

# Effects of adaptive vernacular reuse on historic industrial districts in densifying Dutch cities

Adaptive vernacular reuse deployed as design strategy to redevelop dilapidated Dutch heritage sites.



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This research studies the effects of adaptive vernacular reuse on industrial heritage sites. Hereby the studied effects are focused on industrial sites in Dutch cities. Within the Netherlands a trend can be seen of cities trying to densify the urban environment. This trend is the consequence of a housing shortage and a low availability of developable space for urban growth. Because of this densification process an increasing number of industrial sites get redeveloped into mixed-use neighbourhoods. Characterized by their indistinguishable architecture these redeveloped industrial sites generate a unique type of neighbourhood where old and new are merged together. Why these industrial sites get recognized as valuable potential locations where densification can take place is studied in this research. Looking at vernacular aspects and the way they dictate heritage preservation. Thereby the preservation through use of adaptive reuse strategies and how these strategies can be combined with vernacular aspects get studied based on a reference study on the NDSM-wharf in Amsterdam. In this research both integration of vernacular architecture and adaptive reuse practices get combined in an adaptive vernacular reuse design study.

## 2 INTRODUCTION

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“where there is empty space, there are opportunities for new use – opportunities the Netherlands cannot afford to waste, given the country’s urgent need for space; it is densely populated, travel distances are short and there is a social demand for city renovation that preserves existing quality.” – Paul Meurs (2021)

The Netherlands already uses 67% of its landmass for agriculture and built-up area, the other 33% used by water and nature (CBS, 2021). This combined with the growing demand in affordable housing makes available space a precious commodity. Despite this it is common to find unused industrial districts near city centres. Despite this it is common to find unused industrial districts near city centres, empty warehouses and abandoned factory buildings are often accompanied by graffitied and unmaintained streets. These warehouses and factories lost their value in the seventy’s and fell into despair. The industrial sites are often well connected to existing infrastructure, have favourable locations near city centres and have buildings that are designed with open multifunctional space plans. Expansion and densification into industrial heritage sites therefore seems like a logical solution.

With growing demand in affordable housing industrial heritage sites are being looked at as potential foundation for mixed use neighbourhoods. Resulting in repurposing industrial heritage sites as a recognized sustainable redevelopment method (Andrade et al., 2023). The focus is on improving the social economic conditions in the area (Plevoets, B., & Van Cleempoel, K. (2019)). The trend of transforming industrial buildings, called adaptive reuse, began in the 1970’s and evolved from simple apartment complexes to whole integrated mixed used neighbourhoods (Plevoets, B., & Van Cleempoel, K. (2019)). Since the practice of adaptive reuse has been implemented for decades the effects of this type of transformation can be studied.

Characteristics related to technological, social, architectural, or scientific elements set industrial heritage apart from other types of heritage (Andrade et al., 2023). The unique meaning of industrial heritage can be derived from its representation of human intelligence in physical form. Displaying societal growth in architectural forms that before the 18<sup>th</sup> century have never been seen (Telli, D., Manisa, K. (2018)). This unique vernacular identity makes it easier for people to recognize the value these heritage sites have. However, transforming the dilapidated structures with high potential and recognized value by the cities inhabitants into modern designs proves to be a delicate process. User-led initiatives might provide a more comprehensive approach as compared to commercially or institutional-led initiatives. Leading to a better recognition of the vernacular value of industrial heritage sites (Plevoets & Sowińska-Heim, 2018).

An example of designing following the principles of adaptive reuse and vernacular design is NDSM-Wharf in Amsterdam. During the ninety’s and 00’s the NDSM -Wharf was in decline and seen as a place ‘where you did not want to be found dead’ (Kok 2016: 15; see also Donkers 2007: 15-27). NDSM-Wharf became part of a user-led initiative supported by the municipality and part of the ‘broedplaatsen’ project. The redevelopment of NDSM-Wharf is one of the first instances of combining industrial vernacular design and adaptive reuse (municipality of Amsterdam,. (2015)). Setting an example and sparking a discussion on what values should be preserved within this industrial heritage site (Plevoets, B., & Sowińska-Heim, J. (2018)).

### 3 RESEARCH OBJECTIVE AND QUESTIONS

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The aim of this research is to investigate what effects combining adaptive reuse and vernacular design have on the development of Dutch cities. This research focusses on adaptive vernacular reuse within historic industrial sites, located in large Dutch cities. Using NDSM-Wharf in Amsterdam as a case study. The aim of this research is to better understand what Dutch vernacularity consists of and how industrial heritage sites can function as foundation for adaptive reuse. The reason for narrowing down the scope to industrial heritage sites has to do with the fact that these sites have a lot of potential for redevelopment (Andrade et al., 2023).

In the studied literature a gap can be identified in available information of the effects of combining vernacularity into adaptive reuse redevelopment projects. The term 'adaptive vernacular reuse' is one that is yet to be clarified. By use of the research questions this gap gets explored aiming to give answers to the effectiveness of adaptive vernacular reuse and how this can contribute to the densification process of Dutch cities into dilapidated industrial heritage sites. The following main question is formed:

*What are the effects of adaptive vernacular reuse on the redevelopment of historic industrial districts within densifying Dutch cities?*

To answer the main question a set of sub-questions are formulated to give a in depth view on the research subject.

*To what extent is vernacular architecture present in Dutch industrial heritage sites?*

*How can vernacular design be translated into modern adaptive reuse architecture?*

*How is the vision of NDSM-Wharf's adaptive reuse and vernacular design still relevant today?*

### 4 METHODOLOGY

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The main question goes into the effects of adaptive vernacular reuse on industrial heritage sites within densifying Dutch cities. Here the NDSM-Wharf is used as a case study. A visit to the site and the Amsterdam city archive can provide valuable information for understanding the workings of the NDSM-Wharf. During this visit a photo reportage was done to shed light on how the neighbourhood is experienced.

The first sub question explores what Dutch vernacular architecture consists of. Notable building styles, characteristic elements, and overall atmosphere typical to the Dutch urban landscape are identified. Hereby only vernacular aspects that are related or recognized in industrial heritage sites are considered. Through use of mapping techniques, sketches, diagrams, and photography of the NDSM-Wharf a wide framework on vernacularity can be built. This framework is then compared to other related case studies which are analysed in the same way as the NDSM-Wharf.

