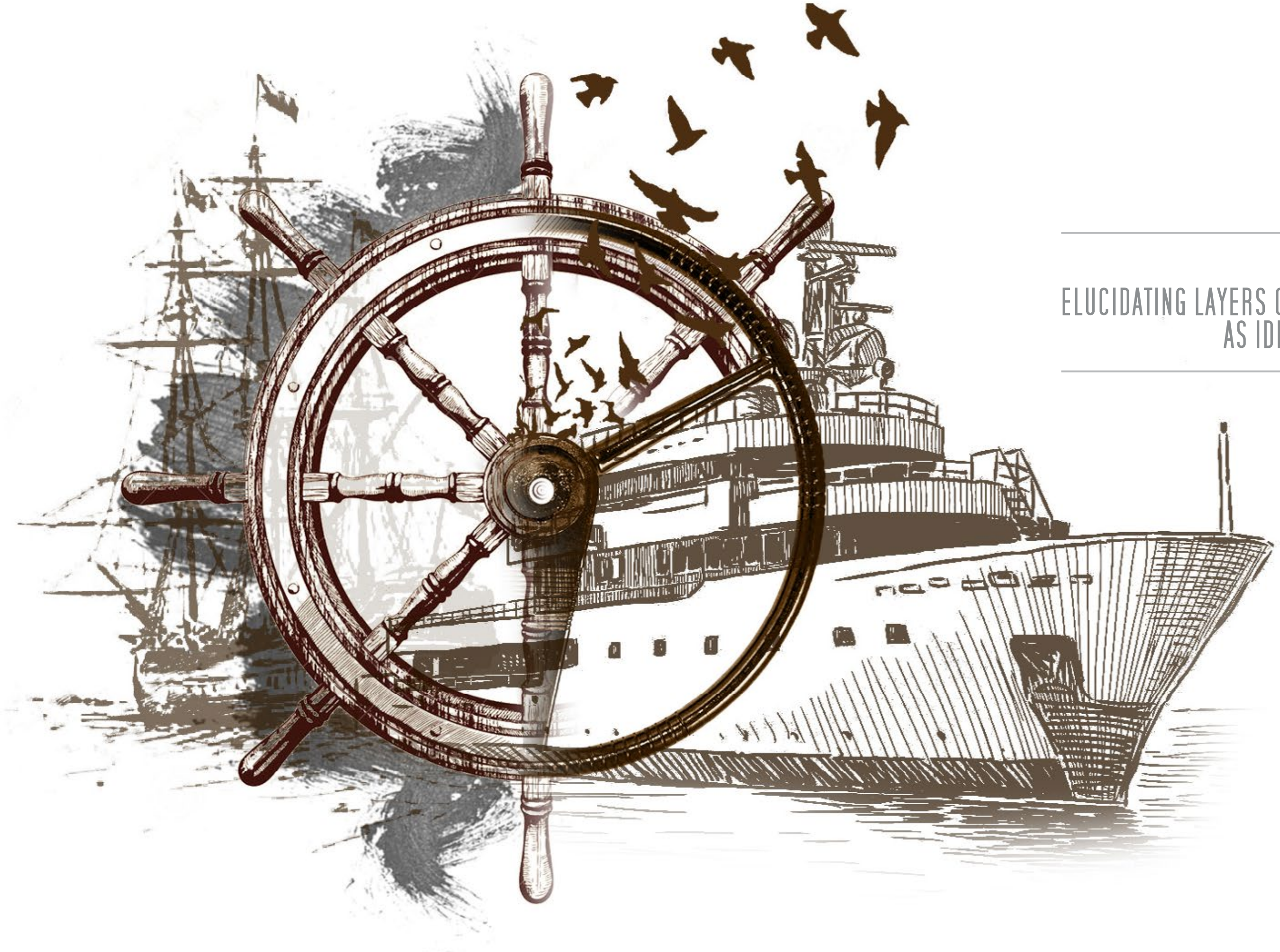

2016

FROM A SAILING CONVEY TO A DOCKED BREWERY:
ELUCIDATING LAYERS OF TIME AND ADAPTABILITY USING THE SS NOMADIC AS IDEAL ARCHETYPE AND ROBINSON DRY DOCK AS HOST

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Submitted in partial fulfilment of the requirements for the degree Magister in Interior Architecture (Professional) in the Department of Architecture, Faculty of Engineering, Built Environment and Information Technology

University of Pretoria
Department of Architecture
October 2016

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DECLARATION

In accordance with Regulation 4(e) of the General Regulations (G.57) for dissertations and theses, I declare that this thesis, which I hereby submit for the degree Master of Interior Architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of my thesis has already been, or is currently being, submitted for any such degree, diploma or other qualification.

I further declare that this thesis is substantially my own work. Where reference is made to the works of others, the extent to which that work has been used is indicated and fully acknowledged in the text and list of references.

Armand Anton Meyer

PROJECT SUMMARY

FULL DISSERTATION TITLE:
From a sailing convey to a docked brewery: Elucidating layers of time and adaptability using the SS Nomadic as ideal archetype and Robinson dry dock as host.

SUBMITTED BY:
Armand Anton Meyer (10026305)

STUDY LEADER:
Prof. Barbara Jekot

COURSE COORDINATOR:
Prof. Arthur Barker

DEGREE:
Master of Interior Architecture (Professional)

UNIVERSITY:
University of Pretoria
Department of Architecture

FACULTY:
Faculty of Engineering, Built Environment
and Information Technology

PROPOSED PROGRAMME:
Saltwater Desalination Craft Beer Microbrewery,
Craft Market and Exhibition Space

LOCATION AND STRUCTURE:
Robinson Dry Dock, V&A Waterfront, Cape Town
and Steamship (SS) Nomadic

RESEARCH FIELD:
Environmental Potential and
Heritage and Cultural Landscapes

APPRECIATIONS

- THANK YOU -

MY CREATOR
for being the architect of all architects

MOM, DAD & TWIN SISTER
for your support, love and work ethic which inspired my foundations

BARBARA
for your esteemed assistance, treasured defense and brilliant mentorship

RETHA
for your continuous encouragement and frequent phone calls

ANZÉ & ANNELIZE
for your valued friendship, keen interest and loving reassurance

RIAAN & CHARLOTTE
for your unceasing mentorship, inspiring suggestions and unending interest

JD & WILNA
for your constant reinforcement and enduring motivation

TANTE SARINA
for your love, assistance and being

LEANDRA & LEANI
for we will always be the children of Professor Jekot

ESKERP

Ontelbare eeue het verby geseil sedert die mensdom 'n reismetode ontwikkel het wat hul in staat sou stel om uitgestrekte oseane, wat onontdekte kontinente verdeel, te verken. Soos opgeteken deur Le Corbusier, was hierdie lynbote beskou as 'n **kordaatstuk vir ingenieurswese in die 20ste eeu**, aangesien die ontwerp daarvan getuig van **toegeeflikheid en gasvryheid**. Omdat die gemiddelde leeftyd van 'n kommersiële boot 25 jaar is, het die skeepindustrie 'n punt bereik waar heelwat **skepe onaktief verklaar** is. As hierdie werktuie oorspronklik bedoel was om funksioneel sowel as aantreklik van aard te wees, waarom dit dan **reduseer tot 'n hoop skrootmetaal** as dit vir 'n ander **doel op land aangewend kan word?**

Ten einde so 'n poging te implementeer, moes 'n onaktiewe boot, tesame met 'n gepaste ligging vir die dok daarvan, voorgestel word. Die keuse van **Robinson Droogdok as gasheer** en die **SS Nomadic as inwoner**, laat ruimte vir 'n omgewings-vriendelike produk waarin die moontlikheid van **kleinhandel en fasiliteite vir vermaak,** voorkeur geniet. Teenoor die blote ingesteldheid van 'n **erfenis-aanslag**, is die **byvoeging van 'n nuwe laag voorgestel**, wat ruimte laat vir dit wat in die verlede gevestig is, sowel as toekomstige byvoeging – dus 'n **palimpses van ontwerp** in terme van 'n programmatiese oplossing en **materialiteit.**

Soos wat die ruimtelike en struktuele formasie van werktuie hoofsaaklik afhanklik is van **staal** en die konstruksie van 'n dok uit **beton**, sal hierdie materiale deeglik en omvattend ondersoek word in terme van hul kwesbaarheid wat degradering betref. Voorgestelde maniere om hierdie materiale te ondersoek en te toets, sal **beskerming teen roes**, asook **historiese verval** en **doelbewuste oksidasie**-tegnieke insluit, wat moontlik die grondslag kan lê vir potensiële ontwerp implementering. Die uitkoms kan die idee bevorder dat **verval en agteruitgang kan bydra tot argitektuele verfraaiing**, eerder as om 'n blote entiteit vir intimidasie te wees. Hierdie idee word verder bevorder deur die 'n **mikro-brouery** by te voeg, wat die glorie van oudword beklemtoon.

Eerder as om skeepsloping en blote vernietiging voor te staan, sal **argitektuele verandering**, soos uiteen gesit deur Fred Scott in sy boek, *On Altering Architecture*, die skep van 'n ruimtelike ingryping toelaat wat **eerlik, nie-opdringerig en grondig** sal wees.

KERNWOORDE:
Interieure Argitektuur, Robinson Droogdok, SS Nomadic, Lae, Palimpses, Materialiteit, Degradering, en Mikro-brouery

ABSTRACT

Countless centuries has sailed by since humanity first discovered the method of travelling across the far stretched oceans that divided undiscovered continents. As noted by Le Corbusier, these liners were deemed being an **engineering feat of the twentieth century**, as their design resembled an **epitome of indulgence and hospitality**. As the average lifespan of a commercial liner is **25 years**, the shipping industry is reaching a pinnacle point in time where countless **ships will be decommissioned**. As these vessels were originally built to be both **functional and appealing** in nature, why have them **reduced to hazardous scrap metal**, when they can be **repurposed on land**?

In order to physically implement such an interior endeavor, both a **decommissioned ship ideal in typology and status**, along with a suited **location for docking** was to be advocated. The selection of **Robinson Dry Dock as host** and the **SS Nomadic as habitant** allowed for the spatial intervention of a **retail-orientated and recreational facility** to be envisioned. As opposed to the mere institution of a heritage approach, the **appendage of a new layer** is proposed that will allow for **past recollection and future addition thereon** - thus a p**alimpsest of design** in terms of programmatic response and actual **materiality**.

As the spatial and structural formation of vessels primarily rely on **steel** and the construction of a dock on **concrete**, these materials will be probed comprehensively in standings of their **vulnerability to degradation**. Proposed avenues of material investigation permits **corrosion protection**, **historic decay preservation** and intentional oxidation techniques that can conceivably ground potential design implementations. The decisive spatial outcome aims to endorse the idea that **corrosion can act as a tool of architectural beautification**, rather than a mere entity of intimidation. This idea is heightened by the insertion of a **microbrewery** that factually exemplifies the splendor of aging.

Rather than promoting slavish **alternative shipbreaking approaches** and mere demolition practices, **layered architectural alteration**, as outlined by Fred Scott in his book, *On Altering Architecture*, will allow for the creation of a spatial intervention that is **honest, non-intrusive** and **profound**.

KEYWORDS:
Interior Architecture, Robinson Dry Dock, SS Nomadic, Layers, Palimpsest, Materiality, Corrosion, and Microbrewery

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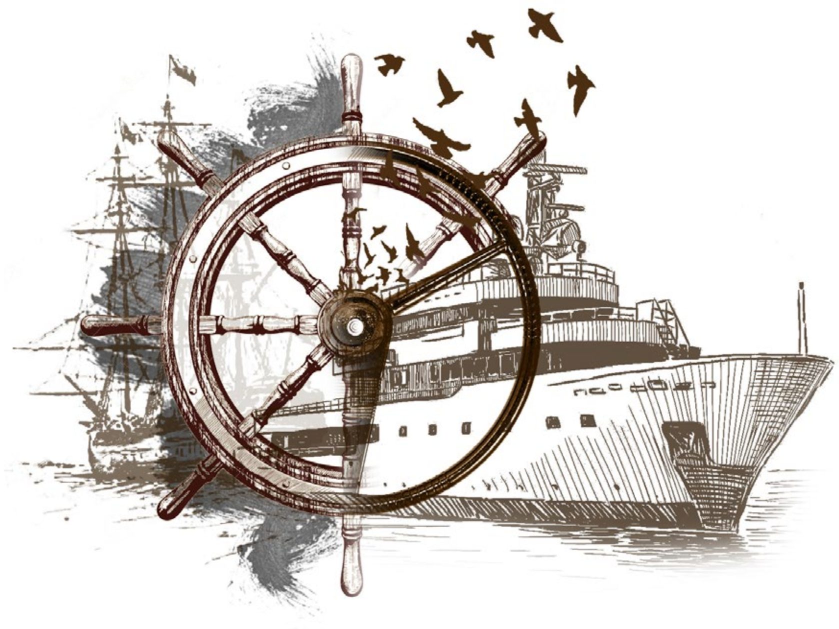


INTRO DUCTION

interior design afloat

As an introduction, this chapter will announce all topics relating to the envisioned study. Avowing current conditions as background, a theoretical premises pertaining to interior architecture is proposed, alongside probable methodologies aspiring to resolve the acknowledged dispute.

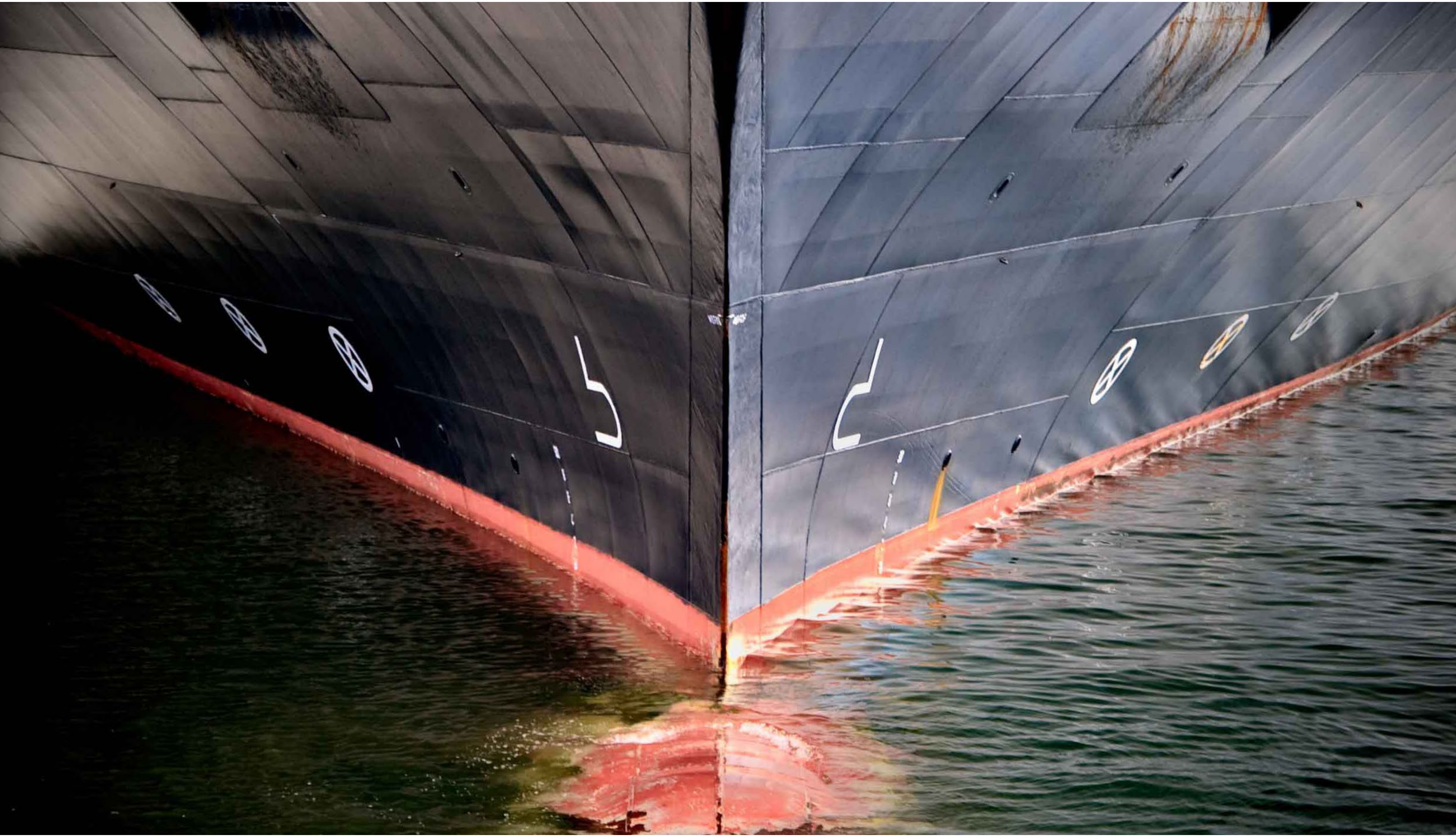


Figure 0.1. Ship's Bow (Lalizas, 2010)

BACKGROUND

"The steamship is the first stage in the realisation of a world organised according to the new spirit ..."

Le Corbusier, 1987

Countless centuries has sailed by since humanity first discovered the method of travelling across the far stretched oceans that divided undiscovered continents. As noted by Le Corbusier (1987:95), these liners were deemed being an engineering feat of the twentieth century, as their **design resembled an epitome of indulgence and hospitality**. Providing conditions ideal for habitation, various scholars have marveled in a **ship's ability to be both functional and beautiful**, since the onset of modern naval engineering (Curtis, 1985:34). The notion of heterotopias pronounced by Foucault (1967:6) in his lecture, 'Of Other Spaces', supports this contemporary idea of oceanic occupancy. Considering a boat as being a **floating portion of space**, an **enclosed place** deprived of space that merely exists by itself, whilst simultaneously subjecting itself to the boundlessness of the sea, its utmost substitute remains imagination - a **heterotopia par excellence.**

As ocean liners are a **harmonious synthesis of communal and private space** of technology and design, of form and function, of machine and man, this opulent approach to design excellence was far from inclusive upon original intent (Curtis, 1985:34). Afore the age of mass passenger ocean voyages, ships were primarily **premeditated to transmit the optimum amount of cargo**, let alone reflecting on passengers **comfort and visual aesthetics**. "Therefore, the interior design of these ships was considered less important than their safety and speed" (Wealleans 2006:6). With the dawn of the **Industrial Revolution**, as ships progressed from **timber to steel** and **wind to steam**, emphasis was directed towards the innovation of extraordinary and **technological advancements** in all areas of leading transport – have it be human or object transference (Urry 1995:130). As the solitary method of continental transportation for its time, modernity allowed for the design of humane interiors aspiring to provide prime **comfort to the elite, similar to that of hotels on land**. This became a significant commercial aspect in charming passengers, as the number of passenger lines and liners grew during the second half of the twentieth century. Given the advancement in technology, ocean liners were finally **surpassed by the aeroplane** for long-distance commute. As noted by John Maxtone-Graham (1972:xiv) in his book, 'The Only Way to Cross', this paradigm shift in conveyance allowed for cruising to become an **act of mere leisure**, as opposed to an earlier necessity. Moreover, this shift in primary utilisation highlighted post-modern maritime architecture where **sea-consciousness became a key commercial feature**, whereas prior modern naval design aspired to create a land-like familiarity oblivious to the sea (Wealleans 2006:54).

Regardless of its necessity, **the production of these luxury liners continued to flourish, reaching a pinnacle point during the late twentieth century**. As the average lifespan of a commercial liner is 25 years, based on statistics provided by the Commission of the European Communities during 1991, the shipping industry are reaching a point in time where **countless ships will be decommissioned** (CEC, 2011:19). As the regulations for the demolition of vessels are subjected to various policies set out between numerous authorities and industry organisations, the essential emphasis is placed on monetary gain, as opposed to **environmental consciousness** (Stuer-Lauridsen et al, 2003: 31). The act of recycling decommissioned vessels, known as ship breaking, is widely associated with a range of **destructive outcomes** in terms of its impact on the **immediate environment** and **work-related wellbeing and protection** of its labourers. Deplorably, the disposal of liners at the conclusion of "their economic lifecycle has excessive worth for the continual regeneration of the merchant marine fleet industry" (White and Molloy, 2001:6) and for justifiable growth and expansion thereof (Sundelin, 2008:9). In addition to ship breaking, Hess and Rushworth (2001:35) have identified three **additional methods of disposal**, namely **long-term storage, overseas recycling and reefing.**

As a global inclination in architecture, spatial designers are encouraged to **promote sustainable practices**. During the last decade, the alteration of existing structures for building **reuse and adaptation, as opposed to mere demolition**, has become a cumulative trend (Ball, 2002:95). With a wide acceptance thereof within the building environment, this study aims to investigate the feasibility of **adaptive reuse** through the **conversion of oceanic vessel into land-manipulated interiors** - thus aspiring to adjoin a **fourth alternative to the utilisation of decommissioned liners**. Realigning this with an actual spatial intervention, the original design and intent of ocean liners as heterotopian spaces will prove vital in the selection of a suitable pragmatic response. The ultimate conversion of these decommissioned ships as a structural whole into a **retail orientated typology** is envisioned, seeing that their heterotopian intent was to be spaces of free time and economic, social, cultural and political activity, as argued by Dehaene and De Cautier (2008:55). In order to ground this study theory-wise, the investigation aims to survey the actual **materiality associated with naval design**.

As the spatial and structural formation of vessels **primarily rely on steel and the construction of a dock on concrete**, these materials will be probed comprehensively in standings of their **vulnerability to corrosion**. The materialisation thereof will prove vital when suggesting an alternative utilisation for ships and the induction of **oxidisation as a form of beautification**. As naval architecture is in dire need of **alternative solutions to the disposal and recycling of decommissioned ocean liners**, this proposed topic pertains to essential avenues for possible explorations within the field of Interior Architecture.

Figure 0.2. History of Sea Voyage as Depicted by Advertisements (Author,2016)

0.1

PROBLEM STATEMENT AND SUB-QUESTIONS

Against the preceding introduction and background, it appears as if there might be a reason for the built environment to introduce an **alternative use for decommissioned vessels.**

As opposed to conventional shipbreaking techniques, can the application of **intentional corrosion act as a tool of interior beautification**, thus transforming a decommissioned oceanic vessel into a land-used retail typology?

- PROBLEM STATEMENT -

AS THE AVERAGE
LIFESPAN OF A COMMERCIAL LINER IS
25 YEARS,
THE SHIPPING INDUSTRY IS REACHING A POINT IN TIME
WHERE COUNTLESS SHIPS WILL BE DECOMMISSIONED
(CEC. 2011: 19)

AS THESE VESSELS WERE ORIGINALLY BUILT TO BE BOTH
FUNCTIONAL & APPEALING
IN NATURE,
WHY HAVE THEM BE REDUCED TO HAZARDOUS
SCRAP METAL, WHEN THEY CAN BE
REPURPOSED ON LAND?

- SUB RESEARCH QUESTIONS -

What has been reported on the pressing issue of shipbreaking ? Could revolutionary methods of metal recycling alleviate the need thereof in addition to land-repurposing ?

How can the induction of revolutionary steel and concrete materials be seamlessly employed alongside safeguarded corrosion to balance aesthetical and structural feasibility ?

Can the incorporation of intentional corrosion be naturally introduced, monitored and halted without the creation of structural and unsanitary impairments ?

How are the material properties associated with steel and concrete deterioration influenced by the rising height in sea-level both inland and along the coast ?

THE
INTERIOR APPLICATION
OF
INTENTIONAL CORROSION BEAUTIFICATION

0.2

PURPOSE AND OBJECTIVES OF THIS STUDY

As interior design is primarily associated with the **production of interior spaces**, it can be argued that an interior space is not merely an empty volume waiting to be filled, but rather any **product that cannot be separated from human activity** (Lefebvre, 1991:135). As the product is affected by and affecting the activity itself, the envisioned spatial intervention aims to **produce a product of the everyday that is constantly producing experiences**. As opposed to the actual limitation of these interior experiences, based on structural capabilities, this study advocates the role of an **interior designer within a context generally associated with nautical engineering**.

The intention of the study is to provide a possible solution to the pressing matter of ship recycling methodologies presently employed nationwide. Regardless of its ecological penalties, "currently the global shipping industry relies on **developing countries to dispose of decommissioned ships** through the process of ship recycling" (Rousmaniere, 2007:359). Although this service is not directly conducted on native soil, the **implications thereof proffer the future possibility of international environmental devastation** (Chang et al, 2010:1391). Furthermore, South Africa accounts for a growing average of **1.7% to the total cruise-ship industry utilisation** on a yearly basis, thus contributing towards this international dilemma (Stuer-Lauridsen et al, 2003:15).

The ultimate reasoning for the conducted research is to provide a solid foundation onto which the proposed design can be visually implemented within the built environment. The proposed response of **converting these vessels** due for recycling into retail oriented facilities, will allow for a contemporary method to ship disposal. As this is a relatively novel field of research, the benefits in terms of the accumulated research will be highly beneficial in order to support future prospective students within the field of interior architecture.

Figure 0.3. Theory Objectives (Author, 2016)

0.3
DEMARCATION

The intention of the research is to provide a **possible solution** to the pressing matter of **ship recycling methodologies** presently employed nationwide, regardless of its **ecological penalties.**

- TARGET GROUP -

According to Kotler (2004:n.p.), one can subordinate two forms of market segmentation categories within the target audience of retail and hospitality - **causal base and descriptive base.** The causal segmentation includes self-concept, attitude or preference or perceptions, benefits and usage situation, whereas the demographic segmentation uses demographic, socio-economic, geographic, personality, lifestyle, product usage and brand loyalty as the characteristic to attract intended audience. The **balanced combination** between these two segmentations is essential in order to ensure viable and **continuous public interactivity** (Lee Hew & Fairhurst, 2000:20).

- TOPICAL DIFFERENTIATION -

Associated topics to be covered includes a brief introduction to **interior design afloat**, followed by **ship recycling** and **adaptive reuse probabilities**, grounded by the theory of **materiality and corrosion**.

- DISCIPLINE DIFFERENTIATION -

The proposed findings aim to contribute primarily towards the subject of **Interior Architecture** within the field of **Environmental Potential,** and secondly towards the discipline of **Naval Engineering**.

- GEOGRAPHICAL LOCATION -

In order to implement the proposed theory, a locality worthy of spatial intervention must be identified. In order to physically implement and execute such an interior endeavour, both a **decommissioned ship (habitant)** due for recycling and a proposed **location for docking (host)** must be advocated (Figure 0.4).

Figure 0.4. Proposed Host and Habitant (Author, 2016)

0.4
SCOPE AND LIMITATIONS

As this is a relatively **novel field** within the architectural realm, demarcated outcomes and clear boundaries must be set in order to prevent this study from becoming too broad and/or unresolved. Though naval engineering will form a fundamental part in the development of the study, the focus remains on the architectural conversion of the interior design of vessels into a **retail facility that adheres to the South-African building regulations and standards**.

As literature on this topic is limited, various articles pertaining to related topics will have to be connected in order to be of any value. These include disciplines relating to **naval design and metallurgical engineering**. As most historical ocean liners of an appropriate scale has either been scrapped or are still in working condition, the availability of suitable vessels for possible adaptive reuse are limited. Apart from relevant literature and implementation possibilities, the retrieval of actual engineering drawings might prove challenging, as most original blueprints are either deteriorating, illegible, unavailable, or redundant due to their outdated drawing conventions. Likewise, the geographical location of the ship might also prove problematic, as investigation will primarily occur via long distance interpretation, thus needing **comprehensive prior explorations** to realise the interiority.

As for any architectural limitations, given the exact shape and size of an oceanic vessel's hull, it might prove problematic in terms of **volume, light distribution and acoustics.** These factors however will not be regarded as being closing restrictions, but rather as **opportunities for inventive design solutions.**

0.5
DELIMITATIONS AND ASSUMPTIONS

Apart from the previously identified scope and limitations (section 0.4), seeing that this study is aligned within the field of **environmental potential,** actual historical naval research will be limited. Attention will be directed away from the development of interior design afloat, and guided towards the **adaptive reuse of decommissioned vessels**. Material investigation will also be limited to the specific **materials identified as being most dominant within naval architecture**. In addition to the investigated theory, the actual interior design **will be restricted to a selected area**, with hypothetical suggestions for additional programs in the remaining areas only to be declared.

Moreover, in addition to the above delimitations, the following will be assumed in order to render the intended spatial intervention feasible and probable:

- The Nomadic Preservation Society (current owner of the SS Nomadic) will allow for the intervention to occur as they have been in search for a **reputable elucidation for the ship's revitalisation.**
- The SS Nomadic has been **restored completely to its original state**, with the distinct **exception of the boiler room's machinery**, which had been removed upon its last transit. The restoration will allow for **hull stability and spatial intervention** to occur.
- Future planning and funding to the restoration of Robinson Dock as an operational berth has been suspended. As aligned with the urban vision of Cape Town for 2020, the **area has been declared as location in need of alternative interpolation.**

0.6
RESEARCH DESIGN AND METHODOLOGY

Subsequently, upon studying **qualitative research** methodologies, one comes across various research methods such as action research, precedent investigation, ethnography, experimental research, and historical research that one can utilise in order to commence with an empirical investigation (Leedy & Ormrod, 2014; Pickard, 2013; Struwig & Stead, 2001). Moreover, Pickard (2013:97) points out that the choice of method relies on an amount of dynamics that include the **purpose of the study, audience, resources and time constraints**. For the resolution of this study, a **precedent and literature research methodology** will be employed in order to provide a holistic overview to the availability of limited publications arranged to provide an in-depth knowledge gain, pertaining unambiguously to the previously identified research questions.

According to Yin (2013:16), a case study refers to the "empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used". Moreover, three assortments of precedent methodologies are envisioned in order to acquire all obligatory information needed in order to eliminate any discrepancies (Pickard, 2013:102; Stake, 1994: 237). Firstly an **intrinsic case study** will be conducted. This includes the **familiarisation of all relevant literature** leading up to the desired outcome. As interior architecture and naval engineering forms the basis of this study, historic publications thereof will be investigated. The second form of precedent investigation allows for **instrumental case study.** Here the investigation is directed towards **marvels and theories more directly associated with the research topic itself.** This will primarily include literature that investigates ship breaking as an enabler of ecological degradation. The final subcategory of qualitative precedent studies, are reserved for **collective data** belonging to the descriptive study that investigates **direct implementation strategies**.

In this phase, possible passenger liners up for adaptive reuse will be scrutinised, along with conceivable perpetual dry-docking solutions.

Furthermore, in addition to the qualitative method of researching precedents, **historical and correlational research** will also be conducted in order to ground the theoretical approach of **materiality**. Evaluating and comparing these findings based on their **context** (sea vs. land), **discipline** (architecture vs. interior design) and **timeframe** (industrial design vs. modern design) will allow for the correlation, or lack thereof, between variables to occur. This combined methodology is illustrated diagrammatically in figure 0.5.

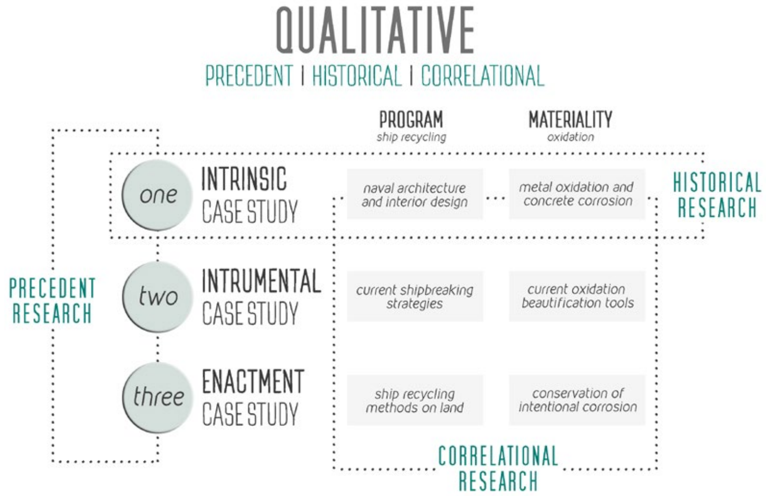


Figure 0.5. Research Methodology (Author, 2016)

0.7
LITERATURE ANALYSIS

As accredited literature hosts a prominent part within the fundamental exploration towards the feasibility of this projected topic of research, the attained information will also prove informative when attempting to spatially implement the proposed intervention. Although some literature will not directly influence the primary investigation of materiality, the knowledge thereof will prove fundamental. Here follows a range of selective literature seeking to enrich, direct and authorise this investigation:

- Literature relating to the history of architectural materials,
- Literature relating to the history of interior design afloat,
- Literature relating to naval engineering and,
- Literature relating to ship recycling and shipbreaking.

- LITERATURE RELATING TO THE HISTORY OF ARCHITECTURAL MATERIALS -

As the primary basis for investigation, all literature pertaining to the historical development of materials will be investigated. In order to articulate the future probabilities of how revolutionary material application can be conjoined within the actual envisioned design intervention, **materials associated with naval design (steel, timber and glass)** must be explored systematically. Providing a clear historical background of the selected materials, 'Constructing Architecture' by Andrea Deplazes, will provide a foundation onto which additional literature can deliver insight of how **materials are shaped, joined and applied**. In conjunction with these past and present technologies, additional levels of investigation (sea vs. land and/or interior vs. exterior) can be affixed to deepen the investigation. Ultimately this investigation aspires to deliver regulation as to the innovative methods in which **current materials** on site can be reintroduced, or newly announced materials can be considered to enhance the overall interiority of the proposed spatial mediation.

- LITERATURE RELATING TO THE HISTORY OF INTERIOR DESIGN AFLOAT-

It has been noted that general publication focusing on interior architecture within the maritime environment has the distinct tendency to celebrate the image of glamorous travel, on a trajectory of innovation regarded within the representations of technological determinism. As accredited literature are very limited on the topic, those available that situate themselves unambiguously within the developing discipline of **naval interior architecture**, will prove to be of high assessment. 'The Nautilus and the Drunken Boat', a primary source of literature to acknowledge the association between a **ship's interiors and conventional interior architecture**, argues that a ship is a habitat before being a mere means of transport (Barthes, 1973:66). This notion is further supported by later publications of Miller (1985:12) and Brinnin (1982:47) which poses the fact that a passenger liner should be appreciated for its interior luxury, as opposed to its mere construction and technical details. In addition to these earlier publications, a more recent book by Anne Wealleans (2006:1), '*Designing Liners: A History of Interior Design Afloat*', allows for in-depth investigation into the developing field of interior design which contemplates the effort of the spatial designers within the settings of national identities, modernity and social class. As for the **physical design**, the seven architectural attributes which constitutes the interior design elements onboard a cruise ship along with its strict adherence to the standards as set out by the Convention and the International Maritime Organization, must be appreciated in order to provide typology conversion (Byun, 2006:5). Furthermore, additional literature pertaining to the idea that maritime design played a profound role in the development of interiors on land, will be investigated in order to assert to the viability of **converting decommissioned oceanic vessels into land-used structures.**

– LITERATURE RELATING TO NAVAL ENGINEERING –

In order to fully **comprehend and utilise the provided structural amenities of a decommissioned liner**, it is essential that the fundamentals to **marine engineering be investigated**. As with whichever diverse field of study, there are a number of particulars to be taken into account when attempting such an endeavour. An 'Introduction to Naval Architecture' concentrates explicitly on the fundamental characteristics of a ship's design (Tupper, 1996:3). In addition to this, the before mentioned publication highlights the clear nautical comprehension engineers and architects should possess along with the **distinct origin**, development and means of implementation bounded by these principles. Regardless of the fact that no significant structural amendments are envisioned for the exterior of the pre-identified vessel, the implications of interior modification to the structure must be probed (Partington, 1826:26). Moreover, the wide arrange of prior studies conducted on the actual interiority of oceanic vessels, specifically cruising yachts, will provide additional **understanding to the materiality** thereof. As a wide array of challenges associated with the internal spaces of such **typologies** will be evident, a variation of approaches to the **adoption of suitable solutions** will be verified in order to provide ultimate comfort. A design that is humble, respectable and pleasing can be trying to quantify. Following proposed principles, these characteristics can be assessed using comfort as a tool of measuring physical space, ergonomics and visual space (Payne & Siohan, 2008:1).

– LITERATURE RELATING TO SHIP RECYCLING AND SHIPBREAKING –

Recent studies have indicated that the **maritime industry is reaching a highpoint in the disposal of decommissioned ocean-going vessels** which has grasped the end of their economic life cycle (Studier, 2008:8). Seeing that the act of leisure cruises is regarded as being the "most important link in the world manufacturers' global logistical chain" (Chang et al, 2010:1390), the **trade of shipbreaking remains viable**, regardless of the admitted datum that it is also **negatively impacting the marine environment**. As the demand for contemporary, more sumptuous and capacity bearing vessels increase, the need in addition for marginal reconditioning methods also escalates. Due to the hazardous derivatives produced as a result from conventional shipbreaking, countless scholars have devoted their studies towards more biological and ecological responsive tactics. Currently there are four main methods of disposal (Hess et al, 2001:35), allowing for the built environment to produce input. Though scarcely mentioned that ships in their entity could pose incentive for **land used conversion, the adaptive reuse of shipping containers have shown a growing interest**, allowing possible implementation campaigns with similar outcomes in the vessel industry. John Smith (2005:11) mentions in his article entitled, 'Shipping Containers as Building Components', that the initial inclination towards containers as a sustainable alternative proved to be far more challenging to fully ordain than originally anticipated. However, as the outcome proved to be highly feasible, its reluctant initiation was soon forgotten, as can the negativity surrounding ship conversion. In addition to this alternative proposition, a vibrant examination into the shipbreaking industry will provide understandings to the considerations made before deeming a vessel suitable for public vending, as well as where and in what way the scrapping ensues.

Respectively, this chapter endeavoured to present the significant value for further investigation within the field of interior and naval architecture, unambiguously leveling to introduce an **alternative method of ship disposal**, alleviating environmental discomfort and amplifying the abilities of an interior designer.

CHAPTER

act of shipbreaking

As a point of departure, this chapter will clearly outline current methods of ship disposal and ultimately propose this study's outcome as a fourth alternative. Moreover, the process and environmental hazards associated with shipbreaking will be outlined in order to prominently accentuate the dire need of spatial intermediation.

Figure 1.1. Young Welder (McCurry, 1994)

THE ACT OF SHIPBREAKING

"We must plant the sea and herd its animals using the sea as farmers instead of hunters. That is what civilization is all about, farming replacing hunting..."

Jacques Yves Cousteau , 2010

The process associated with the clearance of vessels at the conclusion of their commercial lifespan devises a pronounced connotation on the recurrent regeneration of the merchant marine fleet industry and the sustainable development thereof (Sundelin,2008). As briefly introduced in the introduction of this study, currently there are three primary methods of ship disposal being deployed within the maritime industry. Listed in terms of preference and admiration, **domestic recycling** (also known as shipbreaking), **long-term storage** and **reefing** allows for a diverse range of methods to be employed upon the decision of sanctioning a ship to be scrapped.

Long terms storage is the **least desired alternative**. As the berthing and conversion of vessels into applicable storage facilities are **expensive** and still do not alleviate the **inclining amount of decommissioned vessels** currently situated within ship graveyards. As opposed to complete dismantling, long-term storage is the course of action with the greatest amount of cost uncertainty. These uncertainties are primarily associated with the ships **declining age and intervals between dry dock inspections.** "Preservation costs for ships in long-term storage comprise the direct labor and material costs for maintaining these vessels' long-term integrity while waterborne and the indirect facility and support costs associated with this maintenance" (Hess et al, 2002:10). Long term storage is regarded by many as **not truly being a feasible option** for the problem of ship disposal, as it only **defers the problem** from one generation to the next. Whether a ship is stored for a certain amount of years, it would still have to be dealt with in the end.

As the **least desired method of disposal,** reefing allows for a promising and novel alternative to this budding occurrence. During 1830, the first documented artificial reef was created, where log huts were sunk off the coast in order to improve fishing conditions. Ever since the latter part of the twentieth century, 80% of all artificial reefs constructed within international waters utilise **consumed materials of opportunity**. These include rock formations, fauna and flora, ocean-going vessels, and in very recent years , unwanted oil and gas recovery structures (Marine Fisheries Commission, 1997:45). As this deed is regarded as being a **humanitarian act** of courtesy toward marine surroundings, the donation of a "clean" ship to be reefed, possesses **little to no monetary gain** for its owner. On the contrary, the conversion of ships up to environmental standards is quite costly, as **all hazardous entities** contained onboard must be **disposed of before the sinking** of such a ship can commence - thus rendering this method as the least desired disposal option.

At present, there are **no unvarying federal criterions over areas under international cognisance**. Moreover, the responsibility of **reefing standards** is typically engendered by the body responsible for the project in conjunction with the local federal environmental and/or coastal zone regulators (International Department of Natural Resources, 1991:n.p.). Even though reefing is not employed as habitually desired, there is a history of success associated with the usage of sunken ships to construct artificial reefs that **advance marine life, commercial and sport fishing, and leisure diving** (Hess et al, 2002:66).

Ship breaking is the third and most common method associated with the disposal of discharged ships (refer to figure 1.2.). Shipbreaking is the practice vessels are subjected to upon **decommissioning**, during which the obsolete **structure is dismantled for scrapping or disposal purposes**. Generally conducted at grave docks or dismantling piers, the removal of all equipment and machinery, along with the actual cutting down of the ship's infrastructure, occurs. Due to the structural convolution of oceanic liners and the numerous **safety, health and ecological disputes** involved, shipbreaking is regarded as being an **impudent and laborious procedure** (OSHA, 2001:n.p.). During this time, 95% of a ships' valuable steel can be recovered, rendering it as a highly profitable ship disposal opportunity (Greenpeace, 2005:n.p.). Since the onset of this practice, "ship breaking activities migrated to semi-industrialised countries, such as Spain, Turkey and Taiwan, mainly for the availability of **cheaper labour** and the existence of the **re-rolled steel market"** (Hossain and Islam, 2006:2).

In the section to follow, this process will be elaborated upon, casting light on its **environmental impact** and **altruistic repercussions**.

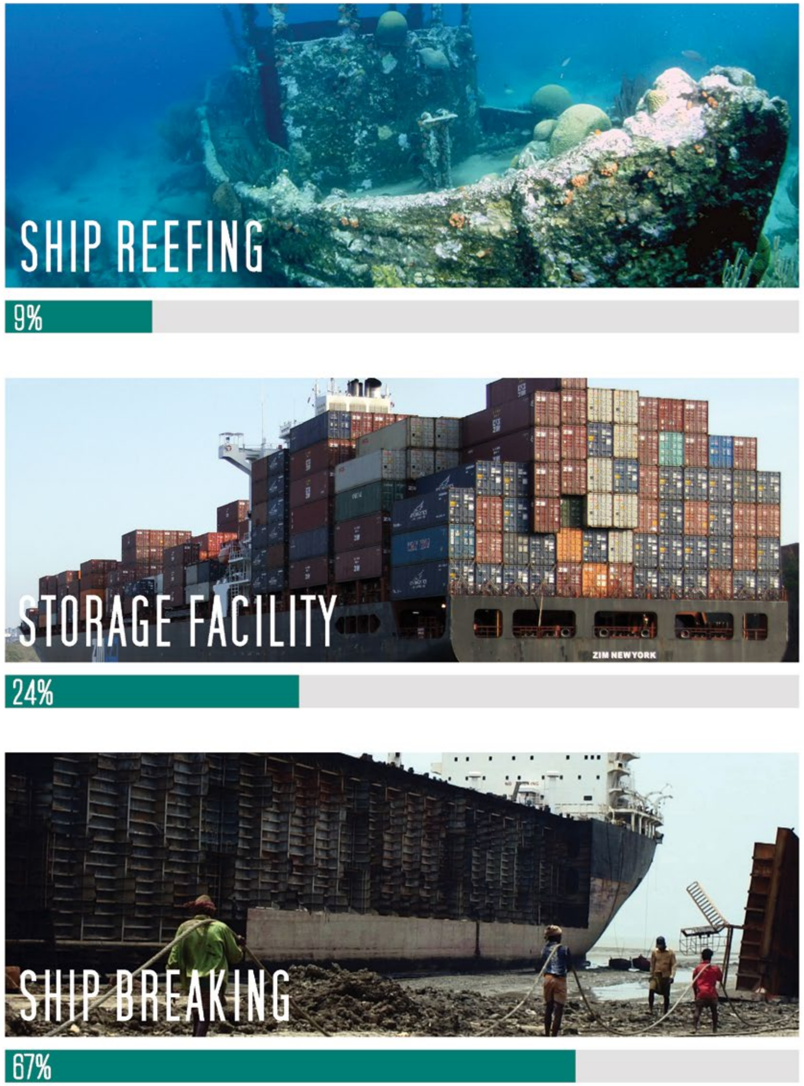


Figure 1.2. Popularity of Ship Recycling Techniques (Author, 2016)

1.1

THE SHIPBREAKING PROCESS

The lifespan of any oceanic vessel consists out of **five fundamental periods**. As illustrated in figure 1.3, the life cycle of a ship is initiated upon its Initial planning during which conceptualisation and design transpires. Thereafter, the equipment and infrastructure is ordered and the ship is constructed. The fourth phase, being the lengthiest on average between 25 -30 years, is dedicated towards the **operational extent of a vessel.** The fifth and **final stage** dedicates its progression towards the concluding nature of any **decommissioned vessel.** In order for the convoluted process of shipbreaking to ensue, the present proprietor of the ship must choose between **two selections of trade**. The first being to r**etail the ship directly to a scrap yard** operator, on the condition that the ship be transported to the facility. Alternatively, the second option allows for the decommissioned vessel to be **sold to a cash buyer**, who subsequently will resell it to the shipbreaker (Sawyer, 2002:548).

The unit of currency in which a buyer is compensated for is determined by the **Light Displacement Tonnes** (LDT), which amounts roughly **equivalent to the steel weight of a ship**. As the amount of steel used during construction varies from on vessel to another, it is approximated that the average steel content mounts up to **90% of the total resource** usage. The measurement obtained from the LDT provides an **upright assessment of the quantities of materials that can be obtained when the ship is dismantled** (Mikelis, 2008:228). In addition to the actual quality and quantity of steel, the price per LDT is also subjected to market demand and supply, ship type, equipment onboard and the current domestic taxation on scrapping tonnage. It has yet to be determined whether or not the amount of hazardous materials (used during construction or operation) onboard also affects this price (COM, 2007:5).

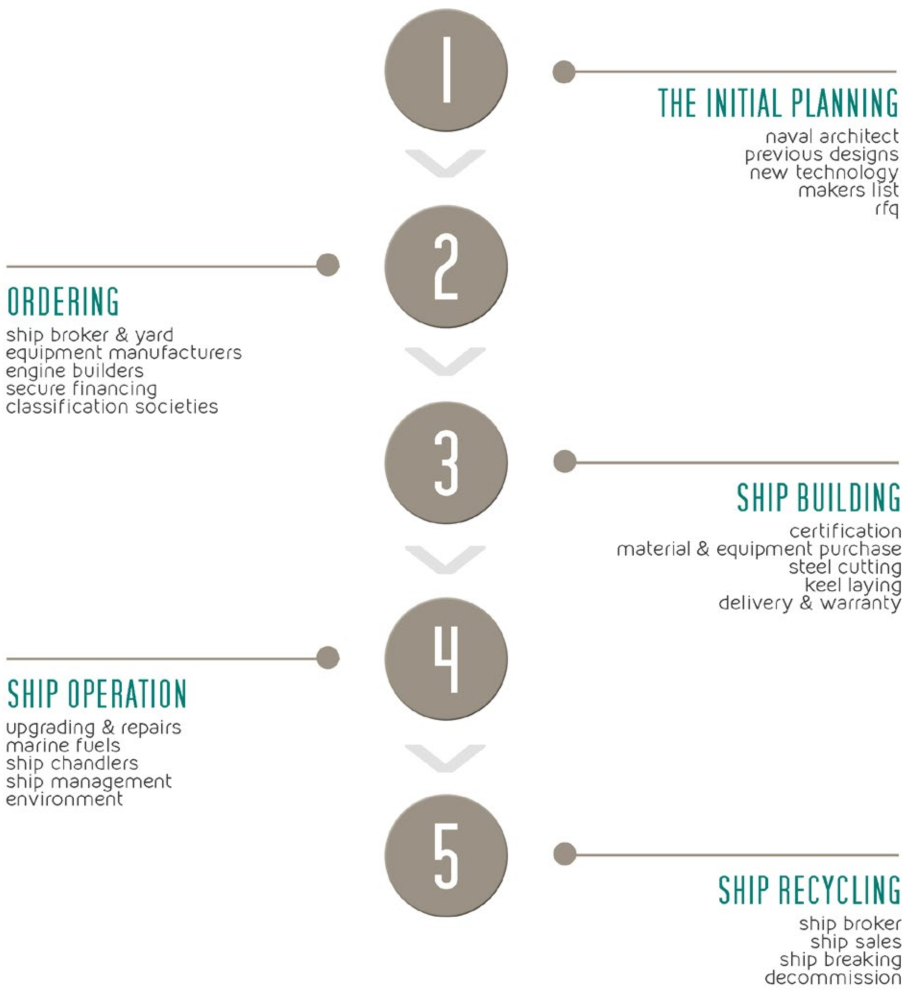


Figure 1.3. The Lifecycle of an Oceanic Vessel (Author, 2016)

Upon purchase, the ship is delivered in its **current condition.** Customarily this final voyage will also act as a **concluding opportunity to transport cargo** to the destination where is will also be disposed of. The quality of the scrap yards differ amongst the five main shipbreaking states - resulting into a **differentiation of methods** applied when breaking a ship. In more developed countries, such as China and South-America, dock-like facilities are utilised. However, in the absence thereof, a **vessel is merely steered up onto the seashore, a procedure called beaching**. Out of the five capitals, beaching is essentially used in Bangladesh, Pakistan and India (Sawyer, 2002:546). High tide permits the possibility of shoring a ship far up the beach so that the ship is effortlessly manageable by the workers during low tide.

Once the ship is **moored into position**, have it be in a dock or on a beach, the process of actual **shipbreaking can occur**. As outlined by the International Maritime Organisation (IMO) (2010:5), the procedure should be carried out in the following sequential arrangement:

- VESSEL SURVEY -

The **identification** of all storage areas, compartments and tanks that might contain **hazardous liquids and materials** must be drawn up diagrammatically. Materials onboard currently classified as being hazardous can include fuels, oils, asbestos, PCBs, lead and other perilous waste. Once identified, a **systematic sampling approach** is conducted on compartments that will be cut first. However, in lieu of sampling, most developing countries **discard this step**, **assuming that particular substances hold harmful substances, thus choosing to dispose them as such**. When this occurs, proper engineering control must be practiced by employer in order to ensure that both workers and those in close vicinity of the removal are **appropriately guarded from exposure**.

- REMOVAL OF FLAMMABLE MATERIAL AND LIQUIDS -

The **subtraction** of leftover fuels, oils and other liquid such as bilge and ballast water from the ship commonly happens throughout the shipbreaking procedure. Water accumulated in the bilge (part on the external façade of a vessel's hull where the perpendicular flanks meets the bottommost curvatures) is **appraised and disposed of suitably**. As water may continuously amass on the beached vessel due to rain and hot work cooling, it will unremittingly have to be removed appropriately. Booms are positioned around the vessel in order to contain any spillage that might occur during the above mentioned process. Following removal activities, Once removed, **a marine chemist must certify the overall insurance of admission and commencement of recycling.** Thereafter, it is required that a proficient individual constantly **monitor areas of contact** to ensure that it remains complaint with the previously issued marine chemist's certificate.

- REMOVAL OF EQUIPMENT -

To begin, small fixtures such as **anchors and chains are removed**. Thereafter all large, reusable equipment, such as **engine components**, are removed depending on their accessibility. In order to allow for the hull to be pulled into shallow water, the **propellers** will have to be removed, if not already detached during the initial beaching stage.

- REMOVAL AND DISPOSAL OF ASBESTOS AND PCB -

The removal of p**olychlorinated biphenyls** (PCBs) and **asbestos-containing materials** (ACMs) are conducted in two phases. Prior to cutting away a section of the vessel, **ACM is removed from areas that are to be cut and PCBs are removed from areas that are readily accessible**. The same process is followed when the expurgated section is moved ashore and the dismantling thereof commences. As the **boiler and engine quarters of most decommissioned vessels contain the most asbestos**, it is expected that the removal of all ACMs therein be the **most time-consuming.**

- PREPARING SURFACES FOR CUTTING -

Preservative coatings such as paint or varnish **must be stripped** in addition to the removal of ACMs, PCBs and combustible materials. Cut-line preparation may be required on hard-to-remove material surfaces. In such an event where flame removal and grit-blasting of paint is needed, precautionary measures must be enlisted as the released **toxic metals and volatile components** of paint can be **harmful to workers** if exposed thereto.

- METAL CUTTING -

During the cutting phase, the upper decks, superstructure and systems are cut first, followed by the main deck and lower decks. Metal cutting is usually done manually, using oxygen-fuel cutting torches, but may be done with shears or saws for nonferrous metals. Typically, as large parts of the vessel are cut away, they are lifted by crane to the ground where they are then cut into specific shapes and sizes required by the foundry or smelter to which the scrap is shipped. As cutting continues and the weight of the structure is reduced, the remaining hull floats higher, exposing lower regions of the hull. Ultimately, the remaining portion of the hull is pulled ashore and cut.

- RECYCLING OR DISPOSAL OF MATERIALS -

Scrap metals, including steel, aluminum, copper, copper nickel alloy and lesser amounts of other metals are **sorted by grade and composition,** and **sold to remelting firms or to scrap metal-brokers**. Valuable metals such as copper in electric cable that are mixed with nonmetal materials may be recovered using shredders and separators. The shredders produce a gravel-like mixture of recyclable metal particles and nonmetal 'fluff', which is not recyclable and needs to be sampled for hazardous materials and disposed of according to state and federal regulations. The metals are then separated from the fluff using magnetic separators, air flotation separator columns, or shaker tables.

Since the onset of the above manifesto in 2010, only **two out of the five major shipbreaking capitols are governed under its legislation**, as most developing countries **cannot afford the costly technology associated with the correct procedure of environmental conscious shipbreaking** (refer to figure 1.4). Being that these developing countries account for most ship recycling activities, the question of whether or not **ecological dismantling** of ships is occurring remains dubious.

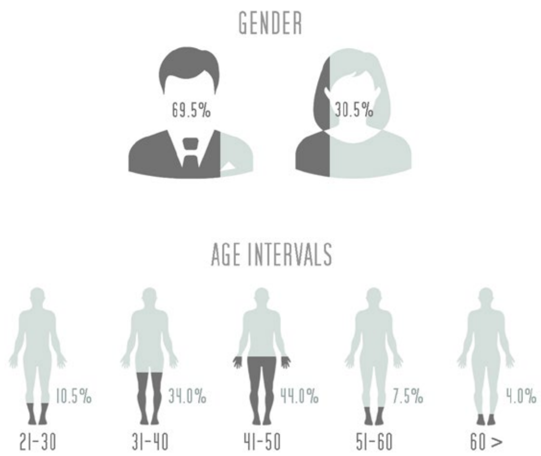
Figure 1.4. Shipbreakers at Work in Bangladesh (National Geographic, 2015)

1.2

ENVIRONMENTAL AND OCCUPATIONAL HARMS

The activities associated with shipbreaking are being condemned as the entire progression necessitates numerous **tasks deemed highly treacherous**. Regardless of the copious amount of hazardous substances to both **ambient environments and workers present** during the practice, the entire scrapping process remains **manual**. As no training or preparation is provided and no safety measures implemented, workers are unaware of the potential threats.

Presented (figure 1.5) in table format are all environmental harms and common work-related hazards that may result into **injuries, ill-health and in severe instances, death.**



SERIOUS ACCIDENT HAZARDS

Fire and explosion: explosives, flammable materials | Falls from height inside ship structures | Being struck by falling objects | Struck by moving objects | Compressed between heavy objects | Slipping on wet surfaces | Snapping of cables, ropes, chains, slings | Sharp objects | Handling heavy objects; poor access to progressively dismantled vessels | Oxygen deficiency in confined spaces | Lack of PPE, housekeeping practices, safety signs

HAZARDOUS SUBSTANCES

Asbestos fibres,dusts | PCBs & PVC (combustion products) | Heavy and toxic metals: lead, mercury,cadmium, copper, zinc etc. | Welding fumes | Organometallic substances: tributylin, etc. | Volatile organic compounds and solvents | Lack of hazard communication: storage, labeling, material safety data sheets | Inhalation in confined and enclosed spaces | Batteries, fire-fighting liquids | Compressed gas cylinders

PHYSICAL HAZARDS

Noise | Vibration | Extreme temperatures | Poor illumination

MECHANICAL HAZARDS

Trucks and transport vehicles | Shackles, hooks; chains | Scaffolding, fixed and portable ladders | Cranes, winches, hoisting & hauling equipment | Impact by heavy and sharp-edged tools | Lack of safety guards in machines | Power-driven hand tools, saws, grinders, abrasive cutting wheels | Poor maintenance of machinery

BIOLOGICAL HAZARDS

Toxic marine organisms | Animal bites | Risk of communicable diseases transmitted by pests, vermin, rodents, and insects that's on ship | Infectious diseases: TB, malaria, dengue, fever, hepatitis, respiratory infections, etc.

ERGONOMIC AND PSYCHOLOGICAL HAZARDS

Repetitive strain injuries, awkward postures, repetitive and monotonous work, excessive workload | Mental stress, strained human relations: aggressive behavior, alcohol and drug abuse and violence | Long working hours and temporary employment | Poverty, low wages, under age, lack of education and social environment

GENERAL CONCERNS

Lack of safety and health training | Inadequate accident prevention and inspection procedures | Poor work organisation | Inadequate emergency, first-aid and rescue facilities | Inadequate housing and sanitation | Lack of medical facilities and social protection

Figure 1.5. Environmental and Occupational Harms (Author, 2016)

1.3

SHIPBREAKING LEGISLATION

As noted upon the examination of the aforementioned arrangement, it is quite evident that an **environmental intervention is required** in order to **administer the activity of shipbreaking**. In Member States of the Organisation for Economic Co-operation and Development (OECD), constituents that enclose harmful materials are subjected to severe observation, and their clearance harshly standardised, thus rendering it highly costly. As most substances found in ships are defined as hazardous under the existing 1989 Basel Convention Act, **industry avoids the affliction of adhering** to the elevated rates of compliance in developed countries. Subsequently, **health issues and occupational safety emerge** - particularly in association with the dismantling of beached ships in India, Bangladesh and Pakistan, where **regulations are limited and labour inexpensive** (Rousmaniere, 2007:57).

The **difficulties associated with maritime regulations** are governed by the fact that the world's oceans are **not owned by any country**. The fact that oceangoing vessels can sail freely between **different jurisdictions offers hindrance in terms of conventions** (refer to figure 1.6). With a regulatory framework being developed by various organisations, legislation on ship breaking is in its infancy. Regardless of current international obligations that shipping industries must honour based on either customary law or explicit treaties, "**unconsciousness and lack of government patronisation** are facing several internal and external problems" (YPSA, 2005:n.p.). Adopted in 1998, but only entered into force in 2004, the Rotterdam Convention on Prior Informed Consent (PIC) is one of the first illustrations of customary law pertaining to trans-boundary movement of hazardous waste produced by ship breaking. As dictated by customary law, upon arrival at the yard of dismantling, end of life vessels are subjected to

Rotterdam Convention

THE ROTTERDAM CONVENTION

VOLUNTARY LAW

Not sufficient to stop unsafe scrapping. In several cases Greenpeace found out that end of life vessels have been exported to a ship breaking country without the importing authorities being alerted.

BASEL CONVENTION
the world environmental agreement on wastes

THE BASEL CONVENTION

VOLUNTARY LAW

Open Ended Working Group has noted that a ship may become waste, in accordance with article 2, and that at the same time it may be defined as a ship under other international rules. This is a loophole that ship owners exploit.

LONDON CONVENTION

THE LONDON CONVENTION

VOLUNTARY LAW

The fundamental obligation is to prohibit the deliberate disposal of waste from vessels at sea. However, the application of this convention on the issue of ship breaking is debated. At the time of set up, the issue of ship breaking was not a problem.

MARPOL SERVICES

PREVENTION OF MARINE POLLUTION FROM SHIPS (MARPOL)

VOLUNTARY LAW

Shipbreaking would apply to the discharges that occur from ships sent for shipbreaking, which take place within the territorial waters. Interestingly MARPOL obliges the person in charge of the vessel to report any actual or probable discharge above the permitted level.

UNITED NATIONS CONVENTION ON THE LAW OF THE SEAS (UNCLOS)

COMPREHENSIVE REGIME

Port states have discretion for enforcement within their territorial waters. Flag states are obliged to enforce the international rules and standards, as well as their own pollution laws and regulations, wherever the violation occurs.

IMO

INTERNATIONAL MARITIME ORGANIZATION (IMO)

COMPREHENSIVE REGIME

Greenpeace believes that the IMO guidelines will not at all change the current practices of ship owners. The IMO failed to accept and complement the existing legislations and regulations dealing with the export of hazardous wastes.

UNEP

UNITED NATIONS ENVIRONMENTAL PROGRAM (UNEP)

VOLUNTARY LAW

These guidelines will make provisions for the proper removal of hazardous wastes and substances, including the collection and disposing of wastes in an environmentally sound manner. These guidelines will not, however, cover issues of health and safety.

INTERNATIONAL CHAMBER OF SHIPPING

THE INTERNATIONAL CHAMBER OF SHIPPING (ICS)

VOLUNTARY LAW

Suggest the creation of a "green passport" for new, environmentally friendly ships. Here too, the voluntary and non-enforceable nature of these guidelines seriously weakens their domain and potential effect.

Figure 1.6. Shipbreaking Conventions (Author, 2016)

prior declaration of all known hazardous substances onboard. It is then the r**esponsibility of the notified importing country to arrange adequate treatment schemes before shipbreaking can commence.** Additional conventions recently established such as The Basel and London Convention, The International Convention for the Prevention of Marine Pollution from Ships (MARPOL) and The United Nations Convention on the Law of the Seas (UNCLOS), all rely on the prior notification of intention. **However, it has been reported that decommissioned ships remain to be exported to ship breaking countries without the importing authorities being alerted - thus no environmentally friendly methods of waste disposal utilised before shipbreaking occurs.**

Aside from these conventions, permissible organisations have been established that govern sea related matters. The function of the International Maritime Organisation (IMO) is to a**dminister all matters relating to issues that might arise during a ship's design, construction, operation and recycling**. Under the patronages of its Maritime and Environmental Protection Committee, the identification of **disposal guidelines** set out for all those involved are to be **followed voluntarily**. Greenpeace, a non-governmental environmental organisation, argues that "t**hese guidelines will not alter current practices, as it fails to accept and complement the existing legislations and regulations as proposed by numerous conventions**" (Vardar and Harjono, 2002:19), as mentioned above. Subsequently, the guidelines thereof fall **outside international law** allowing the possibility of misuse to asylum any prohibited practice. Additional organisations attempting to improve shipbreaking practices, such as The United Nations Environmental Program (UNEP) and The International Chamber of Shipping (ICS), weaken their potential effect and domain due to its non-enforceable and voluntary nature (Hossain and Islam, 2006:41).

Regardless of the previously stated conventions, it is extremely perturbing to note that **very little has been achieved in terms of enforcement**. Furthermore, the **lack of freedom of association, welfare provisions and social protection for the related labors are of identical distress.** In a state of total vulnerability, workers are forced to "work under the regulations of a private individual's will, rather than that of the law" (FIDH. 2002). As argued by Hossain and Islam (2006:45), "the problem is not so much the lack of legislation - but, as often, the nonenforcement of existing ones, and the weakness of remedies". As the **profit** of shipbreaking is dictated by **time**, any **obstacles preventing quick dismantling are eradicated, along with any securities and right of the safety and health of all workers.** As a result, the need of a **diverse and harmonious policy** for sustainable ship breaking activities **remains essential and unresolved.**

The purpose of this chapter was to place emphasis on the **environmental threats** associated with the **unprecedented course most ships are subjected to upon decommissioning.** On account of what have been stated, the dire need of a **precautionary solution to health and ecological perils**, inherent in the process of ship breaking, is obligatory. Founded on this precise demand for a solution, the feasibility of this research paper's pragmatic response aims to act as a possible alternative. **As opposed to regarding shipbreaking as being the only recycling method worthy of monetary gain, why not reuse these decommissioned vessels on land as a continual source of revenue?**

Figure 1.4. A Shipbreaker's World (Azri, 2013)

2 CHAPTER

host, habitant & programme

The following chapter will act as introduction to the proposed host, actual location of the intervention, the suggested habitant, selection of an appropriate vessel that will permeate the host, and lastly, the election of a pragmatic response that would serve as activator.

Figure 2.1. V&A Waterfront Pier (Unknown, 2014)

VICTORIA & ALBERT WATERFRONT

"The tavern of the seas - the V&A Waterfront"

Anonymous

In order to ground the proposed intervention, a suitable host in need of spatial mediation is required. As a point of departure, it was established that it would be more feasible to **station the design permanently** at a specific location, as opposed to a mobile intervention. In divergence of mooring a possible ship merely at port, the permanent dry docking thereof was rendered more advantageous. Enlisted under the National Port Authority (NPA), the South African shoreline only has four dry-docks that would spatially permit such an intervention (refer to figure 2.2). Ensuing that Cape Town retains two dry docks, the selection of the Victoria and Albert Waterfront as setting was deemed proper.

Some of the world's most pioneering real estate developments have taken place at waterfronts where the cultural and historic **links between land and water were re-established**. Once patented as a mere idealistic vision with little to none viability to ever fully materialise, the Victoria and Albert Waterfront at present receives 22 million visitors annually, classing it as one of South Africa's leading real estate success accounts. Exceeding all expectations, the V&A Waterfront has earned its place as South Africa's most visited destination - **bringing new meaning to the romantic description of Cape Town as the 'Tavern of the Seas'** (Breen & Rigby,1996:16). Situated at the southernmost tip of the African continent, Cape Town's stunning scenery, pleasant climate, rich heritage and striking wine lands make it a favourite amongst tourists. Affluent accessibility and tightly abridged markets allow favourable location for business, recreation and dwelling.

With the establishment of the Dutch East India Company during 1652, the developmental history of Cape Town's Foreshore and Waterfront as a refreshment station occasioned into an array of growth. Along with extensive market research which covered aspects such as **retail demand, tourism opportunities, demand for hotel development and the state of the residential market** along Cape Town's Atlantic seaboard, the institution of the V&AW Urban Plan and Development Framework in 1989 allowed for an historic six-phase expansion project. In addition to progressive goals, the creation of rich and diverse environments appropriate for public spaces, the conservation and enhancement of elements with cultural significance and the restoration of the historic link between the harbor and the City of Cape Town were envisioned. With the sixth phase completed in 2006, additional development of the residential and commercial sector composed way for the 2020 ocean vision of the Granger Bay precinct to commence (van Zyl, 2010:8). In addition to retail and corporate substance, the adjacent districts will be activated through the implementation of a world-class marina, ocean-liner terminal and supporting facilities. Furthermore, this vision structures part of the Tourism and Hospitality Outlook of Southern Africa, where **an increase in cruise demand is envisioned** (PwC, 2014:62).

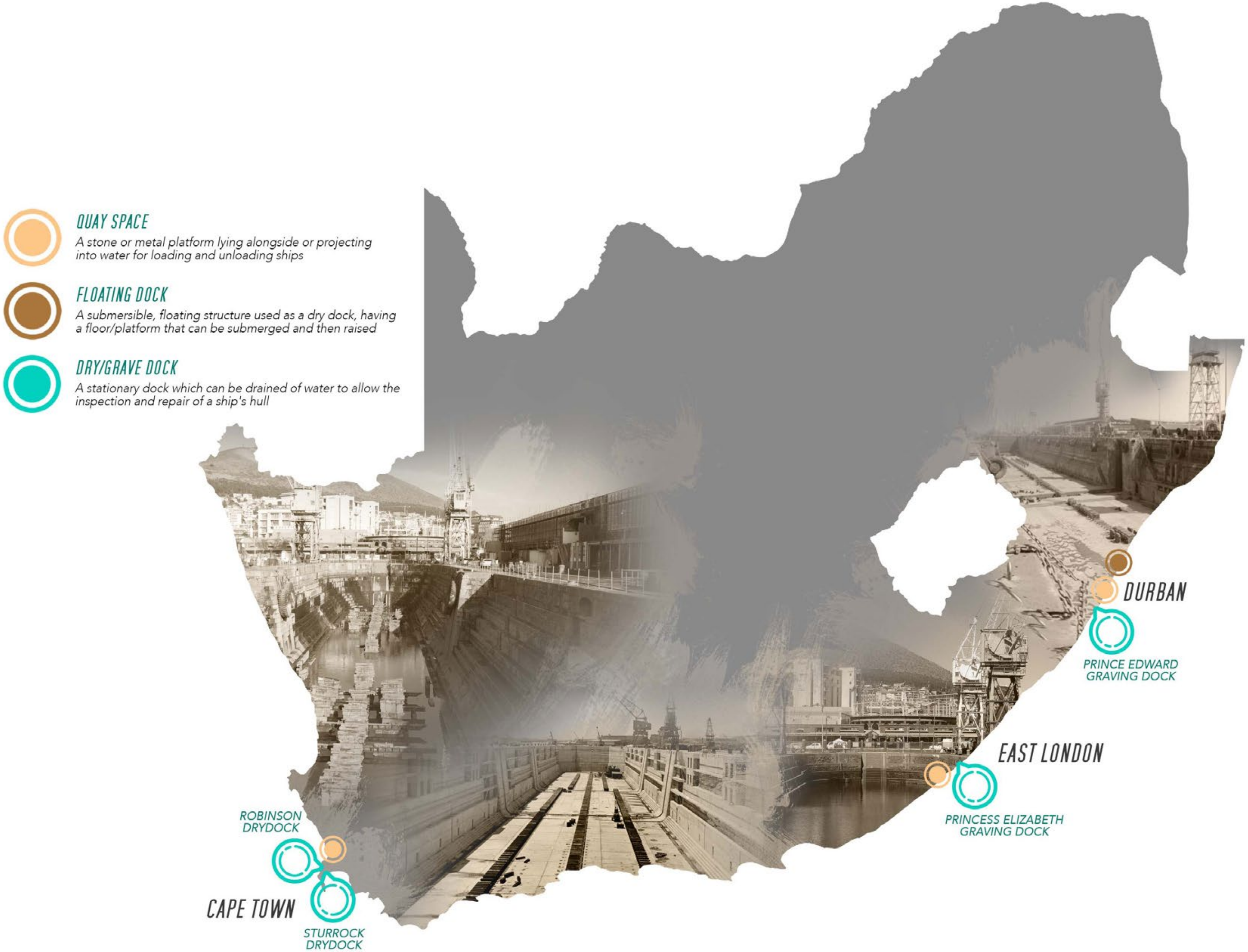
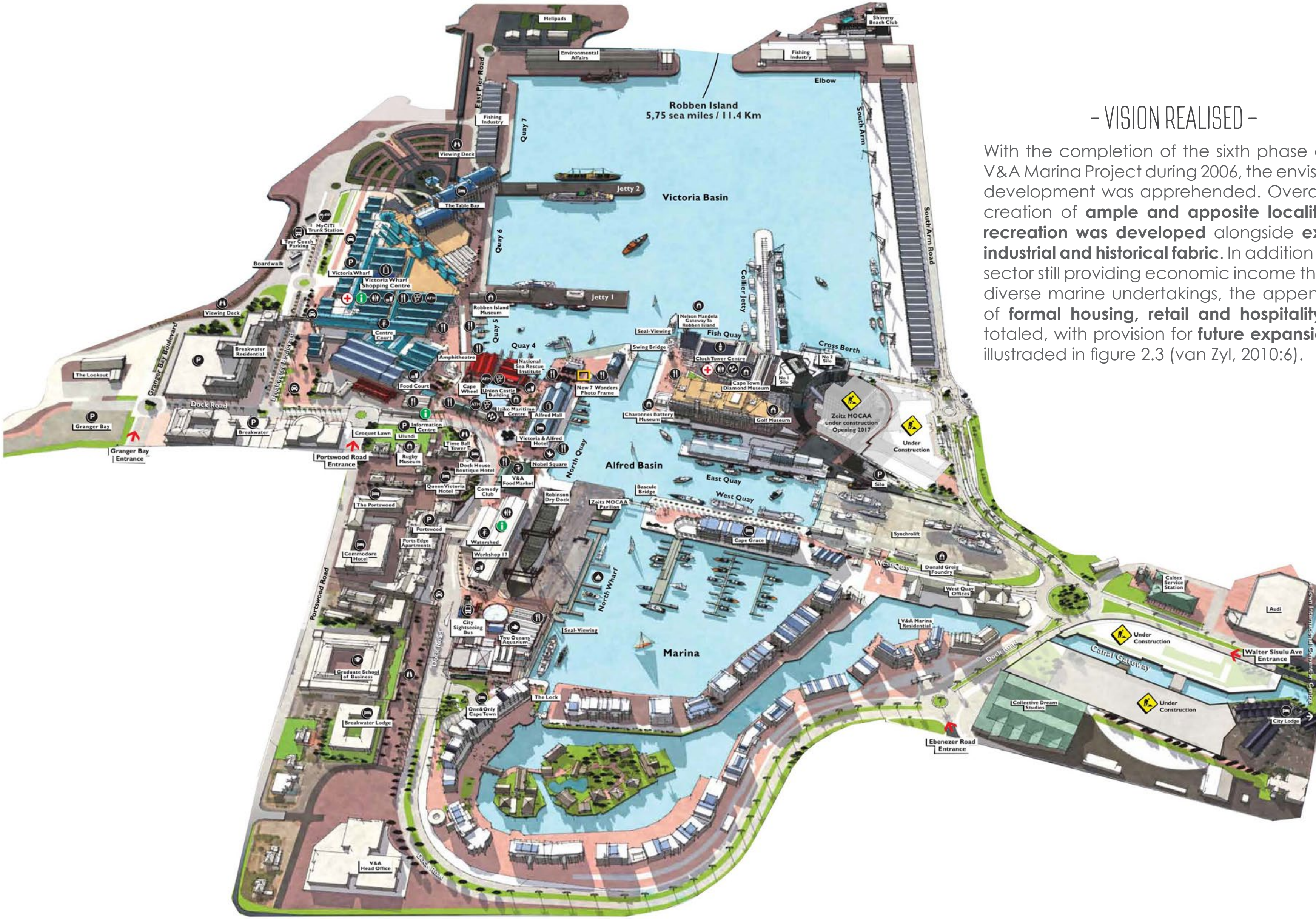


Figure 2.2. Docks Along the Coast of Southern Africa (Author, 2016)



– VISION REALISED –

With the completion of the sixth phase of the V&A Marina Project during 2006, the envisioned development was apprehended. Overall, the creation of **ample and apposite localities of recreation was developed** alongside **existing industrial and historical fabric**. In addition to the sector still providing economic income through diverse marine undertakings, the appendage of **formal housing, retail and hospitality** was totaled, with provision for **future expansion**, as illustrated in figure 2.3 (van Zyl, 2010:6).

Figure 2.3. The V&A Waterfront Precinct (Lancaster, 2015)

2.1

ROBINSON DRY DOCK AS HOST

Situated within the Alfred Basin, the Robinson Dry-dock is considered being the oldest operating dry dock of its kind in the world and dates back early 1882 (refer to figure 2.4). Named after Governor Sir Hercules Robinson, it was used to repair over 300 ships during WWII. As it was originally built with a position for an intermediate caisson, its common use allowed for multiple dockings of two or more smaller vessels simultaneously. As technology advances, the need of an adjoining water facility was deemed redundant. The Pump House situated right adjacent to it (now housing a comedy club and food market) was used to pump the water out (SAOGA, 2013: n.p.).

Regardless of its historical significance, Robinson Dry-dock is listed under the National Port Authority (NPA) as a dock of concern, as the NPA has been attempting to run this waterfront at a profit, but to no avail. In a recent study commissioned by the provincial government of the Western Cape, conclusive findings shown that current NPA docking charges within this old dock is running at some five times the international norm. As the risk assessments of dry docking in this facility have reached a point where foreign owners are starting to baulk at the notion of its deteriorating equipment, the feasibility of its continued operation has been questioned. Proposals on the modernisation of this facility has reached staggering heights, as the financial injection required is rendered implausible against the wide array of associated risks (Mackie, 2007:55).

This study suggest the **pronouncement of the dock as a site of conservation**, permitting **suitable, current and economical repurposing**, similar to the Cutty Sark and Grimshaw precedent, which is reviewed as imperial case studies on pages to follow.

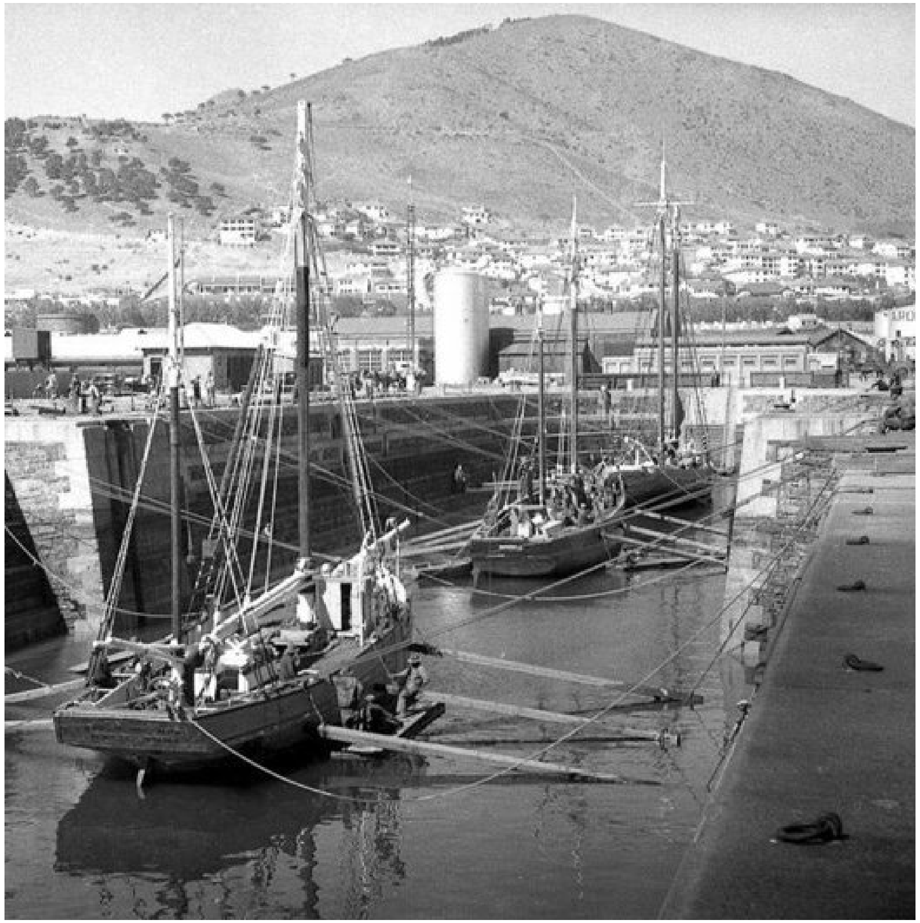


Figure 2.4. Robinson Dry Dock in Service (NPA, 1882)

Figure 2.5. Robinson Dry Dock Looking Towards Dock's Head (NPA, 2014)

- SURROUNDING CONTEXT -

The V&A Waterfront lies on the shores of Table Bay and has a dramatic physical setting, located between **two of the world's greatest urban icons - Table Mountain and Robben Island**. Surrounding the docks immediate locality is a wide array of popular commercial establishments. On its North-Eastern side lays the original dock's pump house that was converted into a theatrical establishment during the late 1900's. Adjacent to this is an old warehouse now known as Workshop 17, which has been lucratively rehabilitated into a conference and collaboration space. Opposite workshop 17, is a **vacant docking space used during ship repairs on site**. This area permits an ideal solution to parking and acts as a connecter between the immediate **dock and harbour.** Situated on the docks south-eastern façade is the world renowned Two Ocean Aquarium - a popular tourist attraction countenancing enduring activity (refer to figure 2.6 and 2.7).

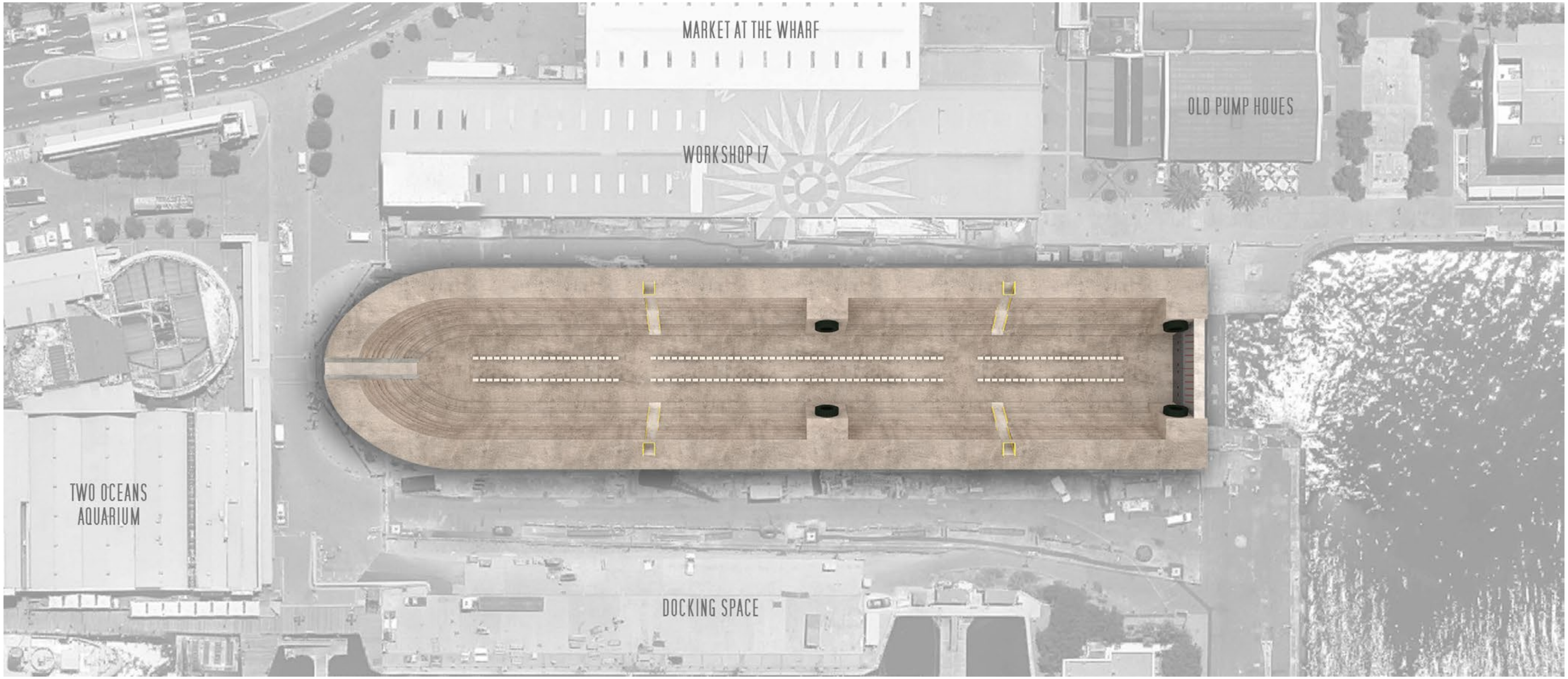


Figure 2.6. Robinson Dry Dock Immediate Context (Author, 2016)

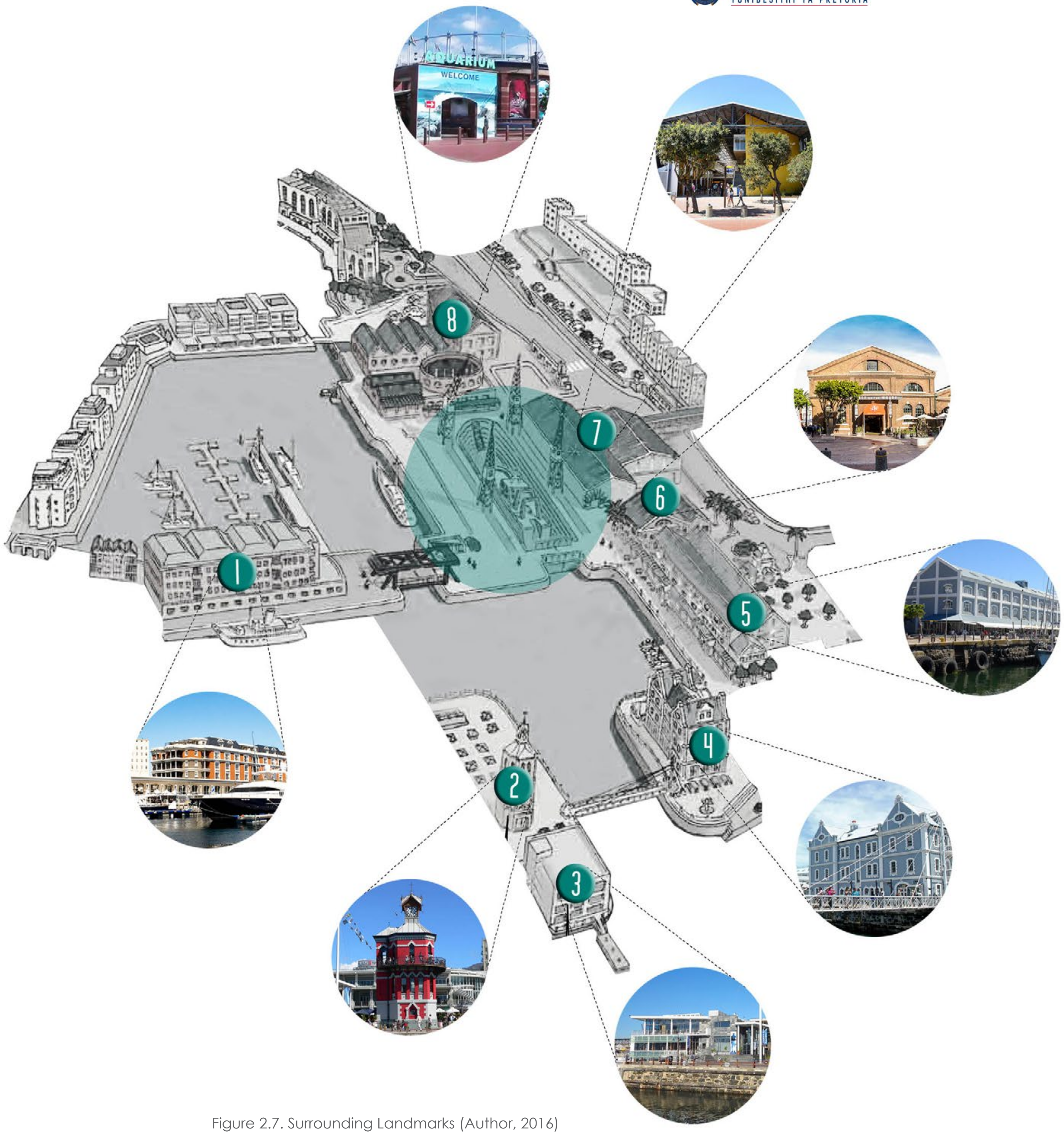


Figure 2.7. Surrounding Landmarks (Author, 2016)

1 CHAVONNES BATTERY | MUSEUM: 1725

This battery was the first major defence facility built (1714 to 1725) by the Dutch East India Company after the Castle. Its purpose was to defend the anchorage in the bay; this was achieved by an overstocking of cannons and mortars.

2 CLOCK TOWER | HERITAGE MONUMENT: 1882

This octagonal Victorian, Gothic-style Clock Tower was built in 1883 and was the Port Captain's first office in the newly constructed harbour. It housed the tide gauge mechanism which worked by a shaft connected to the sea.

3 NELSON MANDELA GATEWAY | MUSEUM: 2000

The Robben Island Exhibition Centre is situated next door to the Clock Tower building, and is a very unique museum depicting the history of Robben Island and the struggle for democracy. This is the embarkation building for visitors to Robben Island.

4 OLD PORT'S CAPTIAN OFFICE | MUSEUM: 1904

With the rapid growth of the harbour, the Port Captain, who was housed in the Clock Tower, moved across the 'cut' into this beautiful gabled building which was built in 1904. This new location offered space to perform a demanding, important job.

5 VICTORIA & ALFRED HOTEL | HOTEL: 1904

Formerly the North Quay Warehouse, this building was constructed in 1904 and was originally used as a cold store. It was then converted into a warehouse and baggage store for the Union Castle Shipping Line

6 MARKET ON THE WHARF | FOOD MARKET: 1902

The V&A Waterfront Food Market was founded by entrepreneur Greg Anderson in December 2012. With a passion for food, hospitality and retail he decided to take on the creation of a leading artisan retail store with a distinct market feel.

7 WORKSHOP 17 | COLLABORATION SPACE: 1885

Workshop17 is a hub that exists to accelerate innovation and entrepreneurship for a positive social and economic change.The space facilitates a community of passionate, innovative and interesting people, formally used as a pump house.

8 TWO OCEANS | AQUARIUM: 1907

The aquarium was opened on the 13 November 1995 and comprises out of the core of the Old Millwright's Building. The enchantment of this particular aquarium is due to its location, where the Indian and Atlantic ocean meet.

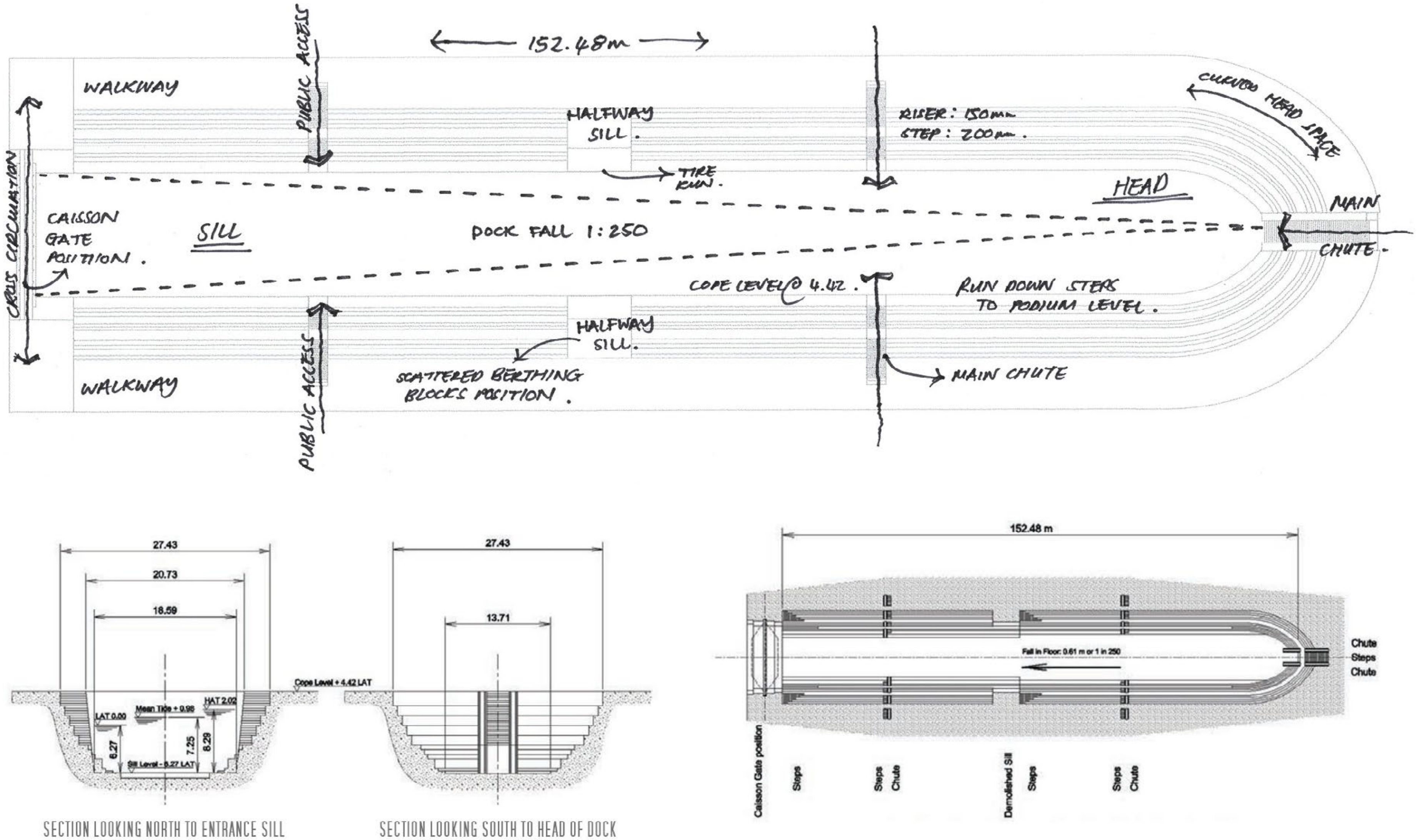


Figure 2.8. Robinson Dry Dock Technical Drawings (SAOGA, 2013)

- ANALYSING THE FOOTPRINT -

The actual dock space itself provides excellent opportunities for a spatial intervention. The dock is constructed out of **reinforced concrete** and dressed with stone masonry. Built to service two ships simultaneously, the central sill that hosted an intermediate caisson was demolished in order to accommodate larger vessels. The cross section of the dock mirrors its initial design for **wooden sailing ships** with rounded **bilges** and separate **bar keels.** The section (figure 2.8 and/or 2.9) is trapezoidal in shape with the edges shaped by **stepped altars** to receive side shores for the lateral support of vessels. However, the function of these side shores have been replaced by a system of sliding berthing blocks that elevate the hull of the ship for maintenance. Moreover, with already present stair access shoots down to the podium, the addition of **universal access will be required**. The podium provides a virtually leveled surface, being that the current fall ratio is too little to notice in distance.

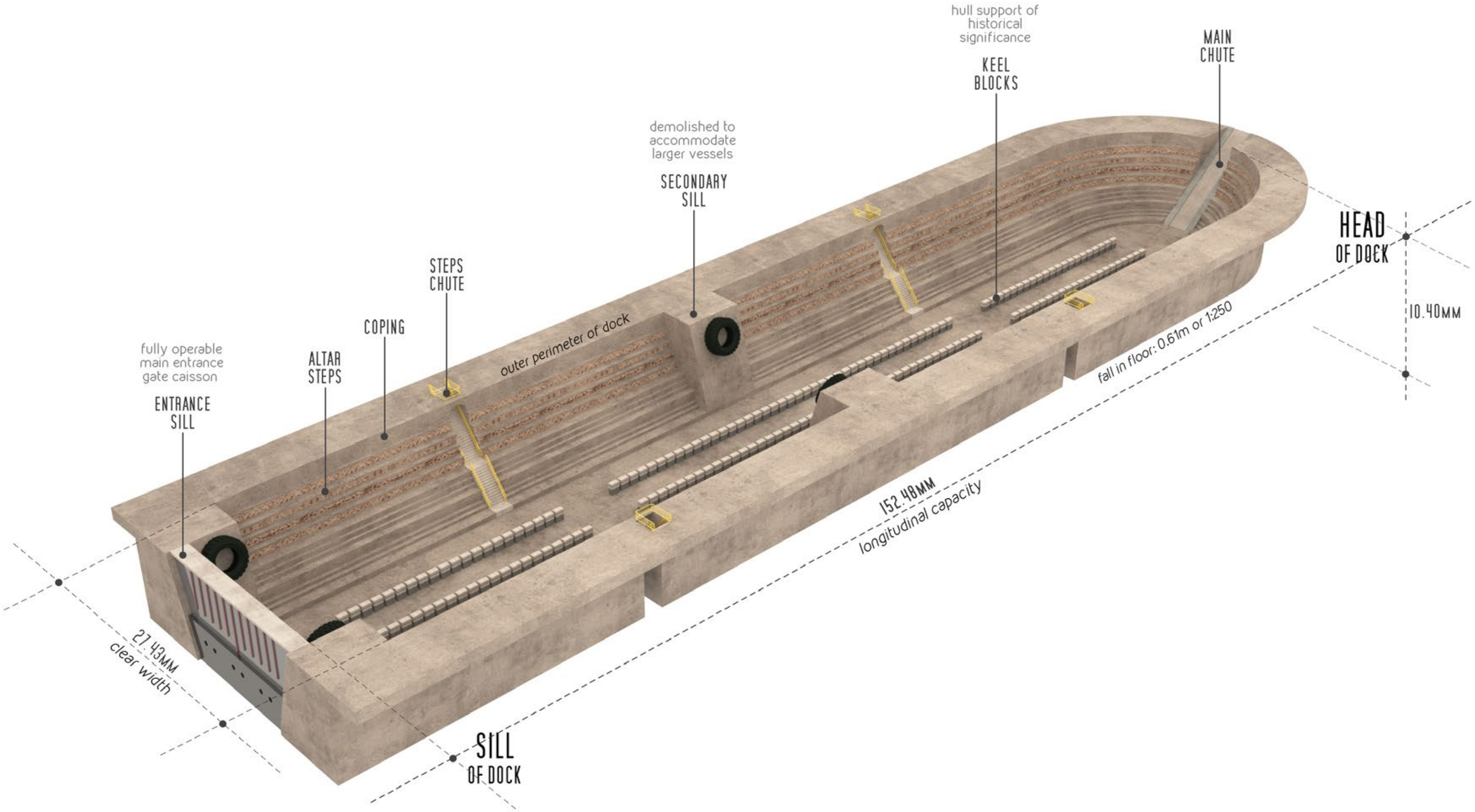


Figure 2.9. Existing Robinson Dry Dock Analysis (Author, 2016)

- LAYERS OF THE V&A WATERFRONT -

In addendum to the familiarisation of a setting's reality, a strong discernment of all current facets totaling up to its current state of being must be individually surveyed. **Four distinct layers were identified** (figure 2.10) which summarises the existing character and prominence of the Victoria and Albert Waterfront. The initial layer is devoted to its **cultural facet** which is rich in a diverse a**ssortment of nationalities and tradition**. Secondly, a **historic** slant is quite evident. In addition to a wide selection of **recreational facilities,** the Waterfront pays homage to an **assortment of monuments, museums** and expanses of historical significance. The third layer is of **economic importance** and is heightened by enduring **marine activity (fisheries and harbour) and tourisms**. The final layer is reserved for **materiality**, which acknowledges the vast **contrast between the new and the existing fabric**. Per conclusion of the established notion, diagrammatic charting (refer to figure 2.11 - 2.13) was initiated in order to **illustrate the findings tangibly** and assert the feasibility of the proposed pragmatic response.

Figure 2.10. Layers of the V&A Waterfront (Author, 2016)

- RETAIL LAYER -

The initial layer is dedicated to the process of mapping out all **retail-orientated establishments**. This investigation will prove vital when aiming to **establish a unique pragmatic response** that will activate the envisioned intervention in this **highly saturated environment**. As indicated, almost every aspect of recreation is covered - from **retail and hospitality**, to **residential and office space**.

