

RECONCILE RAILWAY WITH CITY

Integrate Schiedam Centrum Railway Station and its surroundings into local urban context with a view to the Transit-Oriented Development strategy

RAN HU



PREFACE

This thesis is the product of graduation project for my two years master degree study in Urbanism track at the Faculty of Architecture of Delft University of Technology.

My research is made in the framework of the Urban Regeneration graduation studio, which is about providing a better physical environment and social and economic opportunities for citizens. Under the structure of urban regeneration theory, the main topic of my research concerns on integrating Schiedam railway station and surrounding into local urban context. To create a sense of 'place' around Schiedam Centrum Station area, which is a joint of different modes of transportations but not a pleasant place for people to stay, is the main task of my design.

The method of 'Design driven Research' is used in this project. First of all, the question field will be described and theoretical underpinning will be built. After that the design instruments and planning tools will be concluded by researching and analyzing the existing application of strategies. In the end, the design instruments and planning tools will be test in the project design in one of Dutch railway station Schiedam Centrum.

Rotterdam, 24 October, 2010

Ran Hu

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Master Thesis

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Two years' study aboard is not easy for me, but I indeed had the most colorful time in my life. To those people who are the beautiful colors for my life, I'd like to thank them with all my heart...

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Willem Hermans
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My parents
呼振源 **ZhenYuan Hu**
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My boyfriend
Maarten Den Heyer

and all my friends

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INTRODUCTION

PART 2.
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PART 3.
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1.0 Introduction

The first part of this thesis is to introduce the overall structure of the research. It starts from introducing the background and problem field. Then the research questions, which are tackled in the further parts of this thesis, are described. After that, the research objective, methodology, structure and relevance are introduced in last of Part 1.

1.1 Background & Problem Field

1.2 Research Questions

1.3 Research Objectives

1.4 Methodology

1.5 Thesis Structure

1.6 Relevance

1.1 Background & Problem Field

Railway station surrounding

Railway stations and their surroundings have become nodes of polycentric network city model due to their high accessibility by different modes of transport at different scale levels, and have emerged as new central places in metropolitan cities in Europe (Kusumo, 2007). As 'nodes' of transportation network, railway stations and their surroundings represent the efficiency and cooperation of regional public transportation networks. Meanwhile, it brings flows of people, which offers sufficient opportunities for developing multi-social and economic activities (See Figure 1.1.1). On the other hands, railway stations and their surroundings are also new emerged centrality in local urban context. This represents another character of railway stations areas which is 'places'. As a 'place' of city, it should provide space for diverse socio-economic activities (Bertolini & Dijst, 2003) (See Figure 1.1.2). But to balance this dual character of 'Node and Place' often faces many complexities.

First of all, in the mean time of railway station areas as a junction of different types of transportation bring opportunities; it also creates several difficulties for place-making developments, such as barrier effects of heavy transport and. Secondly, on the local scale level, railway station areas as a new centrality of a city should be integrated into the cohesive local networks, and linked to old city centres and sub centres. Thirdly, on the regional scale level, what are the roles of railway station nodes in the regional networks, how to make these nodes complementary with each other are difficult problems to be solved.

TOD

In recent years, a concept is developed to balance between regional efficient mobility network strategies with local mixed land use developments along public transports within walking radius. The Transit-Oriented Development (TOD) is an integrated land use/transport planning approach operating around urban public transport interchanges or nodal points well served by public transport in which a more specific relationship between development density and public transport service level is instituted (Royal Institution of Chartered Surveyors, 2002). This concept gives us a view on how to develop the potential of dual character of railway station areas. (See Figure 1.1.3)



Figure 1.1.1
'Node' brings flows of people.



Figure 1.1.2
'Place' for diverse socio-economic activities.



Figure 1.1.3
TOD intensification along public
transport line in USA.



Figure 1.1.4
Stedenbaan strategy
(source: [http://www.stedenbaan.nl/
page/Stedenbaan](http://www.stedenbaan.nl/page/Stedenbaan))

Stedenbaan

Furthermore, the Dutch experience of TOD concept is the Stedenbaan strategy (See Figure 1.1.4). It has two main objects which related to the 'Node and Place' characters:

- The creation of a high frequency public transport system on the existing national rail network.
- An intensification of land uses around the stations on the rail network.

(<http://www.stedenbaan.nl/page/Stedenbaan>)

Since 2003, Stedenbaan has started to develop the regional strategy to improve transit capacity and several key projects which are more focus on major Randstad hubs such as Rotterdam Central Station or Den Haag Central Station. But most of the stations that involved in Stedenbaan are middle size city stations. They don't have such a strong position as Randstad hubs, and to survive, so it's necessary to find their positions in the cohesive regional networks. Furthermore, at this stage, developing top-down regional strategy is the concentration of Stedenbaan. But for the next phase of development, a bottom-up local scale intervention guide should be provided. Hence, this research is trying to find way to integrate stations of middle size cities into local context which more related to the role of 'Place' with a clear position in the regional networks.

Schiedam Centrum Station surrounding

By using 'Research driven Design' method, the conclusions from theory underpinning and case study will be test in the design of Dutch city railway station Schiedam Centrum Station, which is one of the nodes of Stedenbaan strategy. From the transit node point of view.

Schiedam Centrum station area combines railway, metro, tram, bus and car transportations, which provides a big potential for the multi-social and economic activities. From the 'place' point of view, the reality shows that the sense of place can not be found around the Schiedam Centrum station area. It more likes a jump-in and jump-out space between different types of transports. And around the station, the areas are vacant for years. Therefore, **'to created a sense of 'place' around Schiedam Centrum station area'** will be the main task for my design.

Meanwhile, the current situation is that Schiedam Centrum Station surrounding is a clear boundary for north industrial site and south old city region. So another task of my design is **'to make Schiedam Centrum Station area into the Schiedam city context'**.

(See Figure 1.1.5 to 1.1.7)



Figure 1.1.5 The south entrance of Schiedam Centrum station.



Figure 1.1.6 The north entrance of Schiedam Centrum station.



Industrial Site

In Between Vacant site

Schiedam Centrum Station

History Centre

Figure 1.17 Current situation of Schiedam Centrum station areas.

1.2 Research Questions

The main research question of this thesis is:

What spatial-functional design interventions can integrate Schiedam Centrum Station and surroundings into its local context with a view to Transit-Oriented Development?

To answer the main question, the sub-questions need to be tackled are:

- What are the roles of Schiedam Centrum Station and its surroundings on regional scale level and local scale level?
- What are the problems and potentials of Schiedam Centrum Station and its surroundings?

Method

- Literature study: Node & Place, Stedenbaan.
- Analyze Schiedam's current situation,

Aim

- To understand the characters of railway stations and surroundings on different scale levels, and find out the essential spatial-functional design principles for carrying out the roles.
- To find out the problems and potentials of Schiedam Centrum Station area.

- What are the principles of TOD, based on the spatial-functional design principles for carrying out the roles and potentials and to solve the problems of Schiedam Centrum Station area?

- What are the weaknesses of TOD for (re)developing Dutch railway stations and its surroundings?
- How to make up for the weakness of TOD?

Method

- Literature study: TOD, Stedenbaan, Place Making
- Depthmap
- Case study: Rotterdam Alexander Station, 's-Hertogenbosch Station

Aim

- To find out design principles and topics for intervention of Schiedam Centrum Station surroundings.
- To find out the criteria for evaluating the intervention result.

- How to apply the design principles, which are concluded from theory study and case study into the spatial design of Schiedam Centrum Station surroundings?

- What kind of street pattern?
- What kind of building typology?
- What kind of function program?

Method: Design case

Aim: To give proposes to integrate Schiedam Centrum Station and surrounding into its local context.

1.3 Research Objectives

This study is based on the 'Research driven Design' method. The main objective of this research is to provide proposes and recommendations to integrate Schiedam Centrum Station and its surroundings into local context with a view of Transit-Oriented Development concept.

To achieve this goal, three objectives from different scales have to be achieved:

- Regional Scale

Find the roles for the Schiedam city in the regional networks.

In Stedenbaan and Rotterdam's networks

(See Figure 1.3.1)

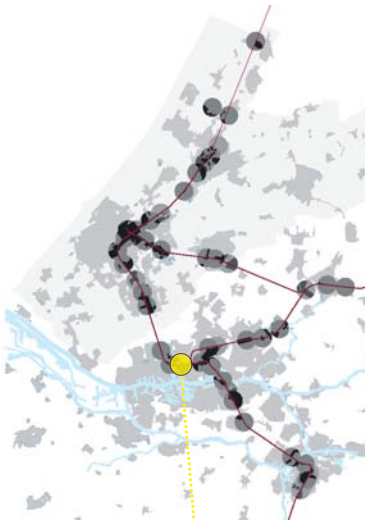


Figure 1.3.1
Schiedam in Stedenbaan network
(source: <http://www.stedenbaan.nl/page/Stedenbaan>)

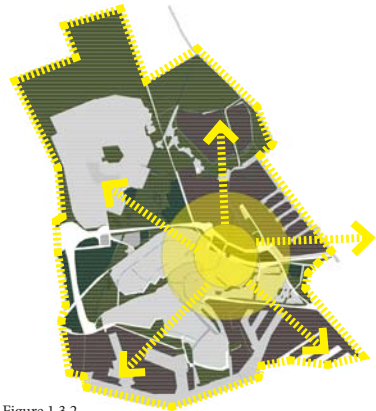


Figure 1.3.2
Linkings from Schiedam Centrum Station to other centers and sub-centers of Schiedam.

- City Scale

Integrate the intensified Schiedam Centrum surrounding new centrality into local context.

Outside the walking and cycling radius

In Schiedam city boundary

(See Figure 1.3.2)



Figure 1.3.3
Schiedam Centrum Station's walking and cycling radius

- Walking & Cycling Scale

Make a 'place' sense in Schiedam Centrum surrounding as a new centrality in Schiedam.

In 600m walking and 1200m cycling radius

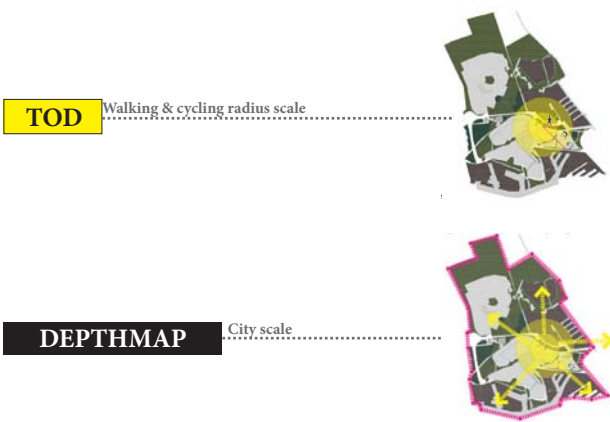
(See Figure 1.3.3)

1.4 Methodology

Depthmap

TOD provide a way to intensify the railway station surroundings, it is defined in a specific walking and cycling radius (see 3.1 Theoretical Framework), but how to integrate station surroundings into local context outside this radius?

Depthmap is a single software platform to perform a set of spatial network analyses designed to understand social processes within the built environment. It is the tool I use to find out the integration degree and vitality of the routes and from station to other centralities of the city, which is on a city scale level bigger scale than TOD's, and furthermore to test the result of the design interventions I made.



The original concept behind Depthmap developed from two strands of thought. One was isovist analysis (Benedikt, 1979), and the other space syntax (Hillier and Hanson, 1984). It consists of several analyses tools, which has varied scales from building through small urban to whole cities or states. The main tools are used in this thesis are 'axial map' and 'segment map' which are at small to medium urban scales.

The axial map shows the degree of the street integrating to other streets, and it represents the space for movement, it is a strong predictor of pedestrian and traffic flow rates (Van Nes, 2009). The segment map shows the degree of vitality of the street. (see Figure 1.4.1)

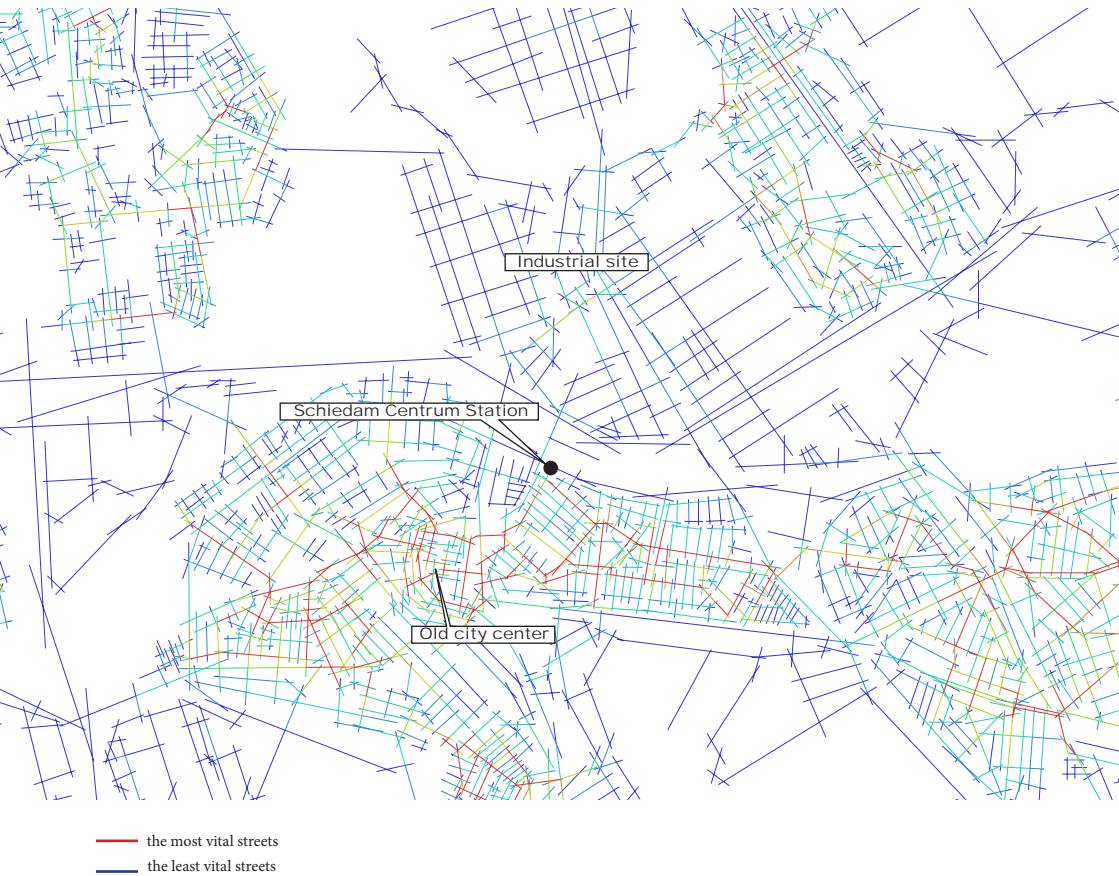


Figure 1.4.1 Depthmap segment analyze of existing situation of Schiedam Centrum Station areas
This figure shows the south part of Schiedam Centrum Station has more vital streets (red lines), which will be more attractive for retail investment, in contrast, the north part has few vital streets.

Literature study

Literature study, which is the reflection on the existing theories, builds up the theoretical underpinning of this research. The steps and related theory are:

- Dual character, potential – Node & Place
- TOD principles
- Stedenbaan principles
- Depthmap operating principles
- Place-making criteria
- Conclusion: design principles, topics

A theoretical guild line will be proposed for narrow down the scope and helps to focus on the specific topics which the 'learn from case' part and 'design' part should focus on.

Cases study

Two cases are selected for Analyzing based on the conclusion of literature study.

- Rotterdam Alexander station, NL
to research the spatial design principles and tools that Alexander Station, which is in the shadow Rotterdam Central similar as Schiedam Centrum Station, use to develop their own economic competitiveness in the public transport network.
(See Figure 1.4.2)

- 's-Hertogenbosch station, NL
to research the way how 's-Hertogenbosch developed the so called 'backside of station' area, how do they link the station area with history centre and other centralities in the city, and how do they integrate the station area into local context.
(See Figure 1.4.3)

Design case

Location – Schiedam Centrum station area

Why Schiedam?

Schiedam Centrum station area is the interchange junction of public transports. It combines railway station, Rotterdam metro stop, tram and bus. Multi-choice for transportation gives Schiedam Centrum the quality as a transit 'Node'. But from the 'Place' point of view, Schiedam Centrum station area doesn't have the sense as a pleasant and walkbale space, and the links between the station and other centralities of city are missing. Hence the high potential for place making bringing by the transit 'Node' makes Schiedam Centrum fit into my research topic, which focuses on integrating railway station areas to local scale urban development.

Meanwhile, Schiedam Centrum, which is under the shadow of Rotterdam Central, is also under the context of Stedenbaan network. To understand the position of middle size city, who has to compete and complement with other cities in the network, is another important aspect for the TOD development.



Figure 1.4.2
square in front of Rotterdam Alexander Station

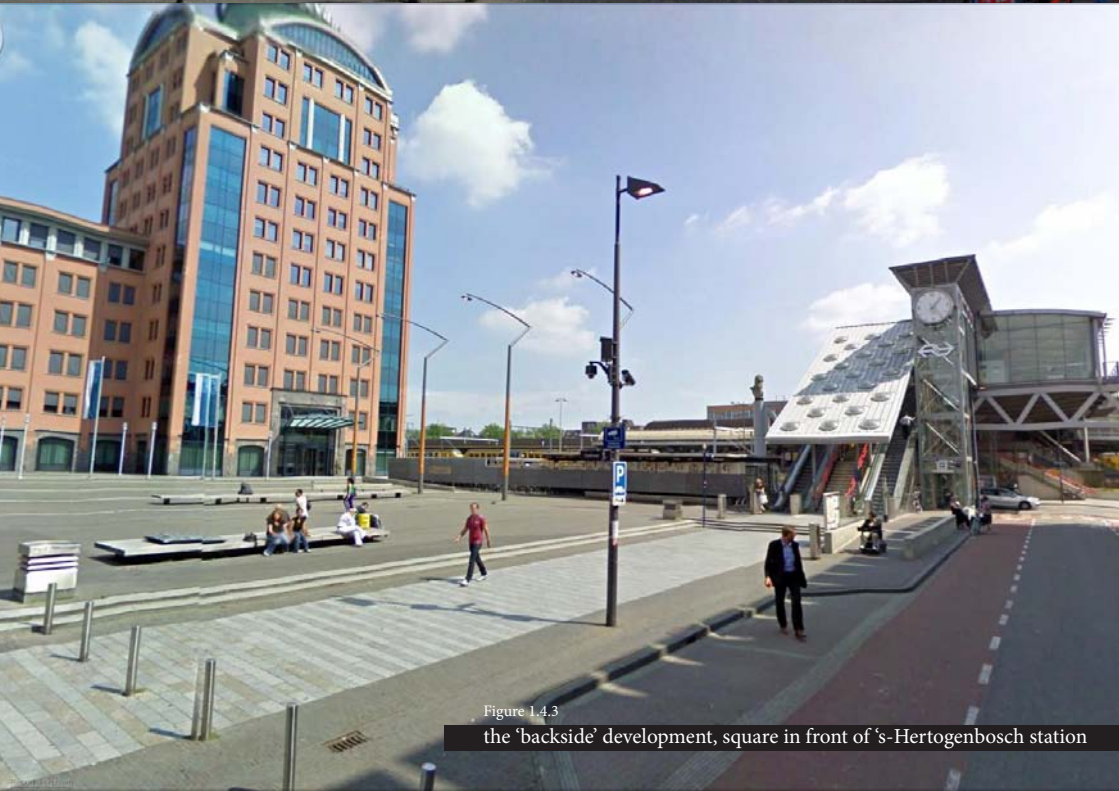


Figure 1.4.3
the 'backside' development, square in front of 's-Hertogenbosch station

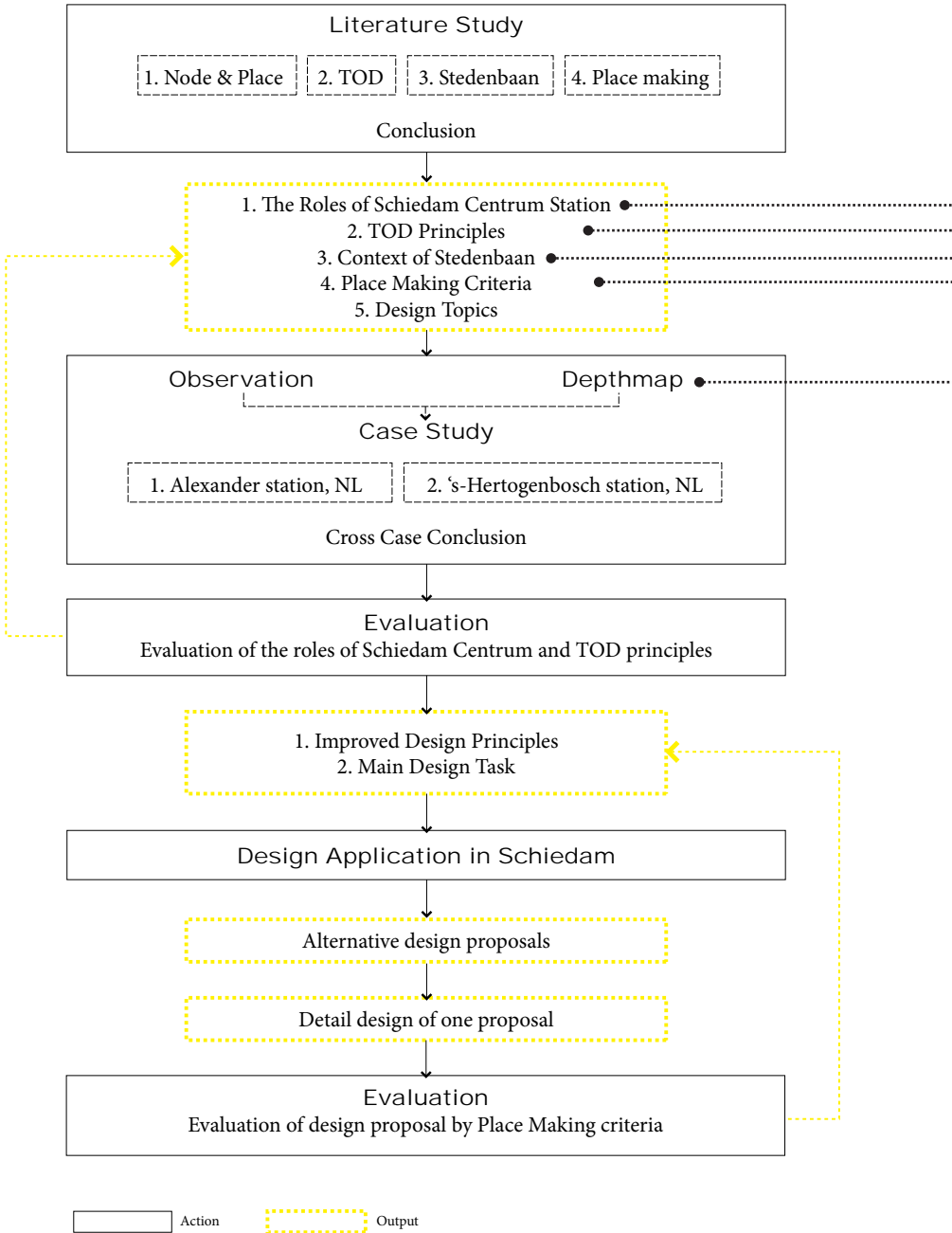
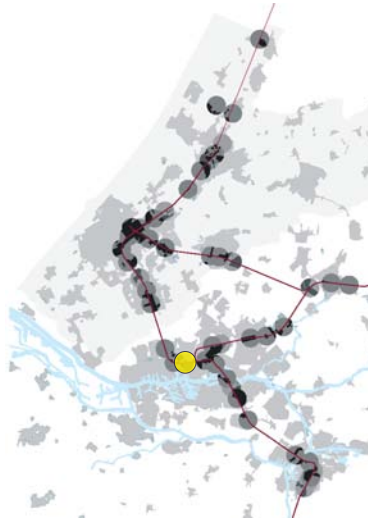


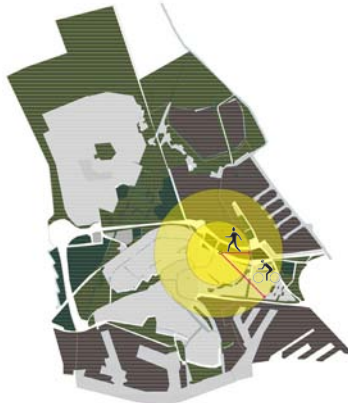
Figure 1.4.4 Structure of Methodology



Regional scale
Schiedam in Stedenbaan network
(See Figure 1.3.1)



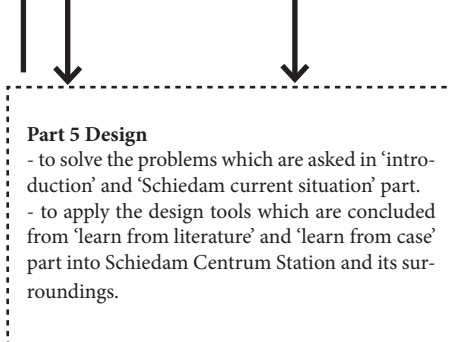
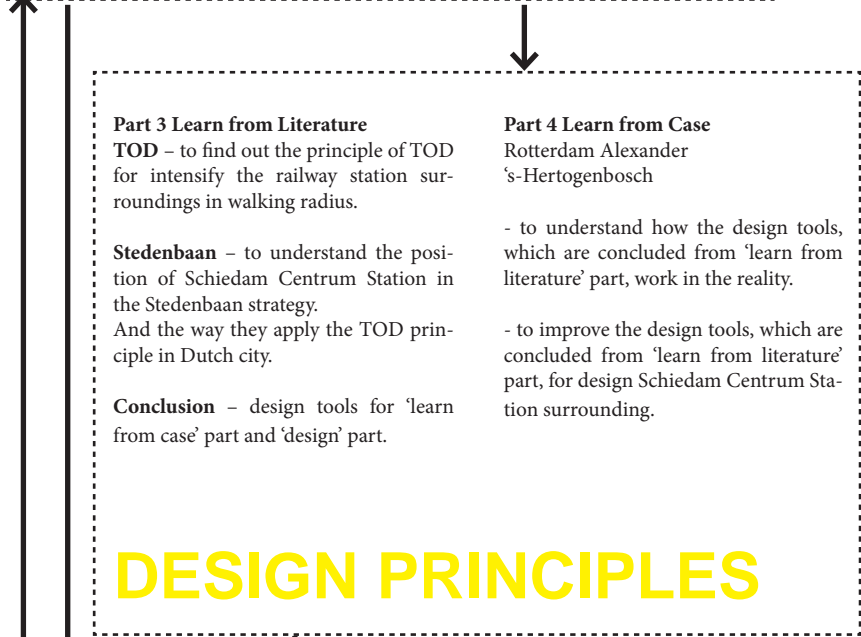
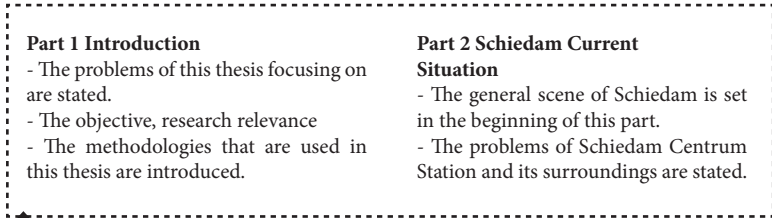
City scale
Linkings from Schiedam Centrum
Station to other centers and sub-
centers of Schiedam.
(See Figure 1.3.2)



Walking & cycling radius scale
Schiedam Centrum Station's walk-
ing and cycling radius.
(See Figure 1.3.3)

1.5 Thesis Structure

QUESTION



APPLY

1.6 Relevance

By using TOD concept, it can help cities achieve some of its environmental, economic and social objectives.

Environmental:

- Reduced greenhouse gas emissions through higher transit ridership
- Improved air quality through the provision of transportation alternatives
- Reduced energy consumption resulting from efficient land use and transportation connections

Economic:

- TOD as a catalyst for economic development
- Maximizing the use of transit infrastructure
- Reduced traffic congestion-related costs
- Redevelopment of vacant or under-utilized industrial and commercial sites

Social:

- Greater mobility choice through improved travel options
- Increased housing, employment and service choices within existing communities
- Promoting a greater jobs/housing balance
- Health benefits of walkable communities

Scientific:

At this stage, Stedenbaan is focusing on developing top-down regional strategy and key projects in Randstad hubs. But based on Transit-Oriented Development concept, a bottom-up local scale intervention guide should be provided. Hence, this research is trying to give some recommendations for Stedenbaan to integrate stations of middle size cities into local context which more related to the role of 'Place' with a clear position in the regional networks.

PART 1.
Introduction

PART 2. -----●

SCHIEDAM CENTRUM CURRENT SITUATION

PART 3.
Learn From Literature

PART 4.
Learn From Case

PART 5.
Design

Reference

2.0 Introduction

This part concerns two sub research questions from Part 1 (Page 24):

- What are the roles of Schiedam Centrum Station and its surroundings on regional scale level and local scale level?
- What are the problems and potentials of Schiedam Centrum Station and its surroundings?

To find out possible answers for these questions, this part starts from describing the general perception of Schiedam Centrum Station surroundings at three different scale levels, at South of Randstad Holland level, at Rotterdam Metropolitan level and at Schiedam level.

Then at Schiedam level, Schiedam Centrum Station surroundings are separated into three parts, which are 'in-between', 'south' and 'north', to find out the problems and potentials of the area. After the SWOT evaluation of Schiedam Centrum Station surroundings, there comes some possible answers of questions which are asked in the beginning, and concludes some questions which need to be tackled in further parts of this thesis.

2.1 Location

2.2 Schiedam Centrum Station at different scale levels

- 2.2.1 at South of Randstad Holland level
- 2.2.2 at Rotterdam Metropolitan level
- 2.2.3 at Schiedam level

2.3 Problems

- 2.3.1 Northern-In Between-Southern
- 2.3.2 Barriers
- 2.3.3 In Between-Vacant
- 2.3.4 Southern-Miss Links
- 2.3.5 Northern-Mono Function Industrial Site

2.4 Evaluation of Schiedam Centrum Station Area

2.5 Questions

2.1 Location

Schiedam is a middle size city and municipality in the province of South Holland, situated in the west of the Netherlands (See Figure 2.1.1 & 2.1.2). It is next to the second largest municipality - Rotterdam in the country (See Figure 2.1.3). Under the shadow of Rotterdam metropolitan, it brings challenges meanwhile also great opportunities for Schiedam.