The second sub question on how vernacular design can be combined in adaptive reuse architecture is crucial to provide a complete answer to the main research question. Through literature study the specific principles that make up adaptive reuse can be determined. These principles form a design manual for achieving adaptive reuse. However, the aim of this sub question is to understand how vernacularity can be translated into adaptive reuse architecture. Therefore, the earlier created vernacular frameworks can be held against the adaptive reuse design manuals. A successful translation between the two subjects can be achieved by looking for similarities, coherent design strategies and matching principles.

Adaptive vernacular reuse might work on paper. However, this is not always the case in practice. Because of this the last research question is aimed at studying the effects of adaptive vernacular reuse. The original vision on the transformation of NDSM-Wharf must be compared to how the neighbourhood is currently perceived. This is done by comparing the municipality's original vision documents to the photo reportage and analysis on the current perception of the neighbourhood.

## 5 RELEVANCE

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Literature study revealed that vernacular design and adaptive reuse are both frequently used when transforming Dutch heritage sites (Meurs, 2021). However, a gap in available literature can be found on implementing both principles simultaneously. This research is aimed explaining how vernacularity and adaptive reuse can be combined and what the effects are of combining the two. Clarifying the term 'adaptive vernacular reuse' into a potential for Dutch industrial heritage redevelopment project.

## 6 LITERATURE REVIEW

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The deindustrialization of cities has left a significant impact on not only the economy but also the socio-cultural character of industrial cities (Plevoets, B., & Van Cleempoel, K. (2019)). The importance of the industrial sites created a sense of involvement and meaning for the city's inhabitants. Nowadays many of these industrial sites face demolition of large-scale redevelopments due the sites to falling into disuse (Andrade, M., Morales, E. J., Rodríguez-Ramos, R., & Martínez-Ramírez, P. (2023)). The preservation of heritage sites through the use of adaptive reuse design principles is becoming an increasingly more recognized method for sustainable development (Bullen, P. A., & Love, P. E. (2010)). While most redevelopments are driven by economic incentives an increasing number of projects are oriented towards socio-cultural drivers (Van De Kamp, L. (2019); Bullen, P. A., & Love, P. E. (2010)). A shift towards taking socio-cultural drivers into account seems logical. The history of industrial sites originated from a time when manufacturing, urban growth and a shift in the city's demographics took place. These developments were important to the cities growth and still carry a lot of meaning and importance for the city's inhabitants.

The city of Amsterdam introduced the 'Broedplaatsen' initiative. A city-wide redevelopment plan that takes socio-cultural aspects as the most important driver. One of these 'Broedplaatsen' sites being the NDSM-Wharf located in Amsterdam north (Municipality of Amsterdam, (2023, 11 December)). This former shipyard was the heart of the Dutch shipbuilding industry and in its peak in 1953 provided work for 9.000+ inhabitants (Municipality of Amsterdam, (2023, 11 December)). In the 1990's reuse possibilities of NDSM-Wharf were recognized by artists who housed their practises and ateliers in the empty warehouses and factories. This newly recognized potential for the site was a catalyst for redeveloping the NDSM-Wharf in a way where the vernacular quality and heritage of the site was identified as a cultural asset that had to be preserved (Plevoets, B., & Van Cleempoel, K. (2019)). This user-led transformation was later backed by the municipality with redevelopment plans. Resulting in a unique design case where user-led vernacular transformation became a catalyst for the adaptive reuse of the NDSM-Wharf heritage site.



*To what extent is vernacular architecture present in Dutch industrial heritage sites?*

The NDSM-wharf is not the only industrial site that has undergone drastic changes through elaborate redevelopment projects. Strijp-S in Eindhoven is a redevelopment project in similar scale as the NDMS-wharf. Also, projects like the LocHal in Tilburg or the Werkspoorfabriek in Utrecht show a growing trend in the preservation of Dutch industrial sites (Meurs, P., & Steenhuis, M. (2017)). The question then is, where does this interest in preserving industrial heritage sites come from? The rich history of these sites often still have a significant impact on the city and its inhabitants. Historically these sites were of great importance to a large part of the city's population. With housing projects like 'Tuindorp', located in Amsterdam North, being built for the lower working class these industrial sites even influenced how and where working-class families should live.



Figure 1. Werkspoorfabriek – Utrecht



Source: Archdaily.com

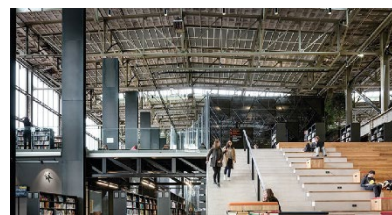


Figure 2. LocHal library – Tilburg



Source: Archdaily.com



Figure 3. Strijp-S – Eindhoven



Source: Archdaily.com

Besides the influence on the inhabitants industrial sites also where important for the prosperity of the city. Generating jobs, income, and urban growth the city as a whole benefited. The importance of these industrial sites currently still resonates throughout the city creating a shared common identity. This identity varies slightly based on the focus on different industries. Large port cities differ in typology and structure from cities that had a large textile or mining production. However, on a national scale these contextual differences have a small impact on how industrial heritage sites are seen today. Interwoven in the greater urban context surrounded by the rest of the developed city that these industries made possible these heritage sites have an undeniable place in the urban context (Plevoets, B., & Van Cleempoel, K. (2019)).

### 7.1 UNDERSTANDING DUTCH VERNACULARITY

To understand Dutch industrial vernacular architecture, it is important to understand the meaning of vernacularity. There is no definitive description on the definition of vernacularity. The term itself has evolved throughout centuries, from vernacular meaning 'traditional' and 'everyday' to nowadays describing the influences of 'culture', 'beliefs' and 'customs' of a group of people on the architecture (Hourigan, N. (2015)). The broad scope of the term means that identifying vernacularity can be done in numerous ways.

Identifying vernacularity through consideration of usage patterns and the gradual evolution of function. Contextual influences play a key role in this way of understanding Dutch industrial vernacular architecture. How user's needs, regional climate and environmental demands influence building structures can be seen as a form of vernacular architecture (Hourigan, N. (2015)). Instead of looking at traditional building methods, such as bricklaying and the use of local materials such as thatched roofs, a buildings vernacularity can be studied based on how a building can support people during a changing timeframe. The constant reshaping of a building tells a narrative of local development. The changes in urban context and the importance of an ever-adapting

building tell a more complete and compelling story compared to simply studying the physical and technical aspects of the building.