RETAIL FACILITIES
The sale of goods to the public in relatively small quantities for use or consumption rather than for resale.

CULINARY FACILITIES
A place where people pay to sit and eat meals that are cooked and served on the premises

HOTELS & INNS
An establishment providing accommodation, meals, and other services for travellers and tourists, by the night.

MUSEUM & EXHIBITION SPACE
A building in which objects of historical, scientific, artistic, or cultural interest are stored and exhibited.

RESIDENTIAL
Property use in which private housing predominates, as opposed to public, industrial and commercial occupation

MEDICAL FACILITIES
A public institution providing medical and surgical treatment and nursing care for sick or injured people.

EDUCATION & COLLABORATION
A high-level educational institution in which students study for degrees and academic research is done.

RECREATIONAL FACILITIES
A public tourist attraction where activity is done for enjoyment and recreational purposes

INDUSTRIAL OFFICE FACILITIES
Acommercial building for storage of goods, and used by manufacturers, importers, exporters etc.

Figure 2.11. Retail Layer of the V&A Waterfront (Author, 2016)

- TRANSPORT INFRASTRUCTURE LAYER -

The second layer is dedicated to the underlying issue of **infrastructure availability** in terms of **transportation**. Ample parking is available at selected establishments, but **limited in proximity**. **Public transportation is greatly encouraged** by the availability of the **MyCity BRT System**, with nearby routes present at the dock. In addition to sufficient public transport, the possibility subsists of converting the vacant berth space on the **south-eastern side of the dock to parking**.

Figure 2.12. Infrastructure Layer of the V&A Waterfront (Author, 2016)

- HERITAGE LAYER -

The final layer of mapping is reserved for the allocation of **historically significant routes and monuments**. Similarly to being **rich in recreation**, heritage is also abundant in this precinct. This investigation illustrates the high availability of current museums and also the connection between the dock and the **historic routes**, specifically the **yellow track**.

1. TIME BALL TOWER
2. IZIKO MARITIME CENTRE
3. UNION CASTLE BUILDING
4. CAPE WHEEL
5. CAPE AMPHITHEATRE
6. SCHERYN PAVILION
7. DONALD GREIG FOUNDRY
8. PORTWOOD PRISON
9. BREAKWATER PRISON
10. CLOCK TOWER CENTRE

RED ROUTE
Clock tower route that features the Ball Tower of 1882

BLUE ROUTE
Fish route passing an aquarium complex and fish statue

GREEN ROUTE
Prison route featuring Cape Town's first historical jail

YELLOW ROUTE
Naval route featuring Cape Town's marine heritage

Figure 2.13. Heritage Layer of the V&A Waterfront (Author, 2016)

Figure 2.14. Danish Maritime Museum at Night (Mora, 2013)

PROJECT SYNOPSIS

Situated amid Kronborg Castle and the Kulturhavn Kronborg Cultural centre, the Danish Maritime Museum was established in a uniquely historic context. In an attempt to bring **cultural attractions** to the Helsingor's harbour, the introduction of a subterranean museum was **positioned in and around the existing dry dock.** Encased by a two-level rectangular structure, the museum's underground galleries exhibit the account of Denmark's rich **maritime history.** Making the dock the centerpiece of the exhibition - an exposed, open-air space allows visitors to experience the scale of this shipping structure. Acting as an **urban activator,** a series of several double-level walkways distance the dry dock, providing visitors with alternative routes to various segments of the museum, both above and underground. Connected by numerous exhibition spaces, the addition of an auditorium, classrooms, offices and a café **unites the old and new both in materiality and current utilisation** (Dezeen, 2013).

PROJECT OBJECTIVES

- The 60 year old dock must remain **untouched**. Both the existing fabric and new addition must be emphasised, but **not visually intrusive**.
- The dock must act as promenade that connects the harbour bridge, castle and new culture centre. (Kulturhavn Kronborg urban initiative)

IMPLEMENTATION STRATEGIES

- Treat the envisioned intervention with similar design objectives that will **respect existing fabric and limit invasiveness**. (Dock remains prominent)
- Construct **various forms of accessibility** that highlight design aspects.
- Seamlessly, yet evidently incorporating the new with the existing.

Figure 2.15. DMM Courtyards (Hjortshøj, 2013)

NAME OF PROJECT
DANISH MARITIME MUSEUM

LOCATION OF PROJECT
HELSINGOR, DENMARK

CHIEF ARCHITECT
BIG ARCHITECTS

DATE OF COMPLETION
2013

theory

materiality

design

programme

2.2

SS NOMADIC AS HABITANT

In order to potentially illustrate the actual implementation of the **envisioned design**, a possible vessel in the form of the habitant must be identified. Apart from the desired tangible appearance and typography, the imperceptible historical significance of the sought after vessel must outweigh the likelihood of scrapping in order to be declared salvageable. In-depth research outlined an ideal archetype that was to be **industrial in design** and **ferrying in nature, due to scale and the desired open internal layout associated with this classification of tender vessels.** As most South African ships are either instantaneously scrapped upon decommission, too vast in scale for the identified dock or inadequate in terms of its classification, the search of an adequate vessel was extended to an international gradation. Being that all vessels are designed to be sea-bound, they are not restricted by locality - thus permitting international retrieval (Frazer-Nash Consultancy, 2009:317).

Commissioned in 1910 by the White Star Line to tender for the RMS Olympic and RMS Titanic, which due to their size was unable to dock at conventional harbors, the SS (Steam Ship) Nomadic ferried passengers, baggage, mail and supplies to and from large ocean liners moored off-shore. Built on slipway No.1, the keel of the SS Nomadic was laid down in Belfast's Harland and Wolff shipyards, where she was launched on 25 April 1911, followed by extensive sea trials that ultimately rendered her sea-worthy. The overall dimensions of the hull traversed 70m in length and 11m in width, with a gross registered tonnage of nearly 1,273 tons which could accommodate up to 1000 passengers when fully loaded.

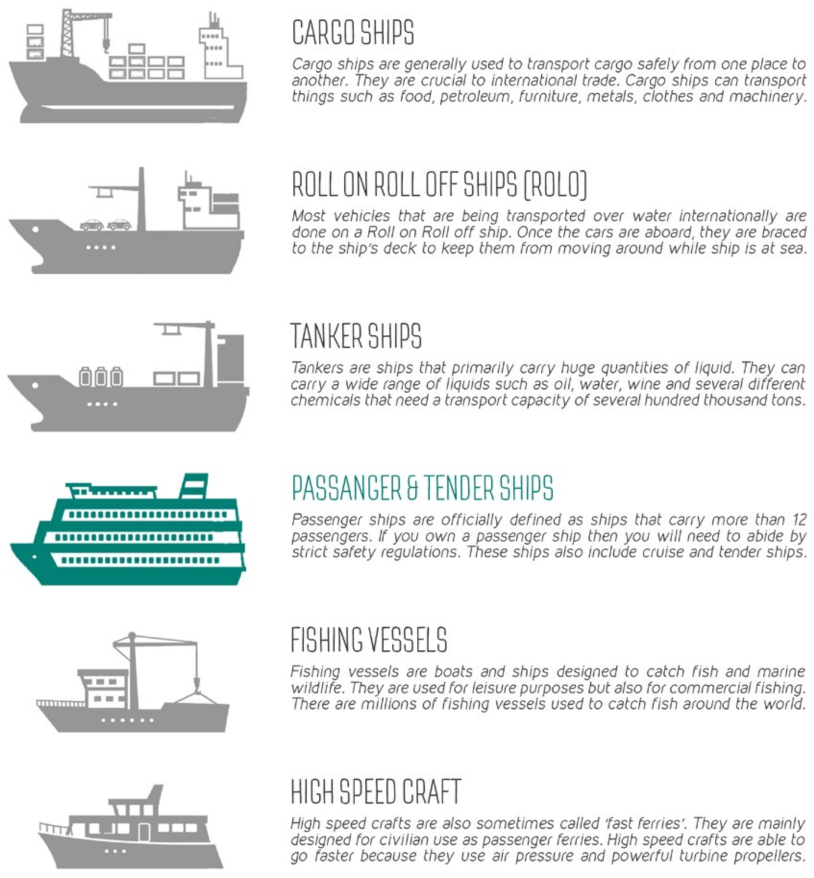


Figure 2.16. Vessel Classification (Author, 2016)

Figure 2.17. SS Nomadic Setting Sail (Besirevic, 2008)

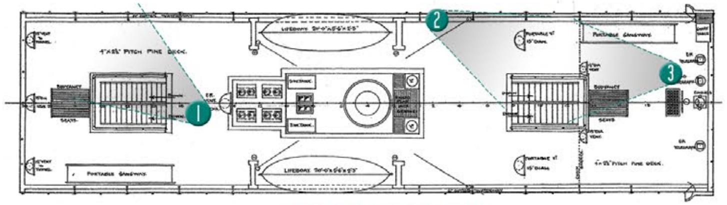
Two three-bladed propellers, each 21m in diameter, provided propulsion through two single-ended coal fired boilers permitting a maximum speed of 12 knots (22 km/h). Ruminated as a feat of industrial engineering, this vessel was primary constructed out of mild steel with adjoining beams, watertight bulkheads and riveted hull plating framing the enclosed steel structure. Comprised out of four distinct decks, her typology as a tender vessel allowed for an open layout which consisted out of lower and upper deck passenger lounges with various hold spaces beneath deck. Divided into first and second class passenger areas, this vessel was subjected to strict forms of classism as dictated by the naval political regime of the time. **First Class passengers enjoyed the lavishly adorned areas afore of the ship, whereas second class ticketholders were permitted to upper levels aft**. A trivial area in the aft end of the lower deck was allocated for overspill of third-class passengers, should passenger capacity exceed tonnage on the **SS Traffic**.

Following similar stylistic requirements as illustrated in the deck plans to follow (figures 2.19 - 2.23), the SS Nomadic was fitted out akin to the liners she was built to serve. **Apart from being superior in construction, her onboard luxuries surpassed any tender ship of her day.** As such, special attention was directed towards internal comfort in terms of aesthetics and novel design. With cushioned **timber benches**, **oak marble** inlayed tables, gender-specific bathrooms with **porcelain** water fountains and a distinct buffet bar, the contained **ornate plasterwork** and **decorative joinery** predominantly in first class areas, the SS Nomadic was regarded as a trophy ship to the White Star Line fleet. Fitted out in the United Kingdom, **abundant natural light**, **adequate acoustic treatment**, and **opulent flow** allowed for a novel **hotel-like experience** on upper levels. However on lower decks, the **honesty of true sea commute was exposed** through **minimal comfort, no natural light and little insulation**. Regardless of these seemingly inhumane environments, these conditions were ranked superior above other methods of commute available for Lower Class at that time (Frazer-Nash Consultancy, 2009:125).

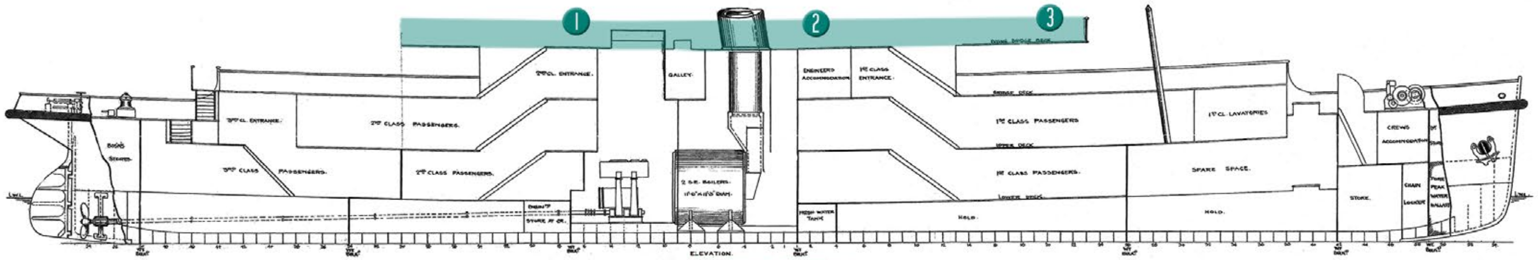
Figure 2.18. The Renovated SS Nomadic (Besirevic, 2008)

- BRIDGE FLYING DECK -

This deck is the uppermost level of the vessel and projects out at both the forward and the aft ends over the bridge deck. Supported by the stanchions and curved supports fixed to both port and starboard sides of the bridge deck, the forward end houses navigation equipment. This open bridge contains the original ship's wheel, a compass and a pair of telegraphs for communication with the engine room.

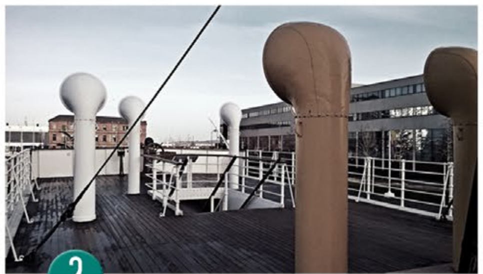


BRIDGE FLYING DECK PLAN
SCALE: N.T.S



SECTIONAL ELEVATION
SCALE: N.T.S

1 *flying bridge deck aft view*



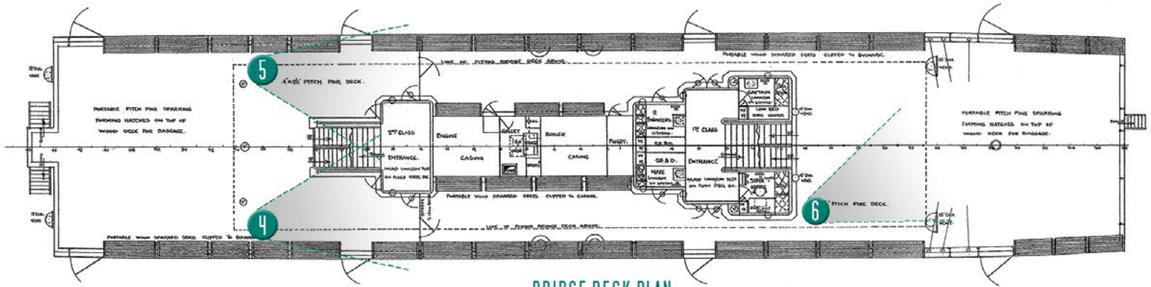
2 *flying bridge deck fore view*

3 *flying bridge deck aft view*

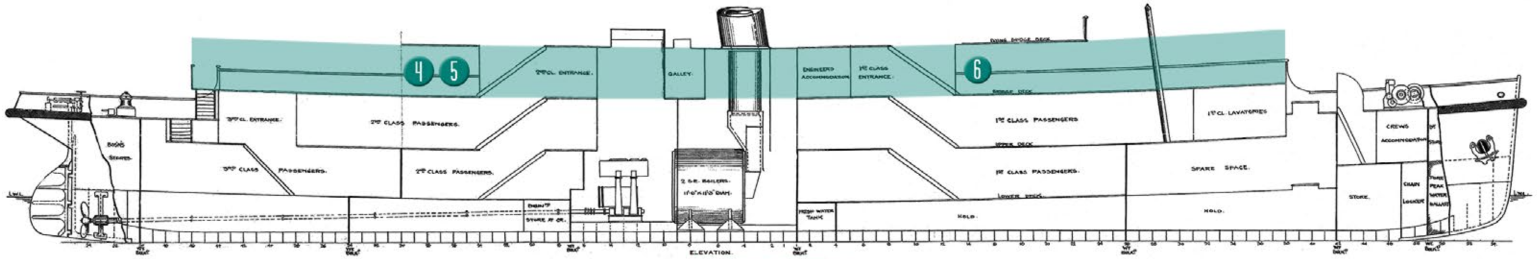
Figure 2.19. SS Nomadic's Flying Bridge Deck (Berry, Hunter, McDonald, Mooney and Stanley, 2015)

- BRIDGE DECK -

This deck provides the uppermost level of access onto the vessel, with four gates on either side which could accommodate gangways for passengers and luggage, as well as First and Second Class passenger entrances, a galley for the crew, and accommodation for the ship's officers. In its original form the bridge deck was fully enclosed with bulwarks on all sides, and included stairs at the aft end providing access down to the Third Class lounge and a ladder at the forward end for the crew.



BRIDGE DECK PLAN
SCALE: N.T.S



SECTIONAL ELEVATION
SCALE: N.T.S

4 covered bridge deck fore view port side

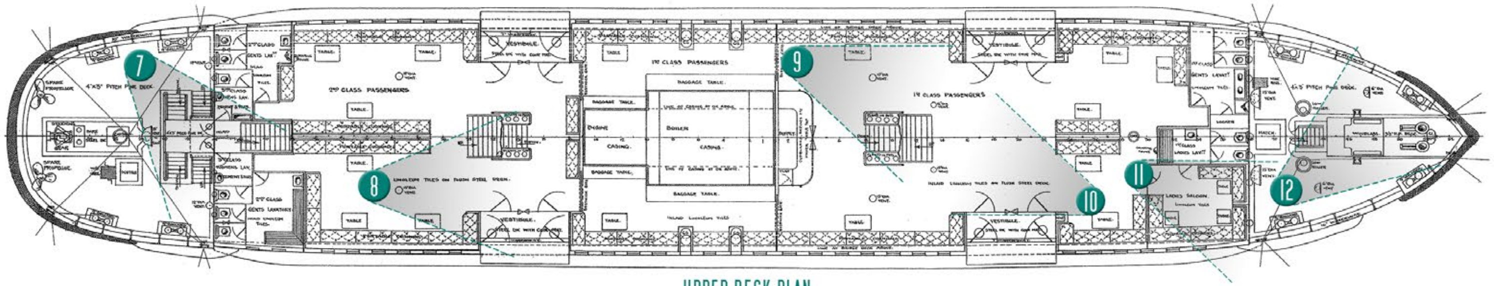
5 covered bridge deck fore view starboard side

6 covered bridge deck fore view

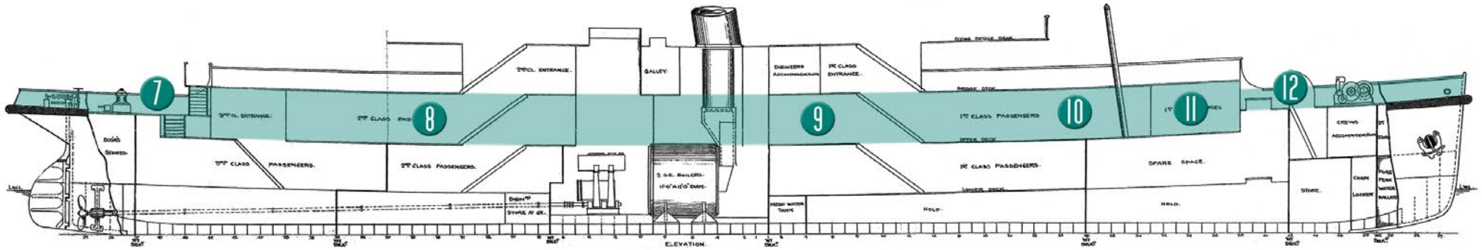
Figure 2.20. SS Nomadic's Bridge Deck (Berry, Hunter, McDonald, Mooney and Stanley, 2015)

- UPPER DECK -

This level contains doors and vestibules on either side, providing direct lower access onto the First and Second Class upper lounges, as well as aft decks and forecastle. Situated on either ends of the lounges, lavatories were positioned with an added saloon for First Class passangers. Additional amenities included the provision of a First Class buffet station, baggage tables and ample covered seating.

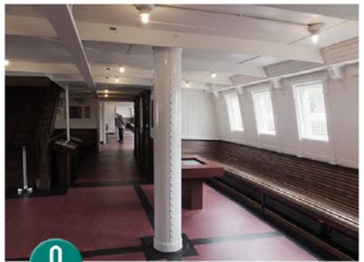


UPPER DECK PLAN
SCALE: N.T.S

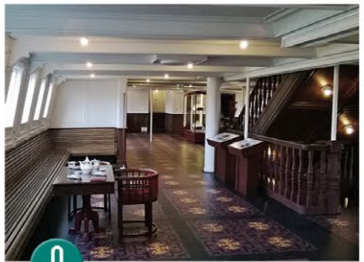


SECTIONAL ELEVATION
SCALE: N.T.S

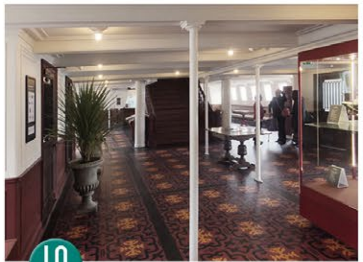
7 aft bow poop deck stairwell



8 upper second class lounge looking fore



9 upper first class lounge looking fore



10 upper first class lounge looking aft

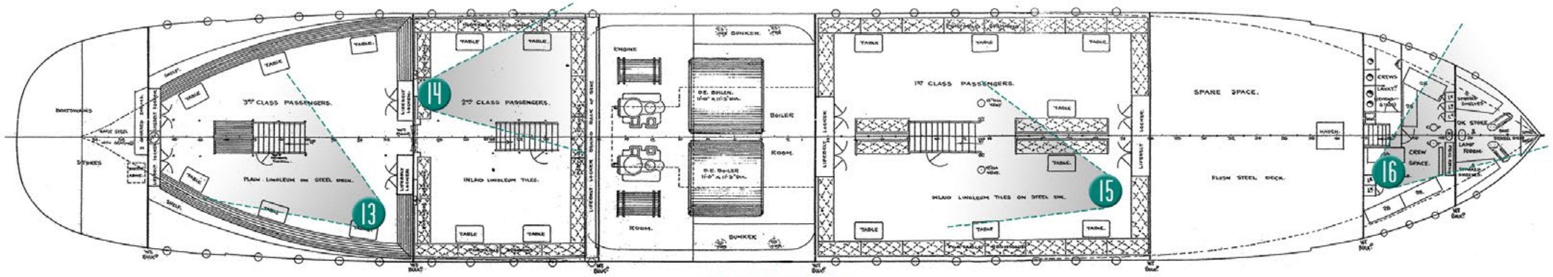
11 first class female powder room

12 bridge deck forecastle

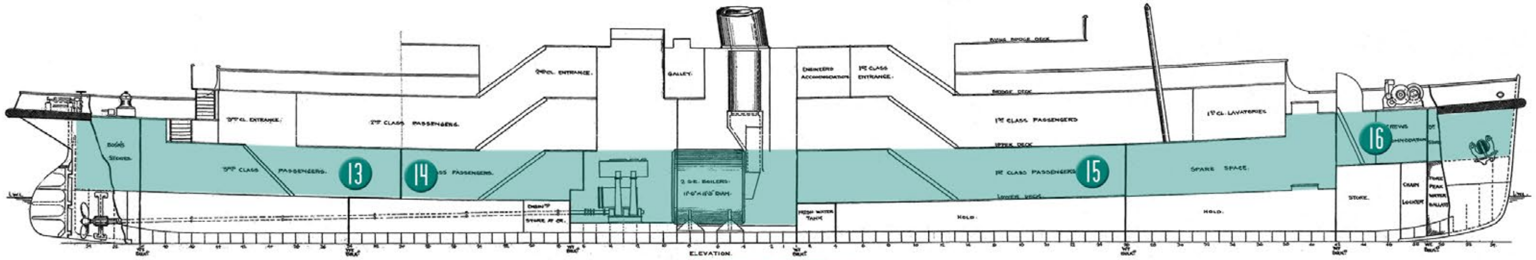
Figure 2.21. SS Nomadic's Upper Deck (Berry, Hunter, McDonald, Mooney and Stanley, 2015)

- LOWER DECK -

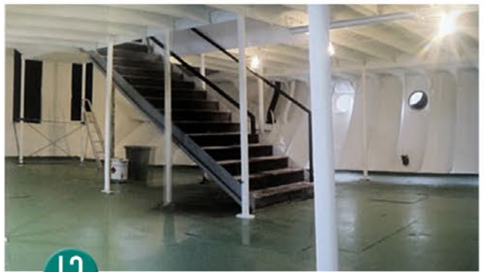
This deck contains the lower level First and Second Class lounges, as well as a Third Class lounge, the crew accommodation, the now vacant engine and boiler rooms, and some spare storage space. Additional elements of importance include the provision of built-in lifebelt lockers on either sides of the lounges, and a lamp room positioned in the forwards bow in front of the crew space.



LOWER DECK PLAN
SCALE: N.T.S



SECTIONAL ELEVATION
SCALE: N.T.S



13 *third class area looking aft*

14 *lower second class lounge looking fore*

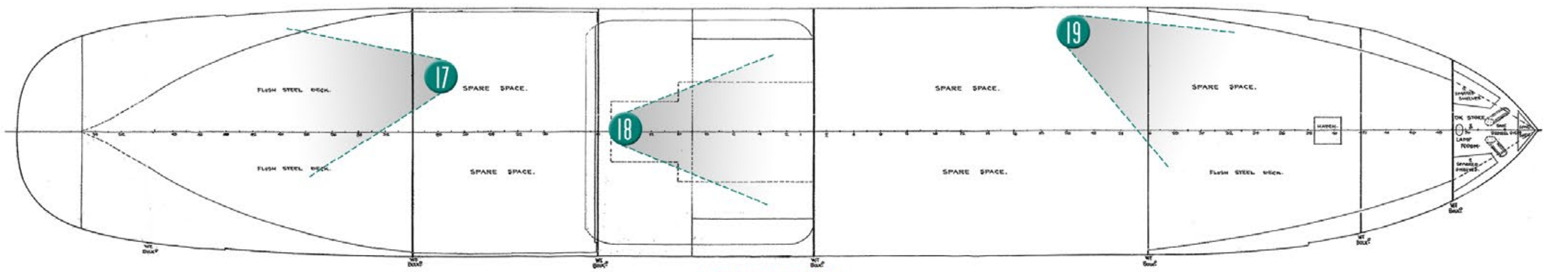
15 *lower first class lounge looking aft*

16 *fore full-time crew accomodation quarters*

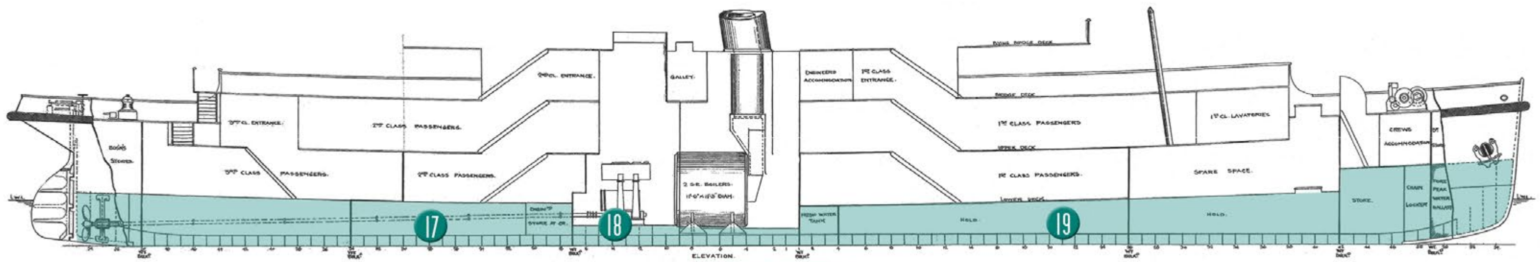
Figure 2.22. SS Nomadic's Lower Deck (Berry, Hunter, McDonald, Mooney and Stanley, 2015)

- BELOW DECK -

Also referred to as the hold, this level contains several fully functional water storage tanks, additional storage areas, and the propeller shaft spaces.

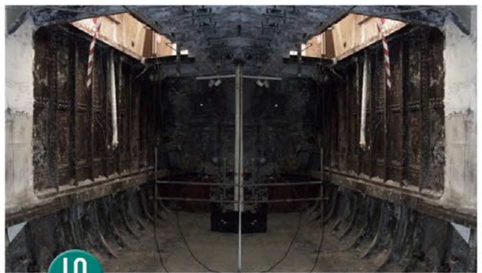


BELOW DECK PLAN
SCALE: N.T.S

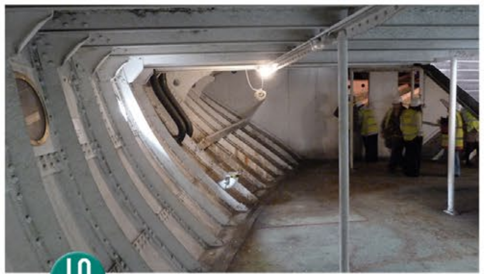


SECTIONAL ELEVATION
SCALE: N.T.S

17 *stern cargo hold aft view with cleared shaft space*



18 *empty boiler room fore view*



19 *bow cargo hold fore view*

Figure 2.23. SS Nomadic's Below Deck (Berry, Hunter, McDonald, Mooney and Stanley, 2015)

- TIMELINE OF THE SS NOMADIC -

Ever since her interval of conceivement, the history of the SS Nomadic was rich in proceedings. Outlining a vibrant history from maiden voyage to final act of service, her antiquity is illustrated in the timeline that follows.

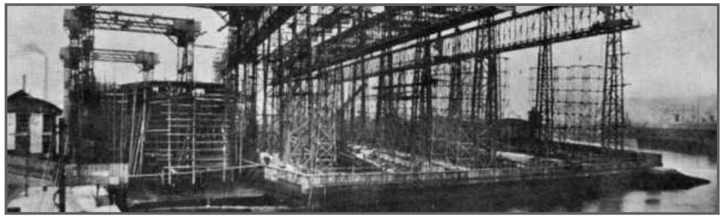


Figure 2.24. The Great Gantry of Harland & Wolff (Culture Club, 1910)

Figure 2.25. SS Nomadic in Cherbourg (Pivain, 1911)

Figure 2.26. SS Nomadic Tendering for the RMS Titanic (Cameron, 1997)

1910

DECEMBER 22

A LEGEND IS BORN

The keel of Nomadic is laid down in the Harland & Wolff shipyard in Belfast (Harland and Wolff yard number 422)

1911

APRIL 29

PLACED ON WATER

Nomadic is launched from slipway No.1 in Harland & Wolff shipyard, Belfast

MAY 16

TRAILS AT SEA

Nomadic completes sea trials succesfully under survealince of Captian Edward Smith

MAY 27

DELIVERED TO THE WHITE STAR

Nomadic is officially delivered to the White Star Line as a tender vessel

MAY 31

ON HER WAY TO CHERBOURG

Olympic and Nomadic leave Belfast bound for Cherbourg (same day RMS Titanic is launched)

JUNE 14

MAIDEN TENDER VOYAGE

Nomadic tenders RMS Olympic when called into Cherbourg on her maiden voyage to New York

1912

APRIL 10

RMS TITANIC TENDER

Nomadic transfers 172 first and second-class passengers to the ill fated RMS Titanic

JUNE

BRIDGE IS COVERED

Due to recurring bad weather, Nomadic receives a covered flying bridge deck

Figure 2.27. White Star Line ferry lighters SS Nomadic & SS Traffic (Haberlein, 1917)

1917

APRIL

NOMADIC GOES TO WAR

Nomadic is requisitioned by the French Government. Nomadic is sent to Brest to serve as a troopship for the U.S. 7th infantry division for nearly two years

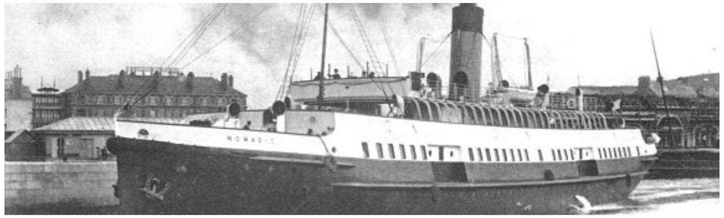


Figure 2.28. The Renovated SS Nomadic (Unknown, 1919)

1919

AUGUST

THE WAR IS OVER

The SS Nomadic returns to commercial service tendering ships starting with Caronia of the Cunard Line

Figure 2.29. SS Nomadic in Port (Unknown, 127)

1927

13 MARCH

SOLD TO CCT

The SS Nomadic was sold to the Compagnie Cherbourgeoise de Transbordement

Figure 2.30. The Launch of the SS Nomadic after Repairs (Harland and Wolff, 1928)

1928

NOVEMBER

COLLISION WITH ORINOCO LINER

Nomadic is involved in a collision with the Liner Orinoco with minor damage that were quickly repaired. No injuries were mentioned in either incident

Figure 2.31. Cherbourg Company Tow and Rescue (Gruss, 1934)

1934

UNKNOWN

DEEP WATER BERTH OPENED

Cherbourg opens a deep water berth so making all the tenders redundant

APRIL

NEW ORDER, NEW NAME

Following the merger of White Star and the Cunard Line, she was sold again to the Société Cherbourgeoise de Suavetage et de Remorquage and re-named Ingenieur Minard.

Figure 2.32. SS Nomadic in Use (Unknown, 1937)

Figure 2.33. SS Nomadic in World War II (Alamy, 1943)

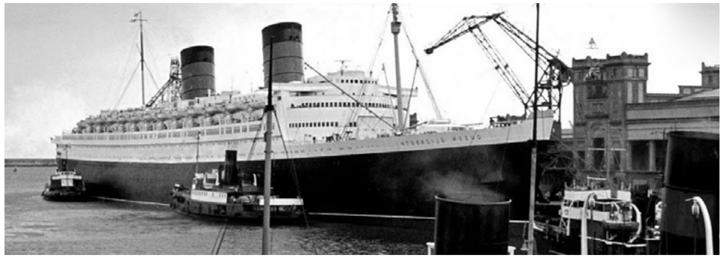


Figure 2.34. RMS Queen Elizabeth & SS Nomadic in Cherbourg (Godefroy, 1966)

Figure 2.35. SS Nomadic Final Tender for RMS Queen Elizabeth (Unknown, 1968)

1936

NOVEMBER

TENDERING FAMOUS LINERS CONTINUES

Nomadic is dry docked in Cherbourg for essential repairs before continuing to serve some of the world's most famous liners

1940

JUNE 16

ESCAPE FROM THE ARMIES

Evacuate soldiers from the French aviation company Amiot to escape the German army

JUNE 18

NOMADIC RETURNS TO WAR

Sails to Portsmouth and is requisitioned by British Goverment as a ferry troop ship for soldiers

JUNE - 1945

FIVE YEAR WAR FERRY

She spends five years as a troop ship, ferrying soldiers from Portsmouth to training camps in the Isle of Wight

1945

JUNE 27

SAVED FROM SCRAPING

Nomadic is saved from scrapping by her former owner, Cherbourg Tow & Rescue Society

JUNE - 1968

FINAL STRETCH OF TENDERING

For the next 23 years she continued to serve the world's great liners, including Queen Mary and Queen Elizabeth

1968

NOVEMBER 4

FINAL ACT OF SERVICE

The SS Nomadic services the Cunard Liner Queen Elizabeth for the last time, after tendering for several decade


Figure 2.36. Historic Pier of Conflans-Sainte-Honorine (Alexandrin, 1970)

1969

SEPTEMBER

MOVE TO FRANCE

French businessman Roland Spinnewyn purchases Nomadic and tows her from Cherbourg to Conflans Sainte Honorine with the intention of transforming her into a floating restaurant


Figure 2.37. SS Nomadic on the Banks of the Seine in Conflans (Unknown, 1975)

1974

MID 1974

SOLD TO YVON VINCENT

Spinnewyn decides his dream is not practical and so the SS Nomadic is sold to entrepreneur, Yvon Vincent

Figure 2.38. The SS Nomadic in France (Nomadic Belfast, 1998)

1977

EARLY 1977

BONJOUR FRANCE

Towed to Le Havre and up the River Seine to Paris to serve as a static function venue.

JUNE 26

FROM FERRY TO EVENT HALL

The Nomadic was fitted with an auditorium and a dance floor.

1977 - 1999

NEXT TO THE EIFFEL TOWER

She plays host to many events and concerts over the following 22 years. Her internal layout is changed to suit each new venture

Figure 2.39. The Hull of the SS Nomadic (Unknown, 1999)

1999

MARCH

A SAFETY HAZARD

Closed due to health and safety regulations requiring annual inspections of her hull in dry docks

APRIL

FINANCIAL IMPLICATIONS

The current owner is in financial difficulties and can no longer afford necessary upkeep

Figure 2.40. An Abandoned SS Nomadic (Unknown, 2002)

2002

LATE 2002

SIEZED BY AUTHORITIES

The Nomadic was seized by the Local Paris harbour authorities who removed some of her superstructure, in order to pass under bridges

Figure 2.41. Repatriation of SS Normadic to Belfast (French Titanic Society, 2005)

2003

APRIL 1

DOWN THE RIVER SHE GOES

Nomadic is towed out of Paris and down the River Seine to Le Havre. On the way, her engines were removed

Figure 2.42. Nomadic Arriving at H&W's Ship Repair Dock (Neill, 2006)

2006

JANUARY 26

GOING BACK HOME

Sold at auction to Northern Ireland and she was subsequently transported back to Belfast

JULY 12

RESTORING HER TO ORIGINAL GLORY

Over 95 years after leaving Belfast, she finally returns home and plans for her restoration begin

Figure 2.43. Restoration of the SS Nomadic's Hull (Wilson, 2011)

2009

AUGUST

DOCKED AT HAMILTON

Nomadic was moved to Hamilton Graving Dock, on Queen's Road, Belfast, right next to the Titanic Museum. Restoration begins shortly thereafter

Figure 2.44. The Renovated SS Nomadic (NPS, 2012)

2012

NOVEMBER

RESTORATION COMPLETE

The final phase of full restoration works to the SS Nomadic was completed with the hull being completely restored

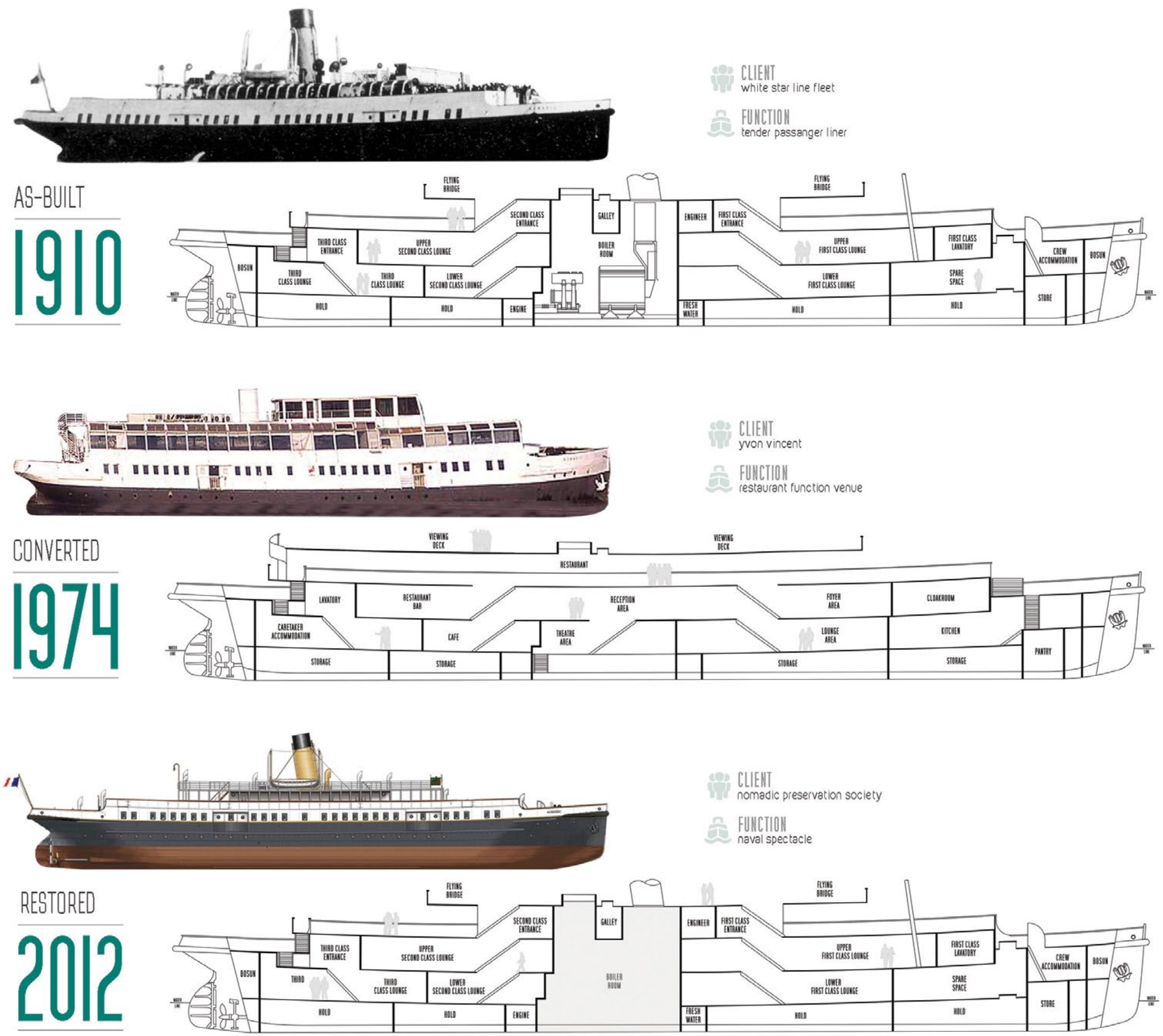


Figure. 2.45. Nomadic's Deck Configurations Throughout the Years (Author, 2016)

- LAYOUT & DECK TYPOLOGIES -

Over the past century, the occupation of the SS Nomadic was **adjusted in order to accommodate** the necessities of the relevant owners. With specific reference to figure 2.45, the vessel was initially designed to **cater as a tender boat**. The open plan layout of all decks rendered this vessel ideal for spatial intervention on an internal scale. Upon decommissioning, **all machinery and engines were removed**, permitting the vessel to be converted into a **docked restaurant and later auditorium**. The third and current configuration of the SS Nomadic necessitated the **complete restoration** of the ship to its original state. Bequeathing the **original boiler room completely vacant**, which extended from bridge deck to lower deck, a vast **double volume area** was generated. This **completed renovation and vacant spaces** allows for promising intervention to occur on land.

Figure 2.46. Cutty Sark Museum at Night (Grimshaw, 2012)

PROJECT SYNOPSIS

As the last surviving Tea Clipper Sailing Ship, the existence of the Cutty Sark portrays perceptible confirmation of the vast history associated with England's sea trade. After **careful restoration through a combination of electrolysis and mechanical cleaning**, the ship was **moored within a desolated dry-dock.** Cradling the historically significant and preserved hull, the addition of a **supporting structure** was embedded into the dock that allowed elevation. Furthermore, the addition of a **glass canopy** provides an **enclosed berthing interior**, which is used for conference and exhibition events (Grimshaw, 2012).

PROJECT OBJECTIVES

- Allow for the design of a structure that **preserves a historically significant artifact** which still sanctions complete **visual accessibility**.
- Restore the current nature of the Cutty Sark to its **original condition** through immense **interior and exterior renovation**.
- Create a prominent tourism destination that will **activate the surrounding harbor**.

IMPLEMENTATION STRATEGIES

- As the **most vital precedent investigation**, the envisioned spatial intervention will follow a **similar construct** in terms of **ship positioning and cradling**, as structural engineering knowledge is limited.
- Introduce approachability through the **implementation of accessibility** in, around and under the ship. Similarly to the Cutty Sark, the SS Nomadic has been **completely restored to its original condition** - thus not requiring renovation.
- Use general design approaches as reference.

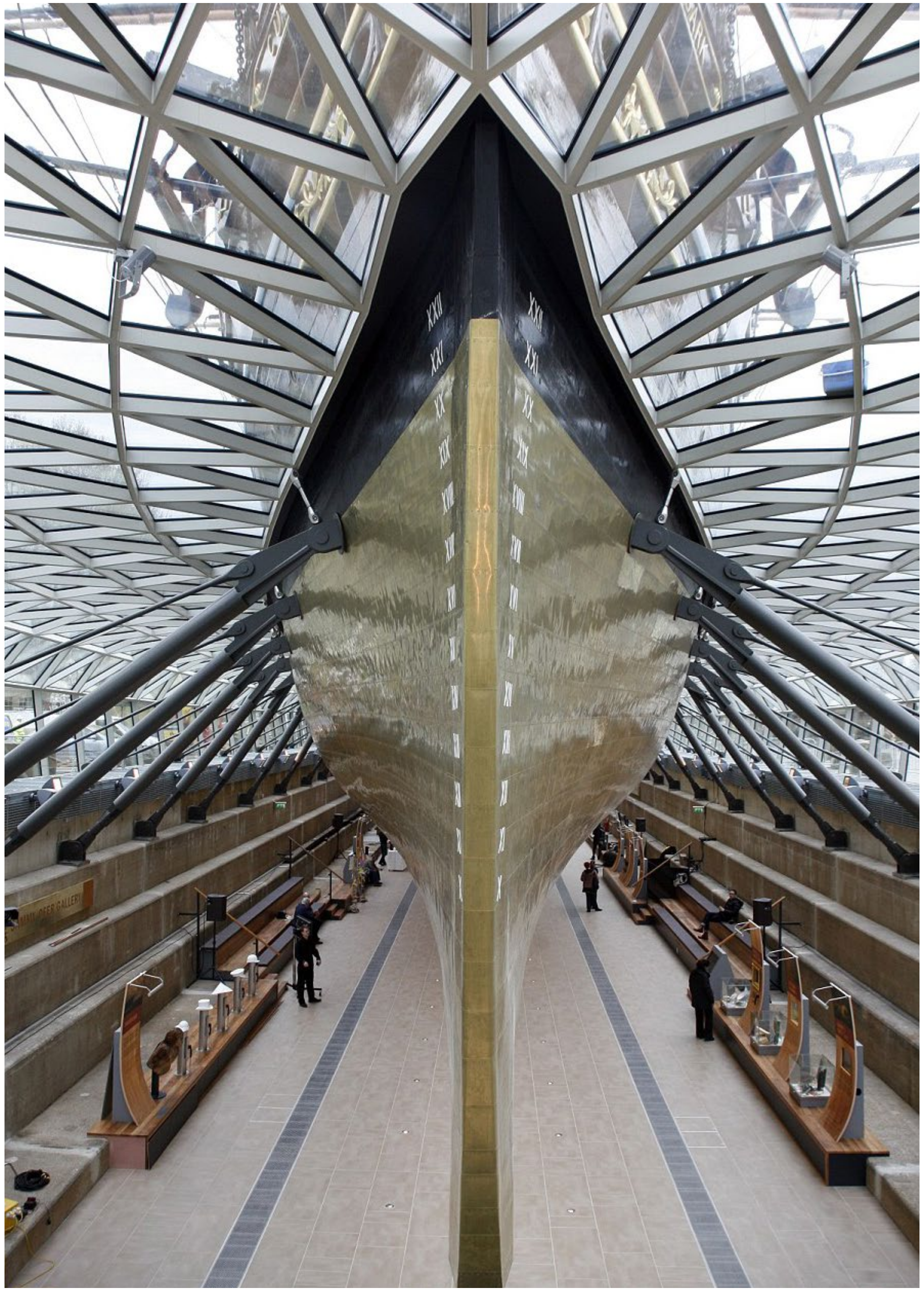


Figure 2.47. Cutty Sark Structure (Grimshaw, 2012)

NAME OF PROJECT
CUTTY SARK MUSEUM

LOCATION OF PROJECT
LONDON, UNITED KINGDOM

CHIEF ARCHITECT
GRIMSHAW ARCHITECTS

DATE OF COMPLETION
2012

2.3
PRAGMATIC RESPONSE

Founded on the concluded context analysis, the highly saturated market restricts and dictates the envisioned programme which will act as activator within the identified host and habitant. Furthermore, prior investigation concluded that a museum as only response would not be sufficient, as most repurposed ships are subjected to these conditions with limited and lackluster outcomes. As a growing form of commerce, the craft beer industry has shown a recent increase in **demand amongst South African cultures.** Surprisingly, **no local brewing facility or beerhouse is evident within the Waterfront precinct**, other than an international franchise (Den Anker) - thus proposing to **convert the SS Nomadic partially into a native brewery**. Not only will the production of saltwater beer be the first of its kind on native soil through the utilisation of abundant resources seeking to promote Cape Town's green culture, but also provide a literal example to the actual process of beverage 'corrosion' in the form of fermentation. Given that the actual size of Robinson dock permits additional activity, the supplementary addition of a craft market was deemed appropriate in order to ensure continuous and recurring activity.

The following segments will briefly outline the process of beer making, along with reverse osmosis, which will provide **potable saltwater for brewing purposes**. Though not architecturally relevant, the complete comprehension of these processes will act as design informant in chapters to follow.

Created by accident some thousand years ago, beer formed a strong bond with human society. Despite technological advancement, which parts ancient brewing techniques from today's **high-tech breweries, the practice in its traditional sort persists entirely unaltered**. Though primitive beers were derived from dough and cereals, this fermented beverage produced by dynasties that were completely unaware of the biochemical steps involved in the process (Pires & Branyik, 2015:2). From the raw material production and fermentation to the conditioning once kegged, **brewing beer encompasses microbial activity at every phase**. As regulated under the Reinheitsgebot, beer holds one of the oldest acts in the history of food regulation. As stipulated thereunder, the ingredients associated with the production of this alcoholic brew are limited to three primary ingredients; barley, water, and hops, with distinct variations thereof, conditional to the style desired. (Bokulich & Bamfortha, 2013:157). These styles are categorised under a conspicuous taxonomy of beer styles (as illustrated in figure 2.48), each imperiled by a fairly analogous brewing process, only differing in ingredients, boiling temperatures and fermentation periods.

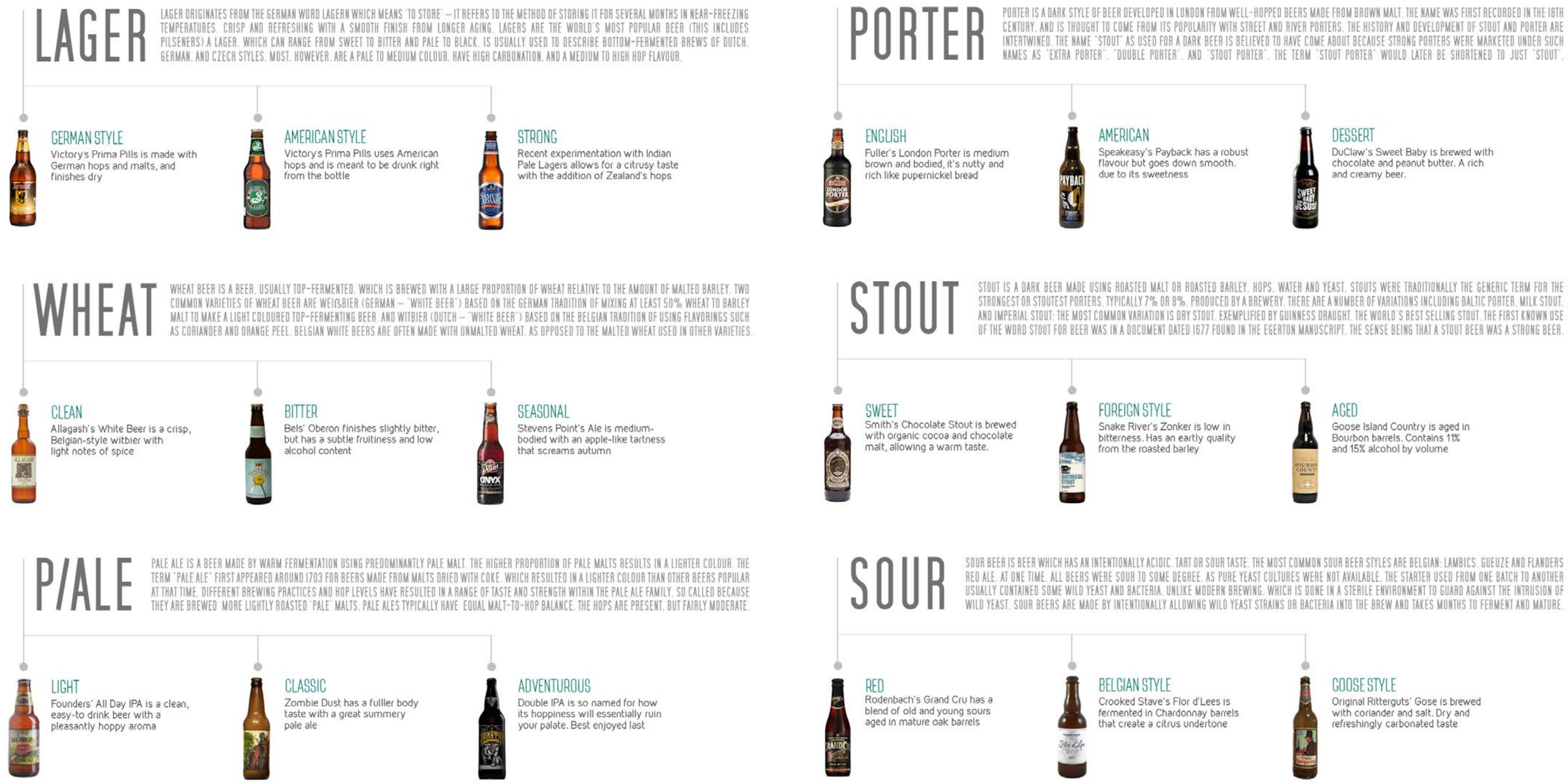


Figure 2.48. Figure. 2.23. Taxonomy of Beer (Author, 2016)

Figure 2.49. Er Boquerõn Advertisement (Boqueron, 2015)

APPEARANCE

Cloudy gold-orange. Bright white head. It teems with life as the fine-bubbled and seemingly natural carbonation lifts chunks and specks of yeast up into the glass and then releases them to drop and re-join the procession. Oddly, it has a limited head retention and next to no lacing.

AROMA

Salt and the pulp of previously squeezed citrus fruits including lemon and grapefruit.

FLAVOUR

The saltiness hits you, but not heavily, just slightly before the softly sweet malt and fruitiness. In the first few sips that could be either off-putting or enticing, depending on your own palate. There's a very mild tartness to it - ever so slight - which could be coming just from the yeast; and a clean salinity. A very mild bitterness helps to balance it, and it's a rather nice progression with salt followed by lemon, golden malty sweetness, and then more salt and a ghost of lemon in the lingering finish.

MOUTHFEEL

Medium bodied on the light side, effervescent and crisp.

OVERALL

Ahhh Barcelona. What a better summation of its aromas than this? The sea, the fruit, the underlying funkiness... 'tis Barcelona in a glass.

Figure 2.50. Er Boquerōn Beer (Boqueron, 2015)

NAME OF PROJECT
ER BOQUERON SALTWATER BEER

STYLE
GOLDEN ALE

MANUFACTURERS
XATIVA VALENCIA

FIRST BATCH
2015

theory
materiality
design
OPEN
programme

BREWING PROCESS

Steps in the brewing process include malting, milling, mashing, lautering, boiling, fermenting, conditioning, filtering and packaging. As illustrated in figure 2.51, this process may vary - all depending on the desired fermented beverage wished to be brewed. For the purpose of this study, the brewing method used for the production of a **pale ale** will be outlined. The **simple replacement of traditional fresh water** used during the lautering process with **potable saltwater,** can result into the creation of **salt pale ale beer.**

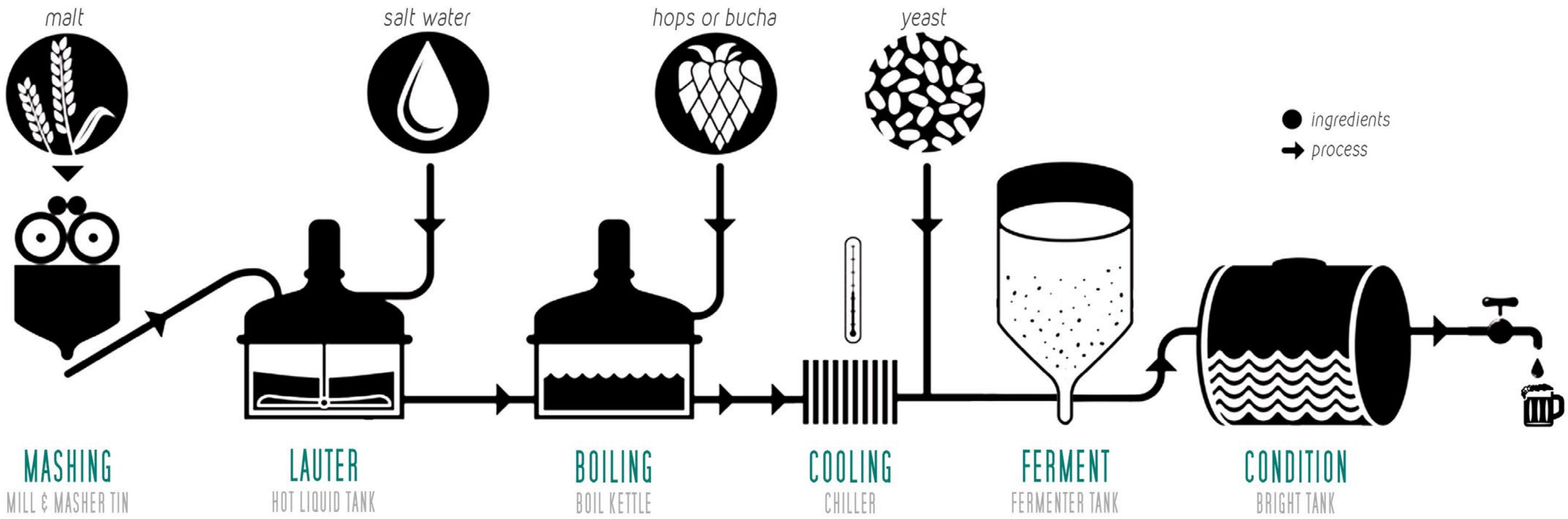
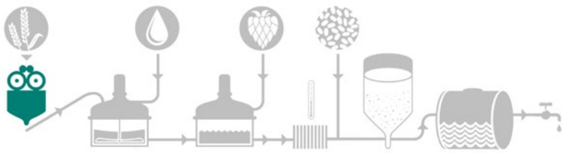


Figure 2.51. Pale Ale Brewing Process Overview (Author, 2016)



EQUIPMENT
MILL & MASHERTUN

DURATION
2 HOURS

TEMPERATURE
HOT WATER

- MASHING & MILLING -

After careful selection of the appropriate malt, which dictates colour and flavour, the malt is coarsely crushed or milled in order to expose its starchy core, all the while keeping all husks whole. These unabridged particles will act as supplementary filtering later in the process. The crushed malt, now referred to as grist, is combined with purified water which is heated and controlled in order to allow the grist's natural malt enzymes to break the starch into sugar.

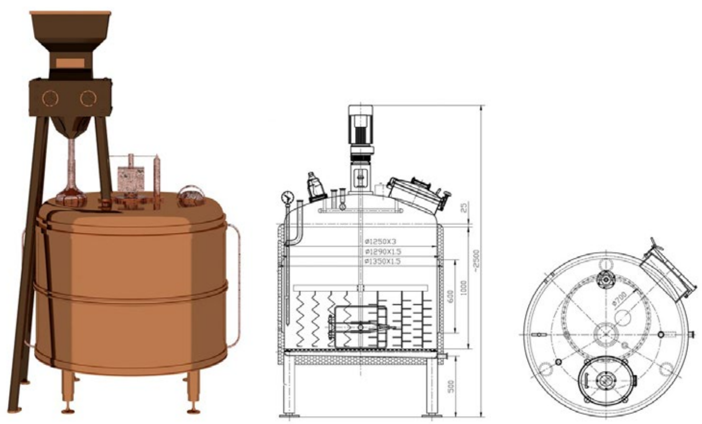
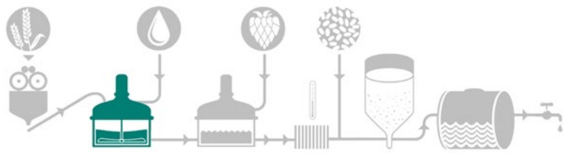


Figure 2.52. Mashing and Milling Equipment Overview (Author, 2016)



EQUIPMENT
HOT LIQUOR TANK

DURATION
1.5 HOURS

TEMPERATURE
200 C

- LAUTERING -

Once the malt is mashed, the grist is transferred to a straining or lautering vessel (figure 2.53) where liquid is separated from the husks. Hot water is continuously sparged or sprayed on top of the grains in order to rinse out as much of the wort (previously created sugary extract) as possible. Afterwards, the spent grain and leftover malt and extraction is collected for cattle feed and/or compost.

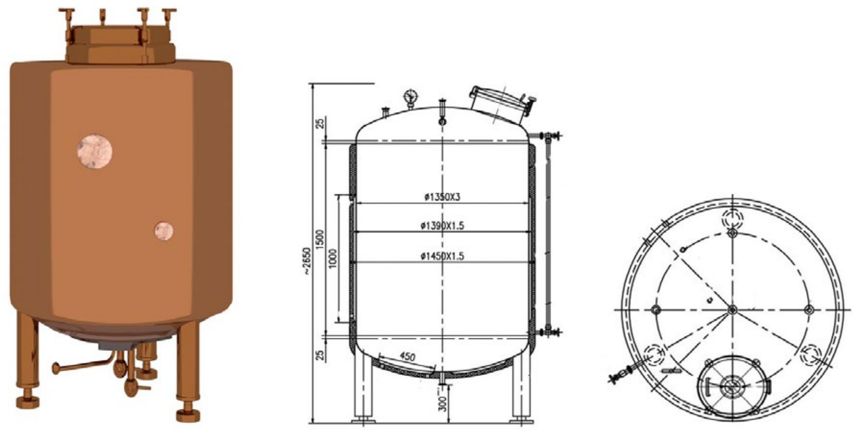
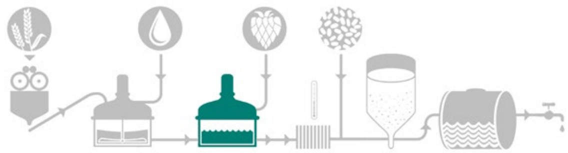


Figure 2.53. Lautering Equipment Overview (Author, 2016)



EQUIPMENT
BOIL KETTLE

DURATION
2 HOURS

TEMPERATURE
200 C

- BOILING -

The extracted wort is collected in a stainless steel or copper kettle and boiled (figure 2.54). During the boiling process, a variation of hops is added in order to provide different multiplicities of aroma, bitterness, flavour and colour to the final product. In addition to actual taste and appearance, these pinecone-shaped female flowers act as a natural preservative in the beer. Moreover, other additives, such as tea extracts, can also be added during this process in order to enhance flavour.

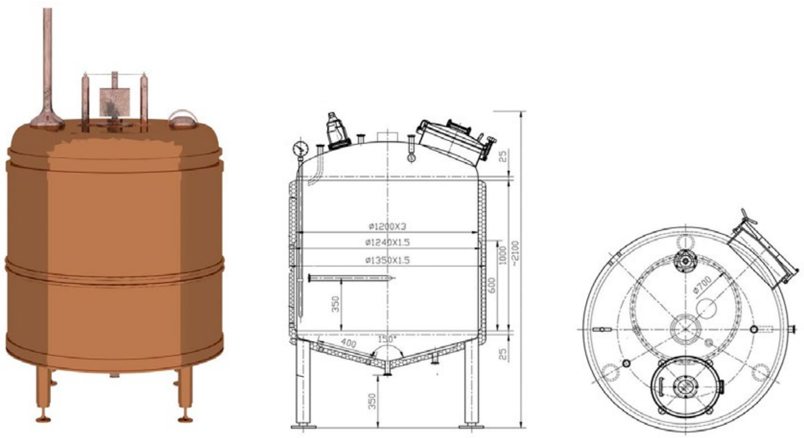
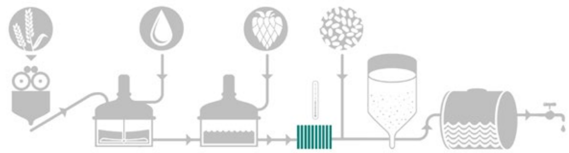
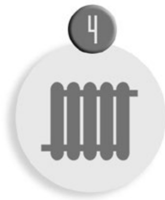


Figure 2.54. Boiling Equipment Overview (Author, 2016)





EQUIPMENT
CHILLER

DURATION
30 MINUTES

TEMPERATURE
ROOM TEMPERATURE

- COOLING -

After the wort has been boiled and infused with the aromatic flavour of the hops, it proceeds to another vessel (figure 2.55) where the hops are then removed and the wort is clarified. The clear, hopped wort liquid is then cooled to room temperature or lowered in preparation for yeast addition. This particular step in the brewing process is only required when creating pale ale beer.

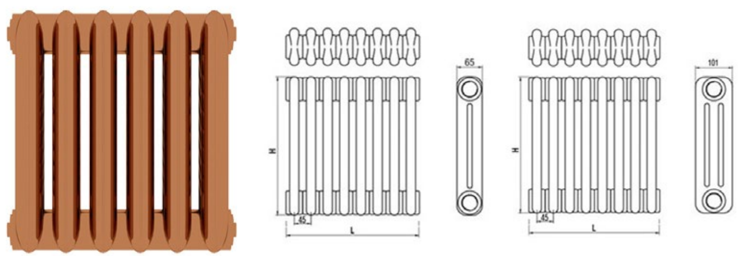
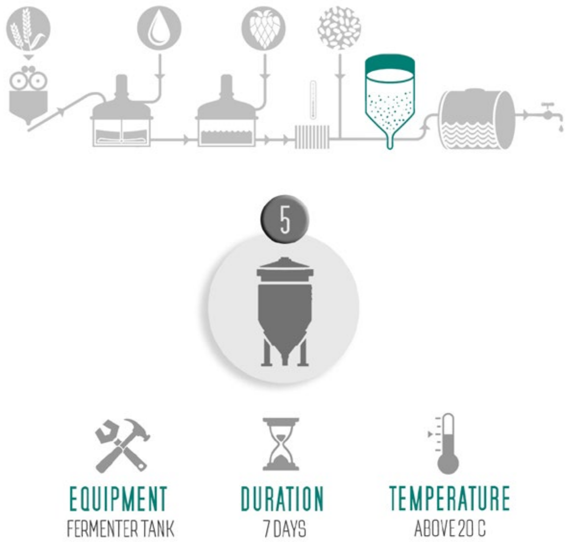


Figure 2.55. Cooling Equipment Overview (Author, 2016)



- FERMENTATION -

Once cooled, yeast is added to the wort liquid in order to ferment the sugar into carbon-dioxide and ultimately alcohol. Different yeast availability ensures a variety of subtle flavour enhancements and craft personalisation. Pale Ale is fermented for seven days, after which all yeast extracts are removed. After this stage of its production, the liquid is now referred to as beer.

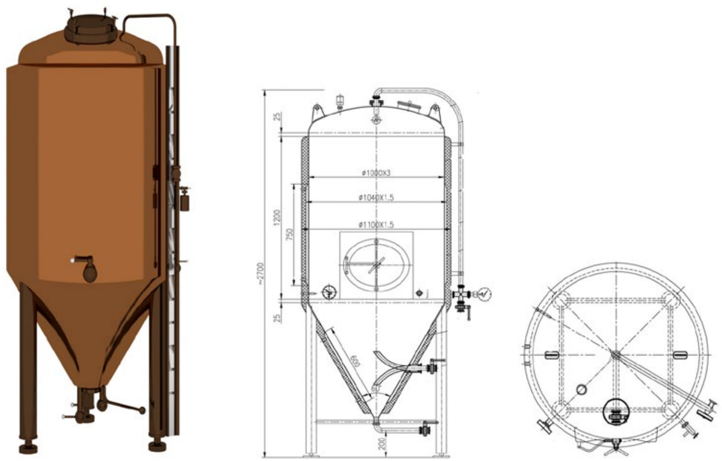
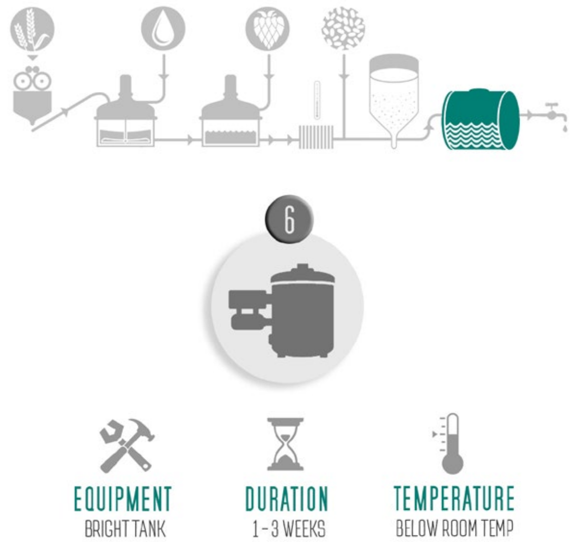


Figure 2.56. Fermentation Equipment Overview (Author, 2016)



- CONDITION -

The final stage in production is reserved for the process of conditioning where the young beer is stored and cooled for 1 to 3 weeks in order to develop body and achieve clarity. Additional filtering may be required thereafter, depending on the yeast used during fermentation. Once conditioned, the beer can be directly tapped from the bright tank (figure 2.57) or bottled if not consumed directly on site.

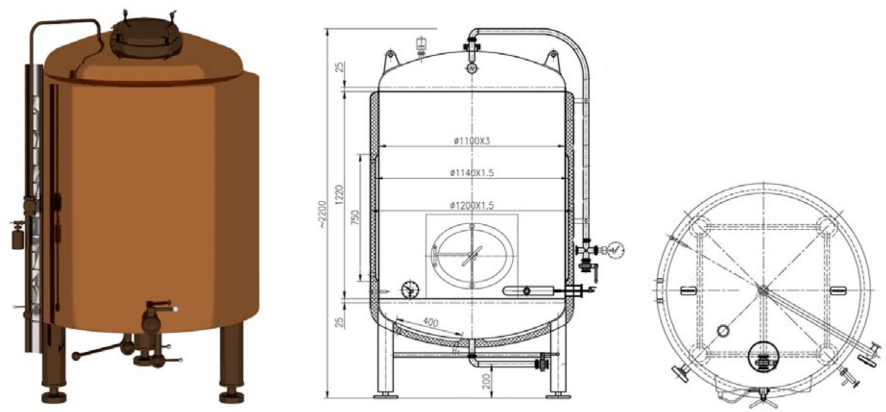


Figure 2.57. Condition Equipment Overview (Author, 2016)

REVERSE OSMOSIS

Sea water can be economically and reliable converted into **potable water** through a process known as **seawater reverse osmosis.** Osmosis is a **naturally occurring process** where a solvent, such as water, passes through a semi-permeable barrier. This semi-permeable barrier, or a membrane, allows selective articles to pass through it, whilst restricting others. In nature, the direction of flow through the membrane is from a **less concentrated solution**, such as fresh water, to a **more concentrated solution,** such as seawater, until equilibrium is reached. **Reverse osmosis is when the opposite occurs**. By pressurising the concentrated seawater solution, the water molecules are forced to pass from the salty seawater solution thought the membrane to the fresh water (refer to figure 2.58).

The process starts (refer to figure 2.59) by extracting water from the ocean using wells located on the shoreline or by using an intake structure located in the open ocean. To protect the reverse osmosis membranes from becoming clogged by solid particles that can be suspended in the seawater, the water is filtered before passing though the membranes. This is accomplished by using multi-media filters which are tanks or vessels containing a series of layered granular materials. These materials can be zeolite, granite, sand, pebbles and/or gravel which are assembled in layers. The filters remove sand, twigs, seaweed and other particles from the seawater. In some instances, other type of membranes known as ultrafiltration and microfiltration membranes are used instead of multi-media filters to pretreat the seawater. Afterward, the filtered seawater travels to the cartridge filters which acts as a second stage of filtration. Cartridge filters used for seawater reverse osmosis, are typically made from a yarn-like synthetic material that is wound into cartridges. These remove even smaller solid particles from the seawater, such as fine sand and

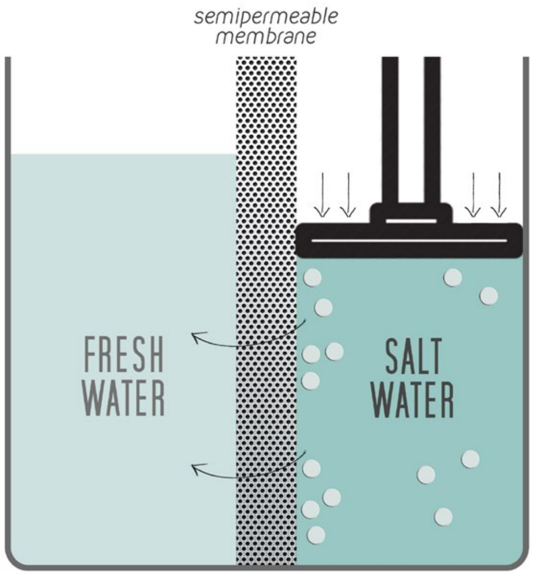


Figure 2.58. Reverse Osmosis Simplified (Author, 2016)

clay, before the water proceeds to the reverse osmosis membranes. High pressure pumps increase the pressure of the seawater up to 1000 psi. The pressure needs to be sufficiently high to overcome the naturally occurring osmotic pressure and force water from the saltwater side through the reverse osmosis membranes to the fresh water side. The salt particles in the seawater are rejected from passing through the membrane into the fresh water side and remain behind in the concentrated saltwater side.

The reverse osmosis membrane can be thought of as a number of sealed envelopes, connected at the open ends of a tube. There are spacers between each envelope which allow water to flow across the membranes. The membrane's envelopes and spacers are then wound around a tube like a roll of paper towels. The reverse osmosis membranes are then enclosed in a fiberglass shell. The membranes are connected end to end, usually six to seven membranes together, and housed in vessels that are built to withstand pressures up to 1200 psi. As the pressurised seawater enters the pressured vessel, and flows across the membranes surface, the water molecules are forced into and through the membrane's envelope, leaving the salt molecules behind. The desalted water passes through the membrane and emerges at low pressure where it is collected in a tube and directed to one end of the pressured vessel. The concentrated salt stream that is rejected from flowing through the membrane continues to pass across the membrane's surface where it is collected separately. The concentrated salt stream is piped into an energy recovery device where up to 98% of the energy of the concentrated salt stream is transferred to an equal volume of the incoming seawater in an isobaric energy recovery

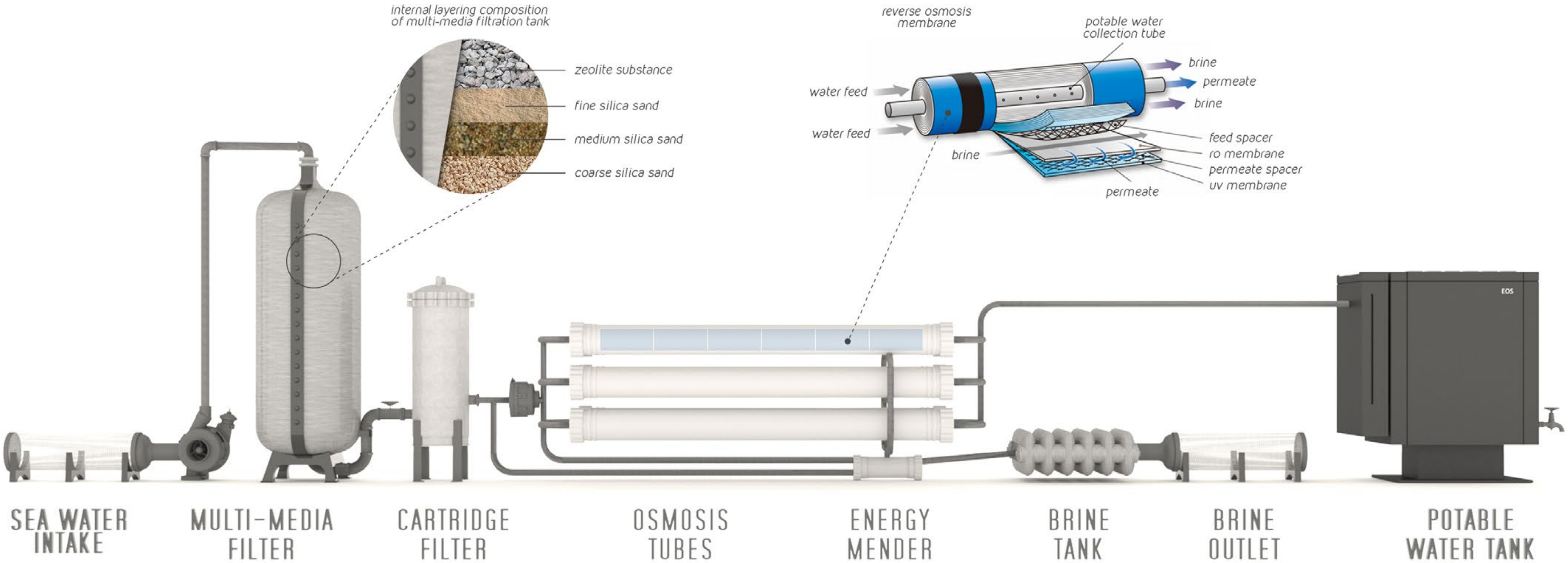


Figure 2.59. Reverse Osmosis Process (Author, 2016)

device. The concentrated salt stream will have about a 60% higher salinity than the incoming seawater. This concentrated salt stream is sent back to the ocean through a brine disposal well or a device known as a brine outlet. The brine outfall is situated is an area of significant ocean flow so that the salt levels are quickly returned to equilibrium with the ocean. In a properly designed brine outfall, no noticeable increase in salinity can be detected at a distance of a few meters from the discharge.

Approximately 40% of the seawater that enters the system is converted into potable water during the reverse osmosis process. This potable water can be further treated by adding chlorine and calciumcarbonate ($CaCO_3$) to improve the taste and bring the pH level to the neutral range if no salty aftertaste is required. However, for the specific application of this study, this unique taste is desired which will enhance the flavour of the produced craft beer. By simply **replacing the traditional fresh water** used during the production of beer with this **potable form of saltwater**, the creation of a **salt pale ale beer will be brewed** as illustrated in figure 2.60.

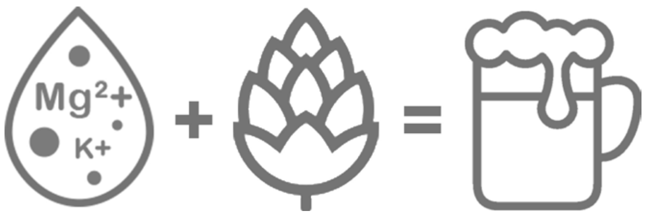


Figure 2.60. Simplified Saltwater Beer Brewing Process (Author, 2016)

2.4 TARGET MARKET & BRANDING

Seen as a unified purpose which embodies a range of ideas and experiences, a brand is a **universal expression** of various values, **both tangible and intangible** (Murphy, 1998:2). Before the current identity was amplified, the clear identification of all possible visitors pertaining to a definite target market was to be determined.

As indicated by the Hospitality Outlook of 2014 - 2018, the Victoria and Albert Waterfront currently accounts for **both local and international clientele**. Aside from being a popular destination amongst residing **Capetonians**, **national and international tourists** are drawn to all variations of activities located within the Waterfront precinct. Furthermore, with the **recent addition of infrastructure and shore excursions**, cruise lines expanded their markets onto South African shores. As **major cruise lines now travel to South Africa** as a port of call on long trips, the addition of immediate tourism is increased. This notion is certified through recent statistics which indicated a growth of 0.72% in South Africa's share of global cruise visitation (PwC, 2014:64).

Given the abovementioned, the outline of **two distinct groups of trade** were established, each categorised by their locality and pertinent activities of visiting interest, followed by the appropriate **rebranding of both the host and habitant** (figure 2.62 - 2.65)

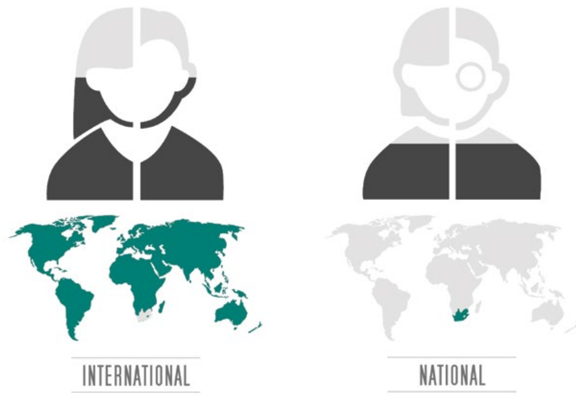


Figure 2.62. Revision 1 of Branding Design (Author, 2016)

- REVISION 1 -

The initial design called for a **simplistic branding** solution that would place emphasis on both the **historic and unique nature** of the intervention. By **contrasting** the inner seird shape with the outer circular shape, the **nature of placing the unknown** (ship & dock) with the known (on land) is accentuated. The overall combination of different stylistic elements and solid colour fill overcomplicated the envisioned notion, permitting the refinement of the logo in a second iteration.

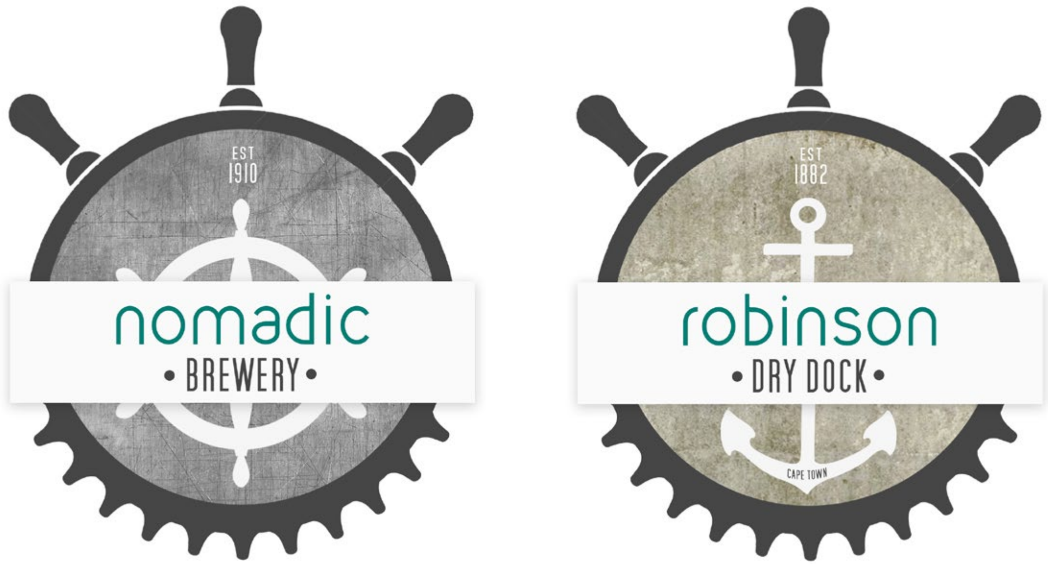


Figure 2.63. Revision 2 of Branding Design (Author, 2016)

- REVISION 2 -

The second iteration placed **emphasis on the idea of current materiality**. By replacing the solid colour fill with a textured image, the overall logo was unstiffened and **practicality was added**. The outer shape consisted out of a combination of a steering wheel and gear, aspiring to **highlight original use and imitate the physical migration** between ship and dock. Ultimately, the complete use of over-simplified iconography and contemporary fonts negatively contributed toward the envisioned historic theme wished to be provoked.

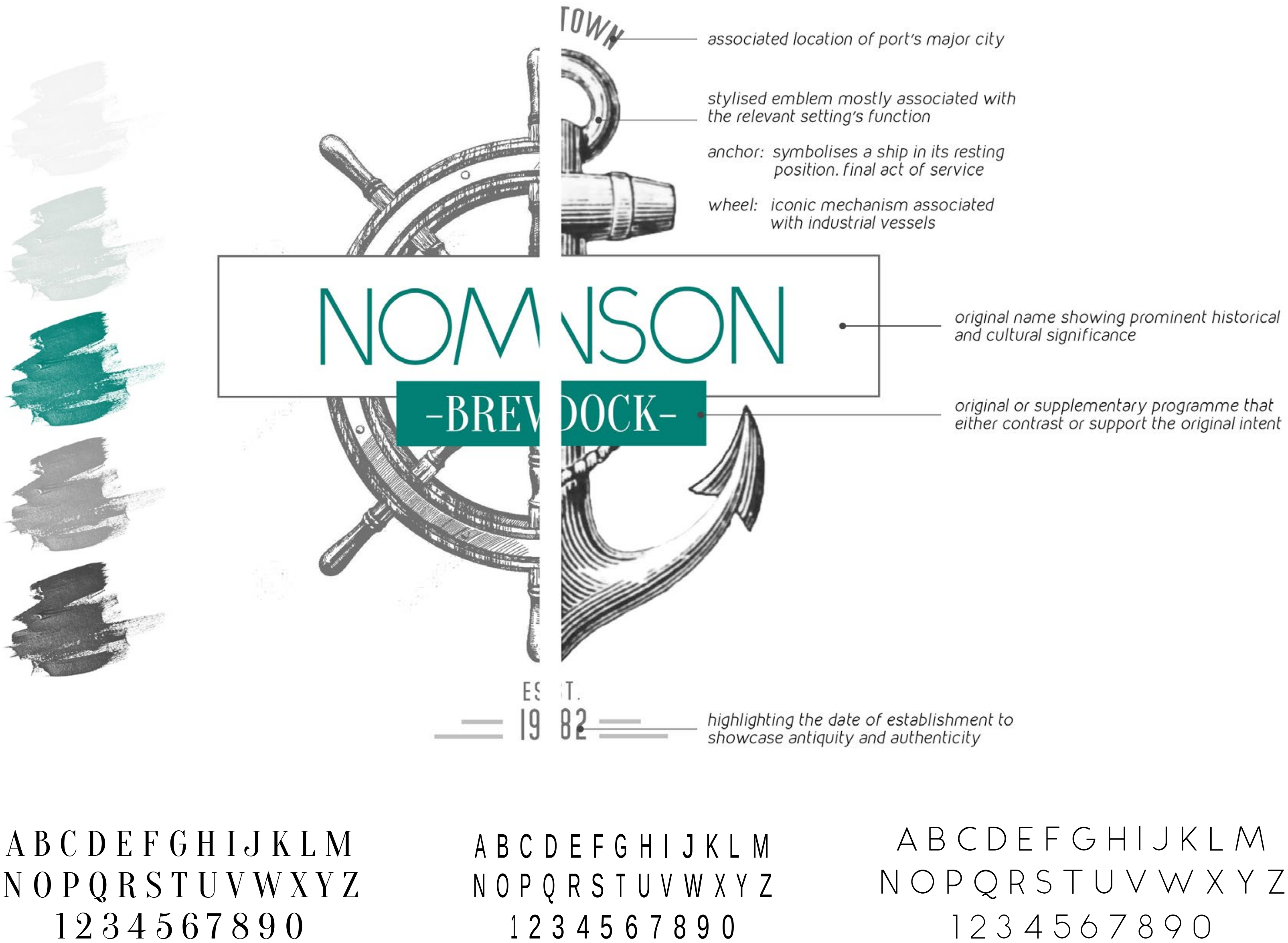


Figure 2.64. Final Identity Inspiration Palette (Author, 2016)

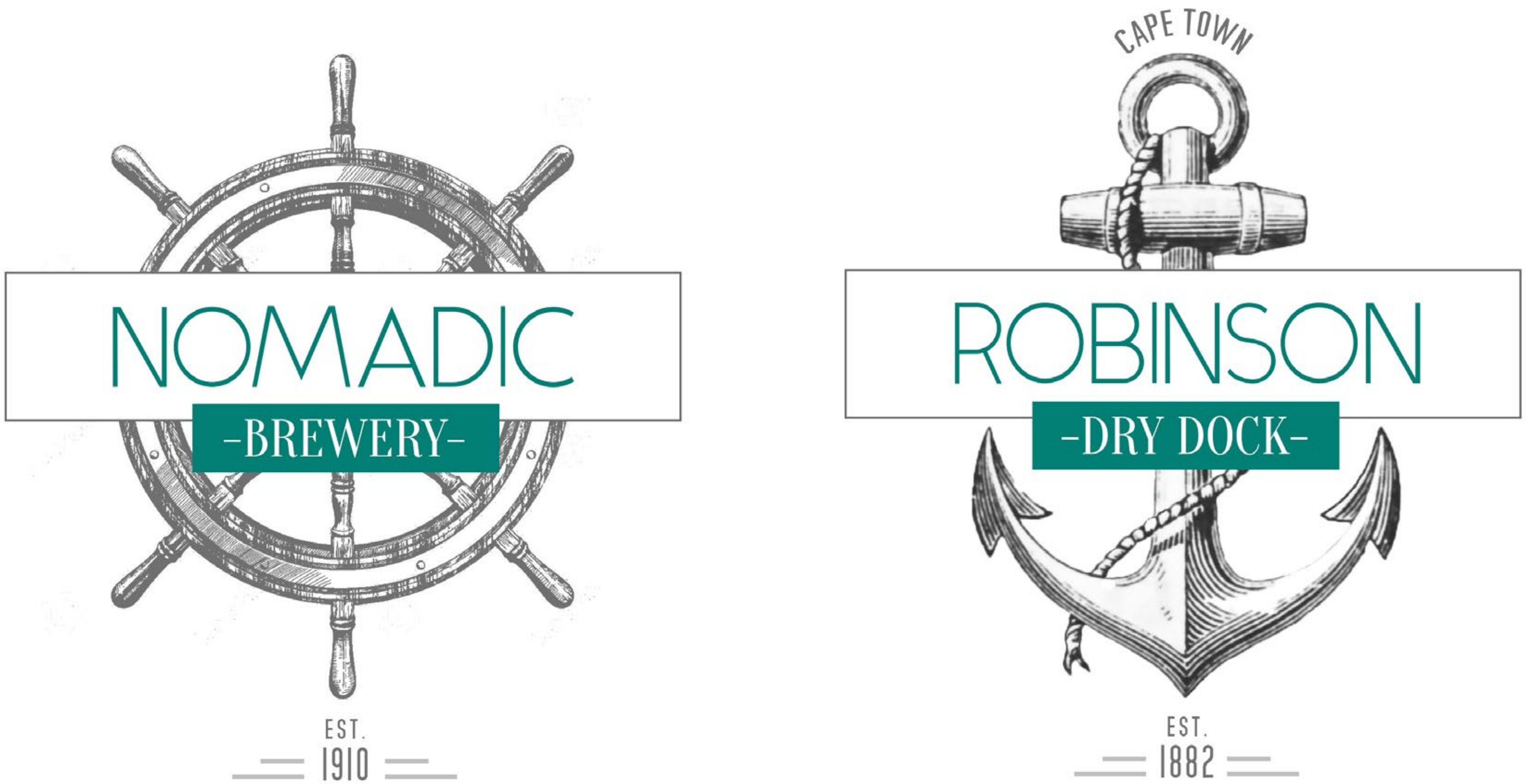


Figure 2.65. Final Revision of Branding Design (Author, 2016)

Figure 2.66. Home Brewing Ingredients (Unknown, 2015)

2.5
BREWING EXPERIMENTATION

As an extension of the rebranding strategy, the **experimentation of actual home brewing proved beneficial**. As opposed to actual micro-brewing that will occur onboard on a larger scale, which requires aforementioned resources, the utilisation of a home brewing kit was employed in order to experiment with **fermentation on a smaller scale** (figure 2.69 - 2.74). As opposed to boiling with fresh water, artificial salt water was used, which was formulated under similar specifications to actual reverse osmosis. Using a contrived malt mixture, the addition of speciality hops and flavouring occurred as trialing. As a way of masking the apparent salinity, the addition of fynbos and buchu extract, both home-grown in Cape Town, was added. This coveted to emphasise the innovative crafting strategy of locality association. As per the manufacturing of a pale ale beer, the wort is fermented for one week in a controlled environment. Thereafter, bottling occurs, which permits conditioning for up to three weeks, before being ready for consumption. Replicating this form of self-experimentation certified an in-depth understanding of the brewing process, which will prove fundamental when designing the **interior layout of the brewery onboard the SS Nomadic.**

In addition to home brewing, the bottled beer permitted opportunity for the application of branding (refer to figure 2.68). Nowadays the availability of a wide array of bottle varieties permits the consideration of **functionality**. The selection of a **full body bottle**, with a t**apered bottleneck and broad shoulder** governs **ease of grip and a comfortable tilt** (figure 2.67) . Though kegged in a bottle for trialing purposes, the actual brewery will **limit the consumption of glass bottles** through the employment of a '**beer tap-to-mug**' approach. This forms a continuation with the previously established identity of the pragmatic response which **encourages environmental potential**.

Figure 2.67. Bottle Shape Selection (Aurthor, 2016)

Figure 2.68. Saltwater Beer Bottle Branding (Aurthor, 2016)

Figure 2.6. Gathering the Ingredients (Author, 2016)

Figure 2.70. Boiling the Hops (Author, 2016)

Figure 2.71. Straining the Wort (Author, 2016)

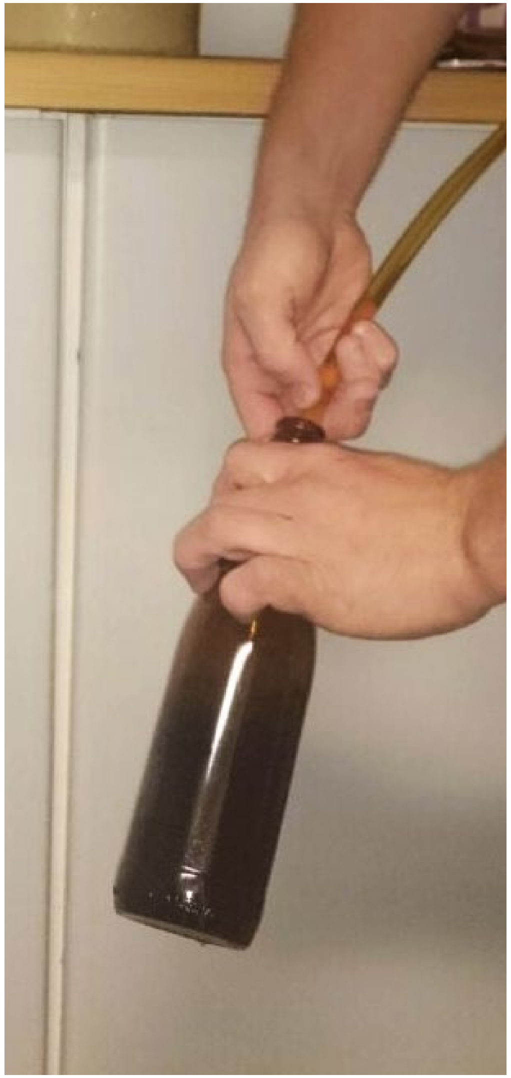


Figure 2.72. Bottling the Bucha Beer (Author, 2016)

Figure 2.73. Bottling the Saltwater Beer (Author, 2016)

Figure 2.74. Capping the Bottles (Author, 2016)

In conclusion, this chapter introduced the host in the form of Robinson Dry Dock as locality, and the SS Nomadic as habitant. These identified artifacts consent the actual implementation of the projected design intercession which purposes to substantiate all ensuing theories. Aside from actual historic investigation, the **technical analysis of both the host and habitant was executed** in order to provide a structural understanding which highlighted possible opportunities for design. In addition to the aforesaid, the investigation of Robinson Dock's contiguous context was imperative in order to award feasibility and outline recreational significance. Furthermore, the pragmatic establishment of a brewery and craft market within a decidedly inundated environment goals to act as spatial activator which will ensure habitual trade.

Over and above the preparatory analysis, relevant precedent investigations were introduced in order to provide fundamental substance and announce the possibilities of similar spatial interventions. Along with probable **design scrutiny, the process and experimentation of brewing and reverse osmosis** was conversed in order to dictate conceivable design policies in chapters to follow.

Having been introduced to the host, habitant and programme of the proposed mediation, the investigation and enactment of all pertinent theories will ensue in chapters to come.

3 CHAPTER

aging of materiality as layer

As the spatial and structural formation of vessels primarily rely on steel and the construction of a dock on concrete, this chapter will probe these materials theoretically in standings of their vulnerability to degradation. These proposed avenues of material investigation (corrosion protection, historic decay preservation and intentional oxidation) wish to conceivably ground potential design implementations that follow.

Figure 3.1. Layers of Time (Yume, 2010)

MATERIALITY AS PALIMPSEST

"The land, so heavily charged with traces and with past readings, seems very similar to a palimpsest."

André Corboz. 1983

Any surface where writing has been erased in order to accommodate new text is referred to as a palimpsest. When applied metaphorically, these actions can consequence into an architectural manifestation, which by extension, encourage the adaptive reuse of an existing structure. Similar to the act of erasing, a hint of what was will always remain as the past can never be fully erased. A palimpsest can be construed to have at least three connotations: the prior meaning, the new meaning, and the hybrid creation when reading the prior with the new. Ke Leng Tran (2011:7) continues by stating that "as past remnants appear partially through the new, the new work becomes an overlay of the old, making a simultaneous reading of both the old and new work. Hence, a palimpsest can be viewed in two ways; on the one hand, it is an entity that makes room for reuse and on the other, it represents a vessel for meaning." Subsequently, reinterpretation and rediscovery is created through the disclosing nature of a palimpsest, which reveals a state where layers of preceding work can be perceived. In addition to reinterpretation, this manifestation serves as an historic platform against which present amendments can be made, allowing for an entity that appears cohesive and seamless when comprehended in the future (Tran 2011:8).

When proposing the addition of another layer onto the existing fabric, it is vital to note that there are indeed **dissimilarities between renovation and reuse**. As the history and memory of a structure must be maintained in order to govern new appendages, it is essential that the proposed location be regarded as a ruin, "something in process, belonging to the past, present and future"(Scott 2008:96), and not as a historic landscape in need of preservation. Moreover, Fredd Scott (2008:7) stated that other than a work of art that is to be **preserved and remain untouched**, design decisions may allow for the **demolition or addition** to historical structures provided that **judgment is informed and unprejudiced**. He continues to challenge this believe by questioning whether further spatial amendment might not increase value, as the initial process of ruination produced such a valuable result to begin with (Scott, 2008:58). Aside from this notion, Robbert Verheij (2015:30) cautions this form of romanticism by stating that design should not be tempted by mere images of ruin decay, but rather be used as a theme that informs the design process and entails an experience of bare materiality. In agreement with Verheij's standing, this study will focus on **the potential of material temporality and failures as a potential layer enabler**. Henceforth, when considering materiality as a form of palimpsest, the **quality of natural materials** that age characteristically should be ruminated (Verheij, 2015:120).

Likewise to the ghostly reminder of previous layers on a palimpsest, additions to a ruin allow for a structure to speak (Kahn, 1973:n.p.). Having analysed the language and layers of history embedded within the proposed **host and habitant**, how to move forward design wise will prove to be the main design discourse of this study. As opposed to the mere institution of a heritage approach, the **appendage of a new layer** is proposed that will **allow for past recollection and future addition thereon**. In order to assure that the metamorphosis of **philosophy and ideology** between the **past and present** become immediately apparent, the **investigation of steel and concrete corrosion as a tool of beautification** is required that will practically accentuate the process of layering.

The act of corrosion has been witnessed throughout the course of history. As **corrosion** can broadly be defined as the **degradation of a material's properties due to its chemical reaction with its environment**, the rate and level in which this fatigue occurs differ from one material to the other. Whilst primarily being associated with metallic materials, **all material types are susceptible to degradation.** Correspondingly to the formation of **patina** on bronze and rust on iron, timber can rot and concrete weather (Marcus and Maurice, 2011:100). In order to ground this investigation theory wise, the definite exploration of the main material associated with **a ship (the habitant) and dock (the host)** will be researched in this chapter - thus the corrosion of steel and concrete.

