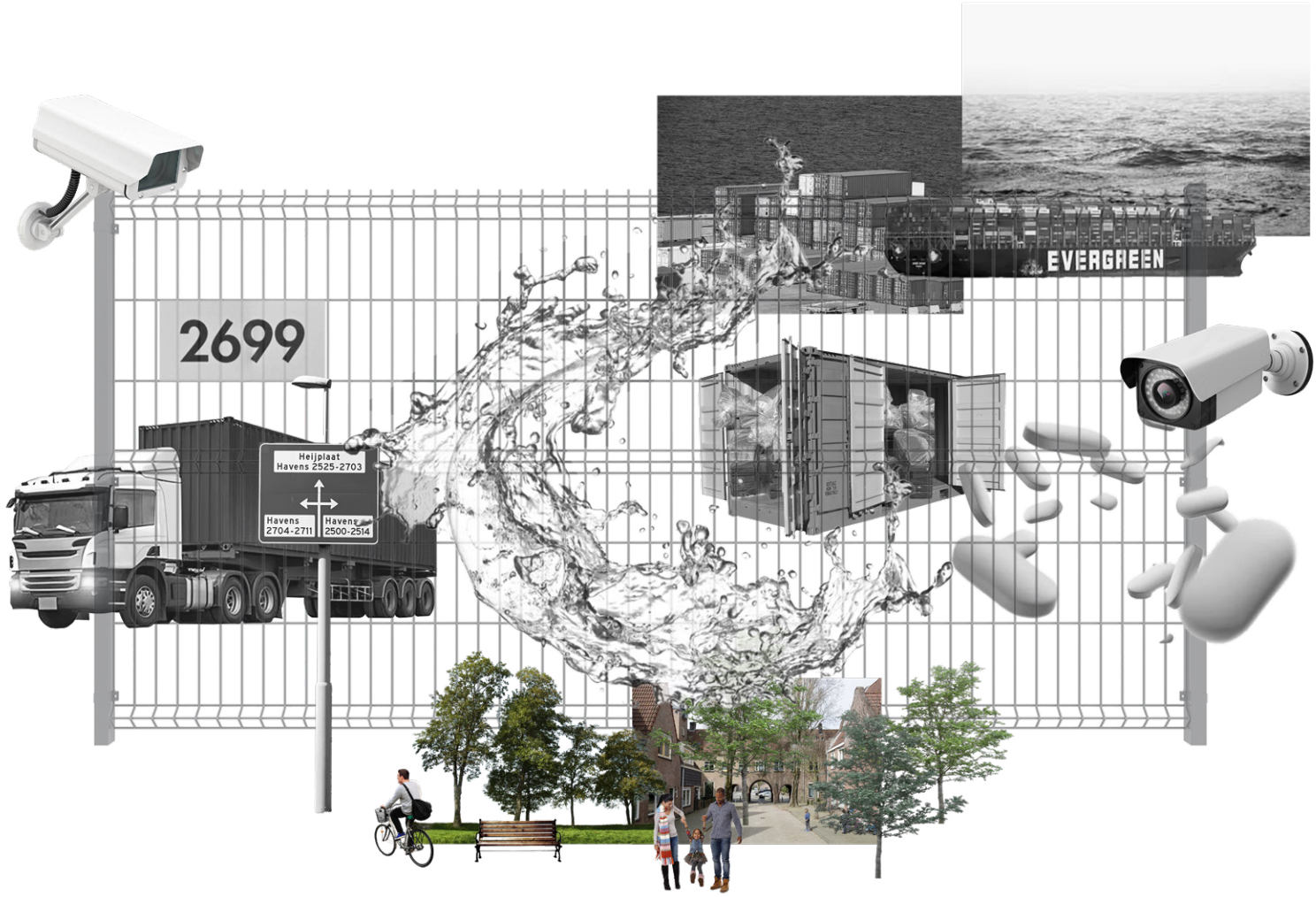

Turning “Virtual Fence” into Safety Net for Heijplaat

External Safety Risks from Working Ports, Elephants around the Port-Nested-Village

Veldacademie Graduation Studio - Resilient Rotterdam
Faculty of Architecture and the Built environment
Delft University of Technology

Master's Thesis Research Report
Turning "Virtual Fence*" into Safety Net for Heijplaat
External Safety Risks from Working Ports, Elephants around the Port-Nested-Village

Keywords
Working Port, Port-Nested-Village, Wijkprofiel, Veiligheid,
Security vs. Safety, External Safety

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June 2025

* "Virtual Fence" is the project by Rotterdam Port Authority under the program "Undermining Crimes."
This is elaborated further on pages 92-93 and Appendix U.

background

port-city

rotterdam center

industrial port

system of security

external safety

foreground

port-people

rotterdam south

residential village

sense of safety

internal safety

background

middle

ground

foreground

port-city

rotterdam center

industrial port

system of security

external safety

port-people

rotterdam south

residential village

sense of safety

internal safety

back-
ground

context and conditions:
what is already established in the
environment and history?

fore-
ground

definitions and boundaries:
where do you pay attention and
where do you direct your focus?

middle-
ground

finding middle-ground:
how do you resolve the differences
between definitions and boundaries
in the specific context and conditions?

back-ground

fore-ground

middle-ground

15km

Rotterdam

Nieuwe Maas

Rotterdam Zuid

Linkeroever Rotterdam Center and Rotterdam South

Willemsbrug
1981
motor vehicles, cyclists, pedestrians, trams

Erasmusbrug
1996
motor vehicles, cyclists, pedestrians, trams

Maastunnel
1942
motor vehicles, cyclists, pedestrians

Van Brienenoordbrug
1965
motor vehicles, cyclists, pedestrians

Heijplaat

Pernis

Oud-Charlois

Carnisse

Tarwewijk

Bloemhof

Hillesluis

Feijenoord

Zuiderpark

Charlois

IJsselmonde

The river Maas is inseparable from the development of the city of Rotterdam. The city sits on both banks of the Nieuwe Maas that flows through and continues far into the hinterland - the direct connection to the North Sea has brought historic, ecological, economic, and social values to the city (van de Laar 2021). As much as this “lifeline of the city” binds the two chunks together, it separates them apart - Rotterdammers from above the river gave the nickname “Boerenzij (the rural side)” to people in Rotterdam South to indicate that the people there were not real city dwellers (TENT Rotterdam 2021).

This graduation studio lays ground in Rotterdam South with a focus on human and social aspects of architecture. I believe that unlocking flows of, with, and around water in our (status quo) dry world can make a city like Rotterdam, particularly Rotterdam South, a testing ground for unique water-human-land integration.

40 meters by 4.5 meters LCD screen at the station hall featuring Rotterdam harbor, Rotterdam Centraal train station, January 2025

infrastructure of delta network: port

ROTTERDAM PORT-CITY

river as the lifeline of rotterdam

PORT as
- brand
- landscape
- workplace
- network

aerial photos - audience of the **port images** and actors of the **physical port**?

water and port: continuosly changing with inflow and outflow

land war between the sea and the city

undefined territory - wet? dry?

"getting lost"

perceiving a port as wilderness

we don't understand the port

port becomes a city with own rights, rules, protocols, system, language, mentality...

city-port antipode from difference in the language and system of thinking

port is a world between the city and the sea

how to make use of the already attractive location?

port reflects

local and world economy

geopolitics

port influences

city identity

surrounding spaces

distinctive/ conflicting spatial needs of the ports and the residentials

development of the port westwards, away from the city

"port as the balcony of the city" -- who is the port serving and what is it serving?

hardware & software, tangible & intangible - integrated or separated?

not designed to incubate humans vs. designed not to incubate humans

why/when do we make it suitable for city dwellers?

ROTTERDAM PORT-PEOPLE

back-ground

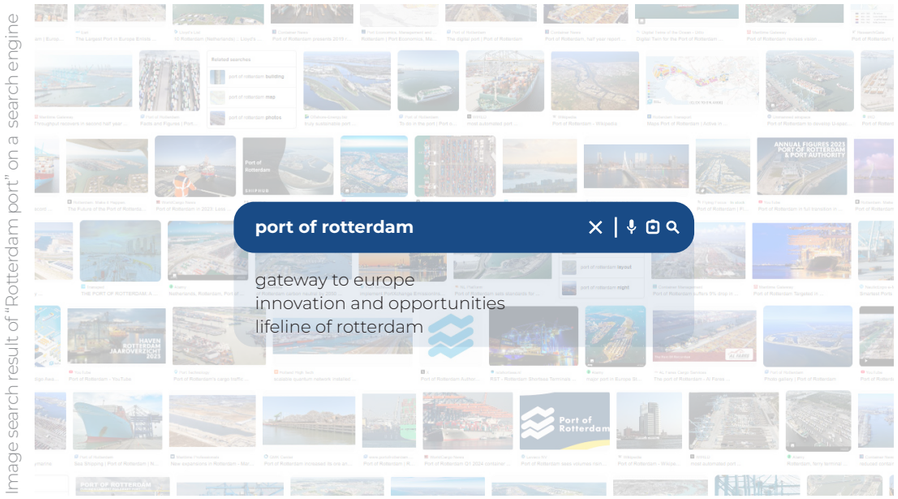
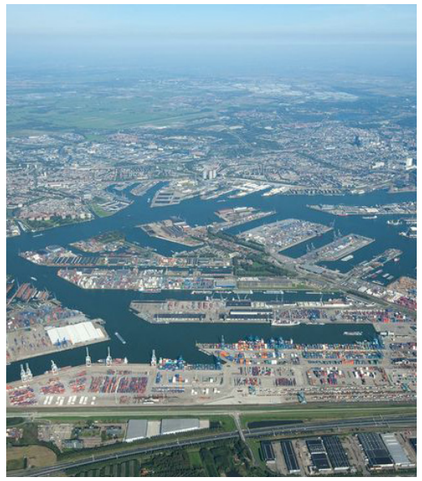


Image search result of "Rotterdam port" on a search engine

Port, a space of flow. As one of the main infrastructures of the delta, the port is a special world between the land and the sea. It is where national and global economies meet and exchange cargos of commodities, bringing opportunities and innovations to the port-city. As a connecting port to the entire network in Europe and beyond, the port of Rotterdam successfully gained its name as “the biggest port in Europe” already in the 1960s (Steenhuis et al. 2015). The port established not only a strong economy but also an identity, brand, and memory for the city.

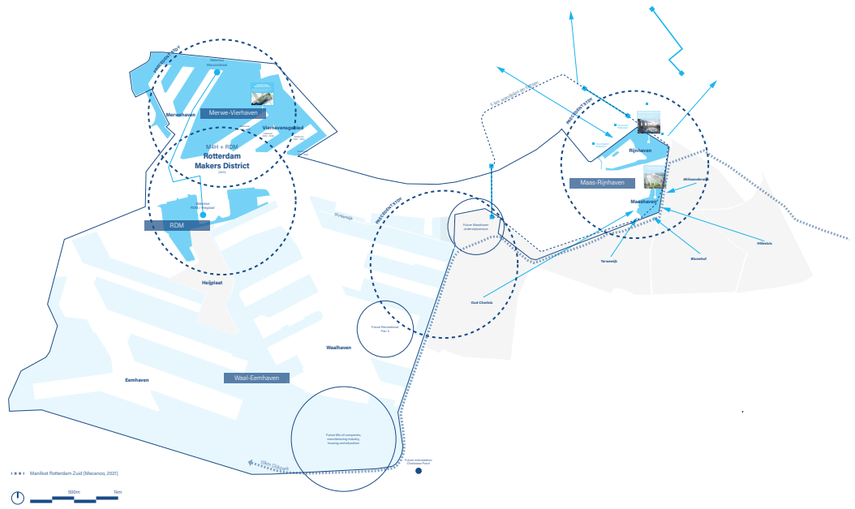
Whereas the port was making the city in the past, today, the city is (re-)making the port. Historically cut deep into the city fabric, the port of Rotterdam has been developing westward towards the North Sea since the 1960s (Appendix A), leaving the ports situated near the city (City Ports; Stadshaven) to the discussion of “keep, get rid of, rebuild”. For example, Maashaven and Rijnhaven have uncovered the potential to rebuild their ecosystem to reflect the urban priorities (i.e., residential



Waal/Eemhaven (left, Port of Rotterdam 2024) and Maashaven (right top, Gemeente Rotterdam 2024a) and Rijnhaven (right bottom, TAUW 2021)

"working ports"

re-making "post ports"



Development of Rotterdam City Ports (Stadshaven)

and park) (Gemeente Rotterdam 2024a and TAUW 2021). These "post-ports", well-connected to the urban core, demonstrate the "renewal of port/city links" (Hoyle 1989, Appendix B), integrating port ground into the urban development as a waterfront. However, Rotterdam continues to employ the romanticized image this manmade landscape offers to the city. Simply searching for images of "Rotterdam port" on a search engine, one can notice that most of the images are taken from a bird's eye view. The question then is, *how do these majestic images make us oblivious of what port delivers to the people of Rotterdam, rather than to the city of Rotterdam?*

Unlike the aforementioned post-ports that transformed into waterfronts with a strong urban motif, Waalhaven and Eemhaven remain as the last working ports* of City Ports. Relatively detached from the urban core, they have continued to develop into the center of container transshipment, logistics, and distribution services. This places the neighborhood of Heijplaat in a complex position. Heijplaat is a small garden village with around 1,900 residents (2024 est.), completely encircled by Waal/Eemhaven. It was originally established by a shipbuilding company, Rotterdam Dry Dock Company (Rotterdamsche Droogdok Maatschappij; RDM, situated at the northern tip of Waalhaven) in 1913. To house the increasing number of skilled workmen in the remote site, its "Old Village (Oude Dorp)" extended southward until the 1920s and westward to form the "New Village (Nieuwe Dorp)" after WWII.

Around the time RDM was going through its final bankruptcy in the 1980s-90s, the village faced a risk of demolition because of the new development plan for port activities (Kamphuis et al. 1998), stricter environmental legislation, and the need for a stricter separation between the port and the city (Rijksdienst voor het Cultureel Erfgoed 2018). It survived through community advocacy "Heijplaat Must Remain (Heijplaat Moet Blijven)" (Gemeente Rotterdam 2023b), and, although the village itself or its people have little to do with port activities today, it has been rebranded as a "Cool Village in the Harbour**" (Appendix C).

* Waal/Eemhaven plots are still operating as "working ports", except for the former RDM plot that now hosts several educational institutions, which is a part of the Rotterdam Makers District.
** "Cool Village in the Harbour (Stoer Dorp in de Haven)" is the slogan used in the the Neighborhood Agreement (Wijkakkoord), established between the Heijplaat neighborhood council and the municipality of Rotterdam.

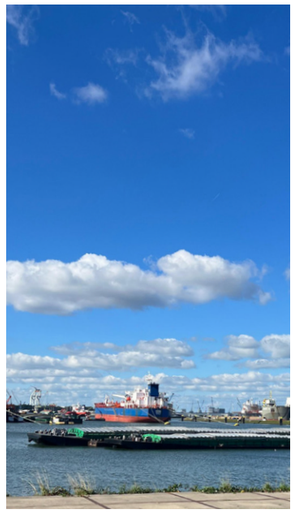


Photo Reportage: Who Would Think There's a Village Inside?
Dichotomy between the port (left page) and the village (right page)

Industrial Background

of Heijplaat Village

Obscure border between the port and the village:
village ground ends where cycle lane ends and port ground starts where paved vehicular road starts

Administratively speaking, the village falls under the jurisdiction of Rotterdam municipality (; municipality), while all the matters of the port are handled by the Rotterdam Port Authority* (Havenbedrijf Rotterdam N.V.; Port Authority). 70% of its shares belong to the municipality, yet, its primary focus lies in port-related operations and infrastructure (Port of Rotterdam 2019). The private interests of the port companies housed at the port and related stakeholders are especially intertwined.

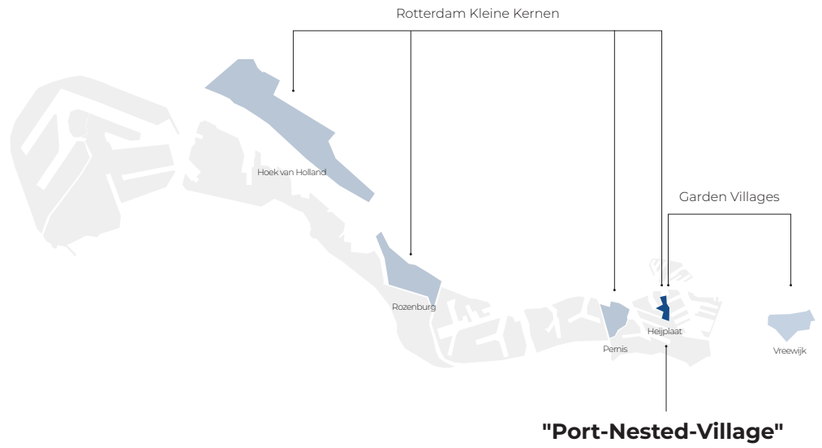
Although the port ground and the village ground are physically adjoining, the mapping of the port functions and the residential functions on the same base map discloses distinctive spatial dynamics - different scales of structure, mobility network, and configuration of the fabric. Even the interrelationship with water is activated differently. Whereas the port utilizes the water “body” for the transport of economies (pages 28-29), residents have limited accessibility to the waterfront,

* Formerly a department in Rotterdam Municipality, it became a semi-private operation in 2004 with operational freedom.

illustrated by fragmented water “lines” detached from the village (pages 30-31). Despite such a strong contrast, the separation between the two grounds is barely legible, revealing that the boundary on the map can be highly deceptive, especially in the case of Heijplaat. The border between the two is rather “sensed” than physically constructed - sensed through the change in the pavement, road signage, the scale and familiarity of the objects on the street, etc. As such, the industrial port and the residential community on the antipode but one physically embracing another makes it exceptionally difficult to integrate or separate the goals and priorities in this area.

Indeed, this specificity calls for a new classification of Heijplaat - it is not directly comparable to other garden villages in Rotterdam (e.g., Vreewijk) or other port-villages of Rotterdam Small Cores* (Kleine Kernen) (i.e., Pernis, Rozenburg, Hoek van Holland). As a “port-nested-village”, it demands more specific discussion about what can trespass over the illegible separation between the two grounds.

New classification of Heijplaat, Port-Nested-Village



* Rotterdam Small Cores are neighborhoods in the port area, at some distance from the city. Heijplaat was added to the list since “Small Cores Approach (Kleine Kernen Aanpak)” launched in January 2024.

Eemhaven

Waalhaven

Water Body for Cargo Transport

Industrial Vehicular Network

All-weather Terminals

Built Structures

Industrial Ground

250m 500m

A15

S101

S101

S102

M4H* + RDM
Rotterdam Makers District

watertaxi

Watertaxi
Quarantaineterrein

Quarantainestation

Watertaxi
RDM / Heijplaat

RDM

D

E

Watertaxi
Heysekade

Nieuwe Dorp

Oude Dorp

bus 68

- Accessible “Waterfront”
- Bike Routes
- Public Transportation
- “Het Oude Dorp**” Focus Area
- Rotterdam Makers District
- Public Amenities/Spaces
- Residential Ground

250m 500m

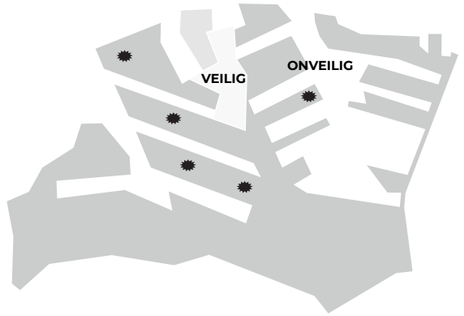
* Merwe-Vierhavens
** “Het Oude Dorp” is a masterplan for the new development in Heijplaat Old Village, drawn between the municipality, the residents, Woonbron housing association, and Port Authority in 2018, targeted between 2025-28. (Gemeente Rotterdam 2018)

Problematization

In this context, we should focus on what being nested in the port can unintentionally bring to the people. The very reason why Rotterdam port is the “gateway to/from Europe” - the geographic location, the economic efficiency, and the robust infrastructure, makes it, especially the working ports closer to the city, such as Waal/Eemhaven, attractive to undermining crimes* (Staring 2019).

From this, one could easily conclude that this port-nested-village may be highly vulnerable to unsafe inflow from the port. However, the Neighborhood Profile** (Wijkprofiel) shows that Heijplaat has been objectively and subjectively a very safe milieu since 2022 (Appendix D). This is surprising, considering the occasional but constant reports on illegal drug smuggling caught on the empty cargo lots of Waal/Eemhaven. The statistics make a simple division for crime data of Waalhaven, Eemhaven, and Heijplaat separately (Appendix E), as if the breakage of “security” in the port does not affect the sense of “safety” in the port-nested-village.

Neighborhood Profile of Heijplaat by the municipality (Gemeente Rotterdam 2024c)



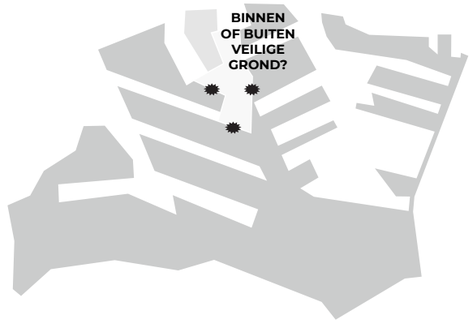
theft violence burglary vandalism nuisance

* Undermining crime refers to a crime that uses legitimate businesses and services for illegal activities (Government of the Netherlands 2024).
** Measured by the municipality on the domains of the physical environment, safety, and social capacity.

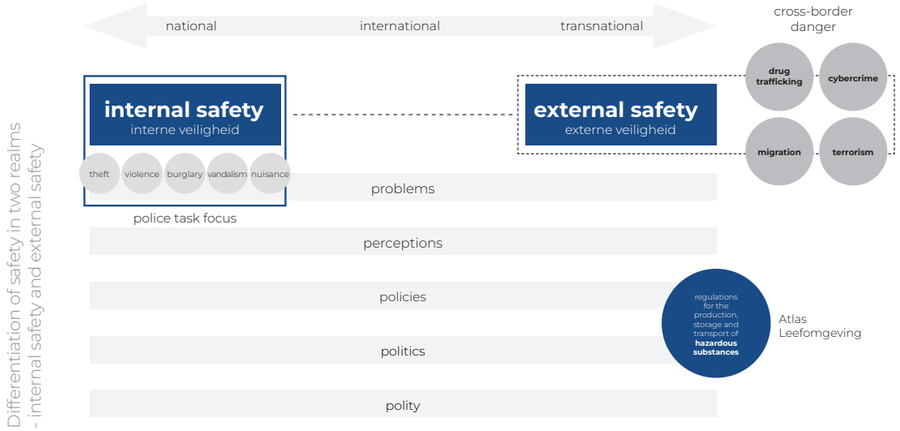
The prevalent utopian stigmatization that the ground before the fence is safe and the ground over the fence is unsafe is questionable, especially when the village and the port share the boundary without a clear threshold. What makes a port-nested-village cordial to all kinds of unsafe inflow must be more than its location, but also the difference and scope of the language of the port and the village - the presence, absence, and misuse of certain notions and terms.

