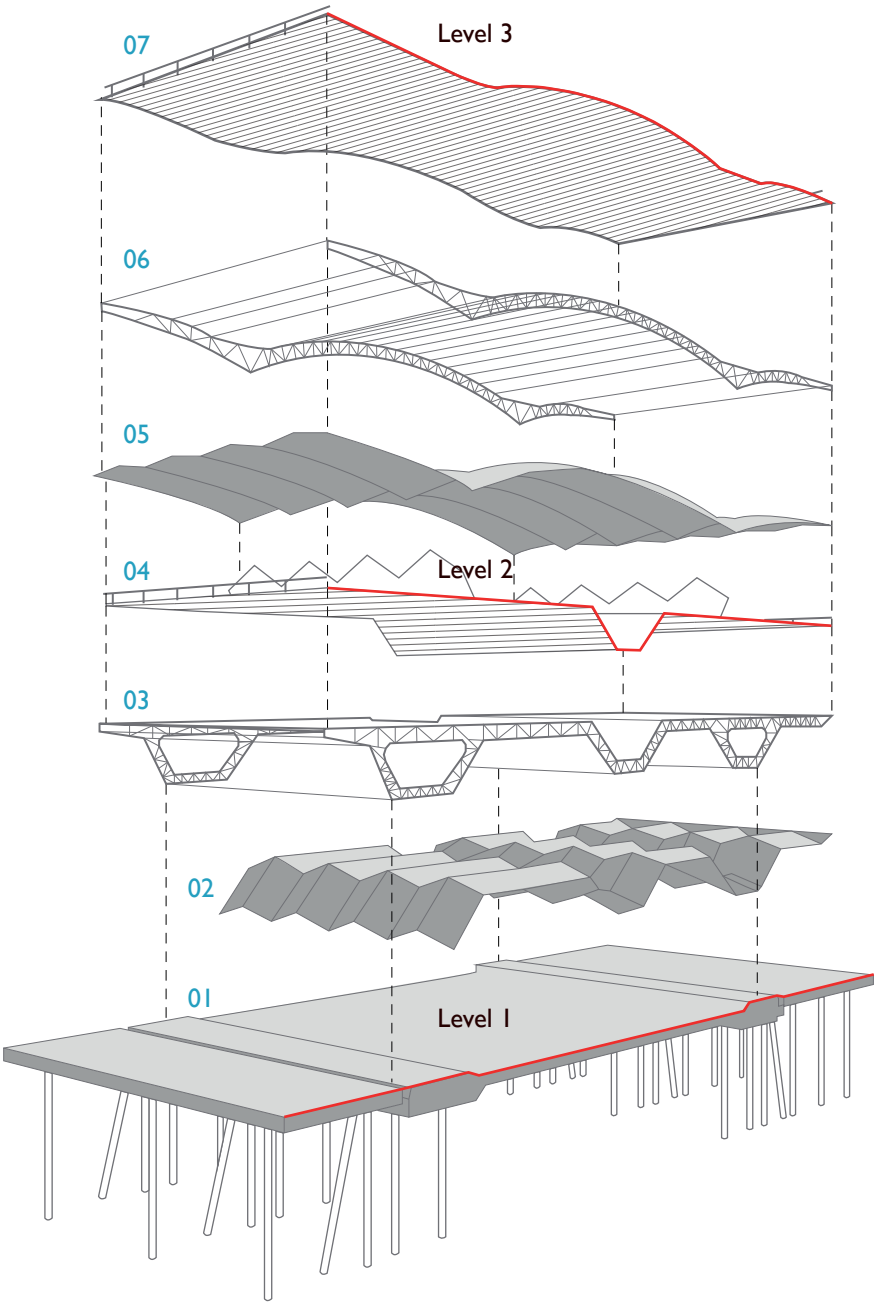
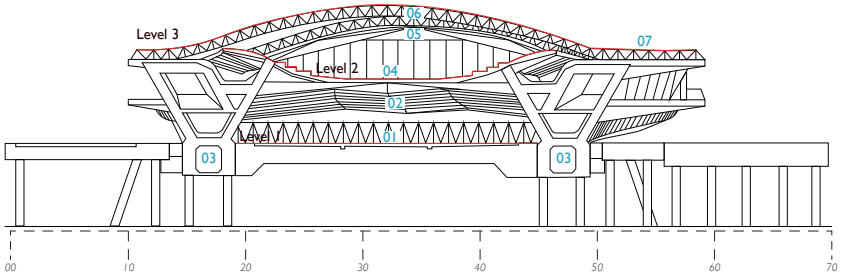


Fig. 29: Yokohama International Port Terminal. Structural Diagram.

01 Reinforced Concrete Slab
02 Concrete Ceiling
03 Steel Trusses
04 Timber Cladding
05 Concrete Ceiling
06 Steel Trusses
07 *Timber Cladding*

Fig. 30: Section



01 Reinforced Concrete Slab
02 Concrete Ceiling
03 Steel Trusses
04 Timber Cladding
05 Concrete Ceiling
06 Steel Trusses
07 *Timber Cladding*

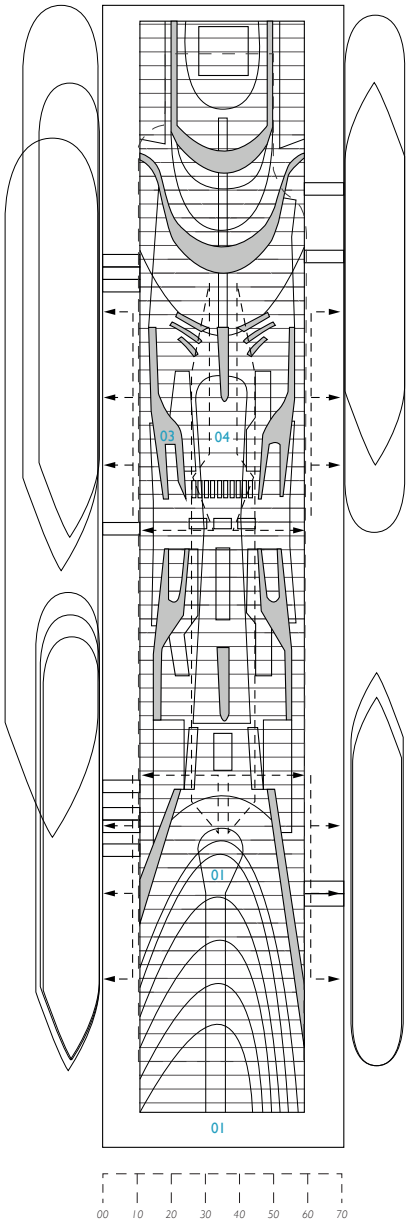
Fig. 31: Level 1 - Passenger Vehicles and Car Parks

Fig. 32: Level 2 - Cruise Terminal

Fig. 33: Level 3 - The timber landscape

Fig. 34: Cruise Passengers and Vehicles arriving and departing.

Fig. 35: Level 2 - Cruise Terminal



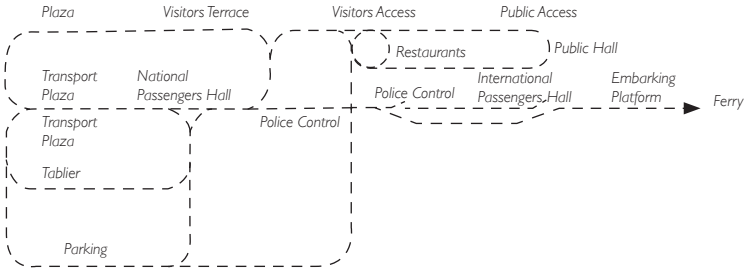


Fig. 36: Circulation Diagram

Landscape Qualities

Access to the building is gained from the top level (level 3) that is an open observation deck rising and falling in wave like oscillations to create pathways and apertures into the vast, enclosed spaces below. All levels are connected with a series of sloping ramps maintaining a continuous flow of circulation from one level to the other. These changes in elevation - sometimes subtle, sometime exaggerated - are the architectural intention of the project. [27]

While the contours of the building occasionally betray an element of randomness, they are in fact generated by a single circulation scheme that dictates spatial organisation. The circulation operates as a continuous looped diagram, directly rejecting any notion of linearity and directionality. Visitors are taken through paths that meander vertically and horizontally before arriving at any destination. For all of the chaotic complexity of the materials and formal gestures, the simplicity of this diagram (fig. 36) offers a sense of clarity and reveals the process from which the building emerged.[28]

The greatest conceptual strength of the project is perhaps it's barrier free and accessible urban landscape. Its height is calculated to achieve continuity with the shore and to ensure that inland views of the waterfront remain unobstructed. Landscape qualities can be identified in the whole length of the building such as cuts, folds, fluidity, junctions of materials and most importantly treatment of surface as a singular plane. The fine line between external and internal spaces, floor and ceiling are the most prominent landscape qualities of the terminal building. [29]

03.3 Case Study 03: Ceramic Landscape

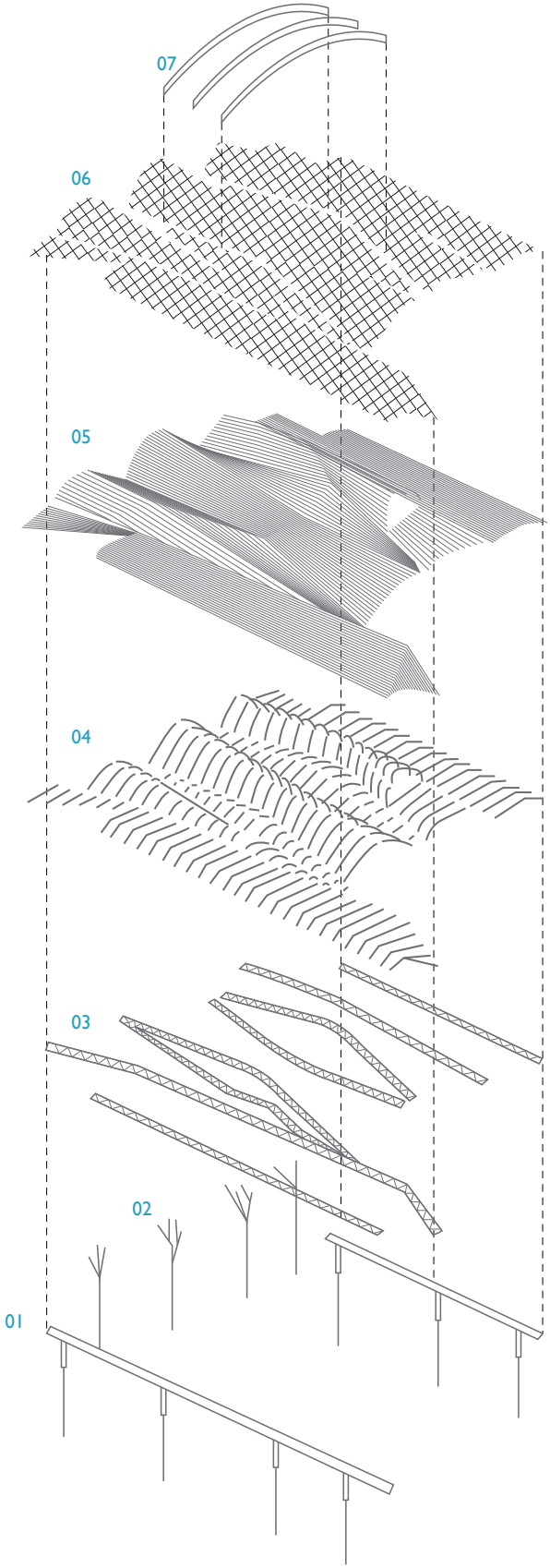
Fig. 37: Santa Caterina Market - Aerial View

Santa Caterina Market designed by EMBT is located in Barcelona, Spain since 2004. It consists of a highly crafted and eccentric roof as an addition to the existing walls over a neoclassical market. The market sits on top of a series of ecclesiastical building below ground. EMBT have exploited the visual effect of this layering in the refurbishment. The contrast of the structure bellow the organic roof makes the new intervention stand out from the surrounding buildings.