Besides the evolution of the building according to its local context an understanding on vernacularity can also be formed by looking at the evolution of local culture, beliefs, and customs. Societal change often mean that people get a different outlook on their environment, simultaneously changing the essence of how certain buildings are to be perceived. Hereby non-contextual influences dictate if a building is to be perceived as something vernacular. Just as how language changes the meaning of a building can change as well (Hourigan, N. (2015)). With socio-cultural perception altering the vernacularity of the building the language of architecture is a medium for conveying socio-cultural views on the urban environment.

## 7.2 COMMUNITY-LED RECOGNITION OF VERNACULAR ARCHITECTURE

In case of the NDSM-Wharf both ways of identifying Dutch vernacular architecture are relevant. The NDSM-wharf underwent numerous changes from the 1950's onwards. From the rebuilding efforts after the second world war the NDSM-wharf grew to its peak in 1953. The oil crisis in the seventy's meant that the NDSM-wharf had to close its doors in 1985. From then onward to the ninety's and 00's the wharf lay empty and dilapidated. Squatters and artist occupied some of the empty buildings resulting in the NDSM-wharf getting a negative reputation (Van De Kamp, L. (2019)). The condition of the NDSM-wharf lead to the municipality launching a design competition. The organization Kinetisch Noord group, representing the squatters and artist, won this competition. Their plan was based on the manifesto 'stad als casco'. A focus on preserving existing structures and designing with existing cultural and social structures in mind (Municipality of Amsterdam. (2023, 11 December)). When looking at the history of the NDSM-wharf the recognition and thus the preservation of the vernacular architectural importance of the existing structures came from local communities. Vernacularity was created by the community itself. Their perspective on the site was essential for other parties like the municipality and UNESCO to also recognize the site that would have otherwise been neglected if not for the community.

## 7.3 PRESERVATION

The collaboration of the municipality and the Kinetisch Noord group initiated the reshaping of the area. With a practice known as adaptive reuse heritage buildings have been adapted to house new functions fit to the needs of that time. The adaptive reuse practices made it possible to change the functionality of the buildings and create better living standards without compromising the heritage of the site. The redevelopment of NDSM was completely led by and based on preserving the already existing structures. Characterised by their robust architecture, steel construction, simple materialization, and large multifunctional space plans Dutch industrial share common properties. However, these properties are not what made these industrial districts into heritage sites. The vernacular aspect comes from a shared sense of meaningfulness (Meurs, P., & Steenhuis, M. (2017)).

*'The motives for protecting the industrial heritage are based on the universal value of this evidence, rather than on the singularity of unique sites'; 'The industrial heritage is of social value as part of the record of the lives of ordinary men and women, and as such it provides an important sense of identity' (The International Committee for the Conservation of the Industrial Heritage. (2003)).*

Vernacularity in case of the NDSM-wharf comes from both the contextual as well as the social impact industrial sites have had on the Dutch urban landscape. The development of infrastructure and social housing but also communal uplift, community building and creating a sense of meaningful productiveness among the inhabitants is what makes industrial districts into heritage sites. When the recognition of vernacularity initiates adaptive reuse practices a rare/new redevelopment strategy is formed called adaptive vernacular reuse. With this practise key drivers such as heritage preservation and sustainable development of existing structures get intertwined. (Plevoets, B., & Sowińska-Heim, J. (2018); Van De Kamp, L. (2019); The International Committee for the Conservation of the Industrial Heritage. (2003)).



*How can vernacular design be translated into modern adaptive reuse architecture?*

Adaptive reuse, the act of reshaping the built environment and transforming existing structures, is an important aspect in creating sustainable architecture. This process of sustainable development consists of multiple interrelated dimensions: economic, environmental, social, and cultural (Gravagnuolo et al., 2017). These four pillars have not always been treated equally. With redevelopment plans often being implemented by top-down approaches the focus tends to shift towards economic incentives and commercializing the public space (Plevoets, B., & Sowińska-Heim, J., 2018). This method of reusing existing structures might be profitable and somewhat sustainable, on a social and cultural basis they often lack substance. By neglecting social and cultural dimensions problems arise that lead to gentrification and a lack of recognition for vernacular architecture. These problems have led to a counter-narrative from local inhabitants. Society and culture as focus points introduce vernacularity into the interrelated dimensions of adaptive reuse. Providing perspectives that are oriented around human design unifying all four dimensions (Gravagnuolo et al., 2017). In practice this form of culturally centred adaptive reuse is often initiated by community-led initiatives. These communities opting for low-impact transformations and highlighting the relation between heritage preservation, economic incentives, environmental impact and social sciences (Gravagnuolo et al., 2017).

This counter-narrative from local communities can be seen in Amsterdam in the 1950's where the creative community and squatters take a stance by occupying the NDSM-wharf. They plead for an adaptive reuse approach with the social and cultural pillars as centre points in the redevelopment plans. The counter-narrative hereby leading to an interdisciplinary approach with minimal intervention into the existing structures located on the NDSM-wharf. This community-led approach makes adaptive vernacular reuse possible by combining the different standpoint from adaptive reuse with the socio-cultural dimensions that influence the vernacularity of the NDSM-wharf.

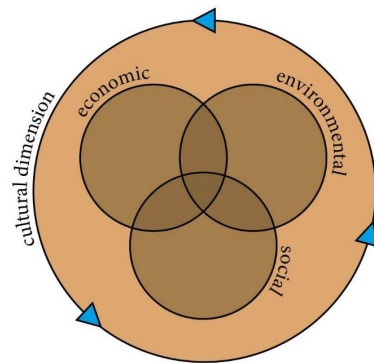


Figure 4. Social dimension as central pillar - Gravagnuolo et al., (2017)

## 8.1 THE PILLARS OF ADAPTIVE REUSE

In order to make adaptive vernacular reuse work planners need an intensive understanding of the heritage site. Not only the historical value but also the current influence the site has on its inhabitants and environment. Creating a framework, based on the interrelated economic, environmental, social, and cultural dimensions, can assist in understanding the reuse potential as well as the vernacular. Hereby the social and cultural dictate the vernacular influences of the heritage site. The economic and environmental dictating the adaptive reuse potential the site has (Telli, D., Manisa, K. (2018); Gravagnuolo et al., (2017)).