For one, since the birth of the village as a company town, there has been an “imbalance” in force between the two grounds. A port acts like its own city with actors, planning guidelines, legal regimes, and governance frameworks, different from the ones considered for a village. The outcome of such an imbalance in interests either existed in the past or was realized in the past but is still continuing to influence the structure of the village, even after the connection to the port became vague. Today, the imbalance between the village striving to achieve safety for the residents and the port focusing on security for business activities creates a profound gap and results in friction at the interface between the two.

“One step inside the boundary, is it safe?
One step outside the boundary, is it unsafe?”



theft? violence? burglary? vandalism? nuisance?

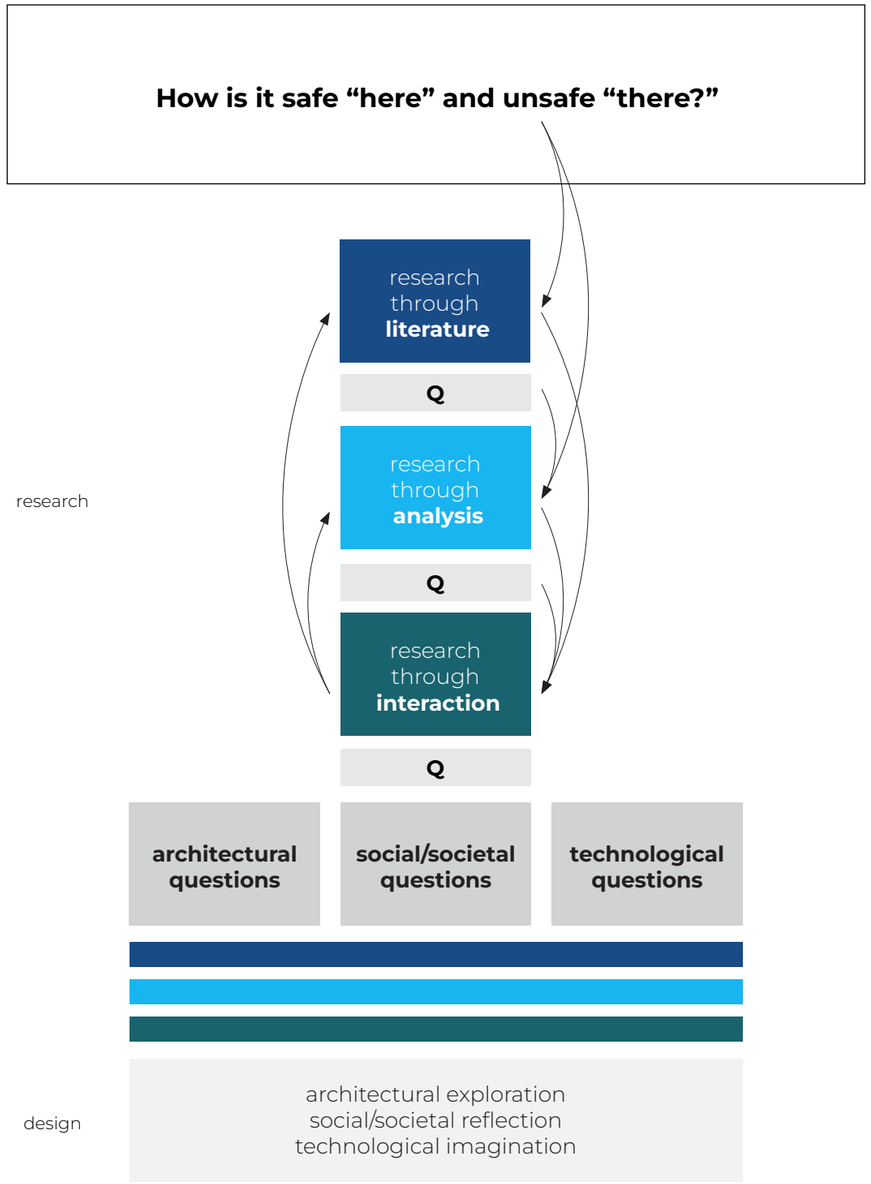


The second problem lies in how the municipality defines safety (veiligheid) in the Neighborhood Profile. The criteria of the safety index are theft, violence, burglary, vandalism, and nuisance, all of which belong to the scope of “internal safety.” The cross-border dangers, which are more relevant in this context, are classified as a distinguished notion of “external safety” (Clingendael 2016). At the moment, the Dutch government defines (and restrains) external safety as the exposure to hazardous materials (Ministerie van Algemene Zaken 2011) and besides, it is not the challenges tackled at the municipality level. For port-nested-village, the scope of safety must be broadened to external safety to address not only the safety risks that originate within the village border but also those that arise from the immediate port. In the case of Heijplaat and Waal/Eemhaven, three external safety risks that occur because the village is nested inside the port shall be identified: road hazards, flooding, and drug smuggling. The current (internal) safety index appears to be a sufficient representation of safety level in other neighborhoods of the city, but Heijplaat must seek the right method for measuring, mapping, and tackling the external safety risks from the port.

Positioning

This is why we need a nuanced and targeted transformation, distinguished from the post-ports transformations. Moving on the chapter **background** with the preliminary research, in the chapter **foreground**, the research will delve into the spatial politics from divergent interests of the port and the village since the 1910s, including the gap between the notion of safety and security, evident through spatial/technical elements on the port and the village today. In the chapter **middleground,** the research will reveal how the identified external safety risks were initiated, why they should be taken into discussion, and how they are/are not being tackled at the moment. The learnings from each risk will hint at the design goals and together form the project brief. In the next stage, the research outcome will be translated into a design project that serves as a middle ground between Rotterdam Center and Rotterdam South, the port and the village, and safety and security, internal safety and external safety.

Can architectural/urban intervention take a part in this? How can we take action to safety-fy the working port of Waal/Eeemhaven and the port-nested-village of Heijplaat as a whole?



Research by Questioning

The research was initiated with a spark of instinctive question upon observing the illogical distinction between security in the port and safety in the village despite the geographical adjacency - “How is it safe here and unsafe there?“ This has led to the first round of questions, which were answered by research through literature, analysis, or interaction in the preliminary research phase (until P1). By the end of P1, further generated but unanswered questions were formulated into the operational questions in three umbrellas: architectural, social/societal, and technological.

Again, in the research phase (P1-P2), research through literature, analysis, and interaction was driven to respond to these operational questions. The combination of operational questions from the two categories will answer one of the sub-questions respectively. Ultimately, three sub-questions together will help provide the possible solution to the main research question (pages 38-39).

Research through literature, including but not limited to:
1) Historical research (e.g., planning report, newspaper, print books)
2) Literature review (e.g., research papers and print books on relevant topics)
3) Data collection from online sources (e.g., Heijplaat local blog/magazine, Port Authority, Rotterdam Municipality/Government of Netherlands, documentary film)

Research through analysis, including but not limited to:
1) (Comparative) mapping series in city-scale and village-scale
2) Analysis of safety/security elements diagrammed into a categorized catalog
3) Cartography, collages, and sketches as a representation of the findings

Research through interaction, including but not limited to:
1) On-site observation and documentation* (e.g., photo reportage)
2) On-field participation** in the port-related events, public events in Heijplaat, and community events organized by the Heijplaat community center
3) Interviews with residents and municipality experts/neighborhood council
4) Discussion with experts on topics related to port/safety/security

* On-site research on week 1.3, 1.4, 1.5, 1.8, 2.3, 2.6, 2.8, and 2.9 (See pages 120-121).
** On-field participation includes: public lecture by Redesigning Deltas group (week 1.2), symposium by PortCityFutures group (week 1.4), volunteering at Harbour Run Rotterdam (week 1.6), and attending PhD Defence on water-sensitive design (week 1.9), and various community events (week 2.3, 2.9)

MAIN RESEARCH QUESTIONS

Can architectural/urban intervention activate spatial qualities that create a safety net for the port-nested-village against external safety risks from the port?

SUB-RESEARCH QUESTIONS

How can we develop a common architectural/urban language between industrial security and village safety?

In what ways can a spatial structure safety-fy the external risks from the port at a local level?

What kind of architectural flexibility and scalability can integrate a public space in the middle of the village and the port?

A1 S1 S2 T1 A2 T2

OPERATIONAL QUESTIONS

A1
How have divergent interests of the village and the port been spatialized since the village was established by the port company?

A2
What are the existing tangible/ intangible elements that create a sense of safety in the village or achieve security in the port?

S1
What are the prominent spatial politics that challenge the port-nested-village to establish symbiosis with the port?

S2
Through what method can we localize external safety risks at institutional, municipal, national, or international levels?

T1
Which current port innovations have the possibility to counteract the identified external safety risks?

T2
What kind of “fence” can be more effective than the current separation barrier in mitigating external safety risks for the port-nested-village?

ARCHITECTURAL EXPLORATION

SOCIETAL REFLECTION

TECHNOLOGICAL IMAGINATION

research through literature

research through analysis

research through interaction

ARCHITECTURAL EXPLORATION

SOCIETAL REFLECTION

TECHNOLOGICAL IMAGINATION

A1 How have divergent interests of the village and the port been spatialized since the village was established by the port company?

historical literature

municipality planning document

"imbalance" diagram over time

interview with neighborhood council "working group"

S1 What are the prominent spatial politics that challenge the port-nested-village to establish symbiosis with the port?

participating in public events in the village

literature review on the notion of "safety" and "security"

Which current port innovations have the possibility to counteract the identified external safety risks?

study of current port innovation introduced by port authority

site observation and photo reportage

S2 Through what method can we localize external safety risks at institutional, municipal, national, or international levels?

mapping of identified external safety risks

How can we develop a common architectural/urban language between industrial security and village safety?

In what ways can a spatial structure safety-fy the external risks from the port at a local level?

CONCEPT DESIGN

"extended" safety index of Heijplaat

T2 What kind of "fence" can be more effective than the current separation barrier in mitigating external safety risks for the port-nested-village?

bridging the antipodes into architecture concept

What kind of architectural flexibility and scalability can integrate a public space in the middle of the village and the port?

A2 What are the existing tangible/ intangible elements that create a sense of safety in the village or achieve security in the port?

catalogue of spatial elements

interview with the residents

summary of research outcome in pages 100-107

"Heijplaat Must Remain (Heijplaat Moet Blijven)" protest in 1990, Coolsingel, Rotterdam (Lampen 2024)

fore-
ground

Old houses on Courzandseweg (Rotterdamsche Droogdok Maatschappij, N.V. 1920)

Just Like Any Other Dutch Village

"... the flowering currant bushes are budding gallantly, and cats roam over the street in search of adventure, only to rush back helter skelter to the safety of home when the children, taking advantage of a quarter of an hour's freedom from school, dash noisily into a street where there is nothing to fear. The houses lie all neatly arranged and scrubbed clean, surrounded by their little gardens*." (Rotterdamsche Droogdok Maatschappij, N.V. 1920)

In his book "Some Particulars about the Garden City Heyplaat", the founder of RDM, M.G. de Gelder, recollected a scene in Heijplaat with "rustic simplicity and calmness of an emotionless existence" (Rotterdamsche Droogdok Maatschappij, N.V. 1920). Even today, walking along Courzandseweg**, the central spine of Heijplaat, it feels like walking in any other Dutch village. Yet, sitting side by side with one of the largest and noisiest enterprises of Rotterdam in the past, the way Heijplaat was spatialized since the beginning was not like any other Dutch village.

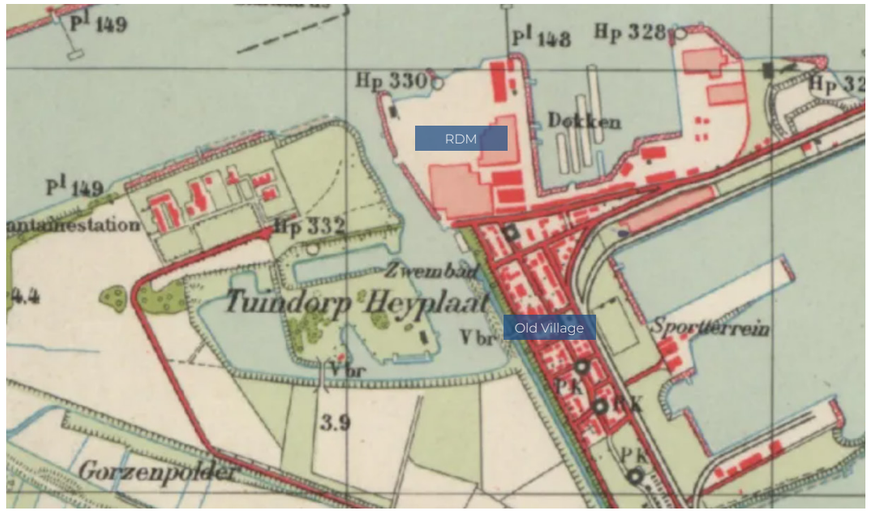
* Original language in Dutch, translated by Google Translate
** Courzandseweg, where more expensive houses were located, was used to be called the "Golden Edge" of the village (Prins 2024).

the “imbalance”

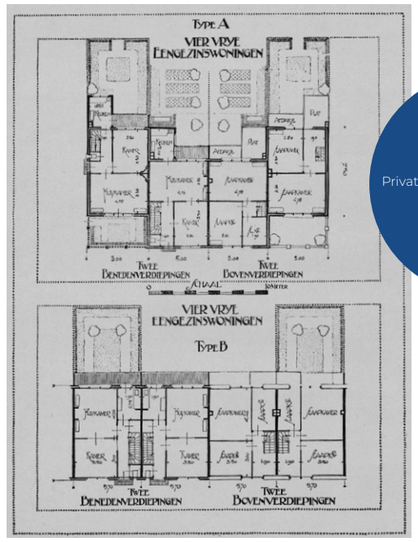
Since the village was first conceived as a company town of RDM, the interests of the port company and the development of the village were deeply intertwined. The balance/imbalance between the private and community interests can be studied in three periods.

The Beginning: 1913 -

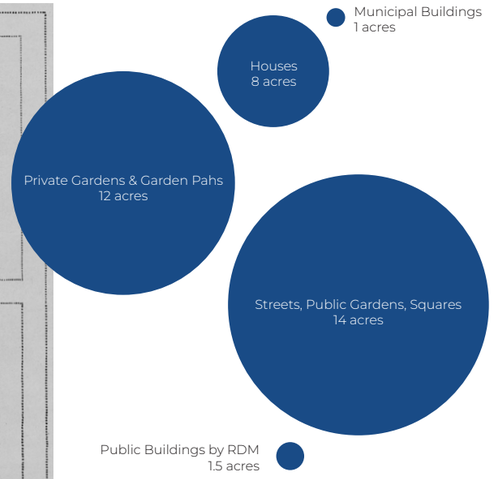
In his book, de Gelder recounted the initial opposition where any kind of development in the village was viewed as only serving the private interests and therefore seen as a selfish venture by the company. However, the need for homes for the workmen in the immediate surroundings of the remote workplace was the first incentive for building this garden village. He believed that raising the standard of living of the workmen is the social duty of the company, and it will benefit the labour-focused company in the end (de Gelder 1916).



Map of Heijplaat, Waal/Eemhaven 1940 (Dicke and van der Zouwen 2006)



Typical plan of the houses in the Old Village (left) and the land use ratio of the village in 1910s (Rotterdamsche Droogdok Maatschappij, N.V. 1920)



In the small piece of elongated land next to RDM, the layout of the district was planned to maximize access to light, air, and ventilation in the house. The village gradually expanded southerly and let hundreds of employees live so close to their work “where everything possible is done for the physical, mental, and spiritual development” (Rotterdamsche Droogdok Maatschappij, N.V. 1916), which met the highest requirements of the time (Huygens Institute 2013).

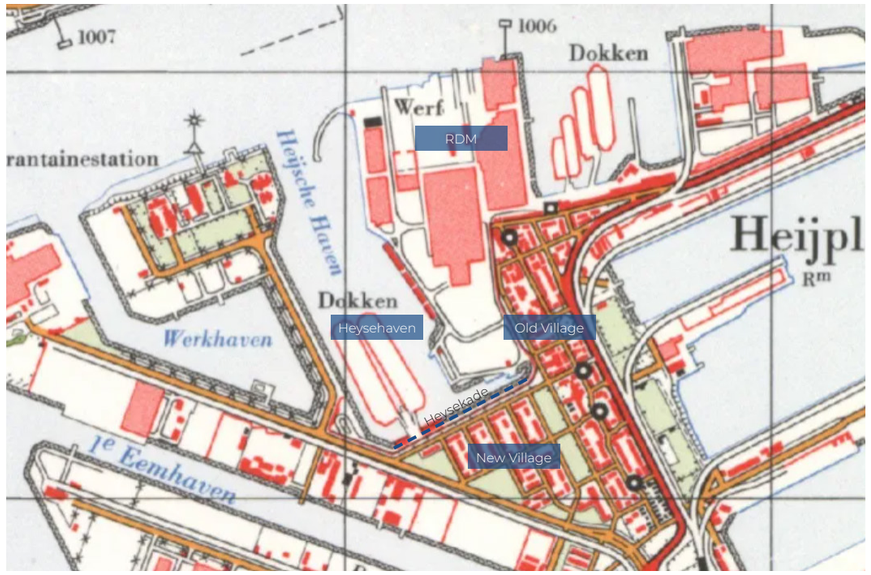
However, only the employees of RDM were allowed to live in Heijplaat, and this means that there was only one group to consider when integrating social interests into the development of the environment. While more attention was paid to the layout and furnishing of the houses, cultivating land and growing vegetables were not regarded as the primary importance for the workers (de Gelder 1916), which resulted in housing types with smaller private gardens. The spatialization of such interest in the past still influences the residents who live in the houses in the Old Village today to pursue an allotment in the community garden* (Volkstuin) away from their home (Appendix F).

* Owned by the municipality, community gardens are offered to Rotterdammers who do not have a garden themselves. There are 44 allotments across the city, of which one of them is located in the South-East part of Heijplaat, right at the interface of the port and the village.

Post-war Growth: 1945 -

After the war, the restoration of the port was given more priority over the reconstruction of the city. The postponed plan of constructing Eemhaven between Waalhaven and the old village of Pernis* was finally set out. With the growth in the port demand and subsequently the increased demand for housing, Heijplaat was expanded further to form the New Village in the 1950s and 1960s. Later in the 1970s, both Waalhaven and Eemhaven became active grounds with containers (Dicke and van der Zouwen 2006).

The construction of Eemhaven, the expansion of Waalhaven, and the consequent development of the New Village largely transformed the village - the access to the waterfront on the west side of the Old Village was lost. Instead, Heysekade has become the new (waterfront) periphery of the village, but unlike today, it was walled** to separate the village and Heysehaven (Appendix G), the new piece



Map of Heijplaat, Waal/Eemhaven 1963 (Dicke and van der Zouwen 2006)

* The first Eemhaven began construction in 1946, and with the container revolution in the 1960s, the second and third Eemhaven were constructed as container ports.
** Pictorial evidence hints at the blocking of direct visual connection from the New Village to the waterfront until 2009 (Appendix G).

of port that came about with the construction of Eemhaven. Not only has the interface between the port and the village significantly increased, but the entire village has become surrounded by the industrial grounds. Industrial buildings and equipment like cranes have become a familiar background of everyday life.

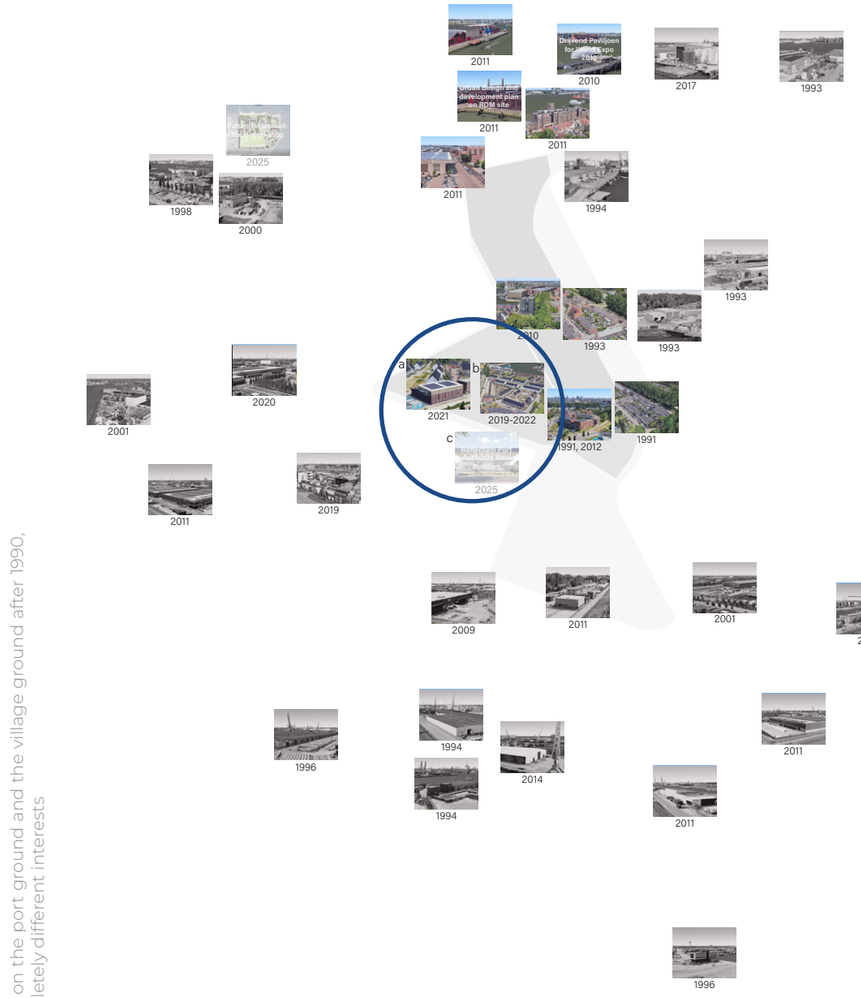
On the other hand, the low rents of the premises and the operation of public buildings substantially increased the deficit in the company's working account. Ironically, "the struggle between labor and capital has ... clouded the consciousness that employer and employee cannot exist without a combined effort (de Gelder 1916)." RDM faced several financial crises, and after rounds of change in ownership, Heijplaat village was sold to a housing corporation, Onzewoning, in 1980 (Rijksdienst voor het Cultureel Erfgoed 2018). The financial decline of RDM, port development plans, and concerns surrounding the industrial setting of the living area sparked the discussion of the demolition of the village. The Heijplaaters emphasized the historical significance and unique identity and have contributed to preserving the village.

Industrial background in everyday life in Heijplaat (left: RDM 1964, right: RDM 1970)

Status Change: 1997 -

After the final closure of the RDM shipyard in the late 1990s, the majority of the port was abandoned for a long time. The developments after the disconnection of the port and the village show that the interests of the two grounds have diverged. The developments on the port ground have been driven purely by the interests of the private port companies. As the population with no strings attached to the port activities began to settle in the village, the developments on the village ground started to respond to a wider range of social interests. The revitalization of the area was initiated in 2004 to create a multifunctional district with sustainable energy and climate resilience. (LIAG 2021) For example, starting from 2011, post-war houses built in the 1950s-60s were demolished and replaced with new housing by the housing association Woonbron to meet the new living and sustainability standards (van Helleman 2018). The major developments that respond to the interests of both parties are no longer present.