In nature, nearly all metals are unearthed in their stable **oxidised condition** either as oxides, carbonates, sulphides, sulphates or chlorides. In order for metal to be extracted from the applicable mineral, a reduction process is required during which a great deal of energy is engrossed. The resulting consequence of this hefty energy input converts the pure metal into a high energy condition labouring to return to its former oxidised, low energy and stable state as rapidly as environmental conditions will allow (Roberge, 2000:6). It is this distinct energy differentiation that occurs between the pure metal and its oxidised state which inaugurates the force for corrosion. Moreover, in order for metal to corrode (refer to figure 3.2), the establishment of a corrosion cell is indispensable. This cell is comprised out of an anode, a cathode, an electrolyte and a metallic path (Ahmad, 2006:9). Once established, the process of corrosion commences when a material is introduced to a corrosive medium. An electrochemical reaction occurs on the surface of a metal due to its energy rich base properties recovered through chemical reactions from naturally low energy minerals, inclined to transform back to its original form. Based on this process, two natures of corrosion reactions are distinguished: chemical corrosion, corrosion excluding electrochemical reaction, and electrochemical corrosion, corrosion including at least one anodic and one cathodic reaction (Maab, 2011:2). For the purpose of this study, **corrosion is considered holistically as the process of universal material degradation**. **Steel corrosion is recognised as oxidation (rust), whereas concrete corrosion as weathering.**

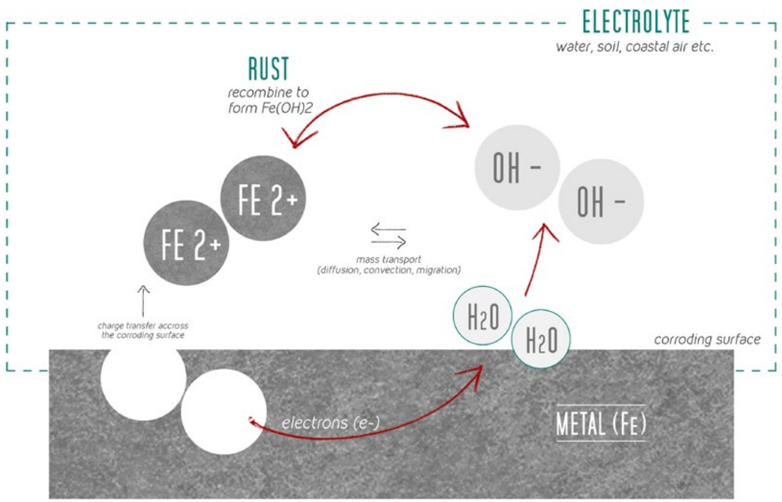


Figure 3.2. Process of Corrosion (Author, 2016)

Based on both the morphology of the attack and the situated environment, corrosion is traditionally classified into **nine divergent categories** as illustrated in figure 3.3 (Fontana & Green, 1967:34). The most prevalent type of corrosion is classified as **general or uniform corrosion** and is found widely. From rusting steel bridges to the tarnishing nature of silver, most unprotected steel left outside will show signs of uniform corrosion, which can definitely be delimited due to its predictable nature. One method of protection against uniform corrosion allows for the application of a sacrificial zinc layer that protects the underlying steel. This sacrificial form of oxidation permits another form of deterioration in the form of **galvanic or bimetallic corrosion** (Kelly & Shaw, 2006:24). As opposed to uniform corrosion, **pitting and crevice corrosion** occurs on certain areas of a materials' surface due to defective coating or underlying metals resisting deterioration through the formation of a native oxide. Contrasting surface deterioration, **intergranular corrosion** occurs when solidified metals, comprised out of once homogenize alloys, crystalises due to a chemical imbalance. This form of corrosion validities the mechanical strength of metals can often result into perfunctory fracture. In addition to this form of corrosion, **environmentally induced fracture** is generated when a material is exposed to a chemically reactive environment, such as an aqueous solution or organic solvent, which propagates the formation of cracks. The final form of corrosion, **dealloying**, transpires when one element in an alloy is selectively removed from the surface of a metal. Though limited to surface quality, in severe circumstances this selective leaching can cultivate into the solid structure of a material and prompt mechanical failure (Ricker et al, 1995:669).

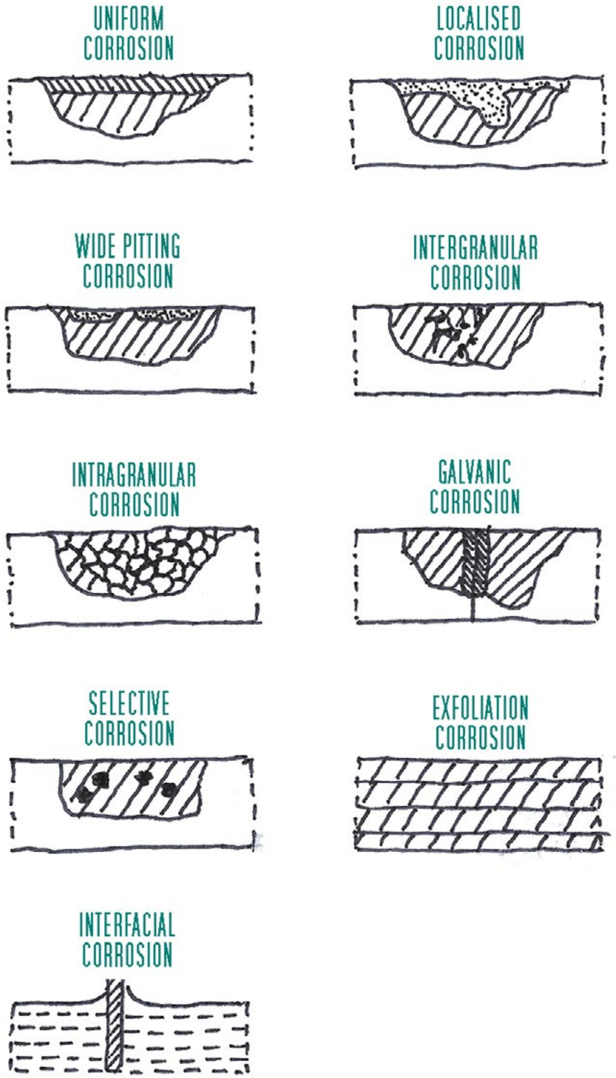


Figure 3.3. Types of Corrosion (Author, 2016)

Similarly to the deterioration of metals in the form of oxidation, the **weathering of concrete** is inevitable. Assumed as being the most widely used material of construction worldwide, the deterioration of concrete has assumed alarming proportion in harsh climatic conditions, such as sea-coastal areas, under recent studies. As illustrated in figure 3.4, concrete can be defined as the artificial stone produced when **cement** (usually Portland cement) is mixed with a **fine aggregate** (sand), a **coarse aggregate** (gravel or crushed stones) and **water**, the combination and quantity thereof is dictated by its intended implementation (van der Merwe, 2011:10). Being a very durable material in itself, the addition of steel embedded within concrete functions as an exceedingly effectual method of reinforcement. The minimisation of steel oxidation is reduced by the protective concretes' alkaline that environs the reinforcement. However, under certain environmental conditions, concrete may undergo degradation and reinforcing steel may also corrode. Dynamics that contribute towards the dilapidation of concrete is prevalent during the time of production. Good production practices demand adhering to lower temperature (5°C) and upper temperature (32°C) limits with the deviation thereof possibly leading to decreased durability. In addition to inferior practice, environmental factors can also affect the durability of hardened concrete. Freeze-thaw cycling, drying and carbonation shrinkage, humidity, sulfate attack and seawater are all ecological aspects contributing towards the corrosion of concrete (Ahmad, 2006:614).

Figure 3.4. Components of Concrete (Author, 2016)

As noted fleetingly overhead, the conditions of a coastal surrounding influence the rapid deterioration of both metal and concrete. Being that the location of the most prominent materials' of both the investigated host and habitant is prevalent by its nautical contact, further investigation in terms of **corrosion protection**, **historic decay preservation** and **intentional oxidation** is required in order to ground possible design implementations.

3.1
CORROSION PROTECTION

The protection of corrosive materials can be defined as the process, measure or procedure aimed at the minimisation, temporary delay and/or avoidance of corrosion by method of modification to a system vulnerable of degradation (Maab, 2011:9). Asserting the detail that properly manufactured concrete do not require conventional protection, but rather its steel reinforcement agent, responsiveness will be directed towards steel in this section.

Active corrosion protection aims to sway the reaction which ensues throughout corrosion. As opposed to only altering the material and corrosive agent, active protection influences the reaction itself in order to avoid corrosion. The addition of inhibitors to the aggressive medium and the development of corrosion-resistant alloys are examples thereof. **Passive corrosion protection** is used when mechanical isolation from the aggressive corrosive agent is required. The appendage of a protective layer in the form of a film or a coating is applied to prevent wear. Permanent corrosion protection provides perpetual defense against biotic, climatic and chemical hindrances relative to its place of use, by the addition of **a permanent chemical veneer.** These include **tin plating, galvanisation, enamel coating and copper plating. Temporary corrosion protection** aims to prevent stresses from occurring during handling, transport and storage and is easily removable upon utilisation or installation. For the purpose of this research, the elaboration of **passive protection methods** against corrosion will be investigated. As the main materials in need of protection are fixed and previously manufactured, other methods are deemed redundant. Furthermore, all newly introduced materials, both utilised externally and internally, will have to be passively protected or comprise out of an embedded active corrosion agent due to its maritime surroundings (Schweitzer, 2010:111).

In order to ensure that the correct method of protection associated with an unambiguous material is applied, it is essential that all environmental factors that might contribute towards possible corrosion be investigated as illustrated in figure 3.5. As atmospheric corrosion is defined by geographic location and local weather conditions, the exact whereabouts of potential material utilisation need be admitted. The Southern Africa Stainless Steel Development Association (SASSDA) fashioned a corrosion map of South Africa that postulates the atmospheric corrosion rate of every region (refer to figure 3.6). Based on these findings, the International Organization for Standardisation (ISO) allowed for distinct categorisation which dictates suitable material selection and the protection thereof.

Figure 3.5. Environmental Factors of Corrosion (Author, 2016)

Apart from the existing materiality of both the host and habitant, the introduction of new materials will **require adequate protection**. In the instance where the actual process of corrosion cannot be chemically manipulated, passive protection methods are employed. As previously mentioned, passive corrosion protection either **prevents or decelerates corrosion** by method of the introduction of a protective layer that keeps corrosive substances away from the steel surface. The applied corrosion-resistant coating either serves as a **sacrificial anode that when scratched** is protected by the remaining deposit until entirely removed, or **protects its base metal by corroding first**. As a result, this composite exhibits properties not generally achievable when disjointed. Whilst the coating merely provides a durable, **corrosion-resistant surface**, the actual core material remains the only entity able to **provide load-bearing aptitudes**. For a protective agent to be deemed apt, certain technical preconditions exist. In addition to its strict regulatory specifications, these protective layers "should be completely pore-free, resistant to external mechanical stress, provide ductility and firmly adhere to the base material onto which it will be passively adjoined" (Maab, 2011:9). This 'finish' can be defined as any final operation applied to the surface of a metal article that alters its surface properties in terms of appearance, abrasion and corrosion resistance, adhesion qualities and general adaptability (Roberge, 2000:782). Archetypally, this finishing layer is appended upon the completion of a materials physical manipulation and can primarily be classified as either being a **metallic or organic coating**, depending on the appraised resistance against corrosion needed in a specific environment (C1 – C5 classification).

METALLIC COATINGS

As with all coatings, metallic passive coatings supplement a layer that **alters the surface properties** of the metal on which it is essentially applied (figure 3.7). Indifferent to organic and inorganic coatings, metal coatings are applied by hot dipping, electroplating, spraying, cementation, and diffusion. The selection of a coating process for a specific application depends on several factors, including the corrosion resistance that is required, the anticipated lifetime of the coated material, the number of parts being produced, the production rate that is required, and environmental considerations (Revie & Uhlig, 2008:269). For the purpose of this study, galvanised coatings in the form of dipping and electroplating will be investigated, as these methods are deemed environmentally appropriate within the identified marine context.

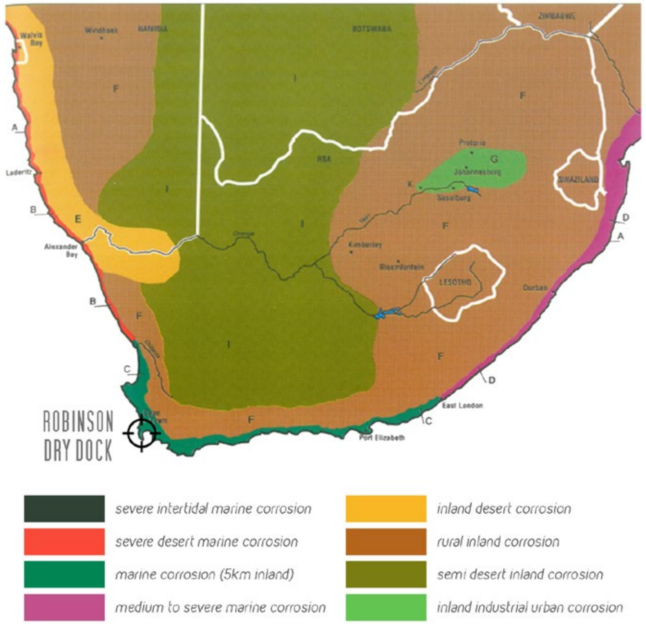


Figure 3.6. Composition of Metallic Coated Metal (ArcelorMittal, 2006)

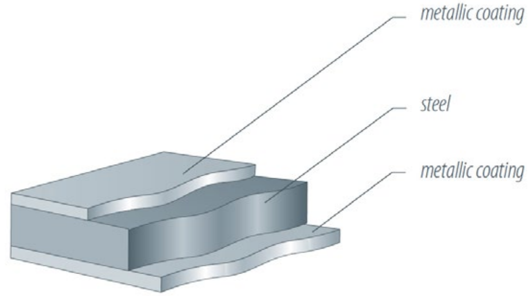


Figure 3.7. Composition of Metallic Coated Metal (ArcelorMittal, 2006)

- HOT DIP METAL COATINGS -

Hot dipping is carried out by immersing the metal on which the coating is to be applied, usually steel, in a bath of the molten metal that is to constitute the coating, most commonly zinc, but also aluminum and aluminum-zinc alloys. Utilised either in a continuous (steel sheeting) or batch process (fabricated parts), this simplistic nature of galvanising allow for great protection and high popularity (Langill, 2003:801). As illustrated in figure 3.8, the layout of a continuous galvanising line consists of three main sections: entry, central section (annealing, metallic coating application and surface treatments) and exit. During the first entry section, a continuous loop of produced steel coils are mounted onto a decoiler that feeds the reel into an alkaline degreasing tank in order to remove any residual lubrication before annealing can commence. In order to maintain the same processing speed in the annealing furnace and the bath of molten metal, two accumulators separate the three sections. In the central section, annealing allows for heat treatment that recovers mechanical properties needed in order to render material suitable for intended application. Once cooled, the uncoated steel is submerged in a bath of molten metal, leaving a thick residue upon reveal. Based on predetermined requirements, the weigh thereof (μm) is adjusted and allowed to cool down to room temperature in a cooling tower. Additional surface treatments can be applied thereafter, followed by the final exit phase in production that permits skin-passing (flattening) and quality control (Arcelor, 2006:17).

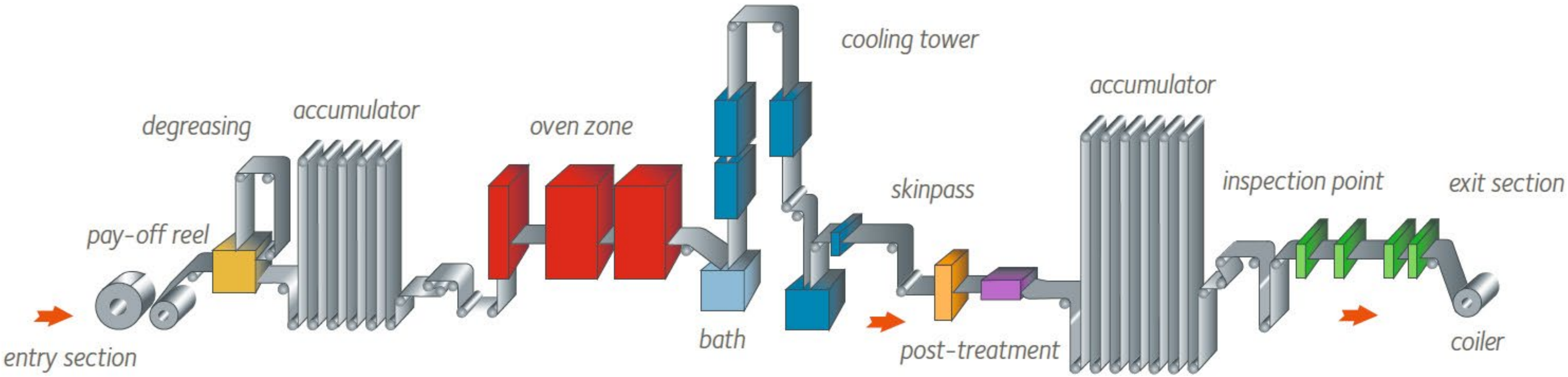


Figure 3.8. Hot Dip Coating Process (ArcelorMittal, 2006)

Figure 3.9. Surface Quality of Hot Dipped Metals (ArcelorMittal, 2006)

- ELECTROPLATED METAL COATINGS -

The conversion of a metal into a cathode, by method of engrossing it into an aqueous electrolyte, is known as **electroplating**. Although primarily used to enhance resistance towards corrosion, this process can also be employed **decoratively**. Electrogalvanising is the electroplating of zinc on either iron or steel with coatings ranging in thickness between 4 to 14 μm (Revie & Uhlig, 2008:270). Similar to hot-dipping and as illustrated in figure 3.10, a continuous electrogalvanising line consists of three main sections: entry, central section (surface preparation and coating) and exit. During the initial entry stage, a continuous loop of annealed steel coils is mounted onto a decoiler that permits elongation through suppression of the yielding point. Once elongated, all oil present is removed in the hot electrolytic alkaline degreasing tank, followed by dip-pickling in bath of hydrochloric (or sulphuric) acid. Once rinsed, the steel strip passes through several electrolytic cells successively where the electric current flows through a zinc solution (the electrolyte) from an anode to a cathode. Before additional surface treatments can be appended, the strip is to be rinsed repeatedly in de-ionised water followed by severe air drying. Furthermore, this process is finalised through surface inspection, oiling and trimming if narrow width tolerances are required (Arcelor, 2006:18).

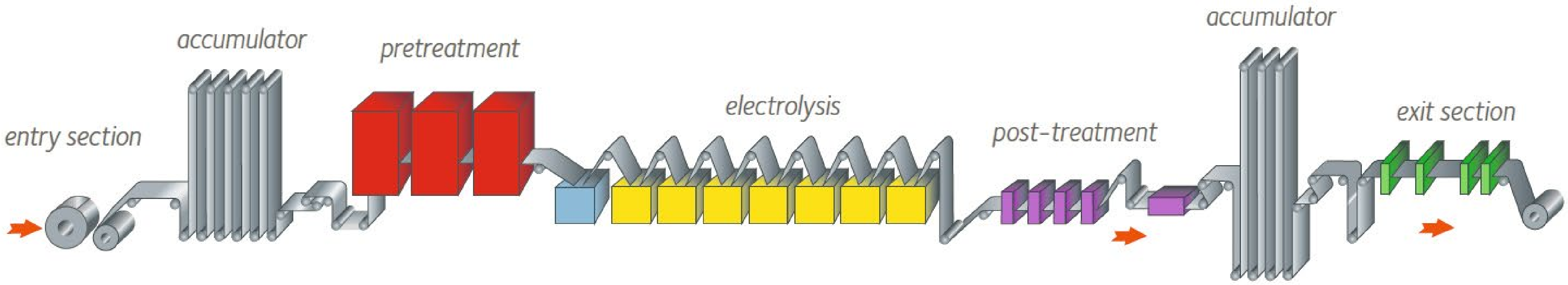


Figure 3.10. Electroplated Metal Coating Process (ArcelorMittal, 2006)

Figure 3.11. Surface Quality of Electroplated Metals (ArcelorMittal, 2006)

Having clearly distinguished between the above mentioned processes, it is essential to note that galvanising, in either the form of hot-dipping or electroplating, protects the underlying core material momentarily. Although galvanising will inhibit attack of the underlying steel, rusting will be inevitable. This eventual corrosion is determined by the amount of zinc present in the protective layer and the acidic conditions it is exposed to. As summarised in figure 3.12, initially zinc hydroxide is fashioned in a galvanised coating. Based on its poor conductivity, zinc hydroxide will slow down the corrosion process whilst dehydrating to form zinc oxide. As zinc oxide is a semi-conductor, a less effective barrier is constituted which may accelerate oxidation – thus not being desired in coastal surroundings. "In addition to the zinc oxides and hydroxides, zinc carbonates are the most abundant corrosion products of zinc when exposed to the atmosphere in an urban environment. Depending on the environment, zinc hydrochlorides (marine environment) or zinc hydroxysulphates (industrial urban environment) may also be formed (Arcelor, 2006:21)." Plainly put, **higher zinc content coatings** allows for the **slower formation of zinc hydrochloride** and thus permits **less maintenance.**

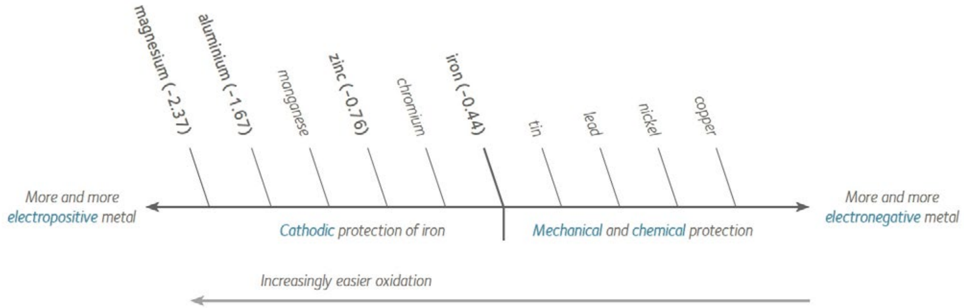


Figure 3.12. Oxidation Scale (Author, 2016)

ORGANIC COATINGS

As an alternative to the mechanical enhancements of materials metallically, organic coatings provide and **ecological other in terms of its applicability as a passive protection technique** (refer to figure 3.13). Paints, veneers, and high-performance organic coatings were developed to protect equipment from environmental damage. Other than the actual differentiation in composition between metal and organic coatings, their lifetime expectancy differs in terms of application. Where metallic coatings can only be applied mechanically during production, the application of organic coatings on steel can either be automated or manually augmented upon installation. This manual application permits continuous maintenance on site, as opposed to challenging upkeep away from the principle area of activity. Governed by the regulatory standards of protective coatings technology, The Steel Structures Painting Council (SSPC) aims to advance and "standardise the use of protective organic coatings to preserve industrial, commercial and maritime structure components and substrates" (Roberge, 2000:818).

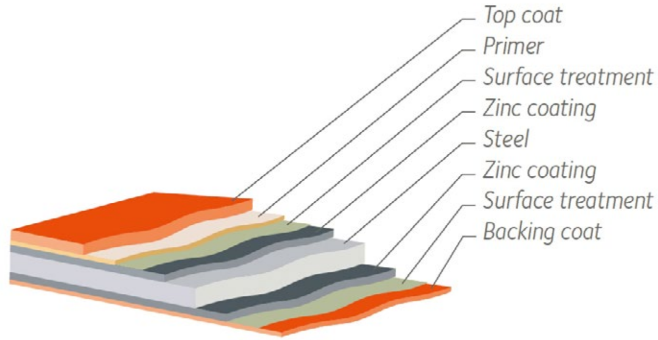


Figure 3.13. Composition of Organic Coated Metal (ArcelorMittal, 2006)

– COATING SYSTEM APPROACH –

Many organic coatings comprise out of a wide array of constituents added to suit predetermined utilities. The existence of certain variables is used to design specific coatings that attest cathodically protective pigments, impermeability and inhibition. Moreover, the existence of a universal coating has yet to be developed, thus directly influencing the metal substrate on the processing performance and corrosion resistance of the organic coated product (Arcelor, 2014:14). As specified by the SSPC, the protection of a steel substrate, either cold rolled or with a zinc-based metallic coating, should adhere to the coating system approach that permit all core material to be covered with a primer, intermediate coat, and topcoat (Munger, 1999:n.p).

The composition thereof (refer to figure 3.14 - 3.15) will be briefly conversed in order to determine plausible utilisation likelihoods:
The primer, regarded as the universal component of all anticorrosive coatings, is considered to be the most significant element in a protective system. This initial layer is applied directly onto the prepared steel surface in order to wet and provide sufficient adhesion thereon for all subsequently applied coats to follow. If duplex application on already metallic coated materials is not required, the provision of corrosion inhibition in either the form of primers pigmented with metallic elements anodic to steel (zinc-rich primers) or primers relying on the high adhesion and chemical-resistance properties of the binder (zinc phosphate) will be required (Hendy & Iles, 2015:306). The intermediate coat acts as a building agent that alters the overall protective and structural integrity of the complete system. Generally, a thicker coating provides a longer life expectancy and thus dramatically lowers maintenance. Aside from overall protection enhancement, when highly pigmented, permeability of oxygen and water is decreased. High pigmentation, either in the form of micaceous iron oxide (MIO) or glass flakes acts as laminar pigmentation which reduces or delays moisture penetration in coastal regions. As this is the innermost layer, it is essential that it remains compatible with both primer and topcoat in order to avoid loss of corrosive integrity (Hendy & Iles, 2015:306).

The topmost layer is reserved for the finishing coat and provides external surface characteristics such as the final appearance (colour, texture, gloss, finish etc.), hardness and resistance to abrasion and ultraviolet radiation. In addition to its outward contribution, this layer serves as a resinous seal over the two preceding layers. Based on its applicability, either a single or double layer can be applied on one or both sides of the protected sheet. Furthermore, being that these coats are formulated with a lower pigment-to-solvent ratio, they are generally denser. “The topcoats commonly used include air-drying paints and oil-based varnishes which harden by oxidation; acrylics and other lacquers, which dry by solvent evaporation; and polyurethane and epoxy paints, which dry by cold curing chemical reactions” (Roberge, 2000:830). Subsequently, accompanying curing and stoving techniques can be employed to produce an even hardened finish, advancing higher corrosion resistance whilst testing removal possibilities.

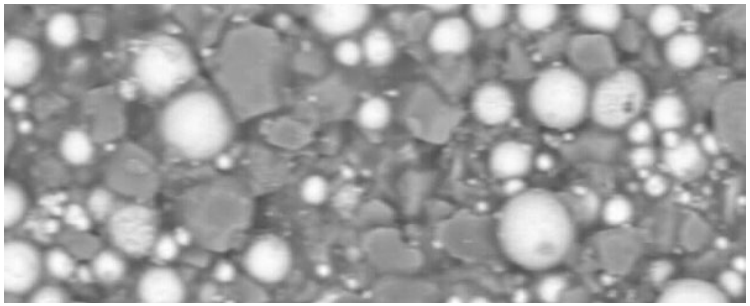


Figure 3.14. Surface Micrograph of Coating System Approach (ArcelorMittal, 2006)

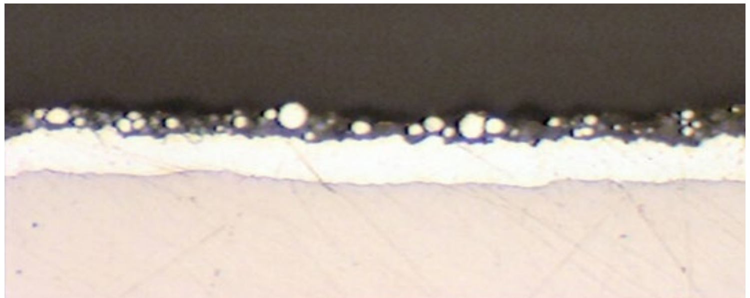


Figure 3.15. Cross Section Micrograph of Coating System Approach (ArcelorMittal, 2006)

- THE COATING LINE -

Likewise to the production of metallic coatings, organic coated steel can also be produced mechanically as illustrated in figure 3.16. Additionally, this coating line also permits three phases (entry, central and exit section) that allows for an automated coated system approach. During the initial entry stage, a continuous loop of annealed steel coils is mounted onto a decoiler which is pretreated in order to allow for preliminary coating. As the sheets enter the secondary section, coating heads apply liquid paint primer to the top and the underside of the core material, before entering an oven for curing. This process is repeated with the intermediate and topcoat following successively. Once the final finishing layer is cooled, the strip passes through an inspection section. Here the overall thickness is controlled, the peak metal temperature (PMT) is measured continuously, along with the colour and ultimate surface quality. Once approved, the convolute weight is adjusted as per specifications and the final product is coiled (figure 3.17).

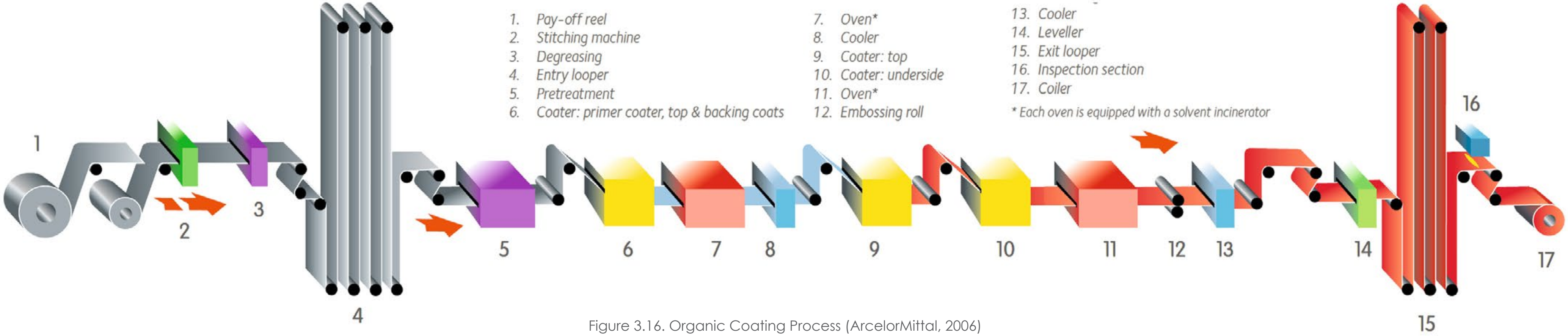


Figure 3.16. Organic Coating Process (ArcelorMittal, 2006)

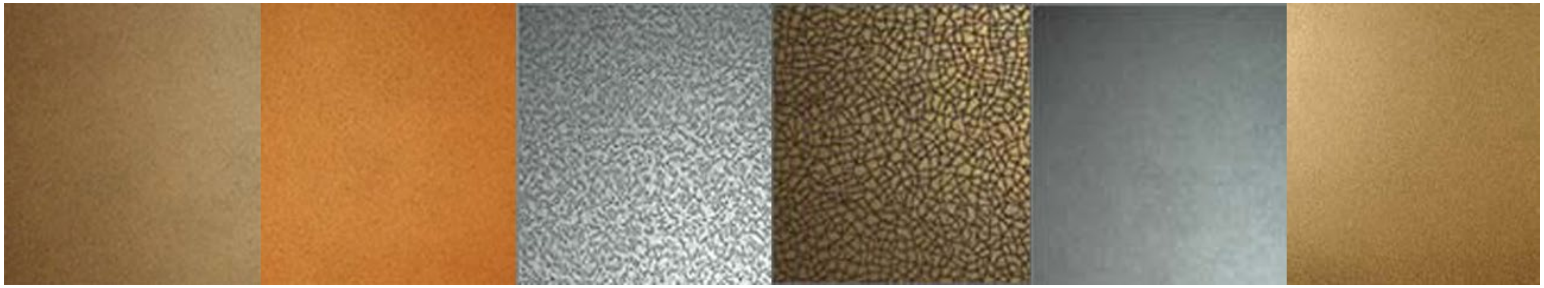


Figure 3.17. Surface Quality of Organically Coated Metals (ArcelorMittal, 2006)

INTERIOR APPLICATION OF COATED METALS

The utilisation of steel has uniquely achieved a distinction in architecture and interior design - more so, the utilisation of coated steel due to its ability to provide prolonged existence. In addition to its enduring nature, the ever increasing ability of coated steel to meet architectural requirements esthetically warrants the use thereof whenever the opportunity arises. Aside from the vast array of exterior applications, coated metals have seen an upsurge in deployment internally (Axolotl, 2015:n.p.).

Apart from esthetic reasons, due to the reduced consumption of materials and the conservation of natural resources, the internal weight of the structure is reduced. The added thermal efficiency of organic coated steel reduces energy consumption in services and provides supplementary internal comfort, whilst offering excellent acoustics due to its high insulation merits. In order to accommodate adaptability and timely prospect, long spans and extension **quality create versatile spaces capable of changing overtime in terms of function, appearance and pertinence**. Furthermore, based on its composition, additional longevity and robustness allows for versatile application.

If enamelled, steel acquires added modern criteria that uphold hygiene, whilst respecting nature. As the applications thereof can either be **structural** (refer to precedent investigation 3.1) or **decorative** (refer to precedent investigation 3.2), its appliance can vary from wall and floor coverings, to false ceilings casing or partition entities. When used architecturally within a building, it can act as an easy-to-clean material with high moisture resistance and anti-bacteriological properties. With a merely unrestricted assortment of colours, screen-printing possibilities and surface textures, most design necessities are fulfilled. In addition to its imperial warranty to never loose colour or gloss, enamelled steel offers admirable resistance to corrosion, abrasion, pollution and fire, offering virtually an **unlimited scope of architectural employment** (refer to figure 3.18).

As one of South Africa's leading manufacturer in galvanised steel sheeting, ArcelorMittal has devoted their international existence to the development of ecological materials that prolong eventual corrosion. In order to concisely establish an appropriate material, zinc and alloyed-based metallic or organic coatings suitable for architectural use will be investigated.

WALLING

Coated metal is a perfect choice for interior and exterior wall panels. Metal wall panels are available in a large number of differing profiles in ribbed, insulated (foamed), composite, and architectural shallow flat styles.

SOFFIT & FACIA

Soffit, facia, and an assortment of other building trim parts are produced out of coated metal helping a home or business streamline its looks while protecting the underlying structure.

DOORS

Coated metal's ability to be stamped into deeply drawn and detailed shapes, resistance to weathering, economical benefits & environmental advantages makes it a perfect fit for door manufacturers.

CLADDING

The metal itself is the major focus of the design. Ceiling tiles, back splashes, ceiling grids, wall panels, wainscoting, and column surrounds are some of the uses of coated metal for interiors.

FURNITURE

Coated metal's ability to be formed into almost any contortion of shapes imaginable make it a popular choice for manufacturing furniture, as well as a wide assortment of parts needed for its installations.

FLOORING

Due to the durable and tough nature of coated metals, its application as accent floor coverage and raised platforms is becoming more popular where life cycle cost is to be low.

Figure 3.18. Interior Application (Author, 2016)

Figure 3.19. General Interiority of Block Office (Kawata, 2012)

PROJECT SYNOPSIS

Slotted into a narrow gap between two existing building, the galvanised metal block office has a similarly corresponding interior than its exterior appearance. Designed for an interior construction company, special emphasis was directed towards the interior architecture. In addition to an industrial palette, the overall finish was to be bare, simplistic and low-maintenance - thus utilising coated metals which appeared unfinished in nature. "When I considered that they undertake precision construction, I believed that the exposed structure without apparent finishing was most appropriate" (Imazu, 2015). Apart from exterior elements, such as the metallic shutters and steel frame that boasts structural support, a variety of components which necessitates **structural reliability** is present internally. The introduction of a suspended feature staircase, purely constructed out of hot-dipped coated metals, is employed to allow vertical circulation. Furthermore, metal cladding, steel partitioning and the exposed galvanised frame permits **aesthetical, yet structural sustenance** (Dezeen, 2016).

PROJECT OBJECTIVES

- Construct an interior that is **functional, low-maintenance, highly durable** and evoke **material honesty** and **good aesthetics**.
- Utilisation of metallically coated materials which permits **light reflectivity** in areas with low levels of natural light (hallways and lounges), yet limits glare in areas where light is ample and tasks are to be performed (desk space and meeting rooms).

IMPLEMENTATION STRATEGIES

- Utilise coated metals in the design of both the outer and inner interior where some **structural veracity** is required, along with clean and **honest aesthetics, finish and application.**
- Employ similar materials where the materiality should **correspond with the existing fabric**.
- Use **material reflectivity** as a method to **enhance light distribution** in areas where natural light is limited.

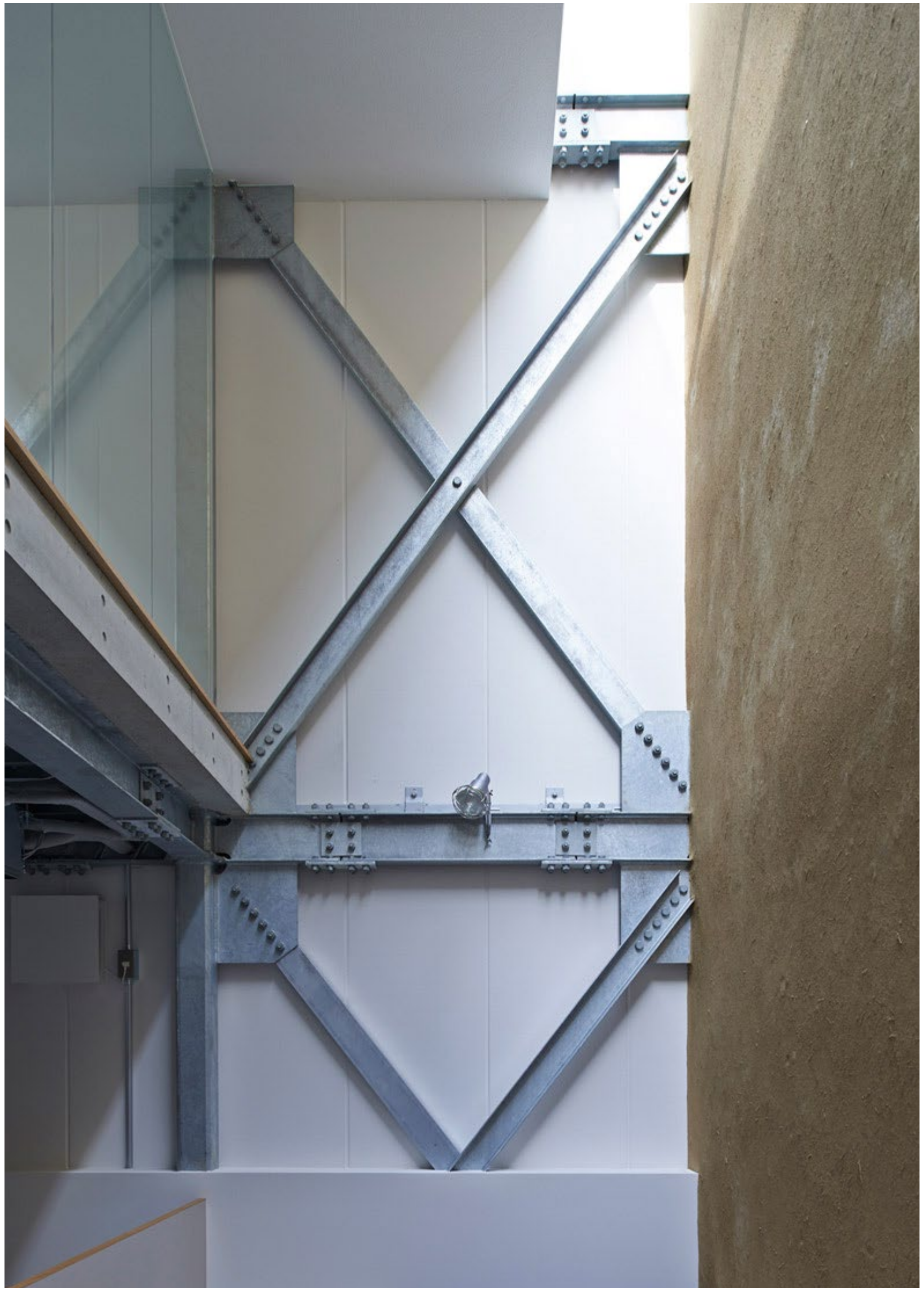


Figure 3.20. Exposed Interior Frame (Kawata, 2012)

NAME OF PROJECT
BLOCK OFFICE

LOCATION OF PROJECT
TOKYO, JAPAN

CHIEF ARCHITECT
NINKIPEN!

DATE OF COMPLETION
2015

theory

materiality

design

OPEN
programme

Figure 3.21. Rouse Hill Food Court (Jack, 2012)

NAME OF PROJECT
ROUSE HILL TOWN CENTRE

LOCATION OF PROJECT
SYDNEY, AUSTRALIA

CHIEF ARCHITECT
ALLAN JACK

DATE OF COMPLETION
2012

PROJECT SYNOPSIS

The Rouse Hill Town Centre features all the facilities of a small town, including streets and a town square, providing patrons with everything they need in one location. There is a dedicated retail and commercial precinct, with added recreational and educational spaces intertwined. The design of the food court was conceptualised by Allen Jack and is enclosed by a feature floral screen that romanticises the notion of unity through the prominent utilisation of the surrounding vegetation as muse. The entire **screen-like canopy** is manufactured using **organically coated steel**. This selection of material provides durability and buoyancy, whilst its manufacturing process corresponds with the sustainable ethos of the centre. The same utilisation of pattern and material is echoed through the implementation of built-in planters, partitioning and counter space. As opposed to the previous precedent investigation, the utilisation of **coated steel** is employed here for **mere decorative purposes.** Supporting constructions coated in a similar finish acts a structural mediator (Allen Jack, 2012).

PROJECT OBJECTIVES

- Find equilibrium between its concurrent roles of meeting place, marketplace and traffic way, all while maintaining links with nature.
- Additional design considerations attend to the community's needs, its imminent expansion and climatic environment.

IMPLEMENTATION STRATEGIES

- Utilise **coated steel decoratively** in applications where only **visual interest is desired and no structural support** is required. Given the robust nature of coated metals, it can be utilised in the **inner and outer interior** on both horizontal and vertical platforms.
- Employ similar materials where the **materiality should correspond with the existing fabric.**

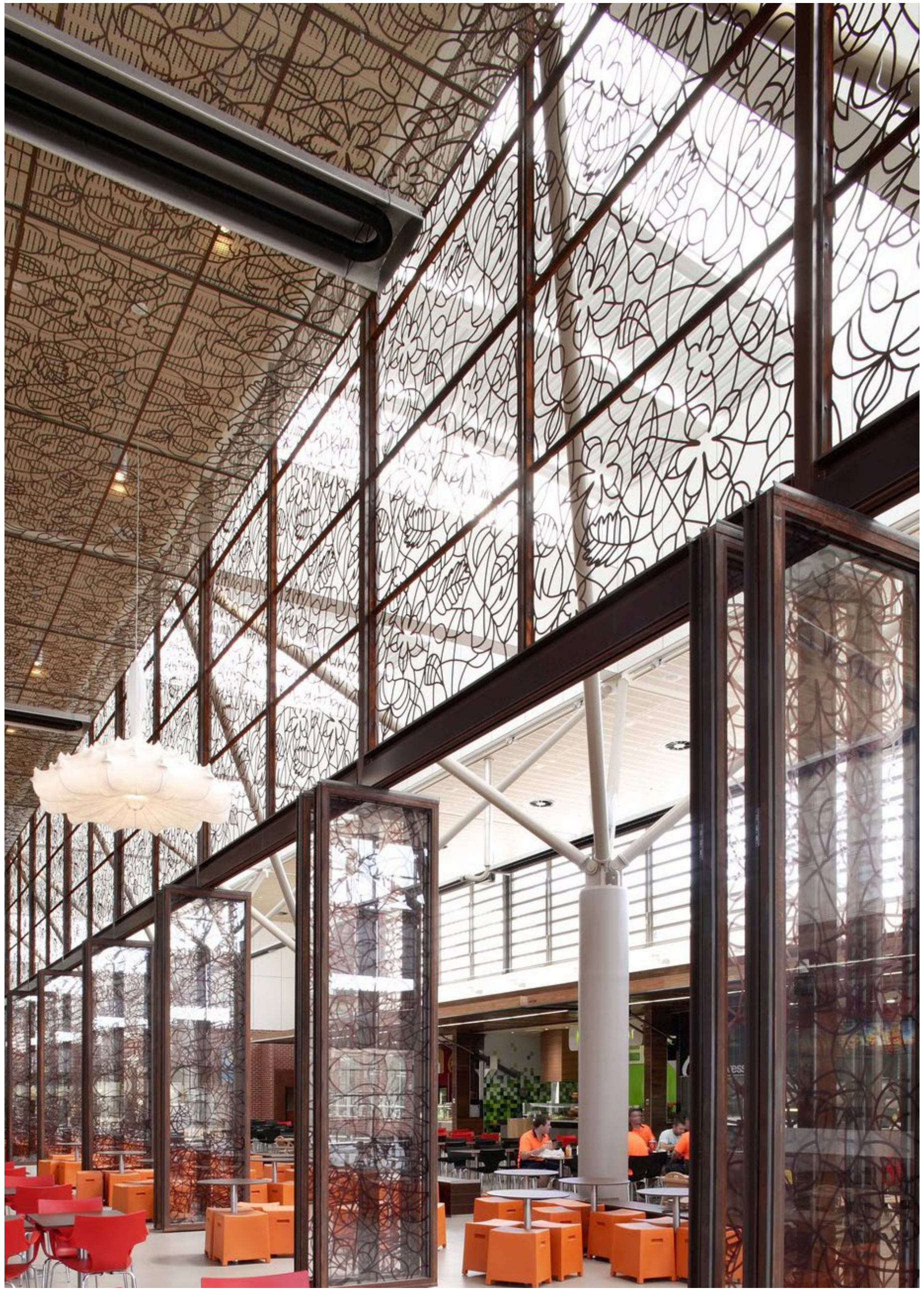


Figure 3.22. Food Court Screen Detail (Jack, 2012)

theory

materiality

design

programme

3.2
HISTORIC DECAY PRESERVATION

By way of the previous section serving as a **protection strategy manifesto of sorts for all newly proposed materials**, this section will alternatively highlight **preservation approaches for already corroding materials that exist on site**. The definite exploration of this chapter sieves the consideration of the safeguarding of the main material associated with the host (Robinson Dock) and habitant (SS Nomadic). "Conservation does not have its own universally defined preservation standards and generally works towards goals generated to satisfy prevailing situations" (Watkinson, 2010:3308). As both the SS Nomadic and Robinson dry-dock each require different approaches in terms of preservation, it is essential that these needs be clearly identified. In previous chapters it was founded that the SS Nomadic underwent complete restoration during 2012, thus merely requiring protection against future degradation. As for the dock, since undergoing structural upgrades in 1980, and being declared as a dock of concern in 2010, not much has been done in terms of upkeep. With most docking requirements currently being fulfilled by neighbouring docks, Robinson dry-dock stands desolated and **in need of preservation and intercession**.

Artifacts of cultural importance contribute greatly to the economy of nations via employment and tourism. As these objects and structures authenticate development, they provide gateways to the past and statute significant symbols of cultures, religion and individual identity. In order to assure the future contribution thereof, these objects need be actively preserved (Watkinson, 2010:3308). Historical objects are often imperiled by decay and corrosion due to timely use, origin and age. Prone to further deterioration, the diversity of contexts from which heritage materials originate presents a significant preservation challenge. In addition to this challenge, the preservation of an object should permit minimal change in order to retain cultural context and evidence of integrity - thus **retaining layers of time**. As there is a fine line between preservation and restoration, general conservation aims to establish a concise balance. Traditionally, the conservation of materials can either be classified as being interventive or preventive. Interventive methods involve the **removal or addition** of something to an object in order to preserve it, whereas the latter aims to prevent corrosion by **controlling the environment** (Caple, 2000:np.). Essentially, both scenarios allow for eventual change in an object or **structure's appearance, functionality and/or configuration.**

Whilst restoration seeks to re-establish the integrity of what once was, it neglects to address chance and the need of progression or the addition of another layer thereon (Scott, 2008:48). Furthermore, Scott (2008:95) asserts that the process of traditional preservation, which seeks to retain a building's condition as it stands to avert future decay, must be prevented as it goes against the natural lifespan of a building's existence. Instead thereof, the decaying nature of materials should be embraced - thus acknowledging a building's failure to provide for a current need and proposing alteration as a form of preservation. This form of alteration aspires to act as mediator by method of stabilising current corrosion, whilst allowing for future layering to commence thereon. Serving as a clear normative stance on preservation, innovative methods such as **decay stabilisation and rust transformation for steel** and **resin infill for concrete**, will be researched in order to act as tools of design during spatial implementation.

DECAY STABILISATION

The eventual conservation objective of indefinite preservation has compelled conservation rationale for numerous years. The frequent use of stabilisation as a method of upkeep requires careful reassessment in terms of its procedure, prerequisites and context. Given that both the **steel of the SS Nomadic and concrete of the dock had either been restored or altered in previous years**, one can assume that abundant structural integrity permits direct stabilisation. If this was not the case, pre-stabilisation procedures would have been required in order to alleviate prior degradation. Due to the fact that only a few materials are inherently stable in ambient conditions, the prevention of continuous corrosion for concrete and metal alloys **necessitates some grade of environmental control** (Ashley-Smith, 1999:15). Beneficial to the sufficient identification of the associated environmental needs of concrete and metal, qualitative and quantitative research conducted on ecological parameters will underpin the concept of preventive conservation. Regardless of this form of control, the associated materials remain unstable and these conditions merely prevented or decreased corrosion. **Stabilisation does not provide interventive treatment which fundamentally prohibits alteration** – hence linking it back to the principles Scott detest. Instead, this minimalist approach actively acts as an inhibitor that **removes, limits or controls corrosion accelerators - thus allowing alteration to occur** (Watkinson, 2010:3309).

Conventionally, environmental control was only employed once restoration was complete in order to enhance the physical and chemical stability of corrosion accelerators. This investigation supports the notion that prior interventive treatments should only be conducted if the stability and lifespan of an object, without contravening ethical guidelines, can be achieved. Various stabilisation procedures currently exist and ideally should support the role and function of the object in a society (Caple, 2000:n.p.). As the most prevalent procedures, such as deoxygenation and ion removal, involve the limitation of public associability in terms of controlled oxygen, light, and heat, these are rendered unpractical as the whole purpose of the envisioned design is to allow complete public accessibility. As an alternative, desiccation will be investigated for possible implementation by way of decay stabilisation for the steel hull of the SS Nomadic.

The prevention of electrolytic corrosion, by method of controlling the agencies needed for this process to commence, is a common strategy employed when aiming to preserve cultural metals. Similarly to deoxygenation, the removal of moisture that causes corrosion can be achieved through desiccation, which is far simpler, inexpensive, and more user-friendly. Dictated by the corrosion mechanism associated with a particular metal, the degree of desiccation necessary to prevent corrosion differs (Watkinson, 2010:3314). As this form of preservation is still relatively novel in terms of actual implementation, only chloride infested iron has been extensively researched. Fortunately, the SS Nomadic's hull corresponds to the researched material, making it possible to identify the relative humidity (RH) no-corrosion thresholds for reactions within its corrosion mechanism. Within corroded metals, ambient humidity can supply moisture to solvate ions which in return create electrolytes. When endeavouring to conserve metals, it is for this exact reason that as opposed to absolute humidity, the function of relative humidity be examined (Scott, 2002:np.).

Reputable research has shown that deliquescent and hygroscopic salts, such as sodium chloride, can lower the relative humidity threshold for corrosion to occur. Moreover, where the formation of electrolytes begins during relative humidity is referred to as the threshold corrosion value. Subsequently, desiccation outlaws the fall of relative humidity and lowers the threshold value, thus controlling the rate of decay (Selwyn, 2004:n.p.). Humidity control either employs passive desiccation (silica-like solvents) or active dehumidification (mechanical plant) in fixed display or storage areas (Ashley-Smith, 1999:21). In order to illustrate the actual implementation of desiccation, the referral to the SS Great Britain (precedent study 3.3 - page 98) will prove vital, as various similarities between this intervention and that of what is envisioned exist.

Figure 2.23. The SS Great Britain's Bow (Watkinson, 2005)

PROJECT SYNOPSIS

Relating the increasing relative humidity to the corrosion rate provides the opportunity for pragmatic management. Based on resource availability and accessibility requirements, the degree of corrosion control for the SS Great Britain (refer to figure 2.23) was implemented in order **to reduce, but not prevent corrosion**. This logic thereof was applied to act as the corrosion regulator of Brunel's famous 1843 wrought iron steamship, whose chloride-ridden lower hull is preserved in a mechanically desiccated dry dock maintained at 20% relative humidity with a goal of retaining its structural integrity, whilst allowing regulatory aging (Watkinson, 2005:77). As illustrated in figure 2.24, the mechanical desiccation system is fastened on either sides of the hull, following its distinct profile which assures even levels of humidity. Telemetric sensors monitor the relative humidity, ensuring that moisture remains below the corrosion threshold value (Watkinson, 2010:3315). This form of stabilisation allows public availability, which heightens its role as a cultural artifact through exposure, as opposed to mere prior degradation (ArchDaily, 2009).

PROJECT OBJECTIVES

- **Stabilise corrosive nature** by slowing down degradation of metal (through desiccation preferably) in order to **preserve** the hull.
- Preservation technique must **permit public accessibility, preserve current oxidation and be visually discreet.**

IMPLEMENTATION STRATEGIES

- As the hull of the SS Nomadic has been completely restored and adequate measures have been employed to protect the steel hull, **atmospheric corrosion** is bound to eventually take its toll. The employment of an identical desiccation system will **decrease the process**, and allow its **sluggish integration** into the existing surrounding as an **additional layer of time**.
- Furthermore, this form of stabilisation will **permit accessibility** and is not in need of **complete enclosure.**

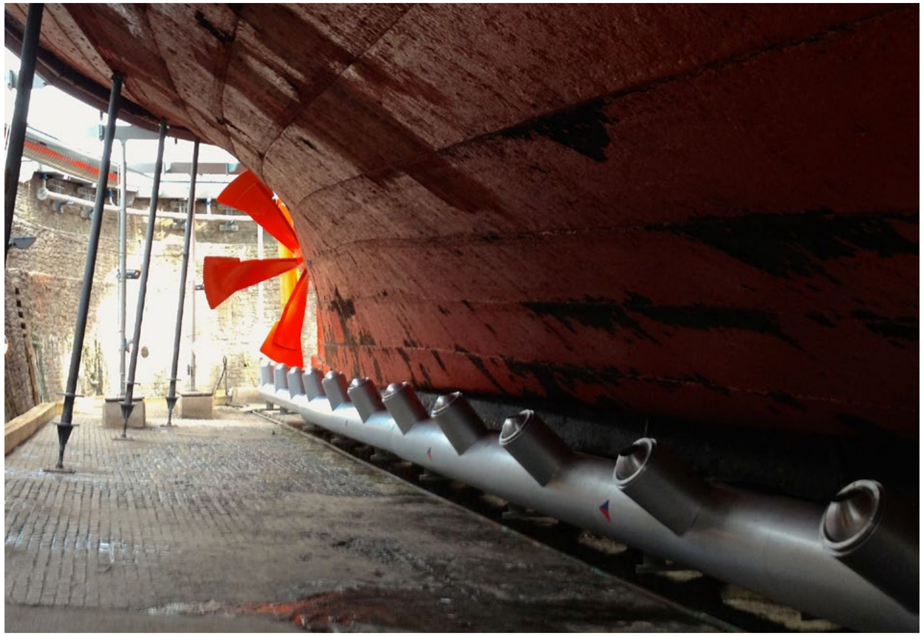


Figure 2.24. Great SS Britain Restored (Watkinson, 2005)

NAME OF PROJECT
SS GREAT BRITAIN
LOCATION OF PROJECT
GREAT WESTERN DOCKYARD, UK
CHIEF ARCHITECT
FENTON HOLLOWAY
DATE OF COMPLETION
2006

theory
materiality
design
programme

RUST TRANSFORMATION

As opposed to the discipline orientated practice of desiccation, the transferal of rust in the form of **printing and dyeing** allows for a more tentative form of corrosion stabilisation. In recent times, literal and figurative expression has been found in concepts such as decay, impermanence and the fleeting nature of conservation. In the production of artifacts that use pigments obtained from rusted metals exposed to ageing conditions such as heat, acid and weather, the process of mark-marking consents corrosion preservation (Feldberg, 2015:33). If looked beyond the most prevalent nuisances associated with oxidation, the ability of rust to provide permanent colour to an object presents perfect properties for a unique design technique. The formation of iron oxides appears once unprotected metal is exposed to air and moisture, resulting in the formation of a reddish-brown layer embedded on the metal's surface. As opposed to the chemical or organic removal thereof, rust dyeing allows for the transferal of iron oxides onto suitable materials, creating a permanent print as rust is absorbed. Furthermore, rust can be **absorbed from objects intentionally subjected** to corrosion, or historic artifacts **exposed to degradation**. As ions are absorbed from the host metal, the actual removal of corrosion occurs in a layering manner. Oxidation can either completely be removed if continuous dyeing occurs, or partially in order to stabilise the core material (Ross, 2015:n.p.).

The process of rust dyeing is rather simple in character and requires little resource availability, rendering it highly feasible. Initially, as a suitable piece of material is immersed into an acidic liquid before being placed over the corroded object. This acidic liquid can range in power of hydrogen (pH level), depending on the ion deposition required. Plainly put, the higher the pH level, the darker the transferred rust colour will be. This acidic liquid acts as an electrolyte that relocates iron oxides from a corroded element thereon. Allow the fabric to stay in contact with the rust until you are satisfied with the pattern and intensity of colour that it takes - the longer you leave the fabric in contact with the rust, the deeper the colour becomes. Once the desired amount of oxidation has been transferred, the fabric must be neutralised. **Neutralisation** can be achieved by method of soaking the finished fabric in a light saline (salty) solution - therefore stabilising oxidation and permanently embossing the conveyed surface with rust indentation (Fox, 2015:56).

Renowned British eco printmaker, Alice Fox, specialises in the creation of natural textiles. Rust dyeing is one of several processes in Fox's mark-making repertoire, chosen to convey a personal message about time and a sense of place. Being vastly influenced by the coastal landscape, her textile creation turned to the recouping of rusted objects washed upon shore. Apart from their interesting mark-making potential, these found objects behold the **capacity to convey an authentic sense of place**, which once added to material, creates an historic layer. As part of a national exhibition, Fox's work was exhibited in 2012 in an old lighthouse near the coast of Spurn, England, which happened to be the exact location from which all rusted objects were salvaged. As part of this exhibition, various wall and floor coverings were exhibited (figure 3.25 left), along with a sculptural tapestry, consisting of a number of rust dyed sheets stitched together (figure 3.25 middle), that acts as area divider and acoustic insulator (figure 3.25 right).

Figure 3.25. Exhibited Work of Alice Fox (Fox, 2013)

– RUST DYEING EXPERIMENTATION –

By means of actual experimentation, credibility was achieved and potential design opportunities realised. Expending Alice Fox as precedent, a similar technique was employed where the transformation of rust onto an auxiliary surface occurred. Different methods of application on a variety of mediums were exercised in order to determine the most optimal practice of rust conversion. Ultimately it was concluded that the complete submersion of uncoated paper (natural fiber) into an acidic liquid, before being brought into direct contact with an oxidised object, produced the best opportunity for proper rust dying.

As illustrated in figure 3.26 - 3.34, trialing with various acidic liquids produced different levels of rust transformation. It was concluded that the greater the pH level of the liquescent, the darker and more prominent the transferred oxidised pattern was.

The eventual outcomes provided interesting patterns, which will be utilised for print-making purposes in the spatial intervention that follows. This form of design will serve as educational décor that tangibly illustrates the process of rust stabilisation.

Figure 3.26. Rust Printing and Dyeing Experimentation (Author, 2016)

Figure 3.27. Printing with 100% Vinegar (Author, 2016)

Figure 3.28. Printing with 50% Vinegar (Author, 2016)

Figure 3.29. Printing with Saltwater (Author, 2016)

Figure 3.30. Printing with Orange Juice (Author, 2016)

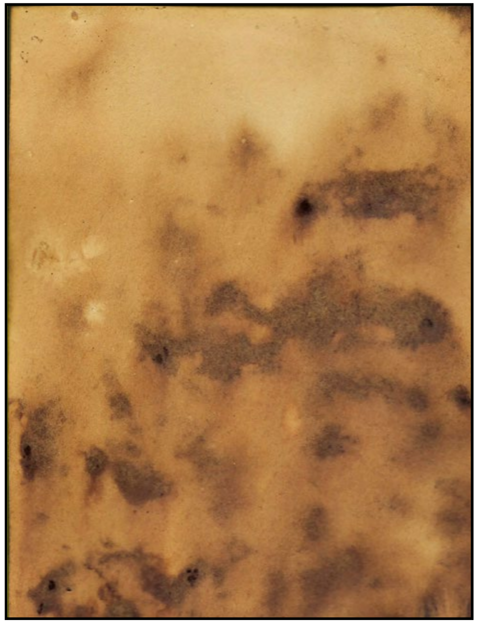


Figure 3.31. Printing with Full Cream Milk (Author, 2016)

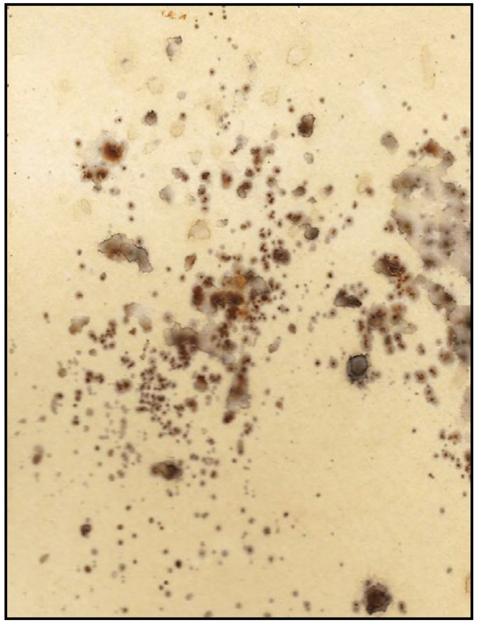


Figure 3.32. Printing with Rooibos Tea (Author, 2016)

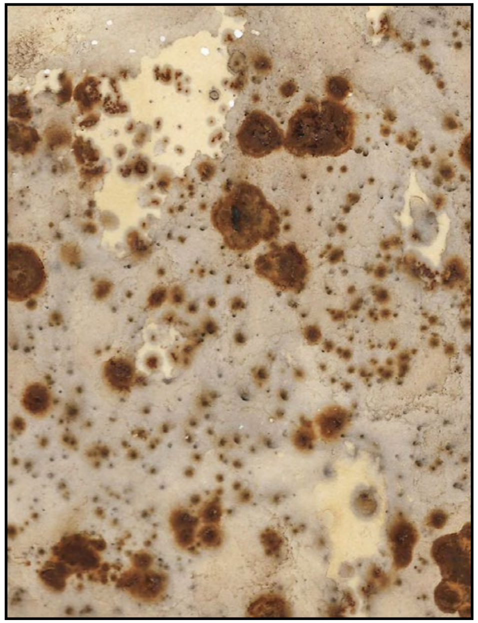


Figure 3.33. Printing with Instant Coffee (Author, 2016)

Figure 3.34. Printing with White Wine (Author, 2016)

RESIN INFILL

Regarded as being one of the Building Industry's most versatile and durable material, the structural distress of concrete can be associated with three distinct occurrences; **cracking, joint deterioration and punchouts** (CCAA, 2009:5). The process of concrete crack stabilisation encompasses the unwanted halting of unwanted conditions such as cracking or settlement (Soudki, 2001:2). The structural imparity of cracks can be established through the investigation of the fractures anatomy (refer to figure 3.26). **Structural cracks** are those which extend either **longitudinal or transverse through the depth of the concrete** and will require extensive repair. **Artificial cracks** however occur on **surface level and are less significant in terms of safety** and are mostly considered due to **aesthetics** (Mehndi, 2014:29).

Conventional methods of repair include **caulking and pressure injection**, as illustrated in figure 3.27. Depending on the desired aesthetics, materiality, surface quality and function, the selected sealant might differ. Most conventional repairs utilise Shotcrete or Gunite epoxy **mortar or cement mortar injection** which, when completely cured, provide a leveled and visually analogous finish. These are normally employed when wanting to stabilise the existing concrete and have it **appear unblemished** (Khan, 2010:440). Conversely, when the preservation is to be noted, novel interventions exist that highlight the stabilisation process and acknowledges the **infill as an additional layer of visual interest** (refer to precedent investigation 3.4). Similarly to mortar instillation, resin injections provide related cosmetic preservation, whilst acting as a medium to **differentiate between the existing and the proposed**.

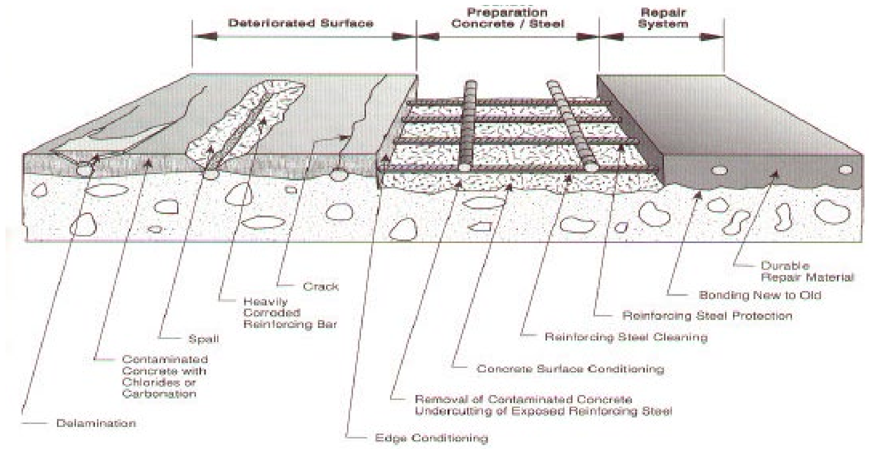


Figure 3.35. Anatomy of Concrete Cracks (Emmons & Vaysburd, 1995)

Figure 3.36. Caulking Repair of Concrete Crack (East Ronavtions, 2015)

PROJECT SYNOPSIS

As a way to avert additional fracture to an existing cracked concrete floor, Naritake Fukumoto infused **conventional methods** of repair with a **traditional technique** which involved the caulking of a golden-hued resin into a surface crack. The method used to create this effect is called Kintsugi, which means to "repair with gold". Traditionally used for repairing broken pottery, this art involves in filling cracks using lacquer mixed with powdered gold. As opposed to conservative methods that wish to provide an **unblemished and perfected finish**, this form of preservation alternatively **enhances and accentuates** the screed floor infill. Through the combination of **honest and contrasting techniques**, the transformation of what was considered imperfect is now the subject of beauty. In addition to this specific infill, several other lacquers have been developed that will provide a related effect in environments coveting to celebrate the **auxiliary layer of material preservation** (Dezeen, 2016).

PROJECT OBJECTIVES

- As opposed to conventional methods of concrete repair that wish to cover up the effect of time, the utilisation of a traditional method is to be employed which **celebrates imperfection** and regards the **residue of preservation** as an additional attribute of visual interest.
- **Stabilise** the current nature of weathered materiality through **simple, cosmetic techniques**.

IMPLEMENTATION STRATEGIES

- Employ this form of **stabilisation** to weathered areas which will be subjected to high amount of physical interaction, possibly the existing cracks on the altars of the dock which will act as walkway.
- **Accentuate the beauty of imperfection** through the addition of a contrasting infill layer that clearly **differentiates** between the **old and the new**.

Figure 3.37. Gold Resin Infilled Concrete Cracks (Hasegawa, 2016)

NAME OF PROJECT
X-CHANGE APARTMENT

LOCATION OF PROJECT
KYOTO, JAPAN

CHIEF ARCHITECT
TANK ARCHITECTS

DATE OF COMPLETION
2016

3.3
INTENTIONAL OXIDATION

As opposed to the protection and preservation of materials to corrosion, in some instances the act of oxidation might be a design prerequisite. When a material, particularly metal, is purposefully exposed to environments conducive to deterioration in order to corrode, the act thereof is referred to intentional oxidation. Where protection strategies wish to avoid decay and preservation wish to control decomposition, intentional oxidation sees weathering as a form of beautification - thus **embracing and not dreading age**. This practice shows extreme favourism in areas where materiality must be seamlessly incorporated into the adjoining landscapes or a periodic appearance is desired. Furthermore, in designs where lifecycle cost and upkeep must be low, materials protected or prone to benefit from corrosion is desired. Nonetheless, it remains vital that the continuous rate of the applied corrosion be alleviated, monitored and controlled in order to ensure structural integrity and no endangerment to public health. It is therefore advised that certified materials designed for this purpose be utilised, as opposed to conventional materials that will simply rust if left unprotected. Utilising this form of oxidation as a l**ayering tool, chemically altered** metals (**weathering steels**) and **physical approaches** (**faux oxidation**) will be reconnoitered. Furthermore, **biological concrete** will also be investigated as a potential contrivance to calculatedly create weathered concrete.

WEATHERING METALS

Apart from the practical values of weathering steel, the aesthetic value of this textured and worn material makes its application particularly useful where **ease of fabrication, strength and appearance are of paramount importance**. If left unprotected, **atmospheric corrosion** will encourage the formation of **patina - a sable protective layer** consisting out of a self-generated oxide deposit. Structures made of these steels **need no anticorrosive protective coating**, subsequently **boosting economic and ecological benefit** (Žáček et al, 2009:1).

As this material will be subjected to **continuous change**, the appearance thereof will perceptibly also show forms of variation, as **oxidation never completely stops**. Successively, the primary layer of patina appears within a few weeks of exposure, with the final coloration only achieved within one to two years and lasting, without maintenance, for at least 80 years depending on product specifications. Furthermore, copper alloys at concentrations up to 0.55%, tolerates the production of a homogeneous, regenerative and **protective surface layer**, which **decelerates corrosion and safeguards the structural integrity** of the **underlying steel**. Henceforth, the investigation of popular weathered metals will be investigated in order to assist possible architectural solicitation (Arcelor, 2013:2).

- STAINLESS STEEL -

Classified as being an actively protected material, the addition of at least 11% of chromium to steel creates an iron-based alloy commonly referred to as stainless steel. Possessing mechanical qualities that limit corrosion, provide chemical resistance and prevent scaling at high temperatures, stainless steel provides universal convenience (Outokumpu, 2013:9). Once compared to carbon steel, the usage thereof is fairly lower due to unfamiliar practice within the field of architecture. As shown in figure 3.29, usage is dominated by areas related to consumerism and equipment, with the building and general construction sector merely accounting for 5% (Leffler, 2011:4). Recent statistics has shown an upsurge in utilisation due to gain in familiarity, product affordability and lifecycle costs justification. Before the suitability of stainless steel as a material ideal for intentional oxidation is conveyed, the distinct classification thereof in terms of composition and topographical implementation will be declared.

Theoretically, stainless steel is divided into five classes. However, as local sourcing will be advantageous, only the three classifications of stainless steel, as recognised by SASSDA, will be mentioned. Apart from their differentiation in production, ferritic, austenitic and duplex stainless steel differs greatly in chemical composition. As mentioned previously, stainless steel must contain a minimum chromium content of 11%. The increase thereof, in addition with supplementary elements such as Molybdenum (Mo) and Nickel (Ni), allows for distinct categorisation (refer to figure 3.30). Austenitic stainless steels are primarily employed architecturally due to a higher composition of chromium and nickel. However, when proposed usage is in close proximity to the coast, duplex stainless steels are advised, as the high levels of molybdenum content renders it resistant to saline corrosion (Revie & Uhlig, 2008:341).

Evidently, it is essential that the intended location of proposed implementation be acknowledged in order to select a compatible grade of stainless steel. In addition to the previously mentioned corrosion map of South Africa (fig 3.6), the different calibers of stainless steel have been arranged according to their resistance to atmospheric corrosion.

Contrary to the popular belief of mere place and structure, this selection is more so governed by budgetary constraints and visual prerequisites. If a material is required that must remain rust-free in appearance, it is advised that a type of stainless steel be selected that fall within the

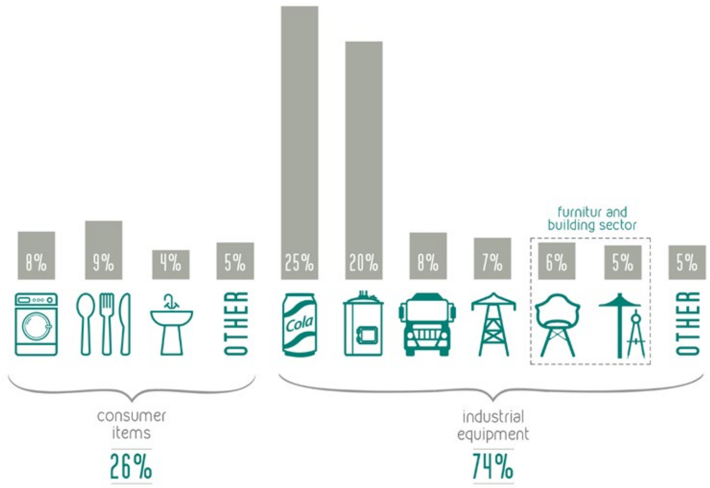


Figure 3.38. Consumer and Industrial Utilisation (Author, 2016)

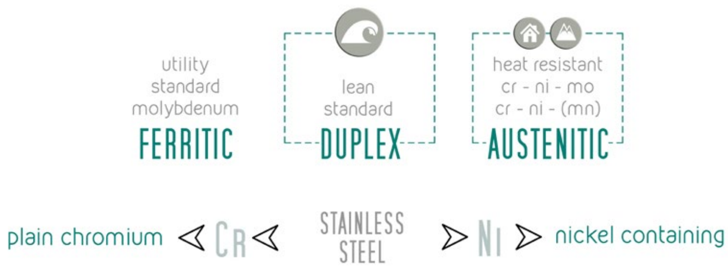


Figure 3.39. Categorisation of Stainless Steel (Author, 2016)

governed region. As per example, if finances allow high cost and the material is required to remain rust-free in appearance in a severe marine environment, the selection of a stainless steel that falls in Class IV must be utilised. However, if the appearance quality is not of vital importance, lower grades of steel can be selected, as only aesthetic modification (addition of patina), and no structural alteration, will occur - similarly to that of conventional weathering metal.

- COR-TEN AND INDATEN STEEL -

As one of the building industry's oldest atmospheric corrosion-resistant steel material, COR-TEN has efficaciously overcome oxidation by capitalising on its unique "rust cures rust" function. Benefitting from its abilities to be implemented without any finish, since the encouraged formation of rust creates a protective layer which suppresses the rate of corrosion, this material nullified the common belief that all steel should be covered with paint. However, should painting be a visual requirement, the service life thereof will be prolonged quite extensively once compared to coatings applied onto ordinary steel. From the time of initial establishment, COR-TEN has been used in practically any field where steel is required. Raging from engineering structures such as bridges and railways, to architectural application on both and internal and external level, the abilities of COR-TEN to reduce lifecycle costs (LCC) and lower environmental burdens will warrant emergent usage (NSSMC, 2014:3).

When exposed to the elements, similarly to any weathered steel, an initial layer of oxidation develops which gradually converts to fine-textured rust. As exemplified in figure 3.31, the initial colour during application appears yellowish, followed by a gradual shift in colour within two years of installation. Thereafter, the materials stabilises due to sulphates of the alloying elements which produce insoluble compounds that clogs the pores of the rust/steel interface, resulting into no clear change other than a darker hue of brown. Moreover, if the patina does not stabilise, penetration might occur, which under continuous wet or buried conditions may result into similar corrosion rates as carbon steel, therefore not recommending such implementation. In marine environments stable oxide films may form on the steel, provided that harmful levels of chloride be washed off if regular contact with direct seawater is permitted (Arcelor, 2013:1). As an alternative to COR-TEN, Indaten steel can also be used as its properties and functionalities are merely identical. Variation in availability and price renders COR-TEN preferable.

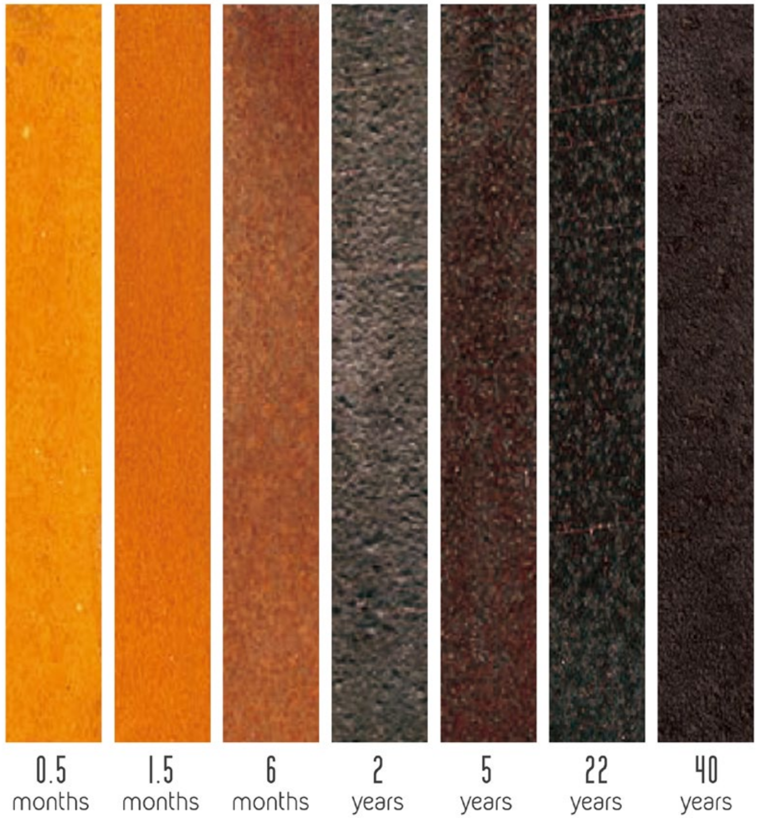


Figure 3.40. COR-TEN Secular Changes in Rust Appearance (Hasegawa, 2016)

PROJECT SYNOPSIS

Through the coverage of arch beams cladded with COR-TEN steel, which **conceals** the rougher surfaces of the walls behind, a former desolated railway tunnel was converted into an enclosed pedestrian passageway. As a **method of rehabilitation** that had to adhere to **strict environmental constraints**, the area was transformed into a striking promenade. Connecting two northern Italian towns (Albisola and Celle Ligure), the focal idea was to design a structure which **accentuated natural** pathways, overhangs and viewpoints. In order to **govern reversibility** of the intervention, **temporarily materials were used and sensitive joining methods employed**. In addition to being a covered walkway, temporary exhibitions can take place inside the tunnel. As one exits the eastern end, the passageway unifies onto the seafront, where stepped decking creates an informal seating area (ArchDaily, 2012).

PROJECT OBJECTIVES

- The intervention was not allowed to alter the existing identity of the historic fabric, **permitting semi-reversibility** if deemed necessary.
- The function of the pathways was to provide the continuity of pedestrian pathways and the usability of all surrounding coastlines and amenities.
- Materiality was to be of **low maintenance and have little environmental/visual impact**.
- In addition to serving as a connecting promenade, the restoration of the railway tunnel must function as a container for visionary art exhibitions and artistic installations.

IMPLEMENTATION STRATEGIES

- Employ the selection of COR-TEN steel in a similar, seamless fashion that **symbiotically merges the new** (spatial intervention) **with the old** (existing host and habitant).
- Engagement alterations that can be **semi-revisable and respect its current setting**.

Figure 3.41. Albisola Promonade (Voarino, 2011)

NAME OF PROJECT
ALBISOLA PUBLIC PROMENADE

LOCATION OF PROJECT
SAVONA, ITALY

CHIEF ARCHITECT
3S STUDIO ARCHITECTS

DATE OF COMPLETION
2011

theory

materiality

design

programme

Figure 3.42. MONA's Central Staircase (MONA, 2012)

PROJECT SYNOPSIS

As one of Australia's largest privately owned museums, the Museum of Old and New Art (MONA) was designed by architect Nonda Katsalidis to evoke the essence of time. Inspired by the antique Greek strongholds, the structure stretches over 6500 square meters and extends to three levels above ground. With the distinct feature of having no apparent windows on the outer envelope of the structure, a sense of danger is engendered in order to **enliven the experience** of the artistic works. As opposed to traditional light and signage, audio and **materiality** is used to guide all visitors - thus **heightening the theory of time and place**. Utilising the concept of Palais de Tokyo in Paris, this museum boasts various platforms where aspiring artists can exhibit work and use the space as a personal studio. This form of active collaboration acts as **supplementary layer** to the exhibited work permanent on display. The selection of materials used in the interior was carefully selected with the **concept of fragility and timeliness** as primary criterion - thus using an assortment of materials which appears to have been exposed to time and harsh conditions. In addition to COR-TEN-like materials, a combination of **unblemished and discoloured** stainless steel is employed in order to **contrast and outline past, present and future** occurrences (Trend Vision, 2012).

PROJECT OBJECTIVES

- Create an **enticing environment** that aspires to encourage collaboration through the appreciation of art and design in an **alluring space**.
- Design an interior that is highly versatile in programme, atmosphere, display and materiality.
- Establish a prominent **link between the old and the new** through the art on display and **selection of appropriate materials**.

IMPLEMENTATION STRATEGIES

- Employ the selection of materials in a similar, seamless fashion that symbiotically **merge the new** (spatial intervention) **with the old** (existing host and habitant).
- Utilisation of stainless steel untarnished, and if underspecified, permit discolouration and appears **intentionally corroded**.

Figure 3.43. MONA's Exhibition Space and Materiality (MONA, 2012)

precedent investigation

3.6

NAME OF PROJECT
MUSEUM OF OLD AND NEW ART

LOCATION OF PROJECT
MOORILLA, AUSTRALIA

CHIEF ARCHITECT
NONDA KATSALIDIS

DATE OF COMPLETION
2012

theory

materiality

design

OPEN
programme

FAUX OXIDATION

If the chemical alteration of materials intentionally are deemed unfeasible, physical approaches exist that promote similar results visually. Faux finishing is the decorative process during which the appearance of materials, such as marble, stone and wood, is artificially replicated (Shekhar, 2005:110). Observed for centuries, this form of decorative art began with plaster and stucco in Mesopotamia. By way of shortage in resources and capabilities, the development of alternative forms of adornment was endorsed. Subjected by time and product availability, two essential grades of faux production remain - the positive or negative categorisation. All positive methods govern direct application of paint onto the surface to be decorated. The surface is essentially either covered with a base colour, followed by the application of patterns onto the wet base-coloured surface, or alternatively, colours are layered onto a dry surface and induced to mix with a spattering of mineral spirits. The latter mentioned negative methods permit the removal of material from the decorated surface by method of surface shellacking or paint chipping (O'Neil, 1971:9).

A number of faux finishes exist, as shown in figure 3.35, that can be employed when the devastating effect of age to certain materials is desired. Apart from stylistic advantages and temporality, structural integrity of the underlying object is certified due to the superficial nature of this application. Faux oxidation utilises a positive approach, which through layering, creates artificial patina. In conclusion, the appearance is enhanced three dimensionally and its protection against corrosion prolonged when a final layer of translucent glaze is applied.

Figure 3.44. Positive Faux Methods (Author, 2016)

PROJECT SYNOPSIS

Situated within the world renowned uShaka Marine World Theme Park, the Phantom Ship is regarded as being one of the key attractions on site. Located on the strip of land between the beachfront and the harbour, uShaka Sea World is the fifth largest aquarium in the world. As a central feature, the Phantom Ship acts as entrance to the aquariums situated underground, which is designed around five infamous shipwrecks. In addition to being a point of admission, the Phantom Ship hosts various restaurants, souvenir shops and ablution facilities. As **opposed to the adaptive reuse of a decommissioned vessel**, the exterior of the ship was newly-built, aspiring to **replicate** an old, stranded steamer. Various artificial methods of **intentional corrosion** were used to **replicate the passing of time**, both on an exterior and interior level. In addition to **weathered steel, faux oxidation techniques** were employed to create a rustic interior, as all elements were in actual fact new. Due to the cost associated with a vessel in such a severe state being too high, the **replication** of a stranded ship was deemed more feasible. Furthermore, a lack of decommissioned vessels resembling the desired **aesthetics supported the notion of imitation** (Tourisms SA, 2004).

PROJECT OBJECTIVES

- Design a central gathering space that will permit admission to aquariums, restaurants, conference venues and souvenir attractions.
- Provide a structure that **correlates with its surrounding theme and location**.
- Imitate the **passing of time** through the selection of durable, cost-effective and artificial techniques that would not hinder safety, nor lessen structural integrity.

IMPLEMENTATION STRATEGIES

- Employ the **replicating technique** of faux oxidation in a similar, seamless fashion that **symbiotically merges the new** (spatial intervention) **with the old** (existing host and habitant).
- Utilise this form of **intentional artificial corrosion** on elements where **materiality cannot be replaced** or be **endangered by possible structural loss**.

Figure 3.45. Phantom Ship's Cargo Hold Restaurant (Unknown, 2005)

NAME OF PROJECT
PHANTOM SHIP

LOCATION OF PROJECT
DURBAN, SOUTH AFRICA

CHIEF ARCHITECT
TNNG

DATE OF COMPLETION
2004

theory
materiality
design
programme

BIOLOGICAL CONCRETE

In addition to the actual degradation of concrete due to **corroded reinforcement, severe load, or inferior composition**, weathering can occur when concrete is exposed to **natural pigmentation**. In addition to atmospheric stress created by water and salinity in coastal surroundings, the growth of microalgae, fungi, lichens and/or mosses can ensue on concrete when subjected to continuous humidified environments. These photoautotrophic organisms are able to obtain different elements for their metabolism (e.g. iron, aluminum, calcium, silicon etc.) through biosolubilisation. Such biosolubilisation involves the production of organic acids, which is the best known biogeochemical mechanism of concrete decay (Jayakumar & Saravanane, 2010:352). As opposed to **actual decay**, the Structural Technology Group has developed a type of biological concrete that **endorse the natural, augmented evolution** of pigmented organisms. In addition to aesthetic advantages, when applied to façades of buildings, **thermal comfort is improved** and atmospheric CO2 levels reduced (UPC, 2012: np.).

In addition to sufficient pH levels, material properties which influence bio-receptivity, such as surface roughness and porosity, were amended in order to produce biological concrete. This resulted into the formation of a **multilayered** panel, which in addition to a structural deposit, consists out of three distinct layers. As illustrated in figure 3.37, the first layer that is situated on top of the structural layer is reserved for waterproofing. This ensures protection against possible damage caused by water. The second sheet, referred to as the biological layer, warrants colonisation and consents water accumulation. Acting as the internal microstructure which facilitates the actual development of the biological organisms, this layer expels moisture and supplements retention though the capacity of rainwater encapsulation. The top layer is reserved for a discontinuous coat that permits the entry of rainwater, but prevents discharging. This reverse waterproofing layer directs the outflow towards where biological growth is desired (UPC, 2012: np.).

Since the onset of its introduction to industry in 2011, research was directed towards the process of growth and ability of the grown organisms to evolve with time, screening deviations of colour according to the time of year and the predominant families of organisms. This form of **intentional weathering** provides **revolutionary options** within the field of design.

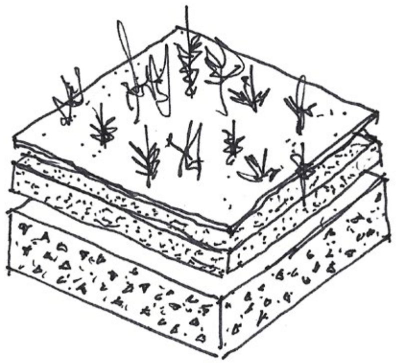


Figure 3.46. Composition of Biological Concrete (Author, 2016)

PROJECT SYNOPSIS

The Aeronautical Cultural Centre is located on a wide stretch of land situated alongside industrial buildings all connected to the Barcelona Airport's terminal. Constructed to showcase, repair and host aircrafts dating back to World War II, the design followed similar construction systems employed by ancient aircraft and hangers. With an outer continuous skin constructed out of concrete, the overall skeleton steel structure was designed to support the weight of suspended aircrafts. The deliberate combination of ancient and current construction techniques contrasts the past with the present, the old with the new. Wanting to imitate a departing plane, the facade is elevated, allowing ample light to flood into the interior. Similarly to the **fragile nature** of corroded aircrafts, the process of **corrosion was intentionally replicated** on the outer envelope. As opposed to the steel of a plane that rusts, the concrete of the actual **building weathers**. The utilisation of biological concrete governs this concept and allows the building to **merge into its surrounding environment with the passing of time** (Dezeen, 2012).

PROJECT OBJECTIVES

- The design of ample space that permits **multi-functionality and adaptability**.
- Combine ancient aircraft construction methods with current architectural trends in order to **contrast the past with the present**. This is applicable to the selection of materials as well.
- Construct a building that permits **migration** into its current setting. As the surrounding buildings and hosted aircrafts decay, the building should undergo evolution as well. This should however be of an **artificial kind** and **not compromise the structural integrity** of the steel skeleton.

IMPLEMENTATION STRATEGIES

- Utilise biological concrete in a similar fashion where **intentional weathering of concrete** is desired. Seeing that the introduced design will make use of great quantities of new concrete, the proposed should be **evidently contrasted against the existing**, yet permit gradual and controlled visual migration with the passing of time.
- Furthermore, this form of material application will **tangibly** illustrate the **process of layering**.

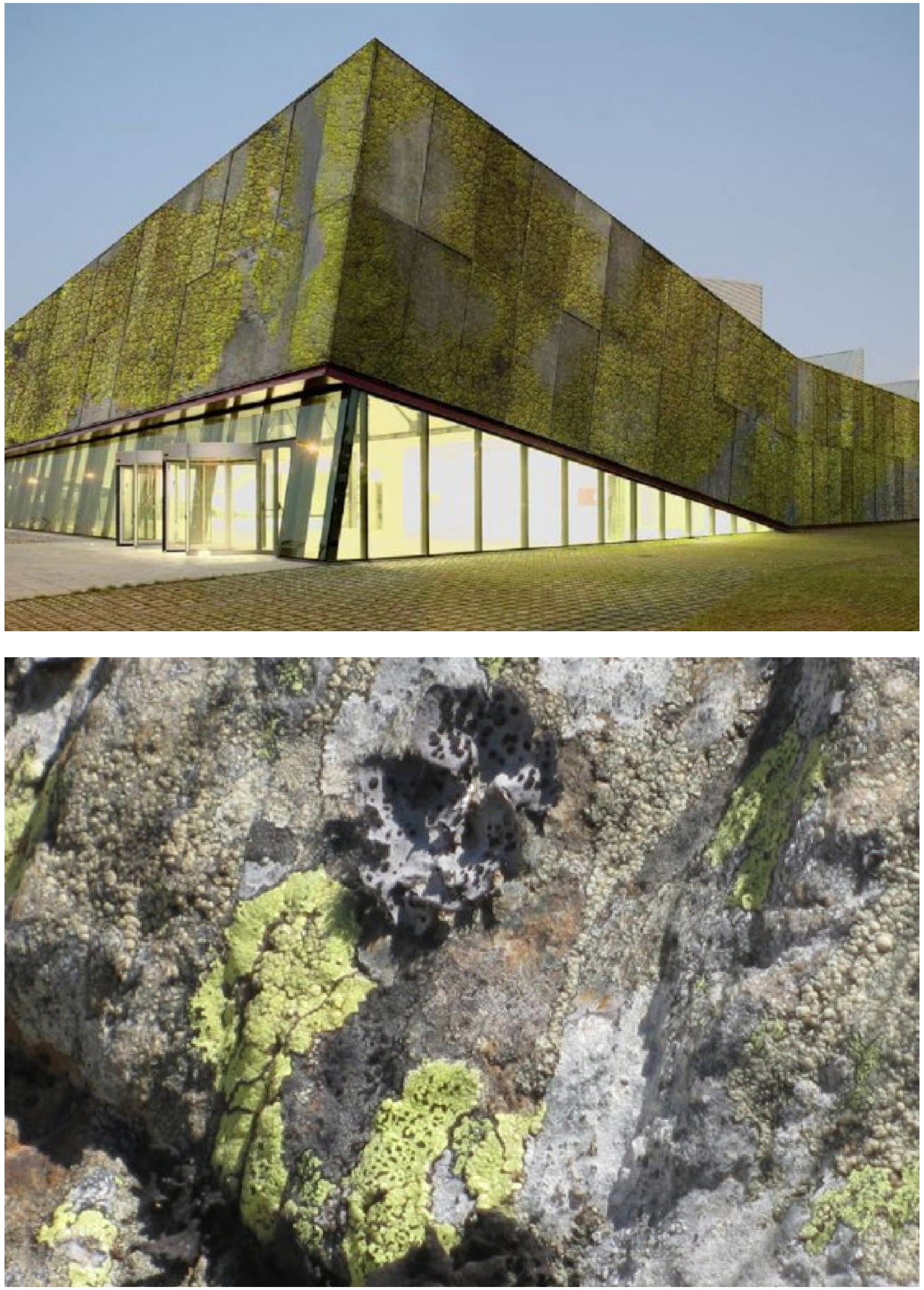


Figure 3.47. Centre Facade and Biological Concrete Panel (Unknown, 2011)

NAME OF PROJECT
AERONAUTICAL CULTURAL CENTRE

LOCATION OF PROJECT
BARCELONA AIRPORT, SPAIN

CHIEF ARCHITECT
SERGI GODIA

DATE OF COMPLETION
2009

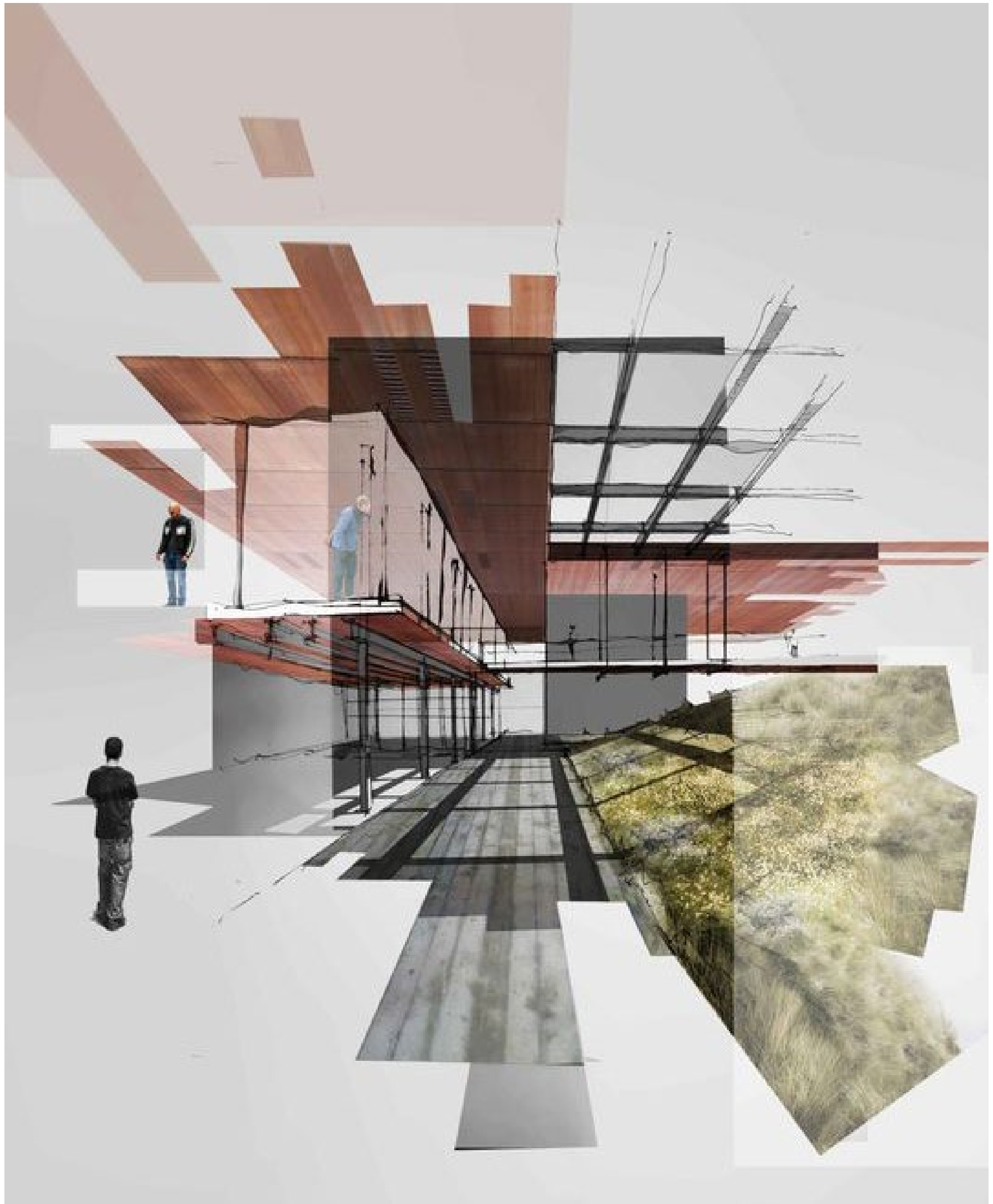


Figure 3.48. Layered Ink, Markers and Watercolour (Chahine, 2016)

Figure 3.49. Approach to Materiality (Author, 2016)

In conclusion, this chapter served as theoretical premises that illustrated **corrosion as a tangible form of layering** which, if associated with materiality, generates an **architectural palimpsest.** As opposed to the mere institution of a conventional approach to heritage (refer to illustration 3.39), the **appendage of a new layer** is proposed that will allow for **past recollection and future addition thereon**. As a way to substantiate the aforesaid belief, **three material methodologies** that gradually acknowledges the conceivable introduction of **corrosion as a form of beautification**, were investigated.

The initial approach, **corrosion protection**, employs coated metals specifically engineered to **withstand the progression of oxidation** through complete fortification. The complete elimination of possible degradation permits the distinct introduction of new materiality that aspires to remain prominent. The second methodology, **historic decay preservation,** completely acknowledges the fact that all materials are **prone to complete deterioration** and thus wish to **stabilise the process in order to prolong material migration**. As opposed to the initial approach that is solitary reserved for all things new, the latter is only applicable to elements of historic importance. The concluding slant, **intentional degradation**, can be applied to both proposed and existing materiality and encourages a **mediated prominence through superficial degradation.**

In summary, design should be comprehended with the **clear realisation that materiality can act as a definite form of palimpsest,** which can either **migrate or overrule existing fabric** with the passing of time. As contended by Fred Scot (2008:96), the deed of alteration should not merely embolden absolute restoration or inattentive demolition practices, but methods of preservation that revel in the remembrance of what once was. Possessing a clear understanding of these fundamentals, the actual implementation thereof in the form of a spatial intervention can be promoted.