Schiedam Centrum Station is a transport node in the east of Schiedam, near to the boundary of Rotterdam and Schiedam. The station areas now are obstacles for the development of Schiedam city, but have huge potentials to become a new centrality in the future. (See Figure 2.1.4)



Figure 2.1.1 Schiedam at Netherlands level

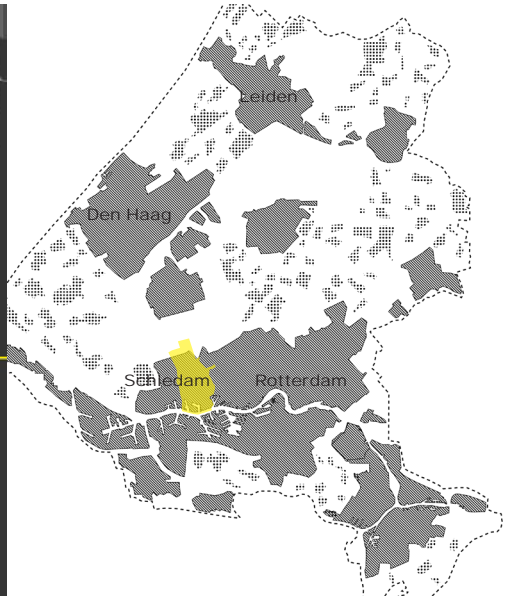


Figure 2.1.2 Schiedam at South of Randstad Holland level

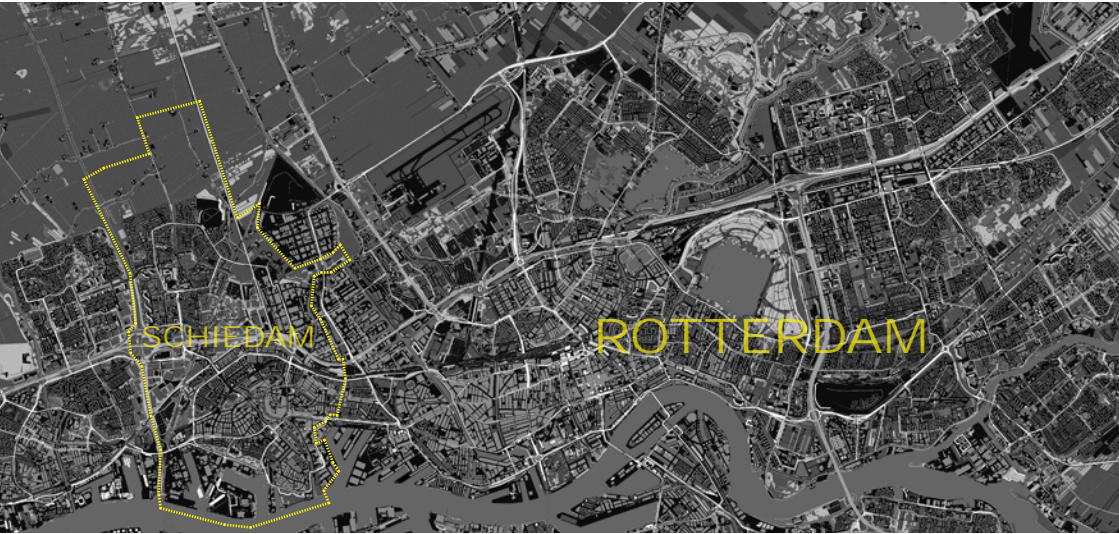


Figure 2.1.3 Schiedam at Rotterdam Metropolitan level

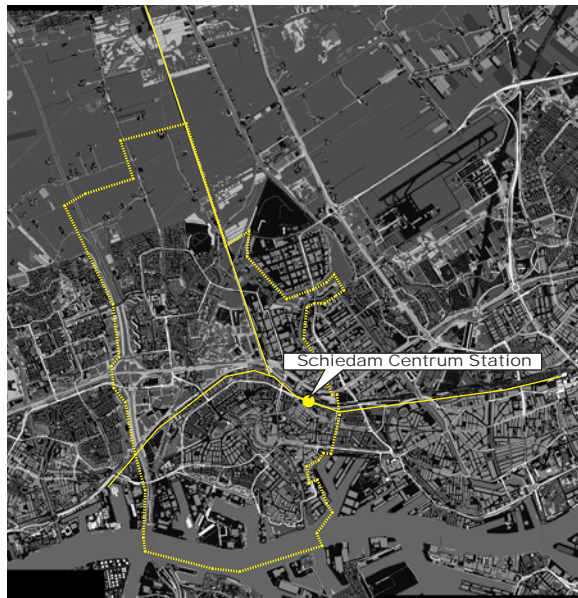


Figure 2.1.4 Schiedam Centrum Station at Schiedam level

2.2 Schiedam Centrum Station at defferent scale levels

2.2.1 at South of Randstad Holland level

Randstad Holland is developed under the Network City theory. A network city evolves when two or more previously independent cities, potentially complementary in function, strive to cooperate and achieve significant scope economies aided by fast and reliable corridors of transport and communications infrastructure. Creative network cities place a higher priority on knowledge-based activities like research, education and the creative arts. The cooperative mechanisms may resemble those of inter-firm networks in the sense that each urban player stands to benefit from the synergies of interactive growth via reciprocity, knowledge exchange and unexpected creativity. (Batten, 1994)(See Figure 2.2.1, 2.2.2)

In the south of Randstad Holland, there are three main cities, which are Rotterdam, Den Haag and Leiden. The surrounding smaller cities are developing in the influence of the networks of these main cities. And to avoid furious competition, they need to complementary with each other and find their own character and position in the networks. That's forming the metropolitan areas of these main cities. For instance, outside of metropolitan areas of Rotterdam and Den Haag, and Leiden area. Furthermore, Delft is in between Den Haag and Rotterdam along the railway line, and known as knowledge centre because it has plenty of universities and colleges. Zoetermeer and Dordrecht, which are providing suburban living conditions, are the housing supplies for Den Haag and Rotterdam. Meanwhile, Gouda as a joint of different railway lines becomes a transportation hub naturally. (See Figure 2.2.3, 2.2.4)

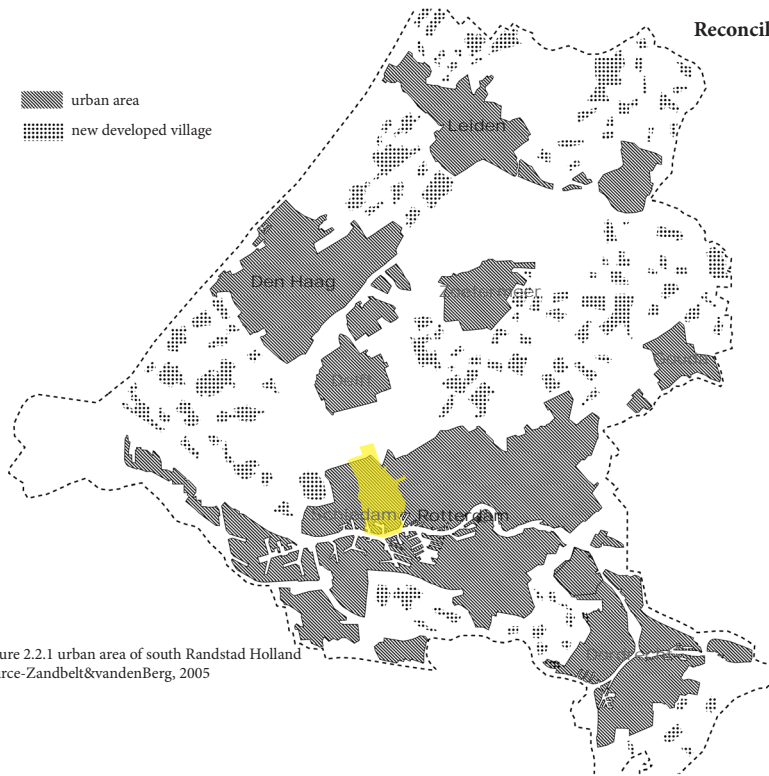


Figure 2.2.1 urban area of south Randstad Holland
source-Zandbelt&vandenBerg, 2005

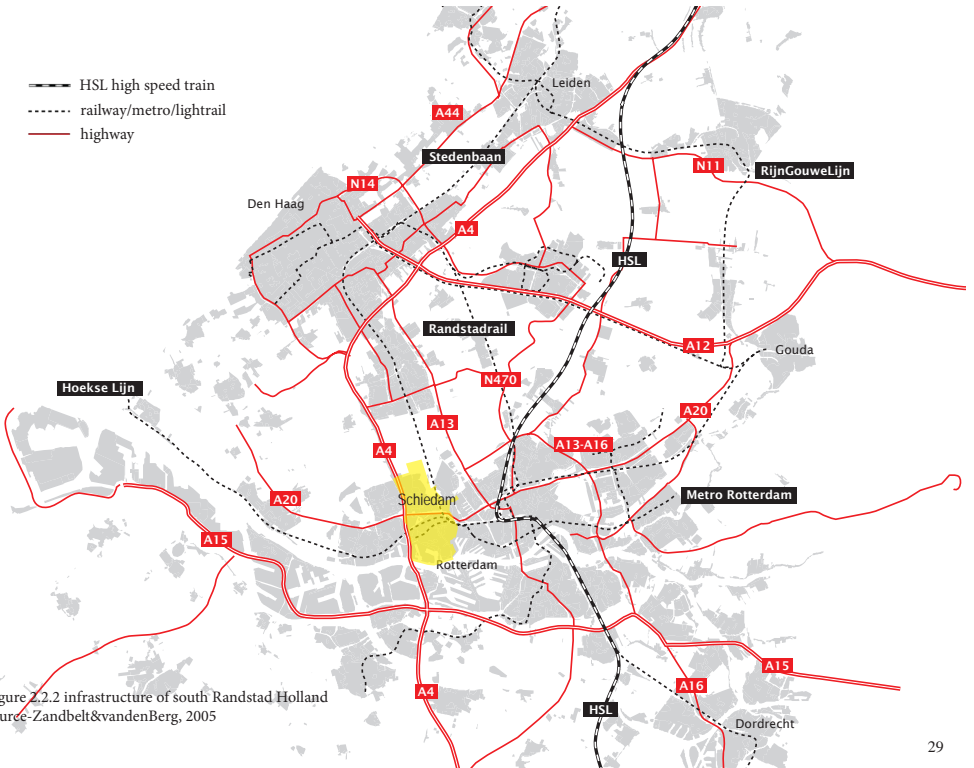


Figure 2.2.2 infrastructure of south Randstad Holland
source-Zandbelt&vandenBerg, 2005

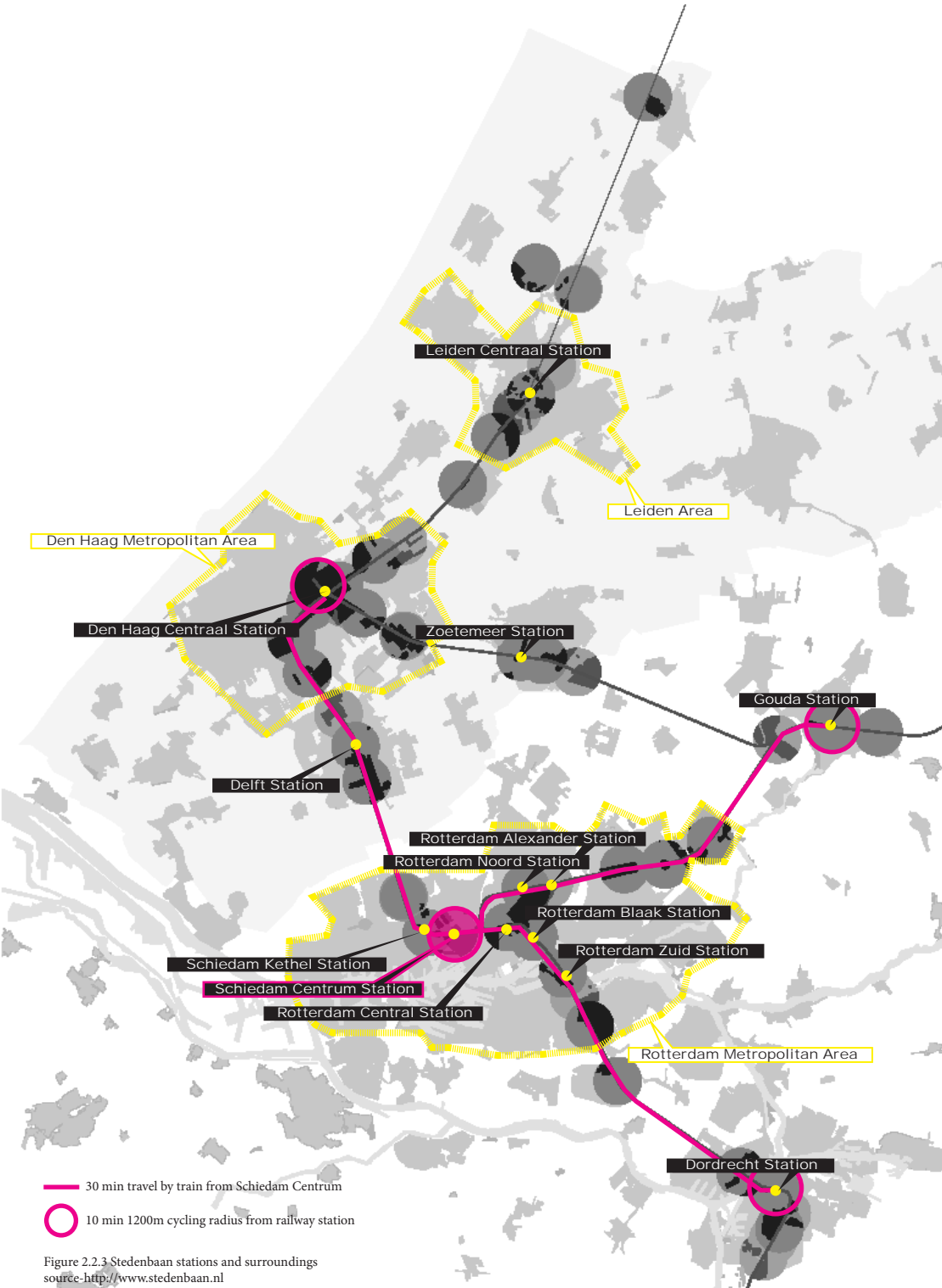


Figure 2.2.3 Stedenbaan stations and surroundings
 source-<http://www.stedenbaan.nl>

Potential of Schiedam Centrum at South of Randstad Holland level

Along the railway line in 30 minutes people can travel to Den Haag Central, Gouda and Dordrecht railway stations from Schiedam Centrum, and go through entire Rotterdam city. From these stations, people prefer to travel 10 minutes by walking and cycling to their destination. In 10 minutes cycling radius which is 1200 meters distance from Schiedam Centrum station, there are around 25,280 people live there. In 40 minutes journey from Schiedam Centrum along the railway lines, it can bring 489,240 people. That creates big potential for developing the station surrounding areas.

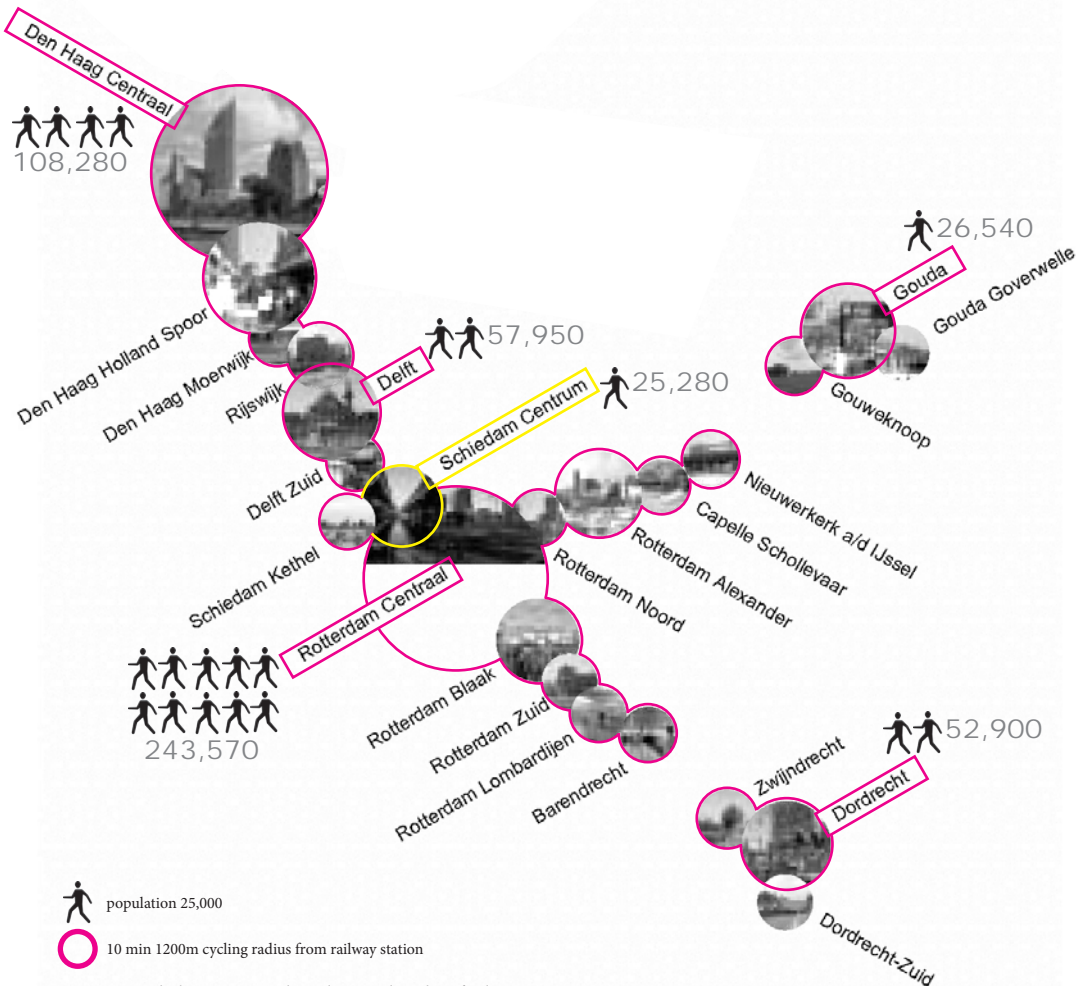
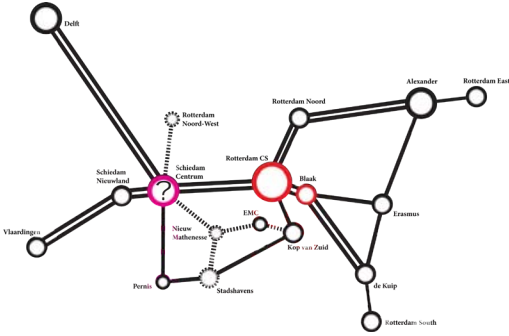
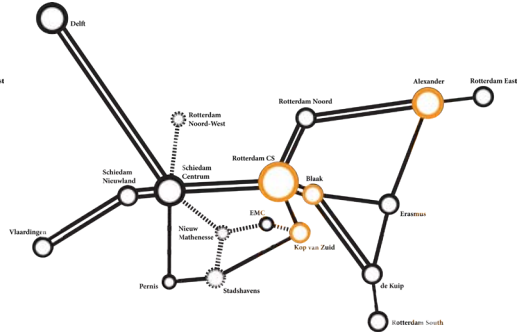


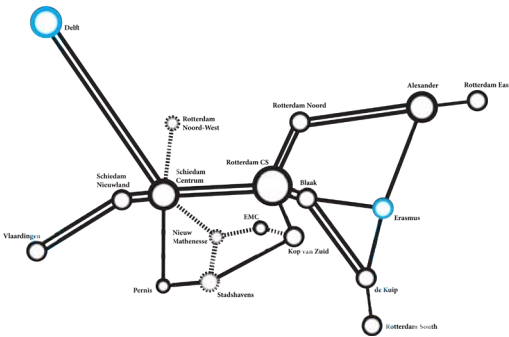
Figure 2.2.4 Stedenbaan stations and population in the radius of railway stations
 source-<http://www.stedenbaan.nl>
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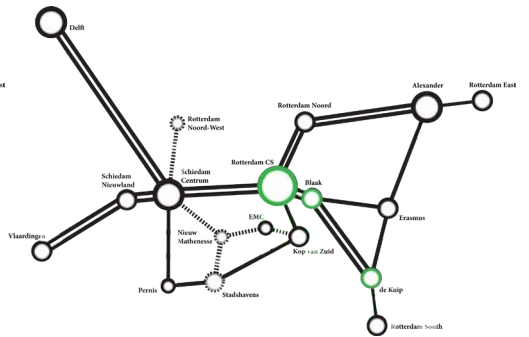
Rotterdam Metropolitan centers & Schiedam Centrum



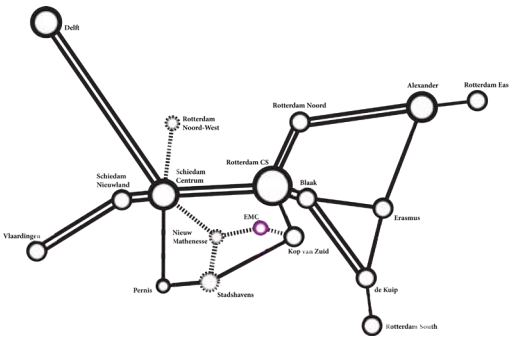
Commercial centers



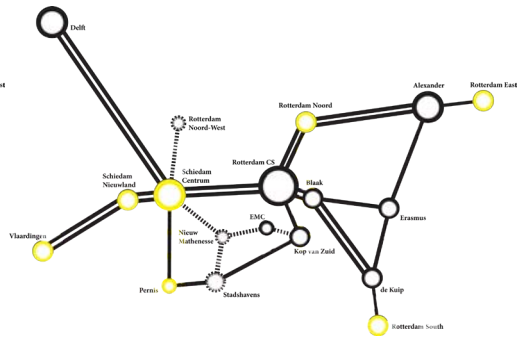
Knowledge centers



Entertainment/
Culture events centers



Medical center



Suburban residential settlements

Figure 2.2.6 centers and sub-centers of Rotterdam Metropolitan

To find a new role for Schiedam Centrum Station, the character of other nodes could bring opportunities and also competitions.

Accessibility

between Rotterdam Centraal and Schiedam Centrum railway stations

It takes 5 minutes to get to Rotterdam Centraal from Schiedam Centrum by train. Comparing to 11 minutes from Rotterdam Central to Rotterdam Alexander, which is one of the commercial nodes, Schiedam Centrum has better accessibility by train. (See Figure 2.2.7)

There are four transfer stations between train and metro in Rotterdam metropolitan area. Schiedam Centrum is one of them which people can transfer from train to Metro Line A, B and C. (See Figure 2.2.8)

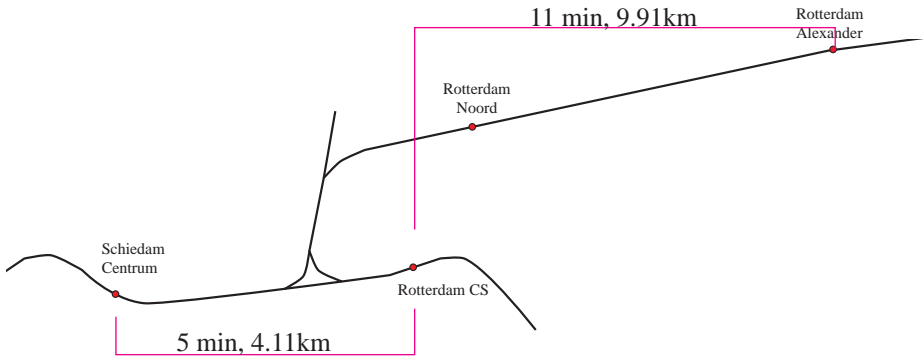


Figure 2.2.7 Railway travel time and distance.

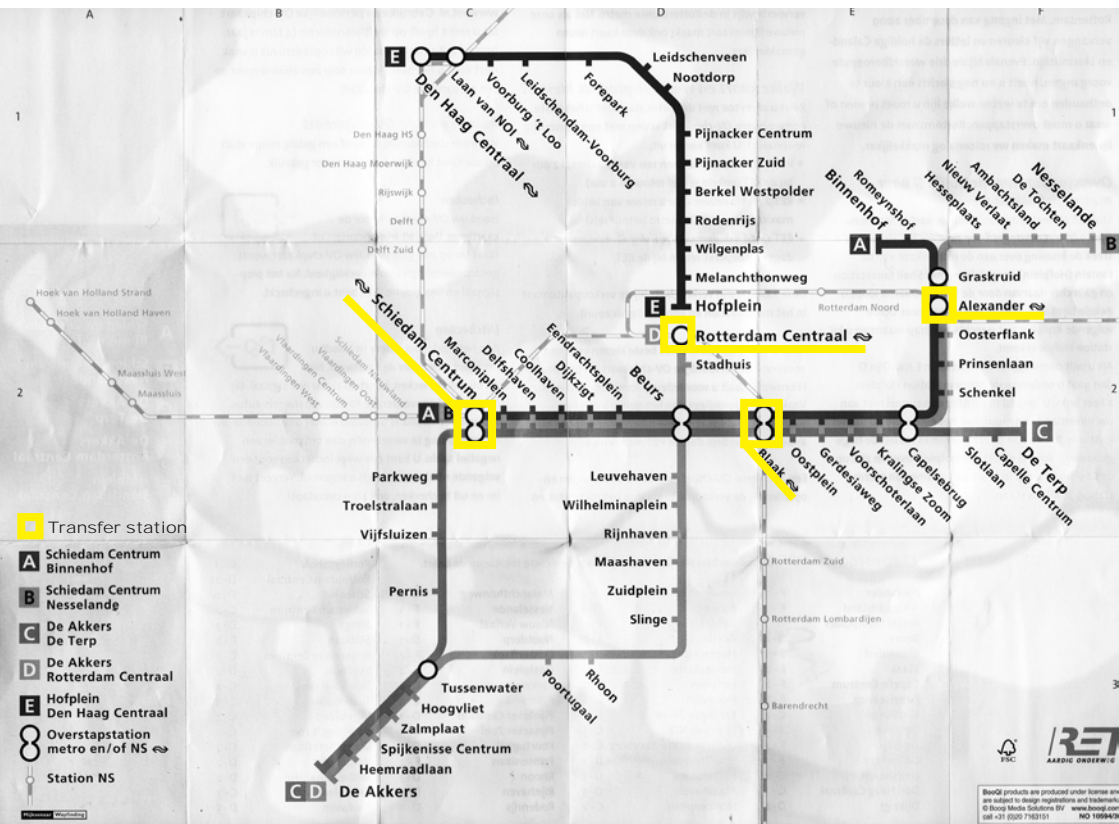


Figure 2.2.8 Rotterdam Mero system and transfer stations between metro and railway. source - RET Metro regio Rotterdam map

Future plans of Rotterdam city

The city developments of Rotterdam have close relation with water. In Rotterdam World Port City 2035 strategy, two of the plans refer to Schiedam, which could bring opportunities for Schiedam city developments.

- Park Lane

which is a line goes along the waterfront combining some existing centralities and new developing projects that Rotterdam city wants to enhance the connections.

It connects Kop van Zuid, EMC, transforming Nieuw Mathenesse area, the area adjusts to Schiedam Centrum Station, then go to Rotterdam North-west area.

(See Figure 2.2.9 & 2.2.11)

- Nieuw Mathenesse & Stadshavens

which are the old port areas that are transforming to residential, commercial, creative economy, cultural facility and mix-used functions.

These are the areas involve the south part of Schiedam city.

(See Figure 2.2.10 & 2.2.12)

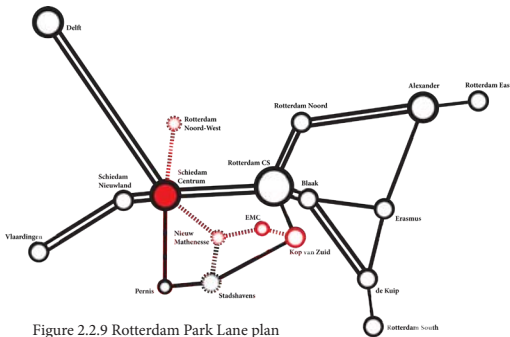


Figure 2.2.9 Rotterdam Park Lane plan

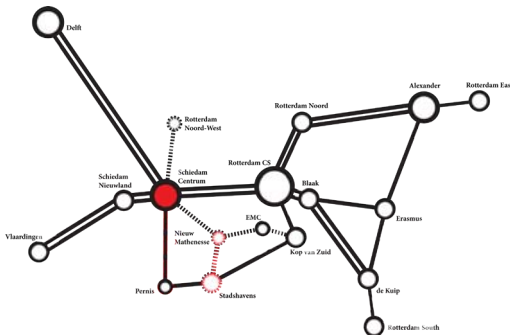


Figure 2.2.10 Rotterdam Nieuw Mathenesse & Stadshavens plans

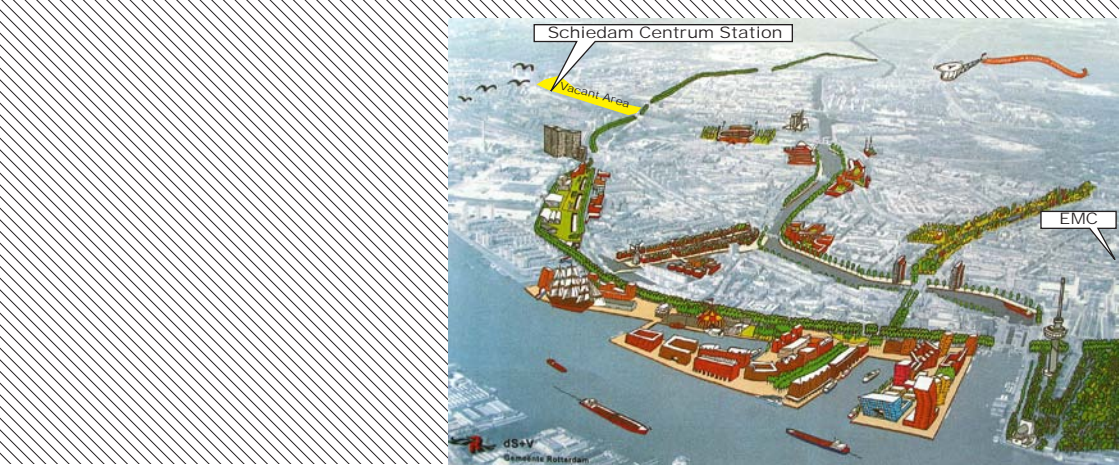


Figure 2.2.11 Rotterdam Park Lane plan

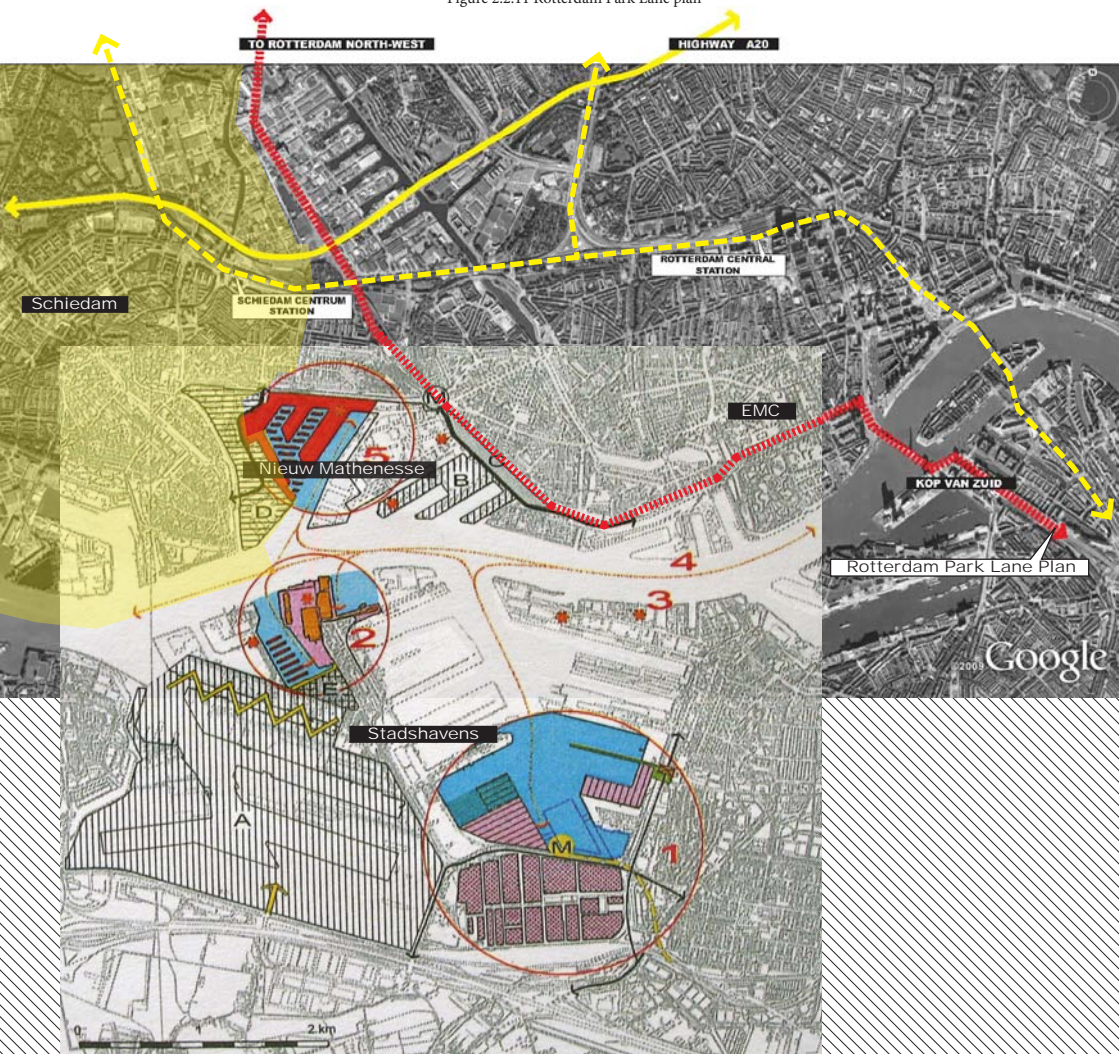


Figure 2.2.12 Rotterdam Nieuw Mathenesse & Stadshavens plans

--- Railway --- Highway --- Rotterdam future plan

2.2.3 at Schiedam level

Zoning

Schiedam has four basic zones, Schiedam Centrum which is developed around historical center, Schiedam Noord which is residential settlement area, Spaansepolder which is old industrial site in the north of Schiedam Centrum Station and Havengebied which is old port area adjusting to Rotterdam Nieuw Mathenesse. (See Figure 2.2.13)

Schiedam has two residential areas, which are separated by highway, railway and green, sports areas. Southern bank and north-east are old industrial sites.

