MAKING SPACE FOR LIGHT INDUSTRY

An Examination of Light Industry Integration through Mixed-use in Amsterdam's Transformation Areas

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Master's Thesis of Science
Management in the Built Environment
Delft University of Technology

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Making Space for Light Industry:

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Master's Thesis | P5 Report
September 2021

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2020/2021

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Preface

This report is the culmination of all the work put into producing a Graduation thesis for the Management in the Built Environment Master's track at the Technology University of Delft.

The thesis explores the three main research areas of **light industry**, **mixed-use** and **transformations** in cities through the examination of the **Amsterdam** situation. This study aims to contribute to the existing body of knowledge on the subject of light industry in urban environments by using a case study design approach that focuses on the **NDSM-Werf**, a former shipyard site currently under transformation into an urban live-work district.

At this stage of the report, I would like to present my utmost gratitude and appreciation to all those who supported me throughout this thesis process especially during a pandemic:

My mentors, Erik and Birgit.
For guiding and supporting me through it all, and for sharing your insights and knowledge with me, even in the midst of a lockdown and internet-related technical issues.

Contributors to the research study.
To those who helped me along the way and agreed to participate in my study: your contributions are greatly appreciated.

My dear friends.
To those who I saw on a weekly basis on campus (when it finally opened again) as we put those hours into thesis writing: thank you for all your support, coffee, love and laughs especially when anxiety set in.
To those from afar especially during lockdown: thank you for your kind words of support, love and virtual hugs.

My family.
My brother for checking up on me at the right moments and keeping my spirits up;
My mom for her continous support and love from the other side of the world even when that comes in the form of her making sure I was drinking enough water over Face-time;
& my dad for being my confidant and sounding board. For supporting me from the other side of my phone screen, and giving me tough love at times when we both knew I needed it to be able to push through.

Thank you.

Abstract

The presence of industry within the urban environment is gaining significant traction in a number of cities around the world. It's growth and importance is fuelled by technology advancements that support both traditional local industry and advanced manufacturing. However, there is a lack of a vision and clear approach regarding industry in cities as well as competing interests for available space in urban environments. Since industry is typically considered as a weak land use, strategic efforts and strong interventions are required to ensure its presence in cities is retained and promoted within the urban fabric (Hill, 2020). This study focuses on examining the conditions that can influence the feasibility of integrating light industry when transforming industrial estates (bedrijventerreinen in Dutch) into new urban mixed-use districts in Amsterdam, The Netherlands. NDSM-Werf, a former shipyard situated on the northern banks of the IJ, is the chosen case study site. In this research, the scope of light industry covers a broad range of industrial and supporting activities that in theory can be incorporated in an urban mixed-use setting. The research methodology includes an extensive literature review, followed by empirical research that is made up of three main components: the Planning & Policy Dimension, the Stakeholder Dimension and the Spatial Dimension. The data collection methods used include documentation analysis in which a range of governmental and non-governmental documents were reviewed; semi-structured interviews with public, private, and third party stakeholders as well as experts; and additional desktop research where applicable. Outputs include the review of planning and policy processes, stakeholder mapping and a spatial analysis that involved the identification of City of Making (CoM) patterns derived from the Foundries of the Future book (Hill, 2020) using the case study site of NDSM-Werf. Main findings include the identification of six key conditions that were found critical to consider to integrating light industry in urban mixed-use developments of transformation areas in Amsterdam. Recommendations are provided at both the city level of Amsterdam and for the NDSM-Werf site in particular, directed at key stakeholders identified in the research. In addition, suggestions for further research into relevant topical areas are presented.

Key words – *light industry, mixed-use, transformation, redevelopment, Amsterdam, NDSM-Werf, urban development management, industrial estates, workspaces, urban environment, urban manufacturing, pattern language, case study*

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Chapter 1 | **Introduction**

1.1 Problem Statement

Until recently, industry as a land use has not been directly associated with urban environments. This is primarily due to the fact that it was gradually pushed out due to environmental factors and production considerations (Corneil, 2020; Hatuka & Ben-Joseph, 2017; Hill, 2020). In **present day**, industrial lands in cities including major Dutch cities are in **significant decline** as a result of pressures to redevelop and convert them into land uses that are considered of higher value than industry. In most cases, **mixed-use development** is chosen as the means to redevelop these areas, which would not normally accommodate the incorporation of industry-related functions. In recent years, it has been determined that there are influences and motivations at play to **re-integrate industry** into urban environments such as local production and innovation, employment creation, livability, and environmental priorities (Hatuka & Ben-Joseph, 2017; Hill, 2020). However, there is a lack of a vision and clear approach regarding industry in the context of cities and the existing planning systems and processes are not able to properly accommodate and capture this transition (Hatuka & Ben- Joseph, 2017; Hill, 2020). In addition, there are competing interests for the available space in urban environments. In the case of the Netherlands, the housing shortage has led to significant pressures to develop housing (Ministerie van Algemene Zaken, 2020). As a result, not all actors recognize the value industry brings to cities (Ferm & Jones, 2017). Since industry has been considered as a weak land use compared to other prioritized land uses, it requires strategic effort and strong interventions to ensure its presence in cities is retained and promoted within the urban fabric (Hill, 2020). As a result of these developments, the study focuses on examining the conditions that relate to the integration of light industry in transformation areas in the City of Amsterdam. This includes the **review of planning processes and tools** and the **views and roles of key stakeholders** to the transformation of particular case study site.

1.2 Research Aims & Objectives

The research aims and corresponding objectives of this study as it relates to the research problem as stated above are presented below.

Aim 1: To gain greater insight on the **planning system** and **policy framework** in Amsterdam

Aim 2: To examine the **feasibility of light industry integration** in urban mixed-use developments of transformation areas

Aim 3: To inform and help guide key stakeholders in developing appropriate interventions & strategies to address the transition to a future where (light) industry is part of the urban mixed-use fabric

Objective 1: By understanding the influence of and approach taken by (local) public bodies in relation to the transformation process of industrial estates into new live-work areas and the accommodation of (light) industrial workspaces

Objective 2: By capturing the **interests, priorities and means of key stakeholders** with regard to the case study site of NDSM-Werf along the Northern Banks of the IJ in Amsterdam Noord.

Objective 3: By shedding light on the situation in transformation areas and identifying **constraints & opportunities spatially** and in the (existing and future) roles and capacities of key stakeholders.

1.2 Research Questions

Given the research aims and objectives presented on the previous page, the main research question (RQ) is provided below:

Main Research Question

What are the key **conditions** that need to be considered in the integration of light industry in urban **mixed-use developments** of **transformation areas** in Amsterdam?

To support the overarching research question presented above, **3 sub-research questions** (SRQ's) were formed, as presented below.

Sub-Research Question 1

What are the processes and planning instruments involved in guiding/steering the **transformation** of industrial estates into **mixed-use developments?**

Sub-Research Question 2

What are the **means** of public bodies to retain and promote light industry?

Sub-Research Question 3

What are the **interests** of key stakeholders and what are their **means** to achieve them?

The three sub-research questions delve deeper into the research issue at hand.
The **first sub-research question** was developed to establish context as it relates to the transformation of industrial estates into mixed-use developments by attempting to capture what is typically involved in the transformation process in Amsterdam from the planning process and policy angle.
The **second sub-research question** focuses directly on the topic of light industry and aims to capture if and how public bodies especially the municipality of Amsterdam are retaining and promoting it.
The **third sub-research question** expands the scope to other key stakeholders and was formulated to capture the interests and associated means pertaining to the selected case study of NDSM-Werf in Amsterdam to ultimately determine if light industry emerges as an alligned priority. All three sub-research questions were formulated to be applied to the case study site of NDSM-Werf, which will be ellaborated on further in the report.

The research questions (RQ and SRQ's) were derived from the main findings of the Literature Review that is presented in Chapter 3 of this report.

Please note that the research questions are to be answered by the Empirical research, which is further described in Chapter 2 (Research Design & Methodology), along with the research method(s) used to address each sub-research question and expected outcomes.

1.4 Conceptual Model

For the research study, a **conceptual model** was developed in conjuction with the research questions was and influenced by the Literature Review. Here, the research context was established to encompass industrial estates (bedrijventerrein in Dutch) that are designated for transformation within the city of Amsterdam. As presented in Figure 1, the scope of research (indicated within the red dashed boundary line) focuses on the influence of the **planning system/ policy framework** set by the public authority and of other **key stakeholders** on the possible integration of light industry (new and existing) as part of the trasnformation of industrial estates into new live-work (mixed-use) developments. Elements such as land use pressures, industry activities considered as 'heavy' and the relocation of industry outside of these industrial estates are excluded from the scope of research. This model was created to act as a guide for the Empirical research portion of the study.

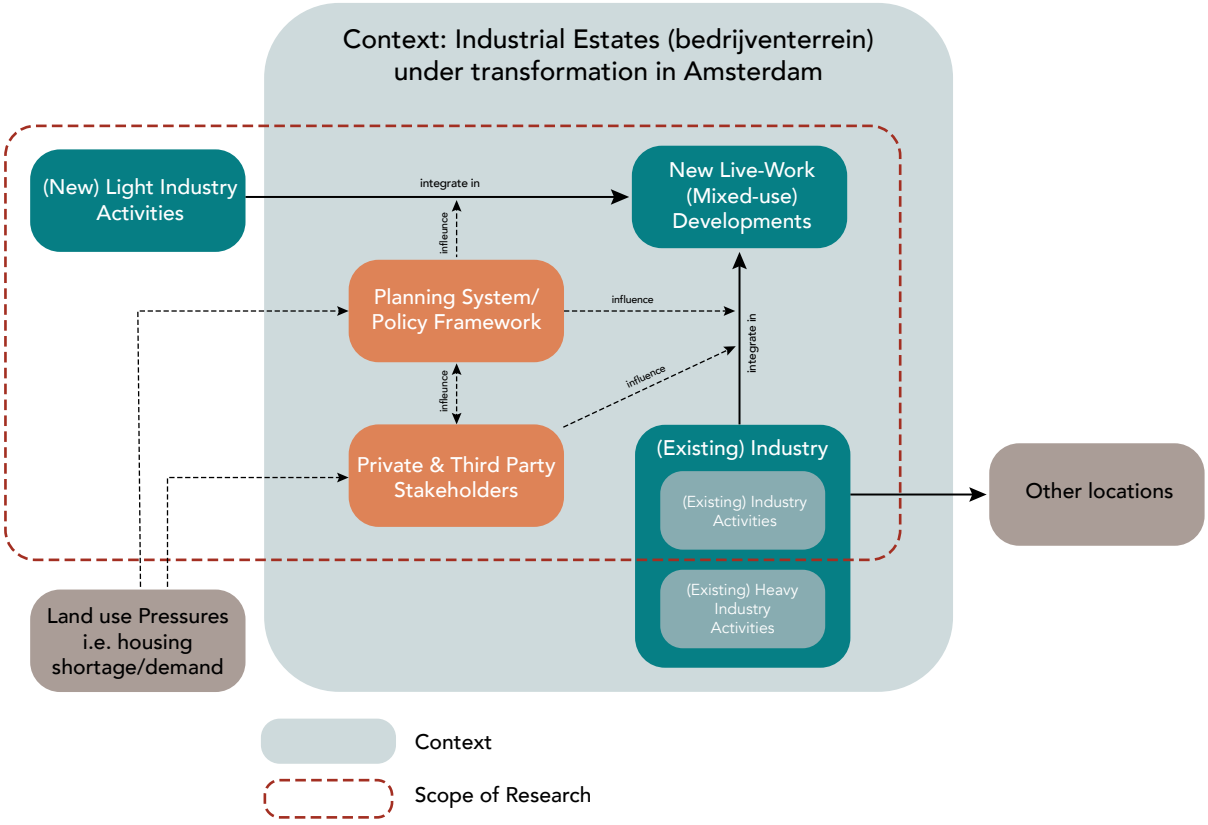

Figure 1: Conceptual Model

1.4 Societal Relevance

Industry in the urban environment is a growing phenomenon in both European and American cities. It's growth and importance has been fuelled by technology advancements that support both traditional local industry and advanced manufacturing such as additive manufacturing, robotics, and Artificial Intelligence (AI) related manufacturing. In addition, the reshoring of overseas production continues to increase, especially in the era of COVID-19 and e-commerce. (The Economist, 2020; Lázaro, Sosef, Gelnik, & Poulis-Leinberger, 2020). This reflects the demand for shorter lead times, greater customized manufacturing capabilities and the need for more control over supply chains. Businesses also want to better foster innovation by locating research & development (R&D) activities, such as prototyping and testing, closer to their engineering and design centers (Hill, 2020). The overall economic impact of urban industry on the local community is substantial, as it is estimated that each manufacturing job is linked to 2 to 3 supporting jobs (Hatuka & Ben-Joseph, 2017).

Space for industry is very limited, as industrial displacement has been occurring in most cities (including cities in the Netherlands) due to pressures from other land uses, such as housing (De Boeck & Ryckewaert, 2020). The integration of light industry

as part of urban redevelopments is possible and desirable. In addition to obvious economic impact and business reasons, urban industry can help address urban sprawl, strengthen the work-live environment for employees and become a major player in the Circular Economy. The challenge is to find ways to better retain and promote industry in the urban environment. It is a complex question as there are competing land uses with higher valued sectors and the perception in communities that industry is not a compatible land use in a mixed-use environment still exists (Grant, 2002). It will demand significant changes to the way planning is undertaken moving forward and will require further investment and support from public and private parties as well as community-based organizations. This thesis aims to provide further insight to the issues relating to light industry in industrial estates designated for transformation within Amsterdam.

1.5 Scientific Relevance

Within the academic and scientific realm, this graduation work can contribute relevant and pertinent knowledge to a number of areas. Urban planning and real estate development, in particular, can benefit from findings relating to the integration of light industry into the urban fabric specifically transformation areas via mixed-use developments. There will most likely be implications to economic development as industry is typically considered as a weak land use compared to higher-valued land uses such as commercial and residential. In addition, industry is one of the harder aspects of the economy to mix with other land uses, especially sensitive functions such as housing, therefore this graduation research should provide greater insight on current and planned efforts to achieve this. This research topic will likely have linkages and potential implications for policy initiatives and regulations in relation to environmental sustainability, livability and planning considerations and decisions concerning light industry and mixed-use developments within urban environments.

1.6 Overall Thesis Outline

For an overview of the different components of the thesis research that is included in this report, a comprehensive outline is provided in Figure 2 on the following page. Up to this point in the Introduction, the research problem at hand has been presented, along with the research aims, objectives and research questions, which are derived from the Literature Review that was conducted prior to the the Empirical portion of the research.

The three main parts of this research study are as follows:

Part I: Literature Section
Part II: Empirical Section
Part III: Synthesis

Both Part I and Part II are marked in Figure 2 using dashed lines. The chapters and sub chapters that make up these two parts respectivley will be ellaborated on in the following chapter (Research Design & Methodology).

The reports ends with Part III: Synthesis in which is comprised of Main Conclusions, a Discussion, Recommendations, future research avenues and a Reflection. Please note that References and an Appendix is provided, which is not captured in the outline diagram.

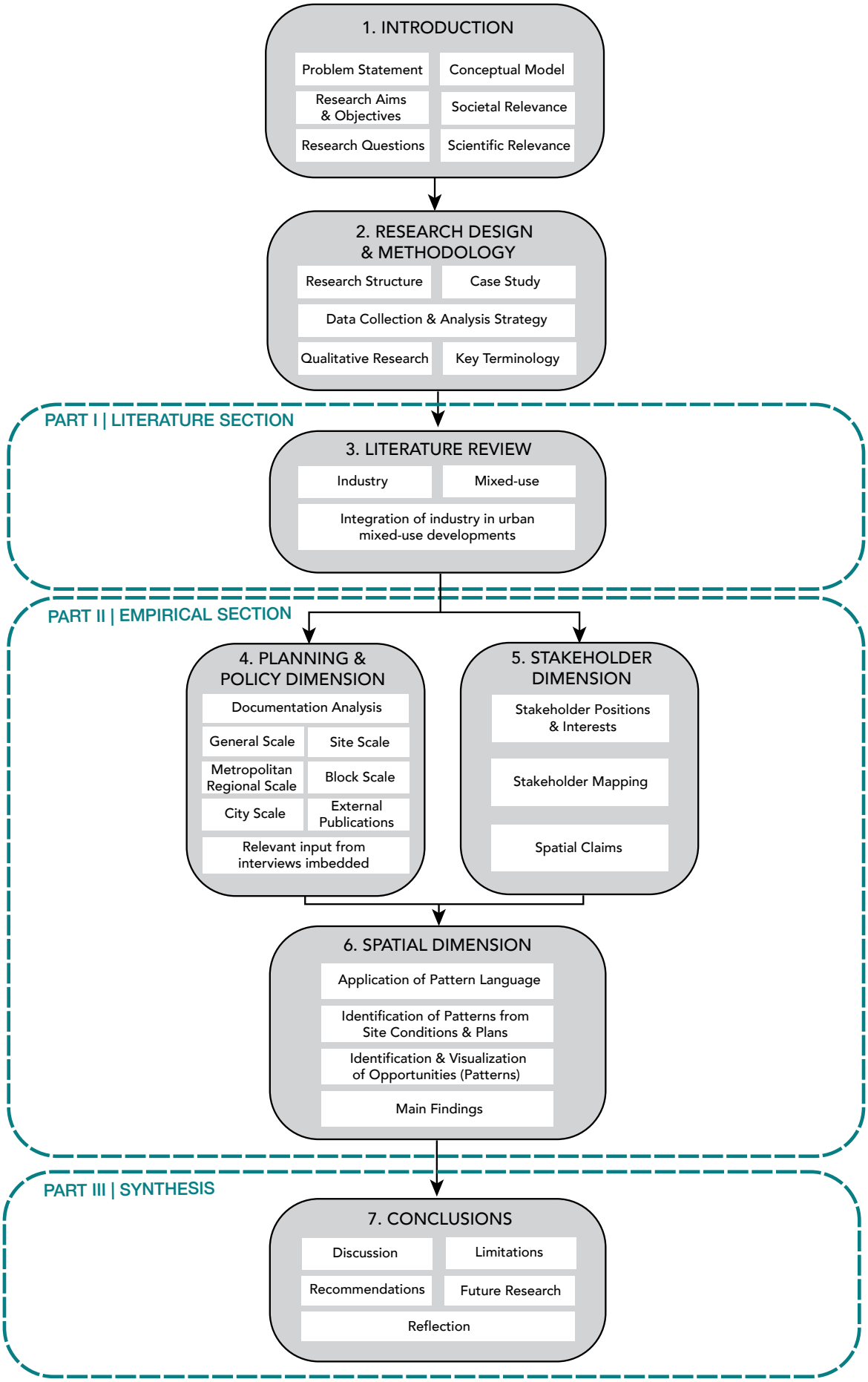

Figure 2: Outline of P5 Report

Chapter 2 | **Research Design & Methodology**

In this chapter, the approach used for the design and metholodology of this research study is presented. The research structure that preceeds this chapter will first be described, followed by details on the case study design in which the empirical research is centered around. and key terminology.

2.1 Research Structure

2.1.1 Part I: Literature Section

The **Literature section of the research study** is primarily comprised of an **extensive literature review** (Chapter 3) on the following topics as they relate to the research focus:
(1) industry, (2) mixed-use, and (3) the integration of industry in urban mixed-use developments

The Literature Review was conducted via **desktop research**, in which the main findings of the literature review had **informed the problem statement**, which provided a **jumping-off point** for the research aims and objectives, and ultimately the **formation of the research questions** (as presented in the Introduction chapter). The Literature Review covered the theoretical aspect of the research, which precedes the Empirical portion of the research. For the remainder of the research, other methods are used to collect qualitative data.

2.1.2 Part II: Empirical Section

The **Empirical section** of the research study consists of 3 main chapters: The Planning & Policy Dimension (Chapter 4), the Stakeholder Dimension (Chapter 5), and the Spatial Dimension (Chapter 6). As mentioned above, these chapters emcompass the case study that was selected for this research, which is ellaborated on in the following sub-chapter. The three dimensions (chapters) are intended to ultimately answer research questions at hand, which are breifly discussed below:

Chapter 4 (The Planning & Policy Dimension) covers the more factual, objective aspect of the Empirical Research, in which **documentation published over time at different scales** are analyzed and then compared by applying the following lens: transformation, mixed-use and the (integration of) light industry. As the majority of the documents reviewed are prepared by the municipality, Sub-Research Question 1 and a portion of Sub-Research Question 2 are addressed in that chapter.

Chapter 5 (The Stakeholder Dimension) examines the **stakeholder perspectives**, in which a range viewpoints, notions and positions as it relates to the integration of light industry in mixed-use developments of transformation sites, specifically NDSM-Werf, are captured. Findings are based on the qualitative data extracted from interview transcripts. This chapter also includes capturing **stakeholders' interests** through stakeholder mapping and the identification of spatial claims. In that chapter, a portion of sub-research question 2 and sub-research question 3 are addressed.

Chapter 6 represents the Spatial Dimension, which covers the **spatial aspects and conditions** of the case study site. For this particular dimension, the main aspects of the **first two dimensions** (Planning & Policy and Stakeholder) are merged and interpreted into a spatial capacity. This is achieved by applying the pattern language from the Foundries of the Future book (Hill, 2020) while examining the most current spatial plans to determine if considerations and/or actions have been captured (by the municipality or other parties) that accommodate light industry businesses in the mixed-use (live-work) development plans for NDSM-Werf. In addition, a major component of the spatial analysis is identifying potential opportunities from site conditions and plans, which are primarily derived from interviews conducted with the research participants. That particular chapter is more output-oriented and is closely linked to the recommendations.

These three parts that make up the Emperical Section on their own and in combination with each other are integral in addressing the main aims and objectives of this study and ultimately the research questions that are posed.

2.2 Case Study Design

In order to effectively answer the main research question and associated sub-research questions as presented in the Introduction chapter, the empirical research is conducted using the research strategy of a **case study**, in which a **single case** is examined. Due to the recent growth, interest, and corresponding availability of data on the topic of **industry in the urban environment**, the case study is an appropriate method to deeper explore **the planning process** and **stakeholder interests and intentions** that contribute to the development of light industry in this setting. Considerations were made regarding possibly conducting a case study in which multiple sites in different Dutch cities are compared. However, the decision was made by the researcher to conduct a **more in-depth, detailed examination of one case**.

In order to select a case that is most appropriate for the purposes of the empirical research, **selection criteria** were developed and used as a means to examine potential case study site options. The determined criteria are as follows:

Figure 3: Workspace in Fiction Factory for manufacturing/production activities & machinery [Own photograph]

Criterion A

An **urban industrial area** designated or already under (mixed-use) redevelopment with at least **one** of the following characteristics:

- ☐ There are existing (light) industry activities that are (potentially) under threat of being pushed out due to exterior forces such as housing pressures/obligations on the lands
- ☐ The local authority (municipality) has shown interest in maintaining and retaining light industry in the area via mixed-use developments
- ☐ Other stakeholders are contributing to supporting, promoting and/or advocating for light industry activities

Criterion B

The **location** of the case site is also a critical criterion, which needs to be:

- ☐ Accessible for researcher to conduct site visits especially when travel restrictions are in place (due to COVID-19)

Based on the selection criteria provided, it was determined that **NDSM-Werf in Amsterdam** is a suitable candidate for this research.

2.2.1 Selected Case: NDSM-Werf

Based on the limited desktop research conducted on NDSM-Werf prior to conducting any empirical research, this site met **sub-criterion 1 & 3 of Criterion A** as they are the most applicable criteria for that particular site. It was determined that NDSM-Werf initially housed a major shipyard operation on the northern banks of the IJ river (Figure 5). More recently, it has been undergoing a major transformation into an urban mixed-use district, authorized by the municipality of Amsterdam (Gemeente Amsterdam). Images of the original NDSM logo and the site's early stages of redevelopment are provided in Figures 4 and 6 respectively).

In Figure 7 on the next page, industrial estates (bedrijventerreinen) designated for transformation within the Amsterdam area are captured in a blue green colour using GIS mapping, which includes the case study site of NDSM-Werf. It is also important to note that the site is currently divided into three separate sub-areas, in which development plans vary. These are ellaborated on in the Emperical portion of the study. In Figure 8, a top view 3D rendering of NDSM-Werf at its current state is presented, in which the burnt orange colour indicates buildings/ spaces that were determined to currently house industrial businesses and activities.

Although the researcher developed the structure of **Criterion A** in such a way that only 1 sub-criterion required to be met, NDSM-Werf exceeded the established requirements. In regard to **Criterion B**, the location of NDSM-Werf meets the location requirement as the site is located in Amsterdam, The Netherlands and is easily reachable by public transportation for site visits even with COVID-19 restrictions in place.

NDSM-Werf is one of multiple industrial estates situated along the northern banks of the IJ in Amsterdam that have been designated for large-scale transformation or intensification. The NDSM-Werf site in particular has had **limited research conducted** to date compared to its neighbouring counterparts, is at its **mid-point of its redevelopment** and is of an **appropriate scope/size** for this particular study.

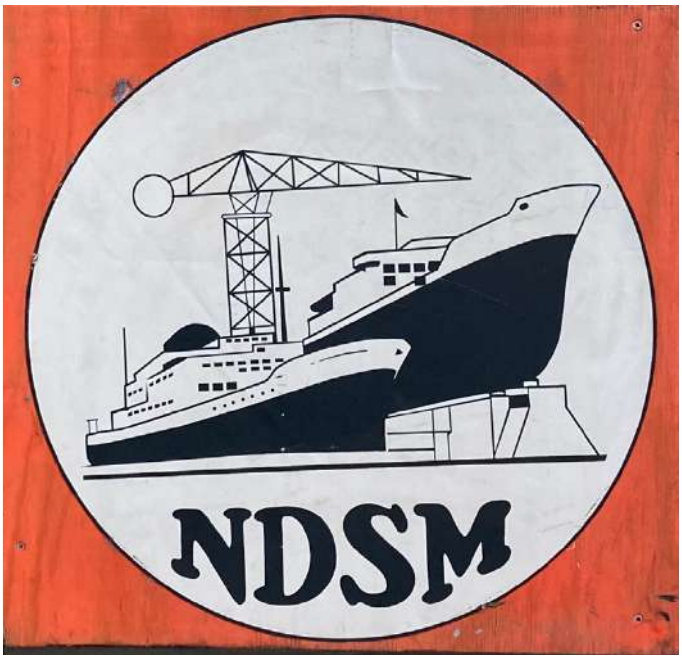

Figure 4: Original logo of NDSM zoomed in [Own photograph]

Figure 5: NDSM-Werf during its original shipbuilding operations (Retrieved from Made up North, 2020).

Figure 6: NDSM-Werf prior to/in early stages of redevelopment (Retrieved from Cie., 2021).

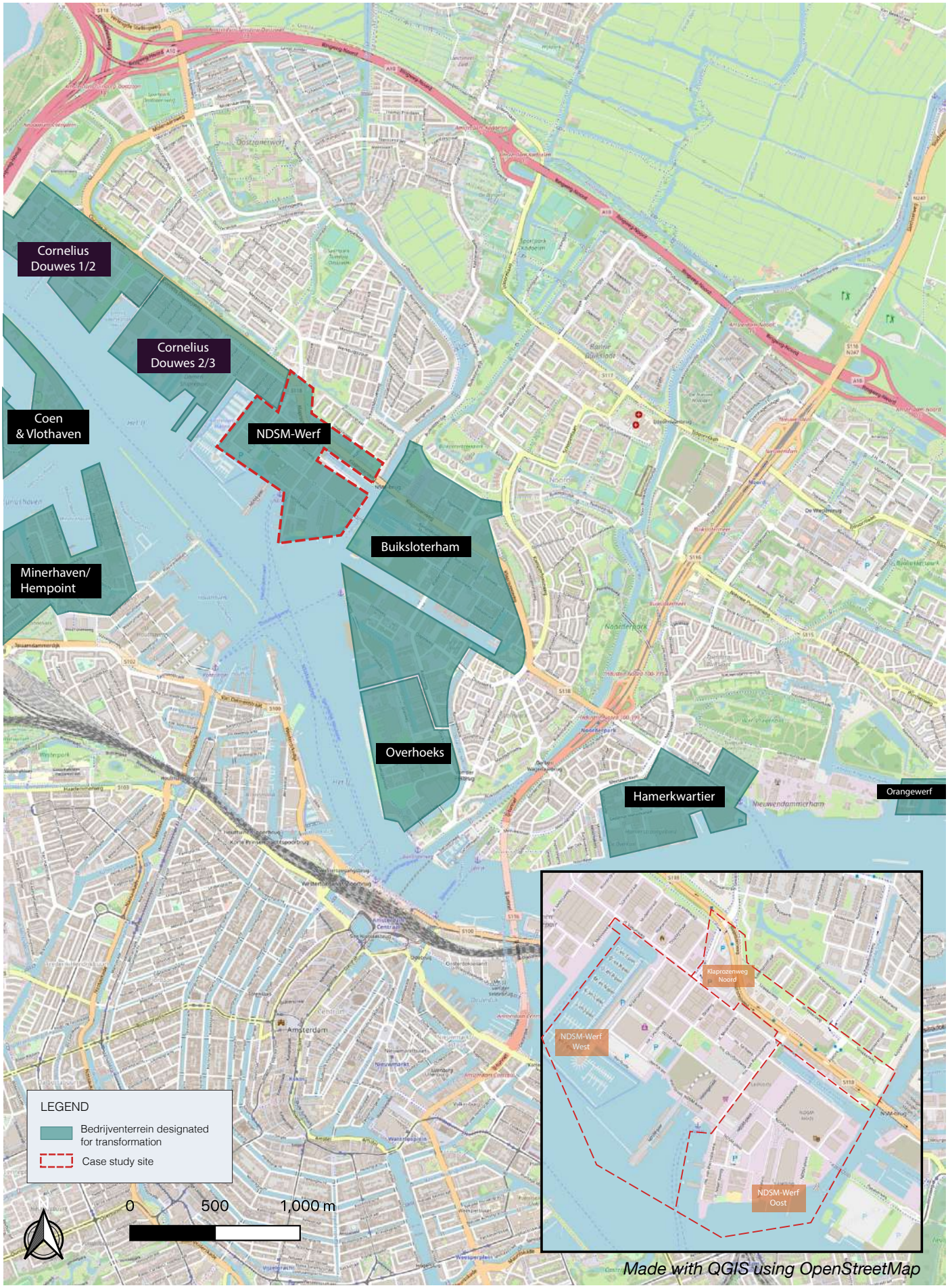

Figure 7: Industrial estates (bedrijventerreinen) designated for transformation in Amsterdam specifically along the (northern) banks of the IJ with a zoomed-in map of NDSM-Werf (case study site) (Adapted from Gemeente Amsterdam, 2017 & Gemeente Amsterdam, 2020b using GIS Mapping).

Figure 8: Top view 3D rendering of NDSM-Werf (the case study site) in its current state at the time of the research study

2.2.2 Data Collection

The Empirical Portion of this research study primarily uses **qualitative data collection methods** of both primary and secondary data. They include **documentation analysis** and **semi-structured interviews, which are ellaborated on below.**

Documentation Analysis

For the documentation analysis, secondary data was retrieved from a range of documents that were published in the last 20 years at the following scales: general, regional, city, site and block (Figure 9). They include **policy and strategic planning documents** prepared by the municipality, as well as **development plans** and **explorative publications**. The majority of the documentation analyzed were prepared by a public body (i.e. Gemeente Amsterdam) with the exception of publications released by third and external parties that were determined to be relevant for the purposes of this study. The purpose of this exercise is to gain a comprehensive understanding of the planning systems, processes and decisions that relate to the transformation. light-industry and mixed use themes of this study. By conducting a documentation analysis, the secondary data extracted adds value on top of the primary data extracted from the interviews, especially surrounding the public party narrative.

Figure 9: Examples of documents analyzed at each scale (left to right: General, Regional, City, Site, Block)

Semi-Structured Interviews

For the purposes of the Empirical research, the primary qualitative data collection method that was selected is the **semi-structured interview**. The researcher is aware that there are different types of interviews that can be conducted (structured, semi-structured and open), however, a semi-structured interview provides enough structure to direct the conversation, but also allows room for the participant to expand on certain topics if they choose to. In addition, the researcher will be able to interject probing questions if needed to gather relevant information and knowledge from the research participants. It is necessary that the researcher is prepared for each interview beforehand to maximize the time with each research participant, and develop a good rapport to gain their trust and confidence to obtain their perspectives and opinions.
Ideally, face-to-face interviews in real time are preferred to properly develop a good rapport with each research participant. However, due to the circumstances surrounding the COVID-19 situation and associated restrictions, all the interviews were conducted on virtual platforms, either Zoom or Microsoft Teams. It was expected that the researcher would likely experience challenges with the language barrier. However, by providing the research participants the main interview questions ahead of time in order for them to be comfortable answering in English during the actual interview, these possible issues were mitigated. The option to translate the questions to Dutch was offered, but was found not to be necessary.

With semi-structured interviews, the sampling method used was **purposive sampling**. Qualitative research typically involved the application of purposive sampling, which takes a different approach than the random sampling approach used for quantitative and statistical-based research (Bryman, 2016). The purpose of this particular approach is to identify participants with relevant knowledge and information that can ultimately answer the research questions of the study (Bryman, 2016). Under purposive sampling, different techniques can be

applied. For the coordination of the semi-structured interviews of this research, two specific techniques were applied. To start, the technique of **snowball sampling** was implemented, which implies selecting a first participant(s) and using their connections and recommendations to gain access to more participants with relevant knowledge on the research topic (Bryman, 2016). Simultaneously, the technique of **strata or stratified sampling** was applied, in which groups are formed based on their backgrounds and perspectives. These predetermined groups were applied to structure the research participants and process accordingly and are as follows: public, private, third party, and end-users. These stratified groupings remain intact to a degree throughout the interview process. The snowballing process led to interviewing addition research participants who do not fall under the pre-formed groups. For the purposes of this research, they have been labeled as **experts** and are not considered as direct stakeholder of the case study site. The initial goal was to conduct between 8 to 13 interviews, in which each stratified group were represented equally. In Table 1, the composition of the interview groups are presented. In total, 14 interviews were conducted in the time span of 2 months, all using virtual platforms ranging from 45 to 1h 30 minute conversations. Details of the interview participants are provided in Chapter 6.1. The research participants were asked to sign a consent form to conduct the interviews. Prior to commencing the interviews, permission to record the conversations were asked for and granted. The recordings were then transcribed using an online service then coded using Atlas.ti in which in which transcripts were created from the recordings.

In regard to the formation of the interview questions, the Manifesto Points from the Foundries of the Future book (Hill, 2020) were used, specifically Protection, Good Neighbourhood and Support, as the basis of the main interview themes that were applied across the interviews, with slight variations in how the questions were structured depending on the research participant. In addition, the research questions are linked and informed by the 'Liveable Manufacturing' Project project in the framework of the Dutch Actie Agenda 'Working together on the strength of design', led by Birgit Hausleitner and Barbara Heebels. A general interview guide is provided in the Appendix A.

When analyzing the interviews content from the transcripts, Atlas.ti was used, in which two different methods of coding were applied – assigning codes based on relevant themes and organizing quotes by interview questions asked. This was proven effective in ensuring key quotes were captured accordingly.
In addition to the data collection methods used, **stakeholder mapping tools** are used to capture the interests of stakeholders. A **spatial component** is also presented in this report, in which patterns from the Pattern Language in the Foundries of the Future book (Hill, 2020) are applied to the case study site.

Table 1: Composition of interview groups by organization and stakeholder type

Sampling Group	Interviews	Organization	Stakeholder Type
PUBLIC	3	Gemeente Amsterdam (Ruimte en Economie Cluster | Urban Planning)	Local Government Authority - Municipality
		Gemeente Amsterdam (Ruimte en Economie Cluster | Land Development)	
		Gemeente Amsterdam (Ruimte en Economie Cluster | Economic)	
PRIVATE	4	BMB ontwikkeling	Area developer
		Lingotto Development	Real estate developer/Leaseholder of plot(s) in an A-Block (-Werf West)
		COD Development Pioneers	Real estate developer/Leaseholder of plot(s) in an A-Block (-Werf West)
		Brand Activation Company	Company/Leaseholder of plot(s) in an A-Block (-Werf West)
THIRD PARTY	2	ORAM	Business association
		Made up North	Foundation (NGO)
END-USER	3	Bicycle Making Studio	Light industry business recently relocated outside of NDSM-Werf (past)
		Visual Arts & Welding Studio	Light Industry business currently operating in NDSM-Werf Oost (existing)
		Interior Building/Set Design Business (Fiction Factory)	Light industry business situated outside of NDSM-Werf with interest in NDSM-Werf (future)
EXPERT	2	Spontaneous City International	External parties involved in conducting research on manufacturing/ production activites in urban environments
		Platform_31	

Ultimately, these research methods are used to address the sub-research questions (SRQ's) that stem from the overarching research question (RQ). This is presented in Table 2 on the following page, where for each sub-question posed, the **research method** selected is indicated as well as the **intended outcomes**.

Table 2: Breakdown of Research Questions/Methods/Outcome

<table>
<tr><th colspan="3">Main Research Question</th></tr>
<tr><td colspan="3">What are the key conditions that need to be considered in the integration of light industry in urban mixed-use developments of transformation areas in Amsterdam?</td></tr>
<tr><th>Sub-Research Question</th><th>Research Methods</th><th>Intended Outcomes</th></tr>
<tr><td>What are the processes and planning instruments involved in guiding/steering the transformation of industrial lands into mixed-use developments?</td><td>Documentation Analysis
• Review of planning & policy documents within the scope of Amsterdam
• Extracting information regarding redevelopment/revitalization of urban industrial sites and instruments used in Amsterdam – at city, site and block scales (where relevant)
• Extracting information on mixed-use developments (process & instruments) in Amsterdam

Semi-structured interviews conducted with:
• Public authorities (from relevant de-partments) with knowledge on the transformation process
• Preferably involved in the transfor-mation of the Northern IJ Banks and the case study area of NDSM Werf to find out how industrial activities are typical-ly addressed
• Potentially with non-public stakehold-ers involved in these transformations (i.e. developer) for their insight (site & block level)

Desktop Research
• Additional online sources on the topic of redevelopment of industrial sites into mixed-use developments</td><td rowspan="3">Greater insight on how Amsterdam manages and approaches the redevelopment of their industrial lands & how mixed-use development is realized (the processes)

Compilation of processes and instruments that have been used to realize mixed-use developments on industrial sites and how/ if industry is accommodated as part of the redevelopment process

Spatial assessment of the NDSM-Werf case area in which patterns are identified when examining most recent plans and site conditions to determine constraints & opportunities to integrate light industry activities

Conclusions: Public bodies' perspective and priorities when it comes to mitigating industrial displacement

Compilation of interventions, instruments at the disposal of, used or consid-ered by public bodies to retain and promote light industry as part of mixed-use, transformation projects (if any)</td></tr>
<tr><td>What are the means of public bodies to retain and promote light industry?</td><td>Documentation Analysis
• Review of planning & policy documents within the scope of Amsterdam to identify means public bodies especially at the local level
• To determine if there are any intentions and associated efforts to retain and/or promote (light) industry and mitigating industrial displacement in the documents and plans

Semi-structured interviews conducted with:
• (Local) public authority
  • Relevant departments at Gemeente Amsterdam: Urban planning, land development, economic department
• Non-public stakeholders to gain their perspectives on the efforts of public authorities (especially municipality) to retain and promote industry</td></tr>
<tr><td>What are the interests of key stakeholders and what are their means to achieve them?</td><td>Desktop Research
• Preliminary online research on relevant stakeholders in NDSM-Werf and their interests

Semi-structured interviews conducted with:
• Public bodies (their own interests & means and input on the interests of other stakeholders)
• Private and third party stakeholders active in NDSM-Werf
• NGO's (representing businesses that are considered as light industry)
• Businesses of NDSM-Werf that would fall under light industry categorization</td><td>Stakeholder mapping: Penta-helix stakeholder map & 3D mapping (Power-Interest-Attitude)

Compilation of stakeholders' interests & means to determine how they influence (positively or negatively) the integration of light industry</td></tr>
</table>

2.3 Key Terminology

Before proceeding with presenting the research, **key concepts** are defined to provide clarity and address any ambuigity. Since there are different interpretations and definitions of certain concepts (which will be most apparent in the Literature Review in the next chapter), the following definitions of the terms present in the Research Questions are used accordingly.

Condition
A circumstance or factor that can determine or have influence on a certain situation or outcome.

Means
A form of action or method with the objective of achieving a certain outcome and/or interest(s).

Interests
Covers priorities and ambitions; involves invested time and energy.

Light Industry
The definition of light industry in the context of this research represents a cross-section of what is covered in the Literature Review under Relevant Categories of (Light Industry). It is broad reaching in scope, covering a range of industrial functions and activities that in theory can be integrated in an urban mixed-use environment. This includes the following: both traditional and more advanced/high-tech forms of urban manufacturing, makers specializing in creative production/crafts, and repairs and refurbishment services. (Figures 10, 11 & 12). Other than manufacturing/production-related activities, supporting activities such as distribution capacities ideal in scale and capacity for an urban environment are captured under this definition of light industry.

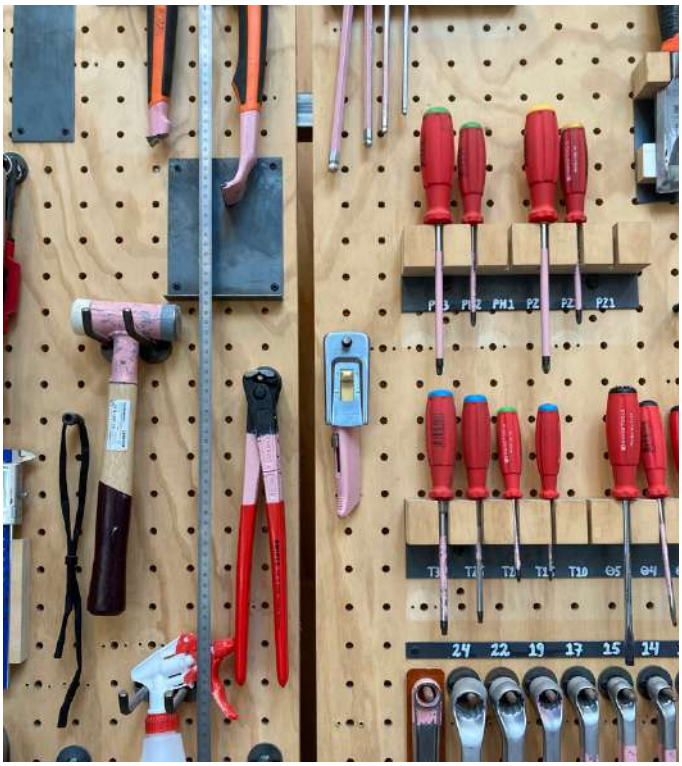

Figure 11: Tool organization at Fiction Factory [Own photograph]

In terms of scale, the focus is small to medium sized enterprises (SME's) in which the environmental category of 3.1, extracted from VNG's ***Guide to Business and Environmental Zoning*** (2009), is applied as a maximum threshold when it comes to nuisance.

The PDR classification system described in the Literature Review is used as the key reference for describing light industry in the context of this research.

Figure 10: Example of advanced/high-tech form of an urban manufacturing activity (retrieved from Made up North, 2020).

Figure 12: Rolls of fabric for upholstery purposes [Own photograph]

Mixed-use Development

Two or more land uses or functions in the same vicinity, in which light industry functions and activities would ideally be accommodated for through the provision of suitable workspaces. The following scales can apply: district, neighbourhood, block and building. Both horizontal and vertical mix types are applicable under this definition of mixed-use development. Example cases of these types of relevant mixed-use projects are demonstrated in Figures 13 & 15.

Figure 13: Rendering of Kabeldistrict - a new city district in Delft that will comprise of both housing and work functions with a high-tech makerspace within the premises of a former Dutch Cable Factory (Retrieved from Kabeldistrict Delft, 2021).

Figure 15: Maker Maze - Render of a mixed-use typology involving urban manufacturing for the Vierhavesblock site witihin the M4H port area development in Rotterdam by Izabela Slodka (Retrieved from Europan 15 NL Rotterdam, 2020).

Transformation Area

An industrial estate located within city boundaries that has been designated by the local public body to be transformed into a new urban mixed-use district/ neighbourhood (as shown in Figure 14).

Figure 14: NDSM-Werf - Former shipyard under transformation in Amsterdam Noord & location of case study [Own photograph]

PART I | **Literature Section**

Workshop area for upholstery in Fiction Factory, July 2021 [Own photograph]

Chapter 3 | **Literature Review**

In order to properly determine and refine a research focus for this Master's thesis, a **Literature Review** was conducted on existing literature and theory focusing on three main (theoretical) concepts: (1) industry, (2) mixed-use, and (3) the integration of industry in urban mixed-use developments. These concepts are first examined, where the most relevant areas and aspects are presented and discussed, touching upon different perspectives and interpretations where relevant. The third concept captured literature findings that are associated with the integration of the first two concepts, in which additional relations as well as knowledge gaps were revealed. Sources for the literature review were mostly scientific and peer-reviewed journal articles, in addition to relevant Master's theses, reports and books. The relevancy of the literature review findings to the research scope is provided, which is reflected in the problem statement provided earlier in the report. Please note that the term light industry is not explicitly used in the literature material examined per se, but the findings of the literature review were still found to be relevant to the scope of light industry that is used in this thesis research as shown under Key Terminology in the previous chapter.

3.1 Topic I: Industry

3.1.1 Background: Industry as an economic activity

Industry has experienced many iterations over the last few centuries in terms of composition, scale, and spatial elements. It initially took the form of small-scaled production of artisan goods in the 16th century, which was typically family-run and closely linked to other daily activities (Hatuka & Ben-Joseph, 2017; Hill, 2020). This was prior to the emergence of urbanization that was instigated by the industrial revolution, which led to the expansion of production capabilities and consequently the position and significance of industry in this new urban environment (Hatuka & Ben-Joseph, 2017). The dynamic between industry and the city is a central theme in many industry-related publications especially its progression over the decades from this point on. According to Hatuka & Ben-Joseph (2017), this relationship can be broken down into the following phases: "Emergence of the Industrial City, the Search for an ideal Industrial City and the Process of Deindustrialization" (p.11). Hill (2020) shares a similar account of the history of industry that was experienced in European cities placing emphasis on how manufacturing first developed in urban environments and the factors for its displacement outside of city limits. The function and significance of industry in the city context has changed over time (Lane & Rappaport, 2020). Lane & Rappaport (2020) provides the American perspective on the situation, and explains that the industry sector was originally considered as the "engine of growth", but then became a "source of political and social upheaval" as well as shifting from being recognized as the "concentration of economic power" to being a "symbol of social disinvestment" (p.1). This aligns with the phase breakdown of industry that was developed by Hatuka & Ben-Joseph (2017) above.

During the Industrial City Era, industrial/ manufacturing activities were interwoven into the urban fabric of cities, which benefited the economy significantly while organically forming a mixed-use landscape (Corneil, 2020; Hill, 2020). However, the living conditions in cities surrounding human health and liveability became a major concern. As a result, environmental regulations were introduced, significantly impacting and limiting the operations and presence of larger manufacturing companies especially in European cities (Hill, 2020). In order for the economy to survive without industry, large cities experienced a shift to a service-based economy starting from the 1960's, that captured a wide range of service and retail activities (Hill, 2020). Planning and zoning tools were implemented to separate land uses and functions to ultimately keep environmental hazards and nuisance-producing activities away from more sensitive uses like housing (Corneil, 2020). Globalization played an influential role in industry's eventual retreat out of cities. In particular, factors like pressures from competition with larger markets, cheaper labour costs to outsource production

overseas, and reasonably low transportation costs at the time significantly contributed to the de-industrialization of cities (Corneil, 2020; Hill, 2020).

For several decades, the **de-industrialization** of cities continued, pushing out large-scaled manufacturers and industries. While smaller-scaled manufacturers and businesses mostly stayed and maintained their operations, a significant amount of industrial land especially in city centres became vacant and attracted criminal activity (Hill, 2020; Love, 2017). American cities at this time also experienced this, where small-scaled companies had limited influence on city investment decisions, which led to poorly maintained public infrastructure in cities especially for urban industrial sites (Love, 2017). Eventually, investments by both public and private parties were made with the purpose of redeveloping these areas into a range of functions and facilities and ultimately improve urban life, which attracted the creative sector, who chose to occupy these areas and establish their operations such as workshops (Hill, 2020). Love (2017) classified industrial sites in general into two groups, 1st tier versus 2nd tier, where the 1st tier sites are in the most prime locations either centrally located or is at/near a body of water. In larger cities, these sites have all already undergone redevelopment to higher-valued land uses, resulting in a shift of redevelopment pressure to the next and final tier of industrial sites that remain in most cities (Love, 2017).

Other than de-industrialization, it was determined that a particular development pattern was emerging – the spatial clustering of certain business activities, commonly referred to as (sectoral) agglomeration. When examining this agglomeration effect in Chile between the late 1990's and the early 2000's, Almeida & Fernandes (2013) focused on determining whether the diversity of economic activities in terms of sector types in one vicinity positively affects the growth in productivity specifically on a long-term basis (Total Factor Productivity growth) of that particular agglomeration. As part of the research, by-products of the agglomeration of industrial activities were explored, such as knowledge attained from either being in close distance with competitors or with customers/direct suppliers, which are referred to as horizontal and vertical knowledge respectively. The research concluded that industrial clusters with a more heterogenous (mixed) composition in terms of economic sector types are found to experience greater production growth and success especially over a long period of time, which has serious implications to future policy decisions surround urban planning in Chile (Almeida & Fernandes, 2013). Brülhart & Mathys (2008) had conducted similar research on the clustering tendencies of manufacturing establishments within different European countries including France, Germany and Italy to determine if economic performance is improved as a result of agglomeration. Distinction between localisation economies versus urbanisation economies were made, in which the former captures the advantages of being near businesses in the same sector while the latter is concerning the advantages of being in close proximity to a diverse range of business activities and specialities (Brülhart & Mathys, 2008). Through empirical modelling, it was determined that productivity results in agglomerations where there are businesses of the same sector (localisation economies) are at the most part negative therefore present economic disadvantages, while clusters consisting of a cross-sectoral range of businesses and activities are mostly positive (Brülhart & Mathys, 2008). Therefore, the findings of both the work of Almeida & Fernandes (2013) and Brülhart & Mathys (2008) are in line with other to a certain degree.

According to De Boeck & Ryckewaert (2020), de-industrialization is still occurring, however, it is manifesting itself through the means of industrial gentrification, which is also known as industrial displacement in other publications. In present day, industrial gentrification/displacement is a growing threat in most cities, taking place when higher-valued land uses (typically residential or commercial) overtake industrial lands and spaces, undermining the remaining presence of industry in urban environments (Ferm & Jones, 2017; Lester, Kaza & Kirk, 2013). De Boeck & Ryckewaert (2020) adds that speculation and real estate price hikes associated with these high-valued land uses are the main factors that lead to industrial displacement. These pressured along with conflicting interests concerning the future of these industrial properties have resulting in significant tension in cities (Lester & et al., 2013). In European cities, pressures to develop more housing is the main cause of industrial displacement while in the North American context like Toronto and San Francisco, workspaces for traditional forms of industry are at extreme risk of being overtaken by commercial/industrial gentrification (Ferm & Jones, 2017). In the case of the Netherlands, Korthals Altes & Tambach (2008), at the time of their publication, revealed that Dutch local authorities have been investigating opportunities and means to expand the scope of housing to also include industrial estates through mixed-use. This is aligned with Ferm & Jones' (2017) remark above regarding the housing influence in European cities.

In publications by Ferm & Jones (2017) and Howland (2011), it was determined that efforts to directly safeguard industrial lands from land-use conversions were made, but in some cases, strategies have changed over time. In the case of London, UK, area-based designations were initially established to protect industrial sites in each borough from development pressures. However, over time, a managed release was issued, in which a set number of designated protected sites per year was released for development. Furthermore, these yearly release targets were greatly exceeded, resulting in a loss of approximately 20% of London's total stock of industrial lands to rezoning from 2001 to 2015 (Ferm & Jones, 2017; Hill, 2020). This caused major setbacks and challenges for industry/manufacturing-related businesses in terms of finding appropriate space to establish or even expanding their operations within the city limits (Hill, 2020). Ferm (2016) also adds that rather then protecting as much industrial lands as possible within the city like before, the city's strategy is now focused on allocating a set amount of 'affordable workspace' in mixed-use developments that are replacing the original industrial/employment lands. With this particular policy strategy, it seems that industrial activities are not being directly accommodated for/prioritized within the mixed-use developments once the industrial lands are converted and would be competing against other work-related activities and sectors for affordable workspace. Therefore, there is lack of assurances that industry would be safeguarded. In American cities where there still are critical ties between the local economy and industrial lands, Howland (2011) discloses that efforts to impede and mitigate the conversion of industrial lands were continuously being made by local planning authorities at the time of the publication. The situation in the Netherlands, on the other hand, involves the transformation of industrial lands into new mixed-use urban developments, which will be discussed under the Mixed-use section of this literature review.

3.1.2 Recent Developments

Although industrial displacement has been recognized as an ongoing issue that has been contributing to the de-industrialization of cities, recent events and developments have led to the revival of "domestic urban-centred production" (Hatuka & Ben-Joseph, p. 10). It is now apparent that the advantages of globalization for industry have eroded over time due to emerging factors such as increasing overseas labour and energy costs, complex logistical challenges as well as mounting concerns regarding the security of intellectual property (Hatuka & Ben-Joseph, 2017). Hill (2020) also noted the environmental implications of overseas production due to substantial energy consumption largely from the transportation of goods. As a result, this has led to the emergence of the reshoring and reindustrialization movements. The year 2015 was notable for both European and American cities in experiencing significant growth of local (urban) manufacturing primarily as a result of reshoring. Hill (2020) stated that 25% of the businesses that were originally outsourced overseas had returned production back to Europe, while Lane (2020) noted that a large portion of manufacturing activities and associated jobs that returned to America established themselves in inner city areas of the largest cities in the USA. This process, where overseas production activities are substituted with a more local-based production capacity, is coined as import replacement by Jane Jacobs (Hill, 2020). As mentioned above, urban manufacturing is not a completely new concept as it originates from the Industrial City era. However, Lane & Rappaport (2020) states that in its return, it has taken on different urban forms including makerspaces, innovation districts and vertical factories. In addition, Grodach, O'Connor & Gibson (2017) claim that "manufacturing is no longer defined primarily by large scale production,

heavy machinery and passive infrastructure" (p. 19). Instead, small-scaled business establishments specializing in manufacturing that are made up of under 50 employees dominate the manufacturing scene in many countries including Australia and the US (Grodach et al., 2017). This evolution is the result of the significant influence of technological advances on both product development and business process improvements (Lane & Rappaport, 2020; Hill, 2020). Hatuka & Ben-Joseph (2017) also mentions there are changes in the scale of production (down-sizing), a shift of workforce preference to a demography with a higher level of education and specific skill sets, as well as cleaner processes and practices that minimize overall nuisance (Hatuka & Ben-Joseph, 2017). These recent developments provide an opportunity for industrial/manufacturing activities to be more suitable and accepted in an urban environment moving forward.

Love (2017) has identified three types of industrial businesses that need to be situated in an urban environment due to their particular operational requirements: short distance and delivery time to customers, visibility of operations to customers, and proximity to critical supporting activities. According to the following publications, cities can gain significant benefits from accommodating and promoting urban industrial activities. Hatuka & Ben-Joseph (2017) claims that there are three reasons for this: production as it leads to a range of new employment opportunities within cities, growth in terms of a more robust economy and additional revenue, and the improved liveability and vitality of urban environments and their identities in terms of placemaking. Similarly, Hill (2020) identified four driving forces to emerge in recent years: "(1) Sustaining a thriving economy, (2) Stimulating innovation, (3) Addressing climate change & environmental impacts, and (4) Providing economic and social inclusion" (Hill, 2020, p. 49). In terms of economic impact, Hill (2020) highlights the importance of maintaining and fostering local industries that provide production services to the service industry and for local consumption. The occurrence of the multiplier effect is a significant benefit of establishing production/manufacturing-related establishments directly in cities as they are by default linked to other sectors (primary, secondary and tertiary activities) in the supply chain (Hill, 2020). It is important to note that there are limitations surrounding the establishment of industrial/production-related activities that are typically done in other regions in more urban environments based on several factors including the realities of economies of scale and feasibility concerns regarding production efficiency and costs (Hill, 2020).

In regard to the innovation argument, advanced manufacturing activities such as additive and mass-customization offer opportunities to grow the local economy into the future (Hill, 2020). Innovation in terms of product development and business practices is an important aspect to developing a sustainable business environment in the city. Overseas production has been proven to hamper and limit innovation in the long-term as it does not allow for efficient capabilities in prototyping, testing and feedback (Hill, 2020; Hatuka & Ben-Joseph, 2017). In terms of environmental impact, the focus has shifted to circularity. By locating production directly in cities, this provides industry the opportunity to focus on key aspects of the Circular Economy such as repair, refurbishment and ultimately waste reduction (Hill, 2020).

3.1.3 Relevant Categories of (Light) Industry

Industry in an urban context has been found to encompass a diverse range of sectors and activities that has continued to expand over time. In relevant literature, the scope can vary depending on the publication. To start, Lane & Rappaport (2020) discusses a classification system that captures a broad spectrum of industrial activities called PDR, which stands for Production-Distribution-Repair. When examining PDR, the production aspect includes manufacturing-related activities as well as other specializations like printing, graphic design, photography and film production, event and catering services. Distribution comprises of companies in logistics, warehousing, wholesale and transportation services while activities under the categorization of Repair covers businesses in the fields of repair, refurbishment and reupholstery and are intrinsically linked to the other two industrial categories (San Francisco Planning Department, 2002; Land & Rappaport, 2020). Table 3 below demonstrates the breakdown of industry types under each PDR classification, while Table 4 showcases the connections between the PDR classification with other key sectors. Please note that these industrial activities are based off the San Francisco situation, but are for the most part transferable to most cities. In addition, this PDR framework has been implemented spatially in San Francisco as a specialized district-wide land-use designation, which has since been adopted by other cities (Lane & Rappaport, 2020; Hill, 2020).

Table 3: List of industrial types under the PDR classification system (Retrieved from San Francisco Planning Department, 2002, p.17).

PDR Classifications	
	INDUSTRY TYPE
PRODUCTION	Printing & Publishing
	Other Printing & Binding
	Photography Services
	Graphic Design, Int.Design & Signs
	Radio, T.V. Stations & Comm Svcs
	Garment Manufacturing
	Other Apparel
	Utilities
	Sound Recording/Film Prod
	Catering & Food Processing
	Building Construction & Maintenance
	Concrete Works
	Furniture Mfg & Repair Woodwork
	Landscaping/Horticulture & Animal Svcs
	Chemicals/Plastics/Leather Goods Mfg
DISTRIBUTION	Wholesale Printing & Publishing
	Wholesale Apparel
	Transportation & Delivery Svcs
	Taxi/Limo/Shuttle
	Trucking, Freight, & Packing
	Parcel Shipping &Courier Svcs
	Public Warehousing & Storage
	Wholesale Flowers
	Food & Beverage Wholesale & Distribution
	Wholesale Construction & Distribution
	Furniture Wholesale & Showrooms
	Interior, Household & Appliance Wholesale
	Large & Heavy Equipment Wholesale
	Wholesale Auto Parts
	Export/Import Trading Companies
	Jewelry Wholesale Mfg
	Waste Management
REPAIR	Auto Wrecking & Scrap Storage Yards
	Furniture Mfg &.Wood Work Repair
	Appliance Repair
	Auto & Boat Repair, Parking& Renting

Table 4: Linkages of PDR industrial types to other key sectors (Retrieved from Lane & Rappaport, 2020, p.10).

De Boeck & Ryckewaert (2020) focuses their research on urban production, in which the definition used covers both material and immaterial production within an urban environment (specifically the Brussels Capital Region). Material production can encompass manufacturing, repair, construction and circular capabilities, which immaterial production in this context implies activities that produce non-physical outputs like ICT and graphic design services (De Boeck & Ryckewaert, 2020). When comparing the scope of urban production and PDR, there are several similarities found regarding industrial uses as both interpretations are broad reaching.

In the following publications, the scope used is limited to manufacturing-related production activities. With

the exception of the PDR classification system mentioned above, Lane & Rapaport (2020) primarily focuses on urban manufacturing especially in American cities, which is defined as "the production of physical products in cities" (p. 13). Supporting activities that would be typically identified as industrial such as distribution and warehousing capabilities are not included in this scope. Urban manufacturing is also the central subject of the publication by Hill (2020), in which the aim is to capture the link between "the production of physical things and cities" focusing on the European experience (p. 23). A typical manufacturing operation consists of the following elements: space allocated for production activities, connections to suppliers and customers, production work and with additional technical staff to support the operations (Hill, 2020). Foundational manufacturing are explicitly discussed, which are activities that support the basic facets of day-to-day life in urban environments, comprising of food production, waste management and construction (Hill, 2020).

Heebels & ten Kate (2019), on the other hand, examines the nieuwe maakindustrie (new manufacturing industry) in specifically Dutch cities. Their scope is much more explicit in which two distinct types are established: craft and industrial production. In their definition of craft, traditional (manual) and more innovative craft-related production activities at a small-scale are captured. The scope for industrial production covers manufacturing activities at a larger scale of production that involves automation that include innovation practices linked to digitization. According to Heebels & ten Kate (2019), the intention of this scope is to capture manufacturing businesses (both established and new) that are incorporating innovative forms of making and associated processes. It is important to note that in this research, three distinct spatial conditions in relation to niewe maakindustrie are examined: (1) inner-city neighbourhoods, (2) business parks and (3) inner-city or business parks in which mixed-use exists (Heebels & ten Kate, 2019). In addition, Heebels & ten Kate (2019) discussed the applicability of the Knowledge and Production Cycle developed by Roots Beleidsadvies. Depending on the activity(ies) taking place in the new manufacturing establishment, this dictates key (spatial) requirements including total square meters of space that would be needed to accommodate the activity at hand (Heebels & ten Kate, 2019). Figure 16 demonstrates the visual of the **Knowledge and Production Cycle,** which consists of the following activities: research, design, prototyping and production. If a business for instance requires a location to establish their research, design and prototyping capabilities, less space and specific requirements are needed than when production activities are involved.