4 CHAPTER

spatial design development

This chapter will initiate the conceptual development of the spatial intervention proposed for both the host and the habitant. In order to evidently differentiate between the various proposed mechanisms of design, all mediations are classified as either contributing towards the inner or outer interior of the proposed intervention.

Figure 4.1. Below the Cutty Sark (Unknown, 2013)

THE INNER AND OUTER INTERIOR DESIGN DEVELOPMENT

"If the highest aim of a captain was to preserve his ship, he would keep it in port forever"

Thomas Aquinas, 1274

Founding portion of the requirements for the successful completion of a professional degree, the **tangible conveyance of the reconnoitered theories** and concepts are to be **illustrated spatially**. Moreover, as outlined by these degree requirements, the envisioned design should be of an **interior nature**. Working within two distinct artifacts (dock as host and ship as habitant), this **novel intervention** will require design that is **not conventional to the field of interior architecture**.

As uttered by indomitable verdicts, it was essential that the design **refrain from a mere museum typology**. As conventional re-use of ships on land either **follow tradition** in terms of **adaptation into a mere landmark or once-visited museum**, the assurance of **continuous call on to site governs an innovative intervention**. Henceforth, the proposal of a **brewery and craft establishment** that will attract tourism and entice locals is envisioned. Positioning the brewery inside the SS Nomadic, and the craft market amid the existing dock, the creation of **two dissimilar interior areas is proposed**. Given that the **brewery** will be framed within the existing structure of the ship, it will be referred to as the **inner interior**. As it will be an enclosed area, its relevance as a traditional interior is quite evident. The latter mentioned interior, referred to as the **outer interior**, is reserved for the **craft market** and will be incased between the dock and ship. The **partial enclosure** a**nd nested position** thereof renders it an **exposed, outer interior**.

As a point of departure, the **current infrastructure** on site was inspected in order to **assure structural viability.** Once approved, the **construction of a steel armature** was designed which allowed **elevation, panoramic accessibility and structural support**. Upon elevation, the creation of an inner and outer interior could commence. In this chapter, attention is directed towards the **design development of the spatial intercession**, from intention to conclusion as an **iterative process**. In assurance of ample visibility, the **insertion of a platform** allows raised approachability and **esteems existing heritage apparatuses embedded atop the docks floor**. The newly instituted podium platform permits the recreation of **craft and exhibition**, whilst still directing prominence towards the surviving fabric. Given the scale of this endeavor, the establishment of ample spatial features will be designed, taking the **holistic nature of the entire host and habitant into continuous consideration**. Upon conclusion, all individual constituents will **piece together as layers that total into an absolute and viable potential destination**.

4.1
DESIGN CONSIDERATIONS

Afore any conceptions can be translated into a **tangible resolution**, certain considerations are to be conscripted which will form part of a **universal design manifesto**. These reflections are not only derived from the **actual structure in terms of scale and inheritance**, but likewise from the **theoretical discourse of materiality**.

MATERIALITY
Existing fabric of the weathered host and renovated habitant must be **celebrated**. Following the principles of **protection, preservation and premeditation**, all **current and newly introduced materiality** must showcase the potential of **corrosion as a tool of beautification**.

OLD VS. NEW
Given the fact that the intervention will **transpire within a location rich in prior occurrences**, **sensitive addition** must be comprehended. These additions will act as **additional layers that highlight the existing from the proposed**, permitting s**ymbiotic convergence with time**.

SCALE
In view of the identified host and habitant, the principle of **proportion** is quite evident. Using selective strategies, several areas will require the emphasis thereof, whereas other **seamless annexation**. Sheer size governs **distinctiveness and abundant design probabilities**.

RELATIVITY
Linking with scale, the notion of relativity is of great importance considering the **association between host and habitant**. When designing **holistically**, yet individually, allowance for **relational placement, constant visualisation and actual accessibility** is governed.

LOCATION
Locality will influence design decisions associated with programme and **material selection**. A dense selection of recreation permits innovative solutions in activity, whilst a **coastal setting** requires **adequate material protection against saline corrosion**.

HERITAGE
Working within a culturally significant environment, the presence of **sacred artifacts** becomes evident. **Sensitivity governs alteration and possible design restrictions**. Presently on site, the **existing structure and berthing blocks** are of prominent historical concern.

REGULATIONS
As with any design initiate, adherence to **strict regulatory standards** must be employed in order to assure v**iable, universal and structural design**. In addition to typical **building regulations and ergonomics**, obedience to **brewing and naval standards** is to be charted.

QUALITY
Above all, **quality in terms of experience** must be encouraged through design. Attention will be directed towards the eminence of the created spatial intervention through **comfort and inclusivity - an interiority that evokes a habitual, and human-centered occurrence**.

4.2
BERTHING CONSIDERATIONS

Before any concrete design can occur, the **positioning of the ship in relation to the dock** must be comprehended. Based on the current condition of the SS Nomadic, **structural integrity limits continuous change in elevation and mobility**, thus proposing to uphold the ship **stationary**. Scrutinising various options for possible positioning, ultimate placement in terms of **accessibility, optimal use of space and aesthetics** was used as guidelines to assess these possibilities. Additional dynamics that subsidised placement was founded on **context and daylight**, which will be investigated as part of the technical resolution in the chapter to follow (page 194).

ORIENTATION

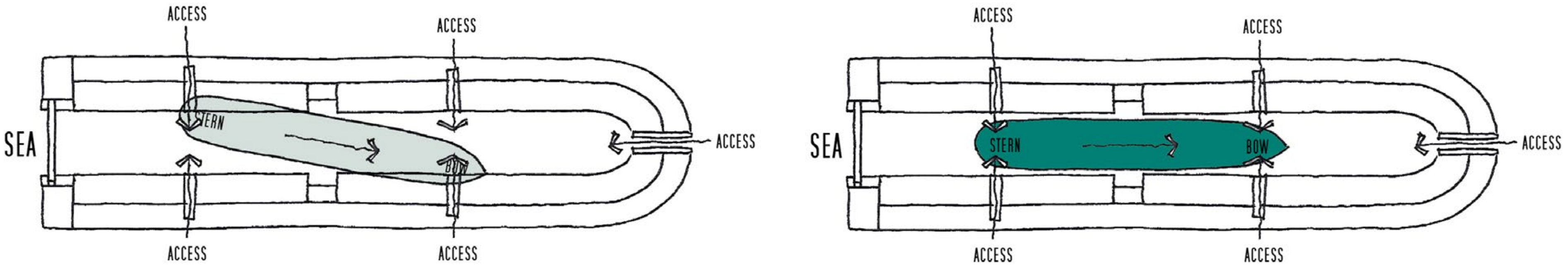


Figure 4.2. Diagonal or Parallel Orientation (Author, 2016)

- DIAGONAL vs PARALLEL -

Due to the **structural support required and precedents undertaken, the diagonal layout was not feasible**. The overall hull size would also have to be risen above water level in order to accommodate this angle of positioning, thus **decreasing visibility**. The parallel positioning of the vessel allows for **better utilisation of dock space, even distribution of weight and symmetrical outline of the keel as framed by the dock**.

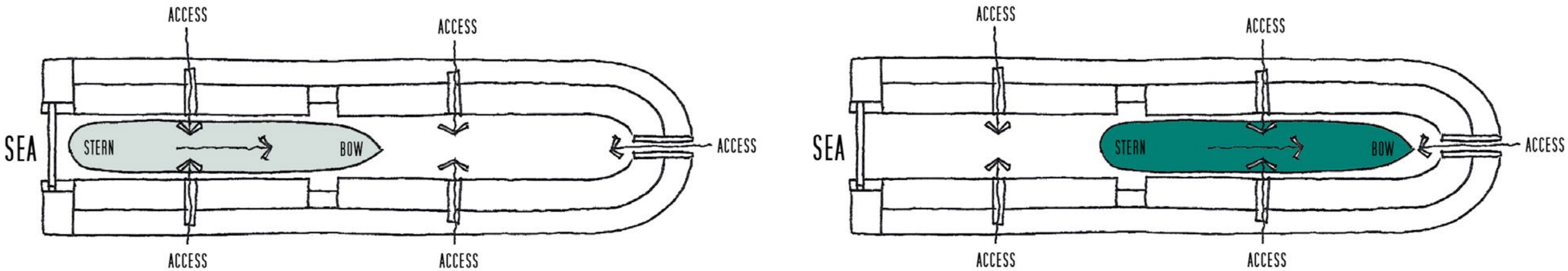


Figure 4.3. Left and Right Orientation (Author, 2016)

- LEFT vs CENTRAL vs RIGHT -

Due to the dock's **secondary sill**, central positioning would be challenging in terms of **structure and accessibility**. In addition to this, the adjacent space on either side will be **wasted**, as the ship merely **utilises half of the unfilled footprint**. As opposed to right positioning, **left is preferred** due to **aesthetics and dramatic effect** of downward decent through the main chute. The vacant space near the caisson will be used accordingly.

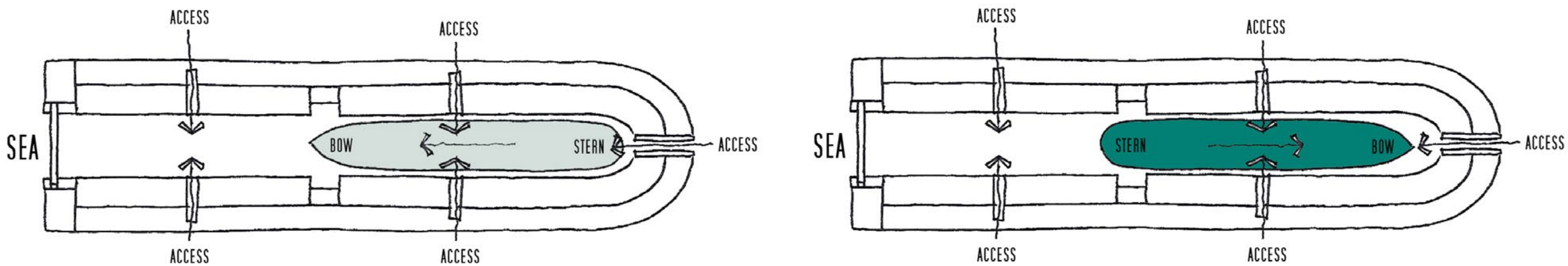


Figure 4.4. Bow and Stern Orientation (Author, 2016)

- BOW vs STERN -

In addition to the dramatic effect achieved upon visitors' downward decent from the main access chute, the positioning of the **bow facing inland** will provide **addition circulation and flow**. Furthermore, the positioning of a forward bow permits a **tailored install** of the hull as **per the outline of the dock**. The vessel will also appear to be **docked in place, sailing into its berthing position** after her final voyage at sea.

ELEVATION

- BERTHED -

When a ship is moored into a dock for repairs, it is centered and raised on berthing blocks. In order to **prevent structural damage to the hull, this process cannot be permanent** as the downward force can cause structural impurities to the keel plates. Moreover, this recessed position will **hide the ship and eliminate any possible opportunities for intervention below hull**.

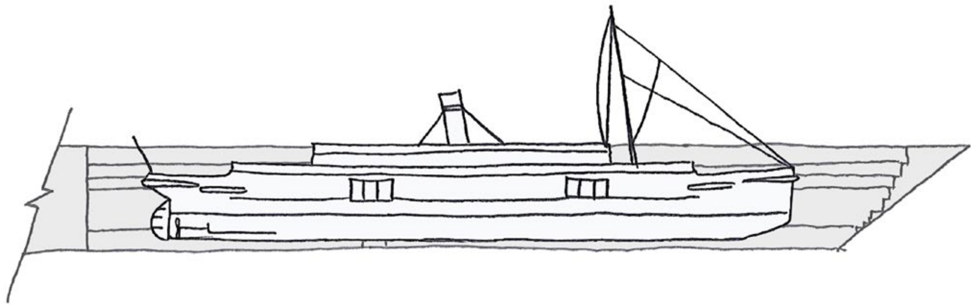


Figure 4.5. Berthed Elevation (Author, 2016)

- WATERLINE -

As opposed to berthing the ship, a raised option is presented. Raising the ship to its original waterline position will provide **aesthetic interest, structural feasibility, all-round visibility** and permit **additional activity below the ship's hull**. Moreover, this elevated preference ties in with the **definite orientation** that seeks to **romanticise the notion of the ship sailing into its final resting position**.

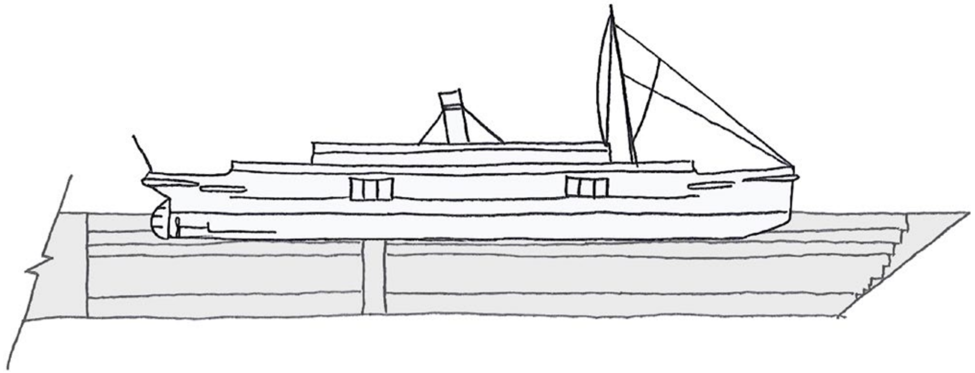


Figure 4.6. Waterline Elevation (Author, 2016)

- STRANDED -

Even though the third option provides full visibility, it allows for the **ship to seem disconnected from the dock**. The steel armature and connecting canopy structure will also prove problematic when connected to the ship's hull, as the point of connectivity will have to be elongated. Raising the hull so high will also **limit optical approachability**, as the introduction of a platform already aims to compensate for the **scale differentiation between dock and ship**.

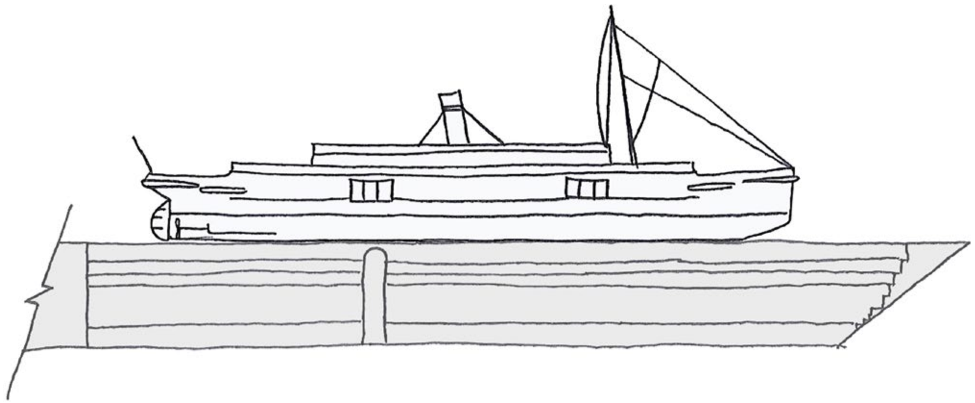


Figure 4.7. Stranded Elevation (Author, 2016)

4.3
ARMATURE DESIGN DEVELOPMENT

Secondary to the institution of orientation, the method in which permanent install between host and habitant will occur, was to be advocated. As mentioned previously, precedent consultation instructed the erection of a **frame-like ring structure that would elevate the vessel**. Founded upon the analysis of the specific construction of the SS Nomadic, t**he attachment of the struts to the keel are to be positioned in alignment with the rib steel structure of the hull.** According to the classification of hull types (refer to figure 4.8), the SS Nomadic **hull's shape is bottom round**, thus requiring **multifaceted support** in order to **distribute force uniformly**. As per consultation with a structural engineer, the creation of several iterations were presented and assessed, based on **structural integrity, visual assimilation and intrusiveness**. This was the final structural formality to be addressed in terms of permanent positioning, before the actual design of the outer interior could commence.

STRUCTURAL INTEGRITY
This primary assessment norm is based on **engineering principles** and was evaluated under strict observation. As suggested by name, **structural viability** is determined by this criterion.

NON INTRUSIVENESS
As a form of secondary evaluation, the **minimization or complete elimination** of actual **harm to heritage fabric** was to be ensured (safekeeping of **berthing blocks and dock alters**).

VISUAL ASSIMILATION
Visually monitors the **amount of newly introduced infrastructure** to site. The addition thereof **should not subtract from existing fabric, nor excessively cover up** any part of the dock.

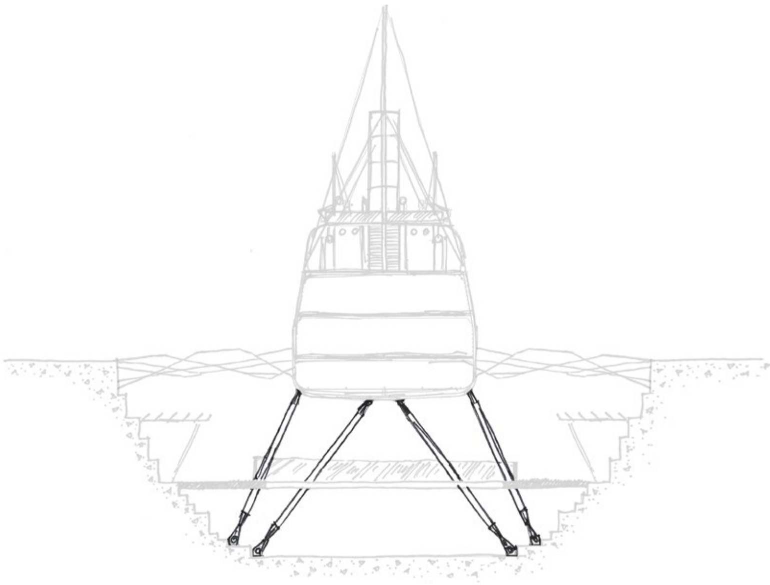


Figure 4.8. Armature Design (Author, 2016)

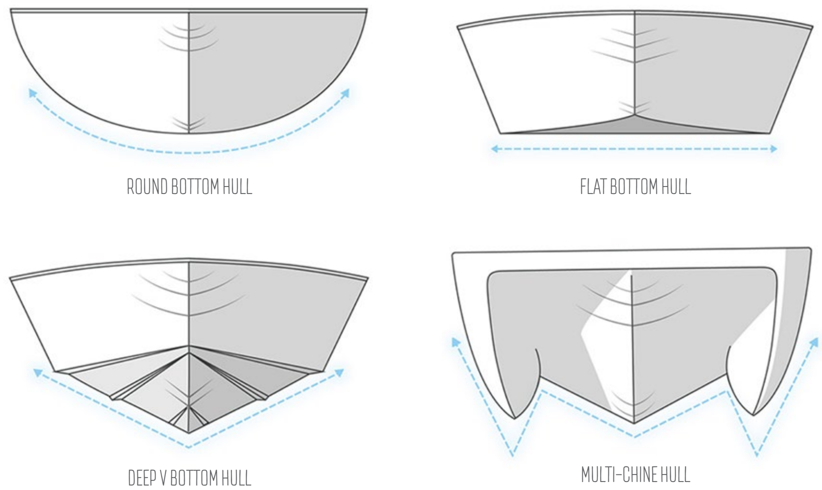


Figure 4.9. Hull Classification of Ships (Boat Smart, 2015)

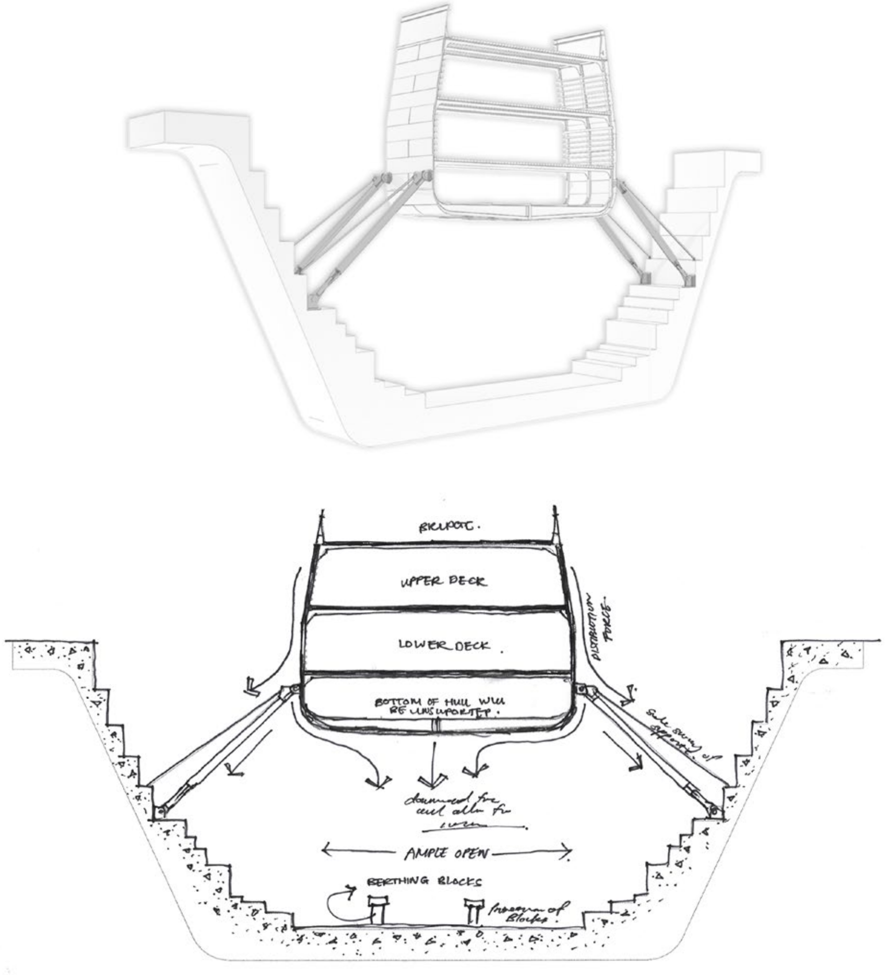


Figure 4.10. Steel Armature Configuration 1 (Author, 2016)

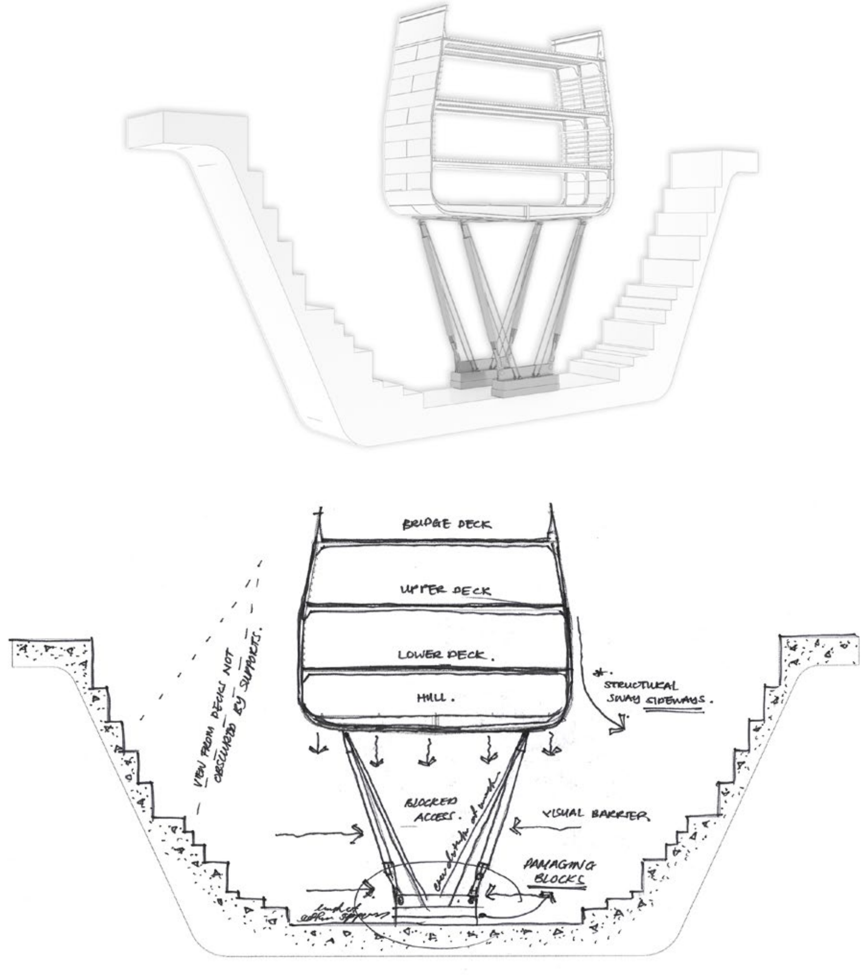


Figure 4.11. Steel Armature Configuration 2 (Author, 2016)

- CONFIGURATION 1 -

The first configuration employs the **frame constructed to elevate the Cutty Sark precedent**. As the hull of the Cutty Sark is classified as a v-shaped hull, a **one-brace support** was sufficient, as the load was distributed vertically downwards to the keel central plate. However, the r**ound hull construction of the Nomadic will require both a horizontal and vertical load distribution** structure brace.

- CONFIGURATION 2 -

Though not as visually invasive as the first configuration, the second iteration only made provision for **vertical distribution of weigh and disregarded the heritage fabric** situated on the bed of the dock (**berthing blocks would have to be removed** or displaced). Structural integrity is compromised by **possible capsizing** potential's should load be dispersed horizontally.

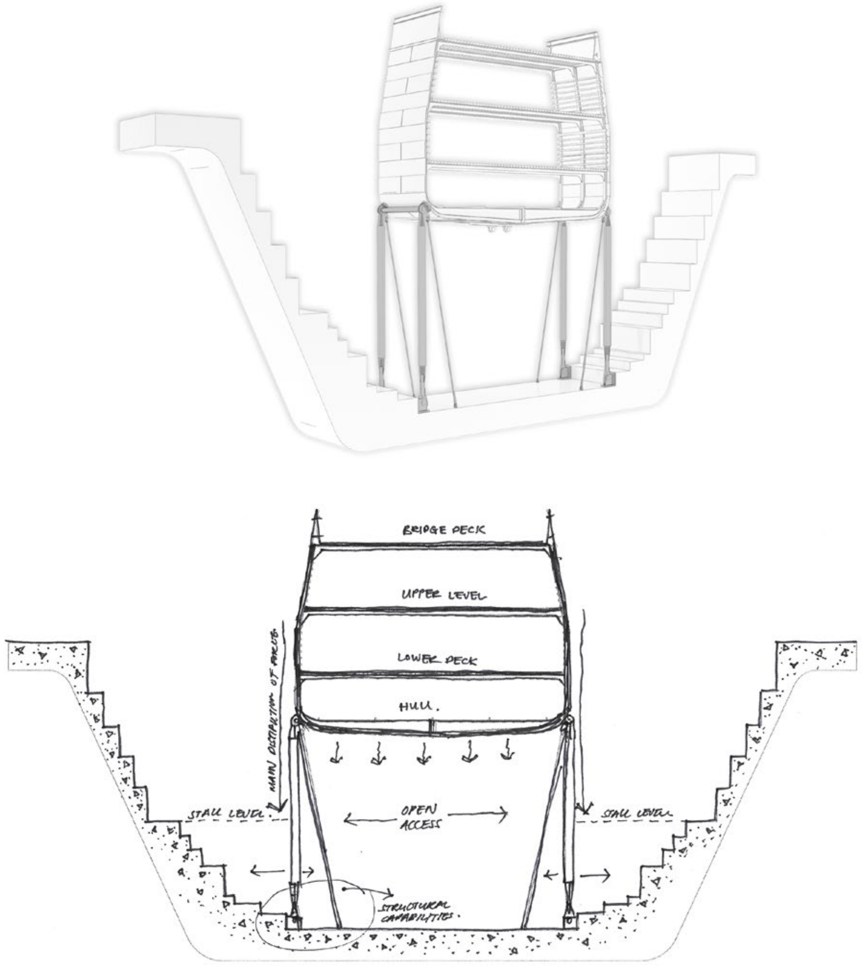


Figure 4.12. Steel Armature Configuration 3 (Author, 2016)

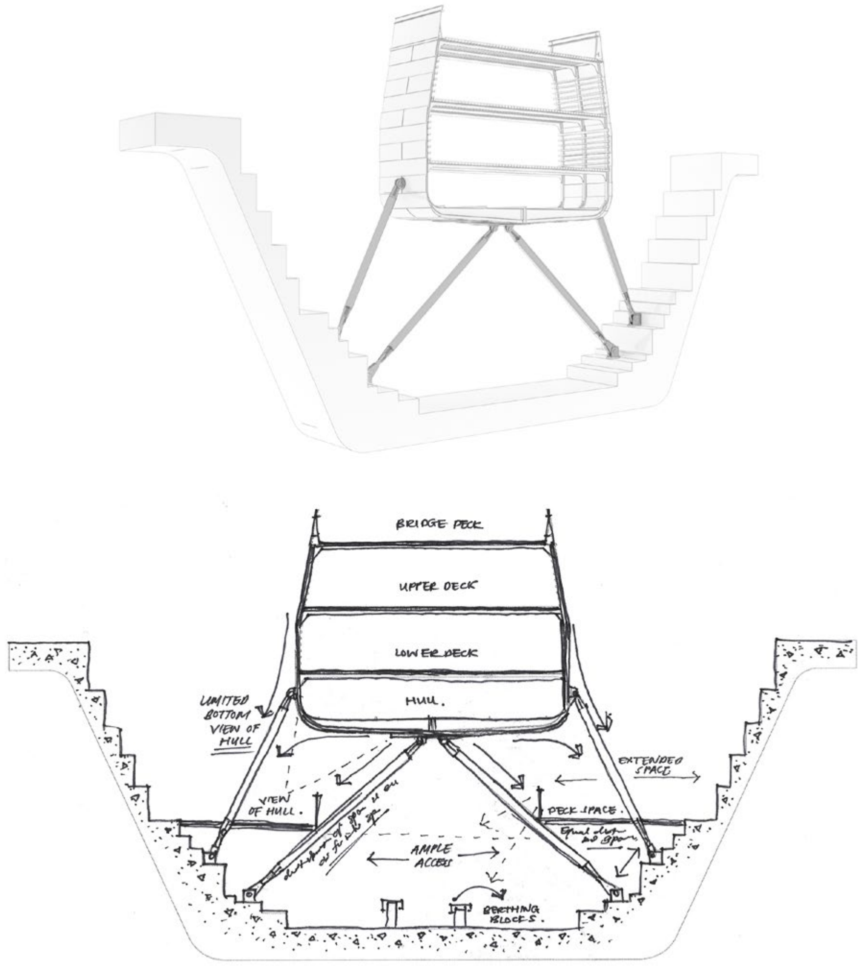


Figure 4.13. Steel Armature Configuration 4 (Author, 2016)

- CONFIGURATION 3 -

The third configuration responded to the intrusive nature of the second iteration, yet again **neglects to accommodate complete loadbearing requirements**. **Lateral positioning of the braces will only ensure crosswise support**. The **bottom of the hull will require supplementary support**, as brewing equipment and atrium induction will provide additional downward force.

- CONFIGURATION 4 -

Paying homage to the surviving berthing blocks, responsiveness was directed back towards the Cutty Sark precedent's lateral armature, which was **affixed to the docks alters** (side steps). The addition of a **subordinate strut allowed lateral and central attachment to the hull, ensuring sound construction**. Additionally, this configuration provides **bracing opportunity for the platform**, bringing the **hull closer** to view.

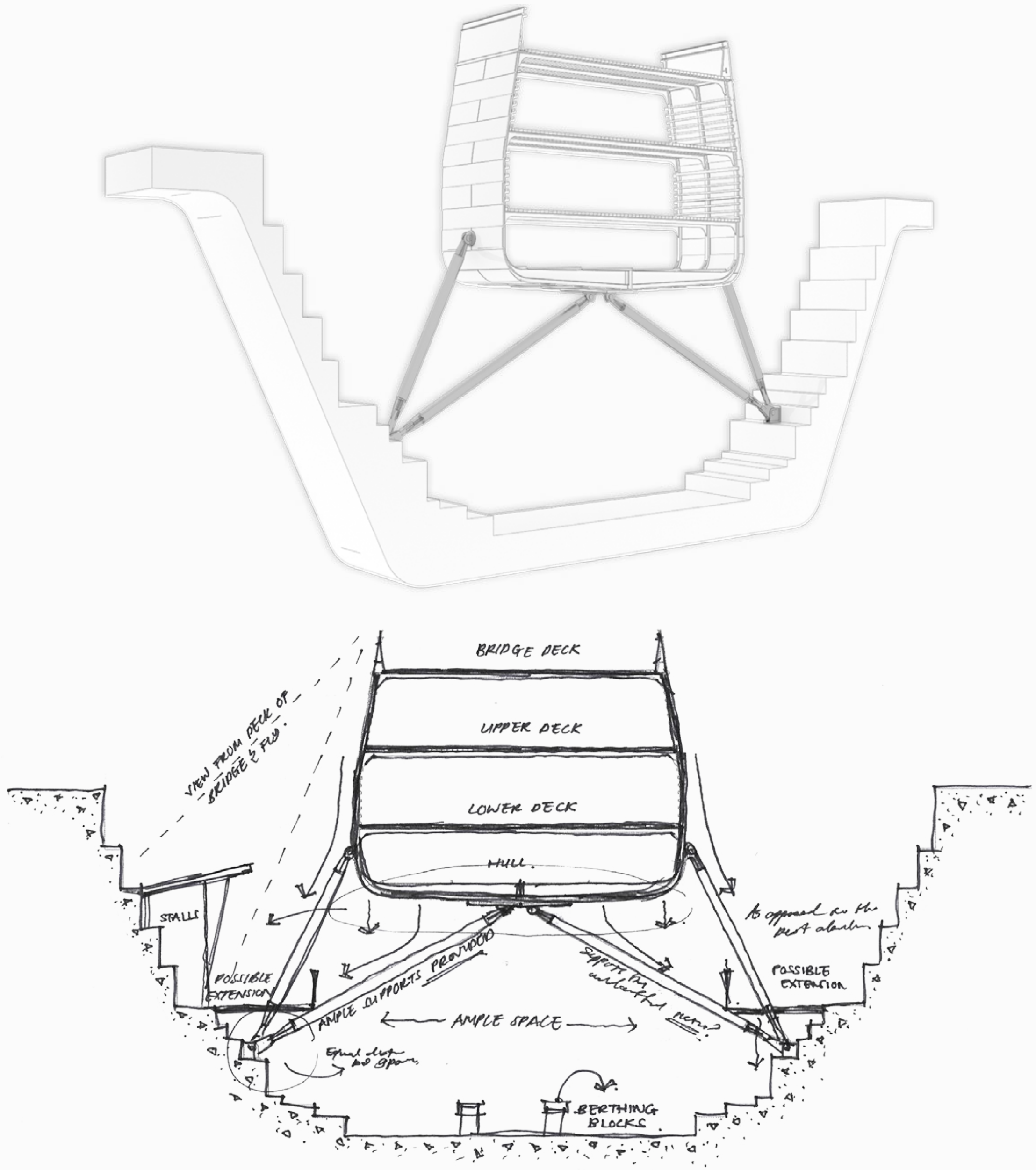


Figure 4.14. Final Steel Armature Configuration (Author, 2016)

- FINAL CONFIGURATION -

The final armature arrangement stems from the fourth configuration, with the only exception being that the **support piers are joined**. Originally the piers were disconnected in order to **provide superfluous support**, should one support fail to function appropriately. However, upon consultation with a structural engineer, it was d**eemed unnecessarily intrusive**. This singular connection to the dock permits **contemporary design and clean constructs which bounds visual abstraction**.

STRUCTURAL INTERGRITY

Structural integrity is maximised through the utilisation of a **two-braced armature structure** that compensates for **horizon and vertical load displacement**. Double support also permits greater distance between struts, which elongates possibilities of intervention on the market platform below.

NON INTRUSIVE

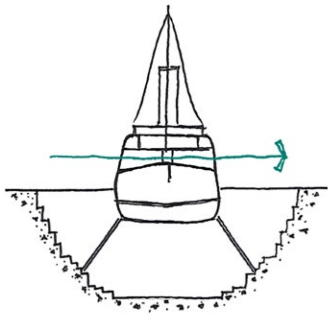
Given that the armature is fixed to the side alters of the dock, **abstraction on the lower levels and berthing blocks are completely eliminated** and remain thus entirely untouched. Moreover, the raised market platform **restricts actual approachability**, **whilst permitting residual accessibility** as a conspicuous **feature**.

VISUAL ASSIMILATION

In addition to restricted invasiveness, the combination of strut supports and the **longitudinal decrease thereof consents greater assimilation.** The addition of hosting sustenance to the market platform above **amplifies functionality and abolishes the need for additional support**.

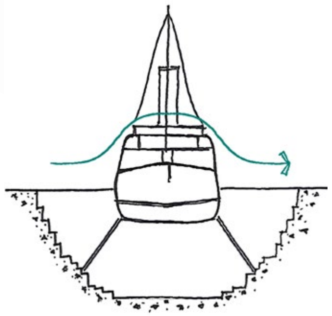
4.4
ACCESSIBILITY

As a way to **administer undeviating accessibility** between the **host and the habitant**, four methods of admittance, refer to figure 4.15, are proposed that governs novel forms of **horizontal and vertical circulation**.



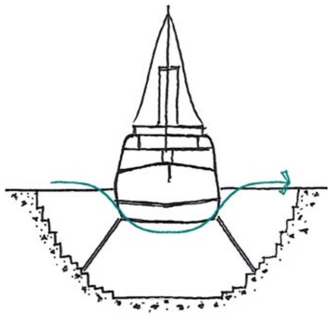
ACROSS

The first route of accessibility is the most conventional. Utilising the **existing gangway planks and enclosing them**, **access onboard** the ship in granted. Visitors will enter the ship through the four existing **entrance vestibules**, which are located on the **upper deck**.



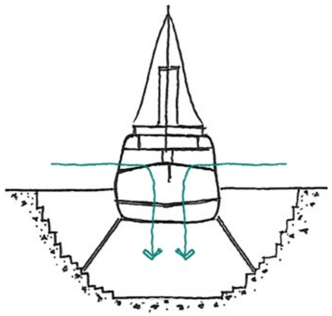
OVER

The second route of actual accessibility is governed by the **existing horizontal circulation** onboard the SS Nomadic. A variety of **staircases are present** that permit **perpendicular movement** to and from levels below the bridge and flying bridge deck.



UNDER

The third form as accessibility is derived from the desired **connection wished to be substantiated between the host and habitant**. The introduction of a **possible platform** is envisioned that will permit **visual approachability** of the **hull** below.



DIAGONAL

The final method of transcendence permits a **migration** between both the host and the habitant through **direct vertical circulation**. The newly proposed atrium will allow for the inclusion of an **elevator shaft** that **actively connects** the dock with the ship.

Figure 4.15. Accessibility Across, Over, Under and Diagonal (Author, 2016)

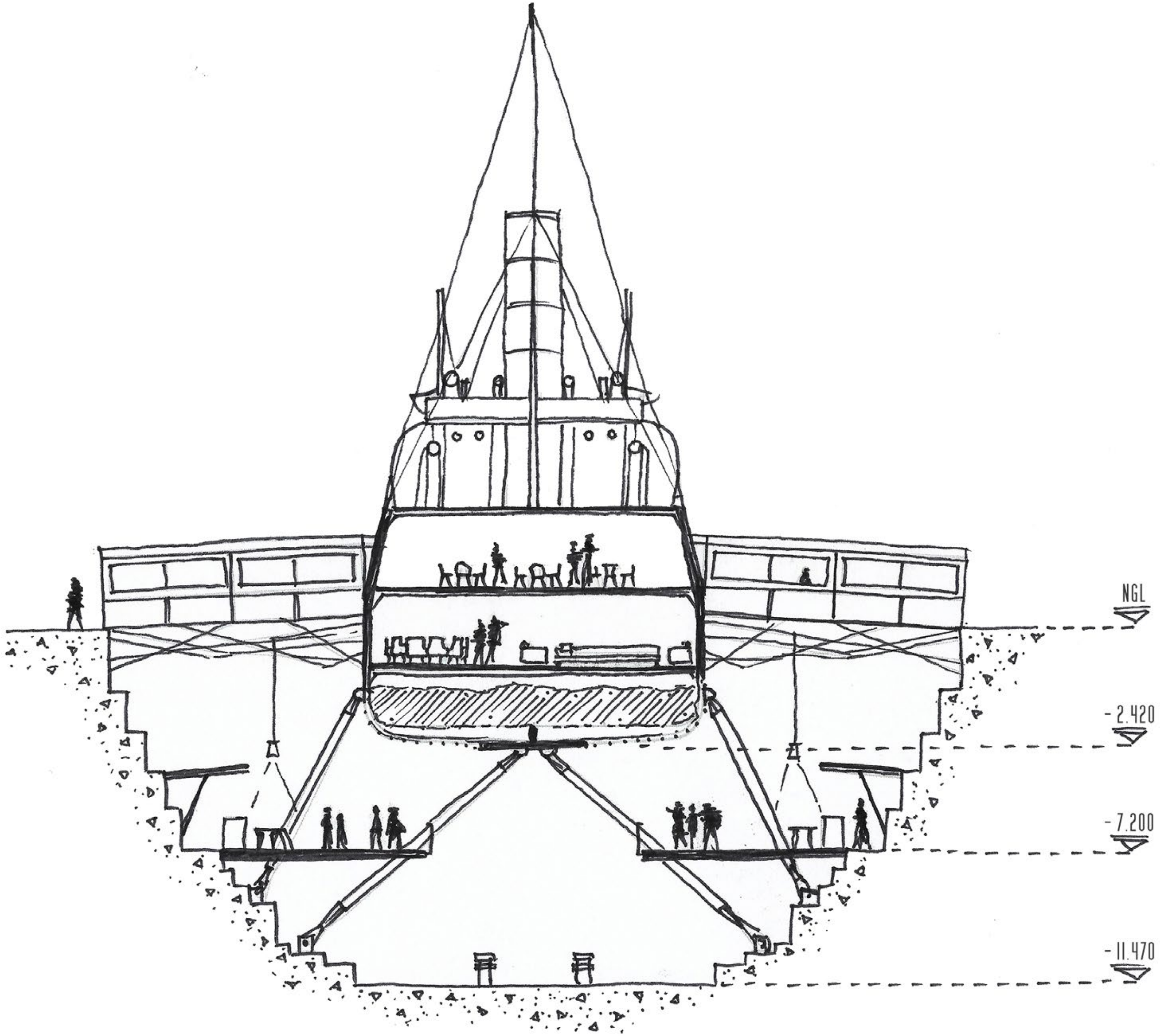
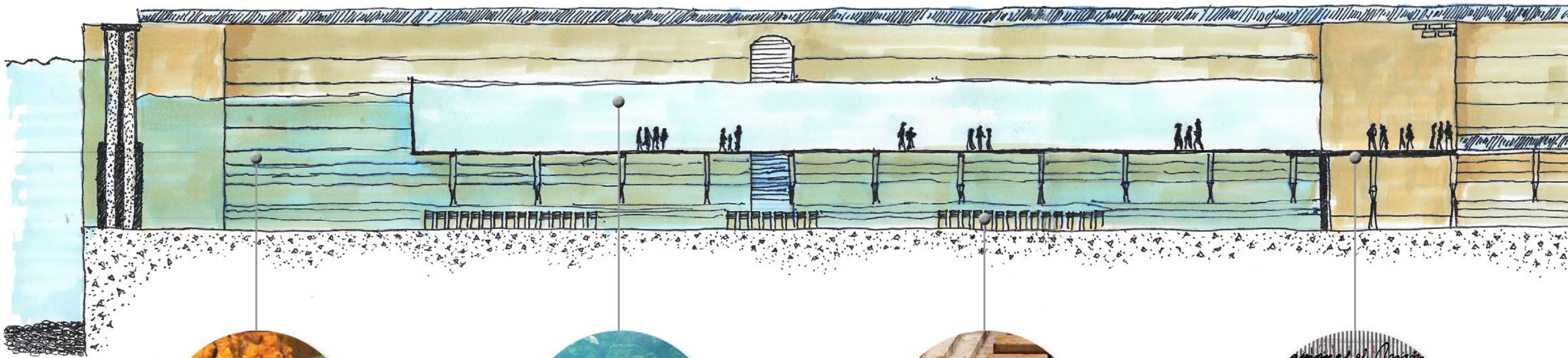


Figure 4.16. Latitudinal Section of Robinson Dry Dock (Author, 2016)

4.5
CONCEPTUAL OVERVIEW

In an attempt to express the initial spatial intention of the envisioned dock, a longitudinal section was created to exemplify the various interventions envisioned for all areas. In addition to the aforementioned **brewery and craft market**, the introduction of a **dock platform, exposed fermentation tank and atrium shaft** is considered. Regardless of this being the initial concept, later revisions merely **amended the enclosure of the entire dock** and the sacrificial implementation of using half of the dock for mere display purposes. These revisions will be discussed momentarily.

Figure 4.17. Longitudinal Section of Dock - not to scale (Author, 2016)



RUSTICLE REEF

As opposed to creating a ridge of rock in the sea formed by the growth and deposit of coral, the creation of a rusticle reef is envisioned. A rusticle is a formation of rust similar to an icicle or stalactite in appearance that occurs underwater when wrought iron oxidizes. As this occurs only underwater, exposing the process of reefing will make for an educational and interesting experience.

DOCK CATWALK

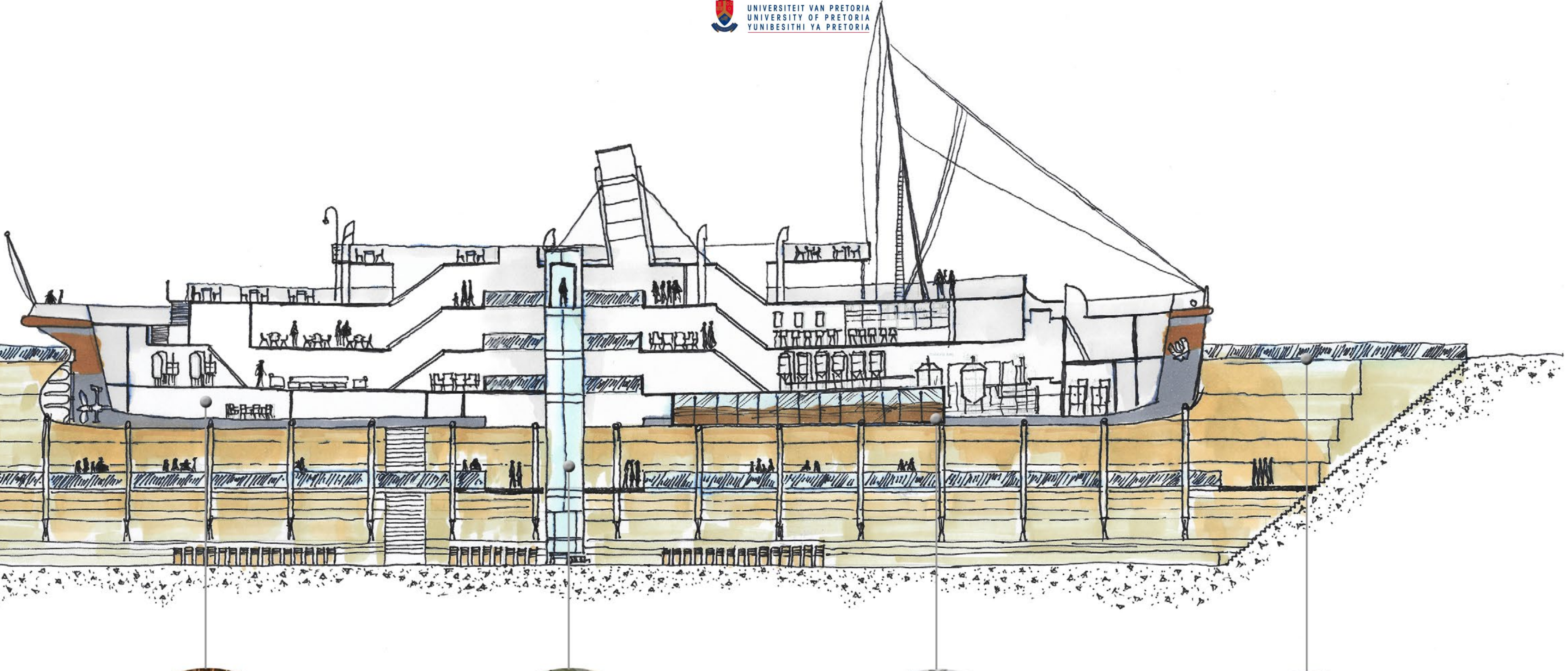
As a method to respond pragmatically to the additional dock space, the introduction of an enclosed glass catwalk is envisioned that will provide visitors with a 270 degree panoramic view of the berthing blocks below. In addition, this will also allow for the original function of the filled dock to be displayed. Displaying ship wreckage will also provide aadditional continuous interest.

BERTHING BLOCKS

The display of the berthing blocks will be visible from the enclosed catwalk. The blocks will allow for inventive opportunities to display underlying objects on the podium of the dock. The deteriorating state will also allow for the theory of concrete corrosion to occur. As this occurs only underwater, exposing the berthing process will allow for an alluringly educational experience.

CRAFT MARKET

In order to provide additional feasibility to the overall intervention, the introduction of an arts and craft market is proposed. The incorporation of craft within the context is ideal, allowing for spatial design to occur in the form of retail stand design using repurposed materials, primarily consisting out of steel. It is still to be determined if the stalls will be permanent, mobile, seasonal, craft specific.



BEER CAFE

The main incentive to the interior program allows for a distillery of saltwater beer. In order to ensure that activity remains constant within the interior of the ship, a coffee café is envisioned where craft beer can be sampled. Due to renovation and typology, this will be ideal. Additional hull space can also allow for conference facilities in conjunction with Workshop/Colab 17 next door.

ATRIUM CIRCULATION

Upon declaration of decommission, all boiler machinery is removed in order to decrease hull weight and allow repurposing on another vessel. Once removed in 1974, the boiler room was left vacant and converted into a double volume auditorium. Restoration in 2012 left the void unoccupied, permitting the insertion of an atrium that will connect the host with the habitant.

EXPOSED BREWERY TANK

In addition to the incorporation of a beer café onboard, the actual brewing and fermentation process will accompany the act of consumption. In order to outline the actual process of aging in a tangible fashion, the process will be transparent, allowing visibility from the dock into the ship and vice versa through the replacement of selected unfastened keel plates with Pyrex glass laminates.

GLASS CANOPY

In order to provide shelter from the elements, the addition of a steel and glass sculpture-like canopy is envisioned. This will This will be positioned at ship's water level to create an illusion of a floating ship. A glazed structure surrounding the ship forms a roof canopy over this hall, bridging the space between the ground and the hull. This structure will also integrate the enclosed gangplank bridges.

Figure 4.18.
Conceptually illustrating horizontal circulation onto the ship through method of **enclosed gangplanks**. Furthermore, the **notion of scale is emphasised** through the introduction of vertical elements that **directs visual attention and flow**.

Figure 4.19.
In addition to figure 4.18, this sketch illustrates **association between visitor, host and habitant**. Positive infill created by elevation creates additional **outer interiors**. Moreover, **layering** is illustrated through **simultaneous activity and level differentiation** between ground, sea and dock level.

Figure 4.20.
Visually illustrates the proposed outer **interior market area**. **Stalls are embedded onto a platform** which allows **elevation and visual accessibility** to all heritage components. This symmetrical arrangement **emphasises the central berthing blocks** of the host and the **hull** of the habitant.

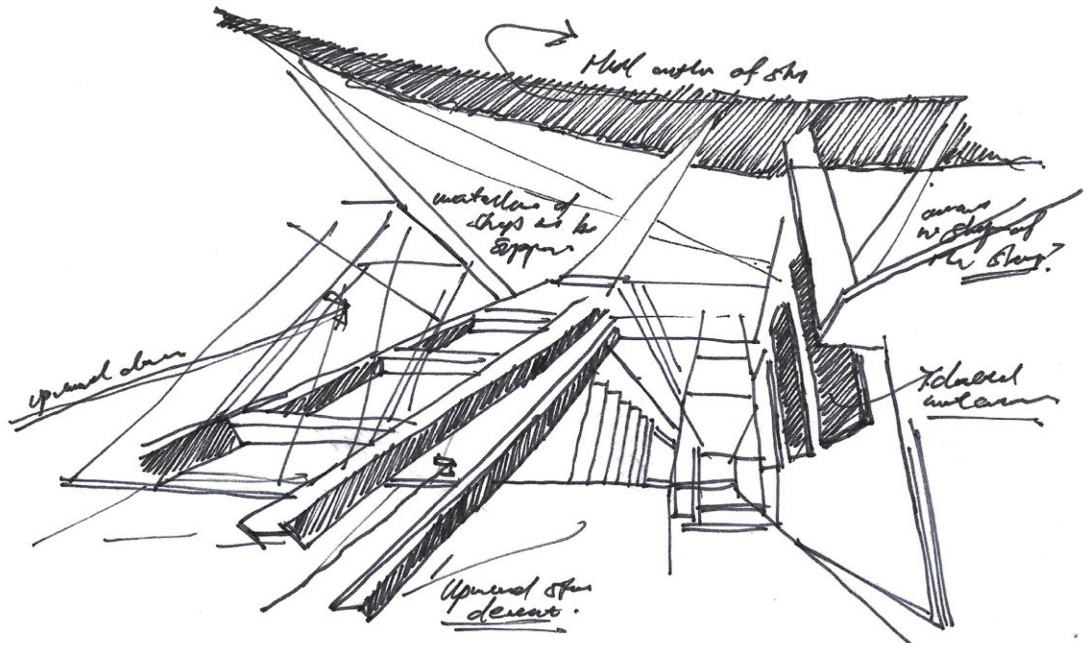


Figure 4.18. Conceptual Exploration of Circulation (Author & Unknown , 2016)

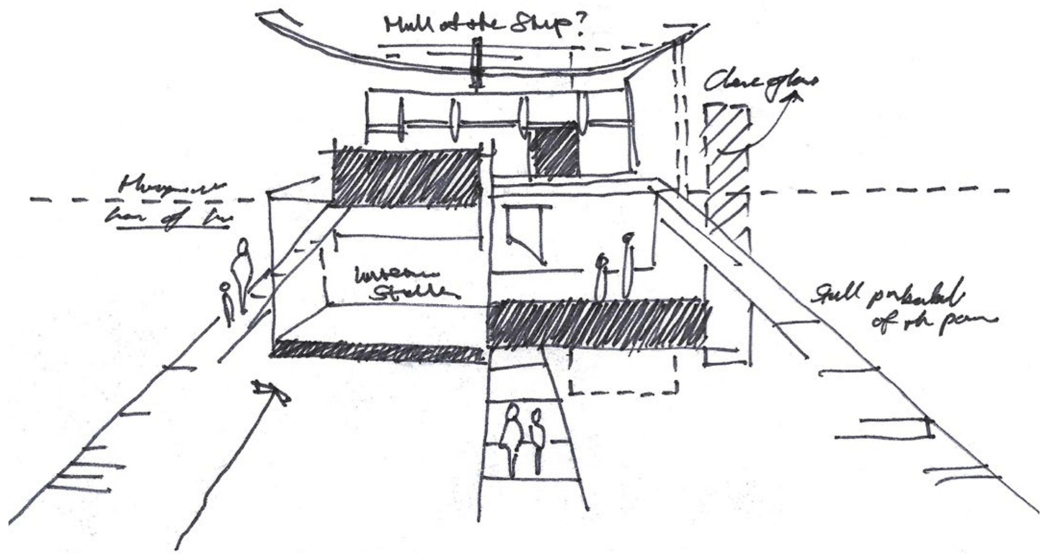


Figure 4.19. Conceptual Exploration of Scale and Space (Author & Loder, 2016)

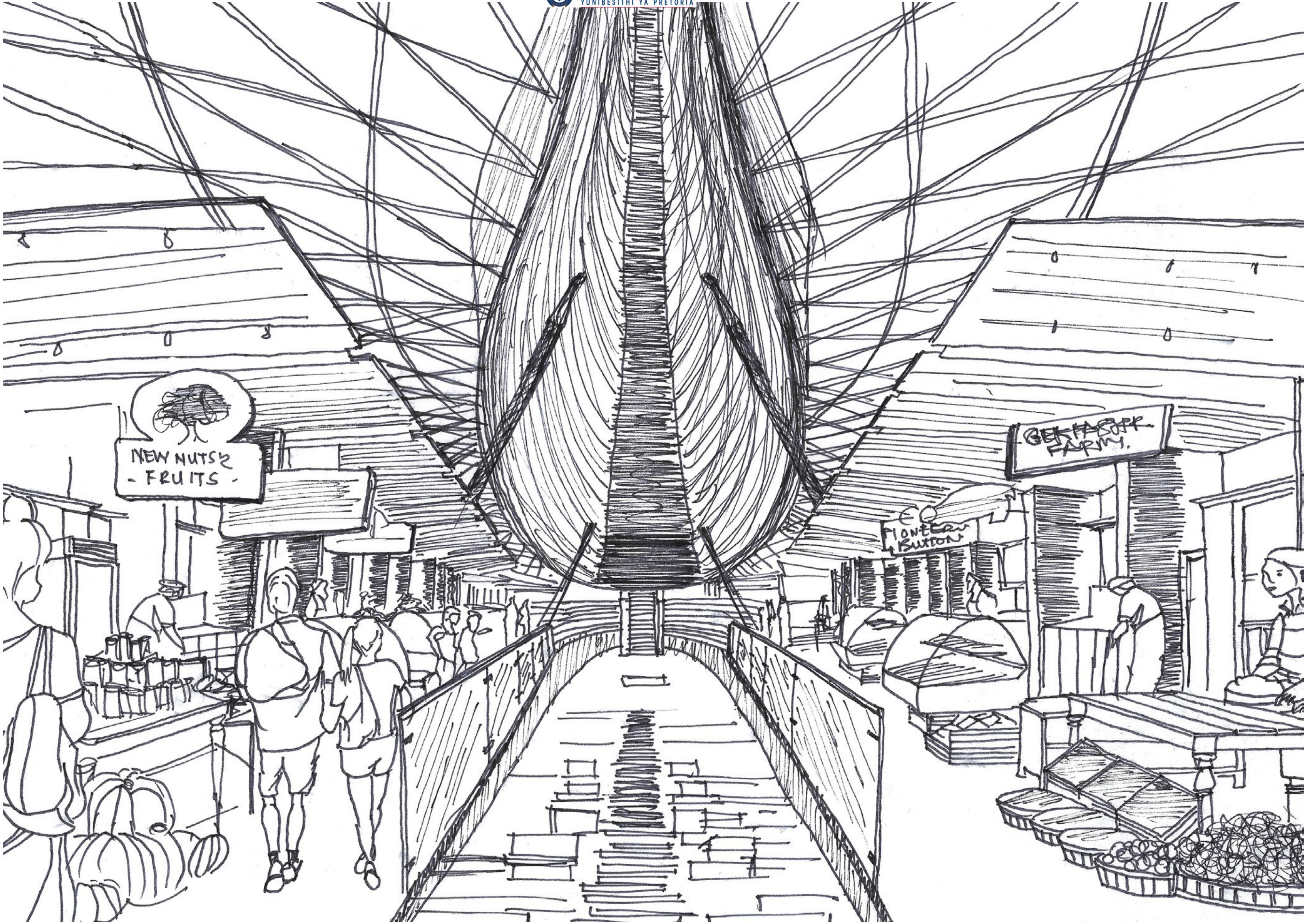


Figure 4.20. Conceptual Exploration of Market Platform (Author, 2016)

Figure 4.21. Model of Habitant (Author, 2016)

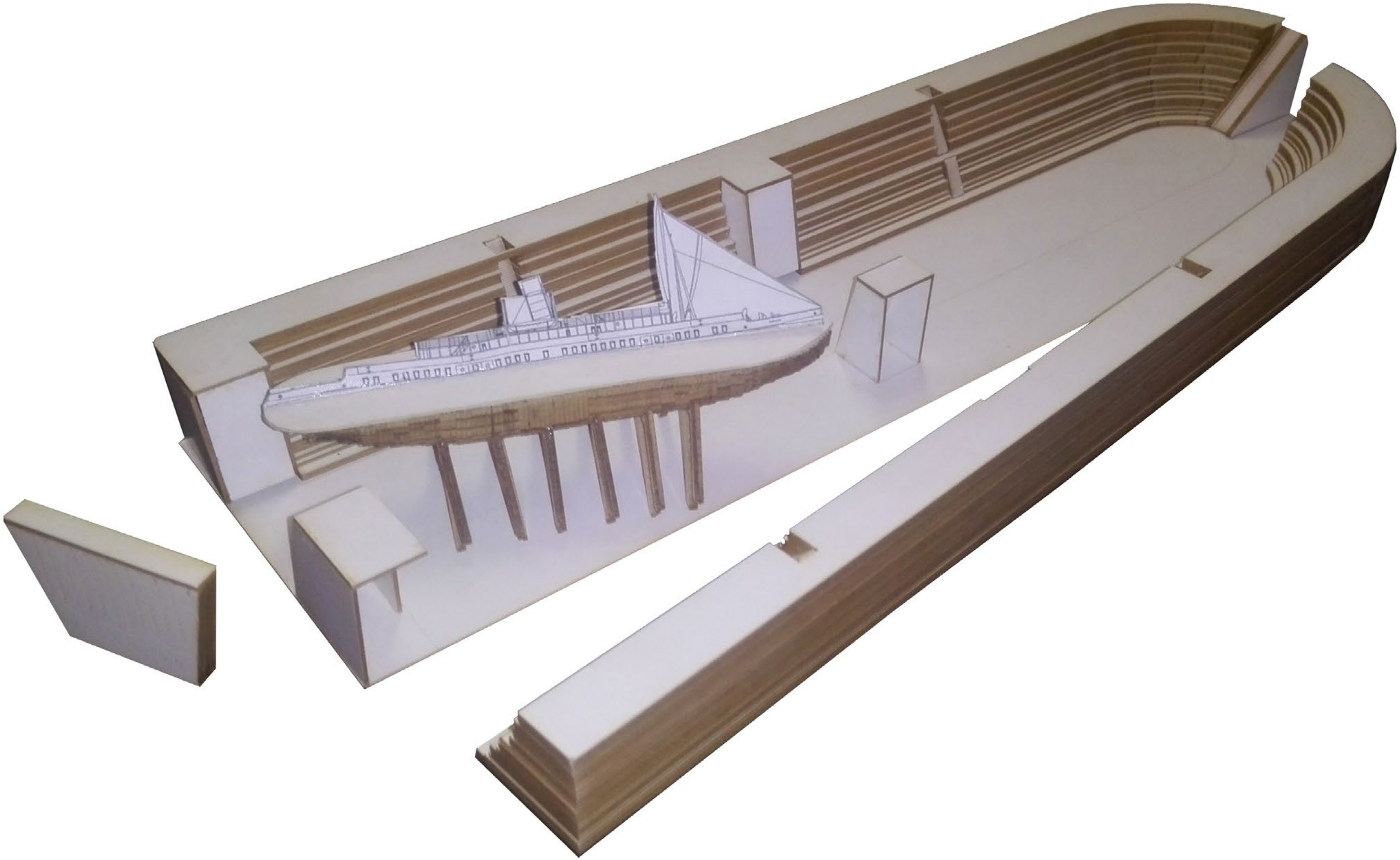


Figure 4.22. Deconstructed Model of Host (Author, 2016)

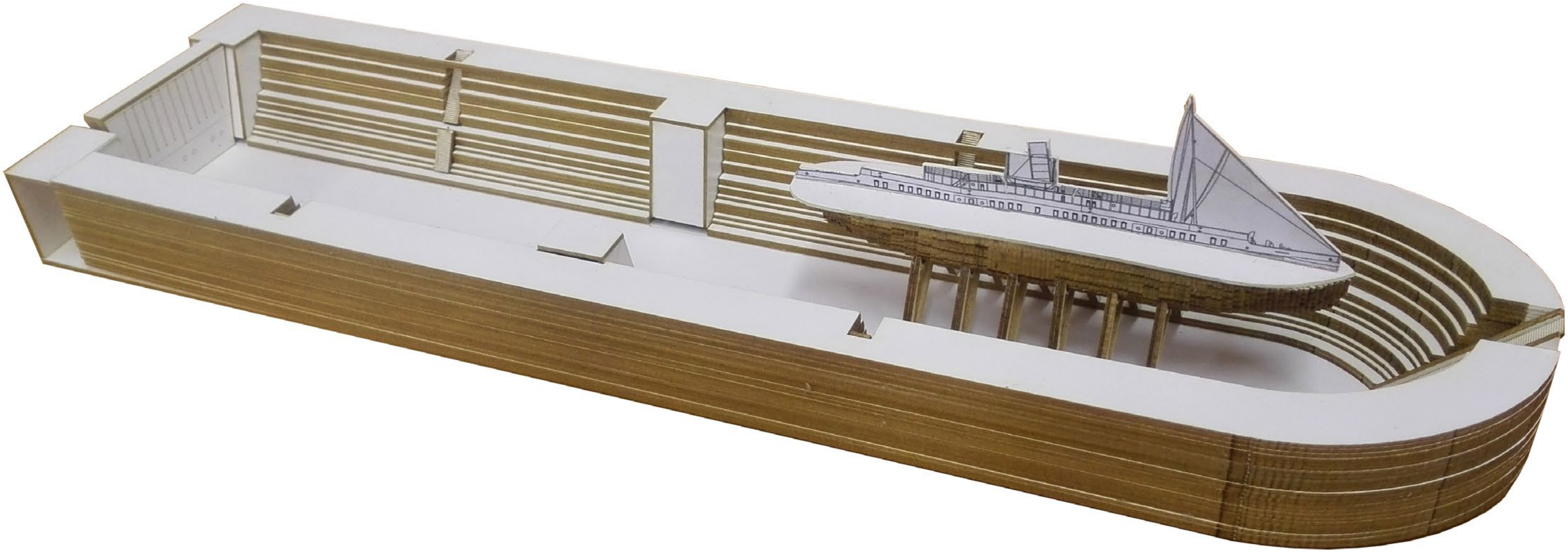


Figure 4.23. Model Depicting Proportional Differentiation of Proposed Connection (Author, 2016)

4.6
PLATFORM DEVELOPMENT

Having established a clear approach towards existing and proposed avenues of accessibility and permanent habitant-to-host joinery, the development of the **recommended elevated walkway** can be conceptualised (figure 4.24). In addition to the **provision of elevation** that permits **closer visual accessibility** to the underside of the ship's hull, this platform will admit **additional activity that ensures unremitting feasibility.**

A number of iterations are presented which factually illustrates the development of an **embedded multi-functional** platform that serve as an **outer, nested interior**.

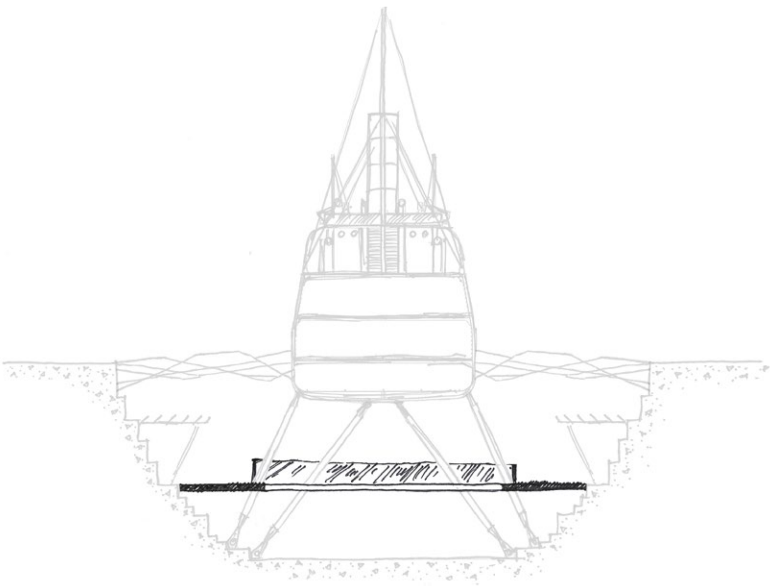


Figure 4.24. Platform Design (Author, 2016)

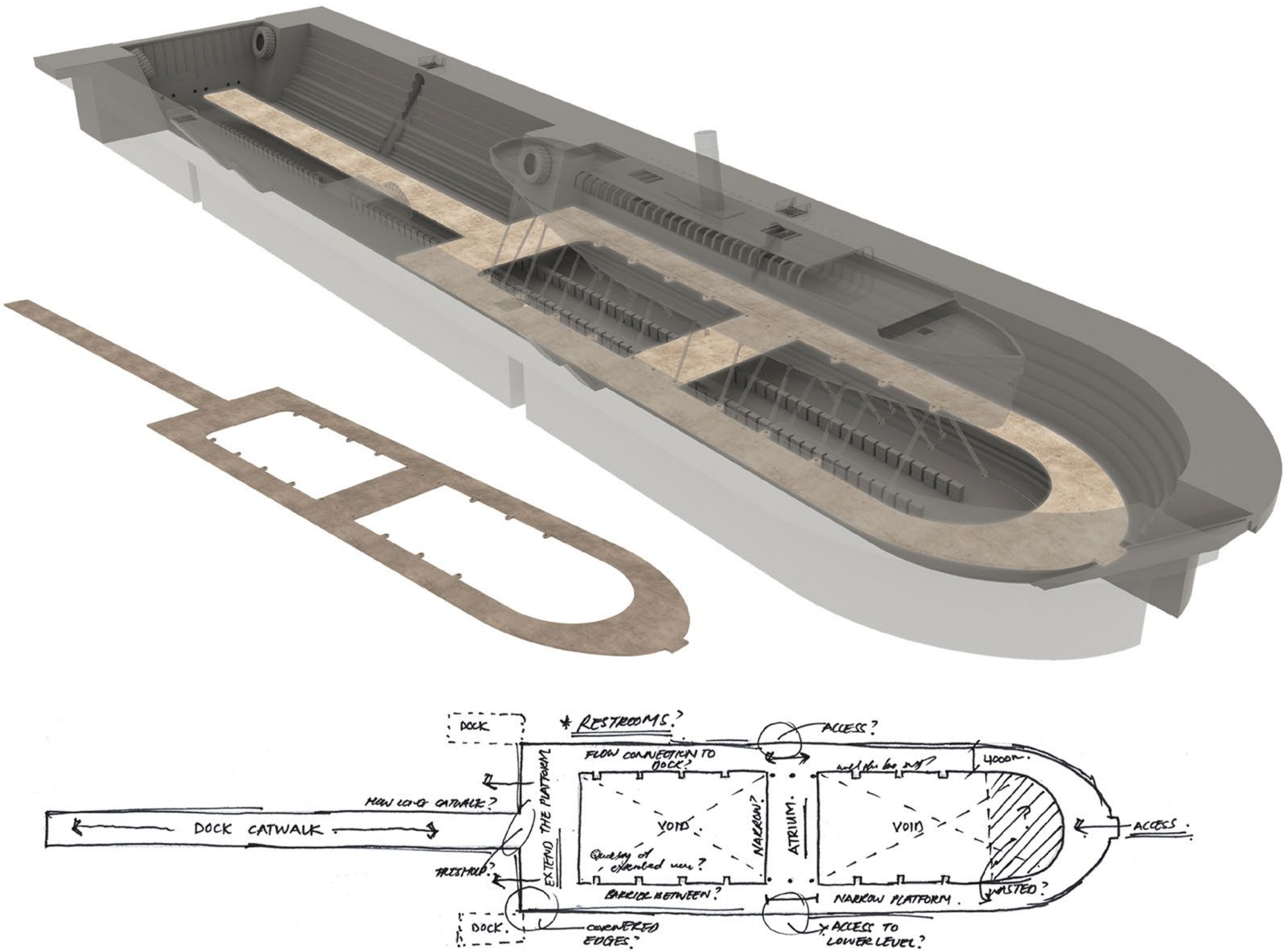


Figure 4.25. Platform Configuration 1 (Author, 2016)

- CONFIGURATION 1 -

The initial concept behind the main outline was to **ensure that the walkable area** be elevated in order to **permit partial accessibility to the existing dock below** and to raise walking level in order to have **closer perceptibility of the ship's hull**. Given that the ship will merely **occupy half of the dock**, the additional half will be converted into a **temporary dock aquarium**, allowing **possibility for extension**.

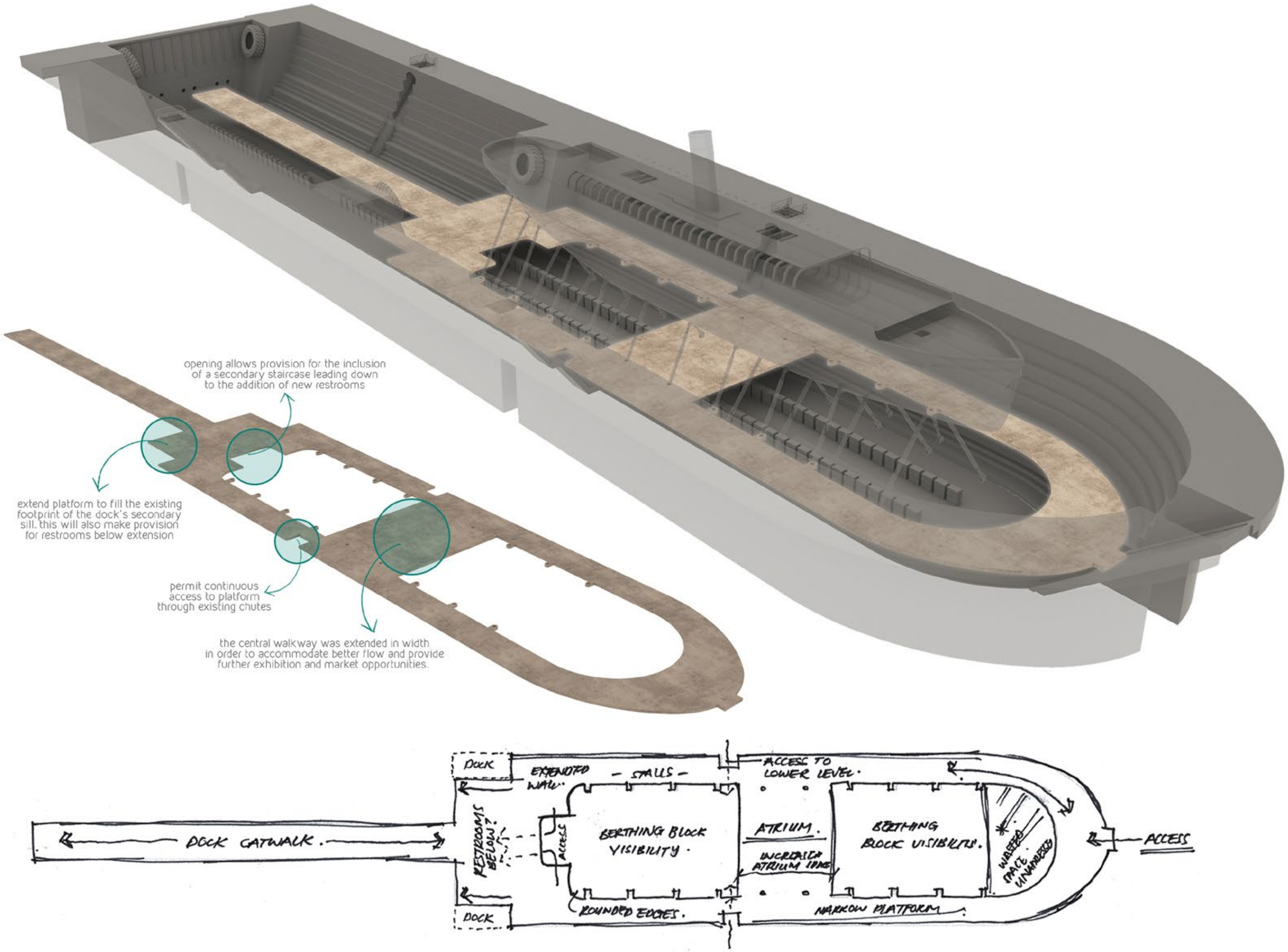


Figure 4.26. Platform Configuration 2 (Author, 2016)

- CONFIGURATION 2 -

The **revision of the overall shape** endorsed a second iteration. In order to fully utilise the existing space, the **platform was extended to fill the profile of the demolished secondary sill**. This extension made ideal **positioning for additional ablution facilities thereunder**. Added **cavities** were inserted on either sides of the platform to govern **admission through the existing chutes** to the dock below.

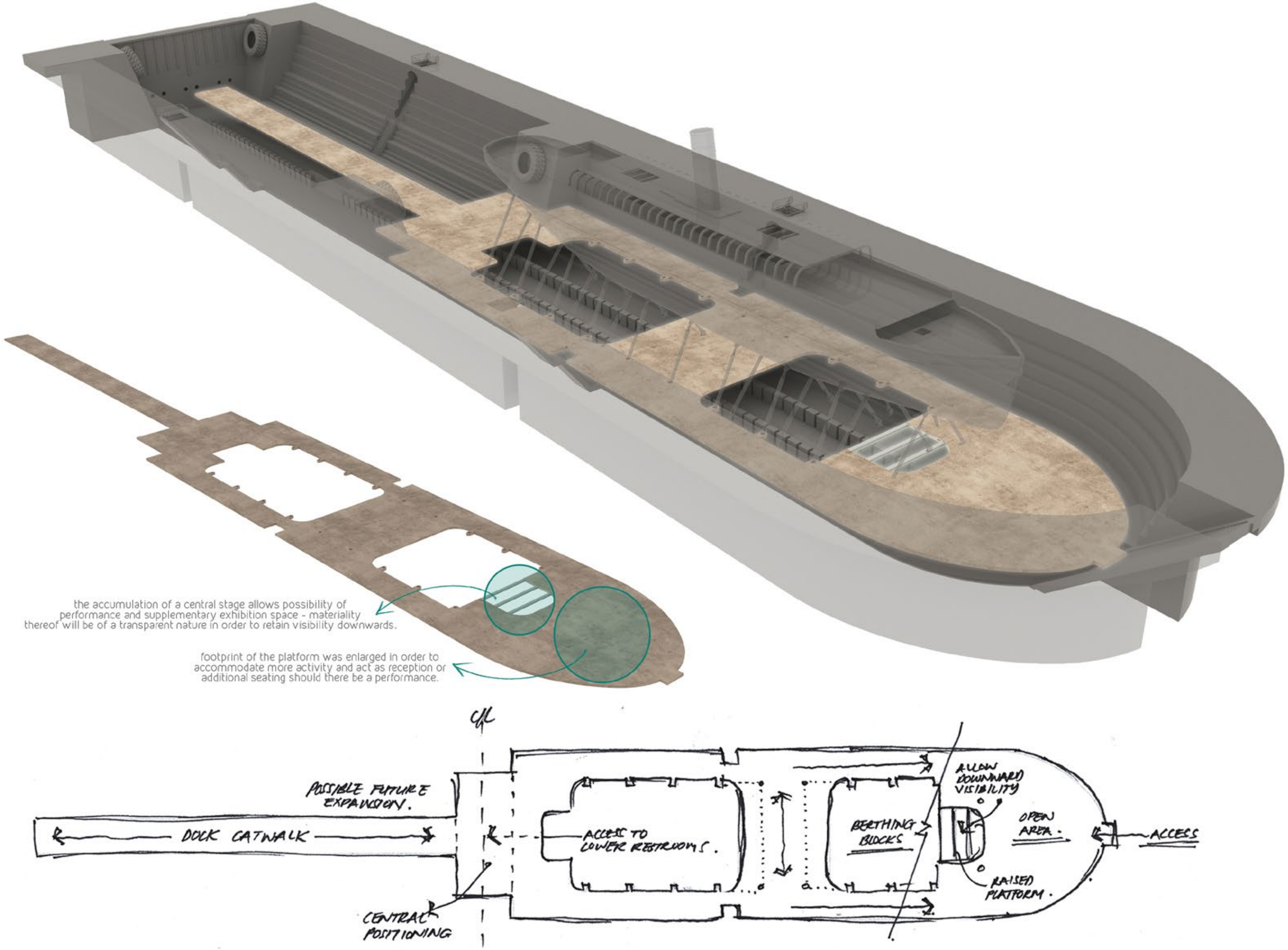


Figure 4.27. Platform Configuration 3 (Author, 2016)

- CONFIGURATION 3 -

The third revision was **relatively resolved in terms of accessibility**. The **postponement of the forward section of the platform** was instigated in order to allow **better use of space and greater potential for enlarged audiences**. Furthermore, a central stage was adjoined in order to provide a **flagrant performance space**, hence the utilisation of the **extended platform as concert seating**.

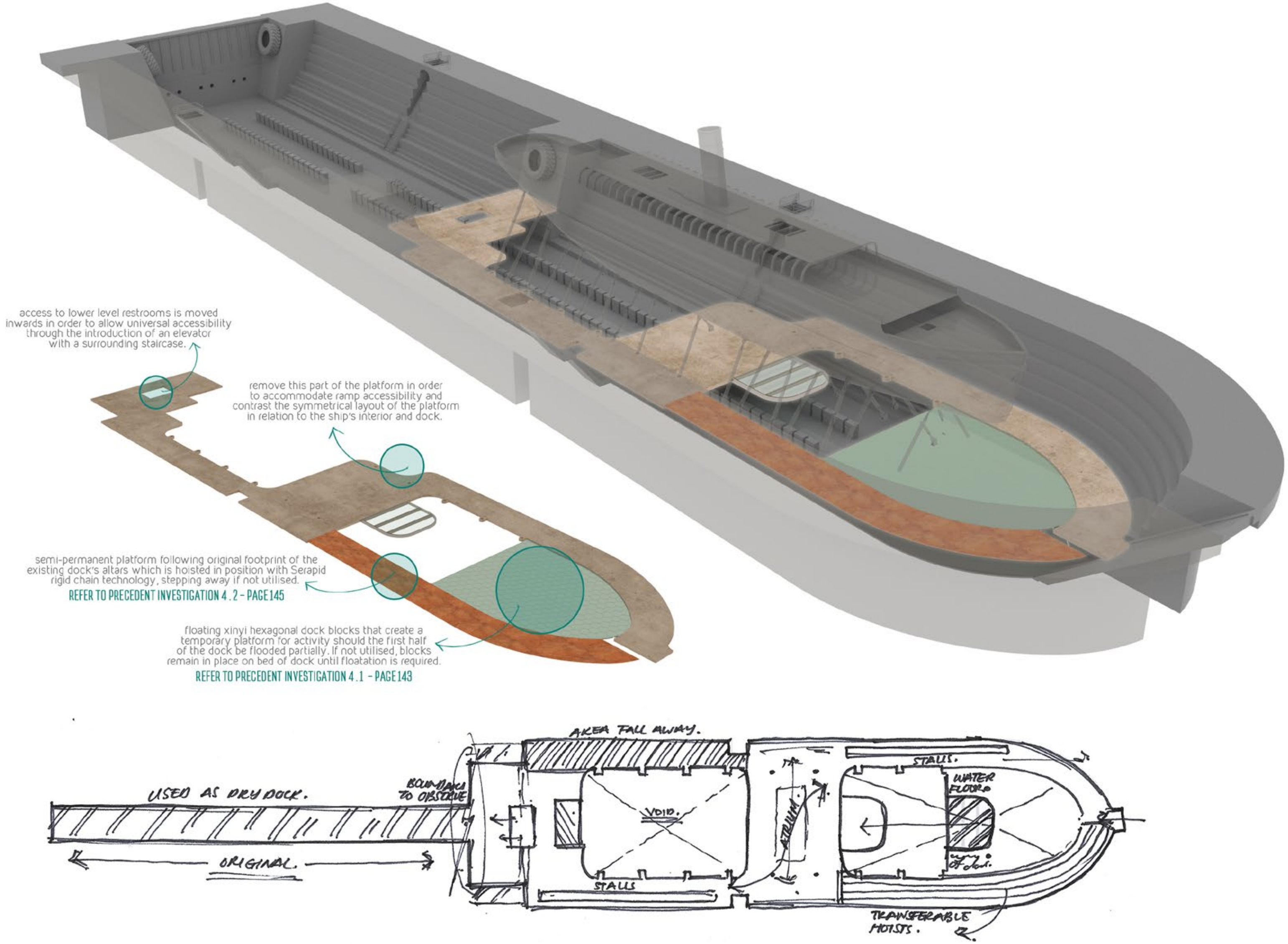


Figure 4.28. Platform Configuration 4 (Author, 2016)

- CONFIGURATION 4 -

Upon presentation of the third resolution, the s**ymmetrical and permanent nature of the announced platform was probed**. In order to **manipulate the use of space**, the introduction of **semi-permanent and temporary platforms** were introduced in order to provide **both intimacy and distance**, depending on what is required in terms of **scale and activity**.

Figure 4.29. The Floating Pier in Use (Volz, 2016)

PROJECT SYNOPSIS

Initially conceived in 1970, Christo and Jeanne-Claude reimagined Italy's Lake Iseo as a floating pier. As an extension of the street, the floating walkway connected Sulzano to Monte Isola to the island of San Paolo. The creation of a walkway, 3 kilometers in length and 16 meters in width, was assembled through the utilisation of a **modular floating dock system** consisting out of 220,000 **high-density polyethylene cubes**. In order to allow traction, prevent omission and linger united, the entire surface was covered in a bright yellow fabric. In addition to the aforementioned cognitive, this transferred the dull white blocks into a collective unit which contrasts beautifully against it nautical surrounding. **Undulated with the movement of the waves**, visitors relate the experience to **walking on water**. As this was a **temporary installation**, all components were removed and industrially recycled after the 16 days of exhibition (Claude, 2016).

PROJECT OBJECTIVES

- Through the extension of main streets on land, the connection of adjacent areas separated by water was to be connected.
- Construct a temporary installation that is discreet, **non-intrusive and environmentally friendly**. As this will be a walkway, the accommodation of large numbers **should not impair structural integrity**.

IMPLEMENTATION STRATEGIES

- To replicate the idea of walking on water, the addition of a similar **modular system** will be implemented in order to provide **additional and temporary platform** for intervention.
- If surplus space is required, the frontal half of the dock can be partially flooded, allowing elevation of the hexagonal blocks into place. Once drained, the blocks descend downwards back into place, following the outline of the original dock.
- Transparent materiality of the polyethylene cubes will allow **clear visibility of the original fabric** once recessed.

Figure 4.30. The Floating Piers (Volz, 2016)

NAME OF PROJECT
FLOATING PIERS

LOCATION OF PROJECT
LAKE ISEO, ITALY

CHIEF DESIGNERS
CHRISTO & JEANNE-CLAUDE

DATE OF COMPLETION
2016

Figure 4.31. The Pottor Rose Performace Hall in a Thrust Configuration (Baan, 2009)

PROJECT SYNOPSIS

As initial concept, the Dee and Charles Wyly Theatre was premeditated with the clear intent to reimagine conventional theater design. Forming part of the city's new AT&T Performing Arts Center, the Wyly will combine front-of-house and back-of-house areas above and beneath the auditorium, as opposed to conventional theaters where it is enveloped about. Defined by an **infinite variety of arrangements**, the vertical amassing of all facilities required for the functioning of a theatre in a single volume, permits completely **open or enclosed environments**. Utilising a state-of-the-art 'superfly' **hydraulic tower**, the unprecedented configuration of both seating and scenery arrangements is allowed. As a result, the preparation of a thrust, proscenium, arena, traverse, studio and flat floor arrangements can be set up in less than a day. Furthermore, being outlined by a glass façade, traditional perimeters are liberated through direct contact with its urban context.

PROJECT OBJECTIVES

- Stacking both front-of-house and back-of-house functions above and below the auditorium itself.
- Permit all seating and stages in the auditorium to be reconfigured timeously to suit different types of performance and rehearsal spaces.
- Allow visual accessibility for the surrounding context through the introduction of a glass envelope.

IMPLEMENTATION STRATEGIES

- In order to reconfigure the actual walkable footprint of the proposed semi-permanent platform, the utilisation of **similar hoisting technologies** are envisioned.
- Brief investigation of the actual **Syrapid® hydraulic system** will prove imperative when detailing and specifying load-bearing capacity.
- In addition to the implementation of a hoisted platform, **similar hydraulic possibilities** will be investigated during the design of applicable **market stalls**, which will be **permanently positioned on the proposed platform**.

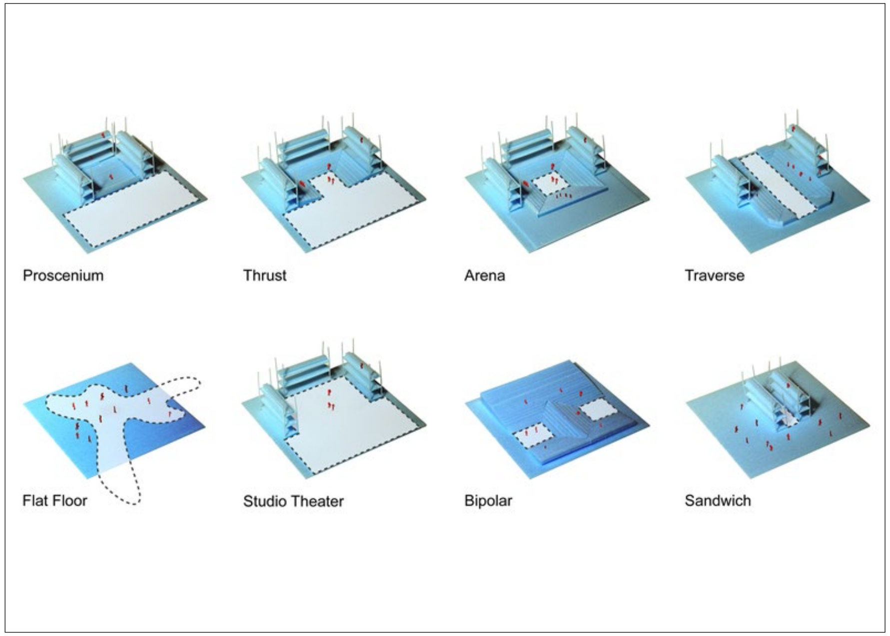


Figure 4.32. Configurations and Platform Hydraulics (Baan & Rex, 2016)

NAME OF PROJECT
DEE & CHARLES WYLY THEATER

LOCATION OF PROJECT
DALLAS, UNITED STATES

CHIEF ARCHITECTS
REX | OMA

DATE OF COMPLETION
2009

- FINAL CONFIGURATION -

The final iteration is founded upon the fourth configuration. Keeping with the notion of **permanent and semi-permanent platforms**, the forward platforms were switched in order to **correlate better with the proposed stalls**. The **temporary platform was also eliminated** as it **convoluted the footprint** and its suggested **construction proved challenging due to the presence of the support armature**. Moreover, fixing the blocks to the bed of the dock would **encumber the existing fabric**. **Clear division** allowed for the frontal part of the dock to be **repurposed**, and the **latter half to continue serving its intended rationale as a dry dock** for small vessels requiring rudimentary maintenance. This educational and thought-provoking activity can be observed from the **proposed viewing deck**.

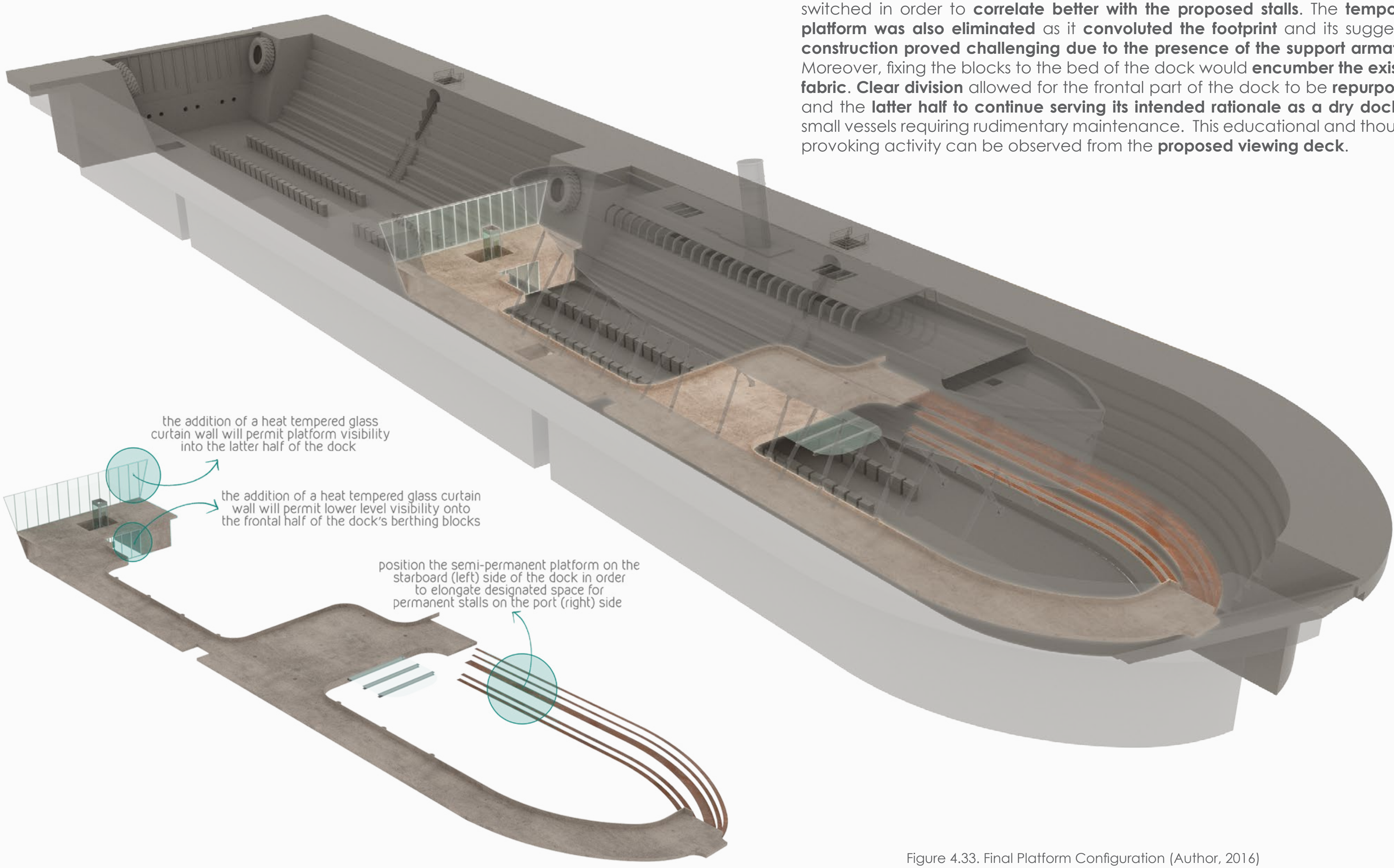


Figure 4.33. Final Platform Configuration (Author, 2016)

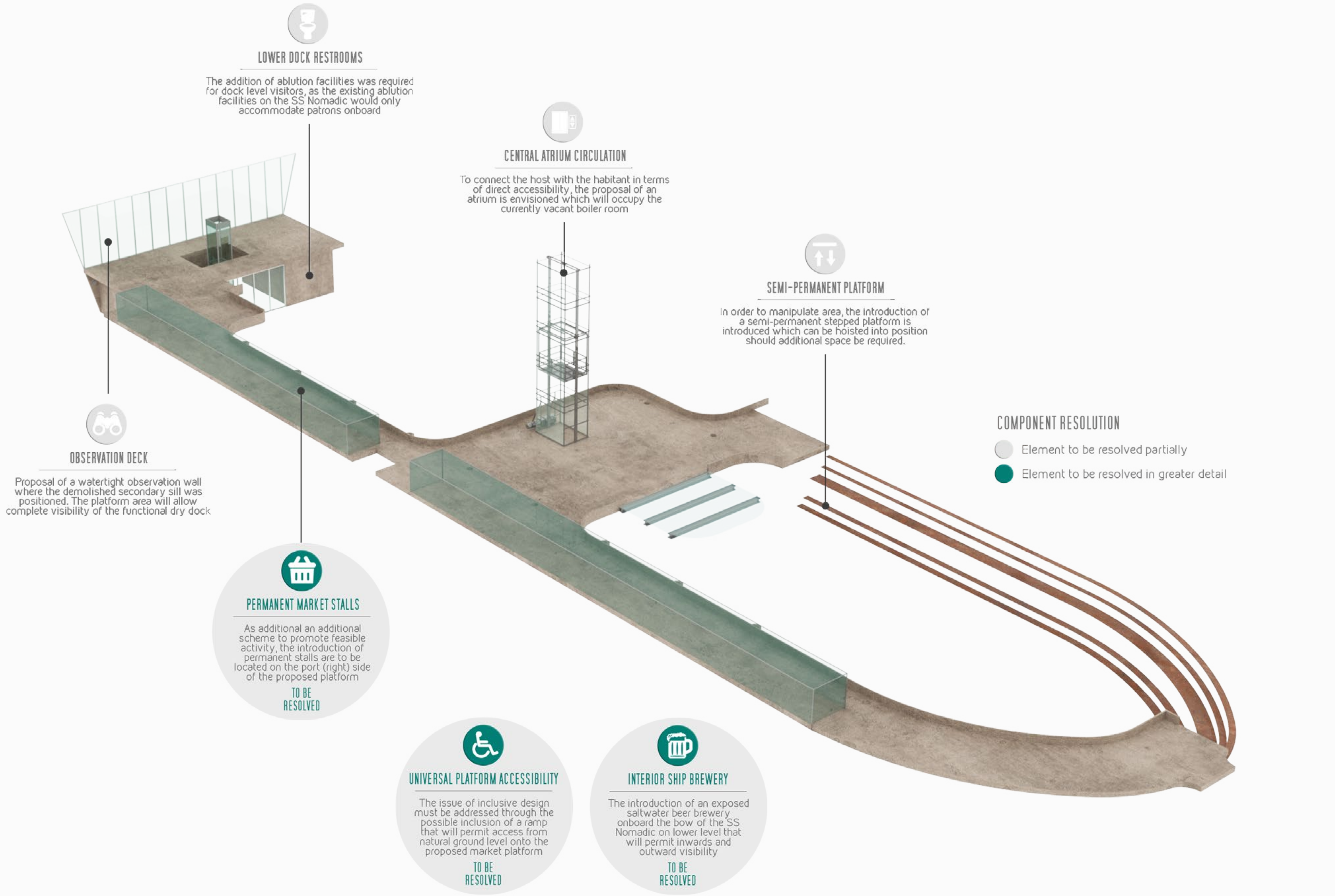


Figure 4.34. Dock Design Components (Author, 2016)

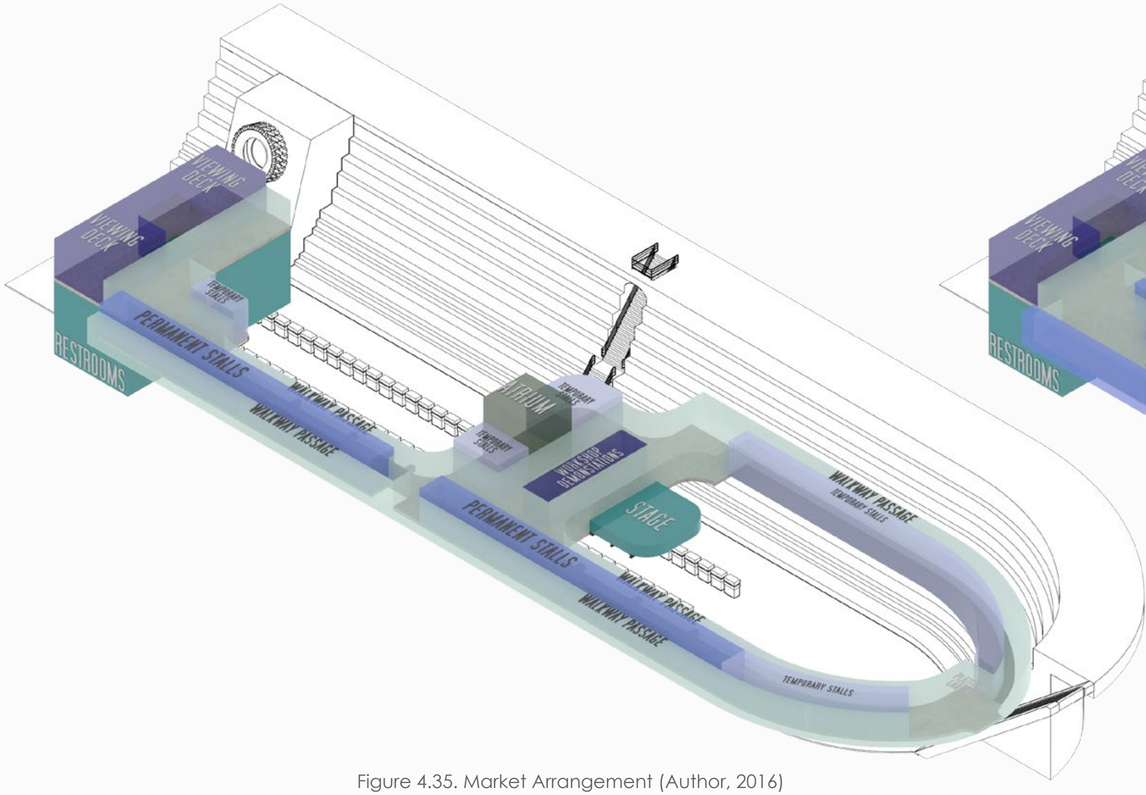


Figure 4.35. Market Arrangement (Author, 2016)

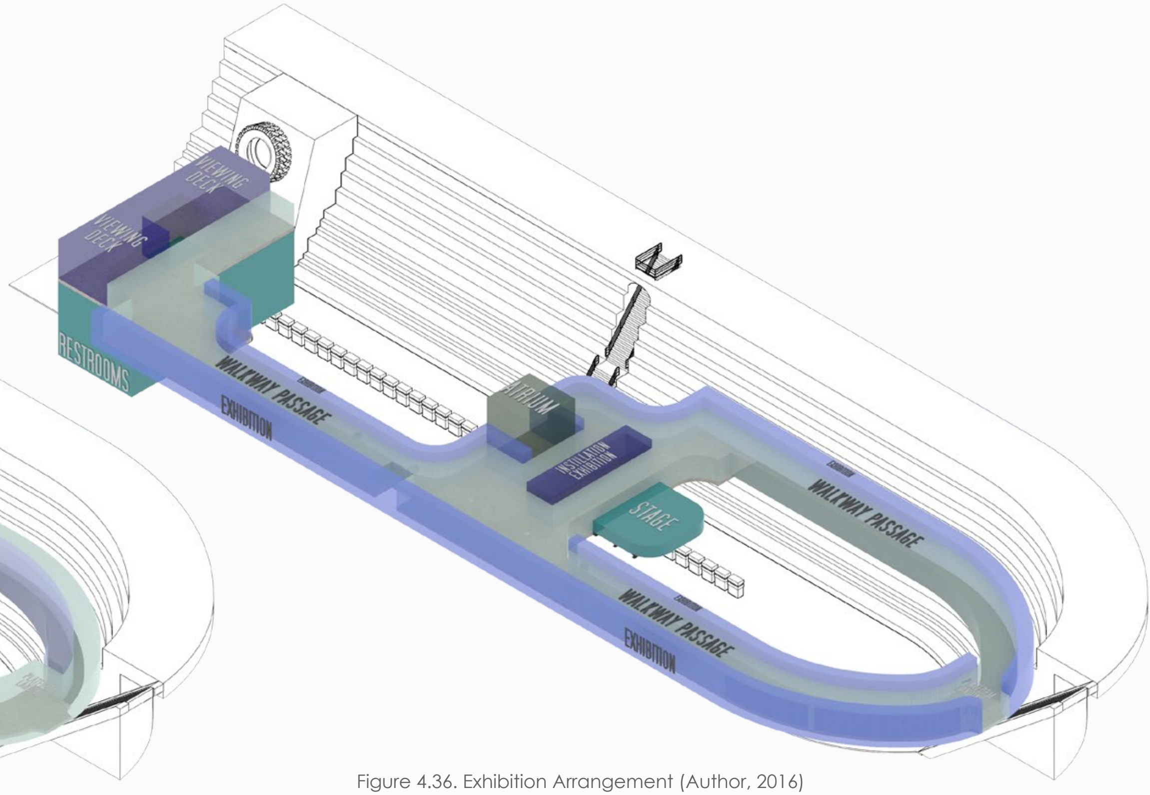


Figure 4.36. Exhibition Arrangement (Author, 2016)

MARKET

The market/stall layout is the **secondary response pragmatically** and will receive additional resolution. In addition to the designated **permanent stalls**, temporary stands and feature workshop/demonstartion areas are also available.

