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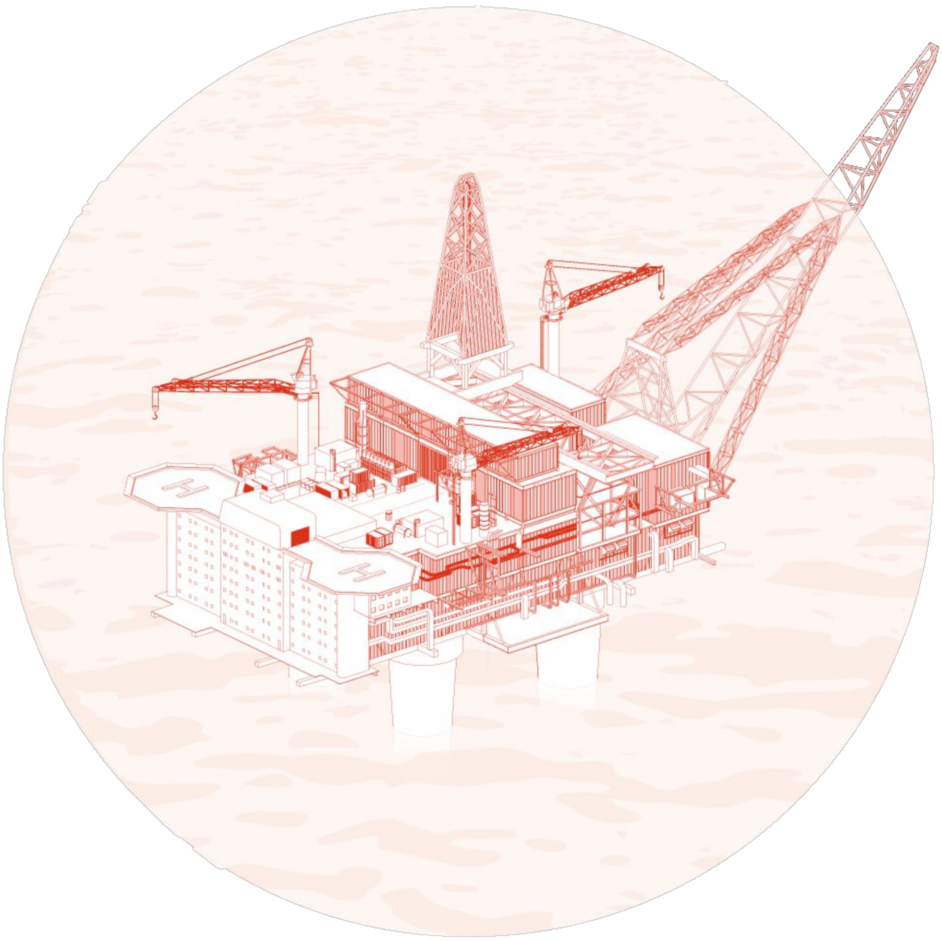
A POST OIL SCENARIO



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STATFJORD B TOMORROW, A POST OIL SCENARIO.

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STATFJORD B TOMORROW, A POST OIL SCENARIO.

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The transformation of an abandoned oil production platform
to an offshore marine research center in the North Sea.

by Julia Menz.

Abstract

Almost invisible to society, one of the largest and most active industrial regions in Europe stretches across the entire North Sea, where decades of oil and gas production have left immense traces. This thesis seeks to reveal the hidden world of offshore structures in the North Sea and to draw attention to the enormous architectural potential of their reuse.

With the end of the fossil fuel era, an enormous number of industrial offshore structures developed for the purpose of oil and gas production will become obsolete. Decommissioned and disused offshore facilities will successive be brought ashore for dismantling in the coming decades, which will unveil the unseen world of the North Sea giants to the public. The return of the industrial heritage of the Northern European oil states is considered an opportunity to examine their potential for temporary or permanent reuse. Exploring the visual, functional and spatial significance of these industrial monuments is therefore the starting point of this work. A North Sea wide strategy of adaptive reuse is presented, taking into account political, environmental, economic and socio-cultural aspects. In addition, a case study is developed using the example of the Norwegian concrete platform Statfjord B, built in 1981. The impressive giant represents a tremendous engineering achievement that justifies its consideration and preservation as an industrial and cultural heritage site. A scenario for long-term reuse of Statfjord B is presented, with a new program focusing on marine science, environmental conservation as well as sustainable tourism, helping to compensate for decades of oil extraction.

Für die Gesellschaft nahezu unsichtbar, erstreckt sich über die gesamte Nordsee eine der größten und aktivsten Industrieregionen Europas, wo jahrzehntelange Förderung von Öl und Gas deutliche Spuren hinterlassen haben. Diese Thesis möchte die verborgene Welt der Offshore-Bauwerke in der Nordsee sichtbar machen und auf das enorme architektonische Potenzial ihrer Umnutzung hinweisen.

Mit dem Ende der Ära fossiler Brennstoffe wird eine enorme Anzahl von Industriebauwerken, die zum Zweck der Öl- und Gasförderung auf hoher See errichtet wurden, obsolet. Stillgelegte und ausgediente Offshore-Anlagen werden in den kommenden Jahrzehnten sukzessive zur Demontage an Land zurückgebracht, wodurch die unsichtbare Welt der Nordsee-Riesen für die Öffentlichkeit zugänglich wird. Die Rückkehr des industriellen Erbes der nordeuropäischen Ölnationen wird als Möglichkeit verstanden, das Potenzial für eine temporäre oder permanente Umnutzung zu untersuchen. Die Erforschung der visuellen, funktionalen und räumlichen Signifikanz dieser Industriedenkmäler steht daher am Anfang dieser Arbeit. Unter Berücksichtigung politischer, ökologischer, wirtschaftlicher und soziokultureller Aspekte wird eine nordseeweite Strategie der adaptiven Umnutzung vorgestellt. Darüber hinaus ist eine Fallstudie am Beispiel der norwegischen Betonplattform Statfjord B aus dem Jahr 1981 entwickelt worden. Der beeindruckende Gigant repräsentiert eine enorme Ingenieursleistung, die eine Anerkennung und Erhaltung als industrielles Kulturerbe rechtfertigt. Es wird ein Szenario der langfristigen Umnutzung von Statfjord B vorgestellt. Der programmatische Fokus auf Meeresforschung, Umweltschutz und nachhaltigem Tourismus trägt dazu bei, die jahrzehntelange maritime Ausbeutung durch die Ölindustrie zu kompensieren..

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Industrial Heritage

[industrial heritage]

refers to buildings or ruins, whether single or set of constructions, whose original value in terms of emotional, cultural, physical, intangible, technical or historical has been increased over the years.

Adaptive Reuse

Preparing existing structures for an altering afterlife has become a prominent and promising strategy to preserve cultural heritage in recent years. The æsthetic process of adapting buildings for new uses while retaining their historic features and values is referred to as Adaptive Reuse.

The term itself describes various methods of modification, characterized by a wide range of activities between intellectual and practical approach operating in the intersection of architecture, interior design and conservation.[1]

VARIETY OF APPROACHES

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The significance of the theory of contemporary Adaptive Reuse is, that there is not only one approach, but a variety of coexisting strategies. Each method varies in the degree of change and offers a specific framework.

Adaption

Adaptation is acceptable only where the adaptation has minimal impact on the cultural significance of the place. Adaptation should involve minimal change to significant fabric, achieved only after considering alternatives.
THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013

Adaptation means changing a place to suit the existing use or a proposed use.
THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013

The conservation of a place of cultural heritage value is usually facilitated by the place serving a useful purpose. Proposals for adaptation of a place may arise from maintaining its continuing use, or from a proposed change of use.
ICOMOS NEW ZEALAND, 2010

Addition

Additions cannot be allowed except in so far as they do not detract from the interesting parts of the building, its traditional setting, the balance of its composition and its relation with its surroundings.
Art. 13 THE VENICE CHARTER, 1964

Alteration

Modifying the appearance, layout, or structure of a building to meet new requirements (Watt, 1999). It often forms part of many adaptation schemes rather than being done on its own.
Art. 13 THE VENICE CHARTER, 1964

Authenticity

Authenticity means the credibility or truthfulness of the surviving evidence and knowledge of the cultural heritage value of a place. Relevant evidence includes form and design, substance and fabric, technology and craftsmanship, location and surroundings, context and setting, use and function, traditions, spiritual essence, and sense of place, and includes tangible and intangible values. Assessment of authenticity is based on identification and analysis of relevant evidence and knowledge, and respect for its cultural context.
ICOMOS NEW ZEALAND, 2010, p.9

Change

Change may be necessary to retain cultural significance, but is undesirable where it reduces cultural significance. The amount of change to a place and its use should be guided by the cultural significance of the place and its appropriate interpretation.
Vgl. Art. 15 CHANGE - THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013

Conservation

Preserving a building purposefully by accommodating a degree of beneficial change. It includes any 'action to secure the survival or preservation of buildings, cultural artefacts, natural resources, energy or other thing of acknowledged value for the future.
JAMES DOUGLAS, 2006 p.584

Conservation of a place should identify and take into consideration all aspects of cultural and natural significance without unwarranted emphasis on any one value at the expense of others.
Vgl. Article 5 VALUES - THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013

All efforts designed to understand cultural heritage, know its history and meaning, ensure its material safeguard and, as required, its presentation, restoration and enhancement. (Cultural heritage is understood to include monuments, groups of buildings and sites of cultural value as defined in article one of the World Heritage Convention).
ICOMOS, NARA DOCUMENT ON AUTHENTICITY, 1994

The conservation of monuments is always facilitated by making use of them for some socially useful purpose.
Vgl. THE VENICE CHARTER, 1964

The purpose of conservation is to care for places of cultural heritage value.. Conservation means all the processes of understanding and caring for a place so as to safeguard its cultural heritage value. Conservation is based on respect for the existing fabric, associations, meanings, and use of the place. It requires a cautious approach of doing as much work as necessary but as little as possible, and retaining authenticity and integrity, to ensure that the place and its values are passed on to future generations.
ICOMOS NEW ZEALAND CHARTER, 2010, p.2

Consolidation

Basic adaptation and maintenance works to ensure a building's ongoing beneficial use.
Vgl. JAMES DOUGLAS, p. 594

Conversion

Making a building more suitable for a similar use or for another type of occupancy, either mixed or single use.
JAMES DOUGLAS, 2006, p.584

Extension

Expanding the capacity or volume of a building, whether vertically by increasing the height/depth or laterally by expanding the plan area.
JAMES DOUGLAS, 2006, p.585

Interpretation

Interpretation actively enhances public understanding of all aspects of places of cultural heritage value and their conservation. Relevant cultural protocols are integral to that understanding, and should be identified and observed. Where appropriate, interpretation should assist the understanding of tangible and intangible values of a place which may not be readily perceived, such as the sequence of construction and change, and the meanings and associations of the place for connected people. Any interpretation should respect the cultural heritage value of a place. Interpretation methods should be appropriate to the place. Physical interventions for interpretation purposes should not detract from the experience of the place, and should not have an adverse effect on its tangible or intangible values.
ICOMOS NEW ZEALAND, 2010, p.8

Intervention

Intervention means any activity that causes disturbance of or alteration to a place or its fabric. Intervention includes archaeological excavation, invasive investigation of built structures, and any intervention for conservation purposes.
ICOMOS NEW ZEALAND, 2010, p.8

Maintenance

Maintenance is fundamental to conservation. Maintenance should be undertaken where fabric is of cultural significance and its maintenance is necessary to retain that cultural significance.
Vgl. Art. 15 CHANGE - THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013

Continual activity to ensure the longevity of the resource without irreversible or damaging intervention.
ICOMOS APPLETON CHARTER, 1989, p.3

A "combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function". Maintenance involves routine work necessary to keep the fabric of a building, the moving parts of machinery, etc, in good order. In other words, it consists of regular ongoing work to ensure that the fabric and engineering services are retained to minimum standards (Ashworth, 1997).
JAMES DOUGLAS, 2006, p.586

Maintenance means regular and on-going protective care of a place to prevent deterioration and to retain its cultural heritage value.
ICOMOS NEW ZEALAND, 2010, p.10

Modernization

Bringing a building up to current standards as prescribed by occupiers, society and/or statutory requirements.
JAMES DOUGLAS, 2006 p.587

New Work

New work such as additions or other changes to the place may be acceptable where it respects and does not distort or obscure the cultural significance of the place, or detract from its interpretation and appreciation. New work should be readily identifiable as such, but must respect and have minimal impact on the cultural significance of the place.
Vgl. Art. 22 New Work - THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013

Non-Intervention

In some circumstances, assessment of the cultural heritage value of a place may show that it is not desirable to undertake any conservation intervention at that time. This approach may be appropriate where undisturbed constancy of intangible values, such as the spiritual associations of a sacred place, may be more important than its physical attributes.

ICOMOS NEW ZEALAND, 2010, p.8

Preservation

Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

U.S. SECRETARY OF THE INTERIOR, 2017. P.2

Preservation is appropriate where the existing fabric or its condition constitutes evidence of cultural significance, or where insufficient evidence is available to allow other conservation processes to be carried out.

Vgl. Art. 17 Preservation - THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013

Preservation is no longer a retroactive activity but becomes a prospective one.

REM KOOLHAAS, 2004

Arresting or retarding the deterioration of a building or monument by using sensitive and sympathetic repair techniques. Preservation means 'the state of survival of a building or artefact, whether by historical accident or through a combination of protection and active conservation' (BS 7913: 1998). It also can be defined as 'the act or process of applying measures necessary to sustain the existing form, integrity and materials of an historic property (Weeks and Grimmer, 1995). Preservation focuses on the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time. It includes protection and stabilization measures.

JAMES DOUGLAS, 2006

Preservation means to maintain a place with as little change as possible.

ICOMOS NEW ZEALAND, 2010, p.10

Preservation means maintaining a place in its existing state and retarding deterioration.

THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013, p.4

Reconstruction

Reconstruction is defined as the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.
The Reconstruction Standards establish a limited framework for recreating a vanished or non-surviving building with new materials, primarily for interpretive purposes.

Vgl. THE SECRETARY OF THE INTERIOR'S STANDARDS FOR THE TREATMENT OF HISTORIC PROPERTIES

Reconstruction is appropriate only where a place is incomplete through damage or alteration, and only where there is sufficient evidence to reproduce an earlier state of the fabric. In some cases, reconstruction may also be appropriate as part of a use or practice that retains the cultural significance of the place. Reconstruction should be identifiable on close inspection or through additional interpretation.

Vgl. Art. 19 Restoration - THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013

The re-establishment of what occurred or what existed in the past, on the basis of documentary or physical evidence. Reconstruction, in other words, re-creates vanished or non-surviving portions of a property for interpretative purposes.

JAMES DOUGLAS, 2006, p.588

Reconstruction is distinguished from restoration by the introduction of new material to replace material that has been lost. Reconstruction means to build again as closely as possible to a documented earlier form, using new materials.

ICOMOS NEW ZEALAND, 2010, p.7

Reconstruction means returning a place to a known earlier state and is distinguished from restoration by the introduction of new material.

THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013, p.4

Refurbishment

Modernizing or overhauling a building and bringing it up to current acceptable functional conditions (Watt, 1999). It is usually restricted to major improvements primarily of a non-structural nature to commercial or public buildings. However, some refurbishment schemes may involve an extension.

JAMES DOUGLAS, 2006, p. 589

Rehabilitation

Modification of a resource to contemporary functional standards which may involve adaptation for new use.

ICOMOS APPLETON CHARTER, 1989, p.3

Rehabilitation is defined as the act or process of making possible a compatible use for a property through repair, alteration, and additions while preserving those portions or features which convey its historical cultural or architectural values.

U.S. SECRETARY OF THE INTERIOR, 1995, p.2

Work beyond the scope of planned maintenance, to extend the life of a building, which is socially desirable and economically viable (Watt, 1999). It is a term that strictly speaking is normally confined to housing. Rehabilitation can also be defined as "the act or process of making possible a compatible use for a property through repair, alteration and additions while preserving those portions or features which convey its historical, cultural or architectural values" (Weeks and Grimmer, 1995). It acknowledges the need to alter or add to a historical property to meet continuing or changing uses while retaining the property's historic character.

JAMES DOUGLAS, 2006, p.589

Relocation

Relocation and dismantling of an existing resource should be employed only as a last resort, if protection cannot be achieved by any other means.

ICOMOS APPLETON CHARTER, 1983

Dismantling and re-erecting a building at a different site. It can also mean moving a complete building to a different location nearby.

JAMES DOUGLAS, 2006 p.589

Remodelling

Substantial repairs and improvements in a facility or subsystem that returns its performance to levels approaching or exceeding those of a recently constructed facility.

JAMES DOUGLAS, 2006, p. 589

Renewal

Substantial repairs and improvements in a facility or subsystem that returns its performance to levels approaching or exceeding those of a recently constructed facility.

JAMES DOUGLAS, 2006; p.589

Renovation

Upgrading and repairing an old building to an acceptable condition, which may include works of conversion.

Vgl. JAMES DOUGLAS, 2006; p. 598

Repair

This is the "restoration of an item to an acceptable condition by the renewal, replacement or mending of worn, damaged or decayed parts" (BS 8210:1993). It is associated with the rectification of building components that have failed or become damaged through use and misuse (Ashworth, 1997).

JAMES DOUGLAS, 2006; p.589

Repair means to make good decayed or damaged fabric using identical, closely similar, or otherwise appropriate material.

ICOMOS NEW ZEALAND, 2010, p.10

Replicate

In consonance with traditional ideals, replication can be accepted as an appropriate strategy not only to conserve unprotected historic buildings, but especially if such replication encourages historic ways of building.

INTACH (INDIAN NATIONAL TRUST FOR ART AND CULTURAL HERITAGE) CHARTER, 2016

Restoration

Restoration is appropriate only if there is sufficient evidence of an earlier state of the fabric.

JAMES DOUGLAS, 2006, p.590

To bring back an item to its original appearance or state (BS 3811). It is often undertaken to depict a property at a particular period of time in history, while removing evidence from other eras. This usually involves reinstating the physical and/or decorative condition an old building to that of a particular date or event. It includes any reinstatement works to a building of architectural or historic importance following a disaster such as extensive fire damage. Restoration may also be defined as 'the act or process of accurately depicting the form, features and character of a property as it appeared at a particular period in time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period' (Weeks and Grimmer, 1995)

JAMES DOUGLAS, 2006 p. 590

The process of restoration typically involves reassembly and reinstatement, and may involve the removal of accretions that detract from the cultural heritage value of a place. Restoration is based on respect for existing fabric, and on the identification and analysis of all available evidence, so that the cultural heritage value of a place is recovered or revealed. Restoration should be carried out only if the cultural heritage value of the place is recovered or revealed by the process. Restoration does not involve conjecture.

ICOMOS NEW ZEALAND CHARTER, 2010

Restoration means returning a place to a known earlier state by removing accretions or by reassembling existing elements without the introduction of new material.

CLAUSE 1.7, THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013

Restoration and reconstruction should reveal culturally significant aspects of the place.

Vgl. Art. 18 Preservation - THE BURRA CHARTER, ICOMOS AUSTRALIA, 2013

Retrofitting

The redesign and reconstruction of an existing facility or subsystem to incorporate new technology, to meet new requirements or to otherwise provide performance not foreseen in the original design (Iselin and Lemer, 1993). In other words, retrofitting is the replacement of building components with new components that were not available at the time of the original construction (Ashworth, 1997)

JAMES DOUGLAS, 2006; p.590

Stabilization

Stabilisation means the arrest or slowing of the processes of decay.

ICOMOS NEW ZEALAND, 2010, p.11

Substantial maintenance and adaptation works to ensure a building's long-term beneficial and safe use. It often includes major repairs and strengthening works such as stitching and underpinning.

JAMES DOUGLAS, 2006; p.590

A BRIEF HISTORY OF ADAPTIVE REUSE

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The idea of Adaptive Reuse has existed since the beginning of humanity. Using caves as dwellings or animal skins as clothing are early examples of the ingenuity of mankind and describe the human desire to reuse found structures and objects or extend the life of materials through recycling. [2]

Throughout history, reusing architecture became a transcultural concept to generate or develop needed space for a new program. Transformations of classical monuments in the renaissance period or adaption of religious buildings for industrial or military uses during the French revolution bear witness to the tradition of this practice.[3]

A prominent reference in history is the conversion of the renowned Hagia Sofia in Istanbul from a Greek Orthodox Christian cathedral to a later ottoman imperial mosque. However, the intentions for these transformations were rarely found in the preservation of monuments, but rather followed pragmatic or economic principles. [4]

Although a pragmatical reuse of buildings without the intention of preservation has been common practice since ancient times, the theoretical approach of Adaptive Reuse was applied for the first time by Eugène Emmanuel Viollet-le-Duc in the 19th century. The French architect and conservator highlighted the practice of Adaptive Reuse as an appropriate way to preserve historic monuments. He argued that "the best way to preserve a building is to find a new use for it, and then to satisfy so well the needs dictated by that use that there will never be any further need to make any further changes in the building".[5]

The ideas of LeDuc, however, were strongly criticized by his contemporary John Ruskin. It was impossible for him to restore anything that had ever been great or beautiful. Instead of restoration, Ruskin recommended regular care and maintenance to ensure the preservation of historic buildings. Ruskin's belief in the preservation of old buildings had a major influence on later thinking about the distinction between conservation and restoration. At the beginning of the 20th century, the conflict between these opposing theories on Adaptive Reuse was elaborated by the Austrian art historian and conservator Alois Riegl, who developed a system to classify monuments according to their value. Riegl distinguished between different categories of values, which he summarized on as memorial values on one hand (the value of aging, historical value and intentional commemoration value) and on the other hand as contemporary values (utility value, art value and novelty value). By establishing the dimension of a utility value of monuments, he recognized the reuse of historic buildings as an essential part of modern conservation.

In the post-war era, architects sought to create new buildings that would break completely with traditional practice. In response to the increasing demolition and new construction, a growing interest in the preservation of old buildings developed. In the second half of the 20th century, architects began to view working with historic buildings as a challenge and made it an important aspect of their work. Since 1970, Adaptive Reuse has once again become the focus of architectural practice and theoretical discourse.

Besides the scarcity of resources as a global problem, it was also during the turbulent period of change in the 1970s when many idealistic protests of the previous decade manifested themselves. In the field of urban planning, it was a time of resistance to urban renewal programs introduced in the 1940s and 1950s. One of the most prominent critics of these urban renewal programs was Jane Jacobs, who in her book „Death and Life of Great American Cities" from 1961 expressed the general dissatisfaction of the population and set the tone for later political decisions. However, it was not until the early 1970s that action was taken, particularly by the U.S. Department of Housing and Urban Development (HUD). In this context, major cities such as New York pursued various initiatives, including one on the ‚reuse of vacant space in existing buildings'.

The New York art scene played a particularly pioneering role in the context of Adaptive Reuse. Art entrepreneur Alanna Heiss shaped the art scene with her efforts to rehabilitate dilapidated warehouses and unused city property in an environment marked by dereliction and decay, and created non-profit art spaces blurring the boundaries between studio, gallery, theatre, and community center. One of the first examples was the establishment of an artists' gallery in the bell tower of the 19th century McKim, Mead & White New York Life Insurance Company building in Lower Manhattan in 1972, further the reuse of a condemned pier under Brooklyn Bridge and the reuse of an abandoned school, the Queens Public School No. 1 (PS1) in Long Island City as the Institute of Art and Urban Resources.[6]

HOSTS, GUESTS, AND GHOSTS

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Operations in the field of Adaptive Reuse are defined by introducing new program within the established order of an existing structure. The old and the new hereby form the essence of the general idea of reusing. Liliane Wong, Author and Professor at the Rhode Island School of Design refers in her book ‚Adaptive Reuse: Extending the Lives of Buildings' to host- and guest structures as the old and the new:

„In the built environment, a host building is a structure that receives a new use for a defined or undefined period of time...Host buildings are wrappers of different kinds, manifested as physical construction into which new life is introduced." [7]

Guests and hosts are by definition mutually dependent. The interaction between both defines the relationship of the visitor with the state. The Hosts' capability to receive new program depends on various factors like state, spatial capacity particularly with regard to the needs, previous usage and the related memory or the contextual location. Host buildings may be categorized according to their particular state of being with each category distinguished by unique physical characteristics. These in turn can specify the appropriate design principles for the intervention. All host structures share the characteristic of being a found object, which lost their significance and became obsolete over time. Host buildings share parallels with the french concept of the objet trouvé, a found and abandoned object which is exhibited by an artist with little or limited modification as work of art. Nevertheless, in contrast to the objet trouvé in art, host structures in Adaptive Reuse are defined by modification and change in the context of design interventions.[8]

Adaption and Modification can be implemented in many different scales and is strongly influenced by the type of the host building.[9] In this context, Liliane Wong describes six different host structure types: Host as Entity, as Shell, as Semi Ruin, Fragmented Hosts, Relics and Group Hosts.

Entity

The most common type of host structure is the existing whole and intact building. Modifications can be made both inside and outside. Design interventions range from renovations to subtractions and additions. The transformation of the Castelvecchio Museum of Italian Architect Carlo Scarpa is representative for this type. The altered medieval castle is converted through renovation, subtraction and extension with new program.[10]

Shell

In this type, the host building represents only the building envelope, which can accommodate new and different activities. This type of host structure is often a historical building with a listed exterior. Adaptive Reuse interventions involve all parts of the building except the shell. An example is the Dominican Library Selexyz in Maastricht. Modern elements and furniture such as bookshelves, a café and a mezzanine were integrated into the 13th century church without affecting the stone frame or the structure.[11]

Semi Ruin

Another type to be named is the incomplete host building. Because elements of the structure or infrastructure are missing, this type of host building is not intact. Interventions here include not only internal transformations but also external additions. Such additions are used to restore the existing destroyed structure to a complete state and to expand the scope and capacity of the host building as desired. The Moritzburg Museum in Halle can be mentioned as an example of the Semi-Ruin type. The half-destroyed roofless castle was rebuilt while the roof was supplemented with additional floors as a folded structure.[12]

Fragmented

A degree of incompleteness indicates the host for this type. The building is uninhabitable in the way it was found. The Adaptive Reuse intervention becomes an act of invention here. Fragmented hosts can appear as a fragment of a building, infrastructure, facade or just as a structure. An addition must be justified by the meaning of the fragment itself. This justification includes the historical significance, but also the economic viability.[13]

Relic

A host structure can sometimes appear as a relic of the past. It is not modified, but only serves as a catalyst for a new building. Its importance lies in recalling a memory of an event or a history. An example of this is the tiny wall fragment and the statue of the Madonna of the parish church of St. Kolumba, which inspired the architecture of Peter Zumthor in the new Kolumba Museum in Cologne.[14]

Group

A host structure is not necessarily to be understood as one single building. Reusing more than one building as a host leads to extensive Adaptive Reuse. Two types of group hosts can be distinguished. Individual buildings that are part of a common complex, or individual independent elements in an entire urban environment. The goal is usually the preservation of a historical event, a community, a historical moment or a period of time, such as the cultural heritage sites protected by UNESCO. This is the case, in particular, with the conversion of the Zollverein coal works and coking plant in Essen. The preservation of the history of coal mining was the focus of the conversion of the complex.[15]

The various possibilities of reusing and adapting the different host structures all require a clear position in the architectural transformation in space and time. A building can be read in this context as a sum of contrasting texts in which interventions represent a further chapter and extension of its history.[16]

DECODING THE DNA OF A BUILDING

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The success of an Adaptive Reuse strategy is linked to how the intervention responds to the defining and characteristic elements of the host structure.[17]

Liliane Wong describes these elements as the DNA of a building and uses an analogy to anatomy that is commonly used in architectural language. While other metaphors such as the heart, the veins or the skin refer to the vibrant centre of a building, the circulation or the building envelope, the identification of the DNA requires greater effort. The DNA of a building is made up of two strings: the obvious and the obscure traces of the past.[18] While evident traces are (in the analogy of the human body) visible ‚scars' [19] that verify and reveal transformations or other impacts through history, the intangible ones appear as „faint outlines of the past". [20]

In order to find an intervention strategy for a new use, traces of history can serve as determinants. Both, the tangible and the intangible tracks of a past existence describe the host structure's specific DNA. Liliane Wong points out that DNA, once decoded, can provide the appropriate framework for future interventions within the process of remodelling and the scope of interdisciplinary actions, between, reparation, conservation, restoration and reconstruction, in which the present reflects the past without copying it.[21] The uncovering and preservation of traces means enabling the coexistence of present and past without erasing or overwriting.

In May 1976, Rodolfo Machado published the moment defining text ‚Architecture as Palimpsest' in a special issue of the Architectural Review entitled ‚New Uses for Old Buildings' that dedicated itself to the new open theoretical context of the afterlife of buildings. In 'Architecture as Palimpsest' Machado suggests a different way of thinking by comparing a host structure to a palimpsest, in which traces of writings are slightly visible within an old manuscript scrubbed for reuse. The transformation process should not be restricted to the production of space only, but that the ‚sense' of the past and the way the architect or designer deals with it should be considered a fundamental part of the strategy.[22] Machado states, „the past provides the already-written, the marked 'canvas' on which each successive remodelling will find its own place. Thus, the past becomes a 'package of sense', of built-up meaning to be accepted (maintained), transformed, or supressed (refused)." [23]

Haunting the Ghost

Abandoned buildings retain and preserve the memories of the events that took place. The question is - to what extent are the refurbished buildings influenced by their past and memory? Should the host submit to the new function or do memories assert themselves to the guest structure?

In particular, structures that have been exposed to traumatic experiences often result in a specific form of afterlife, where the host determines the setup of the future program.[24] The philosopher Henri Bergson argues that pure memory lies in the past and is separated from the body. The example of the Berlin City Palace, however, shows that memories are preserved even though the building has been destroyed for decades.[25]

In the field of Adaptive Reuse, each project naturally refers to an already existing building. The effect that past experiences can have on the new use can be as sustainable as the visible traces of the past itself. Haunting ghosts are above all possibilities for a certain type of architectural intervention. Even if they are not always clearly identifiable, there are ghostly traces in every project, regardless of size.[26] By definition, a ghost is a disembodied soul, which is believed to be an inhabitant of the unseen world that appears in a nebulous, but bodily likeness. [27] The term has a close correlation to the concept of spirit, as supernatural essence of being, that is bodiless but can become visible.[28]

It seems naturally crucial to investigate the history of a host building in order to establish a connection through time, but how to capture the vague idea of a ghost or spirit in architecture? One strategy of haunting the ghost could be to preserve and further to emphasize the found atmospheres of space. Although the architecture theorist Mark Wigley argued in the 1998 issue of the architecture journal Daidalos „atmosphere is something personal, vague, ephemeral and difficult to capture in text or design, impossible to define or analyse", it can be seen as the essence of architecture.[29]

Emphasising on Atmospheres

Atmosphere delivers a conscious experience of room, place, space, that lasts. The Swiss architect Peter Zumthor identifies in his text 'Atmospheres' from 2006 a series of subjects that perhaps capture architectonic atmosphere. His assumption includes nine architectural parameters, which could assist in the process of haunting the authentic atmosphere. Zumthor itemizes the pure 'body of architecture', using the analogy of anatomy, and its material presence; the composition of materials; the specific sound of the built space and its environment; the physical and by implication the psychological temperature of a space; the physical presence of found objects; the given way of exploring the built space as user, with or without control; the tension between the environment and the inner realm; the levels of intimacy; the role of artificial and natural light and the transcendence of architecture and its environment.[30]

Liliane Wong encourages the reader to absorb the intangible memories of events that took place within an existing structure and let them define the strategy of reuse. The memories perhaps lie in Zumthors parameters of atmospheres.

Intersection with the Host

The overall strategy of Adaptive Reuse strives to respond to the unique DNA of a host building or structure with a variety of actions and design interventions.[31] These actions can be understood as operations [on the body of architecture] with the attempt to create a new user experience through different layers and types of intersection with the host. In this context Liliane Wong describes three main types of actions: ‚The Passive', ‚The Performative' and ‚The Referential'.

The Passive action describes a minimal transformation that does not affect the integrity of the structure but rather offers a new experience, while the existing remains relatively unchanged. Since it requires only little structural intervention, the "DNA" of the host stays intact. In contrast, expansion, enhancement or addition are changes of noticeable signs of modification by the outward manifestation of the purpose. Retrofitting the interior is an example of this form of action. The retrofit is a transient occupation which is continually reinvented during the host's brief and multiple life cycles.[32]

While a passive action mainly communicates with itself and uses only the structural grid of its host as a 'shell', the performative action requires participation of the host, while a programmatic, structural or typological transformation takes place.[33] Interventions that demand a reaction of the host challenge its DNA. As host systems are rooted in the concepts of their own architecture, structural components, materials, spatial patterns, line arrangement, morphology or proportions, the reuse of the current framework means altering its architecture and changing its concepts.[34]

The referential practice revives the structure of the host by means of design approaches and initiatives which are mutually based on the past and integrates what has been with what is. Many aspects make for a rich interaction between the host system and its current application, helping to sustain the DNA of a host system into the future. Ignoring these aspects leads to the end of the line. An initial assessment of the host's specific features must be the starting point for each Adaptive Reuse strategy. By studying such features and acknowledging their presence in host structures, we gain an understanding of how the prevailing framework can be changed.[35] The referential action represents a subtle intervention. The emphasis is on accepting the history of the host and revealing or underlining its memory.

Even though the strategies mentioned are uniquely different, they have one thing in common. Each of these actions enlivens its host by recognizing a part of its defined principles.

> *"The practice of adaptive reuse is much like playing the second violin to the melody of the host building. It is a song of redaction in which the minor keys humbly and sweetly negotiate between existing context and new content.*

Liliane Wong
Professor and Chair of the Dep. of Interior Architecture
Rhode Island School of Design, New York

CONCLUSION

~

Numerable publications through history address the principles of architecture in general, but what governs the principles of Adaptive Reuse?

The successful metamorphosis of abandoned architecture depends on the legible relationship of the existing structure and its new use. The transformation of a given space needs to demonstrate a respect for the autonomous existence of their host. Ultimately, the host building forms the physical construction into which new life is breathed. The special ability to be able to take up a new use depends on the one hand on its state, its potential and the possibility of its spatial adaptation, but on the other hand on its individual memory and its placement in the context.

Liliane Wong raises the question of immortality of the host and applies an analogy between Adaptive Reuse and the concept of afterlife and reincarnation.[36] The term 'reincarnation' derives from Latin and literally means, 'entering the flesh again'. It describes an Eastern approach to life after death and rebirth as another form of being. There are complex differences in conviction in Hinduism, Buddhism, Sikhism, Jainism, etc - but with the compliance in the immutability of the soul in a changing body. This analogy applies to Adaptive Reuse and the widespread phenomenon to change the use. A host structure is gaining a second life to fulfil a new and unrelated function. Although often attempted, many such conversion projects fail due to a lack of recognition and even rejection of the nature of the existing structure.

To recognise and further to emphasize the unique characteristics, the spirit and the ghost of a host provide a possible framework for architects. The transition through time creates a particularly rich relationship between the host and its new function. A complexity in relation reveals the unexpected, leaves space for interpretation and creates new realities. Adaptive Reuse requires a strong examination of the history and therefore constitutes always an interpretation of it. While some introduced interventions rather demonstrate an act of overwriting, Adaptive Reuse intends to add another chapter to the continuous story of a building. However, there is no agreement in the basic principles when dealing with historical buildings. The aim is to apply a precise set of interventions as concept of alteration to the host structure that supports its independent existence and treats the existing as an entity.

Conservation due to Adaptive Reuse can mean tearing down a wall to reveal something hidden. Unlike preservation, Adaptive Reuse is considered as radical act. It means growth and continued development, rather than freezing a moment in time.

Learning by References

FIG 01 : The freestanding escalator as new access to the coal washing plant, which has been transformed into the Ruhr Museum, refers to the former conveyor systems.

Zeche Zollverein

LOCATION	*Essen, Germany*
INDUSTRIAL USAGE	*Coal Mine*
YEAR OF CONSTRUCTION	*1851 - 1932*
YEAR OF TRANSFORMATION	*2001*
ARCHITECT	*OMA, Sanaa, Norman Foster et al.*
GROUND FLOOR AREA	*117.000 sqm*
CURRENT PROGRAM	*Leisure & Recreation* *Art & Exhibition* *Creative Industries* *Cultural Activities* *Social Service* *Industrial Heritage Museum* *Housing* *Gastronomy*
REFERENCE	*Complex industrial conversion* *Cultural preservation of historic events*
HOST TYPE	*Group Host*
ACTION	*Referential*
OPERATION	*Addidtion* *Authenticity* *Conversion* *New Work* *Preservation*

FIG 02 : The exhibition tour through the Ruhr Museum follows the former path of coal.

The vast industrial landscape of the Ruhr-Gebiet is the largest urban agglomeration in Germany and Zeche Zollverein its accessible icon of industrial culture.

The preservation of the internationally significant heritage site Zeche Zollverein has resulted in a complex conversion into a cultural destination, with the Ruhr Museum, the regional design center, an art school, the school of dance, a hotel, a public swimming pool and a number of businesses and gastronomies.

The objective behind grand scale adaptive reuse projects, such as the conversation of the Zollverein coalmine and coking plant in Essen, Germany, is the preservation of a historic event, community or moment in time. The perceived deficiency at Zeche Zollverein was indeed cultural and not structural. Hence, the strategy of adaptive reuse of the host structures was to create evolved versions of their initial selves as exhibits, to underline its social and cultural value.

Zeche Zollverein is comprised a wide range of colliery buildings designed by Fritz Schupp and Martin Kremmer between 1928 and 1932 in the architecture of the Neue Sachlichkeit, widespread over an extensive area of 117.000 square meter.

The diversity of unique structures, each with its own identity, history and physical condition was met with a strategy of unifying adaptive reuse, joining the individual structures under a common identity. The encircling park further contributes to this common and unique identity by connecting the built individuals with pathways made of reused railway tracks and overhead walkways.[1]

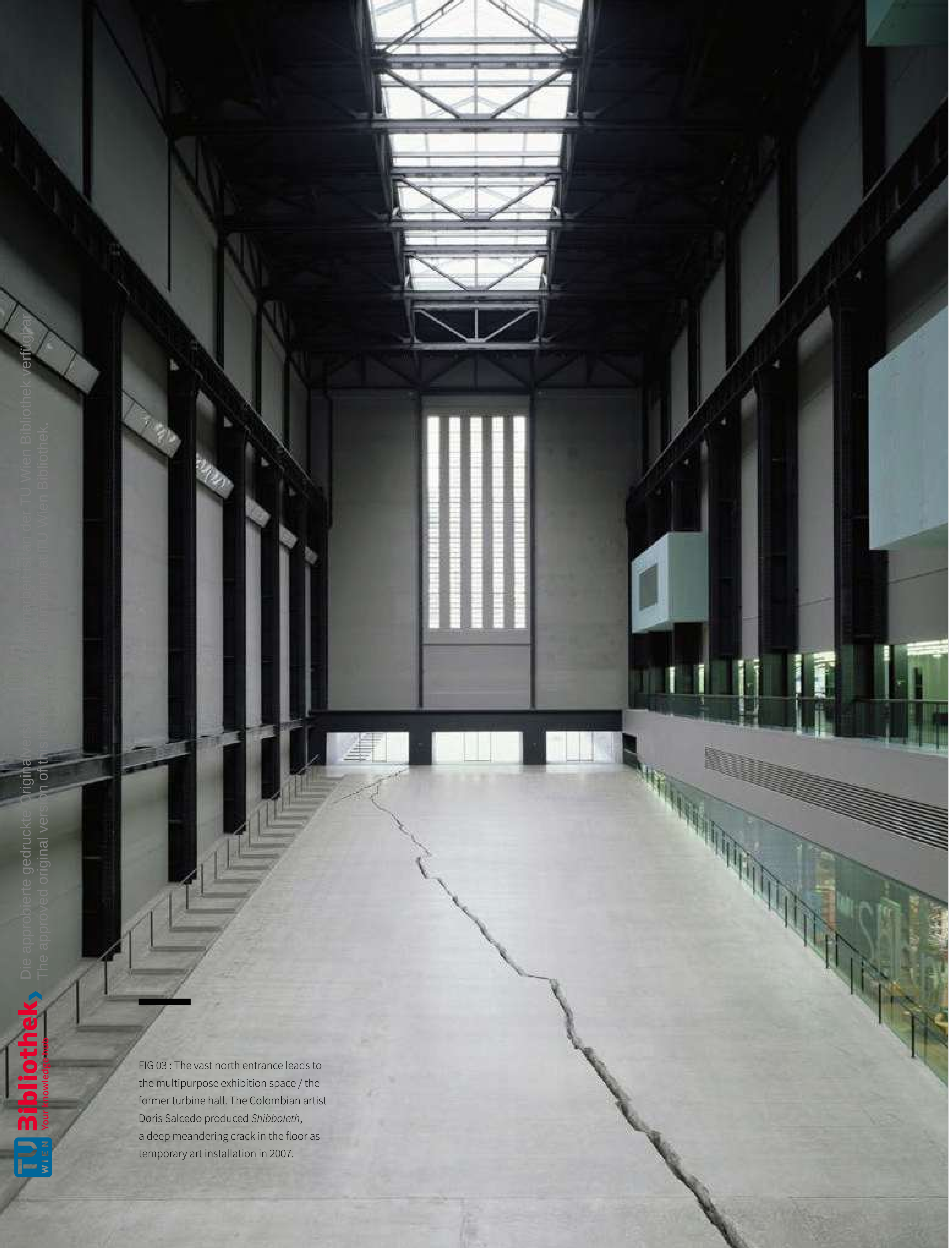


FIG 03 : The vast north entrance leads to the multipurpose exhibition space / the former turbine hall. The Colombian artist Doris Salcedo produced *Shibboleth*, a deep meandering crack in the floor as temporary art installation in 2007.

Tate Gallery of Modern Art

LOCATION:	*London, United Kingdom*
INDUSTRIAL USAGE:	*Electricity Generating Station*
YEAR OF CONSTRUCTION:	*1891*
YEAR OF TRANSFORMATION:	*1947 - 1963*
ARCHITECT:	*Herzog de Meuron*
GROUND FLOOR AREA:	*23.600 sqm*
CURRENT PROGRAM:	*Museum*
REFERENCE:	*Space* *Program*
HOST TYPE:	*Entity*
ACTION:	*Referential*
OPERATION:	*Addition* *Alteration* *Conversion* *Interpretation* *Extension*

FIG 04 : In order to accommodate a broad range of art, Herzog & de Meuron replaced much of the power station's interior with galleries of differing sizes.

„Something new has emerged that is more exciting than the pure preservation of a given structure and more complex than a completely new building."

Statement Herzog de Meuron, 11 Stations at Tate Modern

The transformation of the Bankside Power Station on the banks of the Thames in London to the Tate Modern Museum required substantial alterations. Almost the entire host building has undergone significant transformations through changes in use and architectural interventions.

However, these transformations mostly remain hidden from the outside, as the architects left the initial form unaltered in order to emphasize the industrial character of the building.
Keeping the hosts visual identity, the only significant exterior modification is a horizontal light beam that lays atop the original brick building. The purpose of this element is to bring natural light into the building and additionally to illuminate the extension.

The architects Herzog de Meuron describe their approach as one that unleashes the hidden by strengthening the massive appearance of Bankside, rather than reducing it. "This is a kind of Ai-kido strategy where you use your enemy's energy for your own purposes. Instead of fighting it you take all the energy and shape it in an unexpected and new way."[2]

This exemplary project manifests a respectful and appreciative handling of the spirit of a host building despite significant innovations. The architects were able to maintain and even under-line the specific industrial character of the host, while enabling a new use. The host building is preserved in co-existence.

FIG 05 : The transparent and light-weight office building is elevated and appears to float above the massive concrete crane runway.

Kraanspoor

LOCATION:	*Amsterdam, The Netherlands*
INDUSTRIAL USAGE:	*Craneway*
YEAR OF CONSTRUCTION:	*1952*
YEAR OF TRANSFORMATION:	*2007*
ARCHITECT:	*OTH Architects*
GROUND FLOOR AREA:	*12.500 sqm*
CURRENT PROGRAM:	*Office* *Hotel* *Archive*
REFERENCE:	*Adaptive Reuse of Infrastructure* *Program* *Marine Context* *Relation Host and Guest*
HOST TYPE:	*Relic*
ACTION:	*Passiv*
OPERATION:	*Interpretation* *New Work* *Refurbishment*

FIG 06 : The existing infrastructure serves as foundation and supports the maximum possible weight of a three-story building with an asymmetrical overhang on the water side.

Transformed from a relic into an icon of Amsterdam's industrial heritage, Kraanspoor presents a striking example for reusing infrastructure.

The 270 metre long, reinforced concrete construction was built in 1952 on the grounds of the former NDSM (Nederlandsche Dok en Scheepsbouw Maatschappij) shipyard. The structures served as mooring station in the harbour basin in a shipbuilding assembly line, with two cranes running on tracks.

Architect Trude Hooykaas recognised the significant potential of the obsolete crane way and saved it from demolition in the late 1990s. The found concrete structure was characterized by a degree of incompleteness. The host, as a relic from the past, existed as fragment, which required a strategy of addition in order to achieve a state of completion.[3]

Even if the abandoned concrete structure serves as a recall for a certain historical period, the significant potential lies in the use of the existing infrastructure as foundation for a new use. The architect Trude Hooykaas created a lightweight transparent three-storey hotel- and office building on top of the concrete crane way, while archive space has been created in the concrete structure itself. All areas are still accessible through the four original stairwells.

Although the host only seems to execute the role of a beam at first, it still inspires the architectural language significantly. Hooykaas successfully managed to maintain major parts of the existing structure, even though the two cranes had to be disassembled for the upcoming addition. The addition raises the impression of floating by creating a clearly visible gap, so that the historic Kraanspoor is still recognisable in an independent way. The identification and appreciation of history in the manifestation of a building's new concept are crucial for an effective reuse of fragments.

REM Island

LOCATION:	*Amsterdam, the Netherlands*
COMMERCIAL USAGE:	*Broadcasting Station from Aug to Dec 1964* *Monitoring Station from 1965 to 2004*
YEAR OF CONSTRUCTION:	*1964*
YEAR OF TRANSFORMATION:	*2008 - 2011*
ARCHITECT:	*Concrete Architects*
GROUND FLOOR AREA:	*661 sqm*
CURRENT PROGRAM:	*Restaurant* *Office*
REFERENCE:	*Adaptive Reuse of Offshore Structures* *Program* *Marine Context* *Circulation*
HOST TYPE:	*Entity*
ACTION:	*Referential*
OPERATION:	*Adaption* *Conversion* *Refurbishment*

FIG 07 : The new steel walkways wind up the northeast side of the platform, providing connections to each deck and the roof terrace.

FIG 08 : The actual balustrades were faithfully recreated in order to preserve the original ambience.

REM Island illustrates how offshore structures can be relocated and adapted for reuse in an urban context.

Originated as a pirate commercial radio and television station, REM Island was located nine kilometers off the coast of Noordwijk, just outside territorial waters. Constructed completely from steel, with a massive aerial tower on top, the broadcasting platform resembles an early oil or gas drilling rig in its design.

Just four month after REM Island started regular broadcasting 'TV Nordzee' on August 15th 1964, the Continental Shelf Act was implemented. As a result, REM Island became part of Dutch territory and broadcasting was considered illegal. On 17 December 1964, the government raided the island, to end the broadcasting activities, and took over to use it as environmental testing site.[4]

In 2006, REM Island was brought to land, where it remained for over two years until a Dutch housing association revealed plans to relocate and transform the platform as part of the redevelopment plan of Houthaven, Amsterdam.[5] Nowadays, REM Island is located at Amsterdam's port Houthavens, resting on 12 meter high columns 15 meters ashore. The new program includes an office area on the first deck and a restaurant on the two remaining decks on top. In order to accommodate the new program, the island has been extended by an additional floor on the same grid as the existing structure. As part of that major intervention, the helideck as well as the broadcasting tower were dismantled. The original red and white-checkered façade was maintained, although the white parts have been used to create large openings. By doing so, the architects ensure the island retains its original atmosphere, even due alteration had to be made.[6]

The design of a new steel footbridge, which runs through the enormous steel construction and leads up to the building, is in contrast to the careful renovation of details, a referential, as well as performative act. The comprehensive refurbishment of its original characteristic components make for a rich connection between host structure and its new use, empowering REM Islands DNA. By emphasizing the special spirit of the platform, the architecture thus becomes an authentic historical evidence that tells about its history.

The Krane

LOCATION:	*Copenhagen, Denmark*
INDUSTRIAL USAGE:	*Coal Crane*
YEAR OF CONSTRUCTION:	*1944*
YEAR OF TRANSFORMATION:	*2017*
ARCHITECT:	*Arcgency*
GROUND FLOOR AREA:	*285 sqm*
CURRENT PROGRAM:	*Hotel* *Spa* *Meeting room*
REFERENCE:	*Adaptive Reuse of Infrastructure* *Program* *Marine Context* *Relation Host and Guest* *Exterior and Interior Details*
HOST TYPE:	*Entity*
ACTION:	*Performative*
OPERATION:	*Change* *Conversion* *Rehabilitation* *Translocation*

FIG 09 : The residential cabin on the top floor.

FIG 10 : The former coal crane has begun a second life in the form of a retreat. The Krane offers an exclusive hotel with spa, a conference room with 360° panoramic view and a reception. The black color scheme pays homage to the crane's history.

„Nordhavn still has an industrial look and feel that's attracting entrepreneurs, artisans and others. We kept that rough, industrial feeling and added something unexpected."

Mads Møller, Arcgency

In 2005 the Danish government and the city of Copenhagen started an initiative to revitalize the Nordhavn port area. The industrial zone with a rich past in the shipping industry experienced a massive downfall at the end of the last century. The initiative to redevelop the area incorporated public participations as well as multiple international design competitions to gather ideas for innovative reuse of the existing structures and potentials.

The local architects of Arcgeny identified the unique structural characteristics of an abandoned coal crane as such a potential. After moving the crane within the Nordhaven district, the architects applied minimalistic approach to transform the infrastructural object into a single customer hotel and spa.

The additional building elements were tailored around the structural elements of the crane, leaving its characteristics immediately perceivable from insides and outside alike. All additions are held in black and dark tones to create a neutral and serene appearance. The interior is cladded in fine materials that oppose the rough industrial exterior of the host. A contrast intended by the architects as analogy to Nordhavn itself: a modern and urban development with a wide heritage. The Krane can be understood as enriching symbioses of a structural host and the seamlessly integrated guests. A symbiosis in which both, guests and host alike, preserve their individual and unique qualities without oppressing the counterpart.[7]

The Intention behind the preservation of specific characteristics, such as the coal crane, is not the historical value of the host structure itself, but the preservation of the distinct atmosphere of a historical setting.

Drosscape North Sea

Drosscape is primary an urban design framework that looks at urbanized regions as the waste product of defunct economic and industrial processes. The concept was realized by Alan Berger, professor of urban design at the Massachusetts Institute of Technology, and is part of a new vocabulary and æsthetic that could be useful for the redesign and adaptive reuse of 'waste landscapes' within urbanized regions.[37]

Within the context of this thesis, the concept of drosscape could provide another way of imagine the integration and reuse abandoned offshore structures in the urban world. The term implies that dross is scraped, or resurfaced, and reprogrammed. Drosscape is the creation of a new state that is modeled in accordance with a new program or a new set of values.

FIG 11 : When the fossil fuel era is coming to an end, a vast number of physical structures developed for the purpose of oil and gas extraction will remain unused.