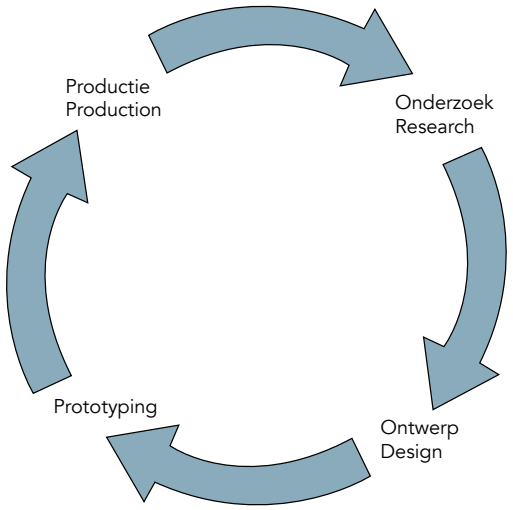

Figure 16: Roots' Knowledge & Production Cycle (Adapted from Heebels & ten Kate, 2019).

According to Wolf-Powers, Doussard, Schrock, Heying, Eisenburger & Marotta (2017), a particular phenomenon that re-stimulated small-scale manufacturing and production in urban environments is the Maker's Movement. The main objective of this movement is to restore and cultivate the link between manufacturing/production and design, which garnered the attention of urban planners (Wolf-Powers et al., 2017). Wolf-Powers et al. (2017) established three classifications of maker types in their research: micromakers, global innovators and emerging place-based manufacturers. As the name entails, micromakers were found to be inherently small-scale and local, with little intention to scale-up their operations, but rather maintain their current capacity, while global innovators are more ambitious in their expansion plans and have located their production operations in other regions or even overseas. The third type of maker, the emerging place-based manufacturer, is found to conduct their production activities locally or at least regionally with ambitions to scale-up their operations (Wolf-Powers et al., 2017). Examples of maker-based businesses include the fabrication of clothing, jewelry making, specialty food production and furniture makers, in which most have taken advantage of technological advancements for promotion and product/process improvement processes. Although the research of Wolf-Powers et al. (2017) focuses on the influence of the Maker's Movement on the development of small-scale manufacturing in American cities, this topic is also relevant in the European context.

When examining the economic composition in specifically the Netherlands, Stam, de Jong & Market (2008) determined that creative industries

have gained a significant foothold over the years especially in urban environments. In their research scope, the creative industry in the Netherlands encompasses a broad range of sectors that possess creative and innovative attributes, in which three distinct classifications have been identified especially in urban areas: (1) arts, (2) media and publishing, and (3) creative business service. The key distinctions include the production features, philosophy, targeted end-users, and its contributions to employment growth (Stam et al., 2008). All three of these categorizations were found to have a large presence in Amsterdam. It is important to note that within the three creative industry domains, there is no explicit mention of industrial functions in terms of production with the exception of the following functions: motion picture and video production and distribution, book and newspaper publishing. Although this publication was written in 2008, it may still be relevant in present day.

In the literature on industry, mixed-use is often referred to as a prime alternative for accommodating industrial activities in urban environments, which will be discussed further in the next section.

3.2 Topic II: Mixed-use

3.2.1 Background

According to Grant (2002), the concept of **mixed-use** first emerged as a major pillar of the New Urbanism movement, both in Traditional Neighbourhood Design (TND) and Transit Oriented Development (TOD). Mixed-use developments have evolved over time in the form of different configurations and has become a main component of the Compact City model in terms of realizing sustainable ambitions in urban environments (Foord, 2010; Wheatley, 2014). In an earlier interpretation, specifically in the Canadian context, mixed-use meant a range of different housing types within a suburban neighbourhood aimed to accommodate different households (Grant, 2002). From here, the scope of mixed-use expanded to also include other land uses such as work functions especially in more urban environments (Foord, 2010). In addition, mixed-use can now be applied at a range of different scales and can take on different mix types. Dovey & Pafta (2017) notes that typically, there are a standard set of land use categories, however, when applying them to more ambiguous or newer activities, overlaps and inconsistency can occur. This would be the case for hybrid businesses as they are made up of more than one work or service functions (Hausleitner, 2020). Typical mix-use configurations are made up of functions that are considered as compatible to each other such as housing with commercial or even office uses. In earlier mixed-use publications, traditional industrial uses were seen as being non-compatible with more sensitive uses due to a range of nuisance concerns relating to noise, smell, and environmental hazards (Grant, 2002; Hirt, 2012). As a result, they were not considered a viable or appropriate land use in mixed-use developments. When it comes to the definition of mixed-use, Dovey & Pafta (2017) focuses on functional mix instead of land-use mix, as it is not constrained to the standard, singular land uses and captures both horizontal and vertical mixing.

One approach of realizing mixed-use developments that has received a critical response is residential-led mixed-use. The main criticisms are that by focusing primarily on realizing residential units, other functions are not prioritized or represented adequately in these developments resulting in vacancies, and that there are serious implications on existing industrial businesses in the area. In most situations, their integration is considered to not be feasible nor are their operations found to be compatible in the desired mixed-use environment, ultimately leading to their relocation (Ferm & Jones, 2016; Uyttebrouck, Remøy & Teller, 2021).

3.2.2 Scalability

In most mixed-use literature, mixed-use is typically differentiated by scale. Dovey & Pafta (2017) states that when it comes to mixing functions, the outcome will vary significantly depending on the scale at hand; for instance, micro level like within a building versus the macro levels of a district or even an entire city. Hoppenbrouwer & Louw (2005) developed a mixed-use typology for residential and working functions using four urban scales, City, District, Block and Building. Other publications use the same or similar scale system when describing mixed-use including the work of Uyttebrouck et al. (2021). This mixed-use typology also possesses four different spatial dimensions: shared premises, vertical, horizontal and the time dimension (Figure 17 on next page). It is important to note that these are not applicable at every scale. Only the horizontal dimension is possible at most of the scales with the exception of the building level. Hoppenbrouwer & Louw (2005) also identified urban texture as another aspect of mixed-use in terms of urban design, which covers grain, density and interweaving of functions in a mixed-use context. Once again, not all types of urban texture can occur at every spatial dimension, with the exception of horizontal and vertical dimensions (Hoppenbrouwer & Louw, 2005). It is important to note that mixed-use is not broken down this comprehensively in other publications. For instance, De Boeck & Ryckewaert (2017) and Bingham & Shapiro (2020) only identified two forms (dimensions) of mixed-use, horizontal and vertical, while De Boeck & Ryckewaert (2017) also looked into granularity of mixing (course versus fine). Hausleitner (2020) also states that mixed-use configurations can also exist in transition areas and fringes.

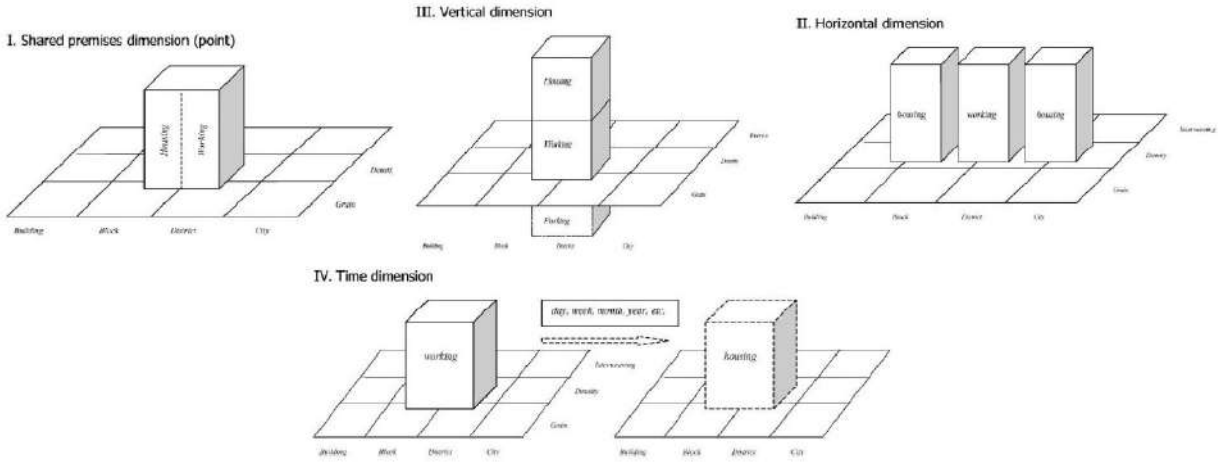

Figure 17: The four dimensions of mixed-use (Retrieved from Hoppenbrouwer & Louw, 2005, p.973).

3.2.3 Perception

According to Dovey & Pafta (2017), there are different ways to examine the functional mix that makes up a mixed-use development, which can be done at different scales. The entropy measurement tool, in particular, calculates the balance between mixed functions. However, it is important to note that by default, it disregards any industrial functions, which results in an inaccurate representation of functional mix in circumstances where there is mixed area with small-scale production activities (Dovey & Pafka, 2017).

When comparing the land use practices of different countries, it was found that the policy makers' perception of and position regarding the mixing of (land) uses differs significantly in the United States in comparison to their European counterpart (Hirt, 2007, 2012). Mixed-use is considered a norm in most European cities while in American cities, mixed-use is more of an exception to the standard separation of uses (Hirt, 2007, 2012). Croxford et al., (2020) claims that sustainability objectives and limited land to develop are the main reasons cities in Europe have prioritized mixed-use developments in densification and urban intensification projects. To add, Uyttebrouck et al., (2021) states that the economic benefits that typically emerge from implementing a live-work mix is also a key factor for many local bodies when making planning and development decisions for their respective cities.
Although the perception of mixed use is mostly positive, van den Berg (2020) reveals that there are critics of it especially when it involves uses that are typically considered as incompatible. There are also concerns regarding the feasibility of mixed-use developments in the long term (van den Berg, 2020). In addition, Foord (2010) has identified several trade-offs when realizing mixed-use developments, which varies depending on the type of stakeholder when both living and working functions are involved – residents versus businesses. Wheatley (2014) also came to similar conclusions when examining a mixed-use area in the City of Sydney Local Government Area (LGA) in Australia, based on the perspectives of both residents and business owners specifically regarding noise. This leads to the topic of nuisance in the context of mixed-use developments in which van den Berg (2020), claims that the perception of nuisance is more critical to address than the actual nuisance itself.
Although mixed-use is often the preferred choice due to its expected liveability and sustainability benefits, the process involved in executing and developing mixed-use especially at an urban area development scale comes with several challenges. Steen (2020) states that when multiple land uses and functions are involved in a development, an extra layer of complexity is added. Typically, there are a large number of stakeholders involved with conflicting needs and priorities, which often lead to a tedious and complex decision- making process as well as limited results (Steen, 2020). Uyttebrouck et al. (2021) also express similar concerns regarding the realization of mixed-use ambitions as, "this involved different kinds of public and private actors – with overlapping interests – who need to build consensus (p. 2).

3.2.4 Implementation & Governance of Mixed-use

In order for mixed-use developments to be initiated and implemented successfully, governance has found to play a key role. As alluded to previously, realizing large-scaled developments in which work and residentially functions are to be combined is a complex procedure, in which consensus between key parties involved needs to be reached (Uyttebrouck et al., 2021). In the research by Uyttebrouck et al. (2021), the governance angle of live-work is explored, in which it was revealed that in a situation where there are numerous stakeholders involved with varying interests and priorities, collaborative governance is ideal to achieve objectives in a coordinated, collective manner. It was determined that public bodies have been taking on emerging roles when it comes to development more recently, which include facilitation, steering and entrepreneurial, while market parties (i.e. developers) have also evolved, but are adopting more opportunistic and strategic positions to achieve their development ambitions. In the context of a mixed-use (live-work) project, in order for consensus to be achieved between both public and market (private) parties, the proper instruments are essential, such as a city-wide plan at a higher level. Other relevant tools to realize mixed-use developments are found to either regulate or capture value in terms of revenue (Uyttebrouck et al., 2021). The former includes land-use/zoning regulations as well contracts between public and private parties in regard the development of specific plot(s). A ground lease system (erfpacht) which is common in the Netherlands would be considered as a value capture tool (Ploeger & Bounjouh, 2017; Uyttebrouck et al., 2021).

When examining the value capture tool of the Dutch urban ground lease system (the Erfpacht), it is found that this particular planning instrument is a key component of the active land policy implemented in the Netherlands in 1896 and is still enacted in most of Amsterdam (Ploeger & Bounjouh, 2017). The original intention of the tool is to ensure that local government authorities (i.e. municipalities) have some form of control over land development by leasing the land to another party for a pre-determined amount of time. There are three distinct types of ground leases that can be enacted, temporary, indefinite and continuous, in which the continuous ground lease model is standard in Amsterdam (Ploeger & Bounjouh, 2017). The ground lease price is based on the land use(s) assigned to that plot, in most cases, is paid in a lump sum for a fixed period. Ploeger & Bounjok (2017) reveals there are many challenges that are occurring as a result of the erfpacht, which has led to the effectiveness and need for this particular land policy tool being questioned. However, in regard to the topic of mixed-use, it was determined that the ground lease system has the capacity to accommodate multiple land uses in one plot by allowing for separate ground lease volumes without requiring additional measures (Ploeger & Bounjouh, 2017).

3.2.5 Transformation of Industrial Estates into Mixed-use

As mentioned above, industrial estates (or employment lands), have become attractive sites for new urban neighbourhoods as space for development in cities become scarcer. According to Korthals Alters & Tamback (2008), a compact-city policy was implemented in Dutch cities including Amsterdam, which prompted local authorities to consider different avenues using a mixed-use approach. One option was to realize housing in combination with the existing industrial functions in industrial estates. This was considered more feasible as industry is perceived as being more compatible than in the past due to adjustments to scale and nuisance externalities (Korthals Altes & Tambach, 2008). The successful realization of mixing housing and industry in the same development is dependent on the site's environmental loading capacity, if people would want to live in an environment where industry is imbedded intentionally, and the development strategies in place (Korthals Altes & Tambach, 2008). It is important to point out that in large-scaled (re)development projects like the transformation of industrial estates, land assembly is typically warranted as in most circumstances, land ownership between plots are fragmented (Louw, 2008). Although there seem to be efforts being made to retain industrial functions through the implemented of mixed-use, Lester et al. (2013) emphasizes the reality that the amount of dedicated industrial lands are declining at a rapid rate. Korthals Altes & Tambach (2008) is aware that by allowing for housing to be built on industrial estates, there is the possibility that the initial intention of establishing a mixed-use dynamic and landscape with the existing industrial functions may not fully realize, but instead, lead to gentrification. It is also stated that a regional

approach is most likely necessary to manage the relocation of existing industrial establishments as a certain portion is expected to occur as a result of these transformation (Korthals Altes & Tambach, 2008).

As previously mentioned, industry possessed a negative connotation and was typically not associated with mixed-use schemes. However, over time, this perception of industry has started to shift. Hill (2020, p. 46) for instance, describes a mixed-use development as "the co-location of manufacturing and housing or other activities" while Love (2017) interprets mixed-use at a building scale as a hybrid building consisting of designated industrial ground floor workspaces and commercial units on the upper floors. This demonstrates that different interpretations of mixed-use continue to evolve, expand and include industry. Uyttebrouck et al. (2021) also reveals that position of industry in the city has come up in discussions of urban planners to the point that efforts are being implemented to re-emphasize its presence especially urban manufacturing, urban logistics and more innovative capabilities. It is important to note that the inclusion of industry in mixed-use developments especially with housing involved is still at an experimental stage in a number of major cities and the outcome has yet to be fully examined (Hill, 2020). The next section of the literature review will further examine the conditions required to integrate industrial activities in urban mixed-use environments.

3.3 Topic III: Integration of Industry in Urban Mixed-use Developments

This section of the literature review examines industry within the context of a mixed-use urban environment.

First, the spatial conditions of industry and their relations to mixed-use based on literature are discussed. From here, the (urban) design considerations for future mixed-use urban area developments involving industrial activities are presented. Finally, the matters relating to the safeguarding of industrial space and implementation limitations in an urban environment are explored.

3.3.1 Spatial Conditions of Industry

According to Hatuka & Ben-Joseph (2017), there are three industrial space prototypes that formed over time and are relevant today, which are Integrated, Adjacent and Autonomous. The integrated industrial space typology can be found directly situated within city limits and in the present day is either vacant and in poor condition or under redevelopment of some sort. Its main quality is that it represents "a symbiosis between living and working" (Hatuka & Ben-Joseph, 2017). Based on this definition, this particular prototype intrinsically embodies mixed-use, especially when compared to the other two prototypes. For the adjacent model, a different approach to allocating industrial space is taken where it involved separating living and working uses from each other in a spatial sense through zoning provisions and physical barriers like major transportation corridors (Hatuka & Ben-Joseph, 2017). The two types of land uses are still accessible to each other, but with this model, industrial activities are not as integrated as the first model (Hatuka & Ben-Joseph, 2017). Lastly, the Autonomous typology is the industrial space term for an industrial park, which has the least amount of association with the urban environment and other functions as it is located at peripheries of cities with limited access by transportation modes other than the car (Hatuka & Ben-Joseph, 2017). The key criteria that define these three prototypes is location and the relationship between industry and the urban context. In the Netherlands, urban industry is primarily associated with the first two industry space typologies. It is important to note that other interpretations of industrial space typologies are presented in other publications. For instance, Hill (2020) established three defining spatial conditions that they consider as ideal for urban manufacturing activities to operate: Inner-city mixed-use, Transition Area and Business Park. These classifications possess similar characteristics as the above typologies presented by Hatuka & Ben-Joseph (2017). In addition, Lane (2020) breaks down industrial areas for specifically urban manufacturing using another set of typologies, which are Loft, Working Neighbourhood and Industrial Park. These particular typologies can be interpreted as the American version of the first two sets of iterations. In Figure 18, these three iterations are presented.

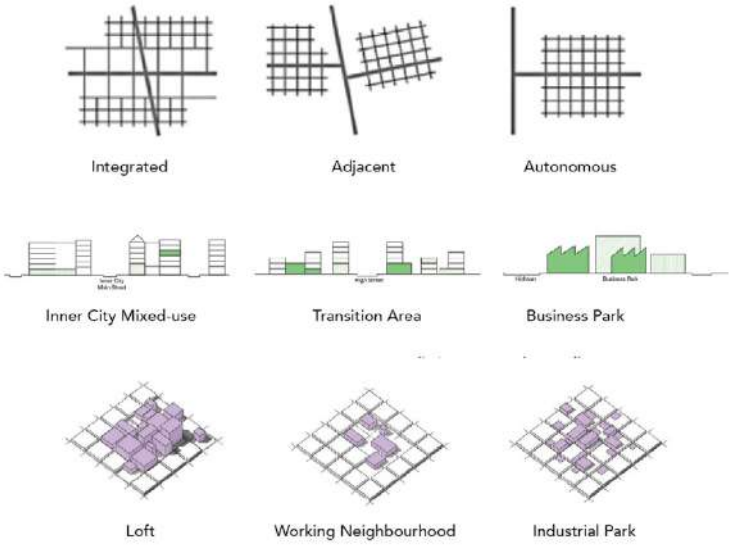

Figure 18: Comparison of three iinterpretations of industrial space classifications
(Retrieved from top to bottom: Hatuka & Ben-Joseph, 2017, p.21; Croxford et al., 2020, p.70; Lane, 2020, p.33).

3.3.2 Design Elements

The renewed interest in urban manufacturing has prompted several cities to respond by implementing new urban design measures specific for industry. However, Lane (2020) claims that many of these initiatives are based on the notion that industry still has nuisance-related traits, therefore these cities tend to focus more on separation rather than promoting integration. This is especially the case when housing is involved, as industry is automatically perceived to be as non-compatible land use (Stuyt, 2020). Lane (2020) argues that through better building and urban design, visibility and promotion of industrial activities can be increased resulting in more public and private investment and community support for industry in the urban environment. Lane (2020) promotes a number of best design practices including the proper management of urban area edges, the development of a range of different sizes of workspaces and improved street networks to foster better distribution movement. From the European experience, Hill (2020) suggests the need for greater urban intensification, while also recommending a number of urban design principles, which are similar in nature to that of Lane's (2020). Some of these include the provision of shared workspaces, facades that promote better visibility to the public, well-designed transition spaces, and ensuring that suitable types of spaces are available for a range of industries (Hill, 2020). These ideas have been formulated into a series of patterns, which addresses design and governance issues related to urban manufacturing, which are categorized by scale: transcalar (R), city/neighbourhood (C), neighbourhood/block (N), block/building (B), and programme (P). The combination of these patterns form a pattern language that can be used as a tool to be implemented by urban planners in coordination with key stakeholders to analyze problems, develop visions and solutions, and monitor progress (Hill, 2020). Manifesto points were developed to capture the key themes relating to urban manufacturing that are reflected in the patterns. They include: (1) Protection, (2) Financing, (3) Spatial Framework, (4) Good Neighbours, (5) Access, (6) Support, (7) Exchange, (8) Circularity, (9) Shared Facilities, (10) Skills & Knowledge, (11) Networks, (12) Communication (Croxford et al., 2020). It is important to note that patterns, at different scales, can appear in a number of manifesto points. It is apparent that urban design is a key aspect to developing workable solutions on the ground and requires participation by local businesses and residents in making these decisions. When scoping down to a building level, Love (2017) reveals that there are key architectural and design requirements that need to be met to be considered as suitable for industrial spaces such as layouts of column grids. This has been found to be a challenge when sharing the building with other land uses like commercial or housing as the requirements are not typically allowed for (Love, 2017). This shows that further attention to design is required to ensure flexibility in allowing multiple uses of a building. De Broek & Ryckewaert (2020) states that conflicts are likely to arise when combining industry with housing in one vicinity, as there are different expectations regarding certain items such as logistics, loading access and public space.

3.3.3 Safeguarding Industrial Spaces

Securing industrial spaces in the urban environment is paramount to ensuring that industrial businesses and activities are retained and real estate speculation is avoided (Hill, 2020). Mixed-use developments are mainly governed and managed through land use regulations and zoning policies. General Mixed zones (or MX zones in American cities) is one way of accommodating certain industrial uses. However, it has been determined that this particular kind of zoning designation can be problematic as it allows for a range of uses, often resulting in industrial uses losing out, in terms of space and presence, to higher-valued land uses like commercial and residential (Rappaport, 2020; Hill, 2020). Hill (2020) also mentions that this type of zoning designation allows higher turnover rates of conversion especially into higher-valued uses, and as a result, is considered too flexible and not structured enough. To counteract this predicament, industrial mixed-use is a newly developed classification of land use zoning that has been recently adopted by several American cities (Lane & Rappaport, 2020). The variations of this zoning designation of industrial mixed-use are: NDI's (Neighbourhood Industrial), IX (Mixed Industrial) and R/I (Residential/ Industrial) designations (Lane & Rappaport, 2020). However, it is important to point out that due to the evolving nature and form of industry in general, cities that have implemented these particular zoning designations, still encounter challenges in establishing a defined scope of manufacturing (Lane & Rappaport, 2020). Love (2017) also discusses mixed-use industrial zoning as a means to preserve industrial space through redevelopment where he proposed a hybrid approach at a building/site level in which cross-subsidies are applied to cover industrial workspaces on the ground floor. Ferm & Jones (2016) noted circumstances in which zoning that initially supported industrial spaces in mixed-use developments were relaxed to allow retail due to vacancy concerns of developers, which resulted in the loss of industrial space. Due to the passive nature of this planning tool, zoning has its limitations in influencing the real estate market (De Boeck & Ryckewaert, 2020).

Alternative tools and mechanisms that have been found to be useful in safeguarding spaces specifically for industrial purposes like as shown in Figure 19 include performance-based zoning, microzoning, land banking, market-based mechanisms and subsidies (De Boeck & Ryckewart, 2020; Ferm, 2012; Love, 2017; Rappaport, 2020). Most of these avenues involve a mixed-use component. Performance-based or performance zoning takes a different approach than the standard land-use based zoning as it assesses the environmental and operational implications of an activity on its surroundings rather than the activity itself (Ferm, 2012; Rappaport, 2020). A financial incentive like subsidies is another useful and popular tool to ensure that industrial spaces are accommodated for and retained. In mixed-use developments, higher-valued land uses like commercial or residential are used to cross-subsidize (affordable) industrial spaces (Rappaport, 2020). In the case of the Dutch context, the anticipated Environment Act that is to be in effect in 2021 will streamline the planning and development process by merging several laws and increasing public participation (Ministerie van Infrastructuur en Waterstaat, 2017; Stuyt, 2020). This will likely lead to greater flexibility and opportunity for industrial businesses to locate in more urban mixed-use environments (Heebels & ten Kate, 2019).

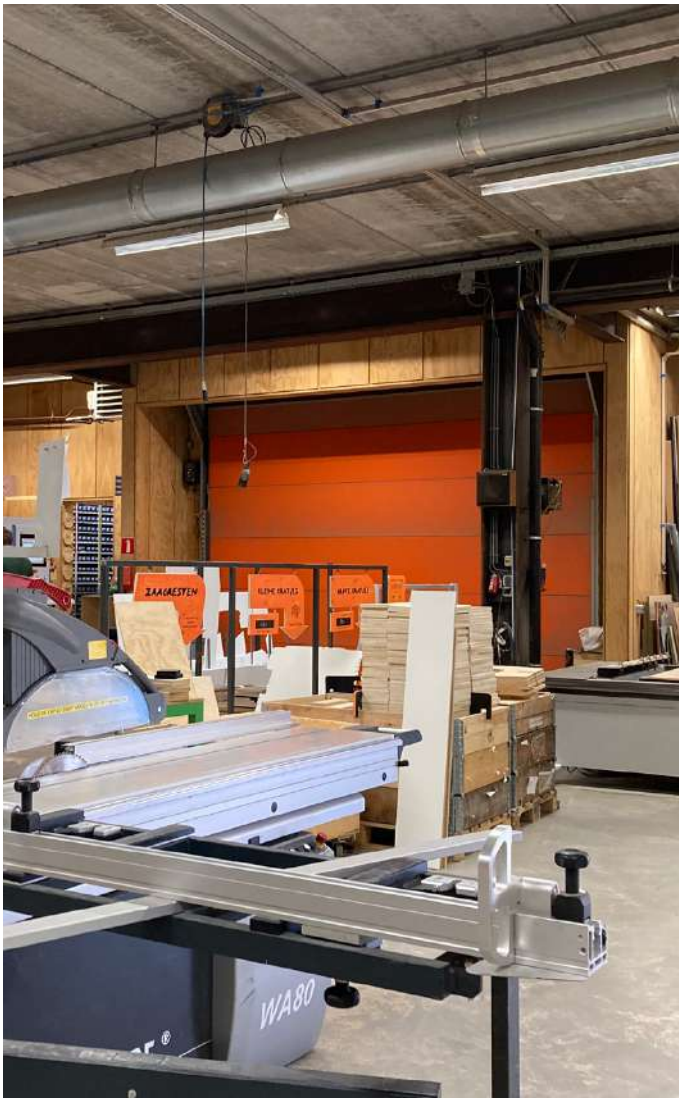

Figure 19: Workspace for light industry-related activities in Fiction Factory [Own photograph]

3.3.4 Execution & Realization

Cities are realizing the potential of incorporating industry back into their urban environments, however, Hatuka & Ben-Joseph (2017) feel that this will not be realized without a greater commitment and investment by government bodies especially local authorities. There is a particular concern that planners are not well-equipped or informed enough to handle the task at hand. A more comprehensive understanding of the relations between industry and city is required in order to further support and promote industry in the urban environment (Hatuka & Ben-Joseph, 2017). Hill (2020) has similar views on this matter and highlights the need for planners to develop capabilities to formulate plans to support industry that addresses pressures from competing land uses such as housing. Without the development and application of clear planning guidelines, stakeholders are often unlikely to agree on development decisions (Hill, 2020). Ferm & Jones (2017) points out that cities like London, UK, have yet to reach a consensus on how industry should be developed and supported in the urban environment.

As previously mentioned, local industrial businesses need to be included in the planning and development process involving industrial spaces. However, they typically lack representation as they are small and medium-sized operations with limited time and resources (Hill, 2020). Community organizations such as NGOs can play a role in assisting them in harnessing their potential by advocating their concerns and sharing resources (Hill, 2020). Hill (2020) promotes the role of a curator, who helps facilitate a working relationship between the local authority and businesses to address several requirements such as suitable infrastructure and resources, financing and planning issues. Another alternative to managing industrial development is the use of an MDM entity (a mission-driven manager), to guide, support and monitor industrial activity in mixed-use environments (Becker & Friedman, 2020). MDMs are primarily used in the US. These are promising solutions for managing urban mixed-use environments with industry as they reflect the need to consult closely with key stakeholders.

Based on the literature review conducted, it is apparent that exhaustive research has been done on the topics of **mixed-use** and **industry** primarily in the form of scientific and peer-reviewed journals; however, when it comes to the topic of integration of industry in urban mixed-use developments in which this two first topics are overlaid with each other, there seems to still be room to expand the existing repertoire of knowledge and literature on the subject. In addition, in the literature reviewed, there were many instances where particular cities are used as case studies at a city scale (as it relates to industry or industrial lands in urban environments), however, this was found to not be done at a site specific level, leading to more broader ranging research findings. As mentioned previously, the findings of this literature review led to the formulation of the main research question, sub-research questions, as well as, the conceptual model. The Empirical Portion of the research that proceeds this chapter aims to address these research questions and contribute to the existing literature on the key research topics.

PART II | **Empirical Section**

The Empirical section of this report represents the core of the research study. It comprises of the following three parts, in which all encompass the chosen case study site of NDSM-Werf.

Chapter 4: The Planning & Policy Dimension
Chapter 5: The Stakeholder Dimension
Chapter 6: The Spatial Dimension

Chapter 4 covers the more factual, objective aspect of the empirical research, in which documentation published over time at different scales are analyzed and then compared by applying the following lens: transformation, mixed-use and the (integration of) light industry. As the majority of the documents reviewed are prepared by municipal departments of Gemeente Amsterdam, sub-research question 1 and a portion of sub-research question 2 are to be addressed in this chapter.

Chapter 5 examines the stakeholder perspective, in which a range of viewpoints, notions and positions as it relates to the integration of light industry in mixed-use developments of transformation sites, specifically NDSM-Werf, are captured. These are mostly based on the qualitative data extracted from interviews (transcripts). This section also addresses stakeholders' interests through stakeholder mapping and the identification of spatial claims. In this chapter, a portion of sub-research question 2 and sub-research question 3 are to be addressed.

Chapter 6 presents the spatial dimension, covering the spatial aspects and conditions of the case study site. Here, spatial plans for the area and site conditions are reviewed, to determine if considerations and/or actions have been captured that accommodate light industry businesses in the mixed-use development plans for NDSM-Werf, and opportunities are also identified. This chapter incorporates the main aspects of the first two dimensions and is more output oriented.

As described in the Research Design & Methodology Chapter, these three parts are key to addressing the main aims and objectives of this research study and ultimately the research questions.

View of NDSM-Werf case site from the ferry, July 2021 {Own photograph}

Chapter 4 | **Planning & Policy Dimension**

The first component of the Empirical research centres around examining secondary data extracted from a range of documentation acquired from either desktop research or provided by research participants who are involved in the study. It is important to note that the documentation examined varied not only in terms of publication date, but also objectives and purposes. For instance, certain publications are more exploratory in nature, focusing on a particular scope of research in which recommendations are provide or on examining different options, while others are more policy-based, either statutory or non-statutory, that are structured to guide development. The majority of the documents and plans are developed by or on behalf of a public body i.e. Gemeente Amsterdam. They included plans, policy documentation and research publications captured at each distinct scale, which at the most part are examined in chronological order in order to capture the timing and (re)occurrence of certain decisions and actions as it relates to **transformation, mixed-use** and **(light) industry accommodation**. The scales chosen are as follows: General (Figure 20), Metropolitan Regional, City (Figure 21), Site (Figure 22) and Block scales. Within the documentation analysis at each scale, **input from research participants** is imbedded where relevant. Please note that a **summary analysis** is provided at the end of the sections for City scale (4.3.2), Site scale (4.4.2), and Block scale (4.5.2), where higher-level examinations of the documents in these scales in comparison to each other are conducted through the application of lens of transformation, mixed-use and the (integration of) light industry. In addition to the documents examined at each scale, there is a separate sub-chapter called External Publications (5.6), in which a report that was developed by an external party that does not fall under any specified scale, but is determined relevant to the research study, is ellaborated on accordingly.

All the analayzed documents are listed in a combined matrix in Appendix B.

Figure 21: City scale - Amsterdam (banks of the IJ) using GIS mapping

Figure 20: General scale - The Netherlands

Figure 22: Site scale - NDSM-Werf using GIS mapping

4.1 General

4.1.1 Documentation Analysis

At the General scale, document(s) that are not specific to any given scale, but have more general implications, were to be captured. In relation to this reserch study, it was determined that the most relevant document was developed by VNG (Vereniging van Nederlandse Gemeenten) in 2009 as presented below, which is an association composed of Dutch municipalities. It is important to note that VNG has since published a follow-up document called *Milieuzonering nieuwe stijl* (VNG, 2019) that consists of more updated environmental regulations as they relate to businesses, however, that particular document was not examined in depth.

Bedrijven en milieuzonering: handreiking voor maatwerk in de gemeentelijke ruimtelijke ordeningspraktijk
Vereniging van Nederlandse Gemeenten | 2009

As mentioned above, VNG released a handbook called *Bedrijven en milieuzonering: handreiking voor maatwek in de gemeentelijke ruimtelijke ordengspraktijk* that was written by Bruinsma, Brunner, Eck & vsn Eck (2009). The objective was to guide future planning decisions as they relate to business and environmental standards. It is important to note that this particular publication is only available as a hard copy in Dutch, therefore limiting what could be assessed. As a result, the most essential elements were extracted and translated accordingly. It was determined that the VNG had established environmental categories for businesses in regards to nuisance levels, in which 1 is the lowest and 6 as the highest. From here, target distances were assigned per environmental category, which are presented in Table 5. In this figure, it is shown that environmental categories 3, 4 and 5 consists of multiple sub-categories in which the target distances are found to differ.

Table 5: Environmental categories and assigned target distances (Adapted from VNG, 2009).

Environmental Category	Target Distance
Category 1	10 m
Category 2	30 m
Category 3.1	50 m
Category 3.2	100 m
Category 4.1	200 m
Category 4.2	300 m
Category 5.1	500 m
Category 5.2	700 m
Category 5.3	1000 m
Category 6	1.500 m

In the publication, multiple tables are provided that are categorized by business activity type, in which the environmental category and assigned distances for the following nuisance criteria are listed: odor, dust, sound and danger. The greatest distance out of all four criteria for each business activity type is also provided. In Table 6 on the next page, a number of these business activities as it relates to some form of manufacturing of goods are extracted from the publication for reference.

It was also determined that the VNG has developed another form of environmental zoning categorization using letters, which includes the categories of A, B and C.

This particular document does not have any statutory standing, however, the majority of municipalities in the Netherlands have adopted these standards including Amsterdam, as revealed in the documentation analysis at the city level. It is important to note that based on the interviews conducted for this research, these environmental categories may not be applicable or relevant when the Environmental Act is enacted.

The environmental categories established by VNG influenced the **definition of light industry** for this research, as shown in the Key Terminology sub-chapter above (2.3).

Table 6: Examples of business activity types and their respective environmental category designations and assigned distances per nuisance (Adapted from VNG, 2009).

	Category	Odor	Dust	Sound	Danger	Greatest Distance
Manufacture of Textiles						
Processing and spinning of textile fibers (Weaving)	3.2	10	50	100	30	100
Weaving of textiles:						
Number of looms < 50 textiles	3.2	10	10	100	0	100
Finishing companies	3.1	50	0	50	10	50
Manufacturing of textile goods	3.1	10	0	50	10	50
Manufacture of knitted and crocheted fabrics and articles	3.1	0	10	50	10	50
Manufacture of Clothing; Preparing & Dyeing fur						
Manufacture of leather clothing	3.1	30	0	50	0	50
Manufacture of clothing and accessories (excluding leather)	2	10	10	30	10	30
Preparation and dyeing of fur; manufacture of articles of fur	3.1	50	10	10	10	50
Manufacture of Leather & Leather goods (excluding clothing)						
Leather goods factories (excl. Clothing and footwear)	3.1	50	10	30	10	50
Shoe Factories	3.1	50	10	50	10	50
Wood Industry & Manufacturing of Articles of Wood, Reed, Cork						
Sawmills	3.2	0	50	100	50	100
Wood preservation companies:						
- with saline solutions	3.1	10	30	50	10	50
Veneer and panel material factories	3.2	100	30	100	10	100
Carpentry factories, manufacture other articles of wood	3.2	0	30	100	0	100
Carpentry factories, manufacture other articles of wood, po <200 m	3.1	0	30	50	0	50
Cork goods, reed and wickerwork factories	2	10	10	30	0	30

4.2 Metropolitan Regional Scale

4.2.1 Documentation Analysis

At the Metropolitan Regional scale, publications are developed by the Metropolitan Region of Amsterdam (Metropool RegioAmsterdam or MRA in Dutch), which is made up 35 separate authorities that work in coordination with each other. Spatially, they cover 32 municipalities and 2 provinces that together, make up the following 7 sub-regions: Amsterdam, Amstelland-Meerlanden, Zaanstreek-Waterland, Almere-Lelystad, Zuid-Kennemerland, Gooi en Vechtstreek and Ijmond (Metropoolregionamsterdam, 2020). In addition to the municipal and provincial bodies, the Transportation Authority Amsterdam is also involved. The city of Amsterdam encompasses its own sub-region, accommodating the largest population of residents as well as homes.

MRA is viewed as an economic powerhouse in the Netherlands consisting of approximately 2.5 million residents and 300,000 business establishments (Metropoolregionamsterdam, 2020).

MRA 2.0 Agenda
Metropool RegionAmsterdam | 2020

At this scale, the following document was examined as it comprises of tasks and priorities that relate to the research topics at hand.

In 2020, the MRA released an updated agenda covering 2020 to 2024, that captures the unprecedented growth in population and demand especially for housing that the region has experienced since the original agenda was prepared in 2015. The key principles of the agenda 2.0 focuses on becoming **future proof** and attaining a balanced metropolis through the implementation of a **regionally coordinated approach** (Metropool regionamsterdam, 2020). Four specific tasks

have been developed that are to be achieved by 2024. These are as follows: (0) Further **strengthen collaboration** not only with internal partners of the MRA network, but also with other non-governmental actors such as market parties, and other relevant organizations, (1) Developing a **united, resilient, inclusive and clean MRA economy**, (2) Addressing the **housing need** and **improving quality of life** as a whole, and (3) Gaining speed with a metropolitan mobility system (Metropool regionamsterdam, 2020). For each task, details regarding characteristics, the situation at hand as well as MRA's ambitions and execution strategies are described.

The first two tasks of the *MRA 2.0 Agenda* (Metropool regionamsterdam, 2020) were examined more closely as they were determined to be the are the most applicable and relevant to the research study at hand. For **Task 1**, MRA states that the region has a very strong and well-renowned service economy, as well as the following economic sectors: the creative industry, life sciences, financial and business services, logistics and health (Metropool regionamsterdam, 2020). It was also revealed that certain economic activities are more prone to being impacted by economic changes, which include construction, industry, and any temporary forms of employment. The following work-related trends were also identified: the transition to more circular and cleaner business practices relating to production and consumption, the agglomeration effect especially in Amsterdam as a result of limited space and high real estate prices, and the need for space to realize digital infrastructure to keep up with energy demands related to population growth (Metropool regionamsterdam, 2020). MRA also emphasizes the fact that the composition of the labor market within the region will continue to change due the influence of technological advancements and automation as positions that exist today most likely will be redundant and disappear in the near future (Metropool regionamsterdam, 2020).To address these challenges, one particular ambition is to implement local policy that focuses on the working environment. Efforts to establish **strong relations with industry and academic institutions** as well as the national government are desired. The following approaches are proposed: (1) creating a **regional economic strategy**, (2) realizing working environments and ensuring that potential relocations in sites designated for transformation are managed accordingly via a **regional-wide business counter**, (3) **recruiting local and international talent** to the labor market by establishing public-private partnerships to create training/development opportunities, (4) convincing market parties to help instigate **transition-related initiatives** related to circularity and sustainable energy, and (5) investing in energy and data infrastructure throughout the region (Metropool regionamsterdam, 2020).

Task 2 focuses on the need for (affordable) housing due to the significant shortage that is occurring throughout the region including Amsterdam. The MRA is set to build an average of 15,000 homes per year up to 2025, in which most are to be allocated to inner-city locations based on the requirement set by governmental bodies involved (Metropool regionamsterdam, 2020). The main challenge that has been identified is the **limited space** for not only those who desire to live in urban environments within region, but also start-up companies and artists especially in Amsterdam, leading to **competing interests (living versus working) for the same space**. Multiple ambitions and associated action items to achieve Task 2 are providing, which mainly centers around implementing a **regional urbanization strategy** in coordination with the national government (Metropool regionamsterdam, 2020).

When analyzing this particular document, it is apparent that the MRA is aware of the evolving makeup of the region's economy and making strategic and coordinated efforts with relevant parties at different scales to address the issues pertaining to space limitations in more urban environments like Amsterdam in which smaller-scale businesses like makers/artists are competing for space to work in the midst of increasing housing demands.

In the next sub-chapter, documents pertaining to the city of Amsterdam are analyzed.

View of the IJ from NDSM-Werf Oost , July 2021 {Own photograph}

4.3 City Scale

4.3.1 Documentation Analysis

In this sub-chapter, documents at the City scale of Amsterdam are examined, which include **statutory and non-statutory policy documents**, as well as, publications of research conducted by specific departments that were determined to be relevant to the research study. Please note that at this scale, a recently released document on **Hamerkwartier**, another transformation site also located on the northern banks of the IJ is also reviewed, in which key development elements relevant to the research were examined. Since it is separate from the case study of NDSM-Werf, it is included under the city scale documentation analysis. Table 7 contains the documentation that is reviewed at city scale. As noted in the beginning of this chapter, a summary of the documents analyzed at the city scale is provided at the end of this sub-chapter.

Table 7: Documentation analyzed at the City scale

	DOCUMENT	AGENCY	YEAR
CITY SCALE	*Kleinschalige Bedrijfshuisvesting (Accommodation of Small-scale businesses)*	Gemeente Amsterdam	1999
	Wonen tussen de bedrijeven door (Living between Businesses)	Gemeente Amsterdam	2003
	Handboek Kleinschalige bedrijfsruimte Amsterdam (The Small Business Space Handbook Amsterdam)	Gemeente Amsterdam	2008
	Structuurvisie Amsterdam 2040: Economisch Sterk en Duurzaam	Gemeente Amsterdam	2011
	Koers 2025	Gemeente Amsterdam	2015
	Ruimte voor de economie van Morgen (Space for the Economy of Tomorrow)	Gemeente Amsterdam	2017
	Bedrijvenstrategie (Business Strategy 2020-2030)	Gemeente Amsterdam	2020
	Omgevingsvisie Amsterdam 2050 (Environmental Vision Amsterdam 2050) - Draft	Gemeente Amsterdam	2021
	Hamerkwartier Werkt: Bouwstenen voor de realisatie van het Hamerkwartier als Creatieve Productiewijk	Gemeente Amsterdam	2020

Kleinschalige bedrijfshuisvesting in Amsterdam

Gemeente Amsterdam | 1999

When conducting desktop research to locate the most relevant planning and policy documents published by the municipality of Amsterdam (Gemeente Amsterdam) to the research topic, one of the earliest documents identified was the *Kleinschalige bedrijfshuisvesting in Amsterdam* (*Accommodation of small-scale businesses in Amsterdam* in English) (Gemeente Amsterdan, 1999). Published in 1999, this non-statutory document focuses on **securing business spaces within the city**. In this document, small-scale businesses are defined as having **less than 50 employees** and its scope can include offices, consumer services (i.e., retail and HORECA), and craft companies. This implicity means that there is an intention to mix uses where possible. The latter business type is the most **in line with light industry**. At the time, the number of workspaces for small-scale businesses in Amsterdam especially in residential areas was declining as they were being displaced by new housing and other higher valued land uses, as well as the introduction of more rigorous environmental requirements limiting the operations of certain businesses (Gemeente Amsterdam, 1999). The document presents four dilemmas: (1) determining the extent of the municipality's involvement in minimizing the risk of other functions overtaking the establishments of small-scale businesses, (2) finding solutions to mitigate small-scale business establishments from being used/displaced by other functions, (3) determining if the municipality should address the limited initiatives in place to support the expansion of small-scall businesses, and (4) determining if expansion plans can/need be supported through spatial planning measures. To address the dilemmas accordingly, the document proposes several policy actions by the municipality for the preservation of small-scale business establishments, as well as, for steering the expansion of businesses operations (Gemeente Amsterdam, 1999).

Three policy approaches to preserve/retain existing small-scale business premises are presented: (1) via **protection**, (2) via **compensation** and (3) via the **implementation of counteracting measures** against the underutilization of the space intended for business functions (Gemeente Amsterdam, 1999). The protection approach involved the identification of **27 concentrations of small-scale business establishments** across Amsterdam and the issuance of special protection designations. Each concentration identified is made up of a total of approximately 5,000 m^2 of businesses clustered together within a mixed-use (live-work) area and must meeting additional criteria in relation to location, minimum number of small-scale business establishments, access and function (Gemeente Amsterdam, 1999). Within the district of Amsterdam Noord, two concentrations were determined and therefore granted this protection: Octa, Kaloenstraat (#21) & Former Wingerdeschool, Wingerdweg (#22), in which NDSM-Werf is not included. The purpose of this designation is to maintain the existing operations of the small-scale businesses that have established there. In regard to compensation, the main aim is to ensure that in circumstances where the premises of a small-scale business in a residential area is being used/displaced by another function, the appropriate compensation is provided in the form of an adequate replacement of space. There are guidelines provided in which specific criteria are recommended such as that an equal number of square meters as the original premises, to be built within the same city district, as well as, the same type of business space, as well as the suggested considerations of layout, access and rent price (Gemeente Amsterdam, 1999). The compensation procedure to be implemented in these circumstances involve obtaining advice the Stuurgroep Bedrijfslocaties (the Business Location Steering Group) in which details on the business establishments being "re-used" as well as compensation plans are to be provided such as the size, total number of squared meters, type of business facilities to be realized along with the rental price points and businesses to accommodate for in the future (Gemeente Amsterdam, 1999). In terms of counteracting measures to ensure that small-scale business activities are maintained, two strategies are presented: **maintenance** and ensuring the **proper enforcement** of maintenance works through the issuance of warnings and notifications when necessary. It is revealed that the registration of small-scale businesses owners is not well recorded, which limits the effectives of enforcement measures, which is to be addressed accordingly.

When it comes to the **expansion of small-scale businesses**, the following steering capabilities of the municipality are presented: **Planning stimulation**, **financial incentives**, and introducing more **flexible zoning plans**. To ensure that business premises can effectively meet market demand, it is essential that three actions are implemented: monitoring, the reporting of any issues and developing pilot projects

(Gemeente Amsterdam, 1999). According to this document at that time, the municipality is invested in ensuring that small-scale business accommodation projects are actually realized, that barriers and bottlenecks in the process are addressed, special protection is issued to these business spaces accordingly and pilot projects are pursued in coordination between city districts and developers. When it comes to financial incentives, plans to provide subsidies to projects that focus on the expansion of small-scale business establishments are presented in which preliminary details of a possible implementation program are provided. It is unclear if this program was even implemented or not. The third steering capability revolves around the possibility of adjusting existing zoning plans in a way that more flexibility is possible for small-scale business activities. The proposal includes introducing mixed-use buildings into a zoning plan where a set percentage of floor space for business functions are allocated (minimum and maximum standards) most likely for the ground floor in which the use of space can adjust over time (Gemeente Amsterdam, 1999).

It is important to note that the policy approaches presented in this document are **proposals**, in which there are limited details in implementation, but instead, suggested points of departure are provided. The question is whether any of these recommended policy measures were carried out and relevant in present day. Based on examining more recent documents, it is evident that more effort is being put in at realizing mixed-use developments, but with little indication if these proposals are implemented.

Wonen tussen de bedrijven door

Gemeente Amsterdam | 2003

In 2003, a research study was conducted on industrial estates designated for transformation by a working group within Gemeente Amsterdam on the basis of the *Amsterdamse Structuurplan 2003*, which centred around the municipality's ambition to mix work and living functions more in areas that are typically monofunctional spatially. Simultaneously, the municipality was in the midst of addressing the housing challenge Amsterdam was starting to face at the time (Gemeente Amsterdam, 2003). As a result, the research study, *Wonen tuseen de bedrijeven door* prepared by Gemeente Amsterdam (2003) examines the possibility of mixing living and business functions in transformation areas. At the time, the municipality had identified a number of industrial estates within Amsterdam to undergo some form of transformation into new mixed-use neighbourhoods moving forward, which can be found in the *Amsterdamse Structuurplan 2003*. The objective of this particular study is to determine what business types are the most appropriate in an urban mixed-use environment and to examine the effectiveness and suitability of existing land use/ zoning tools in achieving the mix of live and work that is desired (Gemeente Amsterdam, 2003). The research focuses on two case studies of Overamstel and Buiksloterham, in which the transformation process of both projects is not included in the research scope. Three scales of mixing are examined closely: (1) building, (2) block, and (3) site. When examining these industrial estates, one of the main conclusions was that the mixing options for businesses especially when housing is involved is not only heavily dependent on scale, but also the existing businesses and site conditions. In addition, the mitigation of (potential) nuisance was found to improve the likelihood of a successful mix between work and living functions in the same vicinity as well as adequate marketing of both function types. When examining the regulations for businesses, which are considered as a zoning plan instrument in the two areas at the time, they were found to be insufficient in facilitating proper mixing at both building and block levels between living and business activities (Gemeente Amsterdam, 2003). As a result, an alternative planning tool was proposed – the provision of adequate workspace for businesses of up to 200 m^2 at block level where measures to limit specifically noise nuisance was proposed. It is not apparent if these proposals were ever enacted or enforced. In terms of the outcome of mixing businesses at different scales, it is important to note that light industry businesses are mentioned as being possible to integrate in the mix at block and terrain levels. When examining the transformation of the industrial estates at a terrain

scale, it was determined that the transformation process becomes more complex with a large quantity of (existing) businesses already established in the site (Gemeente Amsterdam, 2003). In addition, the transformation of these lands will entail the relocation of key businesses establishments. This could lead to a more difficult process in realizing mixed-use developments in which light industry is to be included.

This document also presented several recommendations that seem to be relevant and applicable in present day. For instance, the importance of distinguishing the scale is accentuated as the mixing possibilities are found to vary depending on the scale. In addition, since it was determined that the likelihood of nuisance challenges increase the more micro the scale is, it is recommended that compensation measures to mitigate nuisance are implemented in order for more businesses to be able to be accommodated at a more fine-grained mix (Gemeente Amsterdam, 2003). The marketability of both the work and living functions is also highlighted. For instance, specifying target groups that are most appropriate to reside in the housing component of an urban mixed-use development and ensuring design elements for business workspaces like access and layout are highly recommended (Gemeente Amsterdam, 2003). In addition, the document reveals the importance of informing the end-users, both residents and businesses of the transformation process and implication prior to and as it progresses. Other relevant findings include the key role public space plays in terms of formation and function in ensuring that proper cohesion is achieved when mixing of work and living functions at a site level. In addition, it was determined that mixing at solely a terrain level will not lead to a very stimulated and synergetic live-work area. The importance of a transition zone between an industrial estate and an adjacent residential neighbourhood is also highlighted. In the research, it was determined that a smooth transition can be achieved at a block level using proper urban planning measures (Gemeente Amsterdam, 2003).

This research was conducted at the time when the industrial estates were just being designated for transformation into new live-work districts. Although this particular document is quite dated, it shows that the concept of mixing between living and work functions was very much prominent from the early stages of transformation designation process. In addition, the mixing possibilities of light industry functions was highlighted, which was not explicitly addressed prior to this. Therefore, the main findings and conclusions made at that time seem to be quite relevant especially since the situation surrounding the transformation of old industrial areas at the time is comparable to the present especially as it relates to housing demand. It is possible that the research done for this publication is an extension of the *Kleinschalige bedrijfshuisvesting in Amsterdam* publication (Gemeente Amsterdam, 1999).

Handboek Kleinschalige bedrijfsruimte Amsterdam

Gemeente Amsterdam | 2008

In 2008, Gemeente Amsterdam's Spatial Planning Department (De Dienst Ruimtelijke Ordening) prepared and published *The Small Business Space Handbook Amsterdam*, a manual directed at small-scale (craft) businesses in Amsterdam. It was developed in response to the limited support and means to accommodate the demand for small-scale business workspaces in urban environments at the time (Gemeente Amsterdam, 2008). The main objective is to support and place more attention on increasing the supply of workspaces for small-scale creative businesses in residential areas by presenting typologies, trends and examples. This is a different scope of work than in the *Wonen tuseen de bedrijven door* publication (Grmeente Amsterdam, 2003) from five years prior, which focused on examining the possibilities of mixing businesses in industrial lands under transformation.

It is revealed early on in the handbook that there is an undersupply of especially small-scale business spaces under 100 m^2. A possible solution to address this issue in specifically industrial estates under transformation is to realize a business complex of a large vacant plot and offer smaller plots accordingly (Gemeente Amsterdam, 2008). For the purposes of this handbook, a definition of small-scale business space is provided, which is the following, "workspace up to a maximum of 250 m^2 intended for traditional business activities" (Gemeente Amsterdam, 2008, p.12). In addition, several concepts are defined including the distinction between 'space' and 'activity'. It is unclear what was considered as a business activity that is traditional.

The main component of this handbook is evaluating the outcomes of the policy surrounding the

special protection designations imposed on 27 concentrations (or clusters) of small-scale business establishments in mixed live-work neighbourhoods (inner-city) that was first presented in the *Kleinschalige bedrijfshuisvesting in Amsterdam* document from 1999 (Gemeente Amsterdam, 2003, 2008), It is unclear what the status of these concentrations are like now. Key aspects of the compensation guidelines that were proposed in the *Kleinschalige bedrijfshuisvesting in Amsterdam* document (Gemeente Amsterdam, 1991) are reiterated in this handbook in relation to the designated concentration areas. In this document, each concentration area is examined to determine the status of the established businesses at that time – whether they were maintained as intended or otherwise displaced. The two business clusters in Amsterdam Noord seem to have since been renamed OCTA, Kaloenstraat 11 & Wingerdeschool, Wingerdwed 28-34), however, the business establishments were found to be maintained (Gemeente Amsterdam, 2008).

A description of the urban development history of small-scale business premises in Amsterdam is also provided, followed by urban design typologies of small-scale business establishments that were developed where distinct characteristics are indicated. The first set of typologies include a multi-tenant building, the plinth of a building, and a standalone strip, all within a residential area. There are also typologies that are not directly situated within a resident area, but either adjacent that include a multi-tenant building and a multi-tenant building with a second ground level, or completely separate from a residential area like a strip that is completely accessible on both sides and does not share the premises with other functions (Gemeente Amsterdam, 2008).

In this handbook, several trends related to small-scale businesses at the time are recognized. One particular trend that was highlighted was how their relocation patterns differ to their larger counterparts as the majority of small-scale businesses remain within city boundaries. In addition, the reasons to relocate derive from the limitations of the current location on the existing and future operations of the business (i.e., parking, accessibility, space). It was also found that there is significant growth in creative industries that are made up of both office and production space elements. In regard to small-scale industrial spaces, it was found that they are not typically realized in the plinths of mixed-use buildings, but instead in multi-tenant business premises. Although plinths in new live-work developments are ideal for small-scale (industrial) workspaces, they are typically occupied by other higher valued uses i.e. retail, offices and facilities (Gemeente Amsterdam, 2008). However, when workspaces for small-scale industrial activities are being accommodated in mixed-use developments, they are designed in a way to ensure maximum flexibility such as ensuring a 4.5 meter floor height is realized for multifunctionality purposes (Gemeente Amsterdam, 2008).

Structuurvisie Amsterdam 2040

Gemeente Amsterdam | 2011

In 2011, the *Structuurvisie Amsterdam 2040* was adopted by Amsterdam's city council; a statutory plan that sets outs the long-term spatial vision for the city covering three periods of time: 2010-2020, 2020-2030, and 2030-2040 (Gemeente Amsterdam, 2011). According to Needham (2014), a **structuurvisie** is required to be formulated at the Municipal, Provincial and National levels of government in the Netherlands and is regulated by law. It acts as a framework for upcoming land-use plans (**Bestemmingsplan**) for specific areas, however the contents of the vision are not legally binding for anyone to realize, which is not the case for a Bestemmingsplan (Needham, 2014). This particular Structuurvisie was prepared by Gemeente Amsterdam, containing ambitions and plans for the future spatial development of Amsterdam, focusing on the overarching themes of economic resiliency and sustainability. Specific spatial interventions are presented, which include the housing mandate of constructing 70,000 new homes to increase the overall housing stock of Amsterdam by, improving the built environment's resiliency to climate change, and investing in the following initiatives: mass public transportation infrastructure at a regional and city scales, quality public space, greenery and water initiatives, and the generation of sustainable forms of energy (Gemeente Amsterdam, 2011). It is important to note that to accommodate more housing within Amsterdam's city boundaries, one of the actions items presented is to find alternative location for companies, which is to be done in coordination with the region. It is unclear what this process entails and if the implications of relocation to established business establishments were considered by the municipality. The following motto

that is presented when discussing Amsterdam's economy is as follows: a good city for people is a good city for companies and the reverse is equally true (originally in Dutch). The main spatial challenge that Amsterdam is encountering and will continue to be space scarcity, which has serious implications to the operations of economic activities in the city. In this document, the municipality seems to recognize the importance of retaining sufficient space for economic functions within the city boundaries, especially for 7 key sectors, which are: the creative industry, life sciences, ICT, trade & logistics, financial services, tourism (which includes conventions) and the sector covering fish, horticulture and general food production (Gemeente Amsterdam, 2011). The majority of these sectors are in line with the key sectors identified at the metropolitan regional level in the *MRA 2.0 Agenda* (Metropoolregionamsterdam, 2020). Even though it is explicitly stated that ensuring a sufficient range of locations for businesses activities is a priority as intensification and transformation projects in Amsterdam are implemented, explicit ways this is to be done is not elaborated on.

The long-term vision that is set out in this policy document is broken down by four 'big moves', which are as follows: (1) The roll out of the central area of Amsterdam, (2) Interweaving landscape within the city, (3) Rediscovering the waterfront of the IJ, (4) Transforming the southern flank into an international hub (Gemeente Amsterdam, 2011). For the **first big move**, the locations where new housing is to be allocated are presented, in which the northern banks of the IJ are identified. In addition, it is explicitly stated that existing business establishments that specialize in crafts (i.e., workshops) and more urban-specific services like construction, utilities and suppliers are to be safeguarded, as they are identified as being vital as the city accommodates more living functions. Based on the definition of **light industry** for this research, these businesses would likely be considered in the study's scope of light industry. Details regarding public transport, public space energy infrastructure investments in the central area of Amsterdam are also provided. The municipality's vision for the rollout of the central area of the city by 2040 is provided in Figure 23 below.

The **second big move** focuses on key green features throughout Amsterdam and plans to enhance them over time. The **third big move** focuses on areas situated along bodies of water specifically the IJ, in which development projects along the northern banks including NDSM-Werf are described. Figure 24 shows the vision for the redevelopment of the

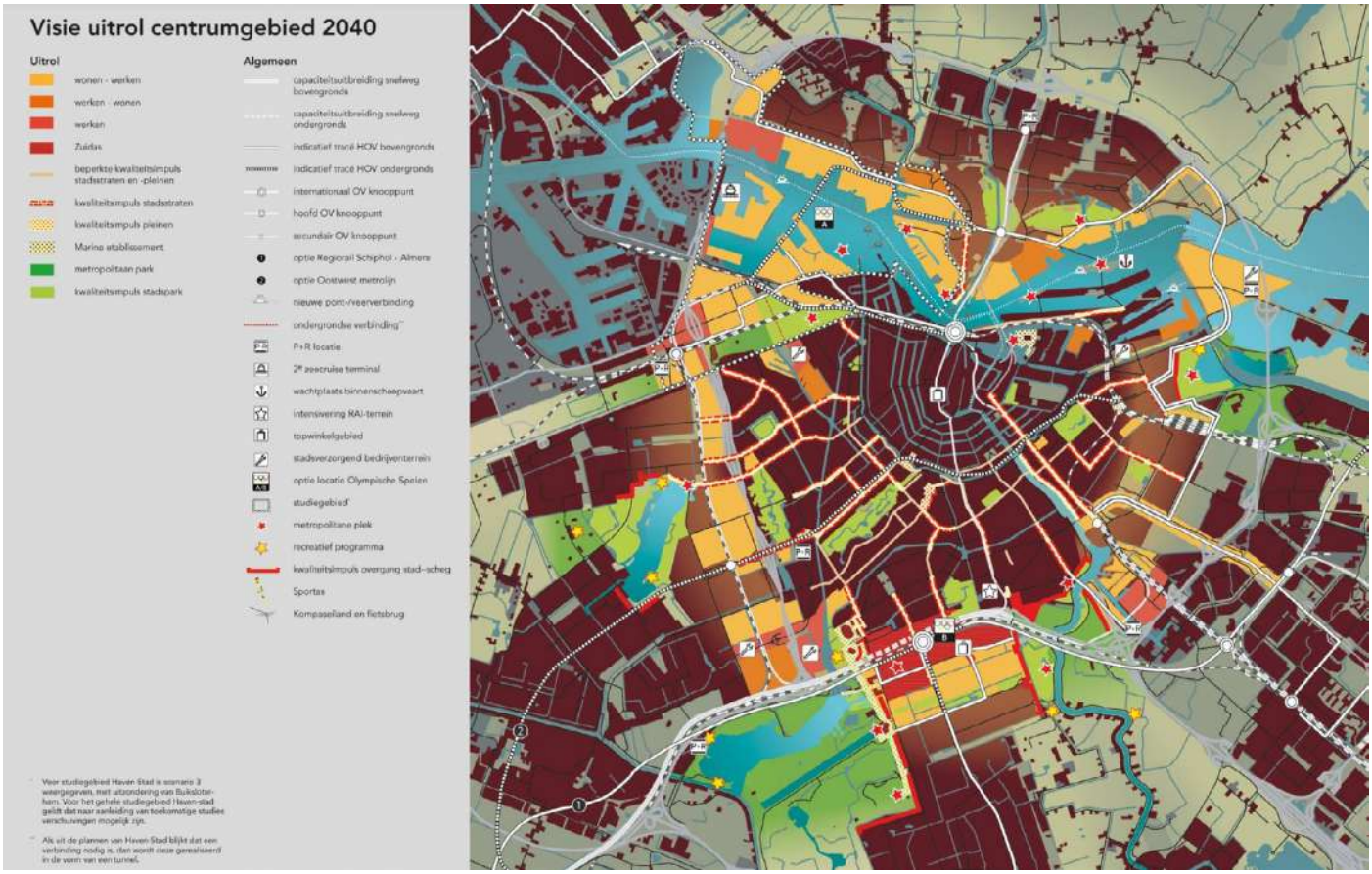

Figure 23: Map demonstrating the vision of the rollout of the central area of Amsterdam up to 2040 (Retrieved from Gemeente Amsterdam, 2011, p.34/35).

waterfront along the IJ by 2040. In both Figure 23 and Figure 25, NDSM-Werf has been identified to be transformed into a live-work district. This implies that in terms of the live-work ratio, housing is to dominate, whereas for work-live area designations, the final breakdown needs to be that 50% minimum of housing is to be achieved, in which the remaining portion is to be allocated to businesses (Gemeente Amsterdam, 2011). In both scenarios, housing seems to be prioritized.