EXHIBITION

In addition to being used as a market, the dock can also host exhibitions and act as **gallery space**. The dock will act as **ideal backdrop against current works of art**. A variation of work can be displayed, ranging from **canvas to temporary installations**.

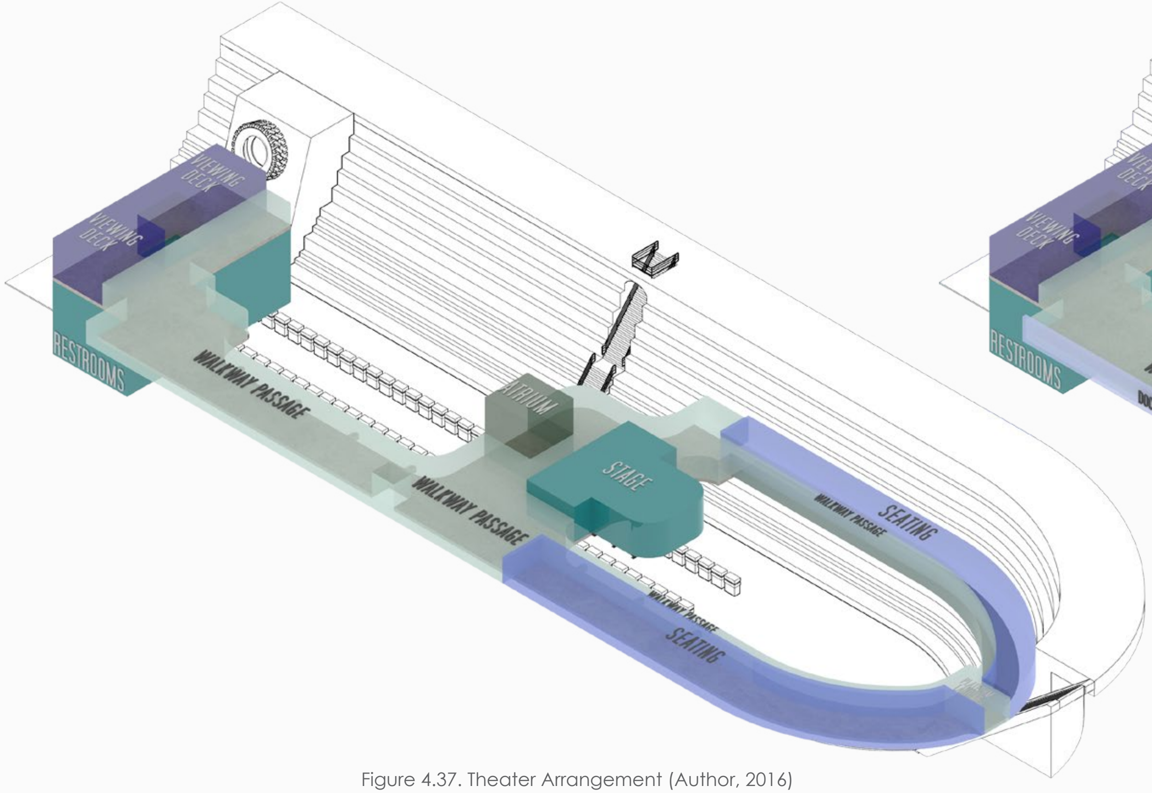


Figure 4.37. Theater Arrangement (Author, 2016)

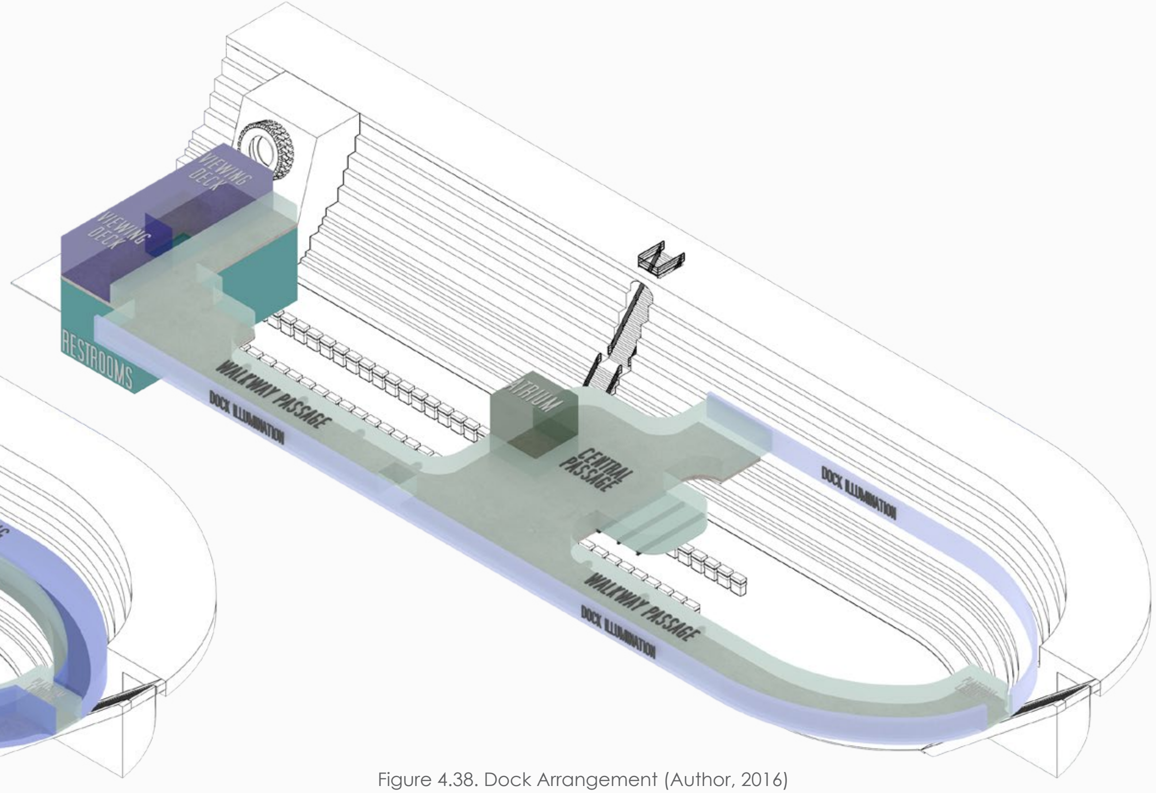


Figure 4.38. Dock Arrangement (Author, 2016)

THEATER

As a third possibility, the platform can be configured to host **theatrical activities**. Areas on adjacent sides of the designated stage area can be converted into **temporary seating** similar to that of an **amphitheatre**, with **frontal walkways to govern circulation**.

DOCK

The final configuration showcases the possibility of space **merely functioning as a dock** when there is **no event taking place**. Illumination will direct emphasis towards the existing fabric and act as a **sculptural element**.

4.7
MIGRATION OF SHIP TYPOLOGIES

As a result of the proposed configuration and division of the dock into a **frontal market** and **aft functioning dry dock**, a display of vessels varying in **occupational status** will be observed. As mentioned in chapter one (refer to figure 1.3, page 18), the **lifecycle** of a ship is divided into five stages; **planning, ordering, ship building, ship operation and ship recycling**. As illustrated in figure 4.39, the **adaptive reuse** of the decommissioned SS Nomadic proposes a **fourth ship recycling alternative**, whereas any serviced vessel in the adjoining aft division of the functioning dock represents a **ship during operation**. The availability of **neighbouring harbors** will also display a ship in its **operational phase**, but as opposed to be serviced, these vessels are in **current use.** This combination of visual exposure to the **variety of vessel typologies actively assimilates the life cycle of a ship**.

SHIP RECYCLING
stage 5
fourth proposed alternative for decommissioned vessels

SHIP OPERATION
stage 4
vessels still in use, but requiring maintenance or repair

SHIP OPERATION
stage 4
vessels currently use primarily for recreational purposes

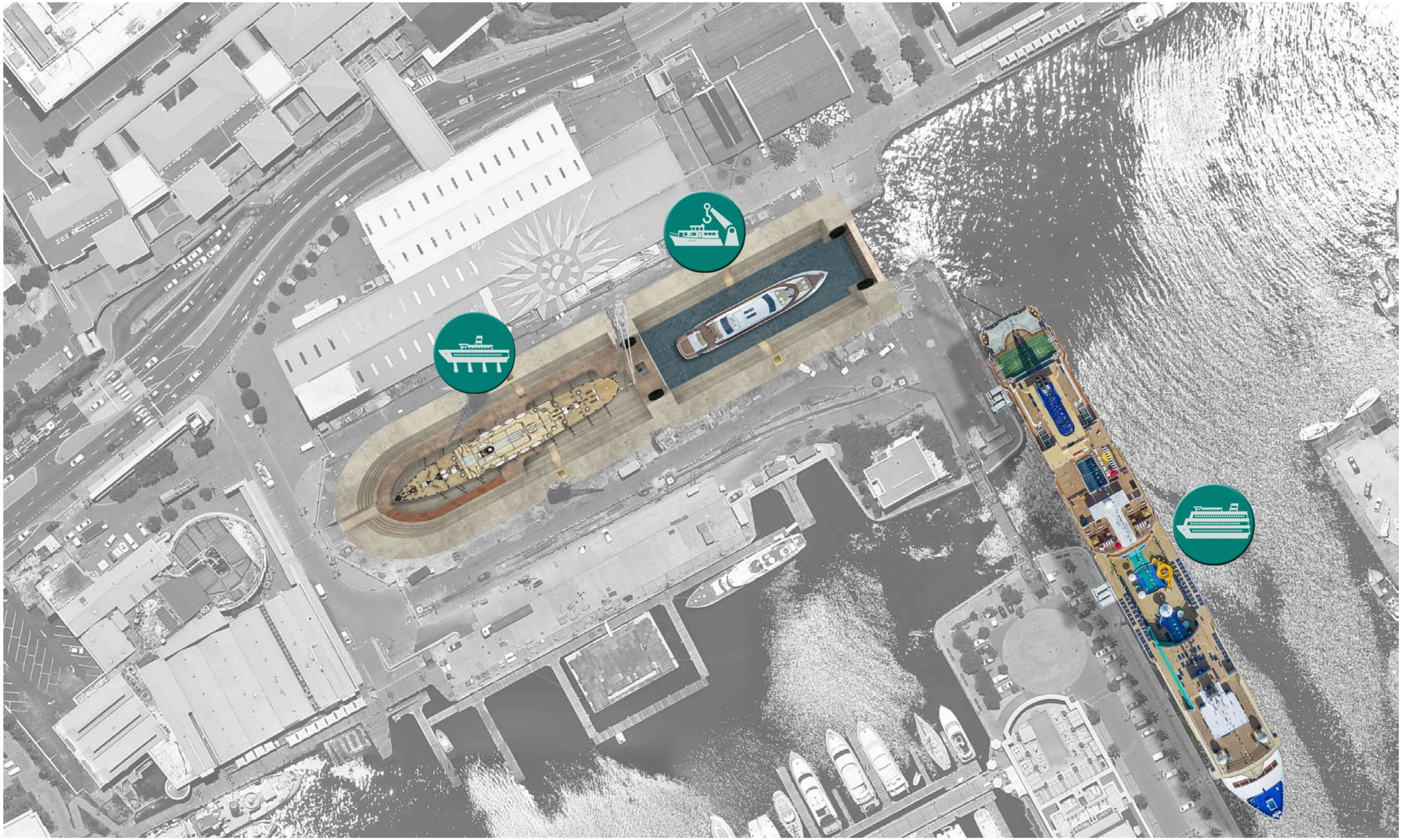


Figure 4.39. Migration in Ship Typologies (Author, 2016)

4.8
PERMANENT MARKET STALL DESIGN

As a resulting attribute due to the selection of a **definite form of the envisioned platform**, the design of additional elements for the outer interior can be conceptualised. Expending significant attention towards the **market arrangement scheme** (figure 4.35), the design of **permanent stalls** to be positioned as indicated on figure 4.41, will be resolved in greater detail. As a definite point of departure, it was established that the **stalls be fixed and modular in design**. This will ensure consistency, encourage proprietorship and evade any possibility of disrespecting the dock through aggressive market setups.

Based on the idea of having the **platform accessible to a variety of different schemes**, the notion of having stalls permanently fixed to the podium proved to be **perplexing in design**. Requiring joinery to the platform meant that the design was to be configured in such a fashion to **allow complete desertion when there is no active market**. Furthermore, the permanent nature of the envisioned stalls permits opportunity for **continuous product display** after hours. In addition to this principal criterion, possible **visual abstraction** caused by this market obstruction was to be restricted. As exemplified in figure 4.42, the placement of the stall was to be **located between two structures of historical significance**. The location thereof was not to **subtract from or obstruct, nor disappear** amongst the **vast existing fabric**. Furthermore, additional benchmarks were inaugurated to provide **framework and act as a tool of measuring amenability**. These principles include **visual discreetness, fixed temporality, adaptability, materiality, multi-functionality and constant exhibition** (refer to figure 4.43). The Gourmet Tea Shop will be investigated as precedent (page 155), with the only requirement pertaining to permanent exhibition not being met entirely.

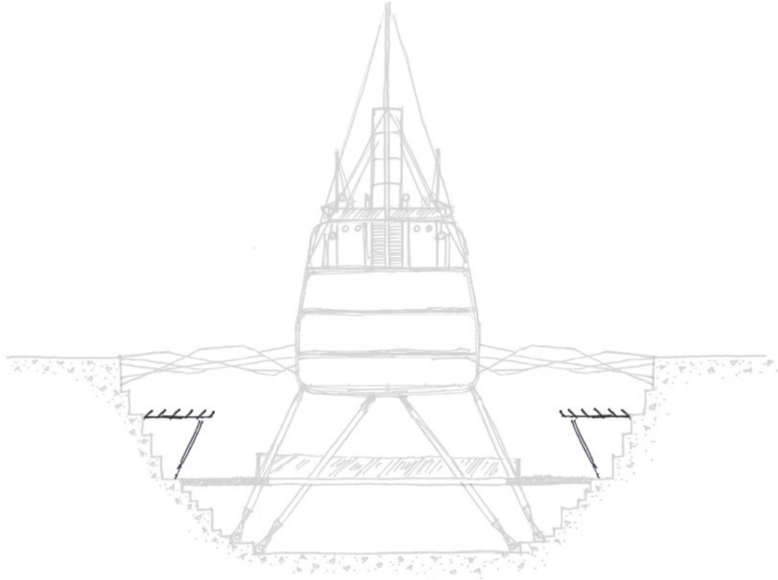


Figure 4.40. Market Stall Design (Author, 2016)

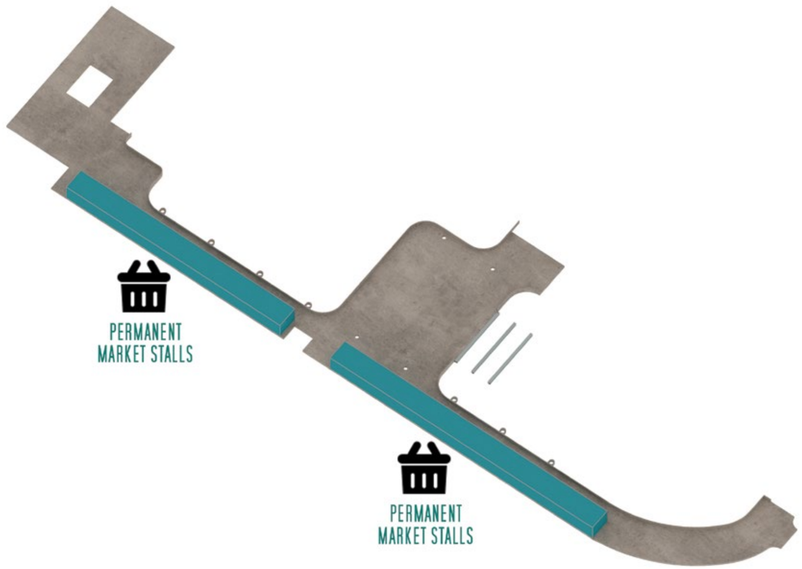


Figure 4.41. Permanent Stall Location on Proposed Platform (Author, 2016)

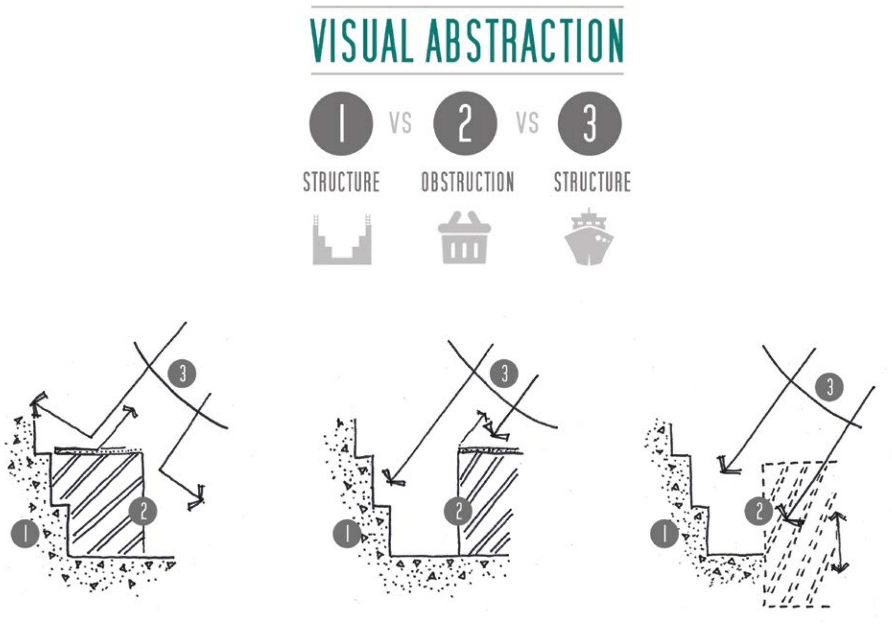


Figure 4.42. Stall Design Concept (Boat Smart, 2015)

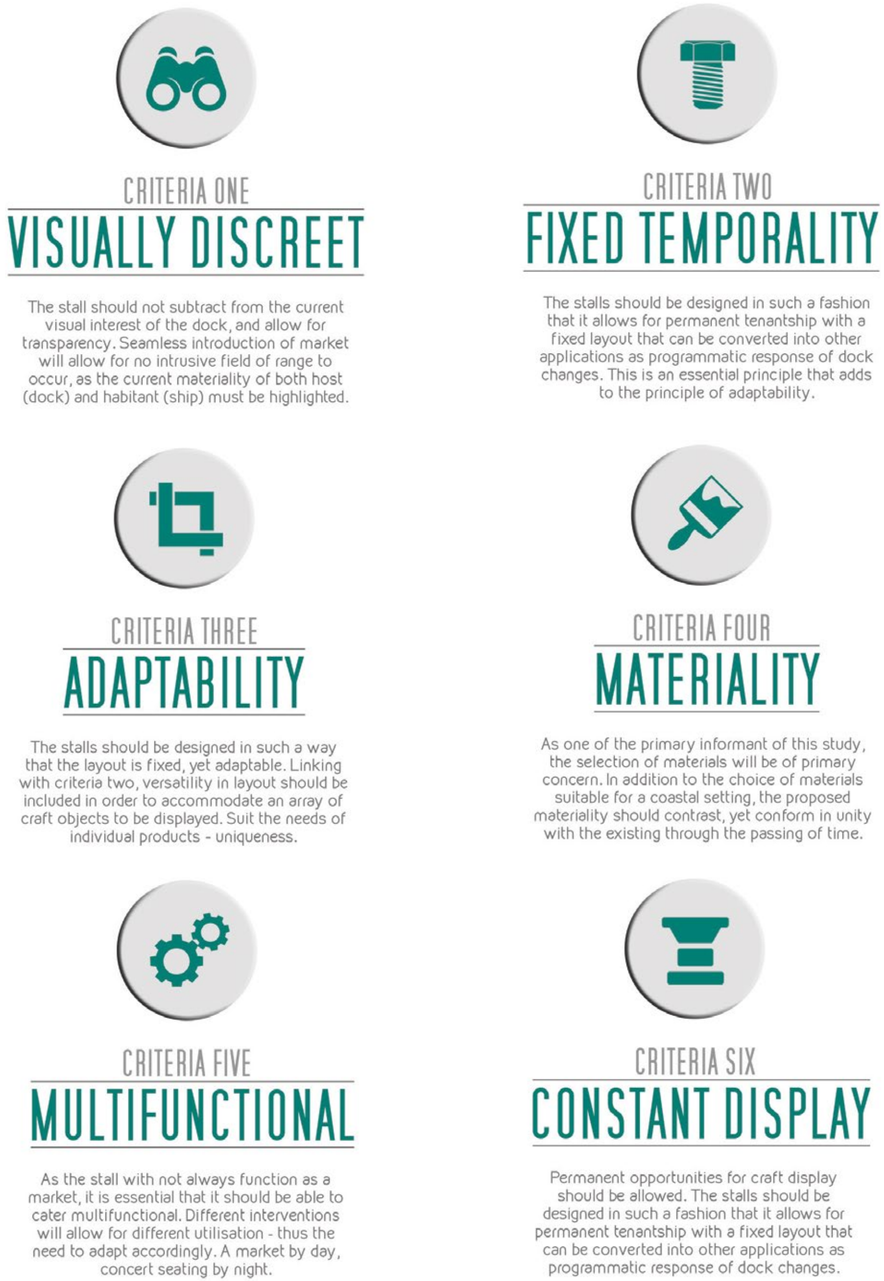


Figure 4.43. Permanent Stall Design Criteria (Author, 2016)

Figure 4.44. The Gourmet Tea Shop when Assembled (Chu, 2012)

precedent investigation

4.3

NAME OF PROJECT
THE GOURMET TEA SHOP

LOCATION OF PROJECT
SAO PAULO, BRAZIL

CHIEF DESIGNER
ALAN CHU

DATE OF COMPLETION
2012

PROJECT SYNOPSIS

As a flagship store for one of Brazil's most enjoyed hot beverage, the Gourmet Tea Shop was designed by architect Alan Chu. Working with a strict design manifesto which encompassed the rich history of this iconic brand, the choice in colour palate was derived from the packaging of the wide variety of organic tea blends available for purchase. All stores to follow would have a dedicated colour assigned to it as accent, depending on seasonality and the location. The counter of The Gourmet Tea slides forward from beneath a purple hatch, while shelves can be wheeled out from behind a grey panel and a cupboard emerges from behind a large brown door. Utilising plywood as materiality, the display is steady, durable and light of weight. The selection in material also permits informal maintenance and frequent replacement as stock alters. Complete assemblage allows for a dynamic design that caters for an ever evolving brand.

PROJECT OBJECTIVES

- Design an interior environment that is permanent, yet semi-transitory in nature.
- All fittings and material slection should be multi-functional and adaptable in nature, allowing display for a variety of stock and change in seasonality.
- Complete assemblage should be allowable after hours in order to permit additional activity within the surrounding area.

IMPLEMENTATION STRATEGIES

- The envisioned markets stalls will follow a similar typology in terms of modular and temporary design. As opposed to all elements folding away horizontally, the identified location only permits vertical assemblage.
- The selection of materials should be environmentally suitable.

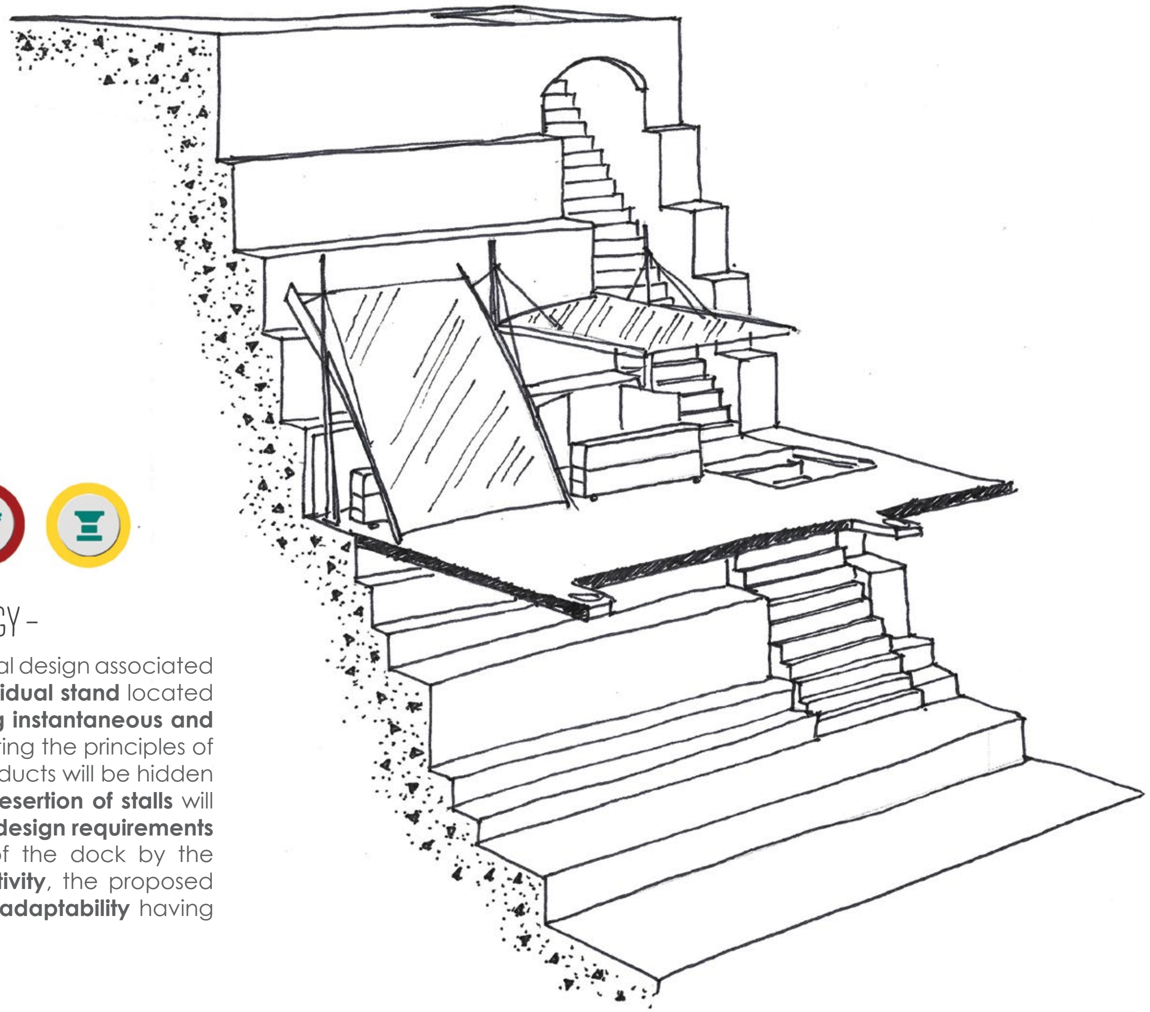
Figure 4.45. Configuration of Shop Dismantled and Assembled (Chu, 2012)

theory

materiality

design

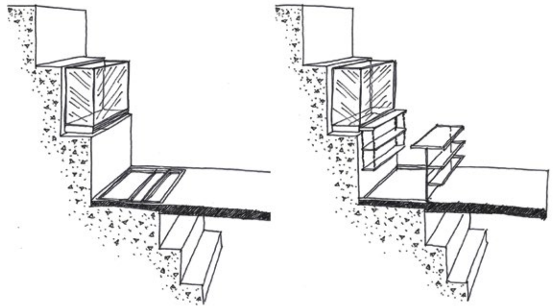
programme

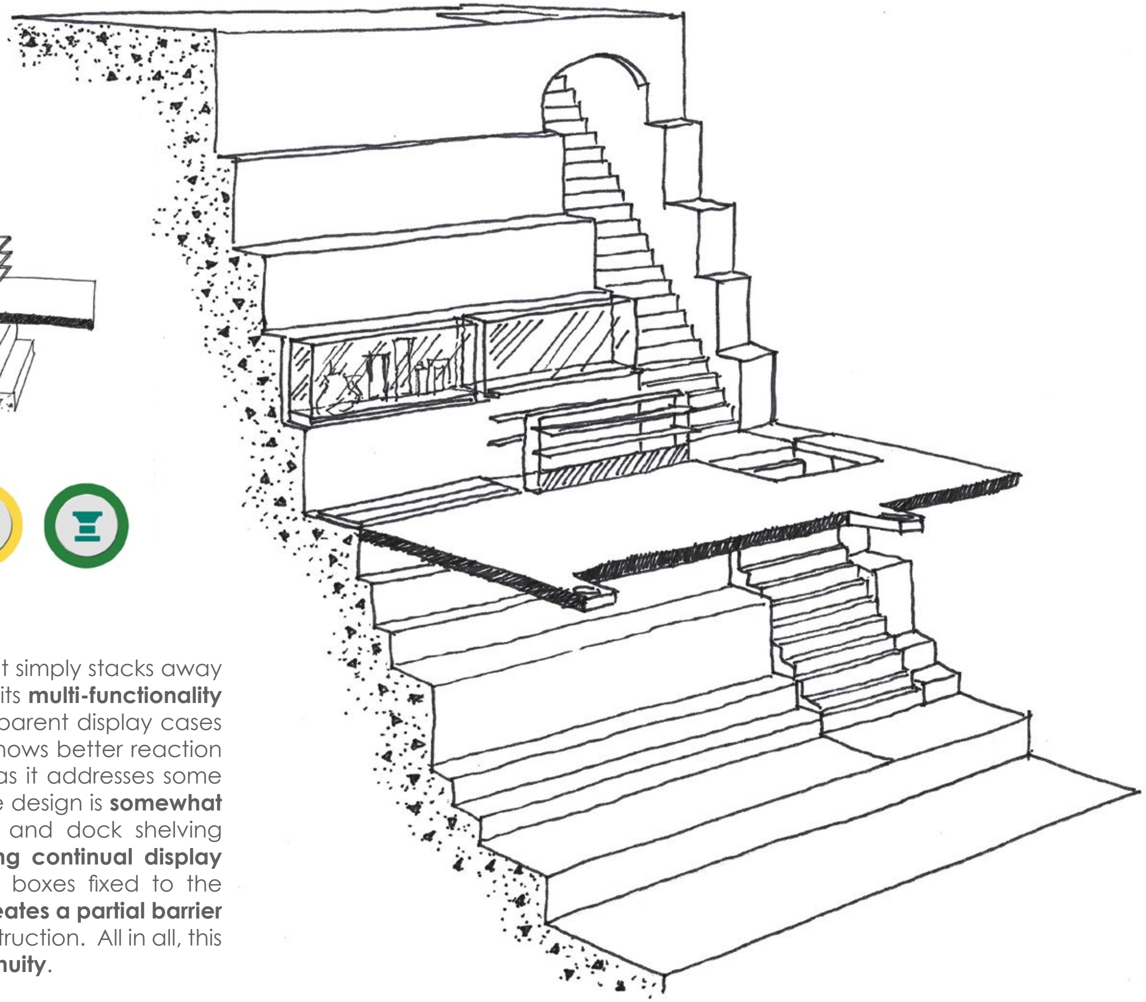


- CONVENTIONAL MARKET TYPOLOGY -

The primary proposal was a mere response to the initial design associated with permanent market typologies nowadays. **Individual stand** located alongside a **designated perimeter**, with **setup being instantaneous and conceived** within an **allocated space**. Though meeting the principles of **fixed temporality and constant display partially**, products will be hidden behind the collapsible awning and **no complete desertion of stalls** will occur - merely **sideway amassing**. Furthermore the **design requirements are not realised** through the **direct abstraction** of the dock by the enclosed stands afront. Aside from **optical insensitivity**, the proposed typology does **not accommodate the prospect of adaptability** having merely **standard configurations for all patrons**.

Figure 4.46. Conventional Market Typology (Author, 2016)

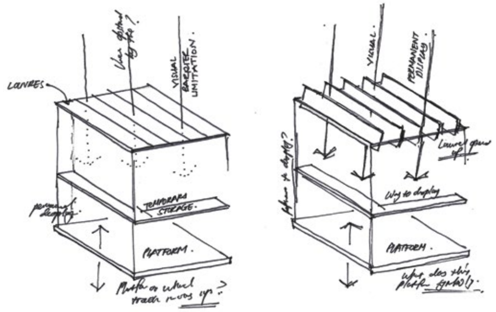


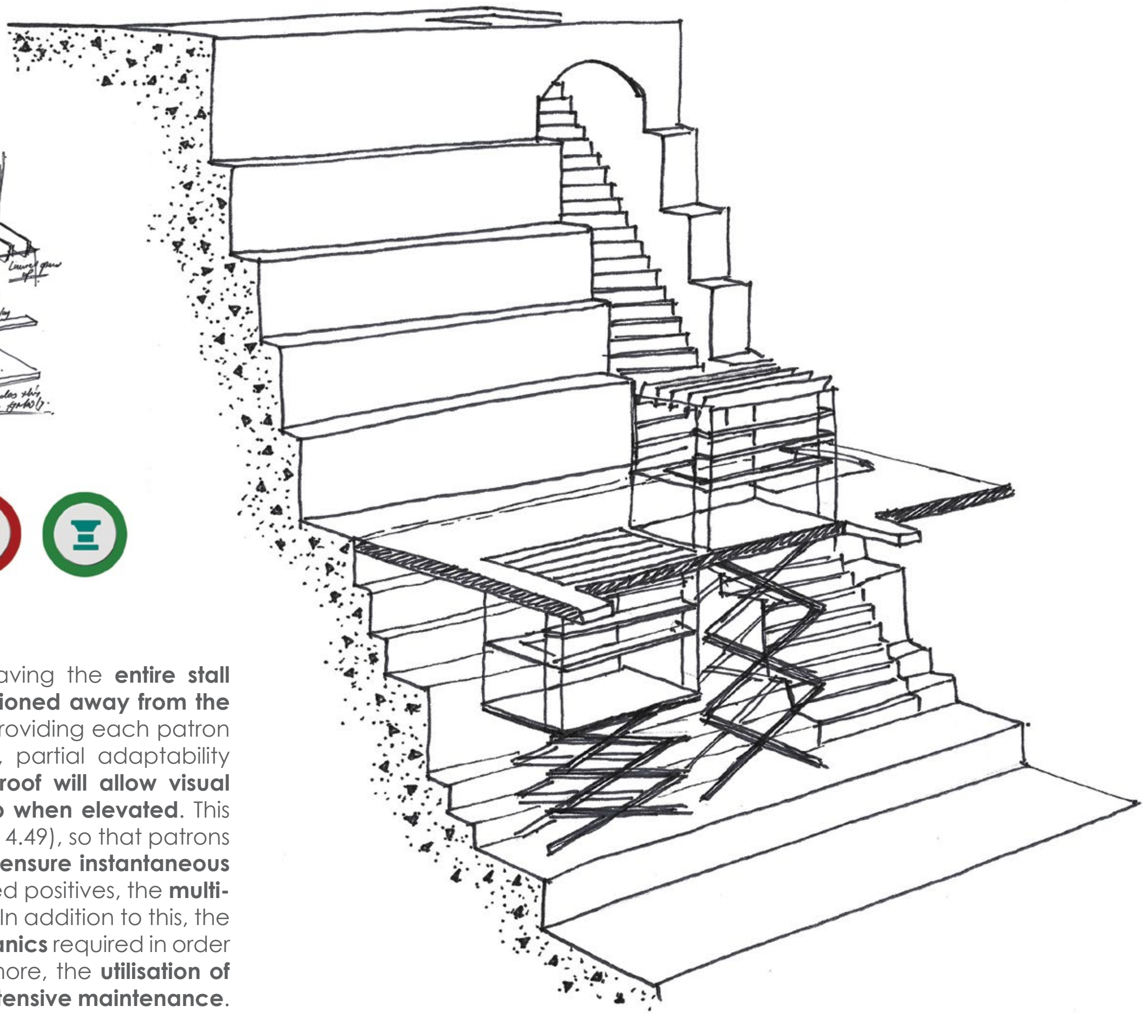


- ITERATION 1 -

The first iteration proposes the design of a market that simply stacks away when not utilised. A **collapsible counter/bench** permits **multi-functionality** and the **prospect of customisation**, whilst **fixed** transparent display cases permit **continuous exhibition of crafts**. This iteration shows better reaction towards the predetermined stall design conditions, as it addresses some of the prominent considerations to some degree. The design is **somewhat visually discreet**, being that the platform counter and dock shelving can **fold away** when not utilised. Thought **governing continual display opportunities** through the initiation of glass display boxes fixed to the dock's alters, the **actual product and encasement creates a partial barrier and encourage direct contact** that might lead to destruction. All in all, this proposal was rendered **not feasible and lacked ingenuity**.

Figure 4.47. Market Stall Iteration 1 (Author, 2016)





– ITERATION 2 –

The second revision proposed the novel idea of having the **entire stall completely recessed when not utilised**. It is also **positioned away from the dock**, creating a **railing-like boundary when raised.** Providing each patron with a **shell to configure as per their requirements**, partial adaptability is allowed. The addition of a **transparent louvered roof will allow visual accessibility to products when recessed and the ship when elevated**. This proposal also governs **admission when lowered** (figure 4.49), so that patrons can adjust and restock merchandise after hours and **ensure instantaneous setup** the following day. Aside from the aforementioned positives, the **multi-functional nature of the unit is ignored when recessed**. In addition to this, the **biggest concern** with this design was the **overall mechanics** required in order to render the intervention **structurally sound**. Furthermore, the **utilisation of hydraulic scissors cranes is outmoded and requires extensive maintenance**.

Figure 4.48. Market Stall Iteration 2 (Author, 2016)

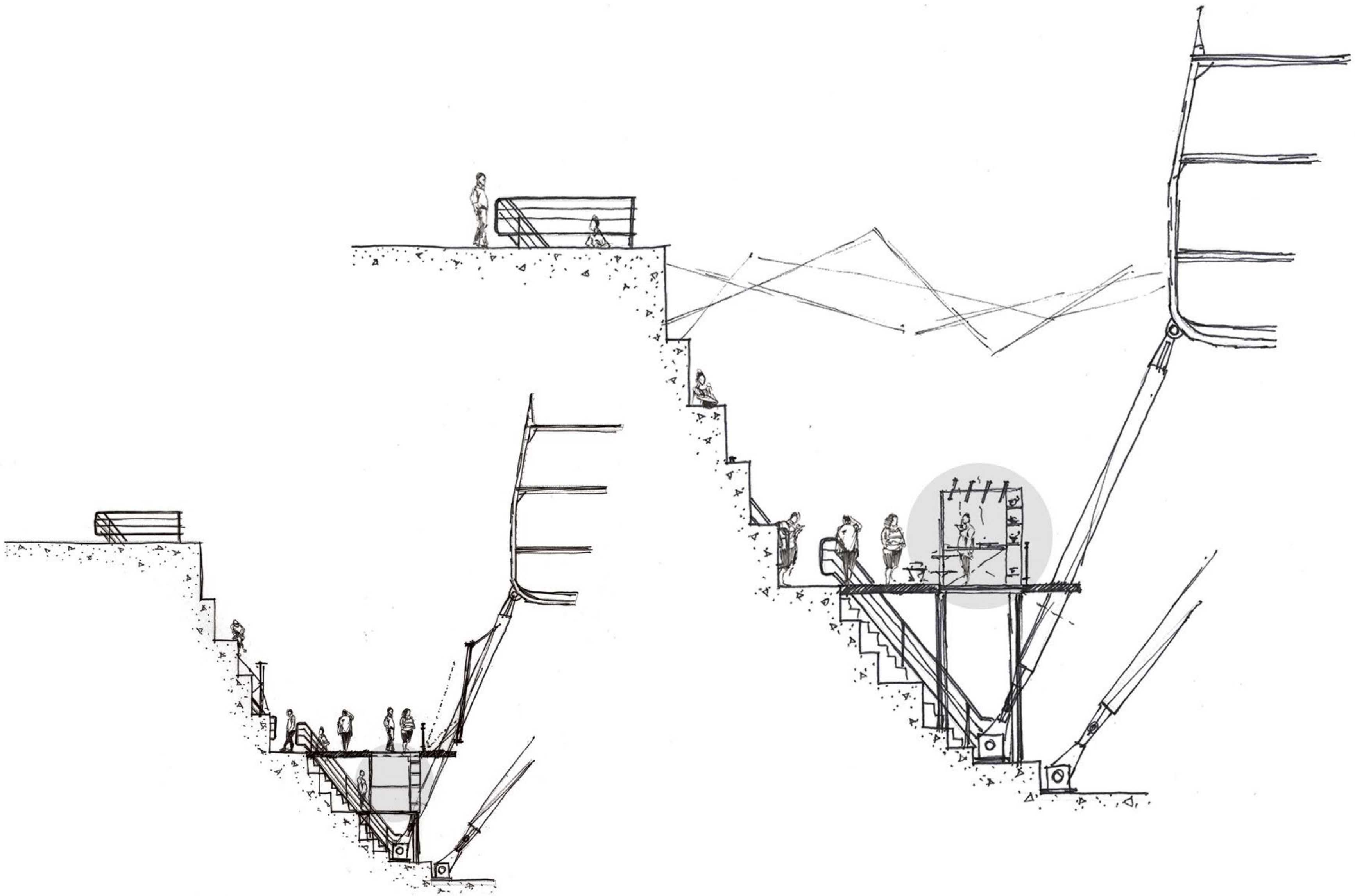


Figure 4.49. Iteration Below and Above Platform (Author, 2016)

Figure 4.50. Inspiration Pallette Collection (Author, 2016)

- ITERATION 3 -

Reflecting on the said proposals, the third iteration provides a **combined revision**. Utilising the **pin point impression apparatus** (figure 4.50) as inspiration, the idea of **podiums as display**, which could be **recessed and raised individually**, was envisioned. The **central positioning** of the stall administers **all-round visibility and either side circulation**. As opposed to a central platform that was to be hoisted, **force is distributed evenly and direct load diluted though individual upheld**. As opposed to conventional hydraulics, the utilisation of **solar-powered electric actuators** will be used, which requires **less space, little maintenance and provide better structural support**. Patrons will have the opportunity to **configure** their platform with a **variety of podium types and arrangements** (refer to figure 4.53) that will be **preconfigured and elevated though central control when there is an active market**. The variety of configurations will permit the tubular podiums to be utilised as seating or tables when there is another event taking place.

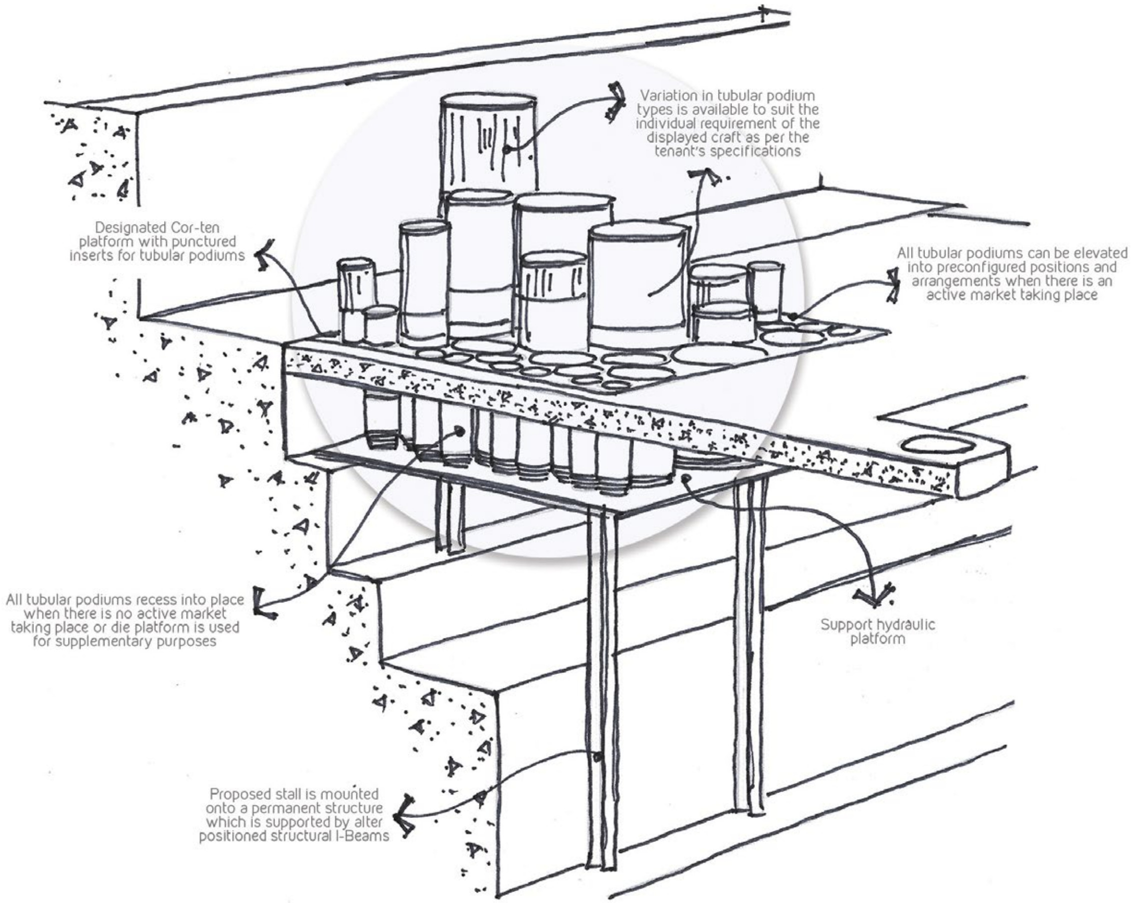


Figure 4.51. Market Stall Iteration 3 (Author, 2016)

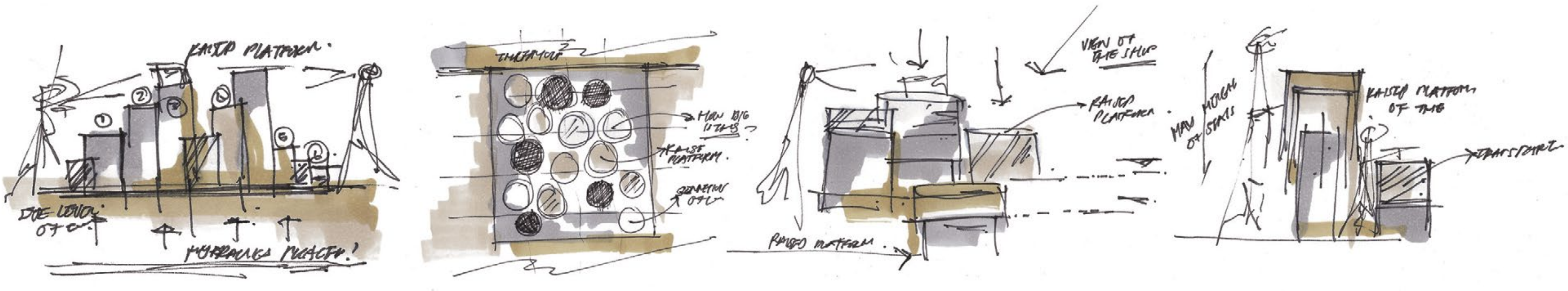


Figure 4.52. Conceptual Development of Iteration (Author, 2016)

Figure 4.53. Configuration Options (Author, 2016)

Figure 4.54. Inspiration Pallette Collection (Author, 2016)

- FINAL STALL PROPOSAL -

The final iteration merely **amended the actual shape of the display podiums**. Through the conversion of circular to square podiums based on the above inspiration (figure 4.54), **waste of infill space is decreased** and the **actual display platform is increased**. Furthermore, modularity is correspondingly improved. With specific reference to figure 4.56, the provision of **various display types** permit a **wide array of display opportunities**. With the addition of a transparent compartment above, **protection** of expensive merchandise is governed when **elevated** and **continuous exhibition is provided when recessed**. As previously mentioned, this variety will license a **selection of configurations to suit the definite craft on display** (figure 4.57 - 4.59) and provide **additional usage for non-related occasions** (figure 4.60). In addition to the actual shape, **materiality is also improved**. This will be discussed momentarily in the technical chapter that follows (page 198). Though **highly novel and enthusiastic** in design, this stall typology is the only proposal that **meets all the predetermined requirements** - thus electing to implement it as a potential form of elucidation.

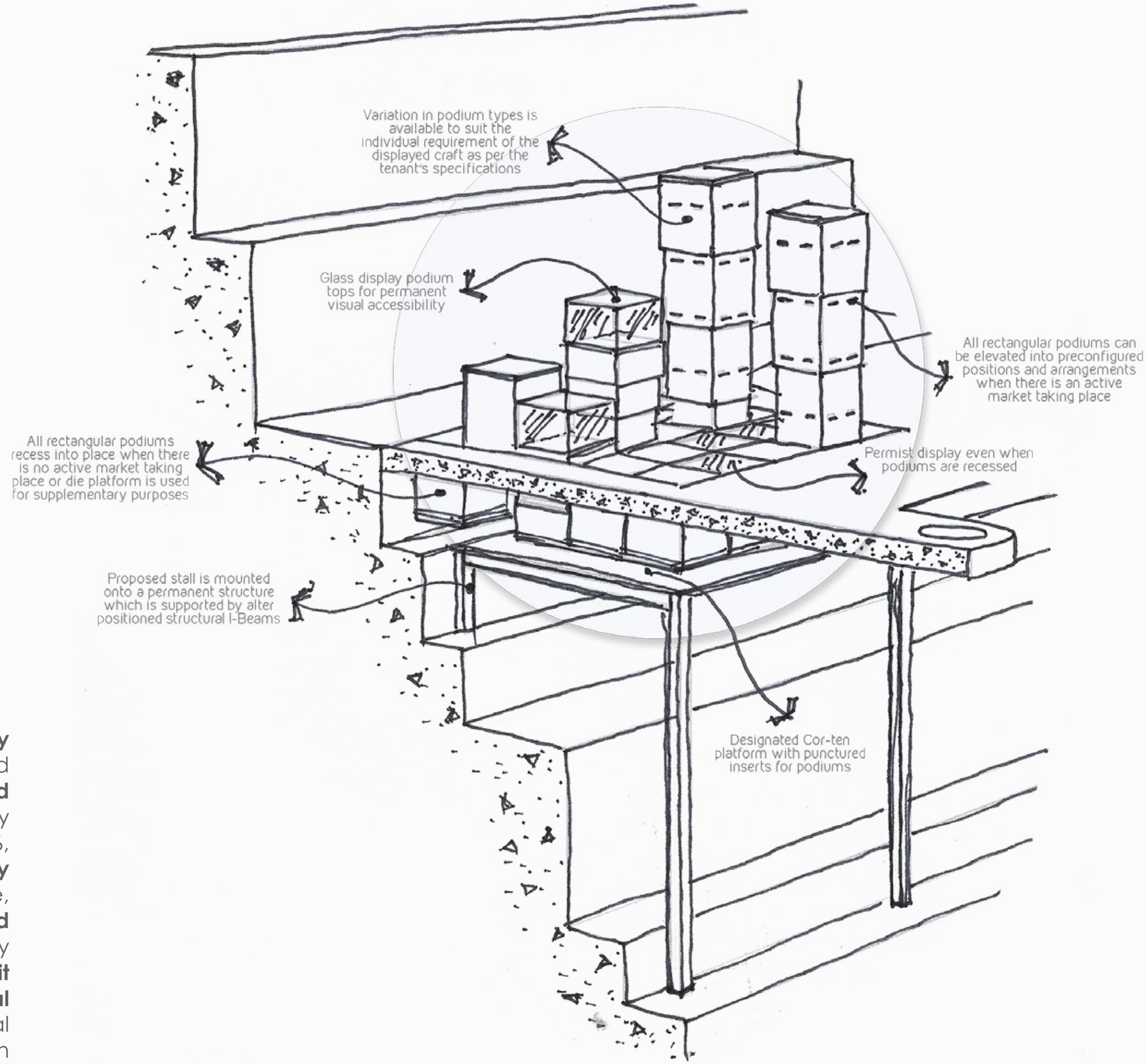


Figure 4.55. Final Stall Proposal (Author, 2016)

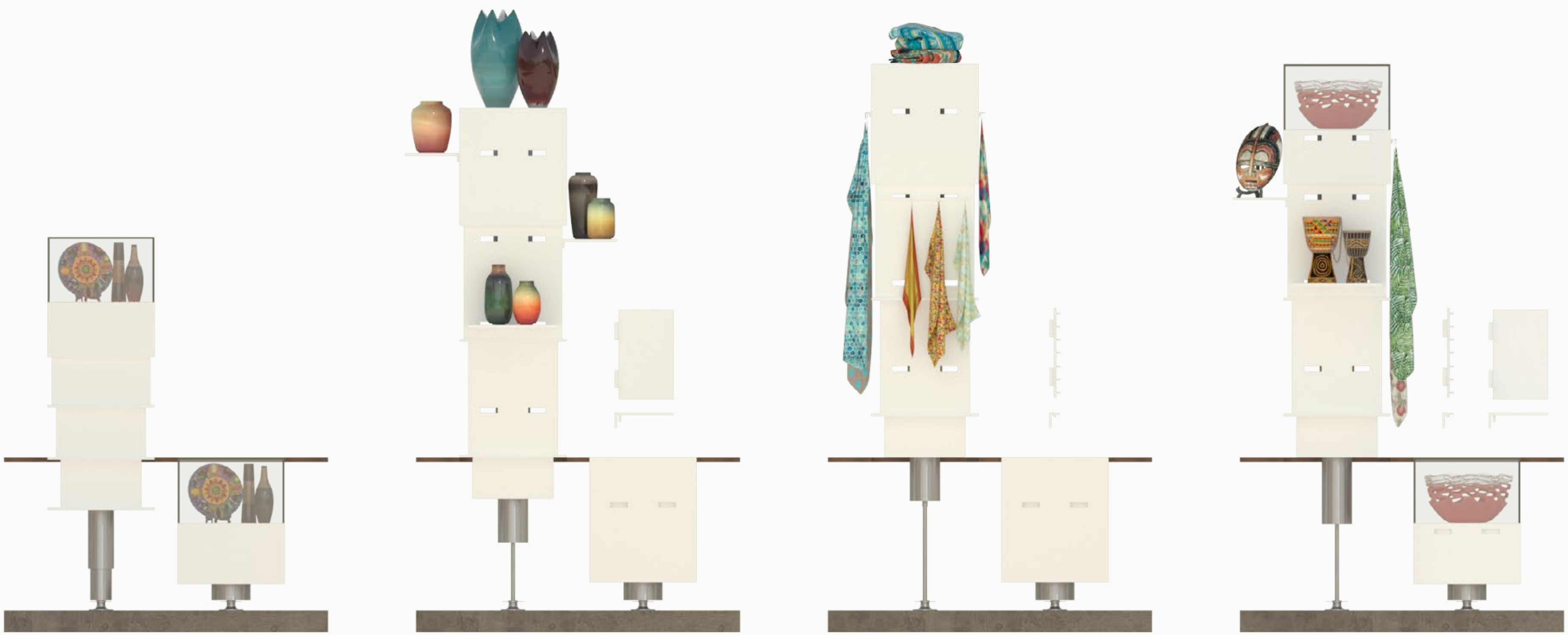


Figure 4.56. Configuration Options (Author, 2016)

Figure 4.57. Possible Arrangement 1 (Author, 2016)

Figure 4.58. Possible Arrangement 2 (Author, 2016)

Figure 4.59. Possible Arrangement 3 (Author, 2016)

Figure 4.60. Possible Arrangement 4 (Author, 2016)

4.9
CANOPY DESIGN

The **final component** of the envisioned **outer interior** that was to be addressed before the design of the inner interior could commence, is reserved for the addition of a **canopy that would enclose the frontal half of the dock**. The initial reasoning behind this was instigated by the Cutty Sark precedent and enthused by **geographical conditions on site**. The introduction of the canopy that **connects the host with the habitant would replicate the notion of water**, which as illustrated in figure 4.62, would be positioned in the location where **water would normally act as mediator** in a traditional dry dock. Using the work of Abdul Azri as inspiration (figure 4.63) the aesthetics of the canopy was **desired to be augmented**. Through these illustrated photographs, Azri wished to replicate the **current and hazardous conditions on a shipbreaking site**. His portrayal thereof influenced the **geometrical nature** of the canopy profoundly, romanticising the **force of the ocean and possible fate of all decommissioned vessels**.

As illustrated in figure 4.64, the development of possible solutions was investigated that would **correspond aesthetically and not hinder visibility**. The semi-finalised proposal (figure 4.65) never matured entirely due to a **change in approach** and question of true relevancy of this outer interior component. Ultimately, the complete enclosure of the dock was deemed **unnecessary**, as this would **isolate the dock from its surrounding** and **mere partial enclosure of certain areas was sufficient** against the elements. The later addition of a **scenic ramp** provided adequate enclosure and a way of **universal accessibility** (page 207).

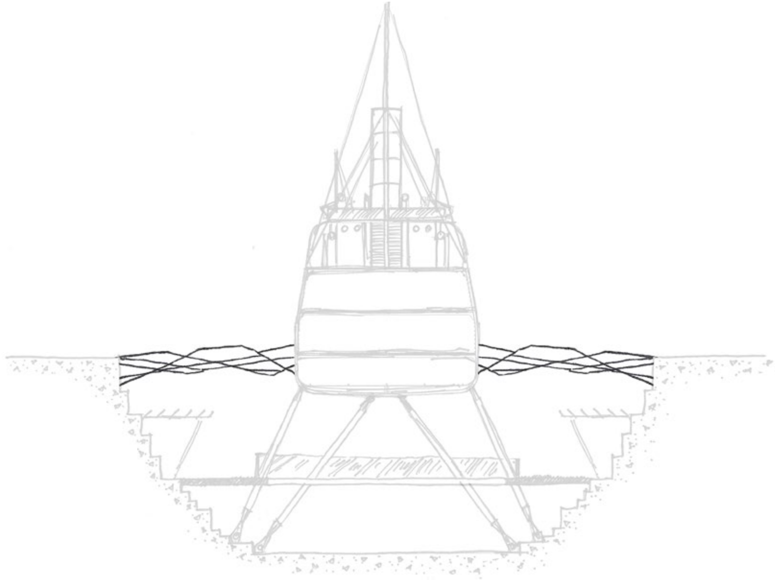


Figure 4.61. Canopy Design (Author, 2016)

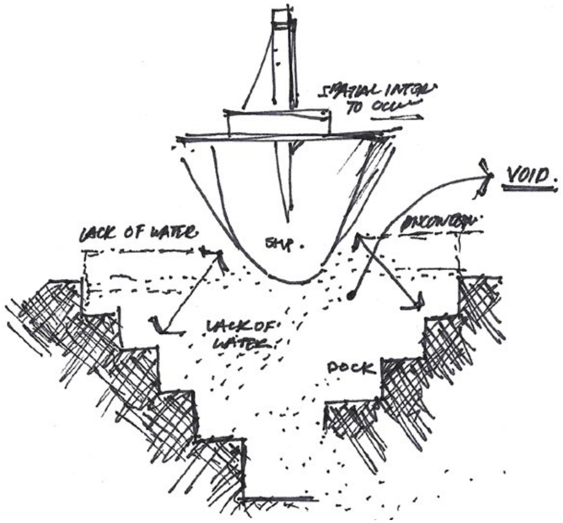


Figure 4.62. Canopy Mediation Between Host and Habitant (Author, 2016)

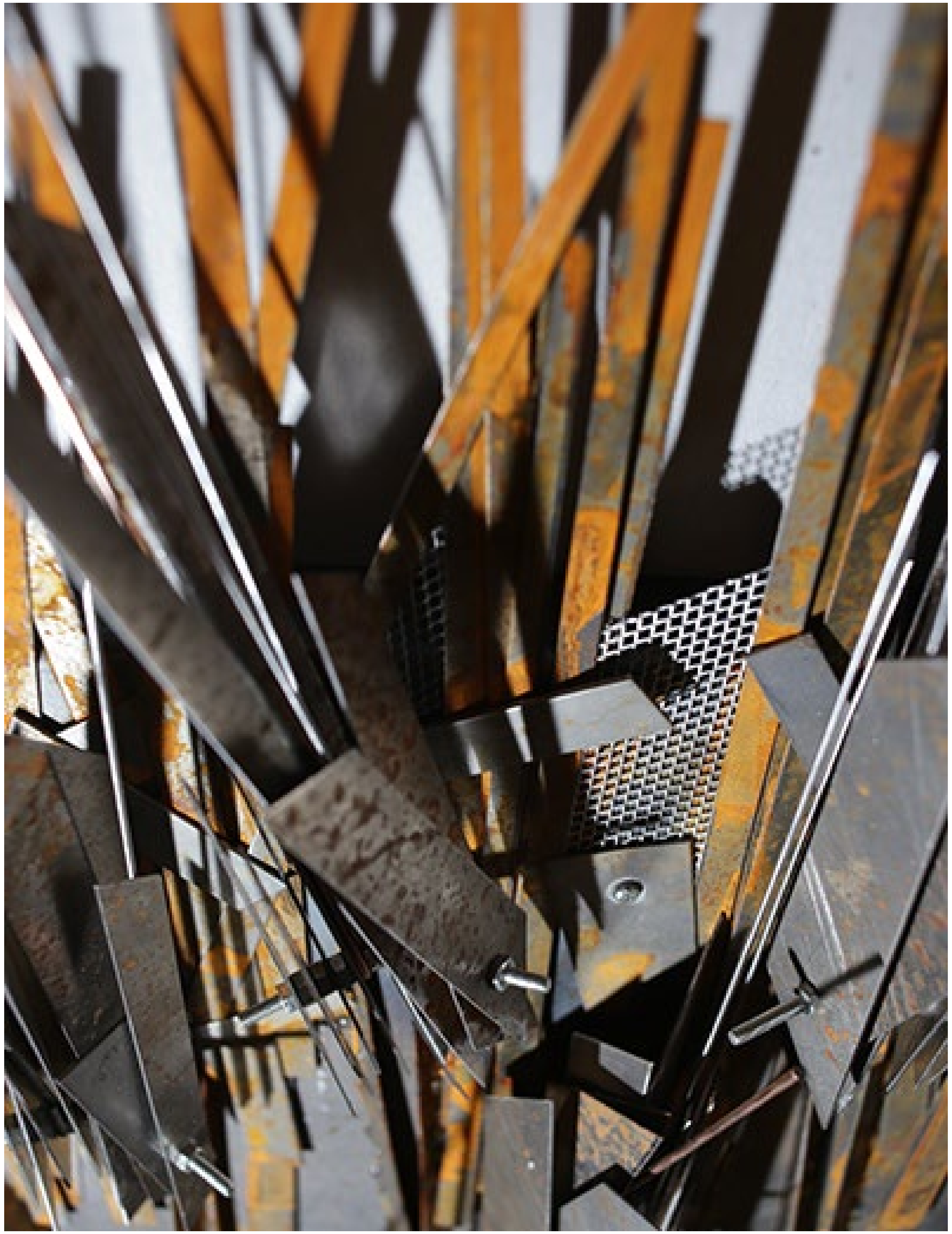


Figure 4.63. Figurative Representation of Conditions on a Ship Breaking Site (Azri, 2014)

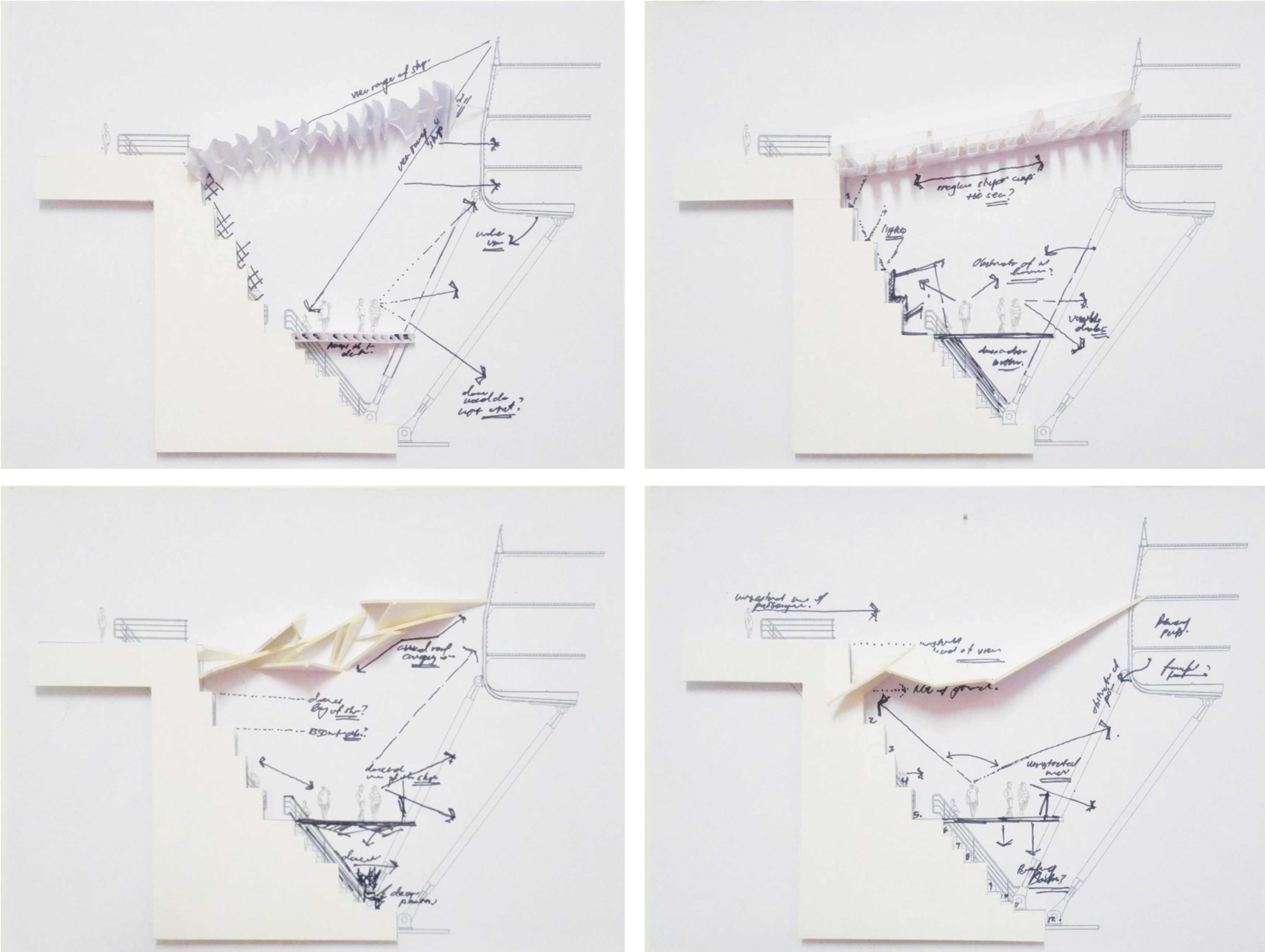


Figure 4.64. Canopy Maquette Development (Author, 2016)

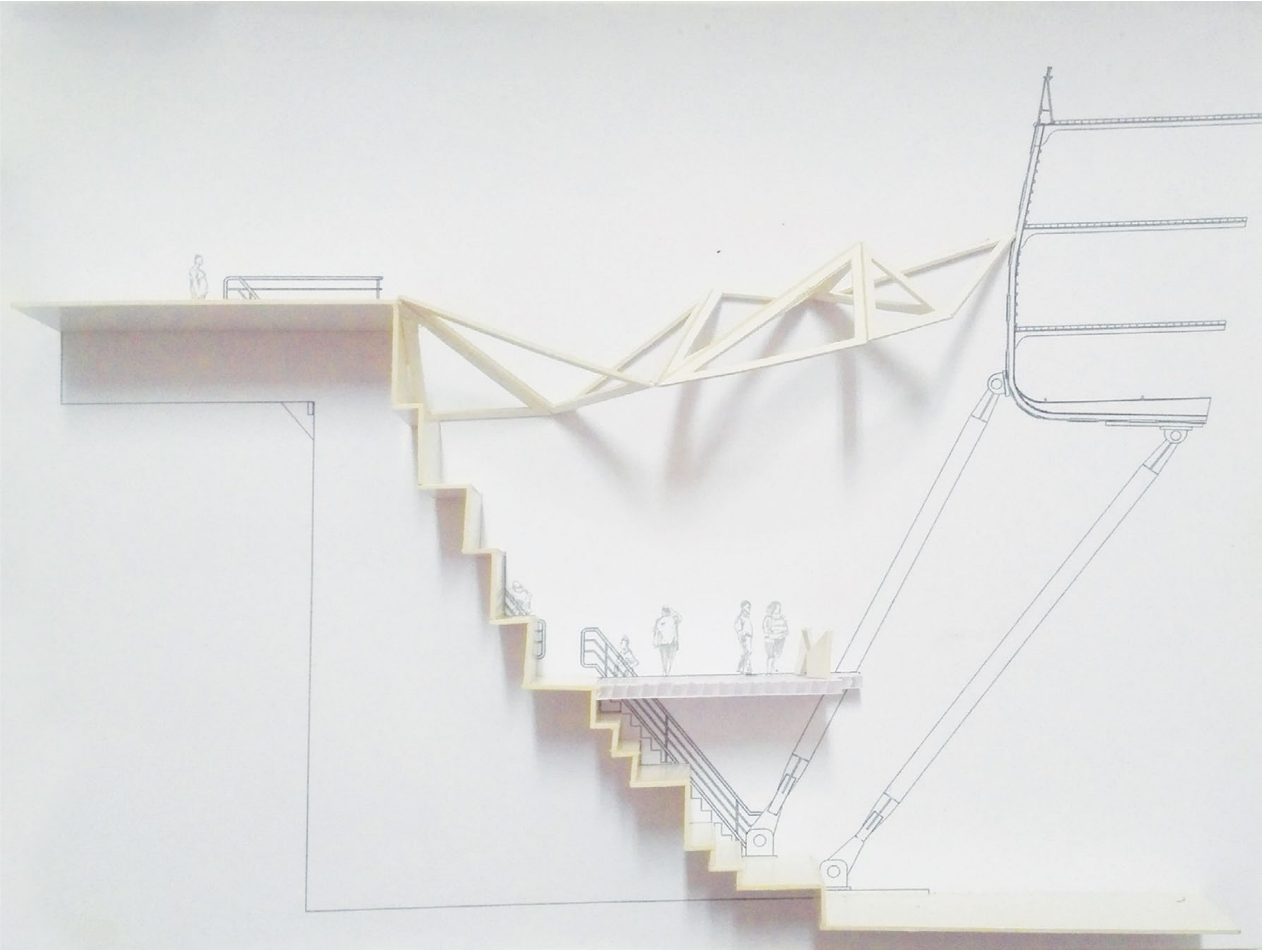


Figure 4.65. Semi-Finalised Canopy Maquette Proposal (Author, 2016)

4.10
BREWERY DESIGN

Diverting attention away from the outer interior and towards the **design of the inner interior**, the **ideal positioning** of the envisioned brewery onboard the SS Nomadic was to be determined. In appendage to the **actual production space** required for the brewing of this alcoholic beverage, the **addition of ample environments must be provided where the process can be observed and consumed**.

After thoughtful consideration, the design proposes the **brewery to be located in the bow (front)** section of the ship. As this portion of a ship customarily accommodates hefty machinery and a substantial amount of cargo, the **bow's frame is reinforced** and will thus be able to **board all associated fermentation equipment**. In addition to the assurance that the bow will be able to provide sufficient support, the **variety of interior conditions** associated with its relevant class will attest beneficial when investigating **materiality**.

Taking the abovementioned into cautious contemplation, the proposal of the brewery to be located on the **frontal lower decks** ascertained to be the most suitable possibility (refer to figure 4.67). This provides additional opportunity to establish a **visual link between the inner and outer interior**.

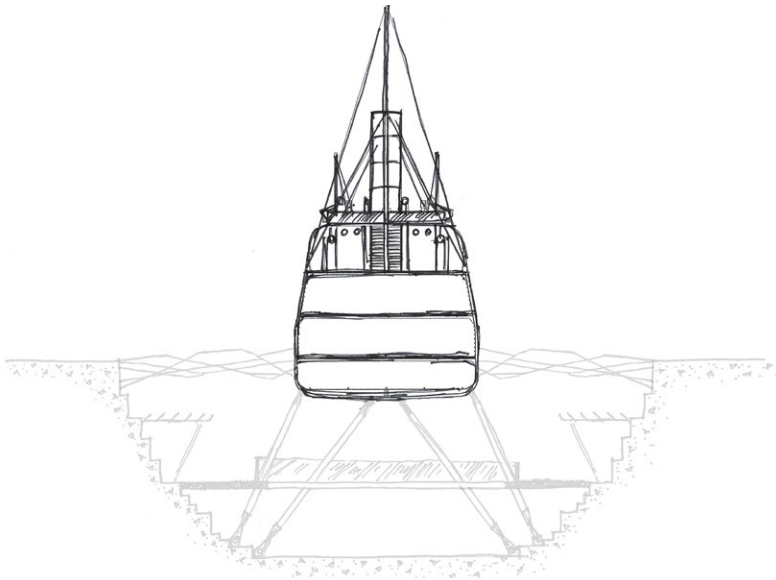


Figure 4.66. Inner Interior Brewery Design (Author, 2016)

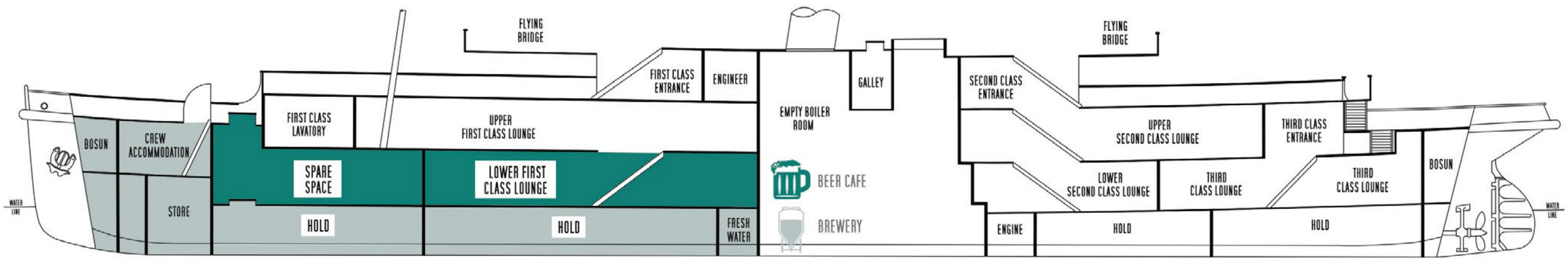


Figure 4.67. Proposed Positioning of Brewery and Beer Cafe (Author, 2016)

Figure 4.68. First Class Lower Level Lounge (McDonald, 2013)

Figure 4.69. Lower Deck Spare Space (Sweeney, 2011)

– FIRST CLASS LOWER LEVEL LOUNGE –

Smallest of the two lounges positioned at lower deck level, was the continuation of a lounge area for First Class passengers **forward of the boiler room**. Lit by **portholes** on either side and **accessed via stairs** down from the larger First Class lounge on the upper deck, it was designed to accommodate **lifebelt storage** at forward and aft ends and was **fitted with seats and tables**.

– LOWER DECK HOLD AND SPARE SPACE –

This **large** spare space, **accessed from a hatch** on the forecastle deck, is located forward of the First Class lounge on the lower deck. Used for additional cargo, supplementary storage space is provided in the hold directly below. The main storage space is **connected to an additional hold** located beneath the First Class lounge on the lower deck, running the **entire length of the bow**.

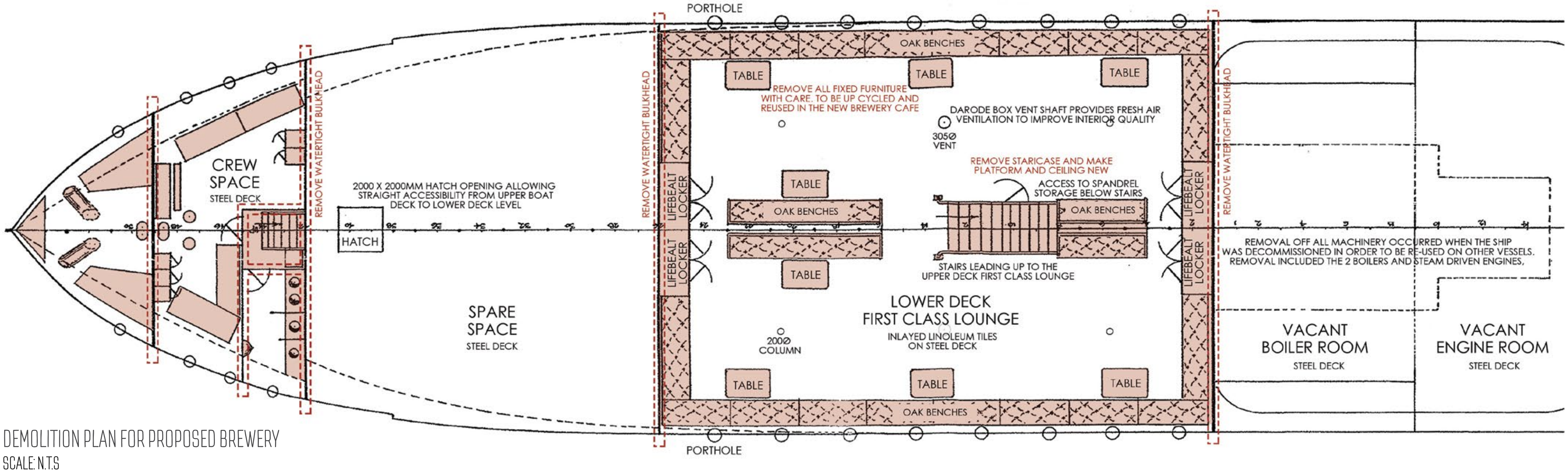


Figure 4.70. Demolition Plan for Proposed Brewery (Author, 2016)

Working within a confined and newly renovated space, the envisioned intervention **required additional room**, **elongated towards the bow**. In order to extend the length of the First Class lower lounge, both adjoining walls **enclosing the boiler room and spare space was to be demolished**. In requisition of providing acoustic insulation, these walls were converted into lifebelt lockers (refer to figure 4.71). As the ship will be **stationary** and all **deafening machinery removed**, this **auditory isolation is no longer required**. Secondary to the drywalls, the central **staircase** (refer to figure 4.72) **will be removed** in order to **provide clear width**. As there is an additional staircase in the opposite lounge and a **proposed atrium elevator, vertical circulation aloft towards the upper deck will still be ample and per fire regulations**. All balustrades and stair treads will be **repurposed** elsewhere onboard. In addition to the demolition of the lifebelt locker wall and staircase, all **built-in benches and tables will be removed and retrofitted** to adhere to the proposed brewing café's layout. **All decorative finishes** (wall and ceiling paneling and tiling), **artificial lighting, portholes and ventilation shafts will remain as is** (refer to figure 4.70).

As illustrated in figures 4.73 and 4.74, the vacant layout provides an interior shell, which serves as a **blank canvas that permits room for an interior intervention** to occur.

Figure 4.71. Demolished Wall (Stanley, 2014)

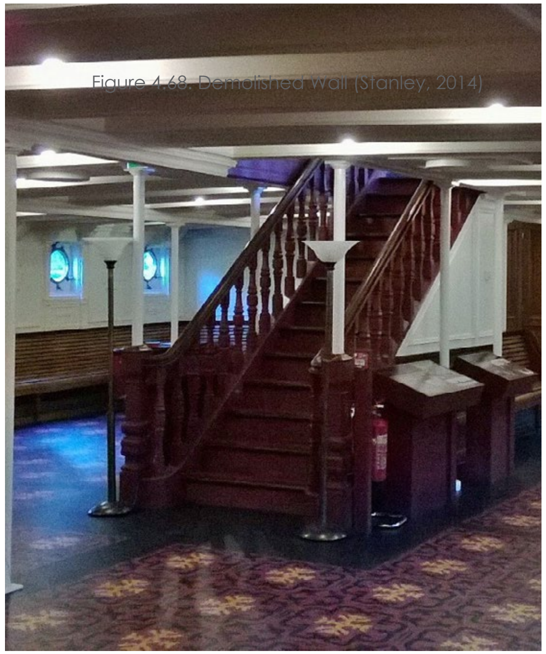


Figure 4.72. Demolished Staircase (Stanley, 2014)

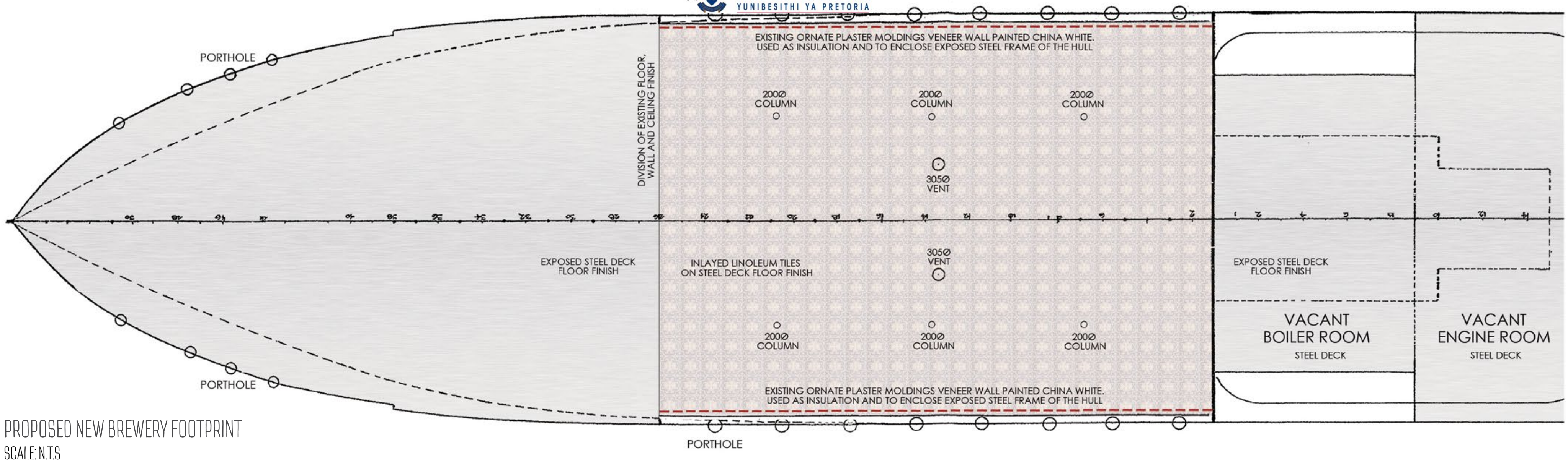


Figure 4.73. Proposed New Interior Footprint (Author, 2016)

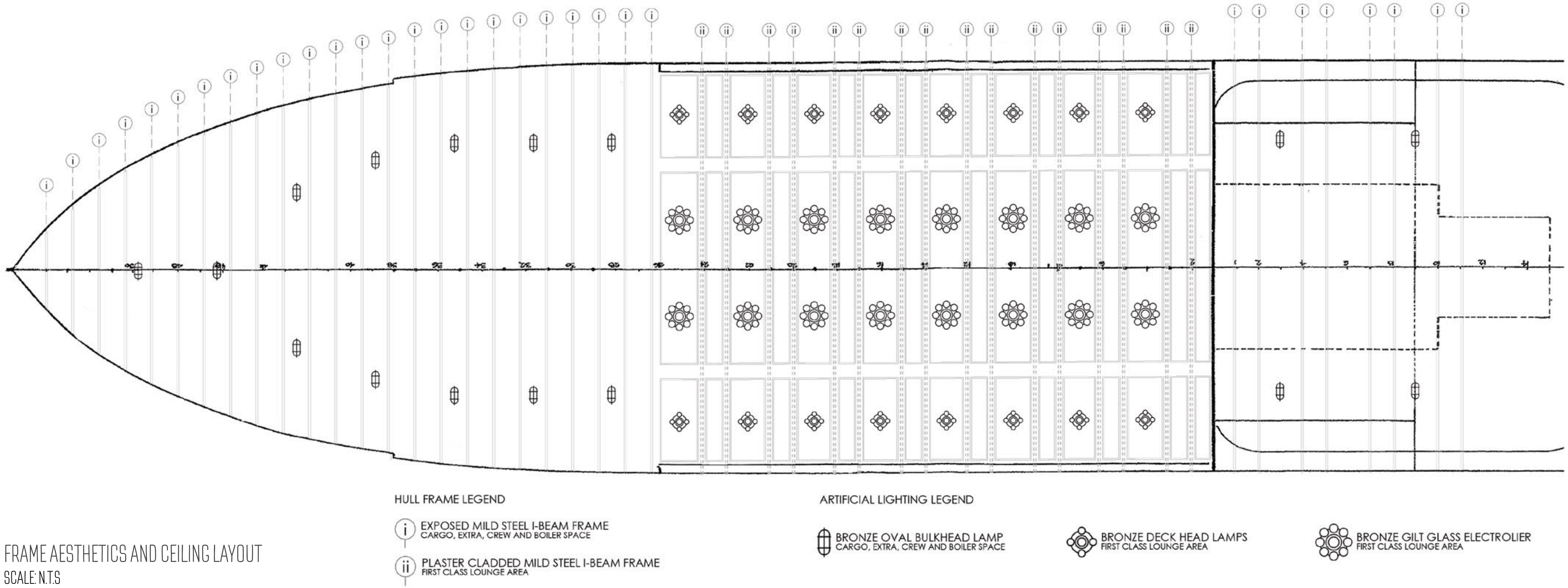


Figure 4.74. Frame Aesthetics and Ceiling Layout (Author, 2016)

DESIGN CONSIDERATIONS

- HULL AND FRAME PROFILES -

The SS Nomadic was built using traditional **open-floor flush-riveted steel** construction and employed similar **materials, techniques, and workforce** used to design all iconic **steel vessels of the Industrial Revolution** (Keyzar, 2009:129). Based on **typology and scale**, the hull was designed to be **round in shape** and comprised out of series of **uniformly spaced steel frames**. Bottom brackets and side deck beam knees were secured to every frame which was riveted at their lower end to the side plate of the double bottom and held in position at the top by a **steel** ribband.

The deck beams, which were **'cambered' or curved** in order to provide a run-off from the main deck, were bolted to the beam knees and held apart by additional **timber battens**. In total, the hull of SS Nomadic was constructed from **108 frames** (refer to figure 4.76) with most **varying in profile**. As illustrated in figure 4.75, the profiles on the right side are for the frames from the middle of the vessel to the bow, whilst those on the left are from the middle of the vessel to the stern.

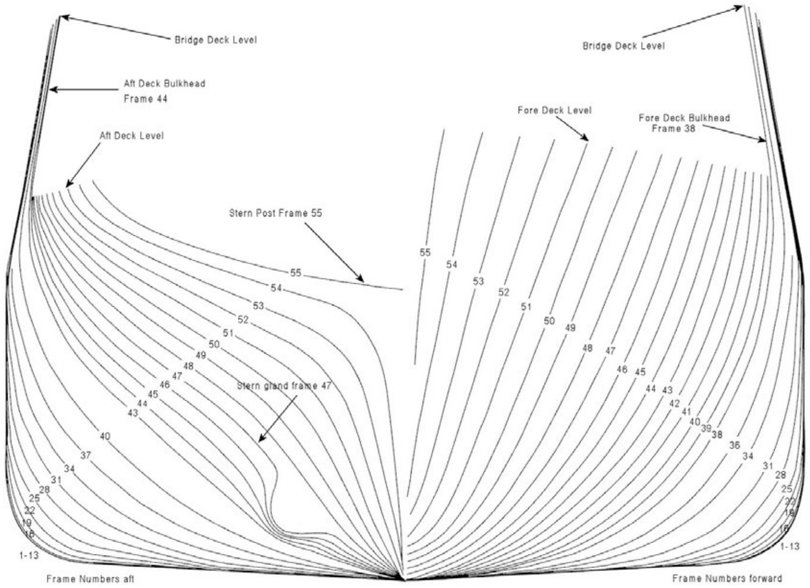


Figure 4.75. Frame Station Profile Guide of SS Nomadic (Pitchard, 2009)

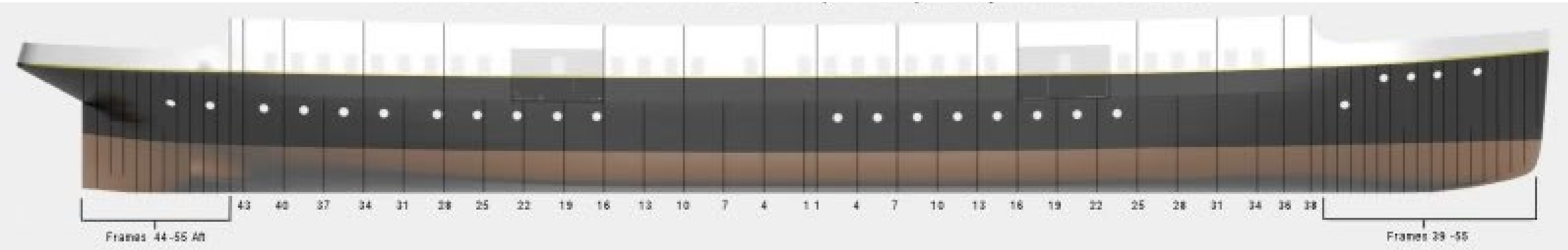


Figure 4.76. Frame Station Elevation Guide of SS Nomadic (Pitchard, 2009)

The complete assemblage of the frames permitted a **functional exterior profile and inimitably shaped interior**. Provided that the **brewery will be positioned in the bow**, distinct **rapid variation in frame profiles** can be noted instantaneously (refer to figure 4.77). The identification of **three distinct profiles** differing quite significantly in outline and scale were noted. Starting at the central boiler rooms and progressing forwards, the interior profile is **relatively uniform** (figure 4.78) and provides **ideal marine interior conditions**. Succeeding towards the bow, the U-shaped outline is bent upwards (figure 4.79), affording **sporadic spaces and decreasing the interior's clear width**. The final frame outline up to the bow's tip (figure 4.80) is **comparatively convex** and is normally **reserved for storage facilities, as the interior quality thereof is bantam**.

Subsequently, the brewing café will be positioned on the upper level where the frame profile is U-shaped. This will provide an **optimal interior environment and best utilisation of the acquired clear width of the space**. Furthermore, the brewing equipment will be positioned forwards in the **narrowly defined profiles**, utilising the **tapered doubles volumes where high levels of comfort are not required**.

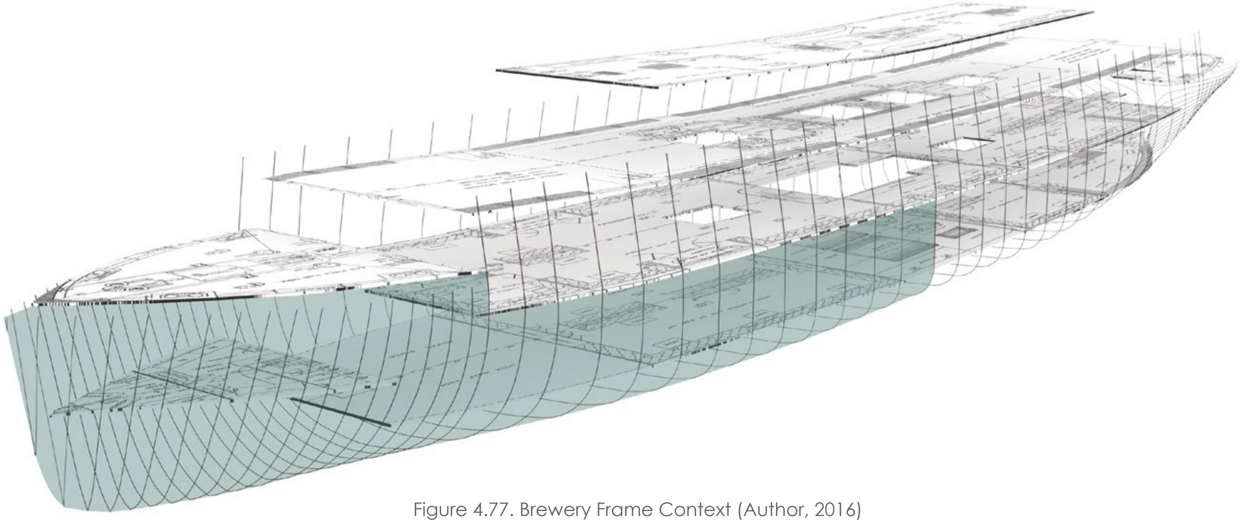


Figure 4.77. Brewery Frame Context (Author, 2016)

Figure 4.78. U-Shaped Frame Profile (Author, 2016)

Figure 4.79. Upward Bent U-Shaped Frame Profile (Author, 2016)

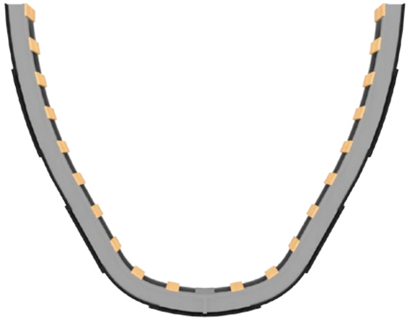


Figure 4.80. V-Shaped Frame Profile (Author, 2016)

- LAYERED HULL COMPOSITION -

Hosting **opportunity to perceptibly illustrate the vital process of layering**, the composition of the ship's hull will be used as design incentive. Upon dissection of the hull, one can clearly take note of **four distinct layers** (refer to figure 4.81 - 4.83). When combined, these **layers create a palimpsest in the form of a ship**. Dictated by locality and class, these layers are either **partially exposed or completely enclosed**. First and Second Class areas would normally be insulated with the fourth, **decorative layer**. This was to enhance **aesthetics and provide acoustic and thermal insulation**. Third Class and cargo areas are normally left **exposed**, with only the **two primary layers** (hull pates and steel frame) enclosing these spaces.