Structure

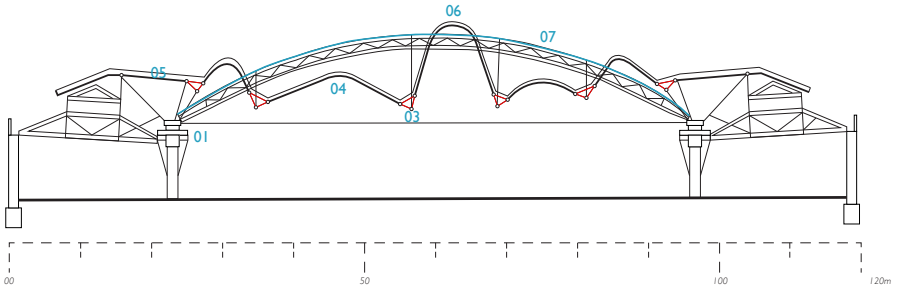
The support at ground level consists of 11 steel columns (fig.38_02), erected directly from the ground. Four curved tubular section columns are located in the main facade while two columns, the lower part made of concrete and the upper part of steel tubes, are relocated at the rear end of the building. The roof rests on two pre-stressed concrete beams (fig.38_01) located on the sides of the building supported by concrete columns and V shaped beams in parallel to the concrete ones. The V shaped beams (fig.38_ 03) are taking advantage of the V shaped zone at the lower edges of the roof and run along as part of the facade of the building. They are distributed in the following way: The two outer beams are parallel to the concrete beams and the four other steel beams change in direction to bend to form a pair of rhombuses. Two beams begin from each of the central columns at the front. One of the two columns at the back of the structure has three beams and the other two. Props are the set of bars that hold the roof, uniting the far steel beams with the lateral concrete beams. The space between the steel beams is completed with wooden arches (fig.38_ 04) that are two-pinned at all spans. The primary and secondary structure host another layer of thin timber boarding (fig.38_05) in a diagonal direction onto which the ceramic tiles are fixed. In addition to the lower structure, three steel arches (fig.38_07) were designed in order to hold the four central beams and are tied at their base. The tension of these cables holds the arches firmly in place. These arches are unique in that they go in and out of the roof.[30]

Fig. 38: Roof Structural Diagram



01 Concrete Beams
02 Steel Columns
03 V Shaped Steel Beams
04 Timber Arches
05 Timber Boards
06 Ceramic Roof Tilling
07 External Steel Arches

Fig. 39: Section



01 Concrete Beams
02 Steel Columns
03 V Shaped Steel Beams
04 Timber Arches
05 Timber Boards
06 Ceramic Roof Tilling
07 External Steel Arches

Fig. 40: Steel Columns

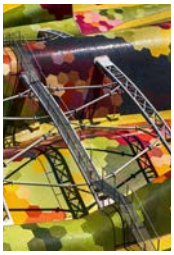


Fig. 41: Ceramic Tiling and External Steel Beams

Fig. 42: Interior View of V shape Beams and Timber beams.

Fig. 43: Roof Plan

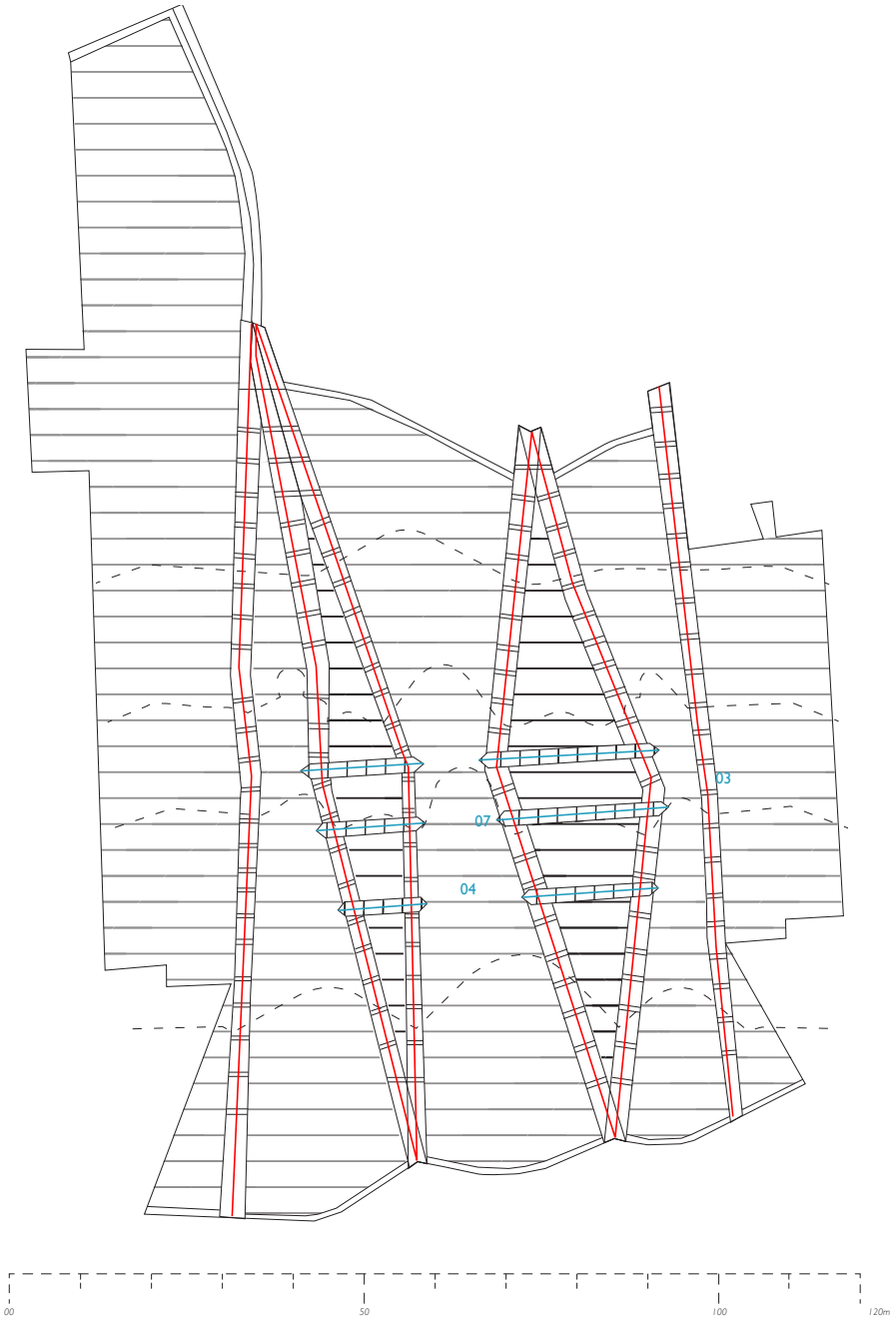


Fig. 44: The market's facade

Landscape Qualities

The main feature of the roof is it's top layer made out of hexagonal ceramic tiles in a large scale non repetitive pattern. Every apartment around the market has a view of the glazed colourful roof like a back garden. This extraordinary pixelated landscape that is raised from the ground creates an unexpected image that has a great impact to the city.

At street level the sharp undulations of the roof are visible as one accesses the market. The roof's three dimensionality emphasises it's fluid quality almost like a floating structure. There is no repetition in it's sectional profile redefining the boundaries of an arched form.[31] The internal view of the roof highlights the contrast between the glazed ceramics and the timbered underside. The timber beams connecting the steel supports appear folded, with slashes of daylight coming in between the folds. Visually and acoustically the underside gives a texture and softness in contrast to the hardness of the roof shell.[32]

03.4 Conclusion

The case study analysis has provided insights into three unique structural systems for the construction of landscape forms in different scales and materiality. All three buildings belong to the public realm and host large groups of users who require to circulate in accessible, open and barrier free spaces. Regardless of the area they occupy, each building has an essence of fluidity along its length. Circulation and arrangement of programmatic elements vary from a single storey learning centre to a three-storey port terminal and an undulating roof, directly relating to their structural systems. Despite the scale difference of each project they have similar spatial qualities of steep slopes, cuts and folds. For instance, Rolex Learning Centre and Yokohama International Port Terminal do not necessarily express a hierarchy of space as they suggest continuity, accessibility and flexibility along their length. In both cases the floor space is formed by a single continuous surface that unfolds to form different floor levels like an expansive continuous ramp. Similarly, the roof of Santa Caterina Market shelters a large open space achieved by the strategically positioned tree like columns that support the intricate roof minimising it's impact with the ground level.

Each structural system suggests an expansive nature along its width and length. Rolex Learning Centre is essentially based on a grid system with irregular undulations based on the scale of the specific site. Its grid could be extended in all directions to create smaller or bigger spaces that host the building's facilities (fig.45). Yokohama International Port terminal is conceived in section whose profile could extend or reduce the length of the structure as it is repeated linearly (fig.46). Santa Caterina Market's primary structure is the set of V shape steel beams (fig.47) that is perhaps more complex and offers the suggestion of a more varied extension. These observations illustrate that each project is overly similar in its direct appropriation of the idea of landscape by using a specific structural system in order to originate their form.

Most significantly, the case studies that have been explored, are contrasting in their materiality and the visual effect they create. Rolex Learning Centre referred to as 'concrete landscape' appears like a monolithic, thick two dimensional extrusion whose materiality is hidden and compressed into a smooth solid surface. Timber cladding in Yokohama's terminal acts in a similar way, aiming to hide the steel structure that supports each level. However, the long thin strips of

timber highlight the surface's movement and almost frame every undulation, fold and cut that occurs along the building's length. 'Timber landscape' can be described as the artistry of timber seams revealing every surface's fluctuation while they are layering the structure. Santa Caterina Market is the most expressive of all three, exposing it's materiality internally and externally. It's external finish of hexagonal ceramic tiles, naturally, produces a repeated pattern. A variation in colour conveys a non uniform pattern emphasising on the singularity of the tile as a small non structural component. Internally, all structural elements are visible, forming an essence of layering and heaviness in comparison to the seemingly light roof shell.

The greatest quality of all three structures is their impact with the city they are located in. Seen from street level, or above, their visual effect is compelling, suggesting accessibility and a direct relationship with the outside. They can be seen as pieces of the city that have successfully merged with their surroundings through their intricate form and unique materiality.