Schiedam Centrum Station locates in between the north-east industrial site and one of the main residential areas. The old historic enter is in the south of Schiedam Centrum Station in 600m walking and 1200m cycling radius from station. The areas on the north side of station is vacant for years. (See Figure 2.2.14)

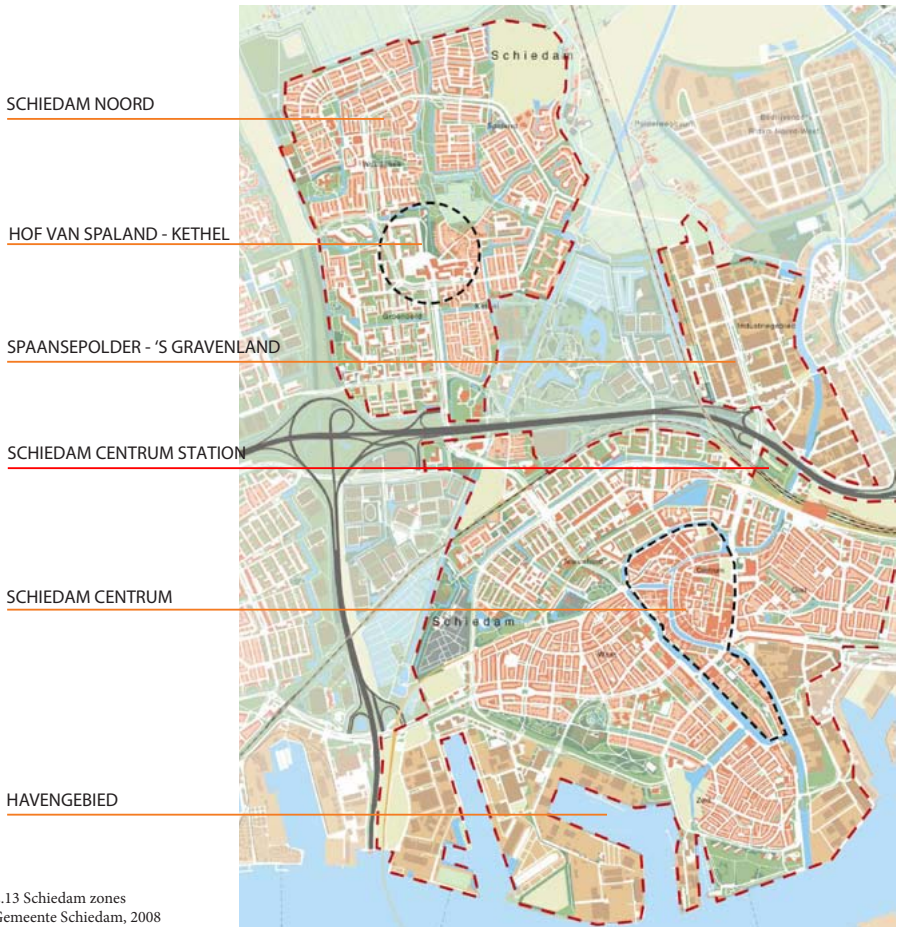


Figure 2.2.13 Schiedam zones
source - Gemeente Schiedam, 2008



Figure 2.2.14 Schiedam zones

Infrastructure

There are two railway stations in Schiedam, Schiedam Centrum Station and Schiedam Nieuwland Station. Schiedam Centrum Station is the one which adjust to Rotterdam city.

In the 600m walking and 1200m cycling radius from Schiedam Centrum Station, it combines different types of transportation, railway, highway, Rotterdam RET metro, tram and bus. (See Figure 2.2.15)

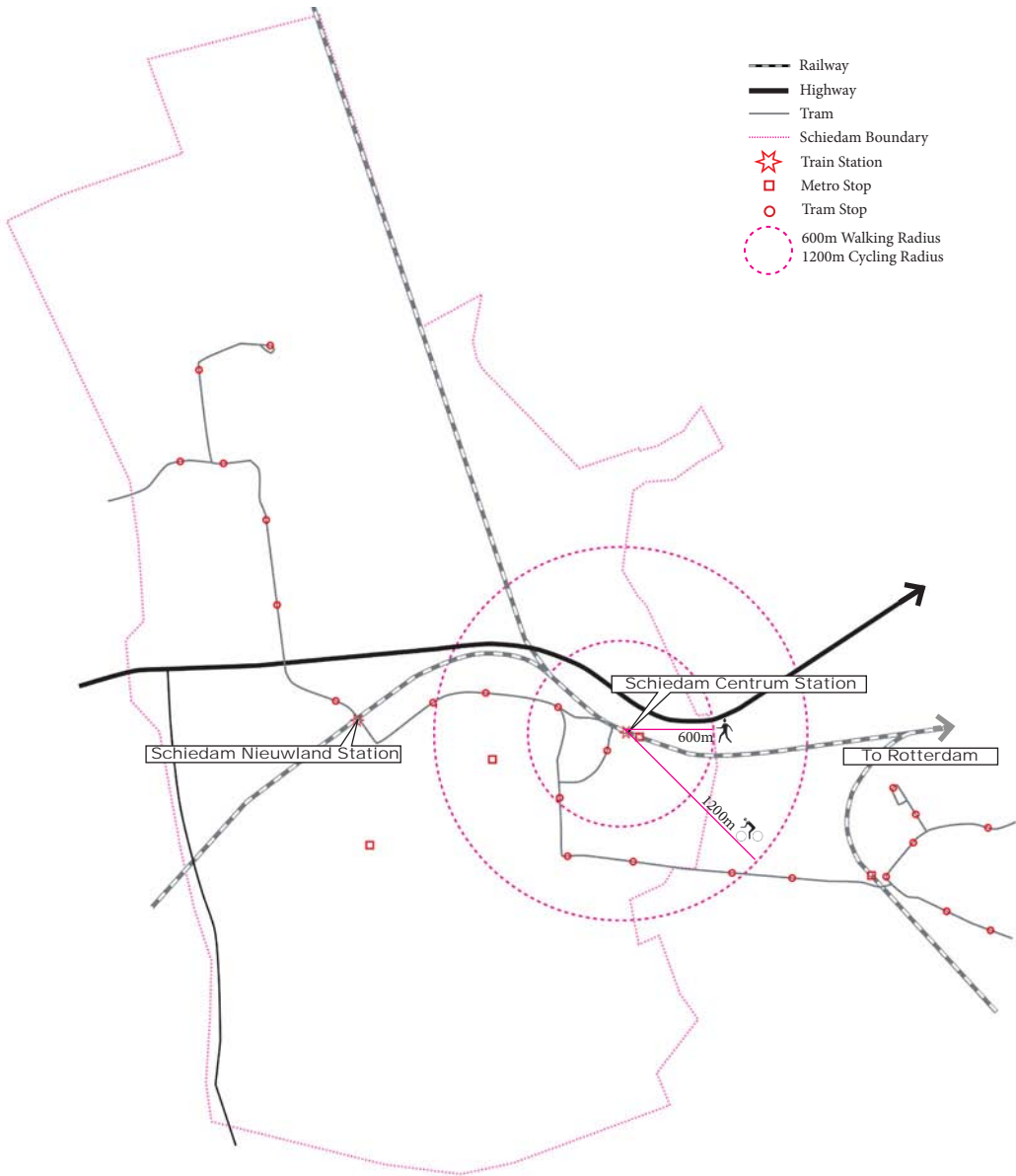


Figure 2.2.15 Schiedam infrastructure

Schiedam Centrum Surroundings

Schiedam Centrum Station adjoin the historical center of Schiedam city. When people get out from the south gate of station, the station square is close to the Schie River and connects the routes to old city center.

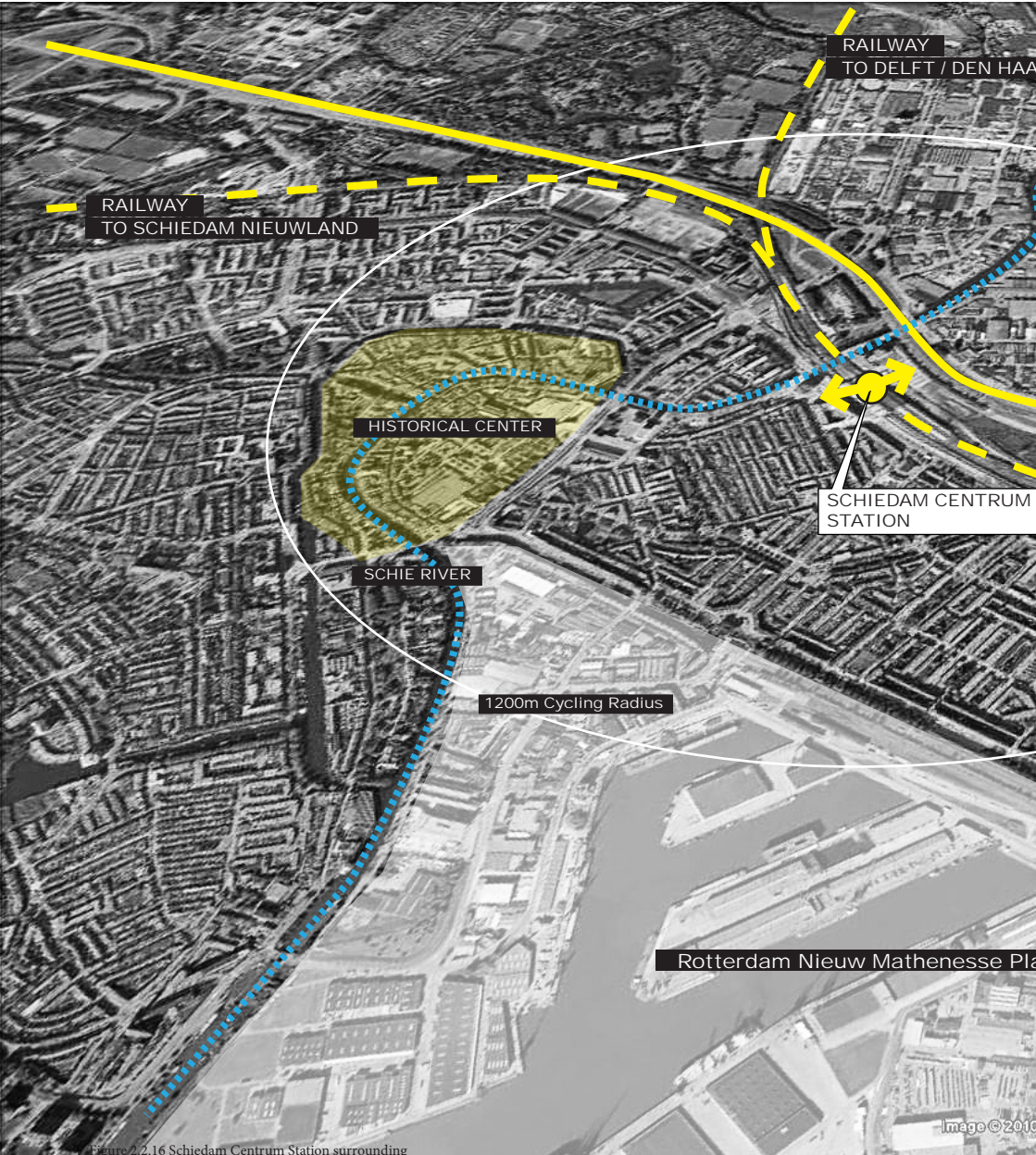
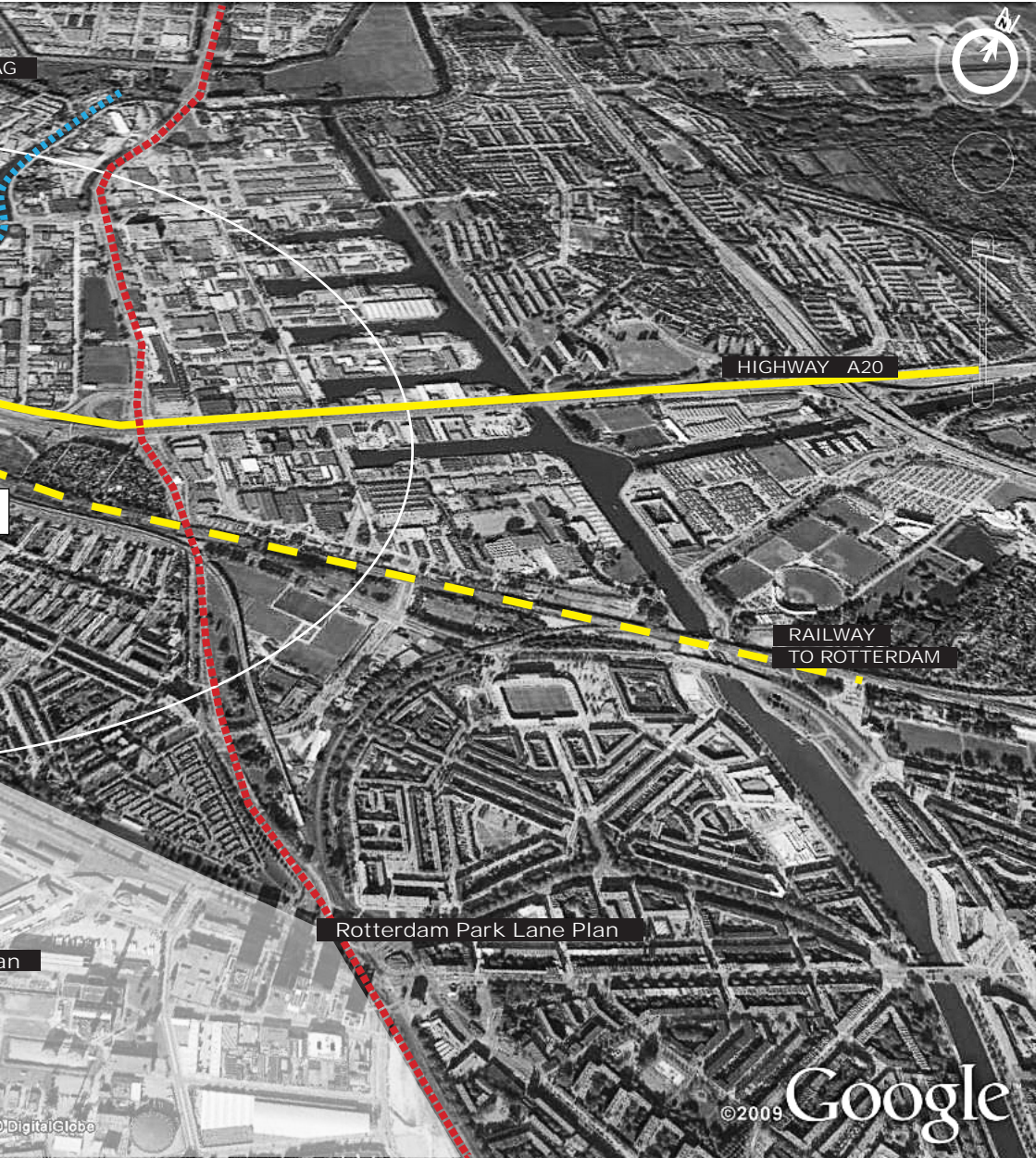


Figure 2.2.16 Schiedam Centrum Station surrounding

When people get out from the north gate of station, the vacant site in between highway and railway connects the routes to the north industrial sites. (See Figure 2.2.14 & 2.2.16)



2.3 Problems

In most of Dutch cities, which established before 19th century railway time came, the railway station were originally situated at the city's fringe and near to one of the city's gate (See Figure 2.3.1). Schiedam is also not an exception. With the improving of transportation technology, the city development much more relied on the railway and the sprawling enveloped the station (See Figure 2.3.2). Nowadays, most of the stations have a central location in between these old and new areas, which have efficient accessibility at regional scale as infrastructure hub character in the network cities (See Figure 2.3.3/2.3.4).

But the reality shows that station areas do not have the centrality character in the economic sense. Furthermore, the rails become to be physical and psychological barriers between the old and new areas. That formed the contrast between old centre and new developing area which is called 'Backside' of station (See Figure 2.3.5). Usually, the 'Backside' of station area has mono-function and weak linking with the 'old' city centre (See Figure 2.3.6). These problems form the current situation around Schiedam Centrum Station. (See Figure 2.3.7 & 2.3.8 & 2.3.9)

The problems exist around Schiedam Centrum Station are:

- Northern-In Between-Southern
- Barriers
- In between-Vacant
- Southern-Miss Links
- Northern-Mono Function Industrial Site

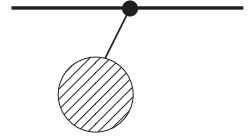


Figure 2.3.1 historical centre and railway station

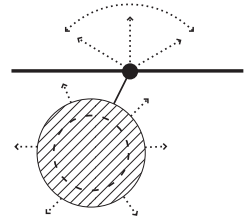


Figure 2.3.2 expanding across the railway

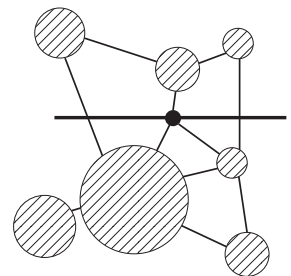


Figure 2.3.3 new centralities and city networks between them

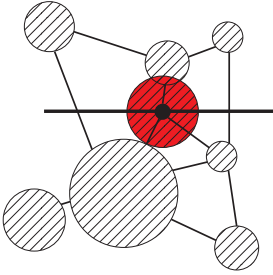


Figure 2.3.4 station area becomes a central location in the city

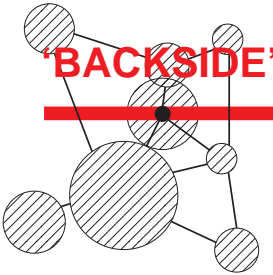


Figure 2.3.5 railway becomes a barrier and forming the so called 'backside' of station

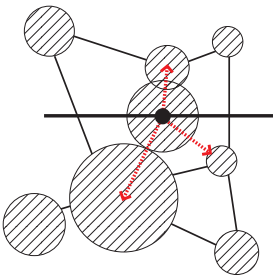


Figure 2.3.6 linking problems for across the barrier



Figure 2.3.7 mono industry site of 'Backside' of Schiedam Centrum Station



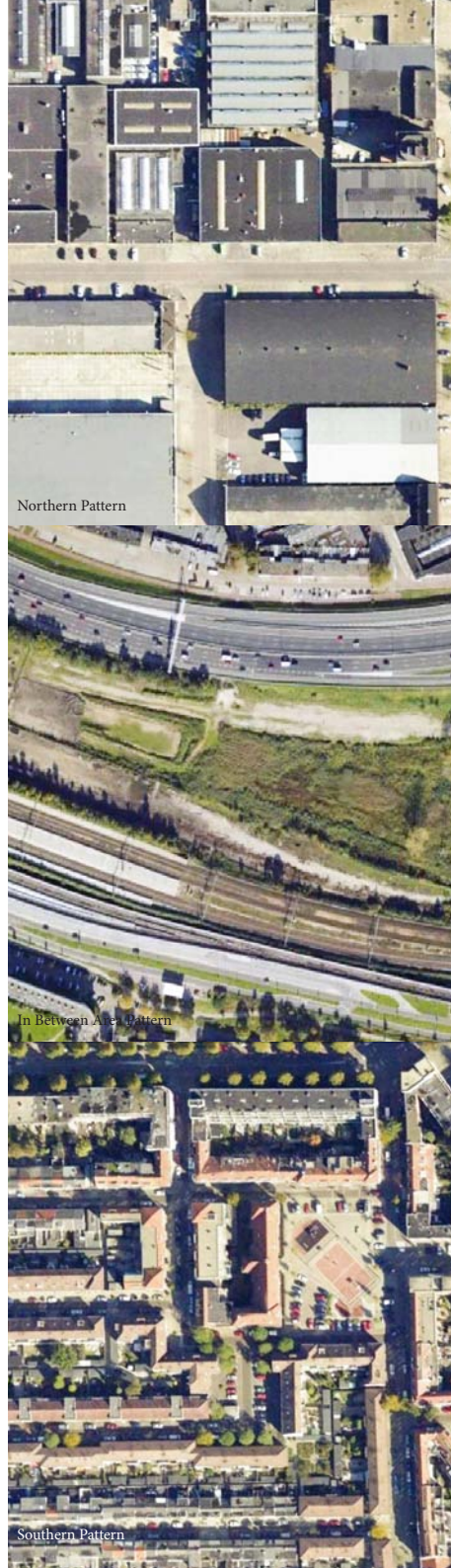
Figure 2.3.8 in-between vacant of Schiedam Centrum Station area



Figure 2.3.9 weak link from Schiedam Centrum Station to historical centre

2.3.1 Northern-In Between-Southern

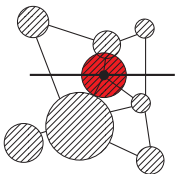
The surrounding areas of Schiedam Centrum have totally different patterns and characters. Southern part is the extent from historical center, has simiilier pattern as historical center area. Northern part is mono-function industrial site, which is the so called 'backside' of station. In between the northern and southern part, there are vacant sites which have existed for years. (See Figure 2.3.10)

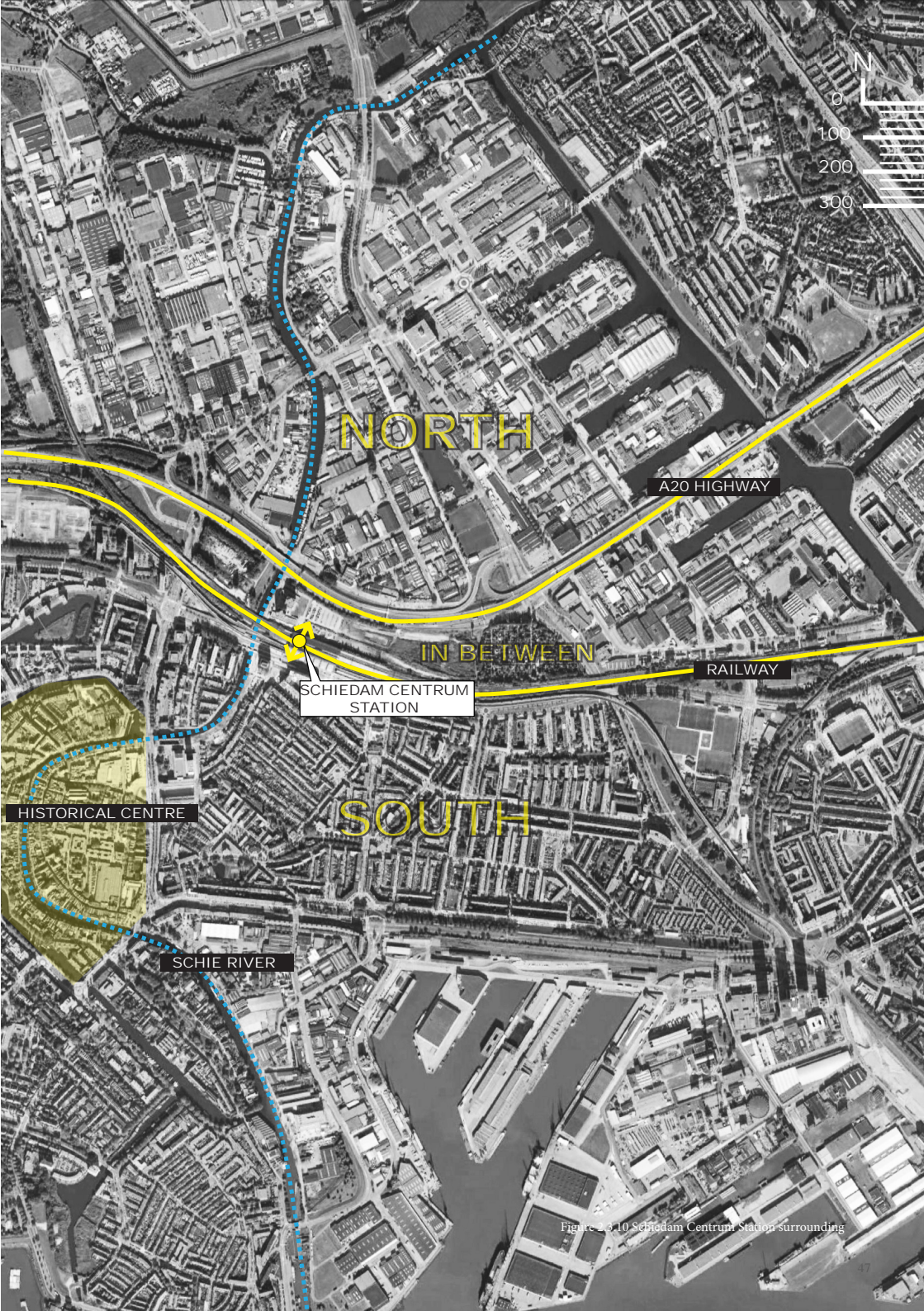


Northern Pattern

In Between Area Pattern

Southern Pattern





NORTH

A20 HIGHWAY

IN BETWEEN

RAILWAY

SCHIEDAM CENTRUM STATION

SOUTH

HISTORICAL CENTRE

SCHIE RIVER

Figure 2.10 Schiedam Centrum Station surrounding

2.3.2 Barriers

Though the railway and highway bring transportation capacity for Schiedam Centrum Station area, it also creates problems for people to walk cross these infrastructures. These infrastructure become barriers for the area.

There are three main barriers for Schiedam Centrum Station area, railway tracks, A20 Highway and Schie River (See Figure 2.3.11). When people get out from south gate of Schiedam Centrum Station, the Schie River is the barrier for people to go to the west residential part on the other side of river bank. And the unpleasant under bridge areas are psychological barriers for people to go to north of Schiedam Centrum. (See Figure 2.3.12 & 2.3.14)

When people get out from north gate of Schiedam Centrum Station, there are no direct routes to cross the highway. Furthermore, from psychological point of view, there are no attractions in Schiedam Northern part for people who get out from north gate of station. Because the highway dike and trees block the view to north, it seems like nothing happens over the highway bridge. (See Figure 2.3.13 & 2.3.15)

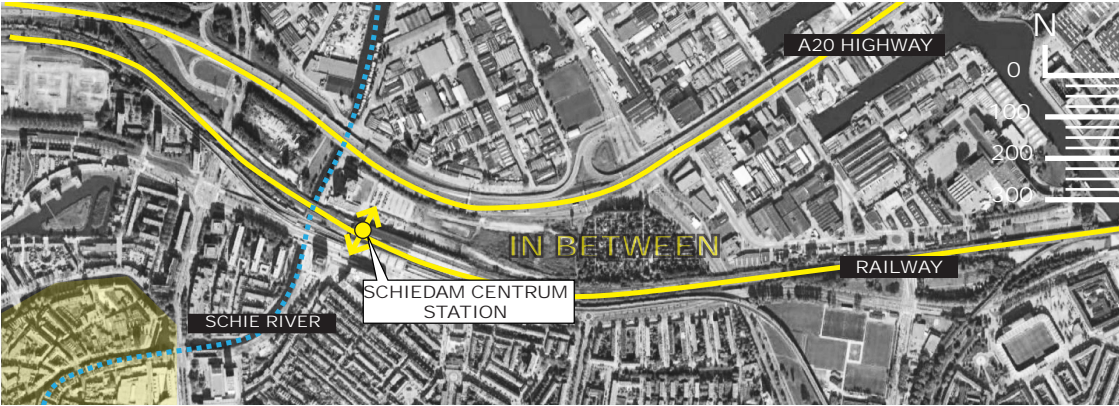


Figure 2.3.11 Barriers for Schiedam Centrum Station Area

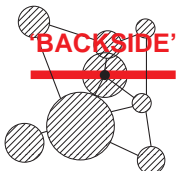




Figure 2.3.12 Barriers for Southern Part of Schiedam Centrum Station



Hum, how can I cross the river?

It's not fun to go through under bridges.



Figure 2.3.14 Walking Routes From Station to Schiedam South



Figure 2.3.13 Barriers for Northern Part of Schiedam Centrum Station



Figure 2.3.15 Walking Routes From Station to Schiedam North

2.3.3 In Between-Vacant

The in between area of highway and railway tracks has been vacant for years. There are only two 10 floor existing buildings along the road adjusting the water front in the west of station. (See Figure 2.3.16 & 2.3.17)

But in the recent two or three years, some investments are happening on the vacant site. One 9 floor building is built in front of the north gate of Schiedam Centrum Station. And another one is under construction on the east side of vacant area. (See Figure 2.3.18)

On the west bank of Schie Canal, the abandon site is a rubbish landfill area. Plants grow wildly along the water front, some people will lying on the grass near the water when there is a good weather. (See Figure 2.3.19)



Figure 2.3.17 Vacant Space Outside of North Gate of Station



Figure 2.3.18 New Investments In The Vacant Space



Figure 2.3.19 Rubbish Landfill Site On The West Bank of Schie Canal

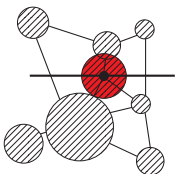




Figure 2.3.16 Vacant Space In Between Railway Tracks And Highway Dike In 1200m Cycling Radius

2.3.4 Southern-Miss Links

Three routes directly connect the square of station south gate. One goes to east, another one to the old center and the last one goes along the Schie water front. There is no connection from station to the west bank of Schie Canal. And the links between station and old center are not clear. And the station front area is lack of place sence. (See Figure 2.3.20 & 2.3.24)

Comparing to other two routes, the route to east is the main street for station front area, which has wide pedestrian, cycling path and linear trees. (See Figure 2.3.21)

The closest route from station to old center is a 12 meters wide narrow alley, with parking on both sides and 1.5 meters wide narrow pedestrian. And there is no cycling route. (See Figure 2.3.22)

Schiedam government has renovated the east bank of Schie Canal. A new tram line is going through in the street along the water front. New pavement and street furniture have been constructed. The nice view of Schie Canal and the truth that the canal goes through north, in between area and south could bring a great potential for linking three separated areas of station together. (See Figure 2.3.23)

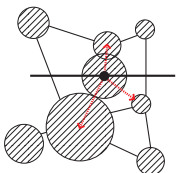




Figure 2.3.20 The space in front of station square, which has no place sense.



Figure 2.3.21 The route to east is the main road in front of station



Figure 2.3.22 The route to Old Center, which doesn't have vitality.



Figure 2.3.23 The water front of Schie Canal, which has great potential for linking north and south furthermore to the old center.