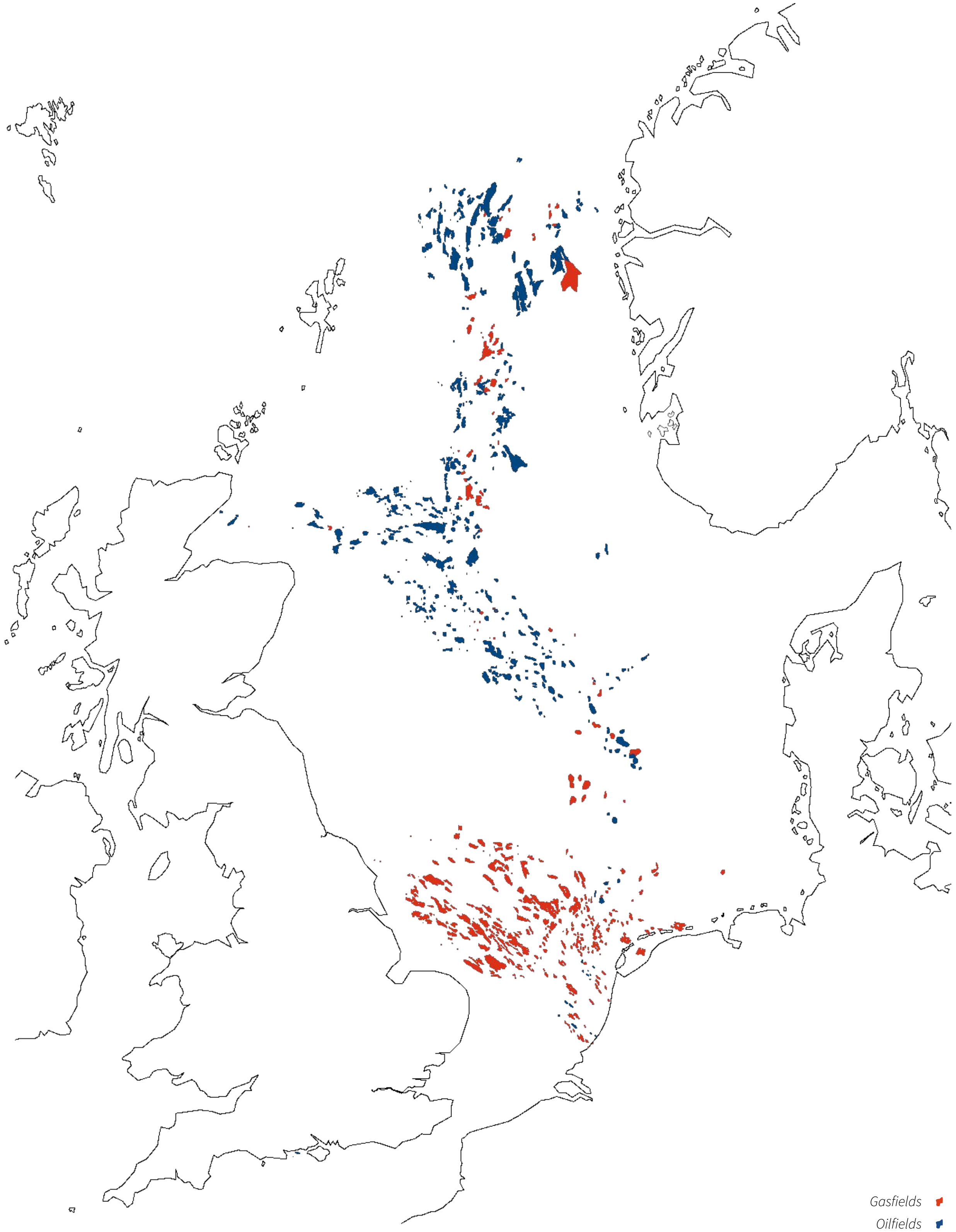


FIG 12 : OIL AND GAS FIELDS
Analytical Map
Territorial scale - North Sea

200 km

Industrial Exploitation of the Sea

The discovery and exploitation of North Sea oil and gas has arguably been one of the most dominant episodes in the post second world war economic history of northern Europe, even though the history of fossil fuel exploration and production in Europe goes back to the Iron Age.[1] Following the discovery of oil and gas in the North Sea, Britain, Norway, Denmark and The Netherlands were largely self-sufficient from the late 1970s and petroleum activities have contributed significantly to Europe's economic growth.

Exploration history in the North Sea dates back to 1959, when an onshore gas field in the Dutch province of Groningen was discovered, when searching for oil. The finding remains as the largest gas field in Europe and one of the largest gas fields in the world.[2] The Energy consumption in Europe was focused primarily on coal and imported oil by that time, so the Groningen discovery led to ubiquitously enthusiasm for offshore oil drilling.

At first, the find of gas under the sea between Dutch and British mainland was expected, due to a similarity in geographical formation that contained the gas in Groningen. The explorations in the shallow waters of the southern North Sea resulted in a steady stream of gas discoveries. At that time, the ownership rights in the North Sea in the high seas were still unclear and the petroleum potential of the North Sea untapped. Agreements on dividing the continental shelf in accordance with the median line principle (see page 56) were reached in March 1965.[3] Till then, a consortium consisting of Royal Dutch Shell and Esso undertook wild exploratory drilling off the Dutch coast. With the application of the UN Continental Shelf Act, oil companies could now acquire production licences with exclusive rights for exploring, drilling, and production in a particular licence area.

Subsequently the first offshore well was drilled in the summer of 1966, however it was a dry hole. In 1967, the first oil field was discovered in the Danish sector of the North Sea and oil companies continued to move explorations further north and with the important Ekofisk discovery in 1969, the North Sea oil episode categorically began. Production from the field started on 15 June 1971, and in the following years a number of major discoveries were made in all sectors of the continental shelf. In 1970, British Petroleum made its first discovery of commercial oil in the large Forties Field, and in 1971, geologists discovered the Dan oil field in the Danish part of the North Sea, from which oil was produced for the first time with permanent facilities.[4]

Although, and today, offshore oil and gas production in the North Sea is at an historical low.[5] However, an important oil heritage, rich in invention and technology, remains.

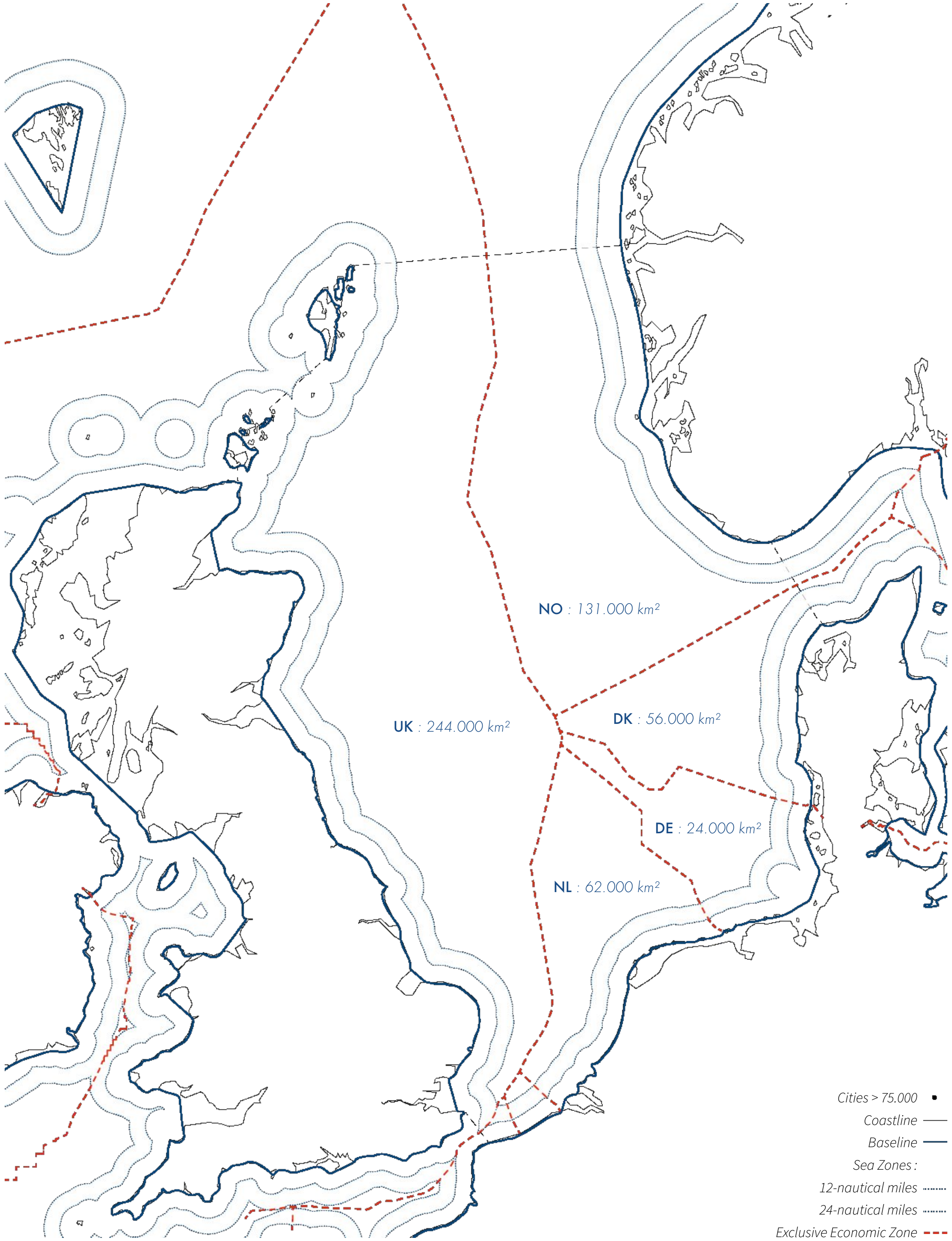


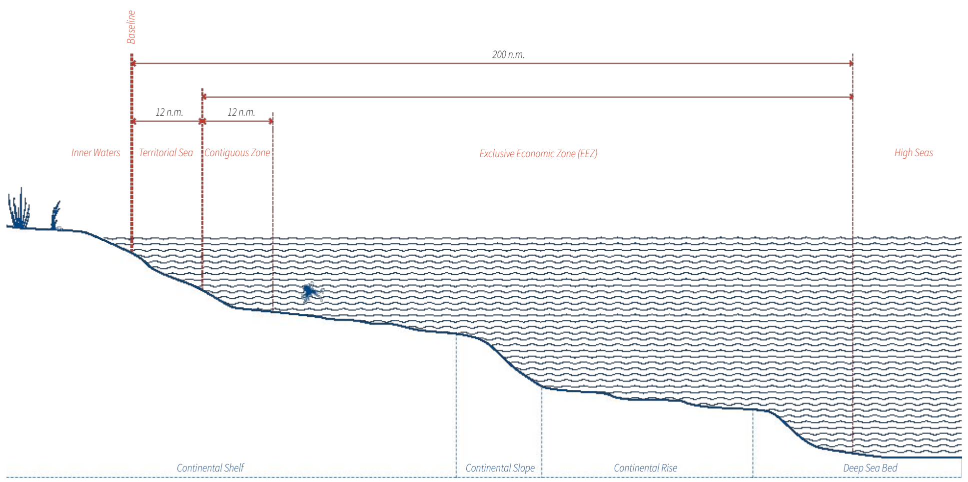
FIG 13 : SEA BORDERS - EXCLUSIVE ECONOMIC ZONES
Political Map
Territorial scale - Greater North Sea

Responsibilities

The current international maritime law is primarily regulated by the United Nations Convention on the Law of the Sea. The Law divides the sea area into legal zones in which the coastal states have certain rights and jurisdiction.[6]

The baseline forms the basis for determining the marine zones named in the United Nations Convention on the Law of the Sea. It is defined by the respective coastal state. All parts of the sea lying inland to the baseline are referred to as *Inner Waters*. These belong to the national territory and are therefore subject to the unlimited sovereignty of the coastal state. The *Coastal Sea* joins the baseline in a zone of 12 nautical miles. The sovereignty of the coastal state is already restricted by international law in this marine zone. Beyond the *Territorial Sea* is the *Contiguous Zone*, a 24-nautical-wide area measured from the baseline, in which the state only has the right of inspection. Below are the boundaries of the so-called *Exclusive Economic Zone (EEZ)*, in which the coastal states have the right to explore living and non-living resources.

The continental shelf sea zone described in the Convention on the Law of the Sea, which in its definition refers to the seabed and the subsurface, corresponds to the boundary of the Exclusive Economic Zone. Coastal states have sovereign rights to explore and exploit the natural resources of their respective continental shelf. *(Art. 77.1 UNCLOS)*



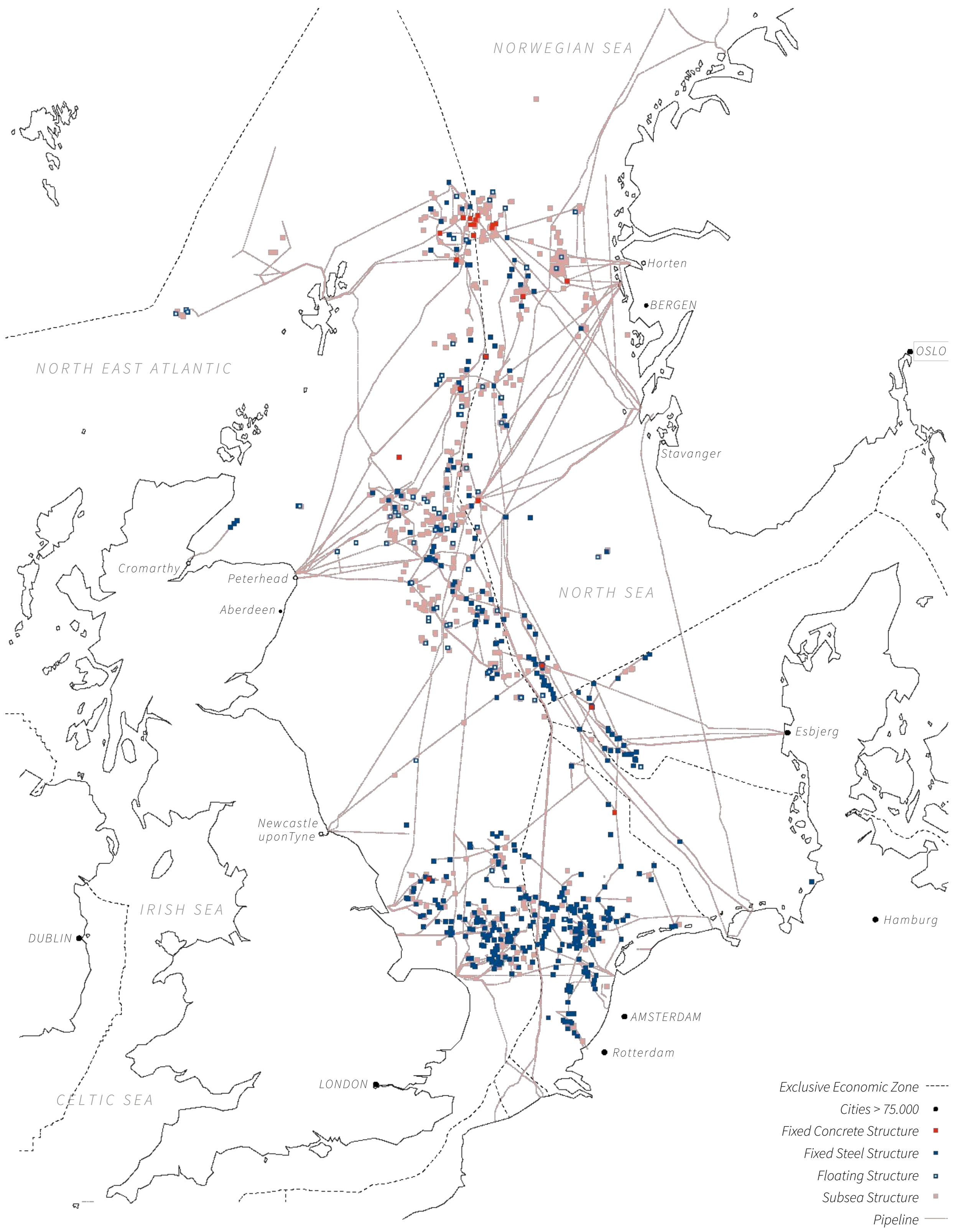


FIG 14 : DROSSCAPE NORTH SEA
Analytical Map
Territorial scale - North Sea

Infrastructure

One of the largest and most active industrial regions in Europe stretches across the entire North Sea, from the shallow shores of the Dutch and German coasts to the margins of the deep Norwegian Sea. The map 'Drosscape North Sea' illustrates the intensive use of the Exclusive Economic Zone (EEZ) of Norway, the United Kingdom, the Netherlands, Germany and Denmark for oil and gas exploitation.

Currently there are more than 1350 offshore facilities operating in the North Sea, varying in size and construction type: Subsea structures, floating structures made of steel or concrete, fixed structures on steel jackets, and fixed structures resting on a concrete foundation.[7]

Subsea structures allow fast and flexible deployment in deep waters and marginal areas of the sea. They have been the preferred solution for oil and gas field development in the North Sea since the 1990. To date, around 50% of all offshore oil and gas extraction facilities in the North Sea are subsea installations.

Fixed steel structures represent the majority of platforms working above sea level. They extend from the shallow waters of the North Sea basin in the south, across the central North Sea to the Norwegian Sea.

Floating steel or concrete structures make up a much smaller percentage of all installations. This type of construction is mainly found in the sea areas Forties, the western part of the North Sea, off the Scottish coast and occasionally in the sea area Viking, about a hundred kilometres east of the Shetland Islands.

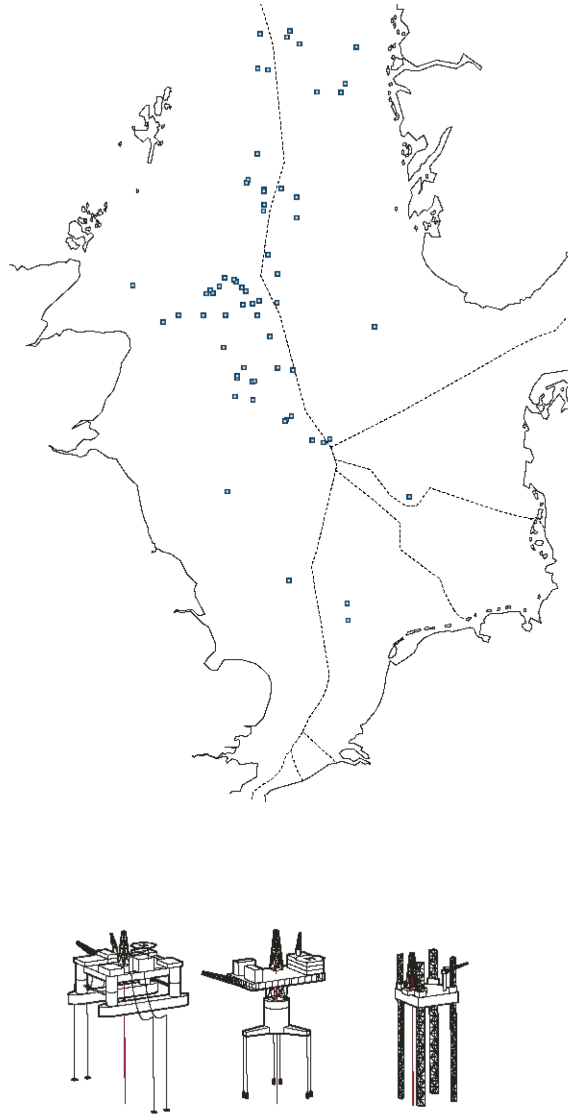
The challenge to build in the harsh environment of the northern North Sea have led to the development of a unique type of offshore structures in the 1970s, which stands out as pioneering work. The Norwegian Company 'Norwegian Contractors' introduced pre-stressed concrete as construction material for the offshore sector for water depths down to 300 meters. The 'Concrete Deepwater Structure' (Condeep) rests on the seafloor through its own weight, while supporting a fully integrated steel deck that accommodates oil production equipment, a drilling unit as well as living quarters. Of the 42 concrete gravity base structures worldwide, 27 are located in the Greater North Sea region. There are 13 concrete structures in the Norwegian sector of the North Sea, 12 in the British sector, and one each in the Dutch and Danish sector. Above the 63rd degree of latitude is only one Condeep structure located. The significant single-shaft Condeep Draugen stands in the 250 metre deep waters of the Norwegian Sea.[8]

The massive concrete facilities of the North Sea are almost exclusively located in the Viking sea area, which is divided in the EEZ of Norway and the United Kingdom. The densely developed industrial area was constructed between 1976 and 1990 and stands symbolically as backbone of the modern Norwegian welfare state.[9]

FIG 15 : Distribution of Offshore Structures in the North Sea

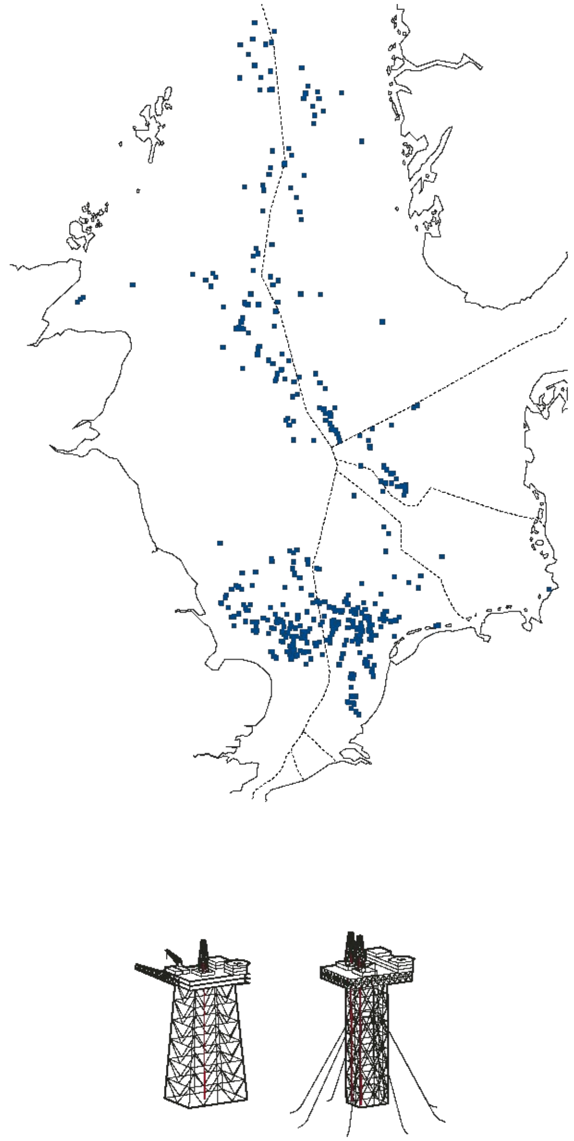
875 SUBSEA STRUCTURES

With over 800 installations, subsea structures make up the largest part of offshore facilities in the North Sea. They work autonomously directly on the seabed and can be found at any oil or gas field development. These type has no architectural relevance, but is presented here for the sake of completeness.



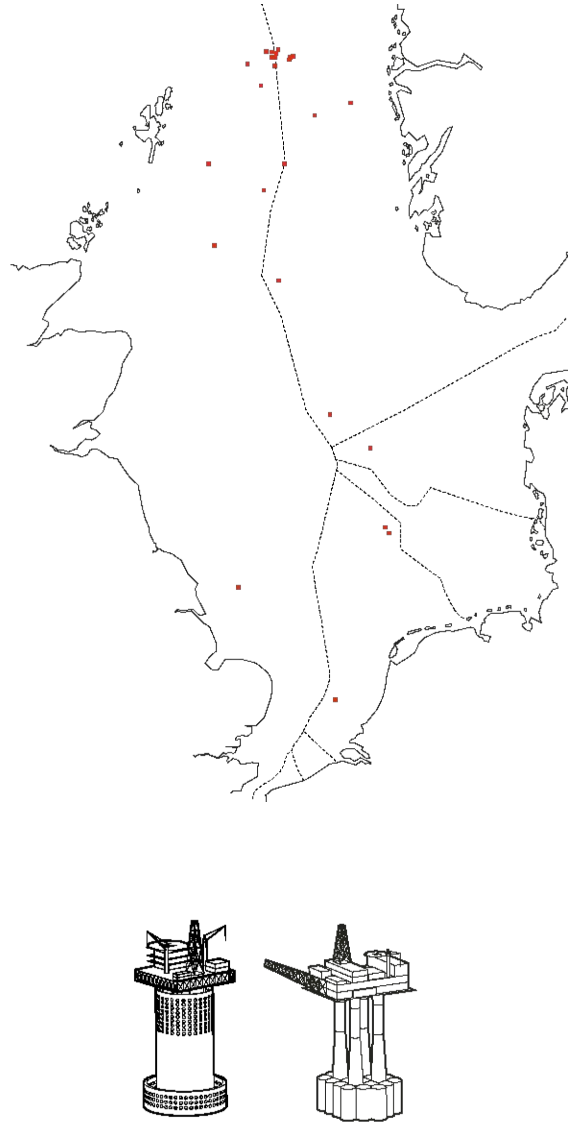
81 FLOATING STRUCTURES

The floating vessels are used preferred in frontier offshore regions or as solution for exhausting smaller oilfields, where seabed pipelines are not cost effective. They are remotely moved to new locations.



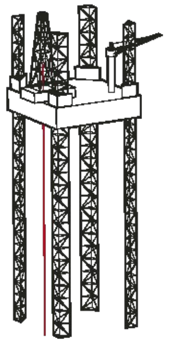
609 FIXED STEEL STRUCTURES

The southern North Sea, including parts of the UK Continental Shelf, the Danish and the Dutch Sectors, is characterised by comparatively shallow water with less than 60 meters and relatively moderate metocean conditions. The prevailing gas resources are exploited with light steel installations.



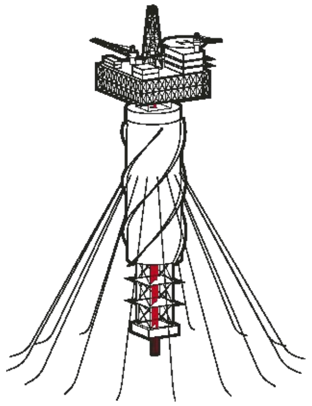
27 FIXED CONCRETE STRUCTURES

The central and northern North Sea is mainly marked by deeper water and more exposed metocean conditions. The instalations found in this region are proportionally heavier installations. The majority of heavy concrete gravity base infrastructure can be found here.



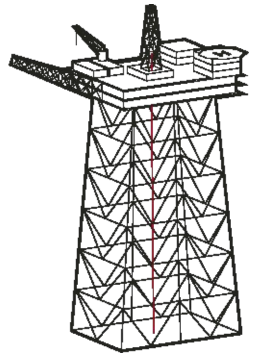
JACK-UP RIG

A Jackup rig is a type of mobile, self-elevating platforms. It consists of a buoyant hull fitted with a number of retractable legs that can be lowered down to the seafloor to raise the platform over the surface of the sea. The buoyant hull enables transportation of the unit to a desired location.



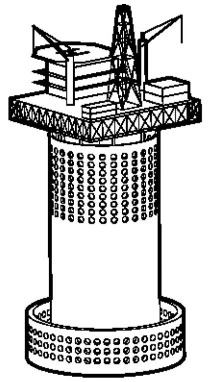
SPAR PLATFORM

The Spar Platform consists of a large-diameter single vertical cylinder, supporting a deck. It has a typical topside with drilling and production equipment, three types of risers (production, drilling, and export), and a hull moored using a taut catenary system of 6–20 lines anchored into the sea floor.



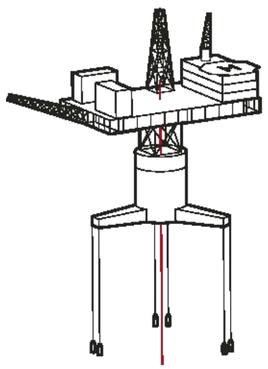
STEEL JACKET

The steel jacket platform on a pile foundation is by far the most common kind of offshore structure. The jacket is fabricated from steel welded pipes, 2 meters in diameter, that penetrate 100 m into the sea bed.



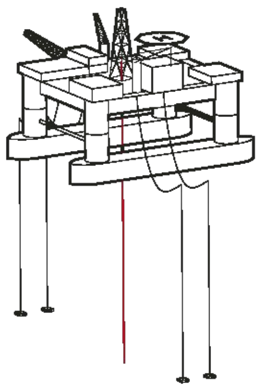
DORIS TOWER

The Doris platform is a cylindical gravity based tower platform made of prestressed post-tensioned concrete. Due to the heavy weight and the characterizing perforated breakwater wall, the tower does not need further anchores.



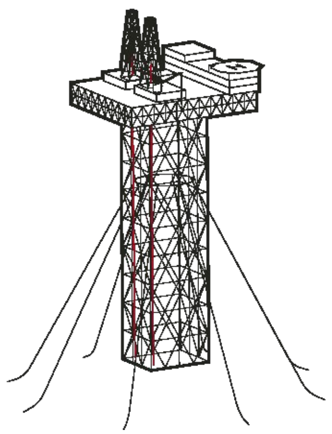
TENSION LEG PLATFORM

The tension leg platform is a type of fixed platforms. The vertically moored compliant platform is permanently anchored to the seabed by steel cables and concrete piles, which are tightened by partially flooding the buoyancy tank.



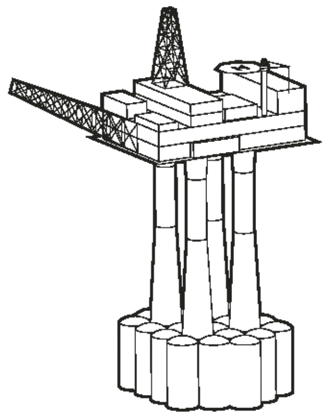
SEMI-SUBMERSIBLE PLATFORM

Semi-submersible facilities are as stationery floating hulls supported by pontoons that are tethered to the seabed with mooring lines. This configuration was considered desirable for relocating the unit from drilling one well to another. A Construction made of steel, as well as of concrete are possible for this type.



COMPILANT TOWER

A compliant tower is similar to a traditional steel jacket platform. The structure extends from surface to the sea bottom and unlike its predecessor, a compliant tower is designed to flex with the forces of waves, wind and current. It uses less steel than a conventional platform for the same water depth.



[CONCRETE] GRAVITY BASED STRUCTURE

The steel reinforced and prestressed concrete foundation of the Gravity Base Structure, GBS in short, is a support structure held in place by gravity. The GBS have proved to be well suited in harsh offshore environments and stands out for environmental friendliness and low maintenance costs.

FIG 16 : Typologies of Offshore Structures.

Post Oil

[Post Oil]

a term refering to a time after the era of worldwide oil dominance

Vision

When the era of fossil fuels is coming to an end, a vast number of physical structures developed for the purpose of oil extraction will remain unused.

In the next decades, numerous obsolete and abandoned oil rigs will subsequently brought ashore for dismantling, revealing the so far unseen drosscape of the North Sea. The heritage of northern European oil nations will ‚return home' with an immense potential to be adapted and transformed.

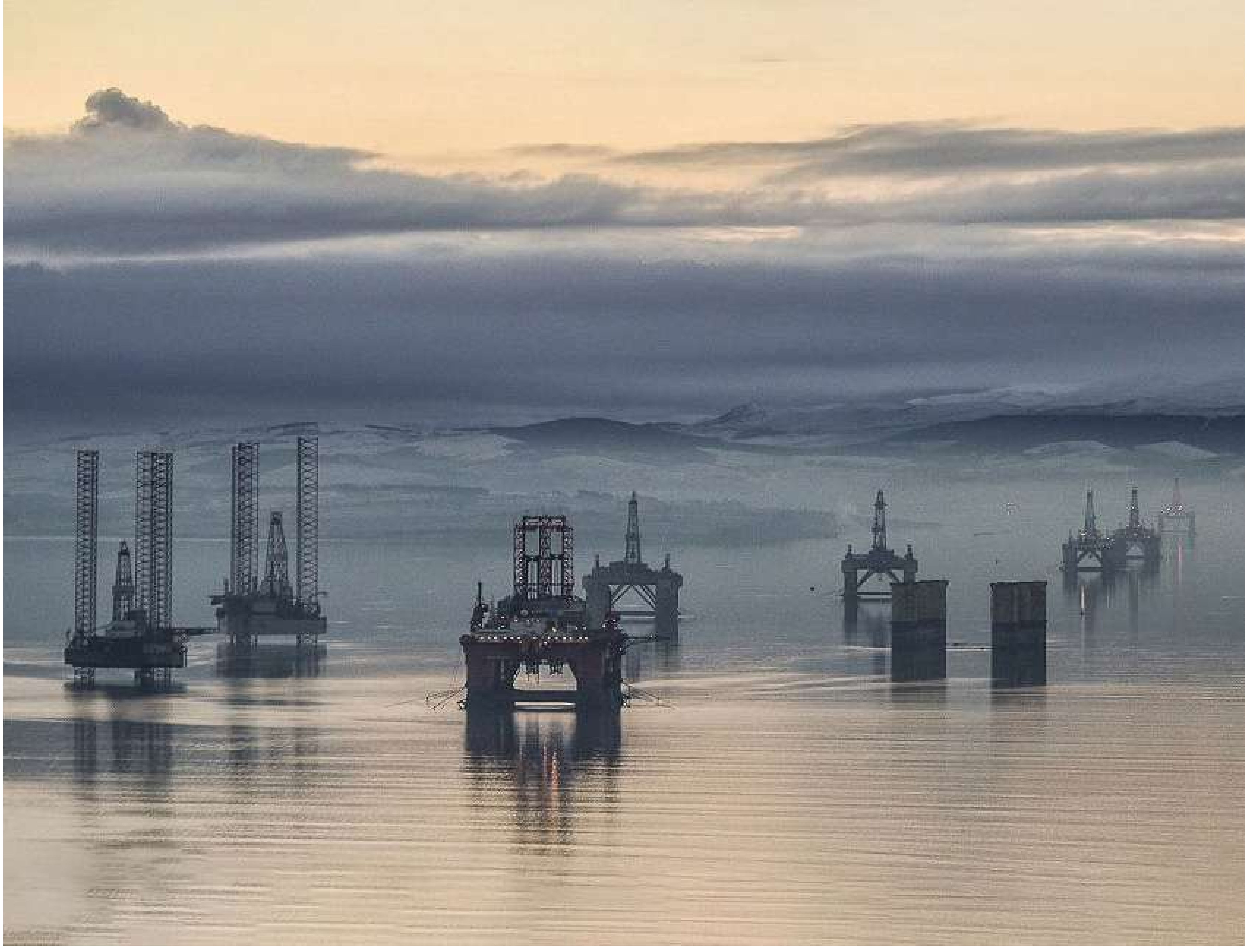


FIG 17 : Cold stacked oil rigs mooring in the Firth of Cromarty in Scotland.

In the next decade, numerous obsolete and abandoned oil rigs will brought ashore for dismantling, what will result in the emergence of the unseen drosscape of the North Sea. The heritage of northern European oil nations is ‚returning home' with an immense potential to be transformed in order to serve varying disciplines.

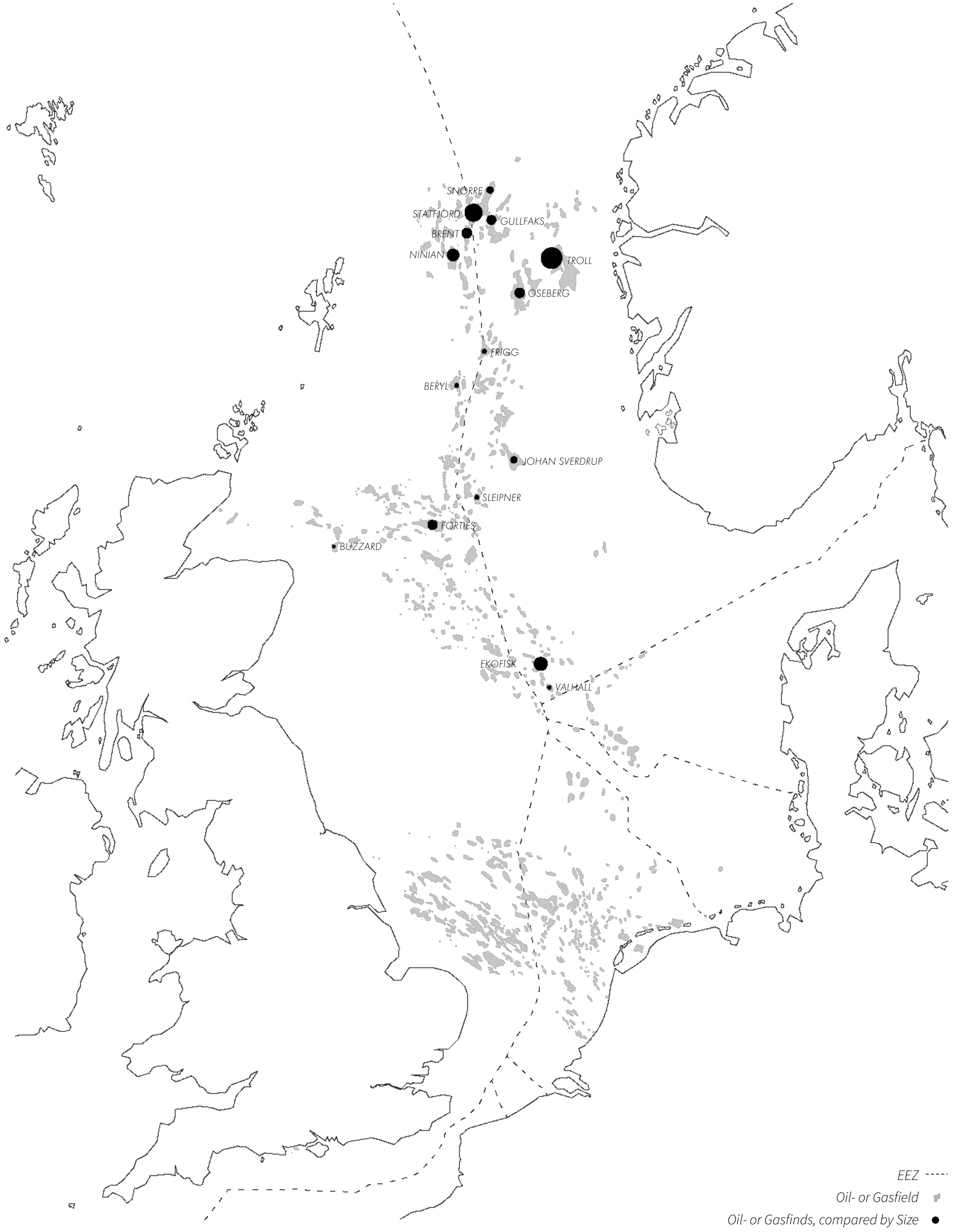


FIG 18 : THE GREATEST OIL FINDS
Analytical Map
Territorial scale - North Sea

200 km

Production Forecast

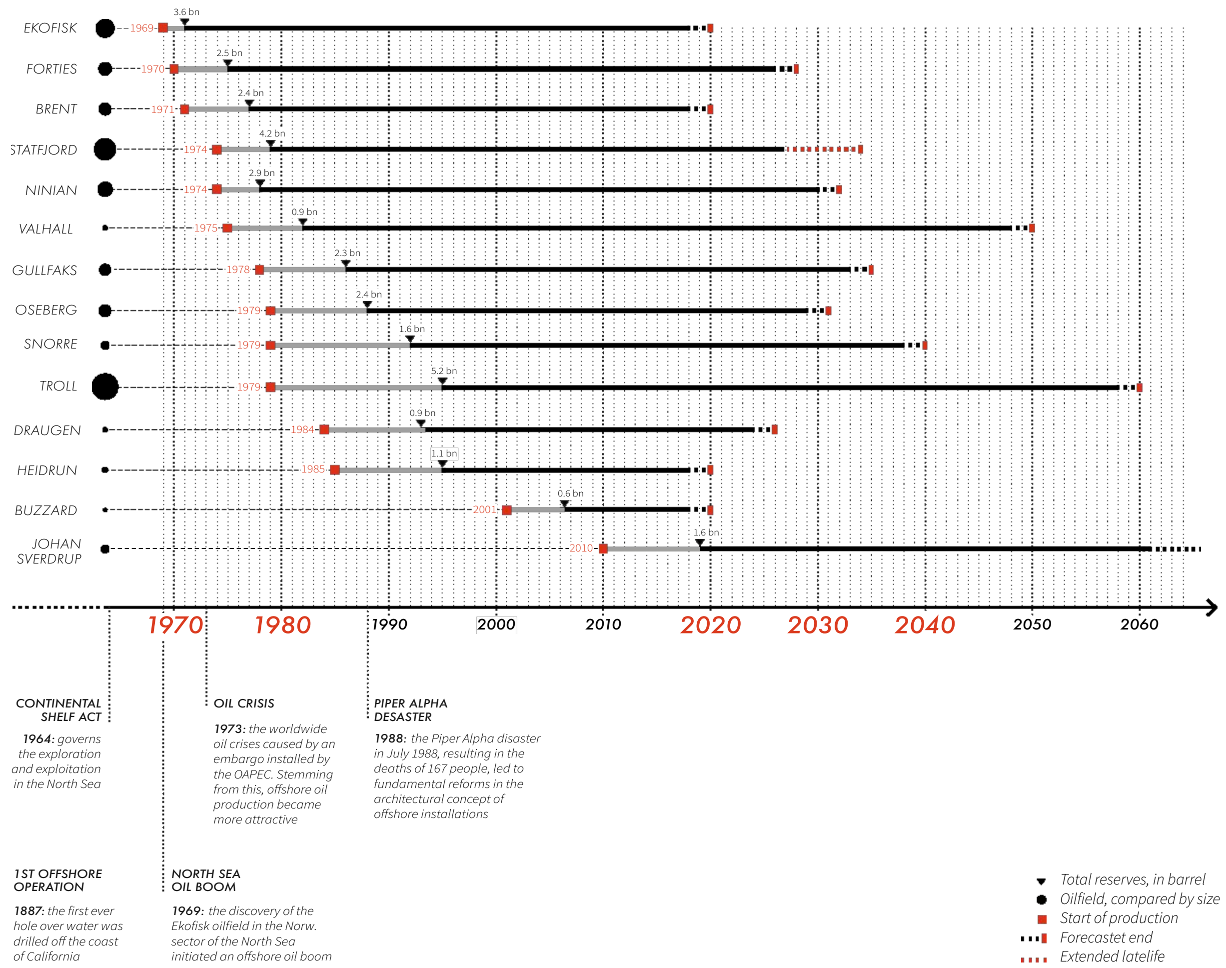


FIG 19 : The chart illustrates the rapid evolving of the offshore development in the North Sea by means of the biggist oil field discoveries. The first decade of exploration between 1969 und 1979 was characterized by major discoveries of giant oilfields. The find of the Ekofisk field in the central North Sea marked the beginning of the North Sea oil boom. Moreover, the table demonstrates that most of the fields are forecast to be shut down in the near future, after decades of producing oil and gas. The iconic Brent oilfield, which is known as the backbone of crude oil pricing, has already dried up and the operater is about to plug the last remaining oil well. This draws the beginning of the end of North Sea oil. Over the next two decades many of the aging fields with rarely remaining resources need to be shut down.

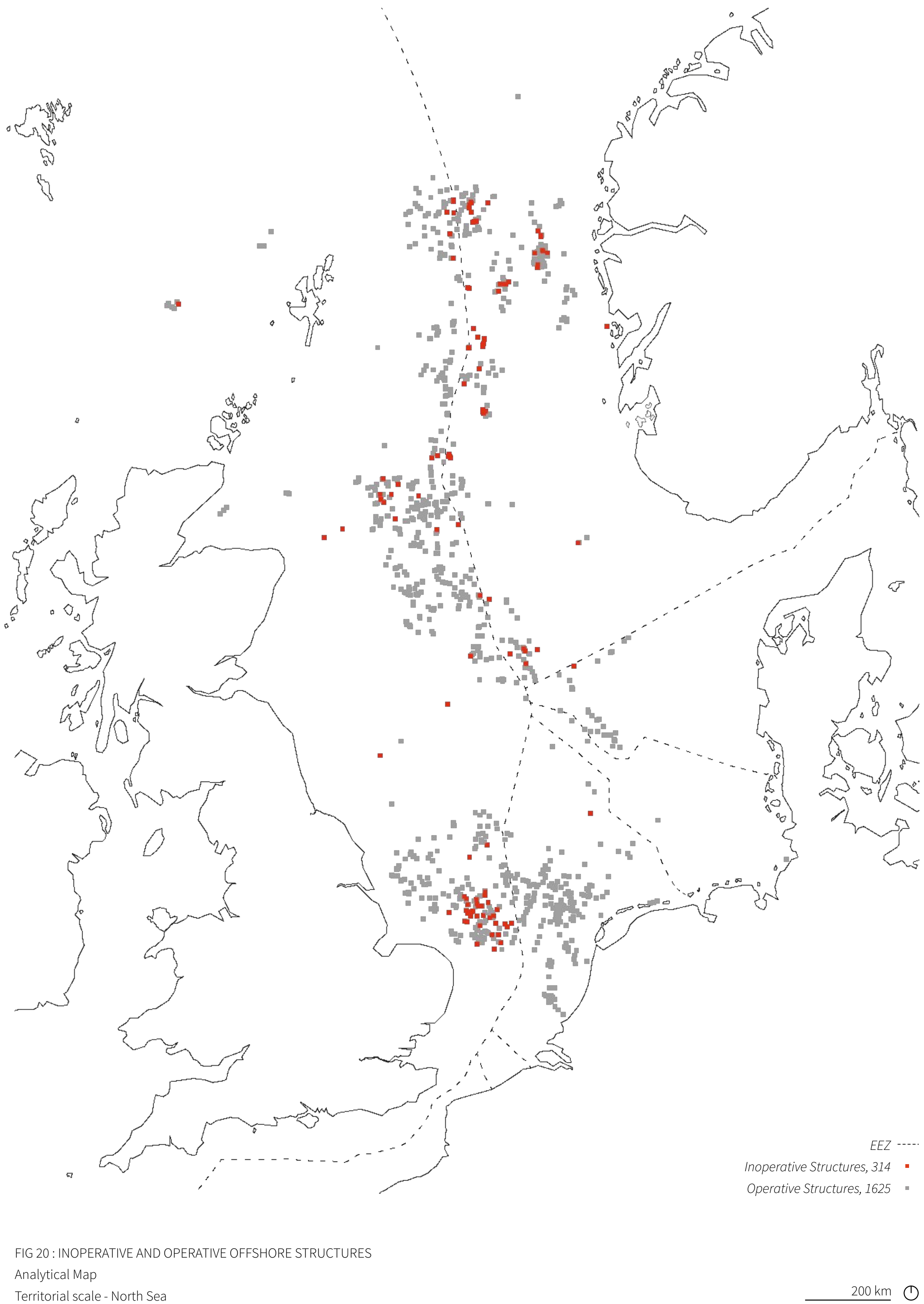


FIG 20 : INOPERATIVE AND OPERATIVE OFFSHORE STRUCTURES
Analytical Map
Territorial scale - North Sea

Most of the producing fields are aging and production is expected to decline by five percent per year after 2022.[1]

There is a long tradition of oil and gas production in the North Sea. For almost 55 years now, operators have been exploiting oil and gas fields across the continental shelf extensively. A vast network of 45.000 kilometres pipelines, including cables and other infrastructure has been installed and more than 42 billion barrels of oil and gas equivalent has been extracted so far.[2] Leaving a remaining potential of 24 billion barrel, equivalent to 35 years' worth of production.However, many of these fields have now reached the end of their productive live with the need for decommissioning. The industry is already closing more sites than it is opening and much of the North Sea Drosscape is expected to be gone by 2040.[3]

Currently, around ten percent of oil and gas platforms installed across the North Sea have been decommissioned and less than five percent of pipelines. Although decommissioning has rarely begun in Denmark, there is already a growing market in the United Kingdom, Norway and the Netherlands. According to the 2017 Decommissioning Insight report, the removal of 206 platforms across the United Kingdom, the Norwegian, the Danish and the Dutch Continental Shelves is expected to take place by 2025.[4] This prediction relates to 349 fields, and platforms of all types. The United Kingdom Continental Shelf currently has the largest decommissioning activity, with 98 of its platforms to be decommissioned, followed by The Netherlands with 77 platforms, 14 installations in Norway and 17 in Denmark.[5]

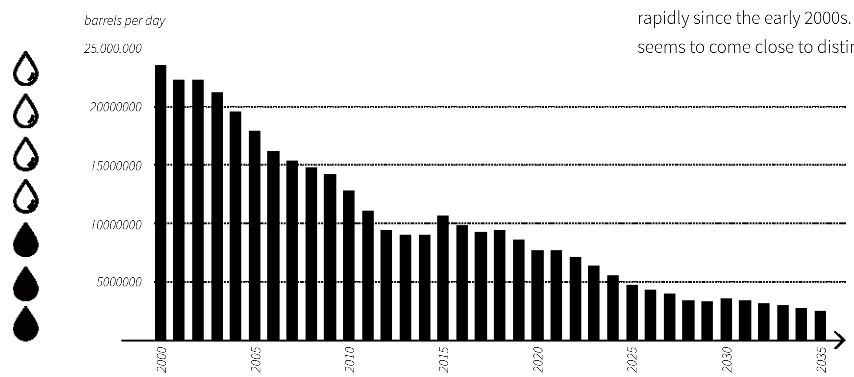


FIG 21 : The forecasted production volume of the Brent, Forties, Oseberg, and Ekofisk field illustrates that offshore production has begun to decline rapidly since the early 2000s. Today, North Sea oil seems to come close to distinction.

FIG 22 : In 2017, the topside of the abandoned Brent Delta platform was brought to Hartlepool in England, for dismanteling, while the massive concrete base was left in place.

Agreement on Decommissioning and the Possibility of Interim Use

UN Convention on the Law of the Sea

Article 60 of the United Nations Convention on the Law of the Sea (UNCLOS) provides for binding legislation on the approval, construction, use, and subsequent implementation of offshore structures. According to the ‚polluter pays principle', operators are called upon to remove all artificial islands and installations in the exclusive economic zone, without exceptions, after they have been abandoned or decommissioned in order to ensure the safety of shipping (Art. 60 § 3).[6]

OSPAR Convention and Decision 98/3

The OSPAR Commission, as an intergovernmental organisation composed of 15 governments and the European Union, provides a forum for the cooperative protection and conservation of the North-East Atlantic.[7] With the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, the organization recalls the relevant provisions of the United Nations Convention on the Law of the Sea. Signatories to the OSPAR Convention, which includes all countries bordering the North Sea, agree to specific rules designed to limit the impact of human activity on the marine environment of the North East Atlantic. The Convention decreed a basic ban on sinking disused offshore plants and demanded the removal of offshore infrastructure from the marine environment during the decommissioning process.[8]

However, the removal of comparatively light structures of the gas dominant, shallow southern waters of the North Sea can be executed without great expenses, the decommissioning of the northern region, where water depths up to almost 200 meters have required steel jackets weighing up to 30,000 tonnes, and concrete foundations with a mass of approximately one million tonnes, represents a great task.[9]

To meet these circumstances, the decision 98/3 on the disposal of disused offshore installations applies exemptions to massive steel and concrete structures. In particular, steel systems with a weight of more than 10.000 tonnes (measured in the air) and gravity base installations made of concrete, when installed in the maritime area before the 9th February 1999, floating concrete systems and concrete anchorages are covered by the exemption and may remain partly or complete offshore after prior verification.[10]

The oil company Royal Dutch Shell made use of the derogation and left the concrete foundation of Brent Delta in place, although towing the topside to shore for disposal. Shell further proposed to continue with this practice for the remaining concrete gravity base structures and storage cells of Brent Bravo and Brent Charly, and in addition to the footings of the Steel Jacket on Brent Alpha. It is to be expected that Shell's decision to leave the legs in place, due to technical, environmental and financial challenges, will be followed by other oil companies seeking for derogation.

Nevertheless, in order to prepare the topsides for removal, the offshore structure must be hydrocarbon free, and free of equipment, disconnected and physical isolated. This process of 'cleaning' can take several years prior the actual removal, according to Shell.[11]

At this point, the question arises whether these North Sea Giants could stay offshore for a defined period of time, to gain a second life, serving a new and unrelated function?

The massive concrete structures of the North Sea were built for eternity. At the time of their construction, no one considered the possibility of the oil running dry and decommissioning was not a conventionally design consideration. However, the now abandoned and cleared offshore structures generating space, waiting to be adopted for a new use.