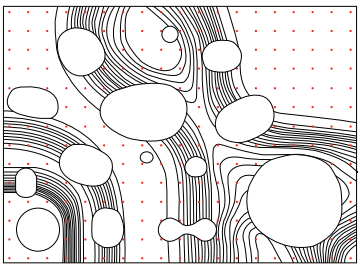
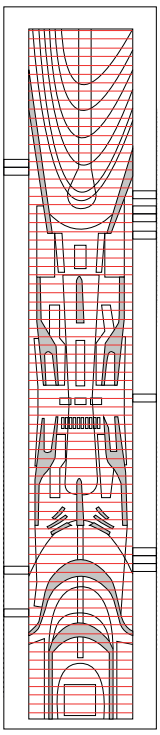


Fig. 45: Grid



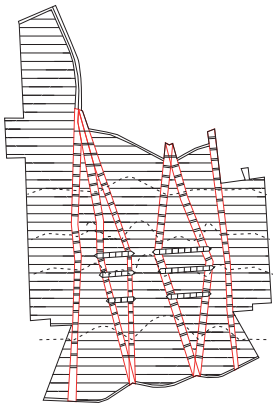


Fig. 46 & 47: Linear Arrangement

04
Proposal


Marseille Cruise Landscape
Roof Plan
Scale_ 1:1000
N
Legend
01_South Terminal Car Park
02_Roof Level Route_Arrivals
03_South Terminal Glazed Roof
04_Passenger Vehicles Departures & Arrivals
05_Bus Station
06_Waterfront Promenades
08_Micro Landscapes
09_North Terminal Car Park
10_North Terminal Glazed Roof
11_Roof Level Route_Arrivals
12_Passenger Vehicles Departures & Arrivals
13_Ceramic Shading Devices
Concrete Roof
Trees
Circular Columns
Timber Decking
Limestone
Green Space
Polished Concrete
Water Features
Terracotta Tiled Roofs of Marseille
Colour Variations

04.01 Concept

Fig. 48: Proposed Masterplan, Marseille

Marseille is characterised by its transiency and cultural diversity seen in its importing and exporting activities that take place in the coast and expand in the mainland. The concept behind the proposed scheme for Marseille has been developed through the experience of the city as a cultural landscape. Architecturally, the city might be thought as a dynamic roofscape consisting of small terracotta tiles, traditional to Marseille. A multiple series of flat planes and sheared surfaces slot into each other, forming a vast fluctuating landscape exposed to all conditions.

The design proposal for the city of Marseille is a cruise boat terminal in the form of a landscape. The site is situated on the historic harbour's edge between the city grid and Marseille's new port, a district that is characterised as a cultural centre. Direct routes lead to the city's central railway station with connections to key surrounding buildings, tourist attractions and the airport. The public promenade extends around the entire edge of the site providing clear views of the city's landmarks and the Mediterranean Sea.

The design of the new terminal is conceived in plan and is based on the circulation routes of cruise passengers and the vehicles entering and leaving the site (fig. 48). Its finishing layer is a field of raised terracotta tiles layering the glazed roof of the proposed structure in order to control direct sunlight entering the spaces below. The choice of this material directly refers to Marseille's image as a tilled roofscape and responds to its specific climate. Naturally, the small scale of tiles will create a rhythm of repetition and density similar to the surrounding cityscape.

The orientation of the proposal is following the cruise boat routes entering the harbour aiming to create a new facade for the historic city. The essence of the proposal is an extension of the city where streets expand and become cuts through a proposed artificial landscape designed for the public. The fine line between the sea and the city is connected by two terminal buildings rising towards the coast. Cruise boats are docked in-between the proposed landscape and the terminal where they can load and unload the passengers from the side and the back towards the terminal facilities. The buildings rise from the mainland to the sea forming a new horizon as one enters the harbour while they frame the urban background.

The design will focus on the proposed roof structure sheltering the south terminal, appropriating it's form and materiality in response to the previous case studies. The proposed materials for the roof are steel structural elements, concrete, glass and terracotta. Part of the structure is accessible from ground level, rising up to a two storey building where the users can circulate and observe the city's surrounding landmarks as well as the boats entering and leaving the harbour.

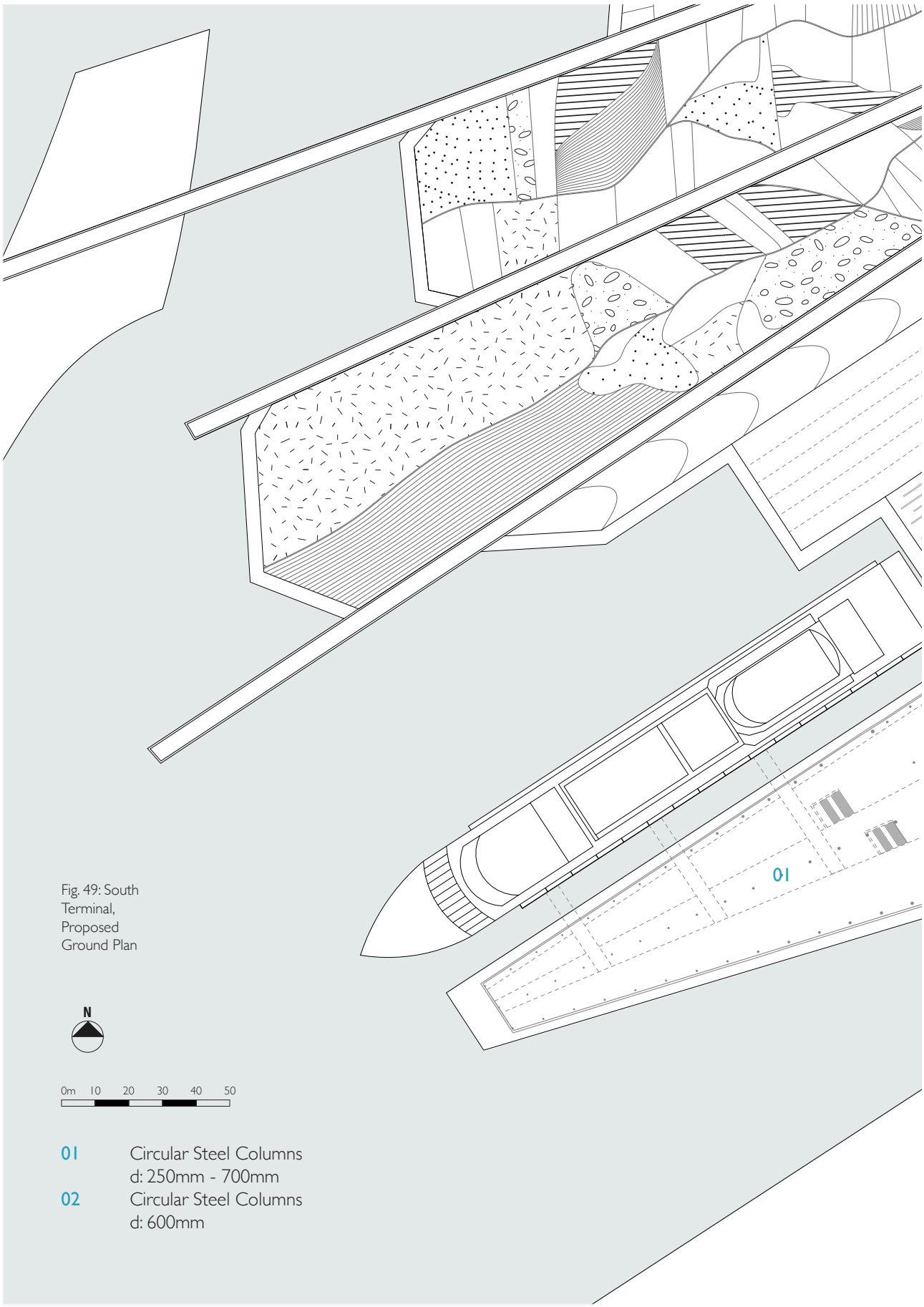
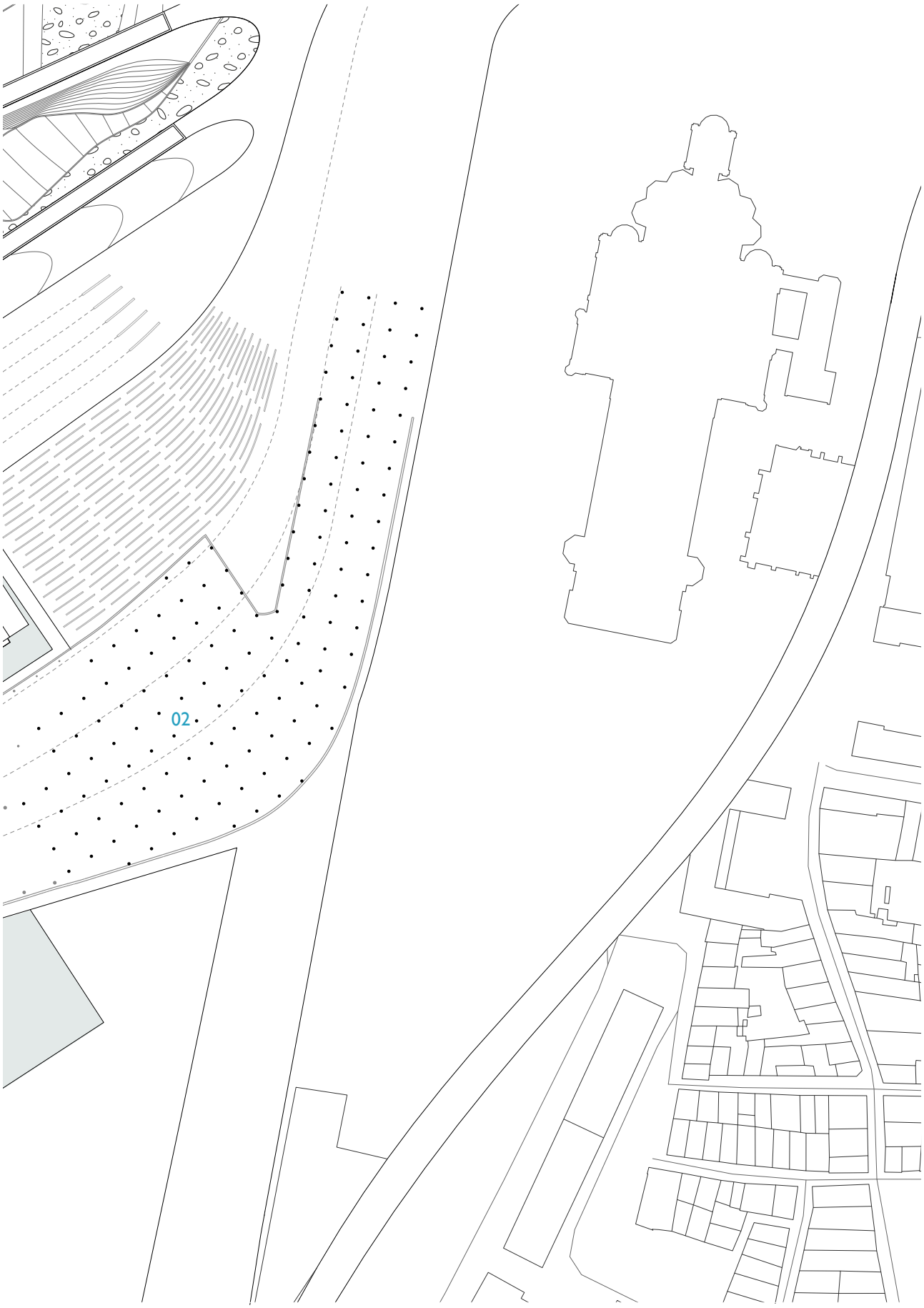