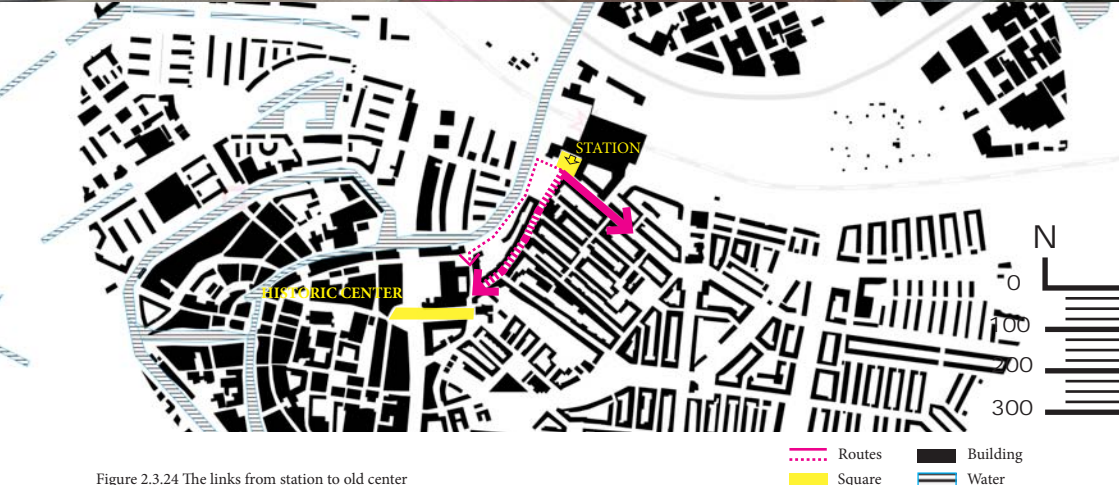
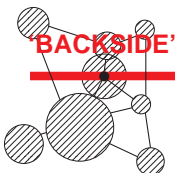


Figure 2.3.24 The links from station to old center

2.3.5 Northern-Mono Function Industrial Site

Crossing the highway dike to the north of Schiedam Centrum Station, people will enter the mono function industrial site. The area is based on the vehicle transport, which is lack of walking/cycling friendly environment.

Most part of the site is covered in the 1200 meters cycling radius, and it's geometrically close to the Schiedam Centrum station. People can see the commercial building in front the station from the north of the highway dike. But it not easy and not pleasant for people to access by walking or cycling. (See Figure 2.3.15, 2.3.25 to 2.3.28)



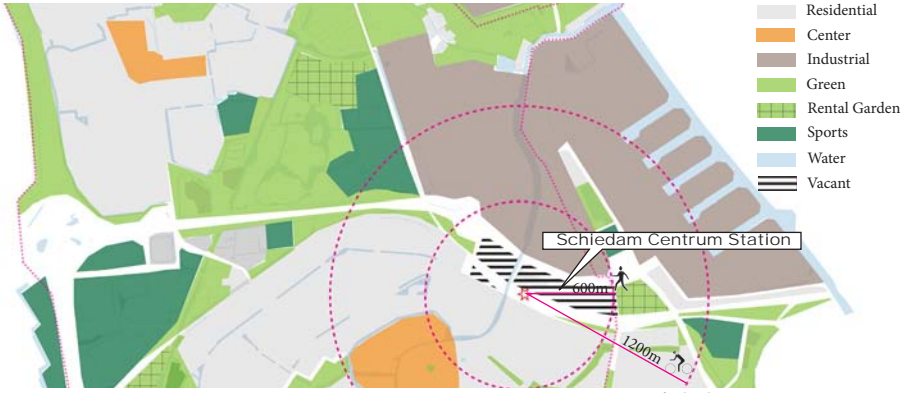


Figure 2.3.25 Zoning map of Schiedam Centrum Station area

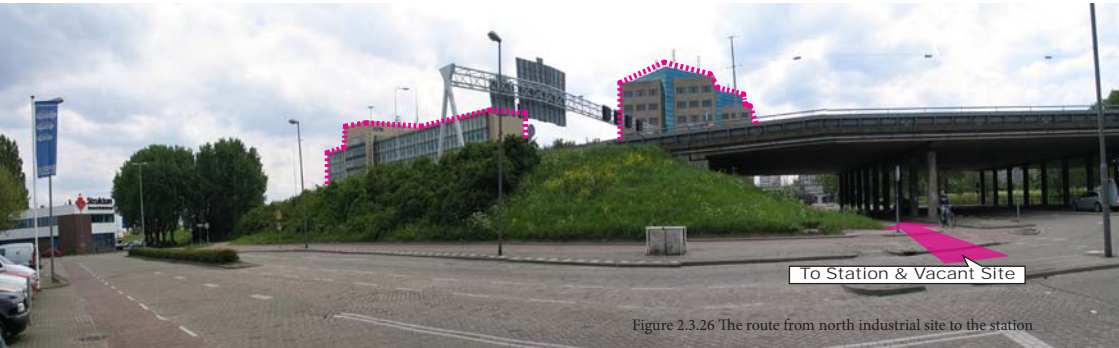


Figure 2.3.26 The route from north industrial site to the station



Figure 2.3.27 Street view of the industrial site



Figure 2.3.28 Street pattern of the industrial site

2.4 Evaluation of Schiedam Centrum Station Area

At South of Randstad Holland scale level

- 30 min reachable to Den Haag CS, Gouda Station and Dordrecht Station by train.
- Involving in 514,520 populations of potential passengers in the 10 min cycling radius of railway stations along the 30 min reachable line from Schiedam Centrum Station.

At Rotterdam Metropolitan scale level

- 5 min to Rotterdam Centraal Station.
- In the network of Rotterdam Metropolitan.

At Schiedam scale level

- Located in the middle of two main zoning areas of Schiedam.
- The 1200m 10 min cycling radius of it covers the old center and also the main centrality of Schiedam.
- Having multiple choices for public transportation at the station.

S

O

At South of Randstad Holland scale level

- Involving in 514,520 populations of potential passengers in the 10 min cycling radius of railway stations along the 30 min reachable line from Schiedam Centrum Station.

At Rotterdam Metropolitan scale level

- Adjusting to Rotterdam City.
- Other nodes in the Rotterdam Metropolitan networks.
- Future plans of Rotterdam City.

At Schiedam scale level

- Schie Canal barrier could become a link connecting southern to northern areas of station.
- Vacant sites of in between area of station.
- Mono Function Industrial Sites of northern area of station.

At South of Randstad Holland scale level

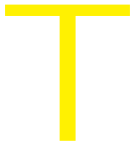
- Do not have strong role in the South of Randstad Holland networks.

At Rotterdam Metropolitan scale level

- Do not have strong role in the Rotterdam Metropolitan networks.

At Schiedam scale level

- Northern, In Between highway and railway tracks and Southern areas of station have complete different urban patterns, and not merge together.
- Barriers.
- Vacant sites of in between area of station.
- Miss Links of southern area of station.
- Mono Function Industrial Sites of northern area of station.
- No place sense in station surrounding areas.



At South of Randstad Holland scale level

- Other nodes in the South of Randstad Holland networks.

At Rotterdam Metropolitan scale level

- Adjusting to Rotterdam City.
- Other nodes in the Rotterdam Metropolitan networks.

At Schiedam scale level

- Competing with Schiedam old center.
- Need investments for transformation and new built projects.

2.5 Questions

At South of Randstad Holland scale level

At Rotterdam Metropolitan scale level

In their networks, what are the roles of Schiedam Centrum is the first sub research question of this thesis.

- What are the roles of Schiedam Centrum Station and its surroundings on **regional scale level**? (pp. 14)

ROLES?

At Schiedam scale level

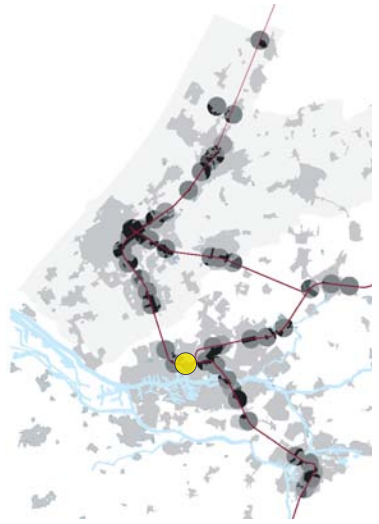
- What are the roles of Schiedam Centrum Station and its surroundings on **local scale level**? (pp. 14)

Some questions are asked after the evaluation of this part:

- How to break the barriers?
- How to fill in the vacancy?
- How to link Schiedam Centrum Station area?
- How to transform the Schiedam Centrum Station northern mono function industrial site?
- How to bring place sense to Schiedam Centrum Station surroundings?

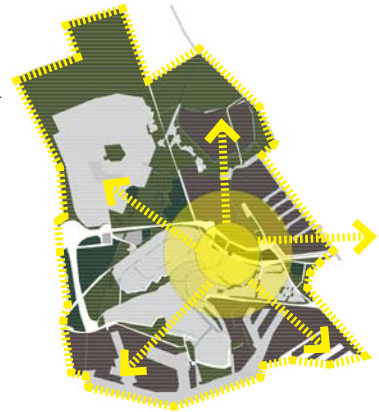
Regional scale

Schiedam in Stedenbaan network
(See Page 15)



City scale

Linkings from Schiedam Centrum Station to other centers and sub-centers of Schiedam.
(See Page 15)



Walking & cycling radius scale

Schiedam Centrum Station's walking and cycling radius.
(See Page 15)



PART 1.
Introduction

PART 2.
Schiedam Centrum Current Situation

PART 3. -----●

LEARN FROM LITERATURE

PART 4.
Learn From Case

PART 5.
Design

Reference

3.0 Introduction

This part concerns four sub research questions from Part 1 (Page 24):

- What are the roles of Schiedam Centrum Station and its surroundings on regional scale level and local scale level?
- What are the principles of TOD, based on the spatial-functional design principles for carrying out the roles and potentials and to solve the problems of Schiedam Centrum Station area?
- What are the weaknesses of TOD for (re)developing Dutch railway stations and its surroundings?
- How to make up for the weakness of TOD?

and the questions which are asked in the end of Part 2 (Page 60):

- How to break the barriers?
- How to fill in the vacancy?
- How to link Schiedam Centrum Station area?
- How to transform the Schiedam Centrum Station northern mono function industrial site?
- How to bring place sense to Schiedam Centrum Station surrounding?

This part is about trying to find out the possible answers for these questions by studying literatures. The literatures are organized by three different scales, regional scale, city scale and walking & cycling scale.

3.1 Theoretical Framework

3.2 Node & Place

3.3 Transit Oriented Development

3.4 Stedenbaan

3.5 Place Making

3.6 Conclusion of Theory Study

3.1 Theoretical Framework

To find the possible answers for the questions (See Page 63), this thesis is trying to learn from some existing theories and principles.

Sub research questions (Page 24)

- What are the roles of Schiedam Centrum Station and its surroundings on regional scale level?
- What are the roles of Schiedam Centrum Station and its surroundings on local scale level?

TOD

Questions from Part 2 (Page 60)

- How to break the barriers?
- How to fill in the vacancy?
- How to link Schiedam Centrum Station area?
- How to transform the Schiedam Centrum Station northern mono function industrial site?

- How to bring place sense to Schiedam Centrum Station surrounding?

NODE & PLACE



Regional scale



City scale



Walking & Cycling Radius scale

Walking & Cycling Radius scale



STEDENBAAN



Regional scale

DEPTHMAP
(See Page 16 to 17)



City scale

PLACE MAKING



Walking Radius scale

Main theory
 Reinforce theory
 Methodology

3.2 Node & Place

ROLES

- What are the roles of Schiedam Centrum Station and its surroundings on regional scale level?
- What are the roles of Schiedam Centrum Station and its surroundings on local scale level?

The railway stations and their surrounding areas as the conjunction of node and place have a dual character. The mass flows of people brought by the public transport force the railway station area become to a new centrality in the city context. And as the gateway from regional scale level to go into the city, the areas have a crucial position in the integrating different scales of developments process.

Synergy and Antagonism

The tensions between the station area as node and as place and, between the perspective of a stand-alone location and of a location within the urban networks, result in possible synergies. (Bertolini & Spit, 1998) (See Figure 3.2.1)

In this wider connotation an accessible mobility environment is thus one where many different people can come, but also one where many different people can do many different things: it is an accessible node, but also an accessible place (Bertolini, 1999). How to balance this dual character relate to the main question of this research. (See Figure 3.2.2)

A transportation **NODE**

How many destinations, within which time and with which ease can be reached from an area? ----- Transit capacity

A **PLACE** of activities

How many and how diverse are the activities that can be performed in an area?-----Palce sense

The conclusion of Part 2 shows that Schiedam Centrum surrounding has the strength and opportunity from transit capacity which is brought by the railway, but has weakness of place sense and treat from railway for developing the place sense. In the next paragraph, this thesis is trying to find some TOD experiences of developing station surrounding areas by taking the advantages of the transit capacity.

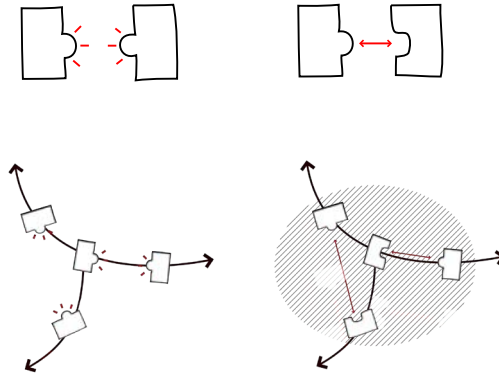


Figure 3.2.1 Stations need their own personalities for competing to others, meanwhile, they need to complement each other in the networks.



THE ROLES OF STATION AREAS

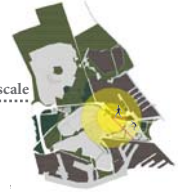
Figure 3.2.2 A station needs to find a way to balance its roles of Node & Place.

3.3 Transit Oriented Development

TOPICS FOR DESIGN

- How to break the barriers?
- How to fill in the vacancy?
- How to link Schiedam Centrum Station area?
- How to transform the Schiedam Centrum Station northern mono function industrial site?

Walking & cycling radius scale



A solid definition of TOD is given in Calthorpe’s The Next American Metropolis: “A Transit-Oriented Development (TOD) is a mixed-use community within an average 2,000-foot (600m) walking distance of a transit stop and core commercial area. TOD’s mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car (Calthorpe, 1993).” (See Figure 3.3.1)

Higher density development is concentrated near the station to make transit convenient for more people and encourage ridership. This form of development utilizes existing infrastructure, optimizes use of the transit network and creates mobility options for transit riders and the local community. Successful TOD provides a mix of land uses and densities that create a convenient, interesting and vibrant community for local residents and visitors alike.

Why TOD?

Transit Oriented Development seeks to implement a more sustainable approach to public transportation and land use. By optimizing the use of land around transit stations, the principles follow a “Triple Bottom Line” approach can help city achieve some of its environmental, economic and social objectives. (See Figure 3.3.2)

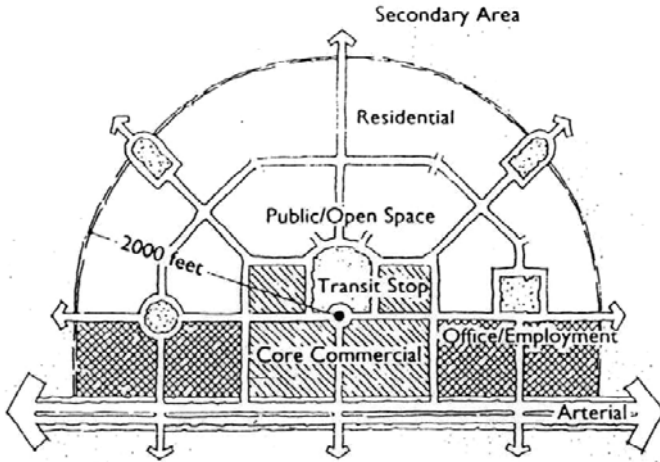


Figure 3.3.1 Preferred structure of a TOD
 Transit lines should be located to allow maximum area for new TOD (which means in a specific radius), to access prime Redevelopable or infill site, and to serve existing dense residential and employment centres. (Calthorpe, 1993)

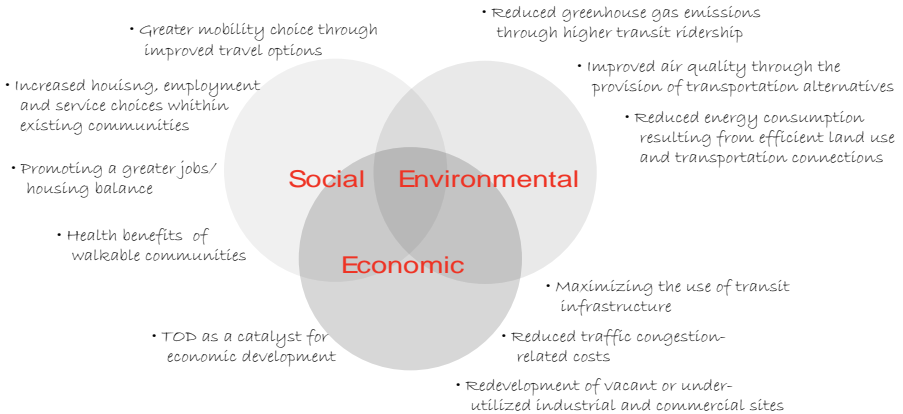


Figure 3.3.2 “Triple Bottom Line” approach (source: Calthorpe, 1993)

TOD Principles

Ensure transit-supportive land uses

- Mix land uses
- Limit non transit-supportive land uses

Increase density around Transit Stations

- Optimize density around each station
- Minimize the impacts of density

Create pedestrian-oriented design

- Provide quality pedestrian connections
- Provide a compact development form
- Provide integrated public systems
- Locate pedestrian-oriented uses at the ground level
- Human scaled architecture
- Incorporate all-season design

Make each station area a “place”

- Emphasize important buildings
- Street and block layout
- Create a focus for the local community

Manage parking, bus, and vehicular traffic

- Consider reduced parking requirements
 - Place parking in appropriate locations
 - Develop parking forms that complement the pedestrian nature of the area
 - Integrate design for transit circulation and drop-off zones
- (Smart Growth Online Smart Growth Resource Library, 2009)

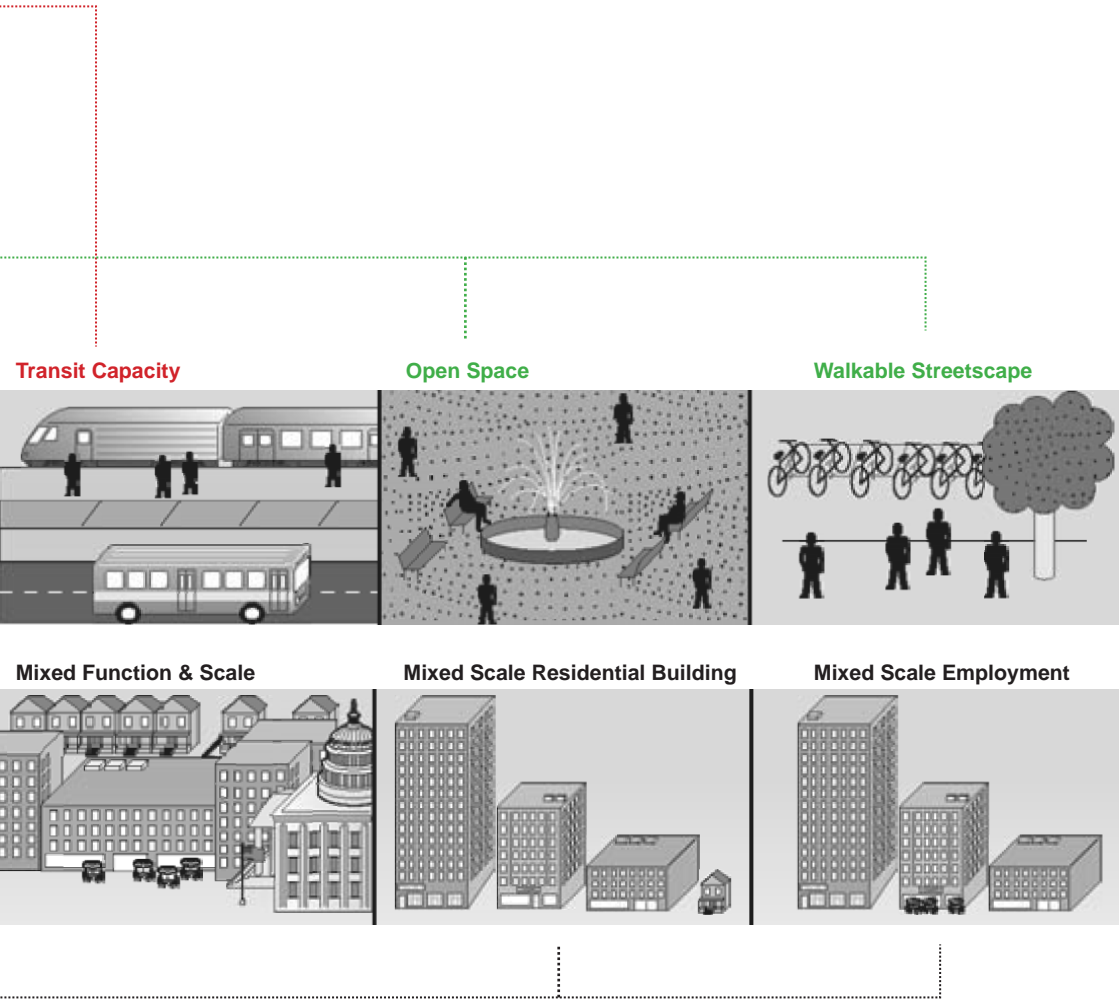


Figure 3.3.3 TOD key components (Google image - GAO)

3.4 Stedenbaan

Stedenbaan is the Dutch experience of TOD strategy. Based on the TOD principles, Stedenbaan represents a dual character. Two objectives are described in the strategy:

- The creation of a high frequency public transport system on the existing national rail network.
- An intensification of land uses around the stations on the rail network. (<http://www.stedenbaan.nl/page/Stedenbaan>)

High frequency public transport system

Stedenbaan will not implement new rail connections, but will improve the transportation capacity on the existing old rail lines. These old rail lines will be used to improve regional transport in two ways:

- A more frequent intercity service will serve the large and medium stations.
- A more frequent 'Sprinter' service will increase service from four times to six times per hour and serve, beside the large stations, stations in the smaller cities, the suburban city extensions and the rural villages along the line. (Transit-Oriented Development making it happen, 2009) A light rail service is provided with new modern train equipment. Randstadrail, a light rail connection between The Hague and Rotterdam, is an example for Stedenbaan.

Intense Land Use

Based on the TOD principles, densification around railway station and mix-use are the requirements of Stedenbaan. Meanwhile, as cities tend to spread and coalesce into lower density urban regions, public transport systems are evolving from mono-centric hierarchical structures into multi-nodal horizontal networks (Transit-Oriented Development making it happen, 2009).

Stedenbaan intent to propose a strategy which the cities involved do not compete with each other, but complement by their own diverse developments. The ambition of densification is not sufficient, but that the diversification of living environments within the region is an equally important objective (Bestuurlijk Platform Zuidvleugel 2007). Hence, the position that a location has within the overall infrastructure network is one of important criteria for the developments of Stedenbaan station areas. (See Figure 3.4.1 and 3.4.2)

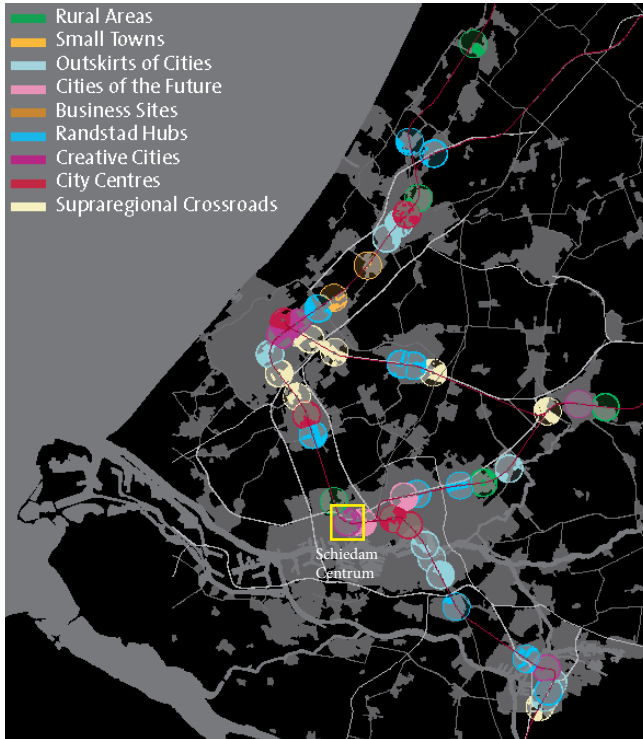


Figure 3.4.1 Stedenbaan - The South Wing Network scenario (Atelier Zuidvleugel, 2007)

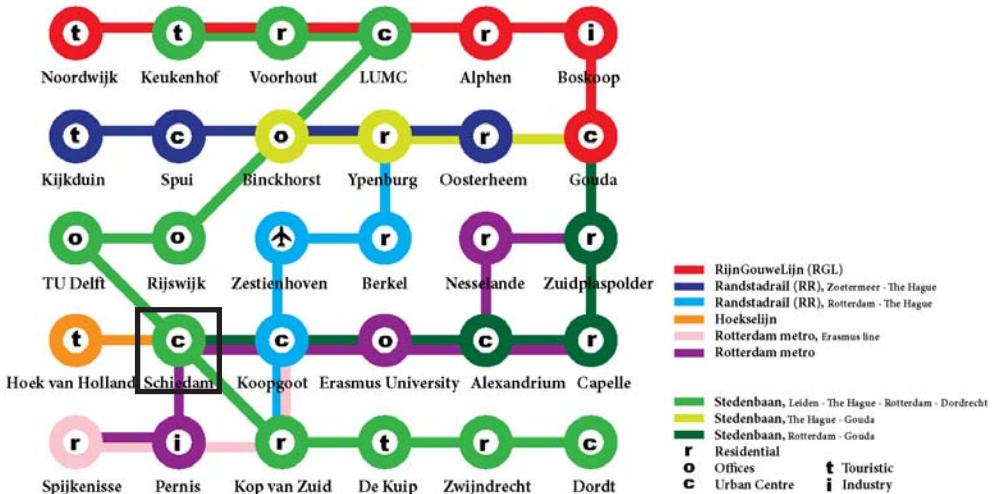


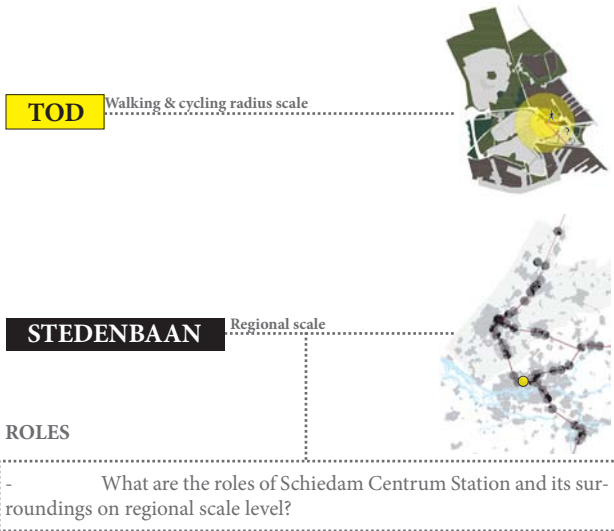
Figure 3.4.2 Stedenbaan networks (Zandbelt & vanden Berg, 2005)

Nine 'Stedenbaan typologies'

To achieve the aim of 'diversification of living environments', Stedenbaan proposes Nine Potential developments Typologies. Schiedam Centrum is defined as a creative city: urban centers accessible by every mode of transport well suited to new urban-type dwellings and creative workplaces. (See Figure 3.4.3)

Scale

Although TOD is developed in a walking and cycling radius scale, at this stage, most of the strategies of Stedenbaan are on regional scale level, which are trying to make the cities along the networks complement each other. Schiedam needs to find its roles in Stedenbaan networks for its own development. (See Figure 3.4.2)



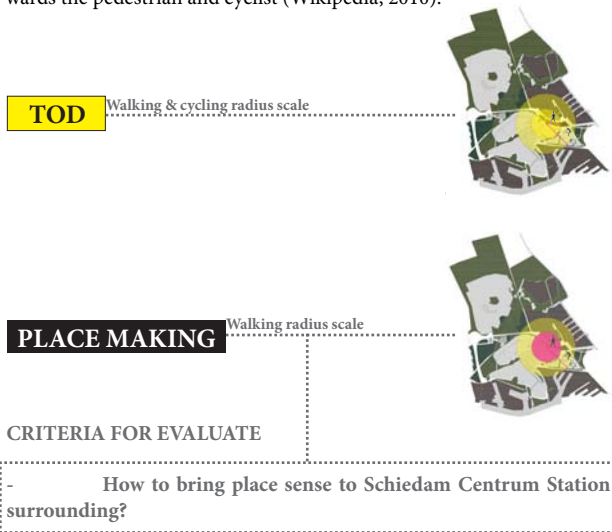
Nine 'Stedenbaan typologies'

1. Rural Areas: spaces in the middle of the landscape for housing development in the countryside and recreational use.
2. Small Towns: new housing sites close to small towns that can expand into autonomous, compact, lively, multifaceted communities set in the countryside.
3. Outskirts of Cities: restructuring areas on the quiet, spacious and green edges of the cities; these qualities are consolidated, enhanced and used.
4. Cities of the Future: easily accessible and dense housing areas; can gradually expand into mixed-use developments with their own identity.
5. Business Sites: extensively used areas along the motorway to be turned into intensively used employment zones.
6. Regional Crossroads: areas linked to one of the major motorway intersections in the South Wing; highly suitable for developing services with a supra-regional function.
7. Randstad Hubs: not intensively used areas, but highly accessible by road and local public transport; excellent places for experimental new employment and mixed-use areas.
8. Creative Cities: urban centers accessible by every mode of transport well suited to new urban-type dwellings and creative workplaces.
9. City Centers: key sites, well served by every mode of public transport but less accessible by car; will have to be better designed for users of public transport.

Figure 3.4.3 Nine Potential developments typologies of Stedenbaan (Curtis, C; Renne, JL & Bertolini, L, 2009)

3.5 Place Making

While TOD provides general design principles for intensify the railway station areas (See 3.3 Transit Oriented Development), to bring a 'Place' character (See 3.2 Node & Place) for Schiedam Centrum surroundings needs more specific design principles. Therefore, this thesis is trying to find out design principles, which are especially for walking movements, by studying Jan Gehl's literatures, who is a Danish architect and urban design consultant based in Copenhagen and whose career has focused on improving the quality of urban life by re-orienting city design towards the pedestrian and cyclist (Wikipedia, 2010).



CRITERIA FOR EVALUATE

- How to bring place sense to Schiedam Centrum Station surrounding?

In his book 'New city life', he uses 12 key quality criteria to evaluate selected city spaces (See Figure 3.5.2). Furthermore described by the book, the reality shows that those city spaces meeting most quality requirements are also the most popular and well-visited sites in the city. Conversely, the city spaces that meet few or next to no quality criteria are those least utilized. Therefore, this thesis is trying to use the same criteria for bringing out the main design principles and to evaluate the design proposals.