Map of Heijplaat, Waal/Eemhaven 2024, Google Maps



Developments on the port ground and the village ground after 1990, showing completely different interests

a: sports hall
b: housing
c: Port Authority office

Most recent/upcoming developments

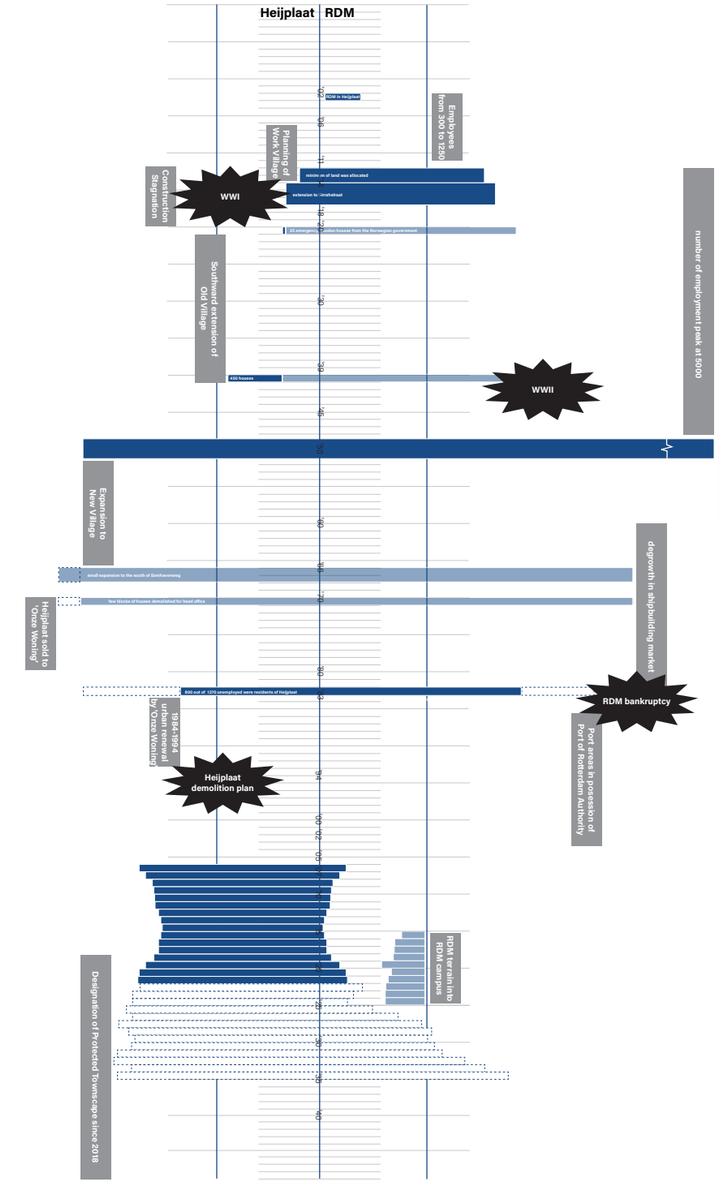
Prospective developments

But there is one exception - the former RDM plot was acquired by the Port Authority (Rijksdienst voor het Cultureel Erfgoed 2020), redeveloped between 2009 and 2015, and opened as a campus where education, culture, and the manufacturing industry cross paths (Appendix H). While this innovative hub does not seem to engage the interests of the village, it is the only port-related ground where the residents can freely take a stroll to the waterfront with a view towards Rotterdam Center*.

The most recent developments on the village ground are a new sports hall** (Appendix I) and zero-on-the-meter (nul-op-de-meter) housing*** (Appendix J), both in the New Village. On the port ground, the Port Authority will be replacing the old one with a new multifunctional office complex in 2025 (Appendix K). Interestingly, all three developments are situated close to the border between the two grounds (page 53), but each of them aims to fulfill the best interest of the stakeholders of where it belongs, in terms of function, scale, and materiality. Whereas there was the company (RDM) and its workers that shaped the village in the beginning, there are dozens of private port companies and new population structures with various needs and wants in the village that have a say in future developments, which complicates the co-creation compared to the past.

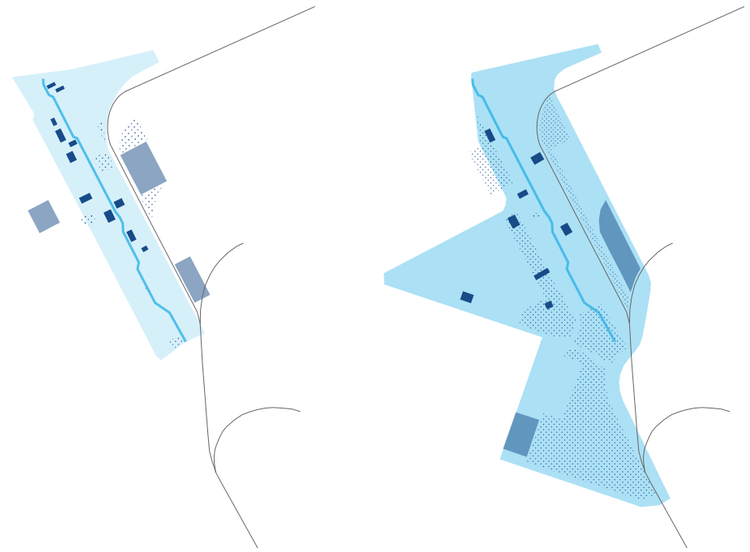
* Another directly accessible waterfront exists as a small beach in Quarantaineterrein, where the quarantine facilities from the 1930s still remain.
** New gym, WIK Heijplaat, was opened in 2022 as a new landmark in the village.
*** The post-war buildings in the New Village were demolished and replaced by a new residential complex - Het Verborgen Geheim. It was built in several phases between 2016-2023.

Chronological "imbalance" between Heijplaat and RDM/Waal-Eemhaven between 1910-2024 (Various Sources)



Need for Public Space

The village working towards the best interest of itself could make one think that the provision of housing and public amenities/spaces would be balanced out in the village today. Ironically, the imbalance between housing and social interests within the village ground is shown to be increased, compared to when Heijplaat was a company town. Following de Gelder's belief in the employer's responsibility for the housing and the well-being of the employees (Dicke and van der Zouwen 2006), after the accommodation of the workers was arranged, buildings with a public character, such as an elementary school and a police station, were built. Means for recreation, like halls and libraries, have "roused an interest for improving workmen's homes even when not directly concerned with industry" (de Gelder 1916). Even on the plot they did not obtain for building purposes, the company rented it and turned it into a football field and recreation ground*. These buildings, except for sports fields that require bigger plots, were



Density of public space in comparison to the village ground: 1920s (left) vs. 2020s (right)

* A stretch of land between the railway track and Waalhaven was owned by the Town Council, reserved for possible harbour extension (Rotterdamsche Droogdok Maatschappij, N.V. 1920).

"I volunteer to cook for the dinner event every Tuesday at de Huiskamer. I go to the supermarket in Hoogvliet, because the small one in Heijplaat doesn't have everything we need."

Old Village resident & volunteer cook at de Huiskamer, December 2024

"I once asked a doctor about how many clients he needs to open a clinic in a neighborhood - he needs 2,200."

Veldacademie alumnus with graduation project in Heijplaat, November 2024

located along Vestastraat-Alcorstraat-Streefkerkstraat, where long rows of houses sit on each side (Appendix L). It ensured that the public amenities were easily accessible to all the residents and made the central spine* a lively place where you can encounter one another.

Comparing the density of public amenities in proportion to the village territory then and today, it is evident that there was more offered to the residents in the past. On the new green spine of today sits the community center of Heijplaat (de Huiskamer 2.0), where community events, mostly indoor, are arranged every weekday (Appendix M). However, the range of public amenities and spaces** does not respond well to the growth in number and diversity of population. Yet, simply plugging the public space in cannot be a solution that self-sustains in a small village with a limited floating population.

* The central spine of the Old Village was Vestastraat-Alcorstraat-Streefkerkstraat. Courzandseweg, which was the western edge of the Old Village, became the central spine today (page 54).
** For the total estimated population of 1,900, there is one cafe/restaurant, one elementary school, one sports hall, one small supermarket, and one small plaza, but no medical facilities, no more religious institutions, and little to offer to the youth in the village.

“I’ve been working at the port company X for over 20 years, but I’ve never entered the Heijplaat village. What is there to do?”

Port company employee heading home from work, September 2024

Routes of Harbour Run event for 2014, 2019, and 2024: Moving deeper into the Heijplaat-Waal/Eemhaven area

Need for Spectacles

In the past, the public qualities were not only contained within the boundary of the village. The village residents went to the swimming pool at Heijsehaven*, next to the RDM shipyard, to swim in the harbor. The port was regarded as a destination, a source of work, pride, and entertainment, not only for the Heijplaaters but also for the Rotterdammers. When RDM built a special ship, the city came out to watch it being launched (Dicke and van der Zouwen 2006).

As the ports move away in a westerly direction towards the North Sea, the relationship between the port and the people of Rotterdam started to change. Working at the port is no longer a widespread occupation for the Rotterdammers. Although the port is the backbone of the city, it has now become a distant landscape or wilderness.In other light, such unfamiliarity has the potential to make Waal/Eemhaven, the last operational city port, a destination again.

Every year, an obstacle run event called “Rotterdam Harbour Run*” takes place in the Heijplaat-Waal/Eemhaven area. The idea is to open the normally restricted industrial area to the public to re-introduce the port to the people of Rotterdam. When it first launched in 2014, the designated route started at the South of Waalhaven and did not reach inside the Heijplaat village - at most, the southernmost periphery of the village park (Park de Hey). In 2019, the route moved more to the north. The starting point was set right on the RDM plot, and the runners ran not only on the port ground, but also inside the park, and along Courzandseweg, looking at the historical houses of Heijplaat (Appendix N).

In 2024, the 10km route binded the RDM plot, Heijplaat Old Village, and Quarantaine terrain (Quarantaine-terrein) (Appendix O). On the day of the event, Rotterdammers who had never been to Heijplaat are invited to the area, and Heijplaaters come out to the street to cheer for the runners and join the event together around the Music Dome** (Muziekkoepel). Regardless of their

* Harbour Run event provides 6km and 10km course with various manufactured obstacles from cranes and containers across the port areas. Port Authority as the main partner, the event engages with several port companies. The author volunteered as a staff member for the 2024 event (Oct 6th 2024).
** Music Dome, designed in 1938, was closed due to the foundation issue and was restored and opened in 2023. It provides a small outdoor plaza with a bandstand.

Engagement of Heijplaat residents at a public event:
Spectators to Indirect Participants (Photo collage from Harbour Run 2024*)

“Some of us (residents) enjoyed the event at the Music Dome (Muziekkoepel) from morning to cheer for the runners.”

Cheering Residents at Rotterdam Harbour Run 2024, October 2024

“I joined the obstacle run for the third time together with my colleagues. The idea of using containers as obstacles is interesting. It’s something you don’t see and access normally.”

Participant of Rotterdam Harbour Run 2024, October 2024

* Photos for the collage were taken at the station the author volunteered at - along Heysekade. To the left lies the new housing of the New Village, to the right lies Heysehaven.

“We used to live in Schiedam for a long time and recently moved to Heijplaat due to the increase in the rental price of our previous property. We enjoy watching the changing scenery, ships coming and going, from our own living room.”

A couple in their 30s taking a stroll on RDM premises, October 2024

age, Heijplaaters were engaged to climb up the obstacles themselves when the runners wave was not there. Certainly, the one-day event brings the “outside people” into the village, marking Heijplaat on the map, and turns the residents from spectators to indirect participants (page 58).

It is not a coincidence that Heijplaat was assigned as a Protected Townscape (Beschermd Stadsgezicht) in 2018. 28 years after the village was almost wiped out in 1990, it was recognized for a rare combination of three important historical ensembles: the former shipyard and the dry dock complex of RDM, the garden village of Heijplaat, and the former municipal Quarantine Facility. The spatial and functional-historical connection between the shipyard and the garden village was recognized as particularly characteristic (Rijksdienst voor het Cultureel Erfgoed 2018). This suggests two things: if there is a next public space development to be added in the area, one, it should inherit the aesthetic coherency and the qualities of the historical ensembles, and two, it is crucial to integrate the port and village comprehensively.

RDM Historical Complex

A Machine Factory (1903-)
B Shipbuilding Shed (1920-)
C Head Office Annex Gatehouse (1913-)
D Former Canteen (1913-1914)
E Dock Shed (1918; 1958),
F Central Warehouse (1918; 1958)
G Boiler Shop and Forge (1920; 1938-1939)
H Dock Office (1920; 1938-1939)
I Submarine Shed (1929)
J Former Foundry (1929-1930)
K Equipment Hall
L New Equipment Hall
M Shipyard
N Office/Storage
O Carpentry Shed
P Warehouse
Q Plate Sorting Area
R Office krve
S West dock office
T Other buildings
U Warehouses
V Other buildings

Historical Public Building

a conference building
b shop
c laundry building
d school
e bachelor house
f special school
g party building (large theatre hall, coffee room, bowling alley and conservatory)
h nursery school
i reformed church
j roman catholic church
k protestant church
l soccer field
m swimming pool

Post-war Extension
"Het Oude Dorp" Focus Area (est. 2025-2028)
Green Spaces
Public Spaces
New Town
Old Town

250m 500m

shipyard and dry dock complex of the former Rotterdam Dry Dock
quarantine facility built in 1930-1933
garden village built from 1915
curved breakwater
mooring space
modern overhead crane
ship lift
Dockhaven
pre-war facade
RDM
quarantaine-terrein
national monument
Heysehaven
Post-war Extension

Joining community event monday evening stroll (january 2025)
Stroll with the resident who has lived in Heijplaat for generations (january 2025)

* PortCity cluster is located on the other side of Waalhaven, at Waalhaven Zuidzijde, 3-4km away from the village (Appendix O).

safety vs. security

How can we develop a new public space that integrates Heijplaat and Waal/Eemhaven together when the two have become increasingly detached and formed an imbalance in the goals and priorities? In particular, examining the visions of the municipality and the Port Authority unveils the repeated use of one common term - “veiligheid.” It is easy to be mistaken that this term denotes the same on the port ground and the village ground. In fact, “veiligheid” can both translate to “safety” and “security,” but the village strives to achieve safety for the residents, whereas the port focuses on enhancing security for the business.

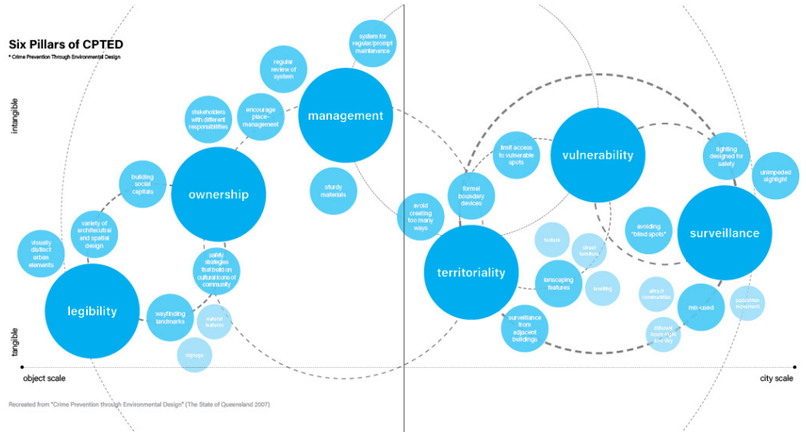
The Safety Course 2023-2027* (Veiligheidskoers) can be taken as a reference to understand this complication. Taking a closer look, one can notice that the discussion of “veiligheid” in different contexts has different usages and targets. Putting “veiligheid” in the context of the neighborhood**, verbs like “experience (ervaren),” “perception/sense (beleving),” and “feel (voelen)” are used together with “safe/safety (veilig/veiligheid).” On the contrary, “veiligheid” in the context of the

* Initiated by the municipality in December 2022.
** Neighborhood context: Chapter 3.2 Increasing Safety and Perception of Safety in Neighbourhoods (Vergroten van veiligheid en veiligheidsbeleving in wijken)
Port context: Chapter 5.2 Combating Undermining in the Port (Bestrijden van Ondermijning in de Haven)

port has a specific focus on targeting undermining crimes (e.g., drug smuggling) and aims to work together with governmental institutions, private companies, semi-private bodies, and international partners (Gemeente Rotterdam 2024d). Before developing a public space that links the village and the port, the nature of the distinguished notions of “veiligheid” must be acknowledged.

In the effort to bridge the two notions, existing tangible and intangible elements of safety and security in the Heijplaat-Waal/Eemhaven area are identified and investigated in the “Safety-Security Handbook” (Appendix Q). The six pillars of Crime Prevention Through Environmental Design* - legibility, ownership, management, territoriality, vulnerability, and surveillance - helped to further categorize the effect of each element. The safety elements found in the area include streetlight, signage, fence, pavement, urban furniture, open green, street networks, and human presence. It is demonstrated that most of them are spatial elements, and although elements like pavement and open green,

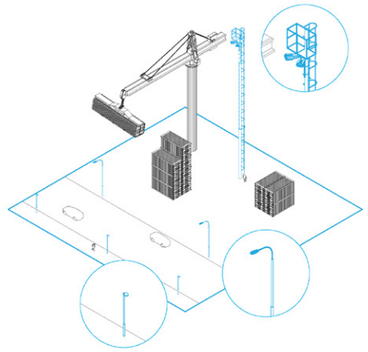
Six pillars of CPTED arranged in tangibility and scale (Safety-Security Handbook, Appendix X)



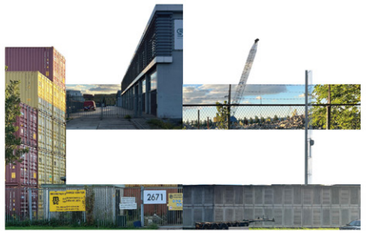
* Crime Prevention Through Environmental Design (CPTED) was coined by a criminologist C.Rey Jeffery in 1971. It is based on behavioral science and environmental psychology, how crime could be prevented through the physical environment.

Streetlight Straatverlichting

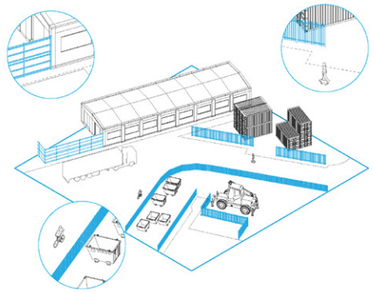
Three types of lighting fixtures



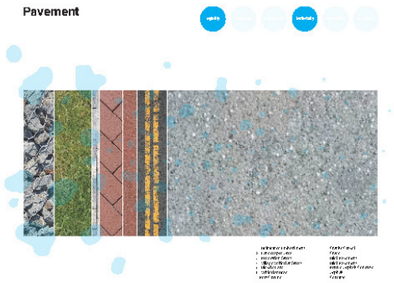
Physical Fence

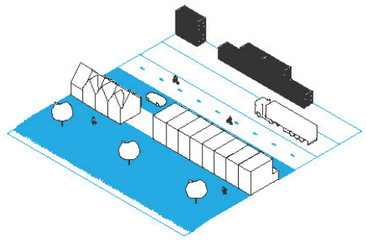


fence that separates residents from industrial elements



Pavement

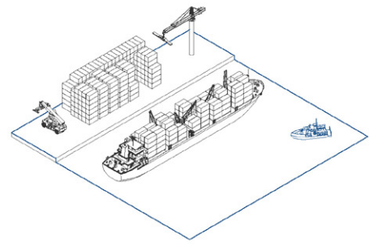




Patrol Boats

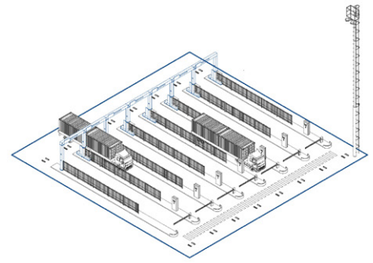
Harbour patrol boats, managed by the Harbour Master Division, conduct continuous surveillance of container ships and monitor unauthorized access or unusual operations in collaboration with the Seaport Police and Dutch Customs. (The Port of Rotterdam) Equipped with Integrated Electronic System (IES), which include onboard radar and sonar functionalities, GPS system, communication systems, and access to the port's camera network, they ensure real-time threat assessment. These boats enforce the International Ship and Port Facility Security (ISPS) Code, ensuring that vessels comply with established security measures. They often carry personnel capable of boarding and inspecting vessels directly using handheld scanners to detect contraband or unauthorized cargo.

https://www.portofrotterdam.com/en/doing-business/port-authority/our-organisation/harbour-master
https://www.vancron.com/nl/over-ons-kennen/projecten/hybride-vaartuiving-40-zwinger/



NOTE (Not To Scale)

X-Ray Imaging



In large ports, X-ray scanning facilities are strategically positioned. One, near unloading areas to inspect containers as they come off ships, and two, at port exits for outbound checks before containers leave by truck or train. The Port of Rotterdam utilizes advanced X-ray scanning systems like the Rapiscan Eagle T80* for road cargo inspections. This system, paired with AI, produces detailed images of container contents in real-time to enhance detection. After high-energy X-ray scanning, AI algorithms use machine learning and pattern recognition to quickly analyze X-ray images to spot suspicious items or contraband (e.g., weapons, drugs, or unauthorized goods) based on training data and risk analysis. Such a system helps detect items that may not be immediately obvious to human inspectors. Capable of quick, on-the-move inspections, the system ensures large volumes of containers are inspected without slowing down port operations.

* Rapiscan Eagle M60 being the most advanced system, however not applicable to Mobil Container.

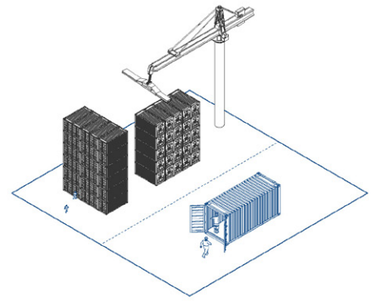
https://www.cbinet.com/cbinet/meeting/news/10605960/rapiscan-systems-installs-cargo-scanner-for-dutch-customer?
https://www.rapiscansystems.com/en/products/rapiscan-eagle-m60

Human Inspection

Selected suspicious containers - Fruit containers from South America

Coined by the field officials, "Trojan" containers refer to empty containers that are used to smuggle runners into the port, so they can fetch drugs hidden shipments in the other containers (Trapcus 2024) Manual checks are conducted when X-ray scanning systems detect anomalies, when containers are flagged due to their origin (eg. South America) and the type of goods (eg. fruit) by Risk-Based Profiling, or randomly. During the manual inspections, Customs officers physically open the container and inspect the contents against the cargo manifest or uses tools like handheld scanners, density probes, or narcotics detectors. Among 15.2 million TEUs (est. 2021) handled in the port of Rotterdam, around 18%* of the total containers are selected and manually checked by Douane officers.

https://www.dutchnews.nl/2024/09/police-find-19-drug-runners-hiding-in-container-in-rotterdam/
https://www.rotterdamsdichtstbij.nl/nieuws/politie/50630/liefst-negentien-verholen-geesten-in-frigolaniet-container-ecd



for example, do not provide direct protection against the safety risks, they give a safe feeling based on legibility and territoriality. The security elements selected for study are patrol boats, human inspection, Secure Chain, X-ray imaging, CCTV, drone, Digital Twin, and crane automation (Appendix Q). Rather than being spatial, many of them employ technological innovation and concern with the exchange of data. They are elements of management and surveillance to prevent intentional threats. From this, a nuanced distinction could be made between safety and security: a “sense” of safety and a “system” of security. Whereas safety is a subjective feeling of being protected and a continuous perception that comes from mutual trust in the environment, security is connected to structured and operational prevention against deliberate, unlawful acts.