Fig. 49: South Terminal, Proposed Ground Plan

01 Circular Steel Columns
d: 250mm - 700mm

02 Circular Steel Columns
d: 600mm


02

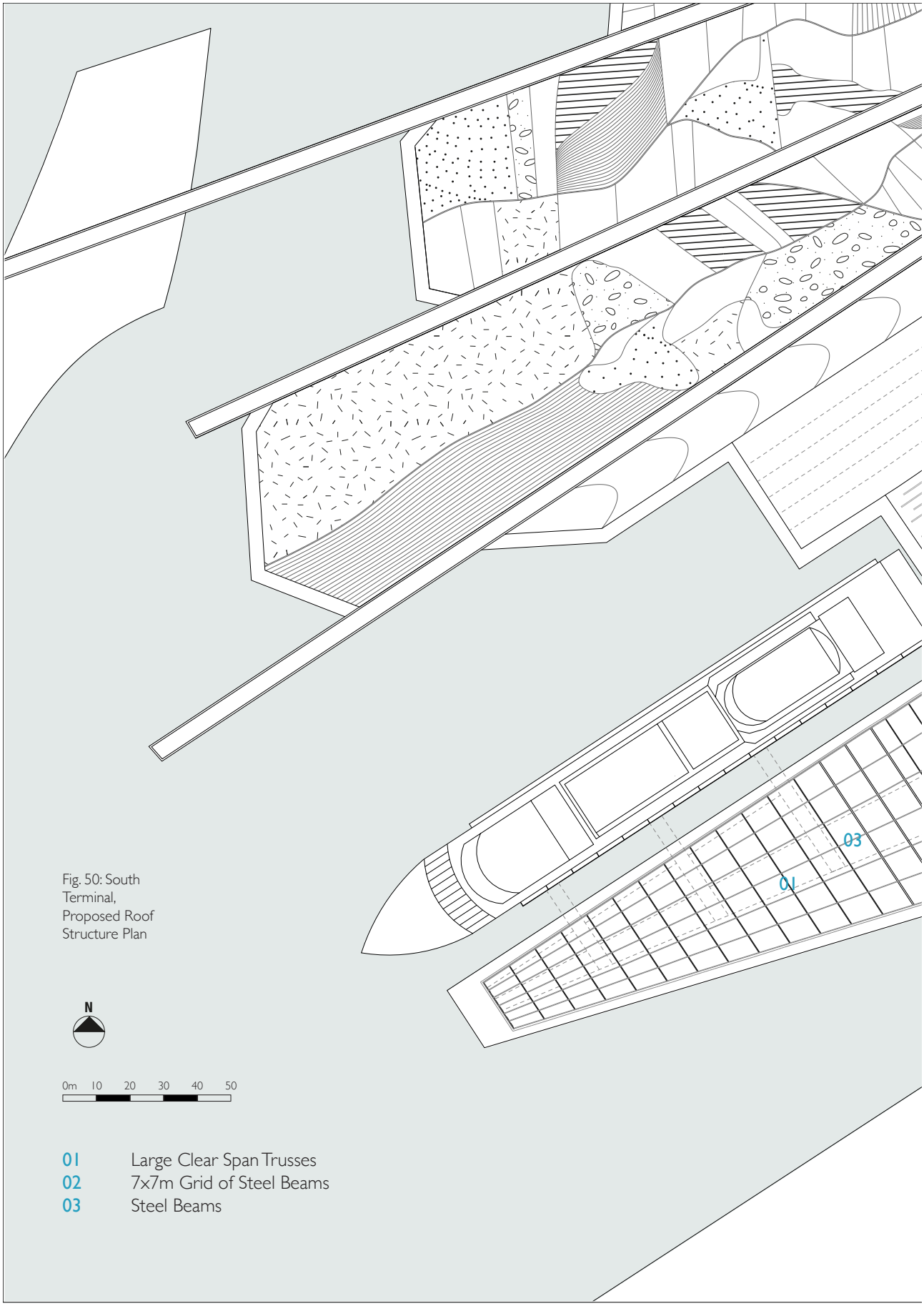
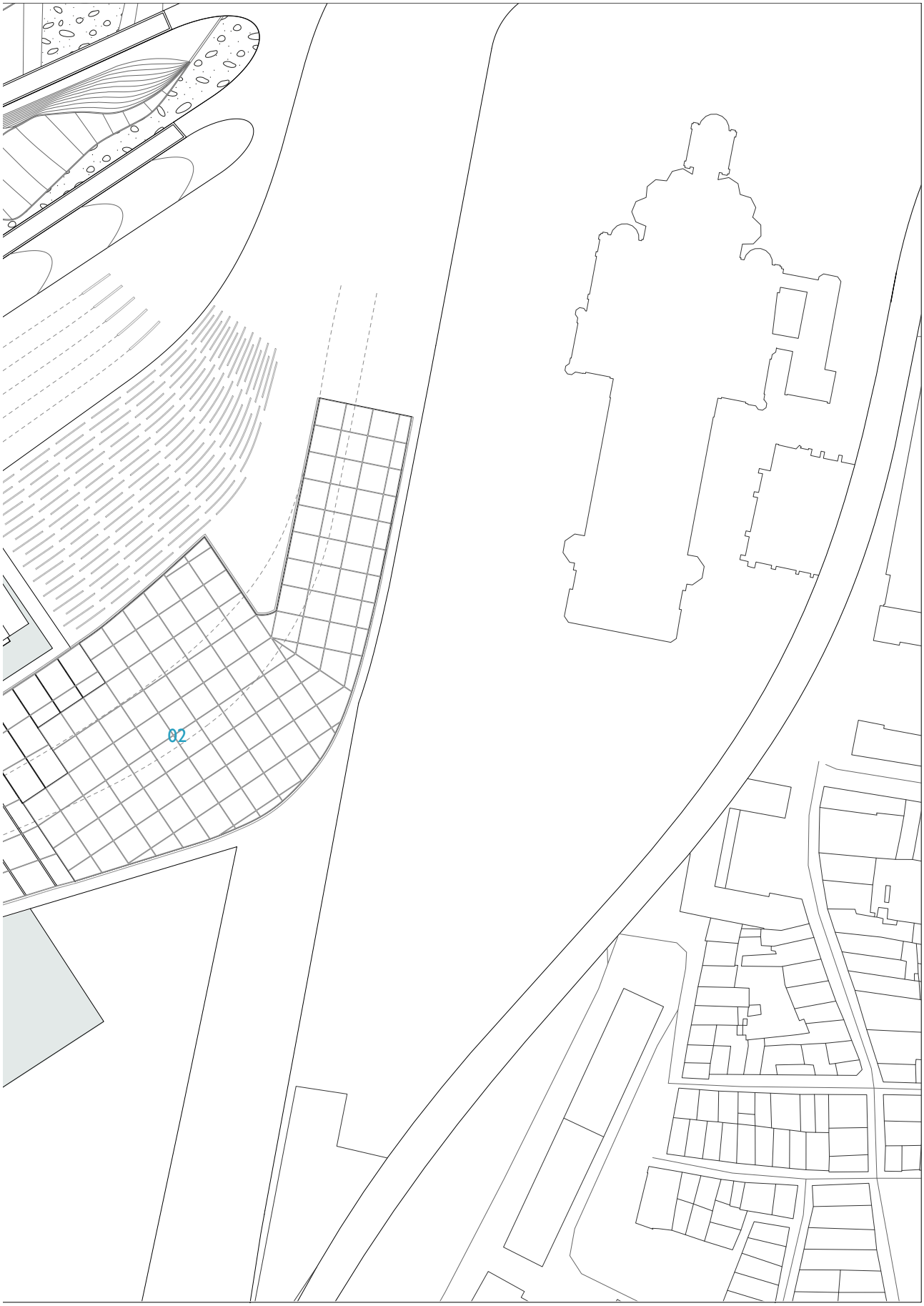