The **final big move** centers around realizing a number of (area) development projects in the south flank of Amsterdam catered towards the international market, which includes the Zuidas, the expansion of the Schiphol airport and a possible venue for the Olympics 2028 (Gemeente Amsterdam, 2011).

The vision as it relates to policy is also described, which is broken down into the following sections: living and working, traffic and transport, green and water, energy as well as the Olympics. Two key demographics that have been identified in this document are knowledge workers and city families. The municipality also presents new development strategy models that are to be implemented instead of the standard large-scale monofunctional housing projects that were built in the past. The realization of smaller-scaled developments that involve more parties are mentioned, as well as efforts to reuse existing stock rather than relying on new builds (Gemeente Amsterdam, 2011). However, it is important to point out there is no explicit mention of realizing more mixed-use developments here or including light industry.

When examining the **work aspect**, the transformation of **bedrijventerrein** (industrial estates when translated to English) specifically within the A10 ring road is discussed. The distinction between intensification and transformation is made, as well as large-scale industrial estates situated outside of the A10 ring road and those located in the inter-city. This document captures the designation of several inner city (urban) industrial estates for transformation – either into new work-live or live-work neighbourhoods. Live-work areas are interpreted as new neighbourhoods in which the living function is dominant while in work-live settings, it is the vice versa. Along the northern banks of the IJ, NDSM-Werf West & Oost have been identified as new live-work neighbourhoods separately (as mentioned above), while the industrial estates of Buiksloterham and Ovenhoeks are to transform into work-live districts (Gemeente Amsterdam, 2011). The main difference between these designations is that the

Figure 24: Map of vision for the redevelopment of the waterfront of the IJ by 2040 (in Dutch) (Retrieved from Gemeente Amsterdam, 2011, p.58/59).

area in question is to be comprised on primarily the first land use function (dominated) to be worked on… At the time, the transformation of NDSM-Werf was projected to be completed in the first time period (2010 – 2020) (Gemeente Amsterdam, 2011). The document also captures the municipality's ambition of ensuring these new urban areas are to have and maintain a mixed program of functions and uses, in which the provision of sufficient space for work functions is emphasized. As part of the mandate to build 70,000 homes by 2040 in Amsterdam, it is mentioned that the aim would be to realize at least 5 m^2 of workspace for small-scaled businesses per home built. The Spatial Economic Consultant at Gemeente Amsterdam (Personal communication, 2021) mentioned this, however, he considers the 5 m^2 of workspace per new home to more of a rule of thumb in new (mixed-used) areas and is not very effective, as it is not being enforced regularly.

It is stated that mixing businesses and residential has been found to more feasible at a more **macro level**, however, certain businesses have been determined to integrate well in **a block with housing**. The municipality of Amsterdam has imposed the guidelines developed by VNG (the Association of Dutch Municipalities) regarding mixing capabilities and environmental categories in terms of nuisance (Gemeente Amsterdam, 2011). The document also discusses Amsterdam's office market and retail market separately, in which trends, characteristics and actions are presented. Industrial workspaces are not as explicitly mentioned in this document.

The implementation strategy of the long-term spatial vision is presented in two ways: by time period (2010-2020, 2020-2030, 2030-2040) and by area within the city (seven city districts – Centre, North, East, Southeast, South, West, New West and Westpoort). For the realization of housing and office workspace, specific amounts are dedicated to each period, but also to each city district (in units and m^2 respectively). For the city district of Amsterdam North in which NDSM-Werf is situated along the northern banks of the IJ, the phasing plan for the 3 periods up to 2040 is shown in Figure 3. In this diagram, the yellow represents work-live areas (werken-wonen), the bright orange signifies live-work areas (wonen-werken), the light orange area are deisgnated for urban renewal and the dark brown-gray represents realized living and/or working areas. Details regarding the development strategies, programming and finances for this particular city district are provided under the implementation section along with the other city districts.

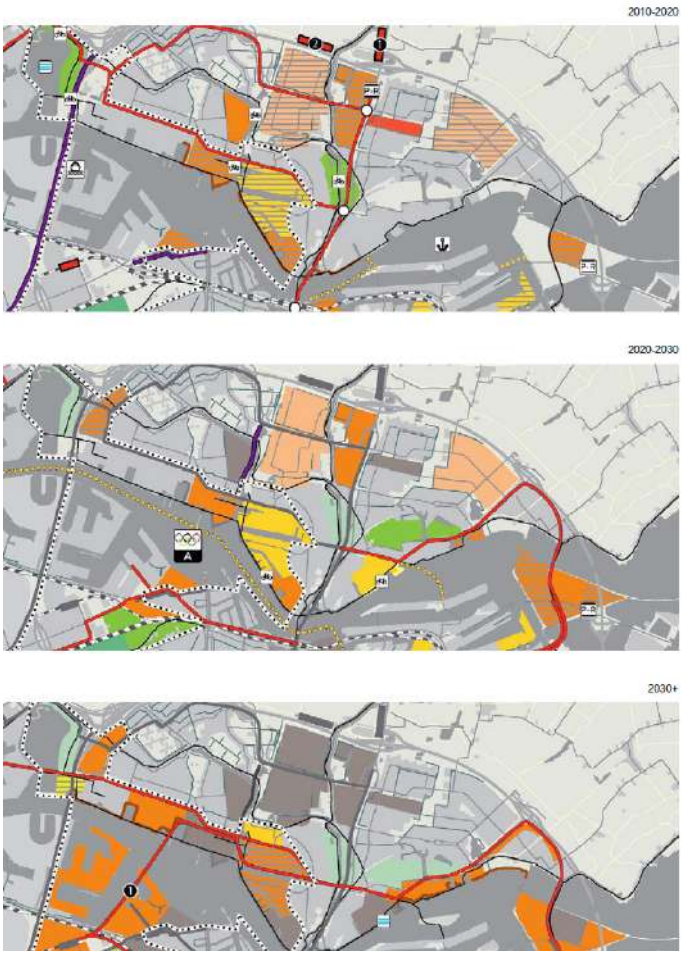

Figure 25: Phasing of development vision for the city district of Amsterdam North (Retrieved from Gemeente Amsterdam, 2011, p.177).

The last part of the *Structuurvisie Amsterdam 2040* (Gemeente Amsterdam, 2011) focuses on the instrumentation aspect of the long-term spatial vision, in which the legal and policy framework at the time is discussed. In addition, definitions and criteria of certain terminology are provided. For instance, the municipality is explicit about the criteria used to identify the following: an industrial estate (inner city vs large-scaled), work-live areas, and environmental categories (Gemeente Amsterdam, 2011). Instrumentation details regarding spatial structure, green and water, traffic and transportation are also provided.

It is important to note that due to certain developments especially surrounding housing demand and growth that were not foreseen nor captured when developing this vision document, a replacement policy document has been since prepared that will cover 2030-2050 in the form of an Omgevingsvisie Amsterdam 2050 (Gemeente Amsterdam, 2021). This particular document will be elaborated on further along in this section as several key documents were developed in the meantime such as the *Koers 2025* (Gemeente Amsterdam, 2015).

Koers 2025
Gemeente Amsterdam | 2015

The *Koers 2025* (Gemeente Amsterdam, 2015) was developed as new strategy to steer future urban growth of Amsterdam within its city boundaries. In comparison to the *Structuurvisie Amsterdam 2040* (Gemeente Amsterdam, 2011), Koers 2025 acts as a short-term, interim strategy in which the municipality's plans to realize a minimum of 50,000 new build homes in the span of 10 years is captured as well as the decision to allocate future urban growth to the city's industrial estates (230 hectares in total area) that were not yet designated for transformation in the *Structuurvisie Amsterdam 2040* (Gemeente Amsterdam, 2017). For the purpose of this research, the *Koers 2025* policy document was not reviewed extensively, however, it should be noted that it is mentioned in other documents that are more relevant to the research topic, such as the *Ruimte voor de Economie van Morgen* (*Space for the Economy of Tomorrow*), as they are intended to go hand-in-hand. The context behind the two policy documents was described during the interview with the Spatial Economic Consultant at Gemeente Amsterdam (Personal communication, 2021):

"Koers 2025 was really about, how can we, in the middle of long term, create as much space for housing. That strategy also relied very much on transformation of industrial sites, so they designated some more sites for living. That was actually a strategy where Ruimte voor de Economie van Morgen, so the spatial economic vision of the city on a broad scale was based, so every aspect of economy in fact." – Spatial Economic Consultant at Gemeente Amsterdam, personal communication, 2021

Ruimte voor de Economie van Morgen
Gemeente Amsterdam | 2017

Shortly after the release of the *Koers 2025* (Gemeente Amsterdam, 2015), the Ruimte en Economie (Room and Economy) Cluster produced a follow-up policy document in 2017 that centres around the economic and work perspective of Amsterdam's future urban growth especially on industrial estates designated for transformation – the *Ruimte de Economie van Morgen* (*Room for the Economy of Tomorrow*). At the time, significant growth in population and employment was forecasted to occur in Amsterdam, which led to the realization of a large quantity of housing to accommodate this growth (Gemeente Amsterdam, 2017b). The municipality was aware that economic elements of the city cannot be overlooked. As a result, three spatial-economic deliverables were to be achieved in the 10-year period set out in the *Koers 2025*. Firstly, it was determined essential to establish live-work neighbourhoods to properly meet the spatial needs of the urban knowledge economy of Amsterdam. Secondly, providing enough space for a range of economic activities and businesses was a priority especially in industrial estates designated for transformation, and thirdly, ensuring that possible economic changes over time are taken into account when developing live-work environments (Gemeente Amsterdam, 2017b). Figure 26 is a map that demonstrates areas designated for transformation up to that point, in which distinctions are made between those designated at the time of the *Structuurvisie Amsterdam 2040* and areas designated when *Koers 2025* was prepared.

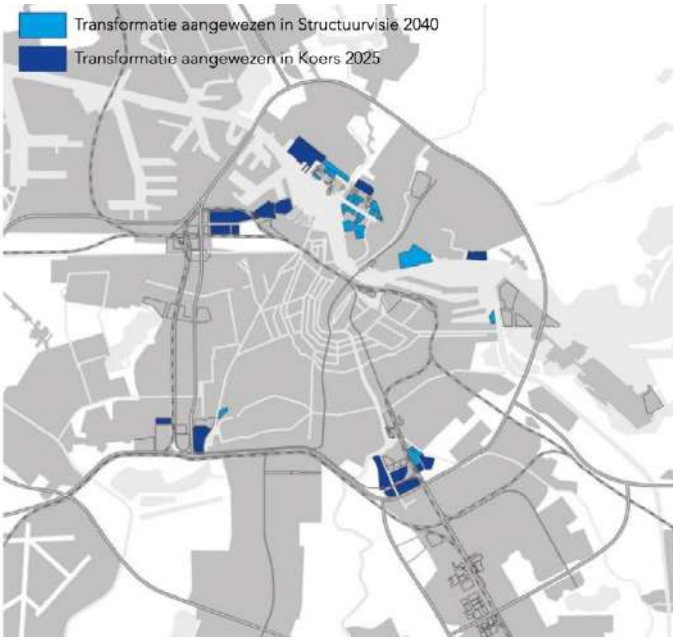

Figure 26: Transformation designation map (Retrieved from Gemeente Amsterdam, 2017, p. 26).

Within the document, three broad spatial areas in which work functions are typically situated are identified: office areas, live-work environments and production zones. The category of live-work environment implies specifically a new neighbourhood in which there is a degree of mixing between live and work functions. Variables to ensure that these live-work areas are economical viable have been identified. They include the following: an appropriate live-work ratio, accessibility in

terms of logistics for businesses, density and network connectivity of the neighbourhood, as well as an established entrepreneur/business presence (Gemeente Amsterdam, 2017b). Four types of live-work environments are distinguished: Living Area, Creative Neighbourhood, Productive Neighbourhood and Urban/City Street (Gemeente Amsterdam, 2017). In Figure 27 below, descriptions and details of the three latter types are provided.

According to this document, NDSM-Werf has been designated as a **Creative Neighbourhood** while the surrounding sub-areas along the northern banks of the IJ have been identified as Productive Neighbourhoods (Cornelius Douwes, Buiksloterham & Hamerkwartiek). Along the main transportation corridor to the North of NDSM-Werf, the Klaprozenweg street has been designated as an Urban or City Street. It is important to point out that the scope of a Creative Neighbourhood according to this document covers creative office space and co-working spaces, as described in Figure 5. More small-scale production spaces as well as hybrid businesses (50% office space, 50% production space) have been identified as the most suitable in Productive Neighbourhoods (Gemeente Amsterdam, 2017b).

Many interview participants especially from the municipality shared their input behind NDSM-Werf's Creative Neighbourhood designation:

"From an economic perspective, we saw NDSM sort of as the central, more central area in those northern banks also because of existing offices over there. So we thought it's more like it could be more creative zone and the production zones around it. But, we've learned lately that there's also quite a lot of production that's that really wants to stay there." – Spatial Economic Consultant at Gemeente Amsterdam, personal communication, 2021

"[...] It was also the intention to [define NDSM as] creative because there was already a creative world [in] NDSM [...] – Head Designer for NDSM at Gemeente Amsterdam, personal communication, 2021

In contrast, interview participants outside of the municipality had **certain reservations** regarding the designations especially in the case of NDSM-Werf. For instance, Expert 1 (Personal communication, 2021) questioned the approach used by the Economic department in identifying the most appropriate designation especially for industrial estates under transformation.

Based on the interviews conducted, the *Ruimte de Economie van Morgen* (Gemeente Amsterdam, 2017)b received a mixed reception depending on the stakeholder.

"The Ruimte de Economie van Morgen was a document that basically a reaction on a document by the city with which structural vision of the city in the area, which paid no interest for economy at all." – Managing Director of ORAM, personal communication, 2021

Input on this document was also provided by an active developer in NDSM-Werf West:

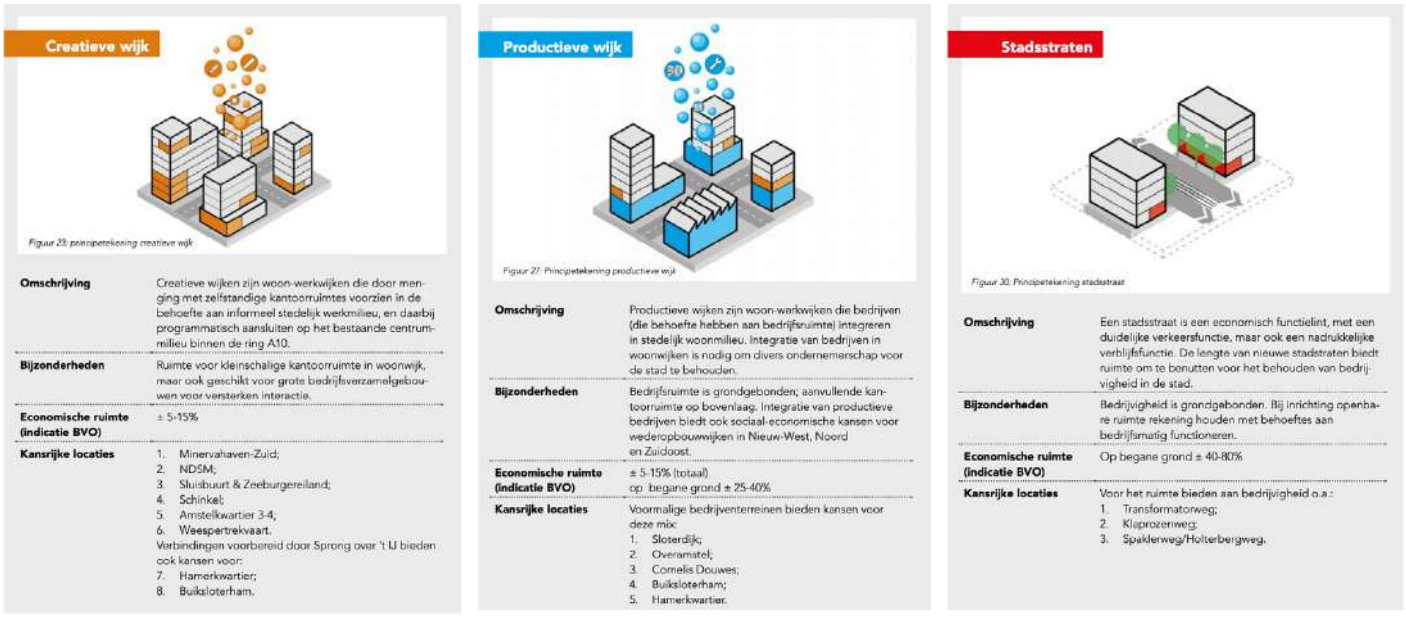

Figure 27: Descriptions of live-work neighbourhood categories (in Dutch) (Adapted from Gemeente Amsterdam, 2017).

"The Ruimte van de Economie voor Morgen…that's the document that I really liked because in that document, they are really trying to differentiate the types of businesses, and they spread it throughout the city, or not. In some areas, they choose to make the office space of this area. So I think it's a good document. That's the thing that I like, It's planned well and it's a good thing" – Real Estate Developer at Lingotto Development, personal communication, 2021

It is important to note that this document also discusses other work-related spatial areas, Office Areas and Production Zones, which are outside of the scope of this research. This policy document also captures a brief business strategy along with an office strategy that is not explicitly described. The *Bedrijvenstrategie 2020-2030* (Gemeente Amsterdam, 2020b) was prepared a few years later, which will be discussed below.

Bedrijvenstrategie 2020-2030
Gemeente Amsterdam | 2020

As a follow-up to the *Ruimte voor de Economie van Morgen* (Gemeente Amsterdam, 2017b), the *Bedrijvenstrategie 2020-2030*, *Business Strategy 2020-2030* in English, was prepared with the intention of implementing a spatial action plan for areas in Amsterdam typically where businesses are situated including industrial estates (bedrijventerrein) that are under transformation. Most recently, the municipality recognizes that the transformation of industrial estates into urban (mixed-use) districts to accommodate the housing agenda will lead to significant implications to the supply of typical business areas in the city. Simultaneously, the city has found to be experiencing an increasing demand for workplaces suitable for industrial activities (i.e. production, storage, repair, distribution) due circularity and energy transition mandates, therefore resulting in a mismatch between supply and demand of said workspaces (Gemeente Amsterdam, 2020b). The objective of this business strategy is to address the situation at hand by implementing measures and initiatives to realize and retain sufficient space for businesses with industrial activities in manufacturing, crafts and repair sectors and ultimately mitigate their displacement (Gemeente Amsterdam, 2020b). It is important to note that this business strategy, along with its counterpart, the office strategy (Kantorenstrategie), were designed to be used as a foundation for the upcoming Omgevingsvie. In addition, its ambitions are to be achieved in collaboration with the Metropoolregion Amsterdam (MRA) (Gemeente Amsterdam, 2020b). Please note that the Office Strategy is excluded from the scope of this research. In an interview with the Spatial Economic Consultant at Gemeente Amsterdam, with the Ruimte en Economic Cluster for Gemeente Amsterdam, it was revealed he was involved in spearheading and developing the business strategy.

"That [the Bedrijvenstrategie 2020-2030] was approved in May 2020 and what we see is that it's on the political agenda, but it's not like the highest priority. We continuously need to push this topic as a part of a balanced city development." – Spatial Economic Consultant at Gemeente Amsterdam, personal communication, 2021

In the *Bedrijvenstrategie* (Gemeente Amsterdam, 2020b), a definition of business space (bedrijfstruimte) was provided, in which at least 70% of the gross floor area (GFA; OVO in Dutch) is allocated for business activities (i.e. production) while the remaining space can be for office use (Gemeente Amsterdam, 2020b). In addition, distinction between different types and classifications of industry is also provided, in which light industry is captured.
One of the main priorities of the business strategy is to maximize the opportunities to mix business space (especially for industrial activities) and housing in the same vicinity, by which industrial space is to be allocated specifically at the **ground floor level of mixed-use buildings** in transformation areas, and housing to be on the upper floors. This is to be achieved by implementing the following actions: (1) zoning measures and programming that prioritizes the provision and enforcement of industrial space, (2) developing a position on the work element of the desired live-work dynamic per transformation area in coordination with existing entrepreneurs, (3) establishing a business counter that would be responsible for matching existing business spaces with those looking for (temporary) locations to operate their establishments, (4) conducting research on the possibilities for a plinth cooperative (plontcoöperatie), and (5) examining the options for joint business establishments that could house various small-scale businesses with industrial activities (Gemeente Amsterdam, 2020b). NDSM-Werf is identified as a **Creative Neighbourhood**,

that was designated for transformation at the time this document was developed. The other priorities include: retaining and intensifying the business activities in industrial estates that were purposely not slated for transformation (into live-work districts), as well as, being very meticulous and strategic about plans for the remaining parcels of industrial lands in the city (Gemeente Amsterdam, 2020b).
During the interview with the Spatial Economic Consultant at Gemeente Amsterdam (Personal comunication. 2021), he described their strategy for transformation industrial estates within the city boundaries:

"We are transforming 450 hectares of industrial space right now. Those spaces are not vacant; they are being used by companies. And if we start developments in such an area, those companies might want to stay, want to leave or want to stop. It just depends. It really depends on whether they ...what they do; how heavy in terms of environmental impact their activity is; it depends on the rent they are paying, it depends on whether they are 25 or 60 years old. They might say, 'oh, that's a nice pension. I'm just going to sell all and that's it.' We made a sort of approach on how big would the demand be if we transform that area as a whole." – Spatial Economic Consultant at Gemeente Amsterdam, personal communication, 2021

For this business strategy, an external party was brought on to locate and calculate the amount of business/industrial space that is still needed within industrial estates under transformation (Gemeente Amsterdam, 2020b). It was determined that the demand can be broken down into three categories: replacement demand (vervangingsvraag), expansion demand (uitbreidingsvraag) and energy-transition related demand (transitiegerelateerde vraag).
To mitigate the need of finding new spaces outside of the transformation areas for certain businesses, it was determined critical that appropriate and sufficient industrial space is provided as part of the transformation output. As part of the research conducted, the industrial estates were categorized by the phase they are to be transformed (Phase 1: up to 2019; Phase 2: 2020 – 2025; Phase 3: 2025 – 2030; Phase 4: After 2030). NDSM-Werf is allocated to Phase 1. From here, the existing businesses identified under each phase are further broken down into the following groups: (1) difficult to mix, (2) mixable under certain conditions, and (3) mixable. The industrial lands identified in the research were divided into four phases of redevelopment. The degree of mixable of the existing businesses in each industrial area is determined based on the following criteria: location, the use of space and size of operations (Gemeente Amsterdam, 2020b). Figure 28 below contains a breakdown demonstrating the assigned mixability of existing businesses that are

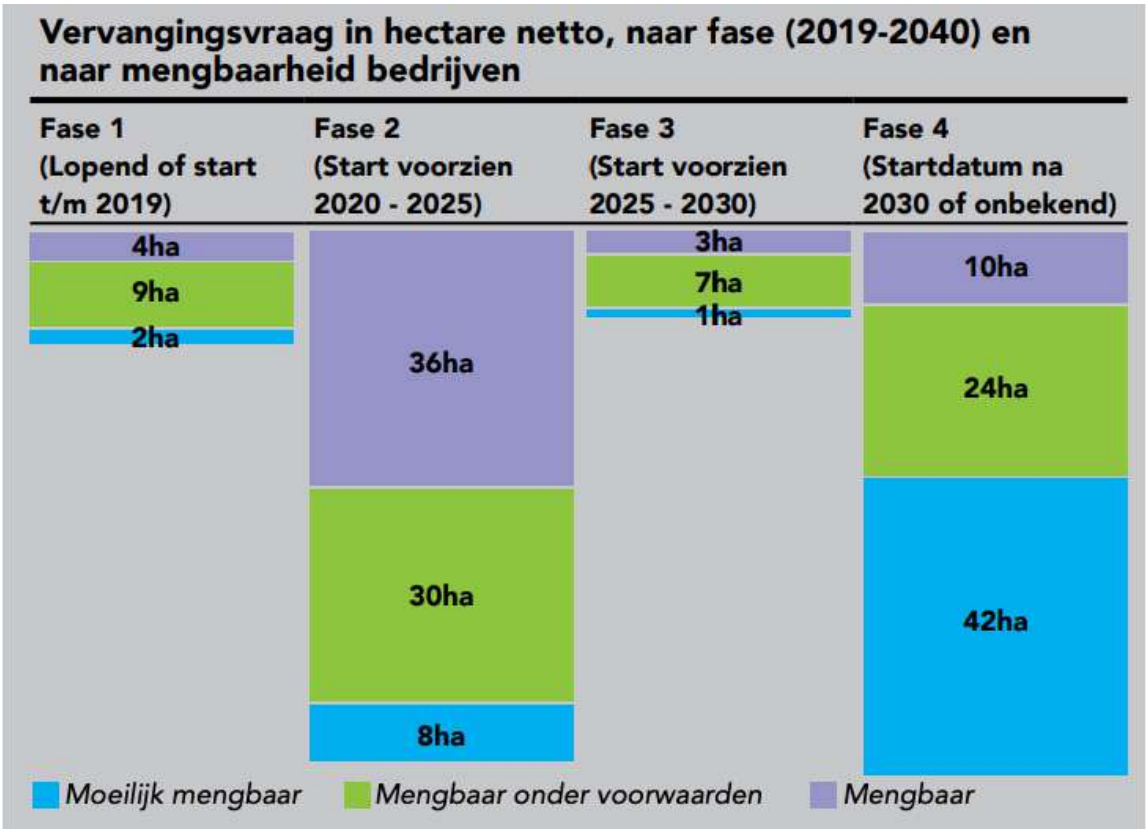

Figure 28: Breakdown of the mixability of companies by transformation phase of industrial estates in Amsterdam (in Dutch) (Retrieved from Gemeente Amsterdam, 2020b, p.19).

designated by transformation phase.
It was also determined that in theory, the majority of the existing business establishments especially in the industrial estates that are transformed during Phase 1, 2, 3 can be **mixed with residential functions**. The question is at what scale is this mixing the most appropriate.

Many recommendations are provided to ensure that businesses can afford to remain in Amsterdam and ultimately address displacement. **Zoning** is a potential avenue in which business functions like industrial activities are not clumped in under the same land use category as HORECA or office for instance in order for a lower price can be allotted accordingly (Gemeente Amsterdam, 2020). The mixing of business and housing functions is emphasized; however, it is noted that the existing spatial instruments applied in the Netherlands separate these land uses at default. It is also recognized that the interests of residents typically dominate over those of businesses when housing and work functions are situated in close proximity to each other and businesses need to want to stay and be integrated in a mixed-use development (Gemeente Amsterdam, 2020b). These prove to be major challenges in ensuring the successful implementation of mixed-use as part of transformation projects especially when industrial activities are involved, that need to be overcome.

Omgevingsvisie Amsterdam 2050 (Draft)

Gemeente Amsterdam | 2021

In early 2021, a draft version of the *Omgevingsvisie Amsterdam 2050* was released by Gemeente Amsterdam, with the intention of replacing the *Structuurvisie Amsterdam 2040* (Gemeente Amsterdam, 2011). The main driver behind the decision for the municipality of Amsterdam to prepare a new city-scale vision document for Amsterdam was the **significant growth of population and employment** that occurred in the last 10 years that was initially forecasted to take 40 years to transpire (as captured in the *Structuurvisie Amsterdam 2040*) (Gemeente Amsterdam, 2021). As a result, the *Omgevingsvisie Amsterdam 2050* (Gemeente Amsterdam, 2021) was created to lay out the updated vision for Amsterdam for the next 30 years, in which the development plans are sorted by the following time periods: 2021-2030, 2031-2040, 2041-2050. The *Omgevingsvisie Amsterdam 2050* (Gemeente Amsterdam, 2021) is expected to align with the New Environmental Act, which is yet to be enacted. This document captures a range of relevant topics and recent topics including the Corona pandemic, the Circular Economy and the Energy Transition. It is notable that the topics of Reshoring or Re-industrialization are not captured in this first draft. When examining the key tasks assigned for Phase 1 (2021-2030), it is explicitly mentioned that the banks of the IJ including the norther banks where NDSM-Werf is situation will continue to be redevelopment into new urban mixed-use districts. New elements that were not captured in the *Structuurvisie Amsterdam 2040* are a HOV line to build along the tt Kaprozenweg and incorporate more greenery in NDSM-Werf Oost to accommodate the housing development in NDSM-Werf West (Gemeente Amsterdam, 2021). In regard to the latter proposal, it was determined that the municipality is experiencing some opposition from local businesses in NDSM-Werf Oost, which will be discussed in the Case Study (Site) Scale section of this chapter under the analysis of the Actualisatie Investeringsbesluit NDSM-Werf 2020. In regard to the **work element**, there seems to be more of an emphasis on the crafts, manufacturing industry, logistics, distribution and repair in this draft document, which is in line with the definition of light industry in this study. However, development actions to accommodate the significant increase in house building include transforming **450 hectares of industrial estates and port areas** in Amsterdam, in which it explicitly states that this will lead to a significant shortage of business space of at least 150 hectares by the year of 2040 (Gemeente Amsterdam, 2021). It is unclear what is to be done to address this situation, but it is evident that there will be serious implications.

The following research participants had opinions about the draft *Omgevingsvisie Amsterdam 2050* (Gemeente Amsterdam, 2021) including the Spatial Economic Consultant for Gemeente Amsterdam (Personal communication, 2021):

"We are replacing that [the Structuurvisie Amsterdam 2040] with an Omgevingsvisie, that's Amsterdam 2050, coinciding with the day that we want […] to switch to neutral as a city, and we want to be circular as well, those are both big ambitions. In that Omgevingsvisie, we try to make really a distinction, where are we going to transform or not? ... on the long term, and that has been a tough, tough discussions. But I'm happy

to say that, you know, that that starts to work out right now." – Spatial Economic Consultant, personal communication, 2021

"I think now and there's this big Omgevingsvisie. the surrounding vision, which everybody's very, quite negative about because it has ...it does not concern to the bedrijventerrein, the productive environment ... it's not in it." – Managing Director of ORAM, personal communication, 2021

One legally-binding avenue of public participation that is enforced is through a **zienswijze**, which allows any person or organization the opportunity to express and present their 'views' on a planning matter typically at an early stage of its development (Needham, 2014; Hobma & Jong, 2016). From the conducted interviews, it was revealed that two stakeholders have submitted a zienswijze, in which they expressed their opinions on the draft of the *Omgevingsvie Amsterdam 2050* (Gemeente Amsterdam, 2021): The Zienswijze ORAM and the Zienswize Vereniging Angsaw. The Managing Director of ORAM (Personal communication, 2021) described the zienswijze process as the opportunity for the public to submit their comments on the draft document, which will go to city council in the near future. Both zienswijze documents were available for the purposes of this research and were determined to capture the main concerns of the two parties on several topics including local businesses and safeguarding worksplaces in the city, in which, at the most part, they were critical of the municipality's plans presented in the draft *Omgevingsvie Amsterdam 2050* (Gemeente Amsterdam, 2021).
It is important to note that during the interview, representatives of Gemeente Amsterdam like the Spatial Economic Consultant at Gemeente Amsterdam (2021) revealed that they do not think that the draft version of the Omgevingsvisie Amsterdam 2050 fully captures the business narrative as of yet. He is however convinced that through the proper engagement and collaboration with necessary parties, it will be reflected and addressed accordingly.

Hamerkwartier Werkt: Bouwstenen voor de realisatie van het Hamerkwartier als Creatieve Productiewijk

Gemeente Amsterdam | 2020

This next document scopes down to a specific transformation project within Amsterdam: **Hamerkwartier**. Like NDSM-Werf (the case study site for this research study), it is also situated on the northern banks of the IJ, however, it is a completly seperate development. As a result, it is included under the documentation analysis at the City scale rather than the Site scale. This document was included in the documentation analysis as it was determined to have key development elements relevant to the research study.

As indicated in the preceding policy documents, Amsterdam has been experiencing significant growth linked to the accelerated housing construction to address the demand of housing within the city boundaries of Amsterdam. The municipality seems to have recognized the **negative implications** of this to the presence of local companies and access to sufficient space for industrial/production activities. In order to address the challenges local, small-scale production businesses and activities are encountering, the municipality's ambition is to transform Hamerkwartier into a **Creative Production District** by 2030 in order for there is sufficient space available for a range of production-related activities as a result of its transformation (Gemeente Amsterdam, 2020c). In contrast to NDSM-Werf, Hamermarkier is designated as a Productive Neighbourhood according to the *Bedrijvenstrategie 2020-2030* (Gemeente Amsterdam, 2020b). In order for this vision for Hamerkwartier to be realized, the Hamerkwartier project team within Gemeente Amsterdam had prepared the document, *Hamerkwartier Werkt: Bouwstenen voor de realisatie van het Hamerkwartier als Creatieve Productiewijk* (Gemeente Amsterdam, 2020d), that lays out details of the area-wide transformation project as well as the implementation strategy.

In the document, it is explicitly stated that when mixing production activities with other functions especially when **housing is involved**, it cannot be realized on its own, without the **support of addition municipality policy initiatives and enforcement**. Hamerkwartier is identified as an additionally challenging case since the steering capabilities of the municipality is limited due to the **fragmented ownership situation** (Gemeente Amsterdam, 2020d). For Hamerkwartier, the desired live-work ratio is 1:2, which translates

a 1/3 working functions and 2/3 housing. Figure 29 visually demonstrates the desired allocation of housing vs business workspaces in Hamerwartier. It is noted that research was conducted via a survey and interviews, which helped inform the contents of the vision and the necessary steps to achieve it.

Figure 29: Spatial allocation of housing versus business spaces in Hamerkwartier (Retrieved from Gemeente Amsterdam, 2020c).

In the document, several reasons for realizing a Creative Production District in Hamerkwartier are presented. They are as follows: (1) Mixing different functions leads to a highly dynamic and lively urban district, (2) there is market demand for local production within the city as well as in mixed urban environments, (3) the circular economy can be incorporated and supported, (4) opportunities to foster innovation and cross-fertilization can be created, and (5) the fact that mixing functions at a high density is supposedly a future-proof concept (Gemeente Amsterdam, 2020c). Several preceding policy documents are mentioned such as the *Structuurvisie Amsterdam 2040* (Gemeente Amsterdam, 2011), *Ruimte de Economie van Morge*n (Gemeente Amsterdam, 2017b) and the *Bedrijvenstrategie 2020-2030* (Gemeente Amsterdam, 2020b) to demonstrate how this document is in line with their objectives and ambitions in regard to mixed-use and accommodating production-related activities within a designated Productive Neighbourhood. Benefits to the area from realizing a Creative Production District are provided.

In the document, target groups for the work aspect of Hamerkwartier are established which are based on current activities in the area and those that are proven to thrive in urban mixed-use environments. They are as follows: (1) craft, production and repair, (2) creative sector, (3) small-scale urban care, (4) experimental HORECA and leisure (Gemeente Amsterdam, 2020d). In order to realize the vision of a Creative Production District for Hamerkwartier, key implementation initiatives are presented, which are either under private law or public law. For plots with private ownership, there will be an Anterior Agreement required that covers mandatory cost recover details for plots under private ownership between the developing party and the municipality. For **plots under erfpacht**, a new or revised ground lease agreement will be issued. To ensure that space for productive activities are used for those purposes, enforcement criteria will be imposed for plots under full private ownership and those under (new) erfpacht, as well as, regulations regarding vacancies (Gemeente Amsterdam, 2020d). Another proposal that is being implemented is introducing the role of the **plinth organization**, in which an organization would take on the responsibility of managing the balance of live and work functions in Hamerkwartier, specifically ensuring that spaces on the plinth are being utilized for the proper purposes. This particular initiative is still in the early stages of development and still requires refinement in terms of its funding, responsibilities and authority (Gemeente Amsterdam, 2020d). **Collaboration initiatives** between the municipality and existing landowners and entrepreneurs are also proposed such as scheduling design workshops with local entrepreneurs. One challenge that was expressed in the document is mitigating potential conflicts between production-related businesses and incoming residents. This is to be done by introducing a **perpetual clause** that is being implemented in Hamburg, with the intention to fully inform future residents ahead of time that they are moving into a productive/creative environment (Gemeente Amsterdam, 2020d). To further promote and emphasize the creative-production climate in Hamerkartier, an **area-wide branding campaign** is to be organized (Gemeente Amsterdam, 2020d). It is important to note that as a result of the Hamerkwartier's transformation, a certain percentage of **displacement of existing businesses** is expected. In addition, it is explicitly stated that the plans for Hamerkwartier are experimental and yet to be proven.

During the interviews, certain research participants revealed their **concerns and criticisms** regarding the Hamerkwartier project. The Managing Director of ORAM (Personal communication, 2021) for instance had comments specifically regarding the Hamerkwartier Werkt document in which he does not agree with the government's approach to address the complexity of the site through space intensive mixed-use solutions. Him along with other research participants like the Co-founder of Made up North (Personal communication, 2021), are not fully convinced of the municipality's vision for the area in

regard to mixed-use and how it will be implemented and actually realized. Direct quotes that reflect this are provided below:

"So the Hamerkwartier ... you must look at this artist's impression of Hamerkwartier. What you see is this guy with the Black and Decker workmate and with a saw in the middle of the street. [...] so that's how they see mixed-use, somebody with some piece of wood and a [...] saw and that will be a combination. But that's not what I see as something that is a vision on how you create mixed-use. Probably that's why you're doing this study, the people have no idea [...] what it is. [...] if I was an entrepreneur, I would never invest in these kinds of environments because I would know that, if the moment I was there, and I would create some noise or smell, that I would [...] have angry people around and you cannot work with angry people; that influence you [...]" – Managing Director of ORAM, personal communication, 2021

Figure 30 below is the artist's impression that is referred to and criticized in the above quote.

"It's still paper plan; it's on paper. There's nothing realized yet. What I hear from economic affairs from the municipality is that it is a very hard discussion with ther spacial planning department - where and how to locate these maker companies - and they have the same difficulties in not getting it on the agenda. So there's a tension... feels that the investors of the land, they've tried to push in as high much rents as they can. So you have to be aware that they really keep making industry with affordable rents, that you're not going to get like media companies as we discussed before, with these higher ends up to 300 euros. So that is the tension that's also there, but the makers don't feel that they can get in that place and there's [...] not much being transformed yet. So, on paper, [...] it looks like an interesting plan for planners with makers on the ground floor and housing blocks on top. But if you ask the makers, they don't feel comfortable with it at all. They work with machines, logistics, but also start very early in the day. They think the 'making district' kind of plan only fits very small artist-like makers or a bike shop. The investors, they will try to push out, you know, real making industry and put in more than, let's say high end stuff. So, I cannot say if it's going to be success. The only thing is that there's a lot of things being demolished and it's not started yet so where do these companies go?" – Co-founder of Made up North, personal communication, 2021

Through the documentation analysis of *Hamerkwartier Werkt: Bouwstenen voor de realisatie van het Hamerkwartier als Creatieve Productiewijk* (Gemeente Amsterdam, 2020d), it is apparent that the municipality has intentions to and have made efforts to accommodate workspaces for (existing) production-related businesses and activities as part of the transformation of Hamerkwartier through mixed-use of work and living, even with criticisms from other stakeholders. For NDSM-Werf, the development approach and plans do differ, which is ellaborated on in the next sub-chapter at the Site scale, after the summary analysis for the City scale documents is first provided.

Figure 30: Artist's impression of Hamerkwartier Creative Production District (Retrieved from Overheid.nl, 2018).

4.3.2 Summary Analysis: City Scale

At the City scale of Amsterdam, many key observations were made as they relate to the application of the following lenses: transformation process, light industry, and **mixed-use**.

When applying a transformation process lens to the documents reviewed at city-scale, it is determined that a high level approach has been taken to address the subject of transformations, in which details on the process itself is found to be limited. Instead, the focus is on the **implications of transforming industrial estates** especially to the small-scaled businesses already established. However, it is stated that the transformation process does become more complex when dealing with existing tenants/ businesses on the lands in comparison to when redeveloping vacant lands. It is important to note that even in earlier documents on transformation sites, it is revealed that **mixed-use** was already being considered and applied. In the **broader reaching policy documents** that cover multiple topics and city-wide ambitions, the transformation of industrial estates is also covered, in which differentiations are made between types of industrial sites and types of transformations. These documents also capture the sites that have been designated for some form of transformation at the time they were prepared. Once again, there is **limited insight** on how the process to transform existing urban sites into mixed-use districts is approached or implemented, or even how the designations are determined. In the more **business-specific documents** produced by the economic department of Gemeente Amsterdam, there is more information provided regarding the process behind developing the phasing plan of different transformation projects as well as the new classifications of mixed-use developments that can result from transformations (i.e., creative neighbourhood, productive neighbourhood). One important consideration the Spatial Economic Consultant at Gemeente Amsterdam (Personal communication, 2021) had alluded to was the process of deciding to transform an industrial site into a new mixed-use neighbourhood is **significantly delicate** and requires discretion as it typically leads to market speculation on the lands and impacting the overall business climate.

When applying a light industry lens to the documents, it is apparent that the earliest documents that were prepared by Gemeente Amsterdam intentionally focuses the research on the topic of (small-scale) businesses in the city of Amsterdam. In the *Kleinschalige bedrijfshuisvesting in Amsterdam* (Gemeente Amsterdam, 1999), the protection of 27 concentrations of small-scale business establishments was discussed, which is mentioned once again 5 years later in the *Handboek Kleinschalige bedrijfsruimte Amsterdam* (Gemeente Amsterdam, 2008); however, it does not seem to be captured in later documents. It is not evident what happened to these protected clusters. In the 1999 document, **policy recommendations** for safeguarding small scale business workspace are provided, which would be views as means of the public body, however, it is not evident if they were ever implemented or even re-introduced in documents that followed (including most recent). In the **broad reaching policy documents**, business/ economic functions that would be considered as light industry were mentioned, but not explicitly focused on as claimed by the Managing Director of ORAM (Personal communication, 2021) in his interview. The *Ruimte van de Economie van Morgen* document (Gemeente Amsterdam, 2017b) is identified as the **first key document** that specifically addresses the business/economic aspect at a larger scale, starting at Amsterdam level and focuses on different areas where designations are established include different live-work classifications that did not exist before. As a follow up, the *Bedrijvenstragie 2020-2030* (Gemeente Amsterdam, 2020b) took the elements mentioned a step further and presented a **spatial action plan** for a range of businesses in transformation areas. In the most recent policy city-wide document, there seems to be more of an emphasis on business spaces for activities that would be considered as light industry.

When applying a mixed-use lens to the documents, several following items were noted. Firstly, the *Wonen tuseen de bedrijbven door* publication (Gemeente Amsterdam, 2003) was found to be quite relevant as it was the first document analyzed that explicitly mentions mixed-use, capturing the **initial stages of transforming industrial estates** in Amsterdam into **urban mixed-use districts**. This document shows that achieving mixed-use goals was a priority for the municipality from the early stages of transformations. It is evident that there was the **intention of safeguarding existing business types** that were determined to be appropriate to be mixed with living functions. At this stage of transformations, mixing at different scales was being examined (building, block and site) in which measures to ensure that adequate workspace for businesses

were available are explored and presented (i.e. 200 m^2 of business workspace at block level). In this particular document, several recommendations in the realization of successful mixed-use districts were provided, which are determined to be applicable in today's transformations; however, certain sites are too far develop to now introduce these initiatives. In broad-reaching documents, the topic of new urban mixed-use districts as a result of transformations was captured, while in the more business-related policy documents, new classifications of mixed-use developments are presented including creative neighbourhood, productive neighbourhood, and urban/city street, which have been spatially designated throughout Amsterdam. Mixed-use seems to be a constant theme in the more recent documents at this scale especially, however, **housing** seems to be the priority which overshadows work functions especially in terms of space and presence. This does not however, appear to be the case in Hamerwartier as the objective is to maintain the current work/industry climate as much as possible while introducing housing.

Another key observation when analyzing documentation at the city scale is that there is a clear distinction in the scope/approach between the 3 business-related documents and the documents that follow as the latter documents are broad reaching, covering other ambitions and priorities of the municipality other than just business presence.

In the next sub-chapter, relevant documentation at the **Site scale** of NDSM-Werf are reviewed and analyzed.

An old NDSM sign located in NDSM-Werf Oost, July 2021 {Own photograph]

4.4 Site Scale

4.4.1 Documentation Analysis

In this sub-chapter, documents at the Site scale are reviewed and analyzed approximately in chronological order. Please note that this includes spatial plans that were prepared by external parties (commissioned by Gemeente Amsterdam) and a range of different policy documents (statutory and non-statutory). Similar to the documental analysis conducted at the city scale, input from interviews conducted are incorporated where relevant. Prior to exploring the publications that focus on specifically the case study at hand (NDSM-Werf), documents on the northern banks of the IJ that were found through desktop research were first examined, which captures NDSM-Werf and adjacent industrial estates.

Table 8 contains the documents examined at the (case study) site scale. At the end of this section, a summary is provided in which an overall analysis of the documents at this scale is captured, which includes general observations and comparisons.

Table 8: Documentation analyzed at the site scale

	DOCUMENT	AGENCY	YEAR
SITE SCALE: NDSM-WERF	*Masterplan Noordlijke IJ-oever Noord aan ket IJ & De Noordelijke IJ Oever: Een Cultuurhistorische Effectrapportage*	Bureau Monumenten & Archeologie; commissioned by District Amsterdam Noord	2003
	XXL Urban Plan	Developed by Rapp+Rapp; commissioned by Gemeente Amsterdam - since archived	2002
	Investeringsbesluit NDSM-Werf (IB 2013)	Gemeente Amsterdam	2013
	Bestemmingsplan NDSM-Werf West	Gemeente Amsterdam	Original: 2014 Wijzigningplan: 2017 Uitwerkingsplan: 2018 Wijzigningplan: 2019 1e Revision: 2020
	Bestemmingsplan NDSM-Werf Oost	Gemeente Amsterdam	2013
	Actualisatie Investeringsbesluit NDSM-Werf 2020	Gemeente Amsterdam	2020
	NDSM Maakstad	Made up North	2020

Masterplan Noordlijke IJ-oever Noord aan ket IJ & De Noordelijke IJ Oever: Een Cultuurhistorische Effectrapportage

Bureau Monumenten & Archeologie | 2003

In 2003, the city district of Amsterdam North had commissioned a masterplan as well as a cultural-historical impact report (*cultuurhistorische effectrapportage - CHER*) that encompasses the Northern Banks of the IJ. For context, *CHER* was prepared to capture the historical background of different sub-areas that make up the Northern Banks including NDSM-Werf Oost and the cultural-historic implications for future development of the industrial lands (Bureau Monumenten & Archeologie, 2003). Historic images are shown in Figures 31 - 33. The Masterplan captured a spatial vision for the northern banks including a general plan concept (Figure 34), plans for green/public spaces, and water/traffic networks that connects the northern banks to the larger context of Amsterdam. It was determined that only a Dutch copy of the Masterplan readable online was available, but not downloadable, hence could not be translated properly to English.

Needham (2016) considers a masterplan as non-statutory as it typically contains spatial and urban design concepts that can be implemented, but they are not legally binding therefore there is no legal requirement for its compliance/execution. It is important to note that this masterplan is not relevant anymore as only policy documents at the city and area levels are referred to and applied by Gemeente Amsterdam, according to the Spatial Economic Consultant at Gemeente Amsterdam (Personal comunication, 2021).

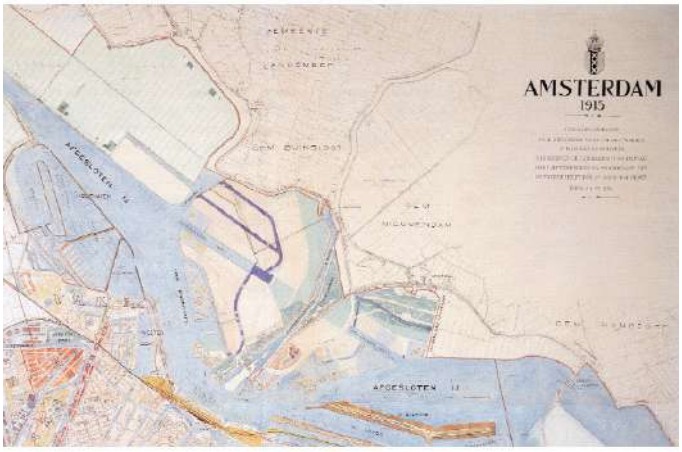

Figure 31: Historic map of Amsterdam in 1915 (Retrieved from Bureau Monumenten & Archeologie, 2013, p.66).

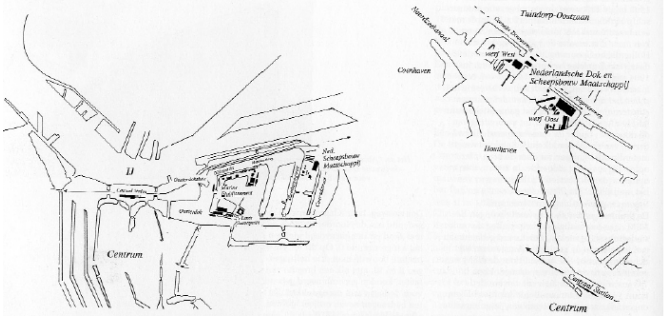

Figure 32: Historic illustrations of Northern banks (Retrieved from Bureau Monumenten & Archeologie, 2013, p.128).

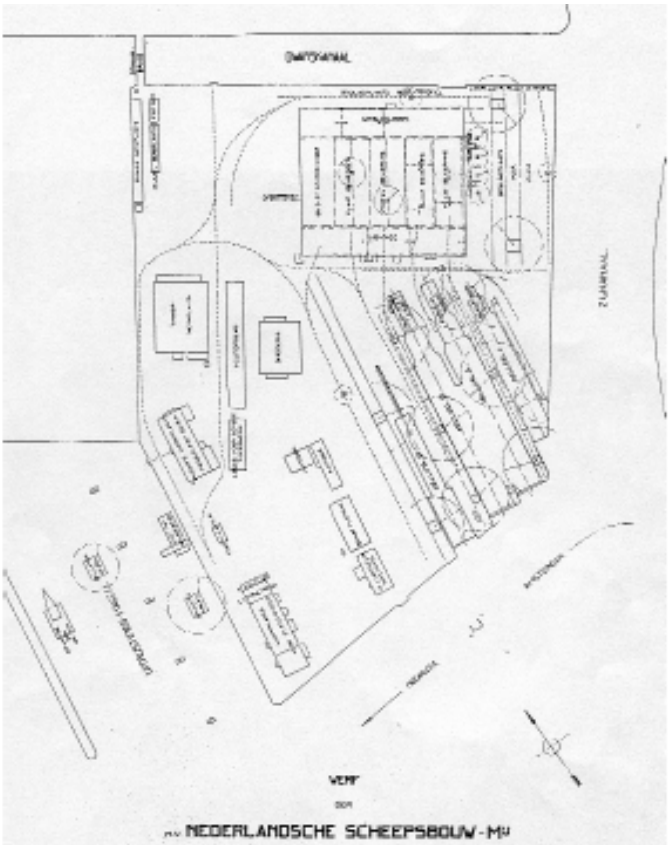

Figure 33: Historic illustration of NDSM-Werf Oost (Retrieved from Bureau Monumenten & Archeologie, 2013, p.128).

Figure 34: Plan Concept of the Northern Banks of the IJ (Retrieved from Stadsdeel amsterdam-noord, 2003)..

XXL Urban Plan

Rapp+Rapp | 2002

Through discussions with representatives of Gemeente Amsterdam and conducting additional desktop research, it was determined that the original ambition for NDSM-Werf was to transform the former shipyard into a dense urban district specifically by incorporating **different types of businesses and urban functions**. At that time, housing was not a pressing issue. The priority was to realize buildings in the West portion of NDSM-Werf (originally called XXL; now NDSM-Werf West) that were to be designed with flexible features to accommodate a **range of uses and space needs** such as oversized adaptable floor layouts, spacious ceiling heights, and innovative, green parking solutions (Rapp+Rapp, 2002). As a result, the **flatted factory building typology** was chosen, in which the interior space of each building block would have covered parking and a courtyard above, surrounded by usable space on all sides that are spacious in terms of depth and ceiling height (Rapp+Rapp, 2002). In the *2002 XXL Urban Plan* (Rapp+Rapp, 2002), this building typology was applied and repeated for eight blocks using a grid street layout (Figure 35).

In each block, an urban plinth is designed on ground level at human scale and the building height of 22m is proposed (no variation in building height). According to the Craftsman/Visual Artist & Activist (Personal communication, 2021) that was interviewed, the objective of this plan was to **mimic** the historic buildings and character of NDSM-Werf Oost. This is done through scale, architecture design and material choice. An image of the physical model representing plan is provided in Figure 36 on the next page. The Land Development Project Leader of NDSM at Gemeente Amsterdam (Personal communication, 2021) revealed that this particular plan was shelved and never realized with the exception of one building – number one, which is now referred to Block B6, which currently houses the headquarters of HEMA. It is evident that when it comes to redeveloping NDSM-Werf especially -Werf West, the priority of especially the municipality shifted from realizing sufficient space for a range of businesses to addressing the housing pressure that Amsterdam started to experience after the *XXL Urban Plan* (Rapp+Rapp, 2002) was developed.

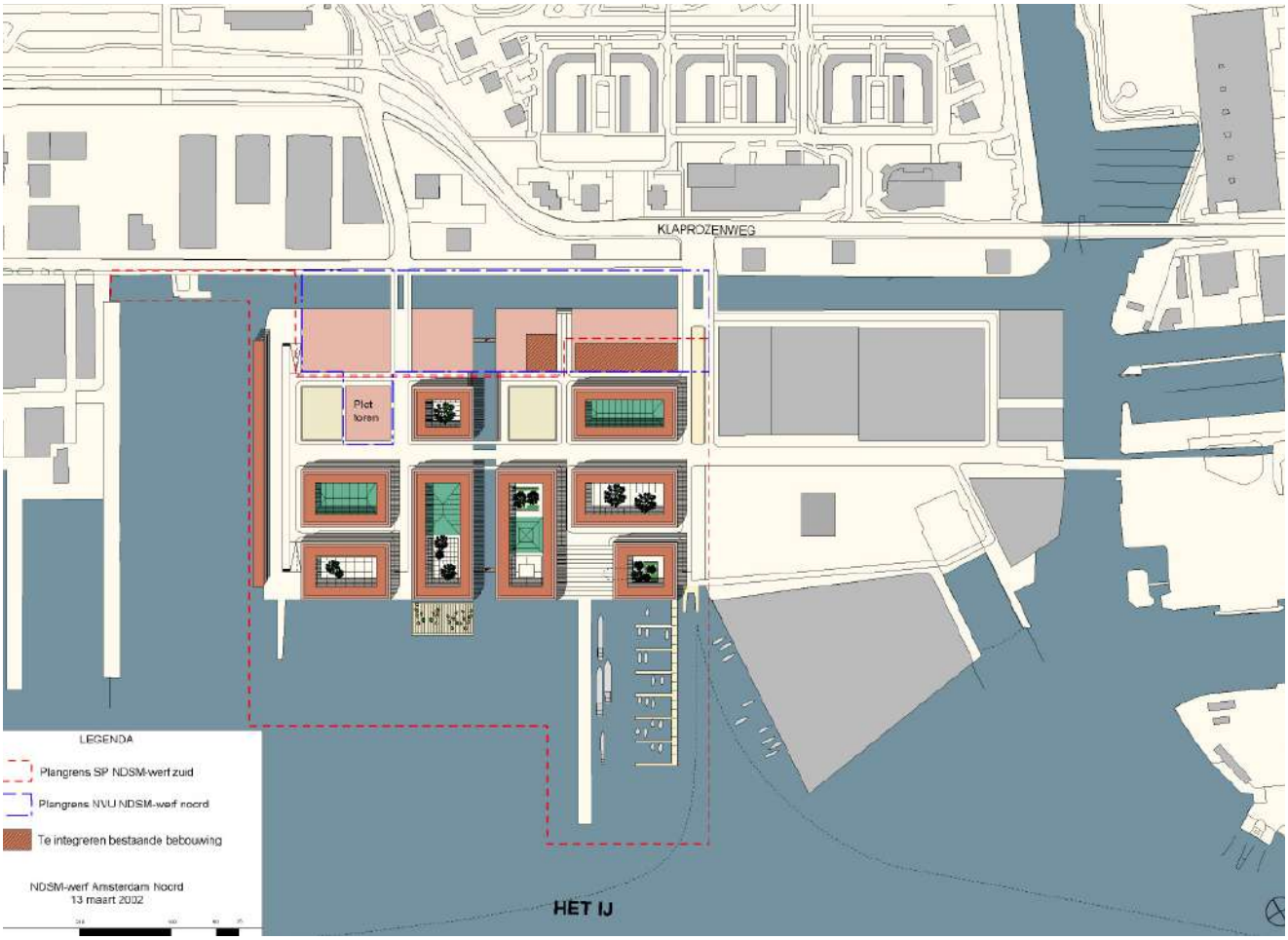

Figure 35: Archived 2012 XXL Urban Plan of NDSM-Werf West (Retrieved from Rapp+Rapp, 2002, p.5).

When examining this particular plan on the basis of mixed-use and light industry integration, there is less emphasis on a living-work mix, but more on achieving a mix of businesses and urban functions. In addition, it is observed that the intended flexibility of the building blocks would most likely accommodate light industry activities that existed at the time as well attract businesses from other areas. The question is if the *XXL Urban Plan* (Rapp+Rapp, 2002) would have actually been realized if a housing shortage did not occur in Amsterdam when it did. A few years after the *XXL Urban Plan* was developed by Rapp+Rapp, a master plan for the entire NDSM-Werf was put together in preparation for the *Investeringsbesluit NDMS-Werf* (Gemeente Amsterdam, 2013b).

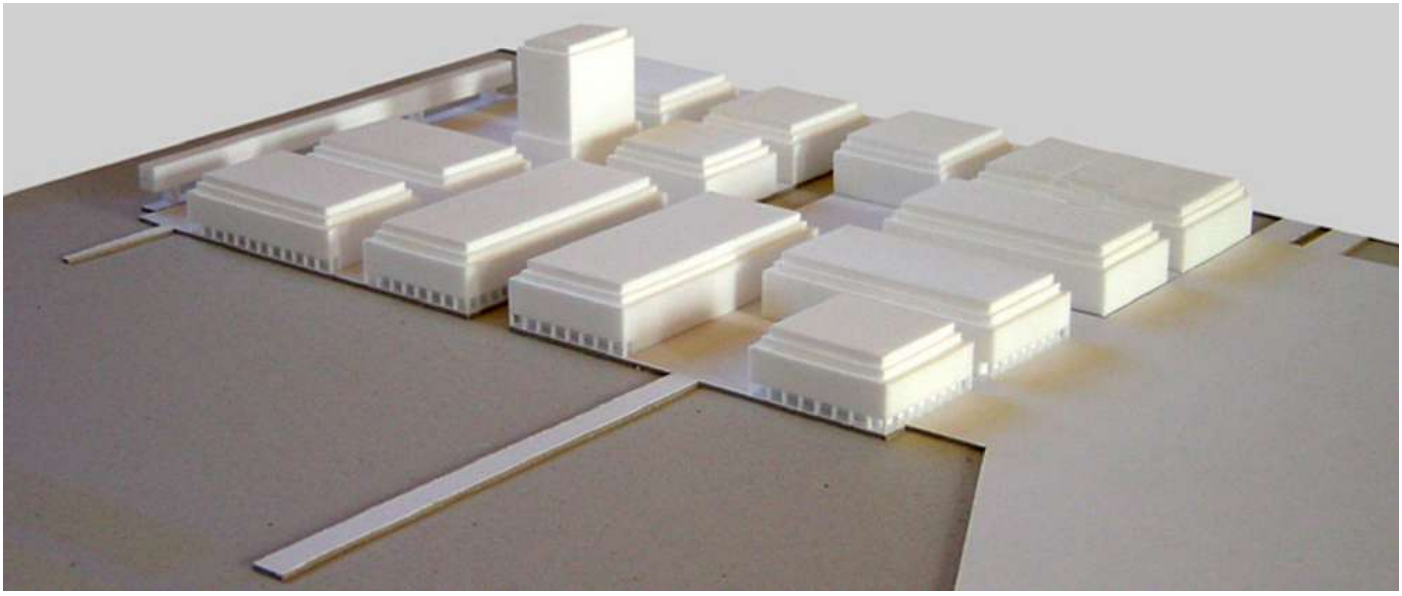

Figure 36: 2002 XXL Urban Plan - Physical Model (Retrieved from Rapp+Rapp, 2002, p.4).