North Sea Analysis

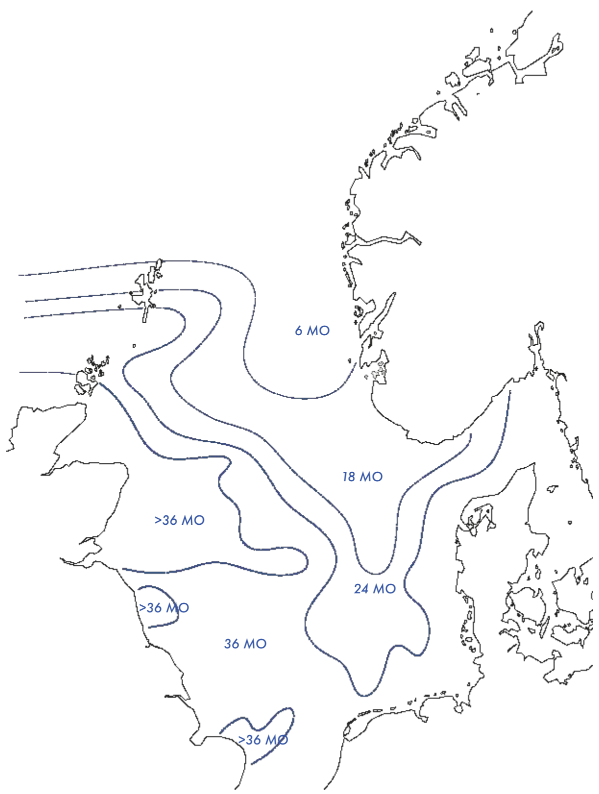


FIG 23 : WATER EXCHANGE IN MONTHS

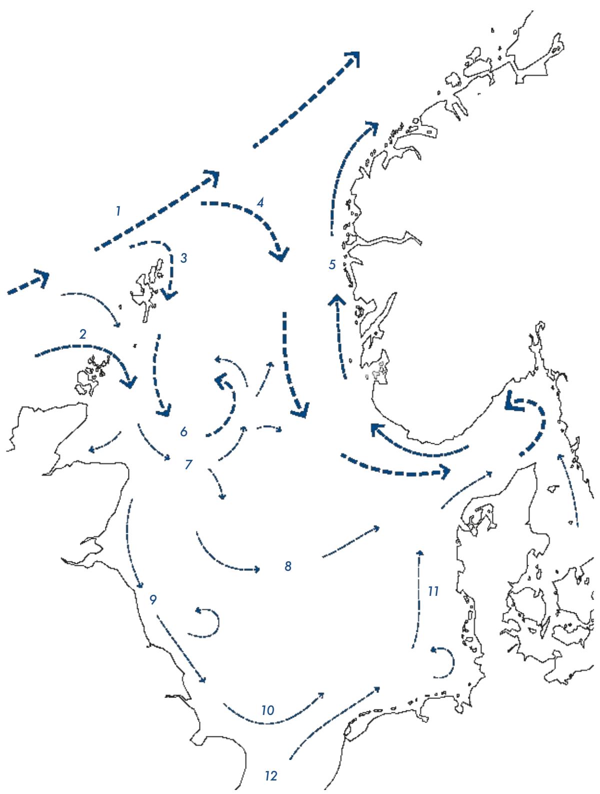


FIG 24 : WATER CURRENTS

Slope Current 1
Fair Isle Current 2
East Shetland Current 3
Atlantic Water 4
Norwegian Trench Current 5
South Shetland Current 6
Dooley Current 7
Central North Sea Water 8
Scottish Coastal Current 9
South North Sea Water 10
Jutland Coastal Current 11
British Channel Water 12

Analytical Map
Territorial scale - North Sea

400 km

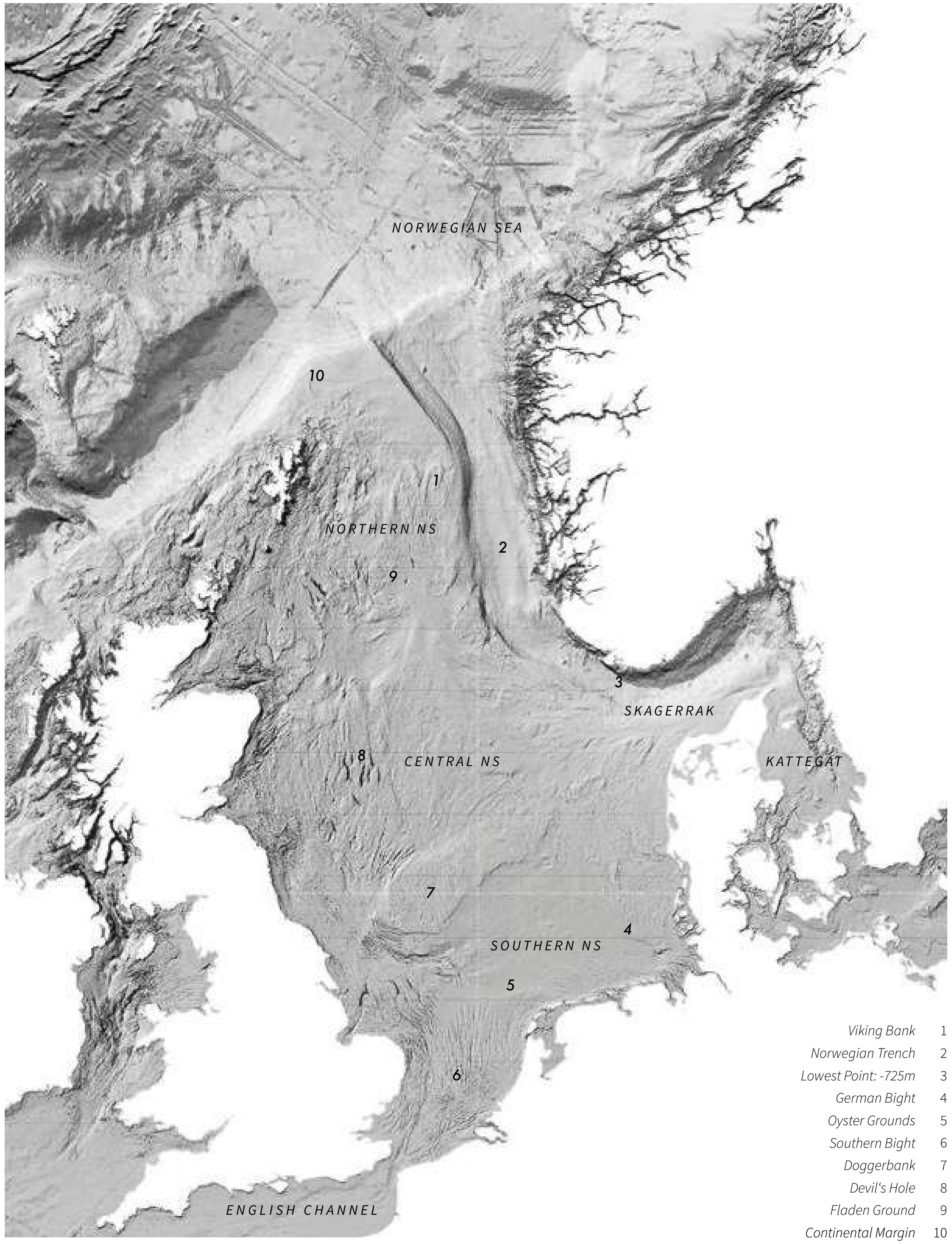
Ecoregion

The Greater North Sea ecoregion consists of the four key areas: the North Sea, the English Channel, the Skagerrak and the Kattegat area. It is a temperate shelf sea with a deep trench along the Norwegian coast and in the northwest.[1]

The North Sea is characterized by a permanently thermally mixed water column in the south and east and seasonal stratification in the north. The topographic map on page 78 shows the actual conditions of the sea bed of the Greater North Sea area. Former river valley systems in the German Bight or in the Strait of Dover, provide information about the primordial formation of the North Sea. After the latest glacial period large amounts of water from Scandinavian and Scottish mountain glaciers spread over the North Sea. New sediments were swept into the basin and changed the sea bed topography significantly.[2]

The average depth of the European shelf sea is 94 meters. The depth of the North Sea increases from 25 meters in the southern part to up to 200 meters on the continental slope between Norway and the Shetland Islands. The southern North Sea is crossed by numerous sandbanks. The flattest point away from the coastal areas is on the Doggerbank, the lowest point is measured in the Norwegian channel at 725 meters. A number of other trenches with depths of up to 230 meters, including the Devils Hole, occur in the Central North Sea. Opposite this is the shallow water zone of the Doggerbank on the Dutch continental shelf, with a depth between 13 and 20 meters. This bank has a significant impact on traffic in the southern North Sea and is an important fishing area.[3]

The North Sea is located in the transition between the sea climate of the northeastern Atlantic and the continental climate of Europe. As such, the transition is characterized by very high variability, which depends on the dominance of one of the two climate regimes. The Norwegian stream forms along the Danish and Norwegian coasts and transports the water from the North and Baltic Seas back to the Atlantic. This moves in water depths of 50 to 100 meters at a temperature of 2° to 5° Celsius in winter. The brackish water of the Baltic Sea, mixed with the fresh water from the fjords, ensures a relatively low salinity. [4]



Viking Bank	1
Norwegian Trench	2
Lowest Point: -725m	3
German Bight	4
Oyster Grounds	5
Southern Bight	6
Doggerbank	7
Devil's Hole	8
Fladen Ground	9
Continental Margin	10

FIG 25 : SEABED AND SEA FEATURES
Topographic Map
Territorial scale - Greater North Sea

200 km

1. VIKING BANK

Large sandbank in the northern North Sea forming the Margin of the Norwegian Trench.

2. NORWEGIAN TRENCH

Elongated depression in the sea floor off the southern coast of Norway.

3. DEEPEST POINT

The deepest point in the North Sea is in the Skagerrak Strait at a depth of 725m.

4. GERMAN BIGHT

Containing the Wadden Sea, with tidal flats, wetlands and its high biological diversity.

5. OYSTER GROUNDS

Oyster reefs and mussel beds, essential for a healthy and rich underwater life.

6. SOUTHERN BIGHT

Area charcterized by its sandbanks and spawning areas for various North Sea fish species.

7. DOGGER BANK

Large sandbank in a shallow area of the North Sea known for waters rich in fish.

8. DEVIL'S HOLE

Group of deep trenches about 80 to 90m in average with its deepest point at 230m.

9. FLADEN GROUND

Atlantic inflow forms a vortex, creating a weak, counter-clockwise rotating current.

10. CONTINENTAL MARGIN

Seabed drops from 200m to deep sea level. Planktonrich areas are a crucial feeding ground for cetateans.

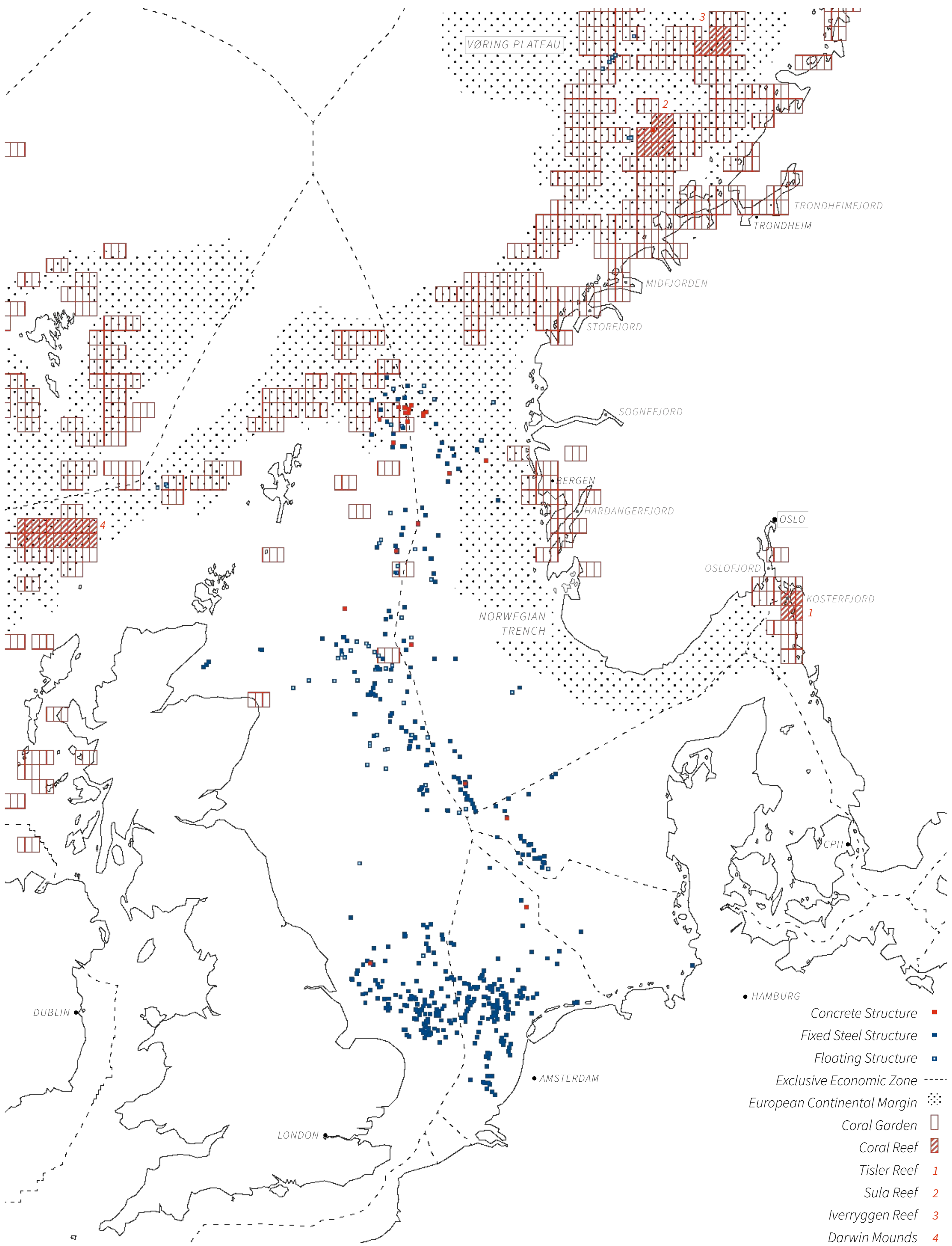


FIG 26 : COLD WATER CORALS
Analytical Map
Territorial scale - Greater North Sea

Cold Water Coral Reefs

Lophelia pertusa

Cold-water coral systems can be found in almost all the world's oceans and seas: in fjords, along the edge of the continental shelf, offshore submarine banks and seamounts.

Living without light and in relatively nutrient-rich seawater, cold-water coral ecosystems function in a very different way from shallow water coral systems. Cold-water corals, living at depth in the dark, have no light-dependent symbiotic algae and therefore depend on the supply of current-transported particulate organic matter and zooplankton for their food. To capture the food efficiently, many cold-water corals produce tree-like branching structures supporting colonies of polyps sharing acommon calcium carbonate frame. These structures form the complex three-dimensional habitat that provides a multitude of micro-niches for the associated animal community.

In the North Atlantic, Lophelia pertusa is the most common habitat-forming, reefbuilding cold-water coral. The bush-like colonies measuring several metres across and consisting of thousands of coral polyps. As the colony develops, adjacent branches tend to join together, thus considerably strengthening the entire framework. Although Lophelia is known as 'white coral', there are several colour variations of the generally translucent tissue, with yellow, orange or red patterns.[5]

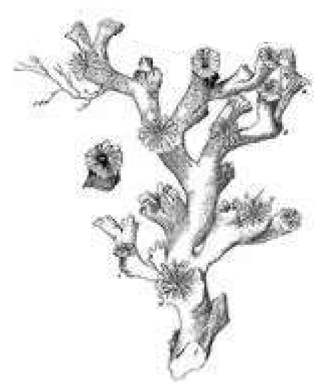


FIG 27 : Lophelia pertusa.

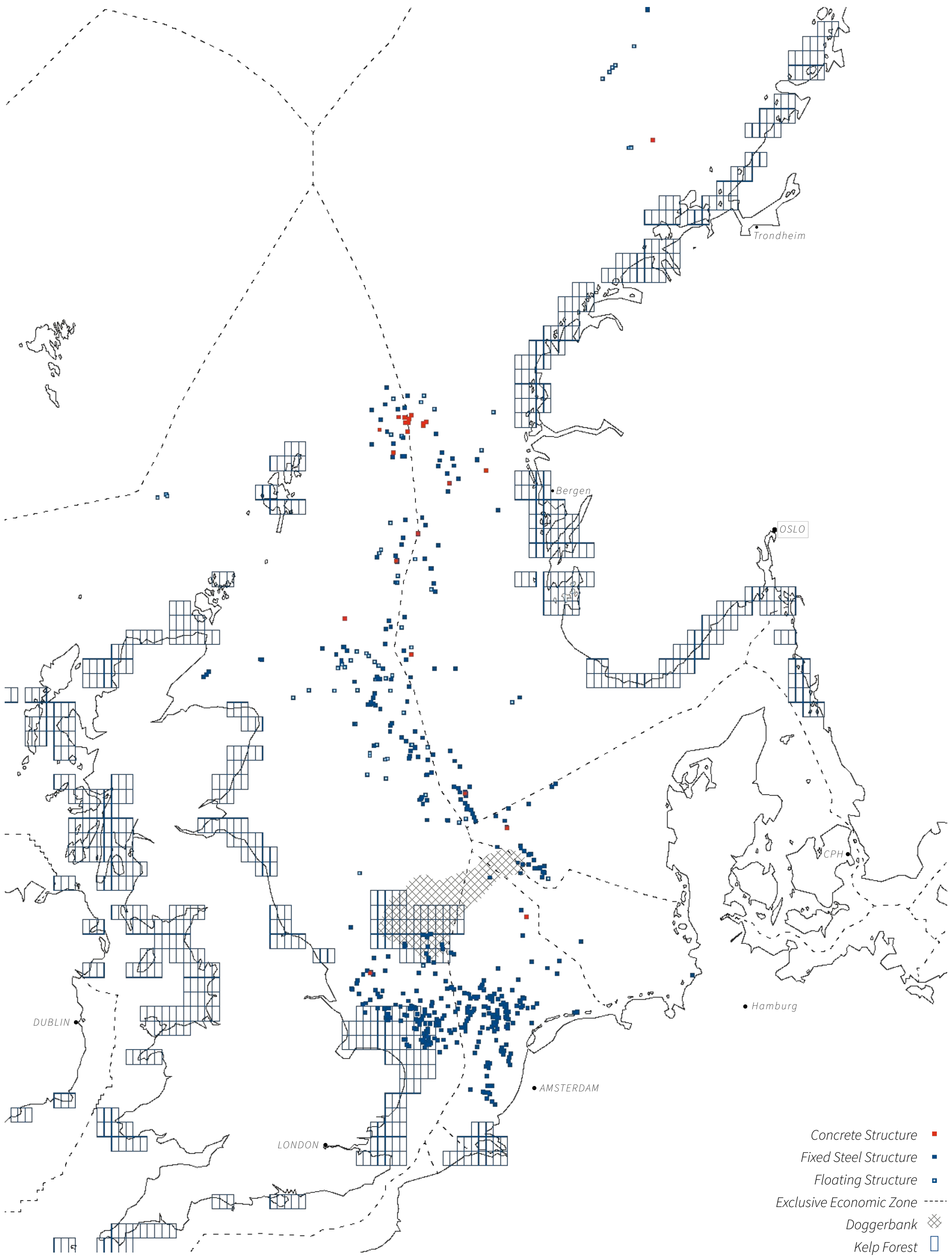


FIG 28 : KELP FOREST DISTRIBUTION
Analytical Map
Territorial scale - Greater North Sea

200 km

Seaweed communities and kelp forests

Laminariales

Kelp forests can be seen along much of the coast of Norway and Great Britain. The large brown algae grows in cool, relatively shallow waters near the coast, occurring in dense groups, much like a forest on land. These underwater seaweed communities and kelp forests are highly productive areas, which provide food and shelter for thousands of fish, invertebrates, marine mammals and seabird species.

In addition, seagrass communities and kelp forests can filter large amounts of carbon from the atmosphere and store it in the sediment. If the reintroduction of underwater plants in the North Sea region can be promoted, large amounts of climate-damaging CO_2 could be sequestered. The Blue Carbon Strategy describes the process of sequestering large amounts of carbon in the oceans and is therefore considered an effective measure in the fight against climate change.[6]

To achieve this, the marine ecosystem of the North Sea must be renaturalized and reforested. Since kelp depends on a stony sediment, the foundations of decommissioned drilling platforms could serve as artificial reefs.

FIG 29 : Bull Kelp.

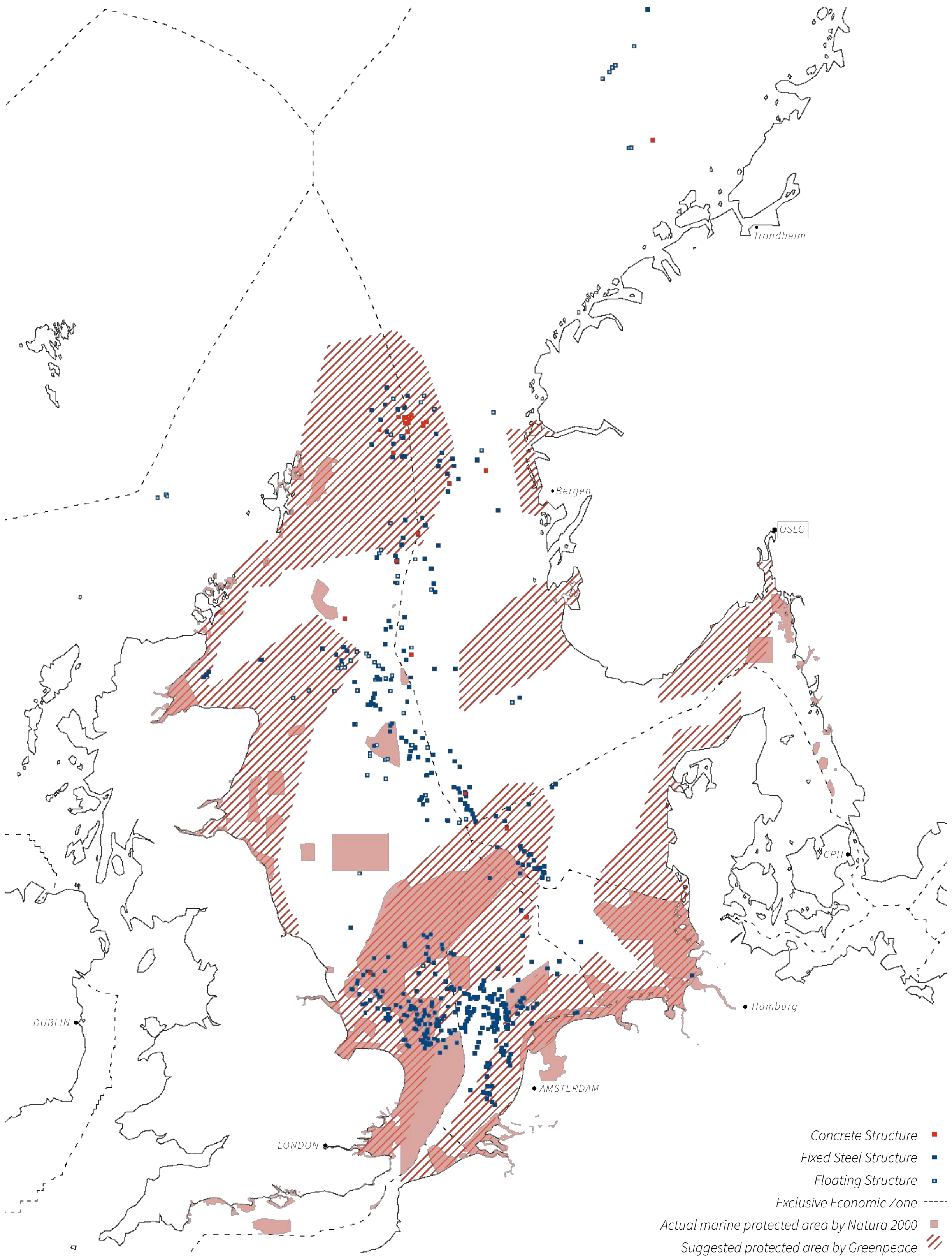


FIG 30 : MARINE PROTECTED AREAS
Political Map
Territorial scale - Greater North Sea

Marine Protected Areas

Marine Protected Areas (MPAs) are designated to protect or restore marine ecosystems. In the Greater North Sea region, an area of 90.257 km^2 is covered by MPAs, which represents 17.9% of the total.

Most marine protected areas in the North Sea are located in the southern region, along the Wadden Sea coasts of Denmark, Germany and the Netherlands. Most of this area is now under legal protection as the Wadden Sea National Park. In contrast, there are only few protected areas in the western and northern parts of the North Sea. However, the entire Greater North Sea Region has been declared a Special Area under Annex V of MARPOL (International Convention for the Prevention of Pollution from Ships), which prohibits the release and disposal of garbage and other household wastes by ships.

The Natura 2000 network is a cornerstone for MPAs in Europe. The network targets a range of endangered marine species and habitats for legal recognition and protection. The overarching goal of the Habitats Directive is to ensure that these species and habitats achieve or maintain „favourable conservation status“. The marine Natura 2000 network therefore focuses on habitats in coastal areas. However, the lack of knowledge about offshore species and habitats has so far resulted in an unbalanced distribution of the marine Natura 2000 network. (Nearshore waters, 0-1 NM: 59.0%, coastal waters, 1-12 NM: 31.5%, offshore waters, 12-200 NM: 11.2%).[7]

In line with the NorthSea2030 strategy, Greenpeace proposes the designation of additional 40 percent marine protected areas to conduct solid scientific research in these closed territories.[8]

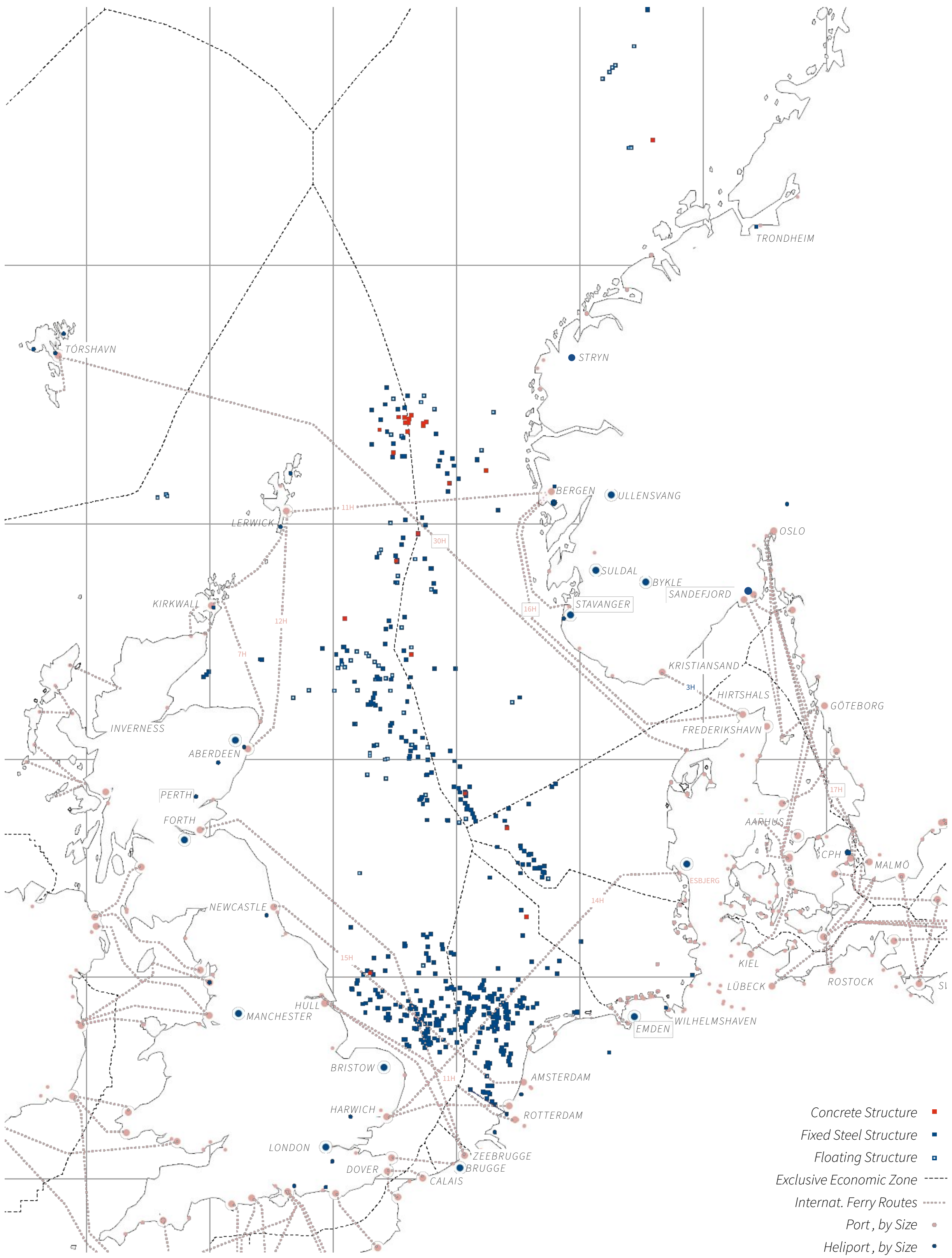


FIG 31 : PASSENGER TRAFFIC
Analytical Map
Territorial scale - Greater North Sea

Marine Traffic

The Greater North Sea is one of the busiest sea areas in the world, with commercial interests competing for space. The sea is used extensively by container ships, service boats of the offshore industry, fishing boats, and recreational and sport boats alike.[9]

The established passenger traffic in the North Sea is determined by the routes between Great Britain and continental Europe as well as between Denmark and the Norwegian seaports of Oslo, Hirtshals, Stavanger and Bergen. In total, there are about 100 ports in the coastal areas of the North Sea that are authorized for passenger traffic.

The map '*Passenger Traffic*' shows all registered passenger ports with corresponding distances of established North Sea routes. In addition, the map shows the distribution of publicly usable helipads in the coastal area. Calculated with an average cruising speed of 260 km/h, this results in corresponding travel times.

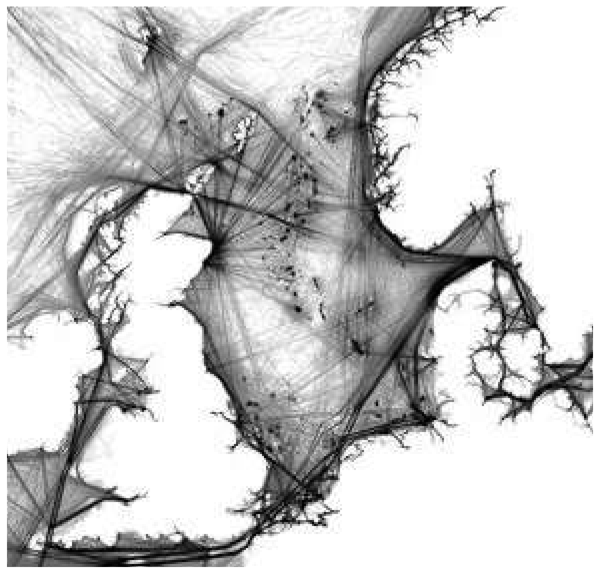


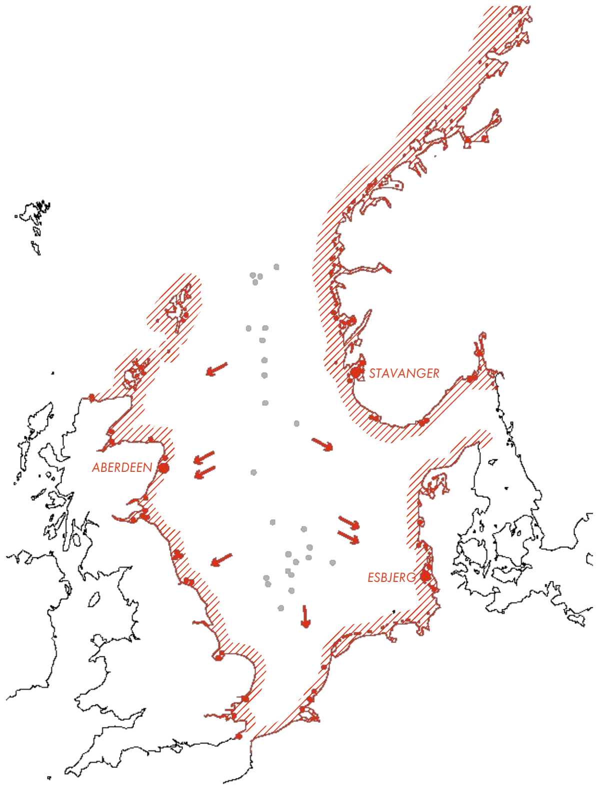
FIG 32 : The density of marine traffic activities in the Greater North Sea.

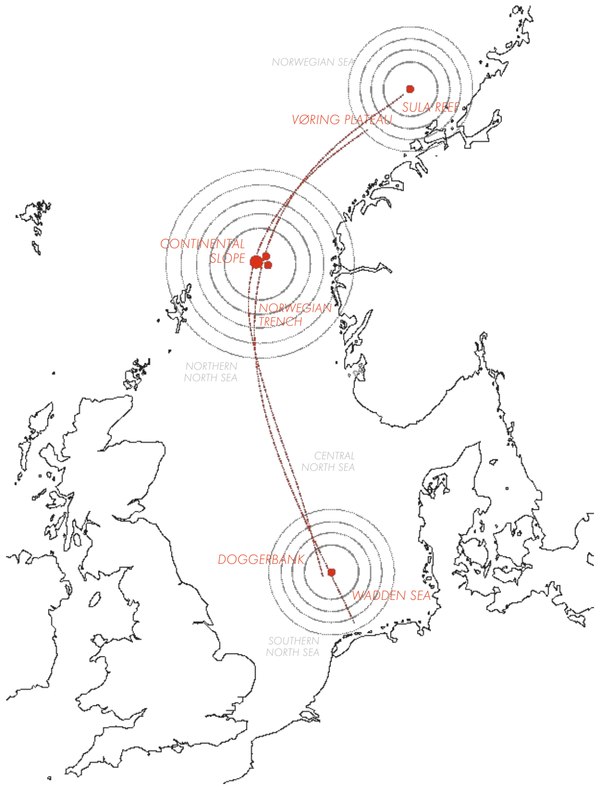
Rethinking Drosscapes

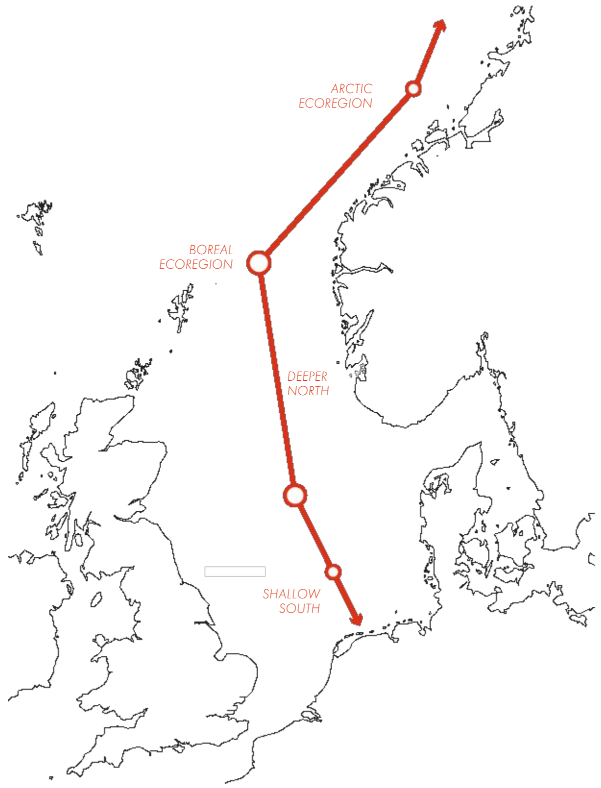
The concept of altering drosscapes, by utilising new social program, can be applied to displaced oilrigs in a large scale. The exploration of their visual, functional and experiential potential in this chapter results in a North Sea wide strategy of reuse; addressing political, environmental, economic and socio-cultural questions.

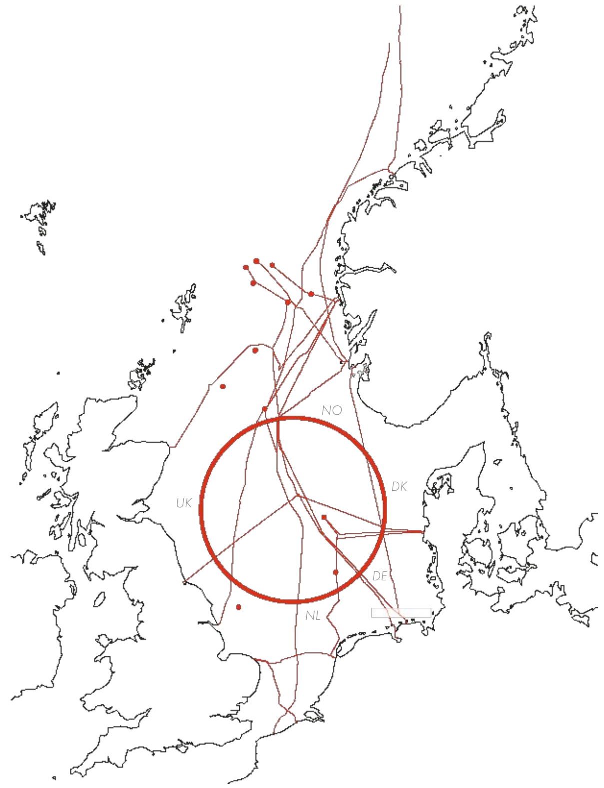
The aim is to develop a sustainable transformation concept for unused offshore facilities in order to emphasize the cultural heritage values on one hand, and to exploit the immense architectural potential of these structures on the other hand.

Four strategies of Reuse on the topics of Cultural Heritage, Science, Tourism and Sustainability, focusing on education and communication, as well as accessibility and expirience.









HERITAGE

The strategy of translocation is the starting point in the scenario of reusing abandoned oilrigs. The North Sea-wide approach will enrich the socio-cultural environment in selected coastal areas. The offered space can be adapted and utilized, and a physical connection to the industrial heritage of the oil producing countries will be established.

The main strategy will focus on smaller Jack up rigs, steel jackets and semi-submersible platforms that will be placed temporarily in urban environments. In order to contribute to the role of Esbjerg, Stavanger and Aberdeen as the European oil capitals, a permanent monument will be installed. In the special case of Stavanger, the reuse of a returned concrete platform to its origin is conceivable due to the geographical advantage of the depth of the neighbouring Hafrsfjord.

SCIENCE

The sea is a crucial source of knowledge, whose resources have barely been explored. To establish a cross-national network of marine science centers in the North Sea, which provides state of the art research facilities with education and training programmes, is therefore the main focus of the marine spatial plan. Each site offers a specific framework of environmental features and therefore varies in the topics of research.

The offshore research centers invites the scientific community, as well as policy makers, organizations, the industry and the interested public to address elementary research questions and environmental issues, and to achieve pan-European goals in terms of a sustainable future.

TOURISM

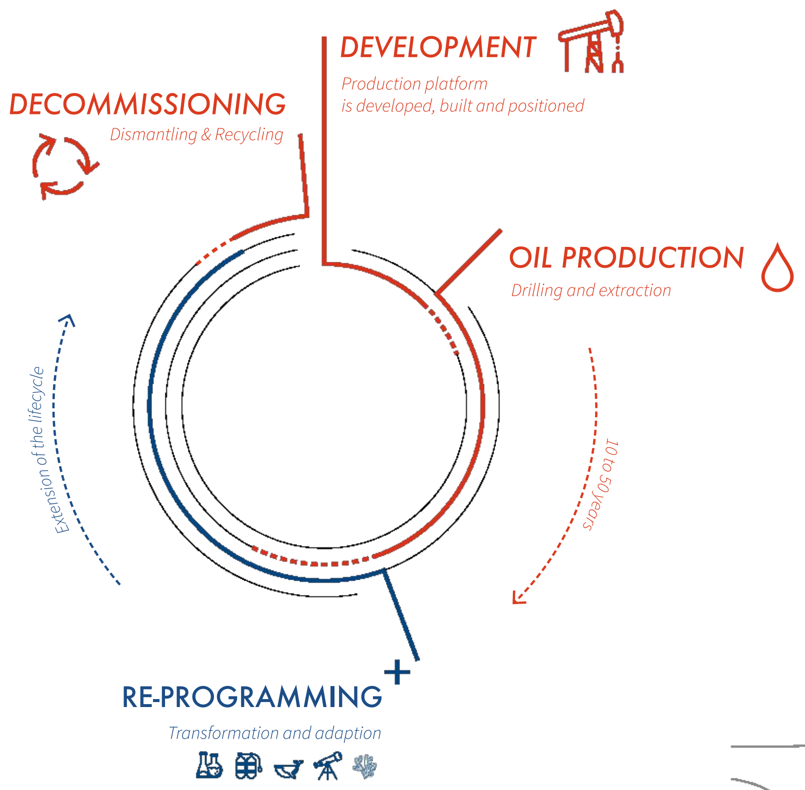
The North Sea is characterized by the transition of the sea climate of the northeastern Atlantic and the continental climate of Europe. Depending on the dominance of one of the two climate regimes, the Sea has a very high degree of variability.[1]

From the shallow waters of the southern area to the edge of the continental slope in the glacial boreal region, tourists can experience the mutable nature of the North Sea, while visiting an offshore memorial, as well as several marine research center, which will be accessible to the public. The visual and physical experience of traveling as well as the exchange with experts in an participatory scientific approach will form people's understanding of the seascape North Sea.

SUSTAINABILITY

A joined energetic system in a macro regional scale describes the ecological strategy within the marine spatial plan. Thereby the remaining concrete structures in the North Sea have a great potential to assist the objective of the European Green Deal of the European Union (EU), which aims to cut emissions by 80 to 95 percent by 2050.[2] *The opportunity to transform components of the offshore fossil fuel industry, such as pipelines, storage cells and platforms, for carbon storage, green power plants and renewable energy transition is a great contribution to the urgent challenge for a climate neutral infrastructure within the EU.*

The transboundary energy system calls for vast collaboration among adjacent countries, which will redefine the role of the Sea as unifying space.



North Sea Wide Approach

More than the 200 platforms across the North Sea are forecasted for complete or partial decommissioning until 2025.[3]

This adaptive reuse approach aims to postpone the final dismantling process in order to use the comprehensive potential of abandoned offshore structures as host for a new program.

SOCIETY

- So1 Flexible Common Ground
- So2 Homeless Shelter
- So3 Kids Ground
- So4 Event Space
- So5 Public Bath
- So6 Sport & Leisure Facilities
- So7 Urban Farming
- So8 Public Canteen
- So9 Community Kitchen
- So10 Entertainment
- So11 Cultural Program
- So12 Educational Program
- So13 North Sea Governance
- So14 Participation

ECONOMY

- Ec1 Local Foodmarket
- Ec2 Fish Farming
- Ec3 Urban Aquaponics
- Ec4 Aquaculture
- Ec5 Algae Cultivation
- Ec6 Vertical Gardening
- Ec7 Gastronomy
- Ec8 Goods Market
- Ec9 Manufacturers
- Ec10 Coworking Space

SUSTAINABILITY

- Su1 Rainwater Collecting
- Su2 Oceanic Waste Collecting
- Su3 Habitat Restoration
- Su4 Server Facilities

ENERGY

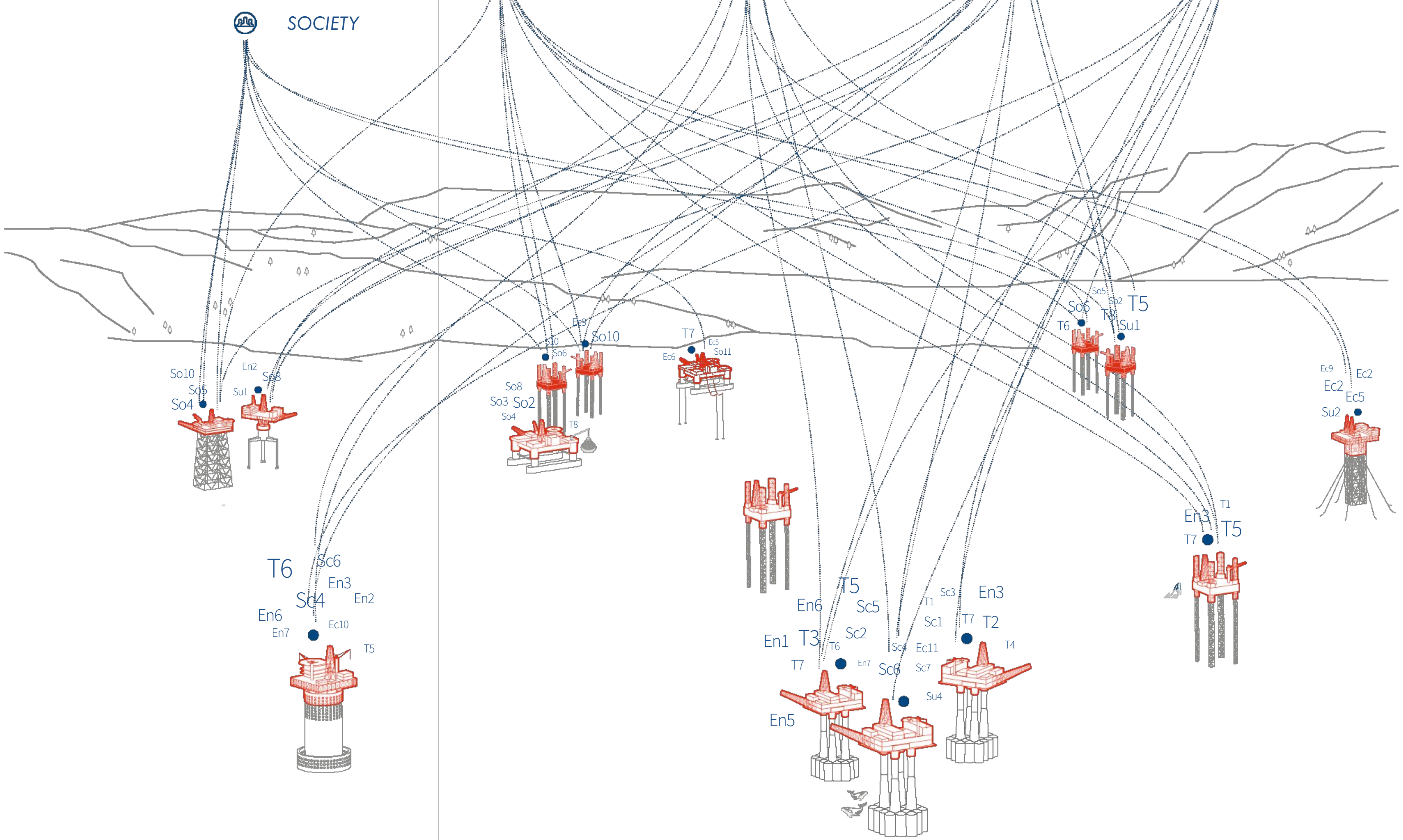
- En1 Renewable Energy
- En2 Solar Power
- En3 Offshore Windpower
- En4 Tidal Energy
- En5 Pumped Storage Power

TOURISM

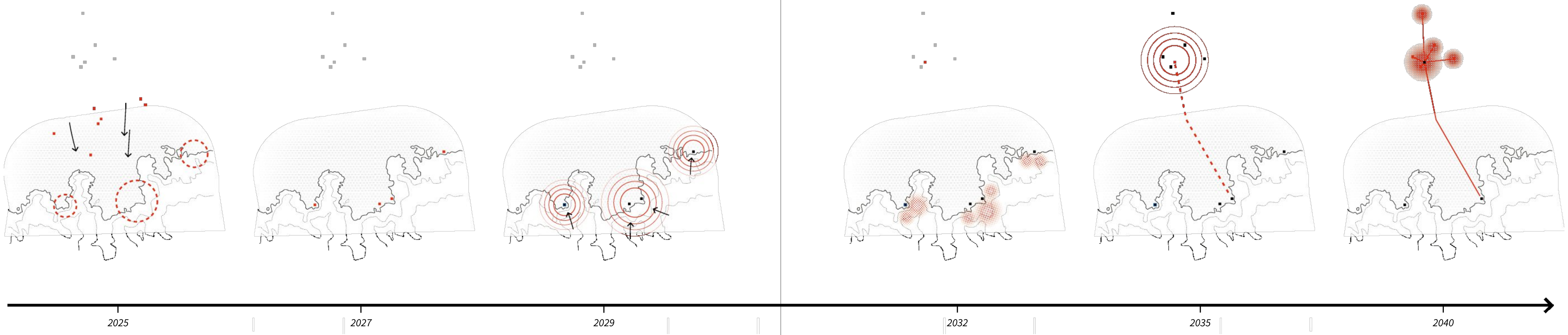
- T1 Bird Watching
- T2 Whale Watching
- T3 Aurora Borealis
- T4 North Sea Diving
- T5 Artists Program
- T6 Memorial
- T7 Heritage Museum
- T8 Hotel

SCIENCE

- Sc1 Oceanography
- Sc2 Marine Science
- Sc3 Coastal Science
- Sc4 Marine Archaeology
- Sc5 Meteorology & Climate
- Sc6 Astronomy
- Sc7 Ornithology



Action Plan



TRANSLOCATION

While abandoned concrete structures will stay in place, the amount of unused steel facilities in need for transition will dramatically increase within the next ten years. In the waiting line for the process of dismantling, these structures will temporarily be placed in highly deprived coastal areas among adjacent countries.

REPROGRAMMING

The replaced industrial structures are offering a highly adaptable space with great architectural and aesthetic qualities to the interested public. Depending on the area of action, a specific onshore program will be implemented addressing individual needs of the region.

STIMULATING

In the stimulating process of transformation and appropriation the replaced steel structures become a new central hub, attracting more people to participate. The local tourism sector will be encouraged through the implementation of (art-) events and festivals, which take place in and around the iconic landmarks. The public debate about the future of the remaining offshore concrete structures and its definition as cultural heritage will be launched.

DEVELOPMENT

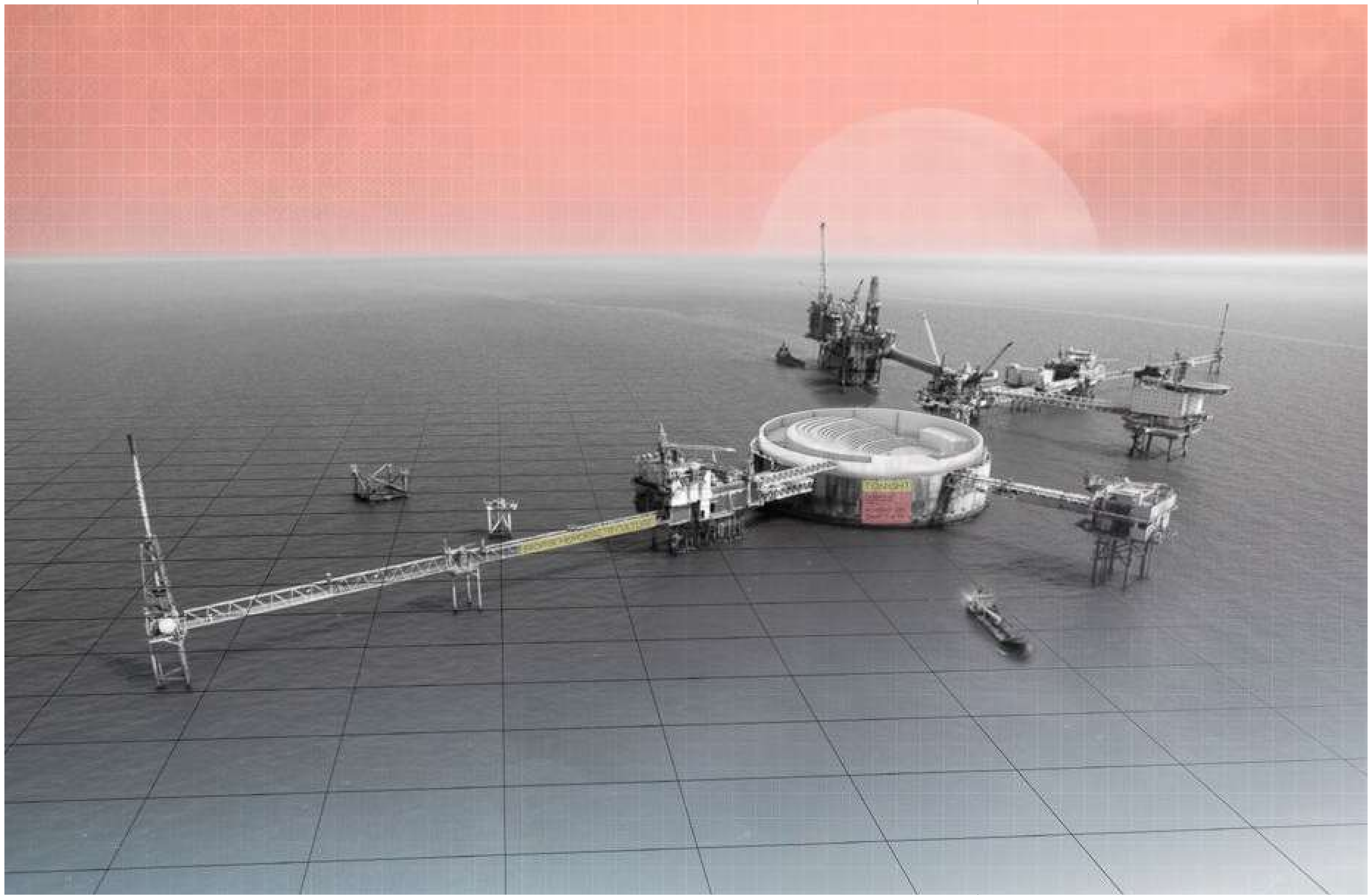
The strategy of valorising the industrial structures will focus on further developments. The local economy will experience a dynamic grow through increasing public interest. In the same time, the remaining offshore concrete structures will be refurbished with the intention to host new programs.

CONNECTION

By this time, the awareness for the cultural heritage of the oil industry is strengthened and the public interest in the previously unseen oil world has risen. An appropriate offshore program, dedicated mainly to marine science, will be implemented on selected structures within the industrial heritage site in the northern North Sea as pioneering project. Short-term tourism starts to develop and international attention will attract investors and policy makers.

EXPANSION

The success of this approach will lead to further developments of the concrete platform cluster as well as designated single concrete structures in environmentally reasonable areas of the Sea. An additional program catalogue, focused on the accessibility of the Sea, on a sustainable transformation, and on further scientific deepening while preserving our collective memory and history, will be applied. Temporarily placed platforms, whose times have come, will be dismantled step by step. Those who are able to maintain their position as cultural hub, will be sustained.