As much as pursuing “veiligheid” as a sense and a system at the same time complicates the symbiosis of the port-nested-village and the working ports, it hints at how to bridge them. In his essay on co-creating the notion of safety and security together (van der Giessen 2022), van der Giessen argues that treating the two in isolation can lead to gaps, redundancies, or even contradictions. A tightened security system in the port could contribute to enhancing the sense of safety in the port-nested-village, but neighborhood safety cannot be achieved through the port’s security systems alone. In reverse, a strong sense of safety can exist without an excessive security system when there is a communal trust. There are always ways to “hack” the system, with a (un)righteous intention, but the mutual interactions between the individuals are unbreachable. So, the key is to learn to benefit from the robust system and build a strong network of safety elements. In the end, we need a comprehensive veiligheid strategy to safety-fy the area of Heijplaat-Waal/Eemhaven and realize social cohesion as a whole.

“We think the neighborhood is very safe, but there are not many people out in the evening. The street in the village is a bit bumpy and we don’t want to trip. We would walk in the RDM plot with bright streetlights and even pavement.”

Heijplaat resident leading the Monday evening stroll group, December 2024

Presence of port in the village, 1980 (Stadsarchief Rotterdam)

Heijplaat looking like a normal Dutch village today

middle ground

“You know, (the safety index) is based on figures (cijfers). Of course, the absolute number of incidents is lower than in major neighborhoods of Rotterdam. But in such a small village, the impact of even one incident is big. When one incident happens, everybody here knows within a day and talks about it for the whole week.”

Municipality expert focusing on Heijplaat and Pernis, January 2025

Extended Veiligheid

Of course, building a comprehensive veiligheid strategy in the port-nested village must embody the context of a small village situated inside the port, remote from the urban core. The current method of measuring safety has a great limitation when it comes to Heijplaat village. First of all, the numerical figure does not fully represent the intensity or the significance of individual incidents. Especially in a small village with a close-knit community, the number of happenings does not take into account the impact in proportion to the population or in relation to the structure of the population (i.e., distribution of age groups, working population, or the duration of residence).

More significantly, the municipality’s definition of “veiligheid” in the neighborhood scale needs to extend beyond the internal safety index*, since Heijplaat is not only a remote garden village, one of the Small Cores neighborhoods, but a port-nested-village. The focus should be distributed from safety risks that originate within the boundary of the village (internal) to a broader scope of safety and

* In Neighborhood Profile, Veiligheid index measures theft, violence, burglary, vandalism, and nuisance, which fall into the category of internal safety risks.

Specialized safety index for Heijplaat, "port-nested-village"

security risks that flow from the port into the village (external). At the moment, the Dutch government outlines external safety (externe veiligheid) only as the exposure to hazardous materials, which determines the permission to build sensitive facilities like schools and hospitals (Ministerie van Algemene Zaken 2011). If not tackled at the municipal level or the national level at the moment, can an architectural/urban intervention initiate the discussion at the district or the community level?

Ultimately, the goal is to develop an extended definition of safety that integrates safety and security in the port-nested-village and to localize external risks from the port into an architecture and an urban design project. Not only internal safety risks within the village but also external safety risks from the port should, either extricately or inherently, be tackled by the new development of public space. Only then, can it serve as a middle ground in the working port of Waal/ Eemhaven and the port-nested-village of Heijplaat.

risk 1 road hazards

The first external safety risk stems from one vehicular road shared between the village and the port. Heijplaat was proximate to RDM, which was located at the northernmost tip of West Waalhaven. As the port expanded with the construction of Eemhaven in the 1940s-50s, the village periphery lost its contact with the hinterland and became almost like an island. The only connection to the land is through the highway S101 and Waalhavenweg, which takes another 1.4 km before one can finally make a turn to enter the village. Due to extremely limited accessibility, most of the residents rely on automobiles, especially after the municipality discontinued the waterbus*, which was more affordable for frequent travel to Rotterdam center than the current watertaxi. In the long term, it would have a considerable impact on the standard of living and safety of the residents based on the population structure (e.g., age groups) and the absence of medical facilities inside the village.

Heijplaat and Waal/Eemhaven sharing one road - Waalhavenweg
Heijplaat with limited accessibility by public transportation

* Between 2015 and 2021, waterbus line 18 connected Erasmus Bridge to Heijplaat/RDM. After it was discontinued, Watertaxi Rotterdam was introduced.

“The city council says it’s too expensive to bring back the waterbus. There are not enough people. It would be only busy during the commuting hours and after that, there’s no demand.”

Residents born, raised, and lived in Heijplaat for 70 years, January 2025

“It’s my first time joining this event and also my first time visiting Heijplaat, although I live in Rotterdam South. It took me 25 minutes on a bike from my home. That’s manageable, but the way here feels long.”

Participant of Rotterdam Harbour Run 2024, October 2024

If a new development of public space is to be built close to both the village and the port, a range of outside people would travel by public transportation* or utilize the existing bike lane along Waalhavenweg. Getting there by bike means you have to witness aggressive driving behaviors of the trucks going to the quay on one side and view rows of containers or repetitive warehouse and industrial buildings on the other side. A long and completely straight road works best for the efficiency of the port, but presents monotonous scenes, making the journey feel even longer than it actually is.

Before reaching the “entrance” of the village, at the intersection of Waalhavenweg, Eeemhavenweg, and Droogdokweg, the entire route is solely sandwiched between the port ground. The built structures on the port ground are unquestionably way beyond human-scale, which adds to pedestrians and cyclists feeling unsafe, on top of the threats from the loud racing trucks. The

* The only public transportation on road being bus 68 between Zuidplein and RDM Campus and on water being watertaxi between Marconistraat/M4H (station 87) and RDM/Heijplaat (station 92).
** Started from 2-3 years ago, distrcit and village council run in every neighborhood in Rotterdam. Elected by the residents, they deliver the residents concerns and interests to the municipality.

Photos of containers and warehouse taken every 50 meters on Waalhavenweg

Heijplaat Neighborhood Council** (Wijkraad) identified the only access road, where traffic is being hindered and blocked by trucks, as one of the threats in the SWOT analysis in the Neighborhood Agreement* (Wijkakkoord). In 2022, 61% of the residents indicated a nuisance of experiencing speeding, and 30% experienced aggressive traffic behavior (Gemeente Rotterdam 2023b). According to the interview with the municipality expert focusing on Heijplaat and Pernis, since the container transport was fully back on track after COVID-19, trucks often arrive at the terminals at the same time, resulting in traffic congestion. Every now and then, a truck accidentally ends up in the middle of the village, while they are expected to diverge their route at the “entrance” of the village their routes, around the periphery of the village to secure road safety within the village boundary.

More attention is being paid to the Rotterdam South area than before, but many city-wide master planning** often do not reach into Heijplaat. For example, while extensively discussing making Rotterdam South integral to the city, the prospective metro station is still far from the village. *Can the new development increase the demand for public transportation to the village and partially mitigate the external safety risk of road hazards by scattering small interventions along the only one access road?*

“There has been a discussion among port companies to increase the height of stacked containers by 20%. You might see higher containers along the road.”

Municipality expert focusing on Heijplaat and Pernis, January 2025

* The Neighborhood Agreement is drawn up with the municipality, consisting of visions and action plans.
** For one, “A New Perspective for Rotterdam South” by Mecanoo, in collaboration with the municipality.

eunbinboo

Residential Grounds

Industrial Fence

Vehicular + Pedestrian Path

External Safety

Potential Risks from Hazardous Substance

250m 500m

1 C. Steinweg Group - Beatrix Terminal
2 C. Steinweg Group - Kamphof Street
3 C. Steinweg Group - Parmentierplein
4 C. Steinweg Group - Pier 1
5 C. Steinweg Group - Pier 2
6 C. Steinweg Group - Pier 6
7 C. Steinweg Group - Lock Dike
8 Lineage Eemhaven
9 Neele-Vat
10 RHB Warehousing
11 Rhenus Waalhaven Terminal

design goals 1

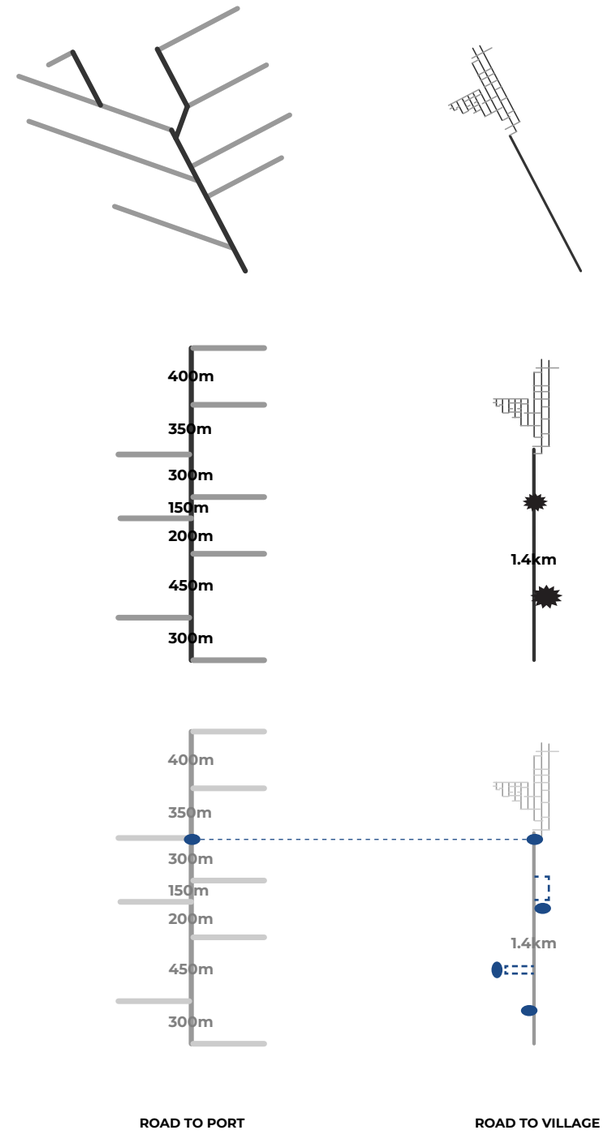
Analyzing how external safety risks are managed within the area, and if they are not being tackled, identifying the conditions that intensify the risks, offers critical insights for the new development. Learnings from the external safety risk of road hazards highlight the need for improved public transportation, distinction from/of the fast-moving port traffic, and the breakdown of the long, monotonous road to revamp the journey to the village and make the progression a part of the experience.

Design Goals

1) Small but urban interventions can break down the shared access road of Waalhavenweg in proportion to the village scale. This could be achieved by adding pockets of green spaces and follies/street furniture, introducing small detour routes to avoid the straightness, and overlaying the elements that mediate the huge contrasts in scales to the port in the background.

2) A well-designed public space in the intersection of the village and the port can itself clearly indicate the route/direction to the port ground and the village ground. As a transitional space, it will humanize the industrial feeling by adopting materials familiar inside the historical village.

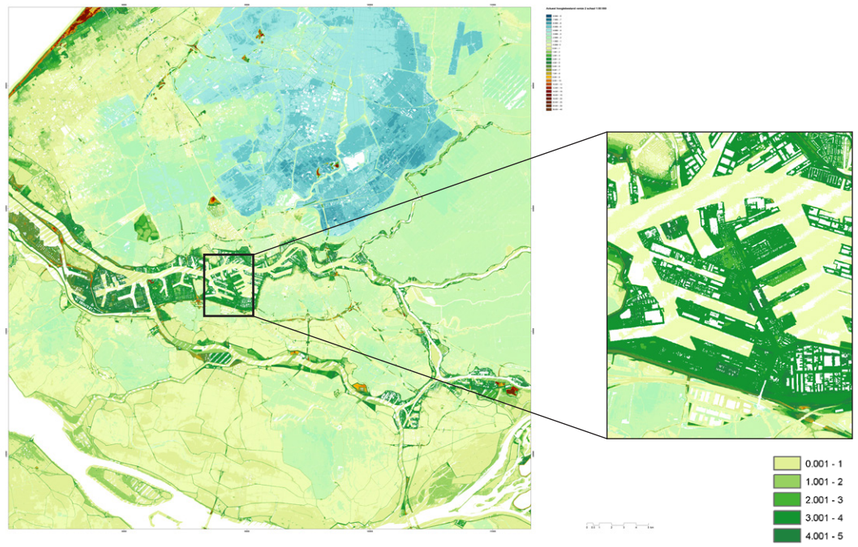
3) Cultural programs can act as magnets to draw people to remote or unfamiliar places. The uniqueness of the port-nested-village can be strengthened to make the Heijplaat-Waal/Eemhaven area, once again, a destination. Indirectly, in the long term, more visits to the village would stimulate the discussion of connecting Heijplaat to the public transportation network of Rotterdam Center.



risk 2 flooding

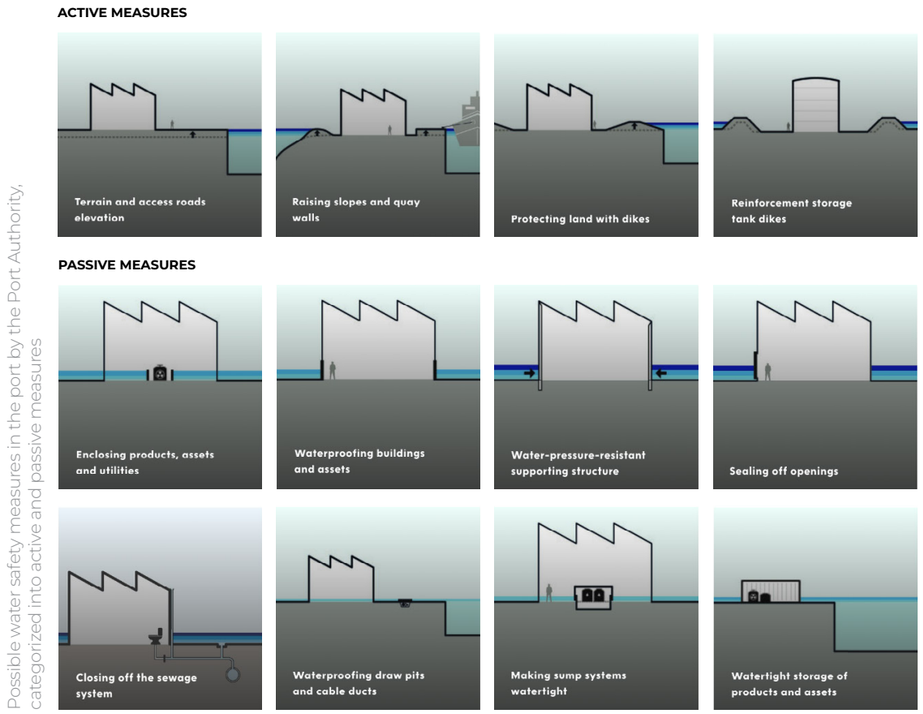
"Water is often a driving force behind the locations of cities, but it also shapes and limits their physical boundaries (Mars and Kohlstedt 2020)."

While inland areas, including most of the residential districts*, are protected by the Dutch dike system, the areas outside the dikes (buitendijks gebied) are under the direct influence of the river Maas. The majority of Rotterdam ports are outside the dike, and Waal/Eemhaven is no exception. To begin with, to secure the safe ground for business accessible by water, the port is built to have a higher elevation above NAP** than the areas inside the dike. Although it is designed with the consideration of minor flooding and sea level rise, the 2023 estimation from the Royal Netherlands Meteorological Institute (Koninklijk Nederlands Meteorologisch Instituut) indicates sea level rise between +26 cm to +124 cm in 2100 (European Environment Agency 2025). The current Dutch Elevation (Actueel Hoogtebestand Nederland) map shows that the Heijplaat



Current Dutch Elevation (Actueel Hoogtebestand Nederland, AHN, version 2) (TU Delft Maproom 2007-2012)

* Exceptions in Rotterdam include Noordereiland, Kop van Feijenoord, and Scheepvaartkwartier.
** The national reference level for the height of the land, Normaal Amsterdams Reil (NAP) is the approximate mean water level for Amsterdam in the absence of water motion.



Possible water safety measures in the port by the Port Authority, categorized into active and passive measures

village and the port that surrounds the village (West Waalhaven and East Eemhaven lie between 2m and 4m above sea level (TU Delft Maproom 2007-2012). In the future sea level scenario, it is foreseen that the port ground will be flooded by riverwater, and because the village is nested in the port with no barrier that completely separates the two, the impact will be on the whole area.

Therefore, flood mitigation measures of the port have a direct impact on the level of flood risks in the village. The Port Authority introduces a number of active and passive water safety measures applicable to the port premises, such as raising the terrain or waterproofing the equipment, the buildings, and the site (Port of Rotterdam 2024a, diagrams above). On top of the physical measures, a

comprehensive digital replica of its physical infrastructure, known as Digital Twin, is being developed with IBM. This virtual model integrates data on ship movements, infrastructure, weather conditions, and water levels (Port of Rotterdam 2024b).

The water resilience measures that can be adopted in the urban setting (page 87) share some similarities with the physical measures of the port in raising the terrain or buildings, while introducing smaller-scale technical measures such as installing infiltration boxes or water channels. But more importantly, they touch upon the "sense" of safety by integrating elements of nature - rather than viewing water only as the source of risk, they actively employ it as a spatial element (Sarkar and Hartman 2023).

In the case of Heijplaat-Waal/Eemhavenn, the resilience strategies against water should not stop at riverwater flooding. When the village was first established, "the ground was perfectly flat and the authorities objected to local raising any part of it" (de Gelder 1916). In 2013, the municipality designated the New Village of Heijplaat as an experimental ground for adaptive construction in both planning and implementation (Gemeente Rotterdam 2013). Instead of the current elevation of NAP+3.9m, the new developments in the planned area are to be built on NAP+3.0m to test the water safety on the scale of building (Gemeente Rotterdam 2013). Moreover, from 2019, the New Village became the first "rain-neutral" district in Rotterdam, with public spaces designed like a sponge* (Kennisportaal Klimaatadaptatie 2018).

In line with the actions being taken in the port and the investigations taking place in the New Village, water could turn into a dynamic spatial structure that unites the identity of the port, shapes the social activities, and, in return, gives a sense of safety. *Can the new development engage water safety measures of the port to incorporate the adaptive construction and alleviate the external safety risk of flooding, but at the same time, let water shape the social activities?*

* The new roads will have permeable stones in a package of sandy soil underneath, so that rainwater can sink (Kennisportaal Klimaatadaptatie 2018).

"Can you see that the terrain is higher in the New Village? When there is a heavy rainfall, the water flows to the Old Village and floods the streets. The drainage system has to be replaced soon."

Residents born, raised, and lived in Heijplaat for 70 years, January 2025

ACTIVE MEASURES

PASSIVE MEASURES

Possible urban blue resiliency measures by Urban Green-blue Grids, categorized into active and passive measures (Pötz et al. 2016)

Residential Grounds

Green Surfaces

Industrial Fence

Dike Line

External Safety

Outer Dike Area

Flood Risk >50cm

dike line

250m 500m

1 C. Steinweg Group - Beatrix Terminal
2 C. Steinweg Group - Kamphof Street
3 C. Steinweg Group - Parmentierplein
4 C. Steinweg Group - Pier 1
5 C. Steinweg Group - Pier 2
6 C. Steinweg Group - Pier 6
7 C. Steinweg Group - Lock Dike
8 Lineage Eemhaven
9 Neele-Vat
10 RHB Warehousing
11 Rhenus Waalhaven Terminal

design goals 2

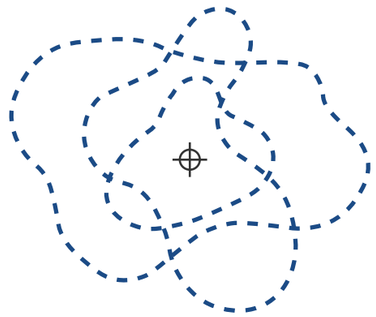
Learnings from the external safety risk of flooding unveil the potential of utilizing the technological innovation of the port and experimenting with adaptive construction to employ water as a dynamic and flexible structure, bringing people together but also future-proofing water safety in the area.

Design Goals

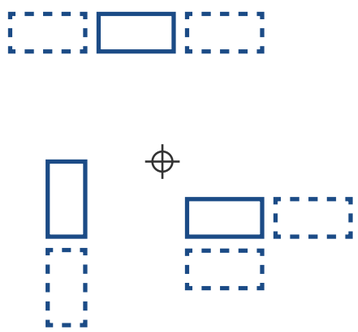
1. The location of the new development and the elevation of the ground terrain should be determined based on location-based possibility of riverwater flooding from sea level rise and rainwater flooding from extreme precipitation. The surplus water can be sent and drained at the nearby port quay.

2. Water-related utility that is commonly in the subsurface layer could be brought up above ground and serve as a building where foreseen but unpredicted water issues are made visible to people. It should be lifted from the ground level to provide a safe space in the time of bigger flooding.

3. The development should provide flexible and/or adaptive solutions rather than rigid, large-scale solutions. The flexibility can also be found in the element of water. Treating water as a dynamic spatial structure, it can transform and influence the social activities around the water square.



WATER FLEXIBILITY



BUILT STRUCTURE FLEXIBILITY

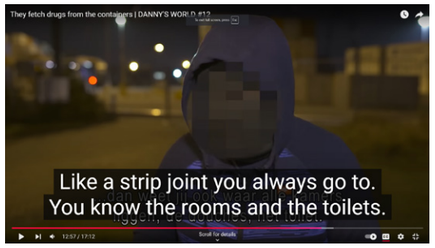
risk 3 drug smuggling

The port of Rotterdam is easily targeted for drug smuggling because, after clearance in Rotterdam, cargo can freely travel to other EU states (Port of Rotterdam 2018). There are occasional but constant reports on illegal drug smuggling caught in Waalhaven, with the most recent incident occurring in June 2024. Still, such external safety risk is overlooked by the village and the municipality. The prevalent presumption is “unsafe” because the port can quickly turn its position from a “special world between the land and the sea” to where the undermining world comes in contact with the legitimate world - approached by criminals, residents and employees of the port companies confront the risks of participating in the drug smuggling chain (Appendix R) by sharing information and access to the industrial ground (Staring 2023, Appendix S).

Even if such networked crimes do not pose an immediate threat to the village, the line between security on the port ground and safety on the village ground is abstract. Also, it is a type of crime that does not respect city borders; such (global) narcotic inflow into these (local) working ports poses a special risk because the impact of the happening can span into the city and the wider (national and global) network (van der Laan et al. 2016).