### 8.1.1 Economic

The economic dimension mostly considers how the building could perform. This performance is based on the development costs, operational requirements, maintenance, and corporate culture. In the process of considering adaptive reuse investors and stakeholders make an evaluation on all these factors before choosing adaptive reuse or demolition (Bullen, P. A., & Love, P. E. (2010)). From a purely economic standpoint most plans would lead to demolition or redevelopment and not necessarily adaptive reuse since that still often is the more expensive option. However, when taking environmental and social perspectives into account a case can be made for preserving exiting context and structures.

### 8.1.2 Environmental

Environmental factors nowadays often touch the subject of creating an inclusive sustainable urban space, shaping the built environment into a sustainable circular economy. Environmental dimensions are not only dictated by the municipality or group of inhabitants. It is moreover being dictated by society. Politics, trends, beliefs, and science are, especially in current days, ever changing. Thereby dictating how people tackle problems. The public demands sustainability within the built environment, thus increasing a demand for adaptive reuse and heritage preservation.

### 8.1.3 Social

Social dimensions initiated for and by communities touch numerous aspects of urban live. The social dimensions touch different subjects. prosperity and liveability are for example also relevant to economic or environmental dimensions. Therefore, the social dimensions are not necessarily about specifics but about giving communities a voice and opportunity to shape the urban landscape according to their needs.

### 8.1.4 Cultural

'Culture embodies the soul of the city' (Gravagnuolo et al., 2017). The cultural dimension influences the built environment by creating a dialogue between the social and environmental. Strategies focus on inclusive communities, social cohesion, and integrated heritage to create a city where people and culture are embodied in its built environment. By creating a place with people and culture stand in the centre of design a higher level of involvement exists within the urban fabric. Higher levels of involvement stimulate a more intense and effective use of the environment and economic growth while safeguarding the cultural dimension that is already in place.



Figure 5. Artist studio located in the NDSM-warehouse

## 8.2 INTEGRATION OF VERNACULARITY INTO ADAPTIVE REUSE PRACTICES

If all pillars of adaptive reuse get treated equally in the design process the most optimal form of adaptive reuse development will take place. Due to the complex nature of heritage redevelopment projects this often is not the case, imbalance is bound to happen to some extent. Where this imbalance happens has a large impact on the overall design. As already mentioned the imbalance of a dominant economic dimension causes gentrification or a lack of recognition for the vernacular. However, an imbalance can be created intentionally. A dominant cultural dimension can, when done carefully, stimulate growth in the other dimensions (Andrade et al., 2023, Gravagnuolo et al., 2017). Cultural dimension as leading principle within the design process activate economic growth, environmental development and social cohesion. This activation can happen because of cultural assets being used to their advantage. When a place has a high level of awareness of assets that are important to the local culture and stimulation of people participation that fits the local culture you make the urban landscape work in its own benefit. Hereby also uplifting the economic, environmental and social dimensions creating a circular model (Gravagnuolo et al., 2017).

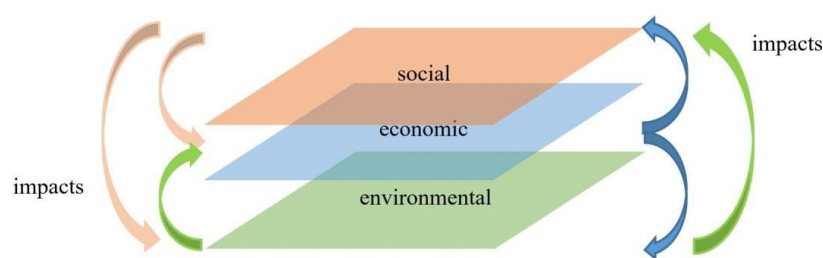


Figure 6. Circular model - Gravagnuolo et al., (2017)

The means of integrating vernacularity in adaptive reuse strategies through user-led initiatives come with its own set of difficulties. Adaptive reuse focuses on the circular economy and sustainable design. Whereas vernacular architecture rises from socio-cultural factors. The two disciplines are not inherently interrelated thus special attention is needed to combine vernacularity and adaptive reuse. By looking at examples where vernacular adaptive reuse has been put into practice it can be seen that community-led initiatives are the catalyst for combining the two separate practices. There is also the fact that adaptive reuse can be done without taking vernacular architecture into account. However, preserving vernacular heritage sites cannot be achieved without adaptive reuse design principles (Gravagnuolo et al., 2017).

### *How is the vision of NDSM-Wharf's adaptive reuse and vernacular design still relevant today?*

The constant development of the NDSM-wharf has been based on a design strategy proposed by the municipality. In this design strategy the following points have been implemented.

- Preservation and reuse of monumental ensemble and character
- Preservation and development as location for cultural events
- Sustainable area development
- High density and maximum function mix
- Using water for a nautical and cultural programme
- Involve users and other stakeholders in planning

The points mentioned above form the basic structure of the redevelopment plans the municipality of Amsterdam has formed for the NDSM-wharf. These points were defined more detailed in later stages of the design process and later formed the 'bestemmingsplan NDSM-werf'.

#### 9.1 PRESERVATION AND REUSE OF MONUMENTAL ENSEMBLE AND CHARACTER

The municipality identified all structures which were part of the NDSM. In this identification process a total of seven buildings were classified as monuments which must be preserved. These buildings all served a different purpose when they were still used by the NDSM company. Ranging from warehouses to welding workshops all buildings were originally built as industrial typology.