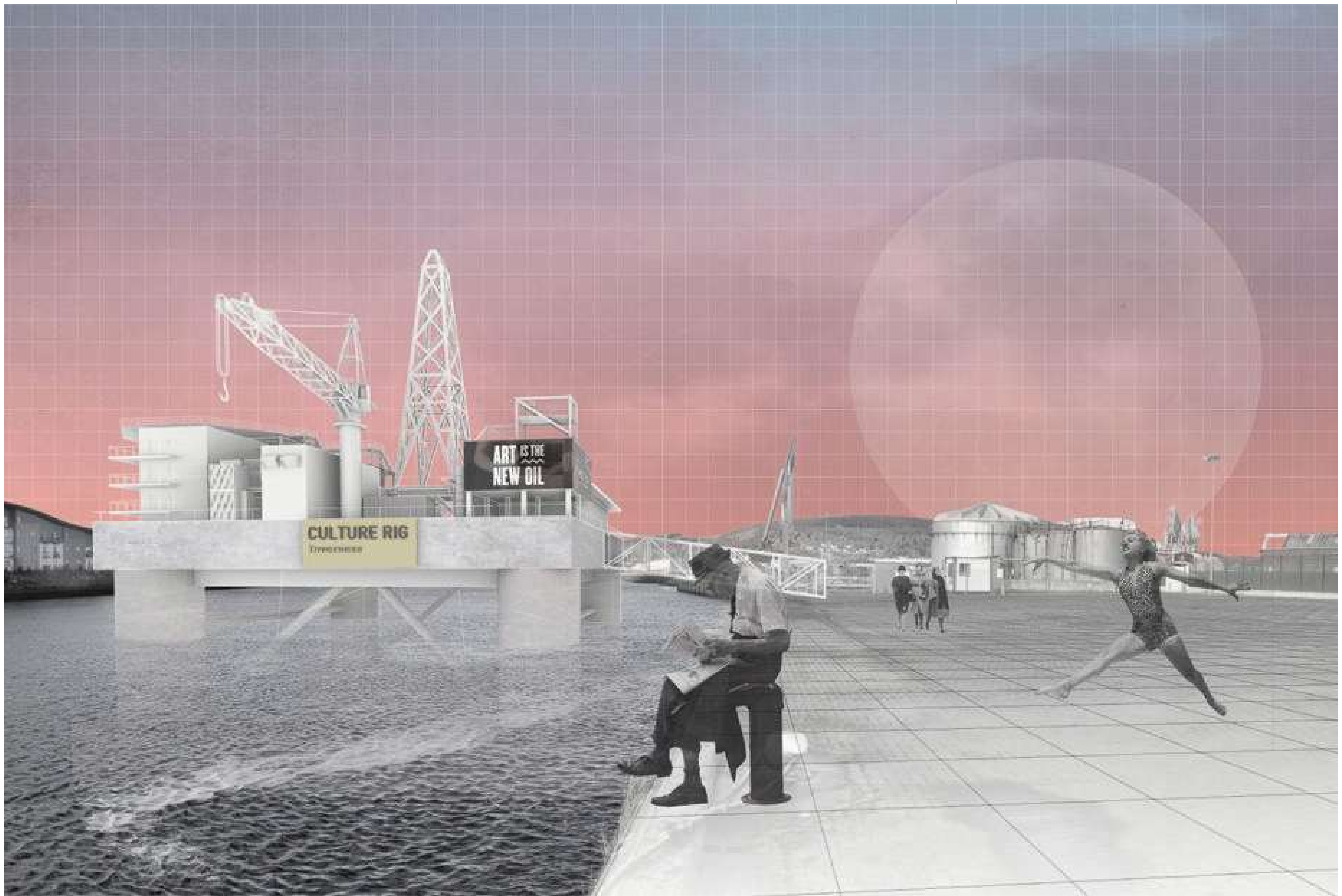


56°32'57.11''N 3°12'35.95''E

Collage - Ekofisk Complex, Central North Sea

FIG 33 : The Ekofisk tank stands like a colossus in the center of the Ekofisk complex in the central North Sea. It was installed in 1973 as the first Concrete Gravity Base Structure in a water depth of about 75 meters.

In a possible future scenario, the abandoned Ekofisk complex will be saved from being demolished and instead made accessible as monument to an interested public.



57°29'9.00''N 3°13'46.63''W

Collage - Inverness, Scotland

FIG 34 : The collage shows a possible future scenario in which a decommissioned oil platform has been moved to Inverness, Scotland, to be used temporarily as a cultural hub, co-working space, open air cinema and restaurant.

Case Study : Statfjord B

[Case Study]

a particular instance of something used in order to illustrate a claim

FIG 35 : STATFJORD B
Analytical Map
Territorial scale - Greater North Sea

Statfjord

The Statfjord area is an oilfield in the northern part of the North Sea, covering the Norwegian and the United Kingdom sectors of the sea. The field was discovered in 1976 and has been established with three fully integrated concrete facilities: Statfjord A, B and C between 1979 and 1985.[1]

Statfjord B was the second installed facility within the Statfjord area, standing in water depth of 145 meters at the southern end of the field. The development is of great symbolic significance, because it is considered as Norways starting point in participating in the oil industry. The development of the Statfjord field built up Norway's competency within the petroleum industry and provided the economic base for the foundation of 'Den Norske Stats Oljeselskap A/S' (translated: Oil company of the Government of Norway), in short Statoil.[2]

Norways participation in the oil industry on the continental shelf led to the grounds of a domestic petroleum industry creating great value for its society. The symbolic character of the field, and its relevance for the Norwegian community justifies the demand for consideration the statfjord area as industrial and cultural heritage site after its shut down.

This case study aims to proof ability to transform offshore structures, while recognizing the outstanding engineering achievements of the past, using the example of Statfjord B. Thus, the refurbishment of the platform defines the starting point for a long-term strategy of reusing designated abandoned concrete facilities in the North Sea as an alternative to demolishing.

STATFJORD "B" CONDEEP

The Statfjord field was discovered in February 1974 and appeared to be the largest oil field yet discovered in the North Sea.

The development started in 1974 when the Statoil/Mobil Group ordered the Statfjord "A" which was installed in the central part of the field by Norwegian Contractors in 1977.

For installation in the southern part of the field for the "B" location, approx. 6 km south of Statfjord "A", the Statoil/Mobil Group ordered yet another Condeep platform in February 1978.

The contract for the Statfjord "B" Condeep was signed in February 1978 and gave the following general scope of work to Norwegian Contrators:

- Concrete structure
- Mechanical design and installation for the equipment in the lower 20 m of the structure (excluding crude oil handling)
- Deck mating operation
- Maritime operations (tows)
- Offshore installation

The main design criteria for the Statfjord "B" Condeep are:

- Water depth at location: 145 m (the same as for Statfjord"A")
- Soil conditions: 30% lower shear capacity than the Statfjord "A" location (fairly low for gravity structures)
- Environmental forces:"100 year" design condition with 32 m high waves in combination with maximum wind and current forces
- Required deck load carrying capacity of the Condeep during tow-out should be a minumum of 35.000 tons (about double of earlier maximum tow-out load)
- Number of wells: 42 slots
- The platform deck was to be supported by 4 towers instead of the 3 as on earlier Condeeps.

Based on these fundamental requirements and within design rules given by the client and Norwegian authorities, Norwegian Contractors has developed and designed the concrete structure that gives the Statfjord "B" Condeep the following main data:

General

Height from sea-bed to top of helicopter deck	204 m
Water depth at Statfjord "B" site	145 m
Accommodation for	200 persons
Oil Production capacity	150.000-180.000 barrels/day

FIG 36 : The key facts about Statfjord B
by the constructor ,Norwegian Contractors'.

Concrete Structure

Concrete Volume	135.000 m3
Reinforcement	35.000 tons
Displacement during tow-out	824.000 tons
Number of cells	24
Diameter of cells	23 m
Height of cells	64 m
Number of towers (height 110 meters)	4
Total height of concrete structure	174 m
Oil storage capacity (20 cells) approx.	2.0 mill.barrels

Deck Structure

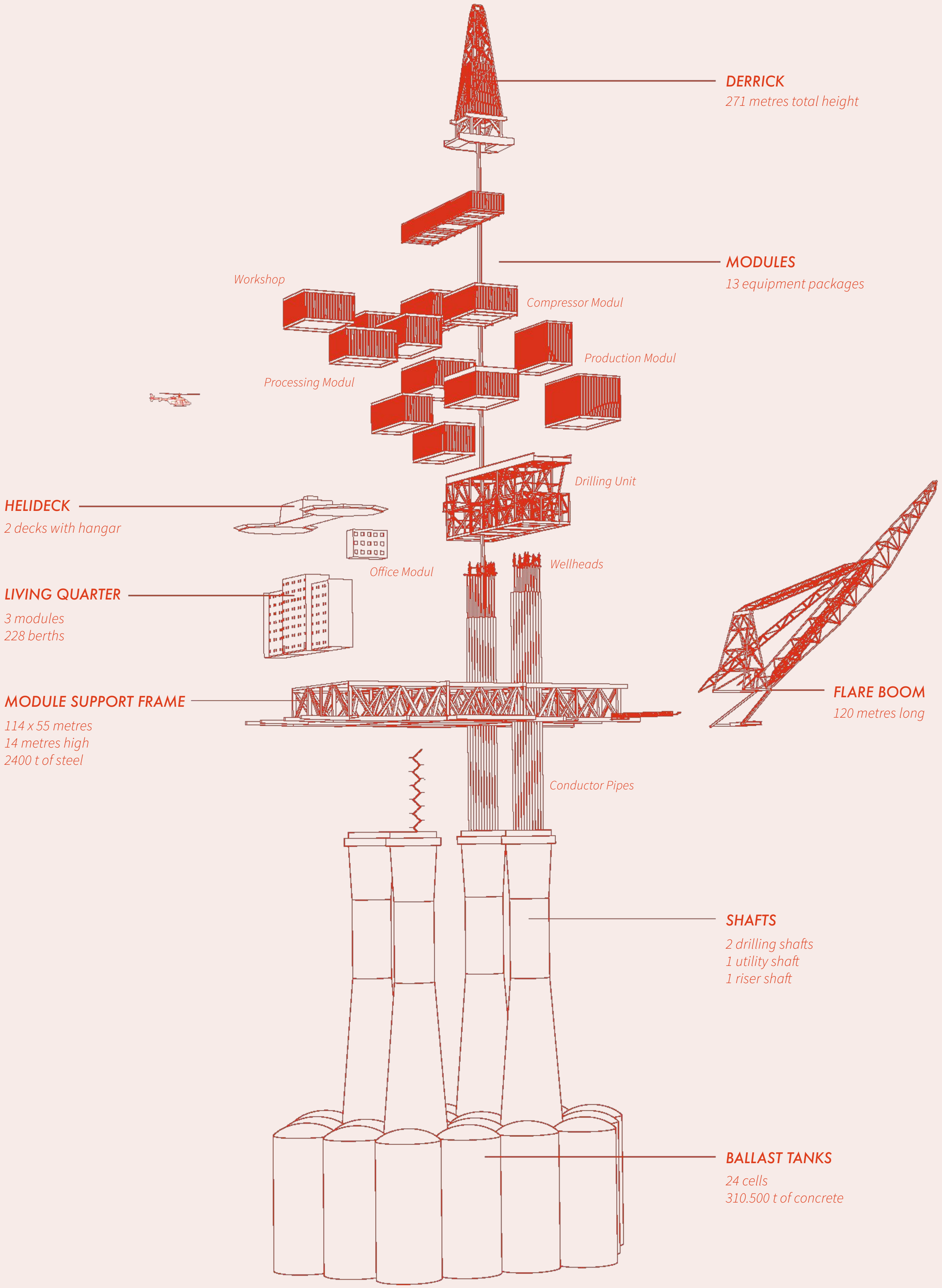
Length	114 m
Width overall	88 m
Height from cellar deck to helicopter deck	30,5 m
Deck load during tow-out approx.	38.000 tons
Deck load during production approx.	50.000 tons

The construction of the Statfjord "B" Condeep takes place at Norwegian Contractors' yard at Hinna, Stavanger, and follows the same general principles as for previous Condeep platforms:

- The base raft is constructed in a 10 m deep dry dock
- The dock is flooded and the base raft is floated out and moored at the deep-water construction site
- At the deep-water site the following main activities are carried out: slipforming of cells, casting of upper domes, slipforming of 4 towers, casting of transition ring beams at the top of the towers and ballast filling in the base raft
- Mechanical installation in the base raft is performed by Norwegian Contractors while in dry dock
- Mechanical outfitting in the shafts and cells is the responsibility of Moss Rosenberg Verft. Norwegian Contractors is doing this installation work in the two drill shafts, in the riser shaft, and in the cells as sub-contractor to Moss Rosenberg Verft. This work is performed at the deep water site after completion of the cell wall slipforming
- The heavy deck load of approx. 38.000 tons during tow-out requires a deeper towing draft than what is available in Stavanger Harbour. For this reason the mating between the deck and the concrete structure will take place at Norwegian Contractors' deep water site at Vats, 60 km north of Stavanger. The structure will be towed to Vats for deck mating in February 1981.
- The complete Statfjord "B" platform will be towed to the Statfjord field in late summer 1981.

FIG 37 : The key facts about Statfjord B
by the constructor ,Norwegian Contractors'.

FIG 38 : STATFJORD FIELD - TOPOGRAPHY
Analytical Map
Meso scale - North Sea



The Anatomy of Statfjord B

BALLAST TANKS

The four-shaft 'Concrete Deepwater Structure' (Condeep) rests stably on the seafloor through its own weight and consists of 24 cells in a honeycomb configuration -19 are used to hold crude oil and diesel fuel, 4 cells are extended to form the shafts. The Norwegian Company 'Norwegian Contractors' introduced prestressed concrete as construction material for water depths down to 300 meters.[3]

SHAFTS

The shafts rise about 30 meters above the sea level. The hollow design allows for additional installation of oil production equipment.[4]

MODULE SUPPORT FRAME (MSF)

The MSF is a massive two-level steel frame, resting on the top of the shafts. The structure provides space for special fitted equipment and is used as base for the Module Deck. The whole interior of the robust latticework module support frame is summarized as the Cellar Deck.[5]

MODULES

Thirteen integrated modules, spread on three levels, each with its own circulation system, form the Module Deck. The modules comprises process plants, workshops, storage- and control units. The continuous open air area on top of the modules, named Weather Deck, is used for storage and for positioning equipment being loaded from or discharged to supply ships.[6]

DERRICK

The characteristic derrick is installed on skids running between the northern and southern drilling shafts. The derrick can be moved both east-west and north-south due to a hydraulic system.[7]

LIVING QUARTER

The living quarter comprises three modules for accomodation and offices, positioned on beams extending from the base of the MSF, and one additional module which consists a canteen, the kitchen, a cinema and further areas for recreation.[8]

FLARE BOOM

The flare boom is a robust truss structure which extends from the MSF to permit safe burning of gas that is collected during the extraction of oil.[9]

FIG 39 : The challenge to build in the harsh environment of the northern North Sea led to the development of the unique Condeep type of offshore structures in the 1970s, which stands out as pioneering work.

CELLAR DECK

1st Floor

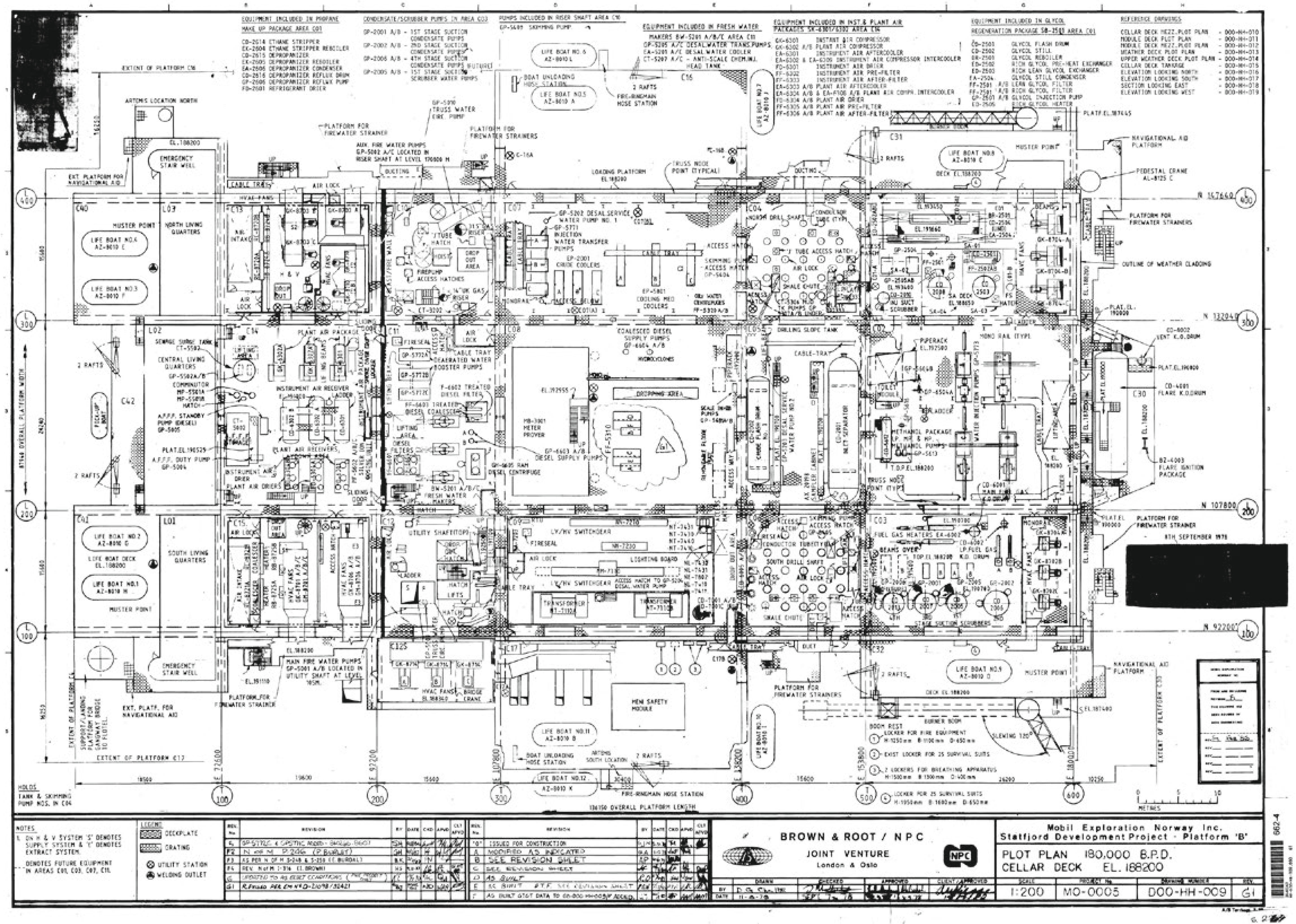


FIG 40 : As-built Drawing Cellar Deck

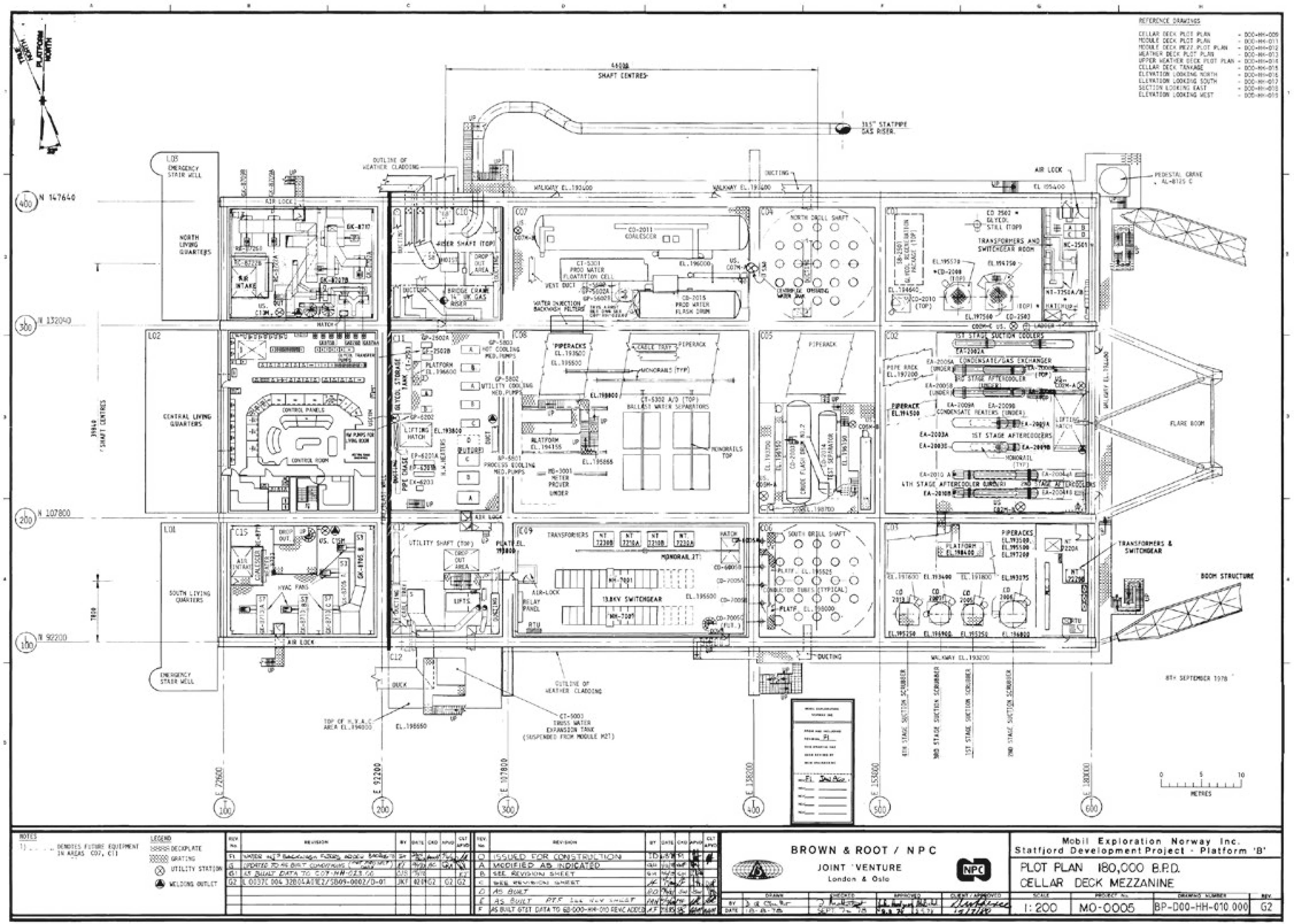


FIG 41 : As-built Drawing Cellar Deck Mezzanine

CELLAR DECK MEZZANINE

2nd Floor

MODULE DECK
3rd Floor

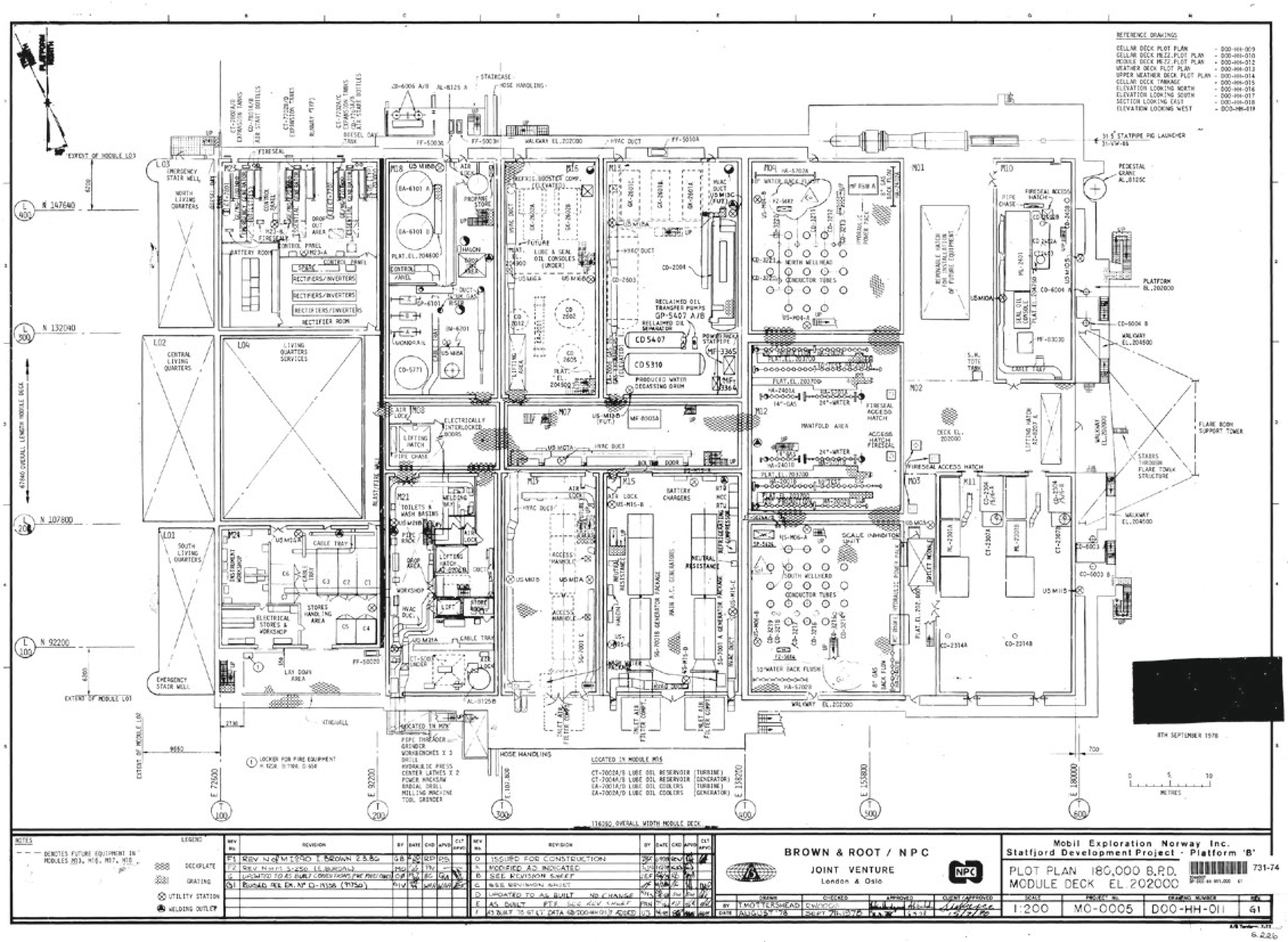


FIG 42 : As-built Drawing Module Deck

MODULE DECK MEZZANINE
4th Floor

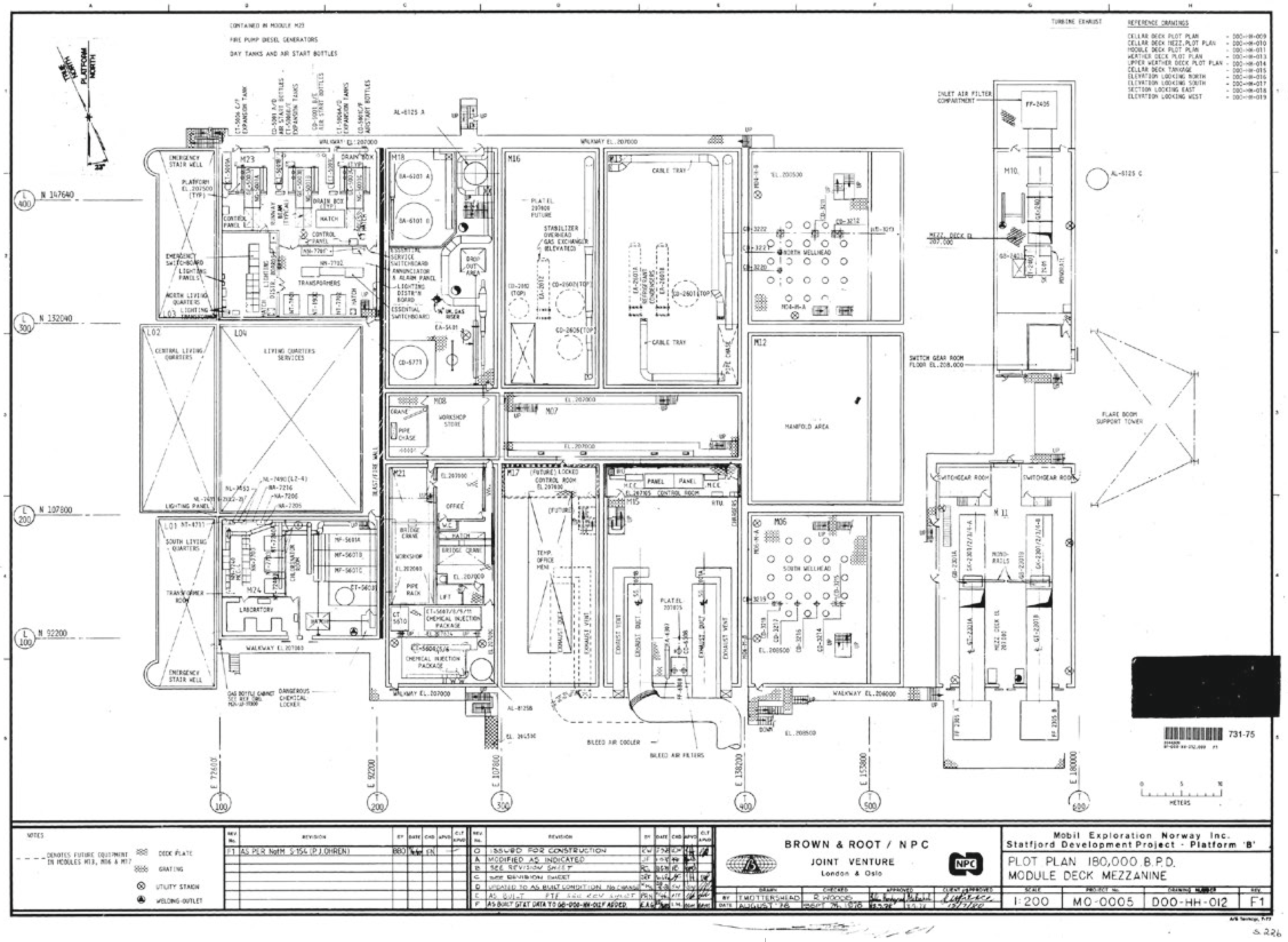


FIG 43 : As-built Drawing Module Deck Mezzanine

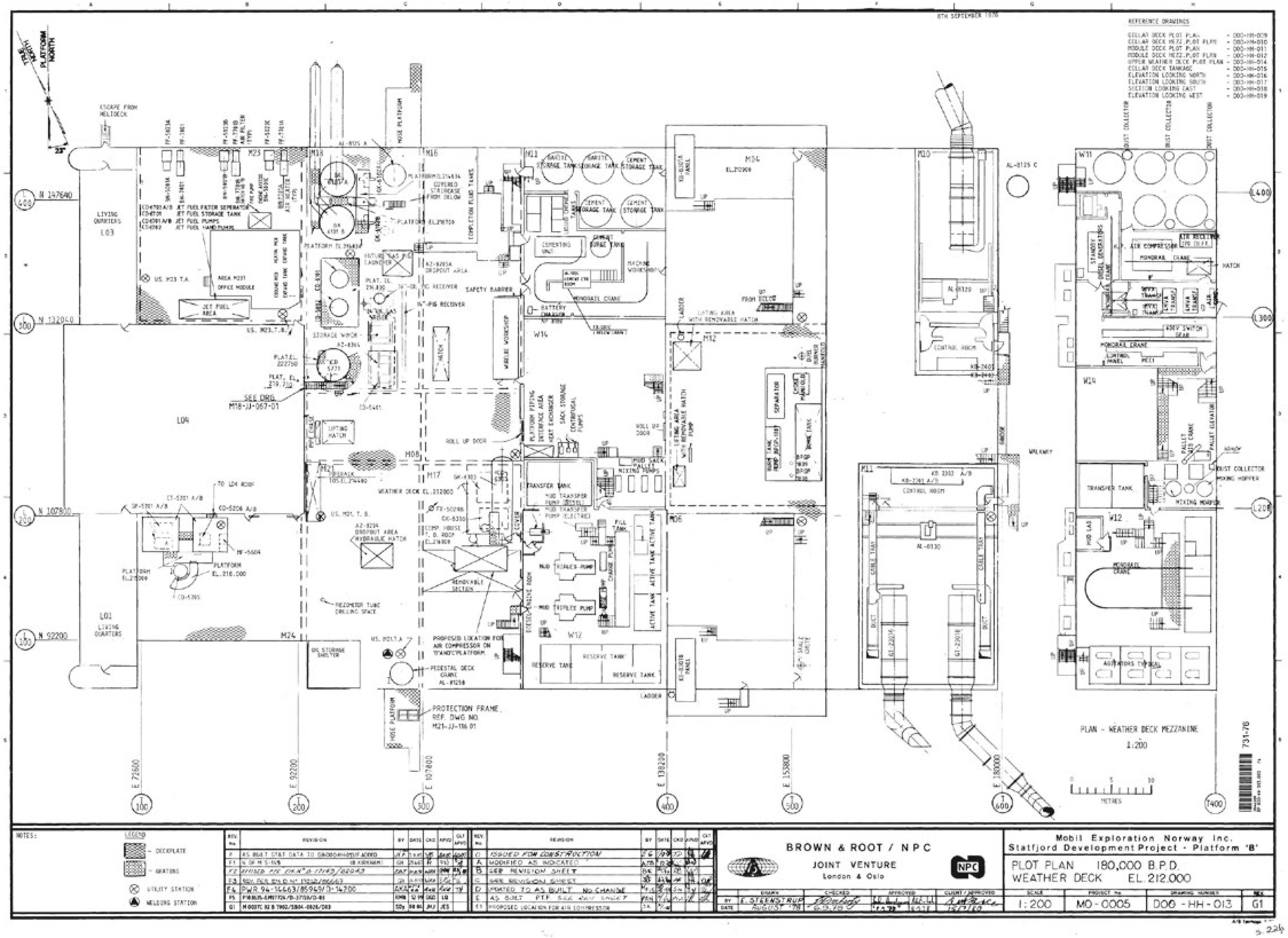


FIG 44 : As-built Drawing Weather Deck I Weather Deck Mezzanine

WEATHER DECK PLUS MEZZANINE

5th Floor I 6th Floor

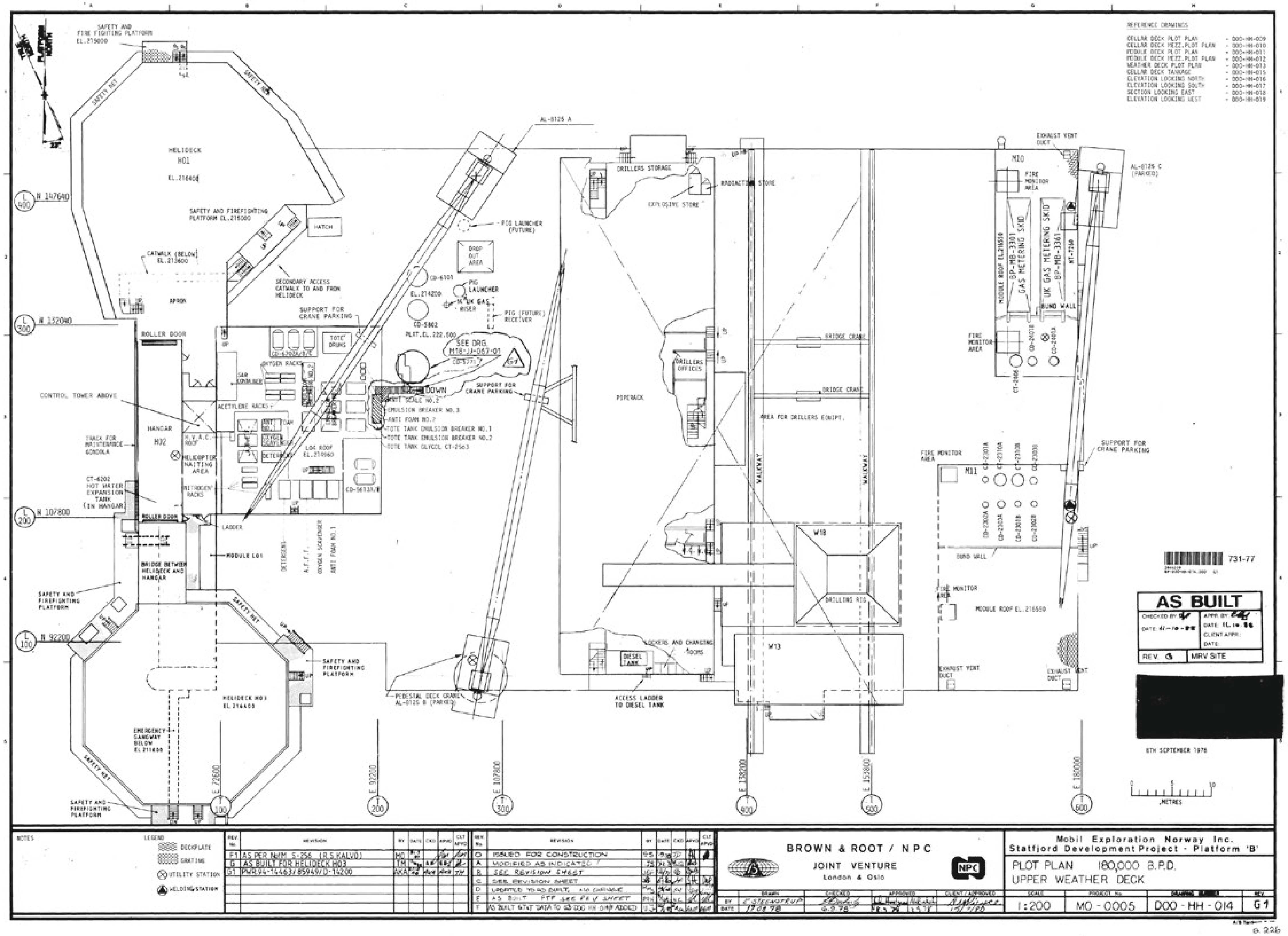


FIG 45 : As-built Drawing Upper Weather Deck

UPPER WEATHER DECK
7th Floor

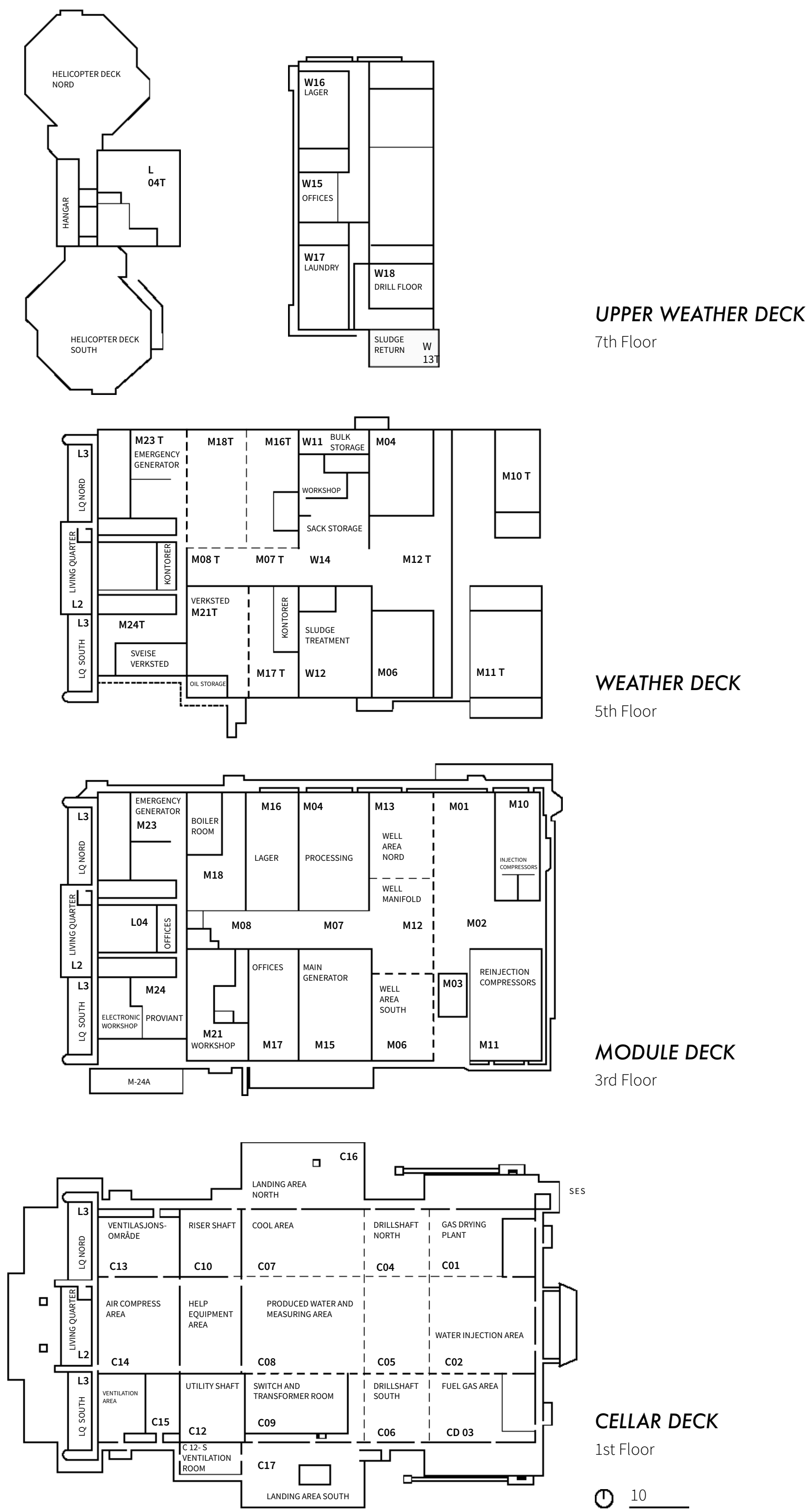


FIG 46 : Simplified floorplan analysis

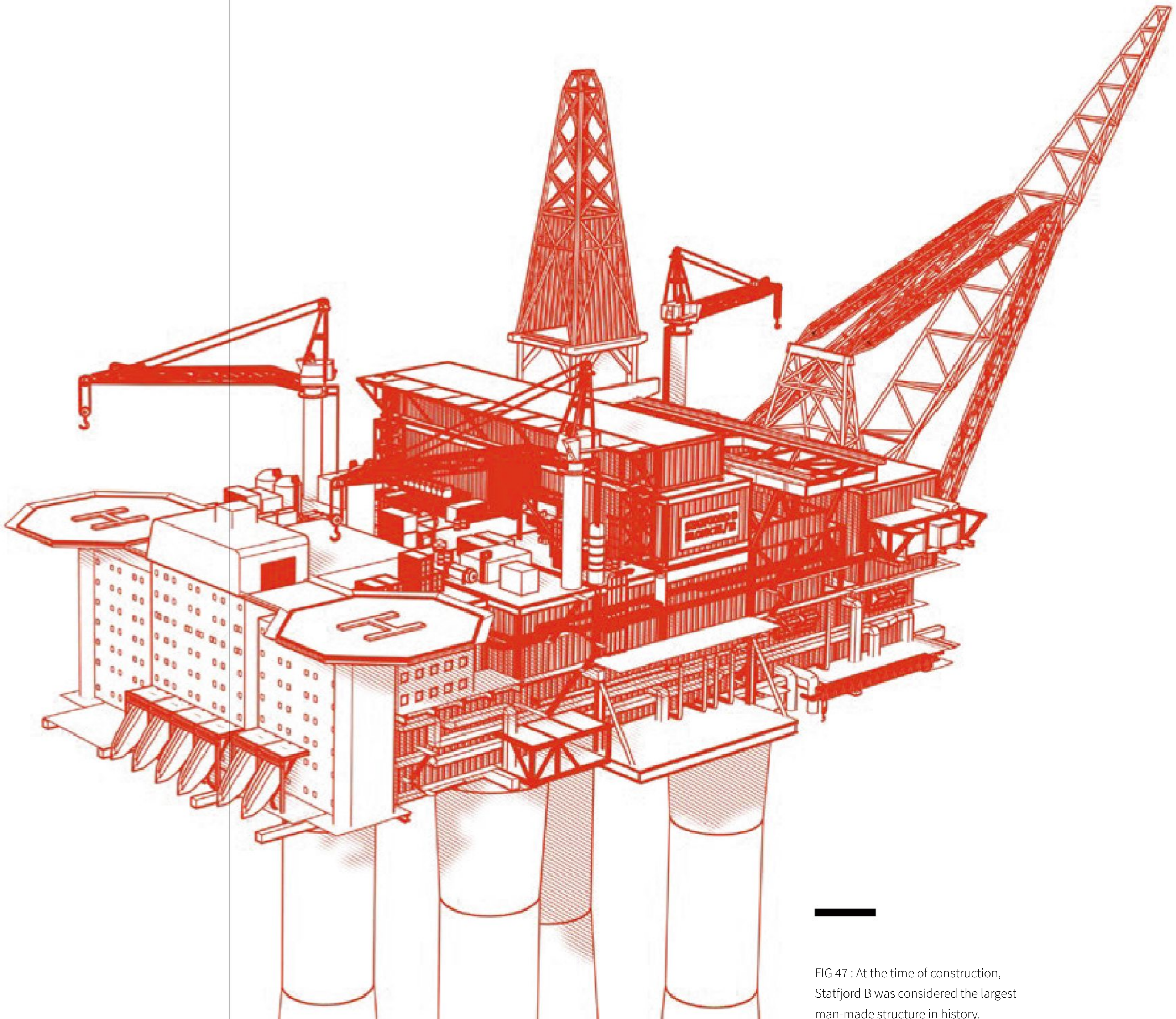


FIG 47 : At the time of construction, Statfjord B was considered the largest man-made structure in history.

Conversion

The overall strategy of the future scenario of altering the abandoned drilling and production platform Statfjord B strives to respond to the unique DNA of the platform with a variety of actions and design interventions.

To recognise and to further emphasize the extraordinary characteristic and spirit of the Norwegian offshore facility provides the framework for the introduced adaptive reuse approach. The aim is to reveal the unexpected and to leave space for interpretation.

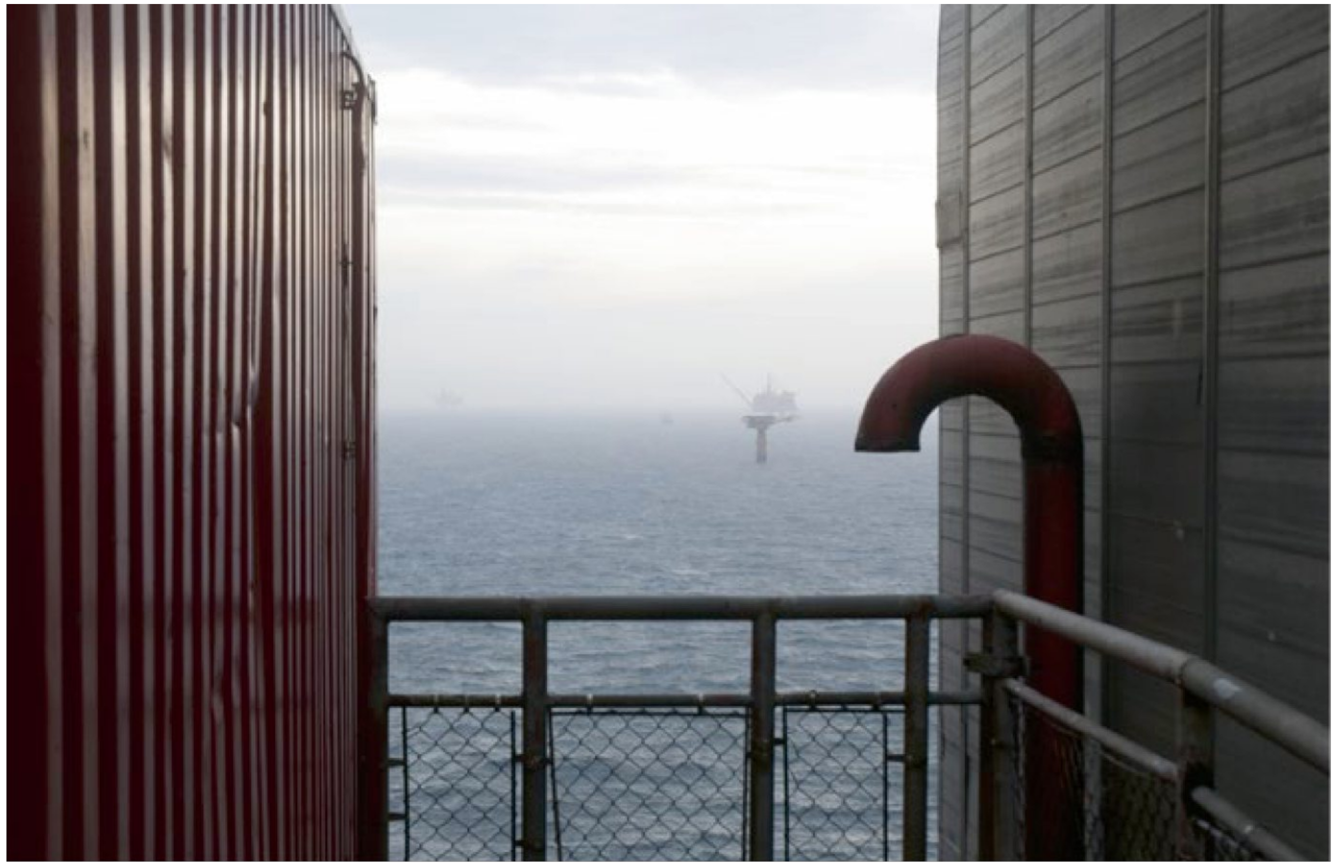


FIG 48 : A Place full of contradiction, where space and object oppose each other.

Adaptive Reuse Approach

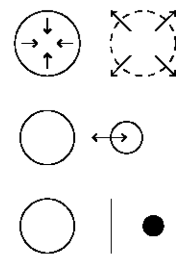
Readings and Design Principles

Examining an oil rig, it becomes apparent that it is a place full of contradictions, which does not seem to interact with its surroundings. In fact, an oil rig creates its own introverted world. In a post-oil scenario, reprogramming these structures means rethinking their role and appearance. The aim of a new concept is to overcome the former introversion and to connect the structure with its environment, but also to emphasize the prevailing contrast between invader and nature.

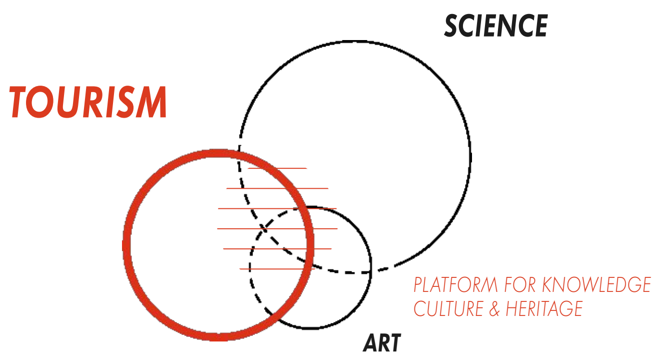
The French philosopher Roland Barthes describes the concept of ambiguity within the built environment as 'semanticization', which allows primary (denotative) and secondary (connotative) readings.[10] In this context of adaptive reuse, the past initiates a dialogue with the present through a process of layering meanings. The concept of 'semanticization' is thus to be understood as a concept of expansion of perception.

Applying this principle to Statfjord B, it can be read denotatively as a machine, built exclusively for the production of oil. The built space is not oriented to human scale, but entirely dedicated to installations and equipment for oil production. Habitants play a minor role within this built fabric and move on subordinate paths. Only the designated areas for living are reminiscent of human standards. Unlike a factory, where architecture states the beginning and specific space is given to the machine, the useable volume of an oil rig lies within the machine itself. By emptying it, space will be created for adaption. The complexity of this space found within the machine Statfjord B, resembles a city as a diverse construct with its open areas and dense alleys.

In addition to the denotatively interpretation as an instrument dedicated to oil, Statfjord B is readable connotatively as a symbol of wealth, cultural values, power and technical possibilities. The intention is to make this semantic layers visible



Vast	*Dense*
Natural	*Industrial*
Space	*Object*
Airy	*Massive*
Fluid	*Solid*
Light	*Dark*
Shapeless	*Edgy*
Extravert	*Introvert*



The goal is to create a dialogue between the visitors, the participating artists and scientific experts.

Reprogramming

Afterlife as permanent research station

The North Sea is facing major changes as a result of climate change and extensive exploitation by a variety of human activities. The strong intention to understand these changings is underlined by the enormous increase in marine research carried out and the consequently rising number of research institutions, knowledge and data. (see page 132)

The high density of well-located marine stations on the coast of the southern North Sea indicates intensive North Sea coastal research. In order to explore the deeper regions of the North Sea, efforts have to be made for research vessels. During long-planned expeditions, a few experts can collect data and samples to bring them ashore for detailed investigations.

The transformation of the Condeep GBS structure Statfjord B into an integrated, interdisciplinary research facility could provide researchers, policy makers, industry and non-governmental organisations, interested in the ecological and health status of the North Sea, with the permanent opportunity to conduct basic and applied scientific research on the edge of the European continental shelf. The scientific focus could be on long-term biological and ecological processes that provide valuable insights into continuous changes in marine environmental conditions.

Statfjord B could take on the role of a centre in a pan-European network of marine research stations, working collaboratively to address fundamental research questions and urgent environmental problems. The establishment of a cross-national research station would thus underline and promote the increasing importance of marine research in order to achieve sustainable future goals for the European Community. As a common voice for research stations and institutes across Europe, Statfjord B could play a leading role in providing strategic advice to European and international maritime policy makers and stakeholders.