Journalist Danny Ghosen Interviewing drug pickers, “Uithalers” (Ghosen 2021)

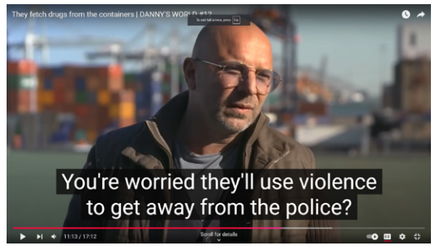
- Getting into a port is hard, isn’t it?
- No, man, that’s what people think.



Like a strip joint you always go to.
You know the rooms and the toilets.

Already in 1930, the Customs (Douane) concluded that it was not feasible to control all ships in the Rotterdam port on illegal drugs with mechanical surveillance and law enforcement (Snelders 2021). Still, the municipality proposes camera surveillance as the ultimate solution, if all other options are found ineffective in Heijplaat (Gemeente Rotterdam 2023b). Reporting suspicion of undermining crimes is done through a digital platform, which is restricted to after-actions (Appendix T). In the Safety Course 2023-2027, the municipality targets to achieve higher and innovative barriers, intensively cooperating with the port companies (Gemeente Rotterdam 2024d). As a semi-private operation, the Port Authority also launched the program “Undermining Crimes” to fight against hard violations of port security through the project “Virtual Fence*” (Port of Rotterdam 2023, Appendix T). A research project, FORT-PORT, awarded by the Dutch Research Council (NWO), aims to understand the criminal activities in the port and evaluate local policies for enforcement.

Although drug smuggling in the port has been recognized by multiple bodies, the broadness and international aspect of it appear to make cooperation difficult. A limited collaborative effort between governmental bodies and private companies in locating surveillance cameras on private premises resulted in a failure to meet the goal in 2023 (Port of Rotterdam 2023).



You’re worried they’ll use violence to
get away from the police?

We don’t know when they’ll come,
or how they get in. No idea.

* However, this project doesn’t go beyond law enforcement for tighter surveillance and raising awareness. Five actions being taken by the Port of Rotterdam are: Imposing additional security requirements, installing smart cameras, facilitating consultations between companies, ‘know your customer’ project, and financial investment against PIN code fraud.

Together with security partners, the Department of Safety (Directeur Veiligheid) focuses on tackling and mapping criminal networks, important locations/ facilitators, and promoting innovative and technical drug detection in the area (Gemeente Rotterdam Directeur Veiligheid 2022). What is known so far is that certain characteristics of a container make it vulnerable to be the target of the crime, and therefore the target for the inspection - a refrigerated fruit container from Latin America. Naturally, the drug-pickers (uithalers) would pick a time when the port operation is not active.

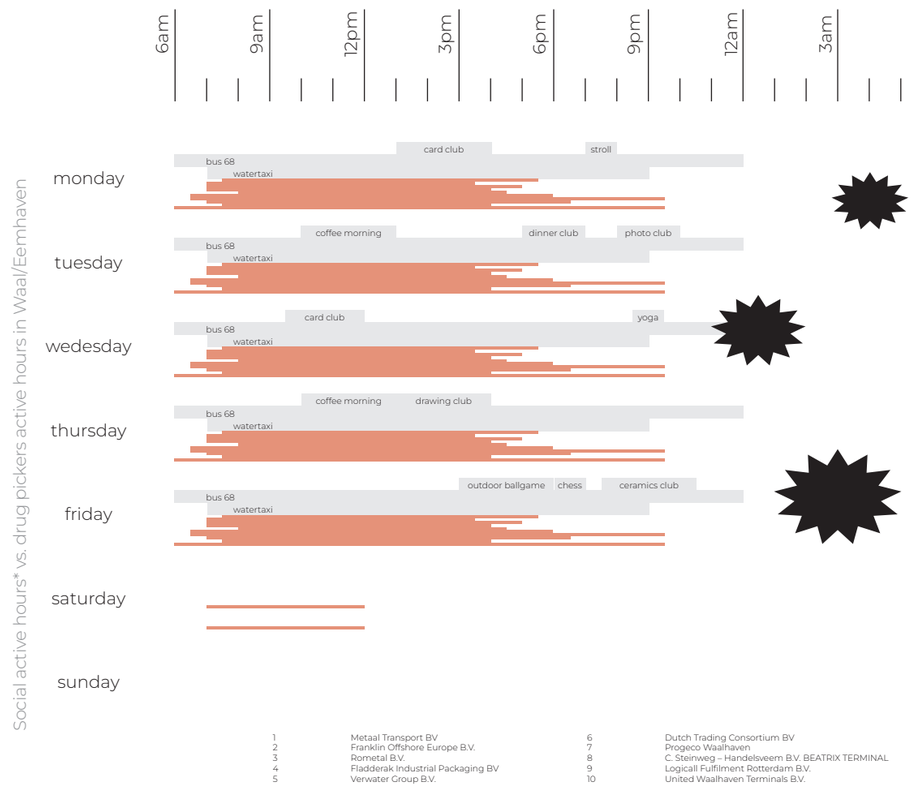
The fact that this information is out open might imply that organized crime organizations are already reacting quickly to look for another way, within the world they are experts in and we have little knowledge of. Rather than formal surveillance, such as guards and CCTV cameras, casual surveillance by the members of the community in their daily lives could be a viable approach to this problem (The State of Queensland 2007) - passive prevention rather than an active response. *Can the new development attract people at irregular times who can serve as the "eyes on the street" and indirectly monitor the external safety risk of drug smuggling?*

"A few years back, there was an incident involving a young Heijplaater, but it was not discussed so much in public. Afterward, the police department and the municipality conducted a survey and easily concluded that youth in Heijplaat are safe from getting involved in drug smuggling at the port. They don't see this as a problem, but I do."

Municipality expert focusing on Heijplaat and Pernis, January 2025

"Can architecture actually prevent drug smuggling in the port or the picking of the drug? Should we rather think about the time when the residents/visitors are active vs. the time when criminals are active?"

TU Delft PhD working on Predictive Model under FORT-PORT, November 2024



* The active hours of the public transportation (non-Heijplaaters coming in and out of the village) and ten randomly selected port companies around the periphery are documented.

Residential Grounds

Industrial Fence

External Safety

Container Depot

Container Terminal

X Temperature Controlled Warehouse

X Temperature Controlled Warehouse

250m 500m

1 C. Steinweg Group - Beatrix Terminal
2 C. Steinweg Group - Kamphof Street
3 C. Steinweg Group - Parmentierplein
4 C. Steinweg Group - Pier 1
5 C. Steinweg Group - Pier 2
6 C. Steinweg Group - Pier 6
7 C. Steinweg Group - Lock Dike
8 Lineage Eemhaven
9 Neele-Vat
10 RHB Warehousing
11 Rhenus Waalhaven Terminal

design goals 3

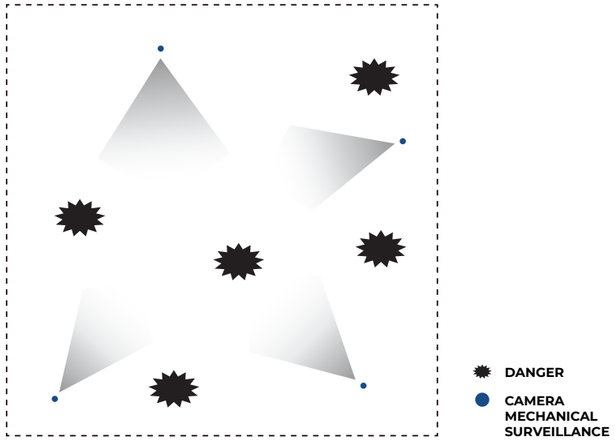
Learnings from the external safety risk of drug smuggling imagine the new development to form a collective milieu where the residents of Heijplaat and the visitors from the city can be dynamic actors of natural surveillance and complement the static surveillance system.

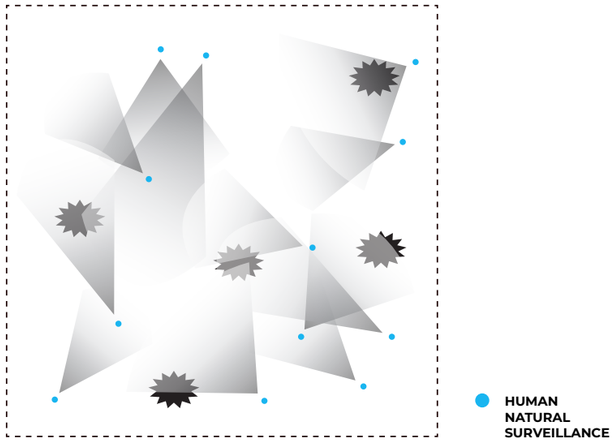
Design Goals

1. The structure can be partially higher than the general height of the surrounding buildings. The eyes become not only the cameras on the street but are invited to become the “drones” looking further out. This could be an observation deck that provides a unique scene of Rotterdam city in the background and the port in the foreground.

2. The location, scale, and choice of materials of the higher structure should be able to blend in with the protected townscape, the combination of historical houses and the port, incorporating elements of nature. Both when having the port as the background and when having the village as the background, the new development should have a cohesive representation.

3. As one of the target groups for the new development, the non-residents should not cause discomfort or unsafety concerns to the residents. The new development should consider and resolve the increased traffic on the road and the parking stress.





* Refer to “Research Trajectory” on pages 40-41.

SUB-
RESEARCH QUESTIONS

How can we develop a common architectural/urban language between industrial security and village safety?

In what ways can a spatial structure safety-fy the external risks from the port at a local level?

What kind of structural flexibility and scalability can integrate a public space in the middle of the village and the port?

TRANSLATION INTO
PROJECT BRIEF

urban strategy

program & location

project brief

CONCEPT DESIGN

common language between security and safety

OPERATIONAL QUESTIONS	METHODOLOGY
A1 How have divergent interests of the village and the port been spatialized since the village was established by the port company?	historical literature municipality planning document “imbalance” diagram over time
S1 What are the prominent spatial politics that challenge the port-nested-village to establish symbiosis with the port?	participating in public events in the village interview with neighborhood council “working group”

urban strategy

The research revealed that having been born by the shipbuilding company RDM to only house their employees, Heijplaat village met the social requirements of the dockworkers with the company as a single actor implementing a holistic plan for the entirety.

Rather, the construction of Eemhaven made Heijplaat a port-nested-village, and the closure of the company deepened the “imbalance” from largely diversified actors in the area along with the growth of the port and the village.

Despite the growth of the village, the public amenities/spaces offered to the residents are far more limited than the time RDM was responsible for the town planning. In the current remote environment, on-field research at the annual event in the Heijplaat-Waal/Eemhaven area pointed out that the residents welcome occasional spectacles in the remote site.

The decision on the specific location of the annual event was not a coincidence. It was assigned as a nationally protected townscape for the unique combination of industry, historical village, and public facility - the representative image of the village that residents are proud of. The new development in the area should be able to integrate the port and the village together.

However, the increased imbalance of visions, and in particular, of a sense of safety in the village and the system of security in the port, adds complication to forming a symbiosis of the two. It demands a nuanced and comprehensive view of cohesive strategies in the area.

spatial structure to localize external safety risks

OPERATIONAL QUESTIONS

METHODOLOGY

S2 Through what method can we localize external safety risks at institutional, municipal, national, or international levels?

site observation and photo reportage

literature review on the notion of “safety” and “security”

mapping of identified external safety risks

T1 Which current port innovations have the possibility to counteract the identified external safety risks?

“extended” safety index of Heijplaat

bridging the antipodes into architecture concept

program & location

A nuanced and comprehensive view necessitates the examination of the specific context of the village being nested by/in the port. In this context, the measures of safety must not solely tackle the internal safety risks, namely theft, violence, burglary, vandalism, and nuisance, defined by the municipality.

Instead, it should extend its scope to include external safety risks - the risks that derive from the port and that have an impact on the village due to the aforementioned context. Three external safety risks are identified in this research: road hazards, flooding, and drug smuggling.

First, the historical growth of the village and the port ended up with the current geography of Heijplaat being completely encircled by the last operational city ports. Vehicles for industrial logistics that congest the only one access road to the village and the limited modes of public transportation, together with the monotonomous setting of the pedestrian/bike lane, heighten the sense of un-safety.

Second, unlike most of the residential districts, Heijplaat sits outside the dike line. Being nested inside the port not only makes it difficult to divide the responsibility in the event of flooding, but also makes the village susceptible to the water safety measures of the port. This led the municipality to assign the New Village as the pilot for adaptive construction for water management.

Third, the excellence of the infrastructure and accessibility have made Waal/Eemhaven highly subjective to becoming a target for drug smuggling. The current unsafe trust that the breakage of security in the port is irrelevant to the safety of the port-nested-village should not be overlooked.

The learnings from the broadened definition of safety propose the program and location of the new development. The outcome of the research also put forward the design goals in various scales and dimensions, which are summarized in the project brief on the next page.

flexibility and scalability between port and village

OPERATIONAL QUESTIONS

METHODOLOGY

site observation and photo reportage

A2 What are the existing tangible/ intangible elements that create a sense of safety in the village or achieve security in the port?

catalogue of spatial elements

“extended” safety index of Heijplaat

T2 What kind of “fence” can be more effective than the current separation barrier in mitigating external safety risks for the port-nested-village?

interview with the residents

bridging the antipodes into architecture concept

project brief

Urban scale

- Small interventions like follies to break down the only access road and turn the long, risky travel safe and unique part of the whole experience of the area

Location

- At the intersection of the village and the port to create a transitional space
- Around the area with a higher probability of riverwater and rainwater flooding
- Close to the port territories subject to narcotic vulnerability

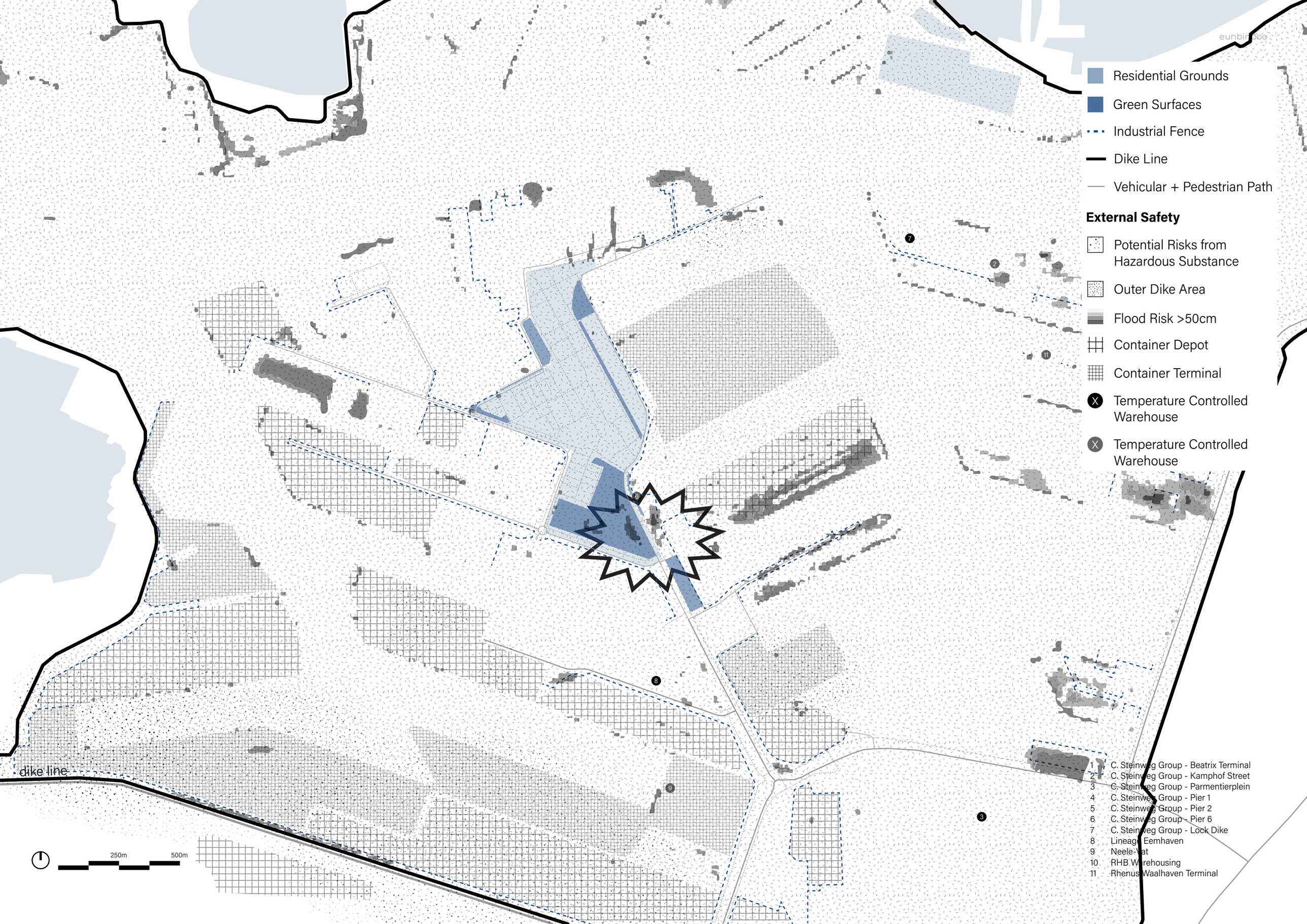
Program

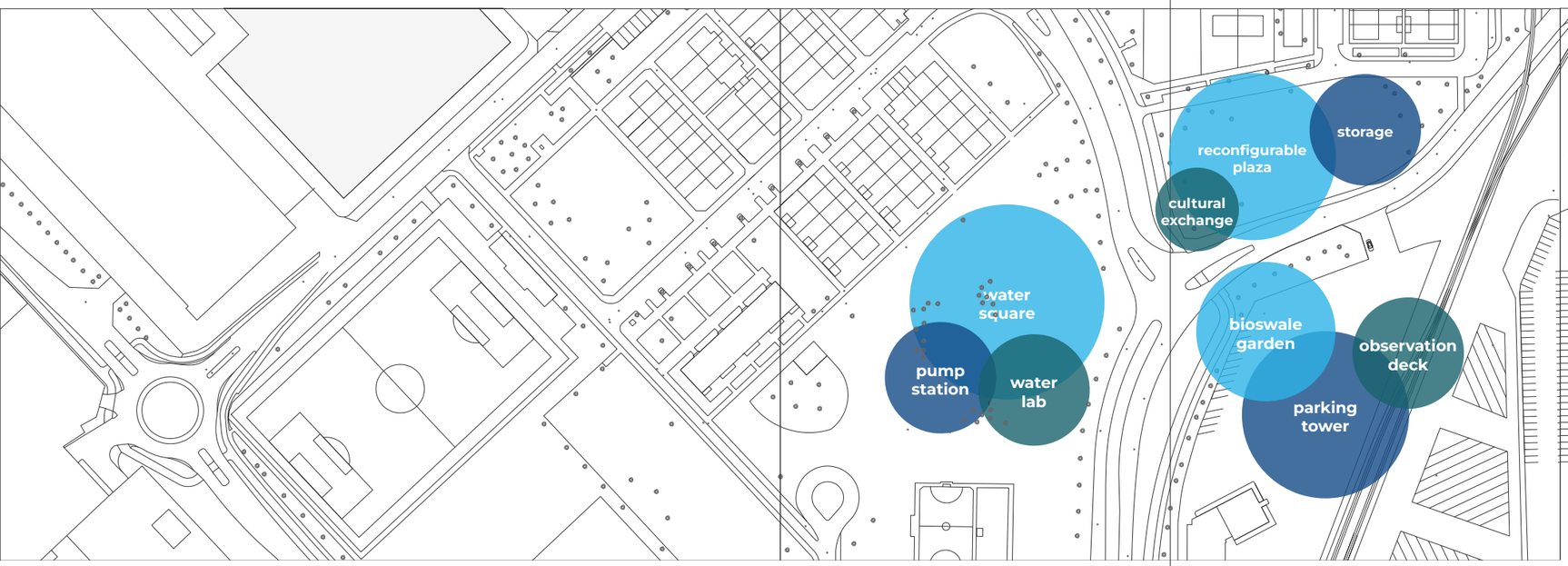
- **Configurable plaza**, inspired by the port equipment and operation, for cultural programs that highlight the originality of the port-nested-village and therefore draw city-dwellers to the remote site, equipped with **functional storage facilities**
- **Water square** that retains water in the time of riverwater and rainwater flooding with the underground water facility brought up above ground as **pump station**, where water is employed as a dynamic spatial element
- **Automated parking tower** that handles the increased demand in parking from the visitors, with an **observation deck** that provides a unique scene of the village with the port as the background
- All the structures should blend the scale, materiality, and aesthetics of the village and the port for cohesive representation

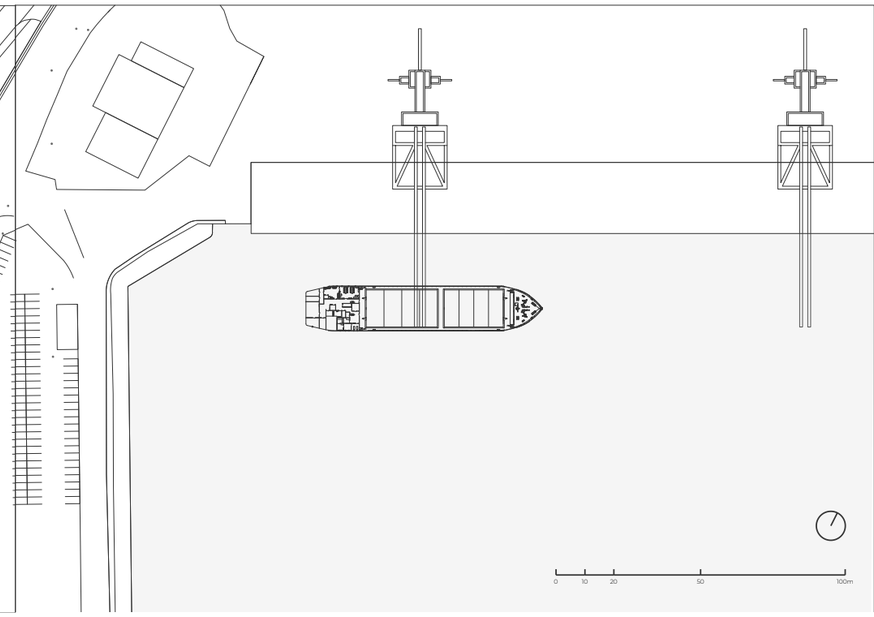
Secondary benefit

- Stimulate the discussion with the municipality on connecting Heijplaat to the public transportation network of the city
- Complement the static surveillance system by making the residents and the visitors dynamic actors of natural surveillance

Transitioning from the research, this project brief sets out a clear point of departure and envisions a creative point of arrival for the design.