Investeringsbesluit NDSM-Werf
Gemeente Amsterdam | 2013

In 2013, an *Investment Decree* (*Investeringsbesluit*) was produced for NDSM-Werf, covering the three sub-areas that make up the former shipyard: NDSM-Werf West, -Werf Oost and - Werf North. It is important to note that the *Investeringsbesluit* was prepared based on a study conducted by De Architeckten Cie., in which an urban development framework was proposed referred to as the Masterplan NDSM (Cie., 2021). Figure 37 is a rendering that was done showcasing the vision for NDSM-Werf according to the study by Cie., which captures a housing development that was being considered in NDSM-Werf East at the time.

Figure 37: A bird's eye view rendering of an early vision of NDSM-Werf (Retrieved from Cie., 2021, p.1).

The *Investment Decree*, now commonly referred to as *IB 2013* (Gemeente Amsterdam, 2013b), was used as the basis for two land use plans (Bestemmingplans) that were developed for NDSM-Werf (-Werf West & -Werf Oost) which will be further elaborated on below in their respective sections. In Figure 38, the distinct sub-areas that make up NDSM-Werf are captured, in which the harbour (haven) is captured as part of NDSM-Werf West.

It was determined that the decision to implement an *Investment Decree* and ultimately redevelop NDSM-Werf was driver by **land use pressures** in Amsterdam at the time as well as a means to **hinder the ad-hoc and spontaneous nature of development** mostly associated to the creative/maker industry that was occurring in the former shipyard. At the time, the existing land use plan covered a broader reaching area that extended past NDSM. The *Invesment Decree* involved introducing a **spatial framework** that consisted of key principles and rules to guide future development (Gemeente Amsterdam, 2013b). This document does not provide a fixed final visual impression of the area, but sufficient structure to guide future development while allowing flexibility for

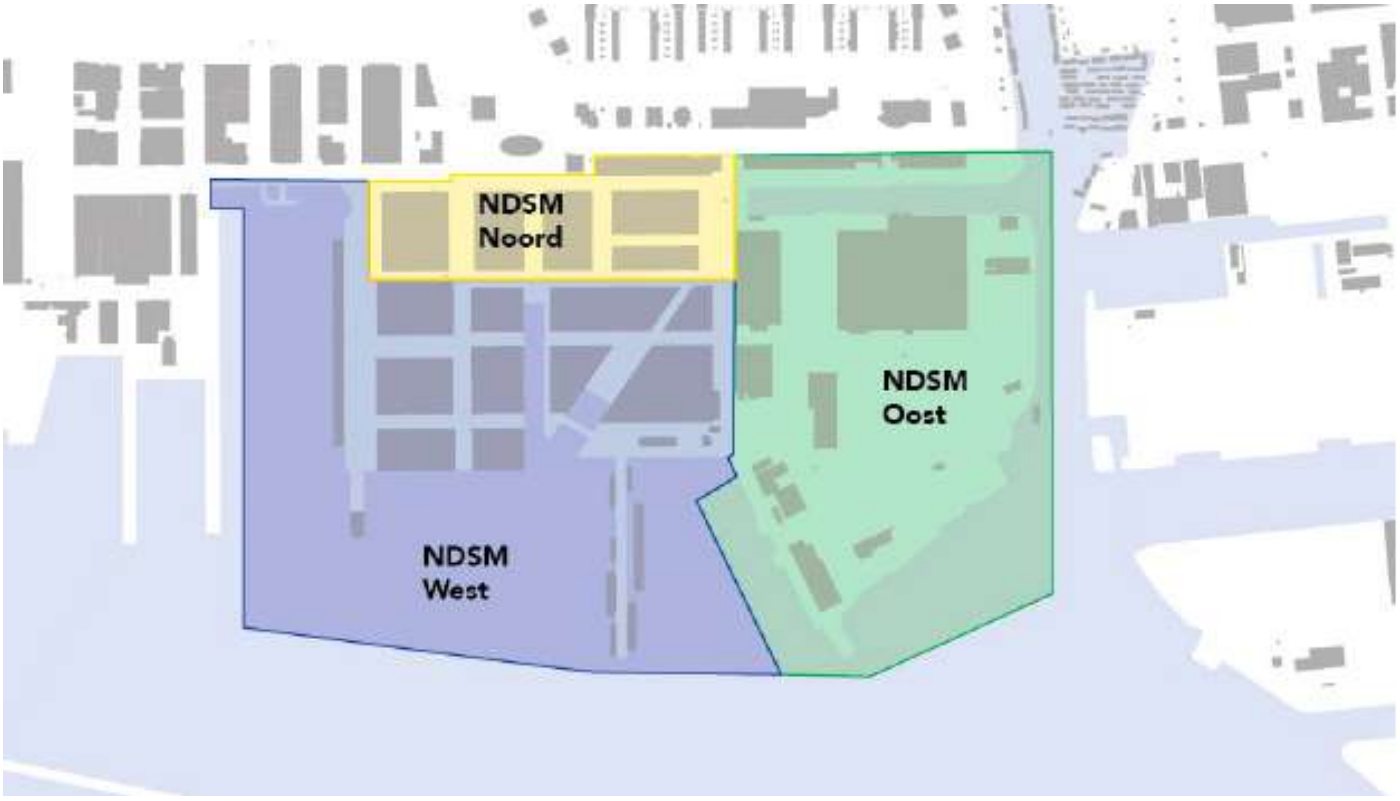

Figure 38: Defined sub-areas of NDSM-Werf in the Investeringsbesluit NDSM-Werf (Retrieved from Gemeente Amsterdam, 2020a, p.4).

development implementation over time. However, the municipality did set out a vision for NDSM-Werf that is captured in this document, in which the West portion of the former shipyard (NDSM-Werf West) is to transform into a highly urban, mixed-use district with a balance of functions between housing, living and facilities, which is in line with how the *Structuurvisie Amsterdam 2040* (Gemeente Amsterdam, 2011), described the future development of NDSM-Werf. These new developments would complement the urban character of the East side of the area (NDSM-Werf Oost), where the monumental heritage buildings and halls were to undergo adaptive reuse into a range of (new) uses (Gemeente Amsterdam, 2013b). The municipality had identified NDSM-Werf North, the sub-area along the Klaprozenwef and tt. Vasumweg corridors, as being outside of their scope in terms of active development measures.

The *IB 2013* (Gemeente Amsterdam, 2013b) had set out a framework for (future) development in which rules are translated onto a spatial plan of the entire area. The land ownership situation in NDSM-Werf is also touched on and it was revealed that all lands are owned by the municipality of Amsterdam with the majority of the plots being under ground lease (erfpacht) and certain lands in NDSM-Werf Oost designated as temporary therefore rented on for a specified period of time (Gemeente Amsterdam, 2013b). For the blocks that are allotted for redevelopment (B-blocks), the development rights have been assigned to two development consortiums, MediaWharf (MW) and Amsterdam Waterfront (AW); one for each half of NDSM-Werf (Gemeente Amsterdam, 2013b). In these lots, the municipality is actively involved with the respective market party. For the northern lots of NDSM-Werf West (A-blocks), **long ground leases** have been issued to external parties, which limits the active involvement the municipality can have. In the map on the next page (Figure 39), a plan boundary is indicated in red, in which two portions of NDSM-Werf East that are marked as temporary are excluded from the plan that the *IB 2013* is based off. According to the Head Designer of NDSM via email-correspondence, plans for housing were developed in NDSM-Werf Oost specifically the area marked as temporary along N.D.S.M.-kade at that time. However, it is important to know that the plans were done at no more than an abstract level and was not included within the project boundaries of the *Investeringsbesluit* of the NDSM-Werf. This is visually captured in the rendering of De Architeckten Cie. in Figure 37.

In the *IB 2013* (Gemeente Amsterdam, 2013b), a development program was also established, in which a total of 390,000 m^2 GFA (OVO in Dutch) is to be reached in NDSM-Werf West while in NDSM-Werf West, 110,000 m^2 GFA of total development is to be realized. Area requirements per land use category are also specified. For instance, a minimum

Figure 39: Spatial plan of Investeringsbesluit NDSM-Werf (in Dutch) (Retrieved from Gemeente Amsterdam, 2013, p.4).

of 10,000 m^2 has been secured for creative breeding grounds, in which has been occupied in NDSM-Werf Oost at the time of this document. In terms of housing, the target was set at a minimum of 870 homes and a maximum of 1,500 homes (on the basis of 100 m^2 GFA per home) that is to be allocated in NDSM-Werf West (Gemeente Amsterdam, 2013b). It is important to note that in this document, it is stated that housing is not permitted in NDSM-Werf Oost, however, it is pointed out that there is a possibility that it could be realized there in the long term (Gemeente Amsterdam, 2013b). For retail, a maximum cap of 2,200 m^2 is specified to ensure that shopping facilities in surrounding areas within the district of Amsterdam Noord are not impacted. In addition, only retail that compliments the nautical character of the NDSM area is permitted (Gemeente Amsterdam, 2013b). For **creative businesses** that offer more than just a retail element such as design, production and marketing, they are not classified as retail and therefore, the limit does not apply to them. This is a similar situation for businesses than have an office space that is less than 50% of their entire establishments as they are not considered as full-fledged offices, therefore the maximum limit of offices in NDSM-Werf does not apply to them (which is 116,011 m^2 GFA according to the Office Strategy 2011 that was applicable at the time) (Gemeente Amsterdam, 2013b). In both these circumstances, it is not clear if the municipality were making efforts to prioritize, promote these types of businesses or even enforce these regulations. It is important to point out that in the *IB 2013* (Gemeente Amsterdam, 2013b), emphasize was placed on the municipality's desire for the creative sector, which would be included in the scope of light industry in this research study, to continue to expand especially since NDSM-Werf was becoming a hot spot for media clustering as well as a well-known breeding ground for creative and cultural activities.

In addition to the programming of the area, various spatial elements are touched upon such as public space, traffic and transportation, parking details and standards, as well as sustainability considerations (Gemeente Amsterdam, 2013b). One key element that is highlighted and emphasized is the importance of maintaining the presence of the monumental industrial buildings specifically in NDSM-Werf Oost A distinction is made between the approach and ambitions for historic buildings versus new buildings in which precedence images from other projects are used for reference.

It was determined that the *IB 2013* (Gemeente Amsterdam, 2013b) ecognized the role NDSM-Werf Oost has played in hosting a large range of events throughout the year from flea markets to large dance festivals. The municipality's intention is to continue to support this function in NDSM-Werf Oost by limiting the amount of development within and adjacent to this portion of the former shipyard especially housing. However, there will also be limitations placed on the size and expected noise levels of events that can take place based on the forecasted amount of housing that will be developed in NDSM-Werf West and surrounding new neighbourhoods (Gemeente Amsterdam, 2013b).

In 2012, at the time the *IB 2013* (Gemeente Amsterdam, 2013b) was being developed, there was a significant amount of land in NDSM-Werf West that remained vacant that have not yet been prepared for redevelopment. This provided an opportunity to allow for temporary functions to establish and attract attention to the area, similar to what was already being permitted in NDSM-Werf Oost where temporary initiatives were issued a land rental agreement up to a maximum of 10 years (Gemeente Amsterdam, 2013b).

The document also contains a long-term plan for public space in NDSM-Werf that intentionally lays out a basic framework that can be further developed and refined in more detailed implementation plans. When it comes to sustainability, the document does not go into explicit detail on the measures that are planning to implement with the exception of reusing heritage buildings and expanding reliance on public transport to and from NDSM-Werf (Gemeente Amsterdam, 2013b).

In terms of feasibility, the development strategy for NDSM-Werf is briefly discussed, which is broken down into the following spatial parts: NDSM-Werf East, NDSM-Werf West (to be completed in 2 phases), NDSM-Werf North as well as Nautical Quarter (Haven Hiswa) that covers the surrounding water (as shown in Figure 40. It is revealed that a 6-point plan was developed based on the development preferences of the two development consortiums involved in the redevelopment of NDSM-Werf West and -Werf Oost, in which six main development sites are scheduled out with a phasing plan.

The *Investeringsbesluit Decree NDSM-Werf 2013* (Gemeente Amsterdam, 2013b) was formulated based on many environmental studies and tests including an Environmental Impact Assessment (EIA) procedure, event, and industrial noise (Gemeente Amsterdam, 2013b).
The *IB 2013* only captured a partial schedule for the redevelopment of NDSM-Werf. It does indicate that 3 separate land-use/zoning plans (bestemmingsplanen) were being developed at that time: for **NDSM-Werf West**, for **NDSM-Werf Oost** and a partial revision of the Cornelis-Douwesterrein zoning plan for NDSM-Werf that was already approved prior to the adopting of the *IB 2013*. According to the Actualisatie Investeringsbesluit NDSM-Werf 2020 (Gemeente Amsterdam, 2020a), *IB 2013* only considered the first phase of redevelopment, which was to be completed by 2028 (Gemeente Amsterdam, 2013b).

From here, the two land use/zoning plans (bestemmingsplannen) mentioned above that cover the NDSM-Werf sire are analyzed.

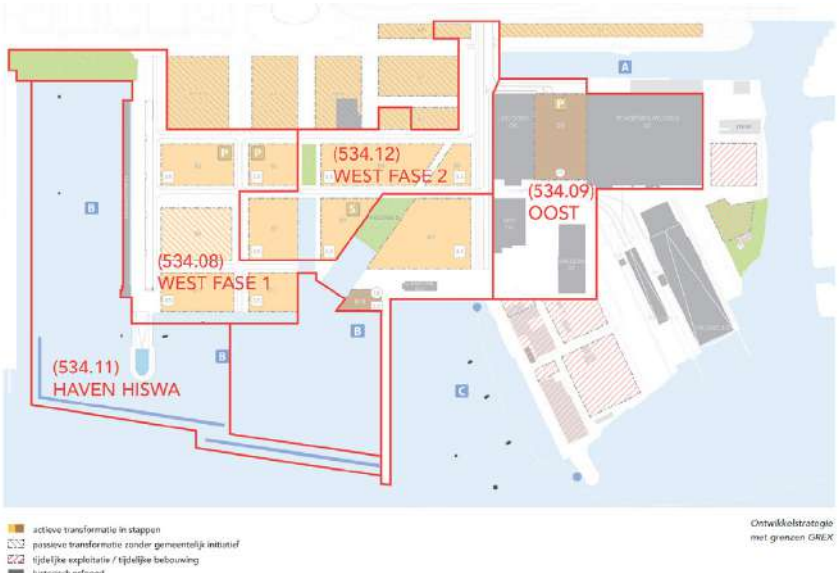

Figure 40: NDSM-Werf Phasing Plan in the Investeringsbesluit NDSM-Werf (in Dutch) (Retrieved from Gemeente Amsterdam, 2013, p.52).

Bestemmingsplan NDSM-Werf: West & Oost

Gemeente Amsterdam

Compared to the other policy documents, a **Bestemmingsplan**, which is land-use or zoning plan that is prepared by a municipality, is statutory-binding. This means that there are legally repercussions if the policy document is not complied to (Needham, 2016). It can be prepared in two manners: more global and general versus more detailed and planned out. For a more **global Bestemmingsplan**, the intention is that more ellaborated plans (an uitwerkingsplan) for specific blocks are to developed at a later date with more defined details (Needham, 2016). This is the approach taken for NDSM-Werf.

Due to the significant size of the NDSM-Werf, the area is divided into three sub-areas: **NDSM-Werf West** and **NDSM-Werf Oost**, which make up the majority of the area, and a portion to the North now called **NDSM-Werf Noord** (which has since been renamed). To properly capture the different sub-areas, two separate Bestemmingsplans were created, in which the Bestemminsplan NDSM-Werf West covers both the West and North portions and Bestemmingsplan NDSM-Werf Oost covers the remaining East sub-area (Figure 41).

It is important to note that in preparation for these land-use plans, an Environmental Impact Assessment (EIA) was conducted, which lead to the formulation of 4 scenarios: (2) Strategiebesluit (Strategic decision) (2) Ontspannen (Relax) (3) Contrast (Contrast) (4) Maximaal (Maximum) (Gemeente Amsterdam, 2013a; Gemeente Amsterdam, 2014). Many recommendations were provided as a result, which set the basis of the Bestemmingsplan NDSM-Werf West and - Werf Oost.

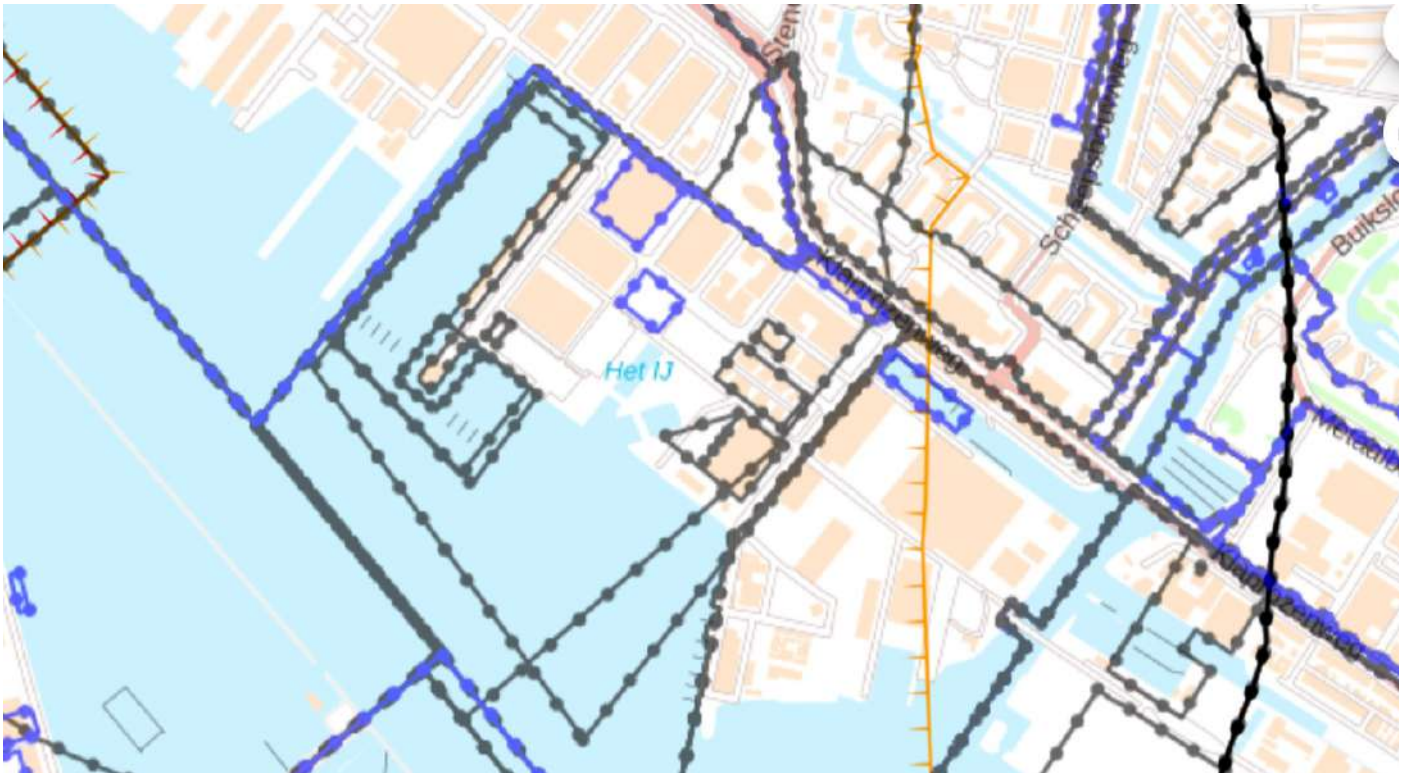

Figure 41: NDSM-Werf (West & Oost) - Screenshot of zoning layout (Retrieved from Ruimtelijkeplannen.nl, 2021).

Bestemmingsplan NDSM-Werf West

Gemeente Amsterdam | 2014, 2017, 2019, 2020

The initial *Bestemmingsplan NDSM-Werf West* was adopted by Gemeente Amsterdam in 2014 shortly after the *Investeringsbesluit NDSM-Werf 2013* (Gemeente Amsterdam, 2013b) was adopted. Not only does it encompass the West side of the former shipyard, but also the North portion of the site area. At the time, NDSM-Werf West was made up of a total of 80,000 m^2 GFA, consisting of a mix of housing and other functions. The proposed development program in this Bestemmingsplan stipulated a total additional GFA of approximately 390,000 m^2, in which housing would make up 212.250 m^2 GFA while the remaining ground floor area to be realized (178,000 m^2) is to be allocated for facilities purposes (Gemeente Amsterdam, 2014). The majority of this proposed development program was to be allocated to the southern plots of the West side that were yet undeveloped at the time (Gemeente Amsterdam, 2014). When translating the square meters of proposed residential development, this equates to a target of 2,150 new homes in which a large portion is to be realized in the southern plots (Gemeente Amsterdam, 2014). During the interviews, the Land Development Project Leader for NDSM at Gemeente Amsterdam (Personal communication, 2021) revealed for these plots (B-blocks), an arrangement was established between the municipality of Amsterdam and VolkesWessels, in which BMB Onwikkeling acts as the area development arm, regarding their redevelopment.

Figure 42: NDSM-Werf West - screenshot of land use zoning designations based on Bestemmingsplan NDSM-Werf West (Retrieved from Ruimtelijkeplannen.nl, 2021).

"Yeah, and so they [VolkerWessels/BMB ontwikkeling] have the right of first refusal, if you know what I mean. It means that we offer every plot, first we offer it to VolkerWessels. They can accept it. If they accept all the terms. If they accept the urban plan that we've made on this plot. If they accept the financial conditions, of course, then they say okay, we accept it and they sign a contract for the development of that plot. It is possible that they say well, we can't accept this, because we can't come to an agreement on what to build there or the price they have to pay for the leasehold so they can refuse it, and then the city will be free to tender it or to put it on the market... find another party to develop it. That hasn't happened yet so far, VolkerWessels has accepted every offer. That's for the B plots." – Land & Development Project Leader for NDSM at Gemeente Amsterdam, personal communication, 2021

According to the *Bestemmingsplan NDSM-Werf West* (Gemeente Amsterdam, 2014), almost every block has been designated as Gemengd (Mixed) with the exception of the Office block that has since been renamed as Plot B8 (originally Number One). Under each Gemengd categorization, a list of permitted activities is provided. It is important to note that a definition of company/business (bedrijf) is provided that covers establishments in the following sectors: industry, wholesale, craft, storage as well as distribution activities (Gemeente Amsterdam, 2014). In Figure 42, the land-use zoning designations per block is provided, in which the orange blocks indictate a mixed (Gemend) designation while the purple represents office. In addition, craft (ambacht) is defined as a business that is entirely or mainly comprised of manufacturing, processing or repair and installation of goods by hand (Gemeente Amsterdam, 2014).

In this document, the following regulation is explicitly stated covering the entire plan area of NDSM-Werf: a **maximum environmental category of 3.1** based on the environmental categories established by VNG, which prohibits heavy industrial activities from operating in NDSM-Werf (Gemeente Amsterdam, 2014). Exceptions were made to existing businesses with an environmental category that exceeds that threshold, however, limitations to realize housing in the direct vicinity were imposed. This was the case in the northern plots of NDSM-Werf West, where proposals for housing would only be permitted if the

operations of existing businesses were not impacted as a result (Gemeente Amsterdam, 2014). On the other hand, office functions were also not permitted in the northern plots of NDSM-Werf West. When examining these particular regulations, it is evident that **retaining the existing business functions** in NDSM-Werf West throughout the transformation of the entire area was a priority for the municipality. It is also stated in this *Bestemmingsplan* that limitations on the quantity of housing will be enforced on (a plot and zoning area level) to ensure **mixed-use is actually realized as intended**. In the interview with Head Designer of NDSM (Personal communication, 2021), he confirmed that in the Bestemmingsplan (presumably for NDSM-Werf West), there is a rule that explicitly states that housing is not permitted on the ground floor level in **some parts** of the plan, depending on the type of Gemengd zoning designation. This is the case for blocks designated as Gemengd-1 and when a (c) is indicated in the Bestemmingsplan map for blocks assigned as Gemengd-2 or -3. Other elements of the spatial framework that were indicated include a maximum limit to the building height of 30 meters, with the ability to realize high-rise accents of up to 60 meters and 1 building of 120 meters and a minimum FSI (Floor Space Index) of 3.5 in specifically the southern plots (B-plots) (Gemeente Amsterdam. 2014). It is important to note these are more general requirements, however, more explicit rules are provided by the municipality depending on the plot bring redeveloped, which is typically presented in a **kavelpaspoort per plot**. Typical details of this document are described in Documentation Anaysis in the Plot Level sub-chapter. For public space, a basic plan is provided similar to the *Investeringsbesluit NDSM-Werf 2013* (Gemeente Amsterdam, 2013b). A phasing plan was also presented in this *Bestemmingplan*, in which the development sequence of NDSM-Werf West was to be conducted starting from the very West and Eastward.

It is important to note that the development program presented in the *Bestemmingsplan NDSM-Werf West 2014* (Gemeente Amsterdam, 2014) has recently been adjusted significantly due to market forces and unexpected rate of housing construction and demand for housing in the last few years, as described above when discussing the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a). This had resulted in the publication of the 1st revision of the *Bestemmingsplan NDSM-Werf West* in 2020. However, prior to this, several addition plans were developed, which include Wijzigningplan and Uitwerkingsplan. According to Needham (2016), a **wijzigningplan** is prepared to capture changes made to an enacted land-use plan, while **uitwerkingsplan** is a more elaborated, detailed out development plan typically for a specific area or block within a more global land-use plan.

A **wijzigningplan** for NDSM-Werf West was developed in 2017, mostly encompassing the revision of an environmental category designation of a particular welding business establishment in the northern part of NDSM-Werf West. It was determined that the environmental category that was given to the business did not match the activities being conducted correctly based on an acoustic assessment conducted. As a result, the designation was re-adjusted to 3.1, therefore leading to the dismissal of the addition development constraint mentioned above (environmental circle buffer) (Gemeente Amsterdam, 2017a). The other elements of the *Bestemmingsplan NDSM-Werf West* remained as is.

In the following year, an **uitwerkingsplan** (an elaboration plan in English) was approved for specifically Block B9, which provided details of the development plans for Pontkade phases 1, 2 and 3, that BMB ontwikkeling in coordination with VolkesWessels were developing based on the rules set by the municipality (Gemeente Amsterdam, 2018b) as shown in Figures 43 and 44 on the next page. Details such as the development programming were indicated, which includes mostly residential with the realization of craft businesses along with other retail and HORECA activities on the ground floor. When asked about the craft aspect of the development, the Project Developer at BMB ontwikkeling (2021) revealed that that was more directed for creative office-like functions in reality, less maker or creative production activities. In this Elaboration Plan, policy documents that were recently issued were also captured such as the *Office Strategy 2017* and the *Overnight Stay Memorandum 2017*.

Another Wijzigningplan was developed in 2019, in which development details for Block B10 specifically the Nautisch project that BMB ontwikkeling is developing were elaborated on (Figure 45 and 46).

In the 1st revision of the *Bestemmingsplan* (*1e herziening*) that was (irrevocably) adopted in 2020, adjustments were made to the development program for NDSM-Werf West in terms of the planned quantities for housing as well as facilities (non-residential functions). There was significant increase of housing allocated in NDSM-Werf West to 414,000 m^2, while the non-residential/facilities program has been reduced and is now capped at a maximum of 130,000 m^2. However, it is emphasized that at

Figure 43: Block B9 Pontkade Development - Boundary lines for phases 1/2 & 3 in NDSM-Werf West (Retrieved from Gemeente Amsterdam, 2018b).

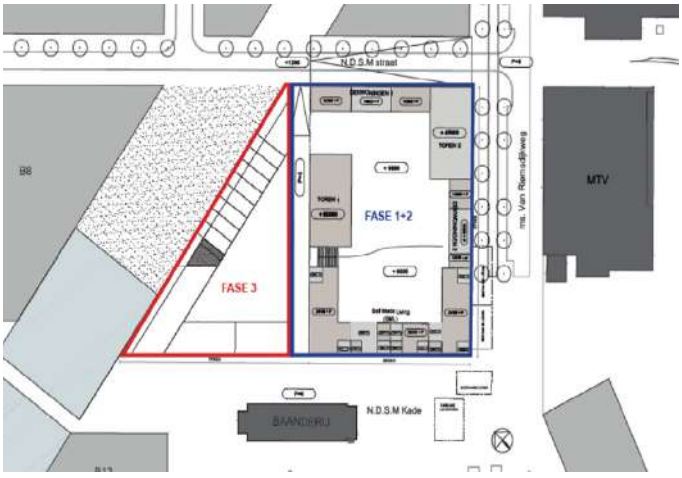

Figure 44: Block B9 Pontkade Development - Approved development & layout details (Retrieved from Gemeente Amsterdam, 2018b).

Figure 45: Block B10 Nautisch Development - Location of project in NDSM-Werf West (Retrieved from Gemeente Amsterdam, 2019a).

Figure 46: Block B10 - Nautisch Development - Render of project in NDSM-Werf West (Retrieved from Gemeente Amsterdam, 2019a).

least 15%-20% of each plot/block in NDSM-Werf WEST is allocated for non-residential functions. As shown above, these updated values are presented in the *Actualisatie Investeringsbesluit NDSM-Werf 2020* therefore, there are no discrepancies found. From the interviews conducted with municipal representatives directly involved in NDSM-Werf, input on these adjustments to the quantitative targets were provided, mostly to justify and defend the decision to do so. Developers active in NDSM-Werf West also provided some comments regarding this quantitative adjustment to the development program especially the housing component. Other new decisions that were captured in this revised policy document was the discarding of the phasing rule to ensure flexibility in development over time. According to the Head Designer of NDSM at Gemeente Amsterdam (person communication, 2021), the 3.1 environmental category regulation has since been maintained.

Bestemmingsplan NDSM-Werf Oost

Gemeente Amsterdam | 2013

For NDSM-Werf Oost, the *Bestemmingsplan* was adopted in 2013 and has not undergone any revisions like its -Werf West counterpart. However, it was revealed earlier in other documents including the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a) that the development plan for the East side has been frozen since 2017 (Gemeente Amsterdam, 2020). It was confirmed in multiple interviews that the municipality of Amsterdam has frozen the land-use plan until 2028 for a several reasons.

Like in the most updated *Bestemmingsplan NDSM-Werf West* (Gemeente Amsterdam, 2020e), only business establishment types with the environmental category designation of 3.1 and below are permitted. The 3.1 designation represents the lightest classification of category 3 according to the VNG guide (Gemeente Amsterdam, 2013a). In regard to the spatial framework of this *Bestemmingsplan*, the total develop program proposed was 110,000 m^2 GFA of mixed functions such as workshops, breeding grounds offices for the creative sector, business, facilities and event spaces, in which 65,000 m^2 GFA was already realized at the time. It is important to note that housing in NDSM-Werf Oost was considered at the time of the *Investeringsbesluit NDSM-Werf 2012*, but not captured in the *Bestemmingsplan NDSM-Werf Oost*. The Project Developer at BMB ontwikkeling (Personal communication, 2021) confirmed that residential development of any kind is not permitted in NDSM-Werf Oost.

Similar to the original *Bestemmingsplan NDSM-Werf West* (Gemeente Amsterdam, 2013a), the majority of the blocks are designated as Gemengd (Mixed), in which there are 4 categorizations (1-4) with a list of permitted activities under each. are provided that vary depending on the numbering. One major difference is that residential is not permitted in any of the blocks designated at Gemengd in NDSM-Werf Oost like it is in NDSM-Werf West. In Figure 47 below, the land-use zoning designations for NDSM-Werf Oost are presented, in which the Gemengd zoning designation dominates the sub-area similar to NDSM-Werf West.

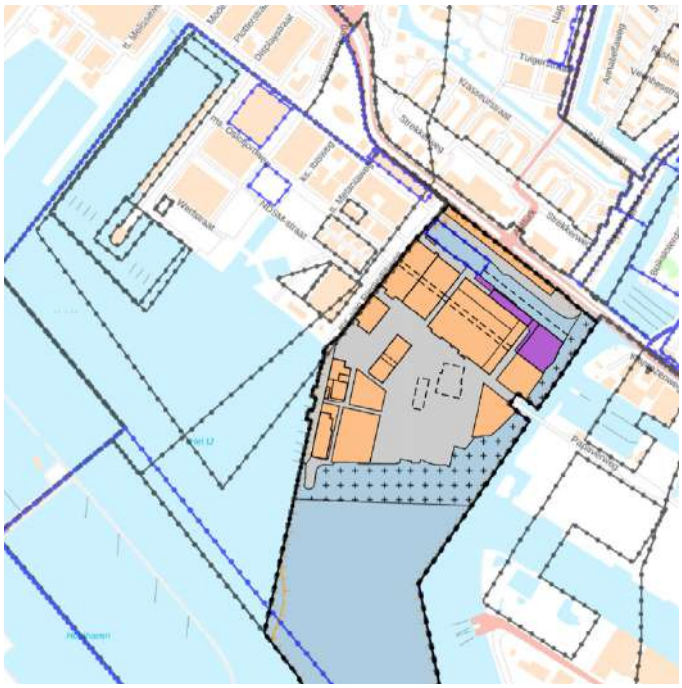

Figure 47: NDSM-Werf Oost - screenshot of land use zoning designations based on Bestemmingsplan NDSM-Werf Oost (Retrieved from Ruimtelijkeplannen.nl, 2021).

Actualisatie Investeringsbesluit NDSM-Werf 2020
Gemeente Amsterdam | 2020

In 2020, the *Actualisatie Investeringsbesluit NDSM-Werf 2020* was developed as an update to the *Investeringsbesluit NDSM-Werf 2013* (*IB 2013*) (Gemeente Amsterdam, 2013b). The main reason for this update was that the original *Bestemmingsplan for NDSM-Werf West* (Gemeente Amsterdam, 2014) allowed for a certain amount of housing to be realized, which was already exceeeded by 2020, due to an increasing demand in housing. As a result, the *Bestemmingsplan* was revised, which entailed the creation of the *Actualisatie.* This was echoed by the Head Designer of NDSM at Gemeente Amsterdam (Personal communication, 2021) during his interview, where he added that these events led to changes in the objective for the redevelopment plans for NDSM-Werf of the initial *Investment Decree*. The Head Designer of NDSM (Personal communication, 2021) also revealed that some aspects of the *IB 2013* were identified to require adjustments. For instance, the initial plans for public space in NDSM-Werf was improved to better accommodate the significant amount of residents moving into NDSM by proposing more public spaces and greenery, as well as, preserving relics of the past as part of the identity of the new neighbourhood.

It is also noted that the *Actualisatie Investeringsbesluit NDSM-Werf 2020* was prepared to be better aligned with the revised *Bestemmingsplan NDSM-Werf West* (Gemeente Amsterdam, 2020e) that was prepared the same year (2020), which will be discussed further in this section. The Land Development Project Leader of NDSM at Gemeente Amsterdam (Personal communication, 2021), on the other hand, explained the situation concerning the need to prepare an update for the initial *Investeringsbesluit NDSM-Werf* from his perspective:

"In 2012, we had the investment decision for the development of NDSM, but we decided ... then it was decided that only the investments would be made for what was the first period of 10 years, because they thought the development of the entire work is going to take longer, but we're only going to reserve the money now for the first 10 years. They estimated that in the first 10 years, there were going to be, well, a certain amount of houses being developed, certain amount of non-housing be developed. But we found out in about 2017-2018 that things went quicker. So, we reached the maximum of the square meters [of housing allocated]. so we had to make a new investment decision. So we had to make the actualization to make the rest of the development possible. That was the main reason." – The Land Development Project Leader for NDSM at Gemeente Amsterdam (Personal communication, 2021)

It is important to note that the boundaries of the sub-areas that make up NDSM has been adjusted, in which NDSM-Werf West now captures the plots that were initially within NDSM-Werf Noord, and a new sub-area has been defined, **Klaporzenweg Noord**, which also covers additional land to the North. The original and updated classification of sub-areas are provided side by side below in Figure 48.

The original principles and vision for NDSM-Werf remains as is in the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), however, it was determined that the **development target** that was to achieve by 2040 was already met by 2020 (approximately 2,500 homes). To address this situation, blocks that were not initially part of the transformation plan (**A-blocks with**

Figure 48: Comparison of sub area categorization within NDSM-Werf (Investeringsbesluit NDSM-Werf from 2013 vs Actualisatie NDSM-Werf 2020) (Retrieved from Gemeente Amsterdam, 2020a, p.4).

existing businesses) will be redeveloped sooner than originally expected. The maximum amount of m^2 in the housing program that was indicated in the IB 2013 (Gemeente Amsterdam, 2013b) has since grown significantly to a maximum of 414,000 m^2 while the non-residential component is now a maximum of 130.000 m^2 resulting to a maximum amount of 515,000 m^2 for the entire NDSM-Werf (Gemeente Amsterdam, 2020a). These values have been updated in the *Actualisatie Investeringsbesluit NDSM-Werf 2020*. In addition, the *Actualisatie* captures key changes to the original plan in the *Investeringsbesluit NDSM-Werf* (Gemeente Amsterdam, 2013b). They include adjustments to certain plot boundaries, public space and greenery allocation, urban design requirements and details of development programming overall and per plot (mostly directed at NDS-Werf West). Additional developments are also captured such as extending the NDSM quay and realizing two primary schools instead of one in specific B-blocks (Gemeente Amsterdam, 2020a). An important change that is presented in the *Actualisatie* is the fact that the live-work ratio for NDMS-Werf West has been shifted from **41/59 % to 55/45 % range** to a **minimum of 75/25% to 85/15 % range (residential / non-residential)** (Gemeente Amsterdam, 2020a). It is important to note that the original live-work ratio range (41/59 % to 55/45 %) was not explicitly stated in the *Investeringsbesluit NDSM-Werf*, hence why it was not captured in its respective section earlier in this sub-chapter. The municipality is aware that this is a significant jump; however, they seem to be convinced that an attractive residential and work area will still be achieved with this adjusted live-work ratio (Gemeente Amsterdam, 2020a). There will most likely be **serious implications to the work element** as the amount of space allocated for non-residential functions has been significantly compromised. This has come up as a major concern in a few interviews with non-public party stakeholders. Expert 1 (Personal communication, 2021), for instance, is skeptical of the non-residential definition that the municipality uses as well as its proportion in comparison to the residential component. However, it is important to note that the municipality has set a minimum total percentage of 30% for non-residential functions in the entire NDSM-Werf (Gemeente Amsterdam, 2020a). This implies that the difference that cannot be achieved in NDSM-Werf West would need to be realized in the remaining sub-area(s) of NDSM-Werf. In the *Actualisatie*, it was also stated in the remaining B-blocks in which the municipality has established a cooperation agreement with VolkesWessels/BMB ontwikkeling (market party), there is a minimum percentage for non-living functions for each plot (Gemeente Amsterdam, 2020a). The breakdown of this **'non-residential' designation** included a range of uses and activities other than living. Now that the alotted percentage of square metres for non-residential functions has been significanlty reduced, the likelihood that **businesses in light industry** would be incorporated would further shrink as they would have to compete with retail, HORECA and facilities including education for the limited space in the **plinths** of these new developments. The Real Estate Developers at Lingotto Development (Personal communication, 2021) and COD Development Pioneers (Personal communication, 2021), leaseholders of plots in the B-blocks of NDSM-Werf West, are under the impression that the municipality is combining industrial/business activities with commercial with no explicitly distinction between them.

This updated document describes what has been realized up to that point as well as the next steps in development. Not only does it capture the renewed cooperation agreement with VolkesWessels/BMB ontwikkeling for the remaining B-blocks (as mentioned above), but also the Urban Development Framework that was developed in 2019 for **Blocks A4-A7'**, which is discussed under the Block level Documentation Analysis. Plans for Klaprozenweg Noord are also briefly mentioned, in which plans to transform the Klaprozenweeg corridor into lively and modern city street (Gemeente Amsterdam, 2020a). This is in alignment with the urban/city street designation of this particular corridor in the *Ruimte voor de economie van Morgen* (*Space for the Economy of Tomorrow*) document (Gemeente Amsterdam, 2017) that was examined under the City scale documentation analysis. In the *Actualisatie* (Gemeente Amsterdam, 2020a), the 10-year pause on development in NDSM-Werf East, which was imposed in 2017 is captured, in which it is states that the existing temporary designations within NDSM-Werf Oost are to remain as is until the end of 2028.

There is a section in the *Actualisatie* (Gemeente Amsterdam, 2020a) that focuses on NDSM-Werf's position in a broader context of Amsterdam specifically Amsterdam North city district. According to the document, it is essential that strong linkages to nearby neighbourhoods especially on the other side of the tt. Kaplrozenweg are fostered and maintained (Gemeente Amsterdam, 2020a). This was emphasized in the interview with the Head Designer of NDSM (Personal communication, 2021) as a main priority for the municipality. In addition, it was explicitly stated that the provision of amenities that can be used by the surrounding

neighbourhoods as well as specialized space for the purposes of housing studios, creative activities and incubator operations are essential. The question is what actions are in place to realize these ambitions. During his interview, the Real Estate Developer at COD Development Pioneers (Personal communication, 2021) eluded to their plans to incorporate community-relation functions and amenities as part of COD's redevelopment plans for block A7 such as a library or communal kitchen.

In this updated version of the *Actualisatie* (Gemeente Amsterdam, 2020a), there is a more explicit section on the work program where implementation of development at the building block level is elaborated on. In the *Ruimte voor de Economie van Morgenrdam* publication that was published in 2017 by Gemeente Amsterdam, NDSM-Werf was identified as a **Creative Neighbourhood**. As a result, the *Actualisatie* captures the ambition to realize this particular mixed-use designation. In addition, there is more of an emphasis to provide sufficient space for **hybrid businesses** (maximum 50% office; remaining space for production/industry) in the plinths of new buildings. Within this work program section, kavelpaspoorts are briefly mentioned as well as the agreements that need to be made with market parties per block where it is decided of workspaces of production-related business are to be realized or not (Gemeente Amsterdam, 2020a). Both these items are further discussed in interviews with both civil servants and private parties, which will be presented under the Plot Level section of the Documentation Analysis. For retail, the maximum limit was slightly increased from 2,500 m^2 to 2,750 m^2 GFA while the allocated total area for breeding grounds seems to be significantly reduced to 1,000 m^2 from the 10,000 m^2 that was secured according to *IB 2013* (Gemeente Amsterdam, 2013b, 2020a).

Similar to the *IB 2013* (Gemeente Amsterdam, 2013b), this updated version touches upon several spatial elements of NDSM-Werf, however, adjustments and further refinements to the original plans were made. For instance, the importance of public space for sports, games, leisure and greenery is emphasized in this document compared to in the *IB 2013*. The public space aspect is much more detailed and a green standard has been applied. In Figure 49 below, the updated public space plan for NDSM-Werf has been provided, in addition to the public space Plan presented in the Investeringsbesluit NDSM-Werf.

NDSM-Werf has been identified as a central urban environment, therefore 85.000 m^2 of green space needs to be realized to meet the green standard (Gemeente Amsterdam, 2020a). In this document, it is mentions that feasibility assessments on opportunities to incorporate greenery and sports facilities for the new residents of the housing developments in NDSM-Werf West in other parts of NDSM are underway. From a number of different interviews, it was revealed that the municipality is proposing to allocate their **greenery ambitions in NDSM-Werf Oost** especially where temporary facilities currently reside, which has resulted in a mixed reaction depending on the stakeholder interviewed. It is important to note that **Made up North**, a non-governmental foundation that represents the maker industry in Amsterdam especially Amsterdam Noord had proposed to realize a Creative-Maker District that would accommodate workspaces and amenities for a range of production and creative businesses. Details of this proposal are described further down in this section. It was also determined that a letter was prepared by a group of entrepreneurs from NDSM-Werf West and sent to the municipality with their reaction of the proposal containing concerns regarding the

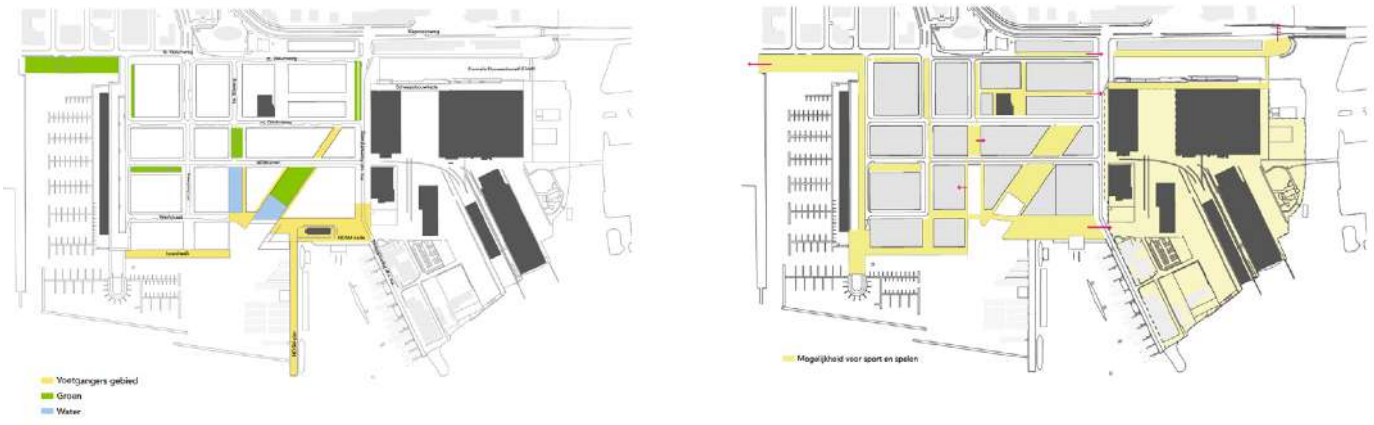

Figure 49: Comparison of Public Space Plans (Investeringsbesluit NDSM-Werf 2012 vs Actualisatie Investeringsbesluit NDSM-Werf 2020) (Retrieved from Gemeented Amsrerdam, 2020a, p.44 & 45).

implications to their business operations. The Head Designer of NDSM (Personal communication, 2021) had indicated during the interview that he is aware of their concerns. In addition to public space, the *Actualisatie* also contains more specific sustainability measures and ambitions focusing on energy, climate adaptation, circularity, waste management and sustainable mobility in NDSM-Werf. There is also a section in the Actualisatie that is dedicated to urban planning, which was not explicitly addressed in the initial *Investeringsbesluit NDSM-Werf* (Gemeente Amsterdam, 2013b). In this updated version, rules are established based on 3 goals: (1) ensuring variation within building blocks, (3) achieving a good relationship between buildings and streets, and (3) enabling opportunities for higher building heights where possible (Gemeente Amsterdam, 2020a). Rules are presented at different scales (city, district and building block) mostly related to requirements for building height accents and the associated required setbacks. In addition, in the *Actualisatie*, adjustments to certain lot boundaries of the original urban development plan for NDSM-Werf are captured specifically blocks in NDSM-Werf West that have not yet been redeveloped, but there are plans to (certain A and B blocks).

When it comes to the development of the lands in NDSM-Werf, in order to properly address the unexpected speed of housing construction, the decision to activate the phase 2 plan of (re) developing NDSM-Werf West while phase 1 is ongoing/finishing up (prior to 2025) was made. In addition, it was decided recently to also include the transformation of the A-blocks (which are comprised of a range of different ground leaseholders) as part of the land development scope and trajectory to represent Phase 3 (Gemeente Amsterdam, 2020a). The most updated phasing scheme is demonstrated in Figure 50 below.

In the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), the development schedule has been updated. Not only does it capture the status of the revised *Bestemminsplan NDSM-Werf West* as a result of the development program adjustments, but also the timing of the realization of B-blocks that are already planning for and the A-blocks which will be a more complex and timely process as the involvement of the municipality is limited. The transformation of NDSM-Werf West in its entirety is to be completed by 2030, which is confirmed by the Project Developer from BMB ontwikkeling (Personal communication, 2021) who is involved in realizing the B-blocks, which laid out in a cooperation agreement between the municipality and BMB (Samenwerings Overeenkomst - SOK in Dutch).

Please note that the plans within the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a) are used to conduct a spatial analysis further in the report especially concerning NDSM-Werf West, in which existing and potential patterns (opportunities) are identified and analyzed where appropriate.

Figure 50: Updated phasing plan for NDSM-Werf West (Retrieved from Gemeente Amsterdam, 2020a, p.75).

NDSM Maakstad
Made up North | 2020

In 2020, Made up North, a (non-governmental) foundation representing makers in Amsterdam especially Amsterdam North, proposed for **a creative production (maker) district** to be established in NDSM-Werf Oost called NDSM Maakstad. In Figure 51, an illustration of NDSM-Werf is provided, in which the location of the Maakstad proposal is highlighted along with other buildings in the area for reference.

In the proposal, Made up North discussed the contents of the *Ruimte voor de Economie van Morgen* (Gemeente Amsterdam, 2017b), in which they criticize the live-work designation assigned to NDSM-Werf as a Creative Neighbourhood and instead, propose that the designation of 'Creative Production District' would be more fitting. A comparison is made with Hamerkwartier, another industrial estate situated further along the Northern banks of the IJ slated to be transformed into a Productive Neighbourhood, in which the municipality plans to realize a Meatpacking-like district environment where production and living functions are intentionally mixed at different scales (Made up North, 2020). Logistical and feasibility challenges and concerns especially in regard to the spatial requirements of productive businesses in this case are identified, which shows that Made up North along with other key actors are not completely convinced with the municipality's vision and implementation plans for Hamerkartier. It is important to note that the Hamerkwartier Werkt document (Gemeente Amsterdam, 2020d) that was analyzed as part of the City Scale documentation analysis earlier in this report was not yet prepared at the time this proposal was developed. Based on research conducted on the matter, Made up North has proposed to cluster different types of productive businesses, startups and more established operations, in one creative maker district in NDSM-Werf Oost, where the existing industrial character of the area can be built on and emphasized. It is apparent that this objective emphasizes a certain kind of mixing. The objective is to provide **affordable workspaces for creative-productive activities**. To realize this, Made Up North is aware that opportunities to realize value are necessary for the proposal to be attractive. Incorporating living functions in the district would warrant an additional study.

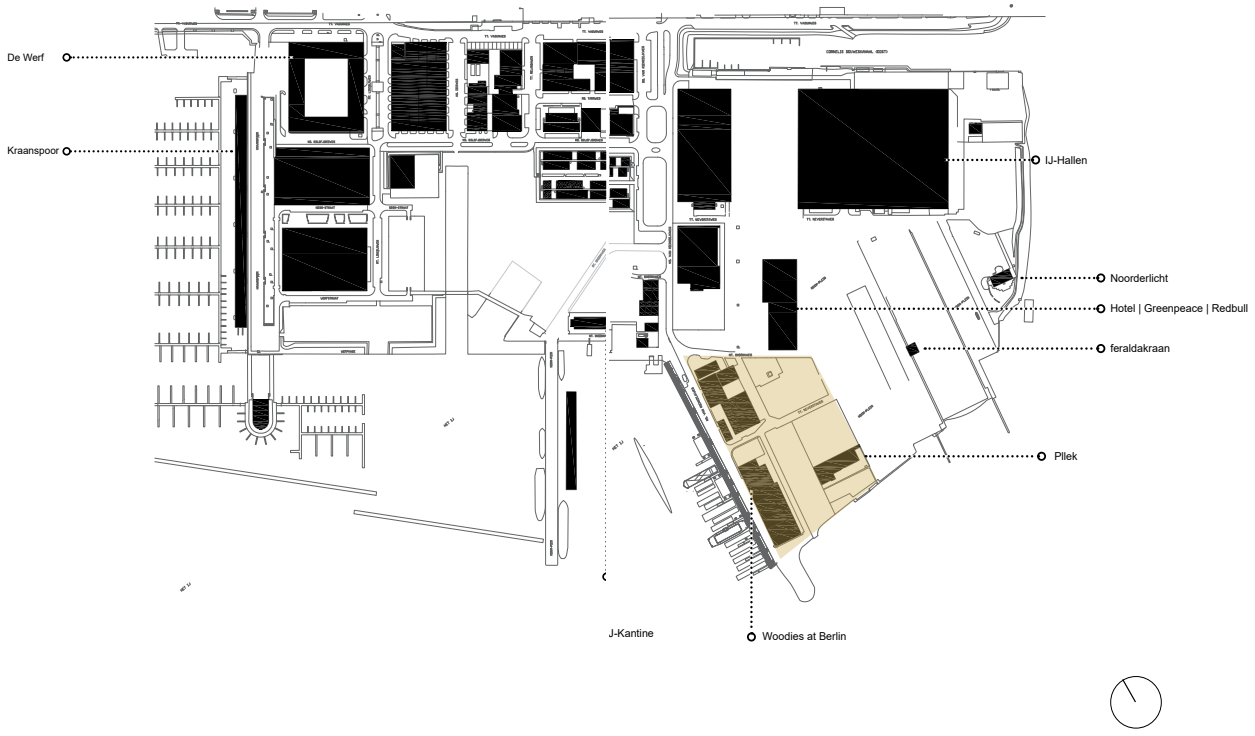

Figure 51: Location of NDSM Maakstad proposal within NDSM-Werf (Retrieved from Made up North, 2020, p.36/37).

The proposal also contains a breakdown of NDSM-Werf's history is described starting from 1964 when the lands were prepared to be utilized as the shipyard for the shipbuilding operations of Nederlands Dok en Scheepsgebouw Maatschappij (NDSM). The document captures the prime years of the former shipbuilding company when it gained international recognition and success, as well as its financial demise, which led to that location being abandoned and eventually becoming a breeding ground for local creatives and small-scaled makers (Made up North, 2020). In addition, the document captures Made up North's (2021) perception of the lack of priority or attention surrounding workplaces for small to medium-sized businesses especially in production and manufacturing in inner-city locations.

The bulk of the document focuses on the proposed plan to provide a **central, urban location for small to medium-size businesses in the manufacturing industry** who desire to retain their operating within the city boundaries. Details of the creative-productive district proposal include the following: the accessibility of the site by car and water transportation, the criteria for the manufacturing/ industry activities permitted (the environmental category of 3.1, which is in line with the maximum set by the municipality for NDSM-Werf for the entire NDSM-Werf), the building height average of 20 m, architectural and green elements.

A rendering of the Maakstad proposal is provided in Figure 52 below.

From the interview conducted with the Co-founder of Made up North (Personal communication, 2021), it was revealed that the preparation/research stages of this plan included the involvement of BMB ontwikkeling. During the interviews, when asked about their perspective on Made up North's Maakstad proposal, the majority of the research interviews were overall supportive, but had some critical feedback on certain aspects such as the **proposed location** and the **business case**. When asked about the Made Up North proposal, the Project Developer from BMB ontwikkeling (Personal communication, 2021) was positive, but critical as she thinks that the project requires additional revenue-creating development initiatives in order for the business model to be solid. Below, direct quotes from other research participants are provided:

"It's very important that that Made Up North guys are making plans, because they're the only ones making plans to people who want to execute it. But the fact is, basically, that in the higher regions of the big rollers, there's not a discussion. Discussion is, how many houses do you want? We have houses here, we have houses there, we have a project there in total in Amsterdam. How do we combine? Who's gonna pay the bill? [...] then I will say that if Made Up North's initiative fits in a plan and developer says, 'Well, that's nice. These square meters have some kind of return, which is okay. It fits in with my plan, it's okay.' But [at] the end of the day, it's the developer who says 'well, am I going to spend my money on this, yes or no?' So, I think that local guys have to really fight for their position, because they have a position." – Managing Director of ORAM, personal communication, 2021

Figure 52: Rendering of the Maakstad proposal (Retrieved from Made Up North, 2020, p.47).

The next few quotes capture the perspectives of representatives of Gemeente Amsterdam from certain departments:

"I have sympathy for their [Made Up North] initiative. Because I think [...] our strategy of [...] small scale integration of individual companies neglects the fact that you need a concentration of like-minded companies as well. Education and [...] their idea of a district is actually very valuable. [...] The big question is, will it happen on that spot? [...] There are lots of ambitions for that spot, but something I think we need to address. [...] If it's not able to to take place [at] that certain [spot], we really need to ask ourselves, if it can happen somewhere else" – Spatial Economic Consultant at Gemeente Amsterdam, personal communication, 2021

"This Made Up North. That's very interesting, of course. And they made a plan, which is situated in an area [we are studying on th add green and sports] " – Head Designer of NDSM at Gemeente Amsterdam, personal communication, 2021

"The kind of program is very interesting for [NDSM]. I would love to have them in NDSM. But on the right spot, then not in East, but invest... so the developers say it's difficult to, to find [...] these functions. But this Made of North shows that [...] they need space; they want space. So it's just putting one on the other and then there's the solution. But the problem ... I think it's [the financial feasibility of realizing the project] – Head Designer of NDSM at Gemeente Amsterdam, personal communication, 2021

Since the development plans prepared by the municipality are frozen for NDSM-Werf Oost until 2021, this particular plan proposal will be used for the spatial analysis of NDSM-Werf East further in the report in which patterns from the *Foundries of the Future* publication (Hill, 2020) are applied.

On the next page, a summary of the main findings from the Site scale documentation analysis is provided.

5.4.2 Summary Analysis: Site Scale

Similar to the summary analysis for the City scale, the lenses pertaining to the transformation process, light industry and mixed-use are applied to the **Site Scale of NDSM-Werf**.

When applying a transformation lens to the documents, several key points were made. To start, it was determined that housing was not a (major) factor in the beginning stages of the transformation process of NDSM-Werf like it is more recently. The **initial intention** of the municipality was to accommodate the interests of the existing industrial businesses and operations during the transformation into mixed-use. It is evident that the priority of realizing housing has **overshadowed** these original intentions as captured in the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a) as well as the most updated *Bestemmingsplan NDSM-Werf Wes*t (Gemeente Amsterdam, 2020e). In the initial development program for NDSM-Werf, the sharp rise in the demand for housing was not accounted for. As a result, the amount of housing to be built in NDSM-Werf West was adjusted, which impacted the schedule and scope of the transformation of NDSM-Werf, and ultimately led to the decision to accelerate the redevelopment of remaining A-blocks in NDSM-Werf West. Since there are two land use plans (*Bestemmingsplan NDSM-Werf West* and *Bestemmingsplan NDSM-Werf Oost*) that cover the site area, it was determined that the (development) approach taken for NDSM-Werf West versus -Werf Oost are distinctly different, where more new development was and continue to be allocated to the West portion, while the objective for the Oost was to retain the historic elements and transform existing buildings into more relevant uses, which was realized early on. Since then, development plans for that sub-area have been frozen for 10 years. Overall, at this scale, there were more explicit details found on the transformation of an industrial site into an urban mixed-use district, specifically its evolution over time; however, there is **limited insight on the processes involved in steering/guiding development**. At the same time, a **Bestemmingsplan** has been identified as a policy tool that steers/influences development decisions at the site scale as it is a statutory document that those realizing developments are required to comply to.

When applying a light industry lens, the observations made centered around **architectural elements** and the evolution of municipality's priorities over time. In the early stage of the transformation process of NDSM-Werf, there were plans to realize building blocks (*XXL Urban Plan*) that were designed to accommodate industrial functions, in which attention to details like floor layouts and ceiling heights were taken into consideration; however, It was never realized as a result of the housing pressures in Amsterdam that was prioritized by the municipality. The narrative around preserving the existing industrial operations was reflected in the original *Bestemmingsplan NDSM-Werf West* (Gemeente Amsterdam, 2014), but was not subsequently captured in later documentations/ plans with the exception of maintaining the 3.1 environmental category maximum in both NDSM-Werf West & Oost. Instead, the later documents/ plans captured the decision to increase the threshold of building housing specifically in NDSM-Werf West and to accelerate the transformation schedule for additional blocks that were to be realized later on. It is evident that the municipality's priorities for NDSM is affected by land use pressures and political will.
In more recent documents at this scale, it was determined that there are **conflicts in interests** for a particular location in NDSM-Werf Oost involving Made up North's proposal for a Creative-Maker District versus the municipality's greenery/sports plans to accommodate the needs of the new residents in NDSM-Werf West. The greenery/sports proposal is a more recent priority that has the potential of having significant implications on the business climate and presence in NDSM-Werf Oost including light industry, as well as, Made up North's plans.

When applying a mixed-use lens to the documents, it is apparent that the **intention and approach** when it comes to realizing mixed-use in NDSM-Werf has **fluctuated over time**. In earlier plans (i.e. XXL Urban Plan), there was less emphasis on achieving a balance of live-work functions, but more on accommodating a diverse range of business functions with varying requirements. In documents after 2013, the objective of transforming NDSM-Werf especially -Werf West into an urban, live-work (mixed-use) district is captured and emphasized However, the **definition/scope of mixed-use** seems to change over time (which is reflected in the documents produced). The **live-work ratio** stared as being more so equal (almost 50/50 %) to housing being the dominate land use (85/15%), in which the 15% does not only represent work functions, but 'non-residential'; this means that work functions including industry need to **compete**

with other non-residential land uses like commercial and even social facilities/amenities for space. The **'non residential' categorization** does not seem to be receiving a positive reception from non-public stakeholders including developers and experts, as captured in their interviews.The intention for mixed-use seems to remain up to this point, but it is evident that housing is being prioritized, which undermines the possibilities for light industry activities to be realized. In both Bestemmingsplannen (-Werf West and Werf-Oost), the **Gemengd** land use designation is applied to most blocks in which a range of functions/activities are listed as permitted. There are different classifications of the Gemengd land-use zoning designation (Gemengd-1, -2, -3 and -4), in which residential is not permitted in the plinths of blocks designated as Gemengd-1 or as indicated by a (c) in the Bestemmingsplan map for Gemengd-2 or -3. This is reflected in certain policy documents and during the interview with the Head Designer of NDSM-Werf (Personal communication, 2021); however, there is no mention of non-residential functions only to be realized in the plinth. Therefore, this is could be interpreted as an opportunity for industrial activities to be realized via vertical mix, but would be restricted by the limit on non-residential uses per block that has been set by the municipality for NDSM.