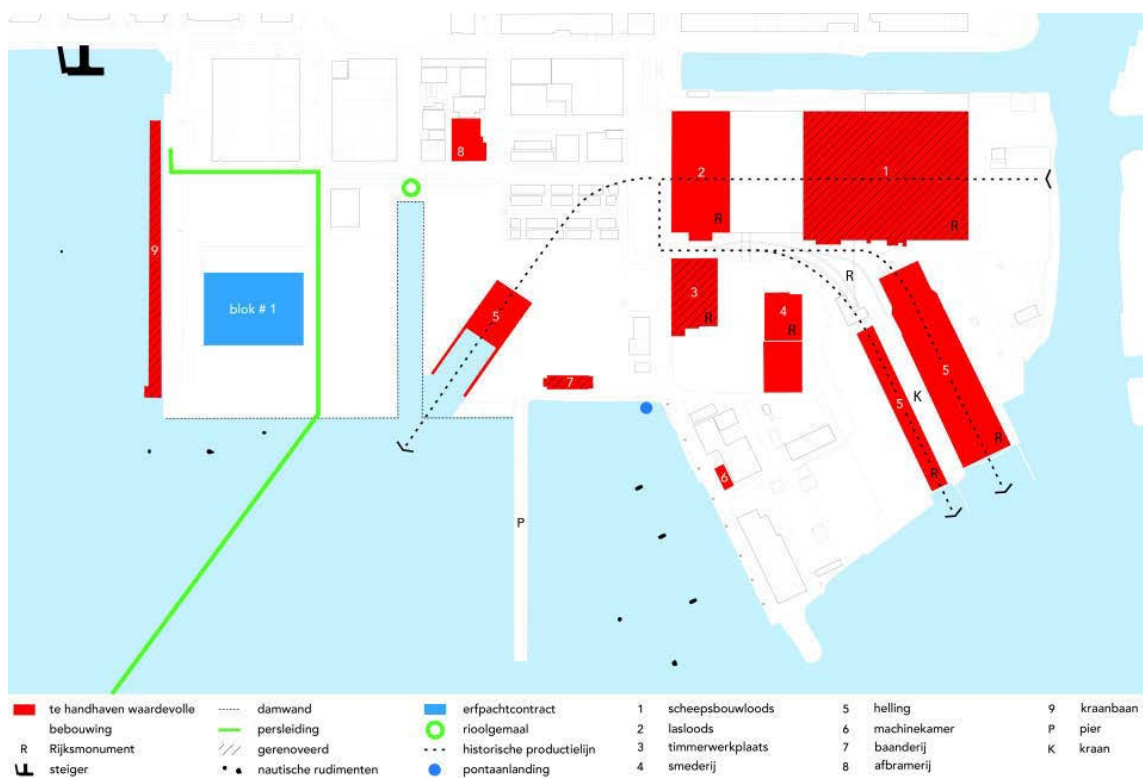


Figure 7. Map of east NDSM highlighting heritage buildings with monument status - Municipality of Amsterdam

The original NDSM buildings that were identified later received a monument status which made sure that during the redevelopment none of these structures could be changed in an unrecognizable way or completely demolished. These monuments were classified as important and had to be an integral part of the overall redevelopment plan. Nowadays the original NDSM buildings are still clearly recognizable. Housing different functions with minimal impact on the original architecture.

#### 9.1.1 Preservation and development as location for cultural events

The NDSM area is part of the larger 'broedplaatsen' initiative of the municipality of Amsterdam. This initiative is in place to support and stimulate the cultural section in Amsterdam by creating space where creative practices can be housed. The warehouse is NDSM's part of the 'broedplaatsen' initiative. Studios and ateliers for 250 artists are located here. Besides space for small creative entrepreneurs there is also allocated space for larger companies within the creative industry. The old carpentry and welding workshop are now office space for companies like MTV Europe. Lastly the public space surrounding the former industrial buildings is used for hosting events and festivals throughout the year.

#### 9.1.2 Sustainable area development

The redevelopment plans focus on maintaining and preserving as much of the existing structures as possible. Limiting building new structures as much as possible makes sure that the environmental impact of the redevelopment is kept at a minimum.

#### 9.1.3 High density and maximum function mix

The location of the NDSM-wharf lends itself to a high function mix where cultural, economic, and housing typologies can be mixed into the same neighbourhood. By completely eliminating the possibility of building housing on the east side of the wharf the neighbourhood as a whole has a lot of space for activities other than housing.

#### 9.1.4 Using water for a nautical and cultural programme

The NDSM-wharf has two former piers that were meant for launching newly built ships into the Amstel. These piers were also identified as important element that should be preserved. Now these piers are used as part of the public space, mainly used for recreational purposes or as part of hosting events and festivals. Besides the piers the NDSM-wharf has a direct ferry connection to the Amsterdam city centre.

#### 9.1.5 Involve users and other stakeholders in planning

Besides the common stakeholders involved in large scale redevelopment plans like the one of the NDSM-wharf a special focus has been placed on community involvement in the design process. The NDSM shipyard supervisory committee has been established in name of inhabitants and other non-institutional parties involved in the NDSM-wharf. Among others this committee consists of original inhabitants and artists.



Figure 8. artist studio located in the woodworking warehouse

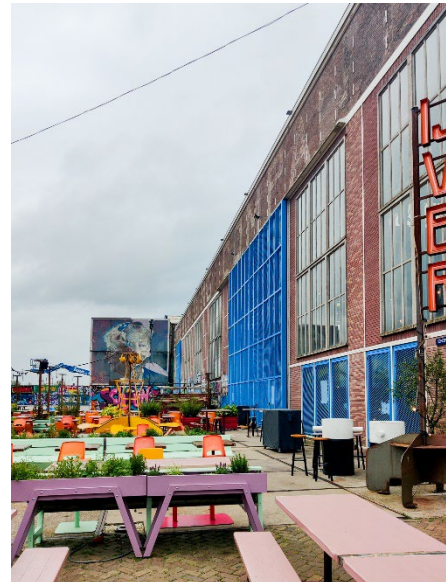


Figure 9. Function mix situated by the NDSM-warehouse



## 9.2 ORIGINAL PLANS IN THE CURRENT SITUATION

The original redevelopment plans of the NDSM-wharf show a strategy of changing the functionality of the industrial area to a cultural hub. When looking at the plans the NDSM-wharf can be divided into two parts. The heritage side on the east and the modern mixed-use side on the west. The division is clearly noticeable by the difference in use of public space, architectural expression, functionality, and atmosphere. The border between the heritage and modern side is marked by the Ms. Van riemsdijkweg. This change in architectural expression comes from the fact that the NDSM-area has been split in an east and west district. Hereby the municipality decided that no housing was to be built in the eastern district due to the presence of the seven former NDSM buildings. The original plans of the redevelopments in the 90's and 00's are still present in the east among the NDSM warehouses and factories with an official monumental status. The monumental status being the result of community-led initiatives leading to recognition in value and preservation efforts (Municipality of Amsterdam. (2023, 11 December)). However, in the western district the same design strategies are followed in a more loosely modern interpretation.