Residential Grounds
Green Surfaces
Industrial Fence
Dike Line
Vehicular + Pedestrian Path
External Safety
Potential Risks from Hazardous Substance
Outer Dike Area
Flood Risk >50cm
Container Depot
Container Terminal
X Temperature Controlled Warehouse
X Temperature Controlled Warehouse
dike line
250m
500m
1 C. Steinweg Group - Beatrix Terminal
2 C. Steinweg Group - Kamphof Street
3 C. Steinweg Group - Parmentierplein
4 C. Steinweg Group - Pier 1
5 C. Steinweg Group - Pier 2
6 C. Steinweg Group - Pier 6
7 C. Steinweg Group - Lock Dike
8 Lineage Eemhaven
9 Neele-Vat
10 RHB Warehousing
11 Rhenus Waalhaven Terminal


reconfigurable plaza
storage
cultural exchange
water square
pump station
water lab
bioswale garden
observation deck
parking tower


0
10
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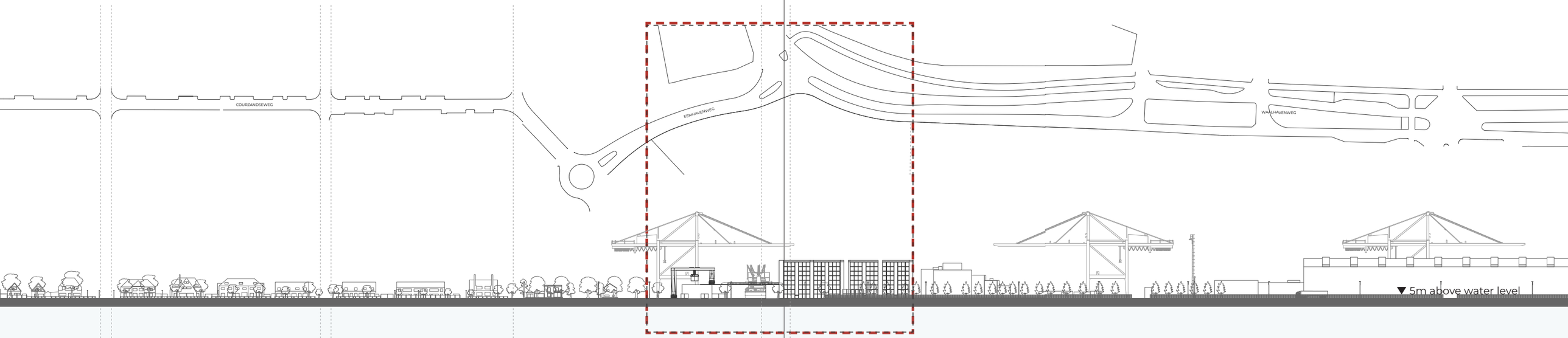


OUDE DORP **GROEN BUFFER** **MUUR 3.0** **HAVEN**

Current marker of the entrance to the village

Proposed entrance to the village

personal motivation

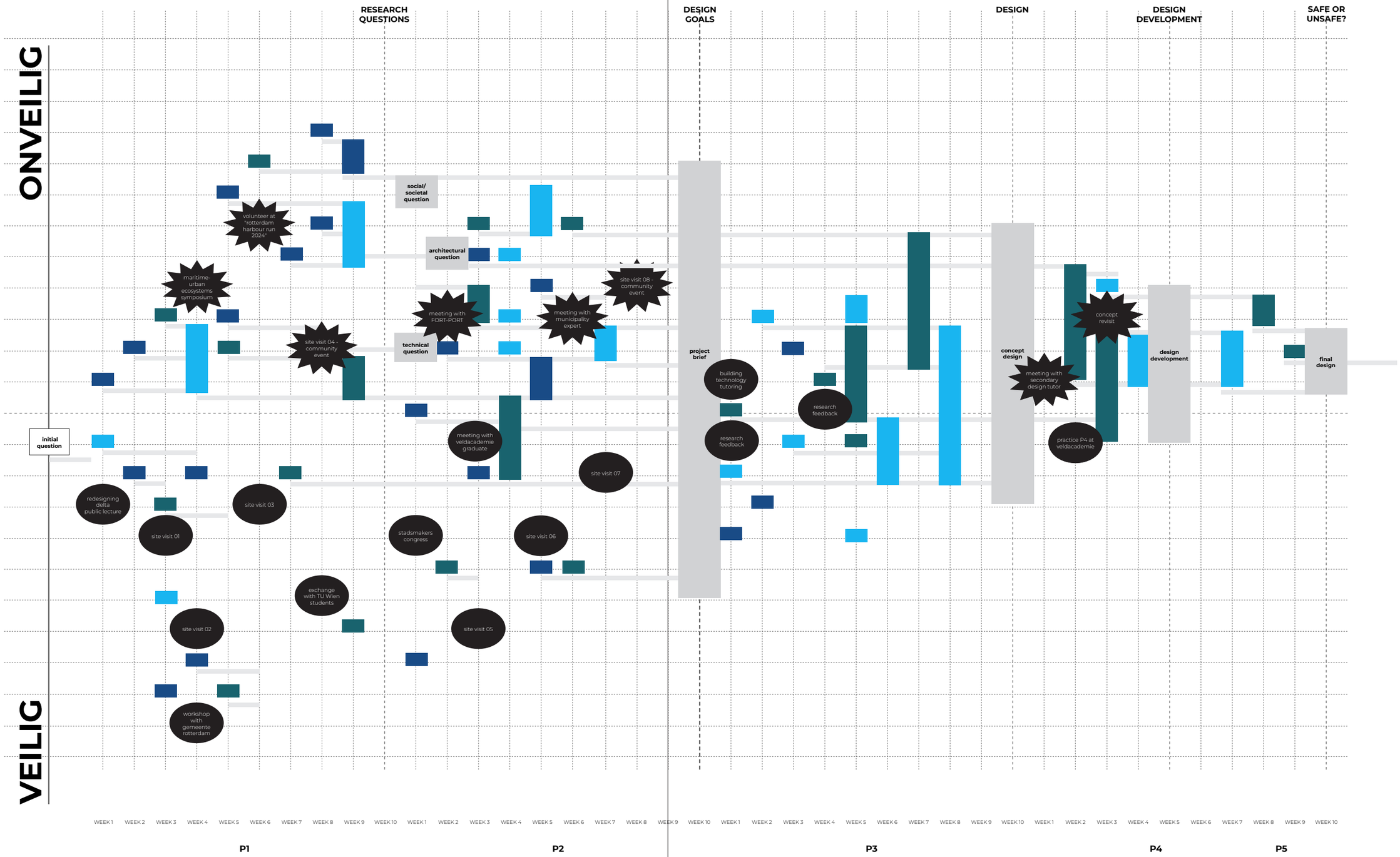
Among the three research methods, research through interaction demands the most emphasis. One says the world is changing not by information, but by knowledge, which stems from interaction. The “Playing Unsafe” chart* will visualize the vertical integration and horizontal expansion of the knowledge throughout the duration of the project. Just like one conversation at the site pushed me to get out of my comfort zone, research through interaction, the core of Veldacademie Graduation Studio, will bring me to the “unsafe” world.

In the course of the research, I had few chances to discuss with the experts relevant to the topics of external safety, security, and port, whose expertise is outside the field of architecture. There, I was often questioned, “So, what can architecture even do to help with this problem?” Striving to understand and translate the issues when others see no direct connections with the built environment, it was a valuable lesson that trained me to work for architecture that “bridges.”

* Assessment of “safe” or “unsafe” will be done at least two weeks afterward and will continue to be adjusted throughout the process.

Project Trajectory

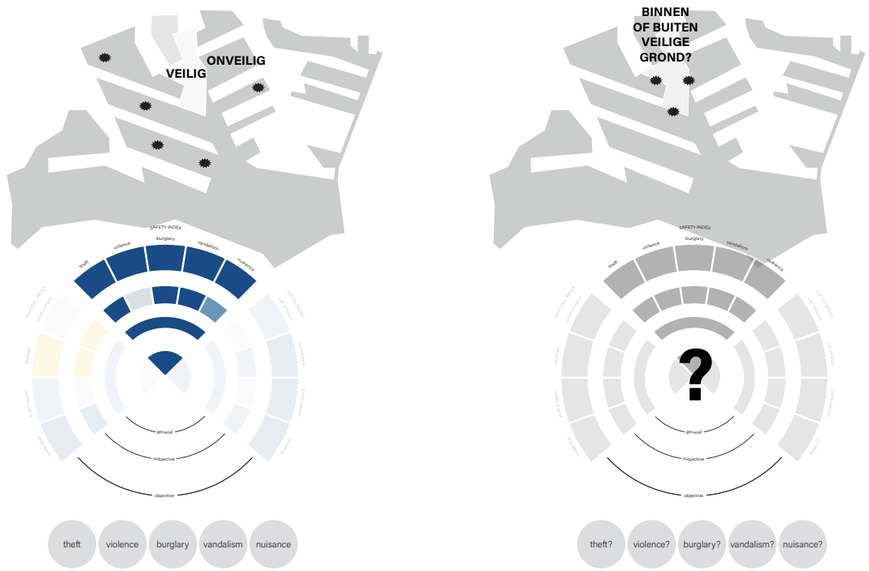
playing unsafe



reflection

What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

I want to begin the reflection by stating that Architecture, in a positive sense, is inherently undefined at every step. It lies across multiple disciplines, but also, it should seek something beyond the preconceived. In search of the graduation topic, my tendency of “questioning” helped me to problematize the acceptance of the formal or given information as fact. For one, Heijplaat village, completely encircled by the ports, is categorized by the municipality as a “very safe neighbourhood.” It is evaluated under the same safety index as all other neighbourhoods in Rotterdam, despite its one and only geographical specificity.



Questioning Municipality’s Safety Index and Commonly Seen Dichotomy that Initiated the Project

Safety is complicated, yet crucial for discussion in building social sustainability. Notably, the Rotterdam municipality launched a new safety initiative (“Veiligheidkoers”) in 2022 to make the whole city, including the port, more resilient. Traditionally, the port and the neighbourhood have been approached as separate entities with distinct natures and expertise. However, as the leading contributor to the delta and the water-related dialogues globally, discussion of the port-city interface is critical and immediate in the Netherlands, especially because the impact of what the port brings to the city, and even more significantly, what the port brings to the people, is transboundary. In this sense, the case of Heijplaat-Waal/Eemhaven presents a special classification of “port-nested-villages,” calling for a specialized and nuanced approach to reframe the notion of safety in the port-city interface.

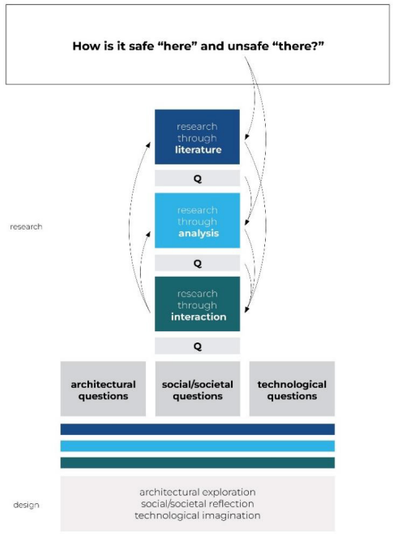
Thus, this graduation project aims to move beyond the conventional boundary of architecture, believing that no single building alone can tackle the interconnected challenges that stem from a complex ecosystem. Instead, the research and design consist of big and small “interventions” that bring together architecture, urbanism, and building sciences. Under the Master’s programme of “Architecture, Urbanism and Building Sciences,” this project has given me a great opportunity to realize my belief that architecture reaches its full potential when the research and design engage with societal issues and embrace technological innovation.

Throughout the research phase, I had few chances to talk with the experts working with the topics of external safety, security, and port, whose expertise is outside the field of architecture (e.g., computer science, a former officer from the police department). I was often questioned by them, “So, what can architecture even do to help with this problem?” The process of understanding and translating the issues that others often don’t associate with the built environment was a valuable training to come up with a spatial solution that “bridge” various domains.

How do you assess the value of your way of working (your approach, your used methods, used methodology)?

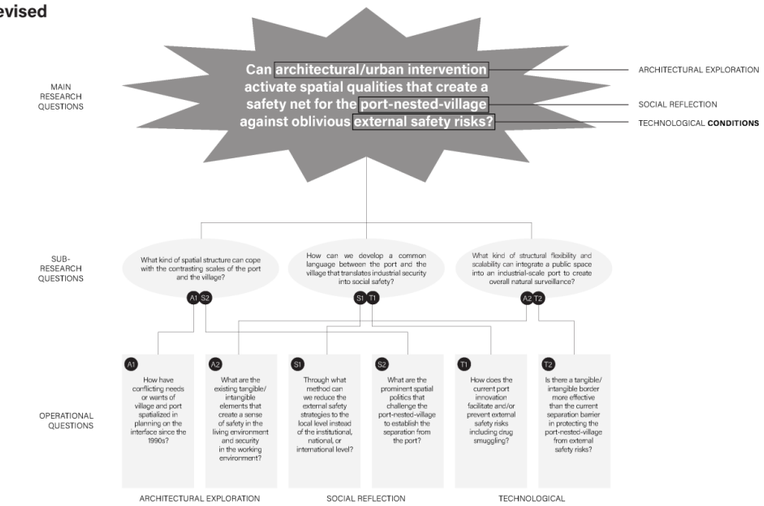
The research was initiated with a nearly instinctive question sparked by the illogical distinction between security in the port and safety in the village, despite the geographical adjacency - “How is it safe here and unsafe there?“ This has prompted the first round of questions, which were answered by research through literature, analysis, or interaction in the preliminary research phase (-P1). By the end of P1, further generated and yet unanswered questions were formulated into operational questions for the research phase (-P2) and organized into three umbrellas: architectural, social/societal, and technological.

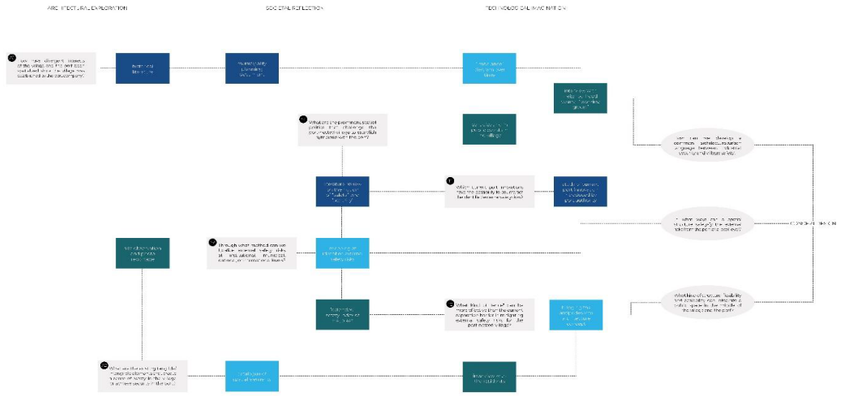
Again, in the research phase, research through literature, analysis, and interaction has led to answering these operational questions. At this stage, establishing a connection between the umbrellas and the overarching research question was challenging. Incorporating the feedback from the Research Mentor, two operational questions from different categories are combined to answer one sub-question. Addressing three sub-questions through combinations of operating questions, the research was able to support a clear response to the main research question.



Before Revision

Revised





Project Trajectory Connecting Operational Questions, Sub-questions, and Research Methodology

The Veldacademie Graduation Studio, as the name suggests, places a strong emphasis on fieldwork. Various types of fieldwork unveiled a range of at-the-moment information from the personnel working closely with the topic and undocumented perspectives of the residents whose living environment will be influenced. It added a human dimension to the research, which mitigated the scale of the project that lies between architecture and urbanism – it makes the research remain tangible and on the social side.

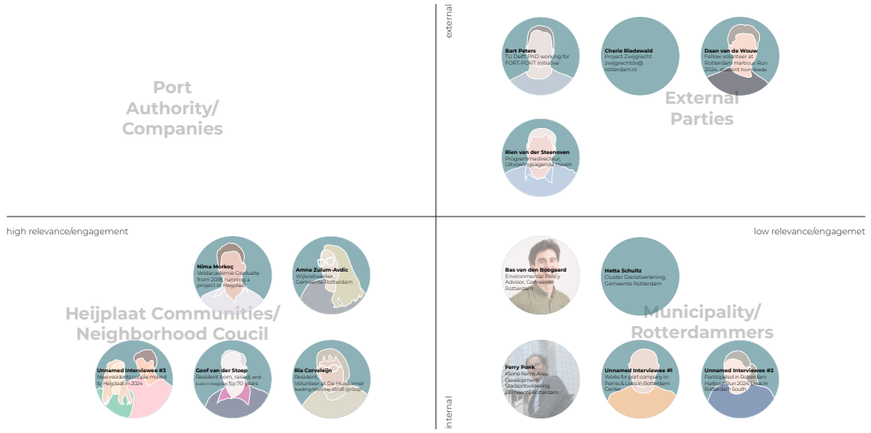
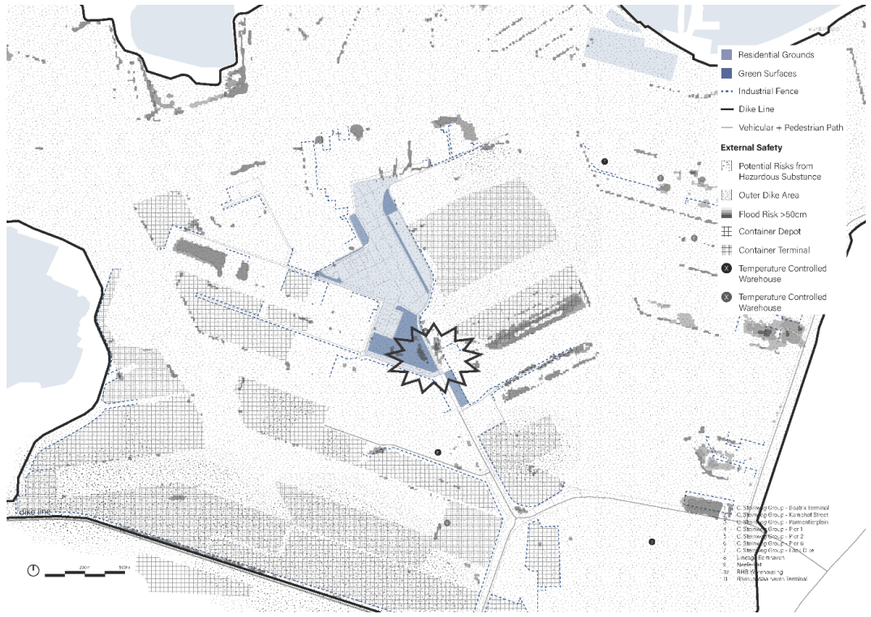


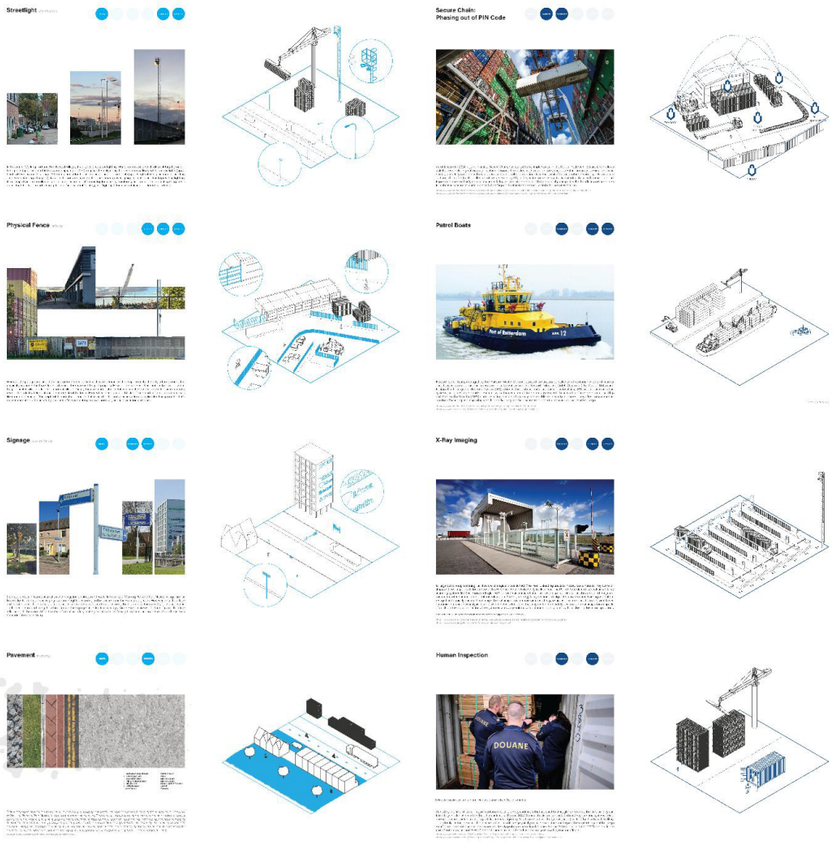
Table of Interviewees During the Fieldwork

However, two limitations from the fieldwork emerged: First, language barriers restricted the engagement to English speakers or Dutch speakers when a third English speaker was present. Second, not being able to get responses from the port companies and the Port Authority skewed the interview pool toward internal stakeholders with varying relevance, rather than the external ones representing the port sector.



Combined External Safety Risks Mapping that Reveals the Target Location of the Project (Pages 108-109 of Research Report)

Therefore, making the research outcome “scientific” while pursuing human-ness was another key point. Research through analysis (sky blue boxes in the Project Trajectory above), whose outcomes can be compiled into visual outcomes like mappings, drawings, and diagrams, helped introduce objectivity and a systematic approach in constructing the conclusion.



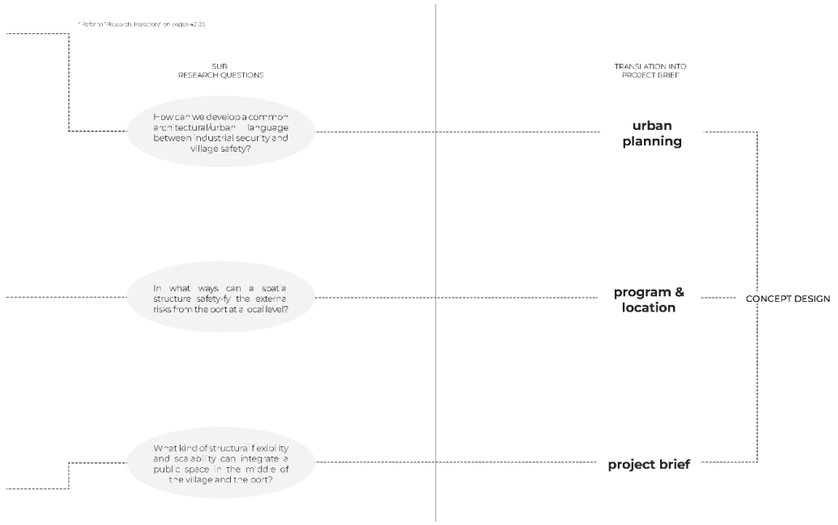
Excerpt of “Safety-Security Handbook” that Identifies Spatial/Non-spatial Elements

The topic itself operates between two poles of “sense” of safety and “system” of security – the former being subjective and the latter being objective. Bridging these antipodes required interpretive decision and critical judgement, particularly in translating them into a design project.

How did your research influence your design/recommendations and how did the design/recommendations influence your research?