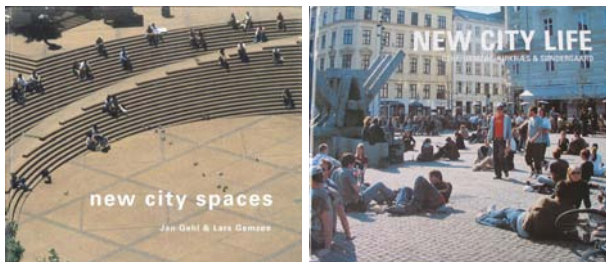


Figure 3.5.1 Jan Gehl's books

THE 12 KEY QUALITY CRITERIA

PROTECTION

Protection against traffic and accidents - feeling safe

- Protection for pedestrians
- Eliminating fear of traffic

Protection against traffic and violence - feeling secure

- Lively public realm
- Eyes on the street
- Overlapping functions day and night
- Good lighting

Protection against unpleasant sensory experiences

- Wind
- Rain/snow
- Cold/heat
- Pollution
- Dust, noise, glare

COMFORT

Opportunities to walk

- Room for walking
- Interesting facades
- No obstacles
- Good surfaces
- Accessibility for everyone

Opportunities to stand/stay

- Edge effect/attractive zones for standing/ staying
- supports for standing
- Facades with good details that invite staying

Opportunities to sit

- Zones for sitting
- Utilizing advantages: view, sun, people
- Good places to sit
- Benches for resting

Opportunities to see

- Reasonable viewing distances
- Unhindered views
- Interesting views
- Lighting (when dark)

Opportunities to talk and listen

- Low noise levels
- Street furniture that provides 'talkscapes'

Opportunities for play and exercise

- Physical activity, exercise
- Play and street entertainment
- By day and night
- In summer and winter

ENJOYMENT

Scale

- Buildings and spaces designed to human scale

Opportunities to enjoy the positive aspects of climate

- Sun/shade
- Heat/coolness
- Shelter from wind/ breeze

Positive sensory experience

- Good design and detailing
- Good materials
- Fine views
- Trees, plants, water

Figure 3.5.2 The key criteria which Jan Gehl used in his book 'New City Life'

3.6 Conclusion of Theory Study

Sub research questions (Page 24)

- What are the roles of Schiedam Centrum Station and its surroundings on regional scale level?
- What are the roles of Schiedam Centrum Station and its surroundings on local scale level?

ROLES

(See Page 80 to 81)

Questions from Part 2 (Page 60)

- How to break the barriers?
- How to fill in the vacancy?
- How to link Schiedam Centrum Station area?
- How to transform the Schiedam Centrum Station northern mono function industrial site?

DESIGN TOPICS

(See Page 82 to 83)

- How to bring place sense to Schiedam Centrum Station surrounding?

EVALUATION CRITERIA

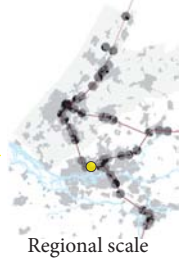
(See Page 76 to 77)

FINDING ROLES

TOD

REINFORCE

NODE & PLACE



STEDENBAAN



DEPTHMAP

(See Page 16 to 17)



PLACE MAKING



Main theory Reinforce theory Methodology

3.6.1 Roles

Sub research questions (Page 24)

- What are the roles of Schiedam Centrum Station and its surroundings on regional scale level?
- What are the roles of Schiedam Centrum Station and its surroundings on local scale level?

Conclude from Part 2 'Schiedam Centrum Current Situation' and Part 3 'Learn From Literature' the roles of Schiedam Centrum Station and its surroundings are proposed in here as:

- a transit node
- a creative city in the Stedenbaan networks
- a city adjoins to Rotterdam center
- a new centrality in the Schiedam city

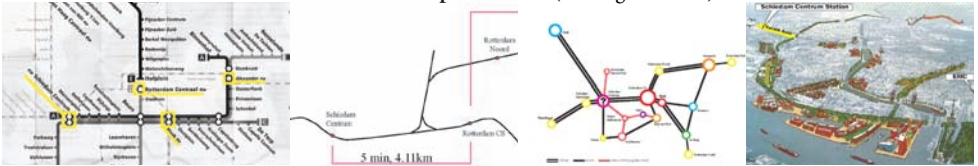
which means Schiedam Centrum Station and its surroundings have good transit capacity and accessible by every modes of transport. It's next to Rotterdam city center which brings benefits and threats of competing. And it's a new centrality in Schiedam city, which is well suited to new urban-type dwellings and creative workplaces.

Schiedam Centrum Station at South of Randstad Holland level (See Page 30 to 31)



RAILWAY TRANSIT CAPACITY

Schiedam Centrum Station at Rotterdam Metropolitan level (See Page 32 to 37)

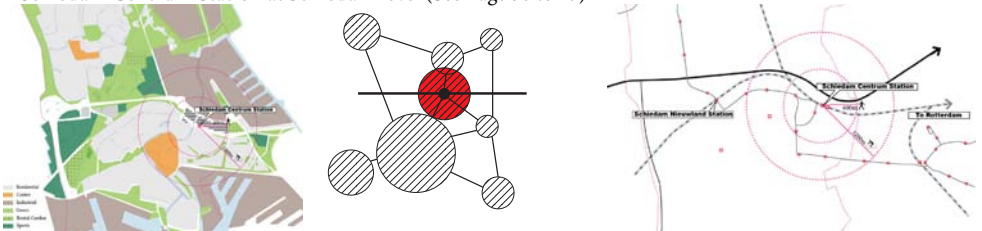


TRANSIT NODE

ADJOINS TO R'DAM CENTER

IN R'DAM NETWORKS

Schiedam Centrum Station at Schiedam level (See Page 38 to 45)



NEW CENTRALITY OF CITY

TRANSIT NODE

Stedenbaan (See Page 72 to 75)



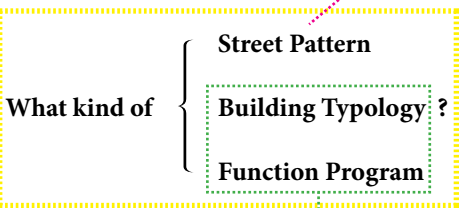
IN STEDENBAAN NETWORK - CREATIVE CITY

3.6.2 Design Topics

To find out the possible answers for the questions which are asked in the end of part 2 'Schiedam Centrum Current Situation' (See Page 60),

- How to break the barriers?
- How to link Schiedam Centrum Station area?
- How to fill in the vacancy?
- How to transform the Schiedam Centrum Station northern mono function industrial site?

three design topics are concluded from this part, 'Learn From Literature', and furthermore the topics are used in Part 4's case studies to learn from the practical application of existing railway station developments.



TOD Principles (See Page 71)

Transit Capacity
which is concluded by 'Roles'



Open Space



Walkable Streetscape



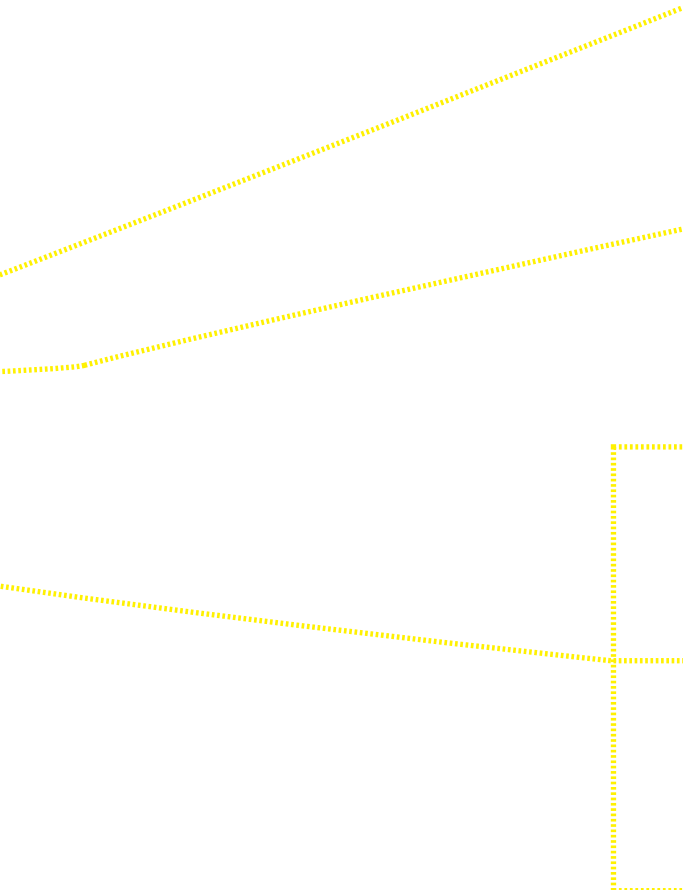
Mixed Function & Scale



Mixed Scale Residential Building



Mixed Scale Employment



PART 1.
Introduction

PART 2.
Schiedam Centrum Current Situation

PART 3.
Learn From Literature

PART 4. -----●

LEARN FROM CASE

PART 5.
Design

Reference

4.0 Introduction

In this part, two cases

- Rotterdam Alexander station, NL
- 's-Hertogenbosch station, NL

will be analysed and compared horizontally by the three design topics which are concluded from Part 3 'learn from theory'.

What kind of { **Street Pattern**
Building Typology ?
Function Program

Questions from Part 2:

- How to break the barriers?
- How to link Schiedam Centrum Station area?
- How to fill in the vacancy?
- How to transform the Schiedam Centrum Station northern mono function industrial site?

4.1 General Impression

4.2 Street Pattern

- 4.2.1 Linking
- 4.2.2 Break Barriers
- 4.2.3 Street Pattern Proposal

4.3 Street Pattern + Building Typology

- 4.3.1 Comparison
- 4.3.2 Scale Testing
- 4.3.3 Street Pattern + Building Typology Proposal

4.4 Street Pattern + Building Typology + Function Program

4.5 Proposal

Street Pattern

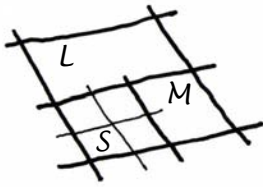
Different street pattern bring different results of street types, which influences people's activities, such as walking environments, speed of traffic flows.

Building Typology

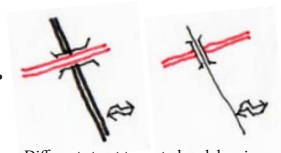
Street pattern is the structure for building typology, which means different scales of building are fit into different street pattern scales.

Function Program

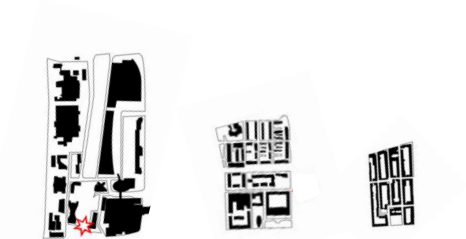
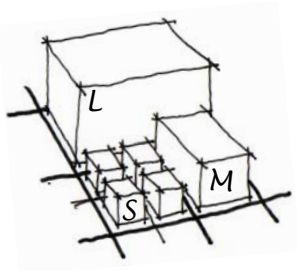
The scale of building typology is related to what kind of function program could happen in the building. Large scale building will be suitable for most of function programs, small scale building fits to fewer function programs but provides a human scale street pattern.



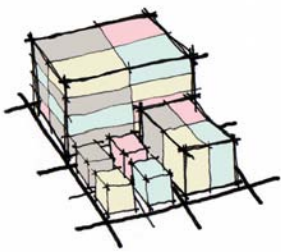
Linking in three scale of street pattern



Different street types to break barriers



Three scales of building typology



4.1 General Impression

The general impressions by people for two station areas are:

Rotterdam Alexander Station Area

Roles

Adjoin to Rotterdam center as the position of Schiedam Centrum in the Rotterdam network (See Figure 2.2.7)

Street Pattern & Building Typology

Large scale, with parking lot and indoor passage.
(See Figure 4.1.1 to 4.1.2)

Function Program

A commercial corridor. (See Figure 4.1.1 to 4.1.2)

Aims

To research the street pattern and building typology that Rotterdam Alexander Station area, which is in the shadow of Rotterdam Centraal as Schiedam Centrum, uses to develop its own economic competitiveness in the Rotterdam Metropolitan networks.

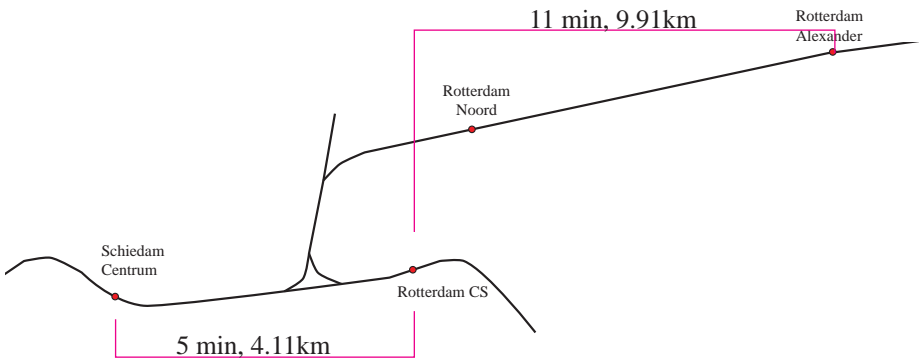


Figure 2.2.7 Railway travel time and distance.



Figure 4.3.2 Rotterdam Alexander Station area's big scale urba structures.



Figure 4.1.1 The commercial corridor in Rotterdam Alexander Station area.



Big scale station square



Parking lot

's-Hertogenbosch Station Area

Street Pattern & Building Typology

Middle scale, with strong links connecting railway station with other parts of the city.

Function Program

Transformed the 'backside' of railway station with new programs, such as commercial, residential, college and court.

Small intervention for public spaces in the old town area.

(See Figure 4.1.3 to 4.1.4)

Aims

To research the street pattern and building typology that 's-Hertogenbosch Station area uses to transform the so called 'backside' of the station area, and how does 's-Hertogenbosch link its station area with other centralities of the city.



Figure 4.1.4 's-Hertogenbosch strong links to transformed (new) side of station

's-Hertogenbosch strong links to old center

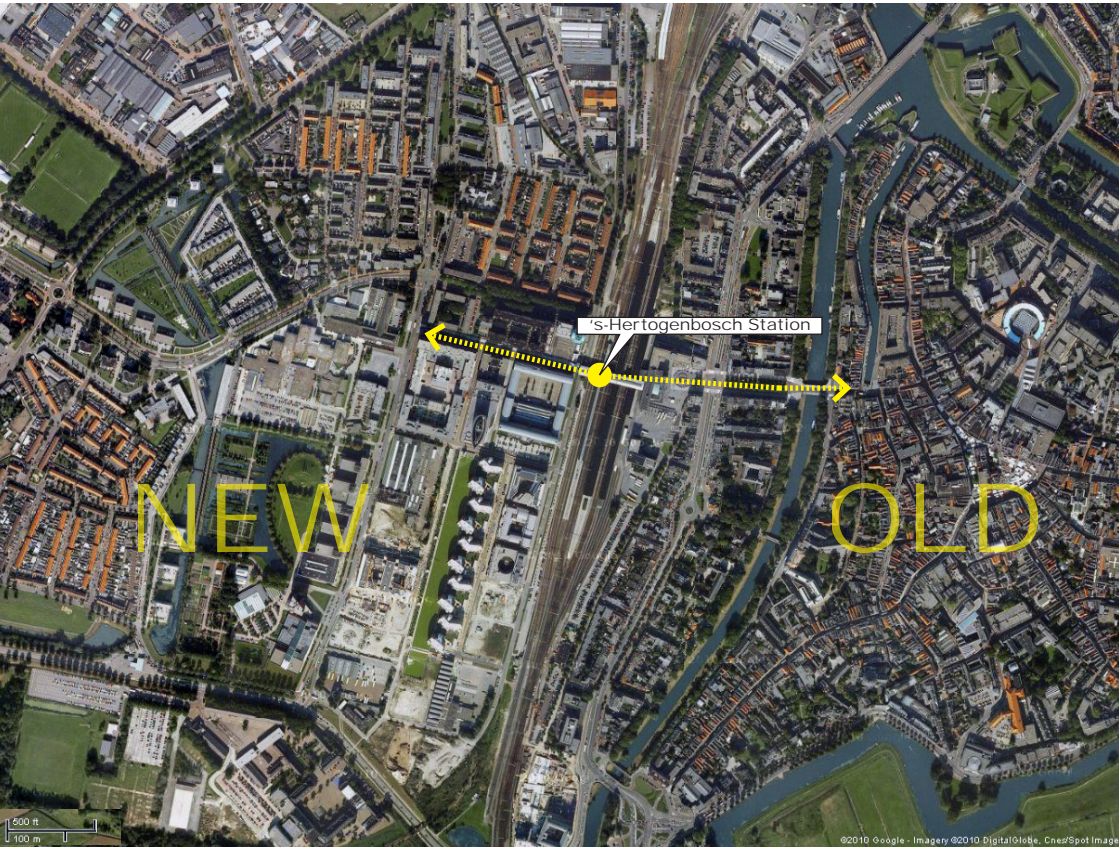
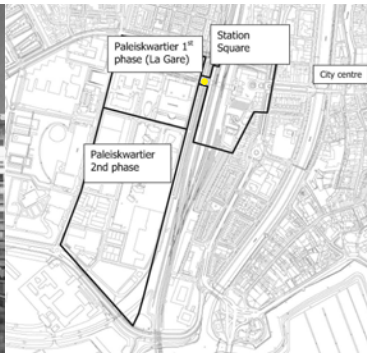


Figure 4.1.3 The contrastive new and old urban pattern on two sides of 's-Hertogenbosch Railway Station.



New programs at the 'Backside' of 's-Hertogenbosch railway station

Small interventions in the old town

4.2 Street Pattern

4.2.1 Linking

Two cases are analyzed in Depthmap to show the vitality of the routes which are related to local or regional flows.

Rotterdam Alexander

Street Pattern Scale - Large

Local slow movements

(See Figure 4.2.1 & 4.2.3)

- Limited connections between local flows and regional flows.
- Few local slow movements in the corridor area.

Regional fast movements

(See Figure 4.2.4)

- A clear regional movement structure.

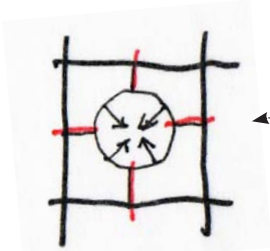


Figure 4.2.1 Large scale street pattern with limited connections between local flows and regional flows, gated communities.



Figure 4.2.2 Rotterdam Alexander Google map

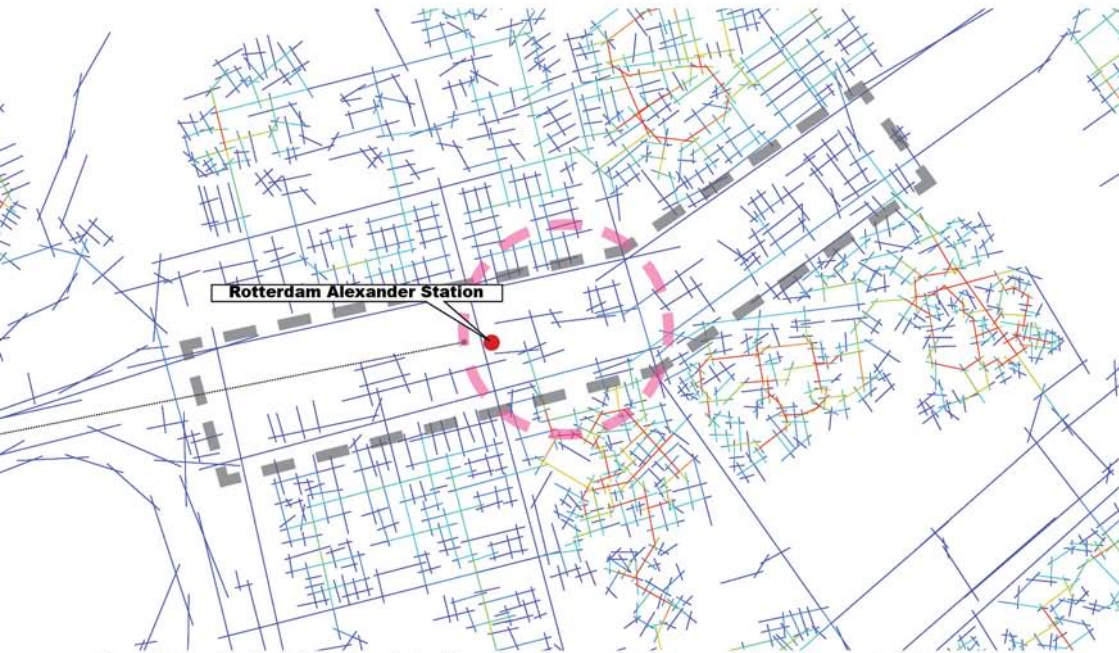


Figure 4.2.3 Rotterdam Alexander R=1 Related to local slow movement
Few local movements happen in the corridor area.



Figure 4.2.4 Rotterdam Alexander R=10 Related to regional fast movement
The area has a clear regional movement structure.

's-Hertogenbosch

Street Pattern Scale - Middle (the so called 'backside' new transformed side of 's-Hertogenbosch station)

Local slow movements

(See Figure 4.2.5, 4.2.6 & 4.2.8)

- More connections between the routes for local and regional movements comparing to Rotterdam Alexander Station area.
- Local movements sprawl from old city area to the transformed area on the so called 'backside' of station.

Regional fast movements

(See Figure 4.2.6 to 4.2.9)

- The areas where have clear regional movement structure and have more connections between routs have more local movements.



Figure 4.2.5 local movements in middle scale street pattern

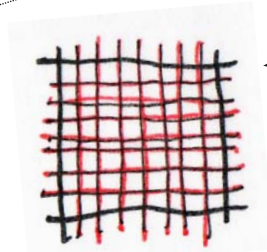


Figure 4.2.6 Local movements in small scale street pattern



Figure 4.2.7 's-Hertogenbosch Google map

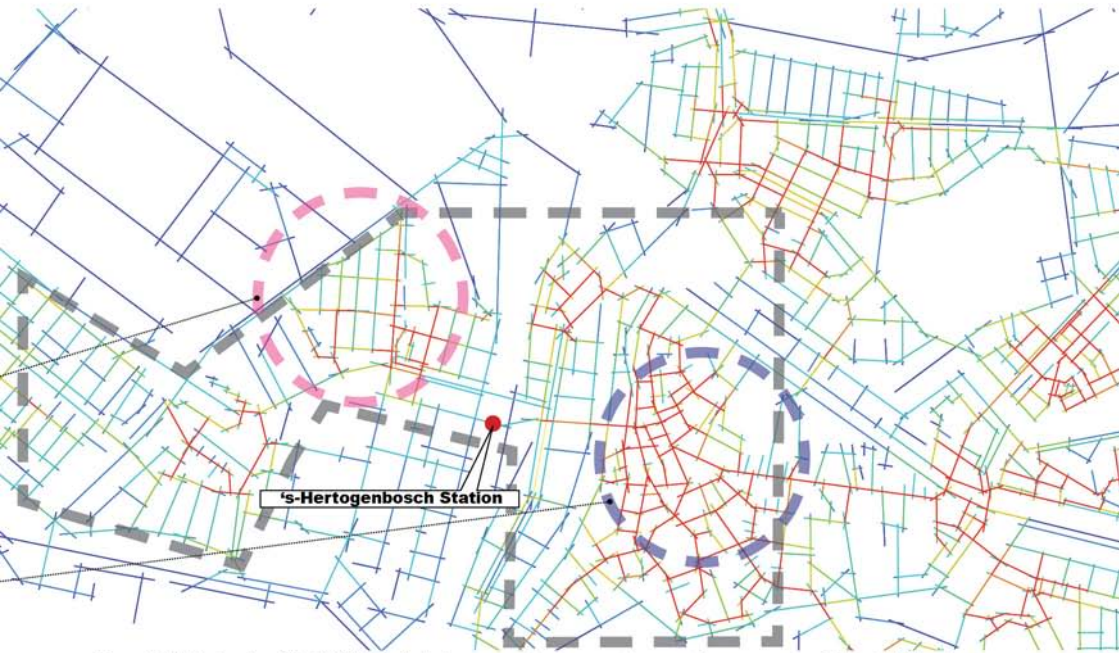


Figure 4.2.8 's-Hertogenbosch R= 50 Related to local slow movement — the most vital streets — the least vital streets



Figure 4.2.9 's-Hertogenbosch R=600 Related to regional fast movement

Furthermore, 's-Hertogenbosch develops strong links for local slow movements between station and other centralities of the city, on both sides of the station. It provides wide pedestrian area with liner plants and cycling path. Good details of facade and pavement bring more attractive space for street activities. (See Figure 4.2.10 to 4.2.12)

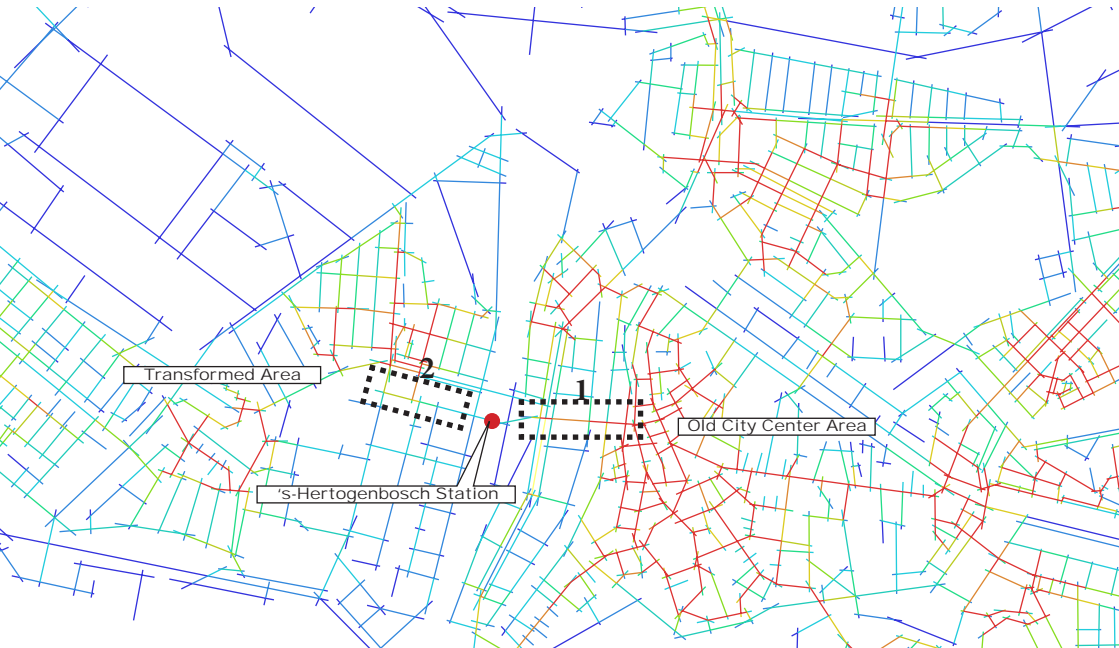


Figure 4.2.10 's-Hertogenbosch R= 50 Related to local slow movement — the most vital streets — the least vital streets



Figure 4.2.11 Link 1 - the main link from station to old city center

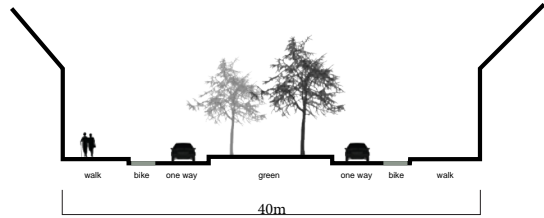
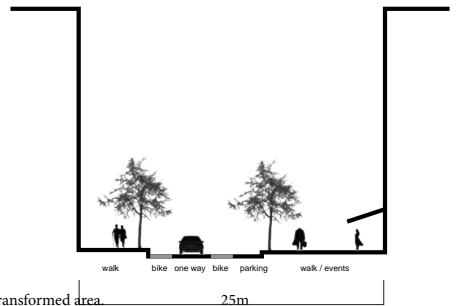


Figure 4.2.12 Link 2 - the main link from station connecting other parts of the transformed area.



4.2.2 Break Barriers

The breaks for barriers in 600 meters walking radius and 1200 meters cycling radius are analyzed, in order to find out

Rotterdam Alexander Station Area

Three barriers which are highway(40m), rails(10-15m) and metro(10m) (See Figure 4.2.13 to 4.2.16).

Break 1, a city main road to cross rails and highway, street width=40m, barrier width=10m, and the buildings beyond the barrier have good visibility.

Impression - open feeling, easy to cross, safe, bright.



Figure 4.2.14 Break 1



Figure 4.2.15 Break 2



Figure 4.2.16 Break 3

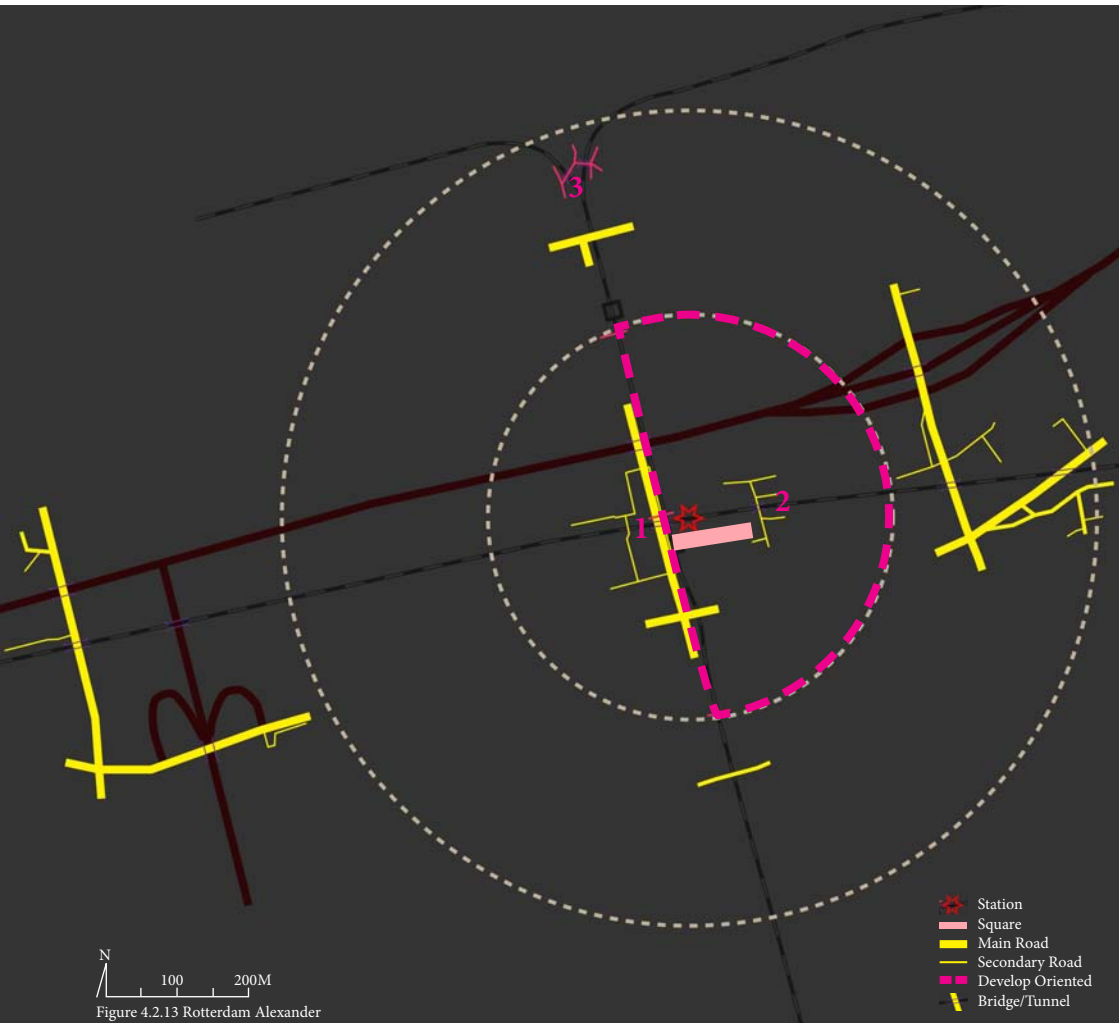
Break 2, a secondary road to cross rail, street width=20m, barrier width=15m, enclosed by trees, the buildings beyond the barrier have good visibility.

Impression - open feeling, easy to cross, safe, little dark, not pleasant.

Break 3, tunnels for cycling path, street width=6m, barrier width=10m, enclosed by green, with street art painting on the walls.

Impression - open feeling, easy to cross, safe, bright, pleasant.

Develop Oriented, the square side of station (east of the city main road connecting to the station) is more developed.



's-Hertogenbosch Station Area

Two barriers which are rails for train(110m) and river(44m), separated the car and walking flows to cross rails.

(See Figure 4.2.17 to 4.2.20).

Break 1, a station passage bridge for walking to cross rails, barrier width=110m, with squares on both sides of station.

Impression - open feeling, easy to cross, safe, pleasant.

Break 2, a secondary road with a tunnel to cross rails, street width=25m, barrier width=110m.