In addition, the state-of-the-art research facility will be able to offer education and training programmes and bring together renowned marine scientists, experts and the interested public. Statfjord B Research Centre will thus become a forum where all stakeholders can come together in a collaborative working environment and discuss issues relevant to the whole society.

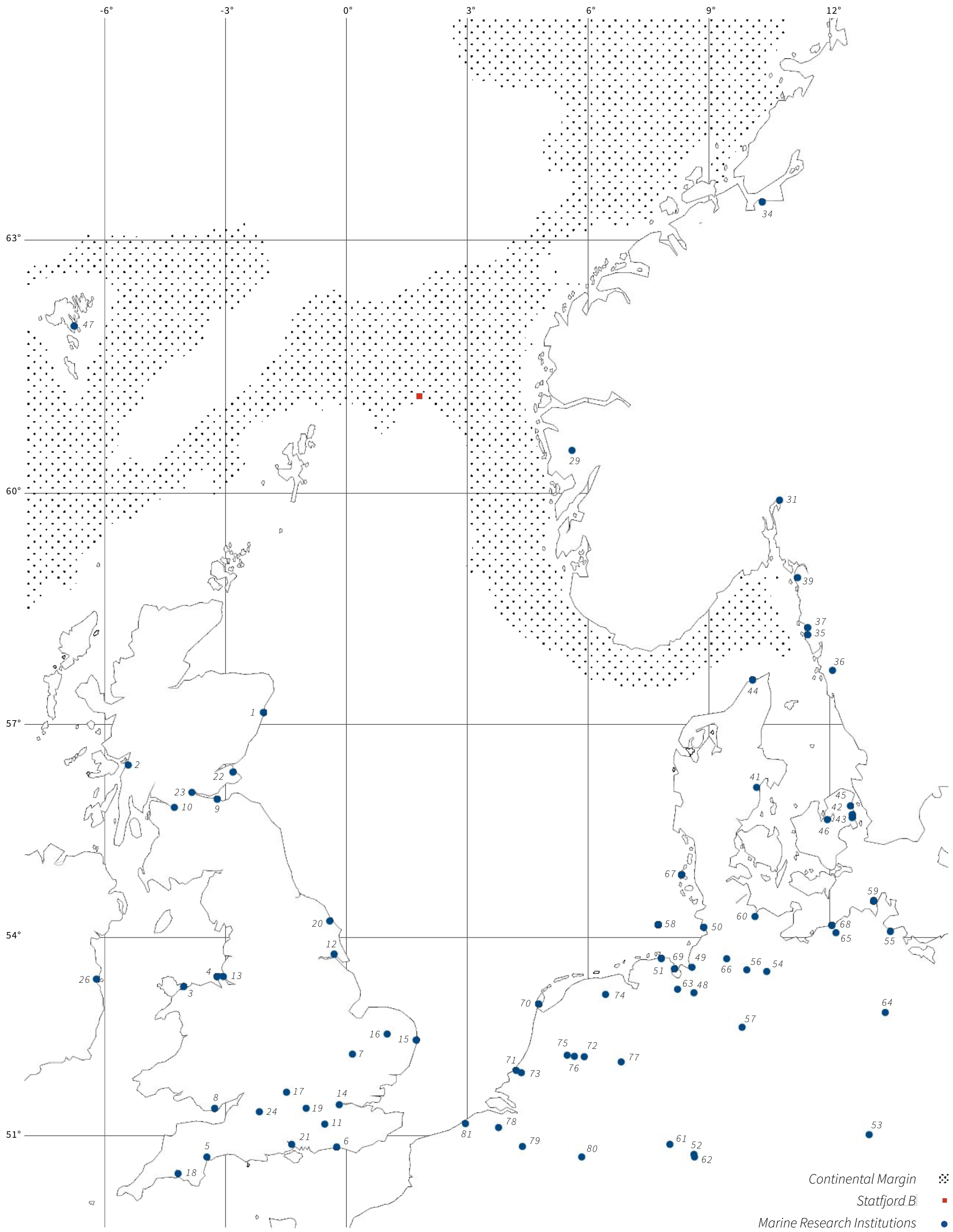
A marine research centre on the artificial island Statfjord B could thus take on a growing social responsibility to combine basic marine science with society's need for knowledge about key processes.

The growing value in connecting Art and Science

A public artist-in-residence programme that will host artists on Statfjord B will support the process of gaining and communicating knowledge.

The programme provides artists with access to the platform's resources, facilities and scientists. During their stay, artists participate in the research processes and use their creative energy to develop projects on scientific topics and to give a new perspective on already existing research questions. In this process, art becomes a tool of communication that connects all actors.

The resultant works of art, performances and exhibitions will furthermore become a great attraction for sustainable tourism. The impact of this interdisciplinary approach will thus benefit all actors, including the public.[1]



200 km

FIG 49 : MARINE RESEARCH INSTITUTIONS
Analytical Map
Territorial scale - Greater North Sea

MARINE RESEARCH INSTITUTIONS IN THE NORTH SEA REGION

~

UNITED KINGDOM

1 Aberdeen
University of Aberdeen
Oceanlab
Marine Biodiscovery Centre
Marine Biology
Fisheries Research Services Marine Laboratory
Lighthouse Field Station
School of Biological Sciences
Marine Conservation

2 Argyll
Scottish Association for Marine Science (SAMS)
Centre for Coastal and Marine Sciences - Dunstaffnage Marine Laboratory

3 Bangor
University of Wales
The School of Ocean Sciences
Centre For Applied Oceanography

4 Bidston
Bidston Observatory
Centre for Coastal and Marine Sciences - Proudman Oceanographic Laboratory
British Oceanographic Data Centre (BODC)
GEBCO Digital Atlas (Bathymetrie)

5 Exeter
The Met. Office
Hadley Centre for Climate Prediction & Research
Ocean Applications

6 Brighton
River Ocean Research and Education

7 Cambridge
British Antarctic Survey
International Whaling Commision

8 Cardiff
Cardiff University
Cardiff Marine Institute
Marine Geoscience Research

9 Edinburgh
Heriot-Watt University
Ocean Systems Laboratory

10 Glasgow
University of Glasgow
Glasgow Marine Technology Centre (GMTC)
Glasgow College of Nautical Studies
Faculty of Maritime Studies

11 Godalming
SOS Satellite Observing System

12 Hull
University of Hull
Institute of Estuarine and Coastal Studies (IECS)

13 Liverpool
University of Liverpool
Oceanography Laboratories
Physical Oceanography Group
Marine Electrochemistry Group
Marine Pollution Group
Inorganic geochemistry group
Organic Biogeochemistry Group
Port Erin Marine Laboratory

14 London
The Hydrographic Society
International Maritim Organization
Imperial College Of Science and Technology
Oceanography Laboratory
Londonderry
University of Ulster
Coastal Studies Research Group (CSRG)

15 Lowestoft
Centre for Environment, Fisheries and Aquaculture Science (CEFAS)
Newcastle upon Tyne
Newcastle University
Department of Marine Sciences and Coastal Management
Millport, Isle of Cumbrae
University Marine Biological Station - Millport

16 Norwich
University of East Anglia
Meteorology and Oceanography

17 Oxford
Oxford University
Atmospheric, Oceanic and Planetary Physics
Physical Oceanography
Marine Group

18 Plymouth
University of Plymouth
Institute of Marine Studies
CCMS Plymouth Marine Laboratory
The Marine Biological Association
Sir Alister Hardy Foundation for Ocean Science
Plymouth Marine Laboratory
Port Arthur, Scalloway, Shetland
North Atlantic Fisheries College

19 Reading
Reading University
Oceanography Group, Department of Meteorology

20 Scarborough
University of Hull
Scarborough Centre for Coastal Studies (SCCS)

21 Southampton
University of Southampton
Southampton Oceanography Centre (SOC)
Challenger Society For Marine Science
National Oceanographic Library
George Deacon Division for Ocean Sciences
School of Ocean and Earth Science
Inter-Agency Committee on Marine Science and Technology

22 St. Andrews
St. Andrews University
Sea Mammal Research Unit

23 Stirling
University of Stirling
Institute of Aquaculture
Marine Environmental Research Laboratory
Institute of Biological Sciences
Marine Bioscience Research

24 Swindon
Fugro Global Environmental and Ocean Sciences

IRELAND

25 Cork
University College Cork
Environmental Research Institute

26 Dublin
Irish Marine Institute
Irish Marine Data Centre
Abbotstown Laboratory Complex

27 Galway
Irish Marine Institute
National University of Ireland
Marine Microbiology Group
Martin Ryan Marine Science Institute

28 Sherkin Island
Sherkin Island Marine Station

NORWAY

29 Bergen
University of Bergen
Department of Fisheries and Marine Biology
Geophysical Institute
Bergen Marine Food Chain Research Infrastructure
Sars International Centre for Marine Molecular Biology
Norwegian Institute of Marine Research
Nansen Environmental & Remote Sensing Center

30 Longyearbyen
Norsk Polarinstitutt

31 Oslo
University of Oslo
Geophysical fluid dynamics
Department of Geophysics

32 Spitzbergen
The University Courses on Svalbard

33 Tromsoe
University of Troms¿
Department of Marine and Freshwater Biology
Polar Environmental Center
The North Atlantic Marine Mammal Commision

34 Trondheim
Norwegian University of Science and Technology
Faculty of Marine Technology
OCEANOR - Oceanographic Company of Norway
SINTEF Civil and Environmental Engineering
Coastal and Ocean Engineering

SWEDEN

35 FiskebŠckskil
Kristineberg Marine Research Station

36 Göteborg
Gšteborg University
Marine Research Centre
University of Gšteborg and Chalmers
University of Technology
Mechanics and Maritime Sciences
Analytical and Marine Chemistry

37 Lysekil
Institute of Marine research (IMR)

38 Stockholm
University of Stockholm
Stockholm Marine Research Centre
Meteorologiska Institutionen (MISU)
Department of Systems Ecology, Marine ecosystem modelling and benthic and pelagic ecology
International Geosphere-Biosphere Programme
39 Stroemstad
TjŠrnš Marine Biological Laboratory

40 Umea
UmeŒ University
UmeŒ Marine Sciences Centre

Other Research Institutions and Marine Resources
Swedish Meteorological and Hydrological Institute
Swedish Oceanographic Data Centre

DENMARK

41 Aarhus
University of Aarhus
Department of Geosciences

42 Copenhagen
The International Council for the Exploration of the Sea (ICES)
Danish Polar Center
University of Copenhagen
Geophysics and Water Resources

43 Lyngby
Technical University of Denmark
Department of Ocean Engineering
Danish Institute for Fisheries Research
Danish Maritime Institute

44 Hirtshals
North Sea Oceanarium

45 Horsholm
DHI Water and Environment

46 Roskilde
National Environmental Research Institute
Department of Marine Ecology
Department of Coastal Zone Ecology

47 Faeroe
Toeshavn
The Faroe Marine Research Institute

GERMANY

48 Bremen
University of Bremen
Department of Physics
Institute for Environmental Physics
Ozeanography Group
Department of Geoscience
Marine Technology / Environmental Research
General Geologiy / Marine Geology
Marine Geophysics
Petrology of the Ocean Crust
Marine Technology / Sensors
Department of Biology
Marine Zoology
Marine Botany
Center for Tropical Marine Ecology
Marum - Centre for Marine Environmental Sciences
Senate Commission for Oceanography of the German Research Foundation
Max-Planck-Institute for marine Microbiology

49 Bremerhaven
Alfred Wegener Institute for Polar and Marine Research (AWI)
German Society for Polar Research
German Advisory Council on Global Change
Otto Schmidt Laboratory for Polar and Marine Sciences (OSL)

50 Büsum
University of Kiel
Research and Technology Centre Westcoast

51 Corolinensiel
University of MŸnster
Marine Biology Wadden Sea Station Carolinensiel

52 Frankfurt a. M.
Senckenberg Centre for Biodiversity Research

53 Freiberg
Technical University Freiberg
Institute for Mineralogy
Leibniz-Laboratory for Applied Marine Research

54 Geesthacht
GKSS Research Center
Institute for Coastal Research
Baltic Sea Experiment (BALTEX)
Environmental Data at GKSS

55 Greifswald
Ernst-Moritz-Arndt-University of Greifswald
Institut for Ecology Hiddensee
Institut for Marine Biotechnology Greifswald

56 Hamburg
University of Hamburg
Centre for Marine and Climate Research (ZMK)
Institute of Oceanography
Meteorological Institute
Institute for Geophysics
Institute for Biogeochemistry& Marine Chemistry
Institute of Hydrobiology and Fisheries Science
Faculty of Biology
German Centre of Marine Biodiversity

Technical University of Hamburg-Harburg
Mechanics and Ocean Engineering
Marine Technology

Max-Planck-Institute for Meteorology
Federal Maritime and Hydrographic Agency of Germany (BSH)
German Climate Computing Centre (DKRZ)
Federal Waterways Engineering and Research Institute - Coastal Division (BAW-AK)
Federal Research Centre for Fisheries
Deutsche Wissenschaftliche Kommission fŸr Meeresforschung (DWK)
German Society for Marine Research (DGM)

57 Hannover
Bundesanstalt fŸr Geowissenschaften und Rohstoffe

58 Helgoland
Biological Institute on Helgoland (BAH)

59 Hiddensee
Ernst-Moritz-Arndt-University Greifswald
Institute for Ecology

60 Kiel
University of Kiel
Institute of Marine Research (IfM)
Ocean and Climate
Marine Biogeochemistry
Marine Ecology
Institute for Polar Ecology
Institute for Geoscience
Research Center for Maritime Geoscience (GEOMAR)
Federal Armed Forces Underwater Acoustic and and Marine Geophysics Research Institute (FWG)

61 Koblenz
German Federal Institute of Hydrology
62 Offenbach
German Weather Service / Deutscher Wetterdienst (DWD)

63 Oldenburg
University of Oldenburg
Institute for Chemistry and Biology of the Marine Environment (ICBM)
Physical Oceanography
Organic Geochemistry
Biochemistry
Microbiogeochemistry (MBG)
Paleomicrobiology
Aquatic Microbial Ecology Group
Mathematical Modelling
Theoretical Physics and Complex Systems
Research Group BioGeoChemistry of Tidal Flats
Department of Physics
Marine Physics Group

64 Potsdam
Research Unit Potsdam of the Alfred Wegener Institute
Institute for Climat Impact Research (PIK)
GeoResearch Centre / GeoForschungs Zentrum (GFZ)

65 Rostock
Universtity of Rostock
Department of Biology
Marine Biology

66 Stade
German Hydrographic Society (DHyG)

67 Sylt
Wadden Sea Research Station Sylt

68 WarnemŸnde
University of Rostock
Baltic Sea Research Institute

69 Wilhelmshaven
TERRAMARE Wilhelmshaven
Senckenberg Marine Station

Further Resources

Lower Saxony State Agency for Ecology
Forschungsstelle Norderney
Wadden Sea National Park of Lower Saxony
Wadden Sea National Park Schleswig-Holstein
Wadden Sea National Park Hamburg
National Park Vorpommersche Boddenlandschaft
Society for Maritime Technology (GMT)
German Coastal Engineering Research Council
German Museum of Marine Research and Fisheries

NETHERLANDS

70 De Bilt
Royal Netherlands Meteorological Institute
Oceanographic Research Division

71 Delft
Delft University of Technology
Delft Institute for Earth-Oriented Space Research (DEOS)

72 Den Burg
Netherlands Institute for Sea Research (NIOZ)
National Oceanographic Data Committee

73 Den Haag
National Institute for Coastal and Marine Management

74 Groningen
University of Groningen
Department of Marine Biology

75 Maarssen
Netherlands Institute of Ecology
NIOO-Nederlands Instituut voor Oecologisch Onderzoek

76 Utrecht
University of Utrecht
Institute for Marine and Atmospheric Research Utrecht (IMAU)

77 Wageningen
Netherlands Institute of Ecology
Centre for Estuarine and Coastal Ecology

BELGIUM

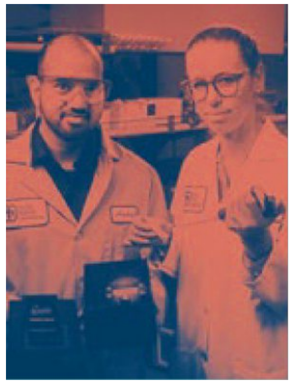
78 Brussel
Royal Belgian Institute of Natural Sciences
Aquatic & Terrestrial Ecology

79 Gent
Ghent University
Department of Biology, Marine Biology Research group

80 Liège
University of Liège,
Geo Hydrodynamics and Environment Research

81 Oostende
Flanders Marine Institute (VLIZ)
Sea Fisheries department

Actors



SCIENTIFIC EXPERTS

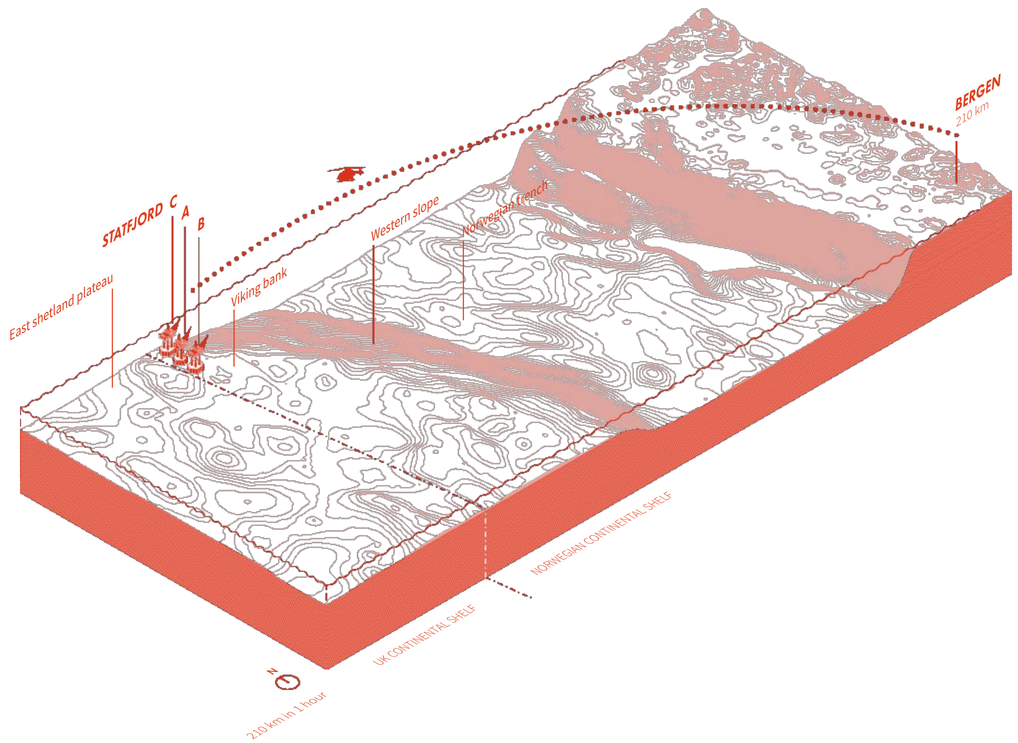
FIG 50 : *Marine Scientists will study the biological, chemical, geological and physical characteristics of the North Sea in a multidisciplinary approach, while focusing on comprehensive fieldwork and data collecting.*

ARTISTS IN RESIDENCE

FIG 51 : *Artists can emphasize the importance of scientific work by making it visually accessible, but the growing value in combining art and science lies in the collaborative process of creating new realities, rather than their mere reflections.*

INTERESTED PUBLIC

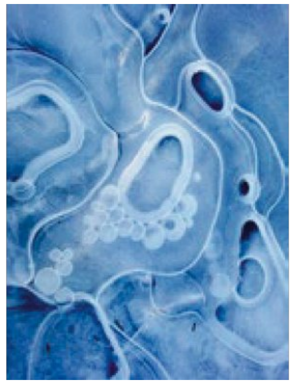
FIG 52 : *The visual and physical experience of visiting the Statfjord Monument and the participatory dialogue with scientific experts will form people's understanding of the Seascape North Sea.*



Experiences

ART

FIG 53 : *The outcomes of the Artists-in-Residence program are presented in changing exhibitions.*

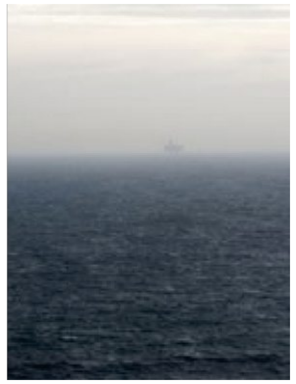


MARINE SCIENCE

FIG 54 : *A state-of-the-art research facility as the main attraction for experts and visitors who want to gain insight into the world of Marine Science.*

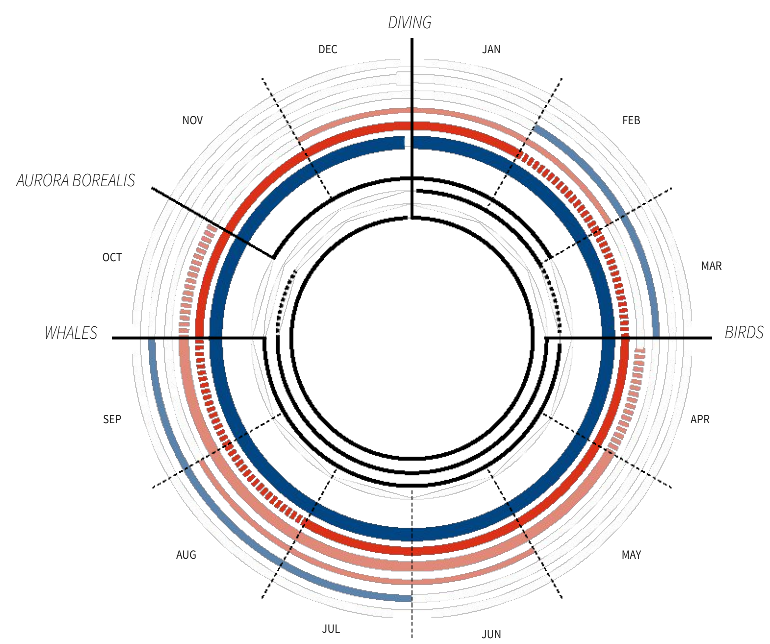
INDUSTRIAL HERITAGE

FIG 55 : *The hidden world of oil becomes visible and comprehensible.*



ENVIRONMENT

FIG 56 : *The North Sea as unique ecosystem can be experienced.*



Interdisciplinary collaboration can generate new ideas and provide new perspectives, which in turn can lead to innovation in existing research areas or the creation of new ones.

Scientists: all year
Students: summer I winter school

Artists: summer I winter program
Exhibition

Tourists: long term
Daytrippers: short term

Environmental experience

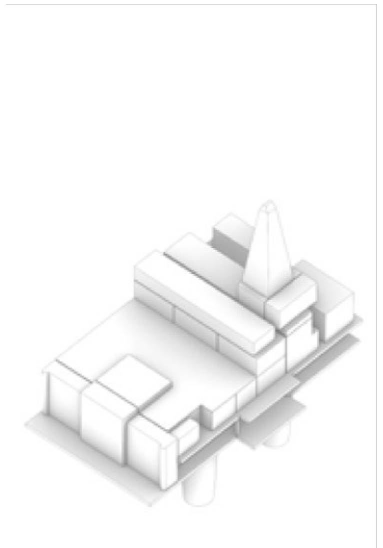
Design

Water as unifying element.

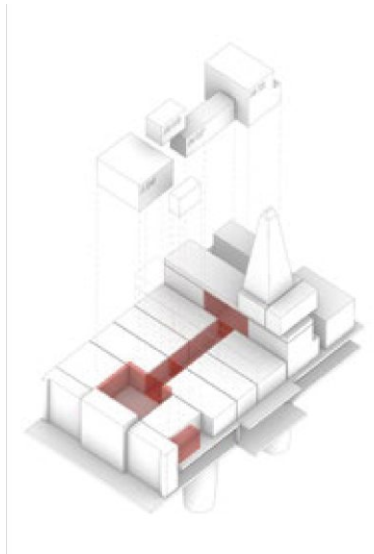
The special character of the site creates an extraordinary situation. Despite to almost any other task in the field of architetucture, in the middle of the North Sea, there is no infrastructure, topography or neighboring buildings to refer to. There´s no other reference except the sea.

The main idea of the architectural concept is to create varying experiences inspired by three different relationpoints to water and combine it with the self-referential structure of the platform.

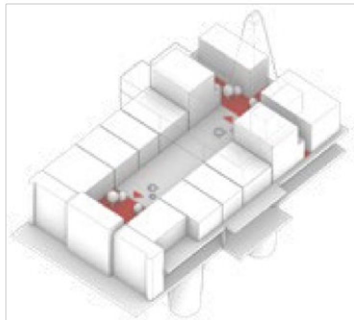
Three levels creating different Experiences with water: Above the Sea, on Sea level and under water. The Architecture reacts to the different experiences of water by highligthing its essentially contrasting qualities.



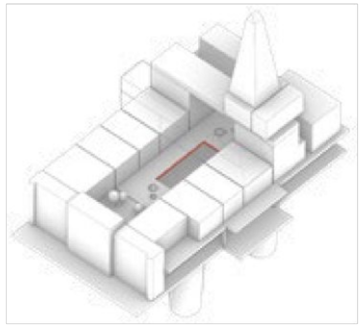
Most of the equipment will be removed, leaving an empty shell.



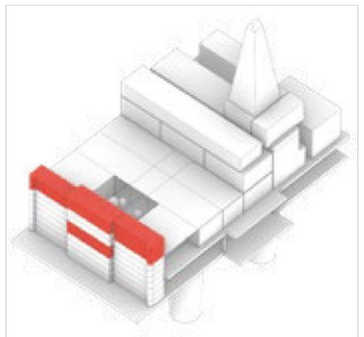
The former living quarter module L04, the office module on the southern facade as well as the modules M07, M08 and M12 will be dismantled.



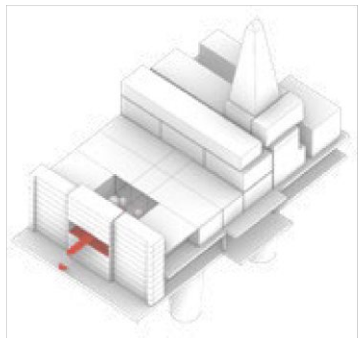
A new patio in the East allows natural light in the center. The extended atrium connects both, the open air space in the east with the new patio in the west.



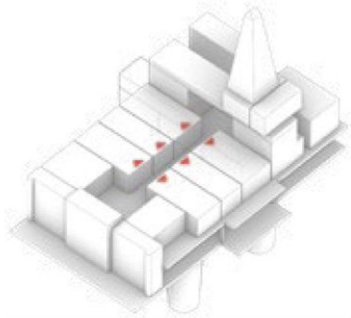
A void is created in order to connect the atrium space with the MSF underneath.



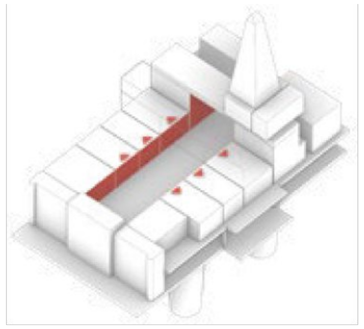
The modul L01 and L02 will be extended with 3 more storeys, L03 with additional 2 storeys.



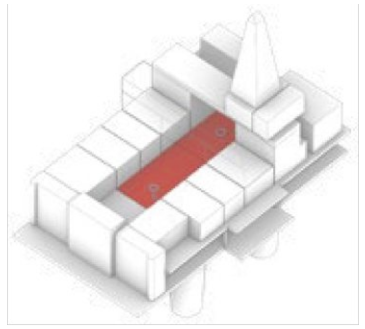
The level between fourth and the fifth floor of modul L02 will be removed in order create a shared double hight living room.



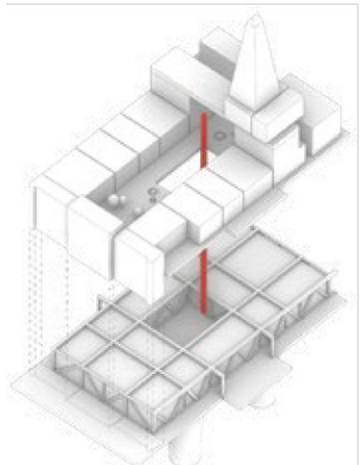
The walls of the inner Modules will be partly removed with the objective to unveil the structures' skeleton .



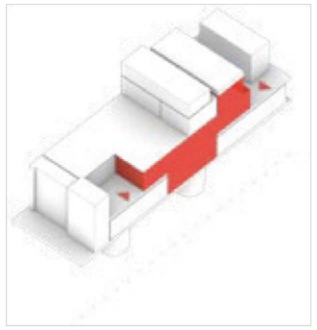
As a result, a clearing is created along the east-west axis.



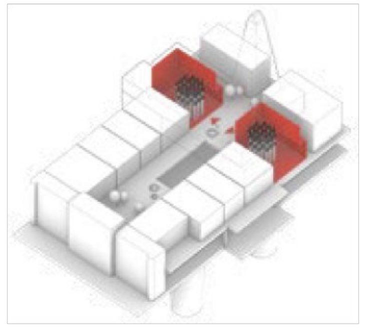
A permeable double height atrium space is formed in the center of the platform.



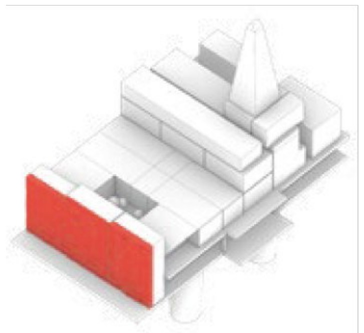
The new main circulation will be placed within the void.



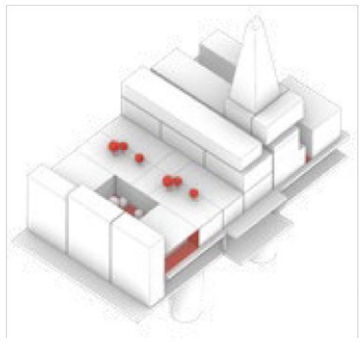
An extensive void links 7 floors and stimulates visual connections.



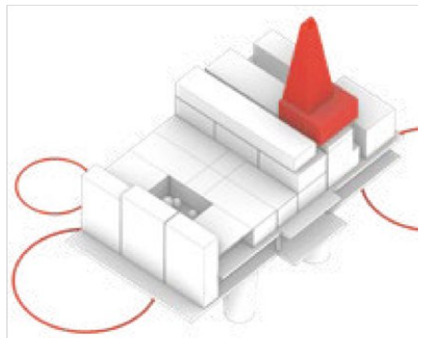
The former drilling towers will be preserved as enties and treated as an objet trouvé. Due to the absence of the module M12, the full height of the drilling unit can be experienced.



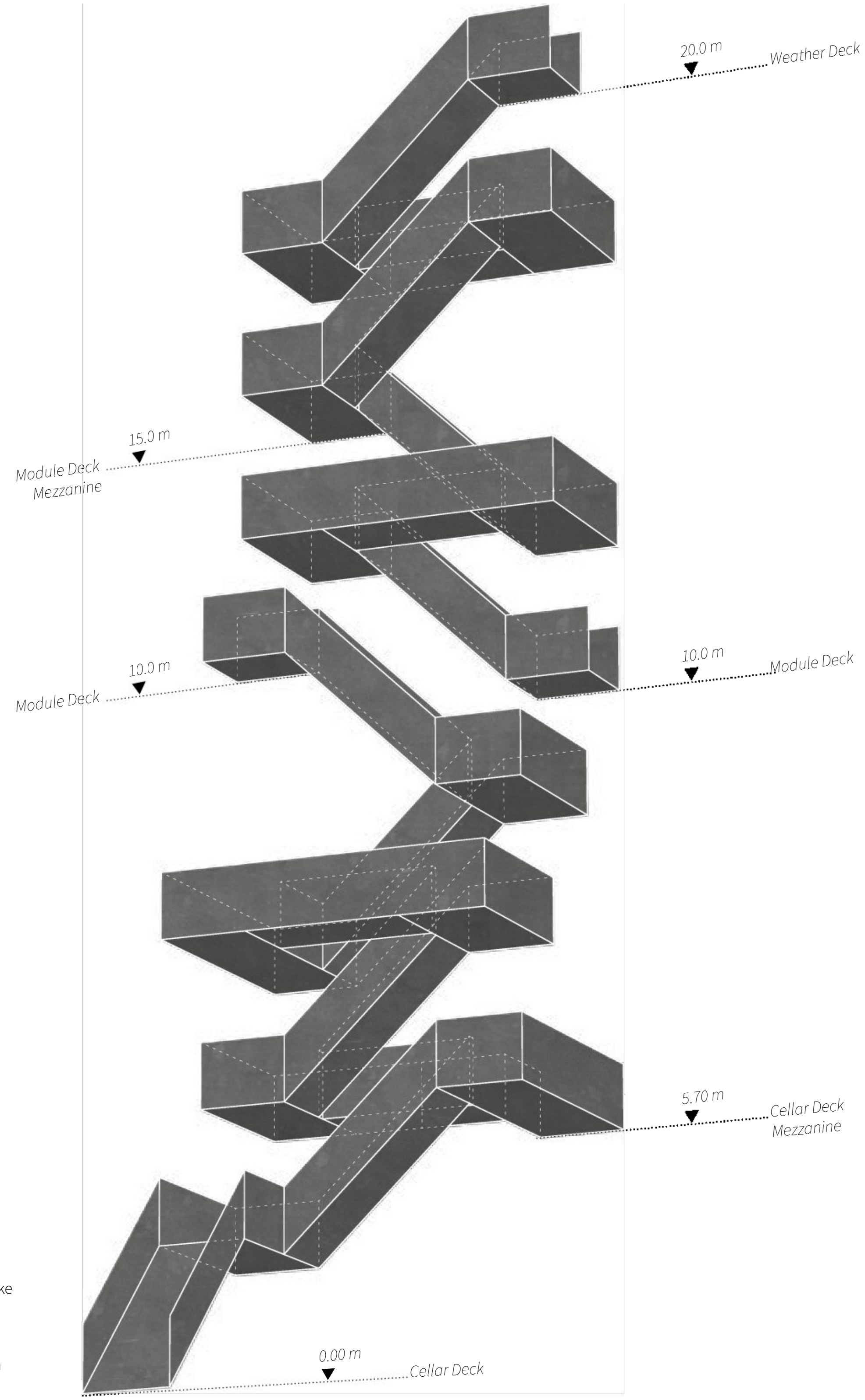
The old facade will be replaced, creating a new extraordinary space facing the Sea.



The various outdoor areas offer a wide range of uses and are connected by the old exterior corridor system.

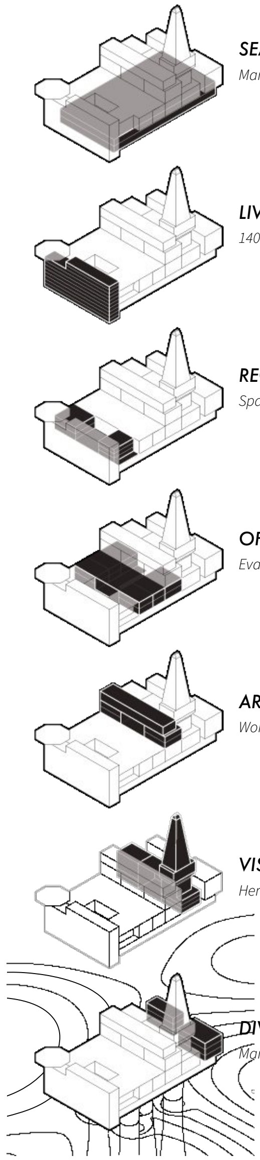


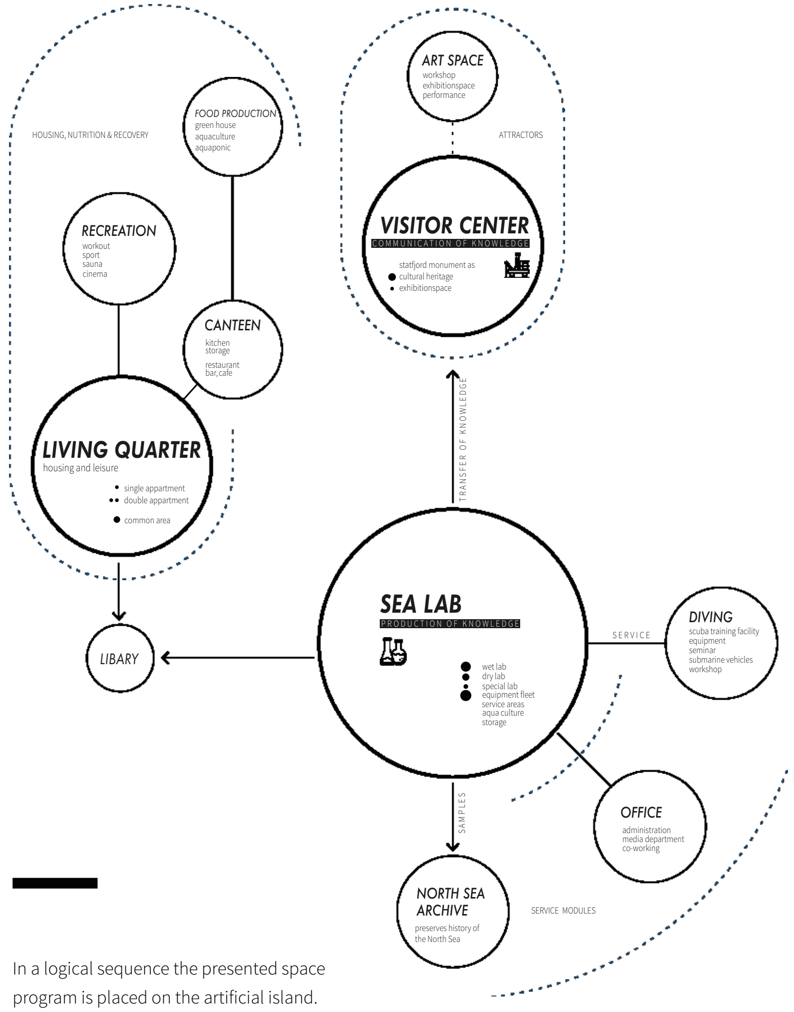
To make the island self-sufficient, the drilling tower will be used for growing food. Further, solar and wind energy plants as well as aquaponics are planned.



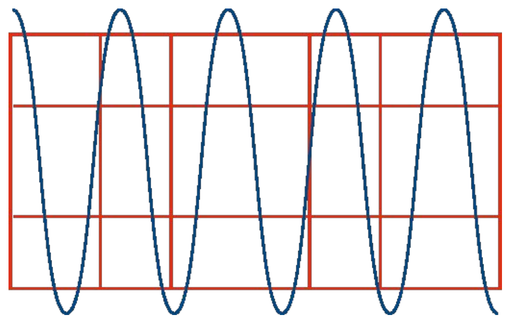
In reference to the labyrinth-like path system of the past, the new staircase stands like a sculpture in the central atrium connecting all six main levels.

Spatial Program





In a logical sequence the presented space program is placed on the artificial island. Hierby, the idea of accommodating each function in a separate module is maintained. The structure is not combined into an Entity, but remains in its individual elements readable as ‚a city'.



HOST *Relic*
ACTION *Referential*
OPERATION *Restoration, Extension, New Work*
REFERENCE *Engineering Achievement, North Sea*

Sea Lab

The fascination of the gigantic, empty structure of the 'MSF' with its decent charm casts its own spell. The raw and mechanical structure is omnipresent, underlining the experience of industry. Inspired by its potential, beauty and elegance, the old structures will remain visible and form the framework for an experiential 'Labscape'. The extraordinary height will be sustained in order to emphasize on the spatial experience and architectural quality. The program, dedicated to scientific research, will be implemented in a cautious and restrained manner in order to accentuate the massive and powerful MSF. With the aim of forming the visual counterpart to the existing structure, the new design quests for a formless, invisible design.

Object and Space

The aim of the design concept is to underline the flowing ambivalence of materiality and space. Glas as the dominant material seems restrained, but deals with intangible aspects such as space, proportions, light, shadow, intermediate zones of different brightness. Room boundaries become indistinct and the architecture seems floating between the massive steel structure. The Old and the New complete each other with opposite properties.

The architecture moves dialectically between exposure and veiling; visibility and invisibility, between inside and outside, between core and shell, between opaque, semi-transparent and transparent, between concept and reality. A state of transition, fragility and ambiguity.

Water and Light

Opening up to the surrounding sea, the marine research center is invaded by nature. The design's objective is to be an extension of the surrounding environment, in order to create an atmosphere of spaciousness and vastness. Due to layers of reflection, the design corresponds with the particularly natural light of the north, which leads to a special atmospheric setting and a rich relationship between user and object.

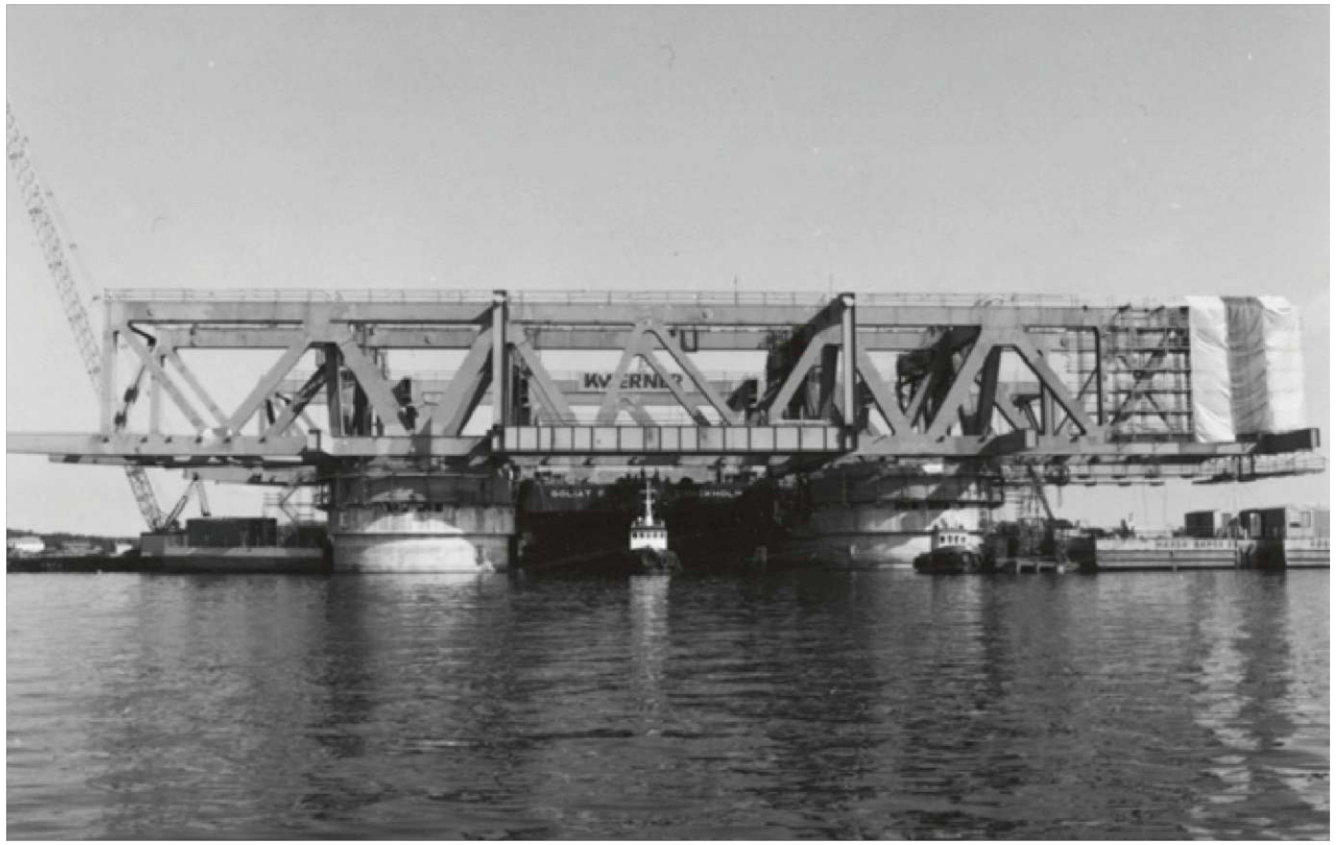
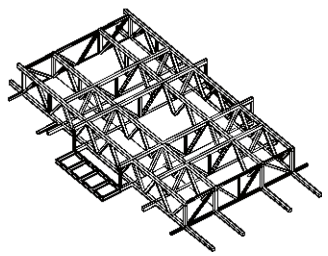


FIG 57 : left side. The steel deck for Statfjord B is being built at the Moss Rosenberg shipyard in Stavanger.

FIG 58 : The steel deck is anchored to the shafts of its concrete gravity base structure.



	MARINE BIOLOGY	MARINE CHEMISTRY	MARINE GEOLOGY	MARINE PHYSICS
	Study of marine species and their ecological interaction	Study of biochemical cycles that effects the Oceans	Study of the Ocean floor with its sediments	Study of the Oceans's physical attributes
WHAT				
MONITORING	Animal migration			Oceanic properties
COLLECTING	Seawater & Marine life	Seawater & Sediments	Data	Data
ANALYSIS	biological processes	Laboratory Analysis	Computational Analysis	Computational analysis
EXPERIMENTATION	Laboratory-based	Laboratory-based	Laboratory-based	Laboratory-based
INTERPRETATION				
MODELING	Mathematical modeling	Thermodynamic modeling	Ecological mapping	Numerical modeling
HOW				
TOOLS	Sensors & Tracking Technology	Sensors,	Sensors,	Buoys, Sensors
	Water Collecting Advices,	Water Collecting Advices,	Underwater Vehicles,	
	Plant & Organism Collecting	Underwater Vehicles,	Robotics,	
	Advices, Underwater Vehicles,	Robotics,	Laser, X-Ray	
	Robotics, Laser	Laser		
WHERE				
SPACIAL NEEDS	Wet Laboratory	Wet Laboratory	Wet Laboratory	Dry Laboratory
	Security lab S1-4	Security Laboratory S1-4	Dry Laboratory	
	Isotope laboratory			
AREAS OF RESEARCH				
EXEMPLARILY	Microbiology,	Marine pollution	Marine sedimentology	Ocean dynamics,
	Cell biology,	and contamination,	and mineralogy,	Marine acoustics
	Planktonology,	Ocean acidification,	Marine tectonics,	and infrasounds,
	Benthic biology,	Photochemistry,	Seafloor morphology,	Marine optics,
	Ichthyology (Fish Science),	Phytoplankton chemotaxonomy,	Coral habitat,	Atmosphere and
	Physiology,	Ecosystem dynamics,	Structural geology,	Climate science,
	Food chain dynamics,	Molecular ecology,	Petrology,	Electromagnetism,
	Food production	Interfacial chemistry (Sea-Air exchange)	Basin analysis,	Lithospheric deformations
			Seismic stratigraphy	

Laboratory Program

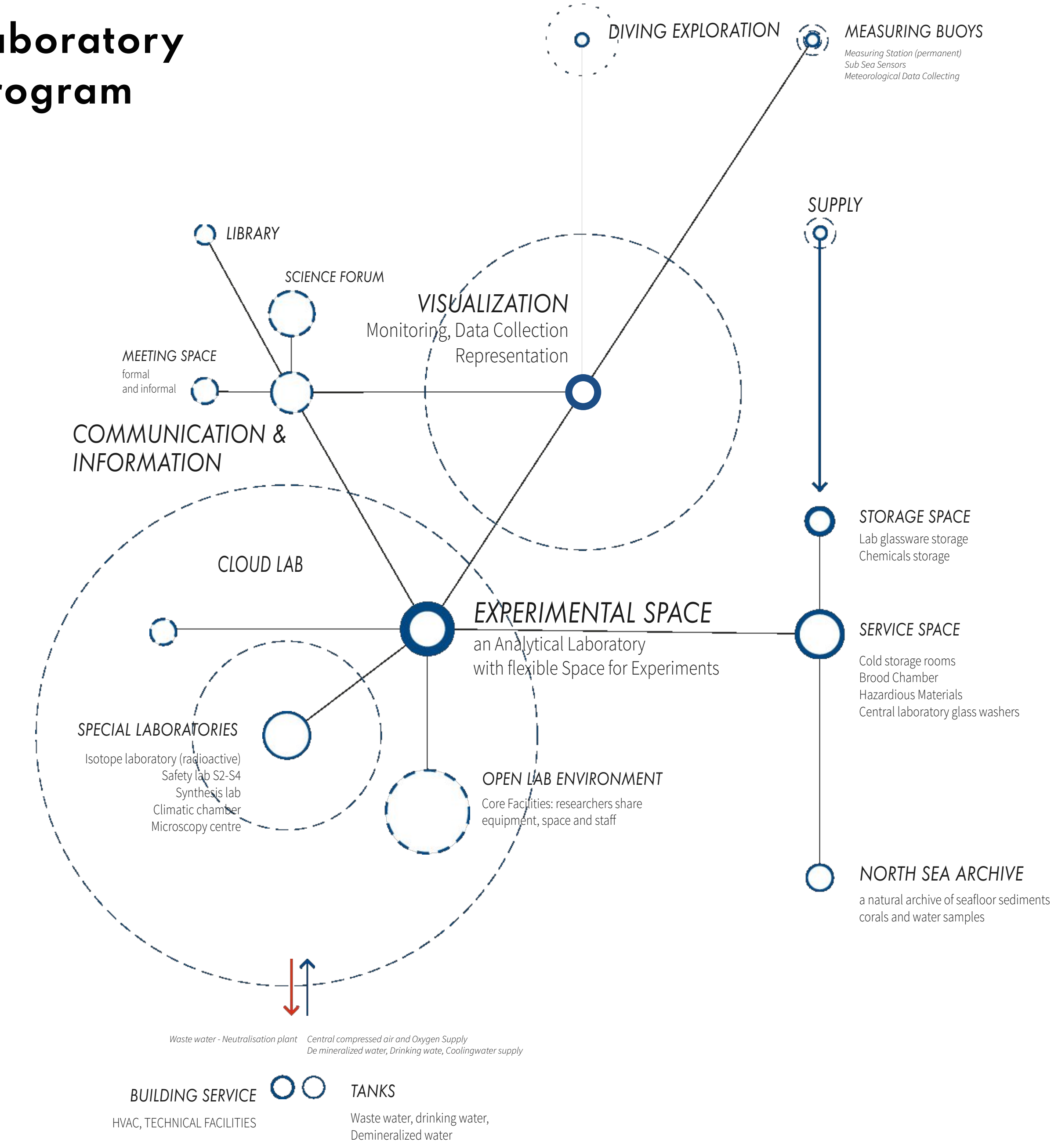


FIG 59 : Conventional laboratories are characterized by separate but self-contained research groups and fixed workstations. This leads to low synergy effects, long distances and high equipment costs.

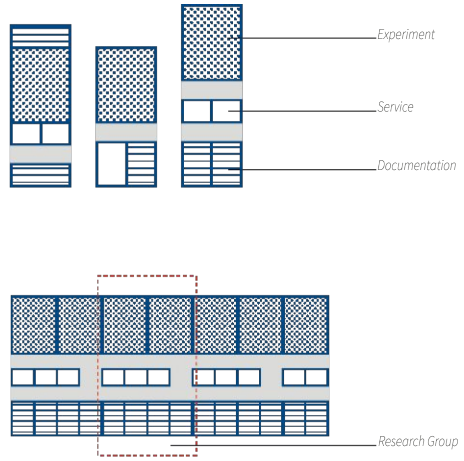
FIG 60 : Freeing Architecture. Junya Ishigami, KAIT Workshop: Flexible and individual areas for varying scenarios, a communicative working environment that enriches interdisciplinarity and highly adaptable spaces for different research groups is what needs to be achieved.

Laboratory Design

Traditionally, laboratories were designed for individual research groups with walls separating the laboratories and support spaces. Group sizes ranged from two to ten people, and most groups were completely self-contained, each with its own equipment and facilities. The concept of these kind of department laboratories provides all spaces required for a specific research purpose in a spatial network. In consequence the synergy potential stays low even though the circulation area increases.

Although the trend is increasingly towards Open Lab layouts, as a counterpart to the common Open Office, the strict order of the highly standardized laboratory configuration is maintained. However, interdisciplinary research is a highly creative discipline, that asks for individual solutions and furtile atmospheres, that enriches the research process.[2]

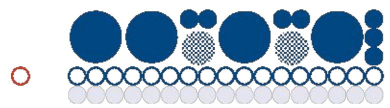
Therefore the question arises how to create an open and adaptable space for research, while achieving the high security standards for laboratories?



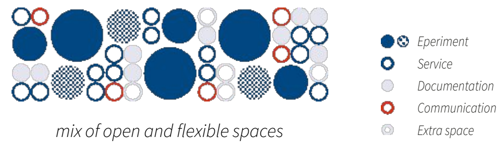
A conventional laboratory setup with assigned office and service areas.

Conventional laboratories are characterized by separate but self-contained research groups and fixed workstations. This leads to low synergy effects, long distances and high equipment costs.