These strategy points have guided the development of the NDSM-wharf and are still used today. Since the first large projects took off in the ninety's and 00's development has increased significantly. The densification of the city of Amsterdam not only noticeable in the NDSM area but Amsterdam North as a whole. The completion of a new metro line and the developments of Buiksloterham and the Hamerkwartier show a pattern of urban expansion. The common factor with these areas is that all these areas used to be or still are industrial sites. Also, similarities in dealing with these heritage buildings coincide. The Kromhouthal in Hamerkwartier hosting cultural and social activities similar to the NDSM-warehouse.

The vernacularity of the Dutch industrial heritage sites in Amsterdam is being recognized by urban planners as the new location for densifying the urban landscape. Although be it in different ways. The plans for each (yet to be) redeveloped site differ depending on the context of the site. With the implementation of new building laws and municipal regulations further plans were made to use the IJ-harbour areas more intensely (Municipality of Amsterdam. (2023, 11 December)). A more intense use of the IJ-harbour areas will be done by shifting the function from an industrial districts, like the Hamerkwartier and Buiksloterham, towards a mixed-use work-living district. It becomes harder to recognize the adaptive vernacular reuse in the newer plans. Industrial sites built in the fifties and sixty's mostly get demolished (Hamerkwartier) whereas pre-war industrial sites/buildings get adapted and reused. Because the properties of the buildings are the same, multifunctional spaces, steel constructions, etc., the choice to demolish one district and redevelop the other must come from factors other than adaptive reuse potential. It seems that if we want to preserve historic industrial districts it must come from an adaptive vernacular reuse approach. Communities involved with the area are crucial to this approach working. (Plevoets, B., & Van Cleempoel, K. (2019); Plevoets, B., & Sowińska-Heim, J. (2018)). When communities take action, it becomes harder for other parties to opt for complete demolition (Bullen, P. A., & Love, P. E. (2010)).



Figure 10. Riemsdijkweg as border between the east and west side of the NDSM-wharf

## 10 CONCLUSION

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*What are the effects of adaptive vernacular reuse on the redevelopment of historic industrial districts within densifying Dutch cities?*

Two ways of identifying vernacular architecture have been implemented during the analysis of the NDSM-wharf. This identification of vernacular architecture is done based on contextual and societal influences on the industrial heritage buildings present on the NDSM-wharf. The architecture of the site has changed according to the different needs and beliefs of the inhabitants. Hereby showing forms of vernacular identity on both the contextual as well as the social aspect. Community-led initiatives originating from the collective memory of Amsterdam's residents have given the site recognition and vernacularity. A change in how dilapidated industrial heritage buildings could be used changed the perspective on the NDSM-wharf. With the abandoned warehouses and factories no longer being precepted as worthless but seen as potential valuable structures that could support new functions. Hereby giving vernacularity to the site through societal change. This change in perception led to the evolution of NDSM. The shift from industrial to cultural usage patterns has given a deeper dimension to the vernacularity of the existing heritage sites. The reshaping of the site tells a narrative of local development. The story of an ever-adapting NDSM-wharf giving a deeper sense of vernacularity. The site now catering to the needs of many different types of users adds to the vernacular value of the NDSM-wharf as a whole.

The redevelopment efforts of the NDSM-wharf were based on adaptive reuse strategies. In collaboration with local communities (kinetisch Noord group) the strategies of adaptive reuse were merged with social-cultural dimensions to create a culturally focussed adaptive reuse strategy. During the development all stakeholders were aware of the importance of the heritage buildings to the local culture. This recognition of importance of course originating from the site being perceived as vernacular. The high level of awareness of cultural assets stimulated people participation that first the socio-cultural environment of NDSM. The culturally focussed development has not only strengthened the vernacularity but also activated economic, environmental and social growth due to this high level of participation among inhabitants.

This way of preserving vernacular architecture is not possible without combining community-led initiatives with adaptive reuse strategies. Adaptive reuse in itself cannot guarantee the preservation of vernacular heritage. Careful collaboration is needed in order to merge the two separate strategies. This collaboration creates a form of sustainable heritage preservation, adaptive vernacular reuse.

The long-term effects of adaptive vernacular reuse can be seen by visiting the NDSM-wharf and comparing the current situation to the original redevelopment plans. The main criteria for design are still in place, with the focus on heritage preservation and an inclusive community still being the main design points. However, when compared to the original plans the area has become significantly more densely built. A division can be seen where east hosts the original historical buildings, and the west now hosts a modern high-rise mixed-use typology. The two strongly differ in atmosphere. However, this urge for densification can be seen throughout Amsterdam's industrial districts. Here, based on the vernacularity of the site, is chosen to either demolish the whole industrial district or to preserve the existing structures.

The fact that cities in the Netherlands are becoming increasingly more densely built is a trend that most likely won't slow down in the coming years. In this search for space industrial sites are more frequently being looked at as potential sites for this densification process. When studied it becomes clear that with the implementation of adaptive vernacular reuse practices these industrial sites indeed boast a lot of potential. However, adaptive vernacular reuse can only reach its full potential when; intensive collaboration, intense understanding of the vernacular and the presence of heritage buildings with the potential of being reused are present. When municipalities and stakeholders are willing to collaborate with local communities and invest in understanding the local culture, projects can be built that boost the economy, environment and social cohesion while still insuring that the local culture remains intact.



## 11 PHOTO REPORTAGE NDSM-WHARF

In order to get a better understanding of the NDSM-wharf a photo reportage was made. With use of photography the existing structures get captured in the way they are currently being used. Capturing the merge between the new functionality within the old heritage buildings was the main focus of this photo reportage. By capturing this interplay between old and new the effects of NDSM's adaptive vernacular reuse strategies become clear.