Impression - closed feeling, easy for car to cross, not easy and unsafe for walking, dark.



Figure 4.2.18 Break 1



Figure 4.2.19 Break 2



Break 3, a bridge to cross river, bridge width=17m, barrier width=44m.
Impression - open feeling, easy to cross, safe, pleasant.

Develop Oriented, both sides are developed.

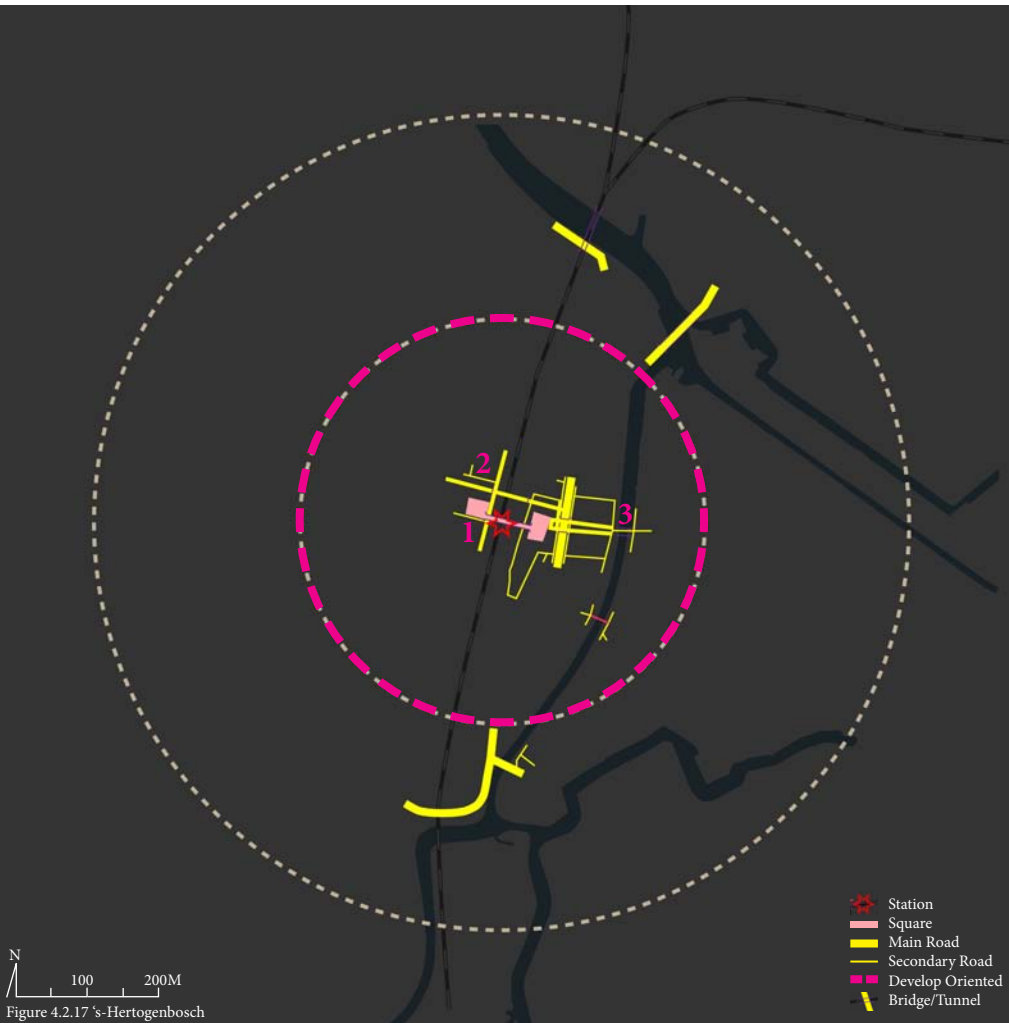


Figure 4.2.17 's-Hertogenbosch

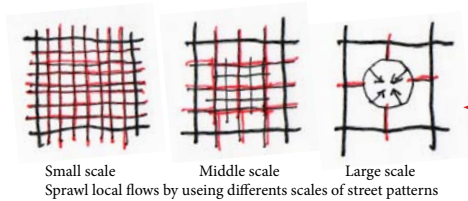
4.2.3 Street Pattern Proposal

Linking

- The current situations of Schiedam Centrum Station area are:
- slow movements are concentrated in the south of station, few slow movements in the northern. (See Figure 4.2.21)
 - clear connections for regional fast movements (See Figure 4.2.22)
 - the link which is connecting station to the northern part is not vital for both slow and fast movements.

Proposal

- Sprawl the local slow movement pattern to the northern of Schiedam Centrum station by taking advantages of the clear regional movements connections. (See Figure 4.2.8 & 4.2.21)
- Enhance the links which are connecting station to the city (link 1 & 2), and use link 3 to connecting south and north of the vacant site.
- Bring events to the streets link 1 and 2, by wider the pedestrian and provide more comfortable environments for walking.



Bring events to the streets by wider pedestrian and details

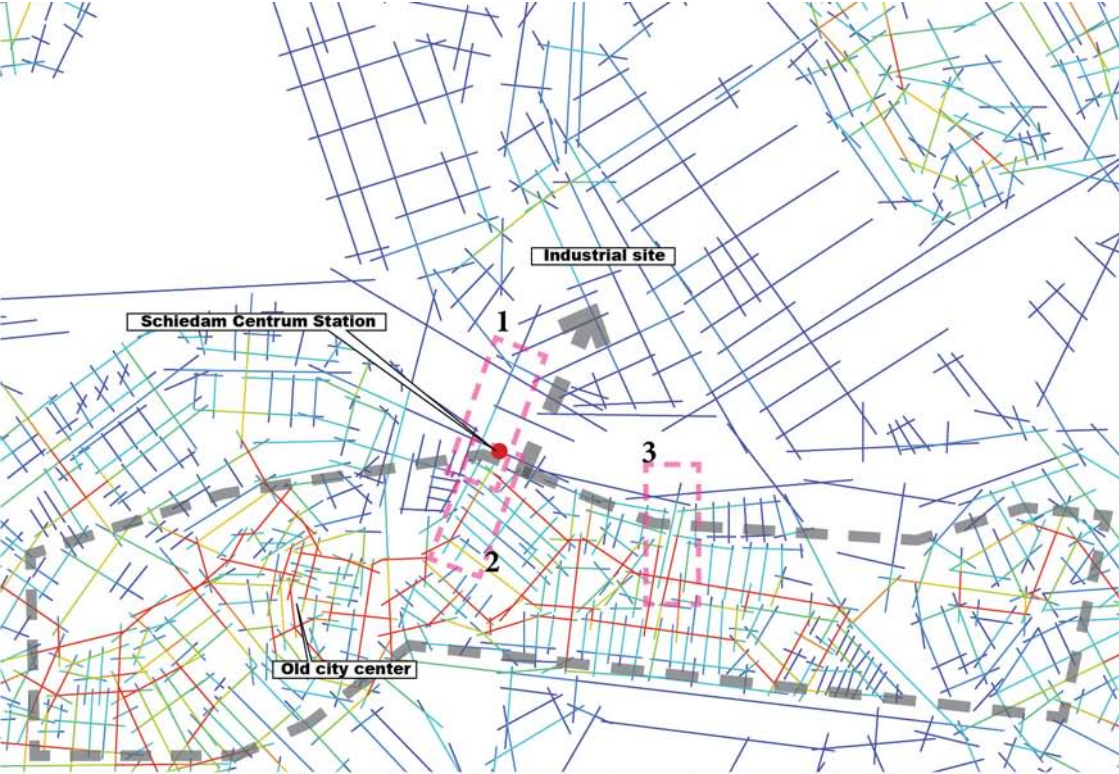


Figure 4.2.21 Schiedam R=1 Related to local slow movement



Figure 4.2.22 Schiedam R=10 Related to regional fast movement

Break barriers

Three barriers which are rails, highway and Schie River. (See Figure 4.2.23 to 4.2.26)

Break 1, a secondary road to cross rails and highway, street width=55m, barrier width=110m, few buildings beyond the barrier can be seen.

Impression -closed feeling, not easy to cross, unsafe, dark, unpleasant.

Break 2, a city main road to cross rails and highway, connecting highway exits, street width=30m, barrier width=60m, with under bridge open spaces, and gaps between rails barriers.

Impression -open feeling, easy to cross, safe, bright, pleasant.

Break 3, a tunnel for cycling path to cross rails, street width=7m, barrier width=80m, only cross rails doesn't cross highway.

Impression - closed feeling, not easy to cross, unsafe, dark, unpleasant.



Figure 4.2.24 Break 1



Figure 4.2.25 Break 2



Figure 4.2.26 Break 3

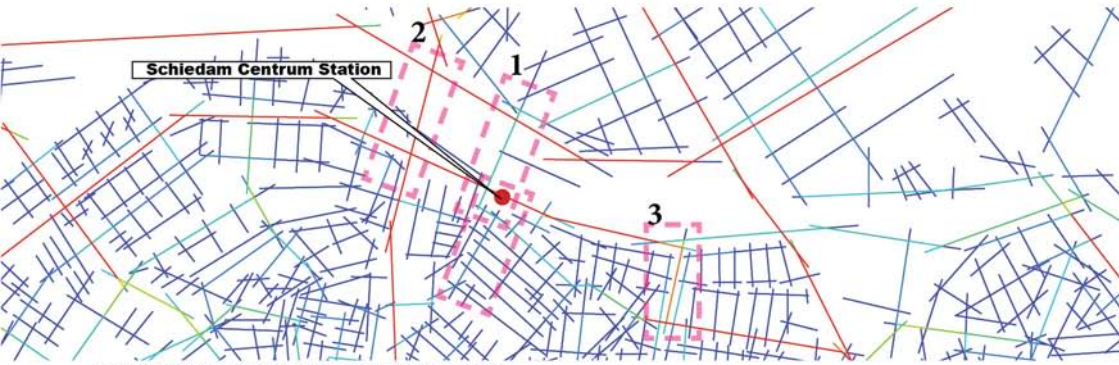


Figure 4.2.22 Schiedam R=10 Related to regional fast movement

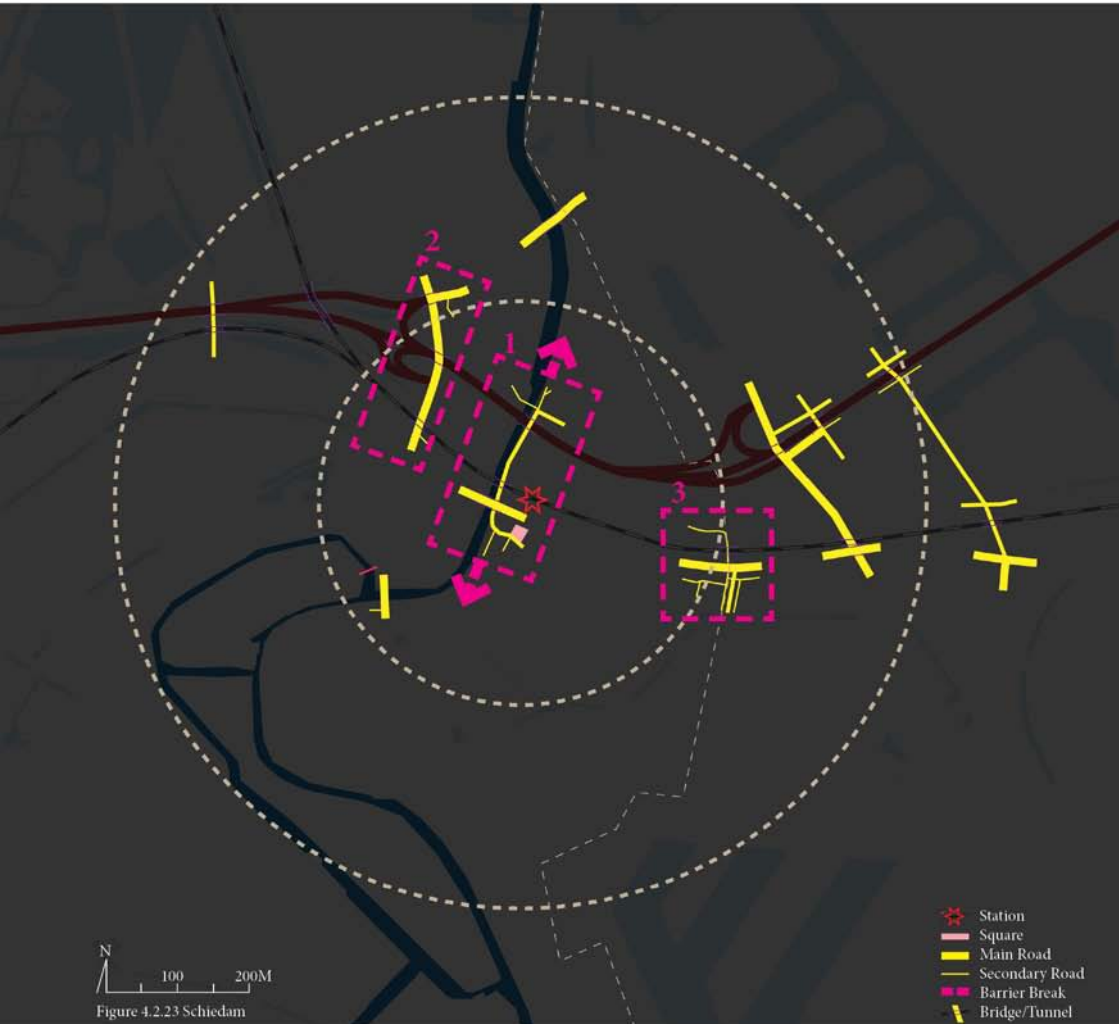


Figure 4.2.23 Schiedam

Proposal



Break 1 - The route connecting station to north and south.



Break 3 - Potential break to cross the barriers to the northern area.

Rotterdam Alexander Station

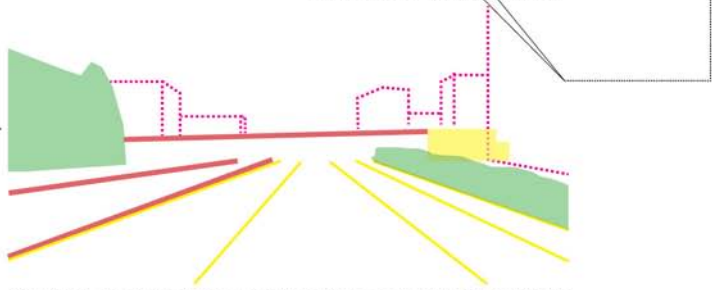


's-Hertogenbosch Station



To provide a walking path from station crossing highway to the north.

Schiedam Centrum Station



Open feeling, bright with cycling path and liner plants, good visibility for the buildings in the north of barriers, such as Rotterdam Alexander Break 1.



Open up the break for walking , cycling and car.

4.3 Street Pattern + Building Typology

4.3.1 Comparison

Rotterdam Alexander
(See Figure 4.3.1 to 4.3.3)

Scale - large

Station Square - 30 x 160 meters

Parking - Ground parking along streets and parking lots in the complex buildings near the station.

Extra - Indoor passage

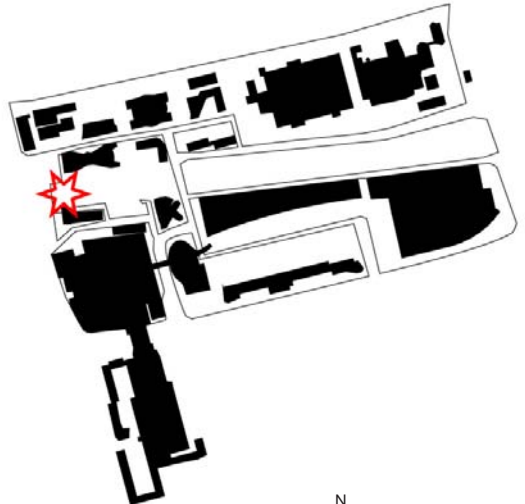
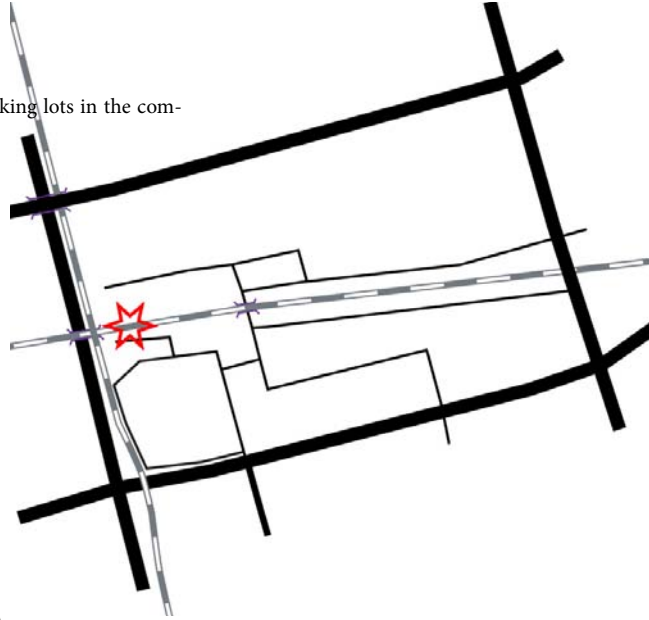


Figure 4.3.1 Rotterdam Alexander building typology and urban pattern

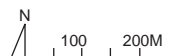




Figure 4.3.2 Rotterdam Alexander Station area urban pattern



Figure 4.3.3 Rotterdam Alexander Station square

Rotterdam Alexander big scale building topology

's-Hertogenbosch - Middle Scale

(See Figure 4.3.4 to 4.3.6)

Scale - Middle

Station Square - 40 x 40 meters (new side), 40 x 80 meters (old side).

Parking - Ground parking along streets and parking lots in the complex buildings near to the station.

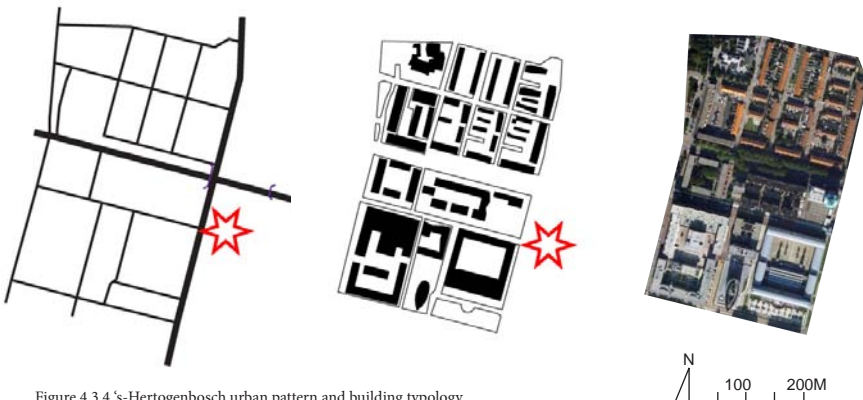


Figure 4.3.4 's-Hertogenbosch urban pattern and building typology



Figure 4.3.5 's-Hertogenbosch Station area urban pattern



Figure 4.3.6 's-Hertogenbosch Station squares

's-Hertogenbosch middle scale building topology

Schiedam

The southern area of Schiedam Centrum Station has small scale street pattern and building typology. And in the north of vacant sites and highway, there are industrial sites, which need to be transformed.

(See Figure 4.3.7 to 4.3.10)

Scale - Small

Station South Square - 50 x 100 meters

Parking - Groud parking along streets

Which scales of street pattern and building typology fit to Schiedam Centrum Station area?



Figure 4.3.7 Schiedam Centrum Station southern area small scale bulding tpology

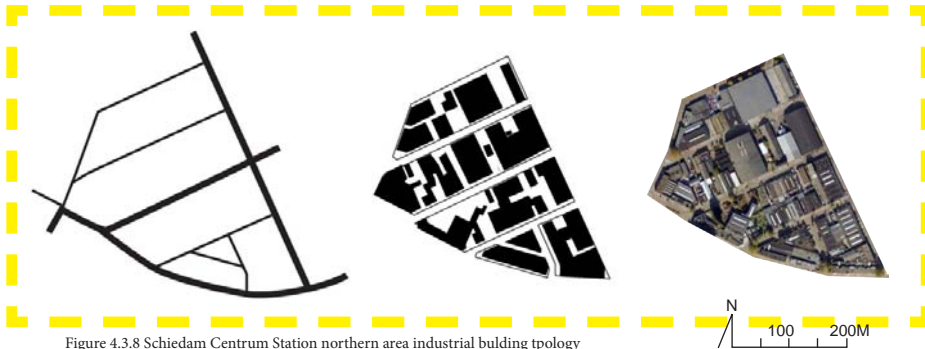


Figure 4.3.8 Schiedam Centrum Station northern area industrial bulding tpology

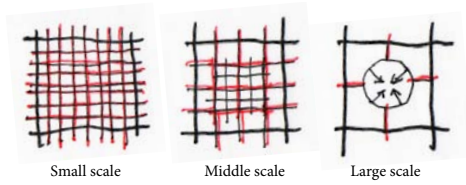


Figure 4.3.9 Schiedam Centrum Station area urban pattern



Figure 4.3.10 Schiedam Centrum Station square Schiedam Centrum small scale building topology station northern industrial buildings

4.3.2 Scale Testing



Three scales of street pattern and building typology are tested in the vacant sites and industrial sites of Schiedam Centrum Station area.

Different scale of street pattern require for different amount barrier breaks, such as small scale pattern needs more breaks while large scale pattern needs few breaks.

Meanwhile, street pattern is the frame of the scale of building typology and brings different street environments, such as large scale building typology can't be used in small scale street pattern, small scale building has better human scale street environments.

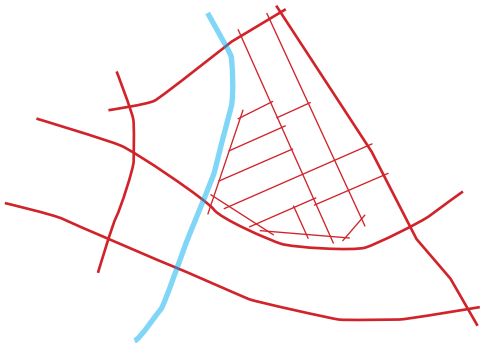


Figure 4.3.11 Current Street Pattern of Schiedam Centrum Station Area



Figure 4.3.12 Middle-Scale Street Pattern



Figure 4.3.13 Small Scale Street Pattern

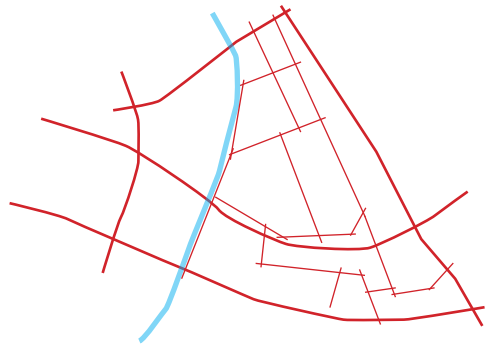


Figure 4.3.14 Large Scale Street Pattern



Figure 4.3.15 Current Building Typology of Schiedam Centrum Station Area



Figure 4.3.16 Middle-Scale Building Typology



Figure 4.3.17 Small Scale Building Typology



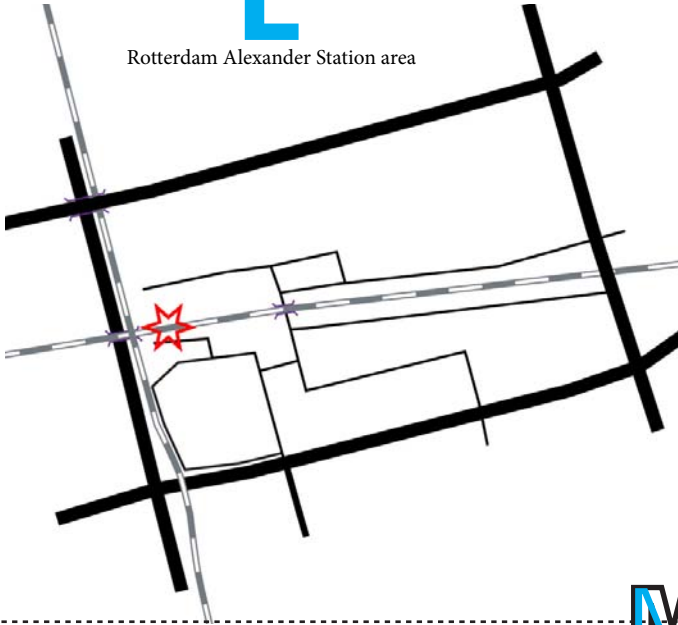
Figure 4.3.18 Large Scale Building Typology

4.3.3 Street Pattern + Building Typology Proposal

According to TOD principles, a mixed scale street pattern and building typology proposal is chosen for the Schiedam Centrum Station area's vacant and industrial sites.

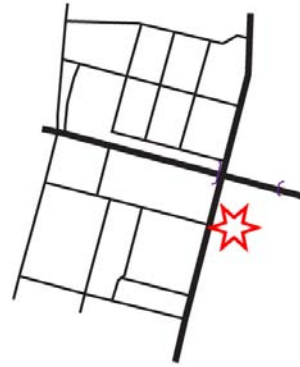
L

Rotterdam Alexander Station area

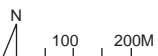
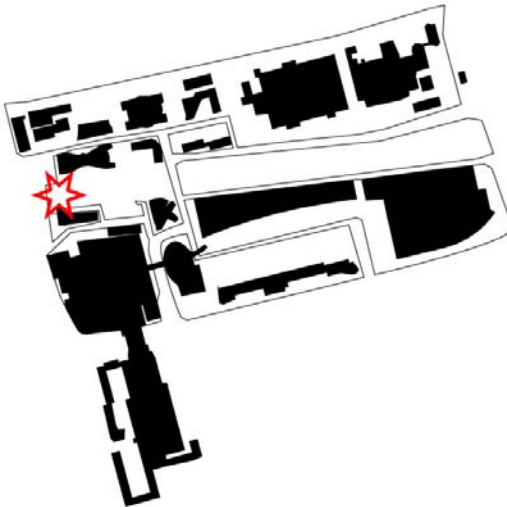


M

's-Hertogenbosch Station area

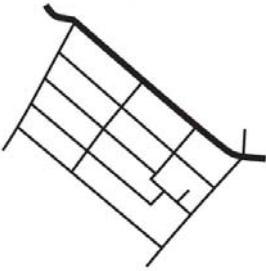


MIX

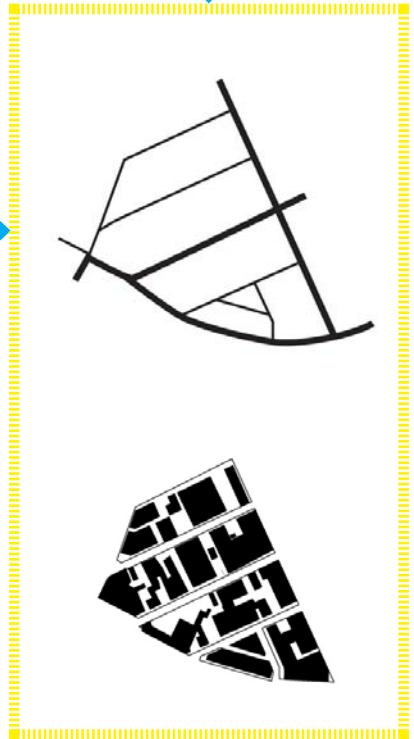
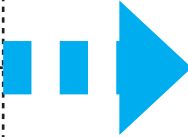


S

Schiedam Centrum Station area



TOD principle - Mix scales



Schiedam Centrum Station northern
mono function old industrial sites.

4.4 Street Pattern + Building Typology + Function Program

Function program related to regional fast flows

The roles of Schiedam Centrum Station in the networks of South of Randstad Holland and Rotterdam Metropolitan Area bring opportunities to develop the programs which are related to regional flows. These programs have bigger potentials to develop in the area which are close to the regional infrastructures, such as station area, highway exit area or along the Rotterdam Park Lane Plan area.

Function program related to local slow flows


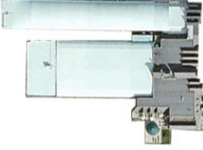

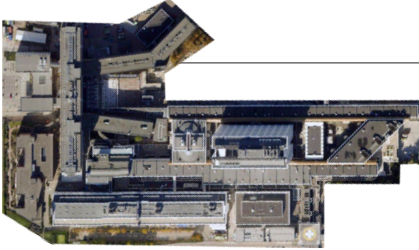
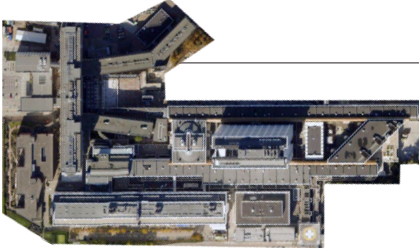

In the walking radius of station, the areas, which are along the main links to other centralities of city, have potential to develop the function program enhancing the 'Place' sense.










(See Figure 4.2.21, 4.2.22 & 4.4.1)









Figure 4.4.1 Schiedam Centrum Station Area

0 50 100 150 200M

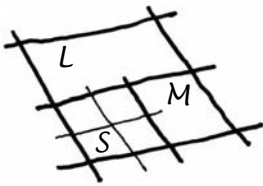
	Program	Scale	Car Dependence
	Stadium	L	YES
	Snow World	L	YES
	Mega Store	L	YES
	Education	L / M	NO
	Medical Centre	L	YES
	Film Theatre	L / M	NO
	Entertainment Center	L / M	NO

24 hours	Special Requirement / Effect
<p>Specific Time</p>	<p>Need - Parking / Sports Fields Make - Noise / Crowd in Specific Time</p>
<p>Holiday / </p>	<p>Need - Parking</p>
<p>Holiday / </p>	<p>Need - Parking</p>
<p> / </p>	<p>Make - Vacant During Vacation Season</p>
<p></p>	<p>Make - Pollutions</p>
<p> / </p>	
<p> / </p>	

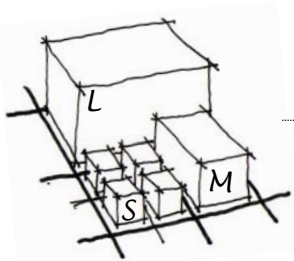
	Program	Scale	Car Dependence
 <p>Programs could be in any scales of buildings</p>	Commercial	L / M / S	NO
	Retail	L / M / S	NO
	Hotel	M / S	NO
	Residential	M / S	NO
	Park	M / S	NO
	Artist Studio	M / S	NO

24 hours	Special Requirement / Effect
	<p>Need - Close to transportation hub</p>
	
	<p>Need - Close to transportation hub</p>
	<p>Need - Facilities</p>
	<p>Make - Unsafely during night</p>
	<p>Transform the old industry building</p>

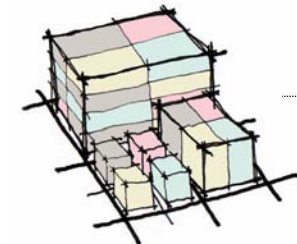
4.5 Proposal



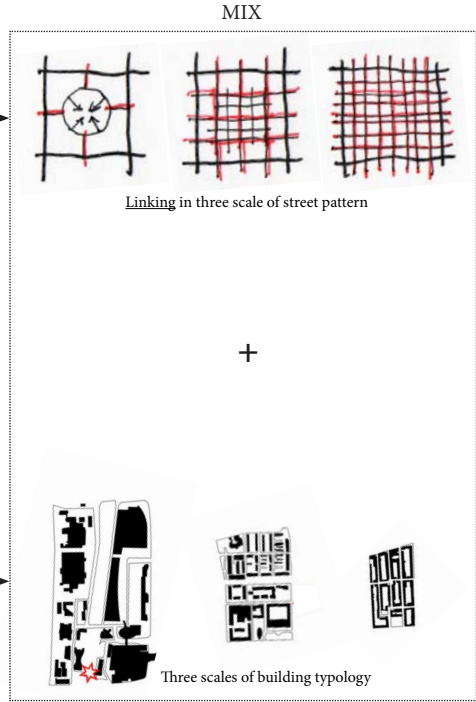
Street Pattern

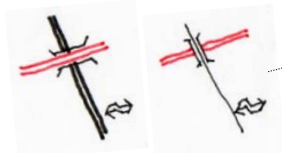


Building Typology

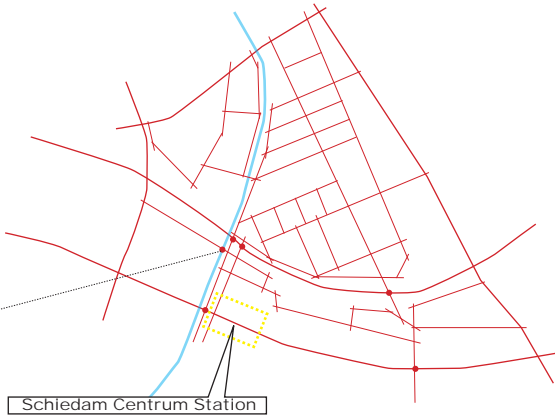


Function Program





Different street types to break barriers



According to TOD mix scale principle, one of possible proposals for the in between vacant site and northern industrial sites of Schiedam Centrum Station is showed here. (See Figure 4.3.11 to 4.3.12)

Small scale urban pattern is used in the further northern area, which could be residential area within walking radius of station.