This **intricate composition** will host interesting design opportunity, as the **proposed brewery stretches over a variety of class fluctuating interiors**.

Figure 4.81. Permanent Stall Location on Proposed Platform (Author, 2016)

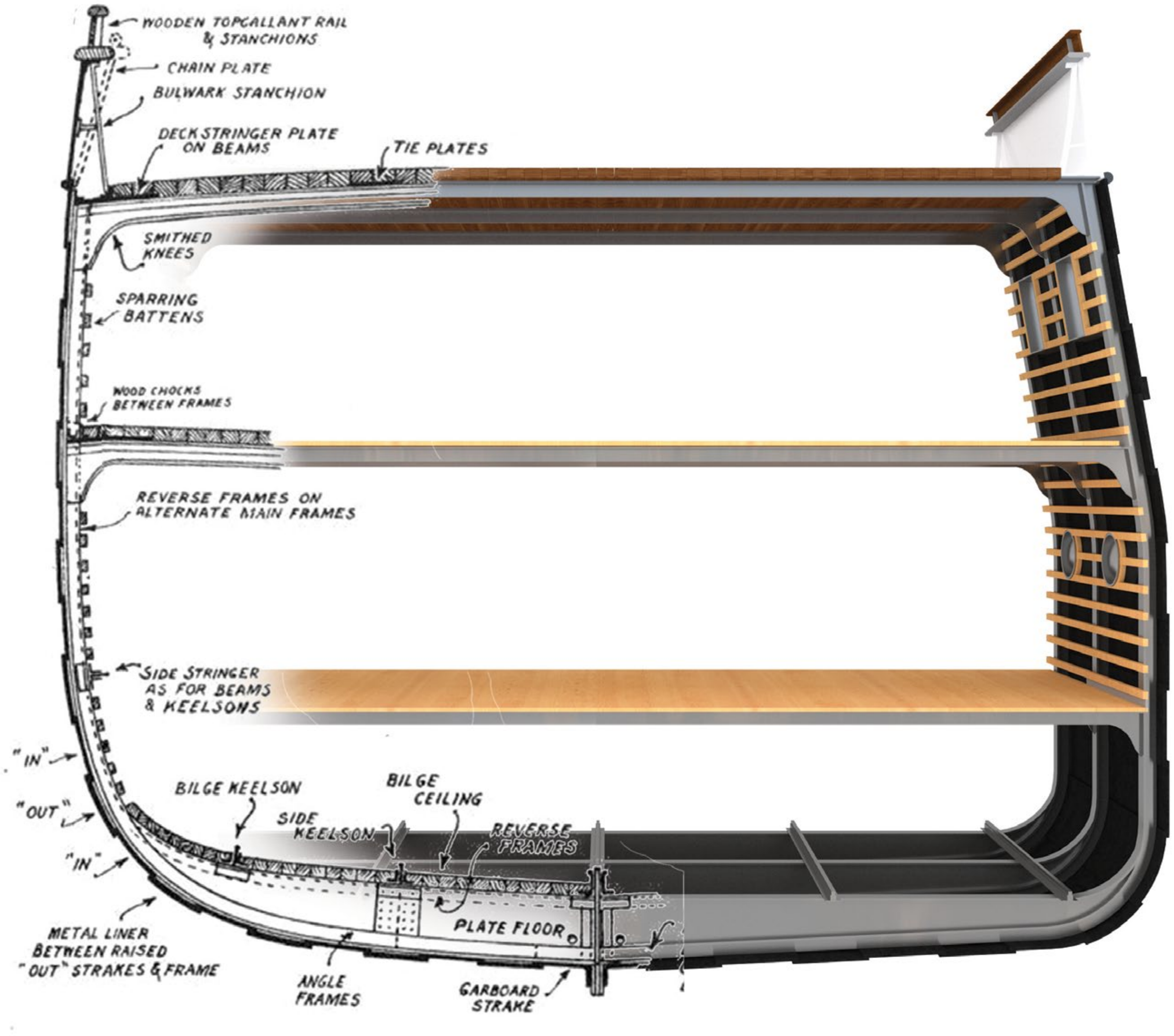
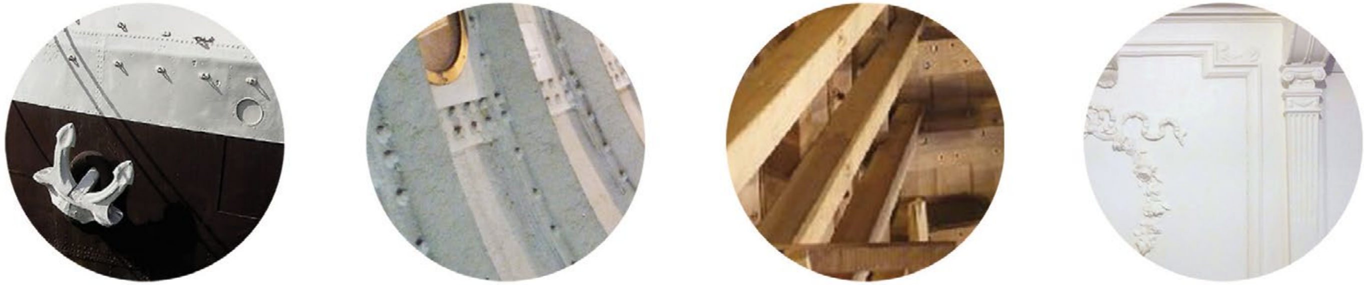


Figure 4.82. Permanent Stall Location on Proposed Platform (Author, 2016)



LAYER ONE
HULL

The initial outer layer that consists out of riveted steel plates configured in an overlaying fashion. This was an iconic feature for ships of the industrial revolution. and will prove vital when considering the portrayal thereof

LAYER TWO
FRAME

The second layer is reserved for the steel frame onto which keel plates are mounted. In addition to this, the frame also dictates the specific profile of the ship and forms the structural skeleton of the entire vessel.

LAYER THREE
BATTEN

The third layer consists out of a long flat strip of squared timber used to hold paneling in place or as a fastening against a wall. This molds the final interiority of a space and adorned in order to conceal honesty

LAYER FOUR
VENEER

The final layer is reserved for the purpose of ornamentation and forms the actual finish. This layer completely encloses structure, and creates a false façade that manipulates the visual aesthetics of the interior.

Figure 4.83. Permanent Stall Location on Proposed Platform (Author, 2016)

– EXISTING VENTILATION –

Aside from **natural ventilation** provided by the portholes when opened, **existing dorade apertures** provides **passive ventilation** into enclosed interiors below deck. As modern cruise liners utilise contemporary heating, ventilation and air conditioning (HVAC) systems, this form of passive ventilation is no longer utilised nowadays in naval design. **Positioned centrally** in the lower lounge area (refer to figure 4.84), two vents are directly connected to a rectangular timber case positioned on the flying bridge deck (figure 4.85). As illustrated in figure 4.86, this box is fitted with two freestanding interleaving vertical baffles that form a series of chambers. Facing forward, the horn shaped ventilation cowl **feeds cool air** into the case. Operating on the principle that air can pass relatively freely across the chambers, **rain and sea wash remains trapped in a successive chamber** which drains out through perforated openings (Brewer, 1994:75). As a result, **cool fresh air floods** the area connected to the secondary baffle, permitting each dorade vent to only feed one area in order to **assure pressure and adequate ventilation**.

Being that the vessel will be **stationary**, **inlet air will have to be amplified** in order to be of any significance. Furthermore, the vent is to be configured in such a fashion that the **incoming amount of air can be controlled**.

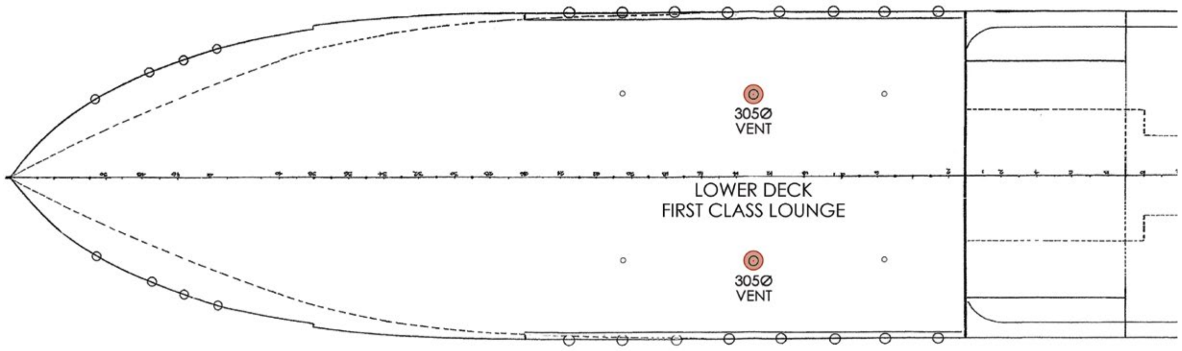


Figure 4.84. Locality of Exisiting Dorade Ventilation Shaft (Author, 2016)

Figure 4.85. Lower First Class Lounge Dorade Vent on Flying Bridge Deck (McDonald, 2013)

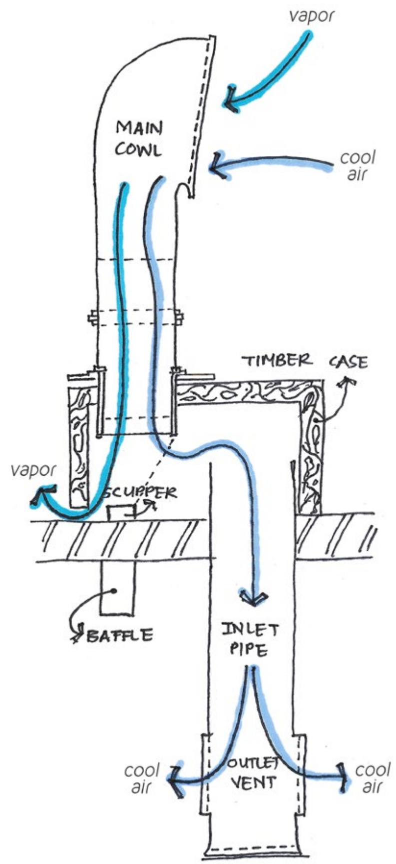


Figure 4.86. Diagrammatic Illustration of a Functioning Dorade Vent (Author, 2016)

- EXISTING LIGHTING -

Being located on the lower deck, the selected shell is subjected to **little natural light**. Other than **direct daylight provided by the 16 portholes of 450mm in diameter, all accompanying light is provided artificially**. Ample decorative light features provide abundant **general illumination**, replicating that of a **hotel's interior**. As maritime travel was generally regarded as being an arduous activity during the Industrial Revolution, **superior land-like comfort** was provided in order to compensate for the fact of being on water. Utilising **two distinct variations of light features**, deckhead lamps (figure 4.89) were positioned along the outer perimeter (overhead of former benches) and two rows of electrolier chandeliers (figure 4.90) positioned midway. The spare space and boiler room employed bulkhead lamps (figure 4.91) as a form of illumination.

As per **SANS 10114**, the luminous flux (lm) per square meter in areas where **visual tasks are only occasionally performed** must be above **150 lm**. As per calculation conducted in figure 4.88, it was determined that the current overall illumination levels of the existing First Class lower lounge area be considered '**moderately adequate, with room for improvement**'. As most decorative light fittings were **re-wired during restoration in 2012**, the usage of **incandescent light bulbs are employed**. This will however be refitted with light-emitting diode (LED) bulbs in order to **improve levels of illumination and lower electricity usage**.

1 deckhead lamp = 290lm/m²
(1 x 40W bulb = 290lm)

1 electrolier chandelier = 870lm/m²
(3 x 40W bulb = 870lm)

TOTAL LUMINOUS LUX PER SQUARE METER (lm/m²)

16 dechead lamps + 16 electrolier chandeliers = total lm/m²

4 640l lm/m² (16 x 290llm/m²) + 13 920 lm/m² (16 x 870lm/m²) = 18 560 total lm/m²

TOTAL SQUARE METERS OF EXISTING LOUNGE (m²)

14.92mm (length) x 11mm (width) = total 14.91m²

REQUIRED LM/M² FOR EXISTING LOUNGE (lm/m²)

14.9m² x 150lm/m² (as per SANS 10114) = 24 619.05 lm/m2

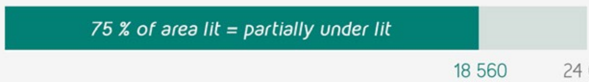


Figure 4.88. Current Lux Levels of Interior (Author, 2016)

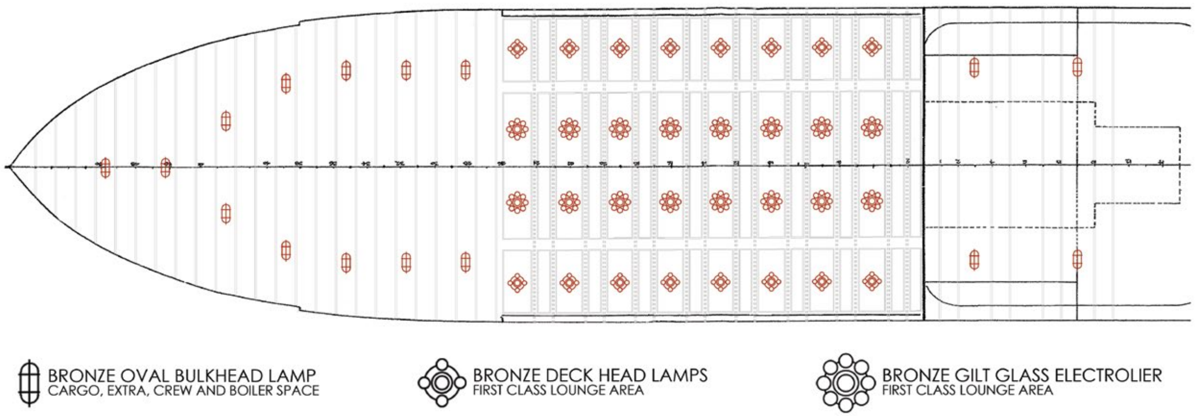


Figure 4.87. Locality of Exisiting Lighting (Author, 2016)

DECKHEAD LAMP

nickel-plated brass fittings with vented band and frosted cut glass shade

size
280 mm high

light source
incandescent light bulb warm white 40 W and 290 lm

total luminous flux
290 lm/m²

illumination ies map

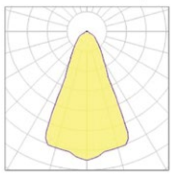


Figure 4.89. Deckhead Lamp (Author, 2016)

ELECTROLIER CHANDELIER

bronze gilt with glass beaded shade on wire frame with fittings for three lamps

size
300 x 300 mm

light source
incandescent light bulb warm white 40 W and 290 lm

total luminous flux
870 lm/m²

illumination ies map

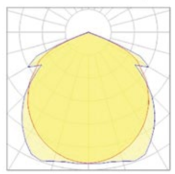


Figure 4.90. Electrolier Light (Author, 2016)

BULKHEAD LAMP

victorian flush frame lamp made from solid brass with a frosted glass shade

size
275 x 215 mm

light source
incandescent candle bulb warm white 60 W and 840 lm

total luminous flux
840 lm/m²

illumination ies map

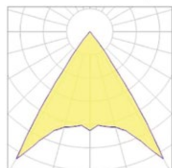


Figure 4.91. Bulkhead Lamp (Author, 2016)

- EXISTING MATERIALITY -

The interior of the First Class areas onboard the SS Nomadic was designed according to the **Jacobean-style** - **elaborate and highly decorative** - similar to the interiors of her sister ship, the RMS Titanic. Following **strict conservation policies** under direct guidance of the Nomadic Preservation Society, the **interior was faithfully restored**. Having demolished the outer walls of the lower lounge, the **material honesty is exposed through the complete visibility** of the steel hull. This **resilient contrast will be celebrated** as design opportunity that tangibly illustrates the aforementioned theories. **Four distinct varieties of existing, material choices** were noted, as illustrated in figure 4.92.

Fine English Oak inlaid with boxwood, ebony and satinwood cross-banding was used in all First Class lounge areas. This was sealed and polished with clear varnish in order to highlight contrasting colours and textures and outline actual originality. Furthermore, slatted oak was used for the bench seating, with elaborately carved armrests and fixed legs. Mahogany was used in all Second Class lounge areas.

All First and Second Class lounge areas were fitted with richly ornamented inlaid linoleum floor tiles. Retained on top of flushed steel decking and/or pinewood panels, this choice in material provided optimal durability (high traffic of passengers and their belongings) and easy maintenance. The tiles are bright rust red, dark grey and yellow cream in appearance, with a high gloss finish.

Apart from the decorative carving and Jesso plasterwork found on the walls, the ship's structure was cladded with dove white painted Gypsyn plasterwork which operated as soft ceiling to conceal the steel frame. The craftsmanship remains exquisite with most original "boiseries" (elaborate carving, rosettes and molds) still present in a distinct symmetrical appearance.

Completely contrasting the perceptible decorative materiality of the lounge area, mild steel is utilised for the hull plates and frame. The frame is either cladded with decorative moldings to conceal it, painted white or remain exposed, depending on where it is employed. This material evokes the true honesty of industrially designed vessels, thus aspiring to celebrate it instead of mere concealment.

Figure 4.92. Exisiting Materiality of Brewery Interior (Author, 2016)

Figure 4.93. Insipration Palette of Look and Feel (Author, 2016)

- ENVISIONED LOOK & FEEL -

The desired look and feel of the envisioned interior will comprise out of a **migration between contemporary and industrial design**. Utilising the basic **principles of design**, special attention will be directed towards the **selection, application and joining of all materials**. The overall approach to materiality will either **govern a material's fortification or degradation**. This methodology will not only be applied to all **newly introduced materials, but to all existing steel and concrete** as well. As illustrated in the aesthetical temper palette (figure 4.94 - 4.102), the **honesty of the selected materials will be celebrated**. This form of honesty will be accentuated through **protection, deterioration, concealment or exposure**, all **harmoniously employed to showcase the process of intentional layering**. A combination of **aged and novel techniques** will be exercised that either **contrast or migrate the new from the existing**. Moreover, supplementary inspiration was drawn from iconic elements associated with **nautical design**, and the progression thereof.

All in all, an **interior palimpsest** which tangibly illustrates the lapsing **effect of time and prospect of corrosion espousal** is envisaged.

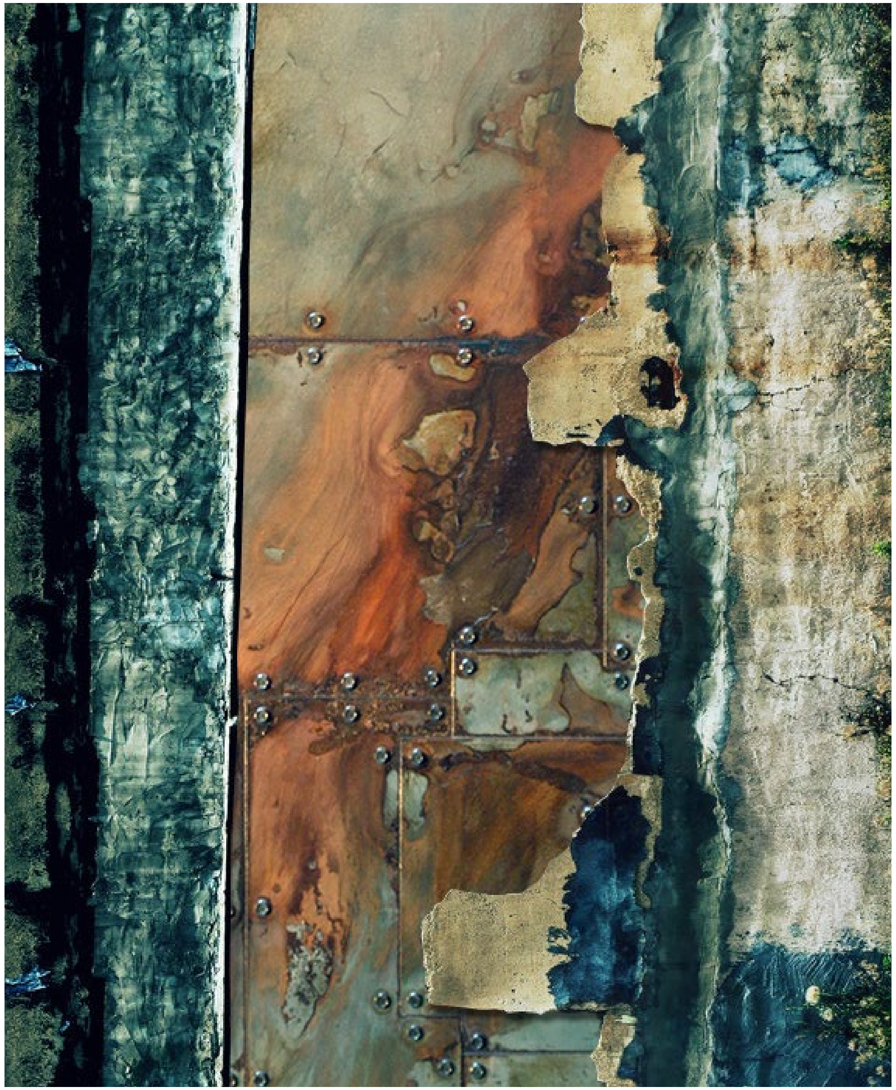


Figure 4.94. Combined Materiality (Author, 2016)

Figure 4.95. Decay Concrete Lamp (Unknown, 2015)

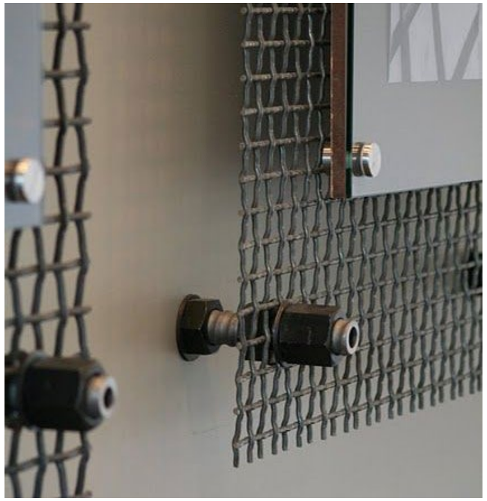


Figure 4.96. Metal Screens (Clemon, 2011)

Figure 4.97. Reclaimed Pendants (Hometalk, 2014)

Figure 4.98. Steel & Concrete (Shamia, 2015)

Figure 4.99. String Hexnut Bracelet (Unknown, 2011)

Figure 4.100. Rusted Chains (Unknown, 2014)

Figure 4.101. Molding and Casting (Lowe, 2012)

Figure 4.102. Warehouse 17C (Fernandez, 2006)

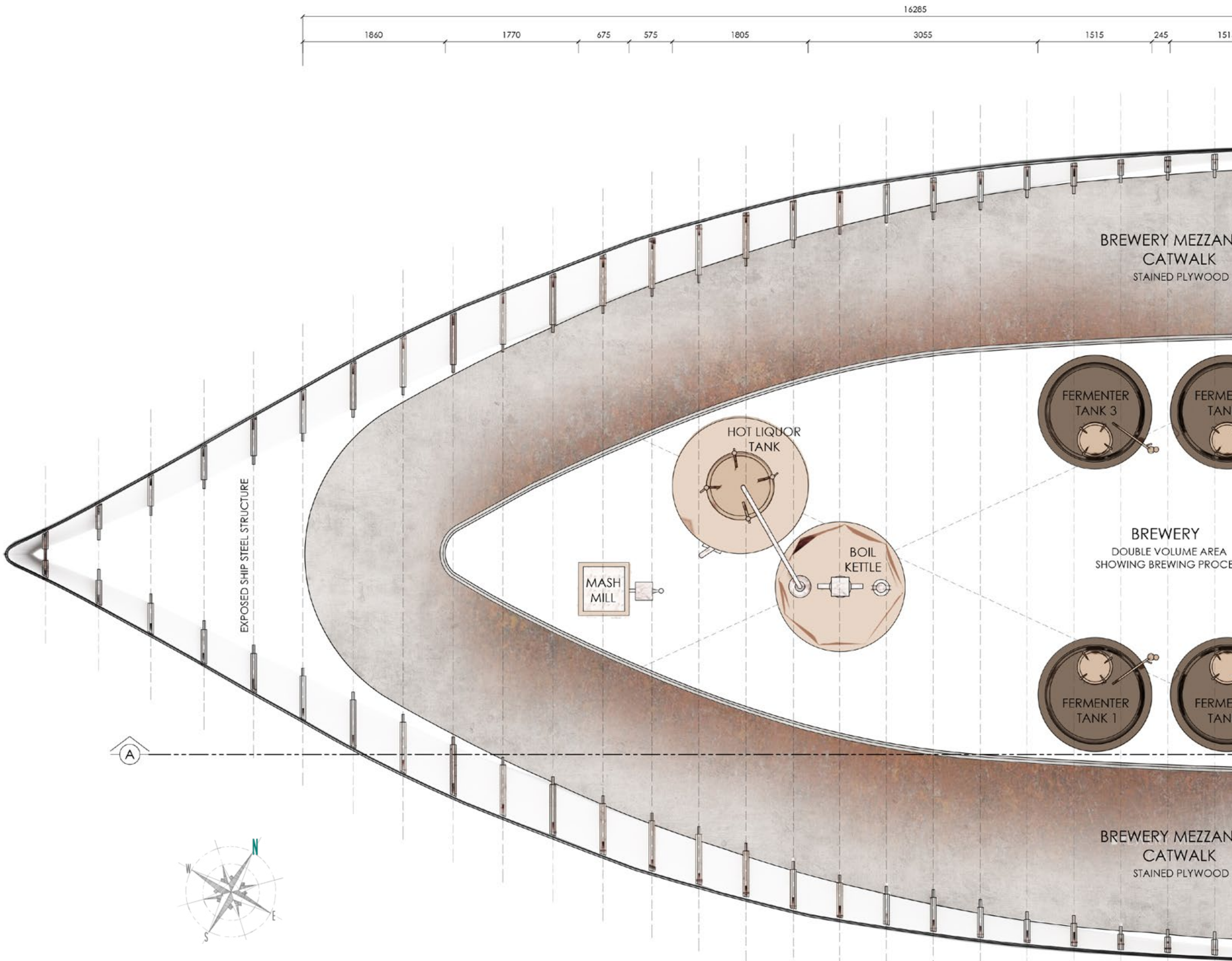
SPATIAL TRANSLATION

- PROPOSED UPPER LEVEL LAYOUT -

As illustrated in figure 4.103, the upper layout of the overall brewery follows a **distinctively symmetrical arrangement**. In contrast with the asymmetrical layout of the dock below, **naval architecture imposes an equally proportioned interior which uniformly distributes onboard weight and influence**. The novel introduction of a **central atrium space**, allows for the **inner interior to live out onto the outer interior**. Furthermore, the induction of an elevator permits **direct access** from the dock to the upper level of the brewery. Passing the point of sale, **repurposed bench seating** is provided along the outer perimeter of the enclosed interior. Modern raised seating **intermediates the original configuration** and allows for an extended, central clear width.

Sited on a **one-way tempered glass platform**, group seating (**adaptive reuse of aged anchor winches**) is imparted with **direct access to communal beer taps**, which is connected to the **beer keg tubes** below. The platform permits **downward visibility into the lower level brewery and dock**. Furthermore, inlayed gears figuratively **symbolise the initiation of ageing**, which is accentuated through the outer illuminated threshold that indicate a **change in materiality**.

Leading up to the bow of the ship, the actual **fermentation process is observable** through a profile-fitted **panoramic platform** that permits **continuous all-round visibility**. Faux oxidation creep up along the outer boundary of the raised walkway in order to **tangible exemplify the development of material degradation**. Ultimately, the **honest materiality of the habitant is celebrated** as one progresses through the space.



FINAL PROPOSED BREWERY UPPER LEVEL LAYOUT PLAN

0 1000 2000 3000 4000 mm

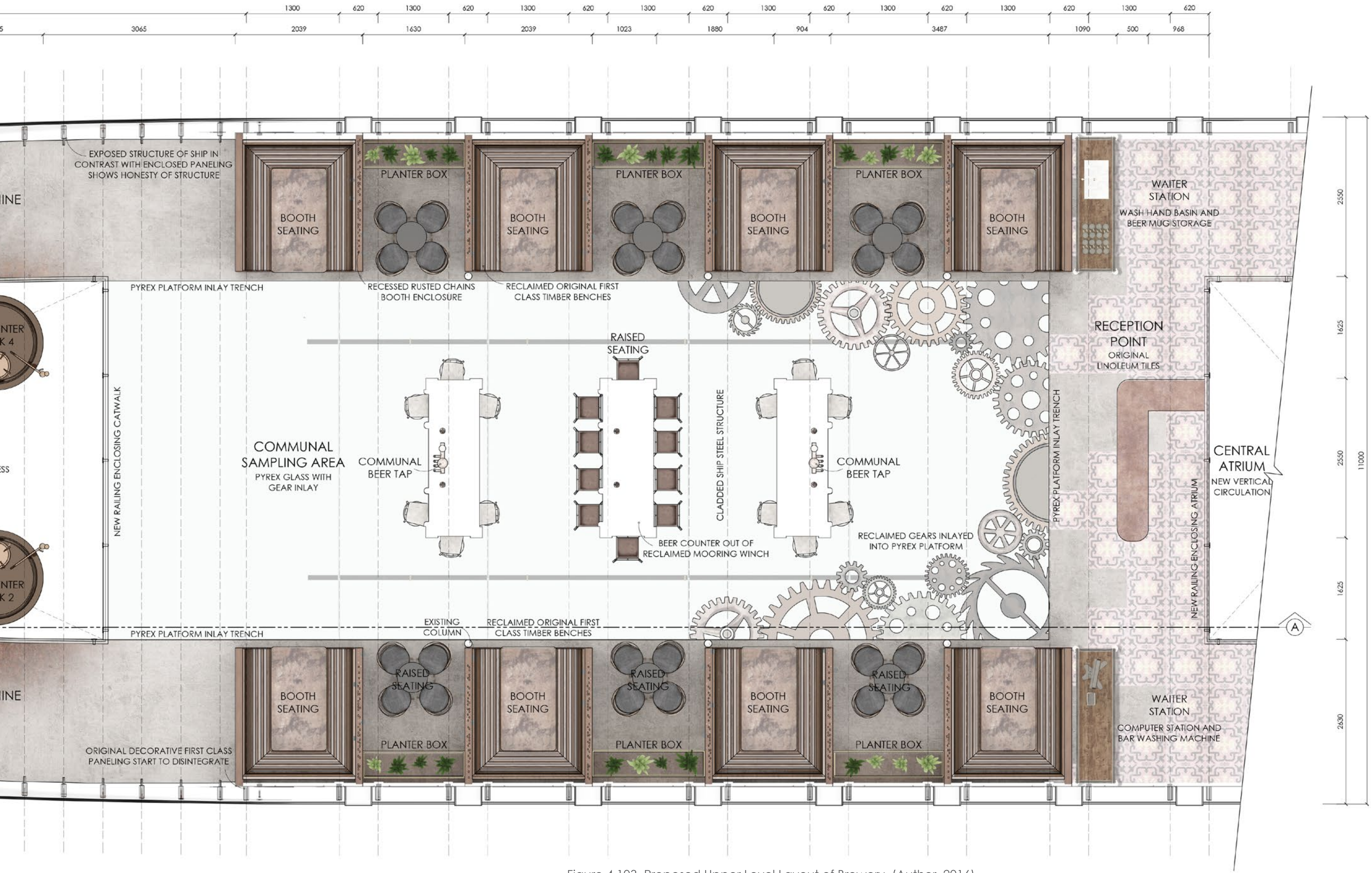
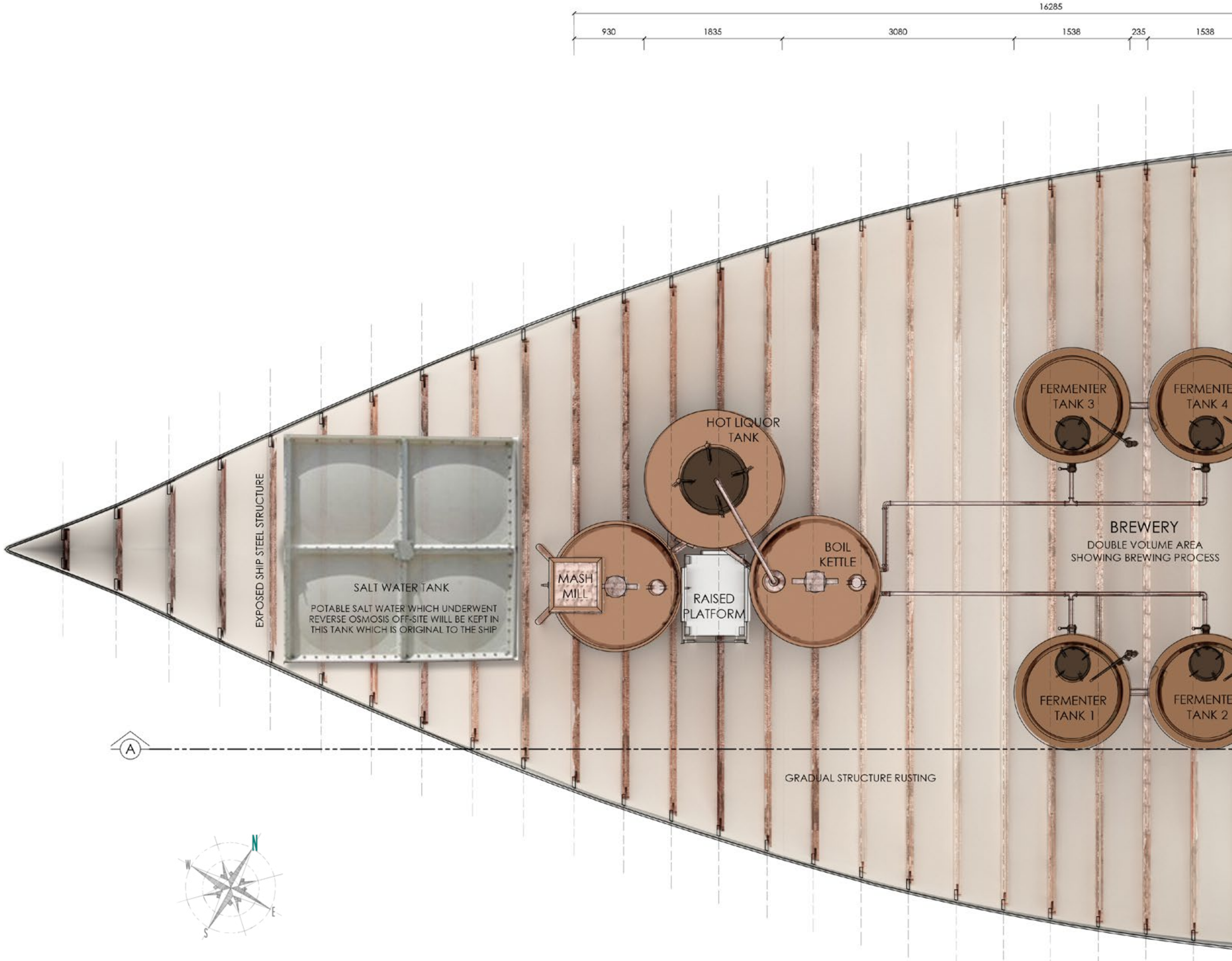


Figure 4.103. Proposed Upper Level Layout of Brewery (Author, 2016)

- PROPOSED LOWER LEVEL LAYOUT -

Correspondingly to the level above, a **symmetrical layout** is once again employed as per naval engineering guidelines (figure 4.104). Forward of the atrium, access to the **fermentation process and kegging tubes** are permitted via **raised walkways**, as direct access onto the keel is not endorsed where **hull plates have been removed**. It was decided to replace a portion of the hull with transparent Pyrex plates in order to **govern direct visibility from dock level and improve natural lighting**. This was specifically employed in areas of low-maintenance and where downward force is limited - thus the beer kegging tubes. The actual **fermentation process is positioned where the original steel hull remains intact**, as structural support will required for **heavy equipment and direct accessibility**.

In addition to the availability of actual brewing equipment, the **existing water tanks** located on this level aft will be **utilised as reservoir which stores the potable saltwater** consumed during the production of **saltwater beer**. This will be further investigated in the technical chapter that follows.



FINAL PROPOSED BREWERY LOWER LEVEL LAYOUT PLAN

0 1000 2000 3000 4000 mm

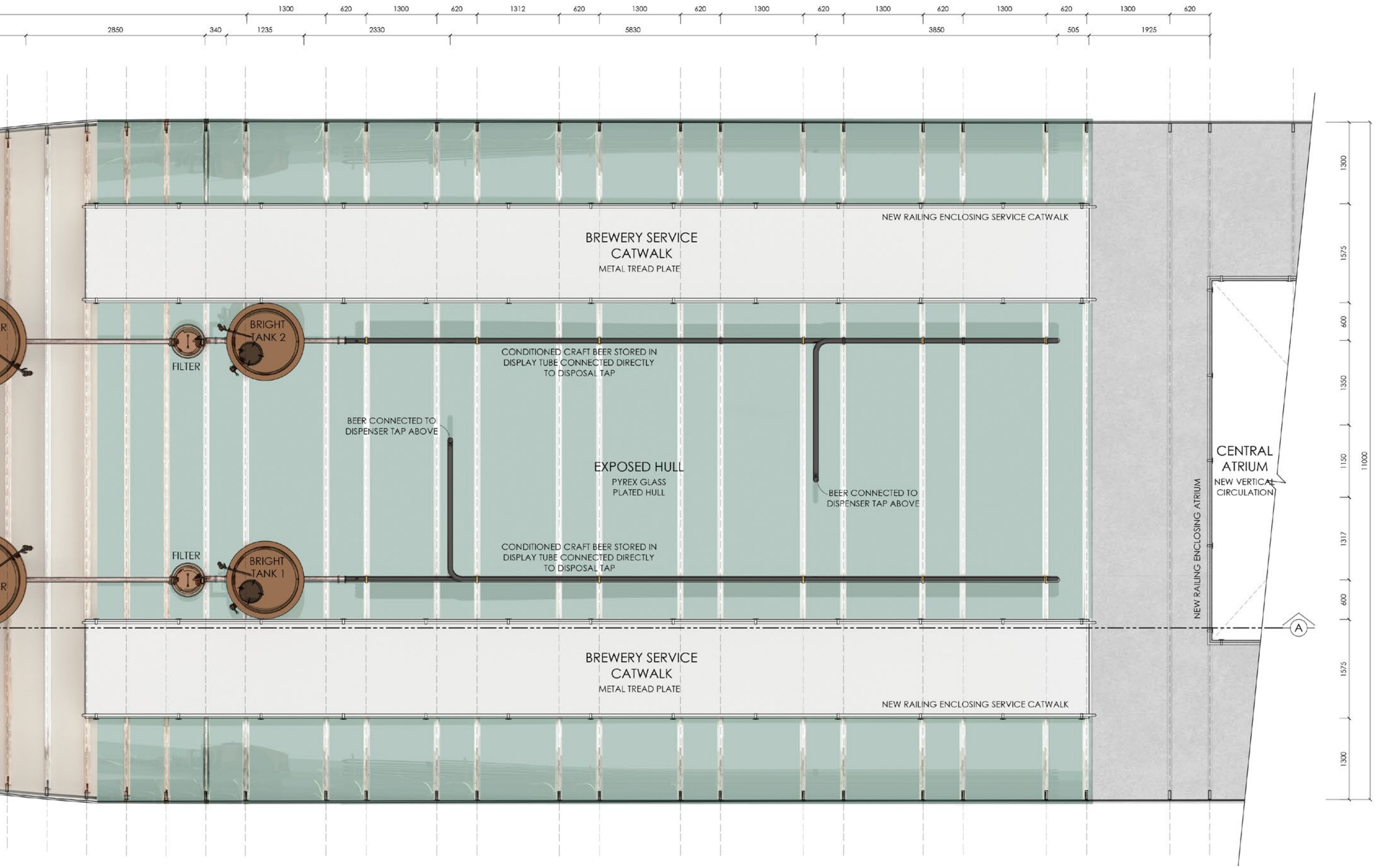
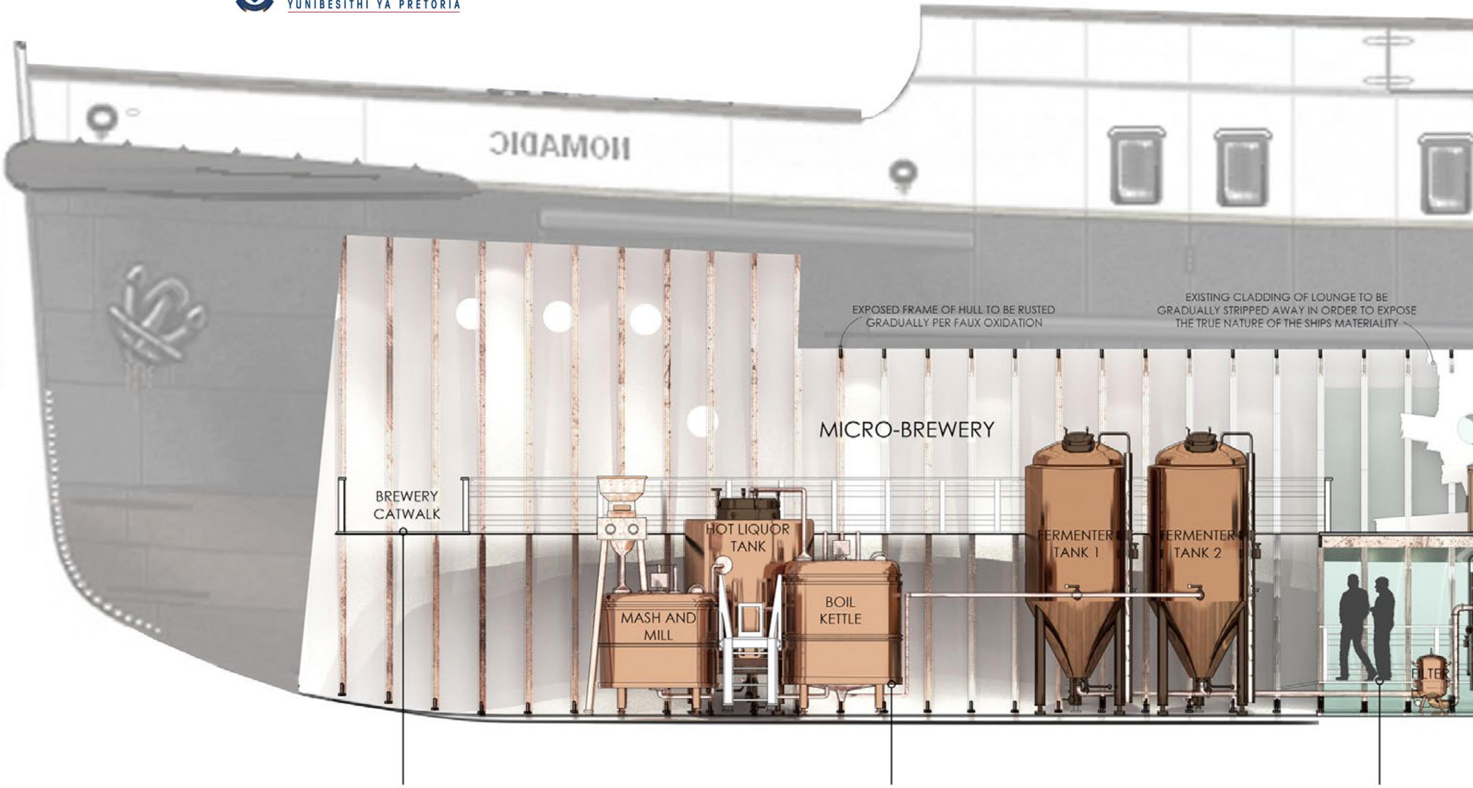


Figure 4.104. Proposed Lower Level Layout of Brewery (Author, 2016)

– PROPOSED SECTIONAL LAYOUT –

As illustrated sectionally (figure 105), the association of **various zones transpire either visually or through uniting constituents**. The upper and lower levels are allied though **direct accessibility of the showcased brewing progression**. This either occurs **visually** (transparent platform) or **palpably** (fermentation catwalk). Aside from optical and actual connectivity, **activities associated with the pragmatic response are concommitant**. This is exemplified through the communal **beer tapping system and atrium inclusion**. In addition to this internal connectivity, the **inner interior and outer interior is coupled**.

Furthermore, **honesty in the materiality** of the habitant is **celebrated and exposed** as one progresses through the bow. The corroded appearance of the frame is **intentionally** increased as it nears the initial brewing stages to **epitomise the course of degradation**. Additionally, all elaborate concealments and finishes (wall paneling, soft ceiling and linoleum flooring) are **gradually stripped away** in order to migrate, yet emphasise, the differentiation of new and existing materiality.



BREWERY CATWALK

THRESHOLD DIVIDING THE BEER CAFÉ WITH THE ACTUAL BREWERY. AN ELEVATED PLATFORM SUSPENDED OVER THE UPPER BOW OF THE SHIP FRAMES THE BREWERY. PANORAMIC APPROACHABILITY PROVIDES TRANSPARENT ACCESSIBILITY. THE CATWALK WILL FOLLOW THE PROFILE OF THE SHIP AND BE ATTACHED TO THE HULL FRAME.

MICRO-BREWERY

MICRO-BREWERY POSITIONED AT THE TIP OF THE BOW IN ORDER TO ENSURE SUFFICIENT SUPPORT AND ACCESSIBILITY. CAPABLE OF PRODUCING 30BBL OF SALTWATER BEER PER WEEK, THE PROCESS IS VISIBLE FROM START TO END. DOUBLE VOLUME ENABLED POSITIONING OF LARGE EQUIPMENT THOUGH PROVIDED HATCH OPENINGS.

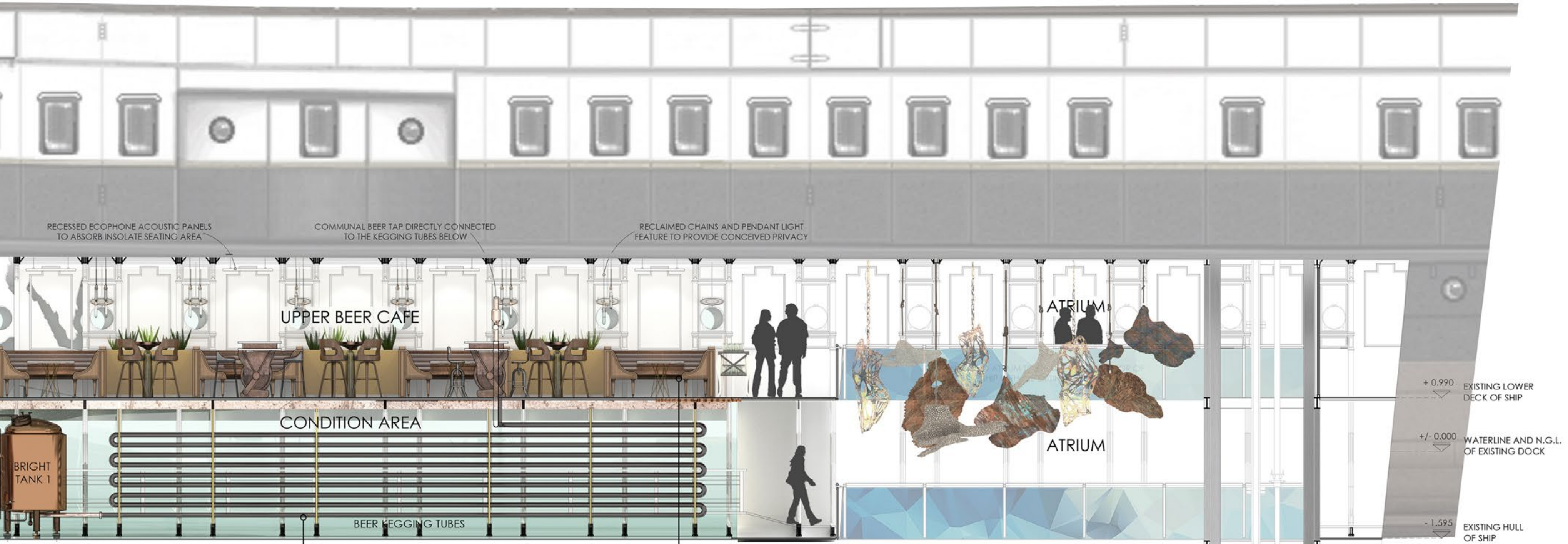
MAINTENANCE CATW

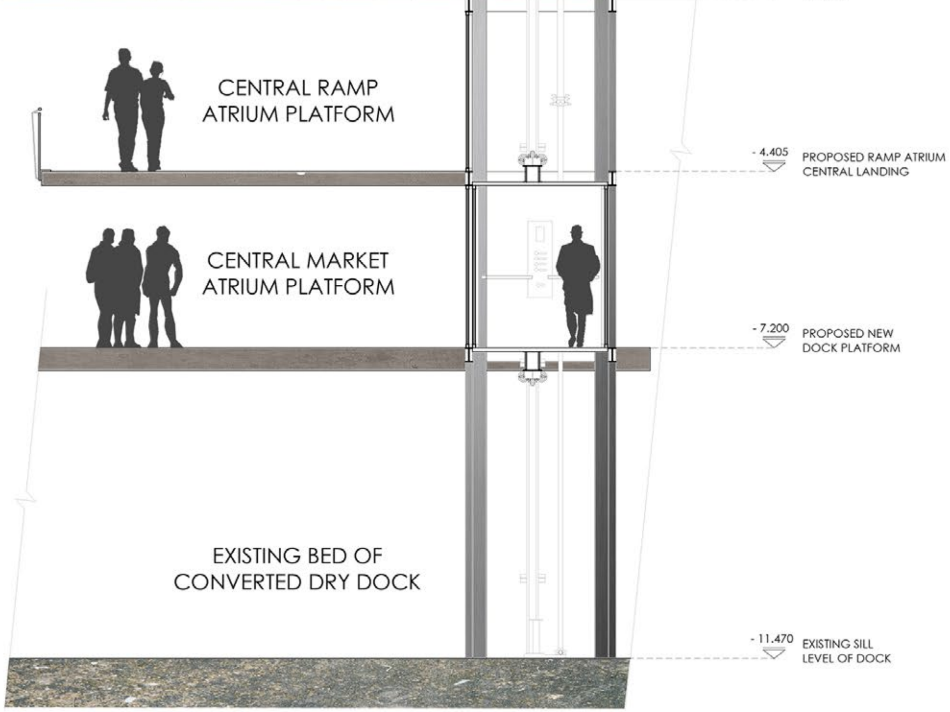
IN ADDITION TO THE BREWERY CATWALK,
OF AN ELEVATED WALKWAY IS PROVIDE
ALLOW DIRECT ACCESS TO THE FRONT SE
BREWERY. AS PART OF THE HULL WILL BE R
PYREX PLATES, ACCESS THEREON WILL NO
HENCE THE INTRODUCTION OF AN ELEVAT

FINAL PROPOSED BREWERY SECTIONAL ELEVATION AA

0 1000 2000 3000 4000 mm

Figure 4.105. Sectional Elevation of Brewery (Author, 2016)





ALK

THE PROVISION
ED THAT WILL
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EPLACED WITH
OT BE VIABLE -
ED PLATFORM.

BEER KEGGING TUBES

GIVEN THAT THE PRODUCTION OF PALE ALE WILL BE BREWED, CONDITIONING TIME IS LITTLE AND THE PROVISION OF FORMAL ENCLOSED KEGGING NOT REQUIRED. 60% OF THE FERMENTED BEER WILL BE CONDITIONED IN THE PROVIDED BRIGHT TANKS, WHEREAS THE ADDITION 40% BE KEGGED IN TUBES CONNECTED TO THE BEER TAP.

UPCYCLED FURNITURE

REPURPOSING OF EXISTING FIXTURES AND MACHINERY INTO NEW SEATING AND FURNITURE PIECES WILL ENCOURAGE SUSTAINABLE DESIGN, WHILST ADDING A NOSTALGIC NARRATIVE TO THE INTERIOR ENVIRONMENT. THE EXISTING LOUNGE TIMBER BENCH SEATING WILL BE RECONFIGURED INTO NEW BENCH BOOTH SEATING.

Figure 4.106. Existing Interior (Author, 2016)

Figure 4.107. Proposed Perspective of Brewery Interior (Author, 2016)

Figure 4.108. Lounge Arrangement Before (Author, 2016)

Figure 4.109. Designed Brewery Seating Area (Author, 2016)

Figure 4.110. Three Dimensional Section of Brewery (Author, 2016)

– FIXTURE & FURNITURE SPECIFICATION –

name
LOFT INDUSTRY HELIX PENDANT
suppliers
LED 7
finish & material
GALVANISED IRON & STAINED GLASS
dimensions
350mm L X 200mm W X 1000mm CORD
code
LED_LIHP002

name
TOLEDO BAR STOOL
suppliers
RED APPLE
finish & material
GALVANISED IRON & TIMBER SEAT
dimensions
500mm L X 500mm W X 1130mm H
code
VG-1160H

name
BELL TABLE
suppliers
WEYLANDTS
finish & material
ANTIQUED BRASS, ALUMINIUM & GLASS
dimensions
560mm L X 560mm W X 1250mm H
code
ACCIND1002

name
CHAIN & TACCLE PENDANT
suppliers
CUSTOM DESIGNED
finish & material
POWDER COATED STEE, BRASS & GLASS
dimensions
400mm DIA X 1000mm CHAIN CORD
code
CUSTOM_01

name
TOLIX BAR STOOL
suppliers
CHAIR CRAZY
finish & material
POWDER COATED STEEL & TIMBER SEAT
dimensions
500mm L X 500mm W X 1060mm H
code
T3513-30FBW

name
GORDON KERAMIK TABLE
suppliers
RED APPLE
finish & material
IRON & EMBOSSED LACQUERED STEEL
dimensions
1200mm L X 2000mm W X 750mm H
code
GKT-1200T

name
TOLEDO BAR STOOL
suppliers
WAYLANDTS
finish & material
CHROME & ZEBRA FABRIC CORD
dimensions
115mm DIA X 2000mm CORD
code
LAMPCONT0601

name
CECINA BAR STOOL
suppliers
BED, BATH & BEYOND
finish & material
WALNUT, LEATHER AND CHROME
dimensions
450mm L X 500mm W X 1100mm H
code
CEC-BS543

name
INDUSTRIAL STORAGE UNIT SERVER
suppliers
PEPPERMILL INTERIORS
finish & material
CAST IRON & PINE TIMBER
dimensions
530mm L X 1200mm W X 915mm H
code
SC677

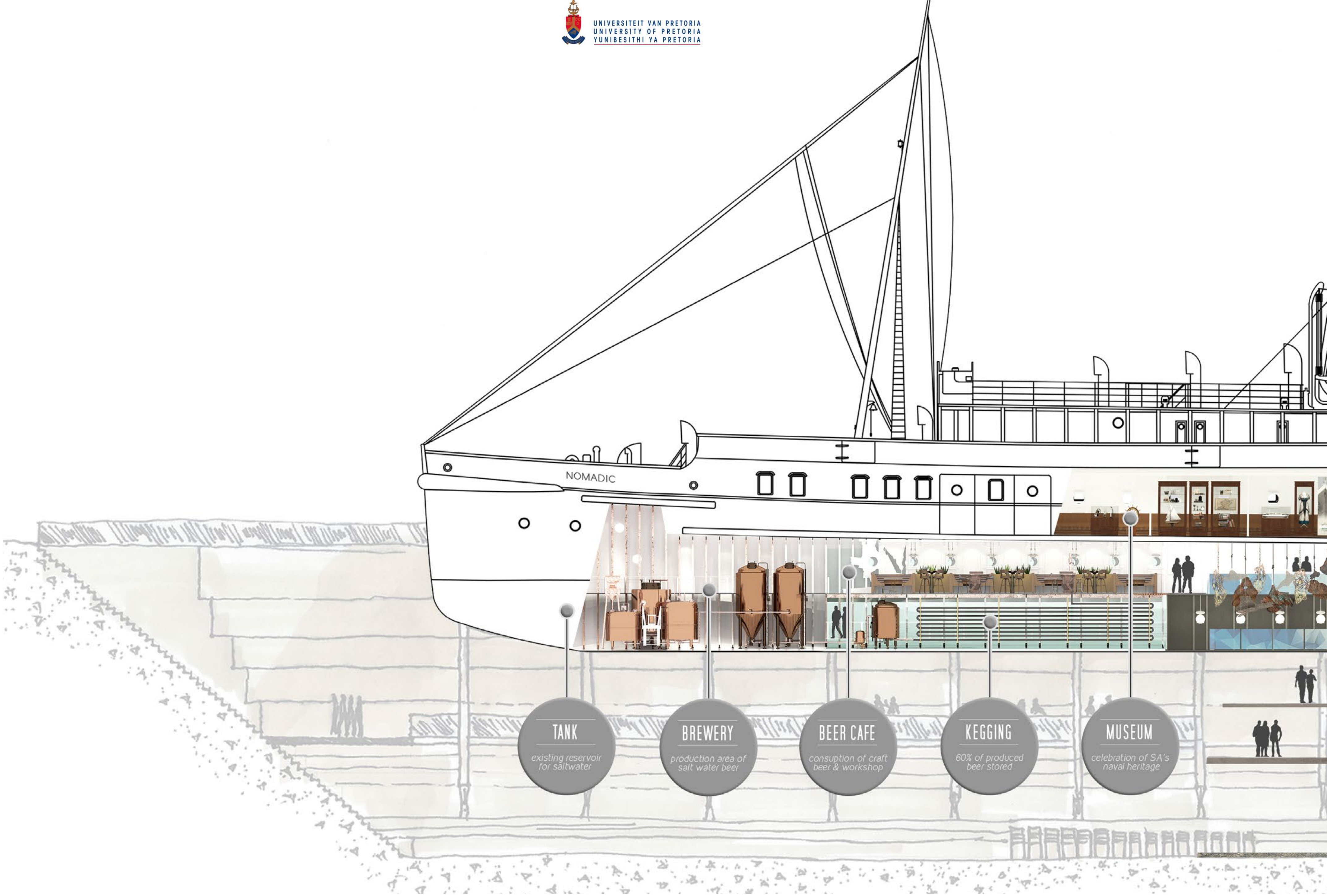
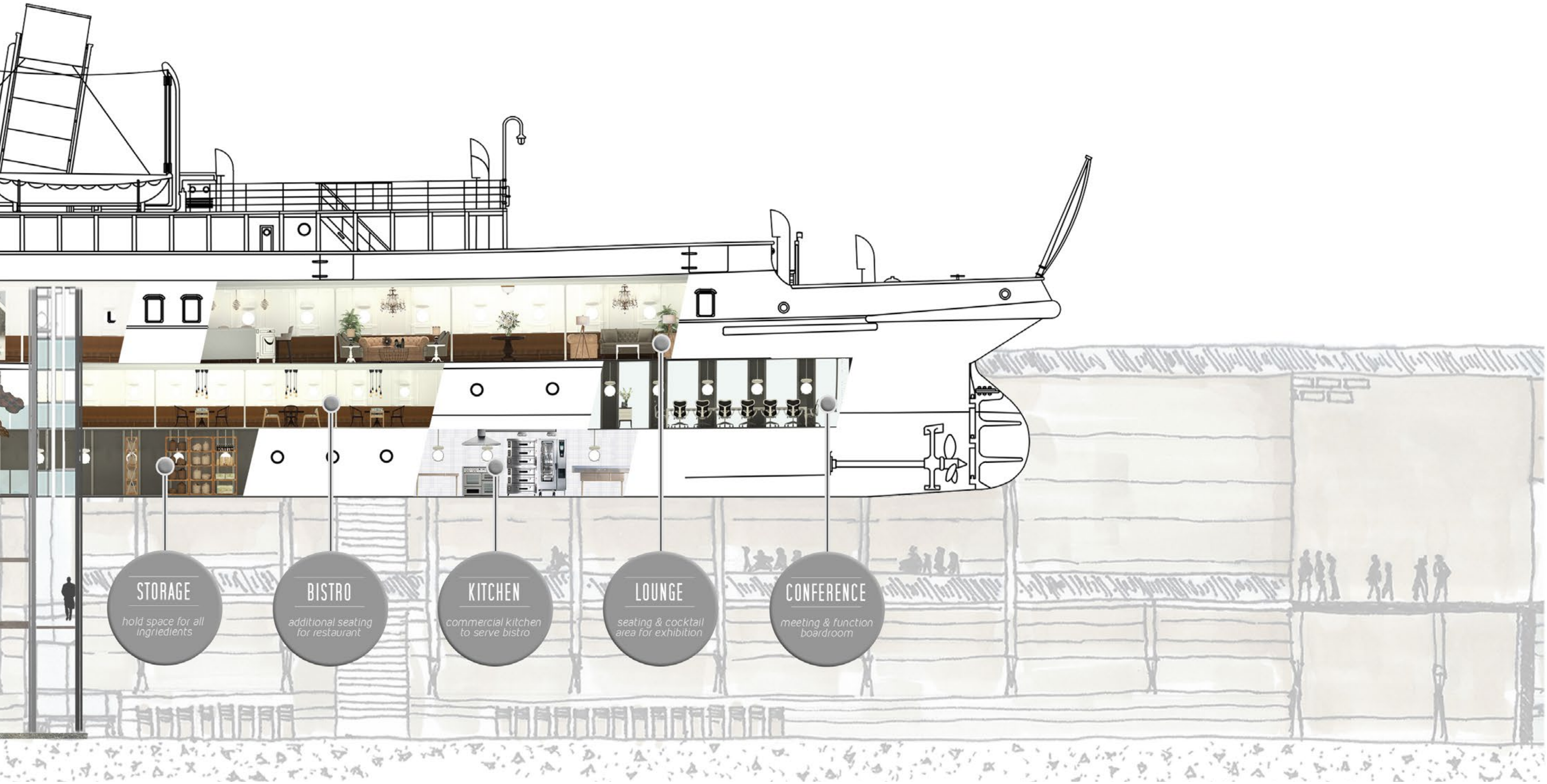


Figure 4.111. Sectional Arrangement of Ship (Author, 2016)


STORAGE
hold space for all ingriedients
BISTRO
additional seating for restaurant
KITCHEN
commercial kitchen to serve bistro
LOUNGE
seating & cocktail area for exhibition
CONFERENCE
meeting & function boardroom

4.11
ATRIUM DESIGN

As a **concluding element**, the design of the **atrium was conceptualised**. As a way to **accentuate** the fact that this element will be responsible for the **actual connectivity of the inner and outer interior (host and habitant)**, **migration was used as concept** from which all design decisions branched. The central positioning of the elevator shaft hosted ideal opportunity to s**ubstantially illustrate the symbiotic synthesis between steel and concrete**. The steel frame of the shaft is partially cladded with **steel sinking from above and concrete rising from below**, centrally divided by glass (refer to figure 4.112). As the two materials near the divided glass, the **steel rusts and concrete weathers to factually illustrated the degradation of these materials**. **Structural integrity** is ensured through **steel reinforcement** that retains the material entirety in place. Additionally, the created interior atrium environment provides opportunity for **suspended accent lighting and coral rusticles**. This provides **additional illumination into the dock below** and some form of **acoustic insulation** from the void created (refer to figure 4.113).

To conclude, this chapter initiated the **conceptual development of the spatial intervention** proposed for both the **host and the habitant**. In order to evidently differentiate between the various proposed mechanisms of design, all mediations are classified as either contributing towards the **inner or outer interior** of the proposed intervention. In continuation, the design of the outer interior (platform, stalls and possible ramp) and inner interior (brewery) will be detailed through technical resolution.

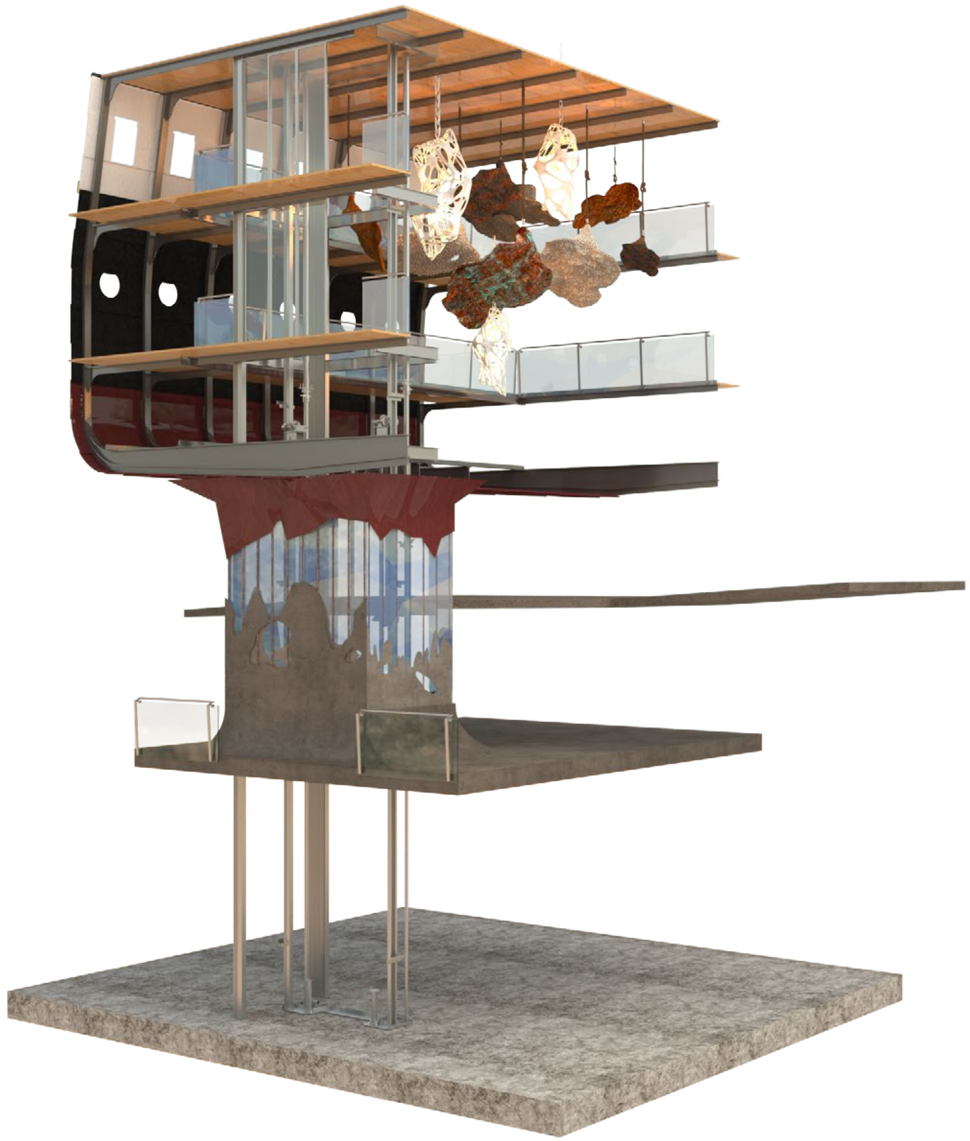


Figure 4.112. Atrium Design Proposal (Author, 2016)

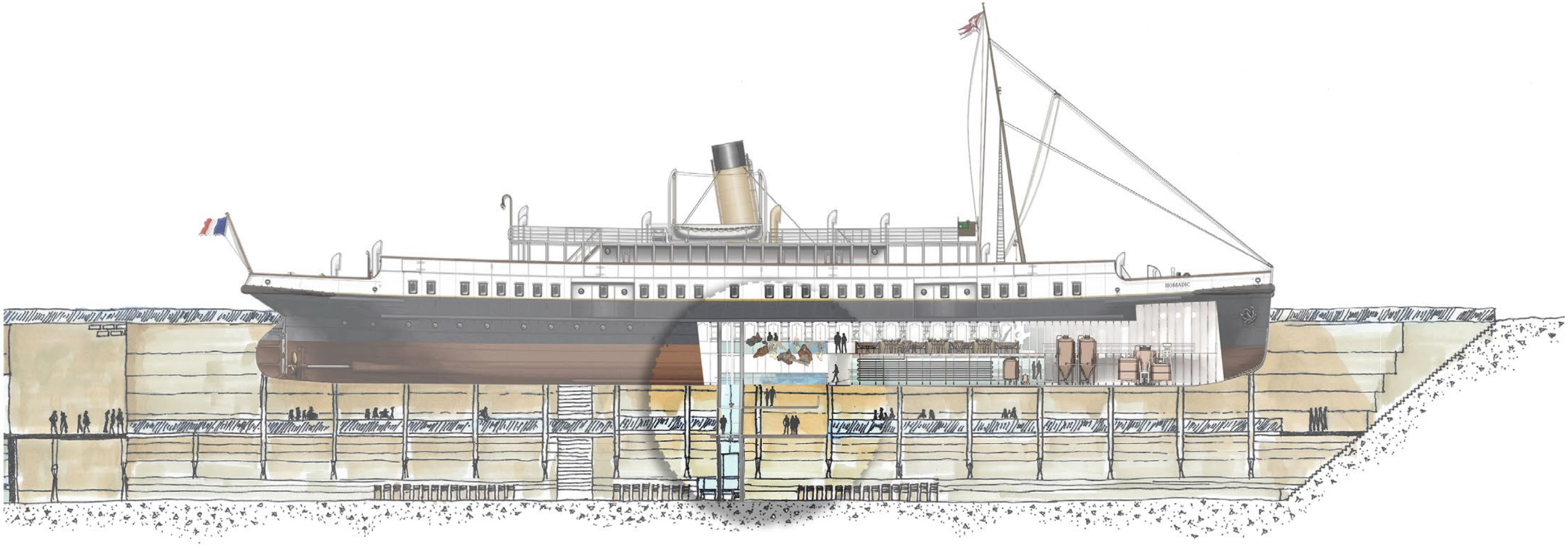


Figure 4.113. Proposed Atrium Introduction in Context (Author, 2016)

5 CHAPTER

technical resolution

This chapter aims to resolve all proposed concepts of the inner and outer interior in a technical fashion, which will exemplify the theoretical investigation of materiality as supplementary form of layering.

Figure 5.1. Mechanical Gears (Unknown, n.d)

TECHNICAL INVESTIGATION

"If gold rusts, what then can iron and steel do?"

Geoffrey Chaucer, 1478

Upon the finalisation of a **definite and tangible design response**, attention will be directed towards the **technical resolution** thereof. Following a similar methodology in terms of space classification, the **inner and outer interior** will be technically resolved, directing attention towards specific components. In addition to the **partial resolution of proposed mediations** on a **substantial scale** (dock layout and ship deck configuration), emphasis will be assigned to the **comprehensive resolution of individual modules,** representing a **holistic**, and not isolated, **spatial intervention** when unified. Determined by disciplinary rudiments and restrictions, the definite mechanical outcome of the proposed **stall development** and nature of **universal accessibility** must be addressed within the outer interior. Furthermore, all amendments brought about to improve the current **internal quality** of the inner interior through the **proposed brewery design**, will be undertaken.

As the act of nautical engineering dictates **structural integrity,** the envisioned interior intervention will command no less. As the history and memory of a structure need to be maintained in order to govern new appendages, it is essential that the **proposed setting be regarded as a ruin**. In addition to the strict devotion to all related historical components, adherence to **South African building regulations and standards** must be admitted. Likewise, the theoretical approach to materiality will continuously be charted as ascertained by aforementioned philosophies.

As concluded from the theoretical premises, avenues of material application permits **corrosion protection, historic decay preservation** and **intentional oxidation** techniques that can conceivably act as a s**upplementary layer** against the **prevailing nature** of both the host and habitant.

5.1
APPROACH TO MATERIALITY

As opposed to the induction of an actual approach to heritage, the introduction of a **new material layer is spatially envisioned**. Respectively to previous design development, the selection of resources is fortified by three distinct principles that outline a **resounding approach to materiality.**

PRINCIPLE ONE
PROTECT

- CORROSION PROTECTION -

Fortification should not merely be considered upon installation as a **mere after thought**, but as a **continuous technical aid** that dictates design decisions. The **active and passive protection** of materials will be employed, along with specific **technical considerations** that will **prolong the existence** of all newly introduced materials.

METALLIC COATING

ORGANIC COATING

PRINCIPLE TWO
PRESERVE

- HISTORIC DECAY PRESERVATION -

In order to **allow future layering,** the preservation of current conditions is permitted. In essence all technical endeavours will **not aim to restore, but rather stabilise** the host and habitant so that public accessibility is granted and the quality of all **interior conditions are amplified**. Methods include **rust transformation and desiccation.**

DECAY STABILISATION

RUST TRANSFORMATION

RESIN INFILLING

PRINCIPLE THREE
PREMEDITATE

- INTENTIONAL OXIDATION -

All newly introduced materials must e**ncourage deterioration in a controlled fashion,** which does **not endanger public health, nor compromise structural integrity**. This includes all methods of **production, shaping and fixing** associated with the selected material. Moreover, existing materiality must be treated similarly.

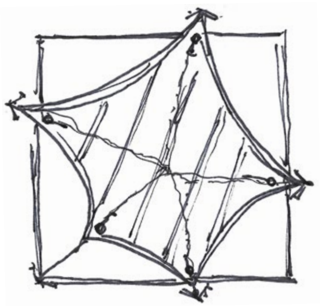
WEATHERING METALS

FAUX OXIDATION

BIOLOGICAL CONCRETE

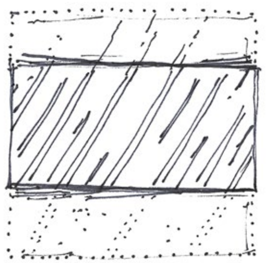
5.2
APPROACH IMPLEMENTATION

In order to **perceptibly illustrate the approach to materiality**, five distinct implementation methods are proposed that **encompass the fundamental principles of corrosion beatification**. Along with their descriptive nature, each method proposes possible approaches that could be illustrated through their application.



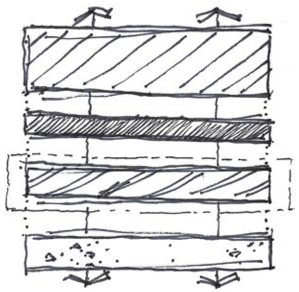
- EXPOSE -

Bare the true honestly of the material through possible **demolition, divesting** and/or **intentional degradation.**



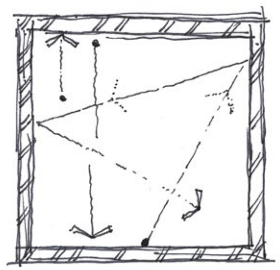
- HIGHLIGHT -

Seamlessly amplify the current status of the material through possible **restoration, veneering** and/or **replacement**.



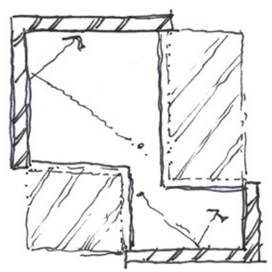
- OVERLAY -

Accentuate the appearance and characteristics of a material in a method that **stresses its layered makeup**.



- SHIELD -

Fortify the appearance of the material through possible **reinforcement, finishing** and/ or **correct selection**.



- STABILISE -

Preserve and prolong the existing nature of the selected material from **immediate degradation**

- STEEL -

The overall composition of an industrial ship's materiality is dedicated towards an amalgamation of **steel, timber and glass**. Diverting attention towards its principle fabric, various implementation strategies will be employed to all **present and newly proposed steel** in order to **protect, prevent en premeditate corrosion**.

Figure 5.2. Steel Materiality (Author, 2016)

- CONCRETE -

The overall construction of a dry dock's materiality is dedicated towards an amalgamation of **stone, steel and concrete**. Diverting attention towards its principle fabric, various implementation strategies will be employed to all **present and newly proposed concrete** in order to **protect, prevent en premeditate corrosion.**

Figure 5.3. Concrete Materiality (Author, 2016)

5.3
INCLUSIVE ACCESSIBILITY

- STAIRS -

Access is granted onto the market platform through **existing access chutes** of original dry dock.
(refer to figure 5.6)

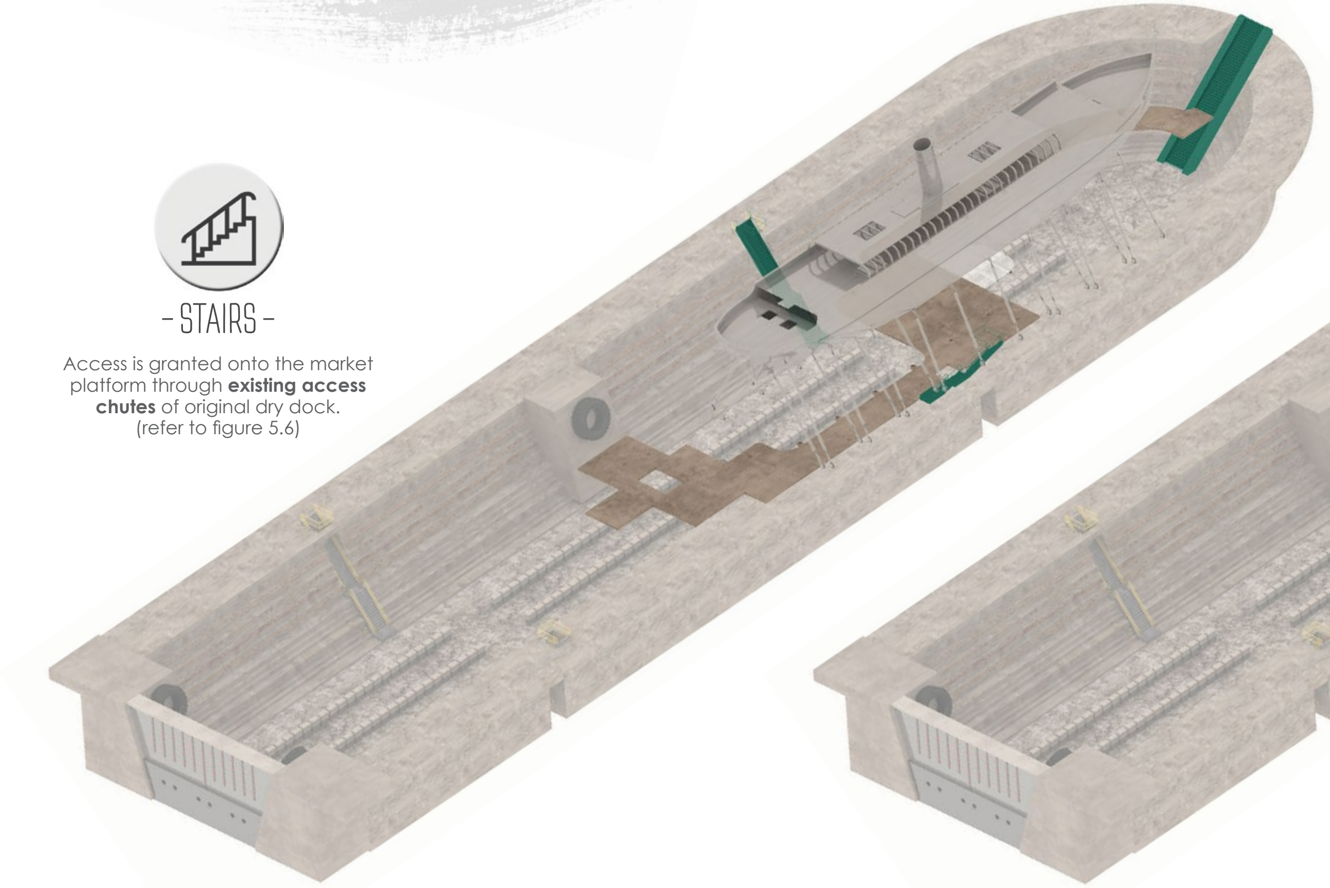


Figure 5.6. Stair Accessibility (Author, 2016)

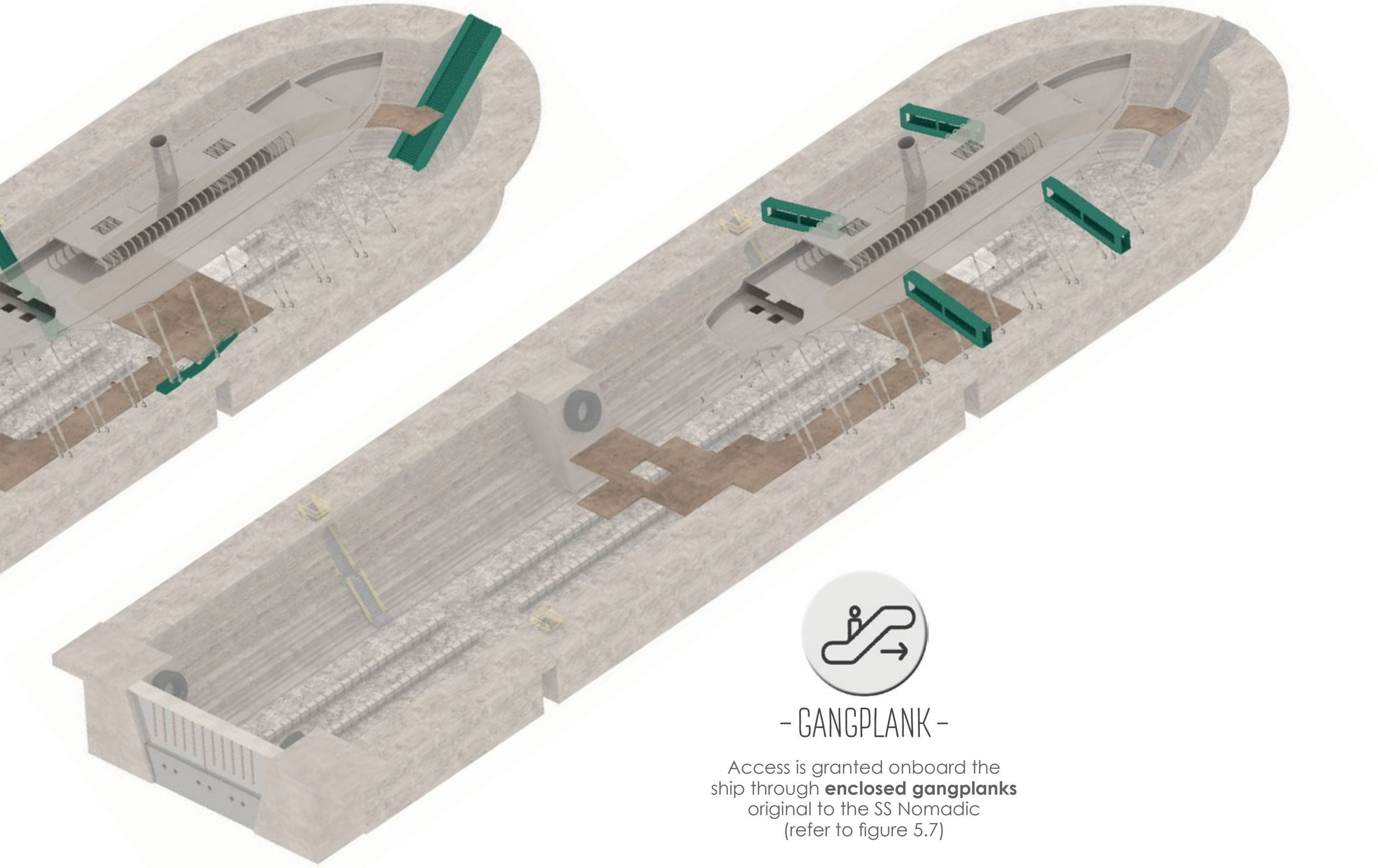


Figure 5.7. Gangplank Accessibility (Author, 2016)

- GANGPLANK -

Access is granted onboard the ship through **enclosed gangplanks** original to the SS Nomadic
(refer to figure 5.7)

- ELEVATOR -

Direct access between the **host and habitant** is granted through **actual connection of an atrium** (refer to figure 5.8)

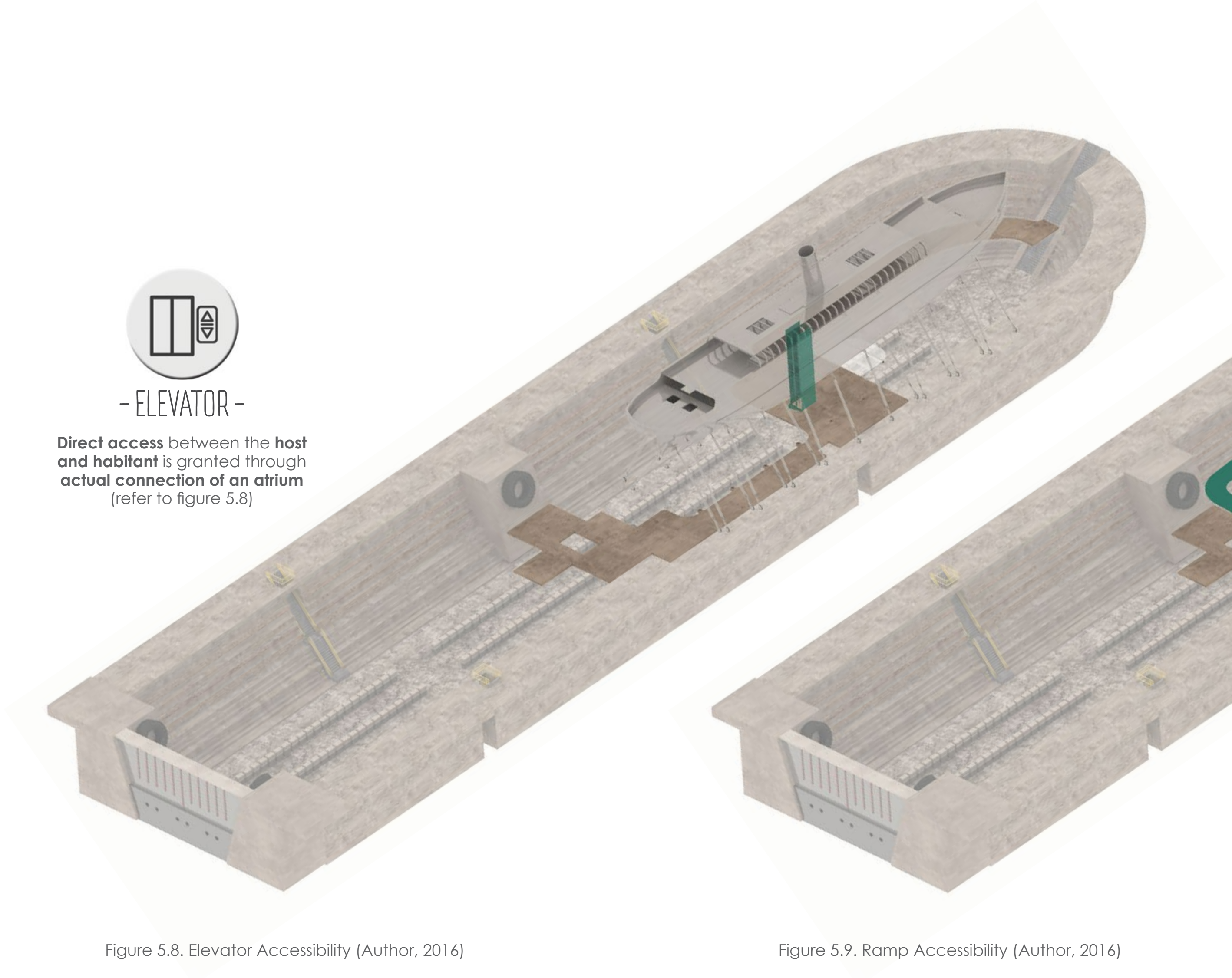
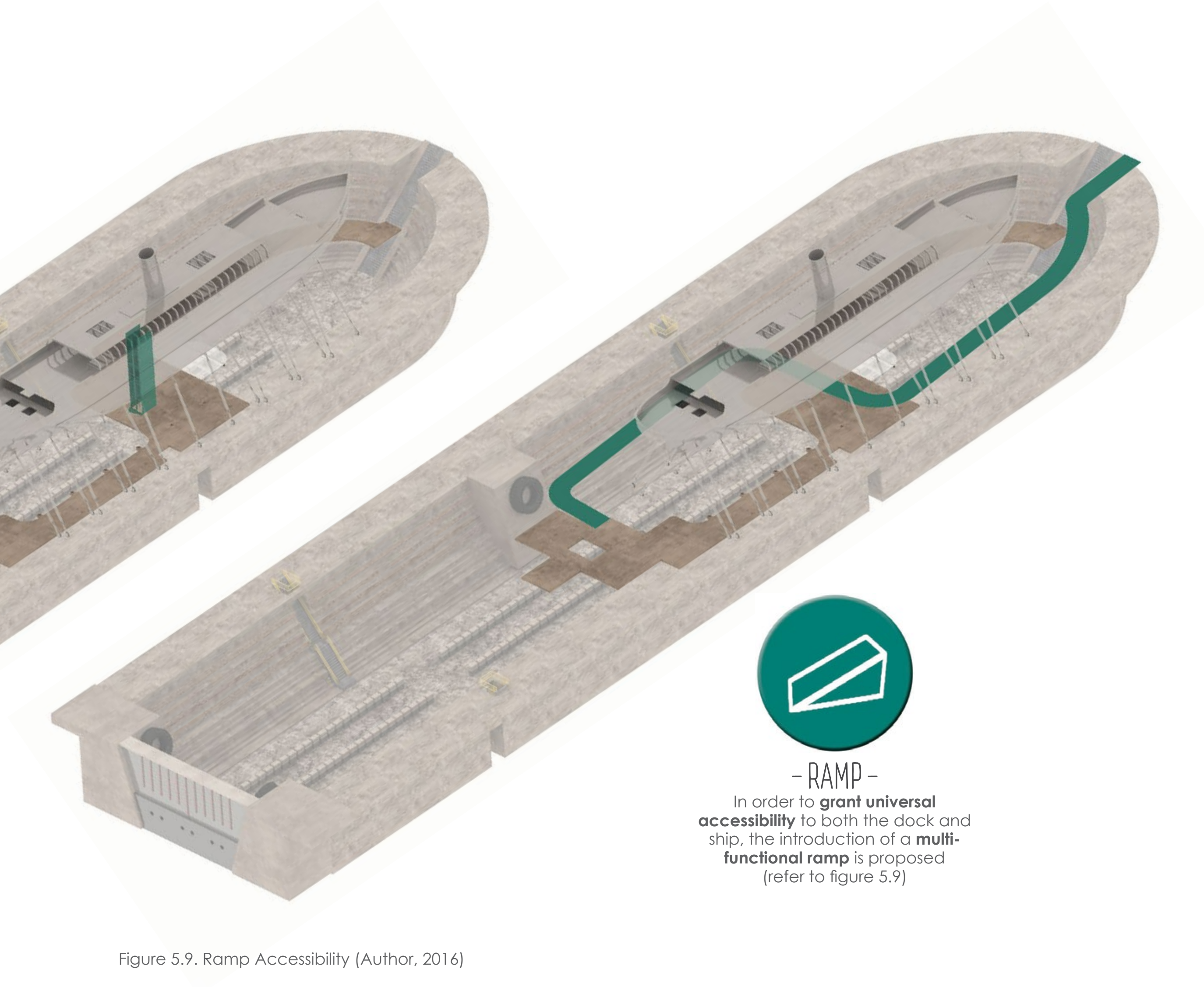


Figure 5.8. Elevator Accessibility (Author, 2016)



- RAMP -

In order to **grant universal accessibility** to both the dock and ship, the introduction of a **multi-functional ramp** is proposed (refer to figure 5.9)

Figure 5.9. Ramp Accessibility (Author, 2016)

5.4

SCENIC RAMP CIRCULATION

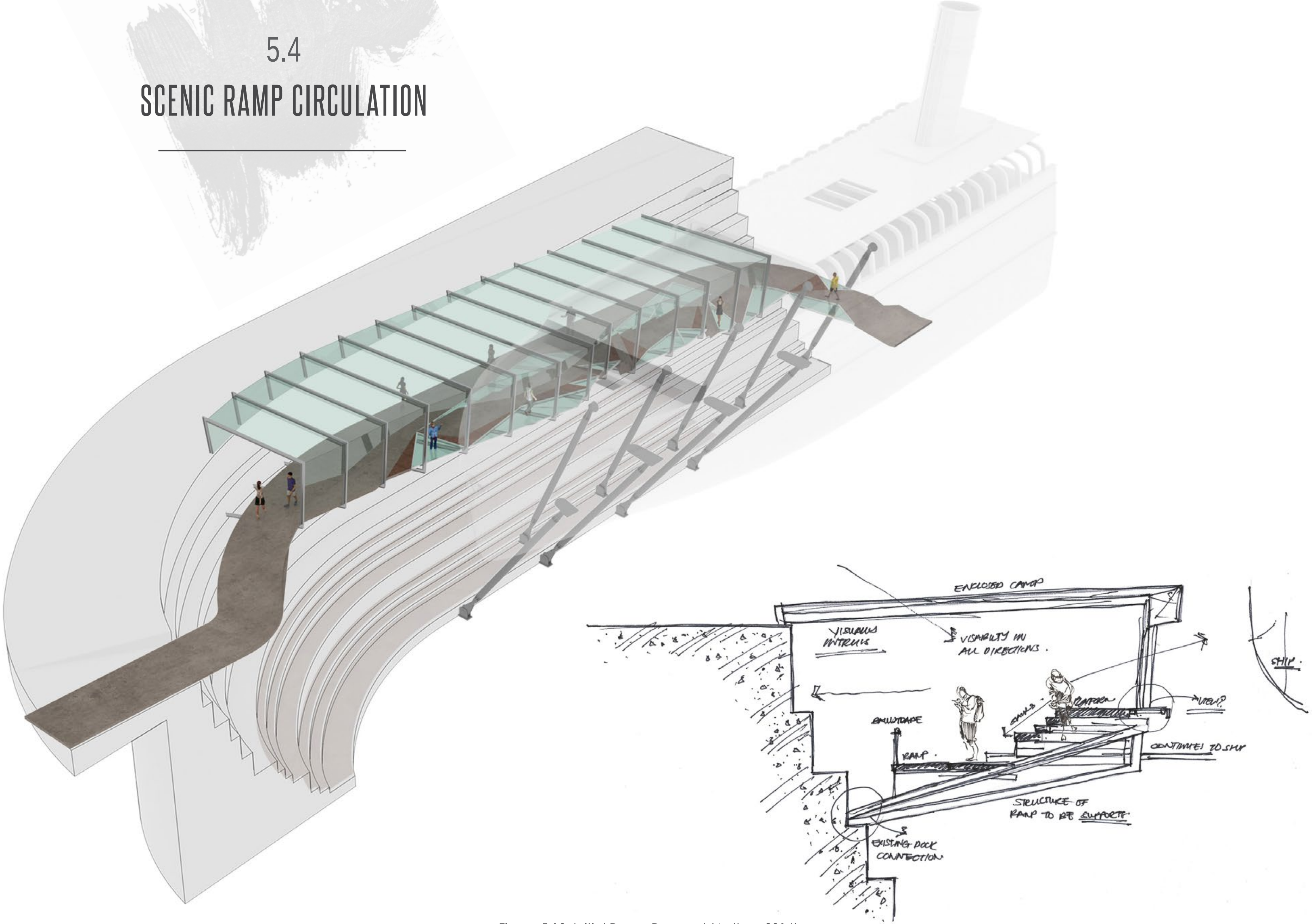


Figure 5.10. Initial Ramp Proposal (Author, 2016)

- INITIAL PROPOSAL -

As opposed to the mere institution of a traditional ramp, the continuous idea of **multi-functionality** is conveyed through the proposal of a **scenic ramp**. Based on the conceptual response of the previously mentioned canopy design in chapter 4 (refer to page 167), the ramp will act as **mediator that connects the host with the habitant** - similarly to that of water in a flooded dock.

Being that the proposed market platform is located approximately 7 meters below the natural ground level of the dry dock, the overall distance of the proposed ramp is of a substantial length in order to provide an attainable slope. Regardless of this auxiliary involvedness, the added advantage of utilising the ramp as an i**nterweaving element provides panoramic views** of both the host and the habitant - thus referring to the gradient as a scenic ramp. As illustrated in figure 5.11, the initial proposal made provision of appended platform landings, acting as **observation decks with surplus seating and aesthetical planters**. The provision of **one-way transparent glass inserts** permits both **visual connectivity** with the proposed **stalls underneath** and allows **natural light to penetrate the market**.

At a minimum fall ratio of 1:12, the resulting slope was deemed too **steep**. Furthermore, the **lack of sufficient landings** and **universal accessibility onto the attached platforms** proved problematic. In addition to the ramp's layout, the supporting structure (figure 5.10) did **not correspond visually** with the introduced ramp. Overall its appearance was deemed to 'bulky' and nature of **attachment to intrusive**. Moreover, the lack of **incorporating the exiting steel armature** as structural support presented a missed opportunity.