Flexible and individual areas for varying scenarios, a communicative working environment that enriches interdisciplinarity and highly adaptable spaces for different research groups is what needs to be achieved.[3]

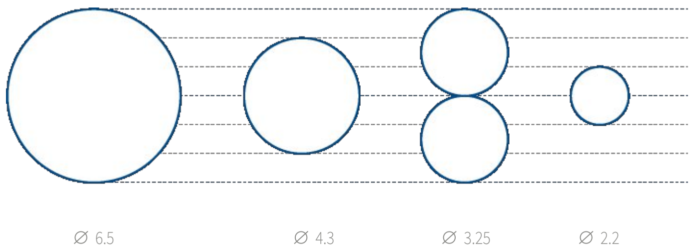


homogenous configuration of space



mix of open and flexible spaces

Space Evaluation

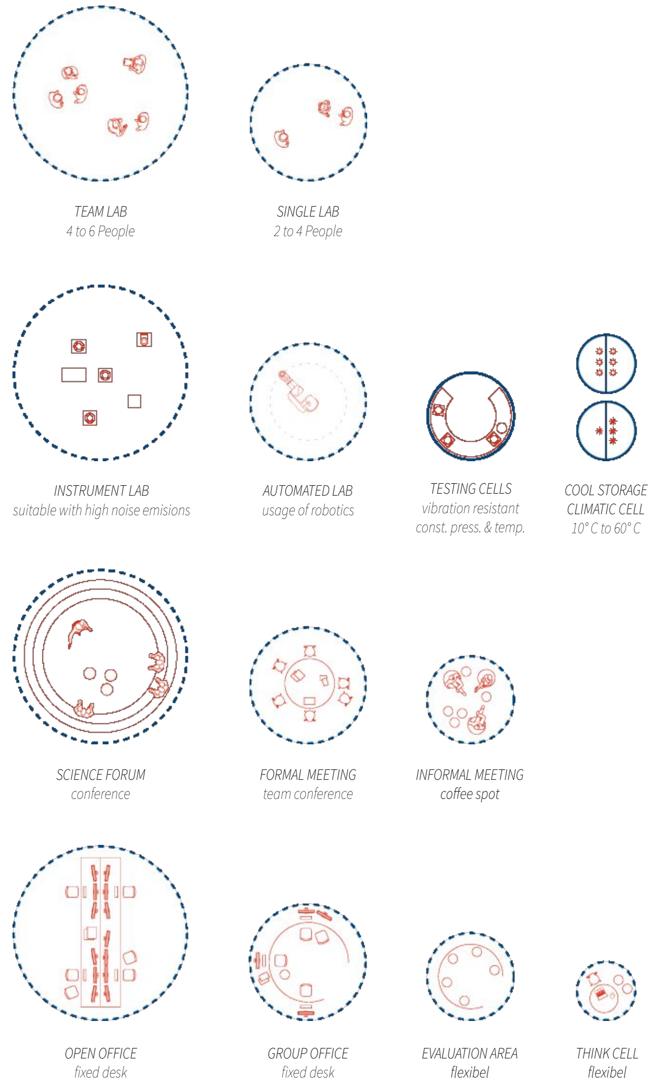


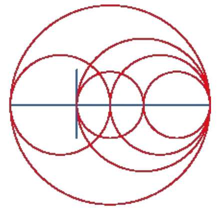
EXPERIMENT:
flexible work environment
special laboratories air locked

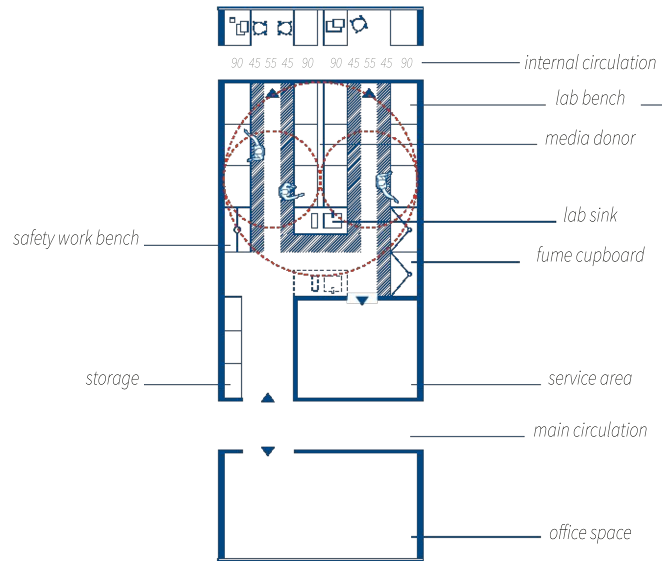
SERVICE:
decentral service cells

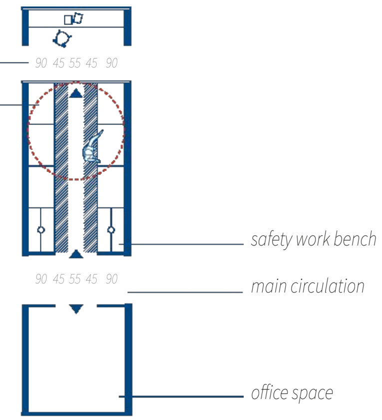
COMMUNICATION:

DOCUMENTATION:



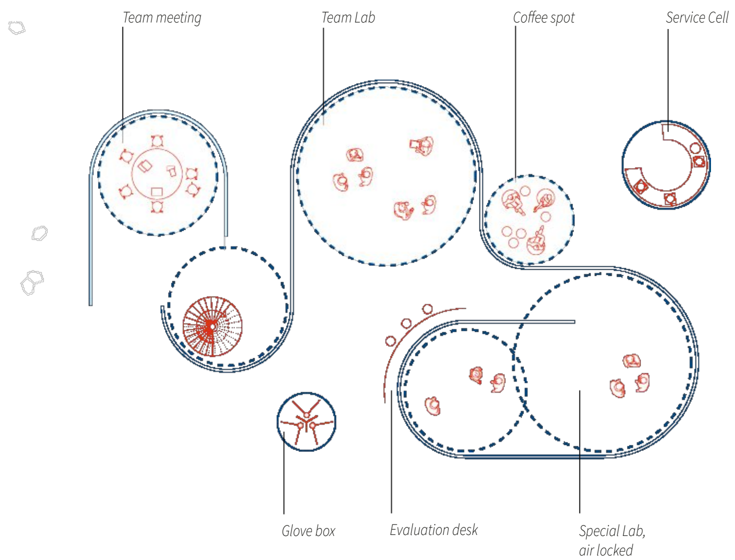




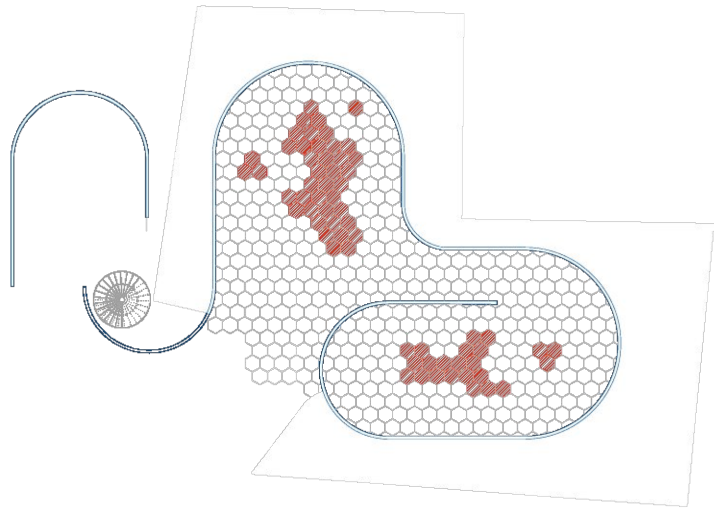


Conventianal 40 sqm laboratory with integrated documentation- and service area.

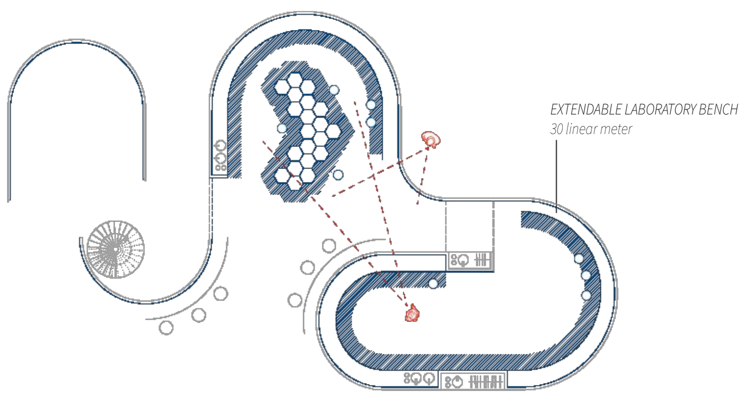
Single laboratory with two laboratory lines for specific work carried out in isolation.



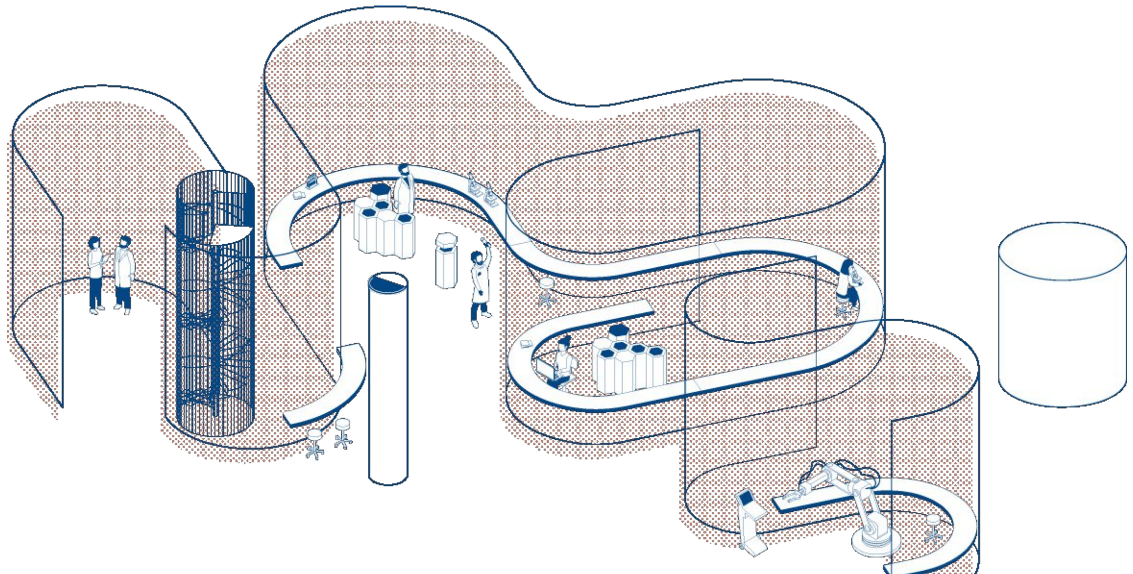
A defined group of experimental-, communication-, documentation and service-areas form one Laboratory Cell in a contigous, open space.



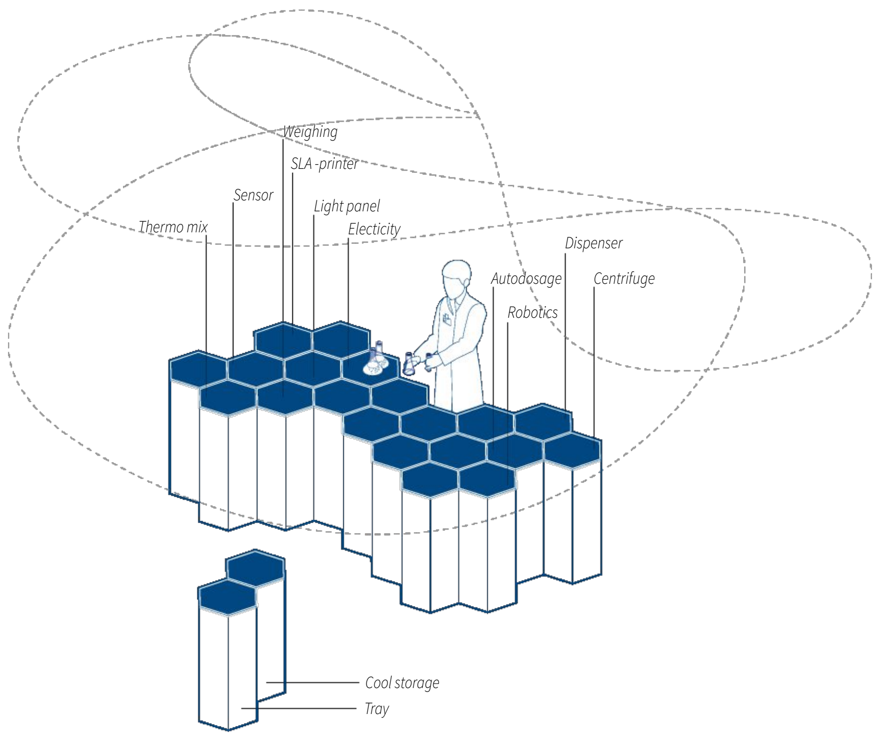
The flexible arrangement of modular furniture allows a individual laboratory setting for changing research groups.



Visibility among researchers increases, while noise decreases due to the separation of individual research areas.

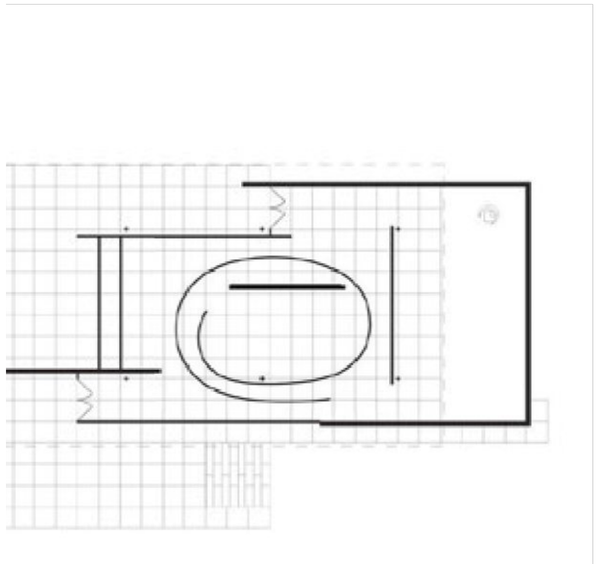


235 sqm flexible Laboratory Cluster



A digital network of modular laboratory components.[4]

FIG 61 : *The aesthetics of reduction. SANAA, Intervention in the Pavilion Mies van der Rohe. 2011-2012*



Encompassing Space

The laboratory floor is characterized by contradiction, created by a continuous arrangement of frameless curved glass panels, contrasting the strict perpendicular order of the existing structure. The aim of layered glass elements is both to reflect the natural atmosphere of the nordic environment, and to enrich the interdisciplinary approach of marine science by creating a fluid space without visual borders.

A modular wall system made of prefabricated curved glass elements allows the construction of an organic spatial structure, which is open and enclosed at the same time. Floor-to-ceiling glass panels form laboratory cells that are equipped with fixed elements such as sinks, safety workbenches, glove boxes, media supply (sea water, pure water, gas) and fume cupboards. Safety cabinets, for personal or product protection, are integrated as space-within-space solution. The flowing laboratory space is further furnished with modular workbenches that allow an individual experimental setup and maximizes flexibility. Due to that, the laboratory cells guarantee easy adaptability to changing user interests and can thus react to the concept of varying research groups.

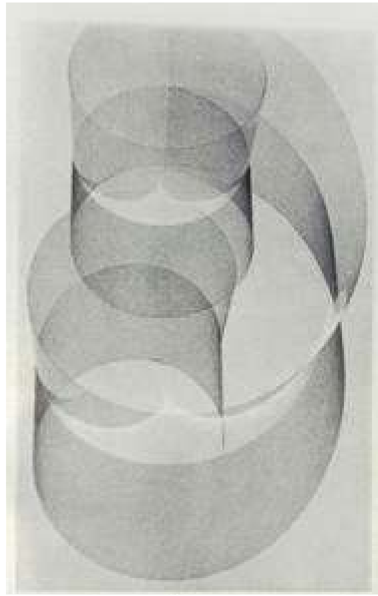
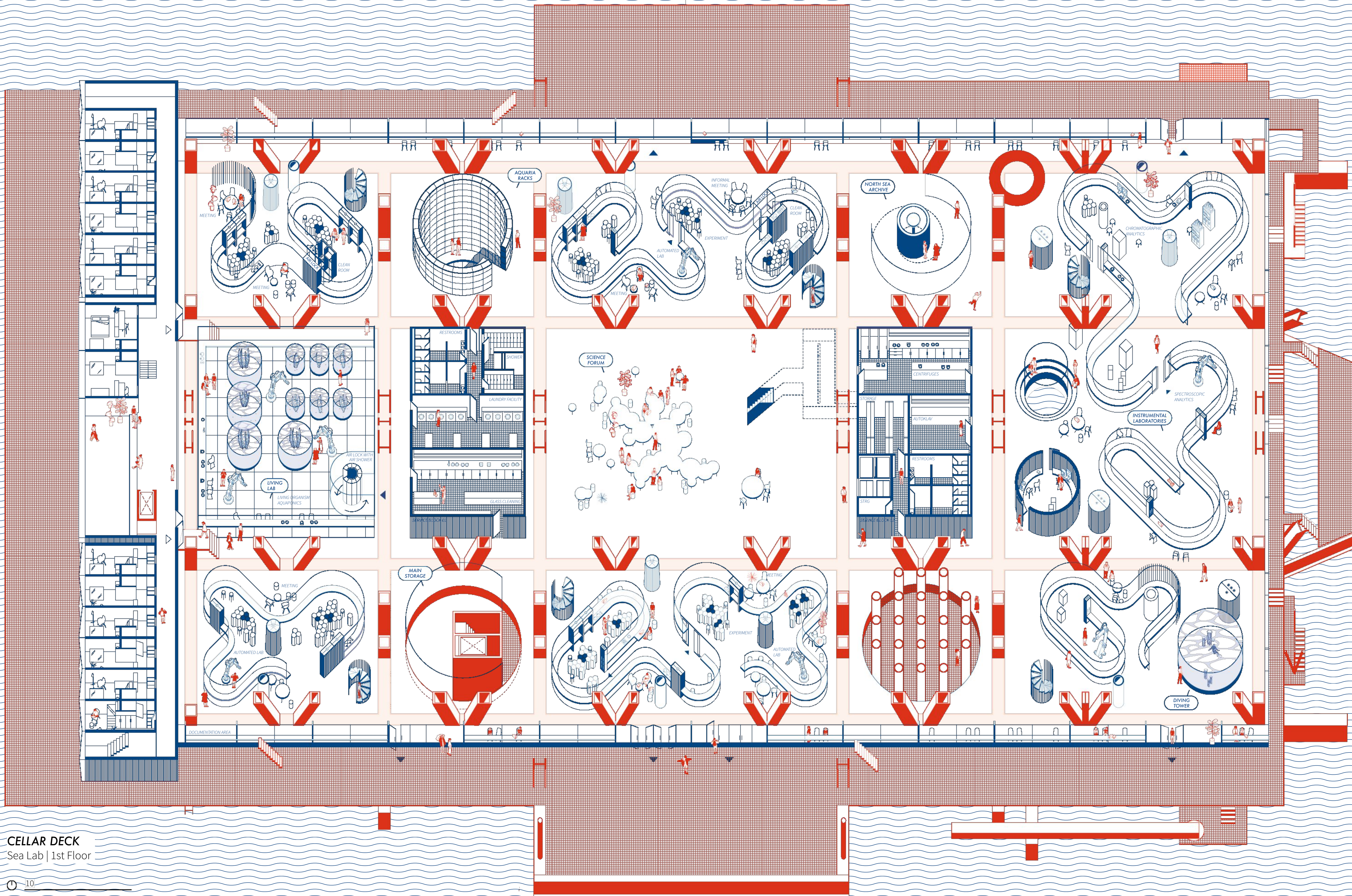
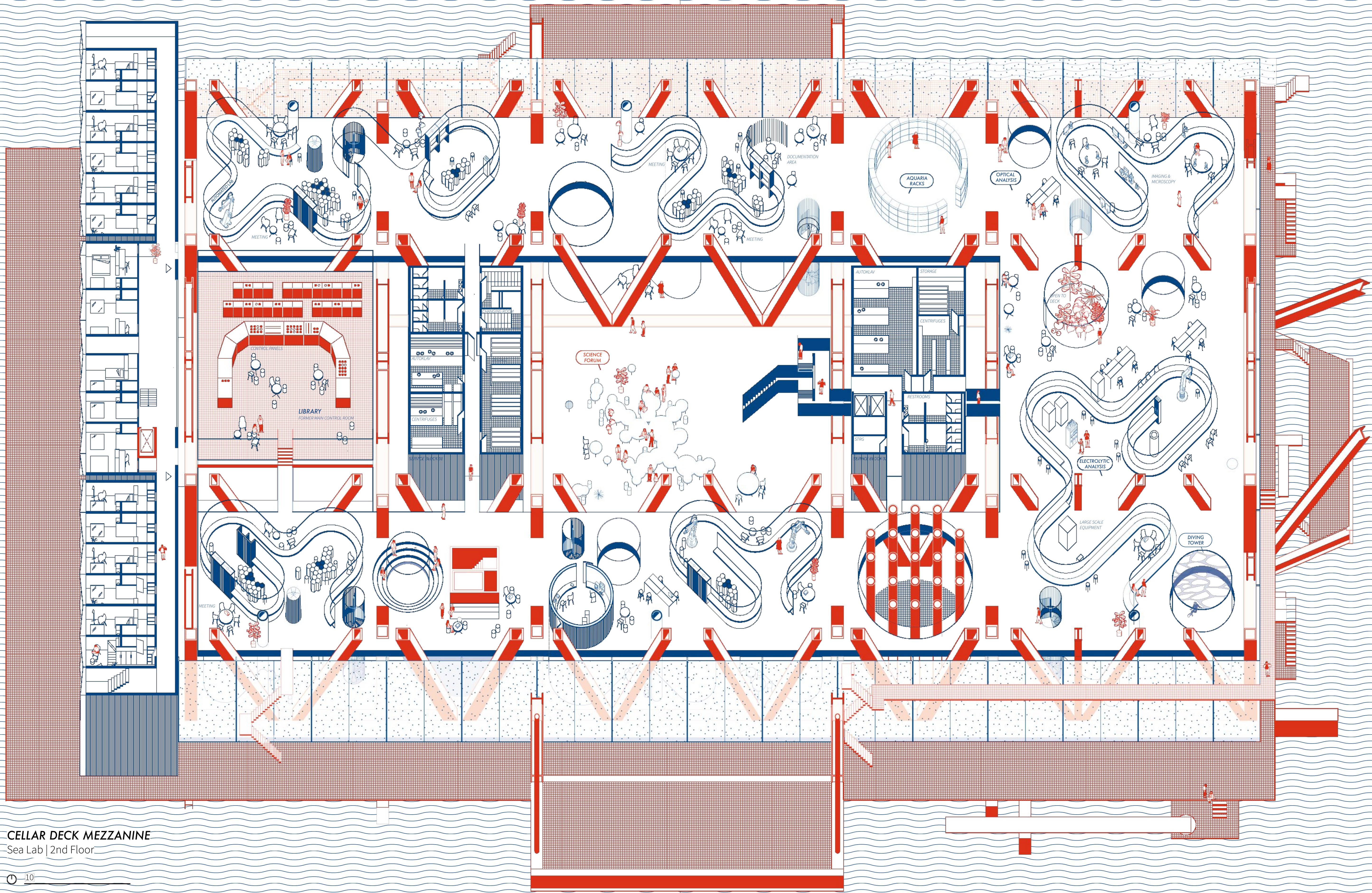


FIG 62 : Concept image, Albe Steiner, Celluloide I Zelluloid, Photogram, 1941



CELLAR DECK
Sea Lab | 1st Floor



CELLAR DECK MEZZANINE

Sea Lab | 2nd Floor

10

Living Quarter

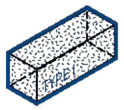
In order to meet the requirements of a new usage, a set of interventions as concept of alteration is applied to the Living Quarter. Through a comprehensive renovation, larger rooms are created in some cases, while the original building grid is retained with the objective to mark the former room cells.

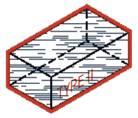
However, most of the rooms will retain the existing narrowness in order to transfer the original atmosphere to the present.
The construction can be read as an invisible trace and will be preserved as an experience, even though the limited space is used more efficiently. In addition, a new façade will extend the existing space and provide an undisturbed view of the sea. The extension generates a new, clearly delinate space that fulfils the previously missing function of a private retreat.

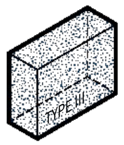
The connection to the past is thus maintained through the use itself and through the experience of the existing space. In contrast, the intervention of the extension demonstrates the break through into the present.

HOST: *Entity*
ACTION: *Referential*
OPERATION: *Extension, Substraction, Renovation*
REFERENCE: *Program, North Sea*

Living Units







SINGLE UNIT

20 sqm | 87 x

Short Term
Scholars
Tourists [Single]
Staff

DOUBLE UNIT

30 sqm | 38 x

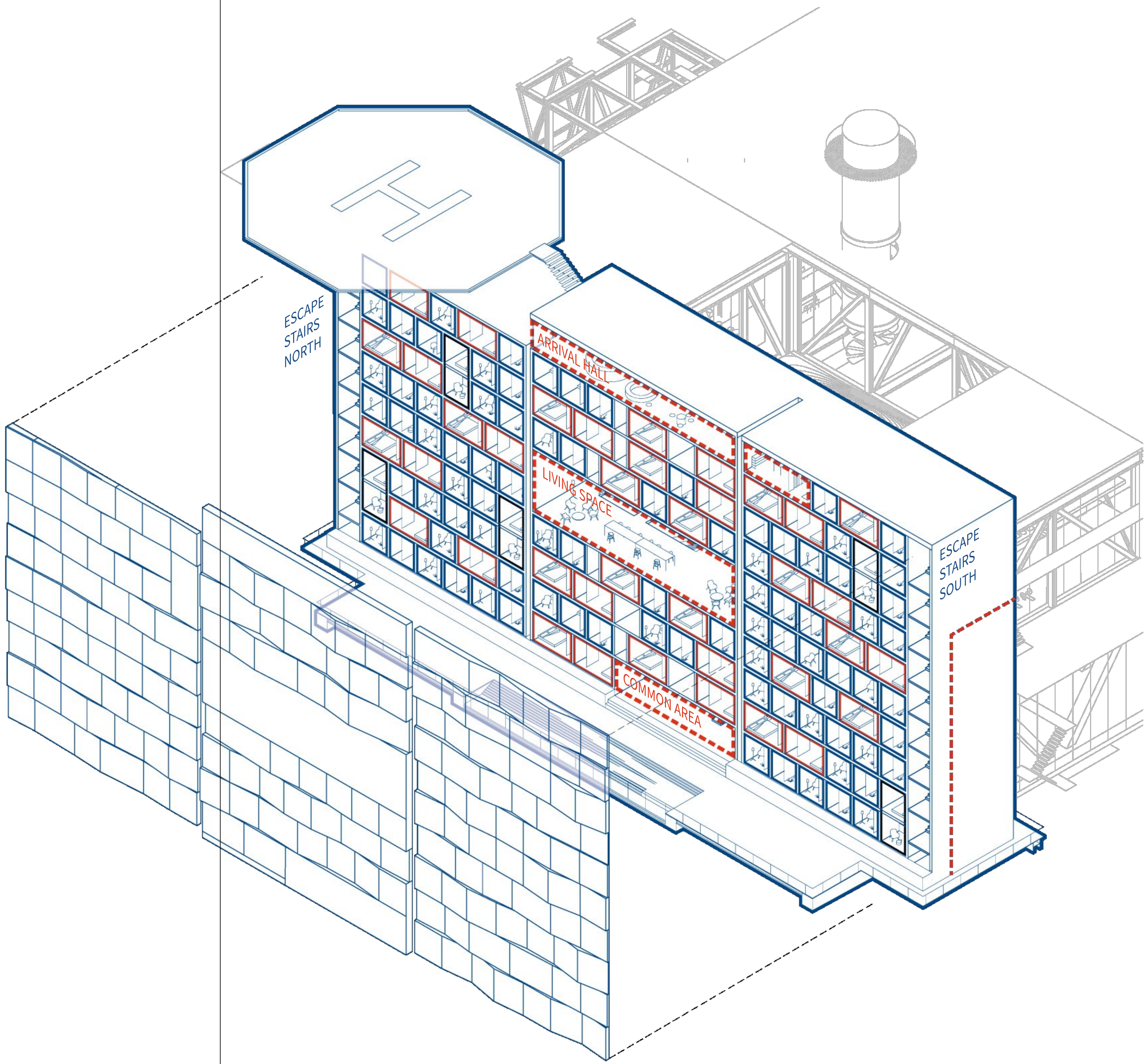
Long Term
Family Visit
Tourist [Double]

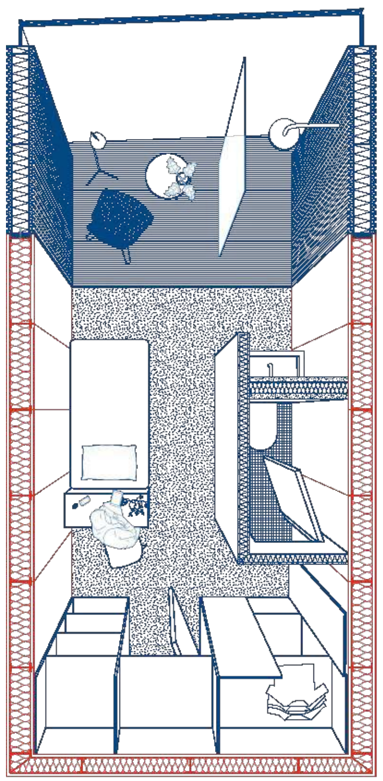
DOUBLE UNIT

35 sqm | 5 x

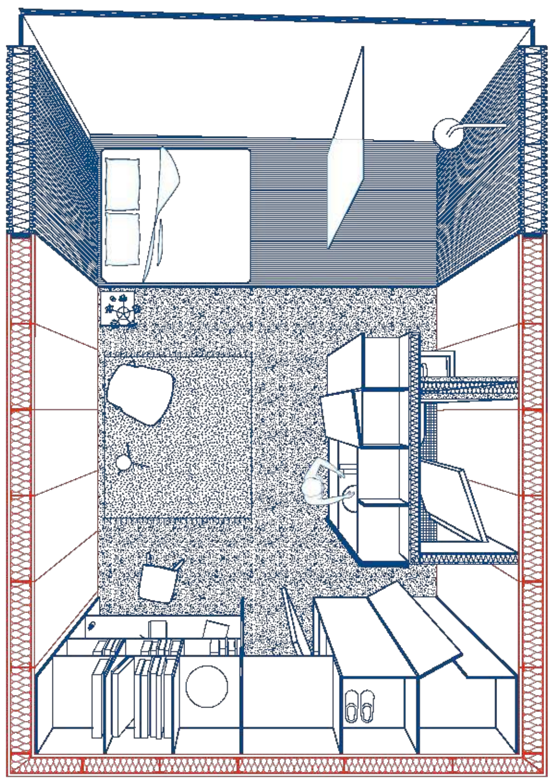
Permanent
Family Visit
Tourist [Double]
Staff

ACCOMODATION FOR 130 - 173 PEOPLE MAX

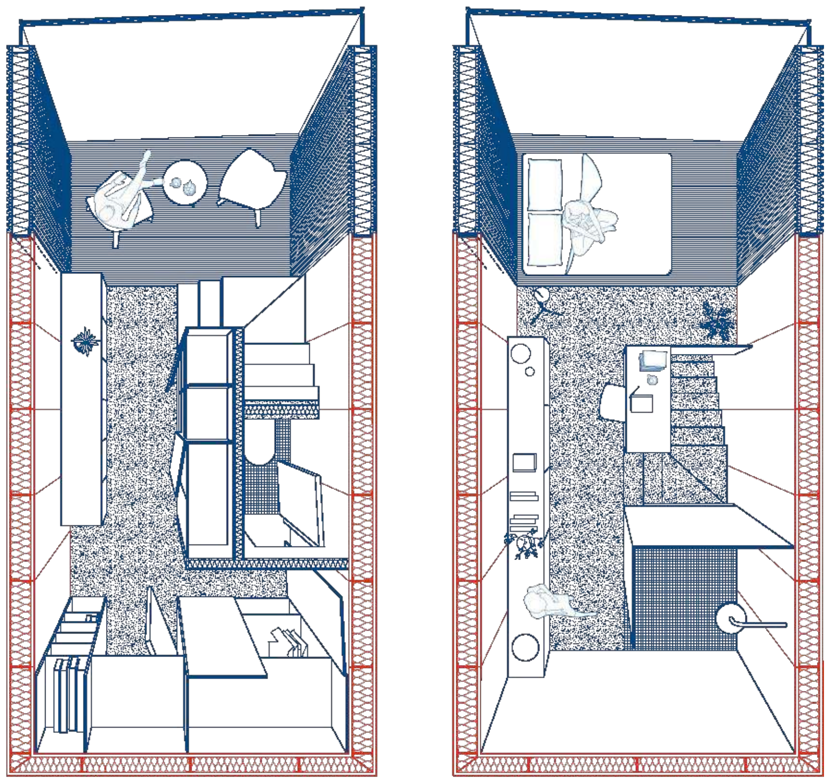




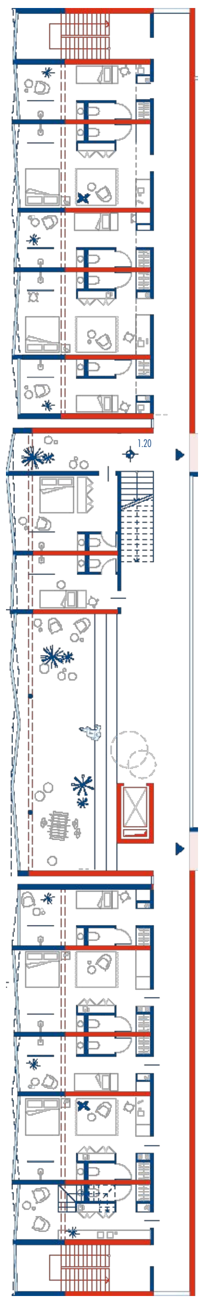
Single Unit



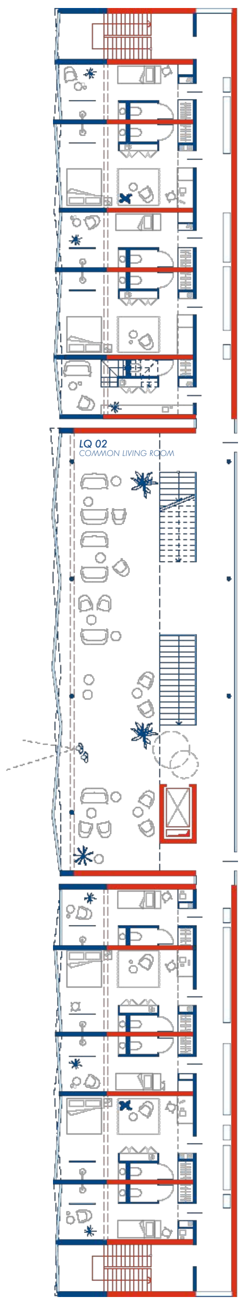
Double Unit



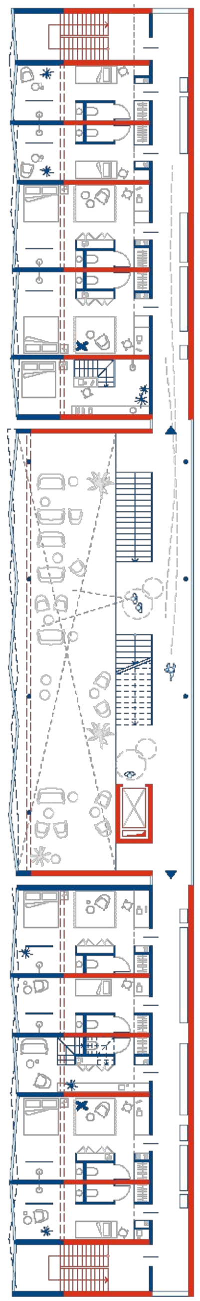
Duplex



1st Floor

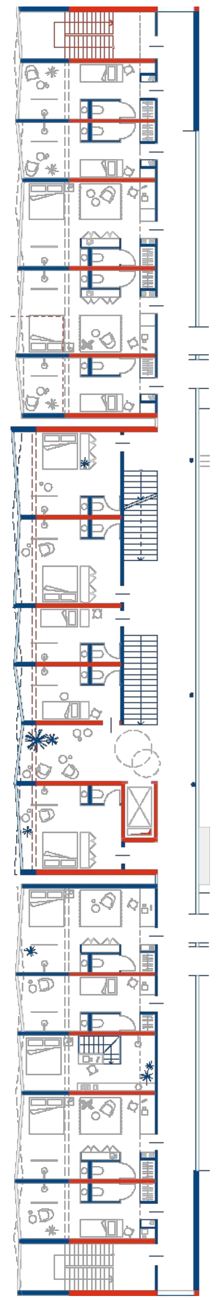


4th Floor

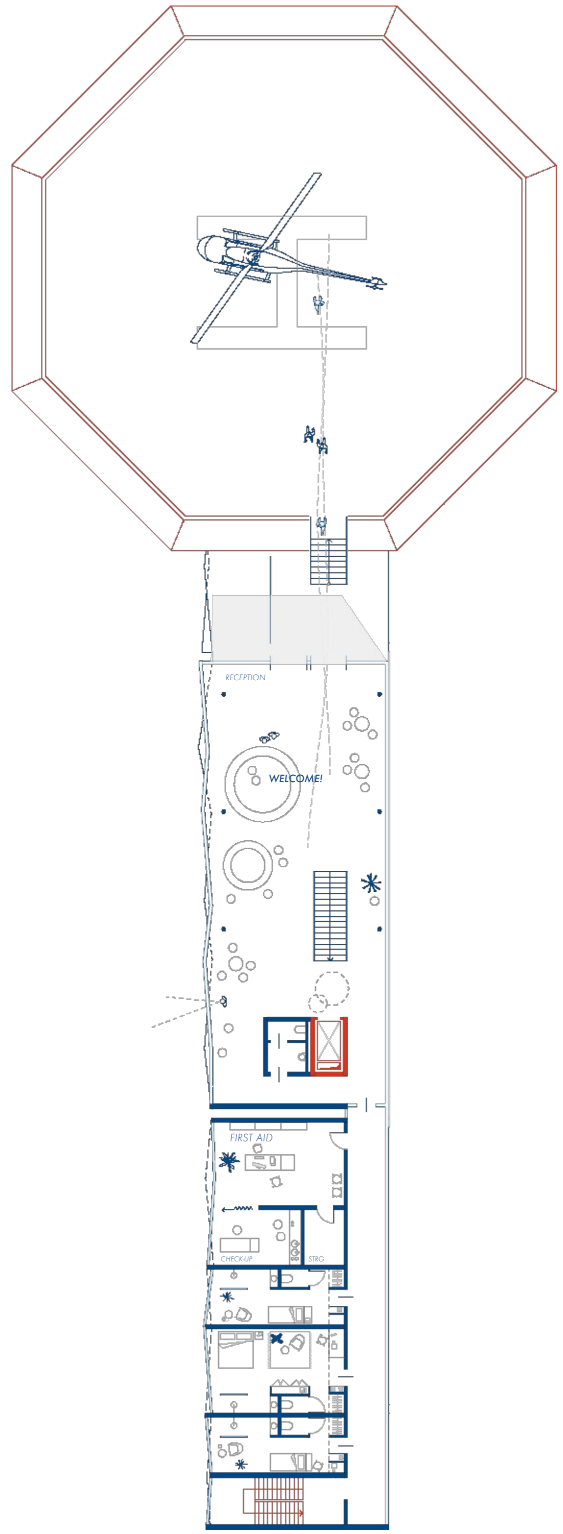


5th Floor

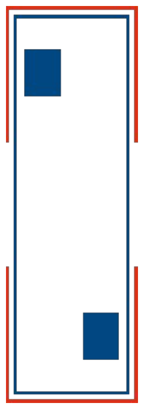
10



Standart Floor Plan



9th Floor

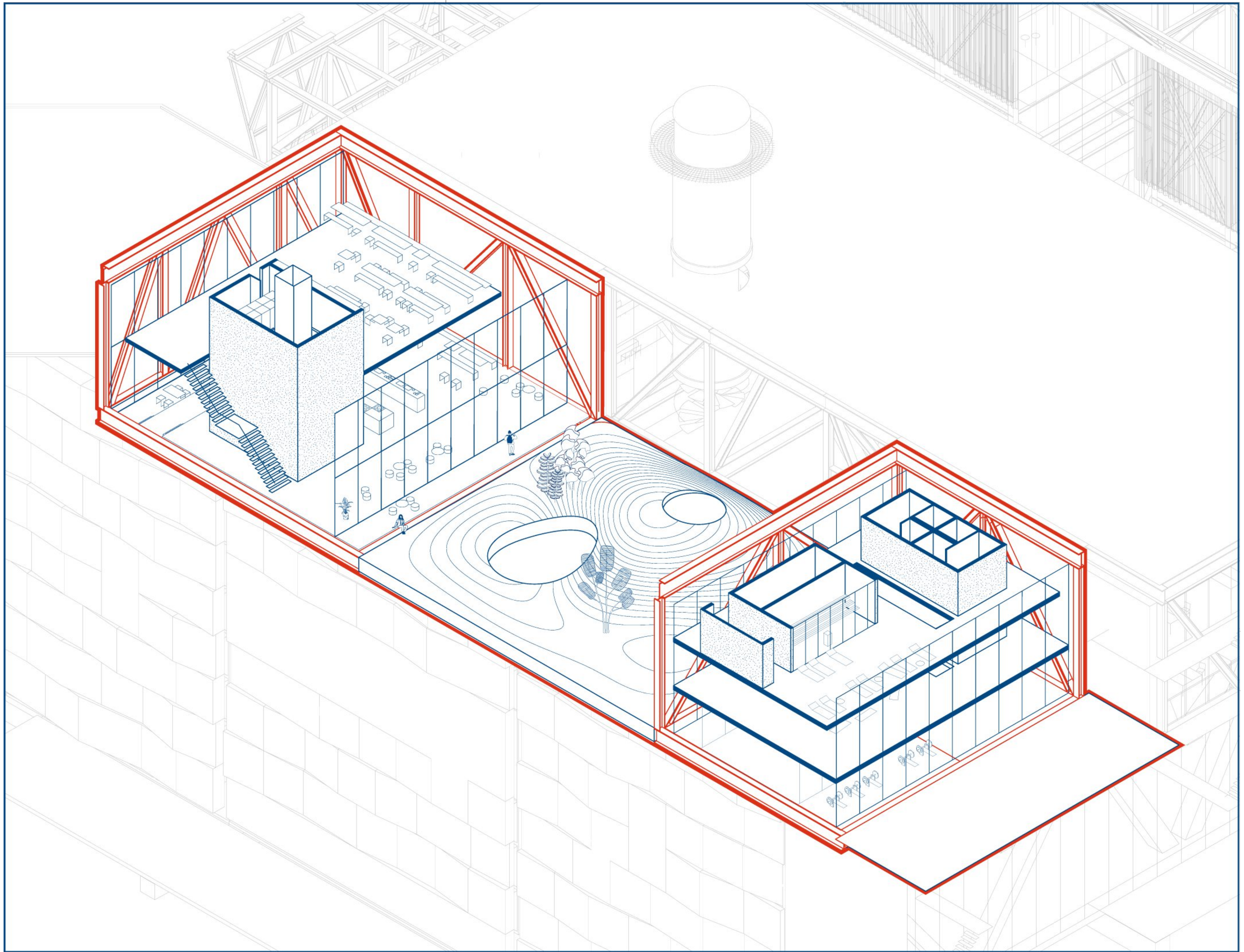


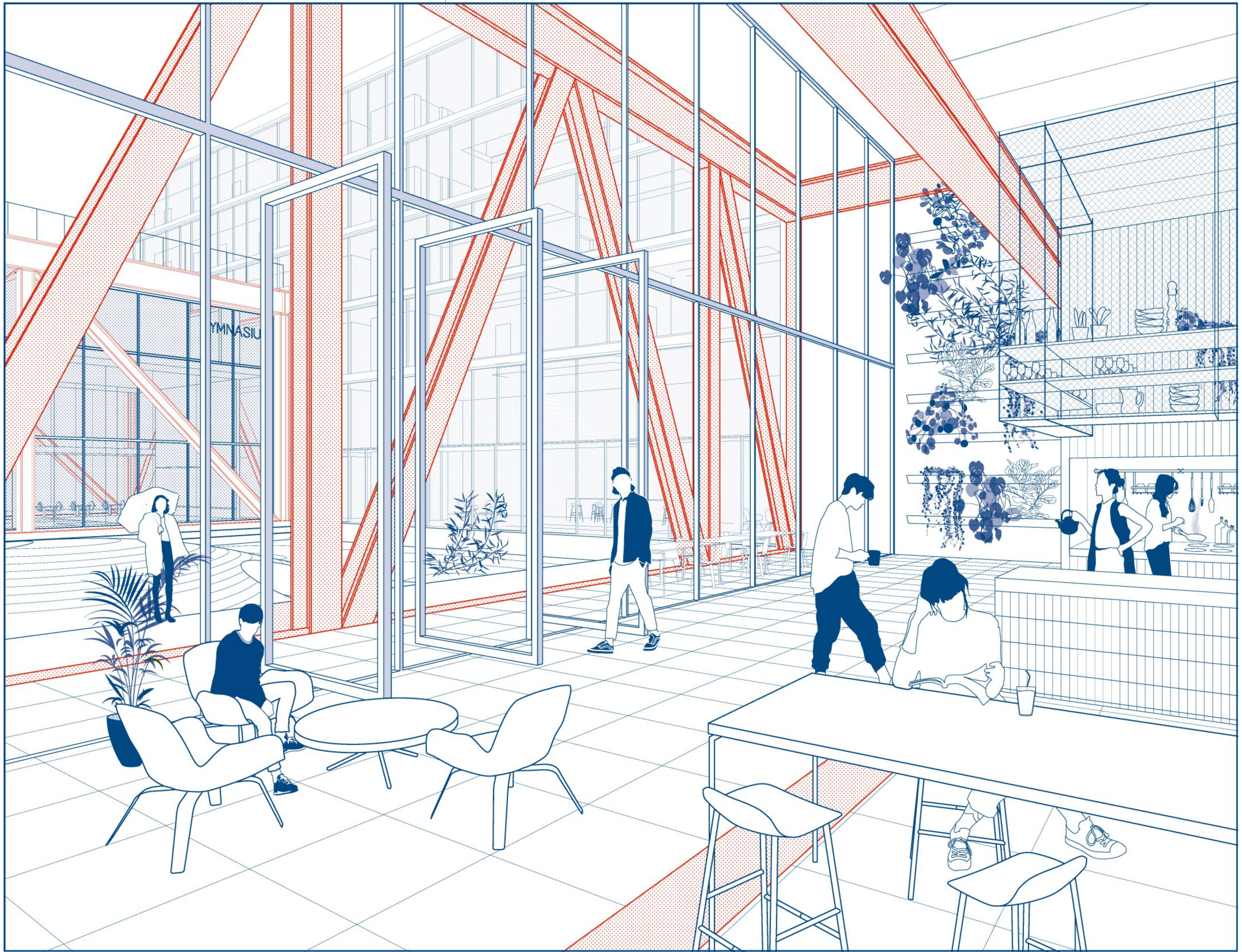
Recreation & Canteen

The modules oriented towards the North and the ones oriented towards South are considered as almost identical pairs. By removing the central located 'disruptive' module LQ 04, the two remaining opposite modules can communicate again. They adopt in extended form the uses that were accommodated previously in the LQ04.

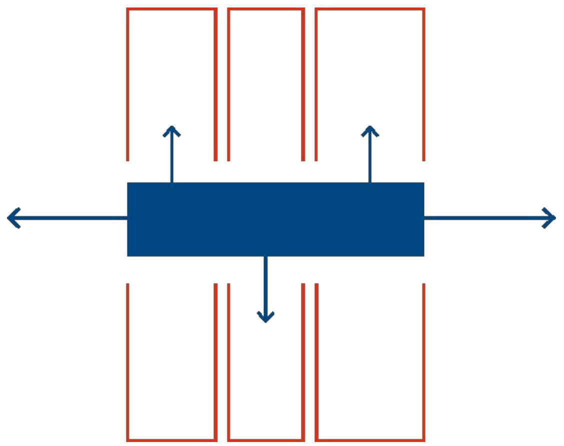
The two modules are used as a shell host into which a new function is inserted. The special and unique framework constructions are exposed and staged towards the inner courtyard. The materials used are inspired by the past in order to maintain the existing industrial atmosphere.

HOST : *Shell*
ACTION : *Passiv*
OPERATION : *Conversion, Addition*
REFERENCE : *Framework*





CANTEEN
Module Deck | 3rd Floor

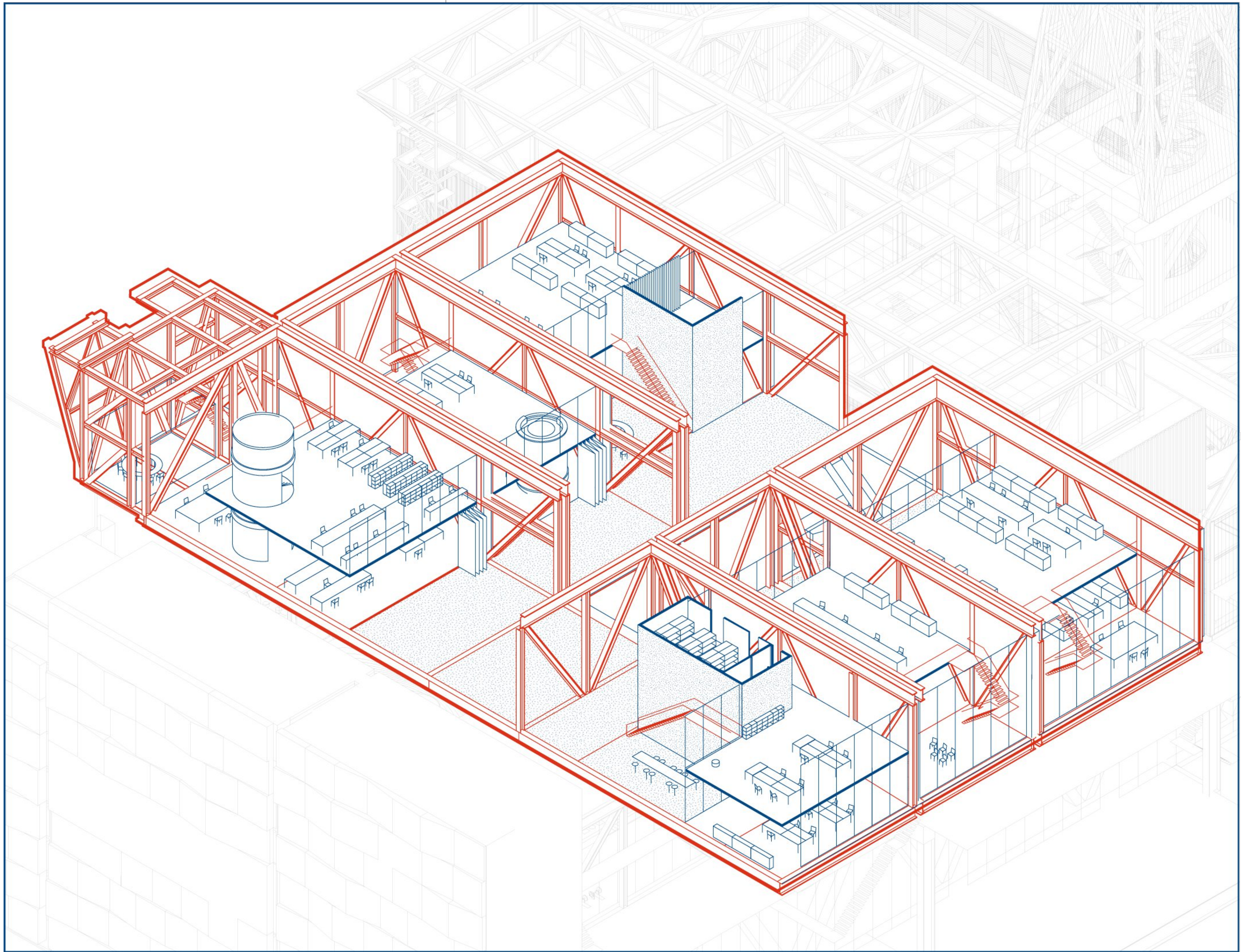


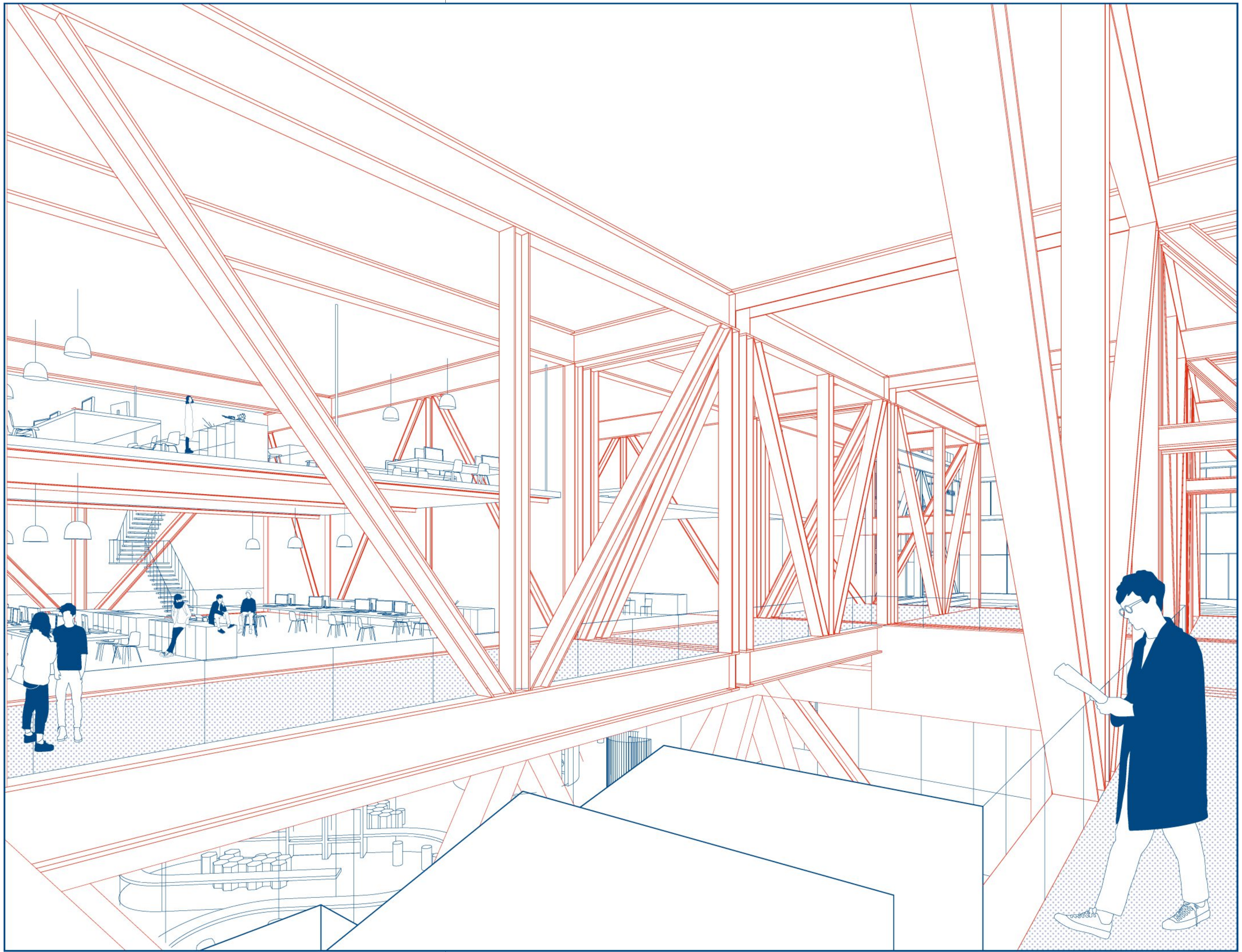
Office

The intervention of removal can be understood as an act of clearence. By dismantling two modules from the inner center of the platform, a new space is created that can be used to explore the remaining six modules. Only the subtraction makes the existing legible in a clearly legible form. The remaining modules become readable as such.