In the northern area of highway, 's-Hertogenbosch urban pattern, which is middle scale, is used in the industrial sites, which could bring a better outdoor walking environments and attract attentions from the people who are driving on highway.

Rotterdam Alexander urban pattern, which is large scale, is used in the in between vacant site to create indoor walking through space for people, to avoid the noise and pollution from railway and highway.

3.



2.



1.





Figure 4.4.2 Street pattern and building typology current situation of Schiedam Centrum Station area

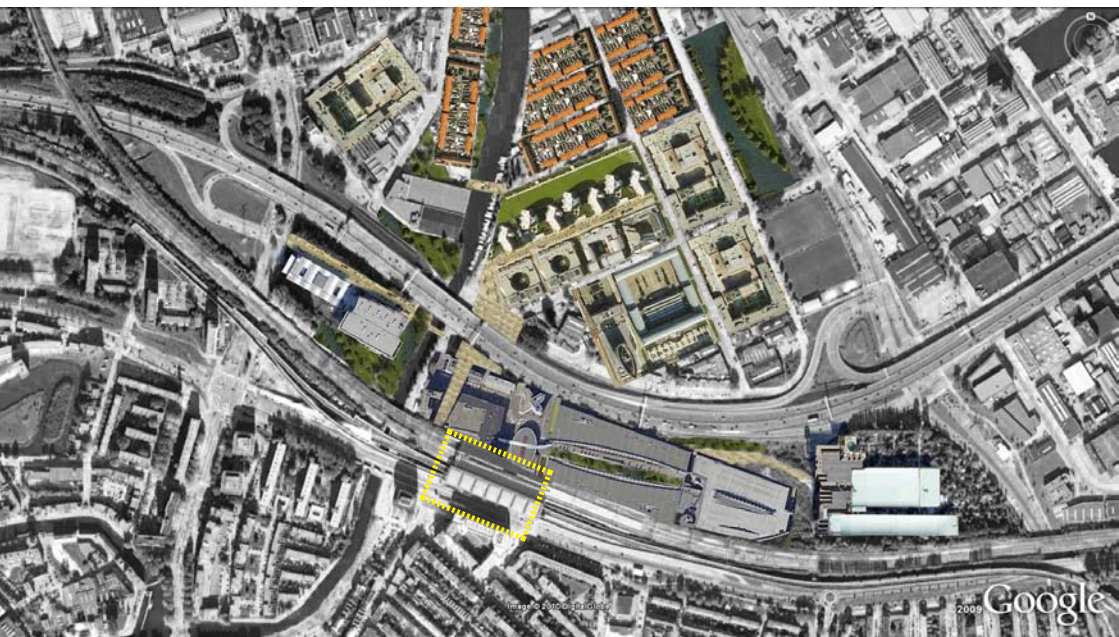


Figure 4.4.3 Street pattern and building typology proposal for Schiedam Centrum Station area

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Reference

5.0 Introduction

The proposal from Part 4 'Learn from case' is carrying out in this part.
(See page 126 to 127)

5.1 Linking

5.2 Key Projects

5.2.1 Key Project 1

5.2.2 Key Project 2

5.2.3 Key Project 3

5.3 Influence to Schiedam City

5.3.1 Linking & Phasing

5.3.2 Land Use

5.1 Linking

There are many ways to link Schiedam Centrum surroundings. This chapter shows one of the possible ways to link which is base on the existing links and the vitality streets shows by the results of Depthmap. (See Figure 5.1.1 to 5.1.4)



Figure 5.1.1 The existing routes which are essential for linking station to other centralities of the city.

Figure 5.1.2 The essential proposal links.



Figure 5.1.3 The street pattern which could happen in the north, after carrying out the essential proposal links.

Figure 5.1.4 The overall proposal for linking.

Testing

The testing by Depthmap shows the changing of streets' vitality degree after the intervention.

After the intervention, the local slow movements expand to the north area of station. And one of the links connecting west to east going through the vacant site becomes a vital street for regional fast movements. Another new link, which is related to regional fast movements, goes through the middle of station northern industrial site.

These potential vital streets are bringing great opportunities for interventions related to different speeds of movements.

(See Figure 5.1.5 to 5.1.6)

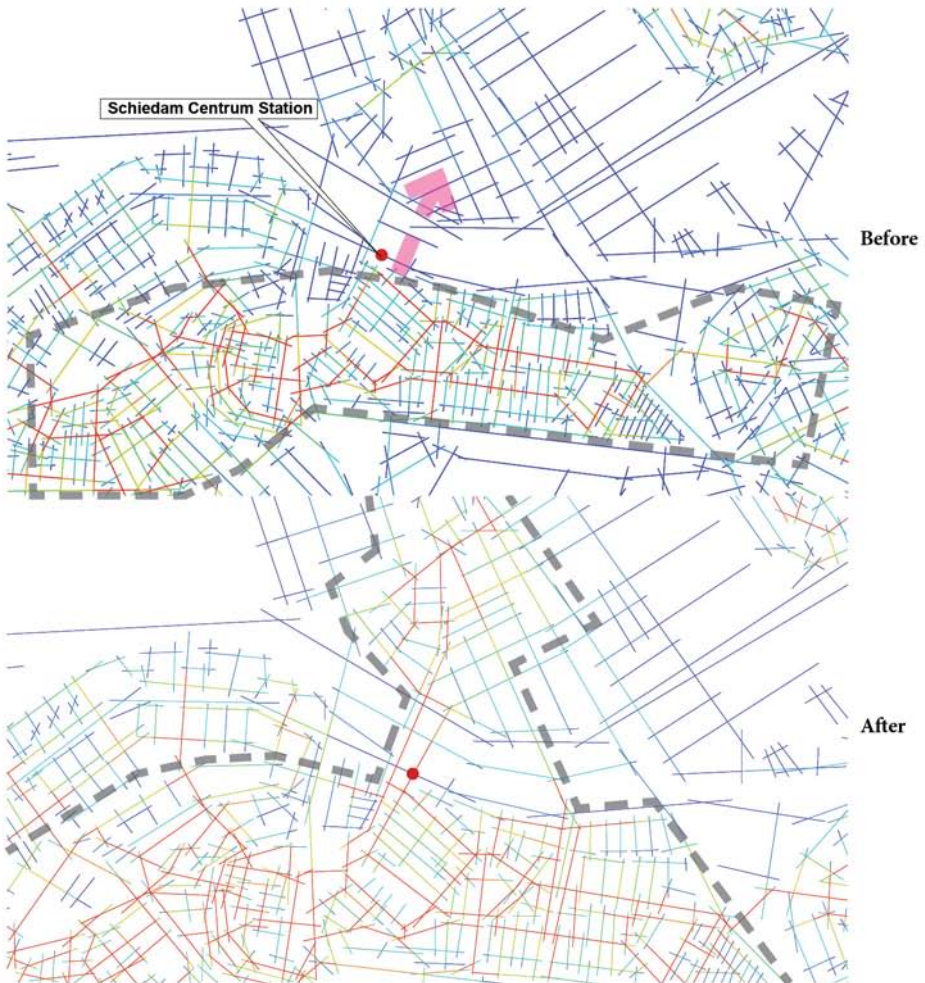


Figure 5.1.5 Schiedam R= 1 Related to local slow movement

— the most vital streets — the least vital streets



Figure 5.1.6 Schiedam R=10 Related to regional fast movement

5.2 Key Projects

To bring the 'Place' sense to Schiedam Centrum Station area, which is the main objective of this research, this design proposes to enhance the links and environments for slow movements.

The key projects are the joints of the essential links to carrying out the whole proposal which need to be carried out in the first phase.
(See Figure 5.2.1 to 5.2.4)

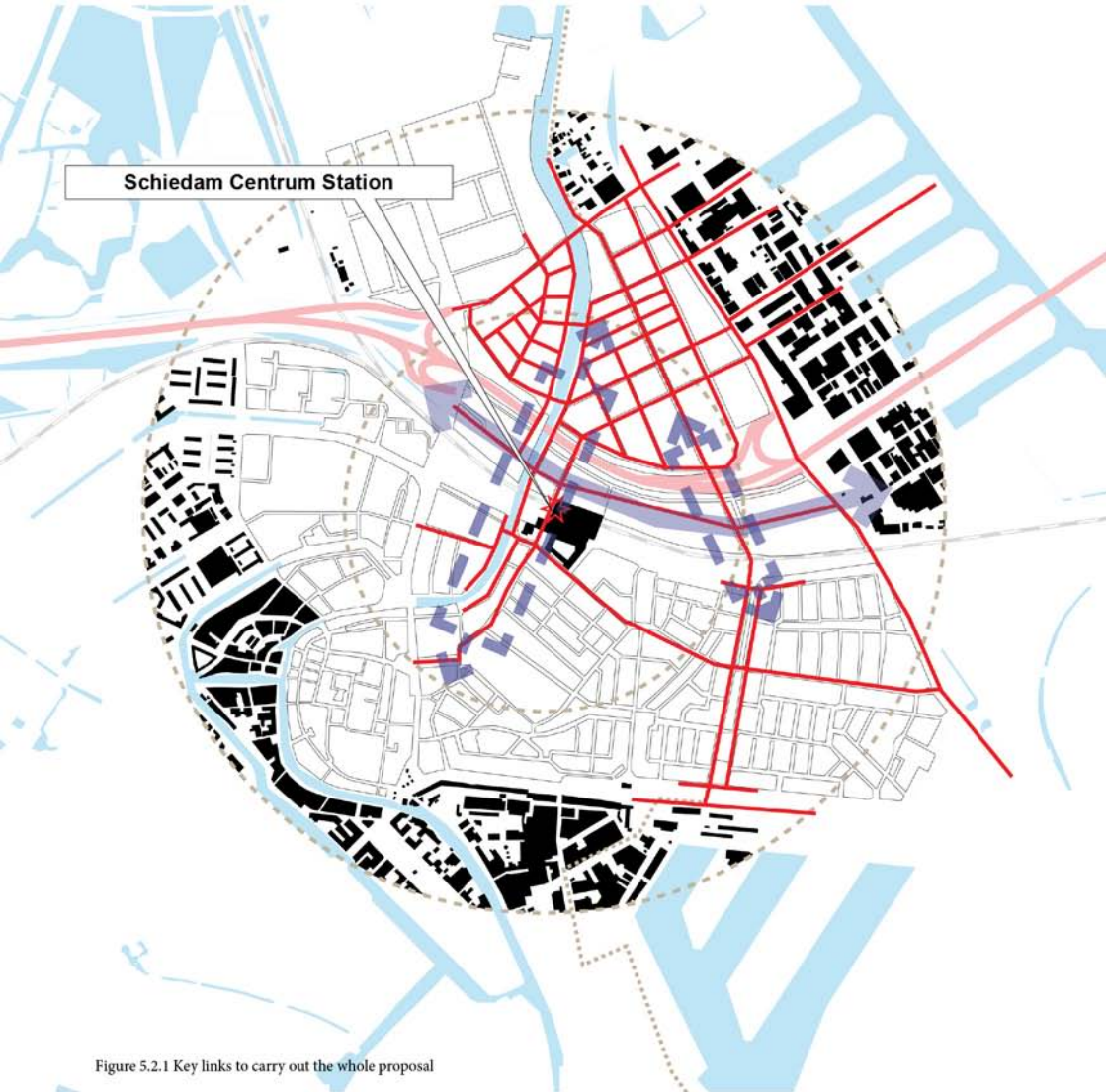


Figure 5.2.1 Key links to carry out the whole proposal

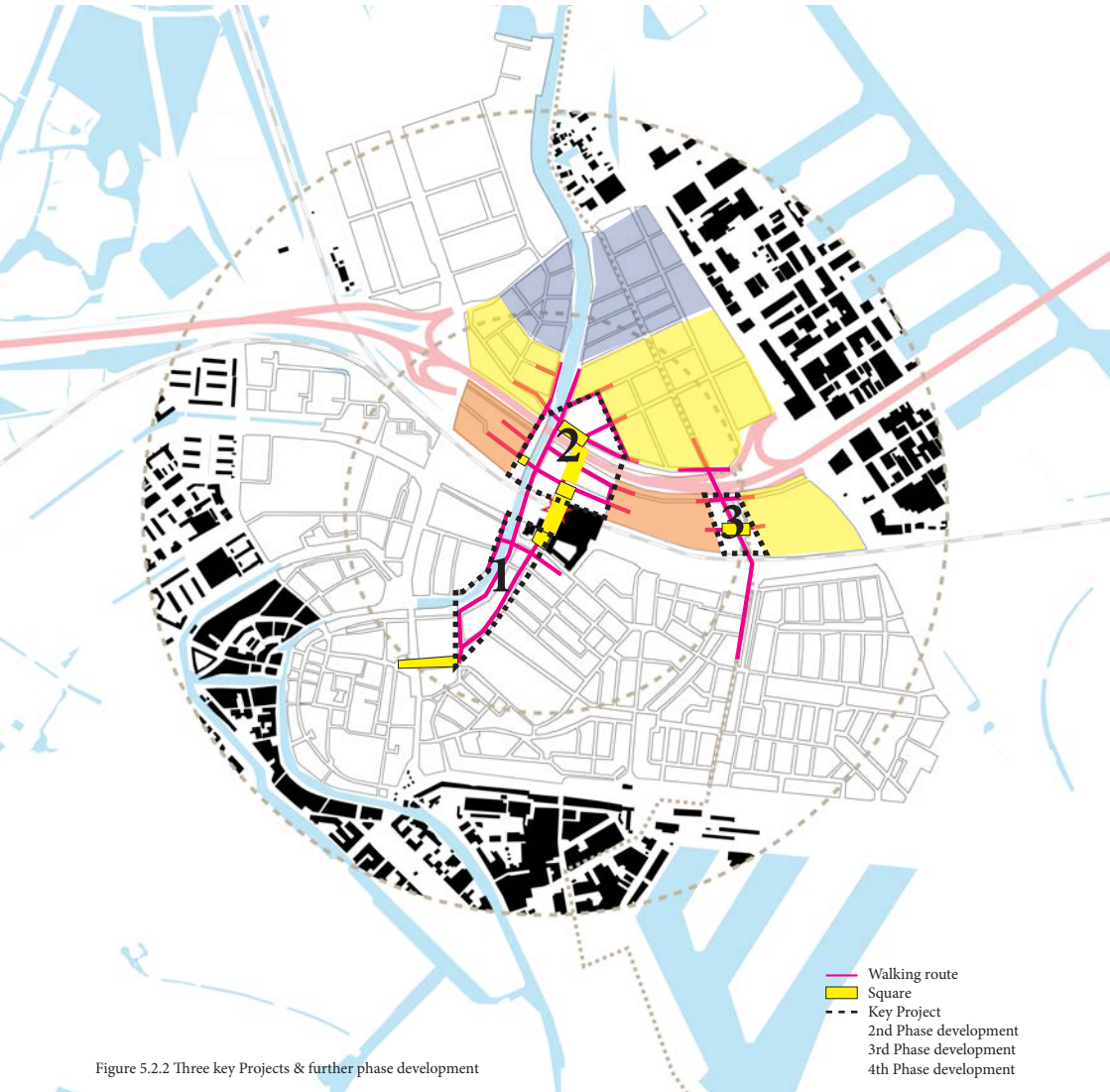
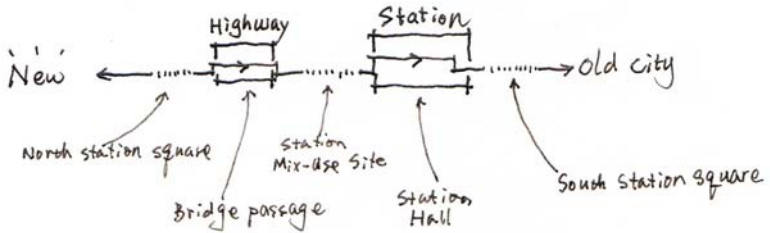
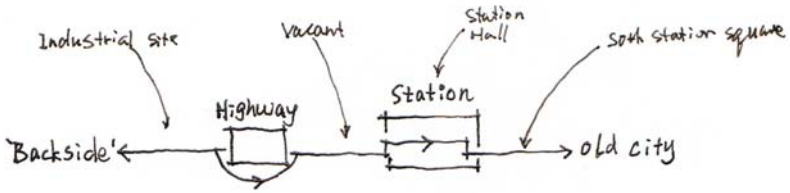


Figure 5.2.2 Three key Projects & further phase development

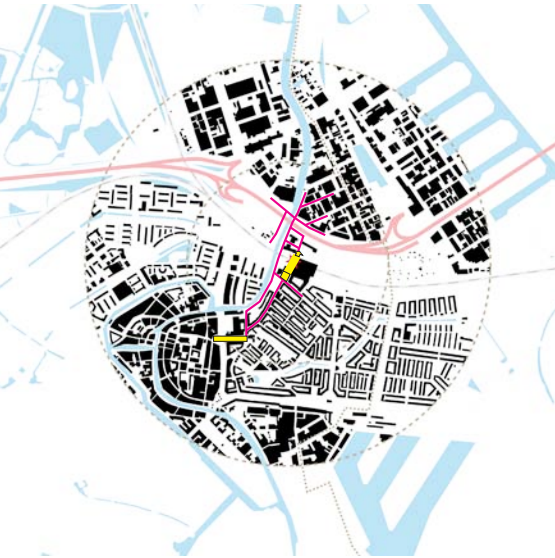
The Vision - Station Sequence

Before



After

Before



After



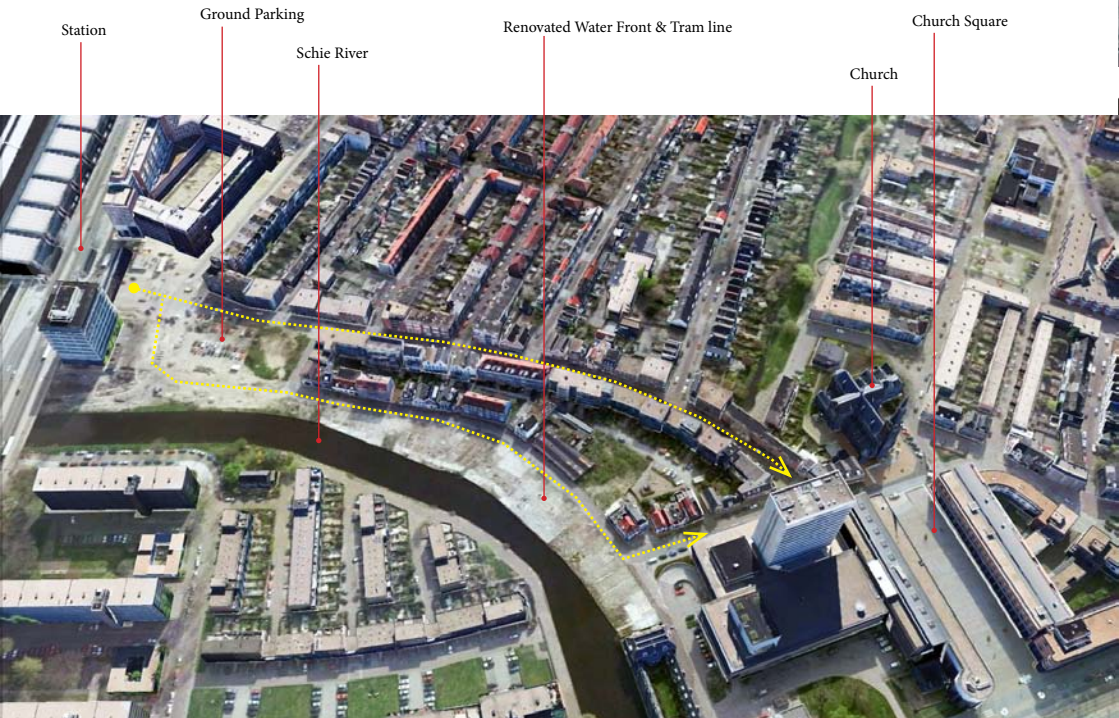
Figure 5.2.3 Current situation of walking routes

Figure 5.2.4 Walking routes after intervention

5.2.1 Key Project 1

South of Shciedam Centrum Station

Impression





Key Project 1 - Program 1

To link east and west, more accessible to water front area.

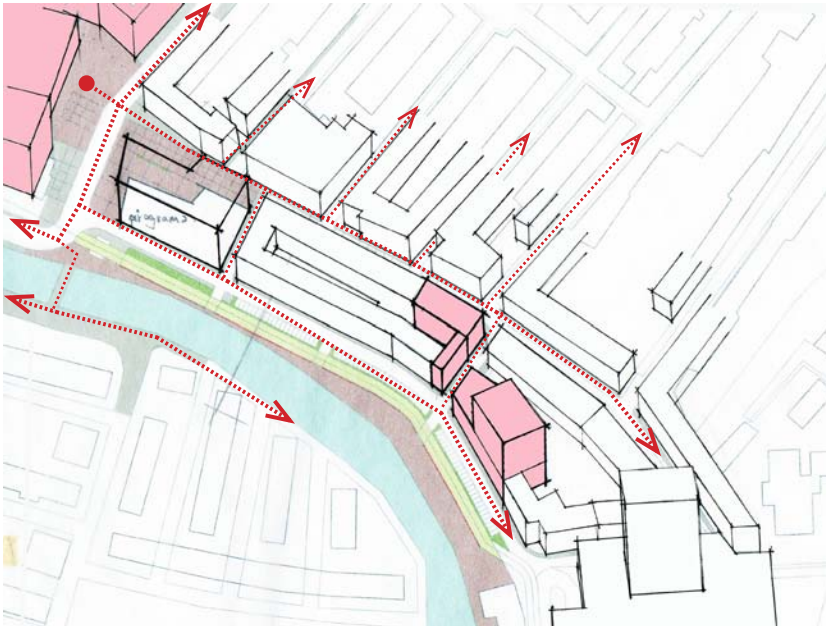
Proposal 1

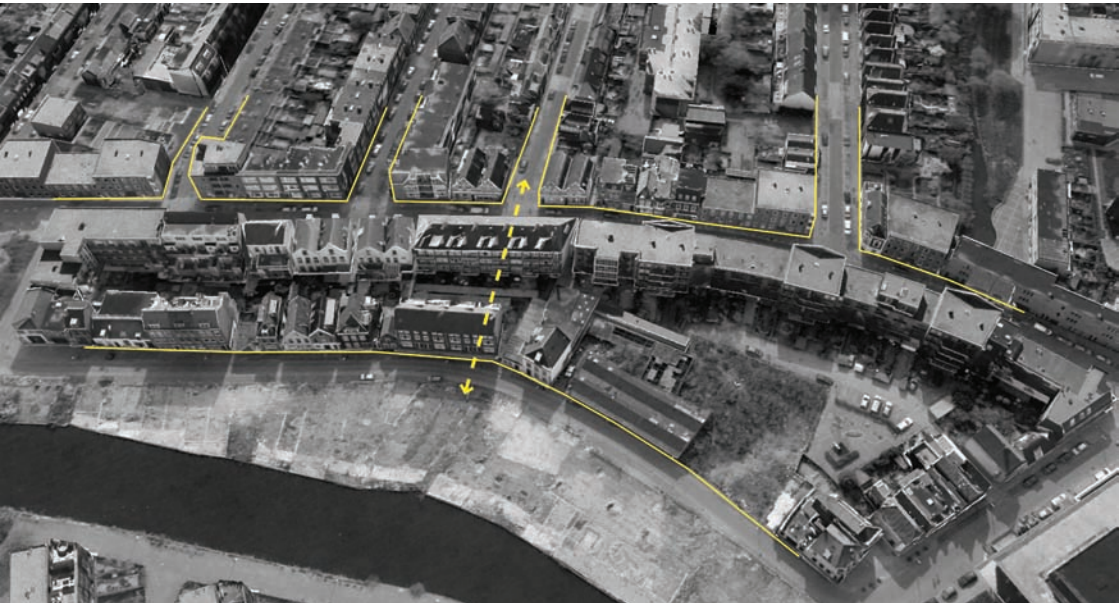
Transform one ground unit of building 1, make a path for people to walk through.



Proposal 2

Demolish building 1&2, build new program combining with the vacant site next building 2.





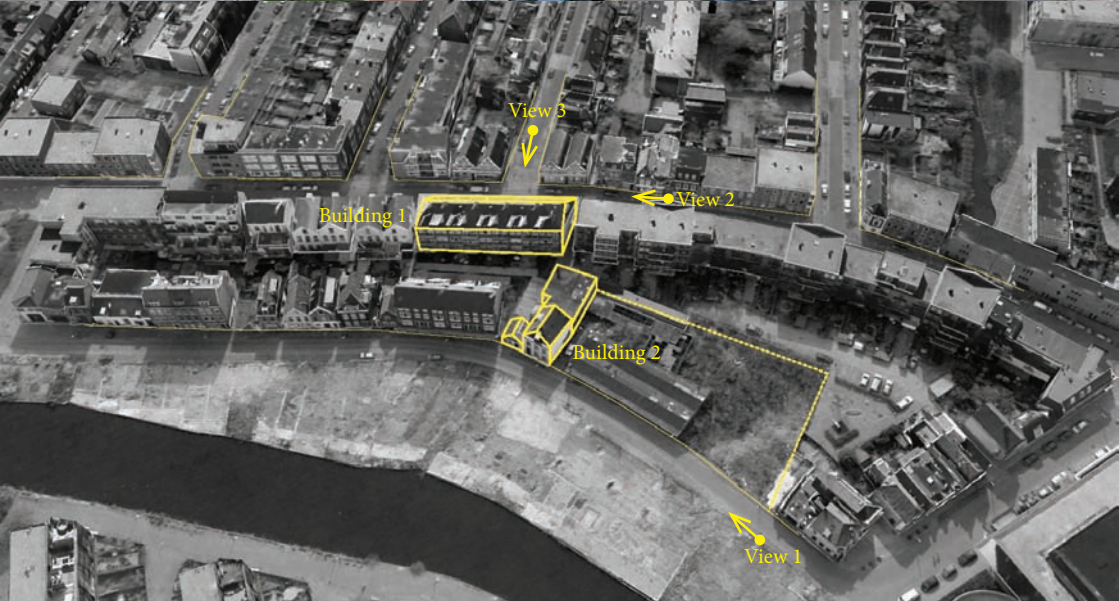
View 1



View 2



View 3



Building 1

Building 2

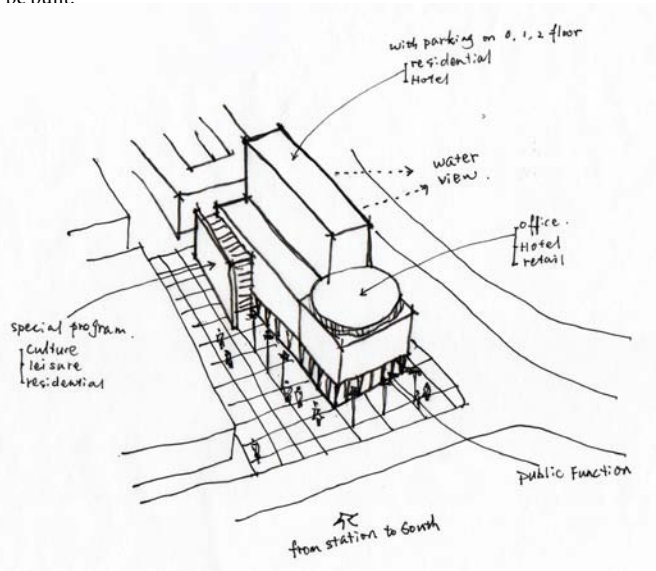
View 5

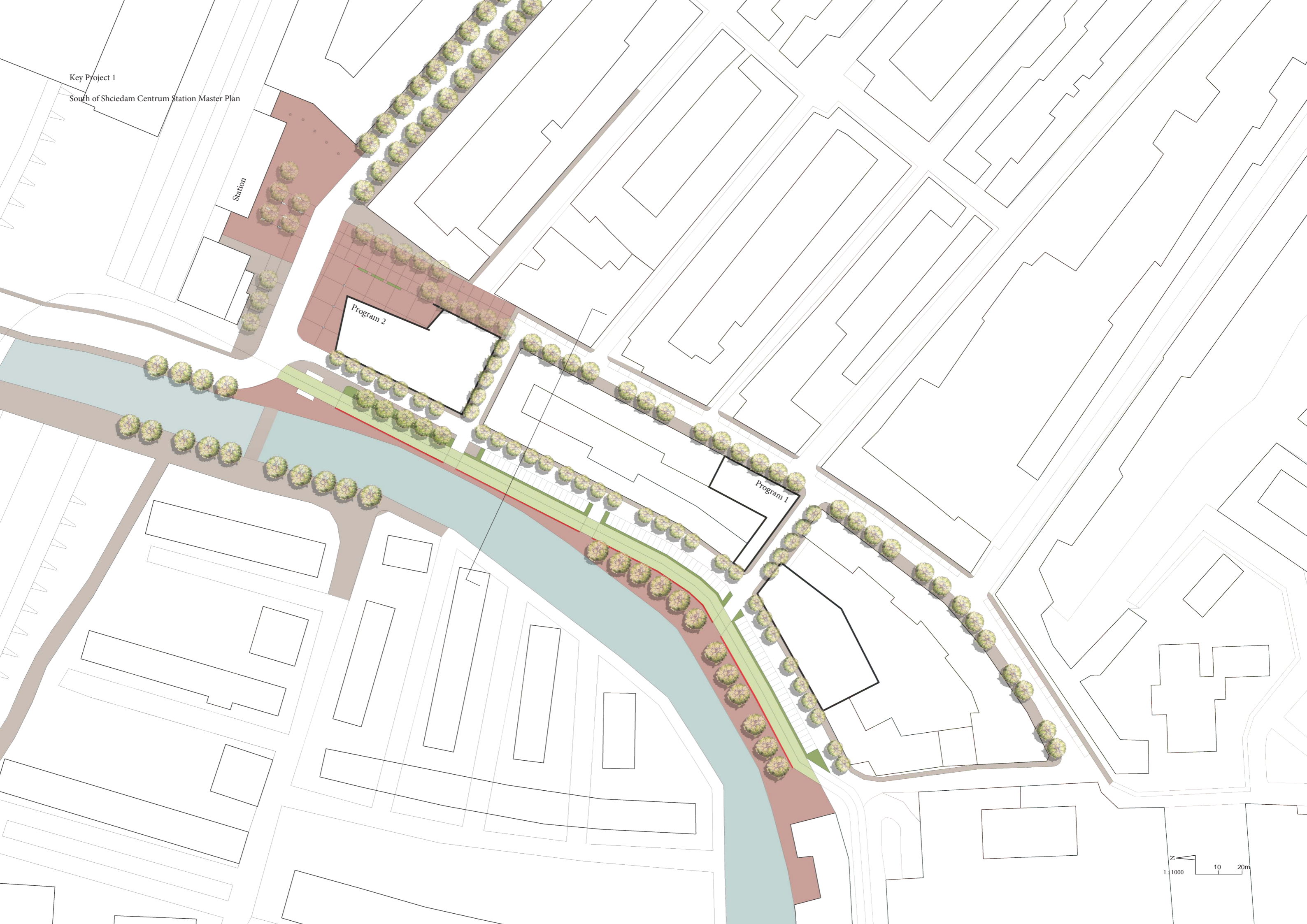
View 2

View 1

Key Project 1 - Program2

The existing ground parking area in front of station could be transformed to new program and square for staying since the good accessibility. Parking space will be placed in the building, and the facades which face to station and square could have a good public function on the ground floor. On top of parking space, a river view apparent could be built.