Fig. 50: South Terminal, Proposed Roof Structure Plan

01 Large Clear Span Trusses
02 7x7m Grid of Steel Beams
03 Steel Beams


02

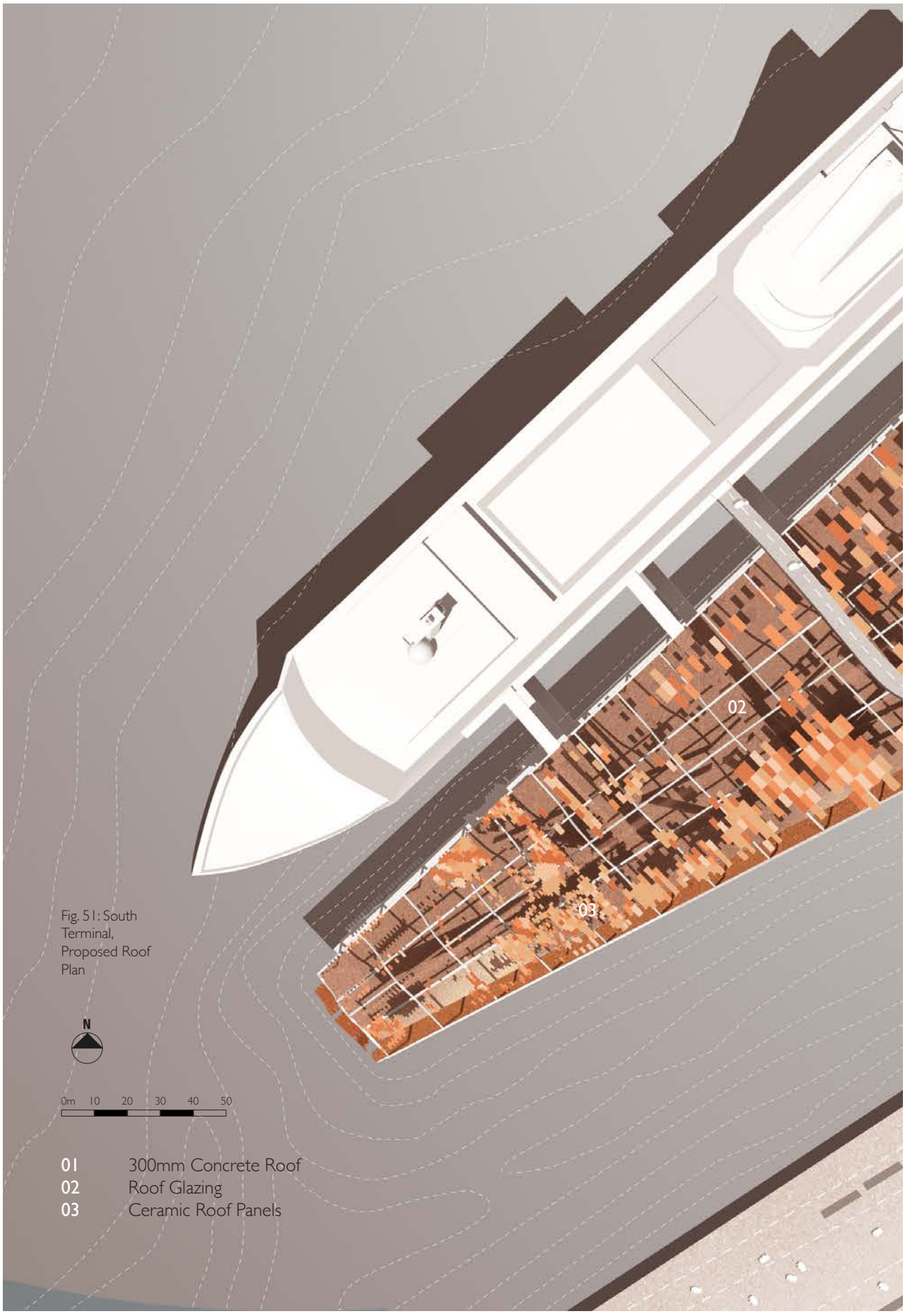


Fig. 51: South Terminal, Proposed Roof Plan

01 300mm Concrete Roof
02 Roof Glazing
03 Ceramic Roof Panels

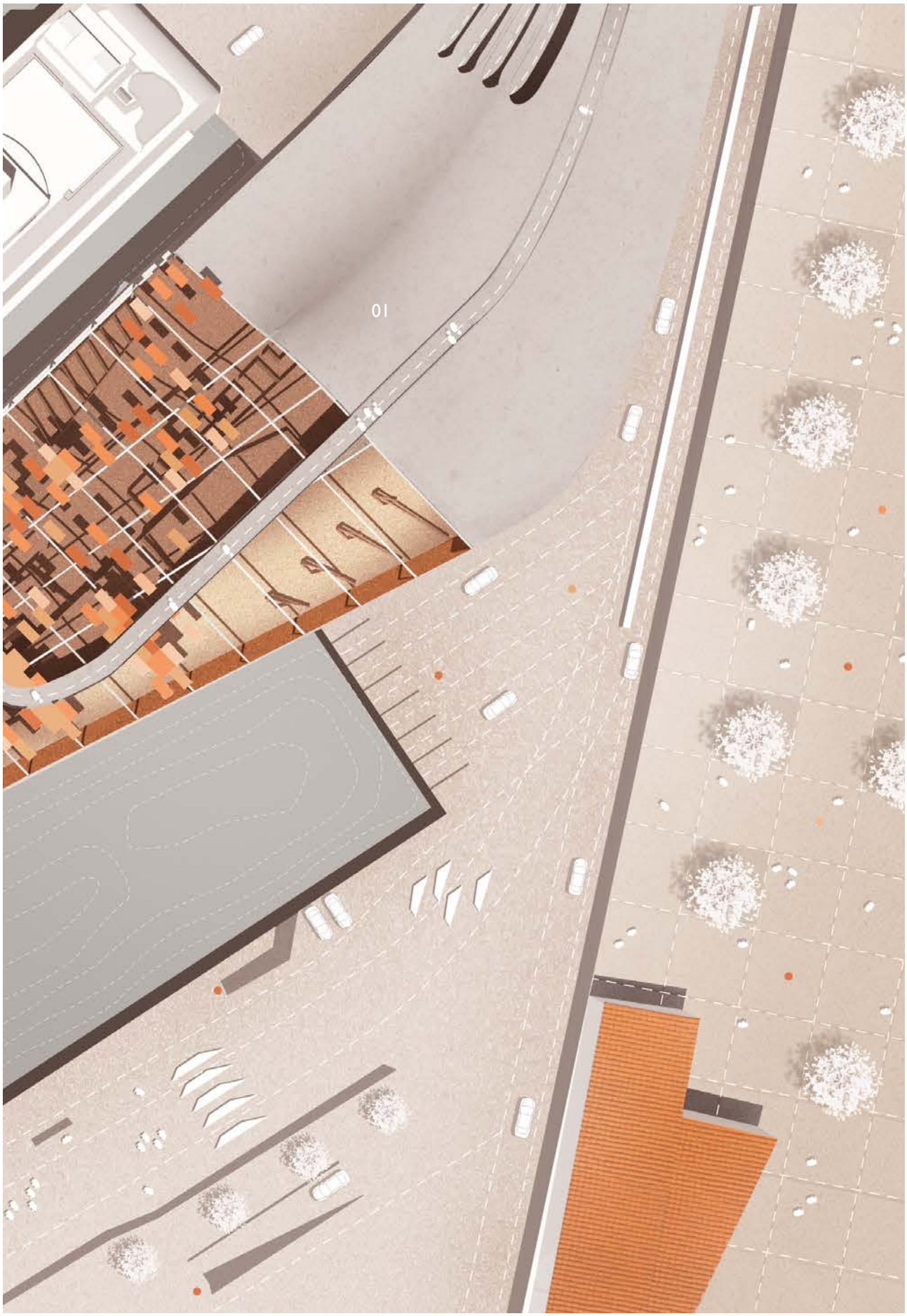
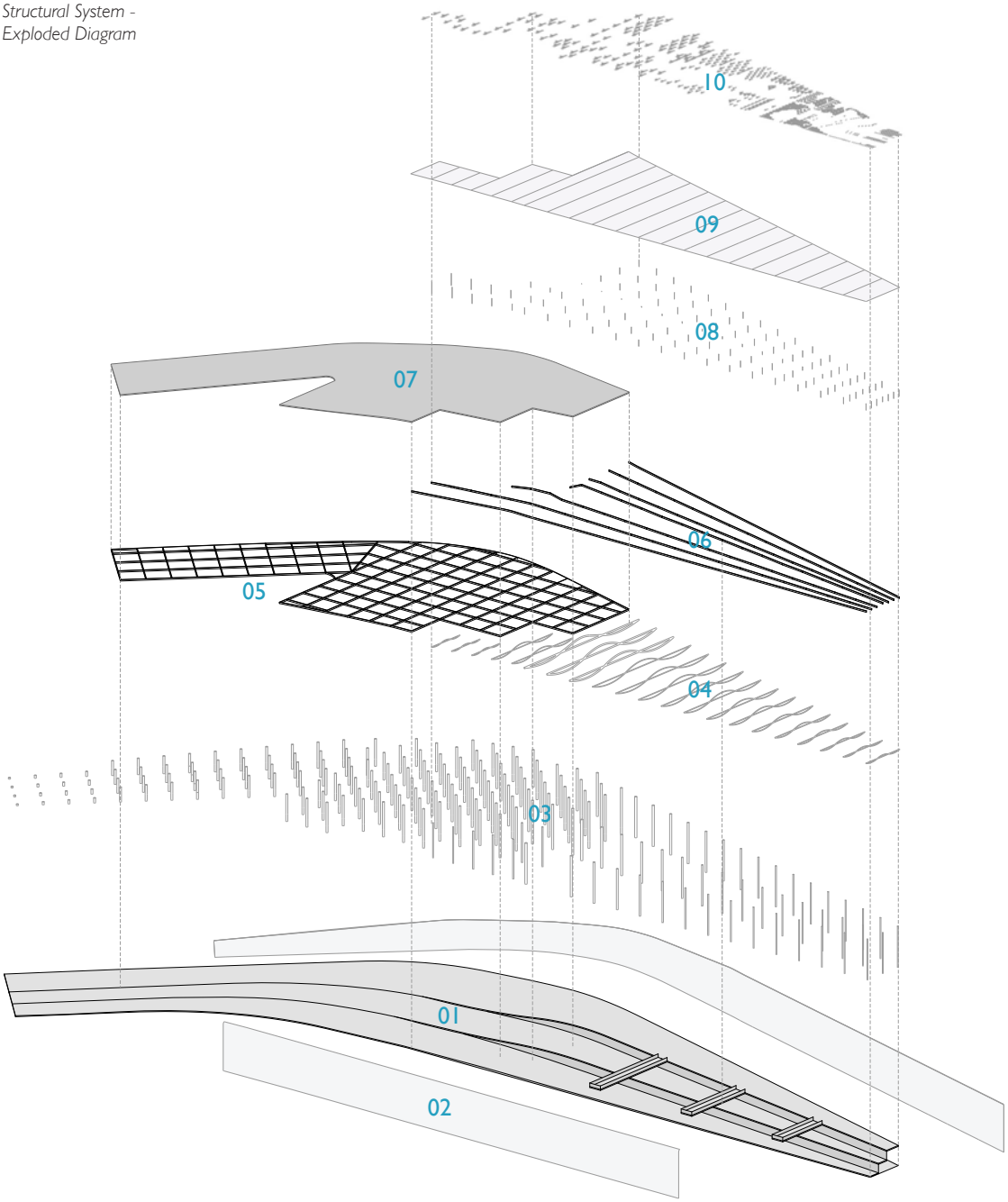

01

Fig. 52: Proposed Structural System - Exploded Diagram



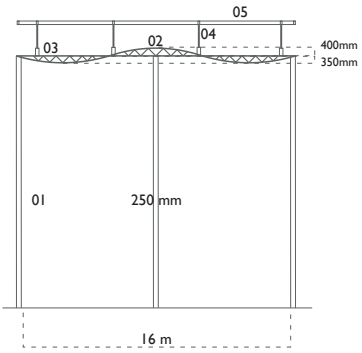
01 Undulating Ground Floor
02 Glazed Facade
03 Circular Steel Columns
04 Large Clear Span Trusses
05 7x7m Grid of Steel Beams
06 Steel Beams
07 300mm Concrete Slab
08 Steel Glazing Supports
09 Roof Glazing
10 Ceramic Roof Panels

04.2 Application of Structural Systems and Materiality

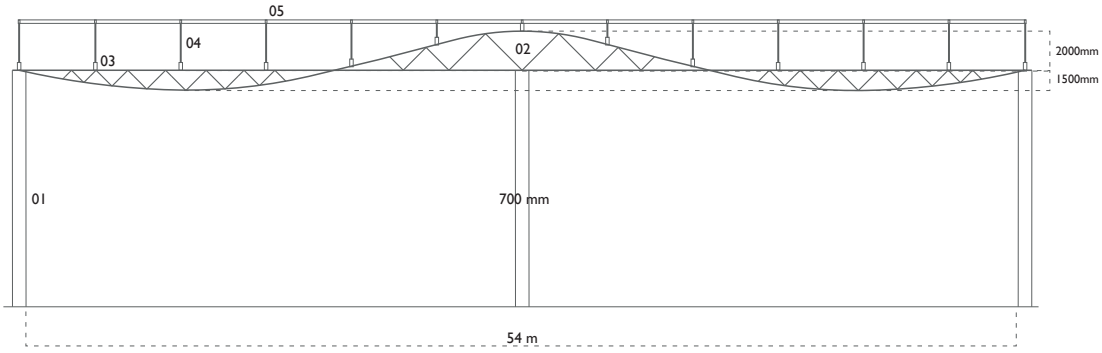
The south terminal is linear in plan with varying spans, running along a 300m maximum length and 70m width. The primary structure in almost half the length of the building consisting of 20 large clear span trusses (fig. 53) ranging from 16m to 54m in excess span and 0.4m to 2m in height respectively. Every truss rests on three circular steel columns, two on the edge and one in the middle (fig.52_03), that vary in their diameter from 0.25m to 0.9m according to the span they support. The steel profiles are completed by 9m long beams that are arranged linearly at a distance of 6m (fig.52_06) from the centre of each truss towards its edges. Thin steel posts (fig.52_08) support the glazed roof panels (fig.52_09) that sit on top of the steel beams and the truss profiles creating a layering of structural elements sheltering arrival and departure areas. Wing shape terracotta tiles are the finishing layer that is raised from the glazed roof, directing intense sunlight that impacts the building, as a response to Marseille's daylight conditions. The rest of the structure that shelters the terminal carpark and bus station is essentially composed of a 7x7m steel grid (fig.52_05), arranged to support a 300mm thin concrete roof slab rising from ground level up to 12m in height (fig.52_07). The grid is held by circular columns of 600mm diameter shaped to provide sufficient space for vehicle circulation.[33]

The roof shelters a two storey terminal building and a single storey car park as a single rising surface. The rising of the structure is continuous from 0m to 12m where it becomes a flat extending surface. Cuts and openings provide minimum head height where the roof frame is almost touching the ground while they suggest an ambiguous condition between the internal and external spaces. Internally, the use of large clear spans result in column-free spaces for maximum circulation and flexible programmatic arrangement.