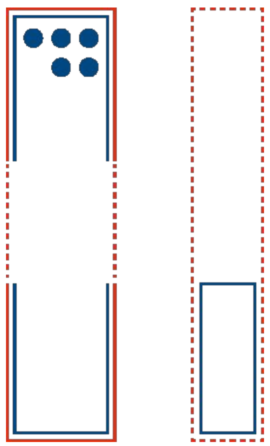
Once shells for compressors and machines, they become constructed architecture through subtle interventions of alteration. In doing so, it is crucial to maintain the original heights, developed for plants, not to deny the original use.

HOST	*Entity*
ACTION	*Referential*
OPERATION	*Conversion, Addition*
REFERENCE	*Modularity, Framework*





ATRIUM SPACE
Module Deck | 1st Floor



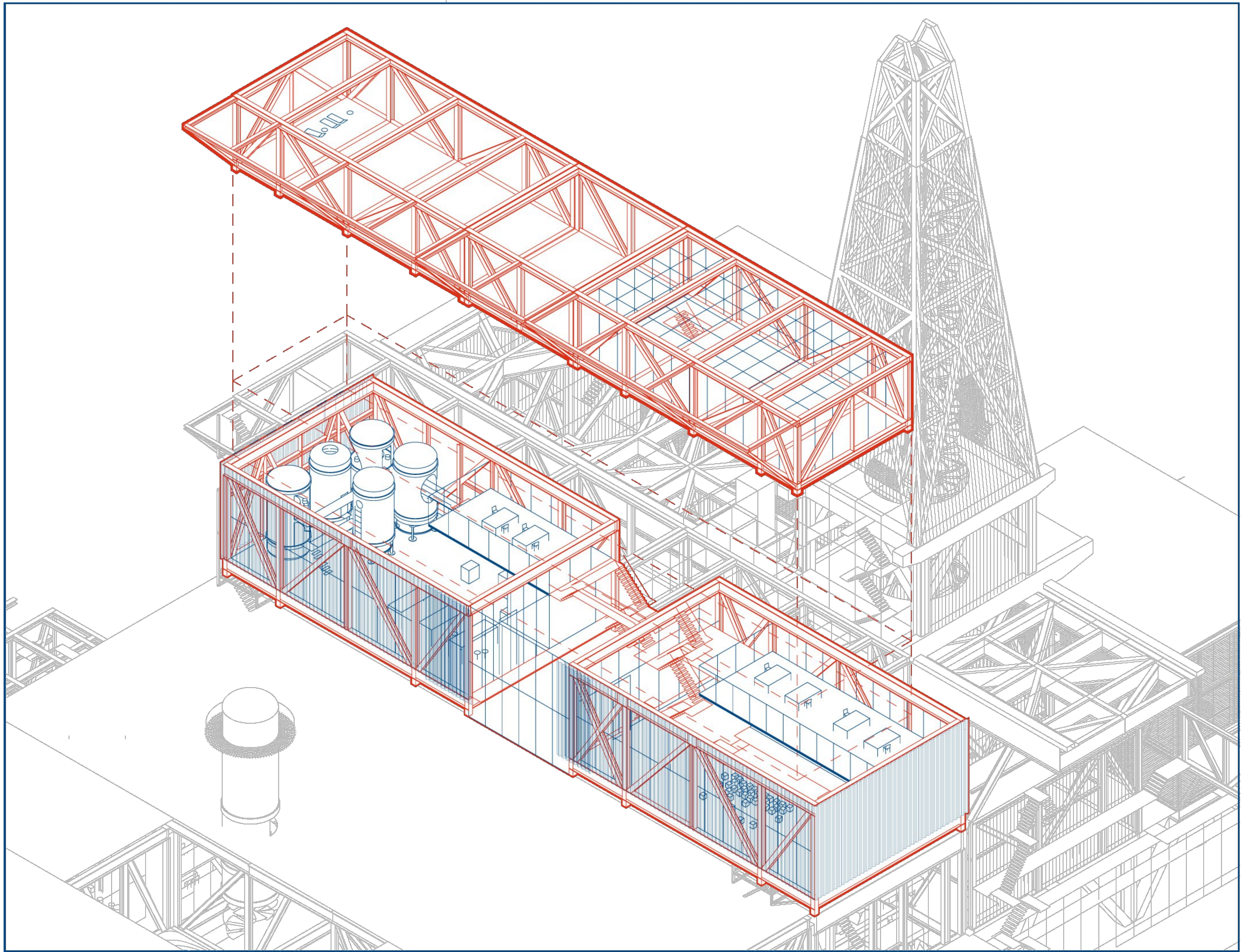
Artists' Space

The existing structure of the Artist room is adapted and creatively reused in a variety of ways. The former cementing unit will be completely preserved, only the machines have to be removed in order to make space for a workshop and a stage.

The complex staircase will be preserved as a relic from the past and extended with a connecting level. The former cement tanks, which present a crucial feature for the preservation of atmosphere, will be maintained and further converted into individual workstations. These relikes tell of the past and at the same time allow a new use.

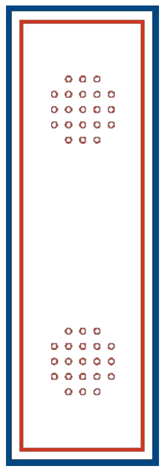
The topmost module stages the emptiness. At this point of the platform there is vast space for interpretation. Nowhere else does the absurdity of this place and the connection to the past become clearer.

HOST *Shell*
ACTION *Referential*
OPERATION *Addition, Substraction, Conversion*
REFERENCE *Program, Modularity*



ART IS THE NEW OIL !

ART SPACE
Weather Deack | 6th Floor



Objet Trouvé

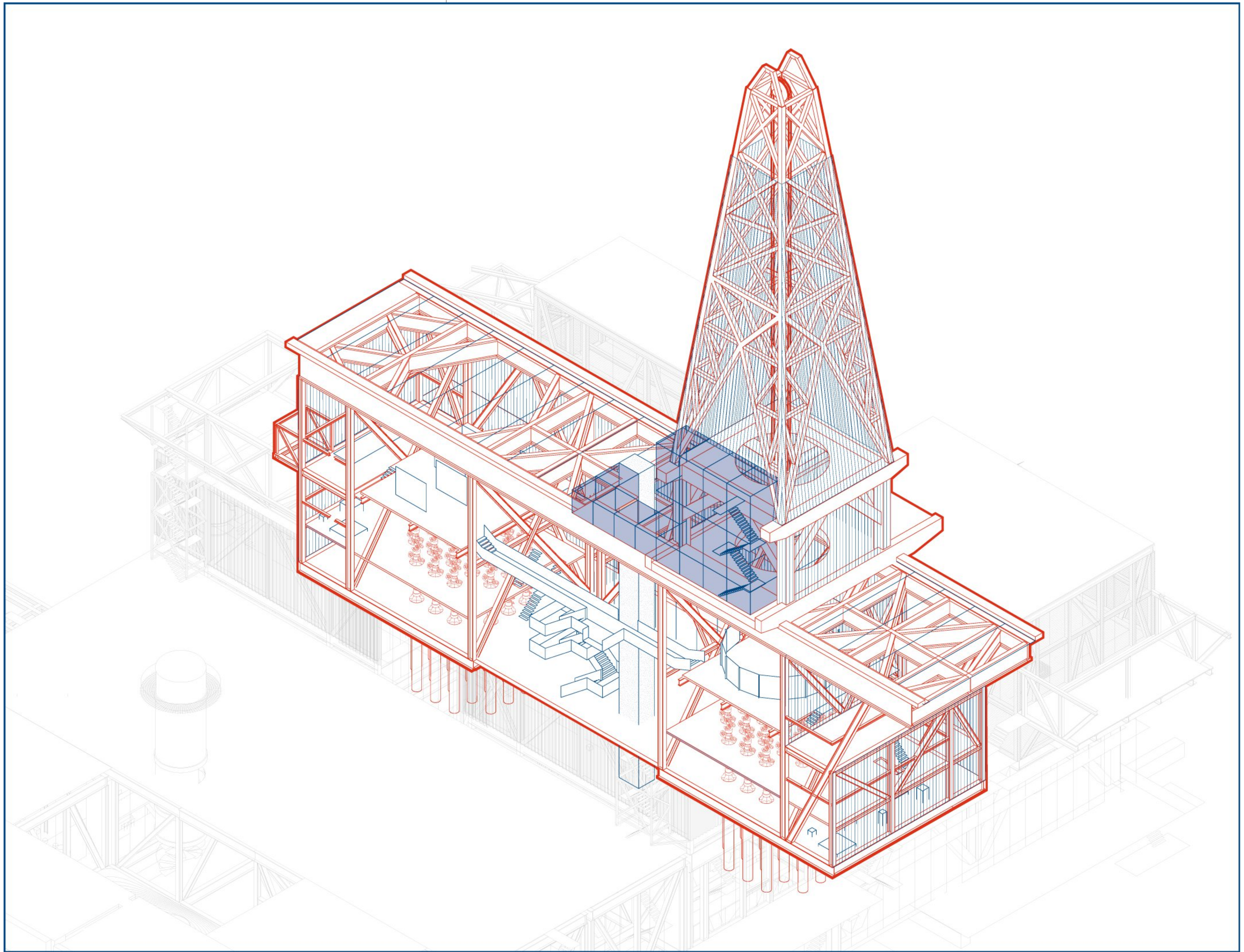
Visitor Center

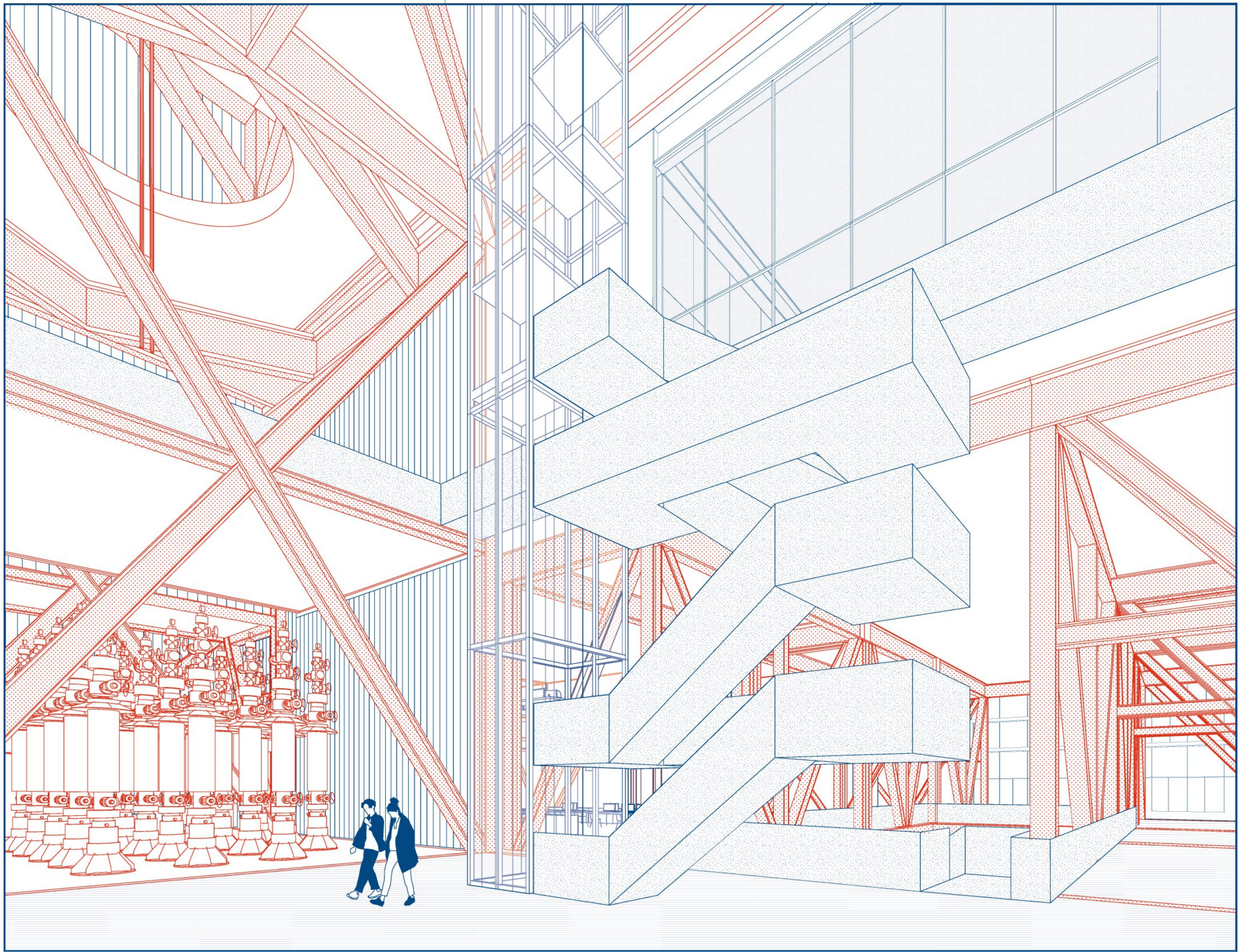
The former Drilling Tower Unit as most significant space within the structure, will be treated as objet trouvé and reframed as visitor center.

Only the connecting intermediate level is dismantled and replaced by a free-floating bridge. The substraction is necessary to provide sight of the northern and southern drilling rigs and to emphasize the enormous heights of the structure.
The materials and forms of the past inspire the addition of a new main stair in the center of the former drilling tower, which provides a connection through material and time to the future.

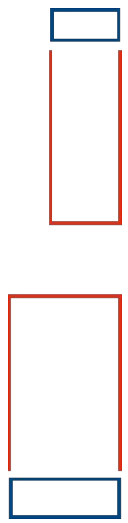
The preservation happens completely free of form, by the mere staging of the found through lighting und guidance. The aim is to create multiple readings within the built environment and to leave space for interpretations.

HOST : *Entity*
ACTION : *Performative, Referential*
OPERATION : *Substraction, Addition*
REFERENCE : *Program,Engineering Achievement*





VISITOR CENTER
Module Deck | 1st Floor

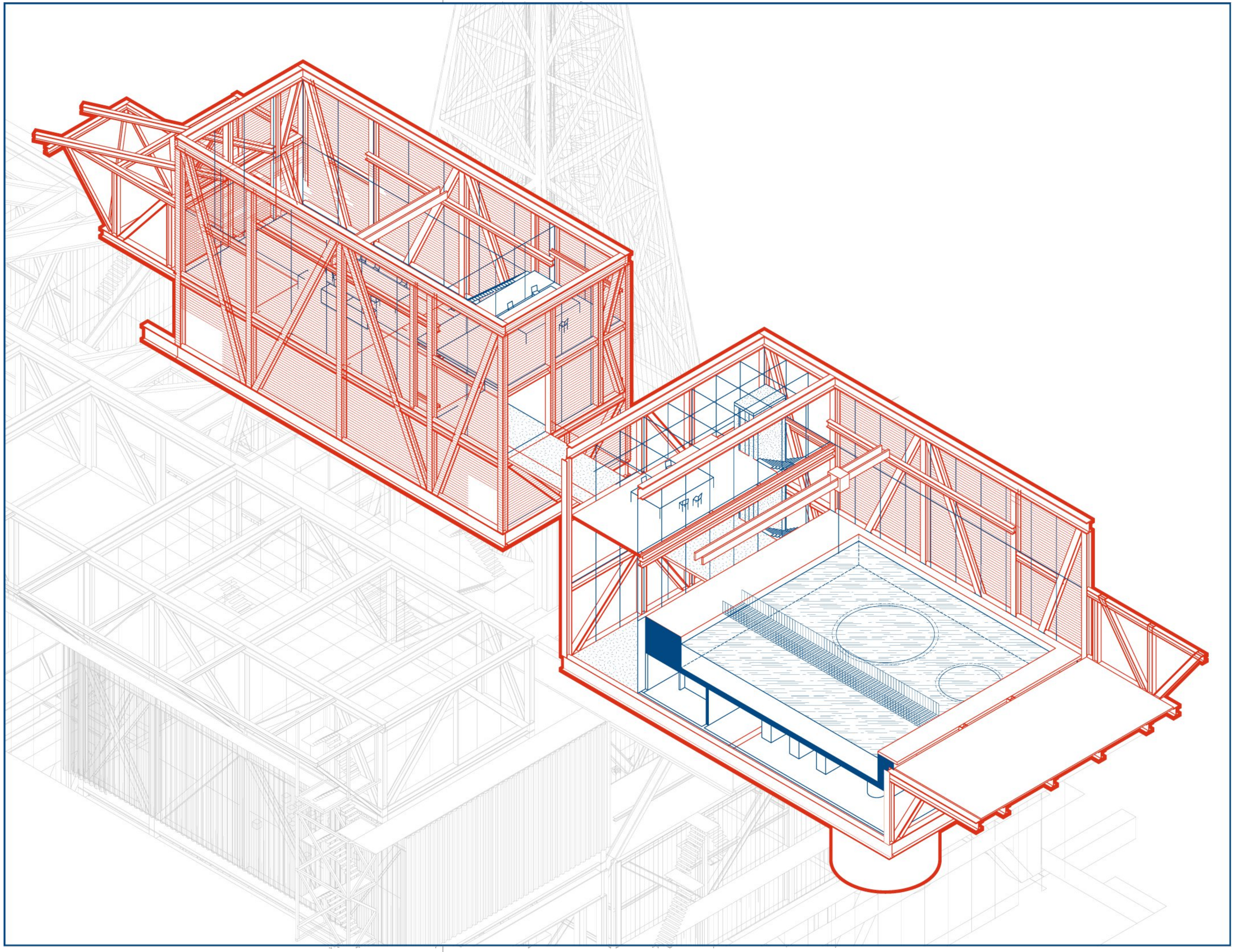


Diving Facility

While the previous design seems to be almost exclusively oriented towards the inside, the remaining two modules do the opposite.

The focus of their design is the strong connection to the environment. The existing levels and thus the generous air spaces are retained and the sea is staged in the form of a glass cube towards the north, and further by removing the existing facade facing the south. The architecture becomes a kind of theatre that creates space for the staging. However, it is not the architecture that is spectacular, but the framed views it provides.

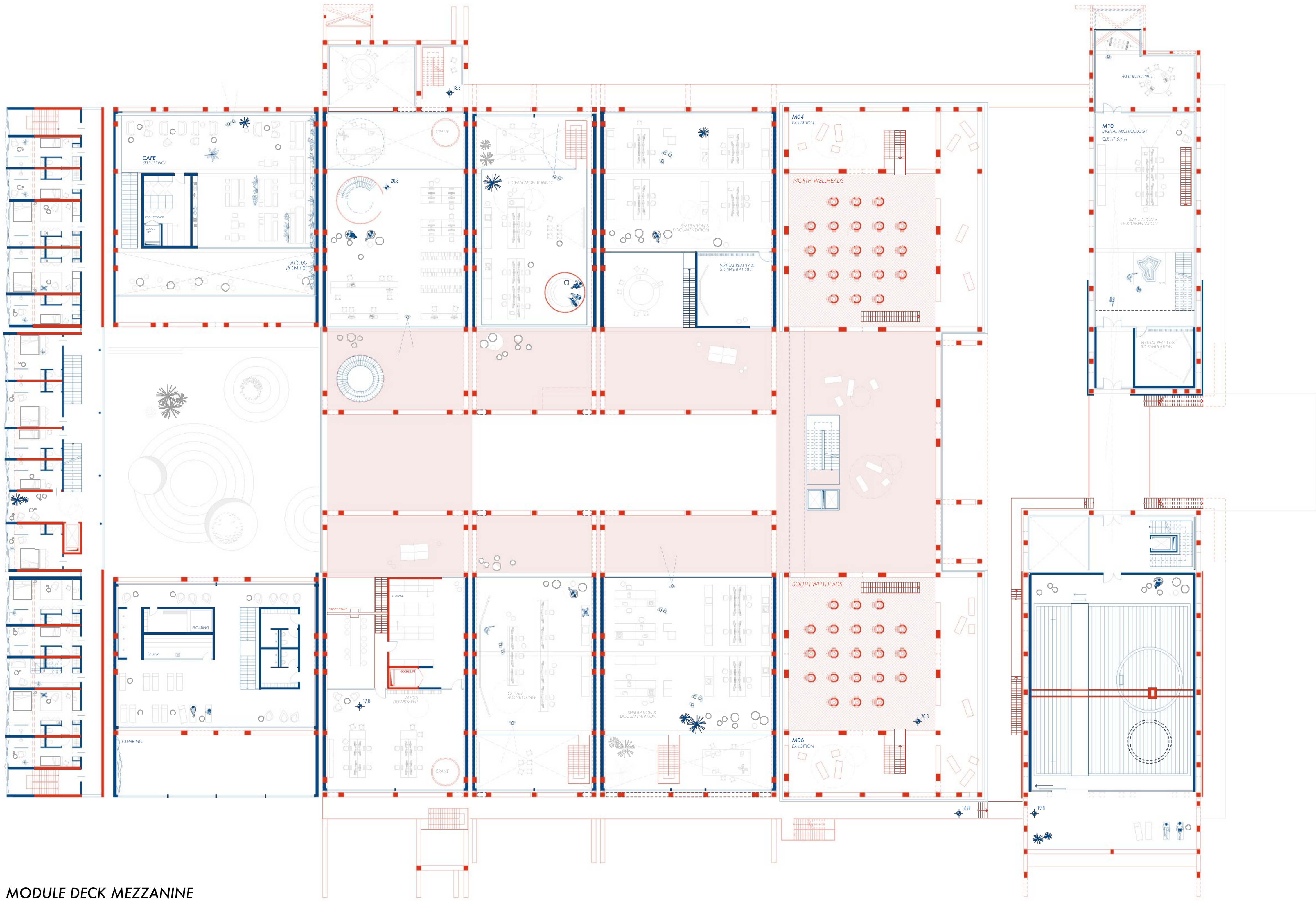
HOST : *Entity*
ACTION : *Referential*
OPERATION : *Substraction. Conversion*
REFERENCE : *Environment*



MODULE DECK

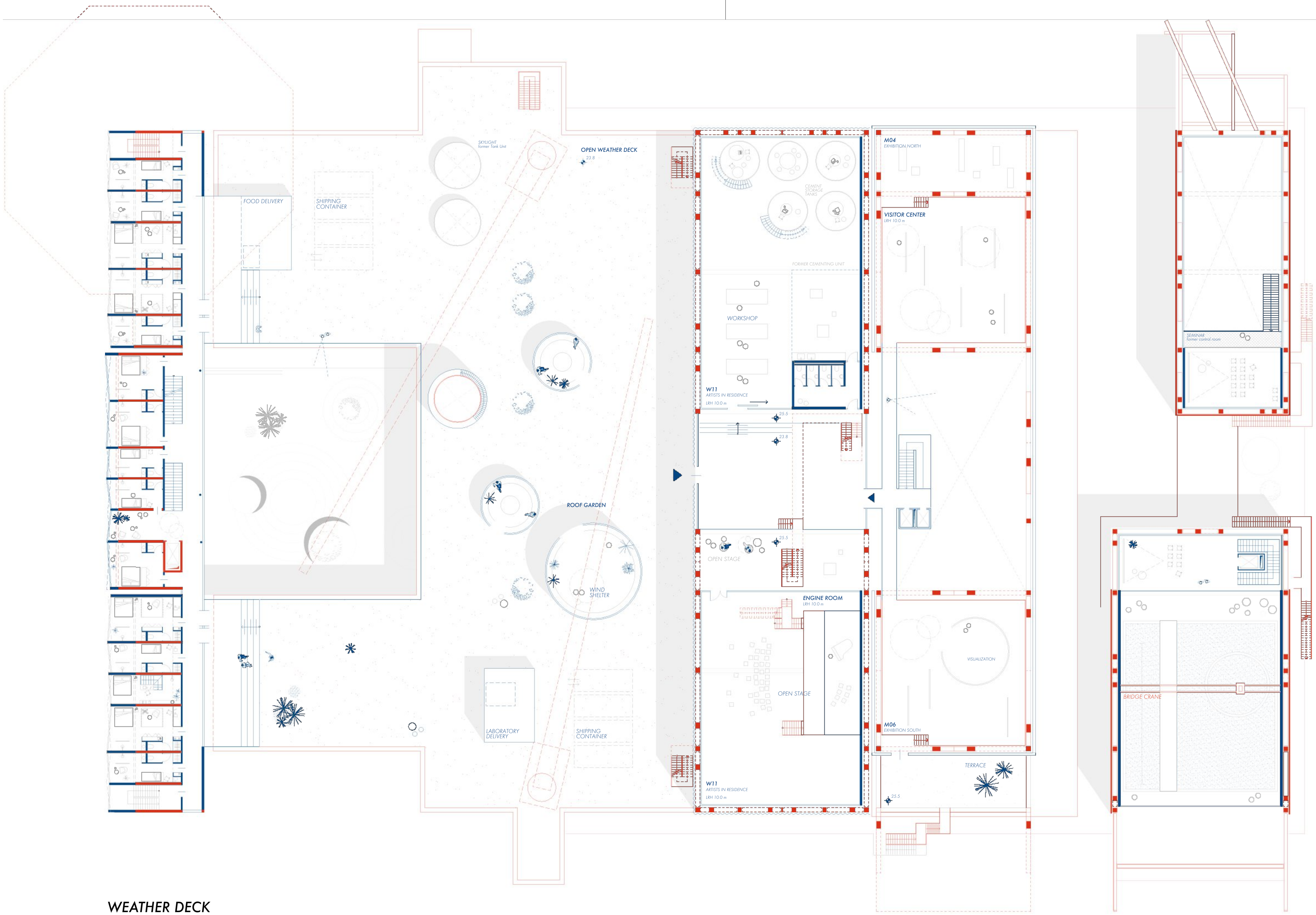
3rd Floor

10



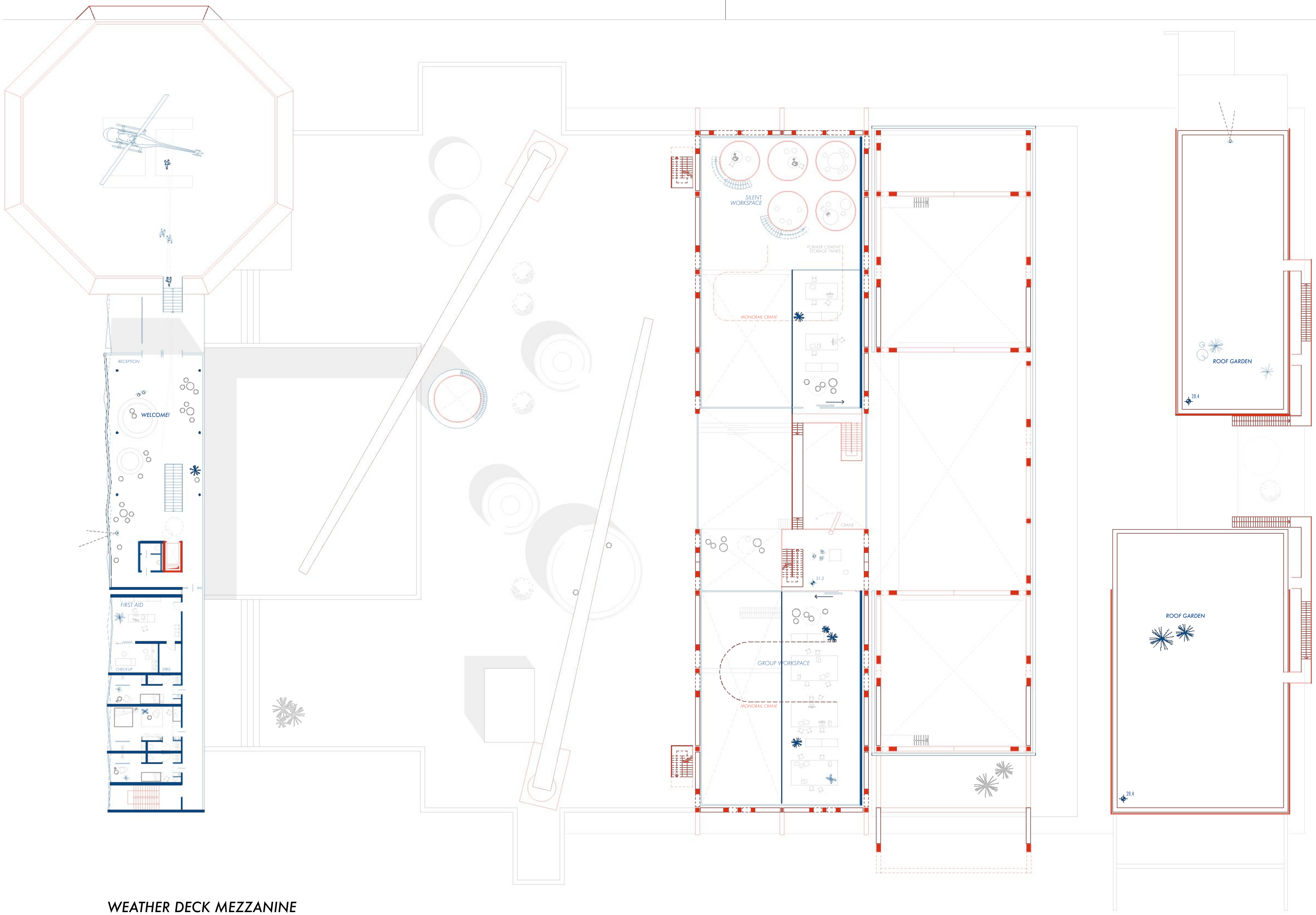
MODULE DECK MEZZANINE
4th Floor

10



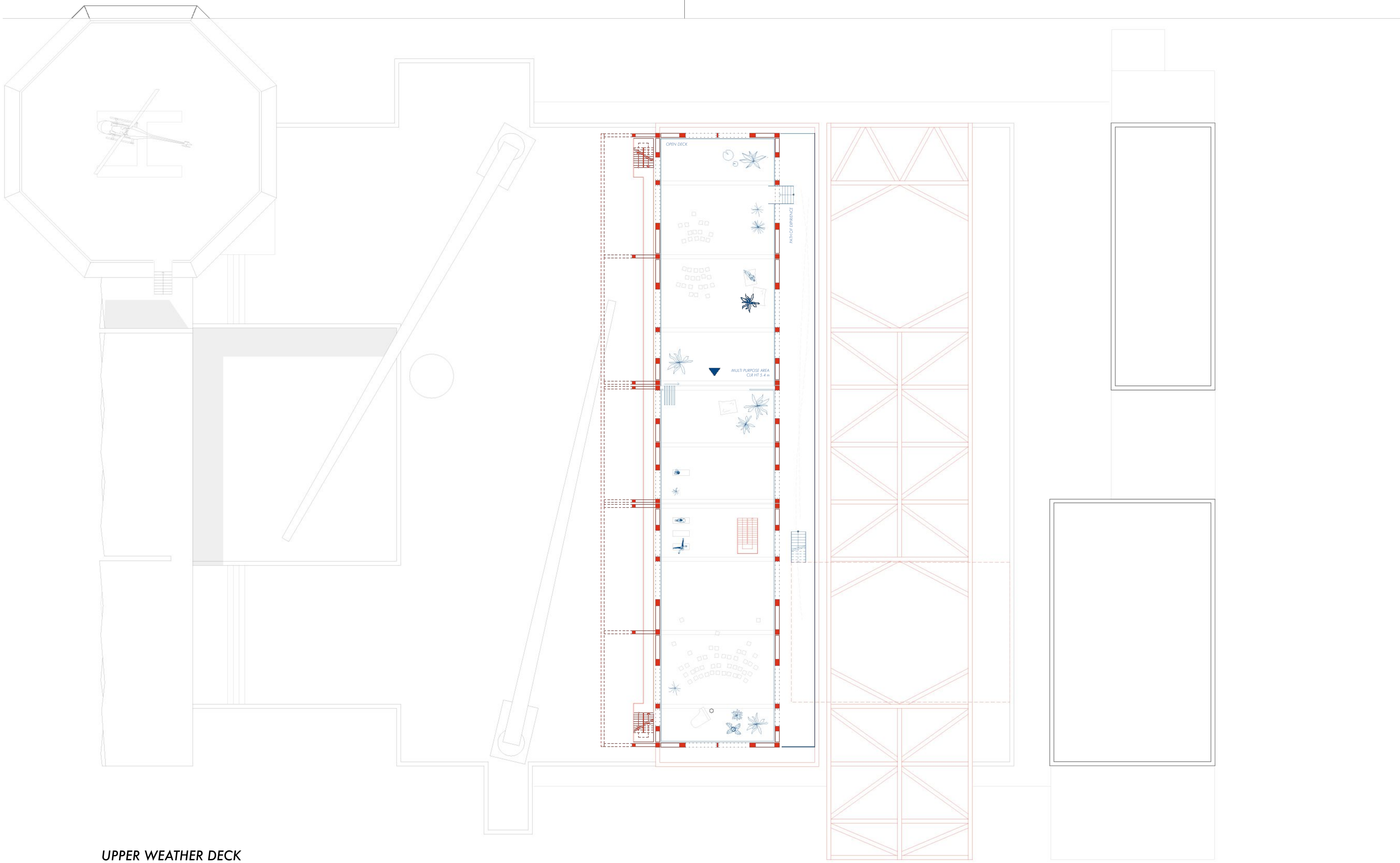
WEATHER DECK
5th Floor

10



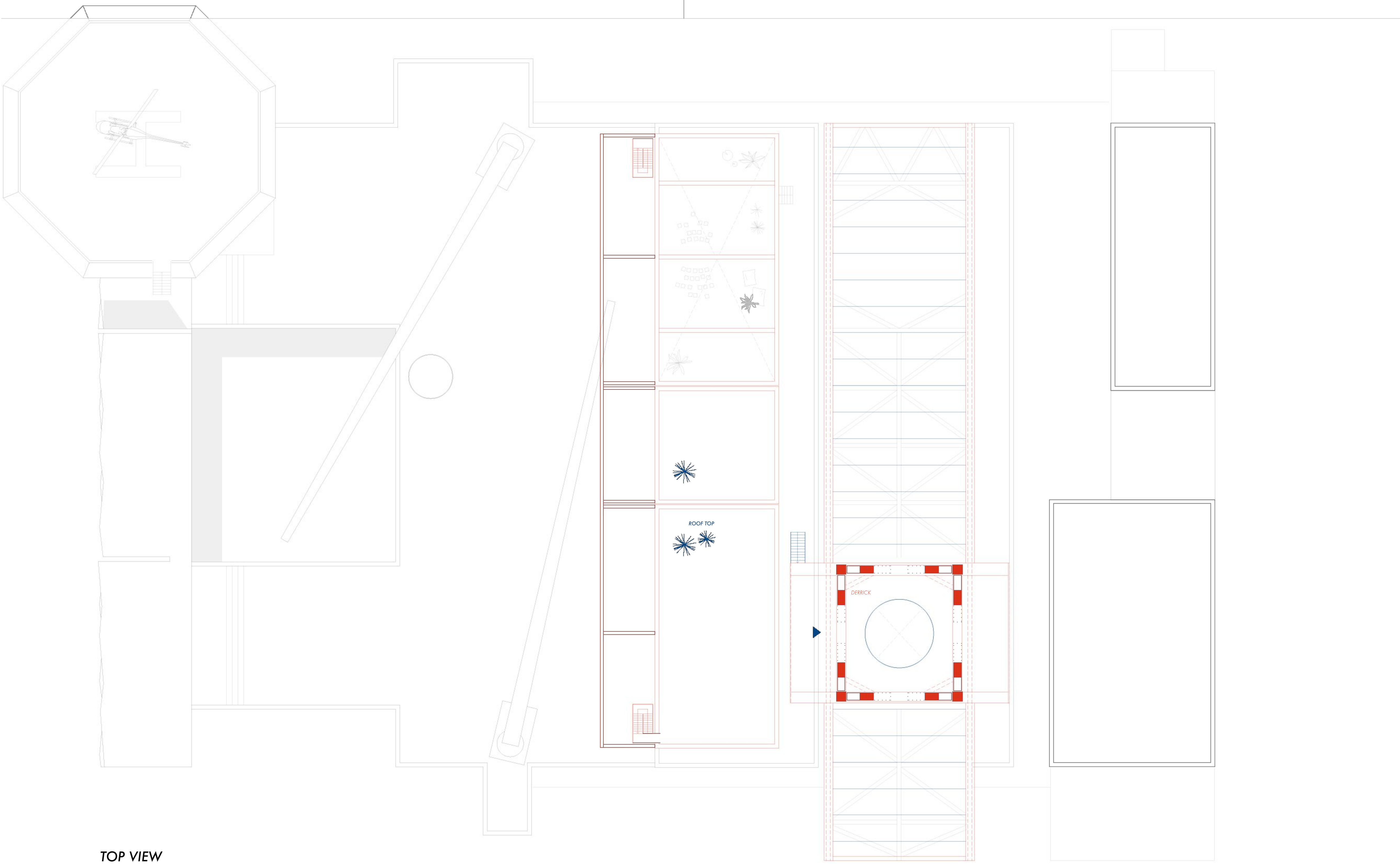
WEATHER DECK MEZZANINE
6th Floor

10



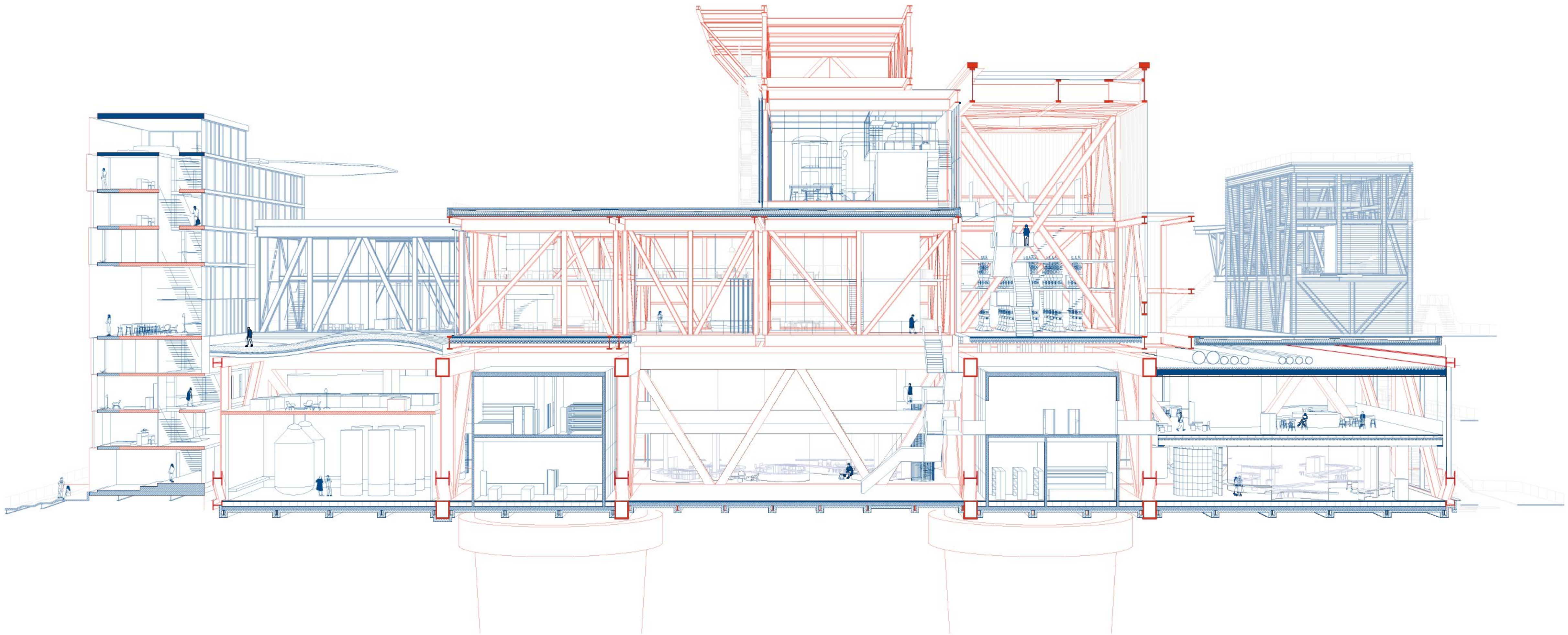
UPPER WEATHER DECK
7th Floor

10



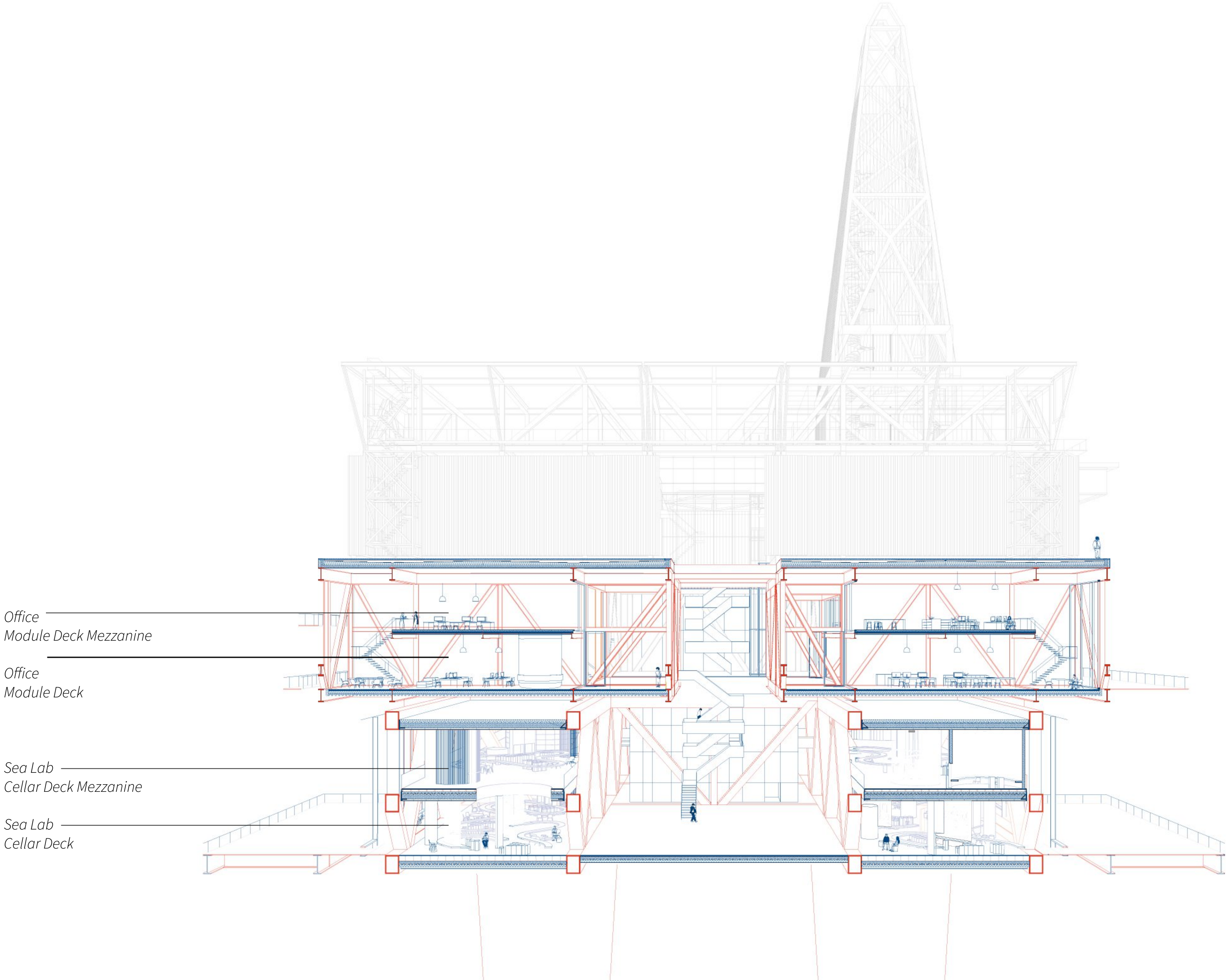
TOP VIEW
8th Floor

10



LONG SECTION
North View

10

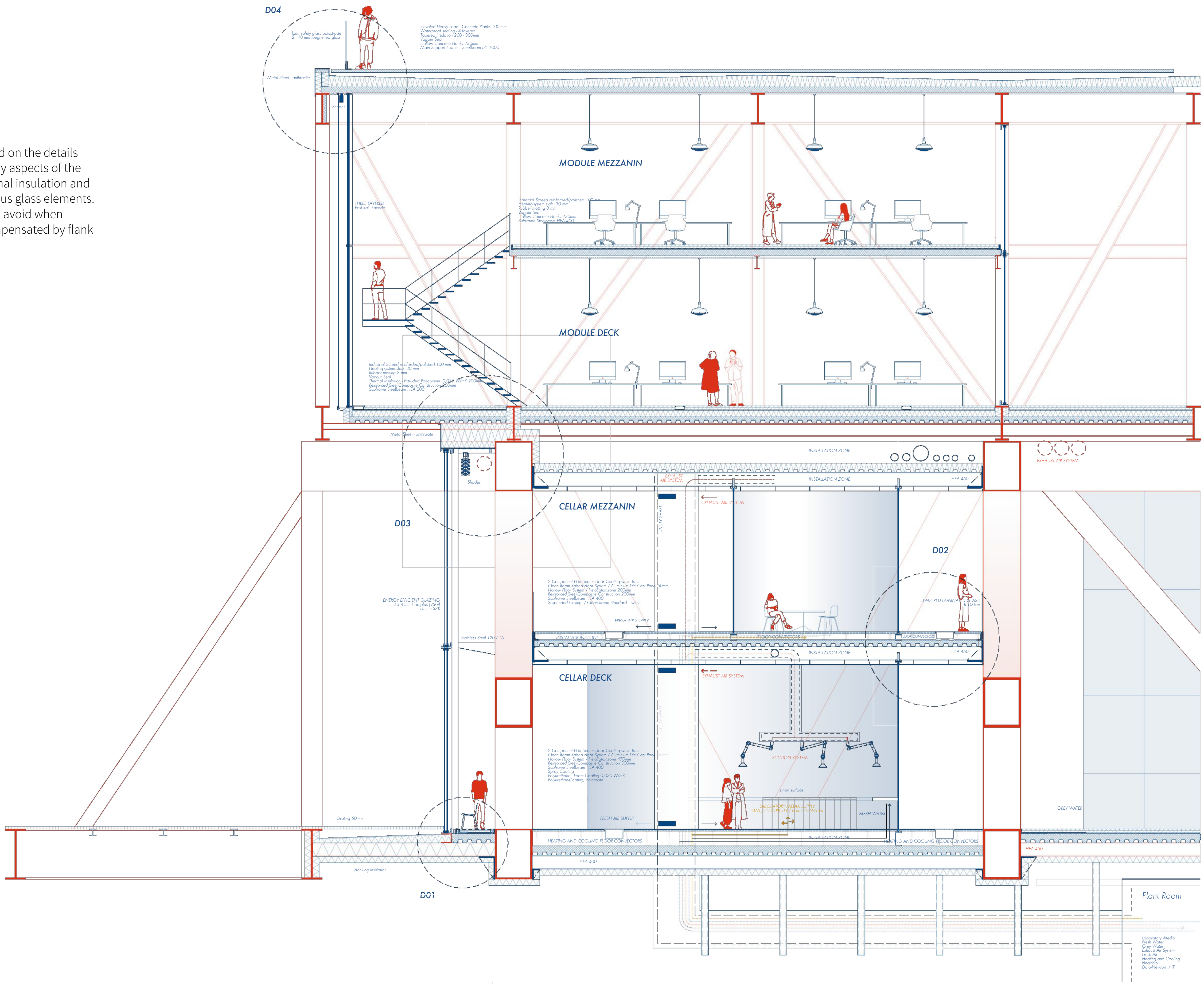


CROSS SECTION
East View

10

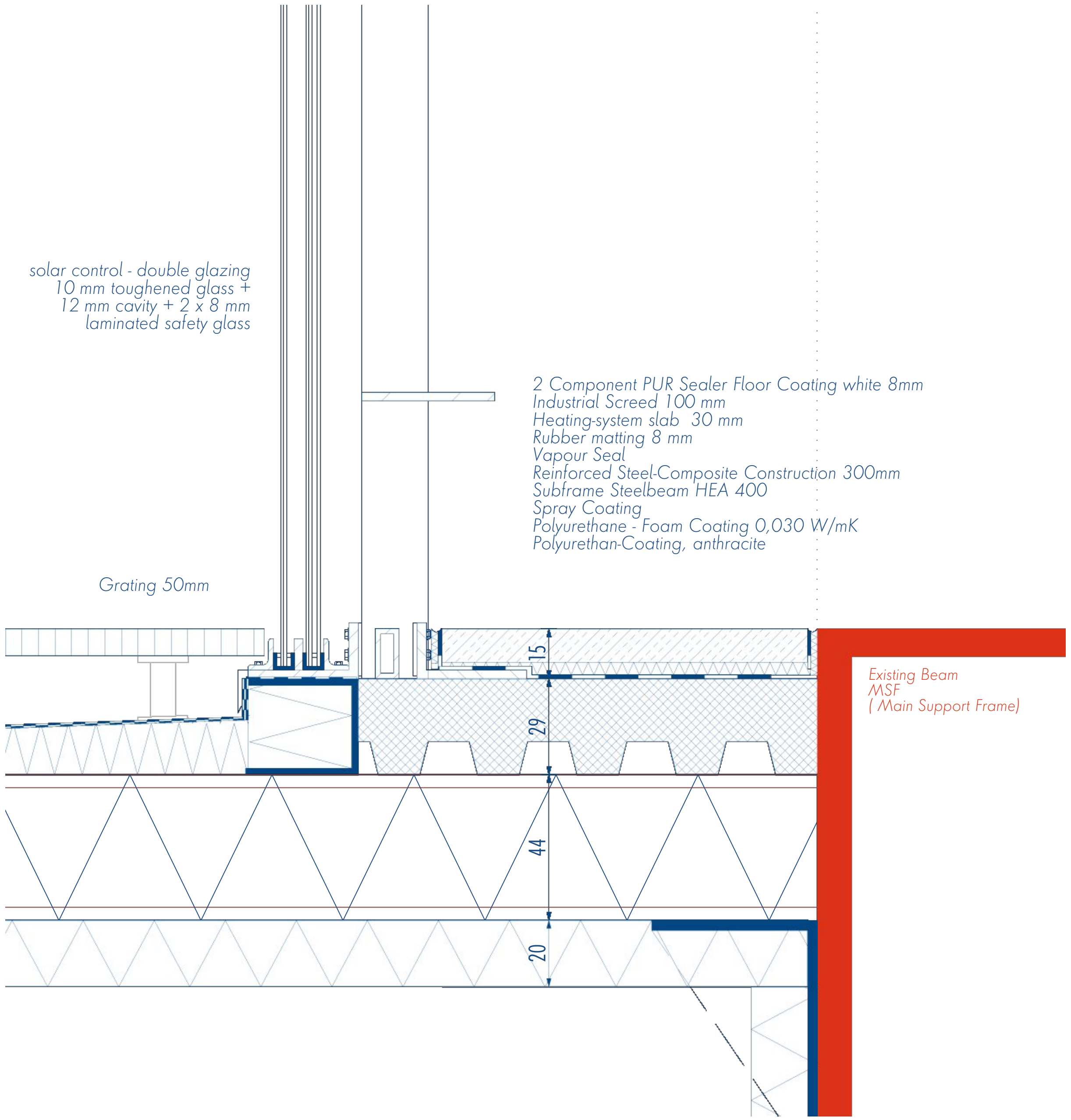
Construction

The design and choice of material is based on the details found in engineering construction. The key aspects of the conversion of Statfjord B are mainly thermal insulation and the opening of the facade through generous glass elements. The thermal bridges, which are difficult to avoid when converting steel structures, are being compensated by flank insulation.