It is apparent that at the **Site scale** of NDSM-Werf, the approach to development as it relates to the transformation process, the accomodation of light industry and realizing mixed-use has not been consistent over time, as they have been significantly influenced by external factors especially land use pressures like the increasing demand of housing. As a result, the intention of and actions by the municipality to retain light industry as part of the transformation of NDSM-Werf are not directly captured in more recent documents. On the other hand, other parties like Made up North are making efforts retain light industry activities and proposing solutions as part of the transformation process at NDSM.

In the next sub-chapter, the documentation analysis scopes down even further from the Site scale to the **Block scale**.

View from Pontkade development courtyard in NDSM-Werf West, July 2021 [Own photograph]

4.5 Block Scale

4.5.1 Documentation Analysis

In this sub-chapter, documentation that relate to the Block scale are examined. With the exception of one document that captures the redevelopment of a particular set of blocks, the majority of the documents reviewed apply to development blocks in general as they center around the topics of **transformations**, **financial matters** and **development rules** (Table 9). Similar to the documental analysis conducted at the higher scales, input from interviews conducted are incorporated where relevant and a summary is provided in which an overall analysis of the documents at this scale is presented.

It is important to note that in contrast to the documentation analyses that were conducted at the other scales, only more recent documents were reviewed at this scale due to limited access to older documents. The majority of the publications at this scale were provided by research participants through the interviews conducted for the research study.

To start, the first document encompasses the redevelopment framework for Blocks A4 – A7' in NDSM-Werf, which has recently been designated for redevelopment, as briefly described in the analysis of the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020) under the Site scale sub-chapter.

Table 9: Documentation analyzed at the Block scale

	DOCUMENT	AGENCY	YEAR
BLOCK SCALE	*Stedenbouwkundig kader NDSM blocks A4-A7*	Gemeente Amsterdam	2019
	Kavelpaspoort A specific version is issued for each plot (once determined to be redeveloped)	Gemeente Amsterdam	N/A
	Erfpacht en groundwaarde bij transformative - Information & Rekenmodel transformative erfpacht – leeg	Gemeente Amsterdam	2020 & 2021 (most updated)
	Stappenplan Transformatie	Gemeente Amsterdam	2020

Stedenbouwkundig kader NDSM blocks A4-A7

Gemeente Amsterdam | 2019

In 2019, Gemeente Amsterdam released a document that focused on the urban development framework of **Blocks A4-A7'** in NDSM-Werf West called *Stedenbouwkundig kader NDSM blocks A4-A7*. An aerial image of the blocks is provided in Figure 53 below. This was a year prior to when the *Actualisatie NDSM-Werf 2020* (Gemeente Amsterdam, 2020a) was developed (as discussed under the City-scale documentation analysis).

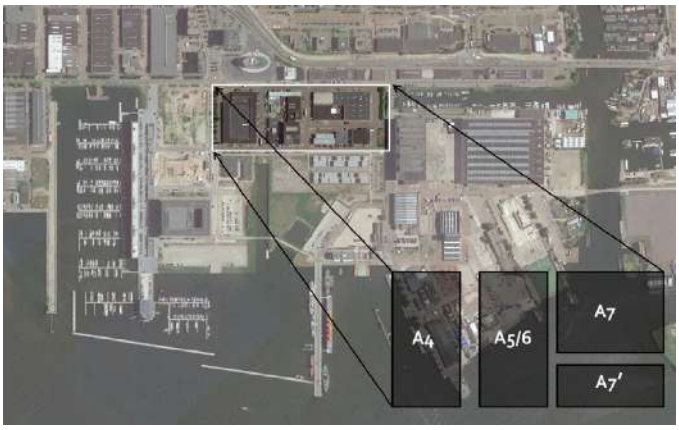

Figure 53: Aerial image of Blocks A4-A7' (Retrieved from Gemeente Amsterdam, 2019b, p.5).

In this document, adjustments to the general vision of NDSM-Werf especially regarding the live-work ratio as a result of housing pressures were captured as well as **Creative Neighbourhood** designation that was assigned to NDSM-Werf in the *Ruimtevoor de Economie van Morgen* (Gemeente Amsterdam, 2017b). For the development programming for blocks A4 to A7', they are split up into A4-A5 and A6-A7-A7' in which both groupings require that housing is to not be realized on the ground floor, comprising of at least 30% social and the remaining to be free sector (Gemeente Amsterdam, 2019b). The two groupings separately are also required to have 15% to 25% of non-residential functions, in which 10% is to be made up social amenities (Gemeente Amsterdam, 2019b). In this urban framework, rules regarding public space, building requirements including the building envelope specific to these blocks are provided. Figures 54 and 55 are illustrations of the spatial layout of blocks A4 to A7' and the general rule regarding the façade allignment requirements for main (outer) streets versus the internal street. In Figures 54 specifically, the buiding footprint in black represents Abramerij, a monumental industrial hall that is being used as a safety training facility for on-shore and off-shore exercises and the building is to remain and act as landmark and anchor for the block (Gemeente Amsterdam, 2019b). In addition, other general urban planning rules that apply to all blocks in NDSM-Werf West that are to be redeveloped are demonstrated, which cover conditions like maximum building height, and variation in building height and width.

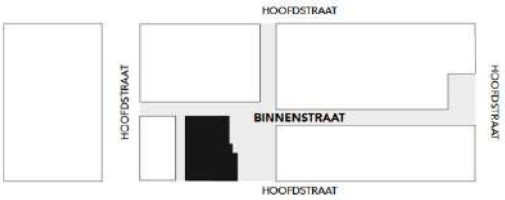

Figure 54: Spatial layout of Blocks A4 to A7' demonstrating facade alignment for inner and outer streets (binnenstraat & hoofdstraat (Retrieved from Gemeente Amsterdam, 2019b, p.23).

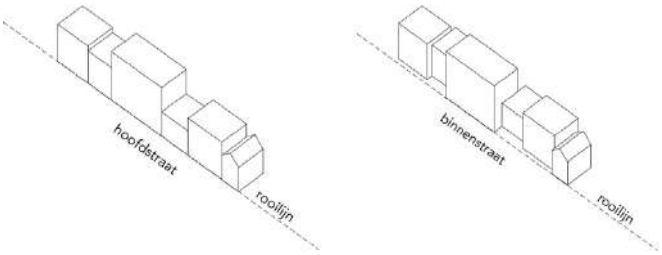

Figure 55: General urban planning rule concerning variation in facade alignment for inner streets (binnestraat) versus outer streets (hoofdstraat) width (Retrieved from Gemeente Amsterdam, 2019b, p.23).

In this document, there is a lack of details regarding the transformation approach taken for these particular A-blocks. This is particularly interesting as it is a different situation then when redeveloping the B-blocks, which are mostly vacant lots that involved a coordination agreement with the area developer. These A-blocks currently house existing real estate with different leaseholders and tenants, which the Land Development Project Leader of NDSM (Personal communication, 2021) had claimed to be a complex procedure that required the existing leaseholders to coordinate with each other to realize their redevelopment plans. Three leaseholders of plots in these blocks, two real estate developers and commercial owner with intentions to redevelop his plot, were interviewed. According to the Owner of a Brand Activation Company (Personal communication, 2021), who is one of the leaseholders of these A-blocks, the municipality has instructed the leaseholders within the A4-A7' blocks to form a project team and develop a plan for their respective block. This was echoed by the other two Real Estate Developers interviewed (Personal communication, 2021).

Kavelpaspoorts
Gemeente Amsterdam

As part of the transformation process of NDSM-Werf especially -Werf West, a **kavelpaspoort** (a parcel passport when translated in English) is used to lay out the municipality's spatial requirements in terms of development on a block-per-block basis. Due to confidentiality reasons, only limited information regarding the details of a kavelpaspoort was available for the purposes of the research study. According to research participants from Gemeente Amsterdam (personal communication, 2021), it was determined that a kavelpaspoort goes hand-in-hand with the ground lease (erfpacht) contract per plot, laying out the rules and spatial conditions specific to a plot, which is required to be complied to by the initiator of the plot's development (typically a developer) as stated below.

"The kavelpaspoort is part of the contract. So first we make a kavelpaspoort. In the kavelpaspoort, there are all the Urban Planning rules for the development. So which program and the building heights, etc, etc. We also decide on the financial terms that belong to that development, with the Kavelpaspoort. Then we make a contract, of which the Kavelpaspoort is a part." – Land Development Project Leader of NDSM for Gemeente Amsterdam, personal communication, 2021

The Head Designer of NDSM (Personal communication, 2021) echoed the above statement in simpler terms, adding that the program and rules for the urban planning elements do depend on the situation per block. The Project Developer at BMB ontwikkeling (Personal communication, 2021) shared her experience with dealing with kavelpaspoorts stating that they receive a kavelpaspoort by plot and each time a new plot is to be redeveloped, additional requirement are included, which often adds to the complexity of the development and in a fight against escalating construction costs.

Within each kavelpaspoort that is assigned to a block, specific rules are imposed that need to be complied to accordingly in order to move forward with executing a development project. In each kavelpaspoort, block details such as dimensions as well as the maximum GFA and FSI (floor space index) are typically indicated. The typical rules and conditions cover the following elements: programming of functions permitted and desired by the municipality, architectural and urban design requirements, and technical preconditions; all in which can be block specific. Therefore, the contents of a kavelpaspoort can dictate the amount and type of mixed-use warranted to a degree. Along with precedence images, general urban planning rules, that can be found in the *Stedenbouwkundig kader NDSM blocks A4-A7* examined above, are also provided in each kavelpaspoort. The programming aspect typically reflects the live-work ratio per block in square meters GFA (85% residential and 15% non-residential on average with slight variations) for NDSM-Werf West, in which functions under the non-residential umbrella term that are permitted according to the **Bestemmingsplan** are presented. The above information was obtained via email correspondence with the Head Designer of NDSM (Personal comunication, 2021) after the interview.

What is permitted in terms of functions is dependent on what is stated in the Bestemmingsplan. Preference of certain functions can be asked for by the municipality. For instance, the Project Developer of BMB ontwikkeling (Personal communication, 2021) described an ongoing project, in which the municipality had asked for special spaces in the Kavelpaspoort to be realized in a specific block in NDSM-Werf West with specific building features such as higher ceilings and oversized doors for truck access to attract and accommodate special companies. It is likely that these spaces are targeted for more industrial/production functions. For the redevelopment of Blocks A4-A7', their respective kavelpaspoorts need to be complied when plans are being developed. The Real Estate Developers of these blocks (Personal communication, 2021) revealed that the municipality is not as explicit in asking for or requiring that spaces for light industry activities to be realized in the kavelpaspoort nor in discussions with them for their blocks. There does not seem to be specific volumes for specific non-residential functions. For residential, the overarching rule for types of housing segment does apply.

Although only limited details on the contents of a typical kavelpaspoort were available for public use, several municipal documents written on Amsterdam's **erfpacht (ground lease) system** specifically pertaining to transformations were provided to be used for the purposes of this research. They include the following: a guide explaining the erfpacht ground rent calculations, the rules of thumb for existing ground lease rights, a timeline of the typical transformation process and an excel

file containing a calculation model that is used by leaseholders to know what to expect in terms of the ground rent price of the proposed transformation of their plot. The most relevant documents will be described briefly in which key aspects that are found to be most relevant and/or have potential implications to the integration of light industry in mixed-use developments in transformation areas are to be highlighted accordingly.

Erfpacht en groundwaarde bij transformative - Information & Excel: Rekenmodel transformatie erfpacht - leeg

Gemeente Amsterdam | 2020 & 2021

In December 2020, Gemeente Amsterdam released a document that encapsulates the **erfpacht (ground lease) system** that is used in areas designated for transformation. The document provides detailed information regarding the breakdown of ground lease land value and ground rent prices for situations in which changes in zoning or building occur in a particular plot (Gemeente Amsterdam, 2020c). Three types of erfpacht (ground leases) are described, which are temporary, continuous and perpetual (Gemeente Amsterdam, 2020c). It is determined that NDSM-Werf, with the exception of temporary lands situated in NDSM-Werf Oost, are under erfpacht, and is most likely continuous due to their 50-year timespan intervals until next renewal (as determined in the interviews).

It is important to note that the **ground lease land value** does not equate to ground rent price (€), but rather is the basis of the ground rent price of a plot. In reality, the ground rent price is calculated by taking the ground lease land value and multiplying it by the ground rent percentage, which can vary depending on fixed time interval (i.e. indexed vs 10 years versus 25 year) (Gemeente Amsterdam, 2020c).

In the document, an example of a proposed zoning/building change from single use to a more mixed-use development is provided, which showcases how ground rent prices are adjusted accordingly. In the new proposed designation for the example plot, there are no business (bedrijven) functions included. It would be very beneficial to see how the measuring unit (BVO), unit price, depreciation factor and ultimately the ground lease land value for specifically business related land-use functions especially spaces for production related activities are determined and calculated. According to the Land Development Project Leader of NDSM at Gemeente Amsterdam (Personal communication, 2021), the ground rent price for industrial/production spaces would be lower if the developer in question would be willing to realize them. For the land use functions that are presented in the proposed destination plan, it is unclear where the unit price per land use function is derived from; how the municipality determined this value. When examining the document, limited information regarding the payment schedule in this document therefore it is unclear if the amount is to be paid in lump sum or per fixed time interval or per year.

An insightful document that was found to go hand-in-hand with this guide to the erfpacht ground calculations is an excel file containing a calculation model that is typically supplied to developers to help them determine the total ground rent price of their development proposal of a particular block/plot prior to moving forward with a project. Key steps of the model include filling in the details regarding the current breakdown of land use(s) in the existing ground lease for that plot followed by providing details regarding the proposed function(s), in which the following options are provided: businesses (bedrijven), office, social amenities, other, housing. For both steps, the BVO of each land use/function in the existing and proposed situation need to be provided in order for the new total ground rent is calculated. In the excel, bedrijven (businesses) is treated as a separate land use and not combined with other functions nor considered as 'other'. However, it is unclear if the ground rent price for the business classification can differ depending on the type work/business being proposed or is one standard price imposed. For instance – advanced production capabilities versus more traditional production activities. This particular excel file was utilized for the redevelopment of Blocks A4-A7'. At the time this document was provided, information regarding the prices for each land use for these blocks were not yet published, therefore it is yet to be determined what the price for businesses are like compared to other land uses. This is echoed by the Real Estate Developer at Lingotto Development (Personal communucication, 2021) who, at the time of the interview, was waiting for the ground rent prices of their proposed plan from the municipality before making any major investment

decisions. These prices determine if a developer will realize said functions or not as it is a significant factor in establishing a solid business case that is to be pursued. The Real Estate Developer at COD Development Pioneers (Personal communication, 2021) revealed that the ground rent prices are crucial in developing a feasible plan and to him, it seems backwards and a waste of time, money and effort to develop a plan based on the municipality's requirements prior to receiving their set prices.

Stappenplan Transformatie

Gemeente Amsterdam | 2020

Another document that was available for the purposes of the research was an informational roadmap that captures the **standard transformation process at a plot level** and includes the following phases: Initiation, Planning, Elaboration, and Implementation in which approximate lead times are determined (Gemeente Amsterdam, 2020f). Figure 56 on the next page showcases a roadmap of t57 typical steps of this plot-level transformation process. It is also broken down by required actors per phase, which include an initiator, the municipality, and necessary advisors. According to this document, the Gemeente Amsterdam in the transformation process is represented by a project team, the leasehold & issuance department, and the Land prices Advice Team (Gemeente Amsterdam, 2020f). In a typical Project Team (Projectteam), it is comprised of the following roles: a project manager, a project leader from land affairs/development, a plan economist, an urban planner and representative from the city district (Gemeente Amsterdam, 2020f). For NDSM-Werf, interviews were conducted with two members of project team. Within this document, key milestones are identified, which include the following: (1) The Agreement of Intent (Intentieovereenkomst), (2) the Appointment letter (Afsprakenbrief), (3) Realization Agreement (Realisatieovereenkomst), (4) the Legal Planning Procedure (Juridisch planologische procedure) and (5) the Ground Lease Agreement (Erfpachtovereenkomst) (Gemeente Amsterdam, 2020d). At the Appointment letter stage, many items are to be addressed. This is when a **kavelpaspoort** is presented by the municipality that is to be complied to by the initiator and also when the land value is to be determined. When applying this roadmap to the transformation of NDMS-Werf especially -Werf West, the **initator role** seems to be differ depending on the block/plot. For instance, it was revealed in the interview with the Land Development Project Leader of NDSM (Personal communication, 2021) that there is an arrangement with VolkesWessels/ BMB ontwikkeling for the B-blocks in terms of redevelopment while the remaining A-blocks have existing real estate with different leaseholders and tenants. It is noted that not all steps are required if not necessary. With this document, details regarding the transformation process at a broader scale is not provided, hence it is not clear how the phasing of the plots are transformed are handled. This particular process seems to be most applicable when erfpacht (ground lease) is in place.

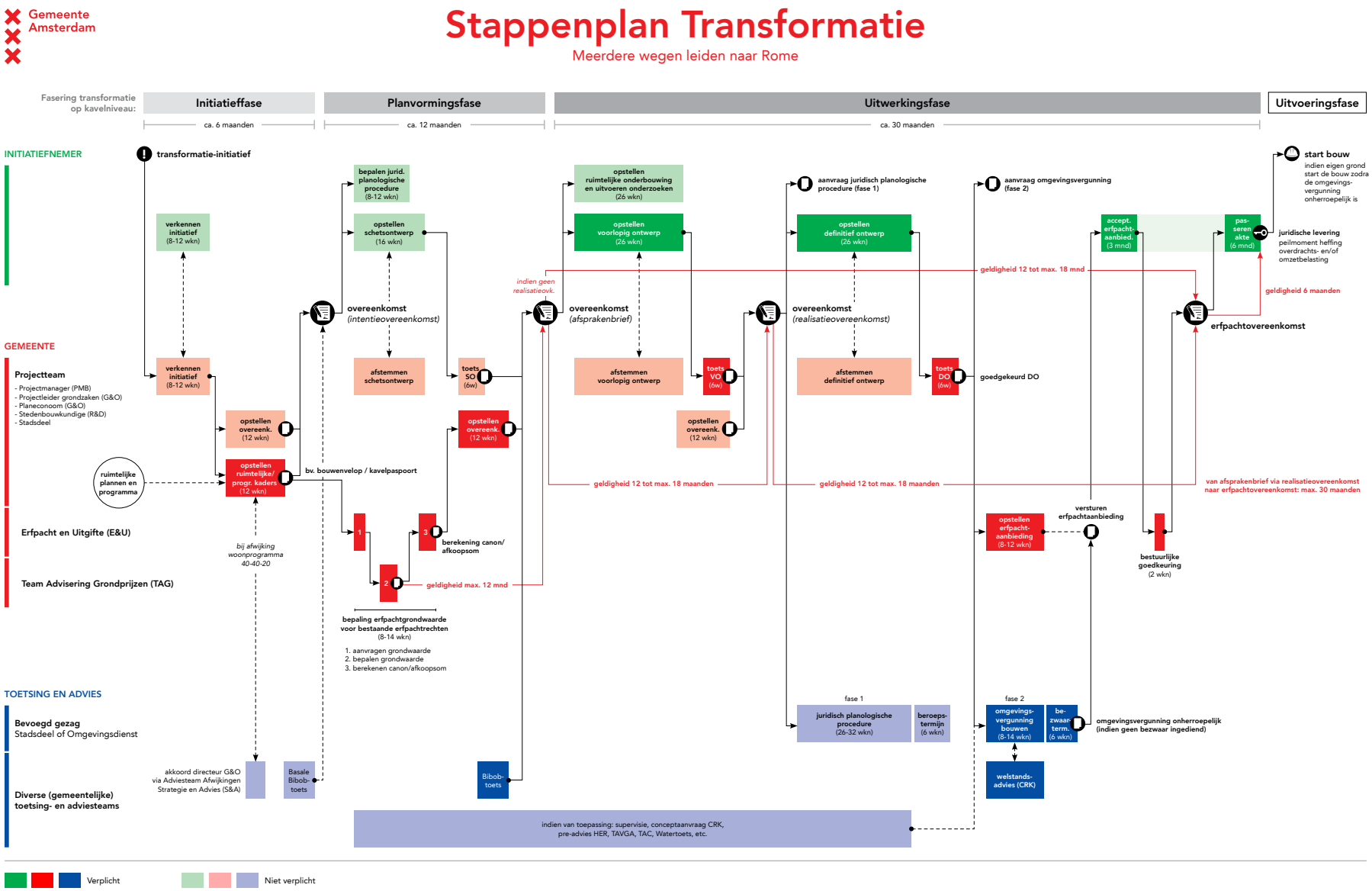

Figure 56: Transformation Roadmap (step-by-step) by block/plot in Dutch (Retrieved from Gemeente Amsterdam, 2020f, p.1).

4.5.3 Summary Analysis: Block Scale

At the **Block scale** within the case study site of NDSM-Werf, insightful observations were made when applying the relevant lenses to this research.

When applying a transformation process lens to the documents at this scale, it was determined that the majority of the documents provided were tailored for transformation projects, focusing on different aspects such as the process itself, financial details, etc, depending on the document. It was determined through the documentation analysis at this scale that the municipality of Amsterdam uses a **standardized roadmap for transformation sites** that lays out the steps involved in transforming per block/plot by development phase in which key elements and instruments are highlighted accordingly. One particular tool that was identified as necessary in the planning phase is the **kavelpaspoort** as it contains the rules per plot that needs to complied with in order the redevelopments plans can move forward past the elaboration phase into its implementation. The **ground lease contract (erfpacht)** is also identified as a critical milestone in which the total ground rent price and associated plans are agreed on between the initator and the municipality. At this scale, the necessary stakeholders and their roles for standard transformation of a block/plot are captured, as well as the financial component of the transformation process as it related to the erfpacht system.

When applying a light industry lens, the following items were noted: There does not seem to be a significant emphasis on accommodating light industry activities at the block scale. In addition, in the documents relating to the erfpacht ground lease system, the distinction between land uses does not seem to capture business as a categorization. However, in the excel file, it is determined that there is the opportunity to assign a land value to a business-related function if that is the case. The shortcoming of this is that 'business' seems to be an umbrella term that covers all types of businesses. As a result, this does not allow for different land prices to be allocated based on the type of business function. For instance, more tradition small-scale production would typically warrant a lower land price than more advanced 3D printing businesses according to certain interviews.

Lastly, when applying a mixed-use lens to the same set of documents, mixed-use is also not as apparent or explicitly captured. In the first document reviewed under this scale, there is more emphasis on the **variation of urban design/architecture elements** like height and width that are desired, but nothing explicitly mentioned regarding the mixing of functions. In a kavelpaspoort, however, rules can dictate what land uses and functions are desired in a plot, in which a non-residential maximum rule of thumb is currently enforced. In the excel file which is used to calculate the total erfpacht ground rent value of a proposed value, the model is set up in a way that multiple land uses/functions can be accounted for when making the calculation. However, the cell designations seem to be quite static and not flexible.

At the block scale, it is apparent that the planning system in place and the processes and tools involved in the development of blocks pertaining to the transformation of NDSM-Werf were developed in a way that does not directly take into account and support light industry integration. Although there seems to be efforts made in incorporating mixed-use opportunities including the erfpacht ground rent values, there are limits especially as it relates to the accommodation of different types of business activities including light industry.

4.6 External Publications

4.6.1 DOCUMENTATION ANALYSIS

In addition to the documents reviewed at the General, Metropolitan Regional, City, Site and Block scales, this sub-chapter was included to capture any publications written by external parties that contain relevant findings to the research study, and do not fall under any specific scale. One particular publication that was examined was written by two members of Spontaneous City International (SPcitl), a think tank based in the Netherlands that focuses on urban planning matters and addressing spatial challenges as it relates to urban growth and the dynamic between working and living (SPcitl, 2021). The organization also publishes their own research, including the publication described below.

Ecosystemen van Werk in de Stad

Bernardina Borra & Gert Urhahn, SPcitl | 2020

Ecosystem van Werk in de Stad is a research study carried out and published by Borra and Urhamn from SPcitl (2020) that centres around exploring more organic forms of urban development as it specifically relates to retaining and expanding the amount of affordable workspaces in the city. The study was commissioned by the Rotterdam University of Applied Sciences specifically the Sustainable Port City Knowledge Center's Area Development and Transition Management research group with the purpose of capturing real-life sucessful examples of efforts to realize and retaining affordable workplaces in especially in Rotterdam's Merwe-Vierhaven (M4H) area. This publication is a follow-up of MensenWerk (SPcitl, 2018), containing recent research pertaining to a range of real-life European cases. The study emphasizes the importance of the **work element in the city,** the **added value** it instrinsically brings, and how critical it is to maintain affordability and to achieve a balanced ratio of temporary and permanent workspaces especially as housing is placing significant pressure on space (Borra & Urhahn, 2020). Here, it implicitly captures light industry within the scope of work activities. The report also highlights a paradigm shift, in which the sectors that typically make up the economy are not as clearly defined due to work activities combining/ merging. This was found to result in the development of the following work ecosystems: hybrid work-living environments, clusters of work activities with high environmental category designations, and mixed work clusters without housing (Borra & Urhahn, 2020). It is apparent that these emerging work ecosystems represent some form of **mixed-use**, in which the first ecosystem type involves the mixing of both working and living functions.

In this publication, a major aspect of the research focuses on the **stakeholder component**; relevant parties involved in retaining and safeguarding work in the city. In addition to the traditional parties such as government bodies and real estate developers, Borra & Urhamn (2020) captured four relevant actor roles (trekkers in Dutch) in their research, that were identified as having the ability to adapt to the changing paradigm surrounding work in the city. They are as follows: Regisseurs, Operators, Bewuste investeerders and Wegbereiders, which in English would be translated as Managing Director s, Operators, Conscious Investors and Trailblazers respectively. The last two trekkers were identifed as the most emergent. In the research, multiple case studies from cities in the Netherlands, Blegium and the UK were captured, which were categorized by trekker type in the report. Under each case, details like location, spatial area type, scale and type of work were provided. It was determined that each trekker role is more applicable at certain scale(s) as well as spatial contexts due to their skillset and resources. For instance, Operators are most suitable at the building scale within transformations, inner city or urban mixed areas, while Trailblazers are more innovative in nature and focuses on the larger picture, therefore more effective at a broader scale (Borra & Urhahn, 2020). However, in the interview with the Managing Managing Director of ORAM (personal communication, 2021), he criticized the roles of the four trekkers as he found them to be more ideal in a perfect world, rather than realistic.

This particular document provides valuable insight on the topic of work in cities as it relates to space scarcity and affordability as well as innovative efforts to retain affordable workspace in cities including in Amsterdam.

4.7 Cross-scale Summary

By organizing and analyzing the documentation **over time by scale**, detailed and tangible findings and observations as they relate to transformations, mixed-use and (light) industry accommodation were captured. When cross-examining the main findings of each scale especially **City**, **Site** and **Block** with each other, the following main findings emerged:

It is apparent that **scale** plays a significant role in how light industry is being addressed and accomodated in Amsterdam specifically in (former) industrial areas designated for transformation by the municipality. At the City scale, specifically in more recent documents developed by the economic department at Geemente Amsterdam, the intention and efforts to address the issue pertaining to the loss of the remaining industrial lands within city boundaries due to mounting land use pressures especially housing were found to be more prominent as it relates to implications to Amsterdam's economy. Through the documentation analysis, it was also determined that mixed-use is considered a possible means to achieve the integration of light industry in transformation areas. However, this has not yet been captured as explicitly in documentation at the lower levels (site and block scales within NDSM-Werf).

When cross-examining the documents based on the timing of their publication, many documents over multiple scales were found to have been developed during similar timeframes. For instance, the *Bedrijvenstrategie 2020-2030* (Gemeente Amsterdam, 2020b) was released the same year the *Actualisatie Investerbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a). When comparing the contents of these two municipal documents, it is apparent that there is a disconnect between these documents as the execution of city-scale visions and intentions are not explicitly covered at the site scale as it relates to safeguarding existing businesses including industrial activities as part of transformation plans. Once again, this demonstrates the limited influence city-scale documents currently have on planning/policy documents and processes at micro levels of site and block scales specifically as it relates to NDSM-Werf. In addition, it is important to note that in certain site scale documents, explicit references are made to documents at the city scale. This is the case in the *Actualisatie Investerbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), in which mentions the Creative Neigbourhood designation of NDSM-Werf that was introduced in the *Ruimte van Economic Morgen* publication (Gemeente Amsterdam, 2017b). This does show that the contents of site scale documents are being informed by what is captured in documents developed at higher scales, but only to a certain degree and at more of a surface level.

When linking to the bigger picture as it relates to safeguarding light industry in urban environments, it is apparent that intentions and efforts depend on the scale within Amsterdam. There is a more explicit emphasis placed on prioritizing industry as part of transformation efforts through mixed-use developments by the municipality at the city scale, which has not yet been full developed at lower scales within the case study site of NDSM-Werf. It is important to note that in contrast to the municipal documents at lower scales like in NDSM-Werf, publications prepared by non-public parties are found to have more direct intentions and priorities related to safeguarding and supporting the presence of light industry in urban areas including those designated for transformation.

New boardwalk/public space near ferry landing in NDSM-Werf West, July 2021 [Own photograph]

Chapter 5 | **Stakeholder Dimension**

This chapter encompasses the **stakeholder dimension of the empirical research.** In comparison to the prior chapter, which was based on examining published documents and plans over time at different scales and ultimately reflecting factual findings, this chapter aims to capture **perceptions, notions, and experiences** as expressed in the semi-structured interviews conducted in the months of March to April 2021. The purpose of this particular dimension is to address a portion of SRQ 2 as well as SRQ in its entirety.

To begin, **key stakeholders** in the context of the case study site of NDSM-Werf were identified and justified. From here, the **positions** of certain stakeholders on specific topics pertaining to the possible integration of light industry in mixed-use developments of transformation areas in Amsterdam especially in the context of NDSM-Werf, were captured based on the **fourteen interviews** conducted for the purpose of this research. The **interests** of key stakeholders are then captured and elaborated on where various stakeholder mapping tools are applied including the Penta-helix Stakeholder map, Power-Interest and Power-Interest-Attitude matrices, followed by the the identification and comparison of **spatial claims** of certain key stakeholders.

5.1 Identification of Stakeholders

Prior to determining the **positions, interests and spatial claims** of the most relevant stakeholders, the first step is to identify the key stakeholders and briefly explain their relation to NDSM-Werf case study site and the research focus. This is captured in Table 10 on the next page. For the stakeholders who participated as research participants for the Empirical portion of the research, they are indicated as 'interviewed' in the far right column where applicable (also highlighted in orange). As shown in Table 10, the identified stakeholders are categorized into the following groupings initially for the purpose of the interview process: **Public, Private, Third Party** and **End-User**. As mentioned in the Research Design & Methodology Chapter, two additional research participants were included in the interview process, which are not considered as direct stakeholders of NDSM-Werf, but are viewed as (External) **Experts** with relevant specializations and experience related to the research study, as well as valuable input on the case study site. In the Public stakeholder group, the higher levels of government body (National, Provincial and Metropool Regional Amsterdam) are not directly involved in the transformation of NDSM-Werf like the municipality (Gemeente Amsterdam), but were identified as stakeholders with broader-scale capacities and indirect relations, as described in their respective rows in Table 10. Their limited involvement in the NDSM-Werf project is apparent in the outcomes of the stakeholder mapping exercises in the proceeding sub-chapters especially in comparison to the municipal departments identified as most relevant.

The list of research participants who were interviewed is presented in Table 11 on the following page, in which their respective organization titles, organization classifications and position title are provided. More ellaborate details on the research participants and interviews on are provided in the Appendix C as well ain interview consent form template can be found in Appendix D.

Table 10: List of identified stakeholders involved in the trasnformation of NDSM-Werf

Stakeholder Group	Function	Description	Status
PUBLIC	NATIONAL GOVERNMENT Rijksoverheid	Relevant ministries handle matters of spatial planning and development, economic affairs and mobility; not a direct/ internal stakeholder for NDSM-Werf	–
	PROVINCIAL GOVERNMENT Province Of North Holland	Involved in matters relating to spatial development, regional economy and accessibility; not a direct/internal stakeholder for NDSM-Werf	–
	METROPOOL REGIONAL AMSTERDAM MRA	Involved in economic matters within the 7 sub-regions that make up the Metropolitan Region of Amsterdam including the city of Amsterdam; ; not a direct/internal stakeholder for NDSM-Werf	–
	GEMEENTE AMSTERDAM Ruimte en Economie Cluster | Economic	Responsible for economic and spatial matters including the business climate in Amsterdam	Interviewed
	GEMEENTE AMSTERDAM Ruimte en Economie Cluster | Urban Planning	Responsible for urban planning matters including public space and preparing a kavelpaspoort per block being redeveloped	Interviewed
	GEMEENTE AMSTERDAM Ruimte en Economie Cluster | Land Development	Responsible for land-related affairs including ground lease (erfpacht) and financial matters and coordinating with leaseholders	Interviewed
PRIVATE	AREA DEVELOPER IN NDSM-WERF BMB ontwikkeling	The development arm of both Amsterdam Waterfront and MediaWharf consortiums and works in conjunction with WesselsVolkes to redevelopment remaining B-blocks (coordination agreement with the municipality for this blocks)	Interviewed
	OTHER ACTIVE DEVELOPERS IN NDSM-WERF Leaseholders	Leaseholders that have been identified as being involved in the transformation of remaining A-blocks	Interviewed
	DEVELOPMENT CONSORTIUMS Amsterdam Waterfront (-Werf West) & MediaWhard (-Werf Oost)	Handles the development aspects of the respective portions of MDSM-Werf	–
END-USER	ORAM BUsiness association network	Represents and advocates for a range of businesses in the Amsterdam Region and acts as the link between the public authorities and network of businesses	Interviewed
	MADE UP NORTH Foundation (NGO)	Advocates for a creative-production district in NDSM-Werf Oost with partners in the production/making industry in Amsterdam especially Amsterdam Noord	Interviewed
	STICHTING NDSM Foundation	Responsible for the cultural and event programming on NDSM-Werf Oost including NDSM Treehouse; partially funded by Gemeente Amsterdam	–
EXPERT	RESIDENTS OF NDSM-WERF Existing & Future	Currently or will live in NDSM-Werf (West) in the (near) future as a result of the transformation in to a live-work district	–
	LIGHT INDUSTRY BUSINESSES Past, existing & future	Located in NDSM-Werf either in the past, in the present or are interested to	Interviewed

Table 11: Breakdown of Research Participants involved in the interview process

	Organization	Organization Classification	Research Participant
PUBLIC	Gemeente Amsterdam	Municipality	Spatial Economic Consultant
	Gemeente Amsterdam	Municipality	Head Designer of NDSM
	Gemeente Amsterdam	Municipality	Land Development Project Leader of NDSM
PRIVATE	BMB ontwikkeling	Area Development Firm/ Leaseholder	Project Developer
	Lingotto Devleopment	Real Estate Development Firm/ Leaseholder	Real Estate Developer
	COD Development Pioneers	Real Estate Development Firm/ Leaseholder	Real Estate Developer
	Brand Activation Company	Company/Leaseholder	Business Owner/Leaseholder
THIRD PARTY	ORAM	Business Association	Managing Director
	Made up North	Foundation (NGO)	Co-Founder
END-USER	Bicycle Making Studio	Light Industry business recent relocated outside of NDSM-Werf	Bike Maker
	Visual Arts & Welding Studio	Light Industry business currently operating in NDSM-Werf Oost	Craftsman/Visual Artist & Activist
	Interior Building/Set Design Business (Fiction Factory)	Light Industry business situated outside of NDSM-Werf	Representative of Fiction Factory
EXPERT	Spontaenous City International	Think Tank	Expert #1
	Platform_31	Knowledge & Network Organization	Expert #2

5.2 Stakeholder Positions

For this sub-chapter, the qualitative data extracted from the interviews was examined to capture the **positions** of the interviewed stakeholders in relation to the overarching topics provided below:

A. Mixing (light) industry in new live-work developments

B. Municipality's priorities & efforts in retaining/supporting light industry businesses in NDSM-Werf

C. Safeguarding industrial space & maintaining affordability

These specific topics were either used as main themes in preparation of the interview questions or emerged as a common theme in the responses of the research participants when interview transcripts were being coded and analyzed. The main objective is to determine if there were any commonalities and/ or major variations in terms of the **positions and perceptions of different stakeholders** interviewed as it relates to the above topics. Where relevant, linkages to theoretic concepts/main themes captured in the Literature Review chapter are acknowledged.

A. Mixing (light) industry activities in new live-work developments

For the first topic, a range of responses were recieved in relation to the stakeholders' positions on incorporating light industry activities in new mixed-use developments such as in NDSM-Werf. While most interview participants were open to this idea of mixing, there were certain **reservations** that emerged surrounding scale and its long-term feasibility especially in NDSM-Werf as concerns regarding conflicts with other functions like housing were captured.

When talking to the representatives of Gemeente Amsterdam who were directly involved in the transformation of NDSM-Werf, their perceptions of the general feasibility of mixing light industry are aligned with each other, however, they emphasized different aspects. For instance, the Head Designer of NDSM-Werf (Personal communication, 2021) had envisioned a **very mixed urban landscape** similar to that of in New York, in which people can work where they live and a vibrant atmosphere is ultimately created. However, he pointed out that there are environmental arguments concerning noise and pollution nuisance relating to situating light industrial activities in urban environments in the direct vicinity of sensitive functions like housing. The Land Development Project Leader of NDSM (Personal communication, 2021), on the other hand, is convinced that this kind of mixing is possible and will ultimately result in a better urban environment in NDSM-Werf. However, he stressed that in order for this to happen successfully, the obligation to invest in and realize these workspaces mostly stands with the developers involved:

"Yes, I think it can be feasible. The developers do have to change their mindset and understand that they are making a different kind of neighborhood then maybe then there used to. It's not going to be Overhoeks. So they have to accept lower revenues in some of the spaces. In the end, I think it will make [a] much better neighborhood with a mixed-use of working and living" – The Land Development Project Leader of NDSM (Personal communication, 2021)

The Managing Director of ORAM (Personal communication, 2021) had critical opinions in regards to mixed-use specifically the approach the municipality has taken to implement it:

"Mixing is because there's no other alternative, you know? You have to mix because there's too many houses in this area, so now we must find out what kind of work can we do in these densely populated and built environments. [...] In my opinion, that's […] the wrong way around, because yeah, you should start with combining all these things and that's a big worry." – Managing Director of ORAM, personal communication, 2021

It is apparent that the Managing Director of ORAM (Personal communication, 2021) thinks that the municipality treats work functions as an **afterthought** especially in comparison to how housing is being prioritized these new urban districts and is strongly opposed to this particular approach to mixed-use. The way he explained the municipality's approach is similar to the description of residential-led mixed-use that is captured in the Literature Review.

A Craftsman/Visual Artist & Activist (Personal communication, 2021) who has been operating his studio in NDSM-Werf East for 20 years was also interviewed, who believes that businesses with production capabilities should be intensely mixed in with housing at the street level and should be time flexible to foster vibrancy throughout the day:

"I would emphasize the mix of functions in every street to have like businesses, to have production spaces right where people live, to keep the city in a mix of dynamics of different [functions and] also have different rhythms in the evening. Because now what you see in the evening on NDSM, after six o'clock, it's like dead. Nothing happens anymore." – Craftsman/Visual Artist & Activist, personal communication, 2021

The idea of mixing industrial/manufacturing activities in mixed-use neighbourhoods is also supported by another local business owner, a Bike Maker (Personal communication, 2021), in which his business would also be classified as light industry as he designs and assembles cargo bikes locally:

"I guess it's a good idea to mix it because it gives people a connection to products they buy, and that not only food, but also a bicycle, sporting goods, some art, from a local maker. They know who's in their building or in their block. Would also turn to if there's something broken or that needs some help with fixing something or just need someone to tell the story to, because they're frustrated about something. If everybody's only living there, then yeah, it's very straight lined... I don't see, that [being] very helpful." – Bike Maker, personal communication, 2021

The representative of Fiction Factory, an Interior Building/Set Design Company (Personal communication, 2021) that is currently based just outside of NDSM-Werf, presented an alternate proposal of how industrial functions can be integrated in urban areas like NDSM-Werf during his interview:

"I'm convinced that we have to also think in this kind of manufacturing in urban areas, that we have to think more vertical." – Representative of Fiction Factory, personal communication, 2021

From this particular interview, it was evident that he believes that **incorporating industrial functions vertically** is a feasible and viable option especially when comparing to solely in the plinths of buildings, which is what the municipality is mandating in NDSM-Werf West for non-residential functions (as described in the documentation analysis section at the Site Scale in Sub-Chapter 5.4). The representative of Fiction Factory also presented other possible solutions for industry to be better incorporated into a mixed-use context such as going beyond the typical spatial bounds, in which small-scale manufacturing activities could occupy spaces when they are not being utilized at certain times or days in a week (Personal communication, 2021). He also suggested that the **business model typically used for office-related co-working spaces** could be applicable for small to medium sized companies with manufacturing activities, in which resource sharing capacities like machinery for instance could be included:

"I think we could definitely think about like shifts, like in hardcore industry of course it's 24-7, I don't think you should do like small manufacturing 24-7, but you could kind of think certain spaces which could serve a different purpose. For example, in the night or in the weekend. So, if you design this in a smart way.... Space is often unused and of course this needs kind of very intense curating" – Representative of Fiction Factory, personal communication, 2021

Figure 57: A range of existing businesses identified as light industry in NDSM-Werf West (A-blocks) [Own photograph]

From these quotes, it is apparent that as a result of the transformation of industrial estates like NDSM-Werf into urban live-work districts, the light industry businesses who were interviewed have seriously considered **mixed-use related alternatives** to their workplace situations.

A particular major point of concern that was expressed in the interviews was the **potential conflict** that is likely to arise between light industry businesses and residents and when situated in close proximity to each other. The Owner of the Brand Activation Company (Personal communication, 2021), who is involved in redeveloping his plot in NDSM-Werf West, could imagine that **noise and smell nuisance** would occur when working with certain materials and tools like wood or iron causing issues, which would not be the case if functions like office buildings were realized instead. For similar reasons, the Managing Director of ORAM (Personal communication, 2021) mentioned that businesses he coined as 'whisper jobs' would be more viable in mixed-use environments dominated by housing, which would be more office-rated and could include 3-D printing capabilities.

It is important to point out that in the case of NDSM-Werf, the Land Development Project Leader of Gemeente Amsterdam (Personal communication, 2021) is not concerned about conflicts between housing and production activities as he views NDSM as accomodating more creative functions, which is in alignment with the live-work designation of a Creative Neighbourhood in the *Ruimte voor de Economie van Morgen* document (Gemeente Amsterdam, 2017b) developed by the Ruimte en Economie Cluster. However, Expert #1 (Personal communication, 2021) is not convinced that this Creative Neighbourhood designation correctly reflects the composition of industrial-related businesses that reside in NDSM-Werf at the time and perhaps in the future.

In a number of interviews, certain research participants shared their perception of how light industry businesses would feel and react about being integrated into an urban mixed-use development. Concerns regarding **security of space** emerged as a recurring theme. Expert #2)(Personal communication, 2021) for instance, thinks that companies especially with **production-related capabilities** are hesitant about situating themselves in close proximity with housing as they think that by default, they are in a weak position and that residents will always have an upper leg when issues relating to conflicts and nuisance comes up. This is echoed by the Managing Director of ORAM (Personal communication, 2021), who emphasized that these businesses will most likely not invest in workspaces if they have any doubts that their operations could one day be in jeopardy. Representatives of Gemeente Amsterdam like the Land Developer Project Leader (Personal communication, 2021) also claimed that the reality that the operations of light industry businesses will be limited in a mixed-use context as well as the fact that complaints may be more prevalent than in a monofunctional industrial park may deter them from wanting to be included in the transformation. Expert #2 (Personal communication, 2021) added that from her own research, it was determined

Figure 58: A range of existing businesses in one industrial building identified as light industry in NDSM-Werf Oost [Own photograph]

that **high-tech manufacturing activities** are more willing to locate in these urban environments due to the benefits relating to access to future employees and customers of centrality outweighing their concerns. The Owner of the Brand Activation Company (Personal communication, 2021) strongly believed that **existing light industry businesses** in NDSM-Werf that **specialize in manufacturing and production** will not return after the transformation of NDSM is complete, but instead be replaced by more **creative businesses that require less space and additional requirements** needed to support this industrial function. For reference, photographs of existing businesses in NDSM-Werf West and NDSM-Werf Oost that are determined as light industry (according to the definition used for this study) are provided in Figures 57 and 58.

It is important to note that multiple interview participants are supportive of integrating light industry activities in a mixed-use environment, but not with other uses in one building, but at **a block or a site scale**, where similar and related light industry activities are clustered together (Co-Founder of Made up North, personal communication, 2021; Real Estate Developer of Lingotto, personal communication, 2021; Bike Maker, personal communication, 2021). To them, this is the most feasible solution as it allowed for these small-scaled light industry businesses to stay in the city with limited conflicts and issues occurring. The Real Estate Developer at COD Development Pioneers (Personal communication, 2021) also added the following comment about the business case to realize light industry in combination of housing functions:

"The only problem is that when you integrate it into a housing block building ... light industry hall with on top, a housing block - it's really expensive. You have to make really big, large construction spans for instance to make free column space." – Real Estate Developer at COD Development Pioneers, personal communication, 2021

Overall, it is apparent that there is preference of integrating light industry activities at higher scale of mixed-use due to a range of reasons as mentioned.

B. Municipality's priorities & efforts in retaining and supporting businesses in NDSM-Werf

When it comes to the municipality's role and approach in retaining and supporting light industry businesses as part of the transformation of NDSM-Werf into an urban mixed-use district, a **mixed response** was received during the interviews. It was revealed that interview participants outside of Gemeente Amsterdam were very critical regarding the municipality's efforts so far especially to those who interviewed that work for the municipality.

The Spatial Economic Consultant at Gemeente Amsterdam (Personal communication, 2021) who is not directly involved in NDSM-Werf, had provided an insightful remark regarding the Municipality's original intentions for the transformation of NDSM-Werf, which he revealed he recently discovered does not reflect the present composition of the area:

"From an economic perspective, we saw NDSM sort of as the […] more central area in those northern banks also because of existing offices over there. So, we thought it's more like it could be more [of a] creative zone and the production zones [would be] around it. But we've learned lately that there's also quite a lot of production that really wants to stay there." – Spatial Economic Consultant, personal communication, 2021

The Spatial Economic Consultant at Gemeente Amsterdam (Personal communication, 2021) also revealed that he supports both the retention of existing and attracted new industrial businesses in these new urban mixed-use neighbourhoods for the purpose of keeping the economic DNA of these industrial areas intact. However, he emphasized the reality that there a significant gap in rental prices of existing versus newly built workspaces that not all businesses especially small-scale production-related companies can afford to bridge that difference. He adds that in situations where existing business do want to stay in the area, efforts have been made to link them with active developers in the area to broker a deal to be part of the moving forward, but he admits that this is difficult feat (The Spatial Economic Consultant at Gemeente Amsterdam, personal communication, 2021).

When interviewing municipal representatives who are directly involved in the NDSM-Werf transformation project, it is apparent that the municipality plays a **limited role in retain existing light industry businesses** as part of the redevelopment plans. In his interview, the Head Designer of NDSM (Personal communication, 2021) highlighted that in the *Bestemmingsplan for NDSM-Werf West*, there are restrictions on where housing can be realized on the ground floor (plinths) of certain Gemengd blocks, however, there is interest to realize street-level housing on 'woonerfs'; streets with limited access for cars. He also mentioned that conceptual plans to realize spaces designed specifically for production and industrial-related activities are being developed. This was also captured in the interview with the Project Developer at BMB ontwikkeling (Personal communication, 2021) who stated they are redeveloping a block, in which the municipality had explicitly requested in the kavelpaspoort for special spaces to be realized. The Co-founder of Made up North (Personal communication, 2021) revealed that she had found out that municipality was investigating opportunities to realize these industrial workspaces in NDSM-Werf West, however she pointed out that municipality did not consult or involve herself nor Made up North in any capacity. It is evident that she perceives this situation as a **missed opportunity** as they could have provided their expertise especially regarding space requirements. In addition to the **limited collaboration efforts** with the municipality that are available, she stated that Made up North along with other organization groups, have to be **proactive** in reaching out the municipality as the opposite rarely occurs.

In the interview with the Land Development Project Leader of NDSM (Personal communication, 2021), he discussed the efforts that are being made to mitigate the amount of displacement of existing businesses from occurring the transformation process in NDSM-Werf:

"Well, it is a priority to maintain these companies, also for the employment in these kinds of businesses. We don't want to chase all these companies out of the city, because that's what usually happens, and that's what we've seen happening, they go to Zaandam or to other parts in the area of Amsterdam, and they all leave the city because they can't afford to pay the rent anymore. And that's, that's quite difficult for the city to have influence on because, well, in this case of NDSM, you see that first thing before the new buildings out there, you have to tear down the old buildings. So

where do users go? And will they come back after the new development is realized? And that's a bit hard for the city to control. So, we try to make the conditions for them to return, but we cannot really make them do that." – Land Development Project Leader of NDSM (Personal communication, 2021)

The Real Estate Developer at COD Development Pioneers (Personal communication, 2021) had a similar concern for the existing businesses regarding the transitional period of time as construction is occurring in which they have to temporary re-locate, and the difficulty to convince them to return. The Managing Director of ORAM (Personal communication, 2021) describes the relocation process, even if on a temporary basis, as being a **traumatic experience** for companies especially those that have been established in a location for a long period of time; comparable to a **heart transplant**.

In regard to regulations that have been imposed in NDSM-Werf especially -Werf West, the Land Development Project Leader of NDSM (Personal communication, 2021) stated that even though the 15% minimum of non-residential functions on the plinth covers a range of uses, the limit of HORECA and offices in NDSM-Werf has been reached, therefore, technically, this leaves room for light industry spaces to be realized. This seems to be a very indirect and unintentional approach to ensuring that spaces for light industrial activities will be available and retained. When asked if the municipality has implemented any enforcement or monitoring measures to ensure that spaces meant for light industry activities are actually realized and not used for other functions, the Land Development Project Leader of NDSM (Personal communication, 2021) presented two ways that this can be achieved:

"Well, we have two instruments, one is the Bestemmingsplan. So that's a public law. So, if they use a space as office space, where the Bestemmingsplan says, it has to be light industry. Then, when [it's] not according to the Bestemmingsplan so that's one way to enforce it. The other is a contract, so that's private law, where we say we have a contract here where it says light industry. And we have agreed upon, financial conditions, which has light industry. And if we see that you're using it as office, then you're breaking your contract." – Land Development Project Leader of NDSM, personal communication, 2021

These instruments represent the means that are available to the municipality to retain and support the integration of light industry activities, however, the fact they are actually being utilized for those purposes are not conclusive. Either Bestemmingsplans (NDSM-Werf West of NDSM-Werf Oost) currently do not explicitly impose the land use designation of light industry to any blocks, but instead can be found in the list of permitted land use activities in the Gemeengd (mixed) land use designation. In regard to the latter instrument, which goes hand-in-hand with the kavelpaspoort, the developers involved in the redevelopment of blocks that have been recently designated for phase 3 (as captured in the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), have slightly different experiences with what the municipality has asked of them to realize, depending on the block at hand. According to the Real Estate Developer at Lingotto Development (Personal communication, 2021), there are no explicit indications in the kavelpaspoort for their respective block nor in conversation with the municipality that they desire for light industry workspaces to be realized.

One particular interview participant, the Owner of the Brand Activation Company (Personal communication, 2021), who is also leaseholder of one of the blocks described above, provided relevant insight on the relevant municipal departments involved in the transformation of NDSM-Werf, who he is working directly with. He describes the Head Designer and the Land Development Project Leader of NDSM as having different roles, positions and agendas when it comes to NDSM-Werf and elluded that they are not always aligned.

When asked about the municipality's approach in ensuring that existing light industry business are accommodated during and after the transformation, a mixed reception was received.
In regard to potential opportunities that the municipality is considering, revealed that the Ruimte en Economic cluster have recent launched several research initiatives including the following, as described below:

"[…] We are investigating that now with Hamerkwartier as well. [If it] would […] be possible to let developers build a building, for example, with light industrial space and then immediately […] sell it to [an exploitatiemaatschappij], a company that specializes in renting out and [utilizing] these spaces. [With] a mixed portfolio, they can charge the right prices" – Spatial Economic Consultant at Gemeente Amsterdam, personal communication, 2021

On top of this, the Real Estate Developer at COD Development Pioneers (Personal communication, 2021), had strong opinions on how the municipality should approach the integration of (existing) light industry businesses as part of the transformation of NDSM-Werf scale-wise:

"I think they can survive. But yeah, […] they shouldn't try to solve it in a building or in one block. They should make like a scheme where they say okay the light industrial can stay there [...] – Real Estate Development at COD Development Pioneers (Personal communication, 2021)

This is the kind of development approach that Made up North supports according to its Co-Founder (Personal communication, 2021), which is reflected in the *NDSM Maakstad* proposal (Made up North, 2020) through clustering as described before. She believes that mixing in clusters is a more logical strategy, where vertical mixing can be realized without needing to mix to the max, density wise. It is revealed that she is aware that there are financial implications of this particular design (Co-Founder of Made up North, personal communication, 2021).

Many remarks were made during the interviews concerning the **approach taken and vision for NDSM-Werf**, specifically the lack of priority shown for non-residential functions including the desires and requirements of light industry activities like makers.

"The needs for houses is so big so that [the realization of industrial/manufacturing spaces is] a secondary request I think." – Owner of Brand Activati9on Company/Leaseholder, personal communication, 2021

"Well, they [the makers] all want to be able to just open the doors; that was very simple. [...] [Also] strong location to the waterfront because they feel that transfport over lands will get more difficult, although it will electrify, make it more sustainable. The city also wants to get pressure off the road. So, they [the makers] prefer the water location also as a backup scenario in the future to be fully equipped from and off the water, just like in the old days actually. They have no problem if that will be the case. They [will have more problems if they're tucked into a housing area where they have the fear that in a couple of years, the mobility strategy of the city will change and there are no large cars allowed, even if they are electrical in the area because then you have a permit, but you have like a useless place." – Co-founder of Made up North, personal communication, 2021

In addition, the **lack of integration between departments** especially between Urban Planning and the Economic Departments was emphasized. This was brought up by the experts especially, which were Expert #2 (Personal communication, 2021) and Expert #1 (Personal communication, 2021), who both perceived that municipal departments work in a very isolated manner from each other, in which they are unaware of the work of their colleagues in other departments, leading to challenges in the field especially when plans and policies are being implemented.
Expert #1 (Personal communication, 2021) also criticized the municipality for not having an accurate depiction of what a maker does and therefore what they actually need and desire to properly operate in an urban environment like NDSM-Werf.

From this analysis, it is apparent that there is a clear distinction between the positions and opinions of the representatives of the municipality versus other stakeholders in regards to the municipality's priorities and efforts pertaining to the retention and support of (light industry) businesses in the trasnformation of NDSM-Werf. The municipal representatives who were interviewed seem to consider their existing planning and policy tools and capacities as appropriate/sufficient for the purposes of light industry integration in the new urban live-work district If NDSM-Werf, while those outside of the municipality are more critical.

C. Safeguarding industrial space & maintaining affordability

The final topic captures the different perspectives and input concerning the **availability of sufficient workspace for light industry functions in mixed-use districts** like NDSM-Werf as well ensuring affordability to not only utilize the workspaces, but also realizing them in terms of an **attractive business case**. Efforts and mechanisms that are being implemented or are potential solutions are touched upon by a range of interview participants. The Spatial Economic Consultant at Gemeente Amsterdam (Personal communication, 2021) for instance is inspired by other cities who have a more regulatory and systematic approach in how they enforce their policies surrounding the proper utilization of workspaces.

"We could actually enforce some more, enforce the right use, that's not really in the DNA of Amsterdam, because enforcement is used for something else and it's a very modest way. But if for example, […] San Francisco does that, they really have those policy in place, and people go in check. Like, is there really a laundry or weaver in here? Is it not an architecture company with all due respect? That could be something" – Spatial Economic Consultant for Gemeente Amsterdam, personal communication, 2021

When interviewing the Land Development Project Leader of NDSM (Personal communication, 2021), he claimed that in the **ground lease contracts** (erfpacht), if certain spaces were to be designated for light industry activities, there would a lower ground rent, which would allow the leaseholder/developer to find tenants that can afford a comparable rent price. However, the Co-Founder of Made up North (Personal communication, 2021) believes the contrary, as she stated in her interview that proposed developments with multiple uses seem to have a higher total ground rent price by default than monofunctional development projects. It is evident that to her, this is a **deterrent** for those who want to realize mixed-use development that includes industrial workspaces.

Figure 59: Ateliers (workshops) in NDSM-Werf Oost [Own photograph]

One relevant subsidy-based initiative that came up on multiple occasions is the **Broedplaats**. Not only can this program benefit the small-scale, upcoming businesses that its targeted, but also parties like developers who are implementing this subsidy program as part of their projects. In the interview with the Managing Director of ORAM (Personal communication, 2021), he described the Broedplaats initiative that is offered by the municipality of Amsterdam:

"Broedplaats is basically something like some warm spot where you harvest the eggs and basically say, well, you're going to go in a Broedplaats. You have two years to determine if you are ready for the market and you have to leave because other people will come to the Broedplaats. The Broedplaats - basically, you can have anything there. It's free space group. So, you're basically trying to hatch an egg there; you have an idea. You're not on the economic stresses by paying too much [...] but if your egg doesn't hatch within two years, you have to make way for somebody else" – Managing Director of ORAM, personal communication, 2021

The Head Designer of NDSM (Personal communication, 2021), added that the subsidy program is aimed for businesses that cannot afford expensive workspaces. When asked if the broedplaats initiative has been implemented in NDSM-Werf, the Land Development Project Leader of NDSM (Personal communication, 2021) revealed that it is offered as a possibility in -Werf Oost to existing artists and small craftsman (as shown in Figure 59). He also revealed that more recently in -Werf West, a matching ground lease price is offered in situations when a developer chooses to implement the Broedplaats program in their development. The representative of Fiction Factory (Personal communication, 2021) claimed that a broedplaats was initially targeted for artists but has evolved to also include entrepreneurs in the creative production industry. However, it is evident from his interview that he considers **safeguarding industrial spaces** as being more of a viable strategy

than through subsidization like the broedplaats situation. The Bike Maker (Personal communication, 2021) interviewed was also not as supportive of the broedplaats program as he revealed that it has limitations that lead to the lack of inclusivity for entrepreneurs, which could be significant improved. From the perspective of an External Expert, Expert #2 (Personal communication, 2021) considered the broedplaats as a subsidy mechanism for specifically starts-ups, while she strongly believes that more attention and support needs to be allocated to scale-ups especially. When real estate developers that are active in NDSM-Werf West were asked about applying a broedplaats program in their development projects, a mixed reaction was received. The Real Estate Developer at COD Development Pioneers (Personal communication, 2021) was hesitant about considering to implement this kind of subsidy program at the current stage of their redevelopment progress, while the Real Estate Developer at Lingotto Development (Personal communication, 2021) revealed that they are planning to implement a broedplaaats-inspired program to accommodate creative businesses and light office who cannot afford high rents. On the other hand, the Managing Director of ORAM (Personal communication, 2021) was not convinced that subsidies is the answer to retaining certain businesses if t**hey do not desire to locate their operations in that area in the first place**.

When interviewing the Co-Founder of Made up North (Personal communication, 2021), it was apparent that she has been researching different ways light industry businesses including creative makers can maintain their operations in an urban environment like NDSM-Werf. She had mentioned that certain cities outside of the Netherlands have been experimenting with capping rents on housing, which she stated could be applicable for work functions like the making industry and even architectural firms who are not able to pay high rents. It was revealed that she believes that this can be implemented through the **ground lease (erfpacht) system**.

When asked about the feasibility of **cross-subsidies** in NDSM-Werf, the Co-Founder of Made up North (Personal communication, 2021) was very receptive, which came up in the literature as a promising means to support the realization of lower-valued functions like light industry.

"Well, it's good [that] you mentioned [cross-subsidies] because we suggested that actually. We said, what if we say […] we use other turnover in the building to lower the rents for the makers [to put it] very simply. Or that we say these workspaces are not being used, after six o'clock in the evening so we can sort of double use [and] we rent out certain spaces so that we maximize the value per square meter so we minimize the rent. […] now in the legislation, in the Erfpacht, it's not possible they told me, because then they would have to make it mixed-use, and then you get the highest erfpacht […]" – Co-founder of Made up North, personal communication, 2021

Based on the anecdote above, the municipality seems to be hesitant in considering alternative options in which spaces for non-residential functions like light industry can actually be realized.

When it comes to the **business case to realize light industry workspaces**, many arguments were made especially by those in the private sector. For instance, the Owner of the Brand Activation Company/leaseholder of an A-block being redeveloped (Personal communication, 2021) strongly believed that a developer would be more interested in realizing more stable functions that are in demand like housing as there is a better sense of security when it comes to occupancy. In the most recent experience of the Project Developer at BMB ontwikkeling (Personal communication, 2021), she revealed that in order to justify the business case for realizing special spaces for (light) industry functions in NDSM-Werf West, two main considerations were undertaken, which were the following: who the **target audience** would be and if there would be **a market for these spaces**. In addition, the Real Estate Developer at COD Development Pioneers (Personal communication, 2021) expressed concerns regarding addition costs that emerge from requiring to make architectural/design adjustments to meet the requirements of industrial spaces.