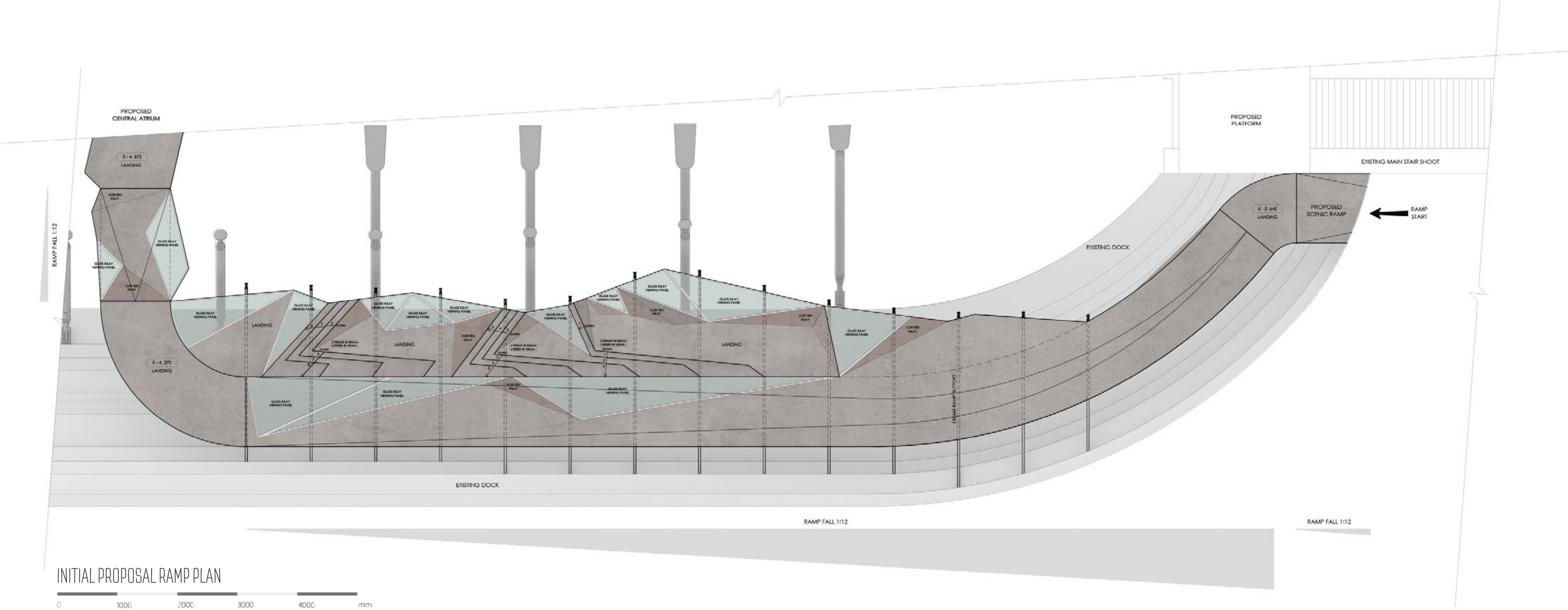


Figure 5.11. Initial Layout of Proposed Scenic Ramp (Author, 2016)

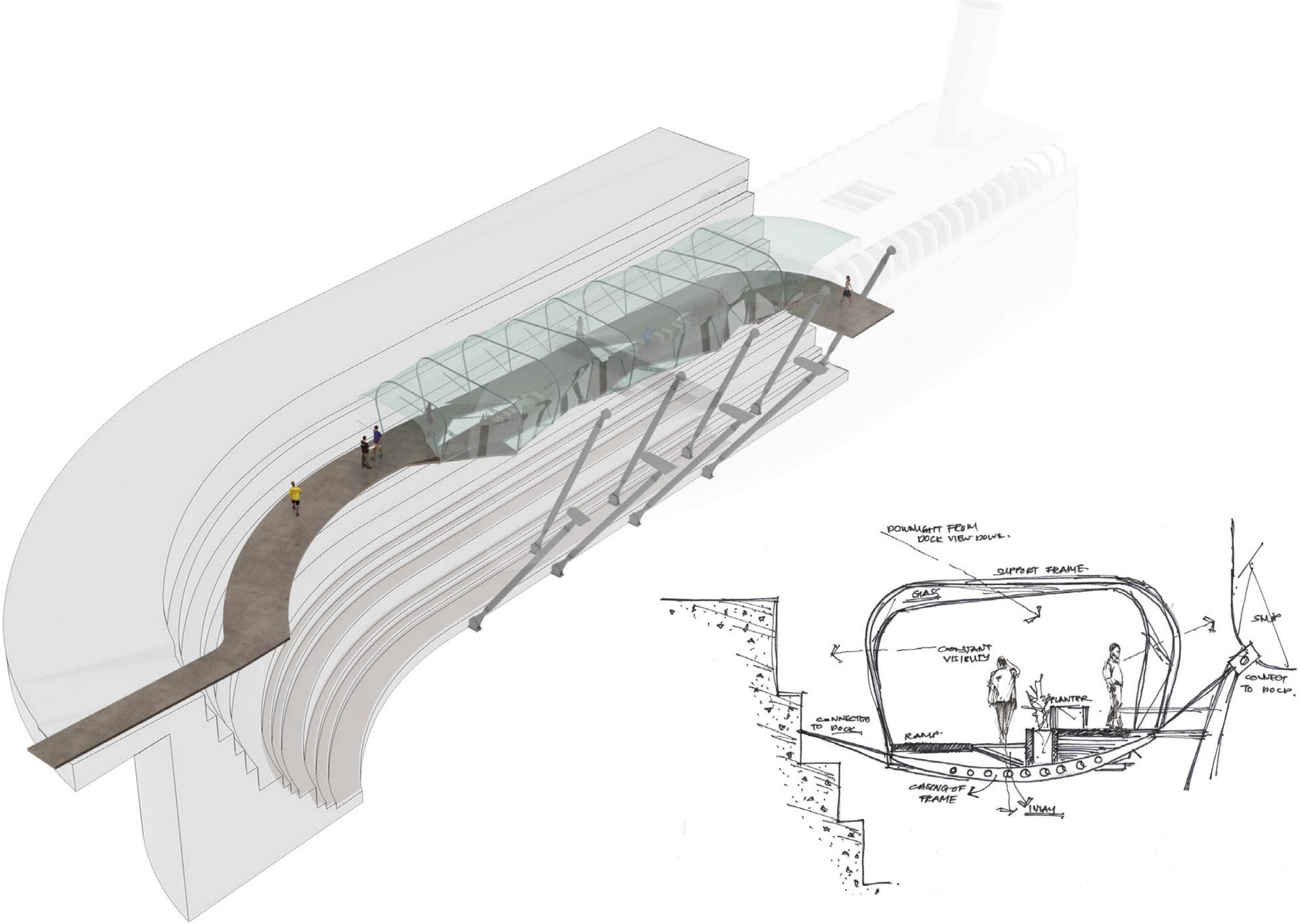


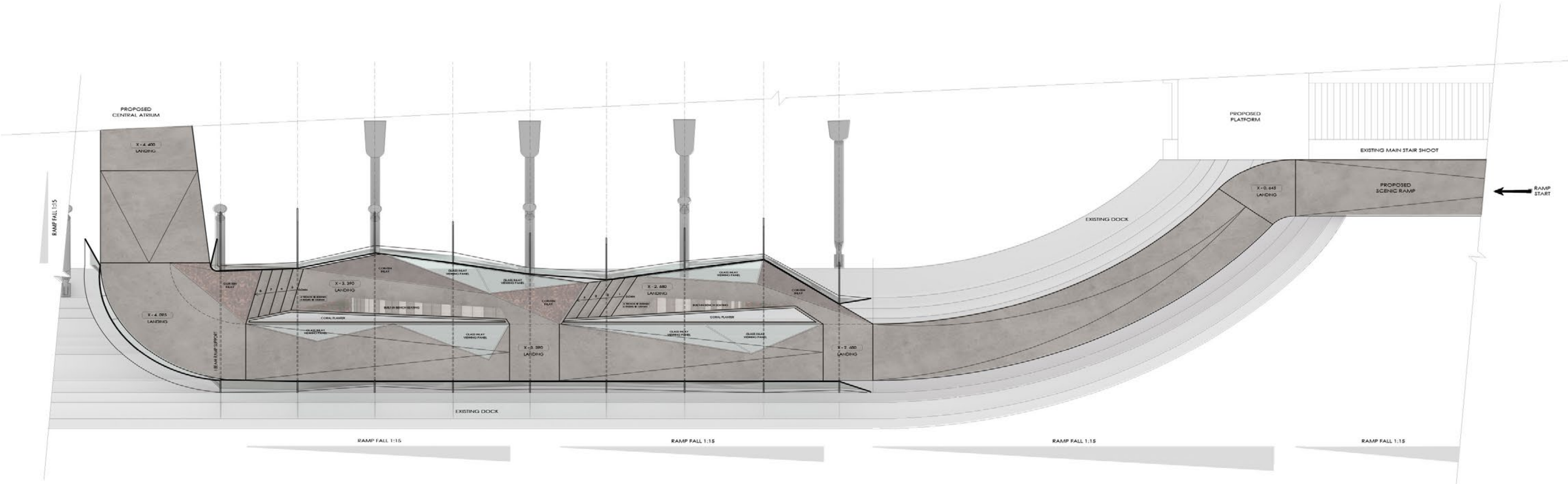
Figure 5.12. Iteration 1 Ramp Proposal (Author, 2016)

- RAMP ITERATION 1 -

As a point of departure, the **steep incline was revised** during the initial iteration (refer to figure 5.13). As opposed to a gradient of 1:12, the angle in slope was **decreased to 1:15**. Moreover, as per **SANS 10400 Parts S**, the introduction of a landing (1.5m in length and 1.2m in width) is provided every 10m. Given that the change in direction as one enters the ramp is continuously consistent and fairly modest, no supplementary landings are required. Additionally, the introduced landings provide **access onto the adjoining platforms,** with an adequate clear width of 1.5m. The overall layout of the observation decks were also simplified in order to abridge navigation and provide **more seating.**

Averting consideration towards the attachment of the scenic ramp to the existing dock, the overall supporting structure was reconsidered (refer to figure 5.12). Utilising the already present steel armature as a point of connection, the design of curved steel frame profiles which **elevate the platform through suspension** was proposed.

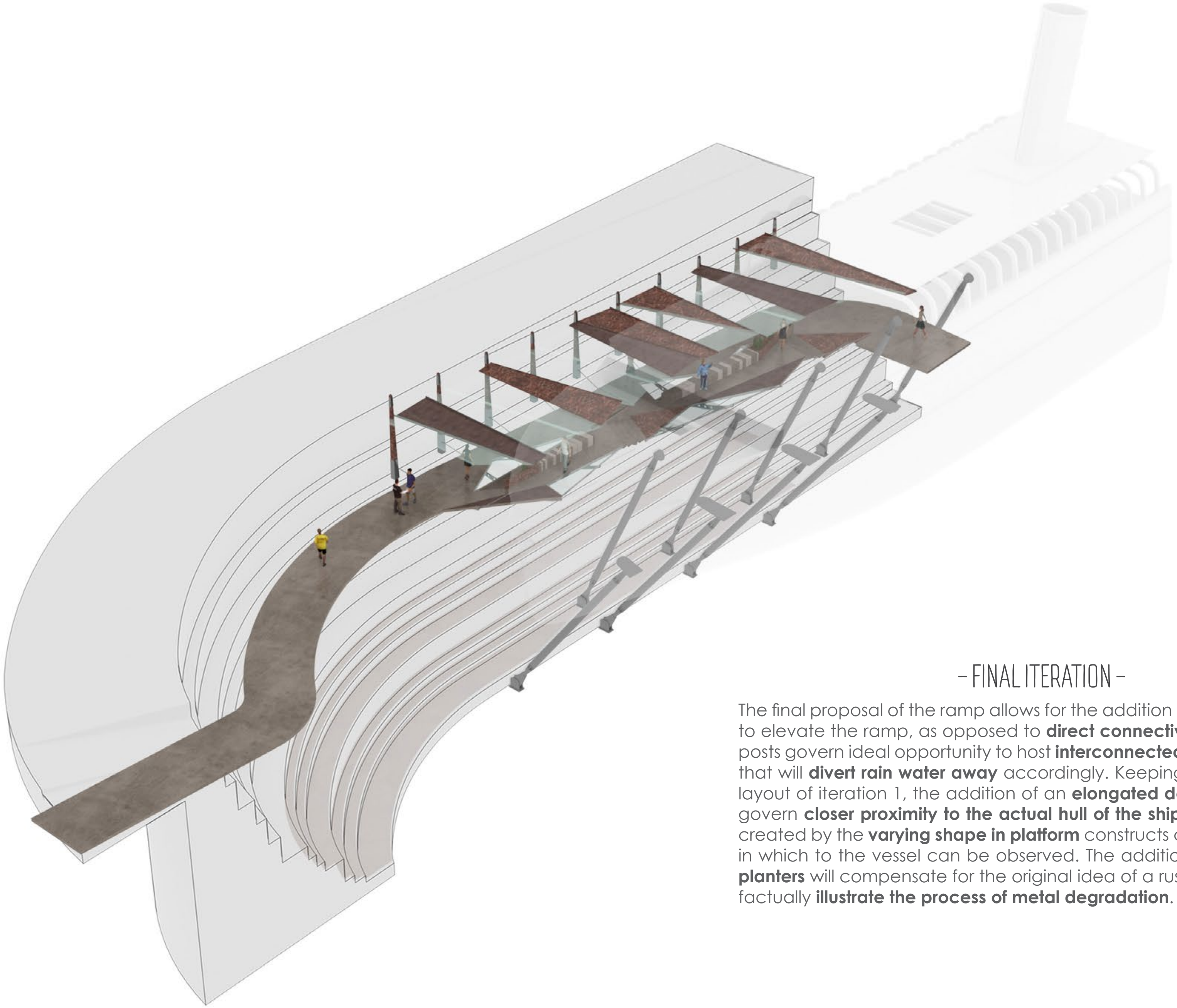
Furthermore, the adequate enclosure of the ramp **promotes spatial quality** through the provision of **protection against the elements**, which could pose possible hazards over sloped areas if left completely open. A t**ransparent enclosure permits panoramic visibility** and **lowers the visual intrusiveness** of the overall structure.



ITERATION 1 RAMP PLAN

0 1000 2000 3000 4000 mm

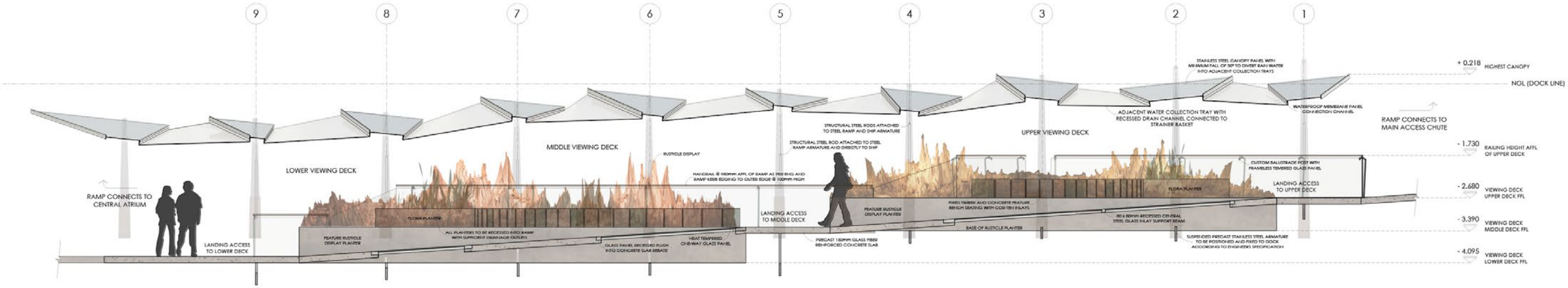
Figure 5.13. Iteration 1 of Proposed Scenic Ramp (Author, 2016)



- FINAL ITERATION -

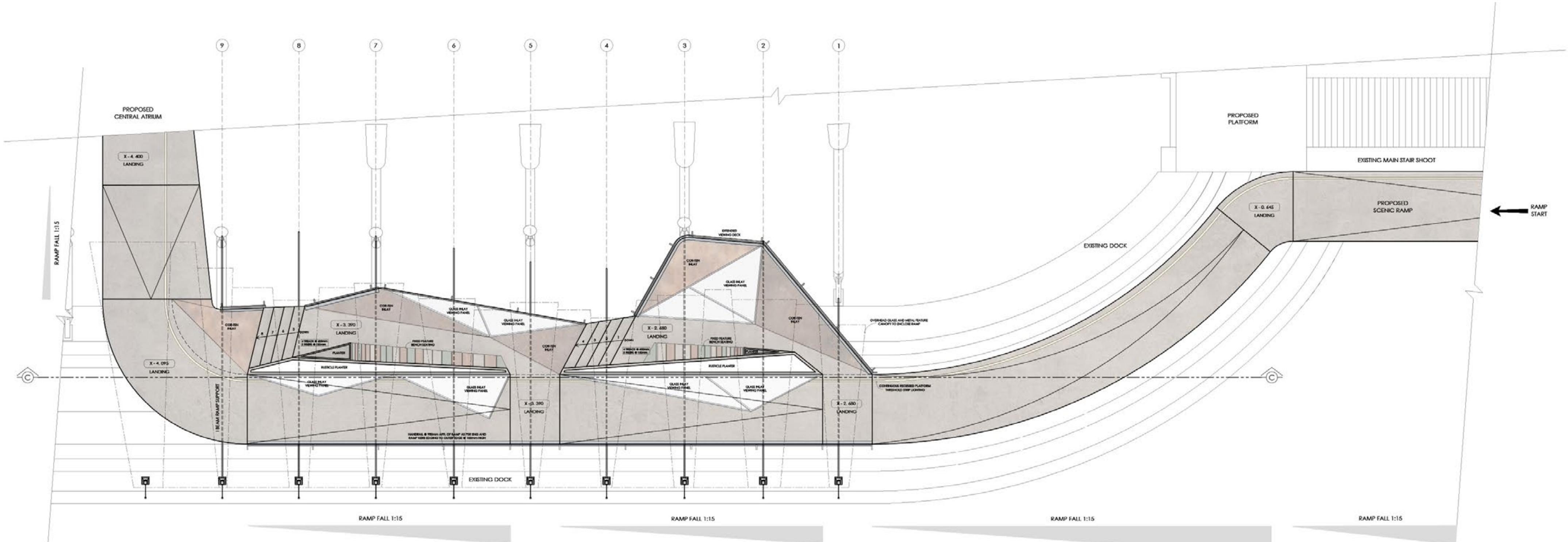
The final proposal of the ramp allows for the addition of **strut post supports** to elevate the ramp, as opposed to **direct connectivity to the dock**. The posts govern ideal opportunity to host **interconnected angled roof panels** that will **divert rain water away** accordingly. Keeping with the proposed layout of iteration 1, the addition of an **elongated deck** is introduced to govern **closer proximity to the actual hull of the ship**. Distance variation created by the **varying shape in platform** constructs a variety of methods in which to the vessel can be observed. The addition of **feature rusticle planters** will compensate for the original idea of a rusticle reef in order to factually **illustrate the process of metal degradation**.

Figure 5.14. Final Iteration of Ramp Proposal (Author, 2016)



SECTION CC OF RAMP PLAN

0 1000 2000 3000 4000 mm



FINAL PROPOSED RAMP

0 1000 2000 3000 4000 mm

Figure 5.15. Final Iteration of Proposed Scenic Ramp Section and Layout (Author, 2016)

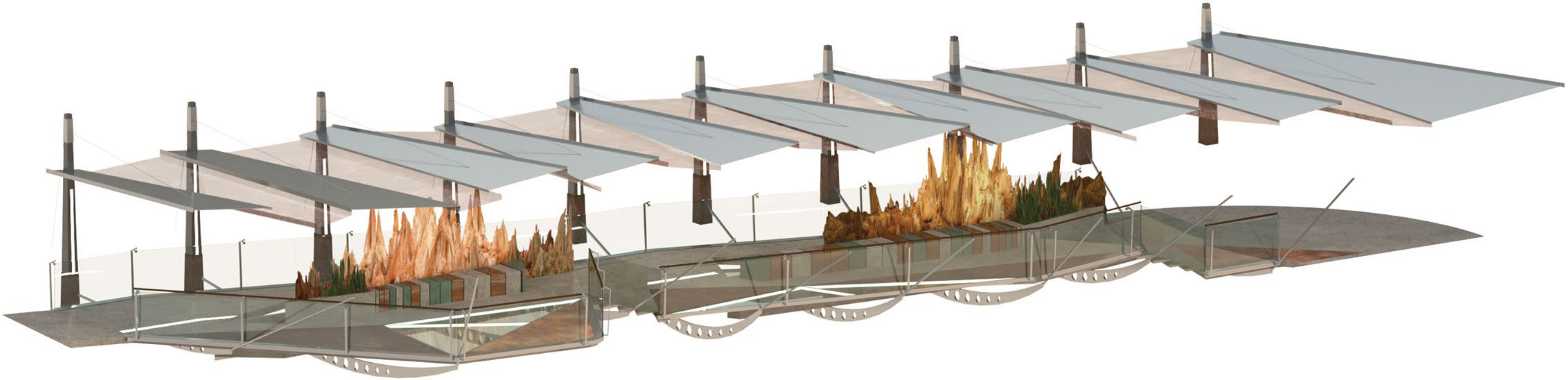


Figure 5.16. Three Dimensional View of Final Proposed Scenic Ramp (Author, 2016)

5.5
WAYFINDING

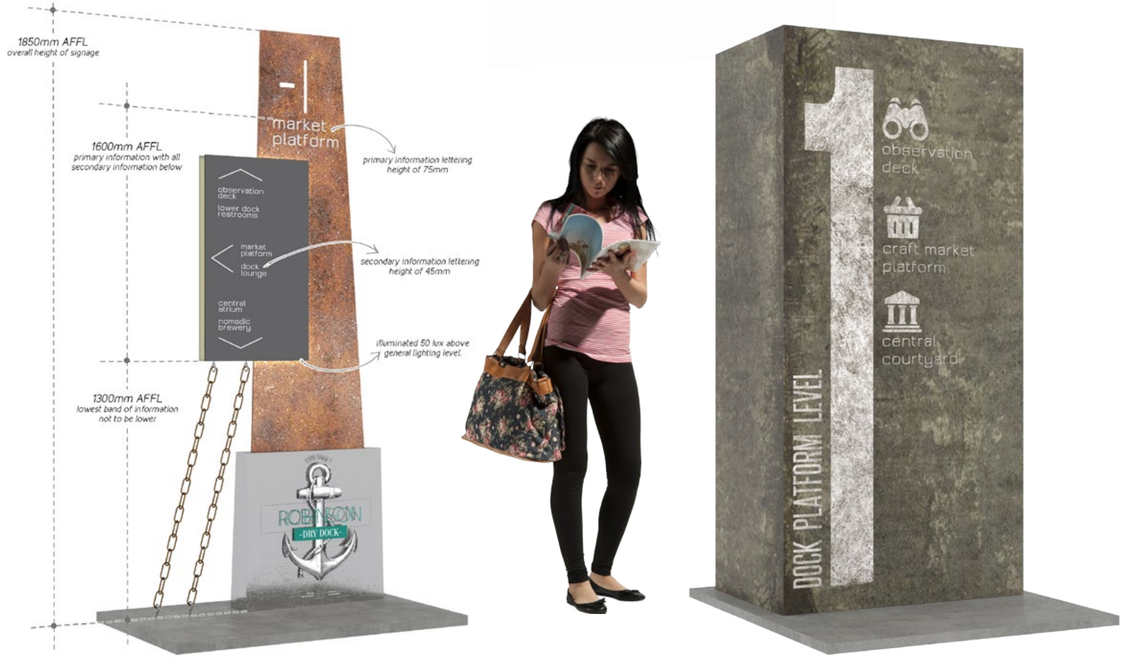


Figure 5.17. Proposed Wayfinding Systems (Author, 2016)

- WAYFINDING SIGNAGE -

Directional signage boards located on the **dock's platform** in order to provide **orientation and context** for all visitors. All signage specifications to conform with **SANS 10400(S)** regulations and will be **designed by specialist.**

- LEVEL ANNOUNCEMENT SIGNAGE -

Level way finding located on the **original fabric of the dock** through method of **ash stained concrete**. This **temporary form signage** will **enhance multi-functionality**. All signage specifications to conform with **SANS 10400(S)** regulations.

5.6
PROPOSED ELUCIDATION

- DOCK LAYOUT -

By means of actual positioning and design, a final layout (figure 5.18) of the dock is proposed that clearly shows r**elativity amongst all facets of design**. Having introduced several methods of **host and habitant accessibility**, an overall view is achieved of the desired spatial intervention. As visitors descend down the main chute, the **vast appreciation of the ship's bow** can be comprehended, followed by the **arrival onto the market platform**. The arrangement of the upper permanent stalls **direct flow** from the head of the dock to the central atrium space. Depending on occasion, these stalls will either be **elevated or recced**. A continuous line of additional stalls **connect the central walkway to the observation deck**, with adequate **ablution facilities** positioned below on the lower level of the dock. A smaller elevator with an enfolding staircase permits access to this lower level of the dock. The positioning of the observation deck and restroom amenities within the **demolished secondary sill's footprint licenses watertight division** between the frontal and aft section of the dock.

Whilst the aft section nearest to the primary caisson can be **completely flooded**, provision is made to allow **partial flooding** of the frontal section to **enhance acoustics** and add **visual interest**. The overall **layout conforms to the existing footprint** and provides novel opportunity for future additions. Furthermore, the allowance of the dock to still **partially function as a service station** will allow additional **income and ensure continuous interest**.

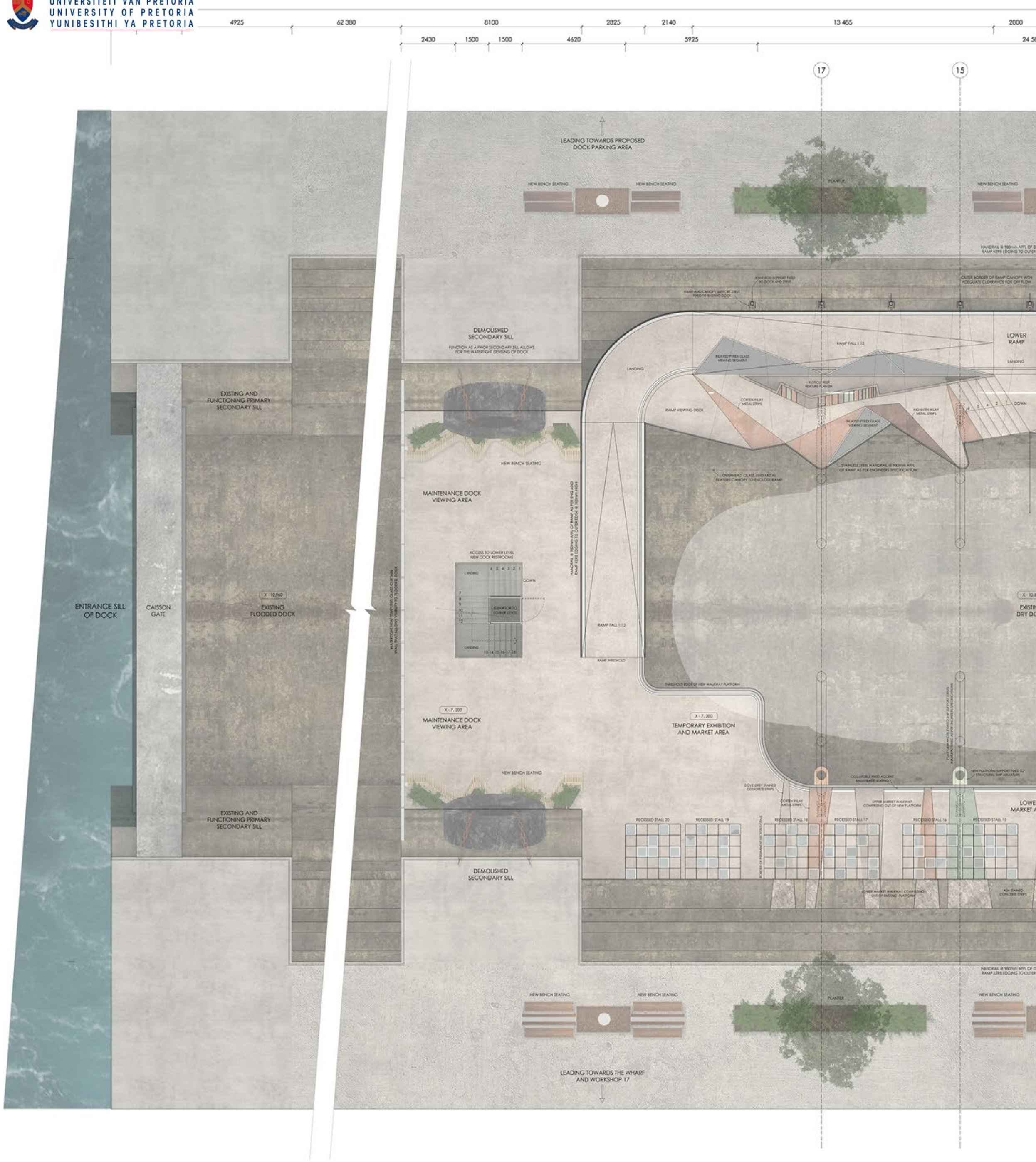
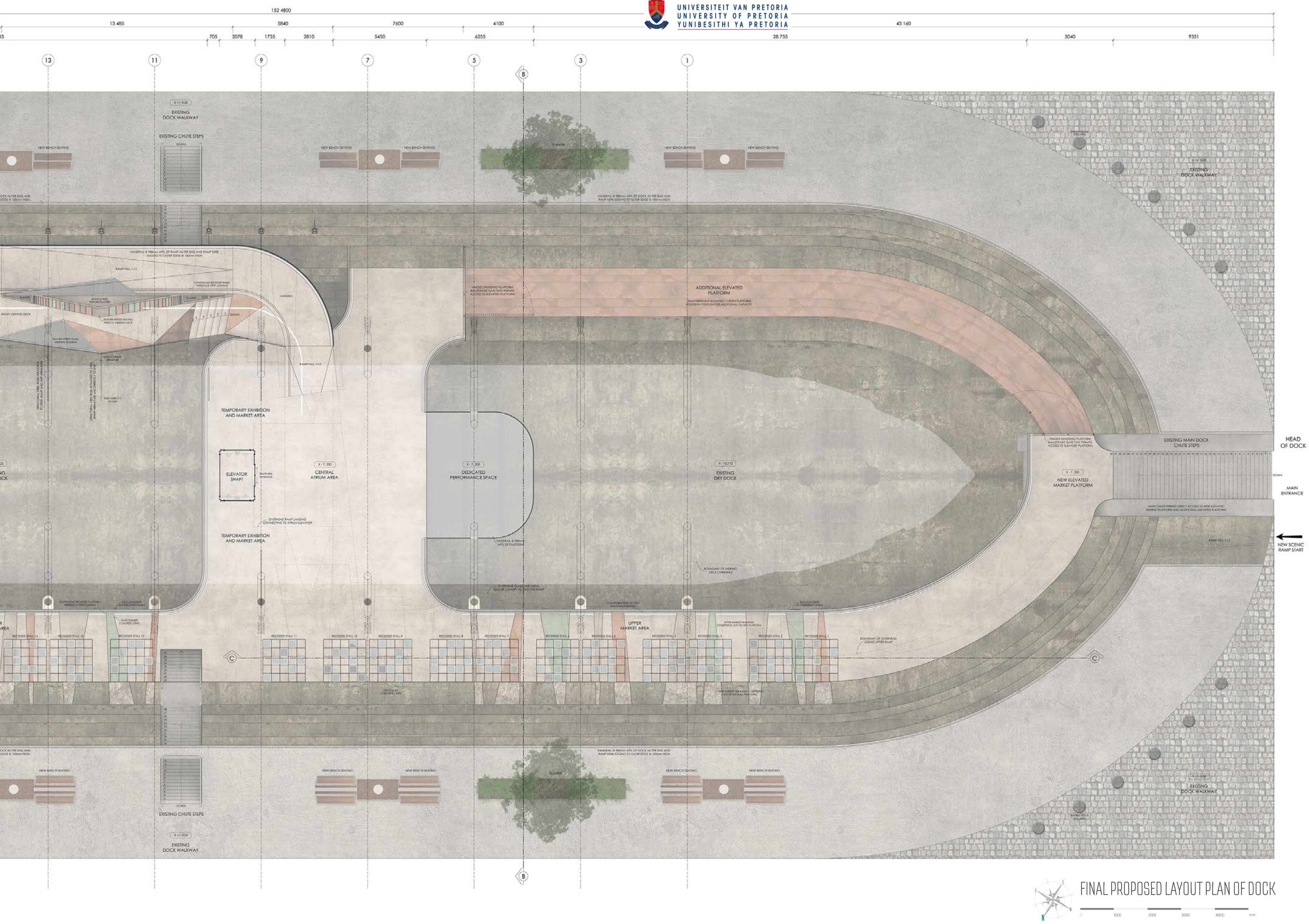


Figure 5.18. Final Proposed Dock Arrangement (Author, 2016)


EXISTING DOCK WALKWAY
EXISTING CHUTE STEPS
NEW BENCH SEATING
ADDITIONAL ELEVATED PLATFORM
TEMPORARY EXHIBITION AND MARKET AREA
ELEVATOR SHAFT
CENTRAL ATRIUM AREA
DEDICATED PERFORMANCE SPACE
EXISTING DRY DOCK
NEW ELEVATED MARKET PLATFORM
EXISTING MAIN DOCK CHUTE STEPS
HEAD OF DOCK
MAIN ENTRANCE
NEW SCENIC RAMP START
UPPER MARKET AREA
FINAL PROPOSED LAYOUT PLAN OF DOCK

- SECTIONAL ELEVATION -

Sectional resolution (figure 5.19) of the dock shows **evident association between the inner and outer interior**. As a method of granting **direct access** onboard the ship at **natural ground level**, the introduction of the **original gangway planks**, used during tendering, will be **enclosed and fixed to the host and the habitant**. This arrangement of accessibility will act as a **nostalgic prompt** showcasing the **original intention (layer)** of the SS Nomadic as a **tender vessel**. The upper section of the introduced scenic ramp situated on the northern side of the ship, **shades the platform below**, whist still governing **visual accessibility and natural light.** Access to the central elevator can be obtained through the **permanent market walkway**, **connecting scenic ramp** or associated **decks onboard** the ship.

In addition to the scenic ramp, direct **universal accessibility** onto the market walkway level can be obtained through the addition of a **lift platform to the northern chute.** The installation of the Savaria Omega inclined foldaway lift hosts a **platform with a fold out seat and an audio visual movement alarm** for abetting those with a **visual impairment.**

Figure 5.19. Final Sectional Dock Arrangement (Author, 2016)

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

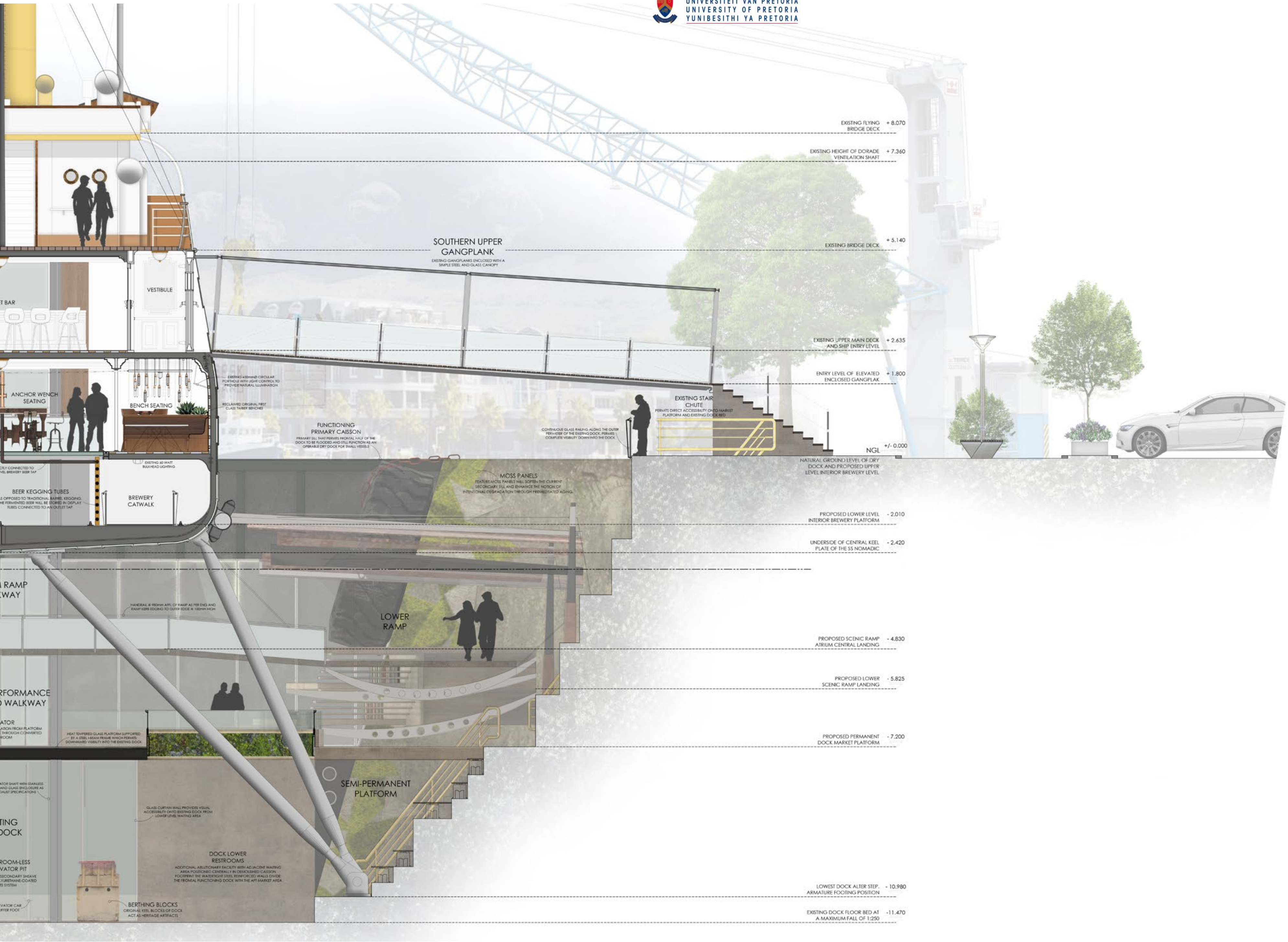


Figure 5.20. Proposed View of Observation Deck as Exiting Ramp (Author, 2016)

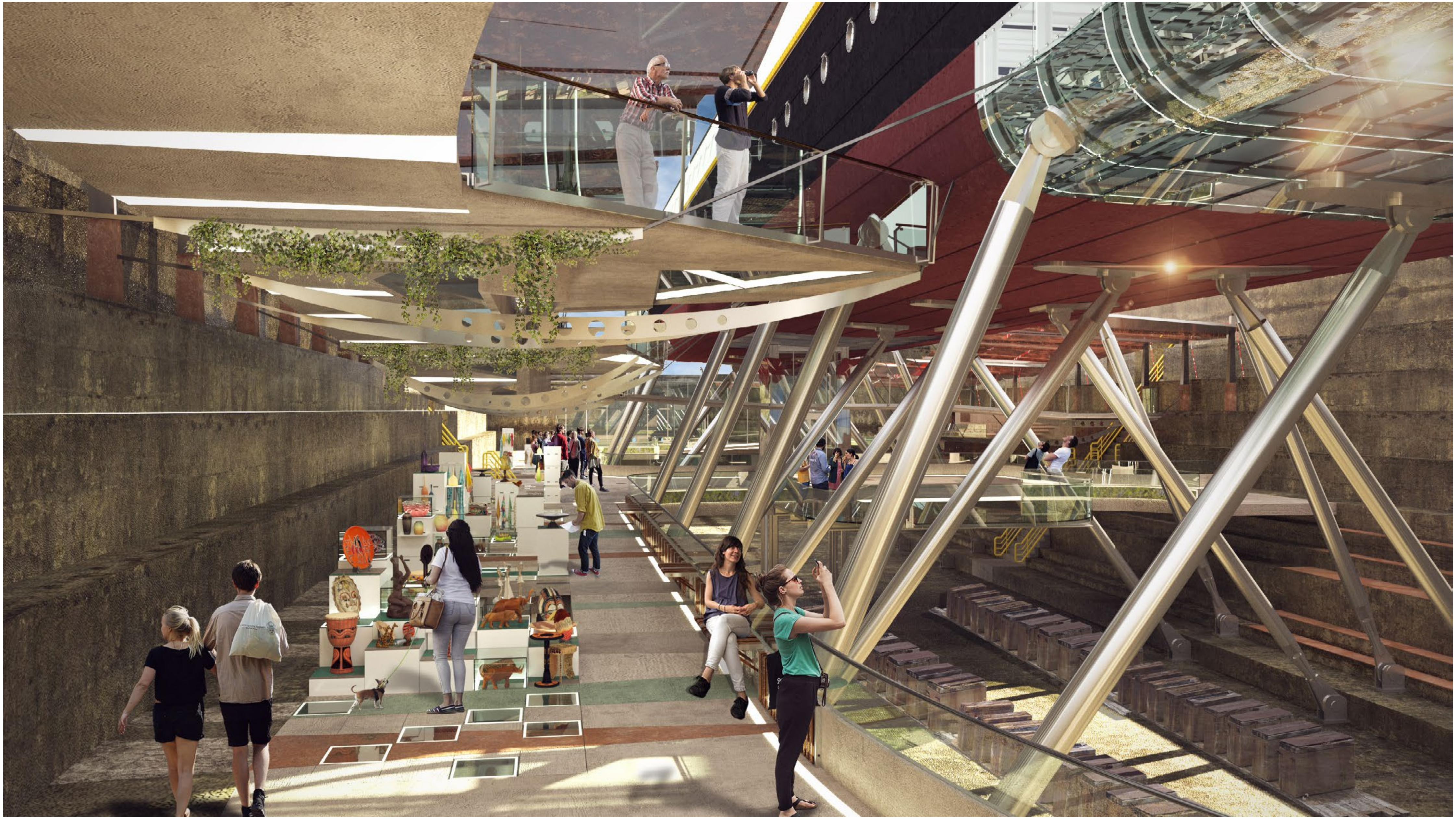


Figure 5.21. Proposed View of Overall Dock Looking Aft (Author, 2016)

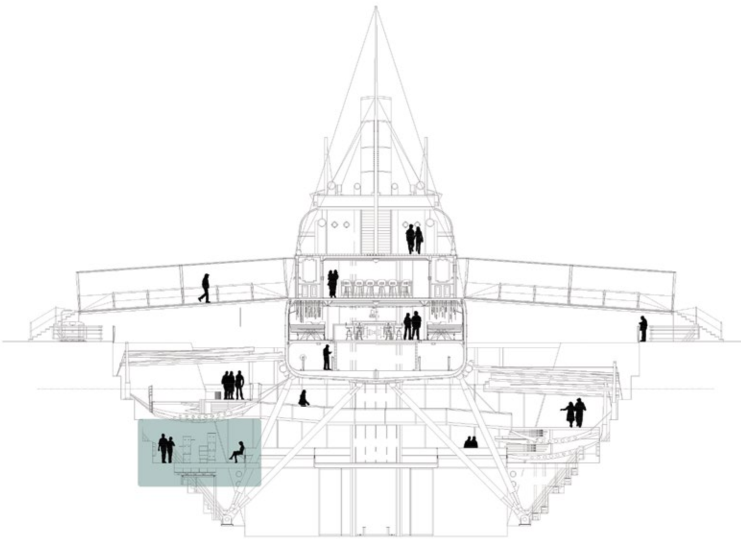
Figure 5.22. Proposed View of Observation Deck at Day (Author, 2016)

Figure 5.23. Proposed View of Observation Deck at Night (Author, 2016)

5.7
PROPOSED STALL DESIGN

- SECTIONAL ELEVATION -

Having resolved the proposed market stalls conceptually (page 163), the **technical resolution** thereof is required in order to **showcase feasibility and materiality**. The illustrated floor plan (figure 5.24) exemplifies the typical layout of these **modular stall** configurations in **context with the surrounding fabric**. A **seamless permutation between the standing and proposed** elements are governed through the **selection of appropriate materials**. Accent ribbons, which imitate the geometrical form of the overhead ramp, **aesthetically tie** the adjoining platform to the existing docks alters. Utilising electric actuators, (refer to figure 5.25) the positioned podiums permit **two way circulation**. Inside flow will oversee **direct contact with the dock**, whereas the outside permit **visual convenience of the ship** by means of a **multifunctional balustrade/seating system** (figure 5.26 and 5.27).



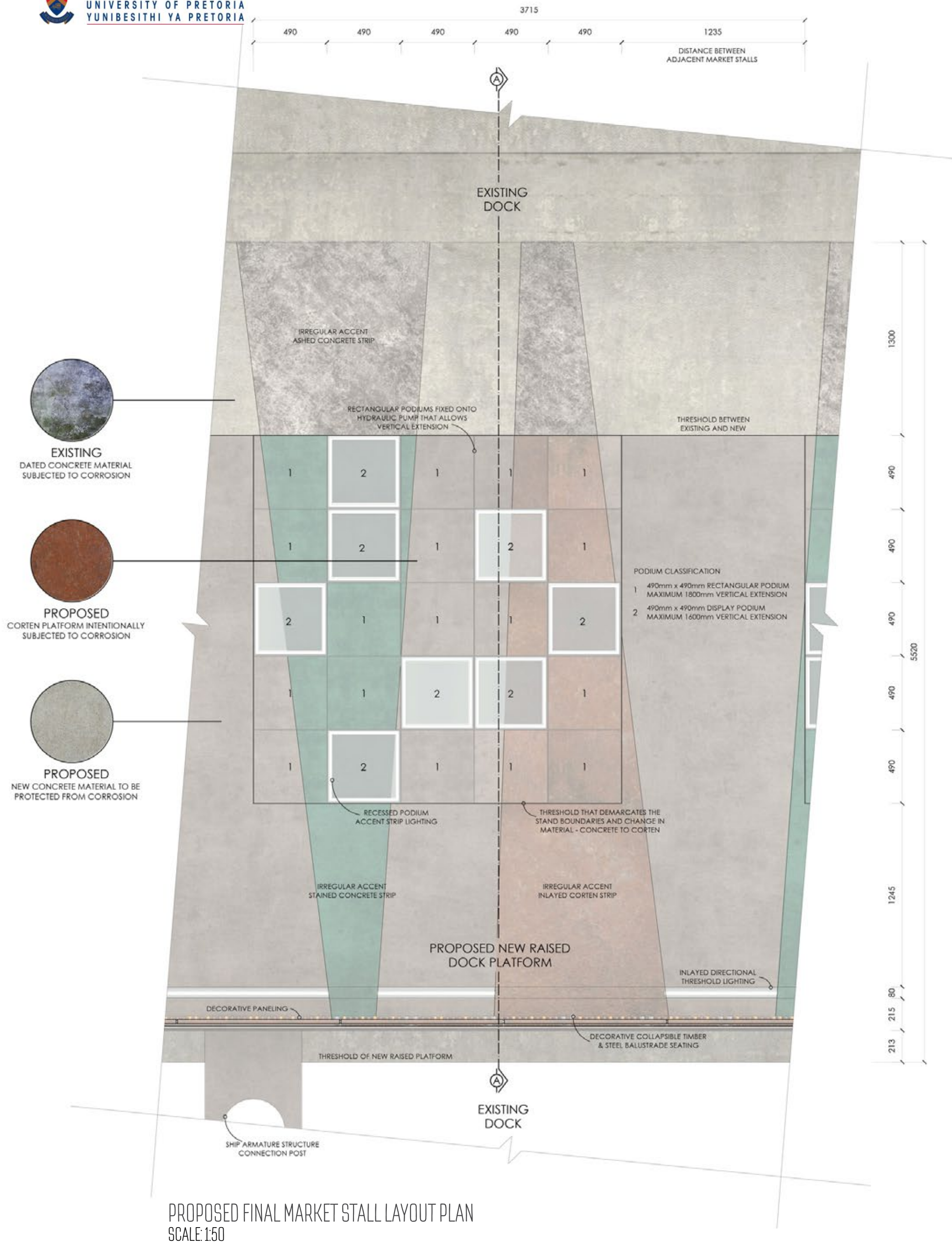


Figure 5.24. Final Proposed Stall Layout (Author, 2016)

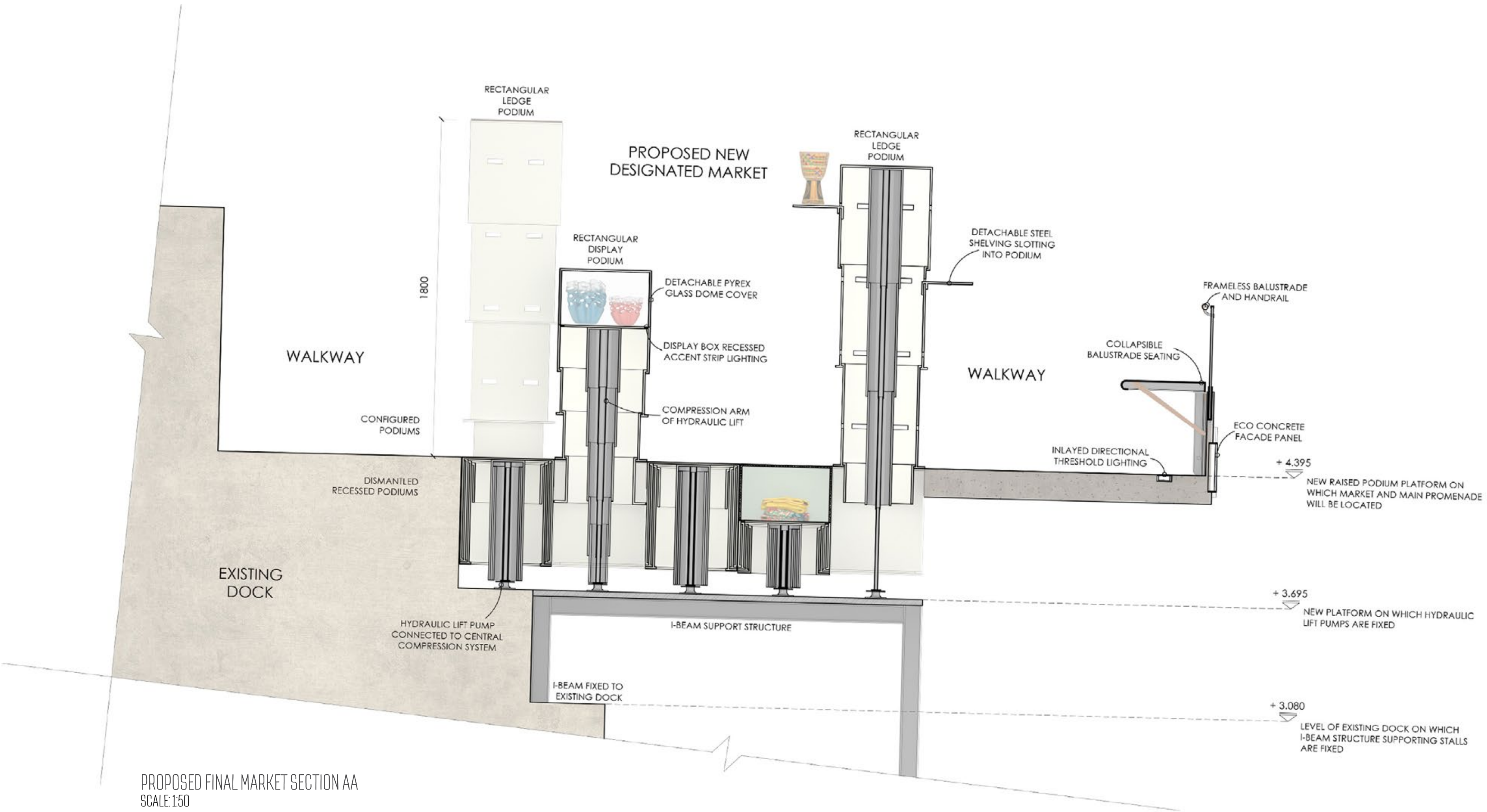
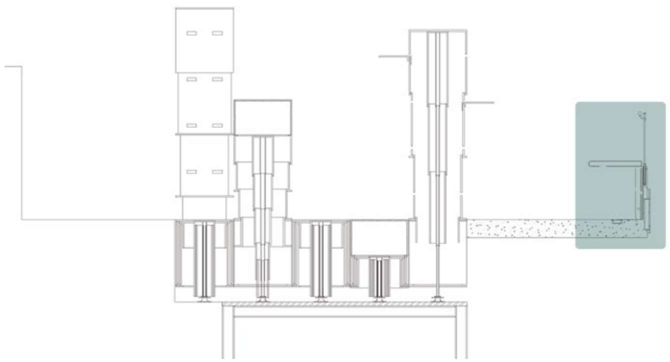
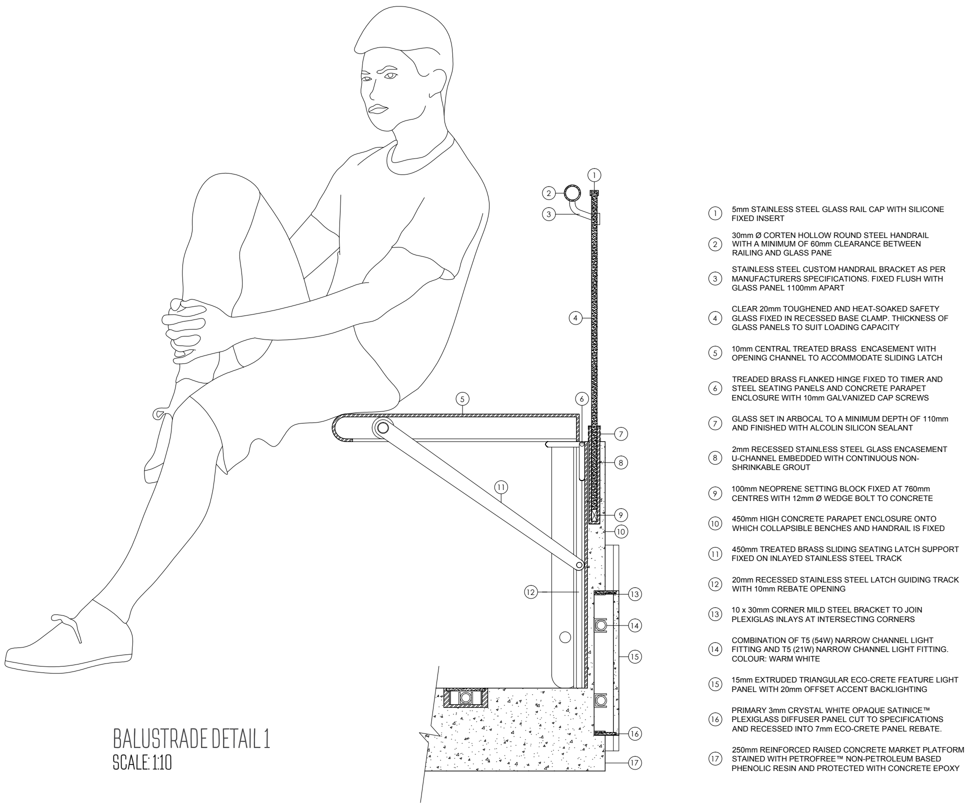


Figure 5.25. Final Sectional Elevation of Proposed Stall Configuration (Author, 2016)





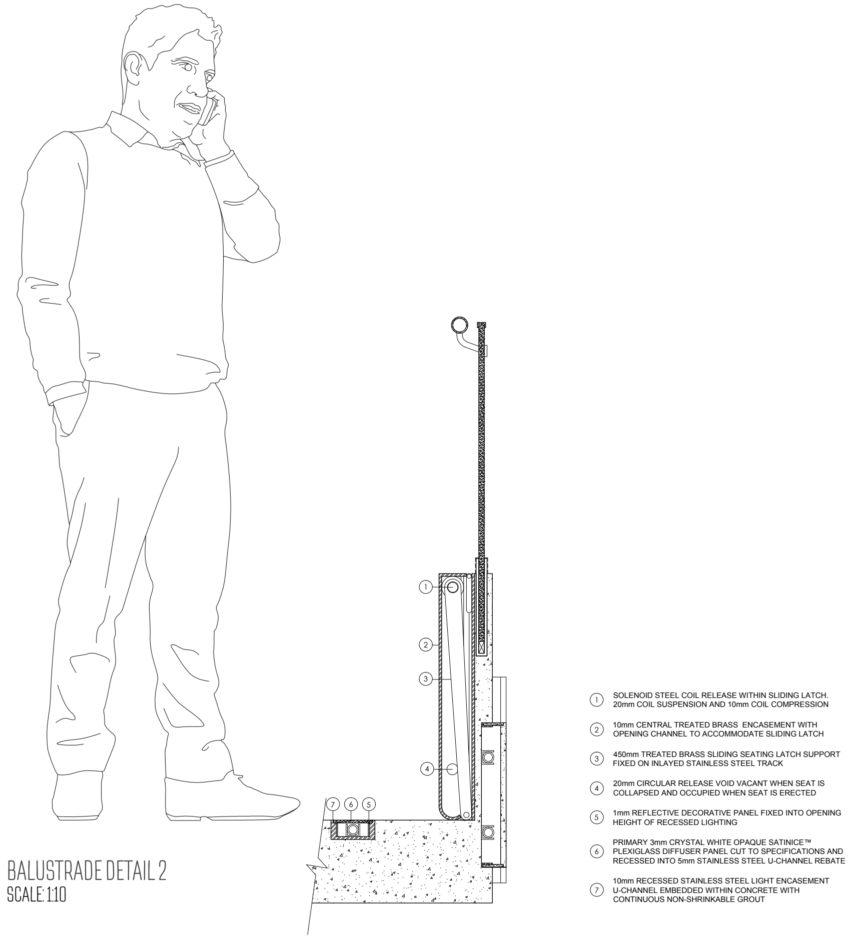


Figure 5.26. Balustrade Bench Detail 1 (Author, 2016)

Figure 5.27. Balustrade Bench Detail 2 (Author, 2016)

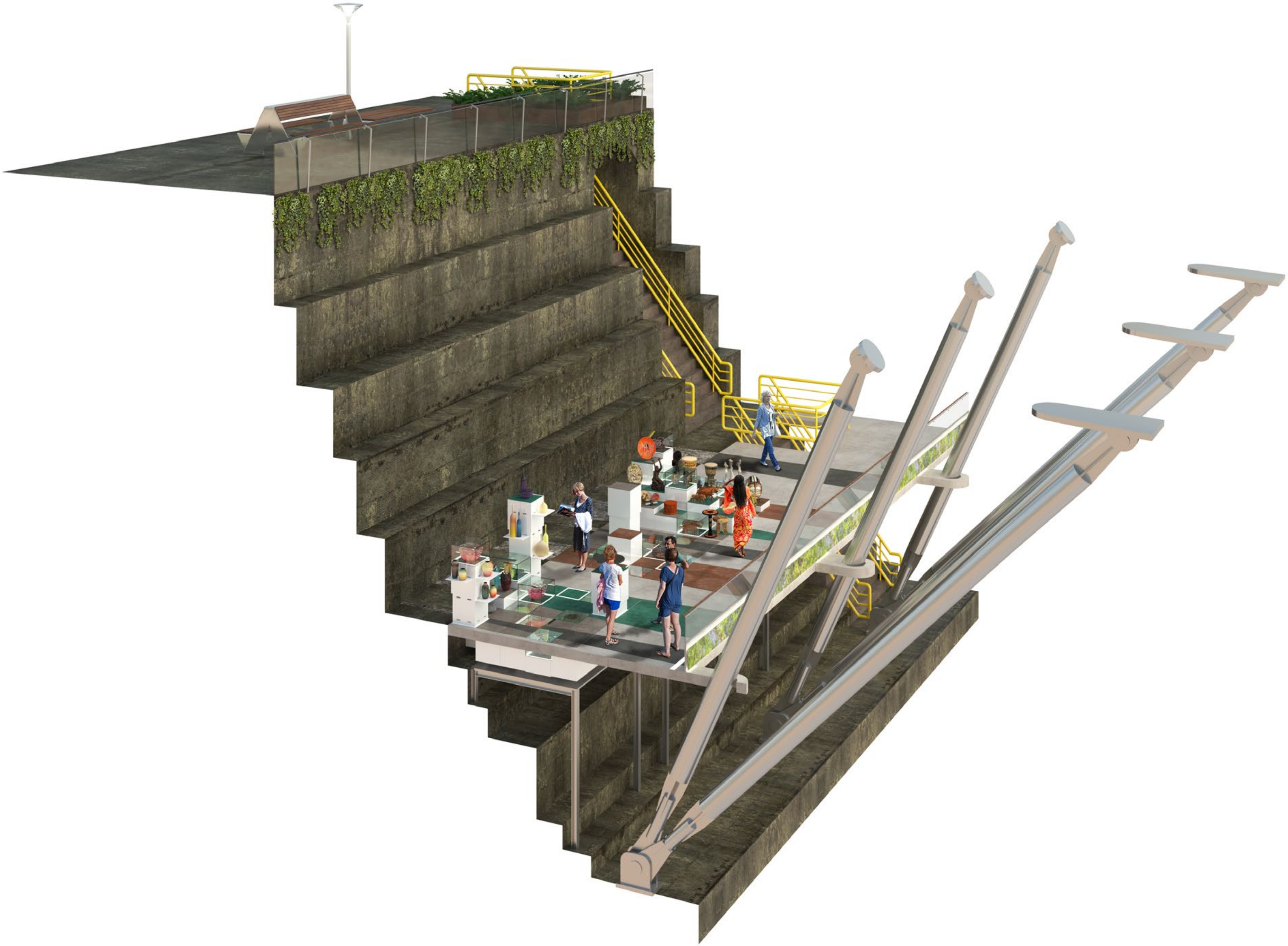


Figure 5.28. Proposed Market Stall Contextualised (Author, 2016)

5.8
INNER INTERIOR

INTERIOR QUALITY IMPROVEMENT

The design of the brewery will be advocated as illustrated in figure 5.30 . Special attention will be directed towards the improvement of **artificial lighting, acoustics and passive ventilation**.

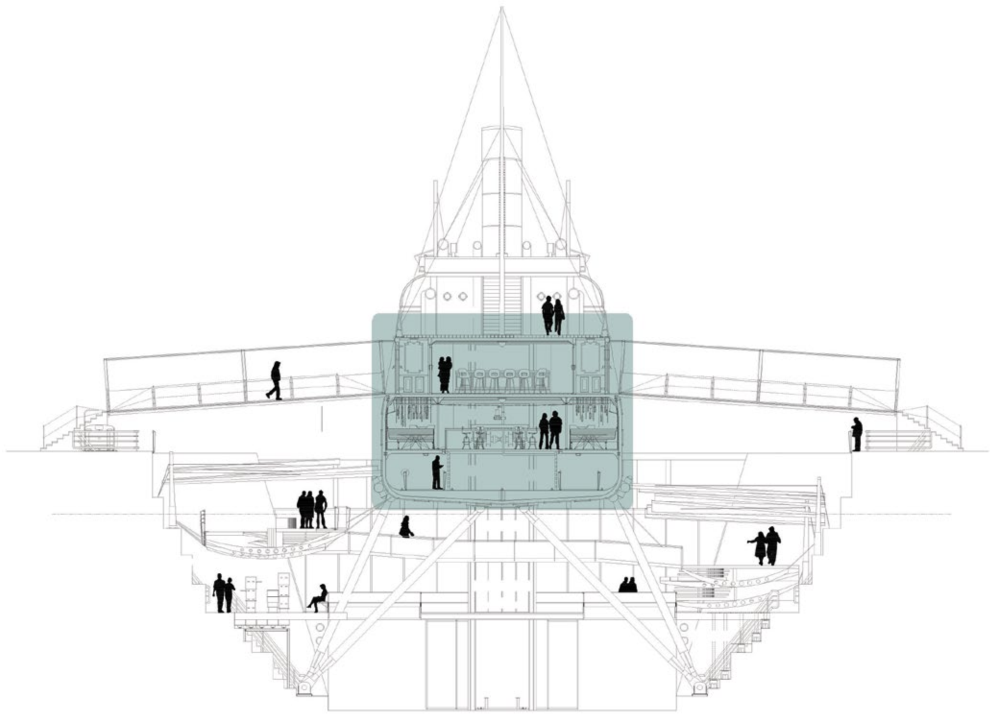


Figure 5.29. Brewery Callout (Author, 2016)

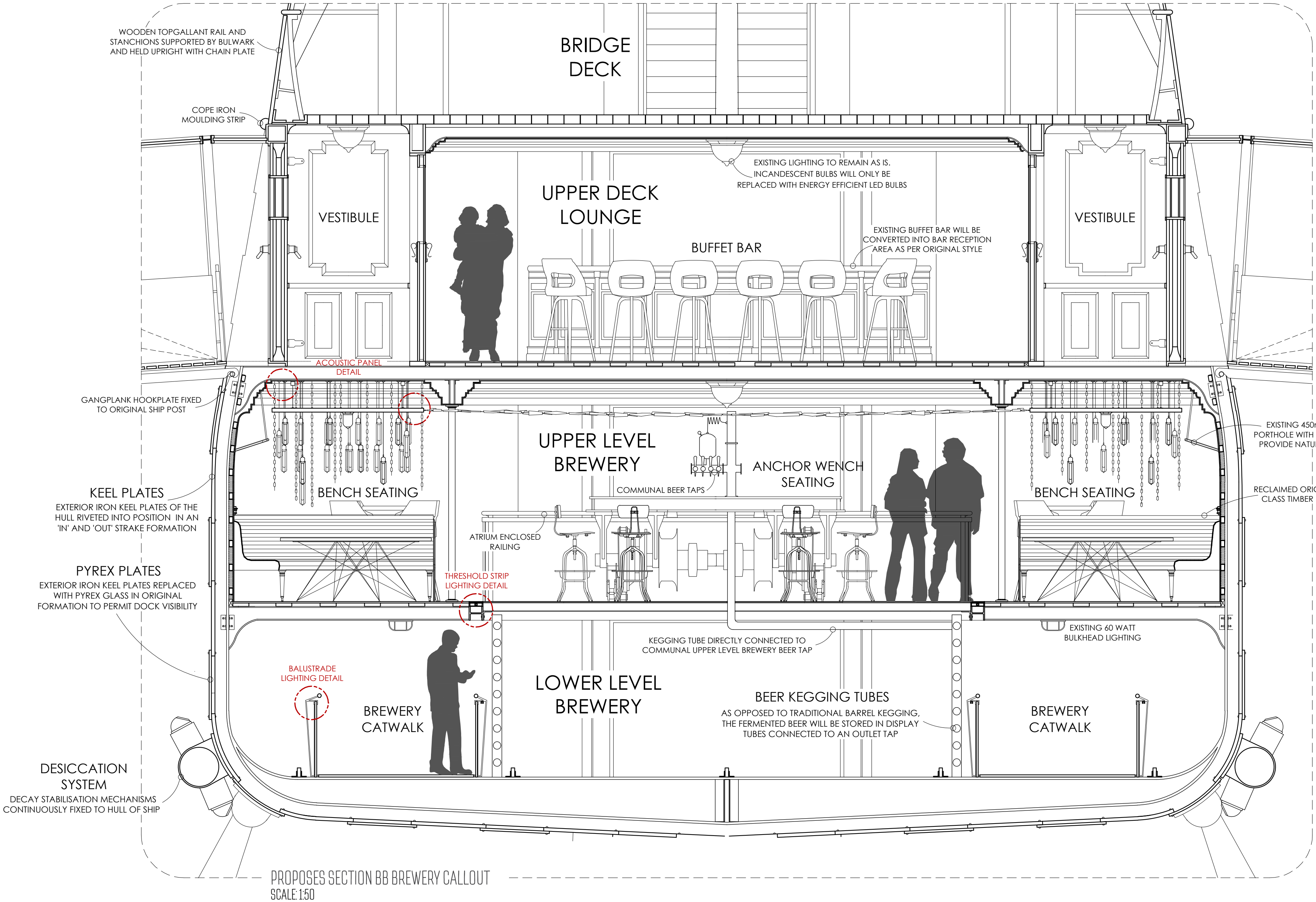


Figure 5.30. Final Section BB Callout of Brewery (Author, 2016)

- LIGHTING -

In addition to the introduced **pendant chain screens**, ambient **strip lighting** will be provided through the **distinct acme of the outer threshold** of the transparent platform (figure 5.31). Furthermore, the addition of **recessed lighting in all railings** (figure 5.32) will provide general **supplementary illumination and dictate direction**. The overall approach to illumination administrates mere **installment of ambient lighting to supplement existing lighting**. These additions should **accentuate, and not supersede the surviving** - both in **aesthetics and radiance**.

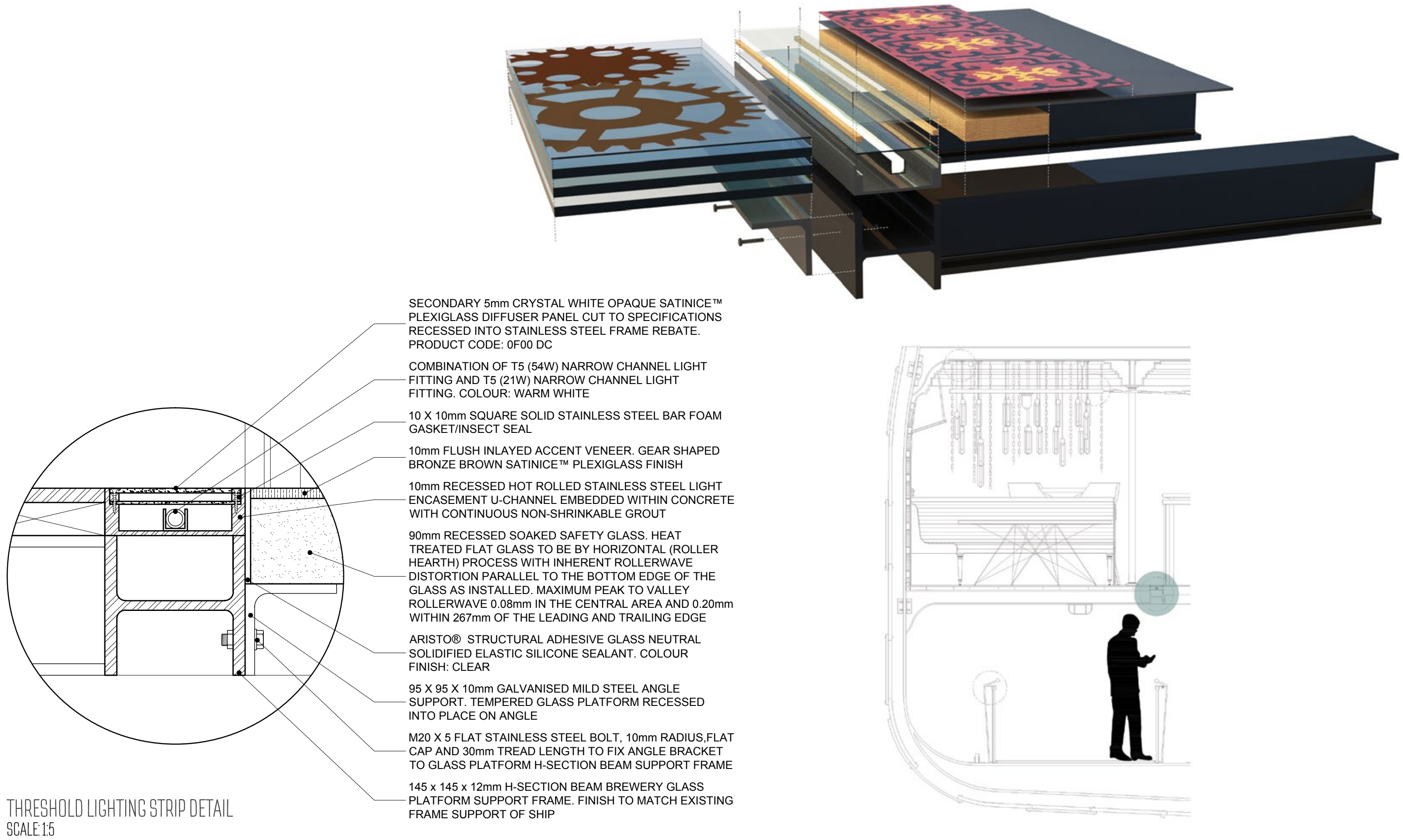
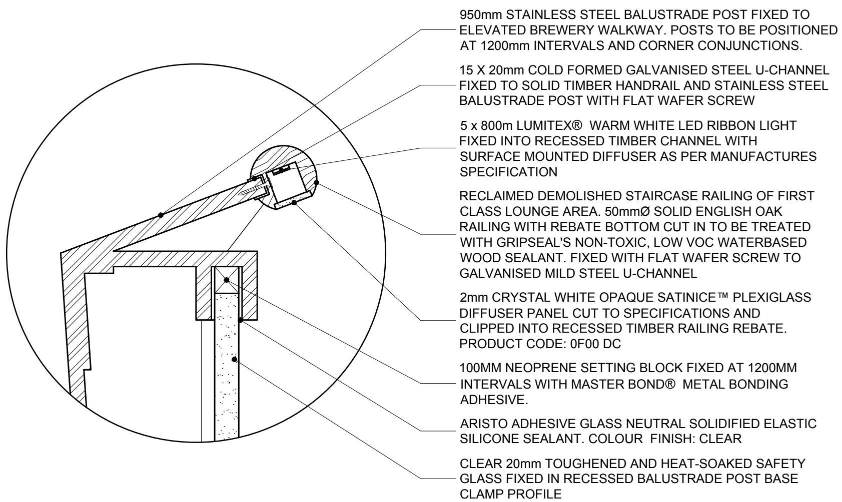


Figure 5.31. Threshold Lighting Strip Assembly and Construction Detail (Author, 2016)



BALUSTRADE LIGHTING DETAIL
SCALE 1:5

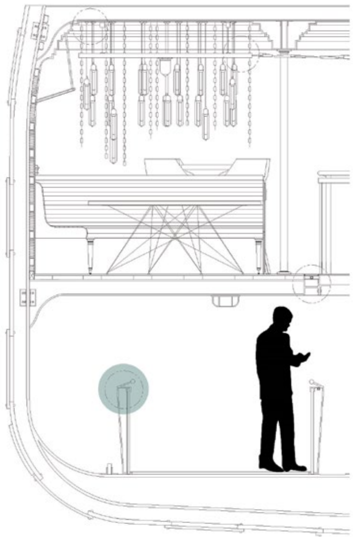
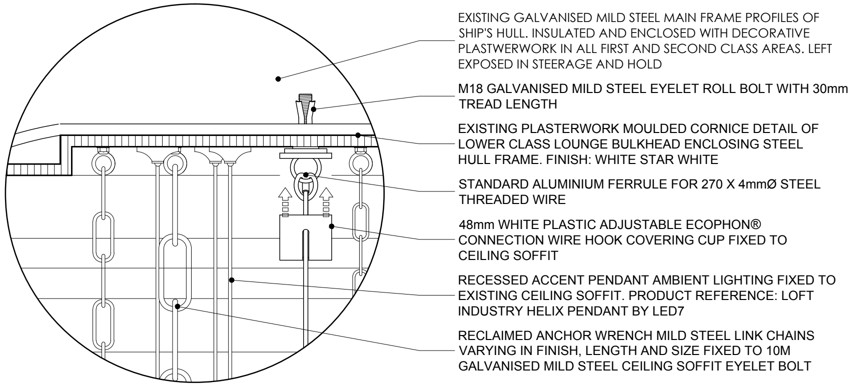


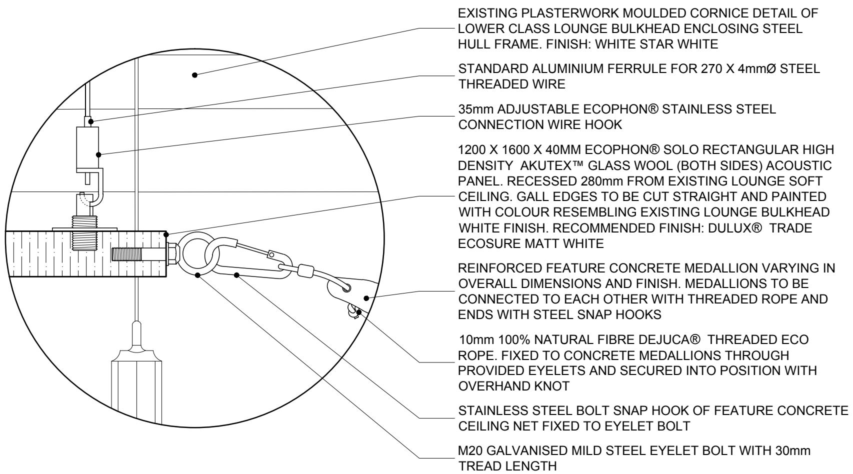
Figure 5.32. Balustrade Lighting Assembly and Construction Detail (Author, 2016)

- ACOUSTICS -

In order to provide **acoustic insolation and limit sound diffusion** on the upper level of the brewery, recessed **Ecophon panels** are inserted over seating areas in bulkheads cavities with the original lighting installed thereon (figure 5.33). The addition of a feature **ceiling lattice**, comprised out of concrete medallions and inspired by a traditional fishing net, provide **supplementary auditory absorption and limits sound generation** (figure 5.34).



ACOUSTIC PANEL DETAIL 1
SCALE 1:5



ACOUSTIC PANEL DETAIL 2
SCALE 1:5

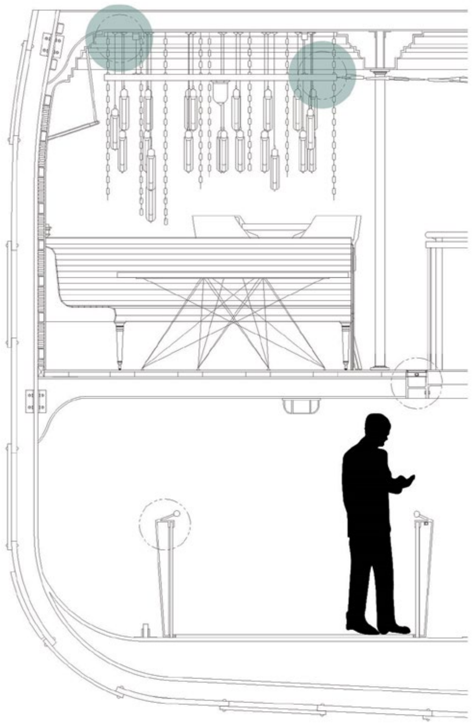
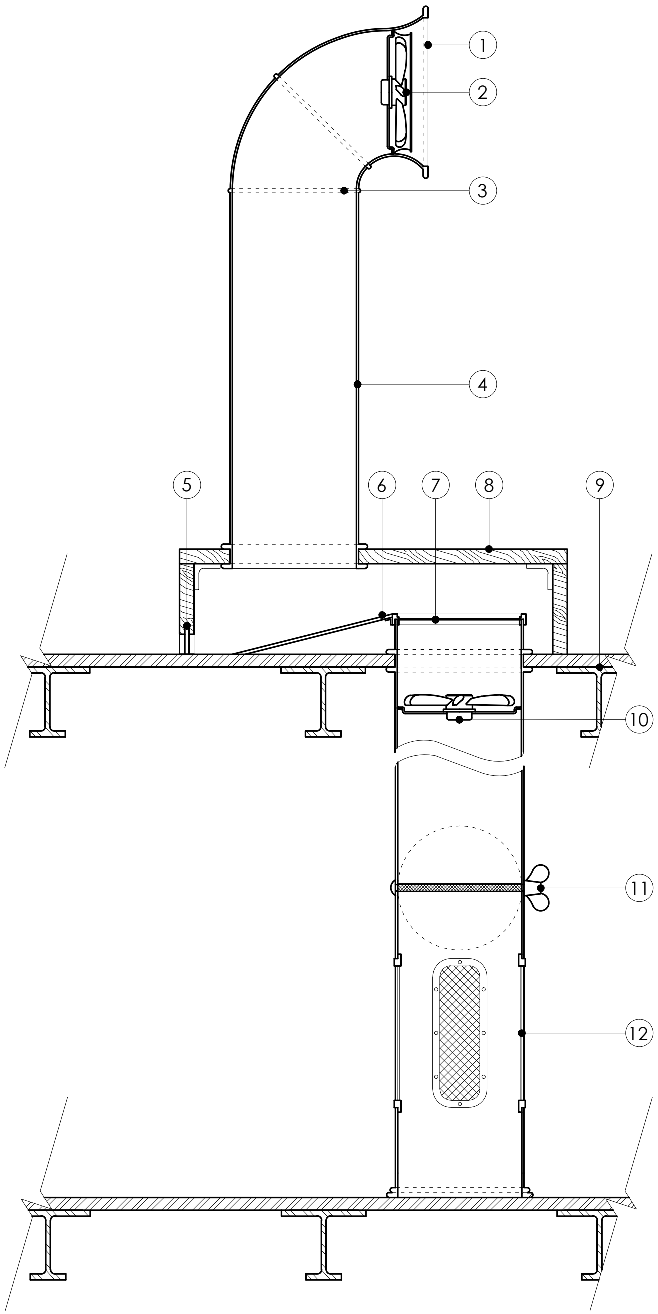


Figure 5.33. Acoustic Construction Detail (Author, 2016)

Figure 5.34. Acoustic Assembly and Concrete Medallion Feature (Author, 2016)

– PASSIVE VENTILATION –

The amendment of the existing dorade box ventilation is proposed in order to **reinstate and improve the interior quality** of the brewery. Being that the ship is **stationary**, these vents **no longer perform optimally**. Resolution advises the addition of an **encircled energy efficient line-in ventilation fan**, which will draw cool air into the existing baffle, and **amplify circulation and inlet pressure**. Furthermore, an **auxiliary fan** is located in the secondary baffle that will **intensify volume flow rates** and provide **adequate interior ventilation**. The addition of a **control plate will consent jurisdiction** over the incoming air.



1. EXISTING HORN-SHAPED FORWARD FACING MILD STEEL DORADE VENT COWL OPENING WITH CLEAR WIDTH OF 400Ø. POWDER COATED AS PER ORIGINAL WHITE STAR APPLICATION STANDARDS. COLOUR: YELLOW GOLD
2. PROPOSED ENERGY EFFICIENT LINE-IN VENTILATION FAN WITH AEROFOIL SECTION ALUMINIUM DIE-CAST BLADES. VOLUME FLOW RATES UP TO 62,000 m³/h AND STATIC PRESSURE INCREASE UP TO 300 Pa. AXIAL BOLTED, MOUNTED FOR SHORT BELL MOUTH FLOW WITH APPROPRIATE GUARD GRILLE AND PRESSURE SIDE
3. VERTICAL BAFFLE WORKING JOINT TO PERMIT CHANGE OF ANGLE AS DICTATED BY CHANGE OF WIND DIRECTION
4. PRIMARY INTERLEAVING VERTICAL BAFFLE WITH A CLEAR WIDTH OF 350Ø. ELEVATED FROM DECK AND FIXED TO DORADE CASING TO PERMIT FREE FLOWING VENTILATION
5. STAINLESS STEEL PERFORATED LIMBER HOLE MESH WITH TO PERMIT OUTFLOW OF EXCESSES CHAMBER VAPOR ACCUMULATION
6. STAINLESS STEEL DOWN-FLOW CHAMBER PANEL TO DIRECT IMMEDIATE SEA WASH AND CONDENSED VAPOR TOWARDS AVAILABLE OUTLET
7. PROPOSED STAINLESS STEEL FLY SCREEN MESH CANOPY TO ENCLOSE SECONDARY INLET BAFFLE
8. EXISTING TIMBER DORADE BOX CASING WITH ENCLOSED CHAMBERS AND FIXED INLET AND OUTLET BAFFLES
9. EXISTING FLUSHED STEEL DECKING FIXED ON GALVANISED MILD STEEL MAIN FRAME PROFILES OF SHIP'S HULL
10. PROPOSED SECONDARY ENERGY EFFICIENT AXIAL VENTILATION FAN WITH AEROFOIL SECTION ALUMINIUM DIE-CAST BLADES. VOLUME FLOW RATES UP TO 62,000 m³/h AND STATIC PRESSURE INCREASE UP TO 300 Pa. AXIAL BOLTED, MOUNTED FOR ADDITIONAL SHORT BELL MOUTH FLOW
11. PROPOSED CONTROL PLATE TO MEDIATE PERMITTED INLET AIR INTO INTERIOR. CALIBRATED WITH PRIMARY LINE-IN AND SECONDARY AXIAL FAN TO ADJUST/STOP FLOW RATE
12. SECONDARY BAFFLE AIR OUTLET VENTILATION OPENING POSITIONED 500mm AFFL. ENCLOSED WITH DECORATIVE STAINLESS STEEL MESH GRILL AS PER ORIGINAL MANUFACTURING SPECIFICATIONS

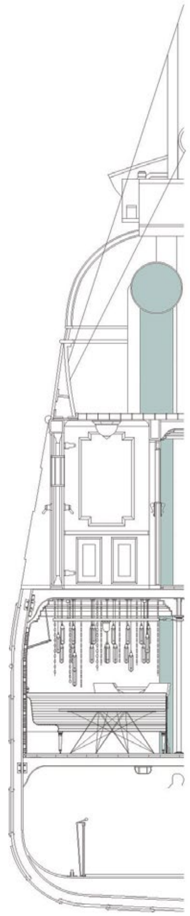
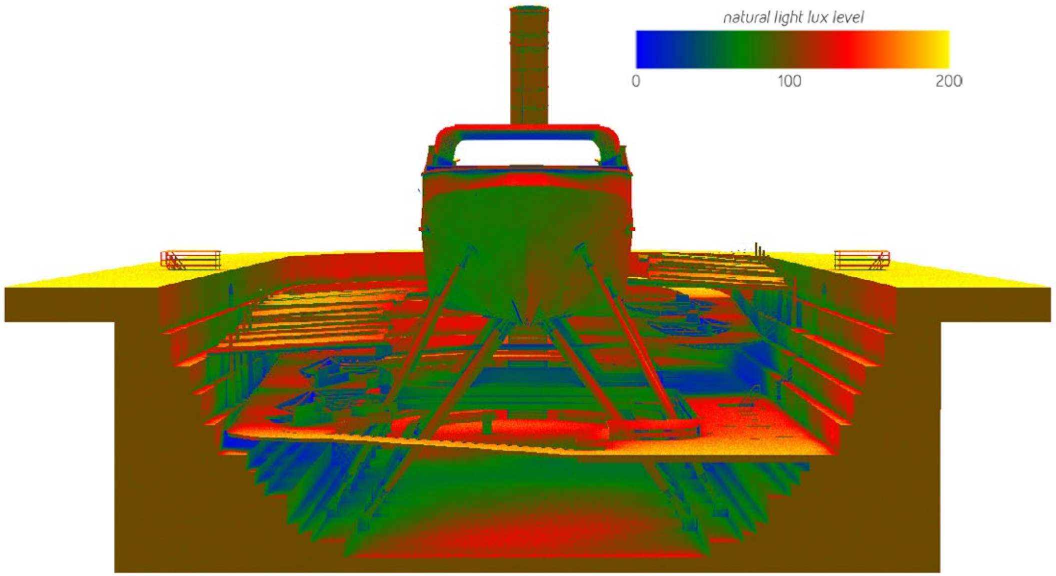


Figure 5.35. Proposed Dorade Vent (Author, 2016)

5.9
DOCK ILLUMINATION

Subsequently to the **addition of any element** to a once desolated setting, **spatial alteration will occur**. One of these amendments that were noted upon technical resolution, is the **lack of natural light in the lower dock** areas due to the **addition of an outer interior**. Figure 5.38 - 5.41 analytically illustrates the effect of the added components on **light availability** atop the dock's bed. The final arrangement, as depicted in figure 5.37, shows the **fractional hindrance of natural illumination** and consents intercession. The addition of **adjustable track lighting fixed to the hull's desiccation system**, enables **equal distribution of light** to the **platform, ramp and lower dock area** (refer to figure 5.36). Auxiliary resolution is to follow.



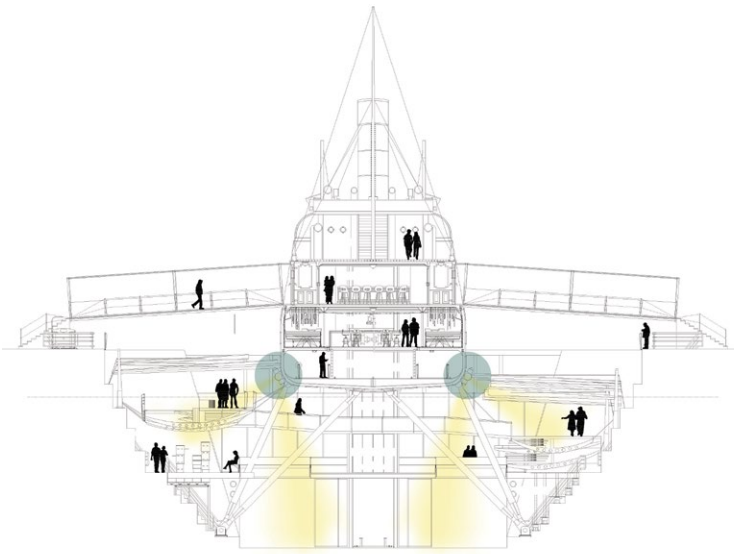


Figure 5.36. Artificial Light Rail Attached to Hull Desiccation System (Author, 2016)

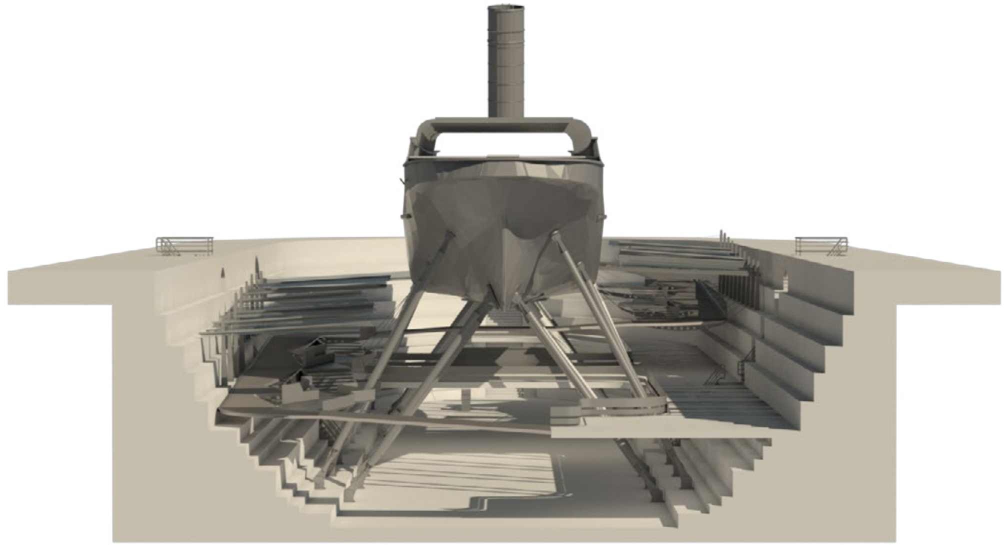


Figure 5.37. Illumination and Shadow Cast in Dock by New Intervention (Author, 2016)

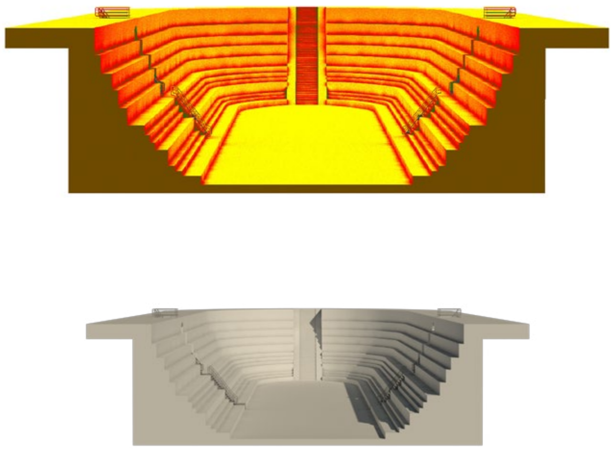


Figure 5.38. Original Illumination and Shadow Cast (Author, 2016)

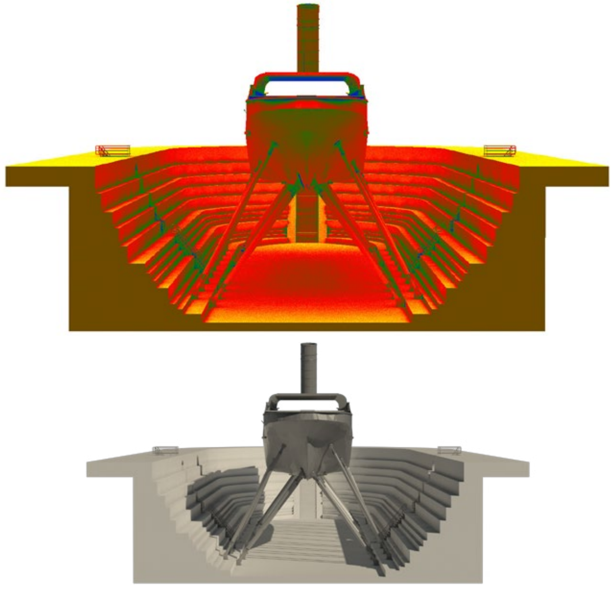


Figure 5.39. Illumination and Shadow Cast by Ship (Author, 2016)

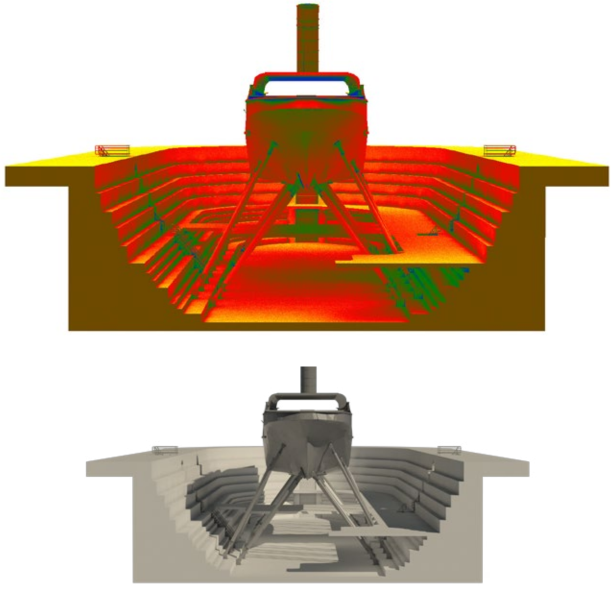


Figure 5.40. Illumination and Shadow Cast by Ship and Platform (Author, 2016)

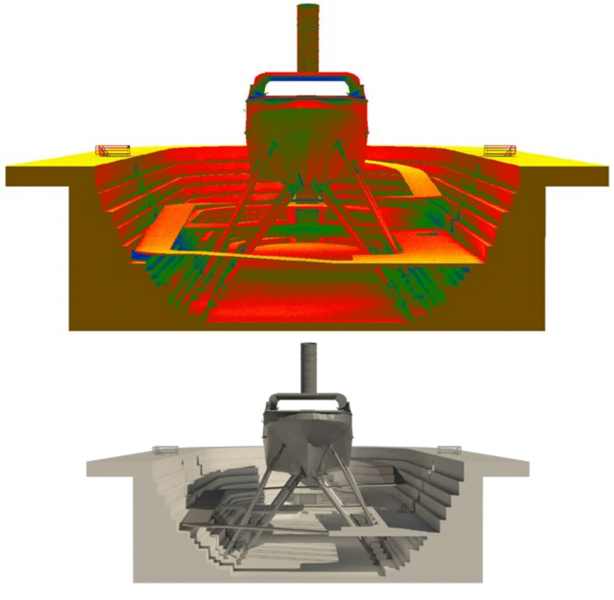


Figure 5.41. Illumination and Shadow Cast by Ship, Platform and Ramp (Author, 2016)

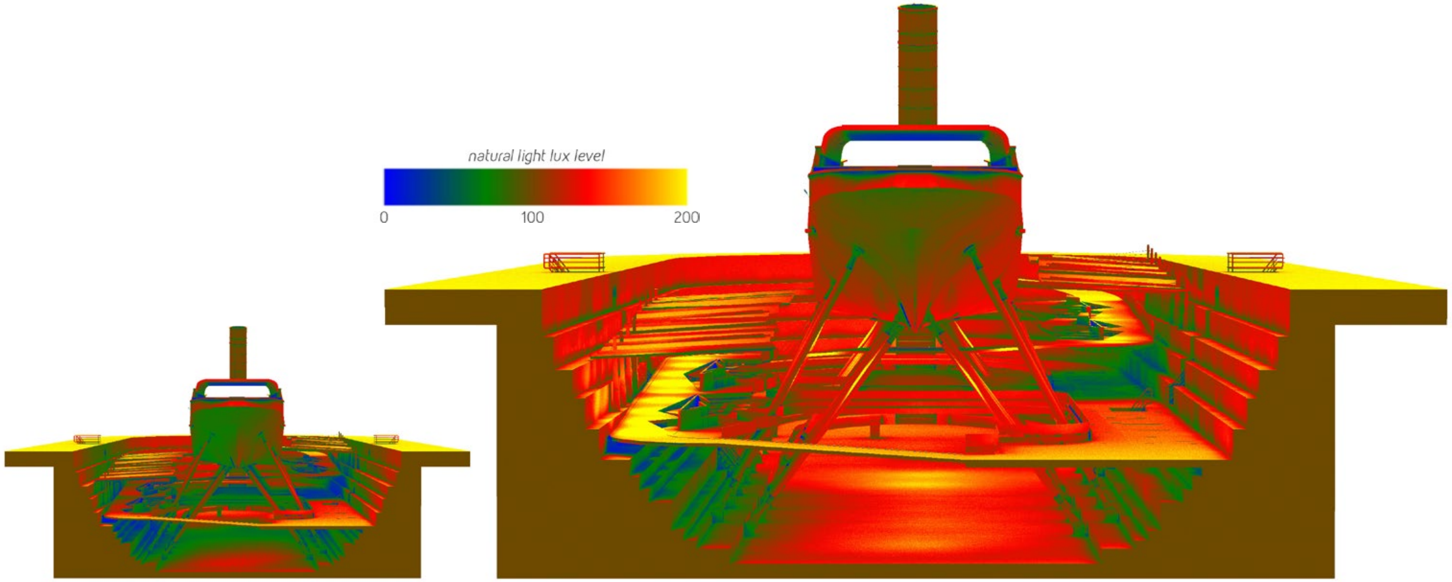


Figure 5.42. Proposed Dock Illumination Levels with Desiccation Lighting (Author, 2016)

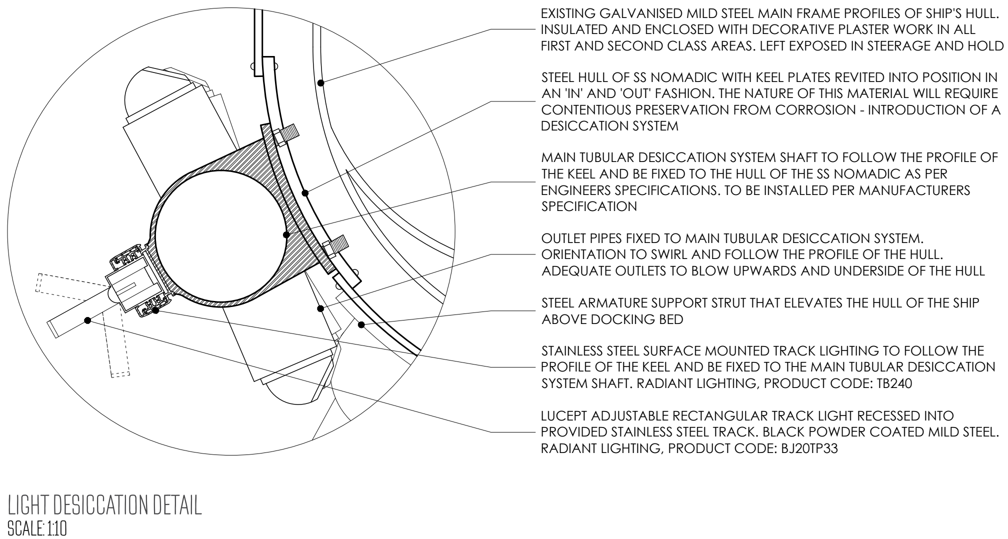


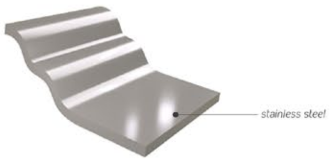
Figure 5.43. Proposed Dock Desiccation Detail (Author, 2016)

5.10

LAYERED MATERIALITY

Before immediate material application commenced, precedent investigation was directed towards possible **product selection**. Utilising the **obtained theoretical knowledge** associated with metallic and organic coated metals, a selection of **layered metals** produced by **ArcelorMittal** is dissected in order to determine their characteristics. As observed in the below chart, the actual representation of these metals create a **material palimpsest**, which exemplifies the envisioned implementation of **materiality as a tool of layering**.