Fig. 53: Proposed Section, Large Clear Span Trusses, Minimun and Maximum Spans

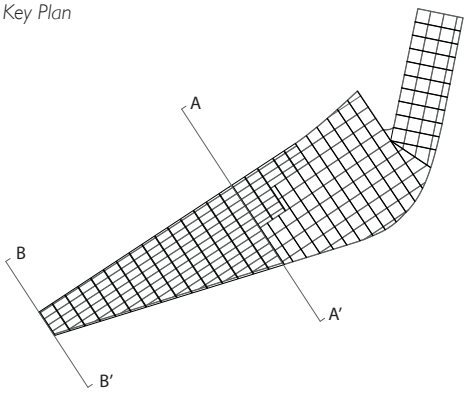


Section BB'



Section AA'

Key Plan



01 Circular Steel Columns
02 Steel Truss Beam - Primary Structure
03 Steel Beam - Secondary Structure
04 Glazing Steel Support
05 Glazing

04.3 Proposed Spatial Qualities

The proposed structural system is a result of understanding the structures analysed in the previous section. Similarities can be identified in the use of same materials such as concrete, steel and ceramics. Access to the proposed south terminal is gained from ground level through the car park and bus station. A thin concrete slab gently rises from the ground to form the roof of the building supported by a steel grid that varies in height to follow the slope of the roofin a similar manner to the structure of Rolex Learning Centre. The rest of the structure, however, resembles the linear arrangement of sectional steel profiles as the ones seen in the roof of Santa Caterina Market. The proposed structure is similarly completed with steel beams arranged to connect the steel trusses. Although the finishing layer of EMBT's roof is a thin layer of small ceramic tiles acting the traditional way, the proposed ceramic panels here are an external layer resting on the glazing panels below in order to shelter the building.

Fig. 52 demonstrates the change in materiality of the roof finish, where concrete meets the glazing, creating a continuous smooth effect. The scale of the proposal can be compared to that of Yokohama International Port Terminal reaching 300m as a curved linear structure. However, it fluctuates in width along its length, thus varying in its sectional profile that is expanding linearly. Similarly to FOA's terminal the proposed structure acts as a roof and as a landscape at the same time. Its top surface is occupiable and only becomes pure roof shelter when materiality transforms and a fine line is created between the occupied space and the roofing. The open continuous concrete plane of the roof suggests access and circulation allowing the user to extend their routes from ground level to roof level without entering the building. Circulation however is limited to certain degree where glazing panels replace the concrete plane as the structure reaches its maximum length towards the sea. A combination of external ceramic louvres attached to the glazing frames and an internal shading system control the amount of direct sun light entering the building.

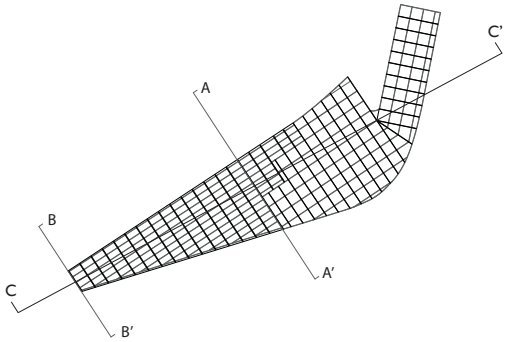
The essence of the proposed structure is a combination of exposing and concealing it's structure. Its concrete surface appears as a single continuous plane that is erected from the ground as an extension of the city while its smooth effect hides the steel structure that lies underneath. In contrast, the glazed part of the roof exposes the structure that its held onto creating an effect of thin layering and lightness almost like a floating transparent plane.

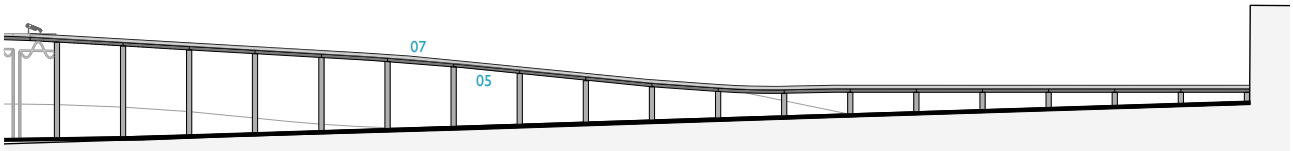
Finally, the terracotta roof panels animate the roof of the building while they create lighting effects according to their orientation along the length of the structure. Internally, the ground level consists of a series of ramps that direct the cruise passengers towards the boats or the city. It is a barrier free space of transparency and exposure. The physical qualities explored are vastness, fluidity and rhythm created by the arrangement of the columns and the terracotta patterns being visible from below.

It's impact with the city is highlighted by the direct connection of the proposed structure and key surrounding locations. Circulation is extended and a gap between the existing cultural area and the rest of the city is eliminated, linking the cityscape with the coast in an organic and accessible way. The proposal can be seen as an extensive piece of Marseille's landscape merged with the city and the waterline. Its intention is to act as a new landmark for the city, a missing piece that frames the coast and encourages the users to circulate and interact with the building.

Fig. 54: Cross Section CC'

01 Undulating Ground Floor
02 Glazed Facade
03 Circular Steel Columns
04 Large Clear Span Trusses
05 7x7m Grid of Steel Beams
06 Steel Beams
07 300mm Concrete Slab
08 Steel Glazing Supports
09 Roof Glazing
10 Ceramic Roof Panels




07
05

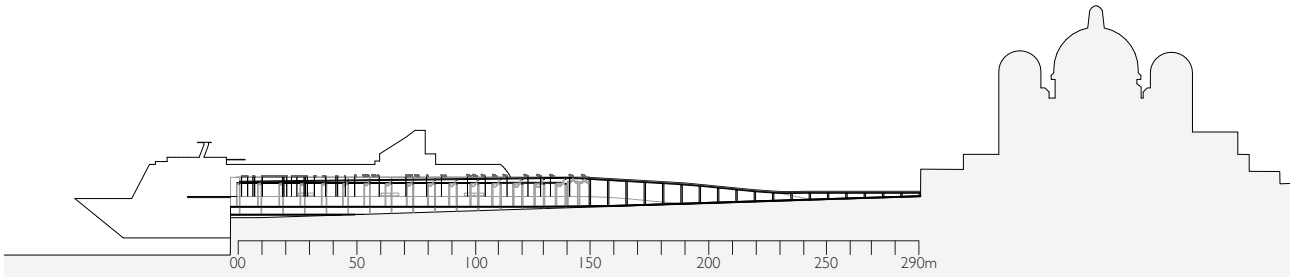
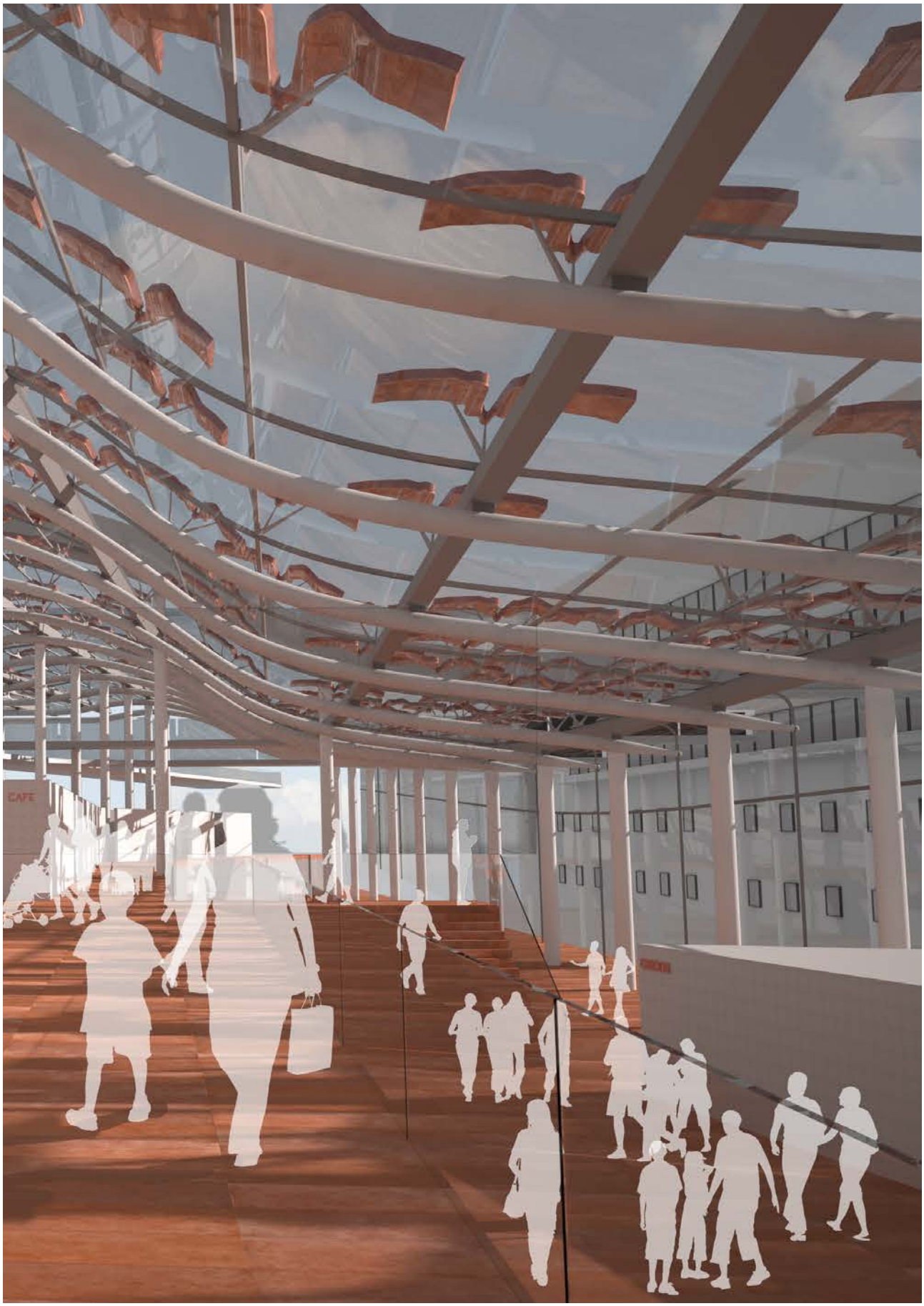