To sum up, by analyzing the input gathered from the interviews conducted with the selected interview participants, valuable and greater insight on the positions of key stakeholders in relation to the three overarching topics was gained. In the next sub-chapter, the interests of the identified stakeholders are captured and examined accordingly.

5.3 Stakeholder Interests

In addition to the positions of key stakeholders captured in the previous sub-chapter, their **interests** as it relates to the possible integration of light industry in mixed-use developments in transformation sites.

This is done by applying differing stakeholder mapping tools that are the following: the **Penta-Helix Stakeholder Map**, the **Power-Interest Matrix** and the **Power-Interest-Attitude Matrix**. The methodology behind each stakeholder mapping tool is described in their respective section. The outcomes of applying these stakeholder mapping exercises were significantly influenced by a combination of input gathered from interviews and desktop research.

5.3.1 Penta-helix Stakeholder Mapping

A **penta-helix stakeholder map** is the first tool applied. It is a diagram that comprises of five pie-sized segments: Knowledge, Community, Capital, Business and Public Services. Each section is then divided into quadrants based on physical scale of interest: micro, meso and macro. In each sub-quadrant, the relevant stakeholder types are identified and captured. The purpose of this tool is to determine which stakeholders according to this diagram are present in the case site of NDSM-Werf as it related to the research topic. As shown in Figure 60, the sub-quadrants highlighted in **orange** represent the stakeholder types that are identified in the context of NDSM-Werf, in which the names of the respective stakeholders are labelled accordingly using red arrows.

The majority of the key stakeholders captured in Sub-chapter 5.2 have been identified in the diagram below, with the exception of residents as that particular stakeholder group did not fit under any of the quadrants based on the descriptions provided. As a result, it is placed outside of the Community segment. It is apparent that overall, the key stakeholders of NDSM-Werf that were identified do not cover all the quadrants laid out in the Penta-Helix diagram (as shaded in **orange**). However, it is notable that at the **micro scale**, the majority of the quadrants are captured. In addition, the entire pie-shaped section of **Public Services** is represented, however, it is important to note that

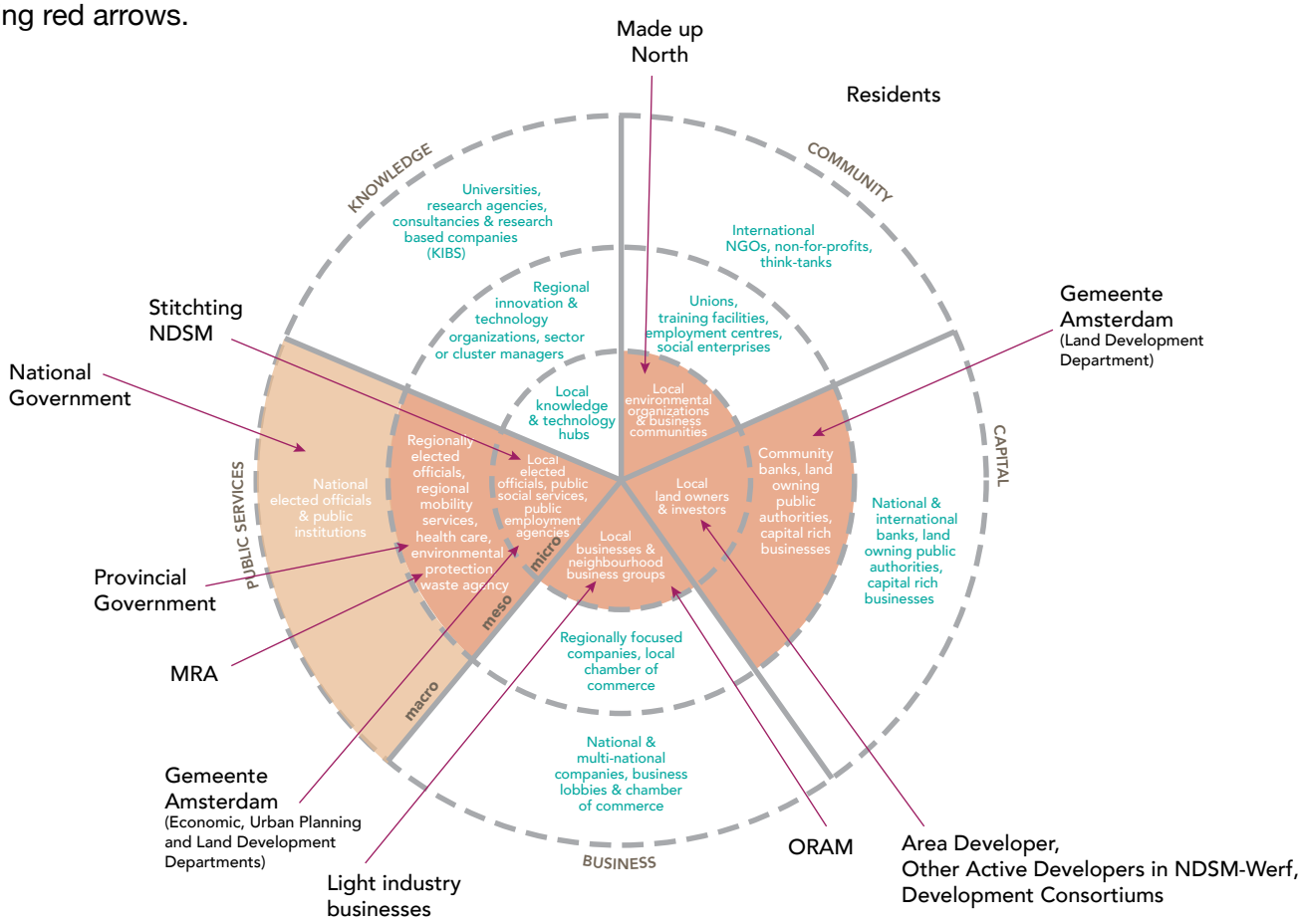

Figure 60: Penta-helix Stakeholder Map of the key stakeholders in NDSM-Werf (Adapted from Hausleitner & Hill, 2020).

at the meso and macro scales, the interests of the provincial and national government stakeholders in NDSM-Werf are slightly less significant than that of the municipality, hence why a **lighter orange** is applied. This particular observation demonstrates that presence and efforts of stakeholders are being concentrated, especially at the meso scale.
According to Hausleitner & Hill (2020), having gaps when using this diagram could be interpreted as a lack of stakeholders present at the table, however, it should not be dismissed as a shortcoming. Instead, it should be viewed as an **opportunity** to bring on additional stakeholders with valuable knowledge and skillsets. One particular sector that is not currently being significantly under-represented in NDSM-Werf based on empirical research is the **Knowledge segment**. This could represent an opportunity to bring in stakeholders from any or all scales of that segment, which would enhance the dynamic within the stakeholders and the areas itself.

It is important to add that the stakeholders in NDSM-Werf like Made up North, ORAM and light industry businesses in NDSM-Werf, may be captured under the **Community and Business segments** of the diagram in Figure 61, however, it has been determined that their involvement and engagement are limited. This is demonstrated through the application of the following stakeholder mapping tools.

5.3.2 Power-Interest Matrix

For this exercise, the interests of key stakeholders as they relate to the level of **power** they possess are captured and gauged accordingly.

To properly capture the **narratives** of the key stakeholders, it is important to determine the **levels of interests and power** as they relate to each other, specifically surrounding the topic of integrating light industry in mixed-use development of transformation areas specifically NDSM-Werf. Two diagrams were developed, in which the first (Figure 61) demonstrates the **expected situation**, while the second matrix diagram on the next page (Figure 62) encapsulates the **expected situation overlaid with the actual situation** NDSM-Werf as they relate to the stakeholders' levels of power and interest based on input derived from interviews. The **expected situation** is based off **assumptions** made on those stakeholders in relation to this topic, therefore, the likely expections one would expect or hope for. The **actual situation** is based on the researcher's **interpretations** of the input received in the interviews, which represents current relations in regard to power & interest dynamics of the stakeholders.

It is important to note that the four quadrants that make of the Power-Interest matrix represents the following: **Keep Satisfied** (low power, high interest), **Key Stakeholders** (high power, high interest), **Keep Informed** (high power, low interest) and **Minimum Effort** (low power and high interest).

Figure 61: Power-Interest Matrix - Expected Situation

When examining the second matrix in which both expected and actual situations are overlaid with each other, there is an evident **mismatch and significant discrepancies** in terms of the identified stakeholders' positions as it relates to power and interest based on the context of NDSM-Werf. In the actual situation, the majority of the stakeholders were allocated to different quadrants than in the expected situation. For instance, the assumption was made that the existing and future light industry businesses would be identified as stakeholders who would at least be kept satisfied. However, based on conversations with municipal representatives who are directedly involved in the transformation of NDSM-Werf, it was apparent that these businesses are more so kept informed, whereas more effort is being made to keep existing and future residents satisfied. This was a similar situation for the developers as it was expected that they would play a larger role in integrating light industry in mixed-use developments, but in reality, they do not have as high interests as expected. It was determined that this is likely influenced by the **lack of incentive and planning procedures** established by public bodies for developers to realize these workspaces as part of mixed-use developments. It was also revealed through the other interviews that stakeholders who would be considered as **allies/advocates for light industry** (i.e Made up North) are **not being used at their full capacity** especially by the municipality. From these revelations, it is determined necessary that these stakeholder placements are adjusted in terms of interest and power or change relations. This could be done by addressing the dynamics and relations between certain stakeholders.

Figure 62: Power-Interest Matrix - Expected vs Actual Situations (Overlaid)

5.3.3 Power-Interest-Attitude Matrix

In addition to capturing the power and interests of each key stakeholder, the **attitudes** of these keyholders are included and examined in this section resulting in the 3D visualization of a Power-Interest-Attitude matrix as shown in Figure 63. In Figure xx, different combinations of power (low/high), interest (low/high) and attitude (positive/negative) are presented per role listed that a stakeholder could represent. For instance, the role of a Savior is a stakeholder with the following characteristics: high power, high interest and positive attitude in particular situation/context and as a result, their position would be that of an Active Backer with an insignificant capacity. In Figure 64, these roles are allocated accordingly to the stakeholders found most appropriate. These outcomes were mostly based on the researcher's interpretations of what the research participants revealed during their interviews.

As presented in 65, certain stakeholders were assigned more than one role, as it was found that they can represent either depending on the situation at hand in relation to the integration of light industry in mixed-use developments of transformation areas.

When conducting this particular analysis, several

observations were made. It was determined that there are specific key stakeholders that need to be managed accordingly based on their Power-Interest-Attitude designation they were assigned. For instance, all the stakeholders under the **Private realm** (development consortiums, BMB ontwikkeling and other developers/leaseholders) can be viewed as playing the roles of either a **trip wire** or an **acquaintance**, in which the latter role designation is preferred in order for light industry spaces to be realized in mixed-use developments. Made up North & ORAM are both identified as **friends**, which indicates that they are active backers, but rather insignificant. Their power is low especially when dealing with public bodies as their concerns are considered, but rarely addressed according to the interviews conducted. Existing/future residents were identified as **time bombs**, therefore are considered as passive blockers with influential means as they have the power to **prevent** the proper integration of light industry in mixed use developments especially on a long term basis. It was recognized that close attention needs to be paid to especially this stakeholder group as it was revealed through the interviews that they typically have the upper hand (legally) in comparison to businesses/work functions especially in terms of complaints to nuisances. As a result, light industry businesses require more power or at least have access to powerful advocates in the eyes of the municipality.

By introducing an addition variable to the original Power-Interest matrix, a different perspective of the stakeholders in terms of their power, interests and attitude is gained. It is apparent that certain stakeholders play a more influential role than others, either as Backers (Passive or Influential) or Blockers (Passive or Influential). In the case of NDSM-Werf, these roles make a significant impact on the likelihood of light industry to be integrated in new mixed-use developments in transformation areas.

By carrying out these stakeholder mapping exercises, better clarity is achieved regarding the interests and associated means of key stakeholders as it relates to the integration of light industry as part of the transformation of NDSM-Werf into a live-work (mixed-use) district. It is apparent that the stakeholder dimension plays a significant role in the feasiblity of this integration being possible. Before diving into the Spaital dimension of this study, the spatial claims of certain key stakeholders are identified and ellaborated on.

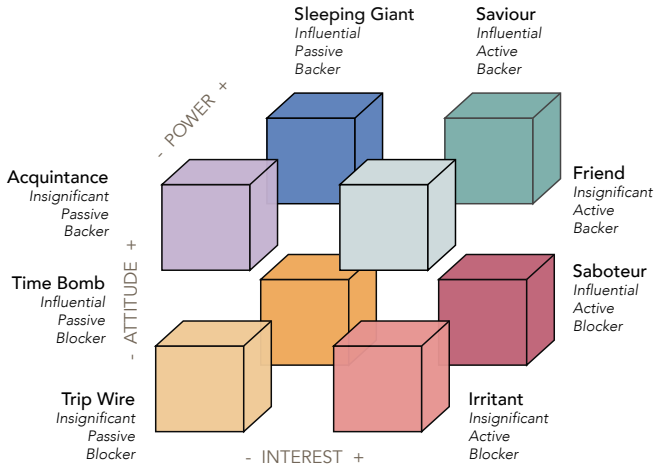

Figure 63: Power-Interest-Attitude 3D Matrix

	POWER	INTEREST	ATTITUDE	POSITION
SAVIOR	+	+	+	Active Backer - *Insignificant*
FRIEND	–	+	+	Active Backer - *Insignificant*
SABOTEUR	+	+	–	Active Backer - *Influential*
ACQUINTANCE	–	–	+	Passive Backer - *Influential*
SLEEPING GIANT	+	–	+	Passive Backer - *Influential*
IRRITANT	–	+	–	Active Blocker - *Insignificant*
TRIP WIRE	–	–	–	Passive Blocker - *Insignificant*
TIME BOMB	+	–	–	Passive Blocker - *Influential*

Figure 64: Power-Interest-Attitude Matrix Guide

National Government	**SLEEPING GIANT**
Provincial Government	**SLEEPING GIANT**
MRA	**FRIEND**
Economic Affairs, Gemeente Amsterdam	**SAVIOUR**
Real Estate Affairs, Gemeente Amsterdam	**SABOTEUR**
Urban Planning, Gemeente Amsterdam	**SABOTEUR**
Development Consortiums	**TRIP WIRE or ACQUINTANCE**
BMB Ontwikkeling & VolkesWessels	**TRIP WIRE or ACQUINTANCE**
Other developers/leaseholders	**TRIP WIRE or ACQUINTANCE**
Made Up North (Foundation)	**FRIEND**
ORAM (Business Assocation)	**FRIEND**
Housing Associations	**TRIP WIRE or IRRITANT**
Existing/future light industry businesses	**FRIEND**
Existing/future residents	**TIME BOMB**

Figure 65: Identification of Stakeholder Roles based on Power-Interest-Attitude Matrix

5.4 Spatial Claims

In this sub-chapter of Chapter 5, the objective is to capture the spatial claims of key stakeholders in the context of NDSM-Werf. The term **spatial claim** in this case implies the interests of a particular stakeholder in a spatial sense typically for a practical purpose. The spatial claim(s) are not bounded or dictated by regulations or expectations. The main purpose of identifying existing spatial claims is to determine how the interests of the certain stakeholders take form spatially and whether there are alligned with each other or if there are discrepencies in the form of overlap that may impact the possible integration of light industry (through mixed-use) in this particular site.

For this exercise, multiple maps were created, in which each map captures the spatial claims of a specific stakeholder or stakeholders in a designated colour and/or pattern per stakeholder (Figures 66 - 72). In these diagrams, a base map is used (via Cadmapper to represent the existing conditions of the case study site. Please note that the red boundary line indicates the transformation project scope that the municipality has imposed on NDSM-Werf. These spatial claims were captured based on input extracted from interviews with certain research participants. They include the following: Municipal representatives of different departments at Gemeente Amsterdam (Spatial Economic Consultant, the Head Designer of NDSM-Werf and the Land Development Project Leader); Real estate and project developers from active development firms/leaseholders in NDSM-Werf; the Co-founder of Made up North; and light industry businesses that are either currently residing in NDSM-Werf or have desires to.

The first two diagrams (Figure 66 and 67) capture the different **spatial claims of Gemeente Amsterdam**. The areas highlighted in a green hatched pattern in Figure 66 represent the spatial claims of specifically the **Urban Planning department** and their public space considerations. Here, the spaces in between buildings as well as public spaces are indicated accordingly. In Figure 67, The **Land Development department** is represented by the **dark blue hatched pattern**, in which their spatial scope covers the development plots throughout NDSM-Werf. When overlaying both of these spatial claims in relation to each other in Figure 68, some overlapping is captured. From the interviews, it was determined that both departments are involved in preparing the kavelpaspoorts per block, in which the urban planning department provides the rules in relation to urban design, while land development dictates the financial land matters. These two departments are expected to work hand in hand as they represent the municipality in regards to the transformation of NDSM-Werf into an urban live-work district. It was also determined that these two departments have different agendas, which has found to result in conflicting situations in terms of intentions and expectations of the transformation per block/ area (according to the interviews especially with

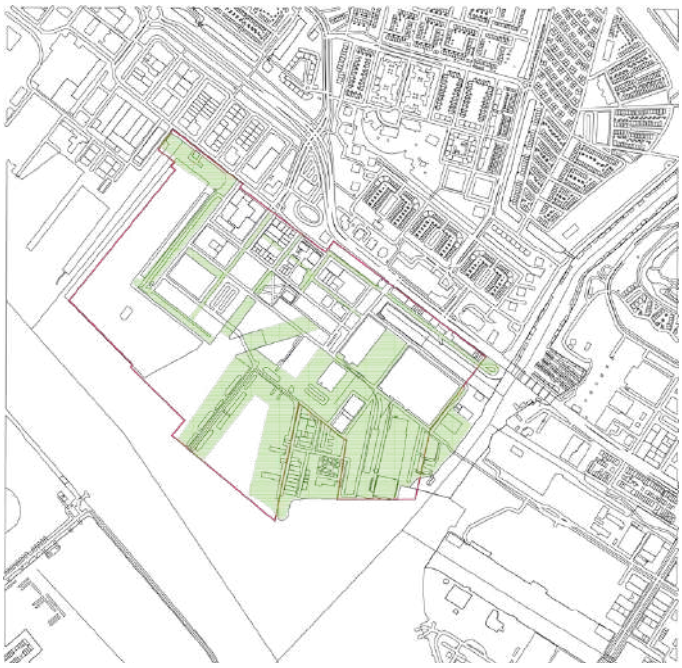

Figure 66: Spatial Claims - Gemeente Amsterdam | Urban Planning & Public Space

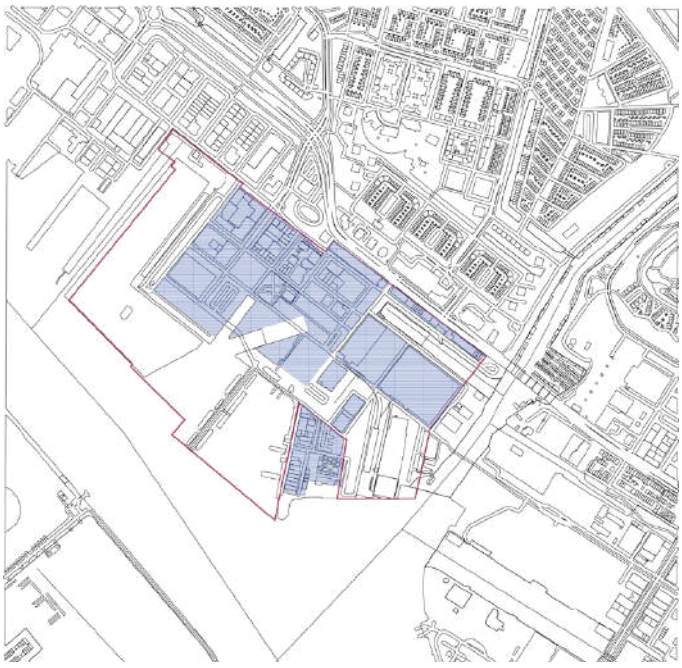

Figure 67: Spatial Claims- Gemeente Amsterdam | Land Development Department

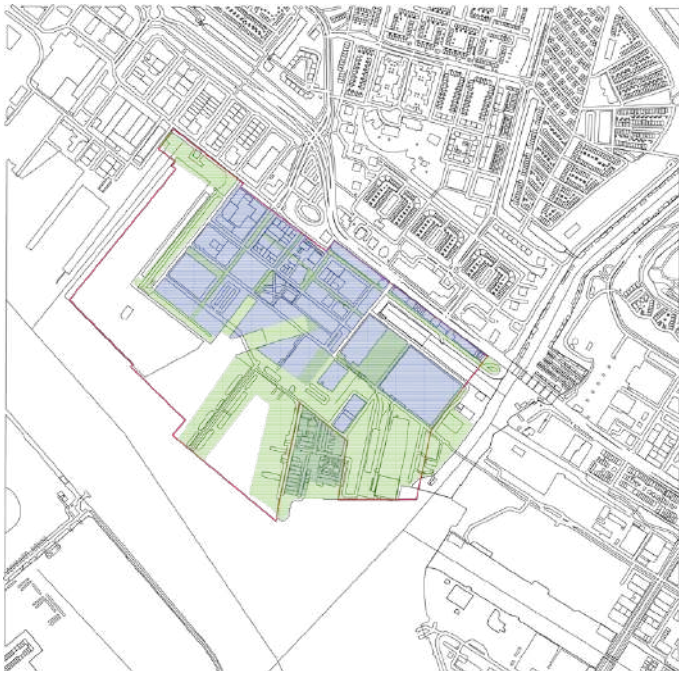

Figure 68: Spatial Claims - Gemeente Amsterdam | Urban Planning & Public Space overlaid with Land Development Department

Figure 69: Spatial Claims - Light Industry businesses (makers)

developers). It is apparent that an integrated approach and proper coordination is necessary to mitigated conflicts especially when their spatial claims overlap.

In Figure 69, the **spatial claims of light industry businesses** such as makers are captured in a **red hatched pattern**. As shown in the diagram, three separate areas were identifed. The highlighted area off of the IJ river was captured as it was revealed in the interview with the Co-Founder of Made up North (2021) that locations accessible to waterways are desirable to especially makers. In addition, some businesses in which would be considered as light industry are still operating here (on a temporary basis). In NDSM-Werf West, **blocks A4-7'** were also highlighted as it was determined that the remaining light industry businesses are concentrated in these particular blocks and are under threat of redevelopment. The last area captured in Figure 69 is along the Klaprozenweg transportation corridor to the North of the case study site as it is highly accessible to major transportation infrastructure and not ideal for housing, therefore would be considered as an ideal location to establish light industry businesses.

Figure 70 captures the **spatial claims of developers** in which a distinction is made between those of the area developer (BMB ontwikkeling) and other real estate developers active within the site area. As stated earlier in the report, NDSM-Werf West is divided into A- and B-blocks, in which the B-blocks are designated to the area developer through a right

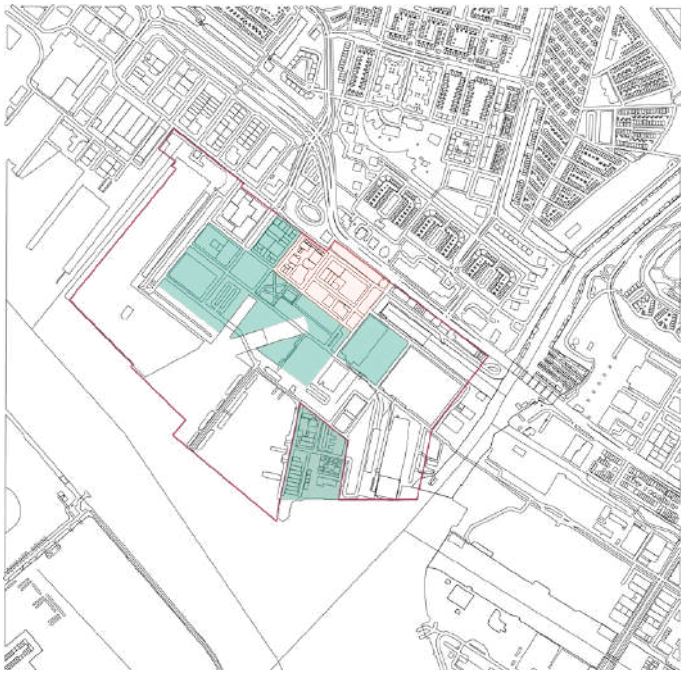

Figure 70: Spatial Claims - Developers (Area developer vs other)

of first refusal agreement with the municipality. Even though both A and B blocks are under ground lease (erfpacht), the A-blocks are comprised of existing real estate with leaseholders and/or tenants, in which many of theme are real estate developers with the intention of eventuallty redeveloping their respective plots. To reflect this, the remaining A-blocks are indicated in an **orange dashed pattern** with the exception of one block while is indicated in a **light green blue** colour as it being redevelopment by the area developer, BMB ontwikkeling. The B-blocks (built and upcoming) in NDSM-Werf West and certain plots in NDSM-Werf Oost are also

Figure 71: Spatial Claims - Made up North

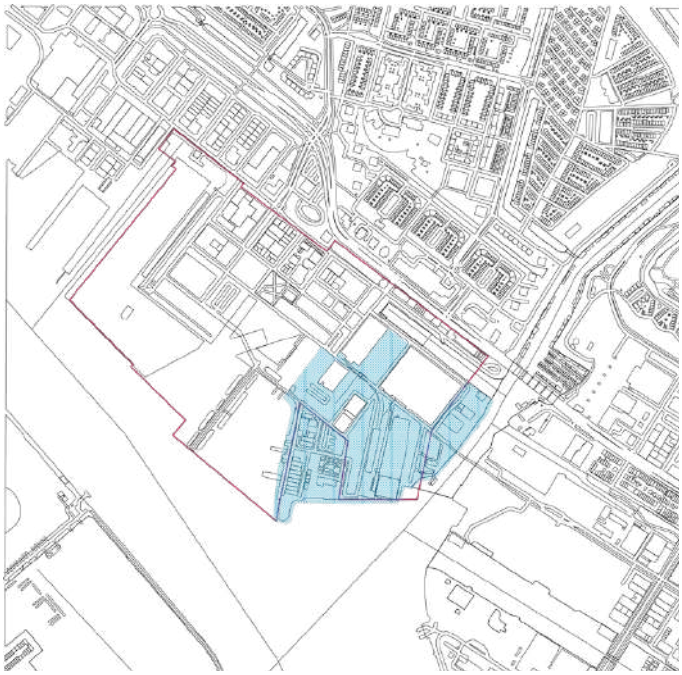

Figure 72: Spatial Claims - NDSM-Stichting

captured in the light green blue. It is important to note that for the temporary plots in NDSM-Werf Oost, both developers own certain plots according to the interview with the Co-Founder of Made up North (Personal communication, 2021).

The **spatial claims of Made up North** are presented in Figure 71, in which two distinct areas are highlighted in **purple**: Blocks A4-A7' in NDSM-Werf Oost and the temporary plots in NDSM-Werf Oost.

In Figure 72, the **spatial claims of NDSM-Werf Stichting**, a foundation responsible for the cultural and event programming of the outdoor space in NDSM-Werf Oost (as identified in sub-chapter 6.1) are captured. As shown in this diagram, the outdoor spaces in NDSM-Werf Oost as well as the temporary plots are highlighted in a **light blue grid-like pattern**, as it was determined that they are managing certain temporary initiatives as well as their own offices situated there.

From here, all the spatial claims presented in the previous diagrams are overlaid with each other in Figure 73. When doing so, it is apparent that there is some degree of overlapping of spatial claims throughout the case study site area. In situations where this is determined to occur, this does not automatically imply that conflicts in interests are present. However, in the case of the temporary plots in NDSM-Werf Oost, it is evident that there are conflicting interests and intentions in that particular location. It was determined that Made up North desires to realize a Creative Production District here,

Figure 73: Spatial Claims of all Stakeholders - Overlaid

however, the municipality of Amsterdam, especally the Urban Planning department, has expressed their plans to allocate greenery and sport facilities in NDSM-Werf Oost in that particular location primarily to accomodate the new residential development in NDSM-Werf West. On top of this, it was determined during certain interviews that developers who are current leaseholders of some of the temporary plots have the desire to realize revenue generating development projects in these plots. Based on the most relevant interviews conducted, this situation has the potential of being a major conflict as it has been determined to already be causing tensions

with existing businesses including light industry. It is apparent that this emerging conflict in synergetic claims stems from **a lack of early coordination and engagement with key stakeholders** especially on the part of the municipality.

By capturing the spatial claims of selected stakeholders, this provides a good transition to the **spatial component** of the emperical portion of this research that will be presented in the following chapter.

NDSM-Werf West: Industrial buildings with newer development behind, July 2021[Own photograph]

Chapter 6 | **Spatial Dimension**

Up to this point of the Empirical Research portion of the study, the planning/policy aspects and the perspectives of key stakeholders regarding the integration of light industry in the transformation of NDSM-Werf into an urban live-work district were examined extensively. **This chapter** aims to contribute a spatial dimension to the research study by conducting a spatial analysis that involves the following: (1) Identifying **patterns present** in site conditions and plans, (2) Identifying **additional opportunities**, and (3) Assessing the likelihood that these opportunities will be implemented by capturing possible **challenges** that may arise. This is achieved by applying the pattern language from the *Foundries of the Future* book (Hill, 2020) produced by the Cities of Making project team, which is referred to as **CoM patterns**. The purpose of this spatial assessment is to contribute to addressing the research questions posed for the research study, specifically Sub-Research Questions 1 & 2 and ultimately determine if considerations or actions have been implemented or proposed to accommodate light industry through integration.

A main aspect of the Spatial Dimension is the application of the **CoM patterns**. It provides a range of patterns at different scales relevant to the subject of light industry integration. As captured in the Literature Review, twelve Manifesto Points were developed, which are tied to the formation of a total of fifty patterns at five scales: transcalar (R), city/neighbourhood (C), neighbourhood/block (N), block/building (B) and program (P). Five of the twelve manifesto points were selected to narrow the scope of the spatial analysis to a manageable task, which are as follows: **Protection, Good Neighbours, Support, Shared Facilities, and Networks**. These specific manifesto points were chosen because they were determined to cover the most relevant areas related to light industry integration in mixed-use developments of transformation areas. They emerged prevalently in the previous dimensions that make up the study's empirical research portion. It is important to add that the first three (Protection, Good Neighbours, and Support) were used as references when developing the main themes and questions for the semi-structured interviews. The other manifesto points, such as Circularity and Finance, were not prominent action areas in the Empirical research, therefore, were not selected for this spatial portion of the empirical analysis.

The initial strategy was to narrow the scope down to patterns linked to more than one of the five chosen manifesto points. In Table 12, all the patterns are presented by scale. The patterns that do not qualify based on the criterion above are indicated in light grey. As shown in the table, the remaining patterns are linked to more than one of the five selected manifesto points and represent the group of patterns that were used as a reference guide when examining the spatial-related elements identified. However, when analyzing the spatial-related elements, certain patterns that were not initially included were identified as being relevant to the analysis. For instance, the easy loading & unloading (B.6) that is not linked to any of the five manifesto points according to the CoM patterns was identified as an opportunity for Proposal 3 under the Municipality's Plans NDSM-Werf West.

The spatial analysis itself is divided into four main parts. The first three are based off the (most updated) spatial division of the NDSM-Werf site, as captured in the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), which are: NDSM-Werf West, NDSM-Werf Oost, and Klaprozenweg Noord. In addition, a higher level analysis was conducted in which site-wide interventions with spatial implications are also examined. The following spatial-related elements are elaborated on where applicable:

- Existing site conditions via site visits
- Municipality's plans specifically from the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterda, 2020a)
- Plan from other parties specifically by Made up North in NDSM Maakstad (2020)

In terms of justification for the selected spatial-related elements, they are as follow:
For site conditions specifically, the researcher recognized that they possess existing patterns and/or identified opportunities during a site visit conducted in July 2021. The *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a) was the primary plan document analyzed spatially. The proposed plans most relevant to the research study were extracted and examined accordingly using the CoM patterns. The *NDSM Maakstad* publication (Made up North, 2020) was prepared by a third party and is not a formalized plan nor is it approved by the municipality. However, it was determined that analyzing its spatial merit in relation to Made up North's efforts to accommodate the creative and production makers in the city in a Creative-Maker District proposal specifically in NDSM-Werf Oost is relevant for the research.

The identification of relevant/appropriate patterns, especially those determined as opportunities, were influenced either by literature or input by research

participants from specific interviews, which is demonstrated under their respective tables at the end of each spatial analysis (Table 13, Table 14, Table 15, Table 16).

For all four parts of the spatial analysis, the main aspects of the first two chapters (the Planning & Policy dimension and the Stakeholder dimension) are incorporated and merged accordingly. In comparison to these chapters, the Spatial Dimension is more output-oriented and contributed to the recommendations provided within Chapter 7.

Table 12: Matrix - Relevant patterns of 5 selected manifesto points

Scale	Code	Pattern	Relevant Manifesto Areas				
			Protection	Good Neighbours	Support	Shared Facilities	Networks
R = Transcalar	R.1	Making Making Visible			x		x
	R.2	Transparent Making			x	x	x
	R.3	Curator	x	x	x	x	x
	R.4	Availability of Diverse Jobs					x
	R.5	Fair Work Conditions					x
	R.6	Sustainable Product Cycles					x
	R.7	Multi-scalar Circular Infrastructure			x		x
	R.8	Moving Things Efficiently					x
	R.9	Assured Security of Space	x				x
	R.10	Place-based financial levers			x		x
	R.11	Incentives for research & development			x	x	
	R.12	Material Database			x		x
C = City/Neighbourhood	C.1	Microzoning	x	x		x	
	C.2	Negotiated Qualities & environmental criteria		x	x		
	C.3	Balance between public & private land	x				x
	C.4	Diverse tenure models	x	x			x
	C.5	Varying unit sizes	x	x			x
	C.6	Strategic access to multomodal mobility					x
	C.7	Links to transport infrastructure					x
	C.8	Access material recovery facilities					x
	C.9	Concentrating messy making along infrastructure	x	x			
	C.10	Transition Zones	x	x	x		
N = Neighbourhood/Block	N.1	Taking advantage of place conditions	x	x			
	N.2	Re-use of material & energy flows			x		x
	N.3	Mixing complementary making & related services	x	x	x	x	
	N.4	Clustering similar making	x	x	x	x	
	N.5	Local collection points of segregated waste					
	N.6	Centralised logistics zone					
	N.7	Local design & prototyping			x	x	
	N.8	Quality urban environment in making areas		x	x		
	N.9	Making touches making	x	x	x		
	N.10	Making along high streets	x				
	N.11	Back of the high street	x				
B = Block//Building	B.1	Making around courtyards	x	x		x	
	B.2	Yards for logistics		x			
	B.3	Public face		x	x		
	B.4	Facilitating horizontal organization					
	B.5	Enabling vertical making	x	x			
	B.6	Easy loading & unloading					
	B.7	Access to technical networks & services					x
	B.8	Space for storage					
	B.9	Large openings		x			
P = Programme	P.1	Productive rooftops		x			
	P.2	Shared making space & technology			x	x	
	P.3	Flexible spaces for making			x	x	
	P.4	Meanwhile spaces & transitional uses	x	x	x	x	
	P.5	The work home	x	x			
	P.6	Re-use & repair centres					
	P.7	Spaces for development & education		x		x	
	P.8	Community hub in making locations		x	x	x	

Spatial Analysis
NDSM-Werf West

View of **NDSM**-*Werf West | July 2021*

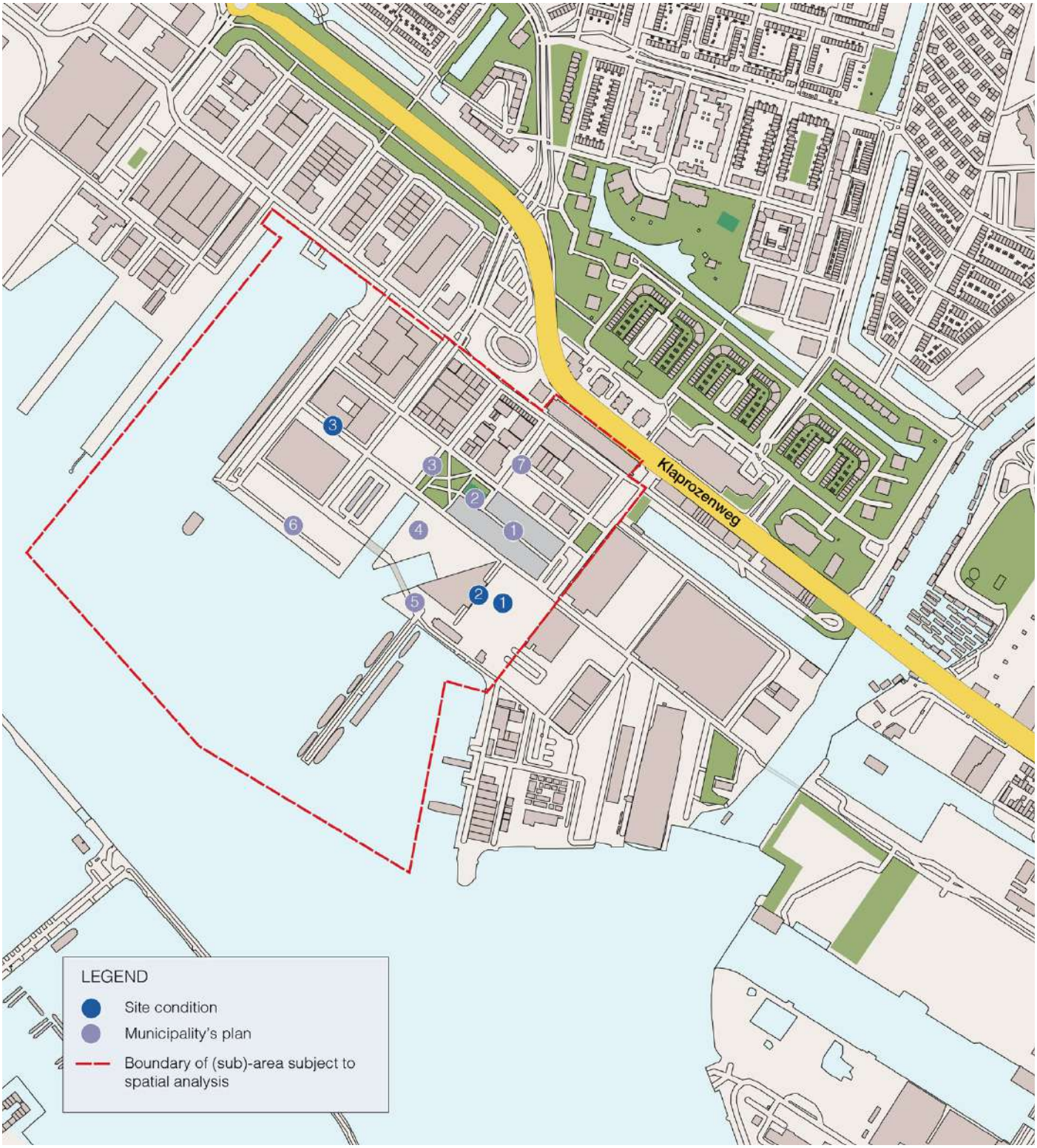

Figure 75: NDSM-Werf West with spatial-related elements identified (site conditions and municipality's plans)

6.1 Spatial Analysis: NDSM-Werf West

As captured in the selected case study site's description, NDSM-Werf West comprises of A-blocks and B-blocks, all under ground-lease arrangements (erfpachts). On the previous page, a map of the case study site adapted from Cadmapper (Figure 75) is presented, in which NDSM-Werf West is indicated with a red dashed boundary line. The numbers identified on the diagram represent the spatial-related elements examined as part of this spatial analysis. Site conditions captured and analyzed are indicated with numbers in dark blue circles, while numbers in purple represent municipal plans. The analysis outcome for each is provided as follows:

NDSM-Werf West: Site Conditions

Site Condition 1: Courtyard of Pontkade Development

DESCRIPTION

When scoping down to the block level of Block B9 specifically, it was determined that Phases 1 and 2 of the Pontkade development were completed, which included a courtyard that is accessible to the public. During a site visit in July 2021, the researcher found that the courtyard (as indicated in Figure 77) had many industrial elements incorporated into the landscaping and outdoor space design, such as furniture, installations, and materials. It is apparent that the intention was to embody and celebrate the industrial/shipping past of NDSM as part of the newer developments through landscaping and urban design. The functions that surround the courtyard include spaces for non-residential functions on the plinths (i.e., HoReCa, groceries) and housing on the upper floors.

IDENTIFIED PATTERNS

For this site condition, it is apparent that there were efforts to incorporate industrial elements into the landscaping and overall design of the outdoor space (as shown in Figure 76). However, based on the CoM patterns, no particular pattern was identified as there were no efforts were recognized to accommodate light industry functions in the development specifically.

Figure 76: Industrial elements in courtyard of Pontkade [Own photograph]

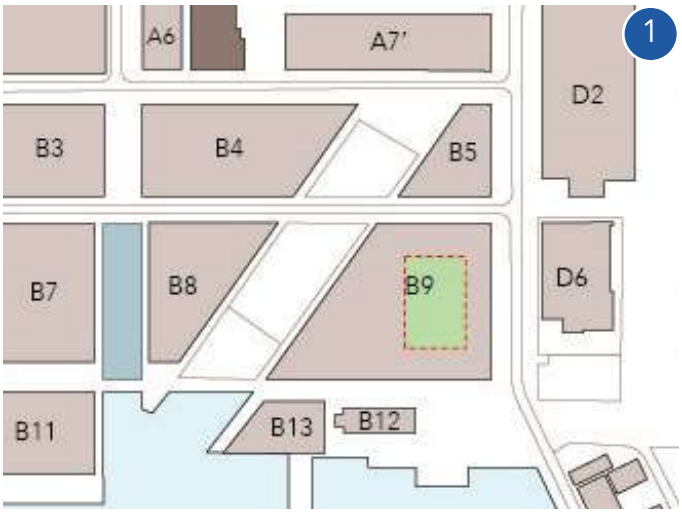

Figure 77: Digitized illustration of the location of the courtyard for Pontkade development Phases 1/2.

IDENTIFIED OPPORTUNITIES

B.1 – Making around courtyards

With this particular pattern, light industry functions like manufacturing activities would be concentrated inside a building block with direct access to its internal courtyard. This allows activities that typically omit noise and dust and have logistic capacities, to operate in a mixed-use environment without causing conflicts with other nearby functions.

IDENTIFIED CHALLENGES TO REALIZE OPPORTUNITIES

Since the Pontkade development (phases 1 & 2) are complete and primarily occupied, there is a low likelihood that at this stage, the opportunity identified above (Making around courtyards) would be realized. It would require significant effort, investment, and support to convert the occupied spaces that surround the courtyard into those adequate for light industry functions and allocate sufficient and adequate outdoor space with the courtyard for manufacturing activities. This particular pattern

would need to be incorporated at the design stage of a development project to be feasible. Therefore, this pattern would be considered more of a missed opportunity.

Site Condition 2: Promotion of NDSM Makers during Construction

DESCRIPTION

At the time of the site visit in July 2021, Phase 3 of the Pontkade development in Block B9 was under construction. Along the throughway street that divides the construction site and the remaining Pontkade development (Phases 1 & 2), temporary promotional materials were installed on the fencing (as captured spatially in Figure 78 in orange and the red dashed boundary). The intention of this is to market and promote local businesses, mostly makers working in NDSM-Werf. It was also determined that this initiative might be an extension of a public display in IJ-Hallen, which is elaborated on in the spatial analysis section for NDSM-Werf Oost.

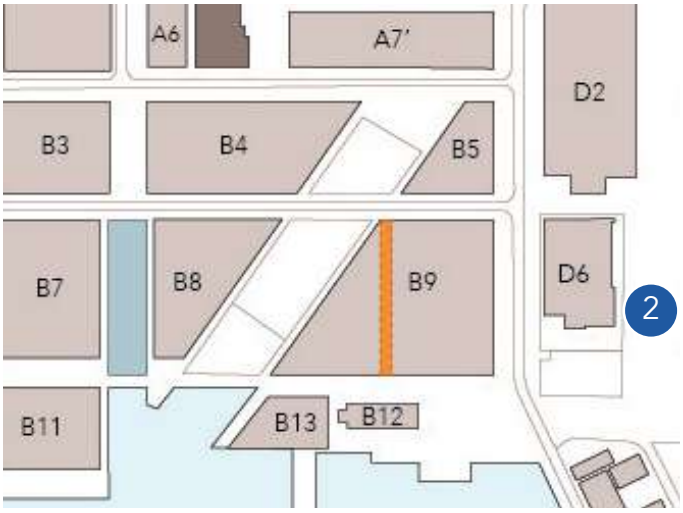

Figure 78: Digitized illustration of the location where promotonal materials are installed along the Pontkade phase 3 construction.

IDENTIFIED PATTERNS

R.1 – Making Making Visible

It is apparent that by using an ongoing construction site to promote the businesses of local makers (that would mostly be considered light industry), the objective was to strategically increase public awareness regarding the presence of makers in NDSM-Werf (Figure 79). In addition, the intention to ensure that the general public recognizes and values the role people in light industry play in cities like Amsterdam is captured accordingly.

Figure 79: Promotional materials of makers in NDSM on construction fencing in NDSM-Werf West [Own photograph]

IDENTIFIED OPPORTUNITIES

R.1 – Making Making Visible

This particular pattern was already identified as an existing pattern for this site condition; however, it was recognized that there is an opportunity to expand this initiative to other construction sites as the transformation process proceeds forward.

IDENTIFIED CHALLENGES TO REALIZE OPPORTUNITIES

Cooperation and permission from the real estate developers of the blocks under development/ construction would most likely be required to implement this initiative in upcoming construction sites.

Site Condition 3: Realized Development Blocks

DESCRIPTION

In NDSM-Werf West, certain development blocks were built early in the transformation process of NDSM-Werf (as indicated in Figure 81 in orange and the red dashed boundary). As captured in the site-scale analysis of this sub-area, the original plan for these blocks was to realize a flatted factory building typology throughout the site in which was flexible enough to accommodate a range of business activities and functions when needed. The final product as it is in the present day is densely built development blocks of primarily housing with plinths that house non-residential functions, with the exception of Block B6, in which the flatted factory building typology was realized, and the HEMA headquarters occupies (as shown in Figure 80).

Figure 81: Digitized illustration of the location of the realized development blocks in NDSM-Werf West

IDENTIFIED PATTERNS

There were no particular patterns identified for this proposal by the municipality. It is most likely because the original intention to accommodate local (light industry-related) businesses in these blocks was not realized.

IDENTIFIED OPPORTUNITIES

B.1 – Making around courtyards

As mentioned, the original plan for the development blocks in NDSM-Werf West was to design sufficient usable space around a central courtyard in each block for a range of businesses to occupy and operate. Although the plan was never realized, except for the HEMA building, where office spaces surround an inner courtyard, this pattern is still a viable option.

IDENTIFIED CHALLENGES TO REALIZE OPPORTUNITIES

Since these development blocks are already realized, it is most likely too late to incorporate this particular pattern (B.1 - Making around courtyards).

Figure 80: Realized development B-blocks in NDSM-Werf West [Own photograph]

NDSM-Werf West: Municipality's Plans

Municipality's Plan 1: Extending Helling 5 for public space purposes

DESCRIPTION

In the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), the municipality proposed to restore the shipping slope called the Helling 5 by extending it back to its original length between blocks B4 and B5, which is indicated spatially in Figure 83. The plan comprises of an incline plane, in which a 1-story building is to be realized under the slope. The municipality has proposed a public park on the surface of the sloped building (simiilar to Figure 84). In the plans, it was also stated that a special function is to be realized under the roof park (Gemeente Amsterdam, 2020a). The present situation of this plan is visualized in a 3D render in Figure 84 on the next page.

Figure 83: Digitized illustration of the proposed extension of Helling 5 (Adapted from Gemeente Amsterdam, 2020a).

IDENTIFIED PATTERNS

N.1 – Taking advantage of place conditions

The municipality has planned to re-purpose and enhance the original monumental Helling 5, especially its original length and sloping incline, and incorporate new functions within it. The patterns identified in the municipality's plans for the Helling 5 are captured in the 3D shown in Figure 85 on the next page.

B.3 – Public Face

In the *Actualisatie Investeringsbesluit NDSM-Werf 2020* document (Gemeente Amsterdam, 2020a), precedence images of glass facades on the plinths are used, which is an ideal way to gain exposure and improve transparency by showcasing the functions within the building. The document also stated that pedestrian routes are to traverse on both sides of the sloping structure, adjacent to the glass facades.

Figure 82: Reference image for sloped green roof building (retrieved from Gemeente Amsterdam, 2020a).

IDENTIFIED OPPORTUNITIES

N.8 – Quality urban environment in making areas

With plans to realize a roof park and a pedestrian network that will traverse along both sides of this sloping building, it is apparent that investments are being made in public space to accommodate the foot traffic and exposure in the area. As a result, this would be an attractive environment to realize light industry workspaces.

P.3 – Flexible spaces for making

In the *Actualisatie Investeringsbesluit NDSM-Werf 2020* document (Gemeente Amsterdam, 2020a), a special function is to be realized under the roof park. It would be ideal that it is used for a multi-purpose space for making and manufacturing purposes that can be adapted over time as needed.

P.7 – Spaces for development & education

This particular plan is in a central location to ideally establish a hub specifically for training and education for those interested to gain skills in light industry activities. The building would also be close to schools that are to be realized in nearby blocks (as described in Proposal 4).

These three identified opportunities are demonstrated in a 3D render provided in Figure 86.

Figure 84: Helling 5 Extension - 3D Render of Present Situation

Figure 85 Helling 5 Extension - 3D Render of Municipality's Plans with patterns captured

Figure 86: Helling 5 Extension - 3D Render of Identified Opportunities

Municipality's Plan 2: Adjusted plans for Block B3 & B4

DESCRIPTION

The development plans for Block B3 are to realized multiple functions, including housing, a communal parking garage with 510 parking spaces, and business spaces in the plinth. The adjustment that was captured in the Actualisatie Investeringsbesluit NDSM-Werf 2020 (Gemeente Amsterdam, 2020a) is that the building line for block B4 has been extended to line up with the building line of Block A5/6 above. The building footprint of Block B4 has also been reduced due to Helling 5 extension, as described in the previous proposal. This plan is spatially captured in Figure 87.

Figure 87: Digitized illustration of adjusted block footprint of Block B4 (Adapted from Gemeente Amsterdam, 2020a).

IDENTIFIED PATTERNS

N.7 – Local design & prototyping

For the plinth of Block B3, a reference image of a workspace for craft businesses and incubators is used to visualize the plinth (as shown in Figure 88). This indicates that there are plans or at least a desire to incorporate more advanced technology capabilities of light industry.

Figure 88: Reference image of workspace for craft businesses & incubators in plinth of Block B3 (Retrieved from Gemeente Amsterdam, 2020a).

IDENTIFIED OPPORTUNITIES

C.5 – Varying unit sizes

By realizing a range of unit sizes, this allows for more options for different light industry activities and the opportunity for them to scale up or down if needed.

R.10 – Place-based financial levers

Although this particular pattern is categorized as a broader scale pattern, it would be appropriate to implement for workspaces in the plinth of mixed-use buildings like in B-3. Certain light industry businesses would most likely not afford to operate in these spaces otherwise. Therefore, this would be a strategy to attract these types of business and achieve the desire to have craft businesses and incubators like the municipality alluded to in their precedence images in the Actualisatie Investeringsbesluit NDSM-Werf 2020 (Gemeente

Municipality's Plan 3: Revised plans for space between blocks B3 & B4

DESCRIPTION

The municipality had initially been designated the (outdoor) space between blocks B3 and B4 for greener purposes, but adjusted these plans in the Actualisatie Investeringsbesluit NDSM 2020 to a 'liveable space'. It would act as an extension of the NDSM canal with paved features, local trees, and children friendly features. The location of this plan is indicated with a red outline in Figure 89).

IDENTIFIED PATTERNS

There were no particular patterns identified for this proposal by the municipality. This could imply that the municipality only considered this space for public purposes and did not consider this outdoor space as being utilized by future functions of the adjacent blocks (B3 and B4).

IDENTIFIED OPPORTUNITIES

B.6 – Easy loading & unloading

According to the *Actualisatie Investeringsbesluit NDSM 2020* (Gemeente Amsterdam, 2020), the plan for Block B3 includes housing, a large public parking garage, and business workspaces in the plinth. When examining this plan, it was determined that the outdoor space between Blocks B3 and B4 can be an ideal location for unloading and loading purposes to accommodate either or both blocks. By having a separate access/zone for unloading and loading the business workspaces, potential conflicts with parking garage users could be minimized.

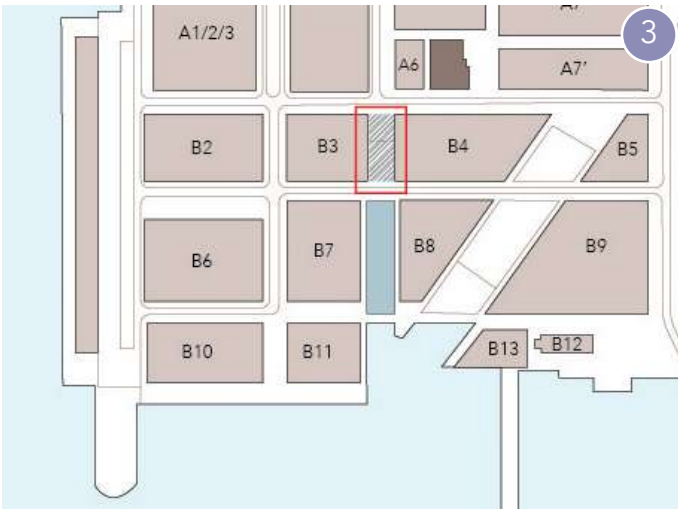

Figure 89: Digitized illustration of location of revised plan for space between Blocks B3 & B4 (Adapted from Gemeente Amsterdam, 2020a).

CHALLENGES IDENTIFIED TO REALIZE OPPORTUNITIES

The challenge to realize this opportunity is that the municipality has already planned to transform this space into a 'liveable space' where they have envisioned a play area for children and green/ natural features. Also, as presented in the following proposal, primary schools are to be realized in the area, which is most likely a prime reason for this adjusted proposal. Therefore, this 'liveable space' is a competing priority for the space.

Municipality's Plan 4: Plans to realize education facilities in NDSM-Werf West

4

DESCRIPTION

The municipality has planned to introduce two primary schools in NDSM-Werf West, specifically in two out of three of the following blocks: B4, B7, and B8 (as captured in Figure 90 in blue). They are to be built as part of Phase 2 of the transformation of NDSM-Werf West. However, it is unclear whether they will occupy the plinths of the blocks or more than one floor and if the schools will be mixed with housing or other non-residential functions.

Figure 90: Digitized illustration of proposed locations for two primary schools in NDSM-Werf West (Blocks B4, B7 and/or B8) (Adapted from Gemeente Amsterdam, 2020a).

IDENTIFIED PATTERNS

There were no particular patterns that were identified for the municipality's school proposal.

IDENTIFIED OPPORTUNITIES

P.7 – Spaces for development & education

A possible learning opportunity for children attending the schools is to expose them to light industry/ production activities and processes taking place in their neighbourhood and potentially involve them in workshops. However, it is recognized that it would be more advantageous if they were secondary schools instead of primary schools.

CHALLENGES IDENTIFIED TO REALIZE OPPORTUNITIES

It was recognized that since they will be primary schools, the children may be too young for this learning opportunity. The biggest challenge associated with this school proposal is that children are considered sensitive, and this could pose an issue when realizing certain light industry activities nearby.

Municipality's Plan 5: Revised plans for Block B13

DESCRIPTION

The municipality had originally planned to develop a 3-storey office building in Block B13 in NDSM-Werf Werf. Due to complications impacting development decisions relating to limited access at certain times of the day, this development plan was disregarded and replaced with plans to realize public space (location captured in red in Figure 91). The existing conditions near Block B13 are shown in Figure 92.

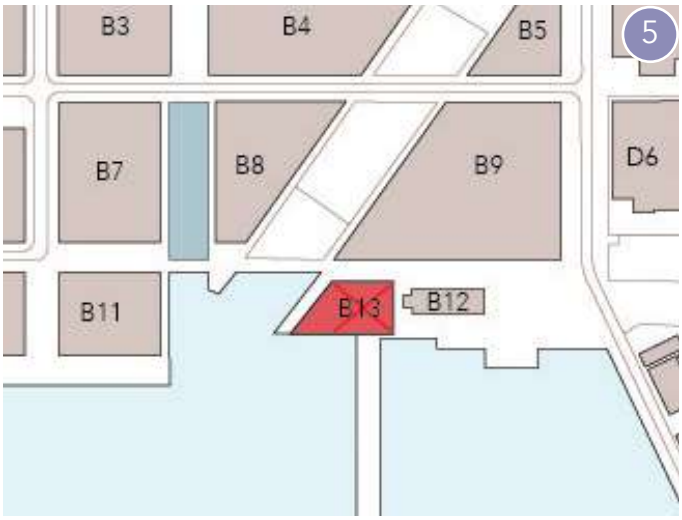

Figure 91: Digitized illustration of location of revised plans for Block B13 (deletion) (Adapted from Gemeente Amsterdam, 2020a).

IDENTIFIED PATTERNS

There were no particular patterns identified for this proposal by the municipality as it relates to light industry.

IDENTIFIED OPPORTUNITIES

C.7 – Links to Transport Infrastructure

As mentioned in the previous pattern, this location has good access to a waterway (logistics infrastructure), which would make it an ideal location to realize workspaces for light industry activities. In addition, there is water-related transportation nearby, which is accessible by the public/potential customers, especially when roadway connections may be limited/obstructed for that location at certain times of the day.

N.1 – Taking advantage of place conditions

This particular block is situated near the water's edge of the IJ, which is ideal for several reasons such as views, exposure, and access via water. It is apparent that these are the reasons why a public space was selected as the alternative option. However, these are also ideal characteristics for light industry businesses. As a result, realizing workspaces for light industry can be a successful development opportunity, especially since the plans for an office building were determined not feasible.

B.3 – Public Face

For this block, exposure to public and potential customers can be achieved by showcasing light industry activities in real-time either with a transparent façade or open-door policy.

P.3 – Flexible spaces for making

Instead of abandoning development plans for this block, an option is to realize a multi-purpose space for makers in light industry that can be adapted over time as needed.

R.10 – Place-based financial levers

Although this particular pattern is classified as a broader scale pattern, it would be appropriate to implement financial levers for light industry workspaces in a key location that would most likely be too expensive to afford otherwise.

CHALLENGES IDENTIFIED TO REALIZE OPPORTUNITIES

As captured in certain interviews, the municipality has intentions to realize more public space in NDSM-Werf, which would be a competing function/ priority to light industry workspaces, especially near the water. Typically, this would be a prime location for more higher-valued functions, but as stated in the plan description, there are building/developing issues to realize these. It was also recognized that rent for these business spaces would likely be too expensive for certain light industry businesses to afford. Finally, the limited access to this location via the roadway network during certain times of the day (peak periods) would most likely still be an issue.

Figure 92: Current development adjacent to the water [Own photograph]

Municipality's Plan 6: Werfkade public space

DESCRIPTION

The municipality plans to realize a public space by the water's edge that would extend past both development blocks of B10 and B11 (Figure 94). In the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), it is stated that the Werfkade would be accessible by only emergency vehicles, which was already captured in IB 2013 (Gemeente Amsterdam, 2013). This implies that delivery vehicles and trucks would not pass through or stop along the facades of blocks B10 and B11 that face the Werfkade. In addition, the relics in the water are to be preserved as part of this public space. Block B10 is currently undergoing land preparations for future development, as shown in Figure 93.

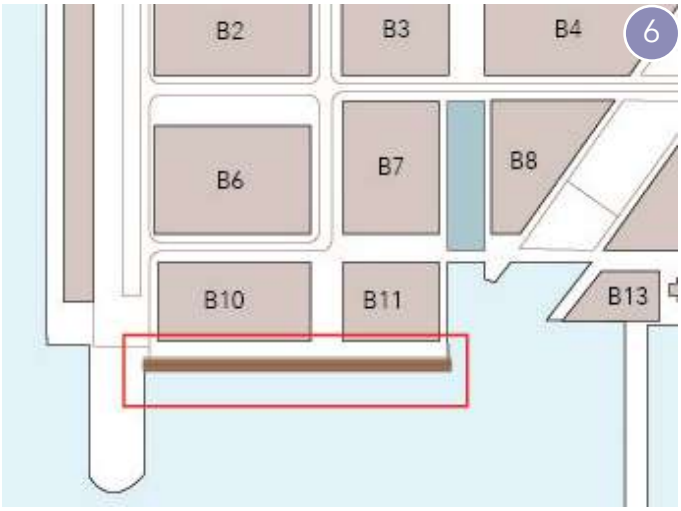

Figure 94: Digitized illustration of location of proposed Werfkade (Adapted from Gemeente Amsterdam, 2020a).

IDENTIFIED PATTERNS

N.1 – Taking advantage of place conditions

The municipality is taking advantage of the water's edge of the IJ to realize a new public space. It is an ideal location for several reasons such as views, exposure, and access via water. However, these are also ideal elements for light industry businesses to operate, which is not captured in the municipality's plans.

IDENTIFIED OPPORTUNITIES

B.3 – Public face

By having light industry businesses operating in the plinths of the buildings facing the proposed Werfkade public space and showcasing light industry (production) activities in real-time through a transparent façade or open-door policy, the business can gain significant public exposure and potential customers.