The research through literature, analysis, and interaction was summarized into texts, visuals, and interview excerpts. The learnings from research of each external safety risk then informed a set of design goals in a textual form and a diagram that explains the idea. Due to the nature of the research being qualitative rather than quantitative, the design was not intended to be a direct visualization of the research outcome – the research does not directly tell the exact location of the site, programs, their area requirements, materials, etc. Instead, it sets out a clear point of departure (necessity of the urban/architectural intervention), direction (in relation to the identified external safety risks), and the point of arrival (the direct and/or secondary impact envisioned for both the immediate surrounding and broader context).

Research Excerpt for One of the Identified External Safety Risks (Pages 92-99 of Research Report)

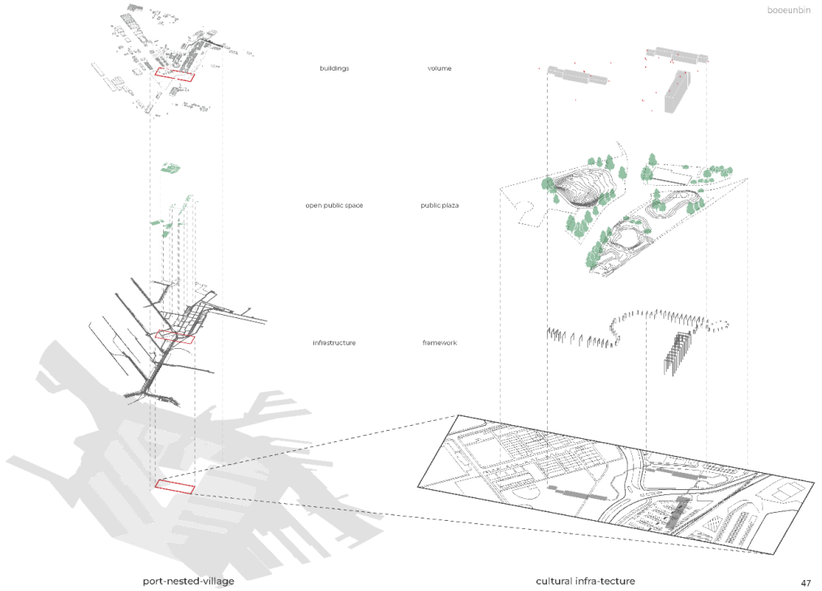


However, each identified external safety risk is highly unpredictable and intricate on many levels. It was made evident during the discussion at the P3 presentation that the project should not aim to directly combat the risks. Instead, it should act as a poetic representation that makes innate or overlooked vulnerabilities visible to society. Therefore, the design started with the idea of providing a framework with flexibility in planning.

In the design phase, the link back to the research was made stronger. The current port-city interface – often just fences – is found to be fragile against the external safety risks. Among others, two existing “walls” mark the boundary between the port and the village, but at the same time, accommodate movement and social functions. This presented the formal language of “soft wall” to the framework – a narrow and tall framework with infills of varying dimensions, porosity, and functions standing in a continuous line. While the framework remains permanent, its “infills” can adapt over time to meet changing needs. Made concrete with the

conversation with the Building Technology Mentor, the framework in a portal frame structure helped secure such flexibility but also helped realize the link between the port and the village. This way, the design study added a physicality to the project goals from the research phase.

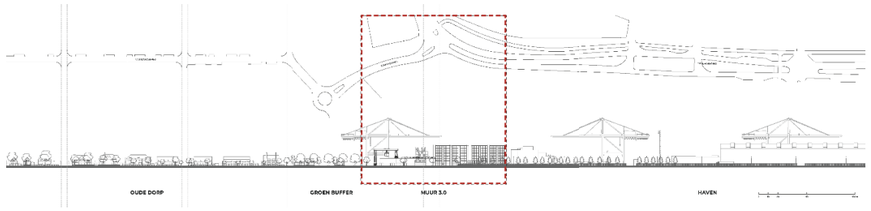
Overall, the project provides functional infrastructure like a storage facility, a pump station, and a parking tower that directly or indirectly respond to the identified risks. But more importantly, it introduces a public space that creates communal opportunities for the residents and draws Rotterdammers into the remote site. In doing so, it forms a cultural infra-tecture that bridges the port (infrastructure), the village (buildings), and open public space in the Heijplaat-Waal/Eemhaven area. The design outcome is the layered composition of framework, public plaza, and infills – a cohesive and responsive spatial system.



How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects? How do you assess the value of the transferability of your project results?

So far, most of the published masterplans for Rotterdam South does not reach into the periphery of Heijplaat village or regard it as the vital actor in the planning – the municipality or the architects/planners do not see the value in developing, or yet, analyzing this unique and specific area because it is not one of the major neighbourhoods with sizable population. Historically, in 1990, the municipality tried to demolish the village based on their own assessment, such as port operation, impact on the environment, and health. However, the residents' protest preserved their living environment intact. Ever since, Heijplaat remains a close-knit community with a strong sense of ownership of the village.

The societal value of this graduation project lies in identifying and defining the new port-city interface typology of "port-nested-village." By drawing attention to the "worth" of developing a project, it aims to stir the discussion of why architecture should and how architecture can react to the overlooked combination of two grounds that are adjacent but treated so separately.



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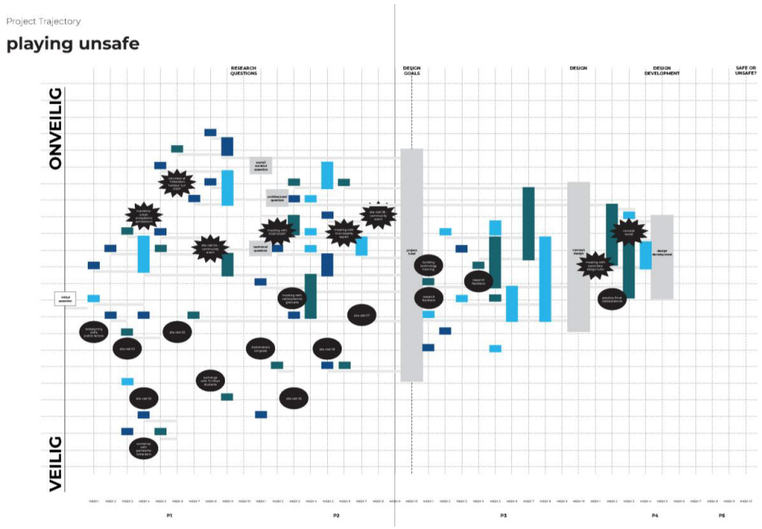
Academically speaking, the project demonstrates how architects and planners can operate beyond a single disciplinary lens. It reminds us that, regardless of initial planning or intention, every element of the built environment carries unintended or secondary consequences or benefits. Yet, given that architecture can reflect and realize the intangible studies and findings, this project presents opportunities for reframing safety in port-nested-villages with adequate layers of translation depending on each case. Since the steps of translation are individual and unique, rather than generalizing the research outcome and transferring the design outcome directly, the project hopes to catalyze discussion around a new typology and exploration of potential spatial strategies for this under-addressed condition.

Discuss the ethical issues and dilemmas you may have encountered in (i) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice.



"Playing Unsafe" Chart Tracking Research and Questions Throughout the Project (Pages 120-121 of Research Report)

(i) Among the three research methods, research through interaction gained the most emphasis. One says the world is changing not by information, but by knowledge, which stems from interaction. The project tracker, the "Playing Unsafe" chart, visualizes the vertical integration and horizontal expansion of the knowledge throughout the project. Dealing with the notion of "safety" in this project, I constantly tried to push myself out of my comfort zone through interaction on the field.

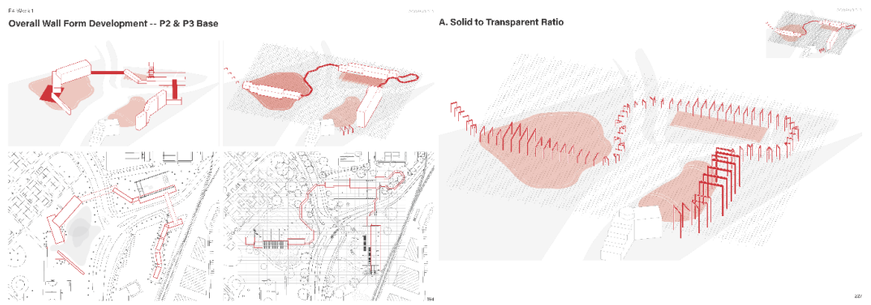
The pivotal moment happened while volunteering for the event in Heijplaat in week 1.5 (October 2024). One conversation with the fellow volunteer sparked a shift of focus toward a more nuanced direction, partially leaving behind the research done for the previous five weeks. These encounters often gave real and lived perspectives, some of which did not align with the hypotheses or narratives previously constructed. Rather than simply filtering out the conflicting information, letting them shape the project were some "unsafe" decisions that made this project more meaningful. Indeed, these are the moments that generated further questions as drivers of the project.

(ii) In the design phase, moving across the scales of urbanism, architecture, and building technology was challenging but crucial in coming up with one comprehensive project. The insight from discussions with the researchers at the Veldacademie research institute was that it is easy to lose the human-scale sensitivity in larger-scale drawings, as much as it is easy to forget about the red thread that binds elements in different scales together.

Since the project aims to form a multi-faceted response rather than a single building, the final design as the solution derived from the research required a clear justification, both verbally and visually. However, after elaborating the design with the concept of "soft wall" in mind, the aerial render revealed that the initial concept is not visualized as clearly.

Aerial Renderings that Helped Reflecting on Realization of Design Concept

In conversation with the Architecture Mentor, I made the “unsafe” but necessary decision to revisit and strengthen the initial concept after the design had already progressed. This reflective step eventually broadened and enhanced the language the architects speak (verbal and visual representation), contributing to a more holistic project.



Massing Diagram of P2 and P3 Design Base (left) and Revisiting the Concept in P4 (right)

(iii) When it comes to application of the project in practice, certain limitations arise due to its academic scope. Initially, I intended to collaborate with FORT-PORT – multi-institutional initiative analyzing illicit acts in the port, which was initiated in September 2023. In order to integrate the system and technology of the port to foster a sense of safety, I aimed to integrate predictive data models into the design. However, this idea was aborted after the meeting with the personnel in week 2.2 (November 2024) – the collaboration was found to be challenging due to one, the timespan of the FORT-PORT project being 4.5 years and the graduation project being 1 year, and two, the confidentiality of the sensitive data. Similarly, attempts to engage with the port companies in Waal/Eemhaven or Rotterdam Port Authority were unsuccessful because of the lack of institutional cooperation for the academic project. This was a missed opportunity to make this graduation project more grounded in a real-world application.

As a result, the role of design became more poetic and interpretive, raising awareness rather than delivering technical solutions backed by technology. While the metaphorical approach draws attention to overlooked issues, it also risks oversimplifying or aestheticizing complex problems. Some problems are deeply rooted in their setting, like in the case of Heijplaat-Waal/Eemhaven area, and some problems may not even be solvable. This raises a broader ethical dialogue and the last set of questions for me – *what is the responsibility of architects in addressing the social challenges with significantly longer lifespan or stems from the structural setting? When we make an intervention, on what terms do we judge whether a temporary change or permanent transformation is appropriate?*


KOUDIJS

appendices

Appendix A

Westward Development of Rotterdam Port (Port of Rotterdam 2017)

Appendix B

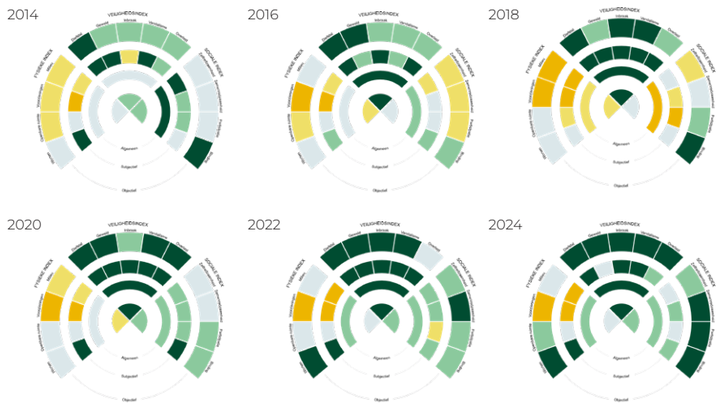
STAGE	SYMBOL ○ city ● port	PERIOD	CHARACTERISTICS
I Primitive port/city		Ancient/medieval to 19th century	Close spatial and functional association between city and port
II Expanding port/city		19th-early 20th century	Rapid commercial/industrial growth forces port to develop beyond city confines, with linear quays and break-bulk industries
III Modern industrial port/city		mid-20th century	Industrial growth (especially oil refining) and introduction of containers/ro-ro require separation/space.
IV Retreat from the waterfront		1960s-1980s	Changes in maritime technology induce growth of separate maritime industrial development areas
V Redevelopment of the waterfront		1970s-1990s	Large-scale modern port consumes large areas of land/water space, urban renewal of original core

Evolution of the Port-City Interface (Hoyle 1989)

Appendix C

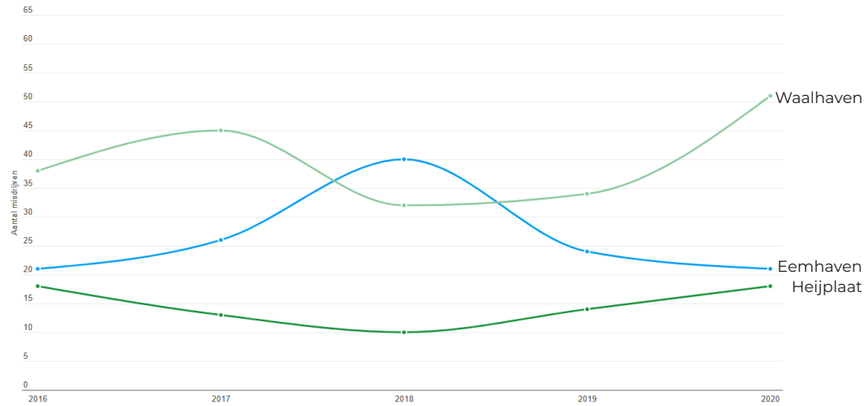
Heijplaat Impression Drawing from Wijkakkoord (Gemeentee Rotterdam 2023)

Appendix D



Neighborhood Profile (Wijkprofiel) 'Pacman' Diagram for Heijplaat between 2014-2024, measured everry two years by the municipality (Gemeente Rotterdam 2024c)

Appendix E



Crimes Per Year (Data from Onderzoek010) (Gementee Rotterdam 2022)

Appendix F

Heijplaat Community Garden (Google Earth 3D Image)

Appendix G

Concrete wall at Boulevard Heysekade separating village and port in 2005 (Lampen 2022)

Appendix H

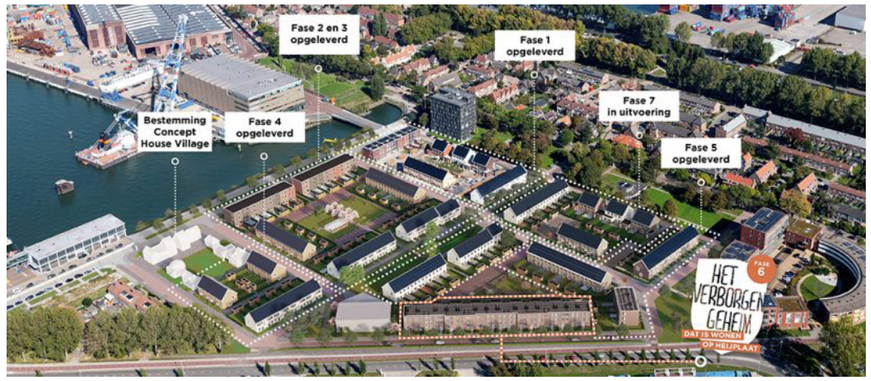
RDM Site Redevelopment (Palmbout Urban Landscapes 2015)

Design of Public Space (Palmbout Urban Landscapes 2015)

Appendix I

New Sports Hall, WIK Heijplaat, opened in 2021 (LIAG 2021)

Appendix J

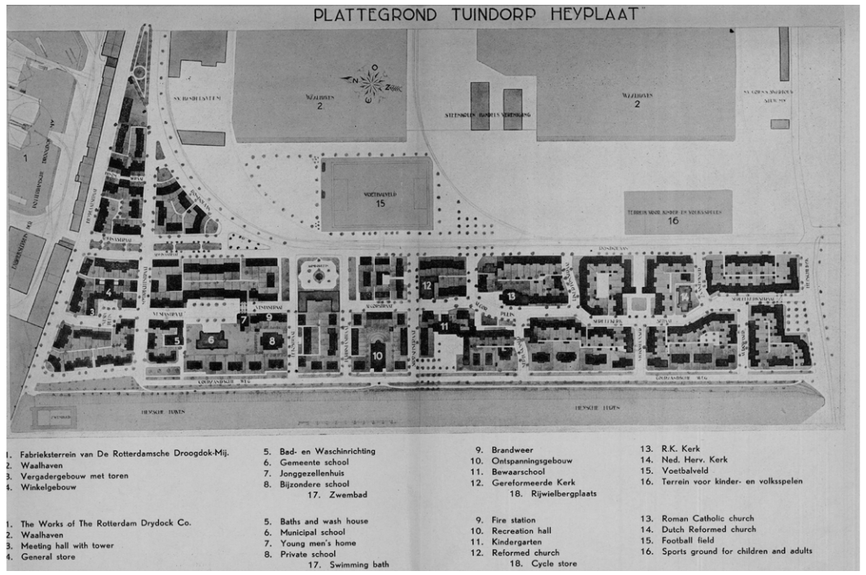


New Housing Complex in the New Village (Wonen in Rotterdam 2022)

Appendix K

Visualization of new office for Port Authority (NUDUS 2024)

Appendix L



Plan of Heijplaat Old Village from 1920 (Rotterdamsche Droogdok Maatschappij, N.V. 1920)

Appendix M

Een ontmoetingsruimte vóór en dóór bewoners. Voor een krant, en een gratis ruilbibliotheek. U kunt ook uw eigen activiteiten bij ons organiseren, Momenteel hebben we de volgende reguliere activiteiten:

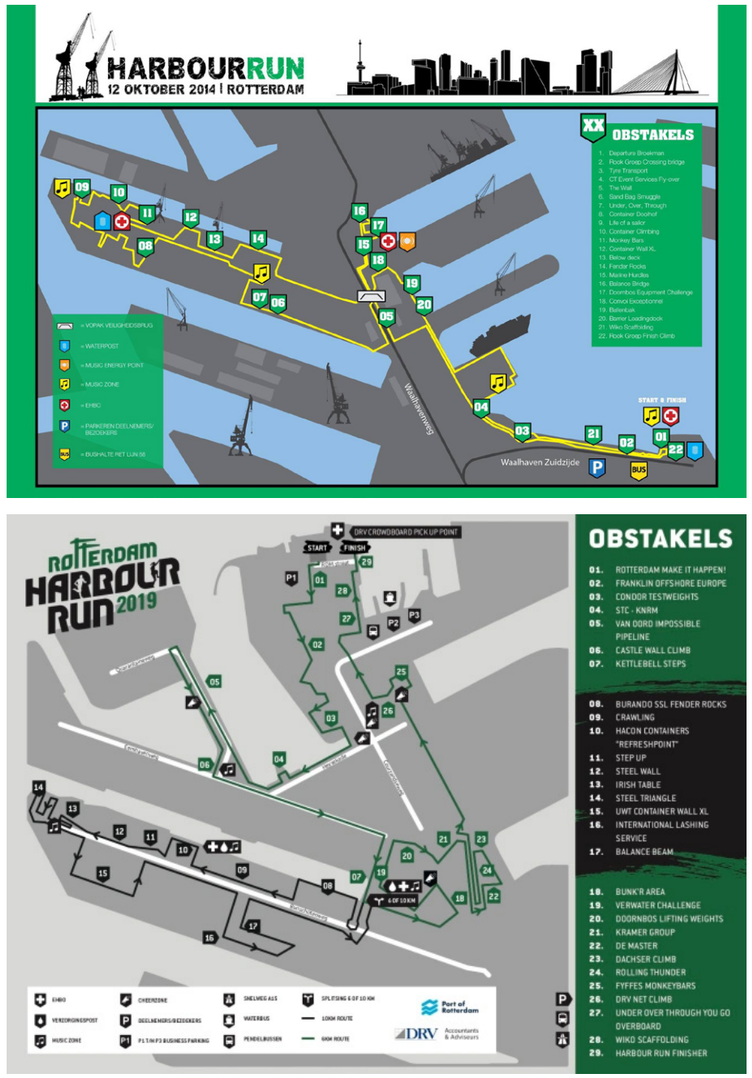
Maandag:	13:30-16:30	Kaarten/Biljarten (vaste club)
	19:30-20:30	Wandelclub, verzamelen voor de deur.
Dinsdag:	10:00-13:00	KoffieOchtend met Sjoelen.
	17:00-18:30	Eetclub voor volwassenen. Driegangenmaaltijd
	20:00-22:00	Fotoclub voor volwassenen. Evenweken.
Woensdag:	09:30-12:00	Kaarten/Biljarten (vaste club)
	10:00-12:30	Koffie-ochtend.
	10:30-11:30	Ouderengym.
	20:30-21:30	Yogales.
Donderdag:	10:30-13:00	Kaart en Biljart mogelijkheid
	10:00-13:00	Koffie-ochtend.
	13:00-16:00	Teken-en-schilderclub voor volwassenen.
Vrijdag:	14:00-16:00	Jeu de Boules, dit spelen wij naast de skatebaan.
	15:00-16:30	Knutselen en spelen in kidsclub de "Huiskamer Kids"
	16:00-17:00	Schaken voor basisschoolleerlingen
	20:00-21:30	Leesclub 1x per maand.
	20:00-21:30	Keramiekclub 1x per maand.
	18:30-20:30	Meidenclub 1x per maand.

A meeting place for and by residents. For a newspaper, and a free exchange library. You can also organize your own activities with us, Currently we have the following regular activities:

Monday:	13:30-16:30 Cards/Billiards (regular club) 19:30-20:30 Walking club, gather at the door.
Tuesday:	10:00-13:00 Coffee Morning with Shuffleboard. 17:00-18:30 Dinner club for adults. Three course meal 20:00-22:00 Photo club for adults. Even weeks.
Wednesday:	09:30-12:00 Cards/Billiards (regular club) 10:00-12:30 Coffee morning. 10:30-11:30 Senior Citizens' Gymnastics. 20:30-21:30 Yoga class.
Thursday:	10:30-13:00 Card and Billiards option 10:00-13:00 Coffee morning. 1:00-4:00 PM Drawing and painting club for adults.
Friday:	14:00-16:00 Jeu de Boules, we play this next to the skating rink. 15:00-16:30 Crafts and games in the kids club "Huiskamer Kids" 16:00-17:00 Chess for primary school students 20:00-21:30 Reading club once a month. 20:00-21:30 Ceramics club once a month. 18:30-20:30 Girls club once a month.