00
50
100
150
200
250
290m

Fig. 55: Interior View


CAFE

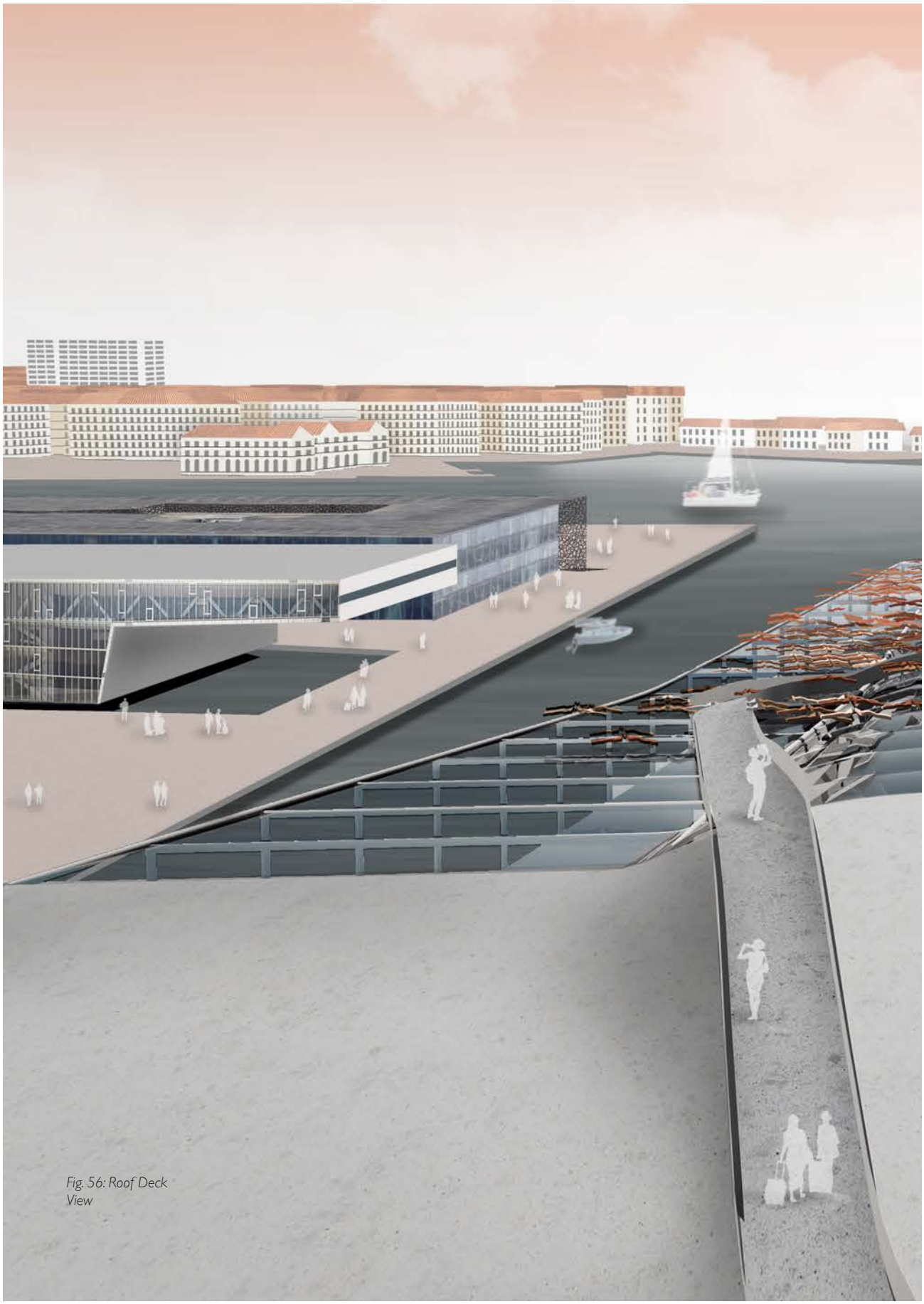


Fig. 56: Roof Deck View

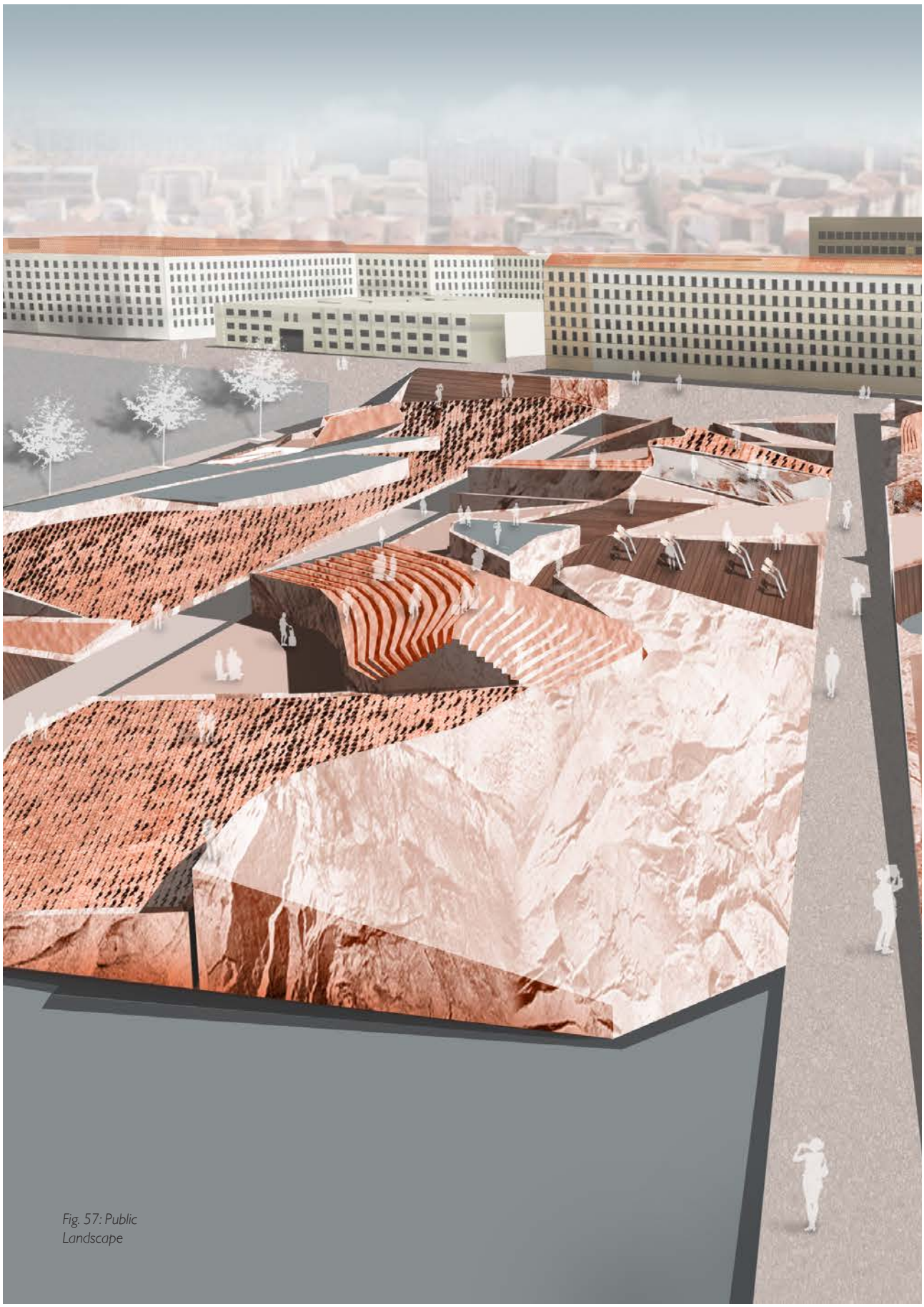
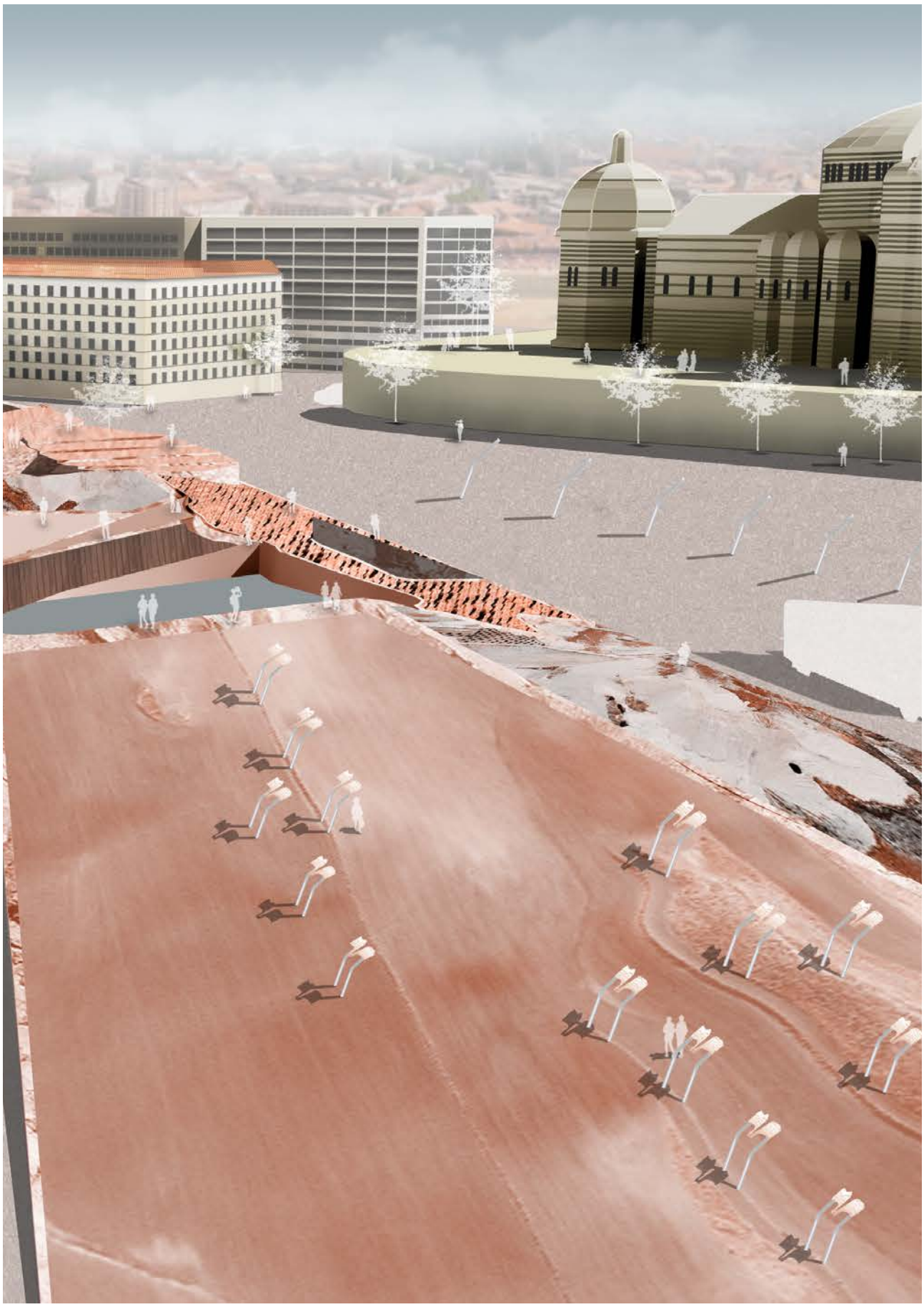


Fig. 57: Public Landscape



05

Conclusion

05 Conclusion

Our experience, intepretation of landscape and how it relates to architecture, encompasses a broad expanse of enquiry. Within this thesis, an attempt has been made to demonstrate how landscape's physical qualities can be translated into a certain architectural language today. Landscape as an architectural space has moved forward from its conception to manufacturing such spaces with the help of modern technology in design processes and building contrsuction. This thesis has focused more on physical examples of such structures as a response to theoretical approaches that define the term landscape.