Figure 93: Block B10 under land preparation [Own photograph]

B.6 – Easy loading & unloading

In the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), no explicit details are provided regarding loading and unloading access for the development blocks facing the future Werfkade. These are critical elements, especially for businesses in light industry, and can be incorporated to the back sides of the plinths. In addition, loading and unloading movements would need to be programmed accordingly to mitigate conflicts with other blocks and functions like housing.

P.5 – The work home

The work home could be an interesting concept to incorporate in developing blocks B10 and/or B11. It would involve realizing light industry businesses in the plinths that would be directly accessible to the housing component above.

R.10 – Place-based financial levers

Although this particular pattern is classified as a Regional scale pattern, it would be appropriate to implement financial levers for the realization of light industry workspaces in a prime location that would most likely be too expensive to afford otherwise.

CHALLENGES IDENTIFIED TO REALIZE OPPORTUNITIES

It is expected that if light industry businesses considered locating in the plinths facing the Werfkade, there would be serious competition with higher valued non-residential functions which also would desire the visibility/foot traffic.

Municipality's Plan 7: Adjusted formation of Blocks A4 to A7'

DESCRIPTION

In the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), it is stated that the original plans for Blocks A4 to A7' have been adjusted as follows: the inner streets in between these blocks are to be narrower, a new throughway path is to cut through Block A4, and a new pedestrian domain is to be created, in which will be shared with the car where the pedestrian is the priority (as shaded in purple in Figure 95). The building lines of Blocks A7 and A7' are to shift to better align with Blocks B5 and B9. The Abramerij, an industrial hall shaded in brown in Figure 95, will remain an anchor for these blocks, in which a public square is to be realized adjacent to it. The proposed pedestrian domain network within the A4-A7' plots connects to the public space of Helling 5 and continues to the water's edge of the IJ. Urban design details for these blocks are elaborated on in the *Stedenbouwkundig kader NDSM blokken A4-A7* document (Gemeente Amsterdam, 2019), which was referred to in the analysis of this municipal plan.

IDENTIFIED PATTERNS

C.3 – Balance between public & private land

All the blocks are under ground lease (erfpacht), and consist of different businesses and leaseholders, as shown in Figure 96. However, the municipality owns specific properties in this set of A blocks as determined in the interviews. Present situation and municipality's plans are demonstrated in Figures 97 & 98 respectively.

IDENTIFIED OPPORTUNITIES

C.5 – Varying unit sizes

With different unit sizes, this can accommodate different types of businesses and have the opportunity to scale up or downsize if needed.

N.7 – Local design & prototyping

In the interviews with current leaseholders/ developers of these blocks, most of them prefer design-related and prototyping activities in the spaces of the plinths of their future developments.

N.9 – Making touches making

In this set of blocks, there is an opportunity to strategically realize light industry businesses in multiple plinths of adjacent plots/blocks, especially those with related activities, to achieve continuity and improve business relations/logistics.

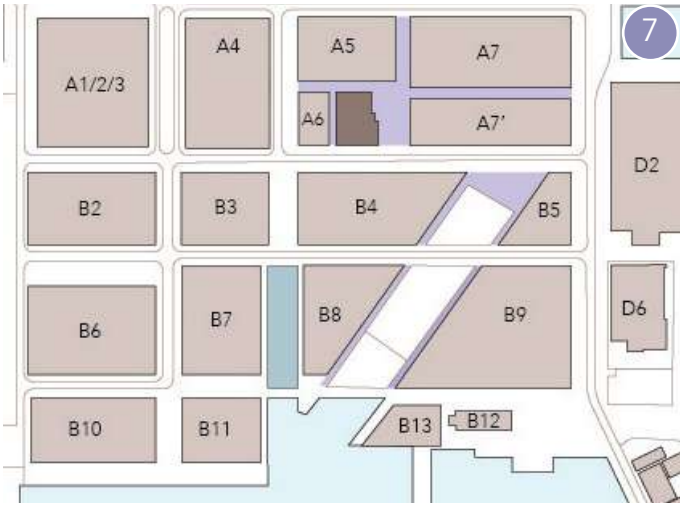

Figure 95: Digitized illustration of location of proposed pedestrian network throughout Blocks A4 - A7' with connection to the waterway (Adapted from Gemeente Amsterdam, 2020a).

B.3 – Public Face

To gain exposure and improve transparency by showcasing light industry (production) activities in real-time as the public and potential customers walk.

P.2 – Shared making space & technology

There is a possibility that this pattern can be accommodated in public amenities in the plinth i.e. the library that one of the real estate developers is considering in the plinths of their future development (extracted from interviews).

The opportunities are visally captured in a 3D render in Figure 99 on the next page.

CHALLENGES IDENTIFIED TO REALIZE OPPORTUNITIES

Pedestrian network of Blocks A4 to A7' will likely create potential challenges with unloading & loading (overall logistics) for light industry spaces in plinth if that is the case. However, vehicles are allowed but do not have as much power as pedestrians.

Figure 96: Existing art gallery hall in Block A7 [Own photograph]

Figure 97: Blocks A4-A7' Formation - 3D Render of Present Situation

Figure 98: Blocks A4-A7' Formation - 3D Render of Municipality's Plans and identified pattern

Figure 99: Blocks A4-A7' Formation - 3D Render of Identified Opportunities

To sum up the spatial analysis for NDSM-Werf West, the patterns identified when examining the site conditions and municipality's plans from the *Actualisatie Investervesluit NDSM 2020* document (Gemeente Amsterdam, 2020a) as they relate to this sub-area are presented in one combined matrix in Table 13. The patterns that were determined as opportunities were influenced either by literature or input from specific interviews conducted as part of the empirical research, which is also captured in the table below.

Table 13: Matrix - Identification of patterns (existing & opportunities) in NDSM-Werf West

Scale	Code	Pattern	Spatial Analysis: NDSM-Werf West					
			Site Conditions			Actualisatie Investerbesluit NDSM 2020		
			Identified (Existing) Patterns	Identified Opportunities	Opportunities derived from/influenced by	Identified (Existing) Patterns	Identified Opportunities	Opportunities derived from/influenced by
R = Transcalar	R.1	Making Making Visible	x	x	Literature: Hill, 2020	-	-	-
	R.2	Transparent Making	-	-		-	-	-
	R.3	Curator	-	-	-	-	-	-
	R.4	Availability of Diverse Jobs	-	-	-	-	-	-
	R.5	Fair Work Conditions	-	-	-	-	-	-
	R.6	Sustainable Product Cycles	-	-	-	-	-	-
	R.7	Multi-scalar Circular Infrastructure	-	-	-	-	-	-
	R.8	Moving Things Efficiently	-	-	-	-	-	-
	R.9	Assured Security of Space	-	-	-	-	-	-
	R.10	Place-based financial levers	-	-	-	-	x	Literature: Love, 2017; Rappaport, 2020
	R.11	Incentives for research & development	-	-	-	-	-	-
	R.12	Material Database	-	-	-	-	-	-
C = City/Neighbourhood	C.1	Microzoning	-	-	-	-	-	-
	C.2	Negotiated Qualities & environmental criteria	-	-	-	-	-	-
	C.3	Balance between public & private land	-	-	-	-	x	Literature: Ploeger & Bounjouh, 2019
	C.4	Diverse tenure models	-	-	-	-		
	C.5	Varying unit sizes	-	-	-	-	x	Interview: Expert #2 Literature: Lane, 2020
	C.6	Strategic access to multomodal mobility	-	-	-	-		
	C.7	Links to transport infrastructure	-	-	-	-	x	Interview: Co-founder of Made up North
	C.8	Access material recovery facilities	-	-	-	-	-	-
	C.9	Concentrating messy making along infrastructure	-	-	-	-	-	-
	C.10	Transition Zones	-	-	-	-	-	-
N = Neighbourhood/Block	N.1	Taking advantage of place conditions	-	-	-	x	x	Literature: Expert #1 & Co-founder of Made up North
	N.2	Re-use of material & energy flows	-	-	-	-	-	-
	N.3	Mixing complementary making & related services	-	-	-	-	-	-
	N.4	Clustering similar making	-	-	-	-	-	-
	N.5	Local collection points of segregated waste	-	-	-	-	-	-
	N.6	Centralised logistics zone	-	-	-	-	-	-
	N.7	Local design & prototyping	-	-	-	x	x	Interviews: Owner of CHASE/Leaseholder, Real Estate Developer at Lingotto Development, Real Estate Development at COD Development Pioneers, Direction of ORAM
	N.8	Quality urban environment in making areas	-	-	-	-	x	Interview: Co-founder of Made up North & Head Designer for NDSM
	N.9	Making touches making	-	-	-	-	x	Literature: Hill, 2020
	N.10	Making along high streets	-	-	-	-	-	-
	N.11	Back of the high street	-	-	-	-	-	-
B = Block/Building	B.1	Making around courtyards	-	x	Literature: Hill, 2020	-	-	-
	B.2	Yards for logistics	-	-	-	-	-	-
	B.3	Public face	-	-	-	x	x	Interviews: Bike Maker & Head Designer for NDSM
	B.4	Facilitating horizontal organization	-	-	-	-	-	-
	B.5	Enabling vertical making	-	-	-	-	-	-
	B.6	Easy loading & unloading	-	-	-	-	x	Interview: Representative of Fiction Factory
	B.7	Access to technical networks & services	-	-	-	-	-	-
	B.8	Space for storage	-	-	-	-	-	-
	B.9	Large openings	-	-	-	-	-	-
P = Programme	P.1	Productive rooftops	-	-	-	-	-	-
	P.2	Shared making space & technology	-	-	-	-	x	Interviews: Real Estate Developer at COD Development Pioneers & Bike Maker Literature: Lane, 2020
	P.3	Flexible spaces for making	-	-	-	-	x	Interview: Craftsman/Visual Artist & Activist
	P.4	Meanwhile spaces & transitional uses	-	-	-	-	-	-
	P.5	The work home	-	-	-	-	x	Literature: Hill, 2020
	P.6	Re-use & repair centres	-	-	-	-	-	-
	P.7	Spaces for development & education	-	-	-	-	x	Interview: Expert #1
	P.8	Community hub in making locations	-	-	-	-	-	-

Spatial Analysis
NDSM-Werf Oost

View of NDSM-Werf Oost, July 2021 [Own photograph]

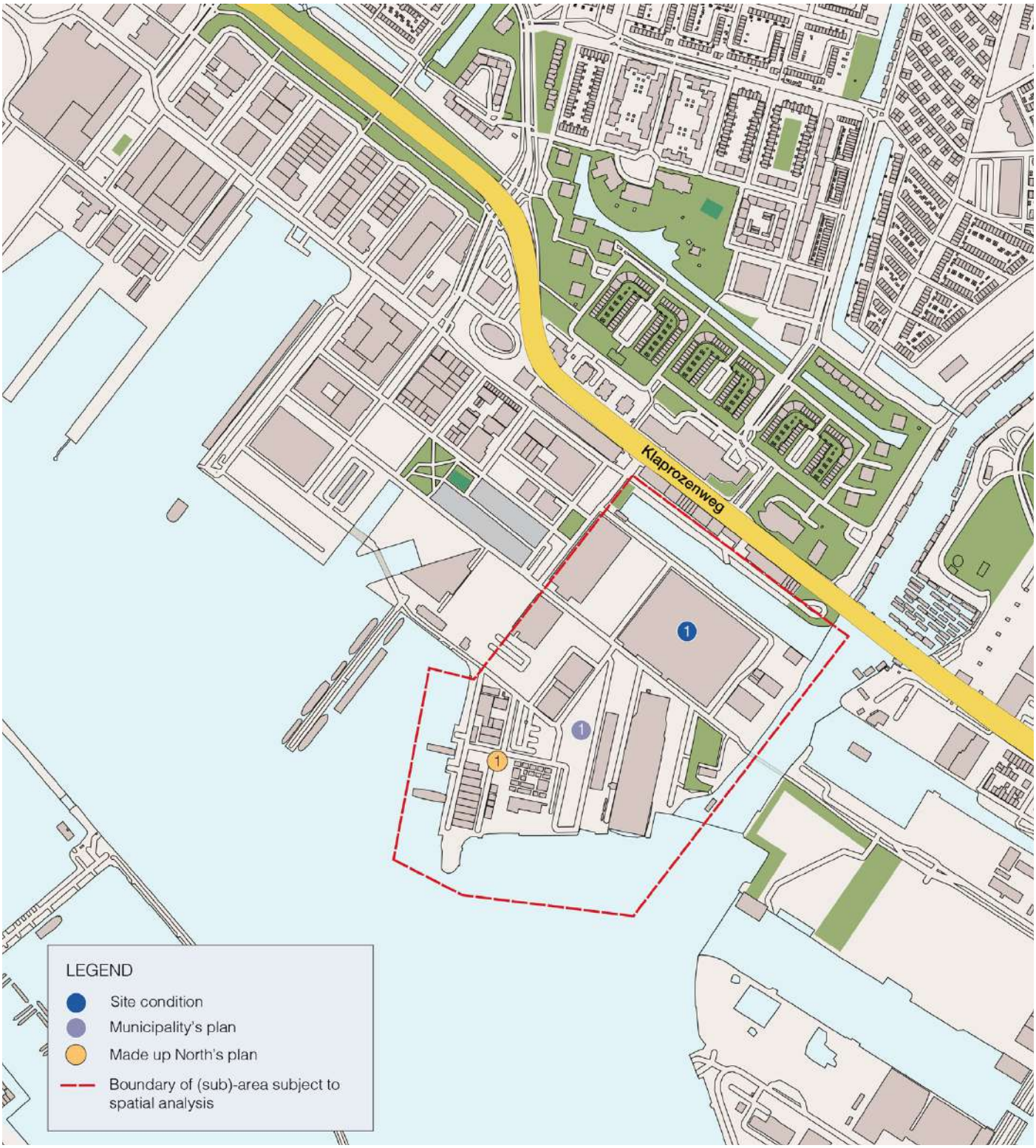

Figure 100: NDSM-Werf West with spatial-related elements identified (site conditions and municipality's plans)

6.2 Spatial Analysis: NDSM-Werf Oost

The second sub-area that is examined spatially is **NDSM-Werf Oost**. Unlike NDSM-Werf West, there are limited proposed plans for -Werf Oost in the *Actualisatie Investeringsbesluit NDSM Werf 2020* (Gemeented Amsterdam, 2020a) due to a development freeze placed on this sub-area, to be lifted in 2028 (as captured under the City-Scale Documentation Analysis). As a result, the *NDSM Maakstad* proposal prepared by Made up North (2020) was analyzed as it captures a proposed plan for a portion of NDSM-Werf Oost where temporary plots are situated.

In Figure 100 on the previous page, NDSM-Werf Oost is indicated with a red dashed boundary line on a map of NDSM-Werf, which was adapted from Cadmapper. One site condition was identified (dark blue circle), as well as one municipal plan proposal (orange circle) and a proposal by Made up North (yellow circle). The outcome of the spatial analysis for each is provided below:

NDSM-Werf Oost: Site Conditions

Site Condition 1: Public Display of Makers in IJ-Hallen

DESCRIPTION

When visiting the case site in July 2021, NDSM-Werf Oost was open and engaging as many local businesses were in operation and active. This was not the case during a previous site visit in January 2021 as COVID restrictions were still in place and many businesses were closed or not open to the public, including the IJ-Hallen (Block D3). At the most recent site visit, the IJ-Hallen (as indicated with a green grid pattern in Figure 103) was open for public viewing where there was an exhibition displaying the backgrounds and works of makers in NDSM (Figure 101). In addition, the ateliers/ workshops of these makers are also situated there (Figure 102).

Figure 101: Public exhibition of NDSM makers in IJ-Hallen [Own photograph]

Figure 102: Ateliers/workshops in IJ-Hallen [Own photograph]

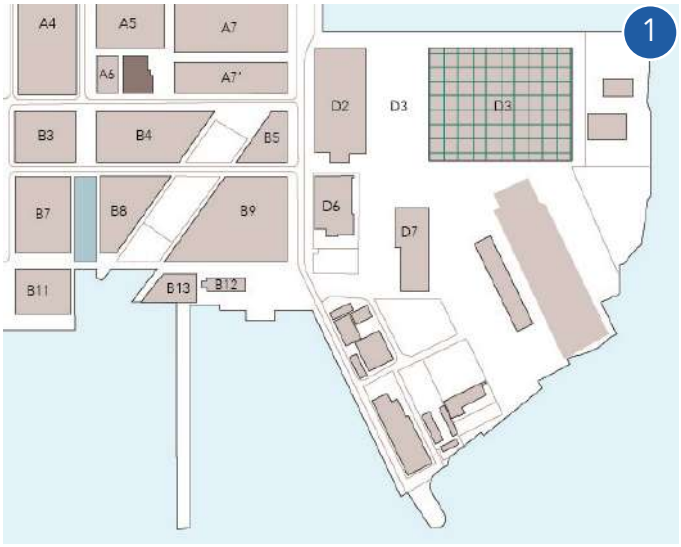

Figure 103: Digitized illustration of the location of the public display of makers in IJ Hallen

IDENTIFIED PATTERNS

R.1 – Making Making Visible

Similar to Site Condition 2 identified in NDSM-Werf West, it is apparent that efforts are being made to showcase the makers' businesses in NDSM and to ultimately expand the public's knowledge and awareness regarding light industry/maker-related activities in the area especially amid a transformation. This was not as apparent in the first site visit due to COVID regulations. Branding and promotion are essential to improving the visibility of light industry activities like those situated in NDSM.

IDENTIFIED OPPORTUNITIES

R.2 - Transparent Making

This particular pattern can go hand-in-hand with R.1 (Making Making Visible), which has been identified

as an existing pattern for this site condition. The next step is to improve transparency with key stakeholders such as the municipal departments, higher levels of public authority, NGO's and the general public, to improve these relations and address issues. By being more transparent, there is a higher likelihood that light industry in the urban context can be better understood, accepted, and supported, especially as part of area-wide transformation developments.

CHALLENGES IDENTIFIED TO REALIZE OPPORTUNITIES

There is a possibility that there will be challenges to improve relations with key stakeholders through transparency due to a lack of cooperation and understanding.

NDSM-Werf Oost: Municipality's Plans

Municipality's Plan 1: Public Space for Sports/Greenery Allocation

DESCRIPTION

In the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), the municipality proposed to realize outdoor green space in sports-related parks and play areas in NDSM-Werf Oost to ultimately accommodate the new residential uses being implemented in NDSM-Werf West (as captured in Figure 105). Due to the amount of dense development allocated to NDSM-Werf West, a minimum of 4,000 m^2 of this outdoor green space is to be realized in NDSM-Werf Oost, which is currently mostly hardscape shown in Figure 104 in yellow.

IDENTIFIED PATTERNS

There were no particular patterns identified for this proposal by the municipality related to light industry integration. This shows that considerations to light industry businesses, especially those currently established in the NDSM-Werf Oost are not being made, at least not directly or explicitly.

IDENTIFIED OPPORTUNITIES

R.3 – Curator

As captured in the documentation analysis at the Site Scale and echoed in the interviews, existing businesses including light industry expressed concerns regarding this sports/greenery proposal impacting their current operations. A curator role would be beneficial in aligning interests and communicating the needs and desires of local businesses to the municipality and vice versa.

CHALLENGES IDENTIFIED TO REALIZE OPPORTUNITIES

One major challenge that was captured during the interview with the Co-founder of Made up North

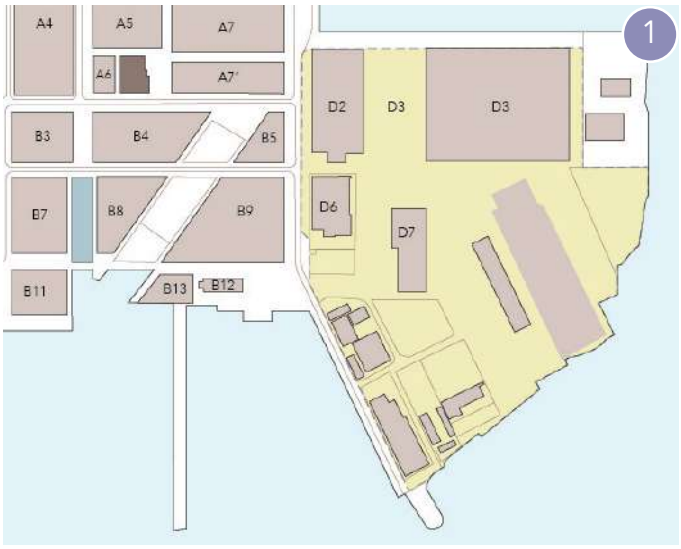

Figure 104: Digitized illustration of the location of the municipality's sports/green proposal as (Adapted from Gemeente Amsterdam, 2020a).

(Personal communication, 2021) is finding a non-bias party to take on the role of the curator without causing additional tension to the situation. Due to the conflict of interests already surrounding the municipality's sports/greenery proposal as captured in the previous two dimensions of the Empirical section, difficulties to effectively implement and execute the curator role are likely to arise. However, aligning these interests is a main responsibility of the curator.

Figure 105: Current site conditions in NDSM-Werf Oost [Own photograph]

NDSM-Werf Oost: Plans by Made up North

Plan by Made up North: NDSM Maakstad (Creative Maker District)

DESCRIPTION

As captured in Chapter 4 under the City-Scale Documentation Analysis, Made up North had prepared a development proposal called *NDSM Maakstad* (2020), which encapsulated their plans to realize a Creative-Maker District of approximately 50,000 m^2 of commercial space, as indicated in Figure 106 in orange. A 3D mockup of the proposed district is presented in Figure 110. Since this proposal was prepared with considerations of small and medium-sized businesses (light industry), several CoM patterns were identified and assessed accordingly. The location of this proposal currently houses a range of businesses, including light industry makers as shown in Figures 106, 108 and 109. It is also where the municipality has considered realizing their sports/greenery plan. The present situation for this location is presented in Figure 111.

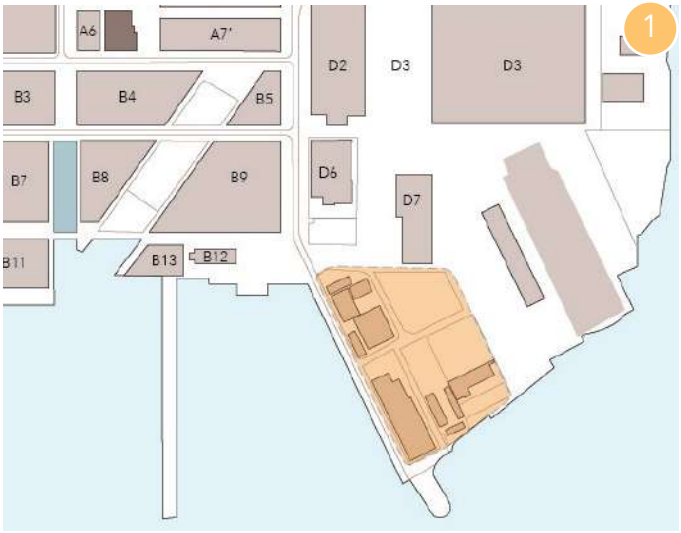

Figure 107: Digitized illustration of the location of Made up North's proposal for a Creative-Maker District in NDSM-Werf Oost (Adapted from Made up North, 2020).

Figure 108: Profile of existing businesses in NDSM-Werf Oost [Own photograph]

IDENTIFIED PATTERNS

C.7 – Links to Transport Infrastructure

In the *NDSM Maakstad* proposal (Made up North, 2020), it is explicitly stated that the location selected for the Creative-Maker District is ideal in terms of accessibility via road, water, and cycling infrastructure. Proper links to transport infrastructure are crucial for logistics purposes and to ensure that those working in the proposed district can conveniently commute to the site from other areas.

N.1 – Taking Advantage of place conditions

It is apparent from the location selected for this proposal that key place conditions for the Creative-Maker District were proximity to the water (the IJ), especially the port of Amsterdam, and good access to road and cycling infrastructure. These particular place conditions would most likely provide the access, exposure and views that Made up North aimed to have for their proposal. In addition, NDSM-Werf was a former shipyard; therefore it apparent that this was a factor in selecting this particular area in Amsterdam.

Figure 106: Existing businesses in NDSM-Werf Oost [Own photograph]

The identified patterns from analyzing Made up North's proposed plans are visually captured in a 3D render in Figure 112.

N.3 – Mixing Complementary making & Related Services

From analyzing the *NDSM Maakstad* document (Made up North, 2020), it was determined that the main aim is to concentrate manufacturing/industrial businesses in one district for them to be near each other. Situating complementary light industry businesses and supporting activities in one vicinity

Figure 109: Temporary workspaces in NDSM-Werf Oost [Own photograph]

allows for improved workflows and knowledge/ resource synergies to emerge and expand. This was the ambition behind the maker landscape of Made up North.

N.8 - Quality Urban Environment in Making Areas

When analyzing Made up North's proposal, it was apparent that the priority is to create an ideal climate for the manufacturing industry in the city. Since the selected site is an existing yard with a range of manufacturing/industry functions and activities currently in operation, this is more achievable without needing to start the development from scratch completely. The maximum environmental category of 3.1 for business functions (VNG, 2009) is reinforced as part of this proposal. Sufficient distance is provided between the district and housing developments to ensure that the operations of light industry activities are not impacted (Made up North, 2020). In addition, the provision of green space is included in the proposal in the form of a new park and access to more relaxing amenities like swimming and sports facilities.

B.3 – Public Face

By realizing this proposed development strategically at the base of NDSM-Werf Oost near the water and ferry access, it is clear that exposure and visibility to the public are important. In addition, by choosing to market the project as a Creative-Maker District, it is apparent that efforts are being made to intentionally promote the small and mid-sized businesses involved instead of hiding their activities. It is unclear what form the public interface would take, except workshops to be incorporated in the district's programming. .

B.5 – Enabling Vertical Making

In terms of architectural design, Made up North has proposed a stacked design based on a high-density orthogonal grid formation comprised of multiple quadrants with an average building height of 20m. Unlike the new live-work (mixed-use) block developments in NDSM-Werf West, work functions, specifically light industry/manufacturing-related are to be incorporated throughout the multi-story district, including vertically, rather than proposing non-residential functions solely on the plinths. Technical details on how vertical making and industrial intensification are to be achieved are limited in the proposal; however, it is apparent that this is the ambition for certain quadrants that make up the proposed district. The representative of Fiction Factory (Personal communication, 2021) expressed his support for vertical making in which lifts that can handle large loads are implemented, something that needs to be considered in NDSM.

P.7 – Spaces for Development & Education

It was determined that Made up North (2020) has planned to provide young individuals the opportunity and appropriate workspace to learn and expand their skills in light industry-related professions, especially to address the workspace scarcity issue in Amsterdam. In addition to this, workshops are to be provided as part of the Creative-Maker District proposal.

P.8 – Community Hub in Making Locations

For Made up North, it is apparent that realizing a centrally-located hub within the city for small and medium-sized companies in manufacturing to establish their operations collectively is essential. It is evident that since adequate and sufficient workspace in the city is in significant decline, Made up North (2020) is aiming to create a collaborative and adequate work environment where collaboration and exchange of knowledge and resources are encouraged and sustained. This is echoed by the Co-founder of Made up North in her interview (Personal communication, 2021).

IDENTIFIED OPPORTUNITIES

R.3 – Curator

As previously revealed, Made up North has proposed the Creative-Maker district is where the municipality is proposing a sports/greenery plan. This has resulted in conflicts of interests between several parties as captured in the Spatial Claims exercise in the Spatial Dimensions Chapter. The role of a curator has the capability of addressing and alleviating these issues by aligning interests and communicating the needs and desires of the parties involved. When interviewed, a non-bias role with these qualities was touched on by the Co-founder of Made up North (2021).

R.10 – Place-based financial levers

Since the target tenants for the proposed Creative-

Maker District are small and medium-sized businesses in manufacturing especially, financial levers would be instrumental in ensuring that they can afford to operate in these spaces. In addition, the municipality should consider the provision of incentives to realize this development project, especially since this project aims to address the workspace scarcity the city is facing.

C.5 – Varying Unit Sizes

An oportunity that was identified based on the CoM patterns is the provision of a variety of unit sizes within the Creative-Maker District. By having these options availabe, there would be the possibility for business to to scale up or downsize if needed.

N.7 – Local design & protyping

It was determined that the *NDSM Maakstad* proposal (Made up North, 2020), has potential and was defined as a promising endeavor by many research participants interviewed. One area that could be expanded more explicitly is incorporating space for design and prototyping activities/capacities. These activities within the Knowledge and Production Cycle would not need as much space or requirements as production-related activities.

B.1 – Making around courtyards

This particular pattern is not captured in the *NDSM Maakstad* proposal (Made up North, 2020); however, it is determined that by incorporating it in the design of the proposed Creative-Maker District, it has the potential of being feasible and advantageous for small and medium-sized businesses. Concentrating manufacturing activities within building blocks with access to an internal courtyard can consequently mitigate nuisance issues with other nearby functions. It is important to note that realizing this pattern would spatially alter the proposal.

P.2 – Shared Making Space & Technology

In Made up North's plans, it is not explicitly mentioned if (work)spaces and technology for sharing purposes are provided as part of the design of the Creative-Maker District. It has been identified as an opportunity to be explored and incorporated. It has been determined that shared spaces, including the ability to share equipment are desired by local businesses in the light industry, as captured in the interviews with users.

P.4 – Meanwhile spaces for transitional uses

For the Creative-Maker District proposed, an opportunity that should be considered is providing spaces that would be occupied temporarily by businesses who require them, especially when they are in transition between locations. These options would be beneficial for start-ups and those who need to relocate temporarily, for instance, during redevelopment, without needing to move to a different area, and reduce the chance they do not return to NDSM. One of the real estate developers currently active in NDSM-Werf West expressed this as a serious concern.

P5. – The work home

In the interview with the Co-founder of Made up North (2021), it was eluded to that realizing housing and

Figure 110: 3D Render of the Made up North proposal for a Creative-Maker DIstrict (Adapted from Made up North, 2020).

the work functions (creative and maker businesses) already proposed would be seriously entertained if necessary to make an attractive business case for the Creative-Maker District. However, it would need to be tailored accordingly to ensure that the work aspect is not affected. For instance, the housing aspect could be for students or those working in the district, which is captured in the *Maakstad NDSM* proposal (Made up North, 2020) as a possibility in the future. At this stage, however, housing is not permitted in NDSM-Werf Oost. This may change once the development freeze that covers the sub-area is lifted in 2028.

In Figure 113, the identified opportunities from examining Made up North's proposal for a Creative-Maker District in NDSM-Werf Oost are presented.

CHALLENGES IDENTIFIED TO REALIZE OPPORTUNITIES

Many challenges were identified to implement the patterns identified above as opportunities effectively. For instance, it may not be feasible to accommodate all the patterns identified as opportunities due to the significant investment costs. In addition, the fact that the municipality is proposing to allocate a substantial amount of greenery/sports facilities in NDSM-Werf Oost has the likelihood of impeding any of the patterns identified from being realized for the Creative-Maker District. In the interviews with municipal representatives (Personal communication, 2021), they are supportive of the plans for this type of district and agree there is a need for it in Amsterdam to address the affordable workspace issue. However, it is apparent that they are not as convinced by the location selected by Made up North.

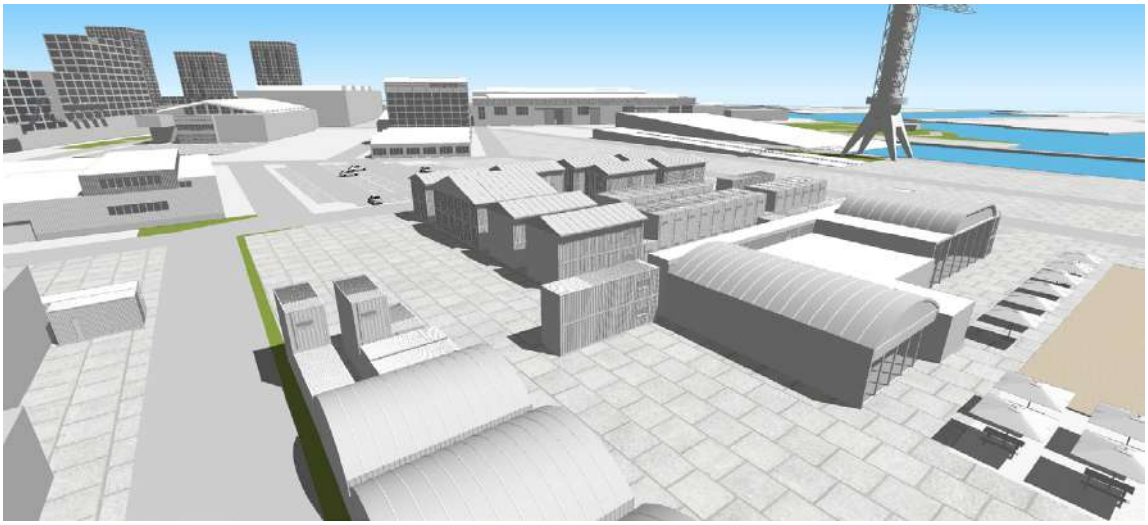

Figure 111: Creative-Maker District - 3D Render of the Present Situation

Figure 112: Creative-Maker District - 3D Render of Made up North's Plans and identified patterns

Figure 113: Creative-Maker District - 3D Render of Identified Opportunities

For the spatial analysis for NDSM-Werf Oost, the following spatial-related elements were examined: site conditions, the municipality's plans and Made up North's proposal for a Creative-Maker district in this sub area. All the patterns identified (existing and opportunities) are presented in a combined matrix in Table 14. Similar to the spatial assessment of NDSM-Werf West, for each pattern identified as an opportunity, the source of this pattern allocation is provided. As shown below, there is a significant difference between the amount of existing patterns and patterns viewed as opportunities that were identified in the *NDSM Maakstad* proposal versus the other two spatial-related elements.

Table 14: Matrix - Identification of patterns (existing & opportunities) in NDSM-Werf Oost

Scale	Code	Pattern	Spatial Analysis: NDSM-Werf Oost								
			Site Conditions			Actualisatie Investerbesluit NDSM 2020			NDSM Maakstad		
			Identified (Existing) Patterns	Identified Opportunities	Opportunities derived from/influenced by	Identified (Existing) Patterns	Identified Opportunities	Opportunities derived from/influenced by	Identified (Existing) Patterns	Identified Opportunities	Opportunities derived from/influenced by
R = Transcalar	R.1	Making Making Visible	x	-	-	-	-	-	-	-	-
	R.2	Transparent Making	-	x	Literature: Hil, 2020 Interview: Expert #1	-	-	-	-	-	-
	R.3	Curator	-	-	-	-	x	Interview: Co-founder of Made up North	-	x	Interview: Co-founder of Made up North
	R.4	Availability of Diverse Jobs	-	-	-	-	-	-	-	-	-
	R.5	Fair Work Conditions	-	-	-	-	-	-	-	-	-
	R.6	Sustainable Product Cycles	-	-	-	-	-	-	-	-	-
	R.7	Multi-scalar Circular Infrastructure	-	-	-	-	-	-	-	-	-
	R.8	Moving Things Efficiently	-	-	-	-	-	-	-	-	-
	R.9	Assured Security of Space	-	-	-	-	-	-	-	-	-
	R.10	Place-based financial levers	-	-	-	-	-	-	-	-	-
	R.11	Incentives for research & development	-	-	-	-	-	-	-	-	-
	R.12	Material Database	-	-	-	-	-	-	-	-	-
C = City/Neighbourhood	C.1	Microzoning	-	-	-	-	-	-	-	-	-
	C.2	Negotiated Qualities & environmental criteria	-	-	-	-	-	-	-	-	-
	C.3	Balance between public & private land	-	-	-	-	-	-	-	-	-
	C.4	Diverse tenure models	-	-	-	-	-	-	-	-	-
	C.5	Varying unit sizes	-	-	-	-	-	-	-	x	Interview: Expert #2
	C.6	Strategic access to multomodal mobility	-	-	-	-	-	-	-	-	-
	C.7	Links to transport infrastructure	-	-	-	-	-	-	x	-	-
	C.8	Access material recovery facilities	-	-	-	-	-	-	-	-	-
	C.9	Concentrating messy making along infrastructure	-	-	-	-	-	-	-	-	-
	C.10	Transition Zones	-	-	-	-	-	-	-	-	-
N = Neighbourhood/Block	N.1	Taking advantage of place conditions	-	-	-	-	-	-	x	-	-
	N.2	Re-use of material & energy flows	-	-	-	-	-	-		-	-
	N.3	Mixing complementary making & related services	-	-	-	-	-	-	x	-	-
	N.4	Clustering similar making	-	-	-	-	-	-	-	-	-
	N.5	Local collection points of segregated waste	-	-	-	-	-	-	-	-	-
	N.6	Centralised logistics zone	-	-	-	-	-	-	-	-	-
	N.7	Local design & prototyping	-	-	-	-	-	-	-	x	Interviews: Expert #2 & Director of ORAM
	N.8	Quality urban environment in making areas	-	-	-	-	-	-	x		-
	N.9	Making touches making	-	-	-	-	-	-	-	-	-
	N.10	Making along high streets	-	-	-	-	-	-	-	-	-
	N.11	Back of the high street	-	-	-	-	-	-	-	-	-
B = Block/Building	B.1	Making around courtyards	-	-	-	-	-	-		x	Interview: Craftsman/Visual Artist & Activist Literature: Hill, 2020
	B.2	Yards for logistics	-	-	-	-	-	-		-	-
	B.3	Public face	-	-	-	-	-	-	x	-	-
	B.4	Facilitating horizontal organization	-	-	-	-	-	-		-	-
	B.5	Enabling vertical making	-	-	-	-	-	-	x	-	-
	B.6	Easy loading & unloading	-	-	-	-	-	-	-	-	-
	B.7	Access to technical networks & services	-	-	-	-	-	-	-	-	-
	B.8	Space for storage	-	-	-	-	-	-	-	-	-
	B.9	Large openings	-	-	-	-	-	-	-	-	-
P = Programme	P.1	Productive rooftops	-	-	-	-	-	-	-	-	-
	P.2	Shared making space & technology	-	-	-	-	-	-		x	Interview: Bike-Maker
	P.3	Flexible spaces for making	-	-	-	-	-	-	x	-	-
	P.4	Meanwhile spaces & transitional uses	-	-	-	-	-	-	-	x	Interview: Real Estate Developer at COD Development Pioneers
	P.5	The work home	-	-	-	-	-	-	-	x	Interviews Co-founder of Made up North Literature: Hill, 2020
	P.6	Re-use & repair centres	-	-	-	-	-	-	-	-	-
	P.7	Spaces for development & education	-	-	-	-	-	-	x	-	-
	P.8	Community hub in making locations	-	-	-	-	-	-	x	-	-

Spatial Analysis
Klaprozenweg Noord

View of new development being constructed along Klaprozenweg corridor from NDSM-Werf West, *July 2021 [Own photograph]*

Figure 107: NDSM-Werf West with spatial-related elements identified (site conditions and municipality's plans)

6.3 Spatial Analysis: Klaprozenweg Noord

The third sub-area of NDSM-Werf examined for the Spatial Dimension is **Klaprozenweg Noord**. In Figure 107 on the previous page, this sub-area is indicated in a red dashed boundary line using an adapted base map from Cadmapper. Only one spatial-related element was captured and examined using the CoM patterns, which is visually represented by a purple circle in Figure 108. It is apparent that spatially, the majority of the municipality's development plans are being allocated to the other two sub-areas, especially NDSM-Werf West. No particular site conditions relevant to the study's scope were recognized during the site visit conducted in July 2021.

Klaprozenweg Noord: Municipality's Plans

Municipality's Plan 1: Transformation of the Klaprozenweg corridor

DESCRIPTION

The municipality has planned to transform the Klaprozenweg transportation corridor that borders NDSM-Werf to the North into a lively, modern city street. The plan is to incorporate housing, businesses, public facilities as well as high-quality greenery. Emphasis was placed on creating a seamless transition between NDSM and the residential area to the North of Klaprozenweg (Figure 108).

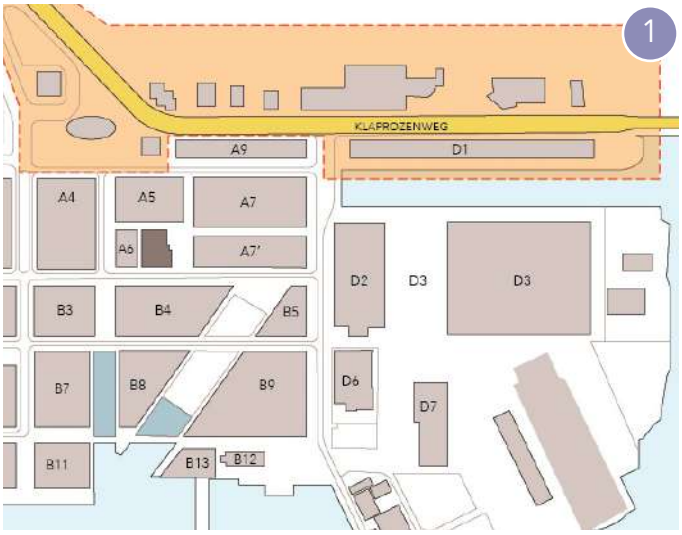

Figure 108: Digitized illustration of the location of plans to transform the Klapr9zenweg corridor (Adapted from Gemeente Amsterdam, 2020a).

IDENTIFIED PATTERNS

C.10 - Transition Zones
The municipality is aiming to create a transition zone along both sides of the Klaprozenweg corridor to ensure a less abrupt transition between the established residential neighbourhood to the North of the roadway and NDSM-Werf as it is transformed into an urban live-work district. According to the interview with the Head Designer of NDSM (Personal communication, 2021), efforts are being made to realize the most appropriate functions near a major transportation corridor.

IDENTIFIED OPPORTUNITIES

C.1 – Microzoning
This particular pattern could be applied to properly manage and accommodate (formal and informal) workspaces for light industry within the transition zone along Klaprozengweg through appropriate planning and zoning measures (concerning safeguarding and retention).

N.1 – Taking Advantage of their Place Conditions
Klaprozengweg is considered a major transportation corridor, which is ideal for most light industry businesses to be near transportation infrastructure as it provides convenient access to suppliers and customers in other areas.

N10 – Making Along High Street
Since this transportation corridor is to become a lively, modern city street, it may be ideal for locating mixed-use activities, including manufacturing activities along Klaprozenweg, for better exposure.

N.11 – Back of High Street
An alternative option for N.10 is to incorporate manufacturing and production activities at the back end of the high street, especially if more revenue-generating functions are preferred along a high street, which would be along Klaprozenweg.

P.5 –The Work Home
Since the plan is to realize both housing and businesses along Klaprozenweg, these two functions could be combined. Certain light industry businesses would be incorporated in the plinths and directly accessible to the housing component above.

For the spatial analysis of **Klaprozenweg-Noord**, the patterns identified when examining the municipal plan captured in the *Actualisatie Investerbesluit NDSM-Werf 2020* document (Gemeente Amsterdam, 2020a), as it pertains to this sub-area, is presented in Table 15 below. For each pattern identified as an opportunity, the source of this pattern allocation is also presented.

As shown below, only one pattern was determined to be explicitly captured in the municipality's plan that was examined (C10-Transition Zone). It is important to note that the plan is vague and not detailed as the priority for development has been allocated more to the other sub-areas, especially NDSM-Werf West. The identified opportunities were selected as they were found to be the most relevant and critical to implement to support the realization of the Transition Zone pattern effectively, as captured in the *Foundries of the Future* publication (Hill, 2020).

Table 15: Matrix - Identification of patterns (existing & opportunities) in Klaprozenweg Noord

Scale	Code	Pattern	Spatial Analysis: Klaprozenweg Noord		
			Actualisatie Investerbesluit NDSM 2020		
			Identified (Existing) Patterns	Identified Opportunities	Opportunities derived from/influenced by
R = Transcalar	R.1	Making Making Visible	-	-	-
	R.2	Transparent Making	-	-	-
	R.3	Curator	-	-	-
	R.4	Availability of Diverse Jobs	-	-	-
	R.5	Fair Work Conditions	-	-	-
	R.6	Sustainable Product Cycles	-	-	-
	R.7	Multi-scalar Circular Infrastructure	-	-	-
	R.8	Moving Things Efficiently	-	-	-
	R.9	Assured Security of Space	-	-	-
	R.10	Place-based financial levers	-	-	-
	R.11	Incentives for research & development	-	-	-
	R.12	Material Database	-	-	-
C = City/Neighbourhood	C.1	Microzoning		x	Literature: De Boeck & Ryckewart, 2020; Ferm, 2012
	C.2	Negotiated Qualities & environmental criteria	-	-	-
	C.3	Balance between public & private land	-	-	-
	C.4	Diverse tenure models	-	-	-
	C.5	Varying unit sizes	-	-	-
	C.6	Strategic access to multomodal mobility	-	-	-
	C.7	Links to transport infrastructure	-	-	-
	C.8	Access material recovery facilities	-	-	-
	C.9	Concentrating messy making along infrastructure	-	-	-
	C.10	Transition Zones	x	-	-
N = Neighbourhood/Block	N.1	Taking advantage of place conditions	-	x	Interviews: Head Designer for NDSM & Co-founder of Made up North
	N.2	Re-use of material & energy flows	-	-	-
	N.3	Mixing complementary making & related services	-	-	-
	N.4	Clustering similar making	-	-	-
	N.5	Local collection points of segregated waste	-	-	-
	N.6	Centralised logistics zone	-	-	-
	N.7	Local design & prototyping	-	-	-
	N.8	Quality urban environment in making areas	-	-	-
	N.9	Making touches making	-	-	-
	N.10	Making along high streets	-	x	Literature: Hill, 2020
	N.11	Back of the high street	-	x	Literature: Hill, 2020
B = Block/Building	B.1	Making around courtyards	-	-	-
	B.2	Yards for logistics	-	-	-
	B.3	Public face	-	-	-
	B.4	Facilitating horizontal organization	-	-	-
	B.5	Enabling vertical making	-	-	-
	B.6	Easy loading & unloading	-	-	-
	B.7	Access to technical networks & services	-	-	-
	B.8	Space for storage	-	-	-
	B.9	Large openings	-	-	-
P = Programme	P.1	Productive rooftops	-	-	-
	P.2	Shared making space & technology	-	-	-
	P.3	Flexible spaces for making	-	-	-
	P.4	Meanwhile spaces & transitional uses	-	-	-
	P.5	The work home	-	x	Literature: Hill, 2020
	P.6	Re-use & repair centres	-	-	-
	P.7	Spaces for development & education	-	-	-
	P.8	Community hub in making locations	-	-	-

Spatial Analysis
Site-wide Interventions

View of NDSM-Werf from ferry, July 2021 [Own photograph]

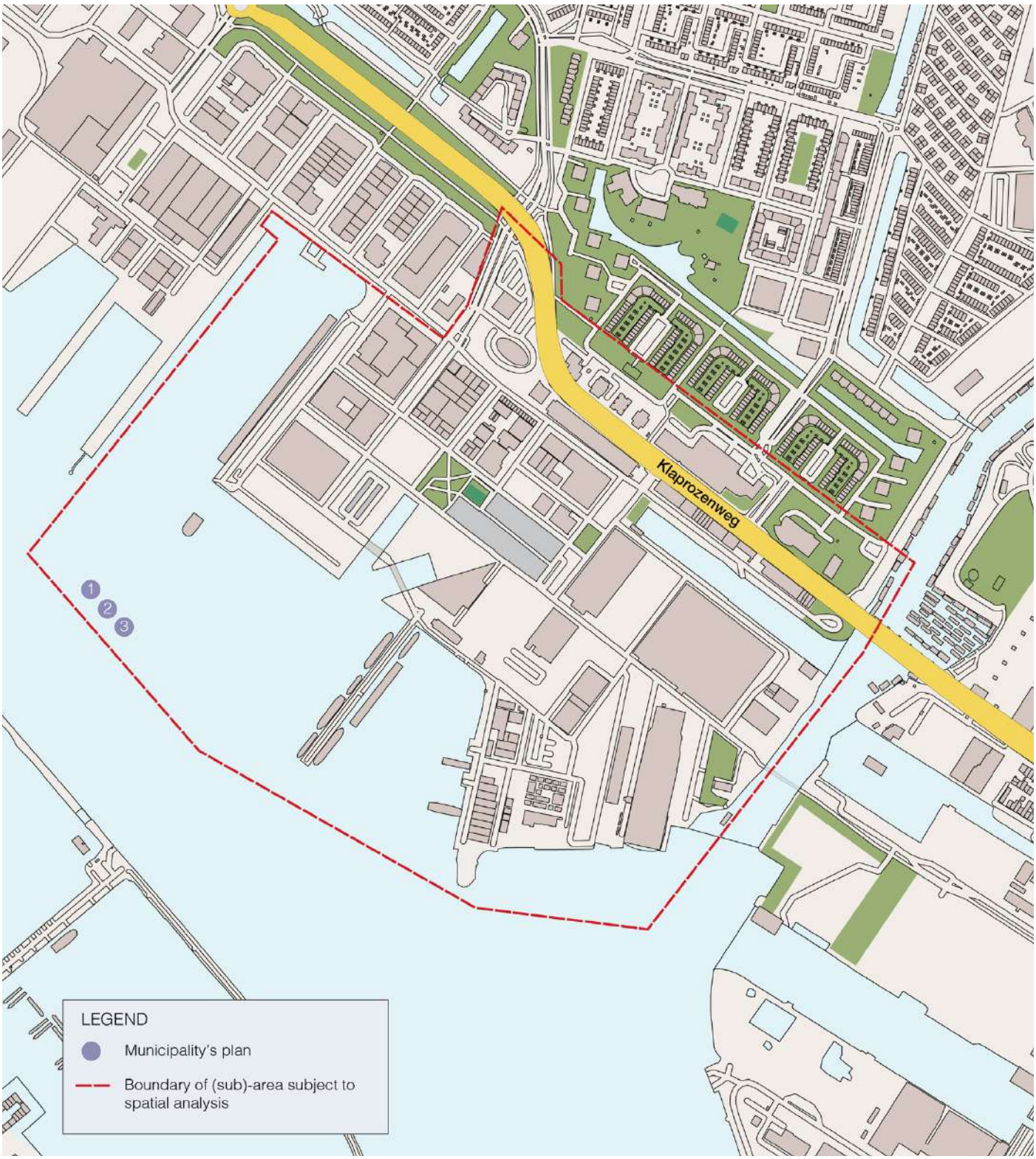

Figure 109: NDSM-Werf West with spatial-related elements identified (site conditions and municipality's plans)

6.4 Spatial Analysis: Site-wide Interventions

In this last part of the spatial analysis, a broader scope is taken, in which the focus is on site-wide interventions with spatial implications for the NDSM-Werf as a whole. For this sub-chapter, three municipality's plans were examined and patterns are identified where applicable. They are visually represented in Figure 109 on a base map adapted from Cadmapper (on the previous page). As shown, they are not allocated to specific blocks like as they were determined to have broader spatial implications.

Site-wide Interventions: Municipality's Plans

Municipality's Plan 1: Circular NDSM

DESCRIPTION

In the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), the municipality has plans to implement the Circular NDSM initiative with the main ambition of significantly reducing the use of primary raw materials by 50% by 2030, which is mandated throughout The Netherlands. In Amsterdam, the aim is to be as circular as possible with materials, especially in construction/development projects. This is demonstrated spatially in Figure 110 in orange for ongoing and future construction projects for buildings and public space.

Figure 110: Digitized illustration of the spatial bounds of the Circular NDSM program as it relates to materials for construction/development projects in NDSM-Werf (West & Oost) (Adapted from Gemeente Amsterdam, 2020a).

IDENTIFIED PATTERNS

When analyzing this particular proposal, the following patterns were identified; however, it is important to point out that there is no indication that this initiative is aimed to improve the production practices of light industry businesses or directed at light industry at all. Instead, the focus is on achieving circularity in the construction/development sector, which is not the scope of the following patterns.

As a result of this observation, these patterns can also be interpreted as opportunities in the context of light industry integration. However, these particular patterns were recognized not to be relevant to the scope of the research study.

R.6 – Sustainable Product Cycles
R.12 – Material Database
N.2 – Re-use of Material and Energy Flows

Municipality's Plan 2: Multifunctional Roofs

DESCRIPTION

According to the Actualisatie Investeringsbesluit NDSM-Werf 2020 (Gemeente Amsterdam, 2020a), the municipality desires to implement multifunctional roofs on private and public buildings, especially in NDSM-Werf West, to collect rain water, provide additional green space, and produce sustainable energy (as shown in Figure 111).

IDENTIFIED PATTERNS

P.1 – Productive Roofs

It is apparent that this particular plan proposed by the municipality is aligned with the pattern of Productive Roofs. However, it is important to point out that this particular CoM pattern was identified in the context of specifically urban manufacturing activities, which is not apparent in this proposal.

IDENTIFIED OPPORTUNITIES

No opportunities were identified for this particular proposal, with the exception of expanding on the existing pattern identified (P.1 - Productive Roofs) as it relates to light industry businesses in NDSM-Werf.

Figure 111: Digitized illustration of the location of potential productive roofs on private and public buildings in NDSM-Werf (West & Oost) (Adapted from Gemeente Amsterdam, 2020a).

Municipality's Plan 3: Waste Management

DESCRIPTION

Regarding waste management in NDSM-Werf and the rest of Amsterdam, the aim is to implement a Waste Implementation Plan where designated containers are to be provided by the municipality to separate different types of waste properly (Gemeente Amsterdam, 2020). In the Actualisatie Investeringsbesluit NDSM-Werf 2020 (Gemeente Amsterdam, 2020a), it is stated that a separate container for textiles waste will be provided above ground in NDSM while companies are responsible for their waste collection. The municipality recommends that collaboration and coordination between businesses and other parties are key to reduce the amount of driving movement in the area and ultimately be sustainable. The scope of this waste management program is shown in Figure 112 in green.

Figure 112: Digitized illustration of the spatial scope of the planned waste management program in NDSM-Werf (Adapted from Gemeente Amsterdam, 2020a).

IDENTIFIED PATTERNS

N.5 – Local Collection Points for Segregated Waste

When analyzing this particular proposal regarding separating waste, it is apparent that the pattern of Local collection points for segregated waste is captured. The municipality does not seem to have a specific protocol for segregating and collecting waste for local businesses, but instead, this responsibility is assigned to the companies themselves.

IDENTIFIED OPPORTUNITIES

No opportunities were identified as it relates to this particular proposal.

When analyzing the site-wide interventions described in the Actualisatie Investerbesluit NDSM-Werf 2020 document (Gemeente Amsterdam, 2020a), only existing patterns that were most apparent in the document were captured (as shown in Table 16 below). However, the majority of the patterns identified were found not to be directly associated with light industry integration. Instead they were linked to other priorities such as sustainability. In addition to this, no additional opportunities were determined relevant.

Table 16: Matrix - Identification of patterns when examining site-wide interventions

Scale	Code	Pattern	Spatial Analysis: Site-wide Interventions		
			Actualisatie Investerbesluit NDSM 2020		
			Identified (Existing) Patterns	Identified Opportunities	Opportunities derived from/influenced by
R = Transcalar	R.1	Making Making Visible	-	-	-
	R.2	Transparent Making	-	-	-
	R.3	Curator	-	-	-
	R.4	Availability of Diverse Jobs	-	-	-
	R.5	Fair Work Conditions	-	-	-
	R.6	Sustainable Product Cycles	x	-	-
	R.7	Multi-scalar Circular Infrastructure	-	-	-
	R.8	Moving Things Efficiently	-	-	-
	R.9	Assured Security of Space	-	-	-
	R.10	Place-based financial levers	-	-	-
	R.11	Incentives for research & development	-	-	-
	R.12	Material Database	x	-	-
C = City/Neighbourhood	C.1	Microzoning	-	-	-
	C.2	Negotiated Qualities & environmental criteria	-	-	-
	C.3	Balance between public & private land	-	-	-
	C.4	Diverse tenure models	-	-	-
	C.5	Varying unit sizes	-	-	-
	C.6	Strategic access to multomodal mobility	-	-	-
	C.7	Links to transport infrastructure	-	-	-
	C.8	Access material recovery facilities	-	-	-
	C.9	Concentrating messy making along infrastructure	-	-	-
	C.10	Transition Zones	-	-	-
N = Neighbourhood/Block	N.1	Taking advantage of place conditions	-	-	-
	N.2	Re-use of material & energy flows	x	-	-
	N.3	Mixing complementary making & related services	-	-	-
	N.4	Clustering similar making	-	-	-
	N.5	Local collection points of segregated waste	x	-	-
	N.6	Centralised logistics zone	-	-	-
	N.7	Local design & prototyping	-	-	-
	N.8	Quality urban environment in making areas	-	-	-
	N.9	Making touches making	-	-	-
	N.10	Making along high streets	-	-	-
	N.11	Back of the high street	-	-	-
B = Block/Building	B.1	Making around courtyards	-	-	-
	B.2	Yards for logistics	-	-	-
	B.3	Public face	-	-	-
	B.4	Facilitating horizontal organization	-	-	-
	B.5	Enabling vertical making	-	-	-
	B.6	Easy loading & unloading	-	-	-
	B.7	Access to technical networks & services	-	-	-
	B.8	Space for storage	-	-	-
	B.9	Large openings	-	-	-
P = Programme	P.1	Productive rooftops	x	-	-
	P.2	Shared making space & technology	-	-	-
	P.3	Flexible spaces for making	-	-	-
	P.4	Meanwhile spaces & transitional uses	-	-	-
	P.5	The work home	-	-	-
	P.6	Re-use & repair centres	-	-	-
	P.7	Spaces for development & education	-	-	-
	P.8	Community hub in making locations	-	-	-

6.5 Spatial Analysis: Main Findings

As described in the beginning of this chapter, the **spatial analysis** is made up of four parts (NDSM-Werf West, NDSM-Werf Oost, Klaprozenweg Noord and Site-wide Interventions). This involved incorporating the main aspects of the two previous dimensions, Planning & Policy and Stakeholder dimensions, as well as the application of the CoM patterns captured in the literature review.
When examining the spatial context of the case study site (NDSM-Werf), it was determined that overall, efforts to accommodate light industry activities and businesses as part of NDSM-Werf's transformation into an urban live-work (mixed-use) are **limited**. This is especially the case when analyzing the municipal plans captured in the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a). Although certain proposed plans were found to contain patterns from the CoM patterns, it is apparent that in most cases, the municipality was not directly or deliberately addressing the situation surrounding light industry integration. Instead, it is evident that **other priorities** have influenced the plans such as realizing housing, sustainability measures and greenery allocation. As part of the spatial analysis, additional patterns were recognized as **opportunities** for spatial-related elements where determined relevant as infuenced by either literature or input from certain interviews, which represent patterns not captured or taken into full consideration when the municipal plans were being developed.

When comparing the municipality's plans with those prepared by Made up North in the *NDSM Maakstad* proposal (2020), it is apparent that there is a **significant difference in the approach taken and scope of focus**. For reference, 3D renderings are provided on the next page (Figures 113 and 115) that demonstrate the plans of the municipality (in blue) and the proposed plans by Made up North (in light orange).

The purpose of the *NDSM Maakstad* proposal (Made up North, 2020) is to propose a Creative-Maker District in NDSM-Werf Oost to provide a central location for businesses in the creative and manufacturing industries, which would be considered as light industry in this research study. As a result, multiple patterns from the CoM patterns at different scales were easily recognized, which in turn was more substantial than what was captured in the municipal plans. Even though Made Up North's plans already contains a large number of patterns that were found to be directly associated with light industry integration and accomodation, it was determined that there is still room for improvement as additional patterns were identified. However, it is important to note that for the majority of the opportunities identified, potential challenges were also captured; both in which were influenced by the input of research participants interviewed. This is also the case for the majority of the municipality's plans examined. For the site conditions identified during the site visit conducted in July 2021, they were recognized to possess key patterns that have the potential of being further developed and expanded on.

All in all, it is evident that the opportunities identified **outweigh** the eixsting captured patterns especially when analyzing the municipality's plans in the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a) in comparison to the proposed plans by Made up North in the *NDSM Maakstad* (2020). This shows that safeguarding light industry businesses and activities within NDSM-Werf as part of the area's transformation is not explicility being captured in the transformation plan especially from the angle of the public party. In the interviews with the representatives of Gemeente Amsterdam (Personal communication, 2021), it was indicated that there is an intention and desire to accommodate businesses in light industry within the city and even in NDSM-Werf, however, these intentions are not being interpreted into spatial measures or actions according to this spatial analysis. Although high development pressures and the objectives of other purposes (like realizing housing for instance), it was determined that there is still space to better incorporate light industry activities and businesses, as captured in the identified of opportunities throughout the NDSM-Werf site. These opportunities demonstrate that there is still room for improvement when it comes to fostering and improving integration of light industry in new mixed-use developments of transformation areas like NDSM-Werf. In the case of NDSM-Werf, applying and realizing these patterns are less likely as NDSM-Werf is quite far in its development progress compared to other sites deisgnated for transformation.