STAINLESS STEEL



TYPE OF COATING:
metal | organic

CONSTITUTION:
at least 11% of chromium
ferritic, austenitic and duplex

DESIGN APPLICATION:
roofing, cladding, siding, cassette, structural decking, flooring. furniture and various consumer items

INTERIOR HUMIDITY:
304
low | medium | high
316 L
low | medium | high

APPEARANCE:
mat aspect, semi- mat aspect or light brushed aspect

MAIN PROPERTIES:
very high protection against corrosion, high sun reηectivity and long durability of brightness

INCOMPATIBILITIES:
non protected steel

REGIONAL USAGE:
316 L
urban | industrial | coastal

COR-TEN

TYPE OF COATING:
metal | organic

CONSTITUTION:
depending on product
indaten fabricated metal

DESIGN APPLICATION:
roofing, cladding, siding and cassette

INTERIOR HUMIDITY:
CO 100
low | medium | high

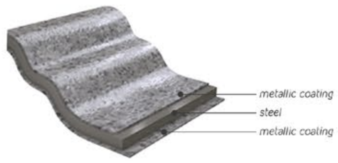
APPEARANCE:
this steel develops a purlish brown patinathatchanges depending the natural environment and thetim ing. to ensure a nice aspect, proper management of run- off water is required to avoid staining

MAIN PROPERTIES:
very high protection against corrosion, high sun reηectivity and long durability of brightness

INCOMPATIBILITIES:
permanent humidity and water retention corrosive smokes, contact with de-icing salt

REGIONAL USAGE:
CO 100
urban | industrial | coastal

KRISTAL



TYPE OF COATING:
metal | organic

CONSTITUTION:
aluminized steel with a composition of 4 % of zinc, and 1.6 % of silicium

DESIGN APPLICATION:
roofing, cladding, siding and cassette

INTERIOR HUMIDITY:
AL 185
low | medium | high

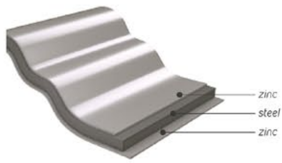
APPEARANCE:
no spangle and homogeneous metallic aspect

MAIN PROPERTIES:
very high protection against corrosion, high sun reηectivity and long durability of brightness

INCOMPATIBILITIES:
copper, lead, non protected steel, wet concrete, alkalinity. brasing with tin-lead alloy is forbidden.
anti-bacteriological, fire-resistant, durable and versatile

REGIONAL USAGE:
AL 185
urban | industrial | coastal

GALVANISED STEEL



TYPE OF COATING:
metal | organic

CONSTITUTION:
metallic coating of at least 99% of zinc (defined by z)

DESIGN APPLICATION:
roofing and cladding, structural decking and floor, trays, furniture, veneers and partitioning

INTERIOR HUMIDITY:
Z 275
low | medium | high
Z 350
low | medium | high

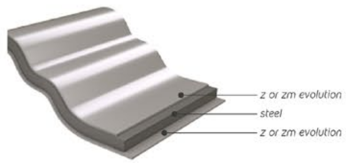
APPEARANCE:
no spangle and homogeneous metallic aspect

MAIN PROPERTIES:
anti-bacteriological, fire-resistant, durable and versatile

INCOMPATIBILITIES:
copper, lead, non protected steel, plaster, wood acids, oak and chesnut

REGIONAL USAGE:
Z 350
urban | industrial | coastal

ZM EVOLUTION



TYPE OF COATING:
metal | organic

CONSTITUTION:
metallic coating based on zinc- aluminium magnesium alloy defined by 'ZM'

DESIGN APPLICATION:
roofing and cladding, structural decking and floor, trays and partitioning

INTERIOR HUMIDITY:
ZM080
low | medium | high
ZM275
low | medium | high

APPEARANCE:
homogeneous, grey, spangle-free aspect very low waviness allowing nice aspect

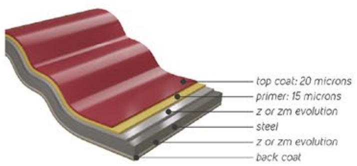
MAIN PROPERTIES:
anti-bacteriological, fire-resistant, durable and versatile

INCOMPATIBILITIES:
copper, lead, non protected steel, plaster, wood acids, oak and chesnut.
brasing with tin- lead alloy is not suitable.

REGIONAL USAGE:
ZM275
urban | industrial | coastal

Figure 5.44. Charted Layered Metals - Part 1 (Author, 2016)

HAIRULTRA



TYPE OF COATING:
metal | organic

CONSTITUTION:
thermosetting polyester resin

FRONT:
5 µm of primer- 20 µm of top coat

BACK:
back coatclass II or category CPI2

DESIGN APPLICATION:
interior | exterior
cladding, structural decking and floor, trays, internalside of sandwich panels and veneer finishes

APPEARANCE:
no pattern, smooth painted appearance

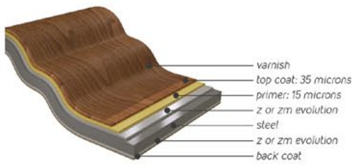
MAIN PROPERTIES:
good resistance to corrosion, color and appearance stability, outdoordurability and forming ability

SALT SPRAY TEST:
500 hours

HUMIDITY RESISTANCE:
1500 hours

REGIONAL USAGE:
urban | industrial | coastal

EDYXO



TYPE OF COATING:
metal | organic

CONSTITUTION:
thermosetting polyester resin

FRONT:
5 µm of primer- 35 µm of top coat and transparent varnish

BACK:
back coatclass II or category CPI2

DESIGN APPLICATION:
interior | exterior
cladding, structural decking and floor, trays, internalside of sandwich panels and veneer finishes

APPEARANCE:
patterned, smooth, glossy appearance

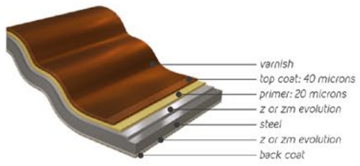
MAIN PROPERTIES:
good resistance to corrosion, color and appearance stability, outdoordurability and forming ability

SALT SPRAY TEST:
500 hours

HUMIDITY RESISTANCE:
1500 hours

REGIONAL USAGE:
urban | industrial | coastal

INTENSE



TYPE OF COATING:
metal | organic

CONSTITUTION:
polyvinylidene fluoride resin (70%)

FRONT:
20 µm of primer - 40 µm of PVDF top coat and transparent varnish

BACK:
back coatclass II or category CPI2

DESIGN APPLICATION:
interior | exterior
cladding, structural decking and floor, trays, facades and elevaional finishes

APPEARANCE:
smooth, robust and semi-glossy appearance

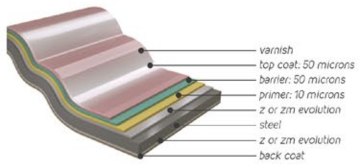
MAIN PROPERTIES:
for metallized colors, resistance to chemical agents, corrosion, ultraviolet rays, abrasion and erosion excellent color and appearance stability, very good flexibility and anti- staining properties

SALT SPRAY TEST:
750 hours

HUMIDITY RESISTANCE:
1500 hours

REGIONAL USAGE:
urban | industrial | coastal

PEARL



TYPE OF COATING:
metal | organic

CONSTITUTION:
polyvinylidene fluoride resin (70%)

FRONT:
10 µm of primer - 50 µm of PVDF top coat and transparent varnish

BACK:
back coatclass II or category CPI2

DESIGN APPLICATION:
interior | exterior
cladding, structural decking and floor, trays, facades and elevaional finishes

APPEARANCE:
smooth, high gloss appearance

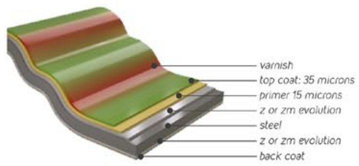
MAIN PROPERTIES:
excellent anti- staining properties excellent resistance to chemical agents, ultraviolet rays, corrosion, abrasion and erosion, good coloranid appearance stability and very good flexibility

SALT SPRAY TEST:
750 hours

HUMIDITY RESISTANCE:
1500 hours

REGIONAL USAGE:
urban | industrial | coastal

IRYSA



TYPE OF COATING:
metal | organic

CONSTITUTION:
thermosetting high durability polyester resin

FRONT:
15 µm of primer - 35 µm of top coat and transparent varnish

BACK:
back coatclass II or category CPI2

DESIGN APPLICATION:
interior | exterior
cladding, structural decking and floor, trays, facades and elevaional finishes

APPEARANCE:
grained aspect, high gloss

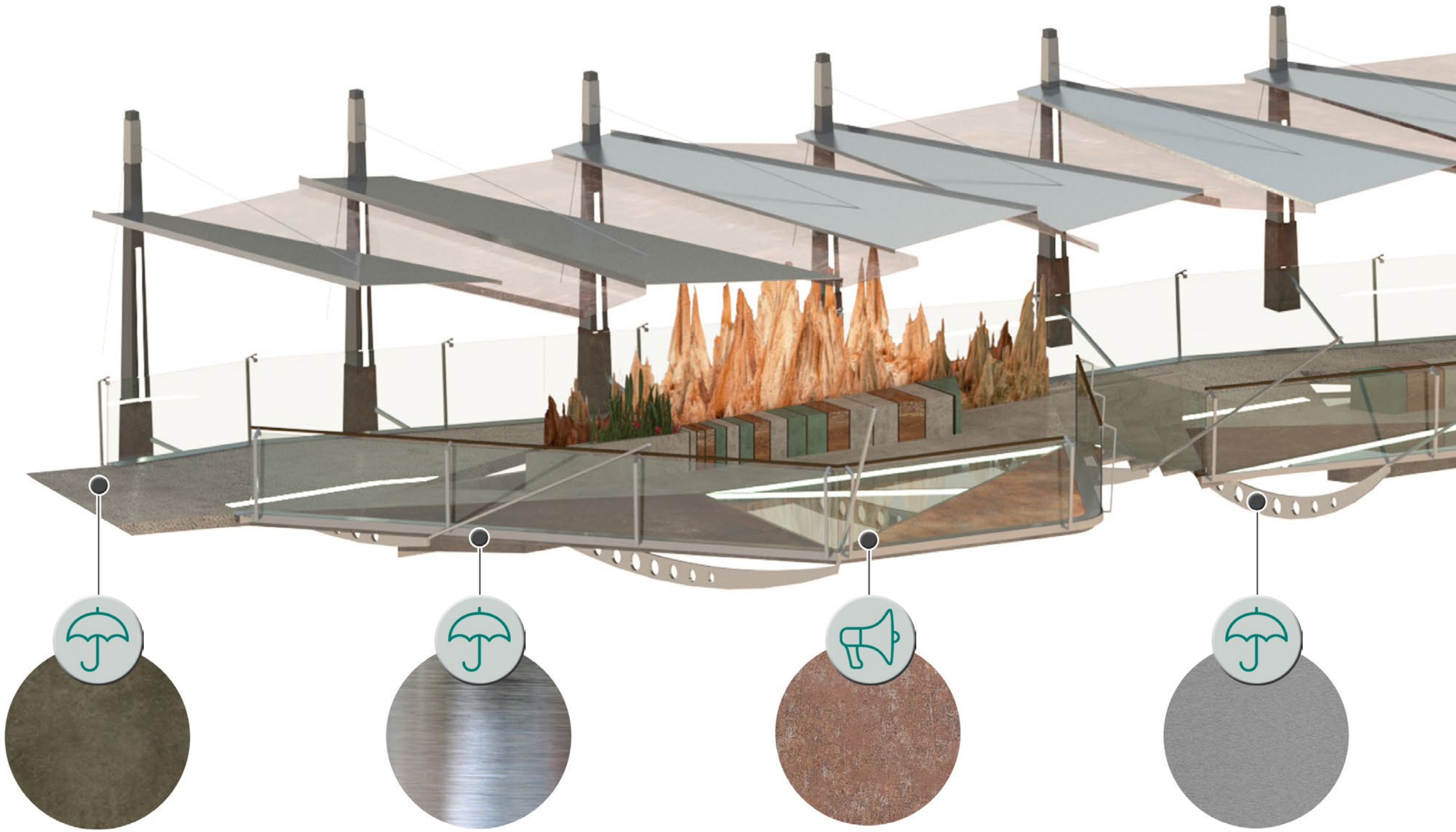
MAIN PROPERTIES:
excellent resistance to ultraviolet rays, good color and appearance stability, and reinforced anti- staining properties

SALT SPRAY TEST:
500 hours

HUMIDITY RESISTANCE:
1500 hours

REGIONAL USAGE:
urban | industrial | coastal

Figure 5.45. Charted Layered Metals - Part 2 (Author, 2016)



PRODUCT
lafarge ultra light concrete

APPLICATION
scenic ramp walkway

APPEARANCE
light textured, dove grey surface

SPECIFICATION
structural lightweight 150mm slab as per engineers specification. reinforced fiberglass aggregate

PRESERVATION STRATEGY
agent against structural degradation. appearance to fade with time

PRODUCT
316 L stainless steel

APPLICATION
ramp railing and kerb

APPEARANCE
light brushed, semi-gloss finish

SPECIFICATION
very high protection against corrosion, high sun reflectivity and long durability of brightness

PRESERVATION STRATEGY
agent against structural and aesthetical degradation

PRODUCT
arcilormittal indaten steel

APPLICATION
accent walkway cladding

APPEARANCE
rough surface, brown patina layer

SPECIFICATION
when exposed to the natural environment a protective patina armor develops that imitates aged steel

PRESERVATION STRATEGY
agent against structural and controlled aesthetical degradation

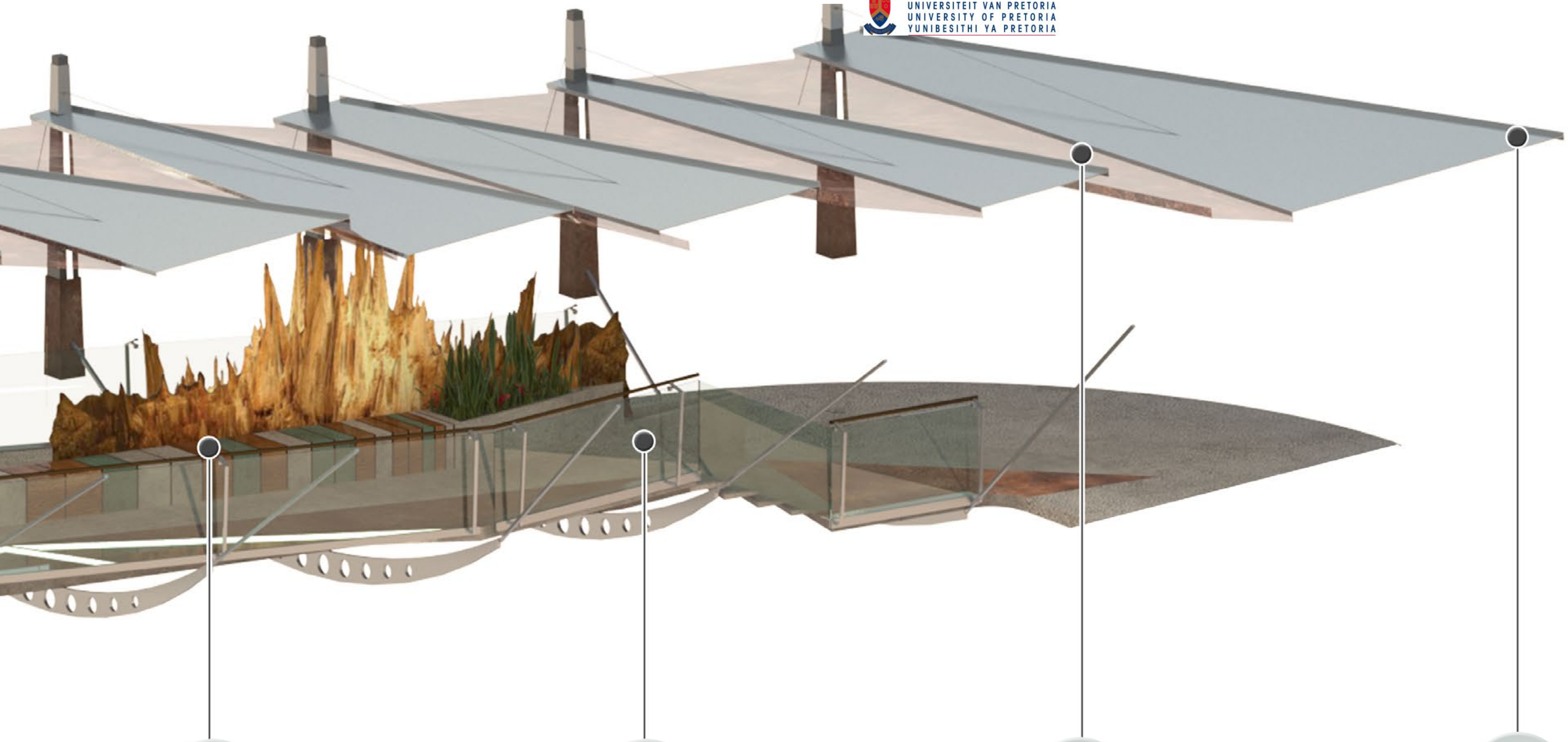
PRODUCT
arcilormittal kristal steel

APPLICATION
suspended structural frame of ramp

APPEARANCE
homogeneous metallic aspect

SPECIFICATION
very high protection against corrosion, high sun reflectivity and long durability of brightness

PRESERVATION STRATEGY
agent against structural and aesthetical degradation



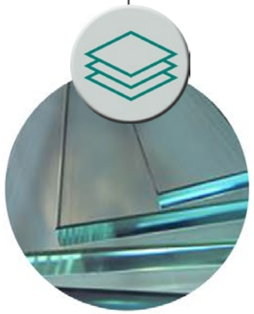
PRODUCT
arcilormittal edyzo steel

APPLICATION
accent cladding for ramp seating

APPEARANCE
smooth & glossy timber veneer

SPECIFICATION
very high protection against corrosion, high sun reflectivity and long durability of brightness

PRESERVATION STRATEGY
varnished against structural and aesthetical degradation



PRODUCT
tempered smartglass armourplate

APPLICATION
ramp inlay and railings

APPEARANCE
clear or sandblast appearance

SPECIFICATION
bolted structural glazing and frameless application as per safety glass requirements of SANS 1263, Part 1

PRESERVATION STRATEGY
material resistant to actual degradation and corrosion

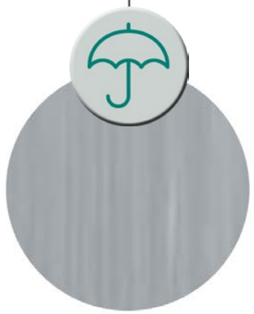
PRODUCT
rust stained duroplastic polycarbonate

APPLICATION
accent canopy panel of ramp

APPEARANCE
semi-trasparent sandblasted rust overlay

SPECIFICATION
toughened transparent plastic to be bolted in place with connected zm evolution panels

PRESERVATION STRATEGY
stain and corrosion resistant with limited colour fading



PRODUCT
arcilormittal zm evolution steel

APPLICATION
canopy roof panel of ramp

APPEARANCE
smooth & matte brushed finish

SPECIFICATION
light weight protected steel used at angles to direct water into basins. corrosion and stain resistant

PRESERVATION STRATEGY
coating against structural and aesthetical degradation

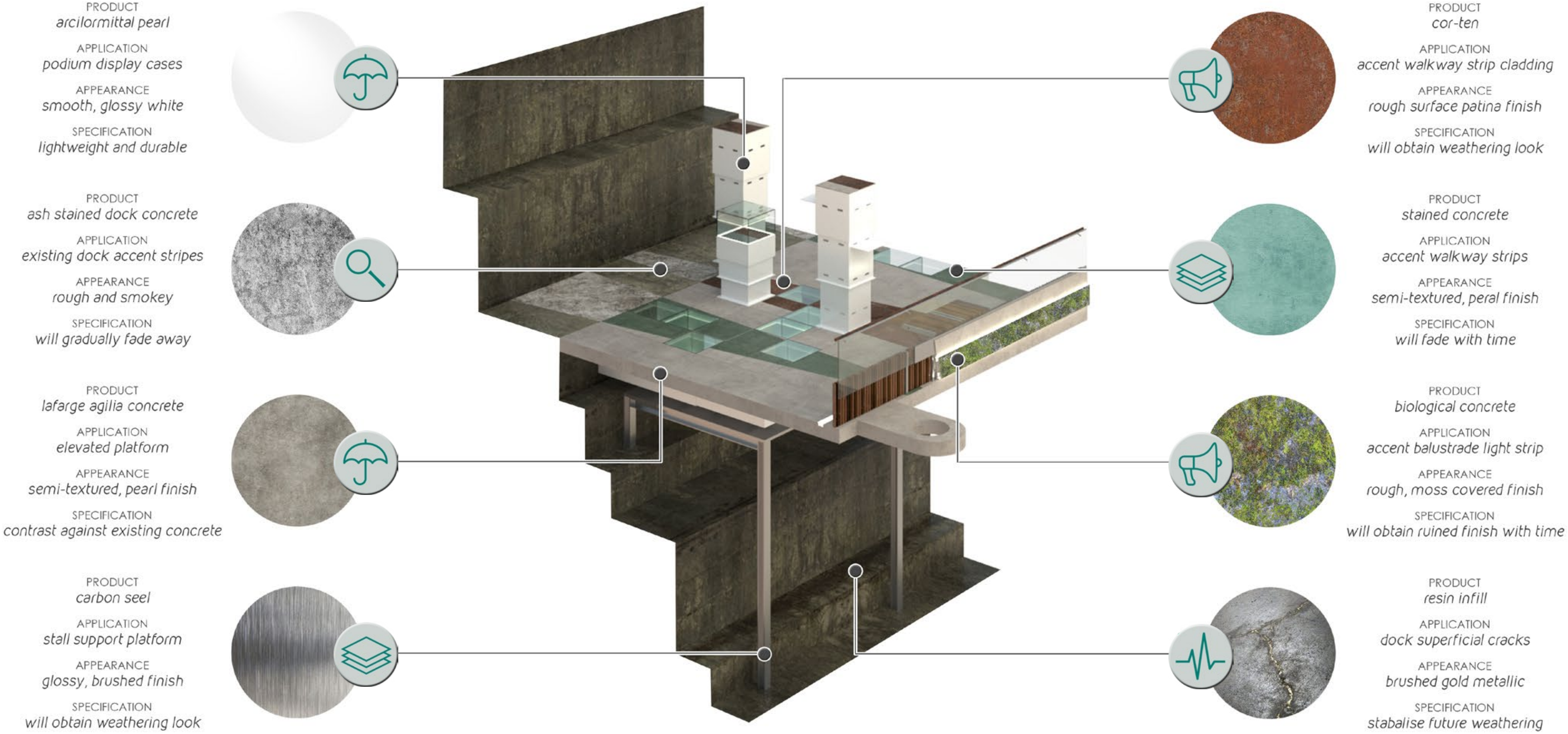


Figure 5.46. Stall Material Application (Author, 2016)

Figure 5.47. Brewery Interior Material Application (Author, 2016)

5.10
GREEN STAR RATING

Upon conclusion of the implemented design, the **overall ecological appraisal of the spatial mediation can be determined** through actual assessment. As governed under the field of **Environmental Potential**, s**ustainable and ecological design** is desired that consider and promote **eco-systemic and holistic approaches**. The **Green Star** assessment of the **brewery as interior** will provide factual evidence regarding the overall **design nature** of the envisioned implementation.

As illustrated in figure 5.48, the overall design achieves a **five star rating**, recognising and awarding it "**South African Excellence**". The overall score sheet with relevant criteria is depicted in figure 5.49.

Figure 5.48. Assessed Green Star Rating (Author, 2016)

1. Management Catergory
A high overall score was established in the first category. **Strict regulatory methods of implementation was followed**, along with frequent **consultation of specialists** and the **transparent nature** of all conducted activities.

2. Indoor Environmental Quality Category
A moderately high score was achieved in the category. Indoor quality was improved through **passive ventilation, supplementary acoustics and additional lighting**. The introduction of **greenery** along with the **prevention of mould encourages wellbeing**. Specific restrictions and limitations of the actual structure limited a higher score in certain areas.

3. Energy Category
A relatively high score was attained in the third category. The utilisation of **green energy** in the form of **solar powered brewing equipment** and **energy-efficient lighting** limits **greenhouse emission**. Provision of **sub-meeting** provided **continuous awareness** of ongoing consumption.

4. Transport Category
A full score was achieved based on **ideal locality**. Direct access to a **vast array of amenities** is located in **close proximity** to the dock. The utilisation of **public transport is encouraged** through the MyCity BRT System, and **pedestrian activity is welcomed**.

5. Water Category
Score achieved in this category is moderately high due to the associated **pragmatic response of saltwater desalination**. **Reverse Osmosis will provide potable water**, whereas adjacent **seawater and accumulated dock water** adequate **grey water for plumbing**.

6. Materials Category
A moderately high score was achieved in this category. The introduction of a **waste management facility** will be available for all patrons and staff to use. Most furniture and fittings will be **repurposed from the exciting ship**, with all new objects adhering to **ISO standards**. No new wall covering is used, and additional flooring is repurposed. **Transportation of sourced material proved problematic**.

7. Land Use and Ecology Category
Limited availability of additional resources other than water and sunlight contributed towards an average score in this category.

8. Emissions Category
A high score was achieved through the utilisation of light sources that **encourage and recognise the avoidance of substances that hinders the atmosphere**. The **minimisation of light pollution** is attained though the **recessed positioning of the enclosed dock** and followed **approach to illumination**.

9. Innovation Category
The final category proved highly beneficial towards the contribution of a high score. The proposed intervention is the **first of its kind in South Africa**, with **revolutionary techniques** that will be employed as pragmatic response. Furthermore, the repurposing of a decommissioned vessel will prevent the hazardous practice of shipbreaking.

GREEN BUILDING COUNCIL SOUTH AFRICA

greenstar Interiors ★★★★★★ GREEN BUILDING COUNCIL

Score Sheet
Green Star SA - Interiors v1

Credit	Credit Name	Aim of Credit	Points Available	Points Awarded
Management Category				
Int-Man-1	Green Star SA Accredited Professional	To encourage and recognise the engagement of professionals who can assist the project team with the integration of Green Star SA aims and processes throughout all stages of a fitout's design and construction phases.	1	1
Int-Man-2	Commissioning & Tuning	To recognise effective commissioning and tuning processes during a project's design and construction phase that ensure all services and installations can operate to their optimal design potential.	2	2
Int-Man-3	Occupant Users' Guide	To encourage and recognise the provision of information to fitout owners and users that helps them understand a project's systems, environmental attributes, and maintenance requirements.	1	1
Int-Man-4	Environmental Management	To encourage and recognise the adoption of a formal environmental management system in line with established guidelines during construction.	1.5	1.5
Int-Man-5	Construction Waste Management	To recognise and encourage management practises that minimise the amount of demolition and construction waste going to disposal.	2	1.5
Int-Man-6	Work space efficiency	To recognise the design of workspaces that provide spatial efficiency and improve productivity and occupant performance.	2	2
Int-Man-7	Green Lease	To recognise and encourage collaboration between the building owner and tenants in order to manage and operate the building along environmentally sustainable principles whilst realising mutual benefit.	2	2
Int-Man-8	Learning Resources	To encourage and recognise sustainability initiatives implemented in the development as learning resources for building users and visitors	1	1
Management credits			**12.5**	**12**
Indoor Environmental Quality Category				
Int-IEQ-1	Quality of Internal Air	To encourage and recognise projects that provide high quality air to occupants.	4	3
Int-IEQ-2	Thermal Comfort	To encourage and recognise fitouts that achieve a high level of thermal comfort.	2	2
Int-IEQ-3	Lighting Comfort	To encourage, recognise and reward well-lit spaces that provide appropriate levels of lighting comfort to occupants.	3	2
Int-IEQ-4	Visual Comfort	To recognise the delivery of well daylit spaces that provide high levels of visual comfort and views to fit-out occupants.	3	2
Int-IEQ-5	Acoustic Quality	To encourage and recognise buildings that are designed to provide appropriate acoustic qualities to enable the functionality of the space.	2	2
Int-IEQ-6	Reduced Exposure to Air Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	5	4
Int-IEQ-7	Mould Prevention	To encourage and recognise the design of services that eliminates the risk of mould growth and its associated detrimental impact on occupant health.	0.5	0.5
Int-IEQ-8	Ergonomics	To recognise the choice of equipment and design of spaces that promotes wellbeing, efficiency and effectiveness	2	1.5
Int-IEQ-9	Indoor Plants	To encourage and recognise the installation of indoor plants that improve indoor environment quality and also provides occupants with a connection to nature.	1.5	1.5
Indoor Environmental Quality credits			**23**	**18.5**
Energy Category				
Int-Ene-1	Greenhouse Gas Emissions	To encourage and recognise projects that minimise the greenhouse gas emissions associated with tenant fit outs.	12	8
Int-Ene-2	Electrical Sub-metering	To encourage and recognise the installation of electrical energy sub-metering to facilitate on-going management of electrical energy consumption.	2	2
Energy credits			**14**	**10**

Transport Category				
Int-Tra-1	Commuting Mass Transport	To encourage and recognise developments that select a site near public transport and facilitate the use of mass transport.	1	1
Int-Tra-2	Local connectivity	To encourage and recognise projects that are located within walking distance of high quality amenities such as shops and parks, thus reducing private vehicle use and the associated negative environmental impacts.	1	1
Int-Tra-3	Alternative Transport	To encourage and recognise projects that promote and facilitate the use of alternative modes of transport over the use of private cars.	2	2
Transport credits			**4**	**4**
Water Category				
Int-Wat-1	Potable Water	To recognise projects that minimise potable water consumption	6	4
Int-Wat-2	Water Sub-metering	To encourage and recognise the installation of sub-metering to facilitate on-going management of water consumption	2	2
Water credits			**8**	**6**
Materials Category				
Int-Mat-1	Operational Waste Management	To encourage and recognise developments which include space and an operational waste management plan that facilitates the recovery of resources used within the developments to reduce waste going to disposal.	2	2
Int-Mat-2	Furniture	To recognise the selection of fit-out furniture that has a reduced environmental impact when compared to available alternatives.	8	6
Int-Mat-3	Assemblies	To recognise the selection of fit-out assemblies that have a reduced environmental impact when compared to available alternatives.	8	6
Int-Mat-4	Flooring	To recognise the selection of flooring that has a reduced environmental impact when compared to available alternatives.	6	6
Int-Mat-5	Wall coverings	To recognise the selection of wall coverings that have a reduced environmental impact when compared to available alternatives.	3	3
Int-Mat-6	Local Sourcing	To encourage and recognise the environmental advantages gained, in the form of reduced transportation emissions, by using materials and products that are sourced within close proximity to the site.	2	0.5
Int-Mat-7	Sundries Materials Sourcing	To recognise the selection of fitout finishes that have a reduced environmental impact when compared to available alternatives through responsible manufacturing, product stewardship and resource efficient design.	1	1
Materials credits			**30**	**24.5**
Land Use and Ecology Category				
Int-Eco-1	Site selection	To recognise and reward a tenant for selecting their space in a building that reduces their environmental impact due to the building's base building design attributes.	4	2
Land use and Ecology credits			**4**	**2**
Emissions Category				
Int-Emi-1	Impacts from refrigerants and insulants	To encourage and recognise developments that minimise light pollution into the night sky.	3	2
Int-Emi-2	Light Pollution	To encourage and recognise the avoidance of substances that contribute to the deterioration and long-term alteration of the Earth's atmosphere.	1.5	1
Emissions credits			**4.5**	**3**
Innovation Category				
Int-Inn-1	Innovative Strategies & Technologies	To encourage and recognise pioneering initiatives in sustainable design, process or advocacy.	4	3
Int-Inn-2	Exceeding Green Star SA Benchmarks	To encourage and recognise projects that achieve environmental benefits in excess of the current Green Star SA benchmarks.	3	2
Int-Inn-3	Environmental Design Initiatives	To encourage and recognise sustainable building initiatives that are currently outside of the scope of this Green Star SA rating tool but which have a substantial or significant environmental benefit.	3	3
Innovation credits			**10**	**8**
		TOTAL POINTS AVAILABLE	100	**88**

Figure 5.49. Green Star Rating Score Sheet (Author, 2016)

– GREEN ENERGY & WATER CONSUMPTION –

In addition to the green star evaluation, the establishment of an overall approach towards **water and energy consumption** was established. Apart from the utilisation of energy and water efficient appliances, the strict application of components that make use of **solar powered energy** will be employed. As opposed to traditional hydraulics, the application of **electric actuators** powered by solar energy will be used for all the stall configurations. **Grey water systems** will also be used for all plumbing, along with the utilisation of **salt water**.

Furthermore, a selection of **passive systems** will be employed that utilise limited amount of actual energy and make use of **sustainable ecological resources** that are **abundant in the surrounding proximity**. In summary, **passive ventilation, solar energy** and **grey water systems** will be utilised in order to **lower carbon emission and ecological impact**.

SOLAR POWERED ENERGY

Solar powered machines will be utilised in conjunction with energy efficient appliances. Excess energy will bestored in a battery farm located in the ship's hold for later usage.

GREY & SALT WATER SYSTEMS

In addition to the utilisation of grey water for the general WC plumbing onboard and at dock level, reverse osmosis salt water can be used for additional plumbing.

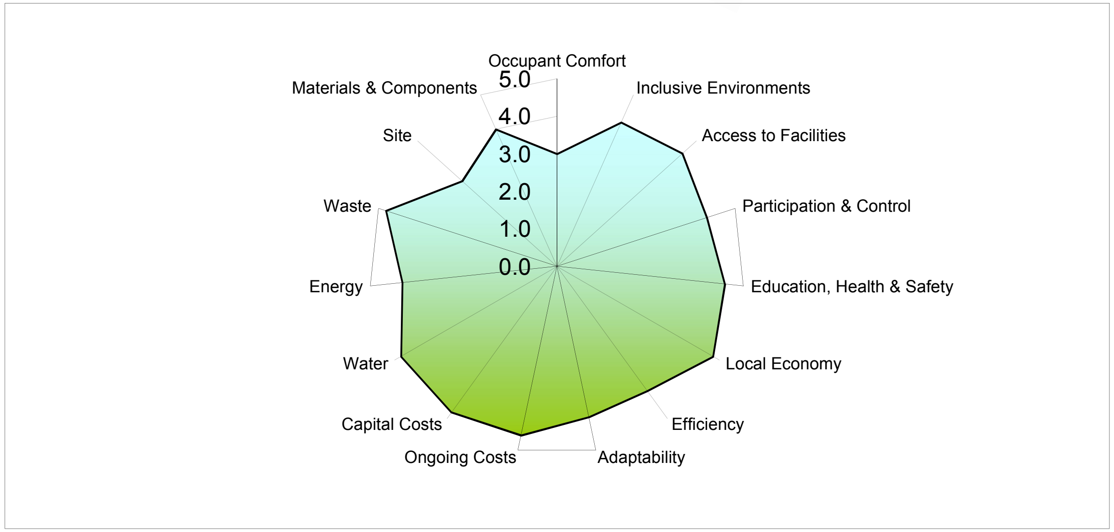
PASSIVE VENTILATION SYSTEM

Existing dorade ventilation will be utilised onboard interior areas where adequate air circulation is required. This will replace conventional HVAC cooling systems.

Figure 5.50. Green Energy and Water Consumption Approaches (Author, 2016)

5.11
SBAT RATING

In addition to the Green Star assessment of the spatial intervention, the **Sustainable Building Assessment Tool** (SBAT) will be used to measure the **social, environmental and economic** facets of the design. Outcomes (refer to figure 5.51) were primarily **consistent** with the classifications of Green Star, with the additional categories of **social, site and adaptability** that will be elaborated on for final examination.



Social	4.1	Economic	4.5	Environmental	4.2
		Overall	4.3		

Figure 5.51. SBAT Analysis of the Proposed Intervention (Author, 2016)

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YUNIBESITHI YA PRETORIA

5.12

EVACUATION PROTOCOL AND SYSTEMS

EVACUATION CHAIR

EMERGENCY ASSEMBLY POINT

EMERGENCY EXIT

FIRE EXTINGUISHER

FIRE HOSE REEL

ALL SIGNAGE AS PER SANS 1186-1: SYMBOLIC SAFETY SIGNS

In an emergency, it is essential that all available exits are used. Clearly indicate all available exit routes so that attendees and workers are aware of all the routes to leave the venue in an emergency. In addition, the provision of exit route signs that are clearly visible to everyone present will prevent panic in an emergency.
All fire safety signs, notices and graphic symbols shall comply with national regulations.
Exit signs shall take the form of a pictogram symbol and should be supplemented by text bearing the words "EXIT" or "FIRE EXIT" in conspicuous lettering. Any exit on an escape route shall be clearly indicated by suitable exit signs positioned, wherever possible, immediately above the door or opening.
Where an exit cannot be seen or where people escaping might be in doubt as to the location of an exit, directional exit signs shall be provided at suitable points along the escape route. Such signs shall be sufficiently large, fixed in conspicuous positions, and wherever possible be positioned between 2 m and 2,5 m above ground level.
Exit signs and signs incorporating supplementary directional arrows shall be lit whenever people are present. Signs at outdoor events shall be weatherproof and clearly visible above people and also lit at night, if necessary.

name
EVAC CHAIR 300H MK4
size
1040mm H X 520mm W X 200mm D
finish & material
BLUE TEXTURED FINISH WITH CONTRASTING YELLOW HAMMOCK.
code
1-300H-MK4
specifications
TO BE WALL MOUNTED ON HOOKS. WEIGHT CAPACITY OF 182KG

name
CO2 FIRE EXTINGUISHER
size
580mm H X 159mm DIA X 5kg
finish & material
ALUMINIUM ALLOY RED EPOXY POWDER COATED (AA6061)
code
ALUM-CO-5KG
specifications
CLASS C AND CLASS B FIRES. SANS 1567:2003 AND SABS 1475 APPROVED

name
HOSE REEL (SWING TYPE)
size
575mm DIA X 19.4kg x 3000mm HOSE
finish & material
ALUMINIUM ALLOY POWDERCOATED IN BRIGHT RED
code
HREEL_19.4KG
specifications
DISCHARGE RATE: 30L/MIN@ 300 KPA. SANS 1086 EN694 AND SABS APPROVED

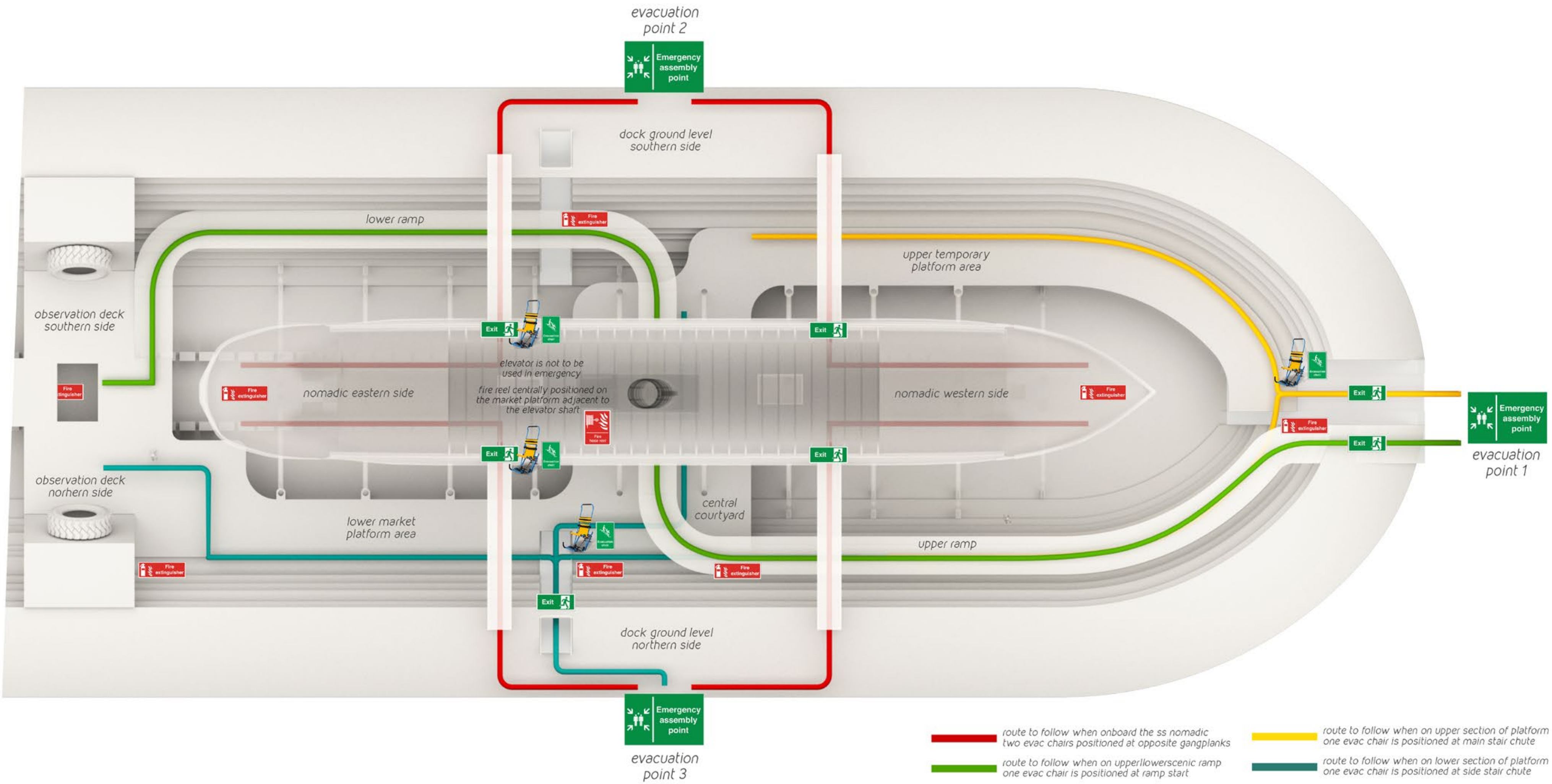

Figure 5.52. Emergency Evacuation Routes (Author, 2016)

TO CONCLUDE

summary

Figure 6.1. Proposed Inner and Outer Interior (Author, 2016)

CONCLUSION

"Architecture should speak of its time and place, but yearn for timelessness.

Frank Gehry, 2013

The rationale and design of oceanic vessels has **evolved** exponentially throughout the progression of history. What was **originally instigated** to deed as a mere **arrangement of freight conveyance**, progressed into a thriving **hospitality industry** (Wealleans, 2006:25). Parallel to the development of a ship's resolution, its **interiority was also adapted to suit habitual evolution.** Resembling "an **epitome of indulgence and hospitality**" (Le Corbusier, 1987:95), the edifice of these opulent liners **embodied engineering triumph** of the twentieth century. As verbalised by a ship's lifecycle, at some juncture in time the vessel will be **classified as being unseaworthy** - thus declaring it decommissioned. As **opposed to the mere demolition** of these exultant structures, this study proposed the introduction of a **fourth ship-recycling alternative**.

The selection of **Robinson Dry Dock as host and the SS Nomadic as habitant**, allowed for the spatial intervention of a **retail-orientated and recreational facility** to be envisioned that **stimulates regional kinship** and **international association**. As the act of nautical engineering dictates structural integrity, the envisioned spatial intervention commanded no less. Dividing the proposed intervention into two distinct areas, the design of an **inner and outer interior was attained**. The position of such an outlandish intervention within its surrounding setting provided **supplementary depth and stratum** to the existing fabric - an **architectural palimpsest**. In order to heighten the theory of encrusted design, the theoretical premise governed the **investigation of materiality**. Furthermore, the **fragile nature** of materiality was amplified via the investigation of **corrosion**. As opposed to traditional stances which dread this form of degradation, this study **encourages the prospect of corrosion as a tool of spatial beautification**. Upon tentatively founded implementation strategies, all material constituents, both proposed and existing, were either **protected** against, **preserved** from or **premeditated** towards corrosion, contingent to the envisioned e**ssence wished to be evoked**. Subsequently, a **Green-Star brand** is fashioned that **concedes the old and heartens the new** through a **holistic and sustainable methodology**.

As a result, it is noted with clear realisation that material **corrosion can act as a definite form of palimpsest**, which can either m**igrate or overrule existing** fabric with the passing of time. As contended by Fred Scott (2008:96), the deed of interior alteration should **not merely embolden absolute restoration** or **inattentive demolition practices**, but encourage methods of **preservation** that revel in the **remembrance of what once was and possibility can be**…

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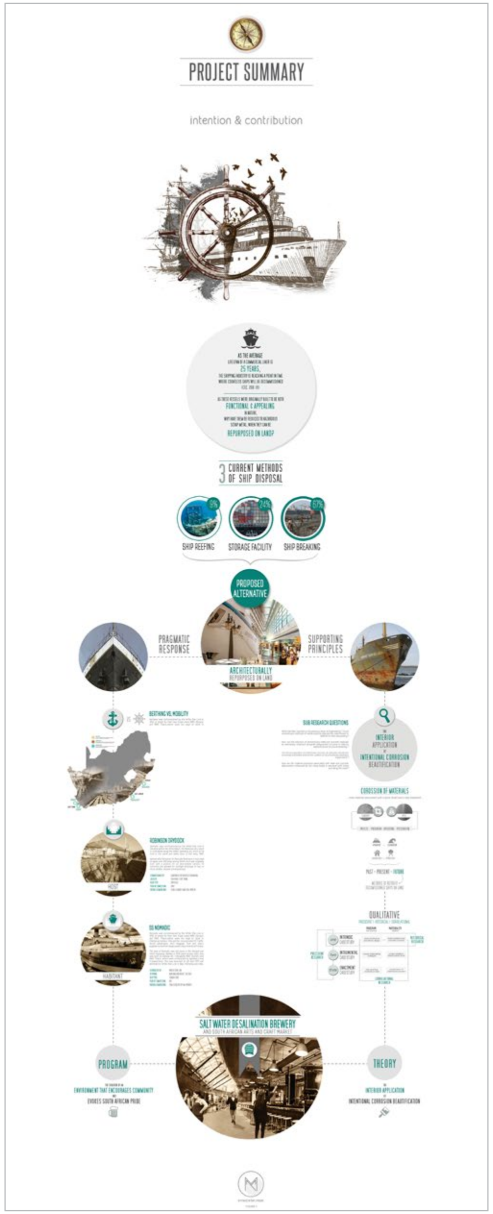
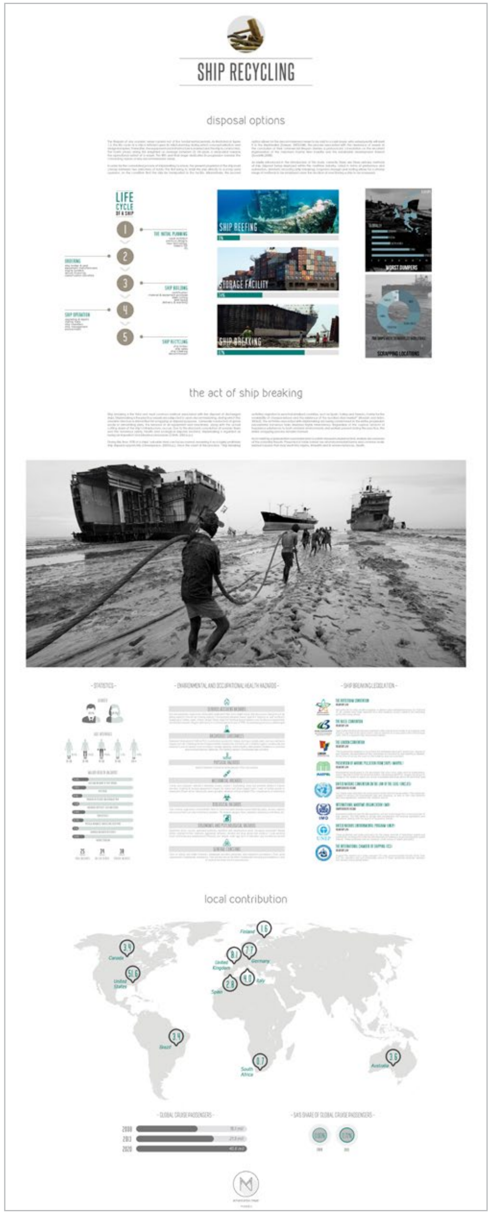
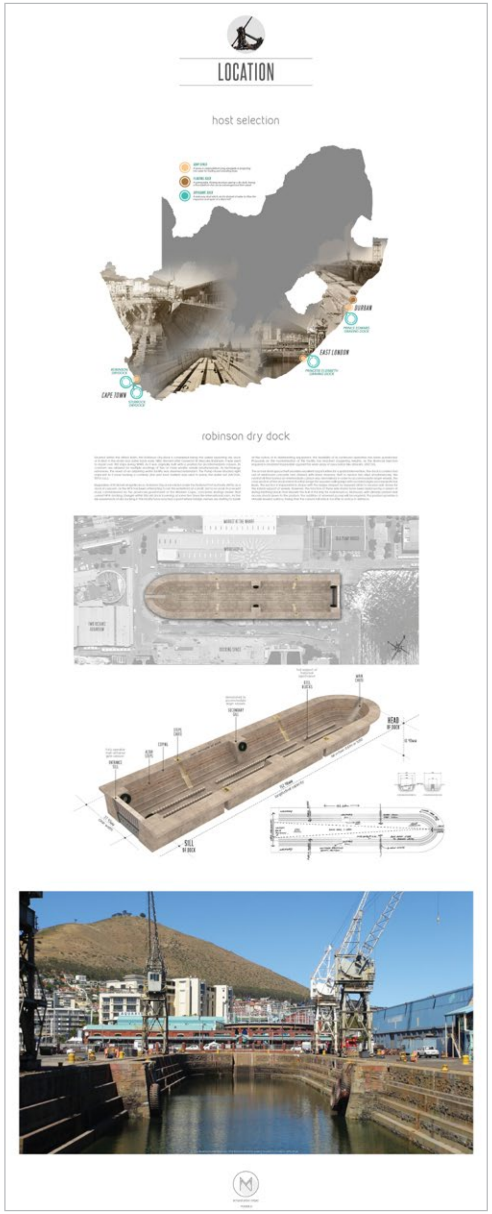
APPENDIX A - EXAMINATION & POSTERS


PROJECT SUMMARY
intention & contribution
3 CURRENT METHODS OF SHIP DISPOSAL
SHIP REEFING
STORAGE FACILITY
SHIP BREAKING
PROPOSED ALTERNATIVE
PRAGMATIC RESPONSE
SUPPORTING PRINCIPLES
PROGRAM
THEORY
SALT WATER DESALINATION BREWERY


SHIP RECYCLING
disposal options
LIFE CYCLE OF A SHIP
SHIP REEFING
STORAGE FACILITY
SHIP BREAKING
the act of ship breaking
local contribution


LOCATION
host selection
robinson dry dock


CONTEXT
victoria & albert waterfront
v & a waterfront 2020 vision

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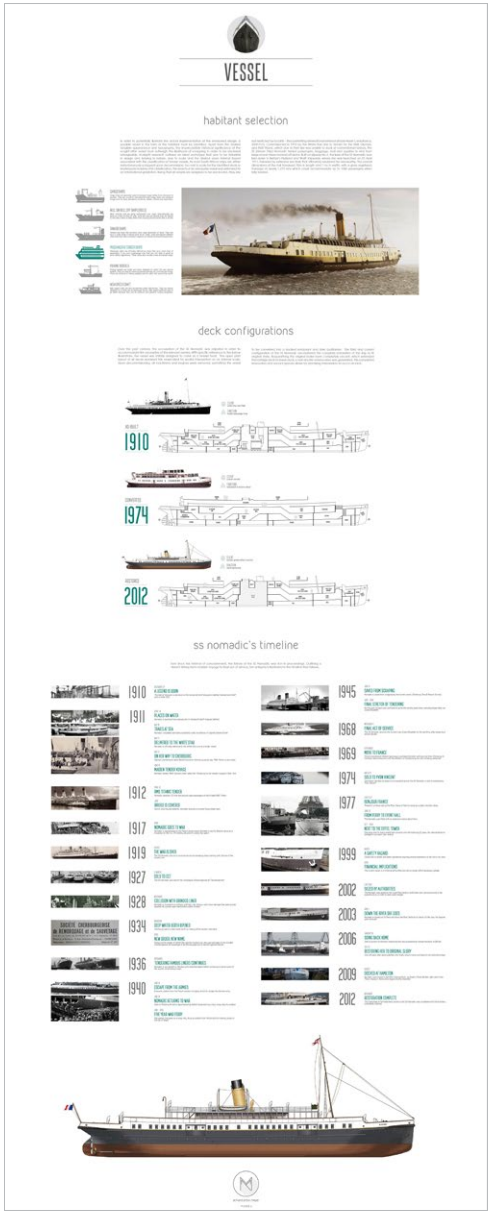

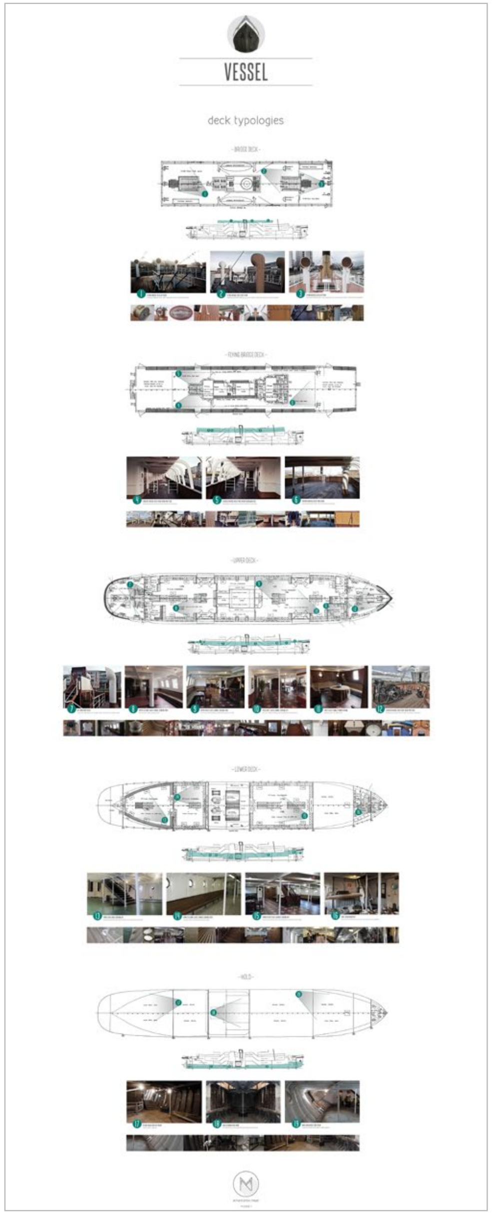

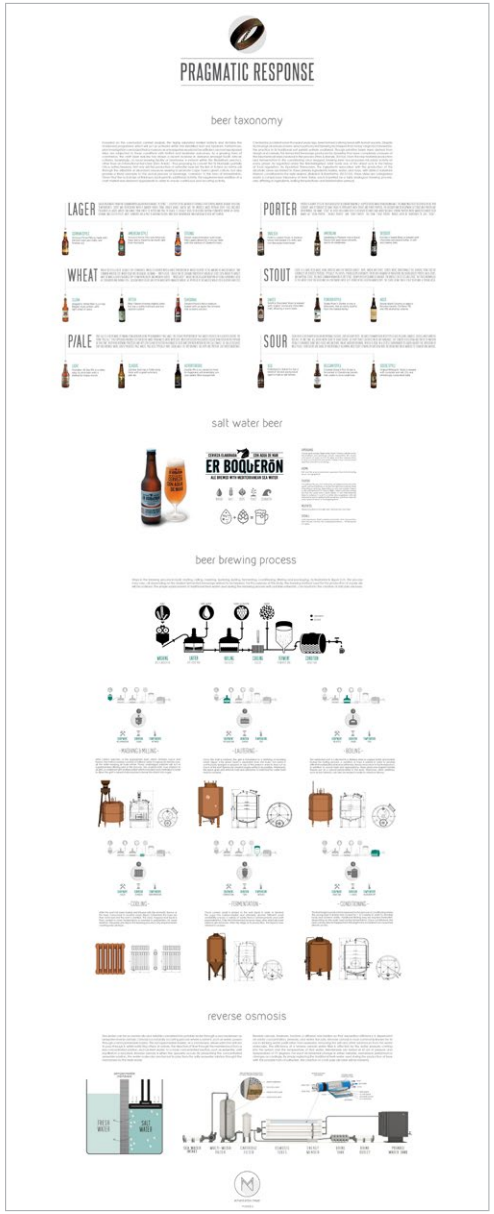

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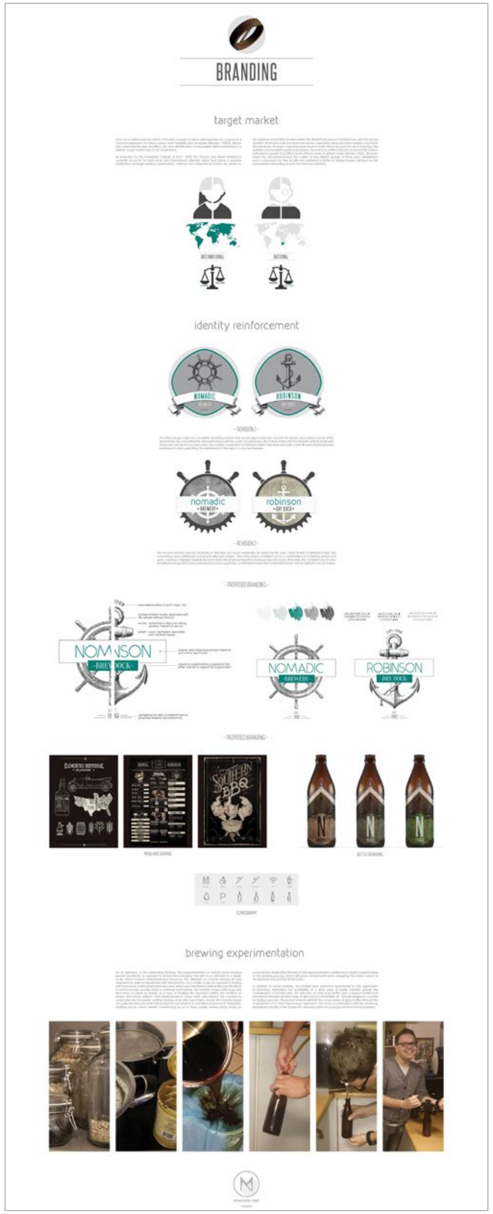
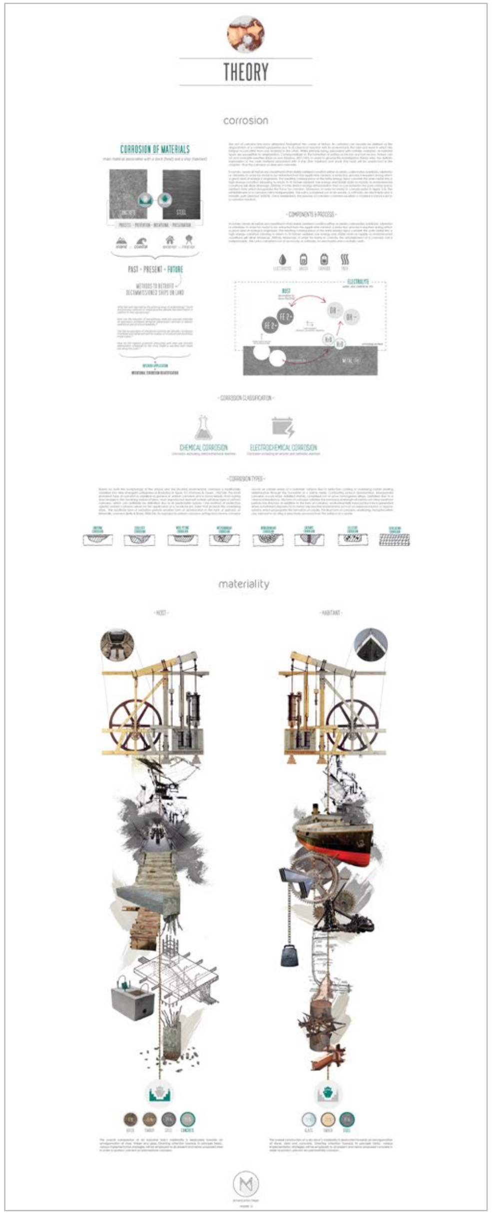
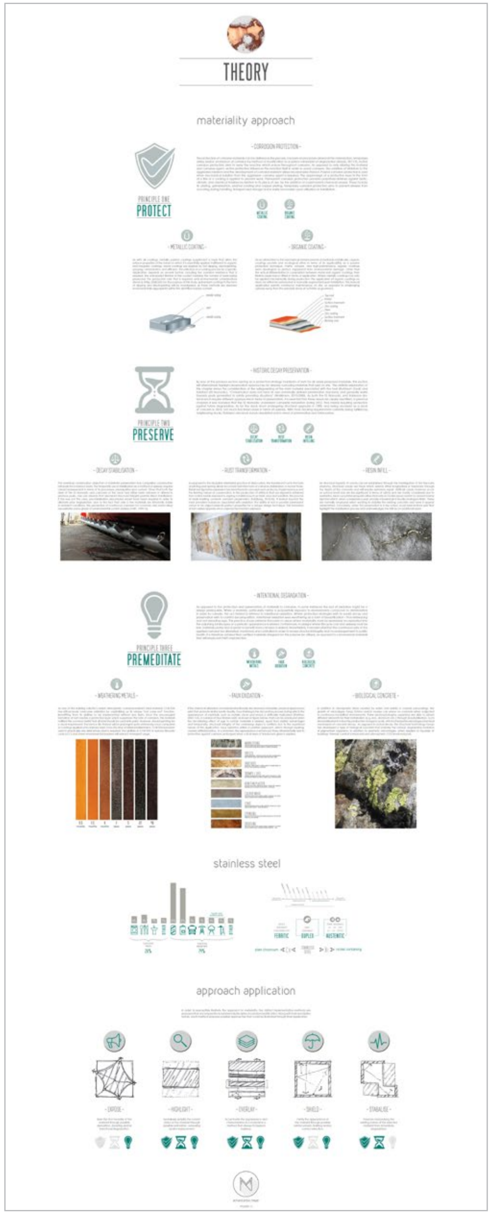
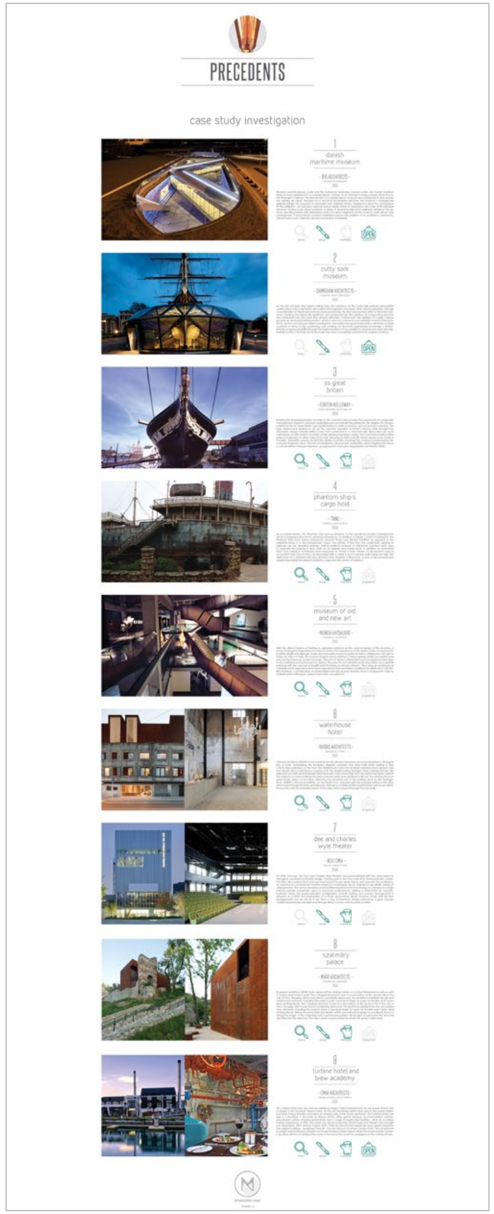
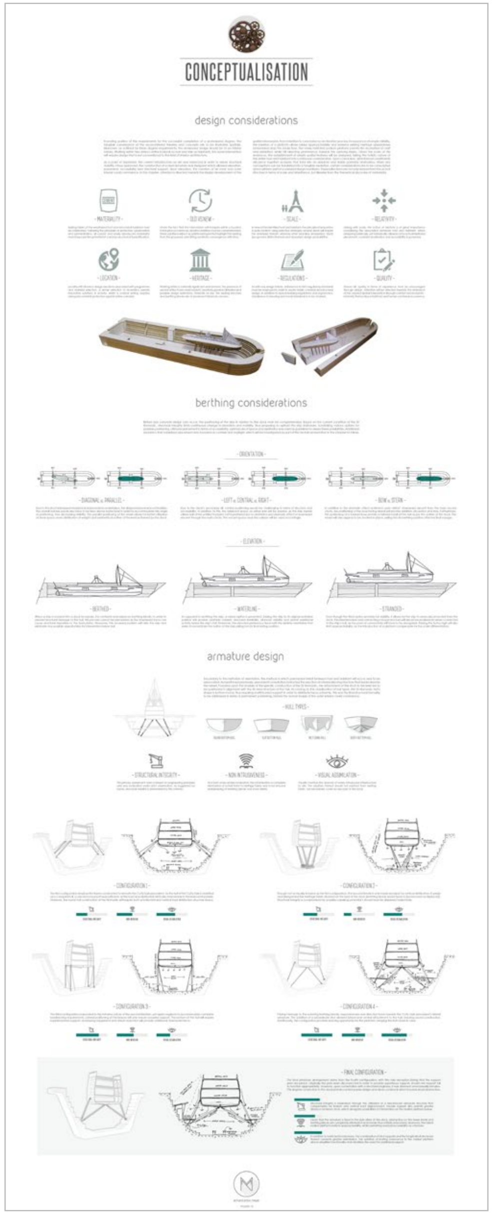
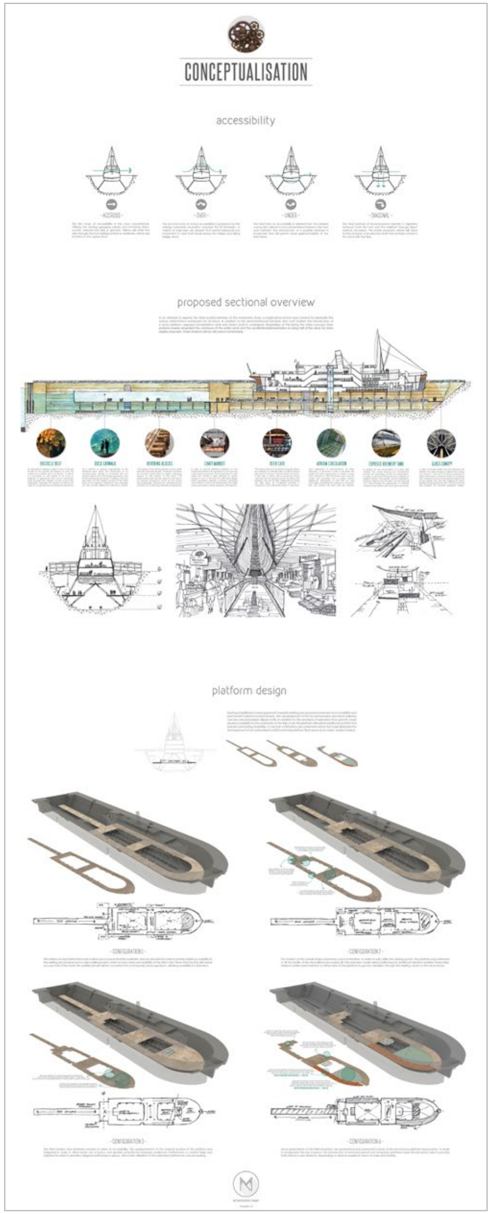


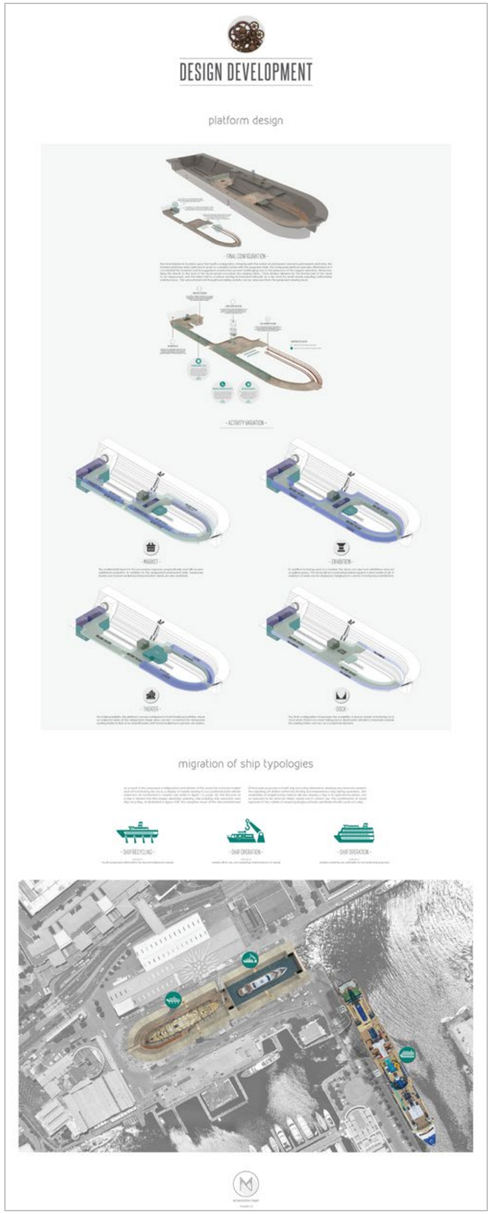







CONCEPTUALISATION
design considerations
berthing considerations
armature design


CONCEPTUALISATION
accessibility
proposed sectional overview
platform design


DESIGN DEVELOPMENT
platform design
migration of ship typologies


DESIGN DEVELOPMENT
market stall

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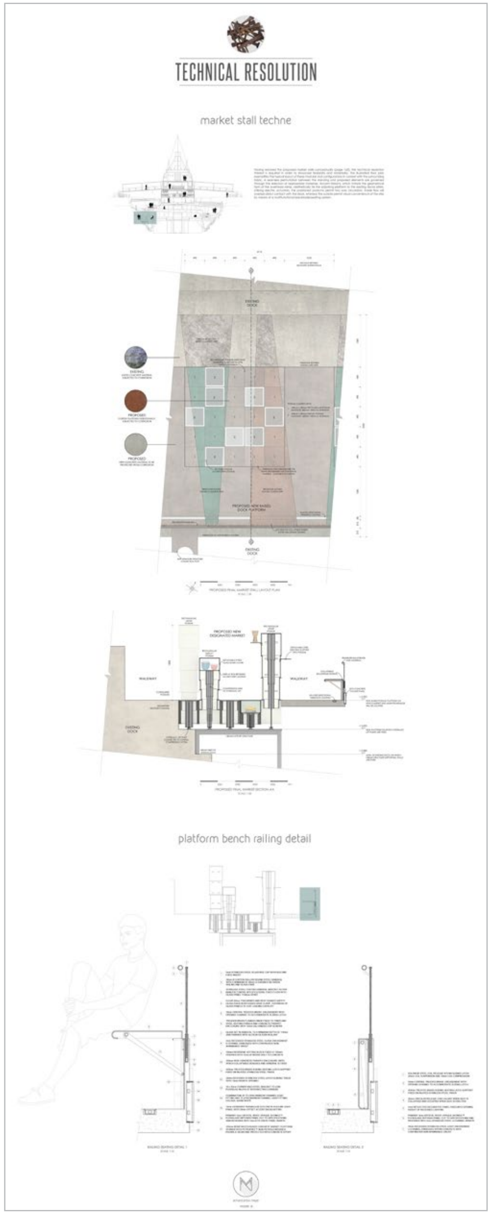
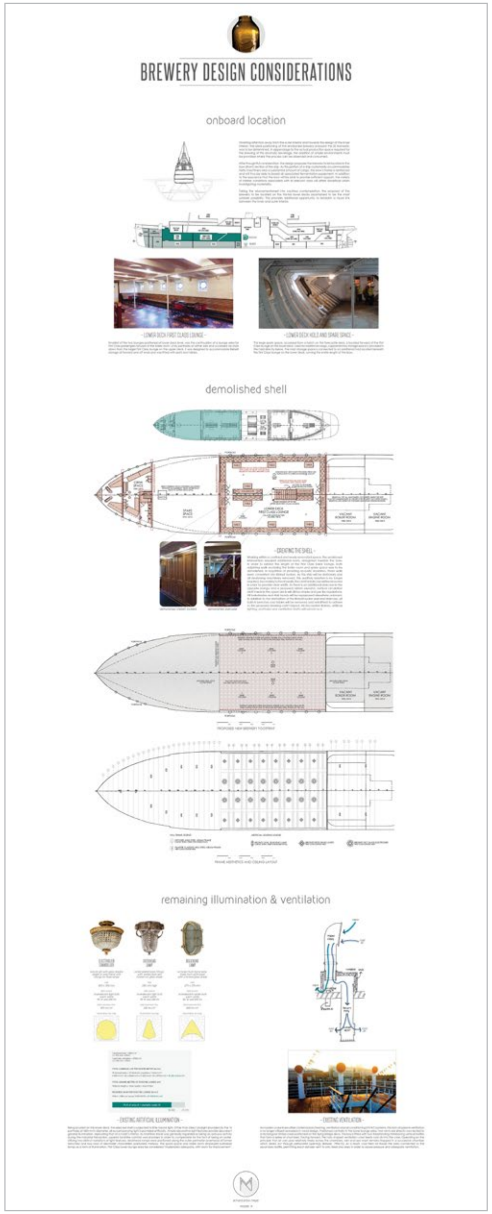
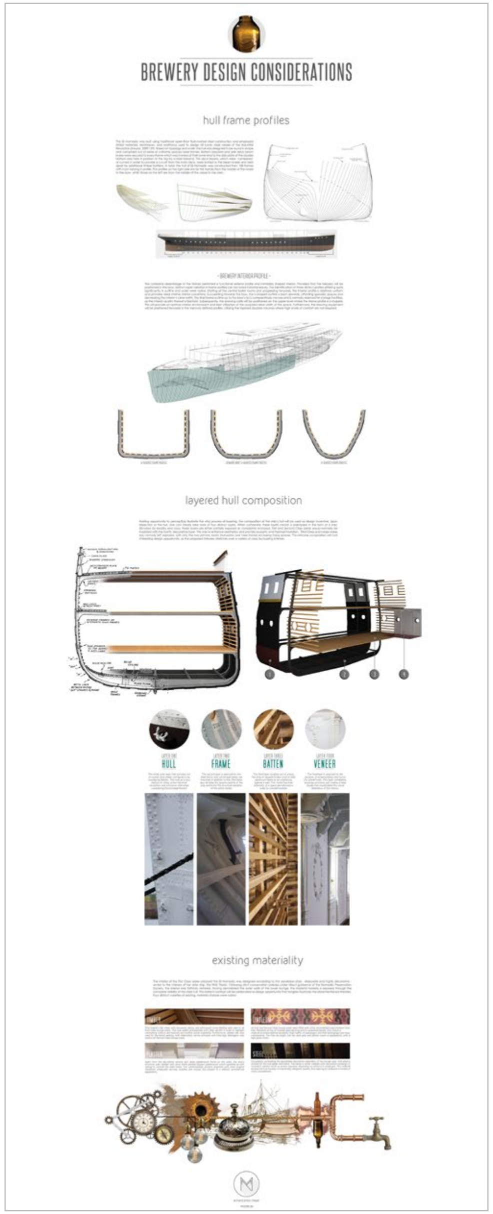
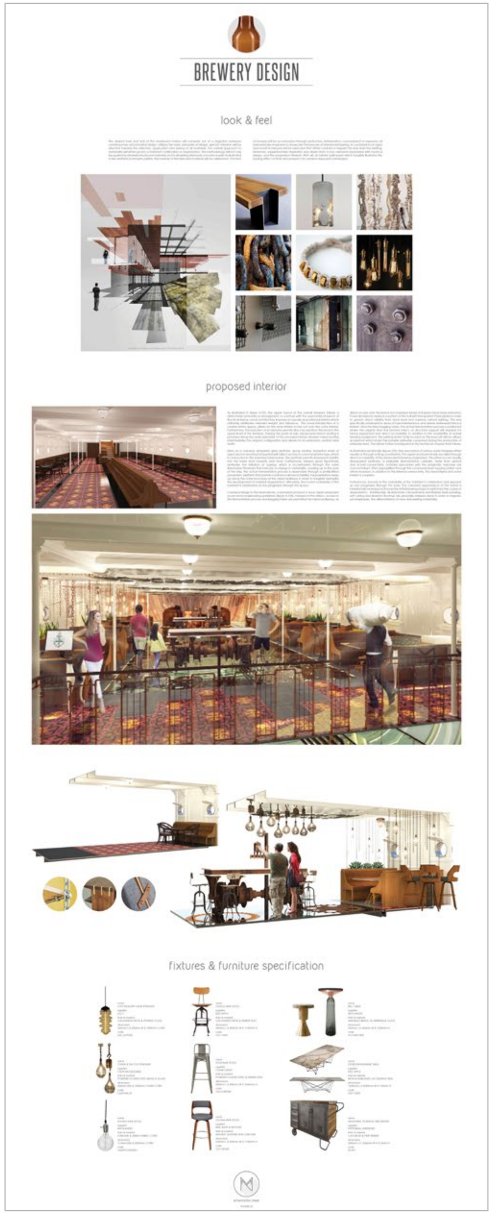
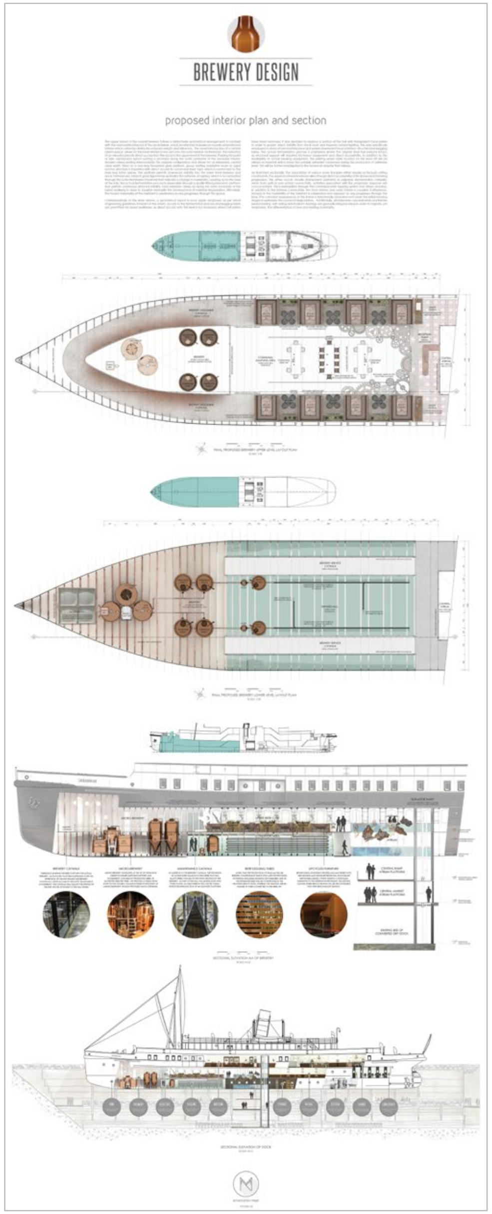
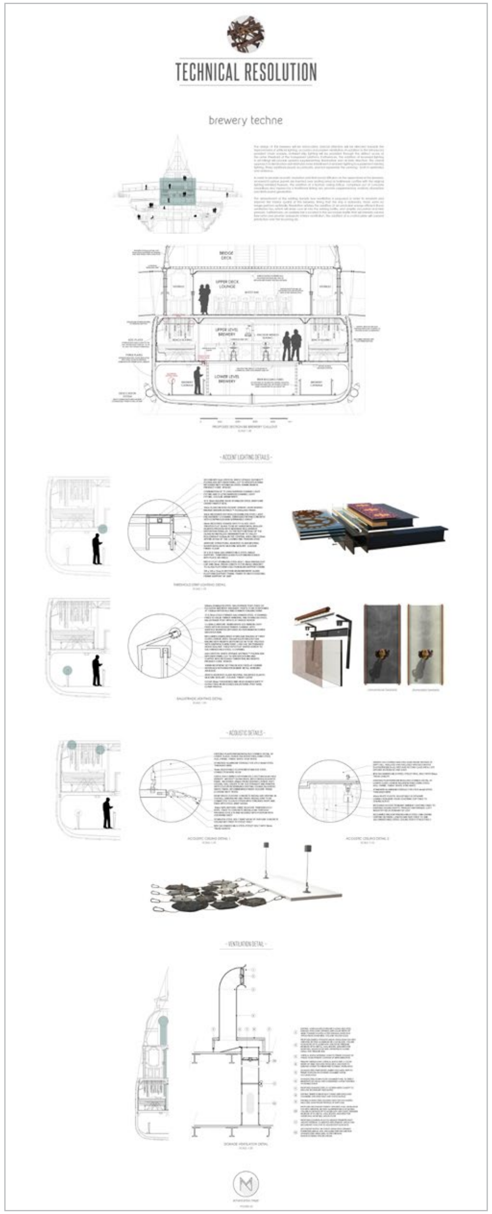




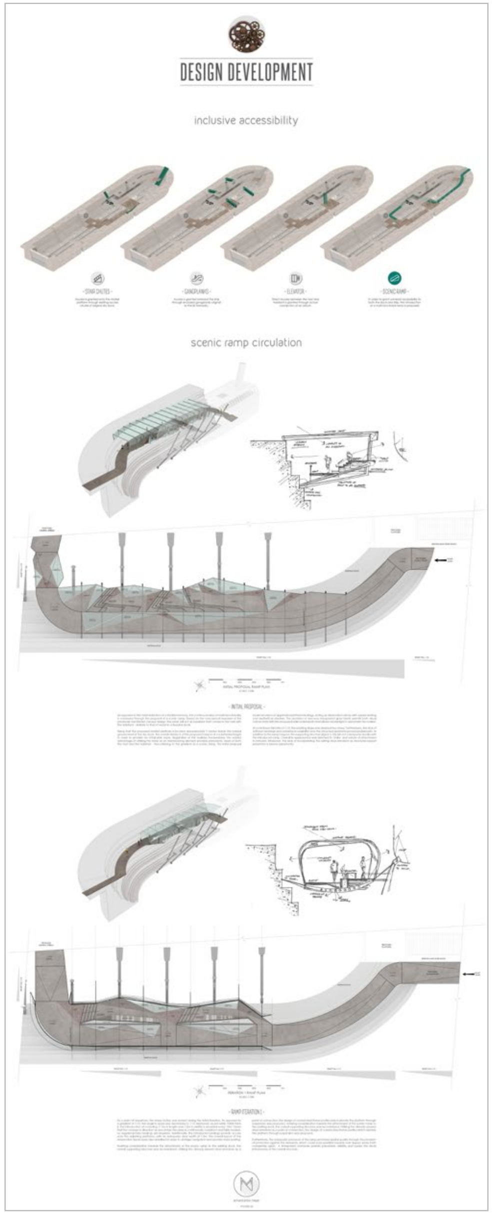


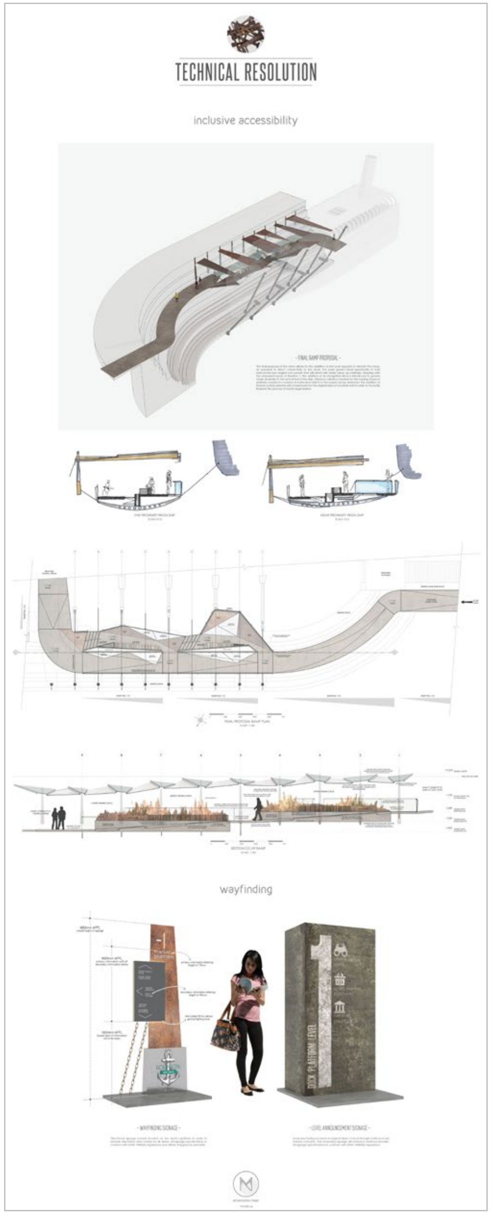

BREWERY DESIGN
look & feel
proposed interior
fixtures & furniture specification

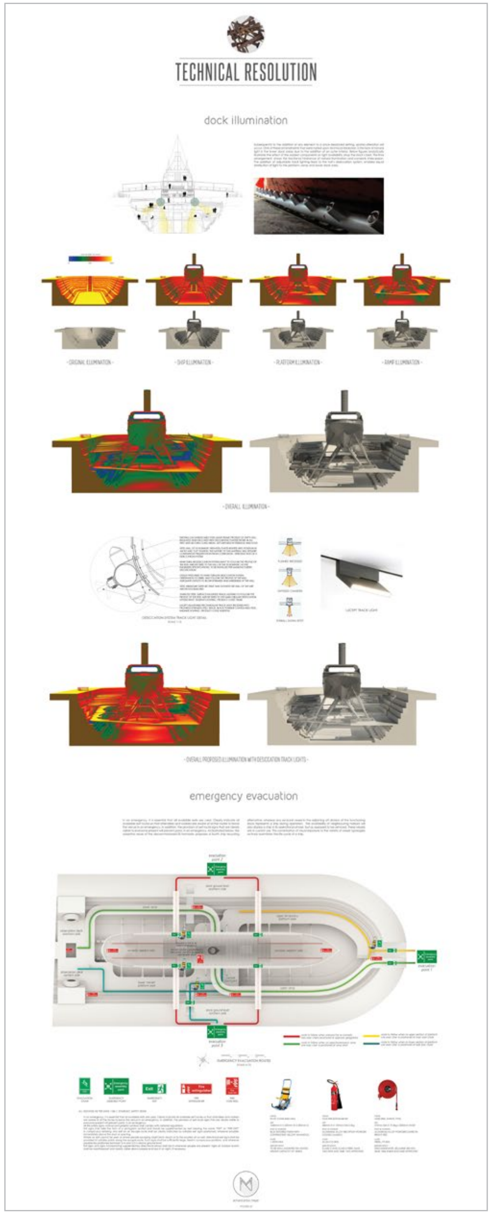

BREWERY DESIGN
proposed interior plan and section


TECHNICAL RESOLUTION
brewery techne


DESIGN DEVELOPMENT
canopy design
atrium design


DESIGN DEVELOPMENT
inclusive accessibility
scenic ramp circulation


TECHNICAL RESOLUTION
inclusive accessibility
wayfinding


TECHNICAL RESOLUTION
dock illumination
emergency evacuation


DESIGN RESOLUTION
proposed perspectives

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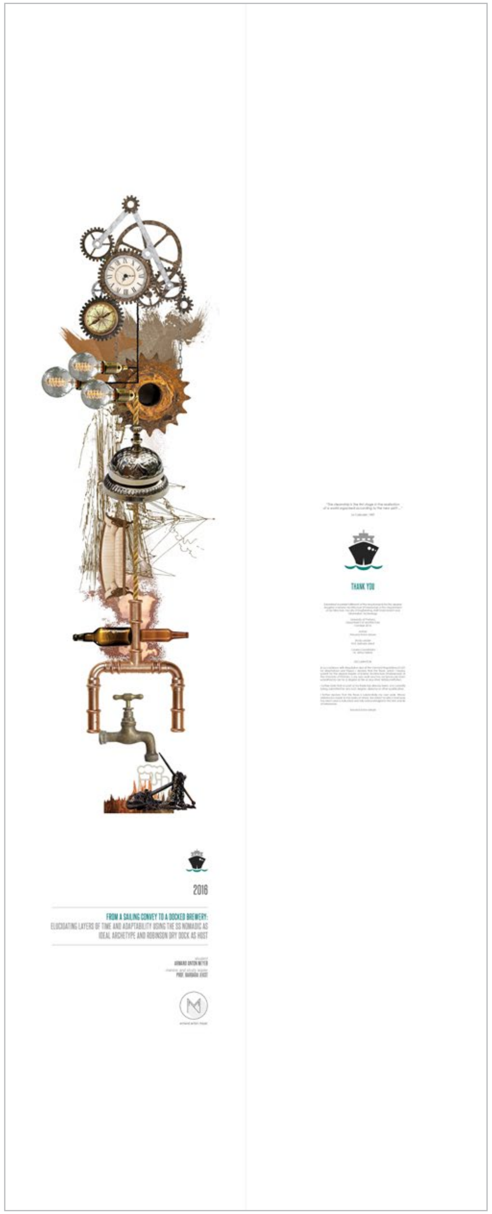
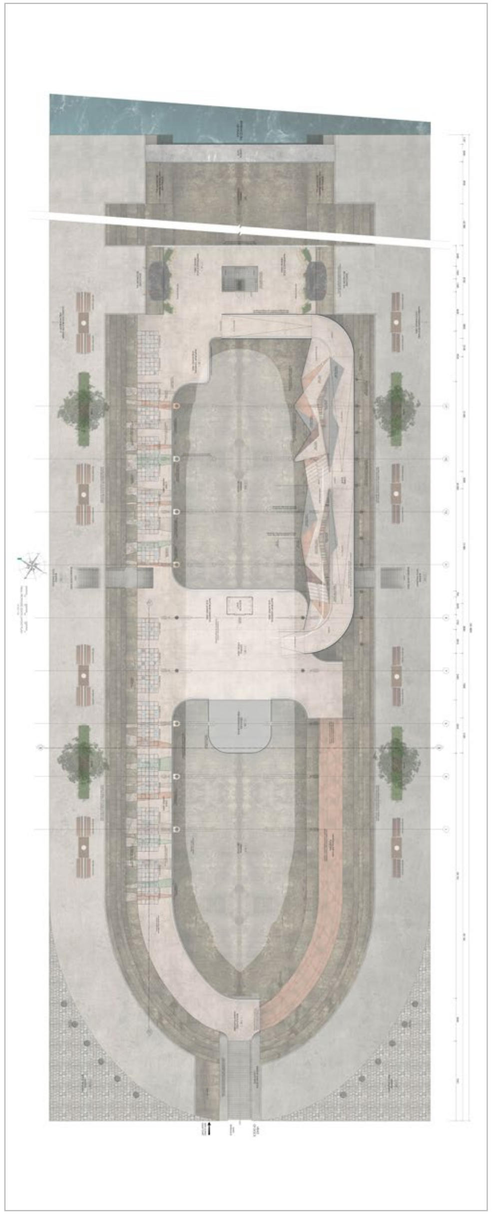
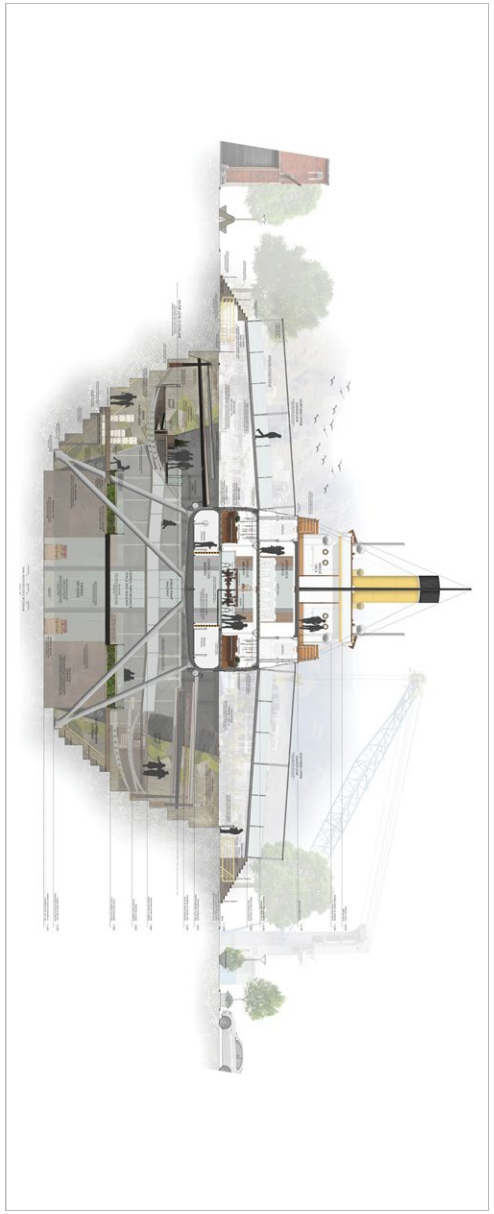
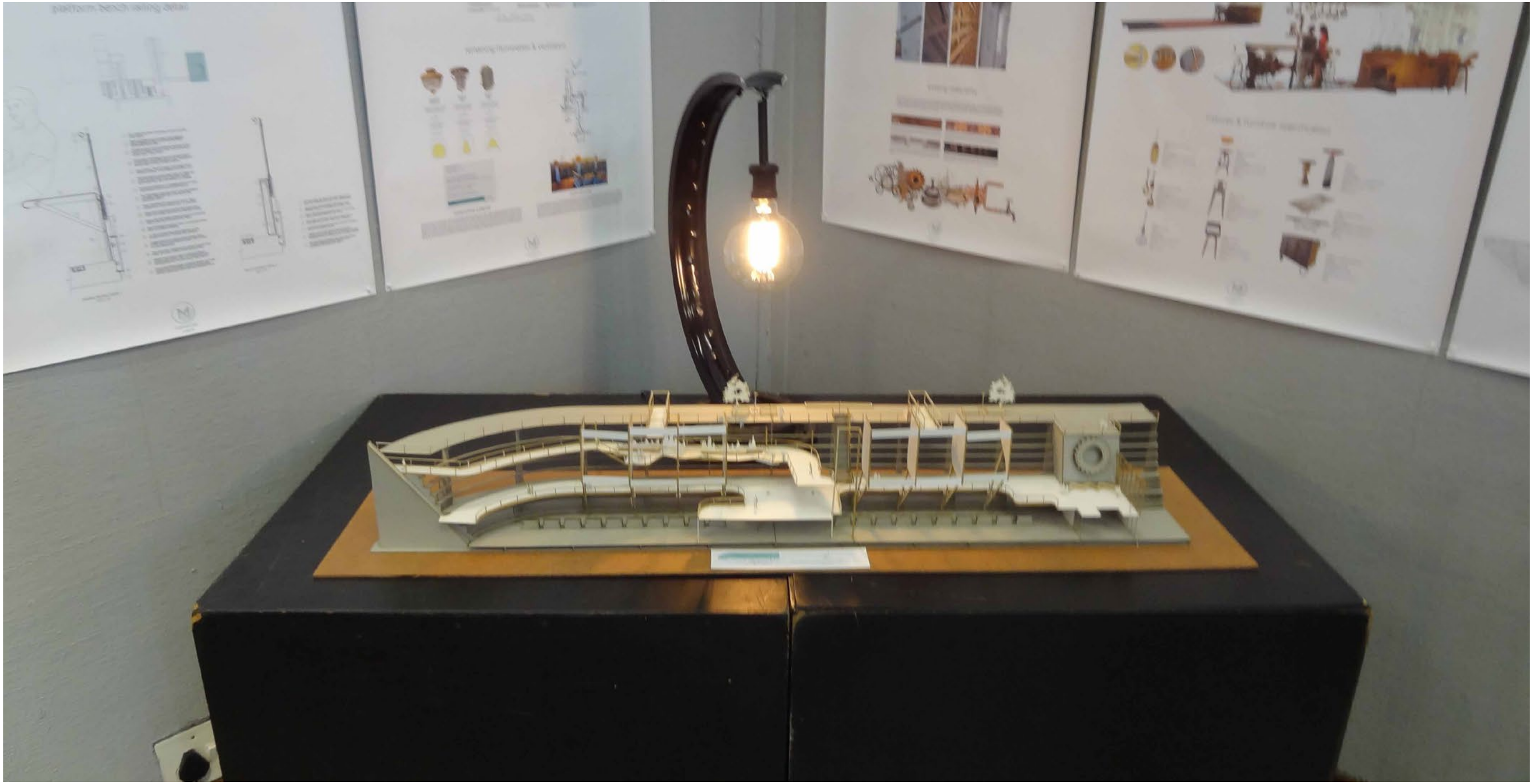
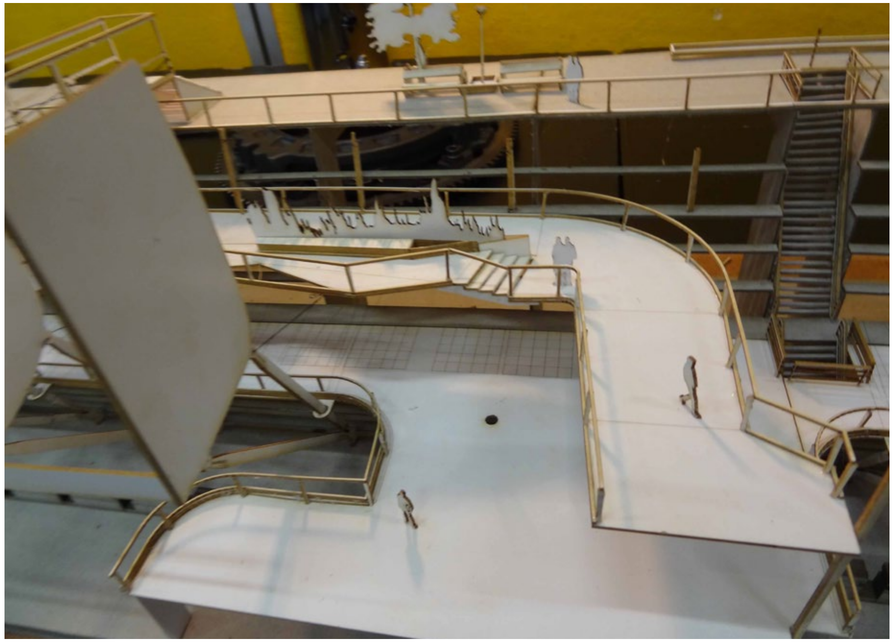






APPENDIX B - MODELS





APPENDIX C - BEER PACKAGING


N
ORIGINAL
N
BUCHU


N
ORIGINAL
N
BUCHU
N
BUCHU
N
ORIGINAL


N
ORIGINAL
N
BUCHU
NOMADIC