Marseille provided a case study to validate the theoretical study. The exploration of three structures, produced in 21st century, discovered how different materials and unique structural systems can display landscape qualities, which in turn influence the built environment.

In the longer term, buildings that act as landscapes can be seen as effective as monuments, because their meanings are multiple and change with the user. Architecture as landscape simultaneously becomes more intensely focused and more abstract. The spaces carrying such qualities offer both extensive detail and vastness of space. They function simultaneously as foreground, middle ground, and background, becoming less demanding and more accessible. Users might find themselves in expanding and contracting spaces formed by simultaneously large and intimate enclosures.

Architecture as landscape is fundamentally an active, creative experience. Each person experiences landscape as a vehicle for their own thoughts, aspirations, functions, styles - so that landscape, architecture, and the person come together in a mutually defining process. Architecture is the agent that allows this experience to be realised and shifts in technology will continue to have an effect how landscape becomes manifested as an architectural space.

06 Figures

Figure_01: www.lib.utexas.edu/maps/ams/france_100k/ (accessed 29/03/16)
Figure_02: www.tate.org.uk/art/artworks/siberechts (accessed 27/04/16)
Figure_03: Author's own
Figure_04: Author (ed) www. ryokoudesune.wordpress.com (accessed 23/12/15)
Figure_05: Author's own
Figure_06: Author (ed) www.blog.flickr.net/en/2015/05/14/eric-fischers-marvelous-maps/ (accessed 01/10/15)
Figure_07: Author's own
Figure_08: Author's own
Figure_09: Author's own
Figure_10: Author's own
Figure_11: Author's own
Figure_12: www.mashable.com/2014/05/29/google-night-walk/#aNV66E9ZK8qz (accessed 03/01/16)
Figure_13: www.myinterestingfacts.com/marseille-facts/ (accessed 03/01/16)
Figure_14: www.vice.com/fr/read/pourquoi-marseille-est-la-plus-belle-ville-de-france-578 (accessed 04/01/16)
Figure_15: www.travelwithintent.com/2013/07/25/rooftops-of-marseille/ (accessed 04/01/16)
Figure_16: www.beiler-schlehaider.com/start.html (accessed 04/01/16)
Figure_17: www.clasf.co.za/q/coronation-roof-tiles-sale/ (accessed 04/01/16)
Figure_16: www.beiler-schlehaider.com/start.html (accessed 04/01/16) Figure_17: www.clasf.co.za/q/coronation-roof-tiles-sale/ (accessed 04/01/16)
Figure_18: www.nguoinoitieng.vn/ (accessed 03/03/16)
Figure_19: www.pinterest.com/pin/63050463505562009/ (accessed 15/02/16)
Figure_20: Cecil F. and Levene R. (eds) (2011) Sanaa (Sejima + Nishizawa): Inorganic Architecture
Figure_21: www.pinterest.com/pin/546905948473363241/ (accessed 13/01/16)
Figure_22: www.pinterest.com/pin/395402042261293626/ (accessed 15/03/16)
Figure_23: www.pinterest.com/pin/516717757227396253/(accessed 15/03/16)
Figure_24: www.urbanarchnow.com/2012/12/sanaarolex.html?view=snapshot (accessed 13/01/16)
Figure_25: www.diegoval494.wordpress.com/2011/11/07/rolex-learning-center—sanaa/1/ (accessed 20/03/16)
Figure_26: www.archidiap.com/opera/rolex-learning-center/ (accessed 20/03/16)
Figure_27: everplaces.com/liquidx/places/5ab20cd8ce7f4f948aa8948a55fc76e0/ (accessed 12/03/16)
Figure_28: www.archdaily.com/554132/ad-classics-yokohama-international-passenger-terminal-foreign-office-architects-foa(accessed 12/03/16)
Figure_29: www.archdaily.com/554132/ad-classics-yokohama-international-passenger-terminal-foreign-office-architects-foa(accessed 12/03/16)
Figure_30: ibid
Figure_31: ibid
Figure_32: www.archdaily.com/554132/ad-classics-yokohama-international-passenger-terminal-foreign-office-architects-foa(accessed 12/03/16)
Figure_33: www.archdaily.com/554132/ad-classics-yokohama-international-passenger-terminal-foreign-office-architects-foa(accessed 12/03/16)
Figure_34: www.archdaily.com/554132/ad-classics-yokohama-international-passenger-terminal-foreign-office-architects-foa(accessed 12/03/16)
Figure_35: www.archdaily.com/554132/ad-classics-yokohama-international-passenger-terminal-foreign-office-architects-foa(accessed 12/03/16)
Figure_36: www.archdaily.com/554132/ad-classics-yokohama-international-passenger-terminal-foreign-office-architects-foa(accessed 12/03/16)
Figure_37: www. googlemaps.com (accessed 12/04/16)
Figure_38: www.mirallestagliabue.com/project.asp?id=59(accessed 14/03/16)
Figure_39: www.mirallestagliabue.com/project.asp?id=59(accessed 14/03/16)
Figure_40: www.bdonline.co.uk/alex-mowats-inspiration-santa-caterina-market-by-embt/5061579.article (accessed 14/03/16)

Figure_41: www.behance.net/gallery/8947237/Santa-Caterina-Market(accessed 14/03/16)
Figure_42: www.mirallestagliabue.com/project.asp?id=59(accessed 14/03/16)
Figure_43: www.mirallestagliabue.com/project.asp?id=59(accessed 14/03/16)
Figure_44: www.ladiesdrive.tv/portfolio/architekturtrends-2012/(accessed 20/03/16)
Figure_45: www.diegoval494.wordpress.com/2011/11/07/rolex-learning-center—-sanaa/1/ (accessed 20/03/16)
Figure_46: www.archdaily.com/554132/ad-classics-yokohama-international-passenger-terminal-foreign-office-architects-foa(accessed 12/03/16)
Figure_47: www.mirallestagliabue.com/project.asp?id=59(accessed 14/03/16)
Figure_48- 57: Author's own

07 Notes

1 Beeler, Landscape, 4
2 Gausa, The Metropolis Dictionary of Advanced Architecture, 390
3 ibid, 387
4 Corner, Landscape Transformed, 10
5 ibid
6 ibid
7 ibid, 12
8 ibid
9 Harvey and Fieldhouse, The Cultured Landscape, 8
10 Vogt, Landscape as a Cabinet of Curiosities, 11
11 Harvey and Fieldhouse, The Cultured Landscape, 24
12 Spens, Landscape Transformed, 8
13 ibid
14 Gausa, The Metropolis Dictionary of Advanced Architecture, 387
15 ibid
16 ibid
17 ibid
18 ibid
19 ibid
20 ibid
21 www.e-architect.co.uk/switzerland/rolex-learning-center-building, (accessed 20/03/16)
22 Cecil and Levene, Sanaa: Inorganic Architecture, 48
23 ibid
24 ibid
25 www.farshidmoussavi.com/node/15#yokohama_international_port_terminal_yokohama_japan_15_68 (accessed 12/03/16)
26 www.archdaily.com/554132/ad-classics-yokohama-international-passenger-terminal-foreign-office-architects-foa (accessed 15/03/16)
27 ibid
28 ibid
29 ibid
30 Velasco, J.M. , Tubular Structures XI, 42
31 www.bdonline.co.uk/alex-mowats-inspiration-santa-caterina-market-by-embt/5061579.article (accessed 12/03/16)
32 ibid
33 Gerrard, J. (2016) Interview between the author and structural engineer John Gerrard (20 April 2016)

08
Bibliography

08 Bibliography

Books

Andrews, R. and Beardsley, J. (eds.) (2006) Maya Lim: Systematic Landscapes, New Haven: Yale University Press

Beemer, R.L., (1985) Landscape, New Jersey: Princeton Architectural Press

Cecil F. and Levene R. (eds) (2011) Sanaa (Sejima + Nishizawa): Inorganic Architecture, N.155, Madrid: El Croquis

Corner, J. (1996) ' The Obscene (American) Landscape', in M. Spens (ed.) Landscape Transformed, London: Academy Editions: 10-13

Cros, S. (ed.) (2000) The Metropolis Dictionary of Advanced Architecture, Barcelona: Actar

Gausa, M. (2000) 'Land-arch', in S. Cros (ed.) The Metropolis Dictionary of Advanced Architecture, Barcelona: Actar: 379

Gausa, M. (2000) 'Land links', in S. Cros (ed.) The Metropolis Dictionary of Advanced Architecture, Barcelona: Actar: 380

Gausa, M. (2000) 'Landscape/Architecture/Urbanism', in S. Cros (ed.) The Metropolis Dictionary of Advanced Architecture, Barcelona: Actar: 382

Gausa, M. (2000) 'Lands in lands', in S. Cros (ed.) The Metropolis Dictionary of Advanced Architecture, Barcelona: Actar: 387

Gausa, M. (2000) 'Land strategy', in S. Cros (ed.) The Metropolis Dictionary of Advanced Architecture, Barcelona: Actar: 390

Harvey, S. and Fieldhouse, K. (eds) (2005) The Cultured Landscape, Oxon: Routledge

Moussavi, F. (2015) The Function of Form, Barcelona: Actar

Parikka, J. (2014) A Geology of Media, Minneapolis: University of Minnesota Press

Pierce, C. (ed.) (2013) Ceramica Cumella: Shaping Ideas, Madrid: Fundacion Metropoli

Roland, C. (1965) Frei Otto: Structures, London: Longman Group

Spens, M. (ed.) (1996) Landscape Transformed, London: Academy Editions

Velasco, J.M. (2006) 'Roof of Santa Caterina Market in Barcelona', in Packer, J. and Willib-and, S. (eds), Tubular Structures XI, London: Taylor & Francis: 39-44

Vogt, G. (2015) Landscape as a Cabinet of Curiosities, Zurich: Lars Muller Publishers

Websites

www.archdaily.com
www.architectural-review.com
www.arcspace.com
www.bdonline.co.uk
www.behance.net
www.big.or.jp
www.ceramicarchitectures.com
www.designboom.com
www.e-architect.co.uk
www.flickr.com
www.issuu.com/
www.mirallestagliabue.com
www.pinterest.com
www.lib.utexas.edu
www. ryokoudesune.wordpress.com
www.blog.flickr.net
www.mashable.com
www.myinterestingfacts.com
www.vice.com
www.travelwithintent.com
www.beiler-schlehaider.com
www.nguoinoitieng.vn
www.diegoval494.wordpress.com
www.archidiap.com
www. googlemaps.com

8,347 words