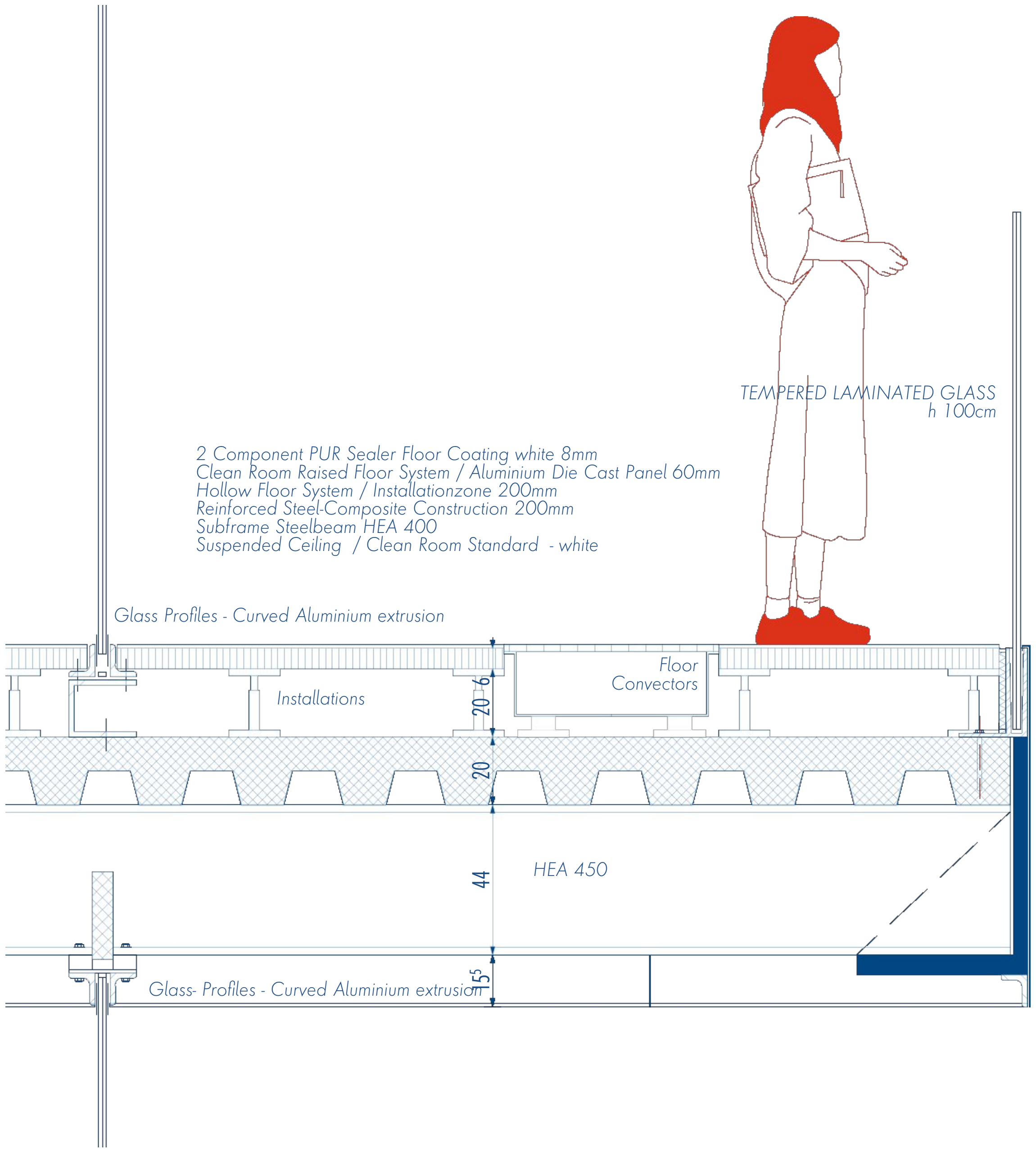


FACADE CROSS SECTION
Laboratory | Office

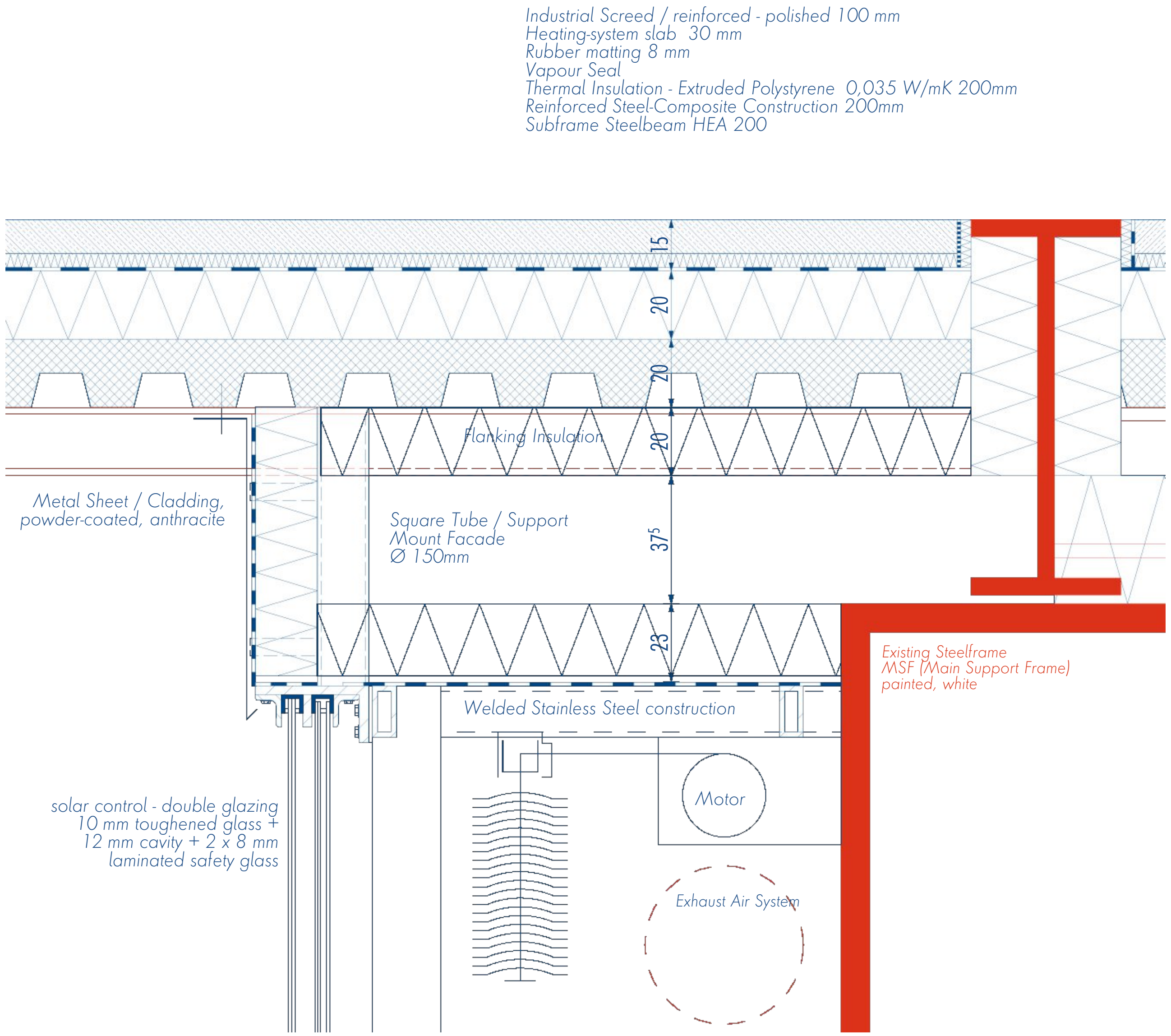
2



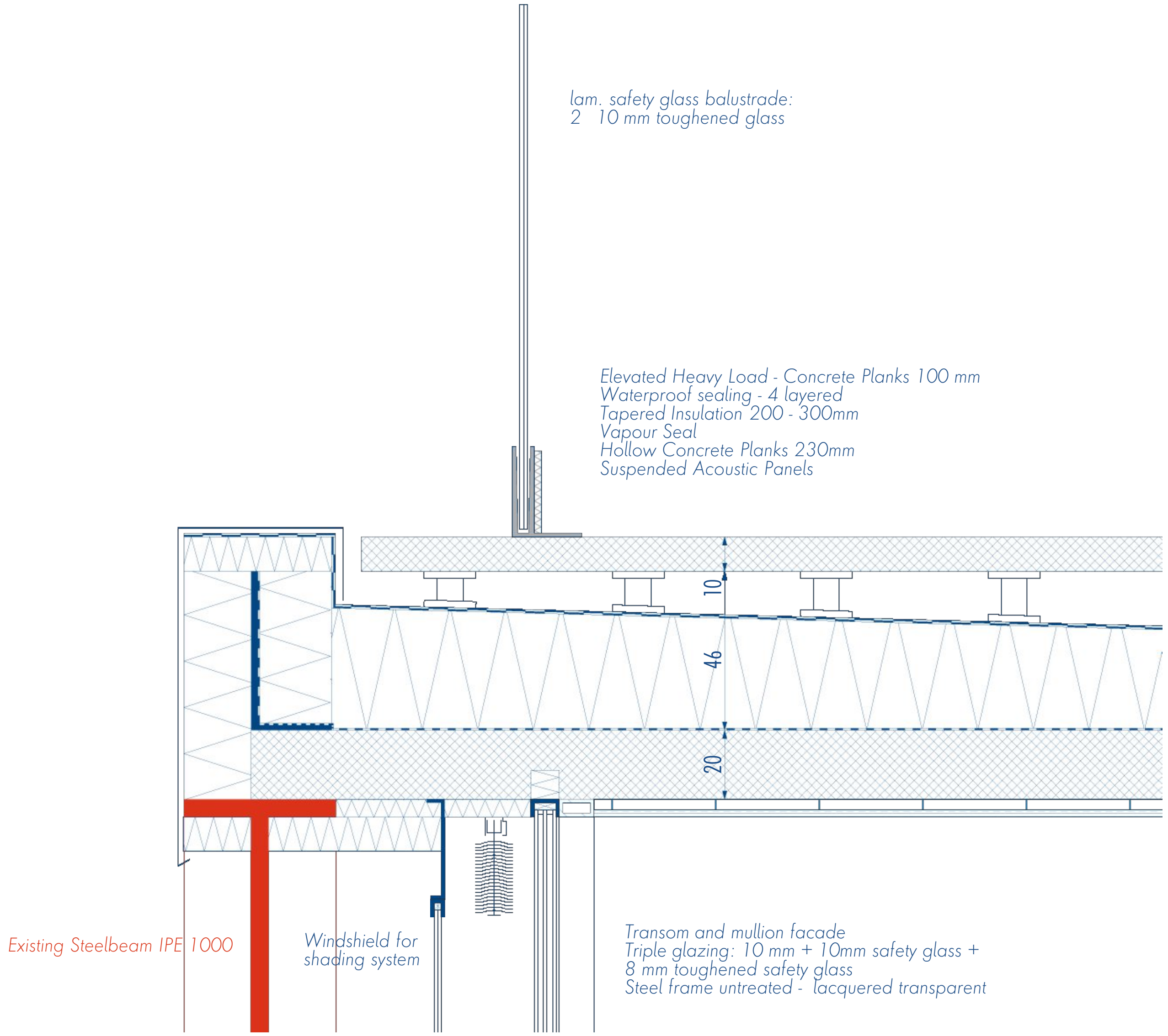
DETAIL : D1
M20



DETAIL : D2
M20

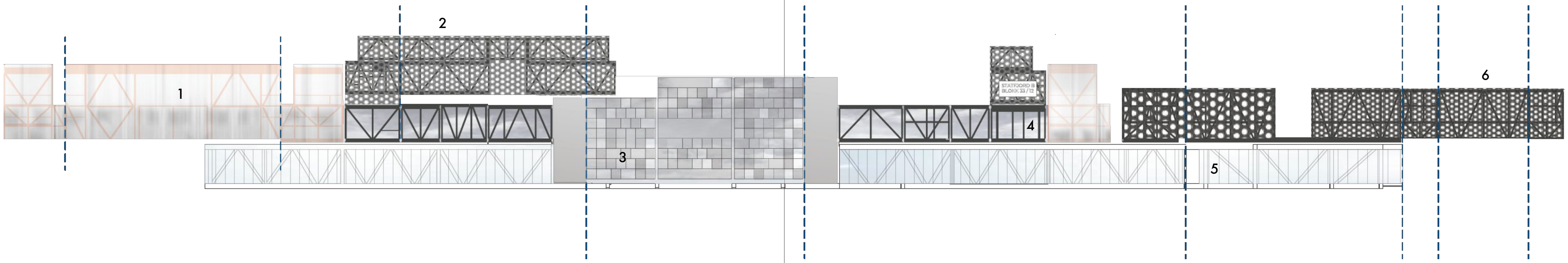


DETAIL : D3
M20



DETAIL : D4
M20

Materiality



1 : VISITOR CENTER

Concept
Construction of Module M04, M06 and M12 is being preserved in original paint and with its original equipment

Facade
A translucent skin is wrapped around the existing structure

Material
Polycarbonate Multiskin Sheets

2 : ARTISTS SPACE

Concept
The former storage and manifold module is cleared of its technical equipment and open for adaption

Facade
Semitransparent Skin

Material
Corrugated and perforated Steel Panels 85% openings

3 : LIVING QUARTER

Concept
Existing living quarters are being transformed and added by new structures to maximise liveable areas

Facade
Generous glass openings framed by living units each tilted differently. Sea surface as reference

Material
Thermal Glazing with solar control

4 : OFFICE MODULES

Concept
Transparent boxes are marking the new inner live of the cleared module deck

Facade
Generous glass walls behind the existing steel structure

Material
Thermal glazing with solar control

5 : SEA LAB

Concept
Main Support Frame (MSF) cleared of all eqipment accomodating the marine science laboratory

Facade
Glazing wrapped around massive Structure

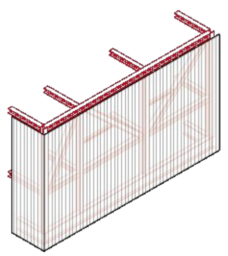
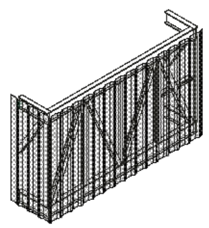
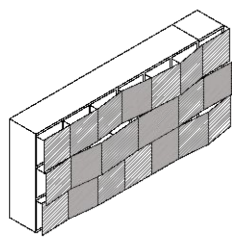
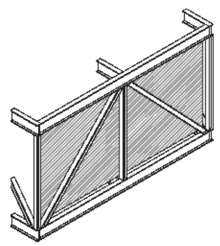
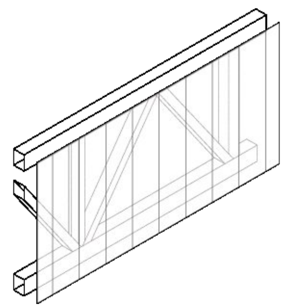
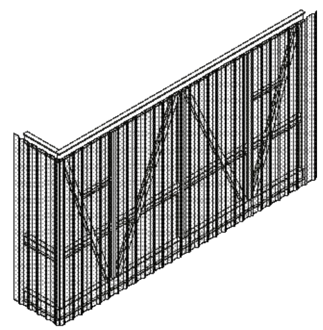
Material
Thermal glazing with solar control

6 : DIVING MODULES

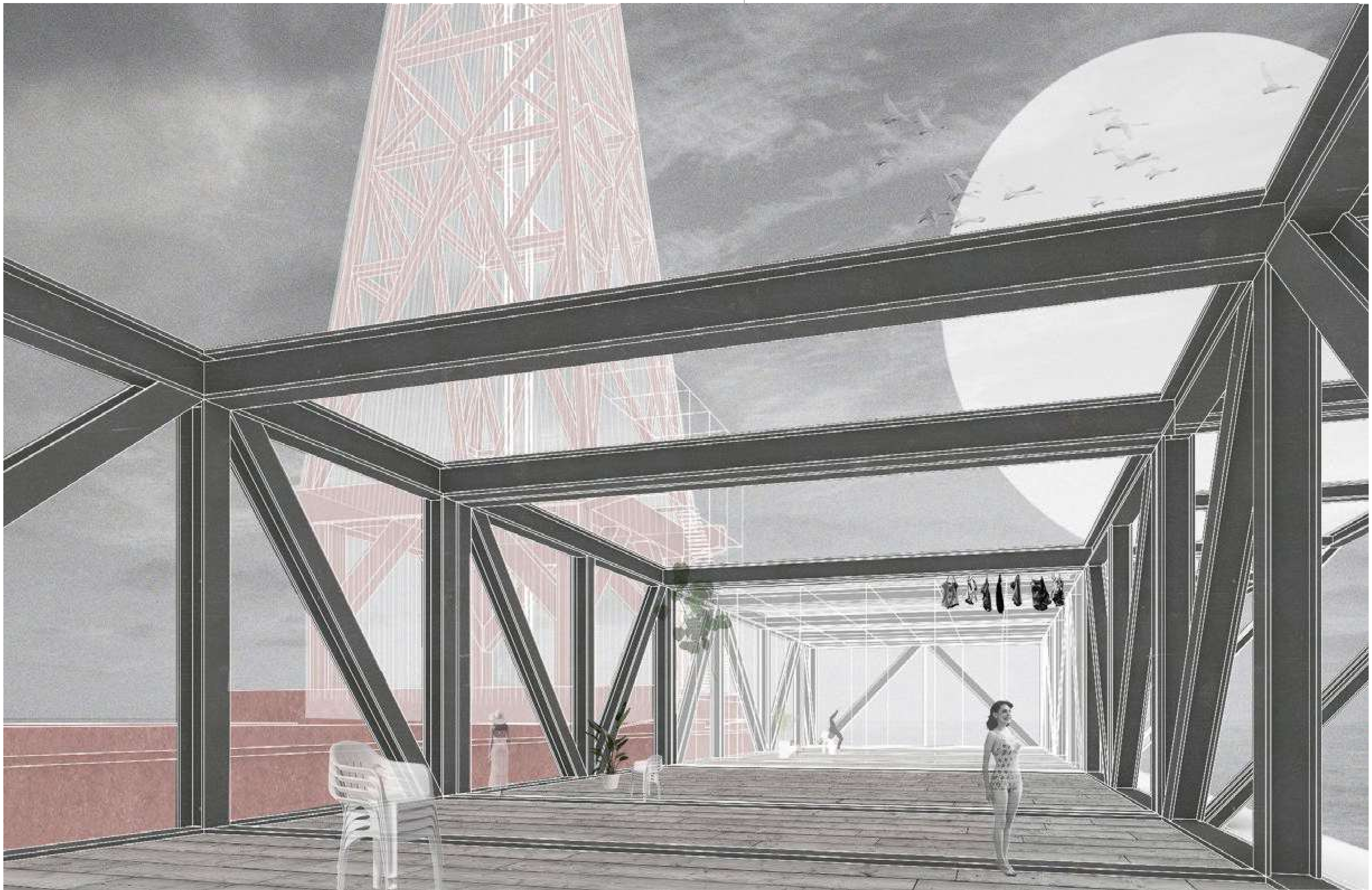
Concept
Transparent boxes are marking the new inner live of the now cleared Modules

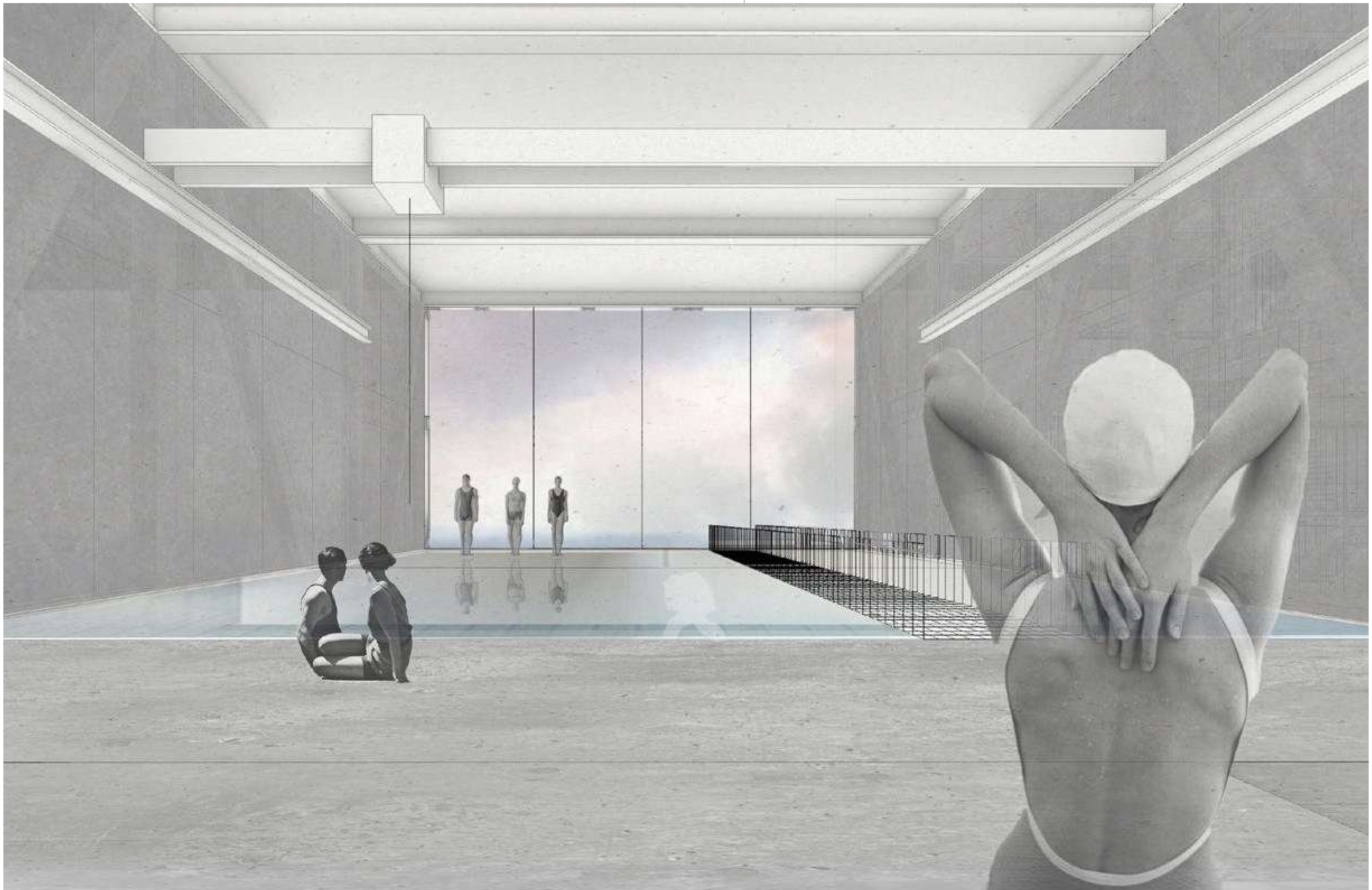
Facade
Generous glass walls behind existing steel structure

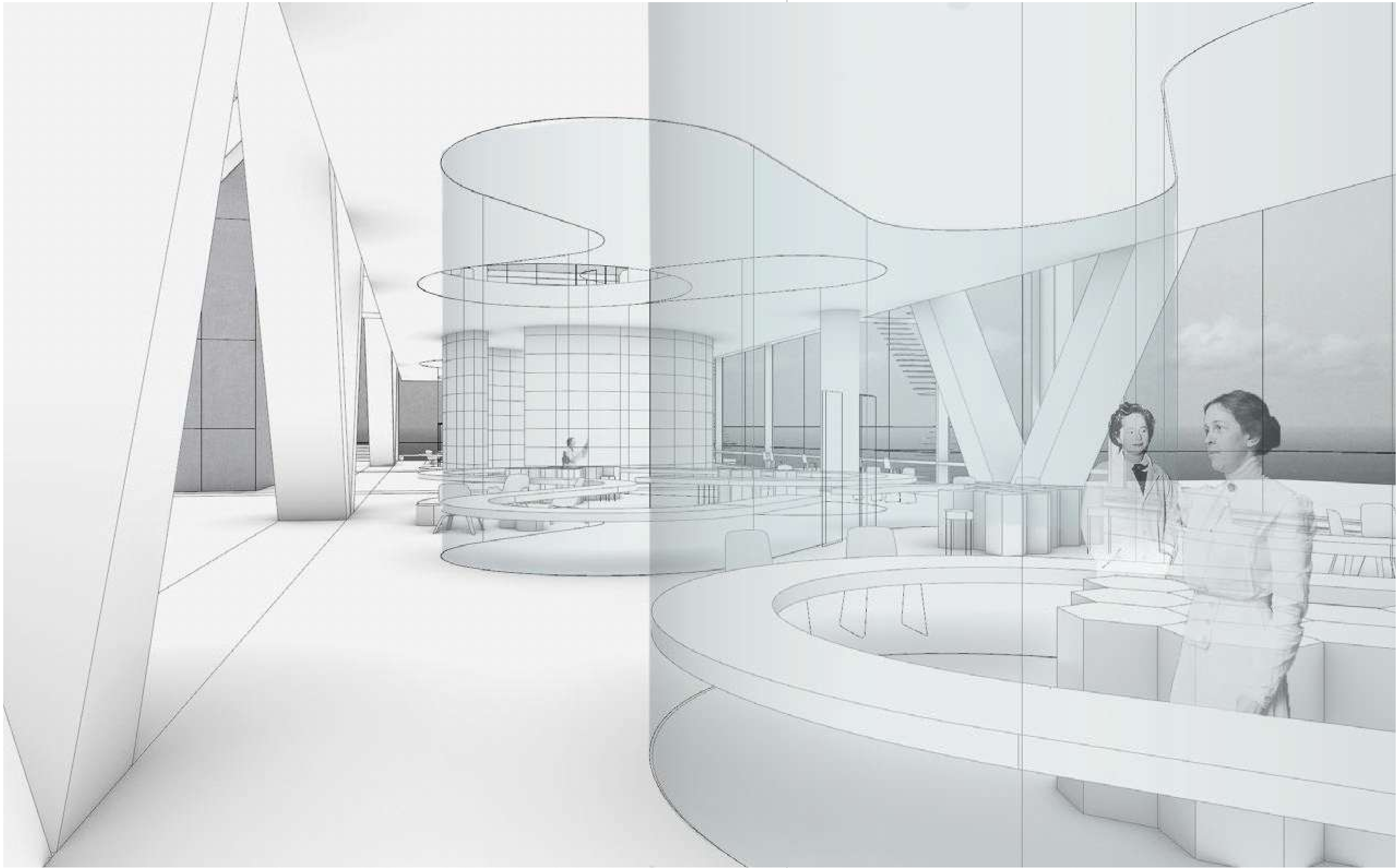
Material
Thermal Glazing with solar control

Atmospheres



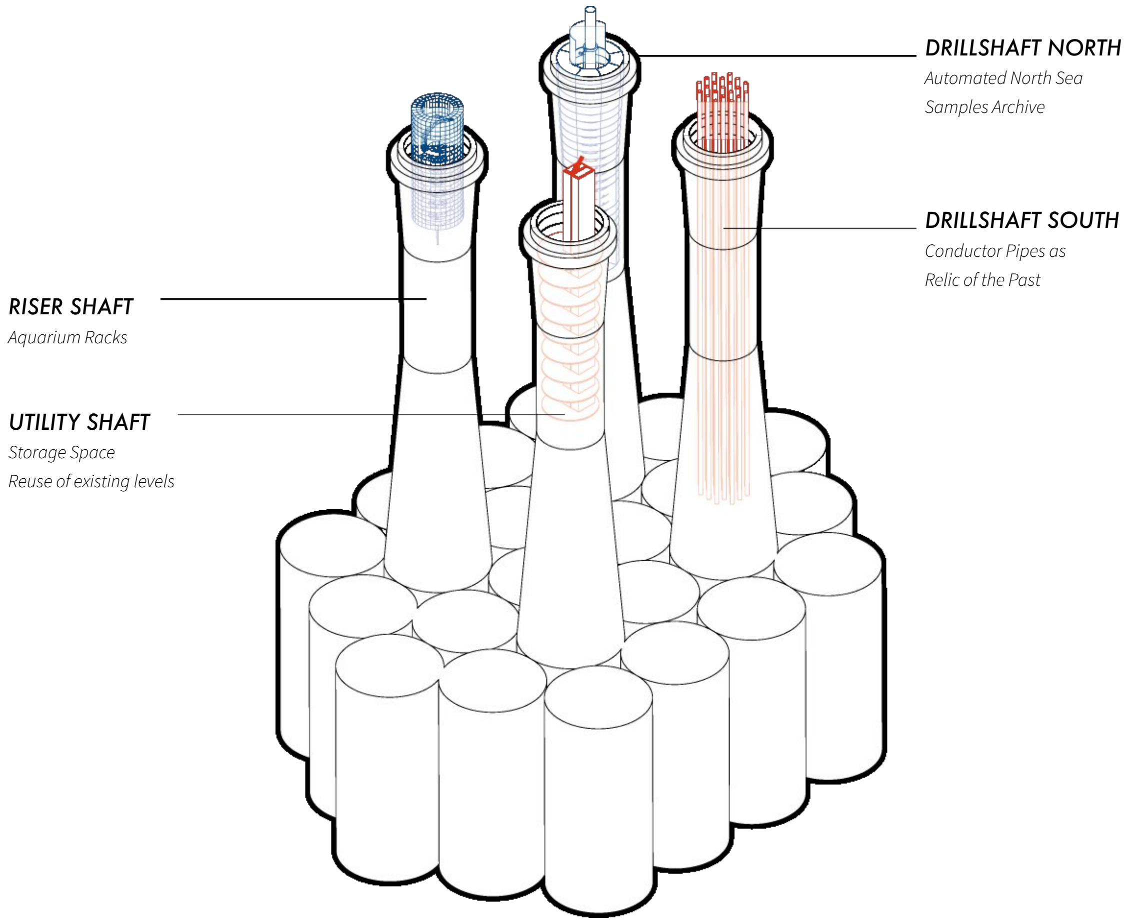




Features

Concrete Shafts

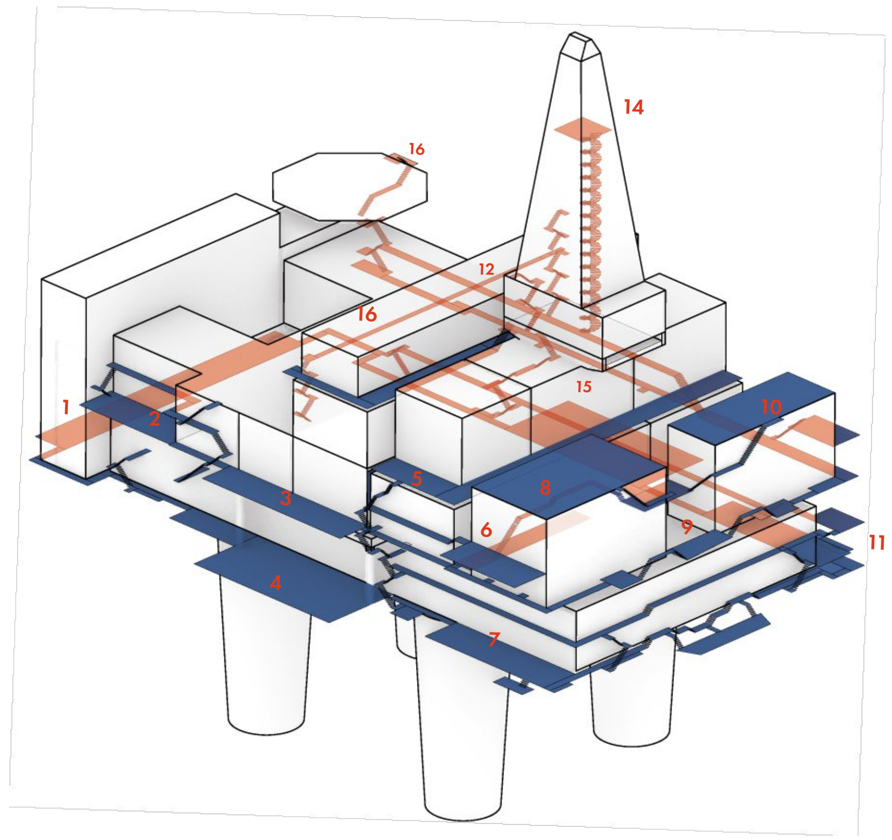
The concrete shafts of Statfjord B are not only necessary solid foundation, but also provide a very special space that can be utilised. The four legs will be used for an automated archive for sea samples, as instrument and chemical storage and as an extendable rackstructure for laboratory aquariums. The drill shaft south remains as found with the conductor pipes as relict of a past time.



Path of Experiences

Statfjord B Explorations

Despite the lack of wide open areas or parks for walks in the limited space of the compact research island, the former drilling platform offers innumerable places that can be discovered via the former circulation system and the numerous inspection pathways. On a length of more than 2 kilometres the island can be circled several times without having to take the same paths. The unique spirit of Statfjord B can be experienced through the act of exploration.



1 OCEAN VIEW

Statfjord-Community deck.

2 RECREATION MODULE

Recreation module's sun Deck.

3 OFFICE BALCONYS

Have a break with the hardworking staff from the monitoring modules

4 MARINE LAB INSIGHTS

Meet some researchers at the Southern Deck and gain Insights to the Marine Lab

5 MUSEUM OUTDOOR AREA

Enjoy a break at the deck of the former drilling modules.

6 CLIFF JUMPER

The terrace on front of the Diving Module.

7 BURNER BOOM

Explore the construction of the former Burner Boom.

8 STARWATCH

Best Spot to see plenty of Stars and even Planets.

9 SF VENICE

The east end of Statfjord is marked by the former flare boom and numerous bridges.

10 BIRDWATCH

Clearest view to see some bird migration.

11 DIVER'S SPOT

Experience the deck where diving explorations start.

12 CRANEWAY

Have a Walk along the massive crane-way - construction for the Derrick.

13 ROUGH NECK'S PLACE

One of the most important and most dangerous places where the drilling was coordinated.

14 THE DERRICK

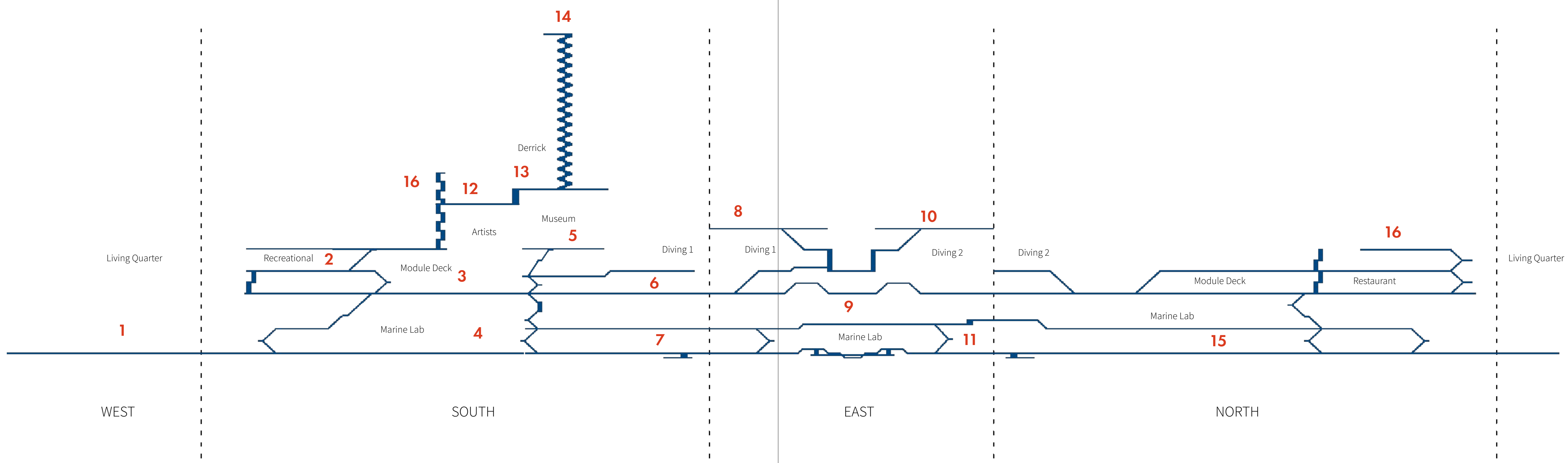
Maximum height experience in the former drill tower.

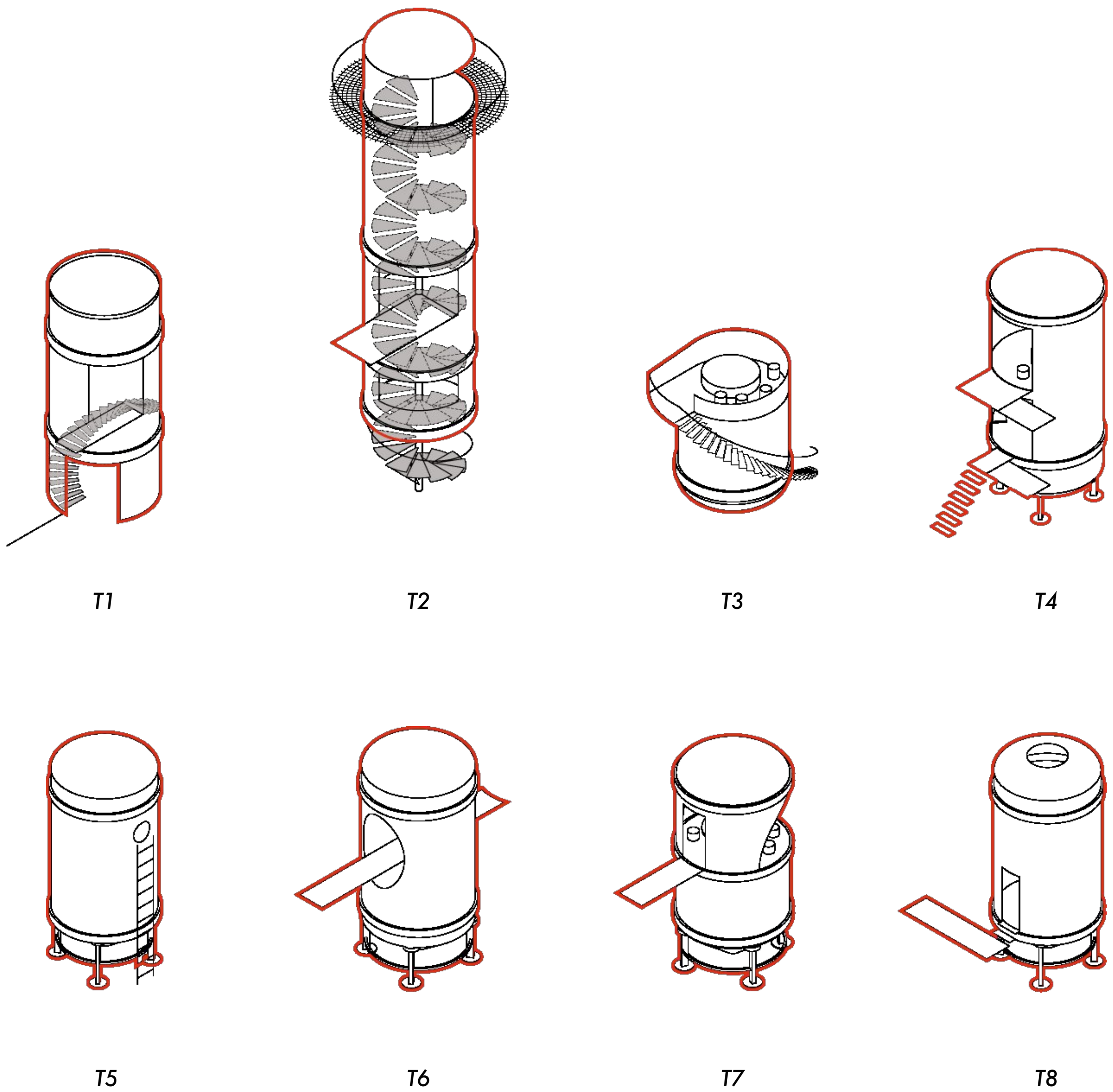
15 WHALE WATCHERS NORTH

Sea Lab Terrace.

16 HELI DECK

Arrival and departure spot for Statfjord B





Reuse of Tanks

T1 SPIRAL STAIRCASE

Former cooling water tank converted to a spiral staircase.
Module Deck | Monitoring | M18

T2 OBSERVATION TOWER

Observation tower connecting Module Deck and Weather Deck.

T3 MEETING SPACE

Cooling water tank converted to Shared Meeting Cell.
Module Deck | Monitoring | M16

T4 ADAPTABLE WORKPLACE

Barite Tank, adaptable workplace for several or individual persons.
Weather Deck | Artists | W11

T5 NEST

Barite Storage Tank as a place of retreat.
Weather Deck | Artists | W11

T6 PASSAGE

Former Cement Storage Tank as Passage.
Weather Deck | Artists | W11

T7 TEAM MEETING

Conference Space in the former Cement Storage Tank.
Weather Deck | Artists | W11

T8 THINKCELL

Place of silence and concentration, Cement Storage Tank.
Weather Deck | Artists | W11

Appendix

Field Study,
Data Collecting,
Illustration Credits,
and Notes.

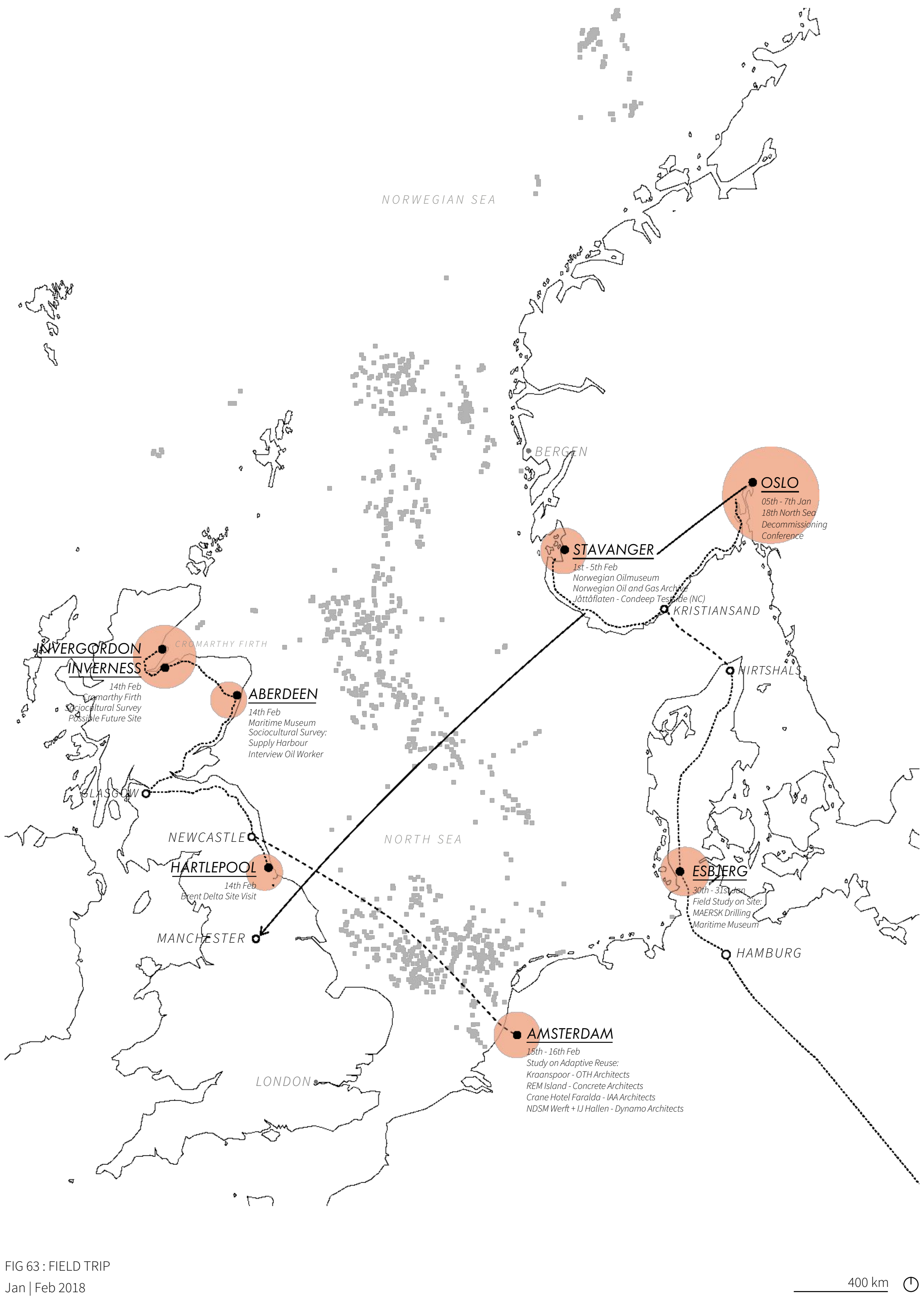


FIG 63 : FIELD TRIP
Jan | Feb 2018

Field Study

Stavanger, the European Capital of Oil

During a research trip in February 2018, I was able to explore the cultural and social heritage of the North Sea and its identity. Intensive research and archival work provided a detailed and insightful framework for my thesis. Due to the cooperative collaboration with the Regional State Archive in Stavanger and the Norsk Oljemuseum, it was possible to access drawings and construction plans of several offshore faculties build in Norway. The evaluation of these plan material was indispensable for the further design process.

Site Analysis

Besides the historical research, the empirical analysis of these giant offshore structures was the aim of my trip. Thanks to the cooperative support of the Danish company MÆRSK Drilling, I was able to gather comprehensive multisensory impressions during a guided tour through the tension leg platform Mærsk Resolute in the harbour of Esbjerg. In Hartlepool, England, the topside of the impressive Brent Delta platform of the oil giant Royal Dutch Shell was dismantled and recycled simultaneously. I had another opportunity to take a close look at the steel structure, which otherwise rests in secrecy. The results of this aesthetic analysis had a significant influence on the atmospheric representation of my project.

Conference on Decommissioning

As a participant in the 18th North Sea Decommissioning Conference in Oslo, I was able to gather further information on the latest developments in decommissioning and to discuss the idea of a subsequent use of oilrigs with policy makers and industry representatives who demonstrated a great interest in the topic. Especially the exchange with experts of the OSPAR Committee on the potentials of adaptive reuse was revealing and valuable.

Socio-cultural Survey in Scotland

The lively exchange with residents and oil workers, during my stay in Aberdeen and Inverness, has sharpened my picture of the society around the industry. I carried out an intensive site analysis, which lead to the identification of a potential site for the presented onshore scenario.

Crossing the North Sea

The crossing from Newcastle to Amsterdam with a ferry of the DFDS fleet is currently the only possibility to reach some large oil and gas fields in the North Sea. The four-hour crossing was crucial to gain a feeling for the density of the industrial landscape and to gather a multitude of lastingly inspiring impressions.

Data Collecting

A physical model of Statfjord B at Stavanger Oil Museum was used as a frame for the architectural analysis. The original model was built in 1978 as a basis for the planning. At a time when planning was still done by hand, the model was intended to ensure that all pipes, cable ducts, and levels were in perfect harmony. When Statfjord B left the building site in 1981, it looked exactly like this model.

To be able to use the physical model as a base for an advanced digital model, the technique of photogrammetry was used to create a three-dimensional point cloud of the object. With the help of countless photos from different angles, the point cloud not only shows the position of individual points in space, but also displays simultaneously with real colour rendering using intelligent software.

The digital model was further measured and compared with other data sets, such as floorplans and historical photos, using a reference dimension.

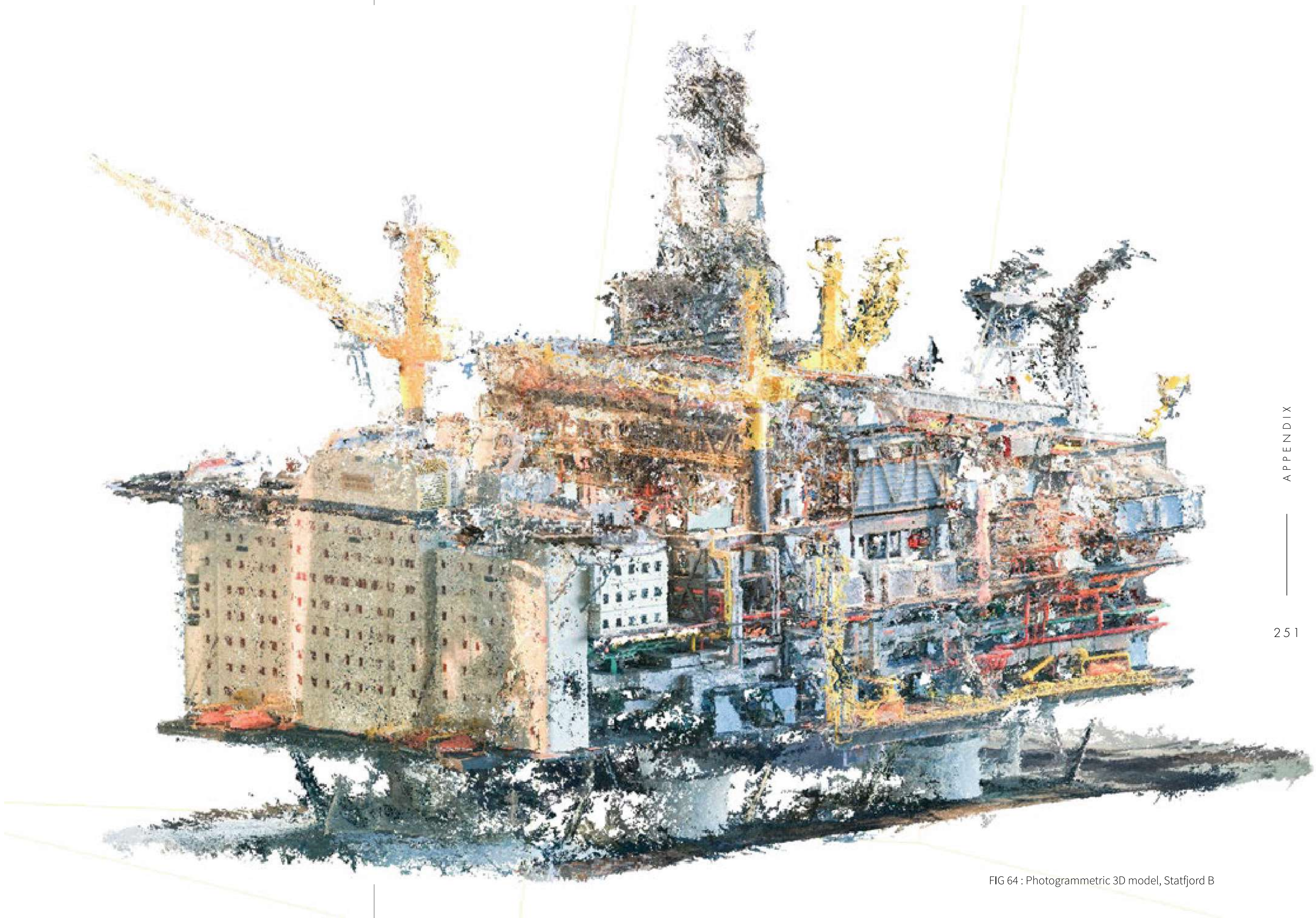


FIG 64 : Photogrammetric 3D model, Statfjord B

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All graphics, illustrations, collages, and plans if not otherwise indicated, are created by the author.

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A POST OIL SCENARIO.

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