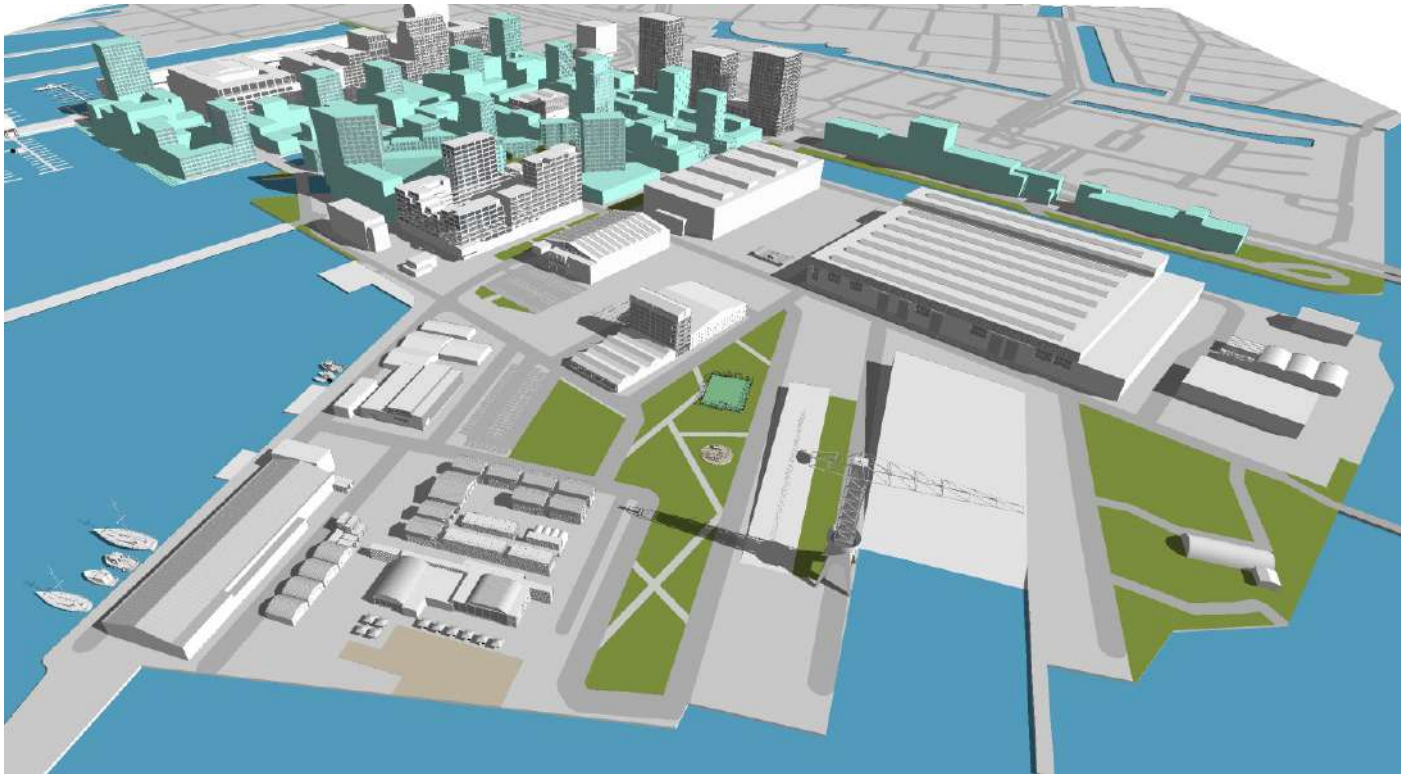

Figure 113: 3D Render of the NDSM-Werf case study site with municipality's plans highlighted in blue

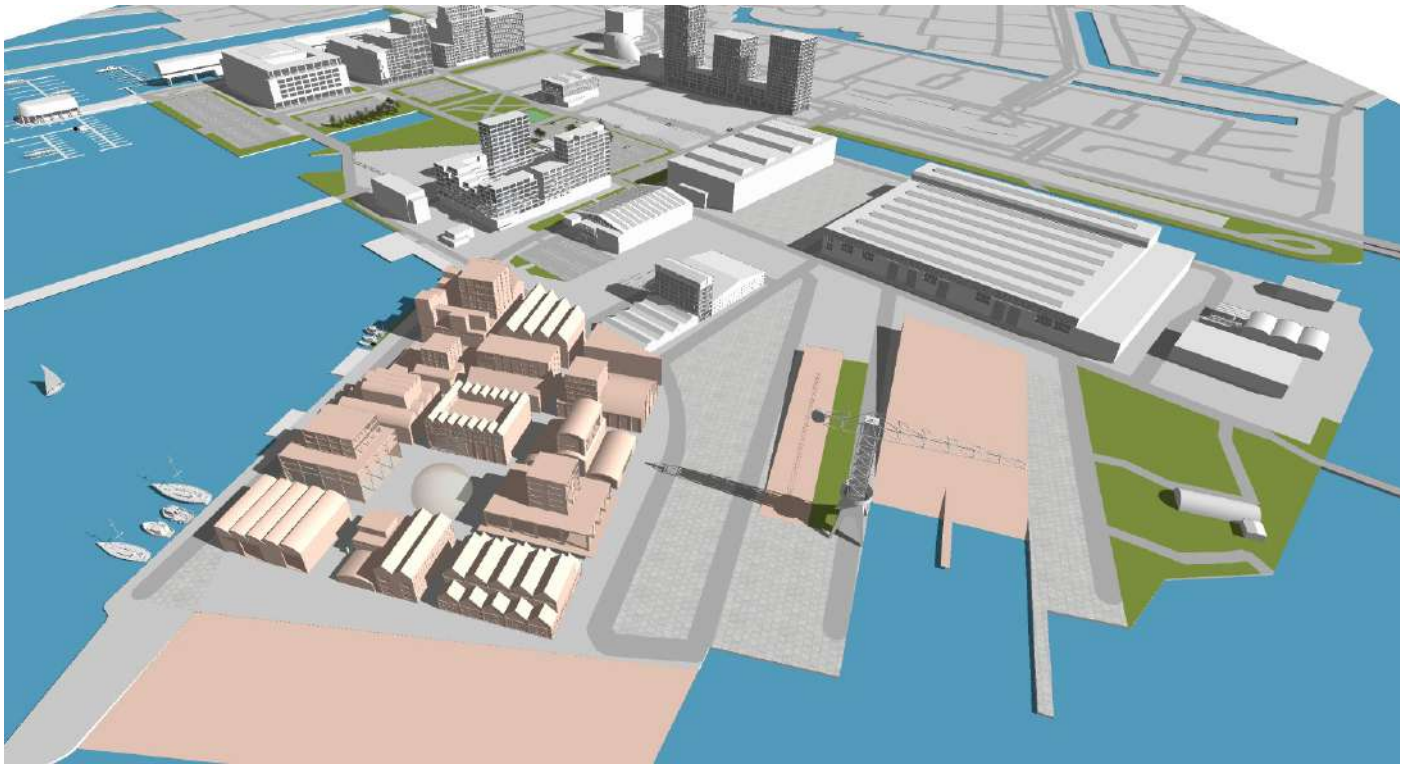

Figure 114: 3D Render of the NDSM-Werf case study site with Made up North's proposal highlighted in orange

PART III | **Synthesis**

View of the other side of the IJ from NDSM-Werf Oost, July 2021 {Own photograph}

Chapter 7 | **Conclusions**

In presenting the main conclusions of this research study, it is helpful first to revisit the initial research topic, purpose and methodology to re-establish context. This Master's thesis centers around the integration of light industry in mixed-use developments of transformation areas in Amsterdam. The case study of NDSM-Werf is investigated, a former shipyard situated on the northern banks of the IJ.
In this study, **light industry integration** pertains to both existing light industry functions and activities established in industrial estates before transformation plans and light industry businesses new to the area or even an urban environment in general. A **mixed-use development** implies two or more land uses or functions in the same vicinity, which, for this research, would accommodate light industry at the following scales: site, block, or building level. The study aimed at **(1) gaining greater insight on the planning system and policy framework in Amsterdam, (2) examining the feasibility of light industry integration in urban mixed-use developments of transformation areas, (3) informing and helping guide key stakeholders in developing appropriate interventions & strategies to address the transition to a future where (light) industry is part of the urban mixed-use fabric.**

The following objectives were established to achieve these research aims: **(1) understanding the influence of and approach taken by (local) public bodies concerning the transformation process of industrial estates into new live-work areas and the accommodation of (light) industrial workspaces, (2) capturing the interests, priorities, and means of key stakeholders with regard to the case study site of NDSM-Werf, (3) shedding light on the situation in transformation areas and identifying constraints & opportunities spatially and in the (existing and future) roles and capacities of key stakeholders.** The theoretical portion of the study was primarily comprised of a literature review conducted via desktop research while the empirical portion of the research study consisted of three main parts: Planning & Policy Dimension, Stakeholder Dimension, and Spatial Dimension. This involved desktop research, an extensive documentation analysis of documents at multiple scales, and conducting semi-structured interviews with a range of stakeholders. In addition, this study included a spatial review of current plans for NDSM-Werf that were developed by either the municipality or Made up North, which centered around the application of the CoM patterns.

7.1 Main Conclusions

In this concluding chapter, the overarching research question is answered, which involved addressing the three subsequent sub-research questions that were developed to structure the research process, ultimately forming main conclusions. A discussion is also included, which links to existing literature, the broader scope, and research limitations are discussed, followed by recommendations.
For this research study, the **Main Research Question** was formulated and posed:

What are the key conditions that need to be considered in the integration of light industry in urban mixed-use developments of transformation areas in Amsterdam?

In this research study, a condition is defined as a circumstance or factor that can determine or have an influence on a certain situation or outcome. A case study approach was applied to the NDSM-Werf site in Amsterdam to determine the key conditions and understand their likely influence on the possible integration of light industry (existing and new) in urban mixed-use developments of transformation sites. From here, three sub-research questions that focus on the transformation process, municipality's capabilities, and the interests and means of key stakeholders related to the integration of light industry, are directly addressed. This led to the identification and examination of the following conditions, which are listed below:

1 – The Planning/Policy Process
2 – Land Ownership
3 – Support
4 – Stakeholder Relations & Collaboration
5 – Scale and Composition of Mixed-use
6 – Spatial (Design) Considerations of Light Industry

Each condition is elaborated on individually, followed by a concluding summary where overall remarks are provided.

1. The Planning/Policy Process

When examining NDSM-Werf, a major factor that was identified in determining the likelihood and extent of light industry integration in its transformation into a new urban mixed-use district is the municipality of Amsterdam's **planning/policy process**. This was captured primarily from analyzing different documents at multiple scales in chronological order, most of which were prepared by or commissioned by Gemeente Amsterdam.

It was recognized that the municipality's intentions, ambitions, and approach to urban development have evolved over time. Regarding mixed-use and the integration of light industry in the urban environment, focus and emphasis on these particular topics were found to fluctuate especially over time, due to the influence of exterior forces like the housing shortage on the municipality's priorities and decisions. As policies evolve over time, there seems to be a lack of consistency in how mixed-use and (light) industry are captured and addressed. This is most apparent when comparing policy documents over the different scales (city, site, block). At the city scale, there seems to be a clearer direction surrounding businesses, especially in more recent years as there is a greater focus on transforming industrial estates into live-work neighbourhoods (i.e. Production Neighbourhoods, Creative Neighbourhoods and City/Urban Streets). The Bedrijvenstrategie 2020-2030 policy document developed by the Economic department was identified as a viable means for the municipality to retain and promote light industry in mixed-use developments of transformation sites, but the degree depends on the live-work designation in place. This involved identifying existing (light industry) businesses in industrial estates designated for transformation that are considered mixable in a live-work environment and which activities need to be relocated accordingly. However, these efforts may not be sufficient to counteract the significant loss of industrial lands therefore prime locations for businesses that is forecasted to continue. It was also revealed through the interviews; the city still lacks a standardized approach in determining which industrial sites are the most suitable to transform and timing associated with those decisions. In addition, the lack of integration between departments within the municipality came up as an issue, which has resulted in significant implications on how light industry presence in cities including transformation areas, are addressed

Regarding the municipality's priorities, it is apparent from the various policy documents and input from interviews conducted that the municipality has been prioritizing housing, especially recently. At the site scale, this was not always the case since safeguarding the operations of existing small-scale businesses while achieving a balanced ratio between work and living was initially the priority for the transformation of NDSM-Werf. This shifted in the last few years due the significant increase in housing demand that the city has been experiencing. As a result, the live-work ratio, which represents mixed-use, was adjusted, and the acceleration of redevelopment of additional blocks in NDSM-Werf West significantly favours housing. In addition to housing, the realization of greenery and sport facilities to accommodate the new housing in NDSM-Werf West has become a pressing priority for the municipality. This consequently conflicts with the interests and agendas of other key stakeholders. Made up North, in particular, has proposed to realize a creative-production district in NDSM-Werf Oost, in the exact location where the municipality plans to allocate their greenery/sports ambitions primarily. This demonstrates different and, at the most part, conflicting interests between key stakeholders, which have spatial implications. In regard to the municipality's efforts to retain and promote light industry at the site scale, research participants representing Gemeente Amsterdam claimed that through a Bestemmingsplan (a land-use/zoning plan), the realization of light industry workspaces can be achieved with the proper land use/zoning designations, which represents a means through public law. In NDSM-Werf, this is currently not the case in either Bestemmingsplan NDSM-Werf West or Bestemmingsplan NDSM-Werf Oost as the majority of the blocks are designated as Gemengd (mixed), which covers a range of land uses and activities; not only light industry. At the site level of NDSM-Werf especially in -Werf West, the most updated live-work ratio is 85%/15%. The 15% represents non-residential functions, which captures a range of activities that would compete with light industry on the plinth of buildings. It was also revealed that the municipality has implemented maximum limits for HORECA and office spaces that have been reached. According to a research participant representing the municipality, this would allow for light industry workspaces to be realized, which seems like a very indirect approach to accommodating light industry. This demonstrates that the current regulations and policies are structured to put work functions, especially light industry, at a significant

disadvantage and, therefore, an afterthought in the transformation of NDSM-Werf into a new urban mixed-use district. It was also revealed that non-public body stakeholders who were interviewed (including experts) are critical of the municipality's current regulations surrounding the live-work ratio and the non-residential designation as they found these regulations to not fairly capture or represent the work aspect, especially in relation to accommodating sufficient (work)space for light industry activities, both existing and new.

At the block scale, the details of the transformation process and the key tools to steer the transformation of industrial estates into mixed-use development are most apparent. This is presented primarily through a step-by-step roadmap developed and enforced by the municipality of Amsterdam to transform a block within a designated transformation area, which contains key parties and milestones such as the preparation of a kavelpaspoort and the erfpacht ground lease contract. The intention is to transform on a block-by-block basis to eventually make up the entire transformation area. The Actualisatie Investeringsbesluit NDSM-Werf 2020 (Gemeente Amsterdam, 2020a), was found to act as a broader reaching framework containing the most updated plans for the transformation project area. When examining this transformation approach, there seems to be a consistent strategy surrounding light industry workspaces in NDSM-Werf as it seems to differ per block depending on the municipality's desires for a said block. When linking back to the Literature Review, it is apparent that the major issue stems from the lack of overarching policy procedures and clear planning guidelines related to retaining and supporting light industry presence in NDSM-Werf. Without these, there is no incentive for developers to realize these spaces.

2. Land Ownership

In the research, **land ownership** was observed to be an important factor in realizing development ambitions especially over a larger transformation area. In the case of NDSM-Werf, the erfpacht ground lease system dominates the case study site except for a portion of NDSM-Werf Oost designated as temporary. The erfpacht lends itself certain unique opportunities for the municipality especially since it implies that through land ownership, the municipality has control over future development per block while gaining revenue especially through the following means: the kavelpaspoort, ground rent pricing and the erfpacht ground lease contract. When it comes to realizing mixed-use in NDSM-Werf, however, work functions including light industry (non-residential) are secondary to housing. It is apparent that through the erfpacht ground lease system, the municipality prioritizes the realization of housing especially in NDSM-Werf West while efforts to incorporate work functions as part of supposedly mixed-use district is limited (including light industry). It is important to note that through the erfpacht system, the municipality has the capacity and ability to impose requirements to realize specific land uses and functions as they desire specifically in the kavelpaspoort and erfpacht contract per block, which can include light industry. However, any intention to retain and support light industry is not fully realized through these means.

Through this particular land ownership situation, the municipality is actively involved in the (re) development process as they can set the rules surrounding development details. However, it is important to note that in NDSM-Werf (West specifically), the municipality's role and involvement differ depending on the block type (A and B blocks). As captured in the research, the municipality has a more active role for the B-blocks as they are primarily vacant lands. The municipality has a contract with an area developer via a right of first refusal arrangement. However, since the A-blocks are comprised of existing real estate with different leaseholders and/or tenants, it is a more complex situation in which the municipality needs to convince and work with the existing leaseholders to execute their redevelopment ambitions. It was also revealed that in situations where the land ownership is fragmented, hence no overarching erfpacht system in place, the ability to establish a procedure or system that would accommodate the realization of light industry workspaces would be less likely to transpire. This is because coordination and reaching

a consensus between multiple stakeholders becomes more complex.

When specifically examining the financial aspect of the erfpacht ground lease system, further observations were made as it relates to integration of light industry as part of mixed-use transformation projects. It is apparent that the erfpacht system has been adapted to accommodate mixed-use development proposals especially when it comes to pricing out the different land uses/functions within one development or block. Here, clearer distinctions between functions under the generic non-residential designation presented in city-scale policy documents are made. However, through this means, it has been found that the municipality still comes up short in accommodating light industry. For instance, in the ground rent calculations developed by the municipality of Amsterdam for transformation sites for developers to use for their proposed developments in the remaining A-blocks in NDSM-Werf West, 'business' is captured as a separate land use entity, however, distinctions between different types of businesses are not provided including light industry. It is not yet known what the assigned land use prices are per land use/function, therefore it is difficult to gauge the land prices to realize workspaces for any form of light industry in relation to those of other land uses. During interviews with developers, it was also revealed that they view the municipality's approach to determining ground rent prices as opportunistic behaviour to gain revenue, resulting in significant implications to developers' business case as it limits what they can actually afford to realize in their respective plots.

It is apparent that efforts to accommodate mixed-use properly are being made in terms of how the ground rent pricing model is structured. However, light industry is found not yet to be properly represented in the calculations. This could adversely impact the pricing decisions concerning workspaces allocated for current and future light industry businesses.

3. Support

Support was identified as a condition or factor that can take on different forms and emerge from different means and sources. In the case of light industry integration in NDSM-Werf, support is linked to safeguarding the availability of adequate and sufficient workspaces and ensuring its affordability for light industry businesses and activities. It was determined primarily through input from the semi-structured interviews that the term support covers financial incentives and advocacy and promotion efforts.

With the exception of the broedplaats subsidy the municipality offers, financial incentives directed at light industry businesses are perceived to be limited by non-public body stakeholders interviewed. However, certain research participants who represent the municipality are under the impression that the erfpacht contracts allow for a lower ground rent price for developers to realize light industry workspaces. In contrast, other research participants believe that mixed-use developments are inherently assigned a higher total ground rent price than monofunctional building projects no matter if light industry is included. Therefore, it is apparent that there are mixed perceptions concerning the ground rent pricing protocol especially when it comes to ensuring affordability for developers in realizing light industry spaces in mixed-use development proposal. It is evident that to the co-founder of Made up North, these higher ground rent prices for mixed-use developments is a deterrent for those who want to realize these developments that include industrial workspaces. A key observation made is how reluctant the municipality seems to implement and even entertain additional and alternative forms of financial incentives in which spaces for non-residential functions like light industry can actually be realized and affordable enough to be used for those purposes. The introduction of a cross-subsidy, which was captured in the Literature Review as a promising incentive model, is a political issue that needs to be brought to the table to at least be considered. Even if light industry workspaces are accommodated in new mixed-use developments, it is unlikely that (existing) light industry businesses can afford to operate in these locations as they were found to prefer their existing working conditions with low rent. This can be interpreted as a security of space issue. Developers also made many arguments regarding the business case for realizing industrial workspaces as they typically involve addition costs for design-related investments. It is apparent that greater commitment and investment by government bodies, especially the municipality, is critical in ensuring that sufficient and adequate workspaces are provided and kept affordable for light industry businesses, especially when competing with housing for space in urban environments like transformation sites.

The interviews also revealed that certain research participants feel that financial incentives like subsidies are not effective in situations where light industry businesses do not want to be part of a mixed-use development due to certain concerns to their operations and space/location-related requirements. It was determined that the main concerns are stemmed from the fact that residents who will live in these mixed-use developments have a leg up in comparison to them especially in terms of nuisance-related complaints. Therefore, advocacy of their needs and desires, as well as proper communication of their concerns, are warranted. When conducting a stakeholder analysis of NDSM-Werf, it was determined that support through advocacy is present through the means of third parties especially Made up North. However, through stakeholder mapping exercises based on interview data, it was discovered that their efforts to represent light industry entrepreneurs like makers are typically impeded, as the municipality would typically consider their concerns, but rarely addresses them directly. In addition, it was revealed that these parties are not proactively engaged by the municipality when projects involving realizing industrial workspaces emerge. This finding is further elaborated on in the next condition.

Without sufficient and proper support for light industry workspaces, their realization and retention will not be fully achieved.

4. Stakeholder Relations & Collaboration

In addition to support, **stakeholder involvement** was identified as a key condition in improving the likelihood of light industry integration in a mixed-use development of transformation areas. In the case of NDSM-Werf, this condition was determined to possess weak elements. Firstly, the research participants representing Gemeente Amsterdam who are directly involved in the NDSM-Werf transformation project seem to be open to mixing light industry, but proper actions do not always back up their intentions. As a result, there seems to be a lack of support, leadership & coordination/collaboration on the part of the municipality when it comes to light industry retention in NDSM-Werf that needs to be addressed accordingly. This is most evident when comparing the Creative Neighbourhood designation assigned to NDSM-Werf to what the area is actually comprised of. There is an obvious mismatch since the municipality seems to disregard the light industry presence, which is recognized by both non-municipal and municipality research participants in the interviews. Without proper support, leadership, and coordination/collaboration efforts, especially on the municipality's part, perceptions of other stakeholders and even within the municipality regarding the retention and support of light industry presence in urban environments like NDSM-Werf will not change on their own.

Regarding the transformation of NDSM-Werf into an urban mixed-use district, key stakeholders were found to have various interests and associated means that do not all directly involve prioritizing/accommodating light industry as part of the outcome of the transformation process. In reality, the majority of the interests conflict with each other, making it more difficult for the integration of light industry to transpire. These conflicting interests need to be managed accordingly through collaboration and consensus building measures.

It was also determined that stakeholders who are considered allies/advocates for light industry (i.e., Made up North) are not being utilized to their full capacity by the municipality as they were not consulted in circumstances in which the provision of workspaces specifically included for light industry is being considered. It is apparent that the Co-founder of Made up North perceives this as a lost opportunity for collaboration. A key takeaway from this situation is that the current relations and dynamics in terms of power and interest between key stakeholders especially involving the municipality, need to be addressed to ensure that efforts to integrate light industry are done with proper coordination and collaboration with key stakeholders with relevant agendas and interests. Within the municipality itself, the perception that there is a lack of integration between departments and limited knowledge and incorrect perception of what light industry businesses actually do is captured through the interviews.

5. Scale & Composition of Mixed-use

When examining the situation in NDSM-Werf, the elements of **scale and composition related to mixed-use** were also captured as prominent factors in the possible integration of light industry in the transformation plans for the area. When it comes to scale, there seems to be an overall preference by non-public body research participants of mixing light industry at higher scales (block or site) via clustering rather than combining other functions within the same building. This is found to be influenced by the lack of knowledge and understanding of design capabilities and new technology advancements to minimize nuisance. In addition, the overall concern surrounding the long-term feasibility of integrating light industry in new mixed-use developments that was captured through the interviews stems from the engrained mindset that nuisance and conflicts are bound to arise and become an issue when industry is involved. Based on the Literature Review, some of these concerns and positions can be addressed through (urban) design, however, as revealed earlier, this may result in additional design-related costs for those realizing the workspaces.

It was also revealed that there is a perception that mixing light industry in an urban environment like NDSM-Werf successfully depends on the activity type. For the remaining A-blocks in NDSM-Werf West that are to be redeveloped, the leaseholders interviewed (mostly developers) seem to be automatically opposed to realizing workspaces for more traditional forms of production and manufacturing, which represent a key subset of the light industry scope defined in this research study. The reason for this could be their inability to make an attractive business case due to the lower rents typically associated with this segment of light industry or the issues. Instead, they are more willing to accommodate workspaces for more advanced production activities or community amenities like public libraries as part of their redevelopment proposals. Other than the business case argument, it is apparent that they are under the impression that certain forms of light industry do not need to be realized or are not appropriate in NDSM-Werf. This is most likely influenced by the fact that the municipality does not explicitly require these kinds of workspaces in certain blocks in a consistent manner, which is captured under the Planning/ Policy process above.

6. Spatial (Design) Considerations of Light Industry

The last key condition that needs to be actively addressed is surrounding **spatial design considerations**. In analyzing the spatial claims of key stakeholders in the context of NDSM-Werf, it was apparent that overlap does occur throughout the site; however, in certain locations, this has led to significant conflicts of interests, which threatens the possibility for workspaces for light industry to be realized. Through spatial design, it was determined that integration of light industry as part of NDSM's transformation into a new urban mixed-use district can be more feasible.

In the Spatial dimension of the Empirical section of the study, current plans of NDSM-Werf were examined by applying the CoM patterns o determine if any existing actions have been proposed or implemented to accommodate light industry businesses/functions. This also involved identifying opportunities and challenges as it relates to light industry integration in NDSM-Werf. When analyzing the plans for NDSM-Werf developed by the municipality of Amsterdam in the *Actualisatie Investeringsbesluit NDSM-Werf 2020* (Gemeente Amsterdam, 2020a), it is determined that what was planned for reflects aspects of certain patterns at relevant scales, but they are not fully captured as described in the Foundries of the Future book (Hill, 2020) due to a lack of or an unintentional consideration of light industry. It is apparent that the details of the plans were not developed to explicitly accommodate the needs or requirements of local productive businesses, especially spatially. The lens applied by the municipality favours other ambitions like public space, sustainability goals, and housing construction mandates, rather than focusing on safeguarding and accommodating productive activities in NDSM-Werf. However, there is the opportunity to adjust and further develop the patterns in which light industry and production activities are integrated accordingly. For instance, when examining proposed spatial elements at the block scale, the patterns that were identified

are not typically linked to light industry. However, they have the potential to be implemented in that regard. On the other hand, when examining the plans for a Creative-Maker district in NDSM-Werf Oost prepared by Made up North, it is apparent that considerations for light industry specifically the maker sector were the main priority and goal for the development proposal.

Spatial (design) considerations were identified as critical in ensuring that light industry will be integrated properly in an urban mixed-use environment, especially at the initial stages of a development as it will be difficult to incorporate them at later stages.

Figure 115: Existing business spaces for businesses light industry activities in NDSM-Werf Oost [Own photograph]

Key Conditions: Summary

The **six conditions** examined above are considered as important factors in determining the likelihood of light industry integration in mixed-use developments within transformation areas in Amsterdam. At the city level, the municipality seems to be committed to pursuing the realization of live-work environments through the transformation of industrial sites as a strategy to retain and foster businesses, including light industry in the city. However, in the case of NDSM-Werf, this research revealed that most conditions are not effectively contributing or supporting this integration. It is apparent that the essential elements of these conditions are present, as highlighted in the findings above, but are either not fully developed, addressed, or supported regarding light industry in the context of the transformation of NDSM-Werf. In addition, it has been determined that these conditions are not mutually exclusive as there are interrelations between various conditions, in which can influence each other. For instance, land ownership (condition #2) of a particular site area can play a big role in how the planning/policy process (condition #1) at the site and block scales are structured and implemented. Another example is how the spatial design considerations of light industry captured in Condition #6 can be better incorporated or at least considered in the planning/policy process at the site scale and achieved through improved stakeholder relations and collaboration measures (Condition #4). The priority should be directed at developing clear planning procedures and strengthening capabilities to coordinate and collaborate between the municipality and other key stakeholders as it relates to the integration of light industry in new urban mixed-use developments.

Figure 116: A mooring post relic from when NDSM-Werf was an active shipyard [Own photograph]

7.2 Discussion

In this sub-chapter, the above conclusions are discussed. First, the main aspects of the Literature Review are revisited to demonstrate how the findings of this research study adds to the existing body of knowledge regarding the topic of (light) industry in urban (mixed-use) environments. This is followed by discussing the application of the conclusions to the broader scope, and the limitations of the research.

7.2.1 Confronting the Existing Literature

As stated previously, this research study centres around the case study of NDSM-Werf; an industrial site in Amsterdam that is currently being transformed into an urban live-work (mixed-use) district. To determine how the conclusions fare against what has been captured in literature up to this point, the most prominent claims in the literature review are †aken into consideration. The majority is captured in the problem statement that formed the basis of this research study. The following observations were made:

In the Literature Review, industrial/employments lands were found to be in significant decline due to redevelopment pressures. In support of the literature, the research identified that Amsterdam is also experiencing a significant loss of industrial lands similar to that of the situation in London, UK. However, in comparison to the situation in London, in which Ferm & Jones (2017) determined a lack of consensus regarding how industry should be handled and supported with the city boundaries, it is quite clear that the municipality of Amsterdam has a strategy in place that focuses on realizing live-work neighbourhoods, but it is not yet clear if it will be successful. In addition, it is revealed that these efforts will not be sufficient in addressing the significant shortage of industrial lands that is forecasted to continue to occur.

On bringing back industry into the city, employment creation, local production and innovation, and livability are some key motivations and influences captured in the research of Hatuka & Ben-Joseph (2017) and Hill (2020). In the case of Amsterdam, reshoring efforts do not seem to be a major influence as of yet. Instead, the priority is more so allocated towards maintaining existing work functions within the city boundaries, including light industry, to ultimately stimulate and sustain the local economy amidst the growth in housing. It is recognized that the city is more open to accommodating more advanced manufacturing activities, which only account for a segment of the scope of light industry for this research.

Regarding stakeholders, Ferm & Jones (2016) stated that not all actors recognize the value industry brings to cities. This particular claim is found to be valid in Amsterdam, specifically the case of NDSM-Werf. Through this research study, it was apparent that there is a level of resistance by certain stakeholders regarding (light) industry being integrated into the new mixed-use district especially at the building level

Especially when housing is involved due to engrained perceptions of nuisance and conflicts linked to industry presence. At the same time, stakeholders, especially light industry businesses, benefit from being in urban locations in terms of access to suppliers and customers and exposure to future customers. Certain representatives of the municipality who were interviewed recognized the value of having light industry in urban environments like NDSM-Werf, but are limited in implementation in terms of proper means and support.

The Literature Review also captured the claim made by Hatuka & Ben-Joseph (2017) and Hill (2020) that there is a lack of vision and a clear approach surrounding industry in cities. This is found to be partially true in the case of Amsterdam, as it depends on the scale. For instance, there seems to be a vision/approach surrounding business activities, including light industry at a city level. Still, it does not seem to be reflected or pursued at lower levels (site and block) specifically pertaining to NDSM-Werf. It is important to note that this may differ in other transformation areas like Hamerkwartier, where the municipality seems to have more of a detailed and structured strategy that favours integrating (light) industry as part of the new urban live-work neighbourhood, but is somewhat still experimental.

According to Hill (2020), planners must develop the proper capabilities to support industry in cities while simultaneously addressing pressures from competing land uses like housing pressures. In Amsterdam, the rising housing demand has significantly influenced the development program of NDSM-Werf West in such a way that the allocation

of non-residential functions, including light industry, has shrunk significantly. The planning department seem to want to incorporate light industry as part of the mixed-use landscape of NDSM-Werf, however, the approach taken to retain and support light industry is not consistent, as it seems to vary per block and not overly enforced, as revealed by the leaseholders/developers active in the area. Proper procedures and planning guidelines that distinctly accommodates light industry by the municipality are warranted to ensure that developers realize sufficient and adequate workspaces for light industry.

Overall, it is apparent that this research study's main findings and conclusions reflect and reinforce the claims made in literature, while contributing additional findings to the existing body of knowledge on the topic of light industry integration in mixed-use developments of transformation areas in Amsterdam. By examining a specific transformation site in Amsterdam, NDSM-Werf, more detailed findings were captured, which provides greater context to insight and understanding of the more generalized findings of the existing literature.

7.2.2 Application to the Broader Scope

This research study presents an in-depth diagnosis of the situation as it relates to the integration of light industry in mixed-use developments of transformation areas in Amsterdam specifically through the examination of the case study site of NDSM-Werf. Many key observations were made surrounding the planning/policy system and views, roles of and relations between key stakeholders. it is apparent that the integration of light industry, especially in a mixed-use development, depends on various conditions and factors in order it to be realized successfully.
In the transformation of NDSM-Werf, there are many indications that light industry, especially existing businesses, is vulnerable since they not being prioritized by the municipality in comparison to other ambitions and mandates. This is primarily due to a lack of support through properly structured procedures or means to accommodate light industry integration. As identified through the spatial analysis conducted, there are opportunities to retain and support light industry as part of NDSM's transformation into a new urban live-work (mixed-use) district that can and should be explored and implemented.

When applying these findings and conclusions to a broader scope, it is apparent that they have implications to a wider economic context. For instance, the existing approach to transform NDSM-Werf especially NDSM-Werf West is heavily regulated in a manner that does not seem to favour the integration of existing light industry as part of the desired mixed-use urban landscape even if the intention is there. This makes it very difficult for small-scale light industry businesses especially those that have or are perceived to have nuisance-related activities, to remain or even to want to operate in these environments during and after the transformation.

The integration of light industry in urban environments especially in transformation sites specifically via mixed-use, was determined to involve various challenges and concerns at the building level. However, if they are managed properly through innovative measures and the other identified conditions are addressed accordingly, there a high likelihood that light industry could be successfully integrated and contribute significantly to cities like Amsterdam and the businesses themselves.

When it comes to the transferability of the research, the research approach is appropriate when examining other transformation sites, especially within Amsterdam especially since the same municipality body is involved. However, since this research centres around a case study approach, the findings may not exactly translate to other sites due to the possible differences in the following factors: land ownership, municipality's priorities for the site, and spatial characteristics. The key conditions identified in this research study as it relates to the integration of light industry in the mixed-use development of transformation areas should still apply especially in the Netherlands context. Still, they will most likely yield different outcomes per condition. It is important to note that it may not be appropriate to use this approach to compare transformation sites in various cities in the Netherlands due to the other conditions. For cases outside of the Netherlands, the erfpacht ground lease system, in particular, would not be transferable as it is very specific to the Dutch context especially Amsterdam.

7.2.3 Limitations of Research

When preparing and conducting the research study, many limitations were encountered, mostly related to COVID-related measures during most of the experience. In addition to this, there was a significant language barrier to overcome, which took a considerable amount of time and effort when translating essential documents to English; however, it was a very valuable exercise. The interview process was overall quite successful. The amount and quality of input received exceeded expectations. Additional documents that certain research participants provided for the purposes of the research were found to be valuable. It would have been beneficial to gain more insight from local light industry businesses to gain a more well-rounded representation of that stakeholder group. However, the timing to connect with these businesses was not ideal due to the sensitive situation surrounding the greenery/sports proposal. It would have also been advantageous to have interviewed representatives of active housing associations in the area to acquire direct input from the perspective of the housing component of the live-work district. It would have also been insightful to gain direct knowledge from a municipal representative working on the Hamerkwartier project to contrast the two transformation projects.

7.3 Recommendations

Based on the research conducted and the conclusions made in this study, the following recommendations are provided, which are divided into the following sub-groups: city scale, site scale and future research.

7.3.1 City Scale: Amsterdam

FIrst Recommendation

It is apparent that efforts are being made by the municipality (especially the economic department) to accommodate existing businesses including light industry in sites designated for transformation, by identifying which businesses can be mixed and which need to be relocated accordingly. However, this light industry lens is not applied at lower scales. For the next step, it is highly recommended that a **structured, city-wide planning procedure directed at retaining and supporting light industry** (existing and new) in urban environments specifically industrial estates under transformation is implemented or at least seriously considered. In addition, it is crucial that **key stakeholders** including NGO's, business associations, light businesses and developers are **engaged** continously through the development process and coordination between key municipal departments is improved while ensuring that efforts to gain relevant knowledge regarding the needs and requirements of light industry businesses especially in sites designated for transformation are continued to be made.

Second Recommendation

To go hand-in-hand with above recommendation, it is recommended that **additional capacity** is incorporated into the municipality's current organizational structure to fully handle matters surrounding the integration of light industry. An alternative is to **allocate/facilitate** this responsibility to a separate entity in which could take on a curator role as it relates to advocacy of light industry businesses, workspace retention and allocation efforts, and handling coordination and communication between the municipality and light industry businesses. This would be most effective at a city-level with designated coordination at an area as it is not realistic to have a separate body per area-wide transformation project.

Figure 117: Maker ateliers/ workshops in IJ-Hallen, NDSM-Werf Oost [Own photograph]

Third Recommendation

Through this research, the municipality is also recommended to be more open to and implement **alternative financial incentives** to ensure affordability for not only light industry businesses to establish their operations, but also for developers to be able to realize these workspaces especially in transformation areas. The cross-subsidy arrangement in particular, which has been implemented in various cities with success, should be seriously considered.

Fourth Recommendation

As shown in the research, there is a need for measures to safeguard adequate and sufficient workspaces for a **range of light industry activities**. Instead of following a rigid development structure where regulations are in place that consequently limit the amount of non-residential functions that can be realized inthe plinths of (new) building blocks (including light industry), there should be **more flexibility** to accommodate light industry at a block level and more organic development in general. This can be done by allowing for certain blocks within a transformation area to comprise of only light industry-related functions while still achieving mixed-use at a site area level. This particular recommendation is most likely not feasible in NDSM-Werf especially -Werf West as the transformation process is already well underway. However, there is potential for NDSM-Werf Oost once the development freeze is lifted in 2028, as well as other industrial sites designated for transformation in Amsterdam along the IJ.

Fifth Recommendation

When transforming industrial estates, it is recommended that efforts to retain and maintain existing buildings in which light industry activities currently operate in are made before deciding to demolish them to realize new buildings, in which the rental prices for light industry would be significantly higher. Through the interviews with active developers, this is something already being considered in the redevelopment of a one of the A-blocks of NDSM-Werf West. This is also being considered in the transformation of Hamerkwartier further along the northern banks of the IJ. To further expand on this, it is also recommended that opportunities for these businesses to be more directly involved in the ownership and management of these buildings/ workspaces thorugh some form of a collective organization are available and promoted. There are example cases of this in Den Haag (Binkhorst) and Rotterdam (Keilewerf).

Sixth Recommendation

As stated in the literature review and the Empirical research conducted, there is an ingrained perception that industry even if it is considered as 'light' automatically leads to the creation of nuisance and ultimately conflicts with other land uses. In reality, due to advance technologies that addresses issues such as noise and pollution, the operation of light industry activities typically involve limited nuisance in urban environments. To **debunk the perception of nuisance**, transparency is necessary, which can be best achieved by showing those, who are not convinced about light industry, example cases (precedence) through site visits. It is important that the opportunity for people to understand through direct experience are provided prior to confronting the situation. In addition to this, (re)branding light industry in mixed-use developments through effective marketing is also recommended.

7.3.2 Site Scale: NDSM-Werf

Recommendation

For NDSM-Werf, the case study of this research, it is highly recommended that the spatial-related opportunities that are identified under the Spatial Dimension through the application of most relevant patterns from the Pattern Language from the Foundries of the Future book (Hill, 2020) are considered and strategically applied. It is determined that the likelihood that they are implemented does vary depending on where in the site areas. For instance, for the B-blocks of NDSM-Werf West, application of patterns pertaining to light industry are the least likely to be implemented as redevelopment is ongoing or already complete. However, for the remaining A-blocks, in which development proposals are currently being prepared by leaseholders, there is a higher possibility for patterns identified as opportunities to actually be taken into consideration and applied. For NDSM-Werf Oost, due to the development freeze in place, there is time to shape the approach taken to redevelop the sub-area and incorporate the opportunities identified as well as the patterns captured in the *NDSM Maakstad* proposal prepared by Made up North (2020).

Figure 118: SIgnage in NDSM-Werf [Own photograph]

7.3.3 Future Research

Within the scope of this particular research study, there were certain aspects of the research topic that were not included or explicitly covered. In addition, there were also elements that were determined important in relation to the integration of light industry in mixed-use developments of transformation areas in Amsterdam when conducting the Empirical portion of the research that were only examined at a surface level. As a result, further, more-in depth examinations of the following research topics are warranted and highly recommended.

• Adapting the research approach/methodology of research study with the purpose of **comparing multiple sites** in the same city (i.e., industrial estates in Amsterdam designated for or under transformation) at different stages of redevelopment. Variables that could differ include: priorities and intentions of the municipality, site conditions like land ownership situation, stakeholders involved as level of influence may differ.

• Examining the **business cases** of different mixed-use typologies in which light industry workspaces are included at different scales (building versus block or site scale) to determine in which circumstance(s) the business case is the most attractive/feasible.

• Conducting operational research by developing a model through linear programming to determine the **best combination of different functions** including light industry, in which each function would be assigned a different added value based on certain established criteria.

• Examining the **circularity angle of light industry** in an urban environment to determine how feasible it is to incorporate circular measures to existing light industry activities/functions spatially and potentially their supply chains. This would involve focusing on the patterns in the Foundries of the Future book (Hill, 2020) that are geared towards sustainability and circularity.

7.4 Reflection

7.4.1 Research Topic & Position

For my Master's thesis, a significant amount of research was carried out in order to determine the topic area to explore. By happenstance, the research topic regarding light industry in mixed-use developments was found. Over time, the scope had narrowed down even further to transformation areas in Amsterdam. By choosing a case study approach, incredible insight was gained on the situation on the ground and capture the perspectives and notions of different stakeholders. At the beginning, I was under the impression that light industry could be mixed with other functions with limited issues. Through the literature review, I started to realize that it was not that simple. Through Empirical research, it was determined that the biggest challenge that the municipality has to overcome is developing greater capacities and capabilities to properly coordinate, promote and support the integration of light industry in mixed-use developments in transformation areas in light of the housing pressures that they are facing.

Based on the research conducted, there are **two distinct narratives** at play pertaining to the possible integration of light industry through mixed-use in transformation areas (in Amsterdam): the municipality of Amsterdam (Gemeente Amsterdam) and the narrative of light industry businesses especially those under threat due to transformation plans. In the case study site of NDSM-Werf, it was determined that these two narratives are at most times in conflict with each other. It is critical that they are in alignment with each other to ensure that presence of light industry is safeguarded and supported especially in areas designated for transformation like NDSM-Werf.
In regards to mixed-use as a feasible means to integrate light industry in transformation areas, my position surrounding this is that mixing more traditional forms of production and urban manufacturing is more feasible at higher levels (block) in which clustering of similar activities could be realized, while more advanced forms for light industry is a more viable option at the building scale. Through my interviews with research participants, it was determined that attempting to intertwine more industrial functions especially more traditional forms with housing for instance is not ideal for many reasons including higher likelihood of conflicts and a less attractive business case. In the next section, my reflection in regard to my research approach and process are elaborated on.

8.4.2 Research Approach & Process

To recap, the research approach was an Empirical study using a case study design. The selected data collection methods include documentation analysis, semi-structured interviews and additional desktop research were used as data collection methods. Stakeholder mapping and a spatial component was also included as final products of the research study.

For the documentation analysis, the majority of the planning and policy documents were found via desktop research with the exception of the documents at the block level which were provided by a research participants post-interview. One thing to note regarding the documentation analysis process was the fact that the majority of the documents and plans were in Dutch and needed to be translated to English. This was a significant undertaking that took tremendous time and effort. In addition, there were certain documents that were very relevant to tge research that I became aware of much later than I would have wanted, which included *Ruimte voor de Economie van Morgen* (Gemeente Amsterdam, 2017), *Bedrijvenstrategie 2020-2030* (Gemeente Amsterdam, 2020b), and *Hamerkwartier Werkt* (Gemeente Amsterdam, 2020c). I made the realization that if these specific documents were found sooner, there is a chance that different case study site would have been selected and the enture research topic would have been approached differently. This is mainly due to the fact that one of the first preliminary findings from reviewing the documents was that Amsterdam is further ahead in terms of policy surrounding business/industrial spaces in new mixed-use environments than originally expected. In addition, the lack of familiarity with the area (Amsterdam) as well as Netherlands as a whole made it additionally challenging to attain a good grasp on the situation relating to the research topic. However, a significant amount of knowledge from the experience was gained, which was recognized by the majority of the interview participants who were interviewed.
For the semi-structured interviews, the sampling techniques of both snowballing and stratified

under the sampling method of Purposive Sampling were selected. The snowballing technique was successful as it led to key interview participants especially within the municipality of Amsterdam from different departments at different levels with relevant knowledge. The stratified technique was also useful as it allowed me to develop sampling groups that provided structure as I moved forward in the interview process (Public, Private, Third Party, End-Users). One sampling group that was not initially accounted was Experts. This stratified sampling grouping emerged as a result of snowballing, in which someone had recommended that I reached out to certain persons with extensive knowledge in relation to my research topic but are not direct stakeholders. In comparison to the language barrier that was encountered when analyzing the Dutch documents, conducting interviews in English up to this point has not become a problem. For convenience purposes, the Dutch translations of key terminology were memorized such as the names of specific planning/ policy documents in case the interview participants were not aware of the English translations. By doing this, the interview participants were engaged more effectively. The majority of them were impressed with the level of preparation and knowledge I had pertaining to the municipal documents and planning publications.

In preparation for P4, certain challenges that were not forseen were encountered. For the documentation analysis portion, the size of this undertaking was underestimated, which led to it taking up a significant amount of time and effort. Another time-consuming task was coding and trying to determine the most effective way to capture the data of the interview input. Once the three dimensions of my Empirical research were better defined, things fell into place.

When reflecting back on the relationship between the graduation topic, the MBE master track and the master programme, the research was initially conducted from a management perspective while touchiing upon multiple urbanism elements related to mixed-use. Over time, the research evolved and ended up focusing on transformation areas in Amsterdam, the development process that is involved and determining the likelihood of light industry integration in these new live-work (mixed-use) areas. Both urban development management and urbanism continue to be evident in the research especially since stakeholder mapping and a spatial component are key outputs.

Within the academic and scientific realm, this graduation work can contribute relevant and pertinent knowledge to many areas such as urban planning, real estate development and even economic development as industry is typically considered as a weak land use compared to higher-valued land uses such as commercial and housing. In addition, industry is one of the harder aspects of the economy to mix with other land uses, especially sensitive functions, therefore this graduation research should provide greater insight on current and planned efforts to achieve this in new mixed-use development in transformation areas.
It is strongly believed that the findings of this graduation research can contribute to the wider social, professional, and scientific framework. As scarcity of space in urban environments (cities) is becoming more prominent, solutions involving mixed-use and a more integrated approach to urban development in which work functions such as light industry activities are not disregarded is crucial. With this research, the aim was to shed light on the situation in transformation areas in Amsterdam and to reveal the opportunities that need to be taken advantage of in regard to integrating light industry in new mixed-use neighbourhoods without housing overtaking the area. Since Amsterdam is quite a unique urban environment in terms of the planning system in place as well as spatially, the transferability of research findings and conclusions to other cities even within the Netherlands may be limited, however, it is most likely relevant and applicable in other designated transformation live-work areas in Amsterdam that either has existing light industry activities and/or have potential in attract new businesses.
During the research progress, no issues were encountered when attaining information from the research participants interviewed. In most cases, they were more than willing to share their knowledge and perspectives on topics brought up during the interviews. To avoid any potential ethical issues, consent forms were sent out that touched upon the follow items: participation, recording purposes and confidentiality. The level of confidentiality preferred by each research participant with any research outputs was confirmed (i.e., name of participant and/or company).

In hindsight, the research approach chosen is still appropriate and effective; however, slight adjustments and refinements were required to be made due to COVID-related circumstances. Overall, the thesis experience was challenges, but ultimately rewarding.

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Appendices

Appendix A: General Interview Guide

Researcher: Jamila Jones

General Brief

In recent years, industry in the urban environment has gained significant traction, greatly influenced by technological advancements and business trends such as reshoring and re-industrialization. As a result, there is considerable competition for available space in urban environments with other land uses considered of higher value. Under the supervision of Erik Louw and Birgit Hausleitner, this master's thesis focuses on the integration of **light industry** in mixed-use developments of transformation areas in Amsterdam. Within the scope of this research, light industry covers a broad range of activities such as urban manufacturing (traditional and advanced), makers in the creative production sector, repair & refurbishment services, and supporting activities like distribution that can be integrated into a live-work environment. The research aim is to examine the likelihood/feasibility of the integration of light industry in urban mixed-use developments as part of transformation projects. A case study design approach is used which focuses on NDSM Werf in Amsterdam Noord. This included capturing the processes and planning instruments that guide the transformation of industrial lands into mixed-use districts, the means of public bodies to retain and promote light industry and the interests of different stakeholders including public, private and third parties/NGOs in the context of NDSM-Werf.

Please note that this interview is also part of research into the spatial conditions for the manufacturing industry and the relationship between making and living in the city, under the lead of Birgit Hausleitner, TU Delft. Earlier research by TU Delft[2] and Platform31[3] has shown that the manufacturing industry and its place in the city are becoming increasingly important, but that there is still little knowledge about the location conditions of manufacturing companies. The demand for mixing functions in the city is increasing. In order to properly determine whether and where mixing is possible, it is important to better identify the wishes and needs of the manufacturing industry, as well as understanding the framing conditions set by the planning authorities. With this research we want to explore under what conditions mixing is possible, when mixing causes problems and where interesting local solutions have already been found. In this research, we focus on the Amsterdam region.

2 Cities of Making (TUD): https://citiesofmaking.com/cities-report/
and https://books.bk.tudelft.nl/index.php/press/catalog/book/ISBN_9789463662475

3 Getting Started with the New Manufacturing Industry
(PF31) https://www.platform31.nl/publicaties/aan-de-slag-met-de-nieuwe-makingindustrie

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Research Participant: [To insert]
Type: Semi-structured interview
Virtual Platform: Zoom or Microsoft Teams
Length: 1 hour (approximately)
Date: [To insert]

Practicalities

The interview will adhere to the following structure:

The researcher (interviewer) is to ask the research participant if the interview can be recorded (both video and voice).
Once recording starts, the interviewer is to ask research participant again about obtaining permission to record and to reintroduce herself.
The interviewer is to ask the research participant about the level of confidentiality he or she prefers. For instance, is it okay for the name of the company and/or name of the participant to be included as part of the empirical research?

Introduction

1. **Short description about researcher (interviewer) and the purpose of the interview**
2. **A brief explanation of the interview guide – to break down into topic areas**

Background Information about research participant & organization

1. **What is your role at [insert organization name]?**

2. **For how long have you been working at [insert organization name] in your current role?**
    a. Probe: How long have been involved in the NDSM-Werf project?

Light industry in the live-work (mixed-use) environment (scope/definition)

1. **How would you define light industry in the context of a mixed-use environment?**

General (Transformation) Questions

1. **Background on transformation and intensification designations in Amsterdam over the years**

2. **What are the typical factors and/or driving forces behind the transformation of large urban areas like industrial estates?**

    a. Probe: How have space scarcity and housing pressures specifically influenced decisions to redevelop these areas in Amsterdam?

3. **What are the steps involved in the transformation of industrial estates? Does it depend on the site?**

4. ***Omgevingsvisie 2050*** **- What are the major changes and impacts to spatial planning (compared to Structuurvisie Amsterdam 2040) e.g. increasing shortage of business space?**

5. **According to the *Ruimte voor de economie van Morgen/ Space for the Economy of tomorrow document*, sufficient space for other forms of work and activity outside of the knowledge-intensive sector (i.e. local services and production) will also be provided in new urban areas. How is this to be achieved? Is this still a priority?**

6. **What are the economic opportunities and expected benefits of integrating light industry businesses (small-scale production, craft, distribution) in new live-work environments? What are the municipality's main challenges and likely approach to developing live-work environments?**

7. **Can you provide Input on government's capabilities, capacities, and approach to urban (re)development specifically transformation sites like NDSM-Werf?**

    a. Their policies (statutory and non-statutory

    b. Their approach to transforming industrial estates

NDSM-Werf: Development

1. **From your point of view, how does NDSM-Werf fit in the overall scope of the (redevelopment) of the Northern banks of the IJ?**

2. **What are the municipality's interests and priorities when it comes to NDSM-Werf?**

    a. Probe: Does it differ between NDSM-Werf West and Oost?

    b. Probe: What are the means to achieve these interests? Are they working or are there limitations?

    c. Probe: Have they evolved over time (during the transformation process of NDSM-Werf)?

3. **Collaboration efforts: Which stakeholders are most involved with in the transformation of NDSM-Werf into a living-working district?**

    a. What interests do these stakeholders represent? Any conflicts? Any big differences of opinions or interests?

    b. Probe: In your opinion, are the municipality's interests and priorities when transforming NDSM-Werf in alignment with these other key stakeholders?

4. **What is the land ownership situation in NDSM-Werf?**

    a. Please elaborate on the erfpacht system

b. Probe: In your opinion, does ownership impact development possibilities and effectiveness of planning measures? What at the benefits of imposing ground lease rules (kavelpaspoort) to 'landowners'? Are there limitations of this?

c. Would it be a different situation if it was all private-owned land? What about fragmented ownership?

NDSM-Werf: Mixing of Functions

1. **According to the *Ruimte voor de economie van Morgen/ Space for the Economy of tomorrow* (2017) document, NDSM-Werf has been designated as a Creative Neighbourhood (a live-work classification) while the surrounding sub-areas are classified as Productive Neighbourhoods. What criteria were used to determine this designation for NDSM-Werf?**

2. **What is your position regarding mixing manufacturing, in terms of light industries in mixed-use neighborhoods? Any specific pros and cons?**

    a. What challenges do you see emerging in implementing light-industry in a mixed-use environment like in NDSM?

    b. Would you have a different opinion if housing is not involved but other functions (that are more compatible; less tricky)? Clustering of similar activities? Mixed-use at a block/area scale?

    c. Probe: the feasibility of the mixing from your perspective - building vs block/area scale?

    d. Any concerns about conflicts with neighbouring residents?

    e. For active developers in the area: Is this something you would consider for your (re)development projects? How does this impact your business case?

3. **In your opinion, where does the municipality stand in regard to retaining and supporting existing business that I (interviewer/researcher) would consider as 'light industry' in NDSM Werf (i.e. production/craft activities situated in NDSM-Werf Ooast as well as the norther plots of NDSM-Werf West)?**

    a. Are there other priorities that are being prioritized?
    b. What about other stakeholders?
    c. Probe: Is there a greater interest in adding housing and creative office stock?
    d. Probe: Level of consultation with key stakeholders
    e. Probe: Are regulations or cross subsidization initiatives in place to retain and attract specific types of production/manufacturing businesses? Functions that are typically not considered as high-valued? For example - the regulation of a specific price per sq m in the plinth for workspaces? Or is it more commercial in the plinth?

4. **NDSM Maakstad: Creative maker's district being proposed and advocated for by Made Up North in NDSM-Werf Oost - Any input regarding this?**
    a. Probe: Is this something the Municipality would entertain or have considered?
    b. Probe: Any strong elements? Weak elements?

Wrapping up

1. **Short conclusion and gratitude for the research participants' participation.**
    a. Ask if I can follow up for additional questions if needed
    b. Ask if she can provide any relevant documents in relation to the development of NDSM-Werf
    c. Ask if there are any other persons that is relevant for my research

2. **Information about how to follow up on the thesis research study.**

Appendix B: Documentation Analysis Matrix

SCALE	DOCUMENT	AGENCY	YEAR
GENERAL	*Bedrijven en milieuzonering: handreiking voor maatwerk in de gemeentelijke ruimtelijke ordeningspraktijk*	VNG (Vereniging van Nederlandse Gemeenten))	2009
METROPOLITAN REGIONAL SCALE	*MRA 2.0 Agenda*	Metropool RegionAmsterdam	2020
CITY SCALE	*Kleinschalige Bedrijfshuisvesting (Accommodation of Small-scale businesses)*	Gemeente Amsterdam	1999
	Wonen tussen de bedrijeven door (Living between Businesses)	Gemeente Amsterdam	2003
	Handboek Kleinschalige bedrijfsruimte Amsterdam (The Small Business Space Handbook Amsterdam)	Gemeente Amsterdam	2008
	Structuurvisie Amsterdam 2040: Economisch Sterk en Duurzaam	Gemeente Amsterdam	2011
	Koers 2025	Gemeente Amsterdam	2015
	Ruimte voor de economie van Morgen (Space for the Economy of Tomorrow)	Gemeente Amsterdam	2017
	Bedrijvenstrategie (Business Strategy 2020-2030)	Gemeente Amsterdam	2020
	Omgevingsvisie Amsterdam 2050 (Environmental Vision Amsterdam 2050) - Draft	Gemeente Amsterdam	2021
	Hamerkwartier Werkt: Bouwstenen voor de realisatie van het Hamerkwartier als Creatieve Productiewijk	Gemeente Amsterdam	2020
SITE SCALE	*Kleinschalige Bedrijfshuisvesting (Accommodation of Small-scale businesses)*	Bureau Monumenten & Archeologie; commissioned by District Amsterdam Noord	2003
	XXL Urban Plan	Developed by Rapp+Rapp; commissioned by Gemeente Amsterdam - since archived	2002
	Investeringsbesluit NDSM-Werf	Gemeente Amsterdam	2013
	Bestemmingsplan NDSM-Werf West	Gemeente Amsterdam	Original: 2014 Wijzigningplan: 2017 Uitwerkingsplan: 2018 Wijzigningplan: 2019 1e Revision: 2020
	Bestemmingsplan NDSM-Werf Oost	Gemeente Amsterdam	2013
	Actualisatie Investeringsbesluit NDSM-Werf 2020	Gemeente Amsterdam	2020
	NDSM Maakstad	Made Up North	2020
BLOCK SCALE	*Stedenbouwkundig kader NDSM blocks A4-A7*	Gemeente Amsterdam	2019
	Kavelpaspoort A specific version is issued for each plot (once determined to be redeveloped)	Gemeente Amsterdam	N/A
	Erfpacht en groundwaarde bij transformative - Information & Rekenmodel transformative erfpacht – leeg	Gemeente Amsterdam	2020 & 2021
	Stappenplan Transformatie	Gemeente Amsterdam	2020
EXTERNAL PUBLICATIONS	*Ecosystemen van de Stad*	Bernardina Borra & Gert Urhahn (SPcitl)	2021

Appendix C: Interview Details of Research Participants

	Organization	Organization Classification	Research Participant	Name	Interview Date	Interview Method	Sign off
PUBLIC	Gemeente Amsterdam	Municipality	Spatial Economic Consultant	Frank van de Lustgraaf	16 March, 2021	Virtual Online Platform	Received
	Gemeente Amsterdam	Municipality	Head Designer of NDSM	Clemens Nuijens	12 March, 2021	Virtual Online Platform	Received
	Gemeente Amsterdam	Municipality	Land Development Project Leader of NDSM	André Vermeer	30 March, 2021	Virtual Online Platform	Received
PRIVATE	BMB ontwikkeling	Area Development Firm/Leaseholder	Project Developer	Danielle Rossmeissl	15 March, 2021	Virtual Online Platform	Received
	Lingotto Devleopment	Real Estate Development Firm/ Leaseholder	Real Estate Developer	Arda Basak	23 April, 2021	Virtual Online Platform	Received
	COD Development Pioneers	Real Estate Development Firm/ Leaseholder	Real Estate Developer	Ferdi Koornneef	28 April, 2021	Virtual Online Platform	Received
	Brand Activation Company	Company/Leaseholder	Business Owner/Leaseholder	-	21 April, 2021	Virtual Online Platform	Received
THIRD PARTY	ORAM	Business Association	Managing Director	Kees Noorman	18 March, 2021	Virtual Online Platform	Received
	Made up North	Foundation (NGO)	Co-Founder	Marlon Huysman	9 April, 2021	Virtual Online Platform	Received
END-USER	Bicycle Making Studio	Light Industry business recent relocated outside of NDSM-Werf	Bike Maker	-	13 April, 2021	Virtual Online Platform	Received
	Visual Arts & Welding Studio	Light Industry business currently operating in NDSM-Werf Oost	Craftsman/Visual Artist & Activist	Bart Klaar	19 April, 2021	Virtual Online Platform	Received
	Interior Building Business	Light Industry business situated outside of NDSM-Werf	Representative of Fiction Factory	Oep Schilling	22 April, 2021	Virtual Online Platform	Received
EXPERT	Spontaenous City International	Think Tank	Expert #1	Bernardina Borra	29 March, 2021	Virtual Online Platform	Received
	Platform_31	Knowledge & Network Organization	Expert #2	Barbara Heebels	2 April, 2021	Virtual Online Platform	Received

Appendix D: Informed Consent Form for Interviews with Research Participants

Institution: Delft University of Technology
Interviewer: Jamila Jones
Contact Information: J.K.Jones@student.tudelft.nl
Research Title (at time of interviewing stage): Light Industry: Can it survive & thrive in urban mixed-use environments? An Examination of factors that influence light industry integration in Amsterdam's transformation areas

Interviewee:
Date of Interview: [mm/dd/yyyy]

Please tick the appropriate boxes	**Yes**	**No**
Taking part in the study		
1. I have read and understood the study information or it has been read to me [at the beginning of the interview]. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	□	□
2. I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	□	□
3. I understand that taking part in the study involves an interview which will be audio-recorded or video-recorded, transcribed and later analyzed. All recordings will be deleted one year after the submission of the final thesis report.	□	□
4. I understand that the researcher will request for company documents to be used as secondary and supportive resources following the interviews.	□	□
Use of the information in the study		
5. I understand that information I provide will be used for academic purposes such as the graduation thesis research paper and thesis presentation. However, I give my consent to the researcher to use the data collected for future research publication and lectures, unless otherwise stated that specific information is confidential.	□	□
6. I understand that if I choose to, my company and personal identity will remain anonymous throughout the research paper and other output.	□	□
7. I understand that personal information collected about me that can identify me, [e.g. my name or where I live], will not be shared beyond the study team if explicitly stated by me.	□	□
8. I agree that my information can be quoted in the different research outputs.	□	□
9. I agree that any company documents that I share to the researcher may be used and expounded on in the research outputs to support and deepen learnings from the interviews. I will identify any confidential information.	□	□

Future use and reuse of the information by others

I give permission for the publication of graduation thesis that I provide to be archived in TU Delft Educational Depository so it can be used for future research and learning. I understand that all my personal and company information shared will be anonymised through the exclusion of personal and company names. □ □

Signatures

_____	_____	_____
Name of participant [printed]	Signature	Date

I have accurately read out the information sheet to the potential participant and, to the best to the best of my ability, ensured that the participant understands to what they are freely consenting.

_Jamila Karunia Jones__	_____	_[mm/dd/yyyy]_
Researcher name [printed]	Signature	Date

Study contact details for further information:

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