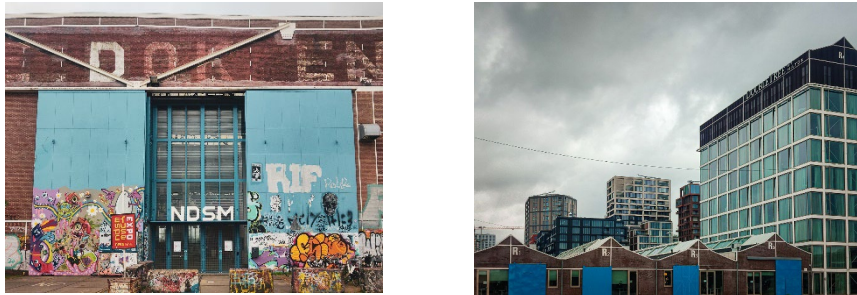


Figure 11. Renovated industrial heritage buildings

The current context of the NDSM shows a strong contrast between old and new. When standing on the eastern pier (formerly used for launching completed ships into the Amstel) you can see the newer high rise buildings towering over the woodworking and welding workshops. The same contrast is noticeable on other parts of the east side of the NDSM-wharf. However this difference between east and west NDSM is not as noticeable from the western viewpoint. The new buildings built in west NDSM have a more simple architectonic expression and modern street pattern. Difference in use of street art, road layout, use of public space and façade materials, colours and hierarchy make it easy to distinguish between east and west.



Figure 12. New mixed-use district on the west side of NDSM

During the excursion a visit to the NDSM-warehouse was made to analyse the effects of adaptive vernacular reuse from inside one of the heritage buildings. The NDSM-warehouse is part of the 'broedplaatsen' project and thus the central hub for artists and creators. The contrast that was clear from the context of the NDSM-site was also clearly recognizable in the warehouse. The large steel structure is a dominant subject in the photos. In this characteristic architecture lie these secondary structures dedicated to artist and creators. These secondary structures often brightly coloured and designed with unconventional architectural elements become an evenly dominant subject in the photo. Despite the difference in architectural form both the structure and the artist studios show a different contrast as the contrast between east and west NDSM.

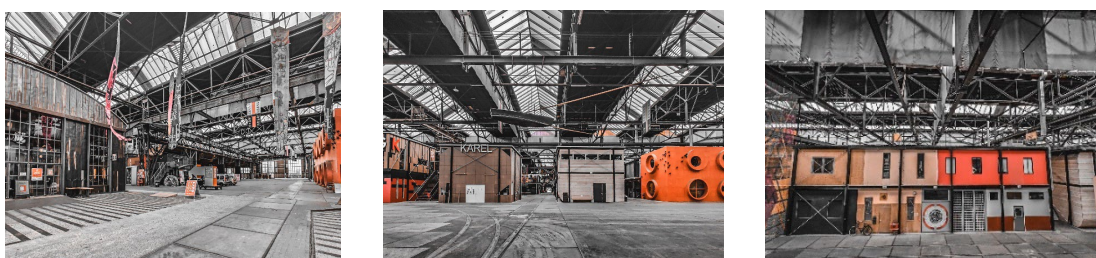


Figure 13. Broedplaatsen initiative present in the NDSM-warehouse

## 12 FORMAL OUTLINE

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- I. Introduction
  - A. Context
    - 1. Densifying Dutch cities facing a housing crisis
    - 2. Industrial heritage sites as potential foundation for redevelopment projects
    - 3. Integration of adaptive reuse and vernacular design
- II. Research questions
  - 1. Analysing Dutch vernacular architecture
  - 2. The integration of vernacularity into adaptive reuse architecture
  - 3. Evaluation on adaptive vernacular reuse as a lasting sustainable design method
- III. Identifying Dutch Vernacular Architecture within Industrial Heritage Sites
  - A. Mapping vernacular architectural elements
    - 1. Case study on NDSM-Wharf
      - I. Photo reportage, sketches, and analysis of the site through an excursion
      - II. Forming an opinion on how the NDSM-Wharf currently is experienced and how this relates or differs from the original plans.
    - 2. Framework of identified vernacular architectural elements.
      - I. The information collected from the excursion can be processed into chapter 1 on how Dutch vernacular architecture is present in industrial heritage sites.
  - B. Comparative Analysis
    - 1. Similar case studies with Dutch heritage sites that resemble NDSM-Wharf.
      - I. The aim is to find reoccurring elements in Dutch vernacular architecture in industrial heritage sites.
    - 2. Comparing all frameworks to identify similarities.
      - I. Comparing the similarities to see if and where the NDSM-Wharf differs or is like other redeveloped Dutch heritage sites. Does the NDSM-Wharf have its own unique architectural qualities?
  - C. Defining Dutch vernacularity
    - 1. Collection of Dutch vernacular design aspects
    - 2. Compiling an extensive framework of all Dutch vernacular design aspects combined
- IV. Integration of vernacular design and adaptive reuse architecture
  - A. Study on adaptive reuse design principles.
    - 1. Literature study
    - 2. Compiling the studied literature into design manuals/principles
  - B. Combining self-standing design principles into one
    - 1. Vernacular frameworks compared to adaptive reuse manuals.
    - 2. Looking for similarities, coherent design strategies and matching principles
      - I. Finding coherent fields where vernacular design meets adaptive reuse.
      - II. Combining the common principles into a new way of designing with vernacularity and adaptive reuse in mind
    - 3. Translating all findings into the 'adaptive vernacular reuse' design strategy
      - I. New term and design strategy useful for NDSM-Wharf and similar redevelopment projects
  - C. Adaptive vernacular reuse
    - 1. Implementation methods of adaptive vernacular reuse
      - I. To understand how adaptive vernacular reuse can be implemented in the current built environment.
      - II. Possibilities to evolve the adaptive vernacular reuse strategy to future needs or changes in the built environment.
    - 2. Sustainability, reduced demolition of buildings and preservation of heritage sites.

- I. The aim is to find out how adaptive vernacular reuse can help in higher levels of sustainability while still preserving heritage sites.
- V. The relevancy of NDSM-Wharfs vision on adaptive vernacular reuse
  - A. NDSM-Wharf as a Case Study
    - 1. The original vision of adaptive vernacular reuse
      - I. Lessons learned from the NDSM-Wharf project.
      - II. Current redevelopment projects that can be similarly influential as the NDSM-Wharf project
    - 2. Current views on how the effects are perceived in the current timeframe.
      - I. Overview of what visions and plans remained intact throughout the years.
  - B. Comparative Analysis with Other Case Studies
    - 1. Exploring different implementations of adaptive reuse
  - C. Lessons learned from the past.
    - 1. Understanding the impact of adaptive vernacular reuse
      - I. Is adaptive vernacular reuse a viable strategy that can hold up through time?

## 13 ANNOTATED BIBLIOGRAPHY

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Municipality of Amsterdam. (2023, 11 December). *NDSM-Wharf: naar woon-, werkgebied en culturele hotspot*.