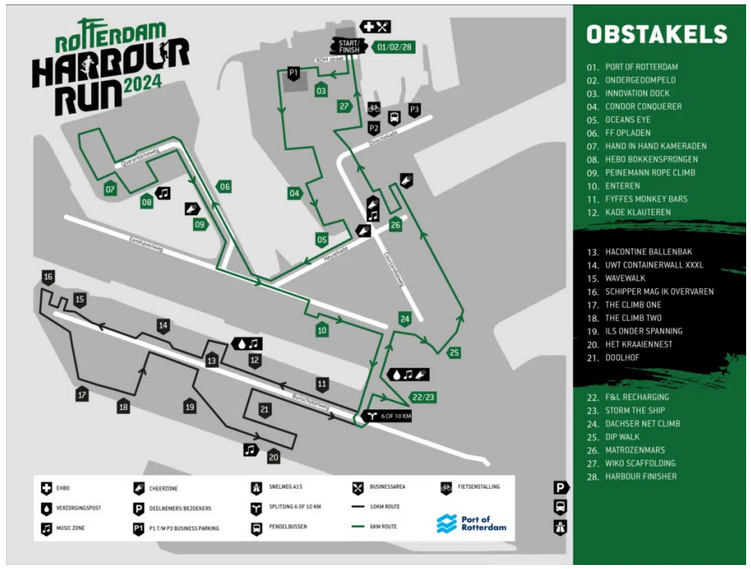
Community Events hosted by De Huiskamer in 2024 (De Huiskamer website https://dehuiskamer2punt0.com/)
Left: Dutch original, Right: English translation by Google Translate

Appendix N



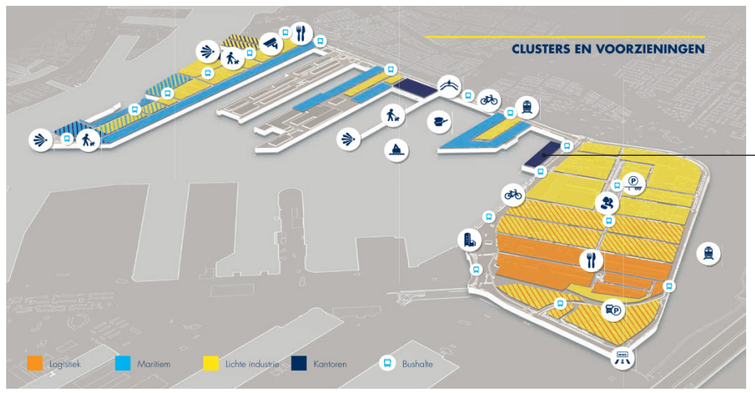
Routes for Harbour Run in 2014 (top) and 2019 (bottom) from Harbour Run facebook

Appendix O



6km and 10km Routes for Harbour Run 2024 (Rotterdam Harbour Run 2024)

Appendix P



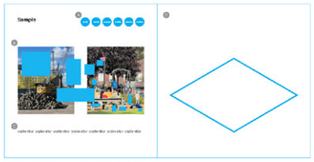
PortCity Cluster Office Tower

PortCity Cluster Office Tower (Port of Rotterdam 2021)

Appendix Q

How to use this handbook

Part I: Tangible safety elements on village and port ground
Part II: Intangible security elements on port ground
Part III: Architectural element bridging the gap between safety and security



A: Assessment of the element based on Six Pillars of CPTED
B: Images from site observation
C: Delineation of the features of the element
D: Digram of a range of scenarios

: reference to inward/personal feelings
: quote definition from stakeholders
: quote definition from stakeholders
: quote definition from stakeholders

: reference to environments and collective experiences
: quote definition from stakeholders
: quote definition from stakeholders

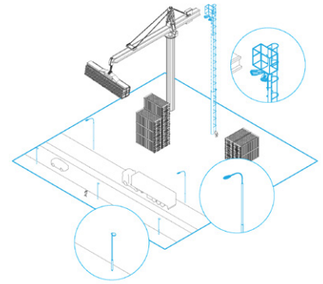
"Cocaine and the ports' shapes of security, urban riotism, and disillusionments of policing efforts in the port of Piraeus" (Garg, 2024)

Part I

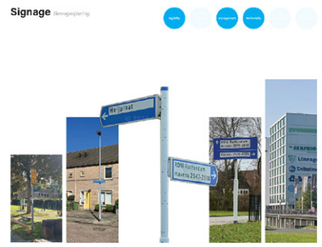
Tangible safety elements on village and port ground

Streetlight streetlamp

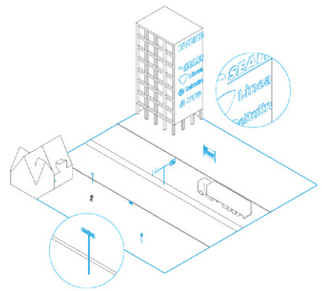
In the area of Working Port and Port-Nested-Village, three types of outdoor lighting fixtures are mixed to reach different target groups - lamp posts (appx. height of 4.0m, average spacing of 20m) are placed mainly along the pedestrian walkway while canopy lights (appx. height of 8.5m, average spacing of 30m) are planned for the fast-moving vehicles. Tower lights (appx. height of 15m, placement depending on the area planning of the port) placed in the port area have much higher lumens, covering bigger areas. In addition to providing lighting, it is equipped with a surveillance camera, a bollar, and a platform on top for security, monitoring, and control. The interesting thing in this area is that the two grounds sharing the interface place different types of lighting fixtures, which leads to different sub-effects.



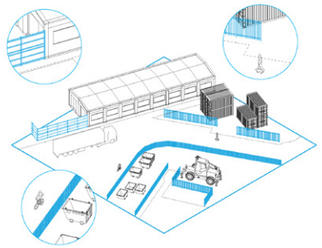
Signage (Wayfinding/Warning)



Signages directly influence orientation and navigation on streets and roads. In the area of Working Port and Port-Nested-Village, similar to street lights, signages have varying sizes and heights depending on the locations and the main target groups. However since the all logic and the port share the interface, some signages can be perceived out of scale, showing the hierarchies. For example, for the pedestrian on the pedestrian road along the vehicular road, the signage targetting fast-moving vehicles might make one feel out of place, therefore influencing the behavior. While it can be a form of boundary-making as a result out of navigation, the boundary is invisible, and thus does not control the accessibility.

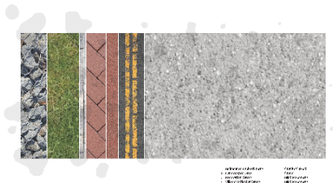


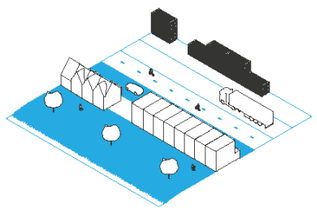
Physical Fence



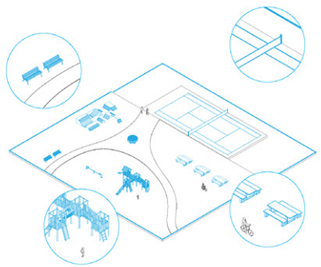
Whereas the port ground and the village ground seem to have a divided domain on the map, in reality, the only urban element that physically separates the two is fences of various forms around the port property. However, this element of separation does not fully turn the port-riented village to look like a normal village. Usually, they are made out of metal wire, which stops the access but predominantly reveals the industrial elements on the other side of the fence. Even when there in a solid block of fence made of incise sturdy materials like concrete, because of the height of the industrial elements that respond to the port activities, it forms an alienated background. What's more, it cannot stop the unsafe by-products of the port setting such as noise, air, and light pollution and more.

Pavement





Urban Furniture

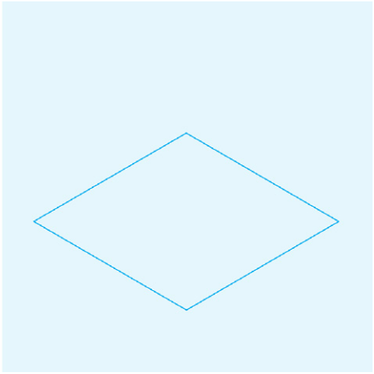


objects seen on the village ground and port ground
village ground : Bench, planter, playground, sports ground, **bus shelter**
include port ground "furniture" : **waste dump, train sign, barrier**

Open Green

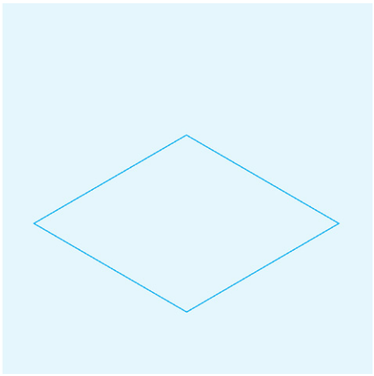
intentionally closing off (wide road spaces) by adding grass and other landscaping along the side may make driver a little more cautious - safer road for everyone

grass patch, park strip, tree belt, planter zone, gardening zone



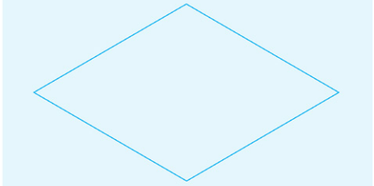
Interconnected Street Network

Three types of lighting fixtures



Presence of Human

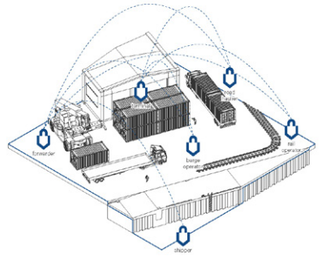
Eyes on the street = Supervision by Authorities (Ducane, Pollitte)



Part 2

Intangiible security elements on port ground

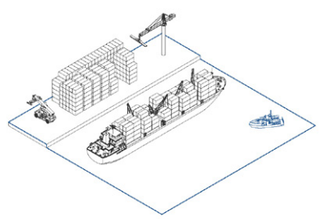
Secure Chain:
Phasing out of PIN Code



As of December 2024, a joint initiative, Secure Chain, has started to be implemented in the Port of Rotterdam. Secure Chain allows stakeholders, including rail operator, customs, shipping line, police, authorities, shipper, barge operator, forwarder, terminal, and road hauler, to digitally pass the authorization to access and collect a container from the terminal to one another. Previously, PIN codes are exchanged on paper. The collection of containers using PIN codes, which were susceptible to potential abuse, will come to an end. Import containers will only be securely and reliably released via the Secure Chain. Those only concerns the first handle import containers from the Far East and Oceania as road in line for port activities in the Secure Chain in the port of Rotterdam.

https://www.portofrotterdam.com/en/news-and-press-releases/shipping-sme-start-connecting-for-safe-and-reliable-secure-chain
https://www.portofrotterdam.com/en/news-and-press-releases/fighting-security-risk-import-container-chain-in-rotterdam

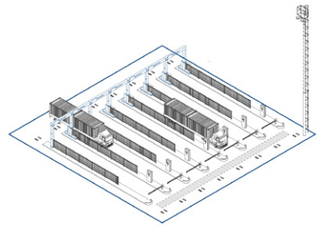
Patrol Boats



Harbour patrol boats, managed by the Harbour Master Division, conduct continuous surveillance of container ships and monitor unauthorized access or unusual operations in collaboration with the Seaport Police and Dutch Customs. (The Port of Rotterdam) Equipped with integrated Electronic System (IES), which include onboard radar and sonar functionalities, GPS systems communication systems, and access to the port's camera network, they ensure real-time threat assessment. These boats enforce the International Ship and Port facility Security (ISPS) Code, ensuring that vessels comply with established security measures. They often carry personnel capable of boarding and inspecting vessels directly, using handheld scanners to detect contraband or unauthorized cargo.

https://www.portofrotterdam.com/en/about-port-authority/organisation/harbour-master
https://www.portofrotterdam.com/en/news-and-press-releases/fighting-security-risk-import-container-chain-in-rotterdam

X-Ray Imaging

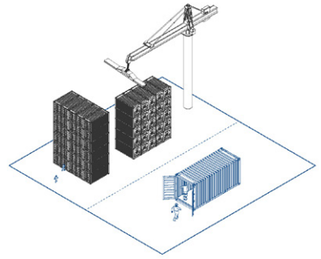


In large ports, X-ray scanning facilities are strategically positioned. One, near unloading areas to inspect containers as they come off ships, and two, at port exits for outbound checks before containers leave by truck or train. The Port of Rotterdam utilizes advanced X-ray scanning systems like the Rapiscan Eagle T80* for road cargo inspections. This system, paired with AI, produces detailed images of container contents in real-time to enhance detection. After high-energy X-ray scanning, AI algorithms use machine learning and pattern recognition to quickly analyze X-ray images to spot suspicious items or contraband (e.g., weapons, drugs, or unauthorized goods) based on training data and risk analysis. Such a system helps detect items that may not be immediately obvious to human inspectors. Capable of quick, on-the-move inspections, the system ensures large volumes of containers are inspected without slowing down port operations.

* Rapiscan Eagle T80 Being the most advanced cyclotron licensee and applicable to World Maritime.

https://www.linkedin.com/pulse/rapiscan-systems-installs-cargo-scanner-for-dutch-customs-7
https://www.securitymagazine.com/articles/84744-rapiscan-eagle-t80

Human Inspection



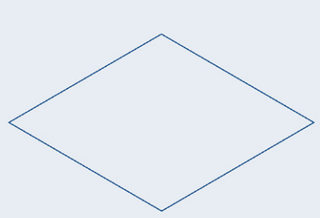
Selected suspicious containers - Heat containers from South America

Coined by the field officials, "Hajer" containers refer to empty containers that are used to smuggle runners into the port, so they can fetch drugs hidden in between in the other containers. (Pessoa 2021) Manual checks are conducted when X-ray scanning systems detect anomalies, when containers are flagged due to their origin (e.g., South America) and the type of goods (e.g. fruit) by Risk-Based Profiling, or randomly. During the manual inspections, Customs officers physically open the container and inspect the contents against the cargo manifest or uses tools like handheld scanners, density probes or narcotics detectors. Among is 2 million "TEUs (est. 2021) handled in the port of Rotterdam, around 15% of the total containers are selected and manually checked by Douane officers.

https://www.linkedin.com/pulse/rapiscan-systems-installs-cargo-scanner-for-dutch-customs-7
https://www.telegraaf.nl/nieuws/1000/article/douane-ontdekt-regelmatig-cocaine-in-containers-uit-zuid-amerika

CCTV

The Port of Rotterdam has initiated a Virtual fence) project to enhance security and combat organized crime, particularly focusing on drug trafficking, since Smart Surveillance Deployment of advanced cameras equipped with intelligent monitoring capabilities to provide real-time surveillance across the port area. The municipality operates CCTV in the ports but the two realms – one public, under 8 safety and two, detection of crime. CCTV cameras have been developed since six, and today they have functions including high definition images, night-time, heat detection. CCTV camera surveillance is part of the "Virtual Fence" project, initiated between Port Authority Customs and Sea Police. camera network locations by municipality, but the network is not connected because cameras on the private parties do not



Vertiport - Drone

As part of the "Virtual Force" project, Dronis Integrator Utilization of drones for urban surveillance reach, offering aerial views of port activities and enabling rapid response to suspicious incidents. In the future, drones will be used for all kinds of tasks in the Rotterdam port area, ranging from complex cargo inspections and monitoring to transporting packages. "This requires the possibility to set up a strategic network of unmanned take-off and landing platforms for drones, known as vertiports. — Drones offer many opportunities, but they can also be used for non-good purposes and involve risks where safety and security. Examples include the use of drones to take surveillance patterns of logistic businesses by entering prohibited corridors or other unwanted trajectories, preparation of other malevolent activities, drug delivery, or supplying or possibly even terrorist intentions. We are consulting with a large number of port-related parties regarding protection

Digital Twin

The Port Authority started to develop a digital copy/digital twin of the port, that continuously tracks the whereabouts of sea-going vessels, containers, inland vessels, trains and trucks. Infrastructure, weather, geographical and water depth, safety and security, visibility and airports data with 100% accuracy in real-time. Thanks to sensors the underlying transport network all together, it will help to increase efficiency and reduce waste of energy. In the port of the future, citizens will be able to communicate with each other without human intervention. Employing IBM's Internet of Things (IoT) technology, easy walk, talk with ships, containers and sensors, terminals and trains, distribution centers with trucks." The building enables real-time simulation of operational issues.

Crane Automation

Rotterdam is building the most automated port in the world.

Appendix R

Container ship moored at the EuroMax shipping terminal in the Port of Rotterdam - Credit: Foto-VDW / DepositPhotos - License: DepositPhotos

CRIME BUSINESS DRUG TRAFFICKING COCAINE PORT OF ROTTERDAM AIVD » MORE TAGS

SHARE THIS:

WEDNESDAY, 22 MARCH 2023 - 09:45

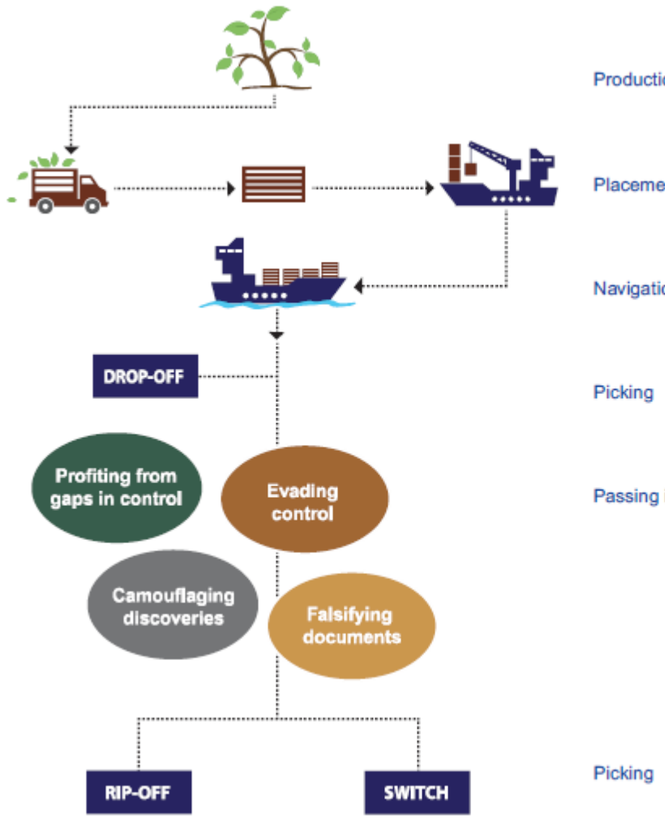
Thousands of Rotterdam port workers to be screened for links to drug crime

Companies in the port of Rotterdam will team up with intelligence service AIVD to screen thousands of employees and drivers for criminal offenses linked to drug crime. It involves employees in positions interesting for drug traffickers, like planners at terminals and truck drivers, Trouw reports.

Some port companies already use a standard certificate of good conduct to screen employees. In the new screening, the screening authority, Justis, will look specifically for cases relevant to drugs and drug smuggling. Employees will have to reapply for this special certificate of good conduct periodically. This form of screening by the AIVD is also used for Schiphol employees.

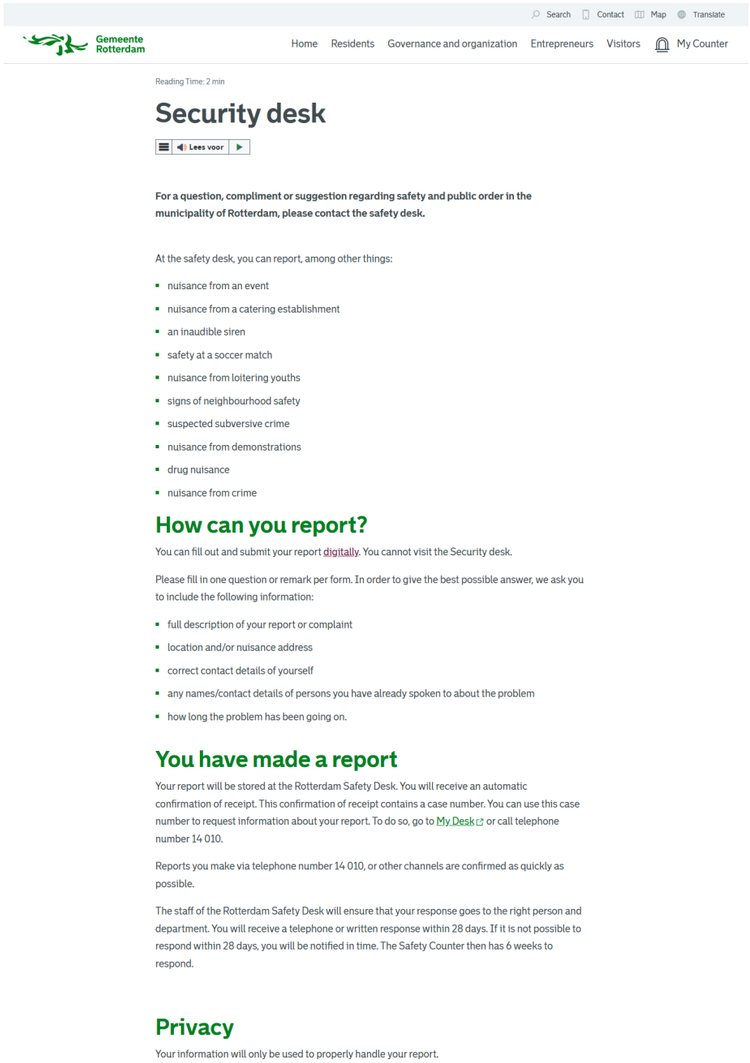
Risks Posed to the Port Employees to Participate in the Drug Crime Chain (NL Times 2023)

Appendix S



Drug Smuggling Process from Country of Origin to Delivery (Staring 2023)

Appendix T



Screenshots of Security Desk (Veiligheidsloket) Page on Gemeente Rotterdam Website (Gemeente Rotterdam 2024b)

Appendix U

BASIS

Enterprising and efficient organization.

MATERIAL THEME	KPI	GOAL 2023	REALIZATION 2023	REALIZATION 2022	REALIZATION 2021	CONTRIBUTION TO SDG
Undermining crime	Increasing awareness Progress on 'Virtual Fence' project	Green	Orange	-	-	3 GOOD HEALTH AND WELLBEING 8 DECENT WORK AND ECONOMIC GROWTH

THE IMPACT OF THE PORT OF ROTTERDAM	SELECTION OF RELEVANT CAPITALS	MAJOR RISKS
KT - Undermining, mixing of the underworld and upper world (often drug-related), is increasingly a problem for the port of Rotterdam. It disrupts logistical efficiency and causes a feeling of insecurity among residents and employees in the port. LT- Long-term problems surrounding undermining crime can lead to a decline in support for the port and damage our reputation. This translates into a worse business climate.	- Our people - Finances - Infrastructure	T10 - Terrorist attack in the port T13 - Undermining crime in the port

Strategies to Tackle Undermining Crimes in Port (Port of Rotterdam 2023)
/ Images Originally in Dutch, Machine-translated by Google Translate

image credits

All the illustrations in this Research Plan are done by the author.

Images in the Appendices section are from the following sources:

Appendix A

Port of Rotterdam. 2017. *"Rotterdam's Port Development."* Port of Rotterdam. 2017. https://www.portofrotterdam.com/sites/default/files/styles/por_is_content_image/public/history-port-asia.jpg?itok=fxLpfjVK

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Appendix S

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Appendix T

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Appendix U

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Heijplaat in the foreground, RDM shipyard in the background
(Rotterdamsche Droogdok Maatschappij (RDM) 1958)