Amsterdam.nl. <https://www.amsterdam.nl/projecten/ndsm-Wharf/>

This website provides insight into the transformation of the NDSM-Wharf. The NDSM-Wharf is categorized into residential, public space, services, and history. The municipality of Amsterdam provides an up-to-date selection on redevelopment plans planned or already completed. This source can be used to find actual information that is directly relevant to the NDSM-Wharf as a case study.

Anderson, S. (1999). Memory without Monuments: Vernacular Architecture. *Traditional Dwellings and*

*Settlements Review*, 11(1), 13–22. <http://www.jstor.org/stable/41757728>

This article gives an insight into the role memory plays in determining vernacular architecture. Explaining the differences in perception and embodiments of memory and the role these different types of memory have on architecture. The source gives an interesting view into what factors play a role in determining vernacular architecture.

Andrade, M., Morales, E. J., Rodríguez-Ramos, R., & Martínez-Ramírez, P. (2023). Reuse of port industrial

heritage in tourist cities: Shipyards as case studies. *Frontiers of Architectural Research*.

<https://doi.org/10.1016/j.foar.2023.09.005>

This article on the reuse of port industrial heritage used numerous case studies to investigate the challenges and opportunities relevant to transforming industrial heritage port areas. The article describes case studies from the Netherlands, one of which being NDSM-Wharf, which can provide specific insights into works of transforming this industrial heritage port area.

Bullen, P. A., & Love, P. E. (2010). The rhetoric of adaptive reuse or reality of demolition: Views from the field. *Cities*, 27(4), 215–224. <https://doi.org/10.1016/j.cities.2009.12.005>

The article written by P.A. Bullen discusses the process of determining whether a heritage building should be demolished or preserved. Underlining the key influences of this decision process. In this research adaptive reuse gets highlighted in a way that clearly shows the obstacles and benefits of the adaptive reuse design strategy.

CBS. (2021, 9 February). How do we use our land? - The Netherlands in Numbers 2020. How do we use our land? - The Netherlands in Numbers 2020 | CBS. <https://longreads.cbs.nl/the-netherlands-in-numbers-2020/how-do-we-use-our-land/#:~:text=Of%20the%20total%20surface%20area,living%20space%20and%20business%20parks>.

This source was used for finding information on statistics about land use in the Netherlands. In the introduction this source supports the claim that the Netherlands deals with a shortage of available space for urban expansion.

Gravagnuolo, A., Girard, L. F., Ost, C., & Saleh, R. (2017). Evaluation criteria for a circular adaptive reuse of cultural heritage. BDC. Bollettino Del Centro Calza Bini, 17(2), 185–216. <https://doi.org/10.6092/2284-4732/6040>

Gravagnuolo's article provides a detailed study on implementing adaptive reuse with regards to cultural heritage redevelopment in a sustainable framework. Using adaptive reuse as a sustainable measure for rejuvenating heritage sites is the focus of the research. The combination

Hourigan, N. (2015). Confronting Classifications - When and What is Vernacular Architecture? Civil Engineering and Architecture, 3(1), 22–30. <https://doi.org/10.13189/cea.2015.030104>

Hourigan's article provides an explanation on the basic concept of what vernacular architecture consists of. By providing a basic understanding of the elements and principles that make up vernacular architecture it becomes easier to study the vernacular architecture of the NDSM-Wharf.

Meurs, P., & Steenhuis, M. (2017). *Reuse, redevelop and design: How the Dutch Deal with Heritage*. Nai010 Publishers.

Meurs' book shows how redevelopment, reuse and heritage are approached in the Netherlands. By analysing Dutch buildings that have been redeveloped Meurs describes several ways of integrating historical buildings into the modern urban landscape. This analysis is on building as well as urban scale giving an extensive overview of transforming Dutch historic industrial buildings and districts.

Plevoets, B., & Sowińska-Heim, J. (2018). Community initiatives as a catalyst for regeneration of heritage sites: vernacular transformation and its influence on the formal adaptive reuse practice. *Cities*, 78, 128–139. <https://doi.org/10.1016/j.cities.2018.02.007>

This article focusses on vernacular transformation initiated by local communities. These community driven redevelopment projects offer an insight in how historical districts are shaped based on vernacular design approaches. This paper does not look at NDSM-Wharf specifically thus offers a more global insight into transforming historic industrial districts.

Plevoets, B., & Van Cleempoel, K. (2019). *Adaptive reuse of the built heritage: Concepts and Cases of an Emerging Discipline*.

The book written by Plevoets offers theoretical concepts and case studies on adaptive reuse design. An answer to the research question can be given by deriving theoretical and/or practical strategies from this book by translating them to the specific transformation of the NDSM-Wharf.

Telli, D., Manisa, K. (2018). Adaptive Reuse as a Design Approach “Industrial Structures”.

[https://www.researchgate.net/publication/356267200\\_Adaptive\\_Reuse\\_as\\_a\\_Design\\_Approach\\_Industrial\\_Structures](https://www.researchgate.net/publication/356267200_Adaptive_Reuse_as_a_Design_Approach_Industrial_Structures)

In the research done by D. Telli the different criteria for applying adaptive reuse to industrial heritage sites get studied. The research goes deeper into the value of industrial heritage sites and how to preserve this during adaptive reuse. Provided with case studies the research gives specific information on the effect of adaptive reuse within these heritage sites.

The International Committee for the Conservation of the Industrial Heritage. (2003). The Nizhny Tagil Charter for the Industrial Heritage. In <https://ticcih.org/about/charter/>.

This source provides a short and clear overview of points on industrial heritage sites. From identifying heritage sites to maintaining and conserving these sites the points give a quick and easy overview of important aspects that have to be taken into account when working with industrial heritage sites.

Van De Kamp, L. (2019). The heritagization of post-industrial re-development and social inclusion in Amsterdam. *Journal of urban cultural studies*, 6(2), 199–218. [https://doi.org/10.1386/jucs\\_00010\\_1](https://doi.org/10.1386/jucs_00010_1)

Focussing on social inclusion this article describes the effects on local communities of transforming historic industrial districts. This article used the redevelopment of Amsterdam North and dives deeper into how post-industrial heritage sites can contribute to the densification of the Dutch urban landscape.