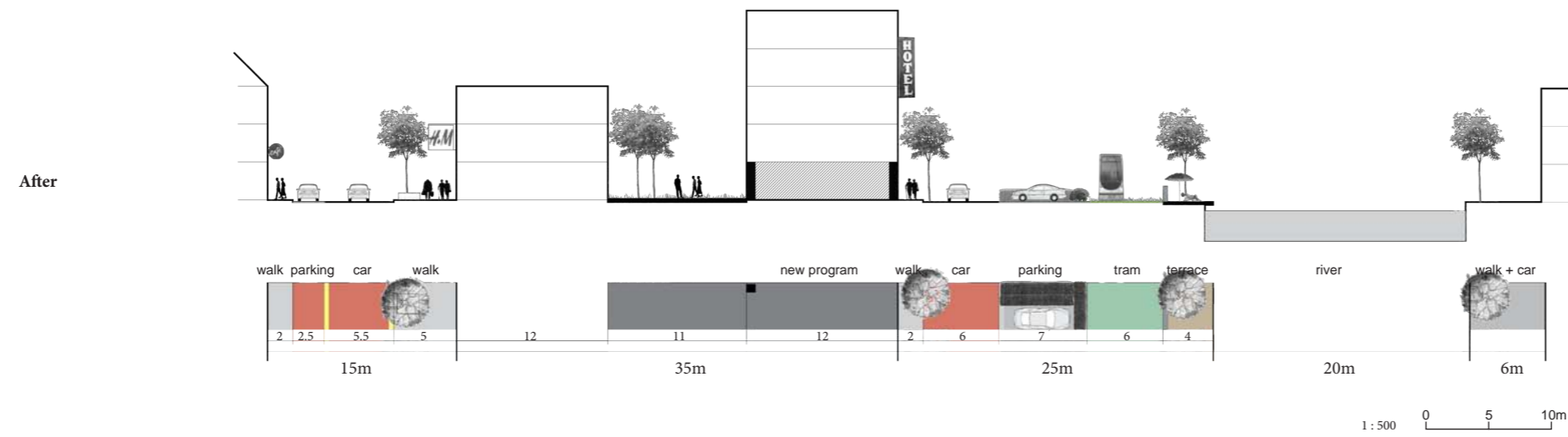
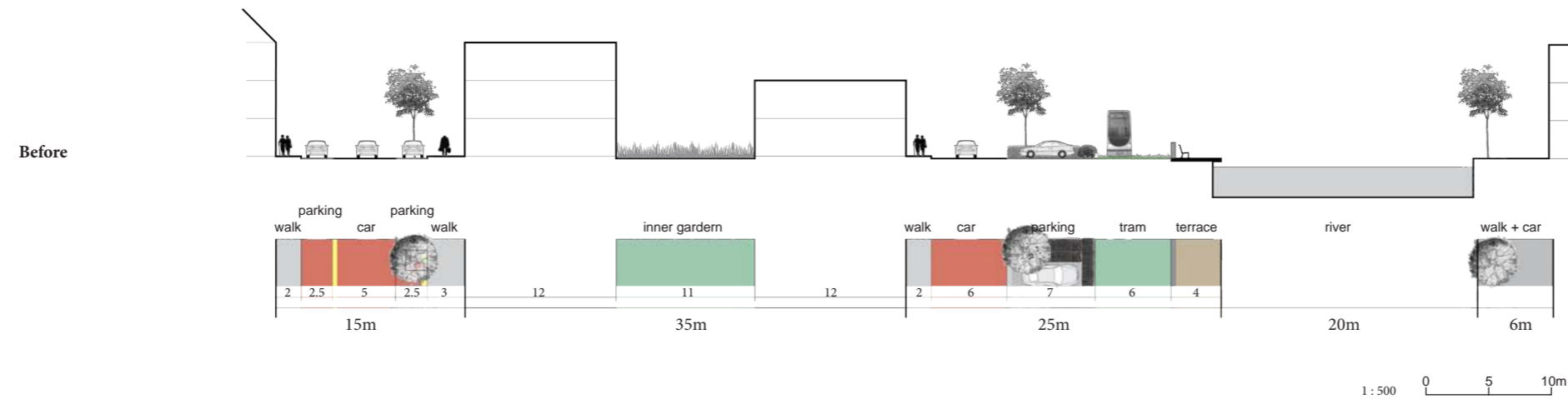
Station

Program 2

Program 1

South of Schiedam Centrum Station Cross Section

Key Project 1



5.2.2 Key Project 2

North of Schiedam Centrum Station

The former vacant site in the in between area is transformed to a mixed-use site with new programs. Extend the station hall to develop a station passage combining the under railway stage space, which was storage space before, and new programs.

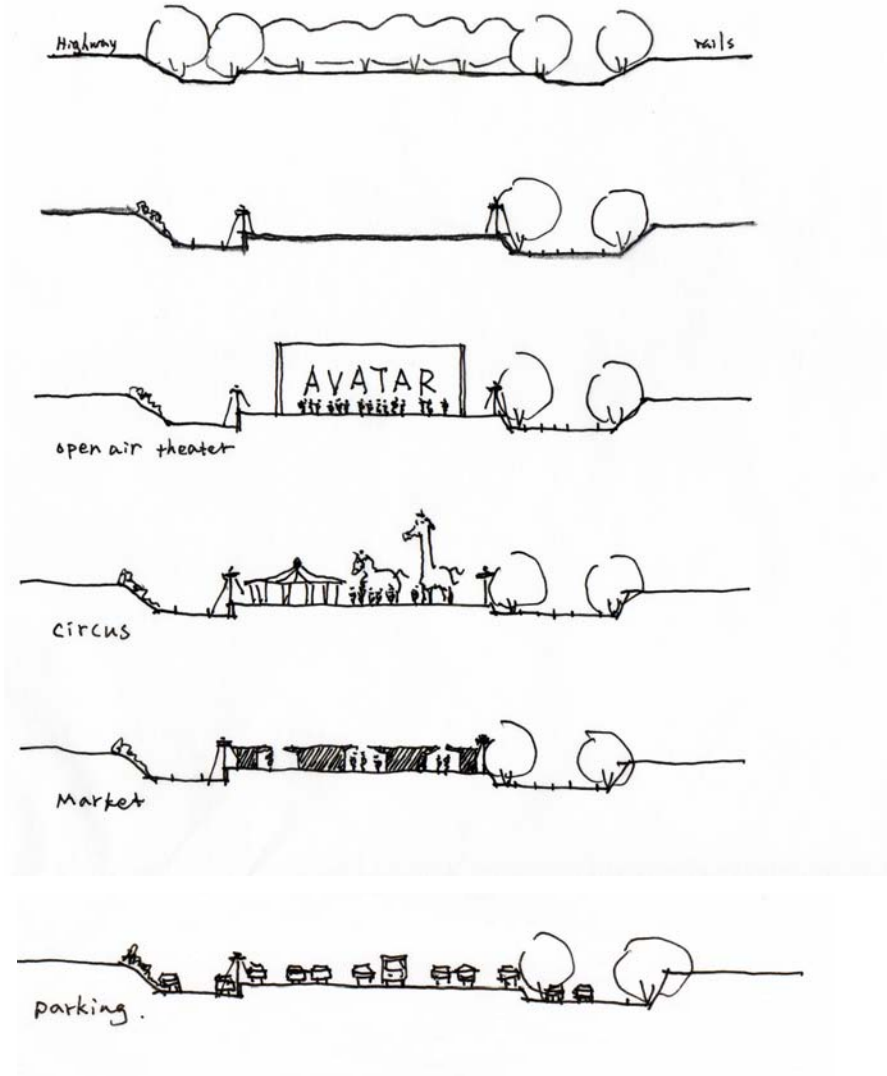
Open up the space under the highway, to make a direct connection for people to walk through to north Schiedam Centrum Station square.





Garbage Filling In Site Transform

Garbage filling in site is transformed to temporarily events site. Covered up the ground with lighting facilities and accessible roads.



Key Project 2

North of Shiedam Centrum Station Master Plan



Station

1:1000

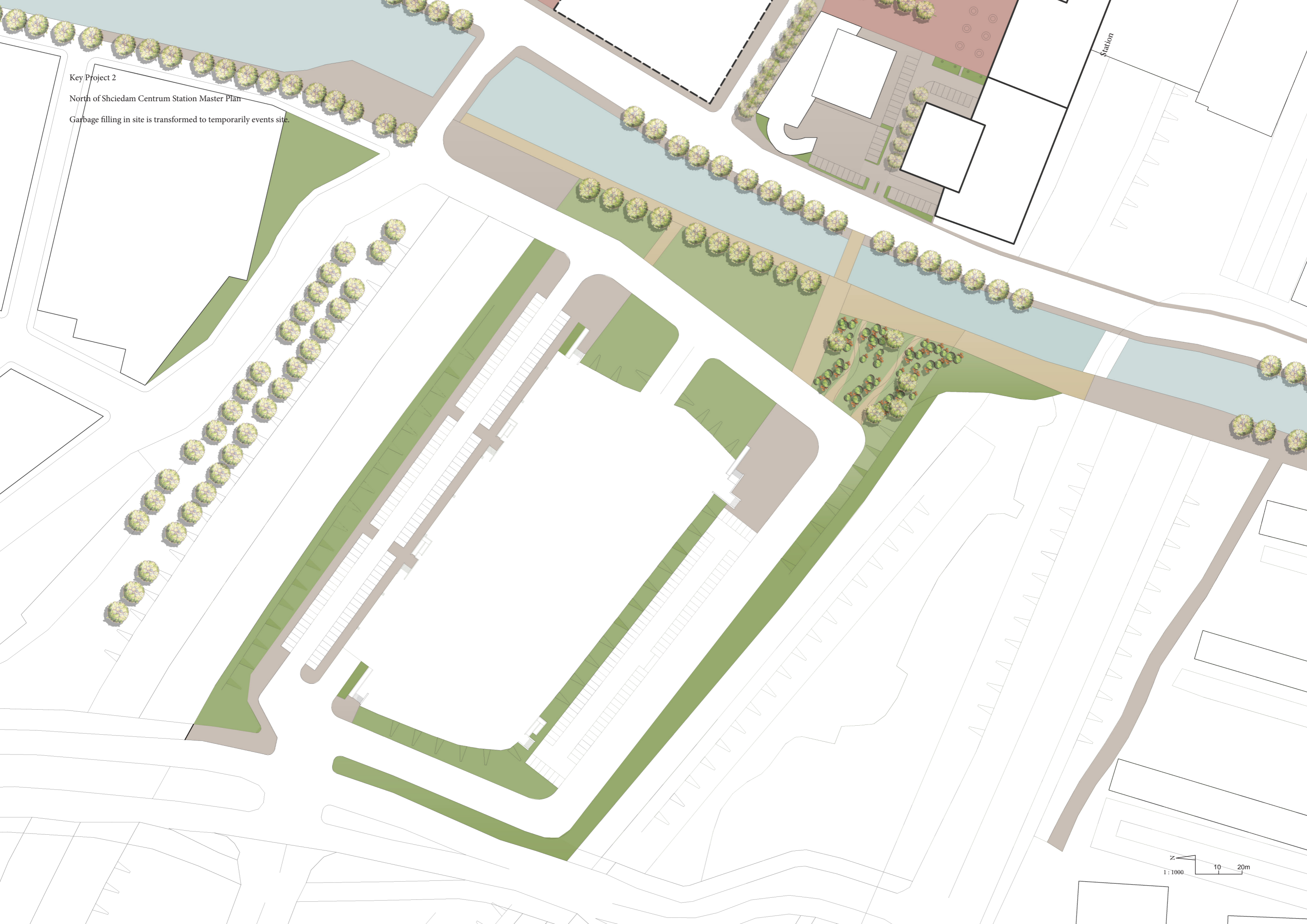
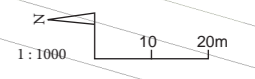
10 20m

Key Project 2

North of Shiedam Centrum Station Master Plan

Garbage filling in site is transformed to temporarily events site.

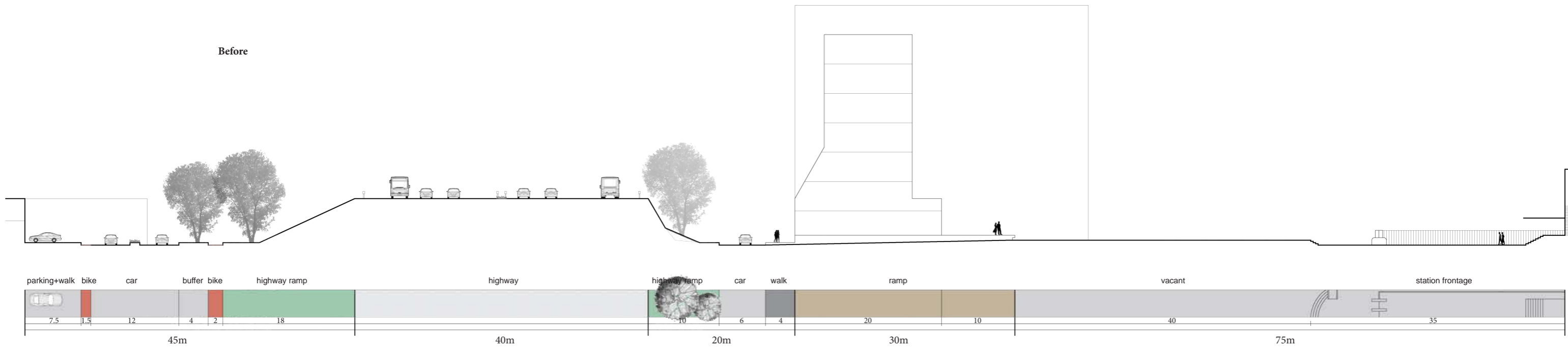
Station



North of Schiedam Centrum Station Cross Section

Key Project 2

Before



1:500 0 5 10m

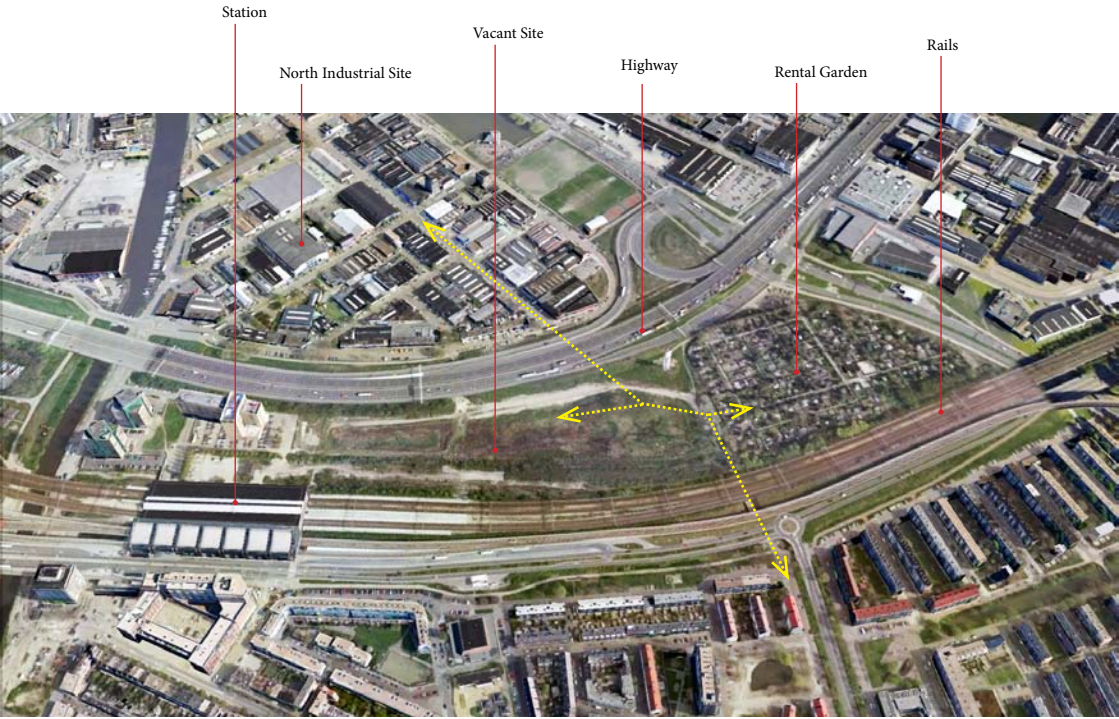
After



1:500 0 5 10m

5.2.3 Key Project 3

The essential joint to link south and north which provide the way for people walking, cycling and care to go through rails and highway barriers, and the way to entre the former vacant site and the rental garden area.



Key Project 3
East Barrier Break Master Plan



1:1000
10 20m

5.3 Influence to Schiedam City

In the current situation, Schiedam Centrum Station are mostly only serve for the south old centre side. Since the highway and railway are barriers for people to walk and cycle to north of station.

The intervention of proposal links south and north and furthermore provides ways to go to east and west from station. Therefore, the service radius of Schiedam Centrum Station could not only for the south, but also for north, east and west. The former 'backside' of station could become to a 'newside' of the city.

(See Figure 5.3.1)

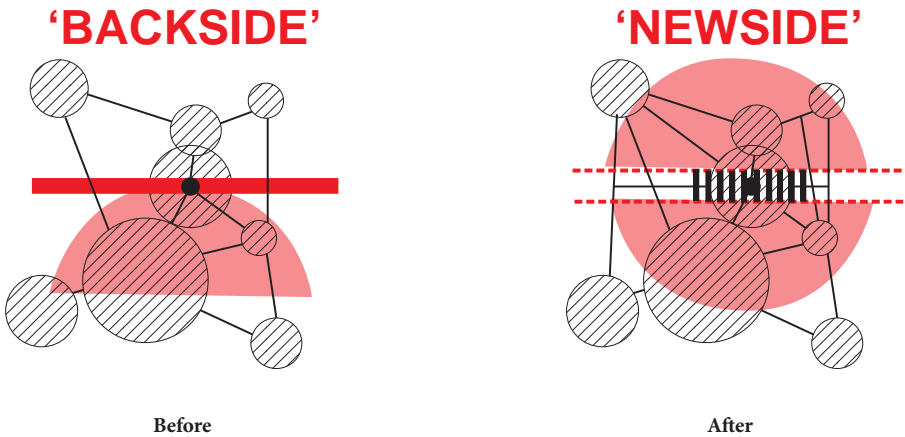
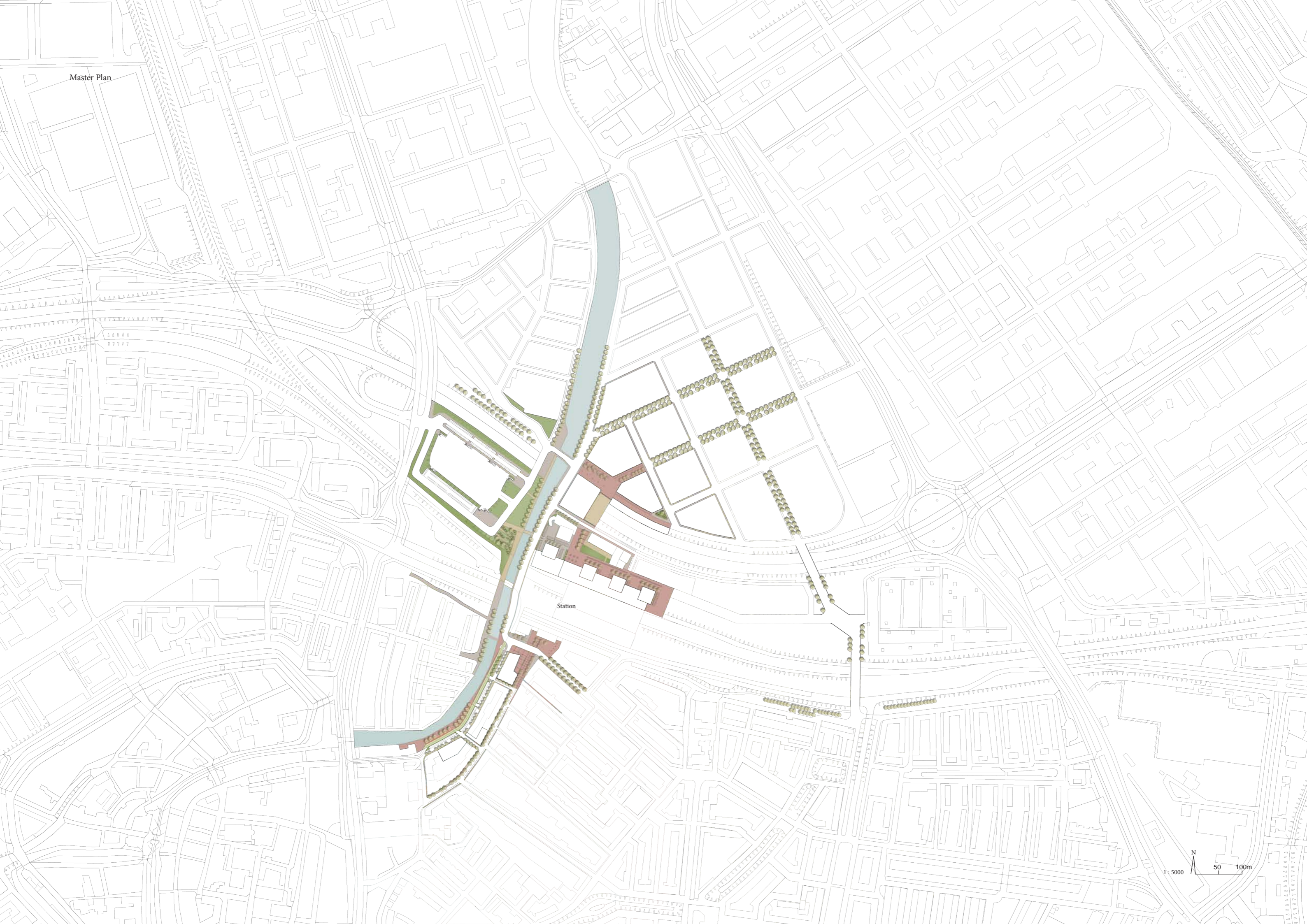


Figure 5.3.1 Changes of station serve radius after intervention.



Station

5.3.1 Linking & Phasing

The 1st phase areas are essential links and joints for carrying out the whole proposal, which need to be developed in the very beginning as a developing start engine.

The 2nd phase areas have good accessibility brought by the different modes of transformation or have great potential for investments could happen after or at the same time as 1st phase area.

The 3rd phase areas are in the walking and the 4th phase area are in the cycling radius, they could be long term development.
(See Figure 5.3.2 to 5.3.3)

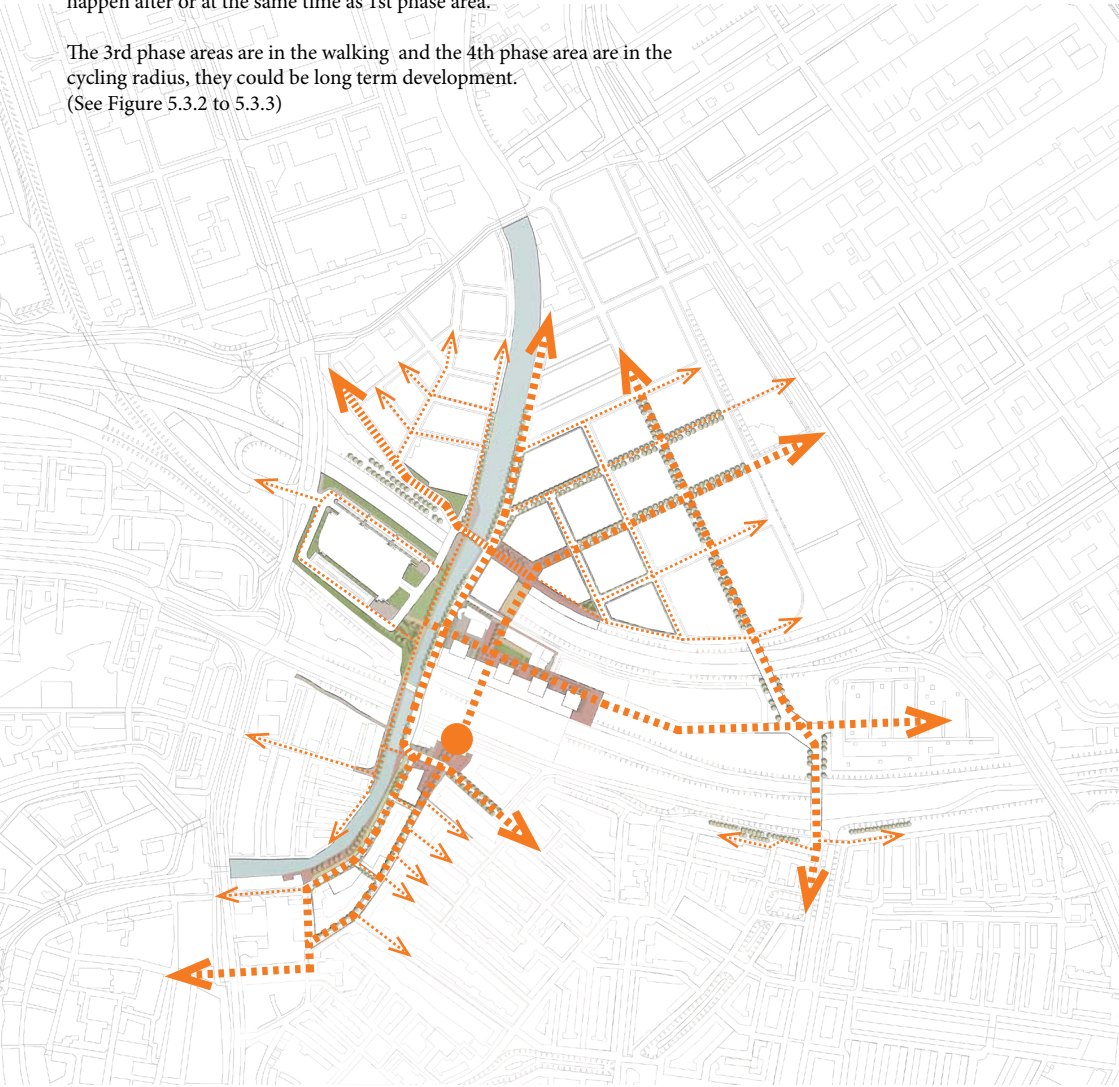


Figure 5.3.2 Linking

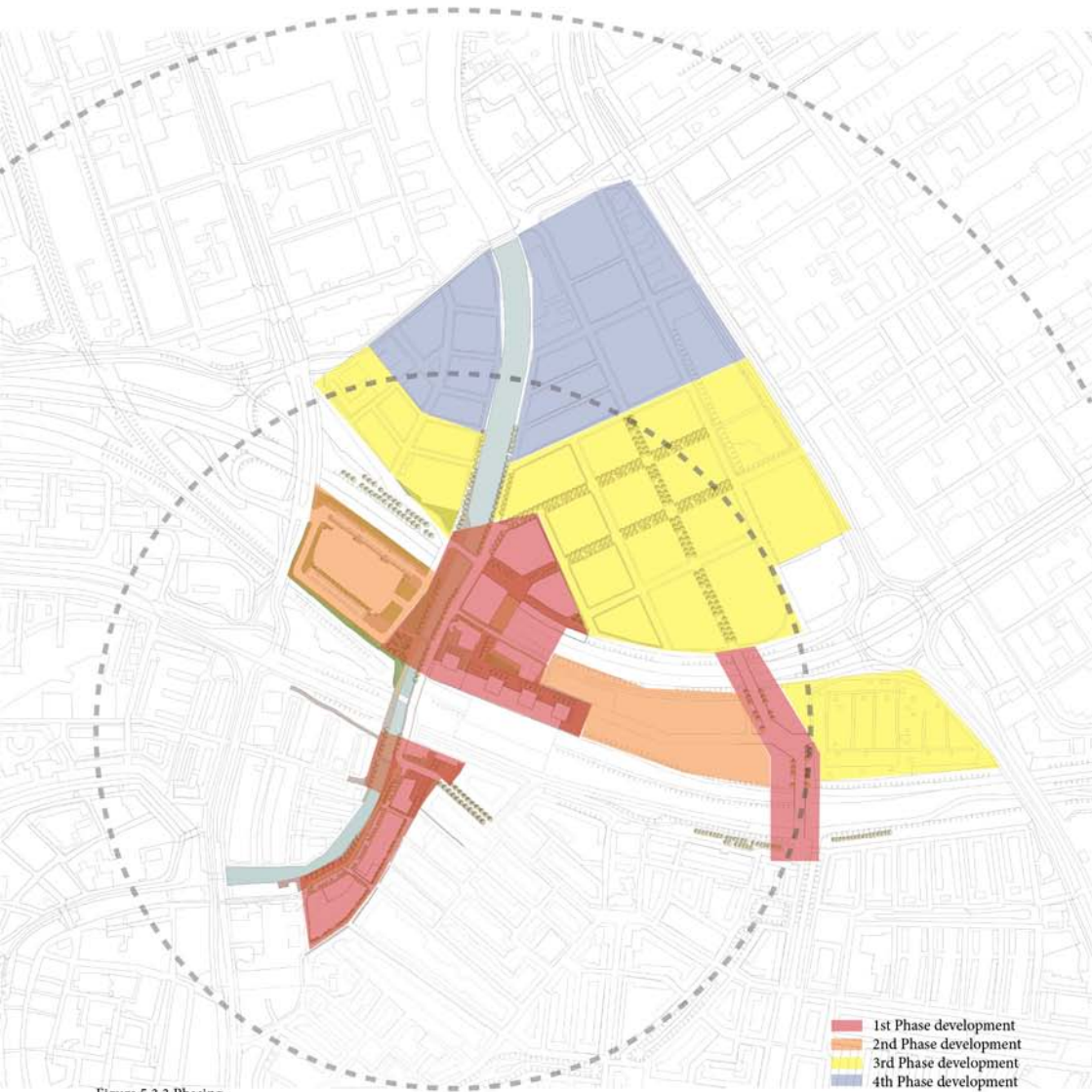
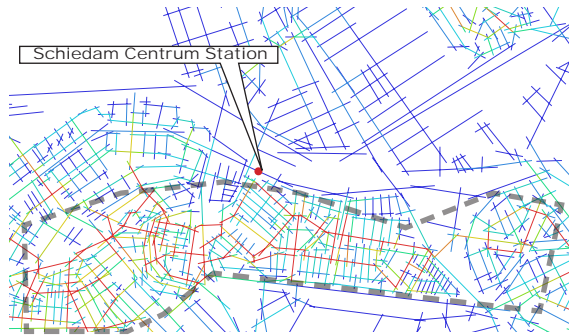


Figure 5.3.3 Phasing

5.3.2 Land Use

The intervention of proposal could change the land use of station surroundings. Station square areas could become to mixed-use site. The in-between highway and railway area and station north former industrial sites could become to residential and commercial areas. A new center in the north could be formed.

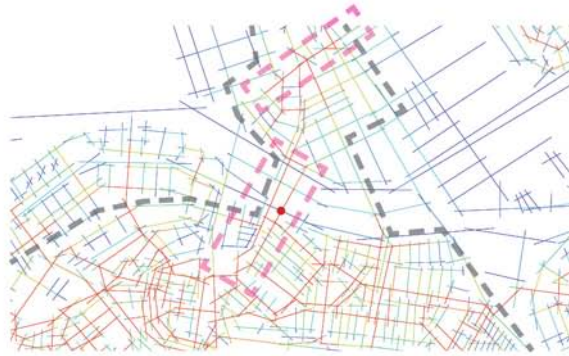
Schiedam Centrum Station could become to a regional node not only for transportation but also for many events and activities to be carried out there.



— the most vital streets — the least vital streets

Before

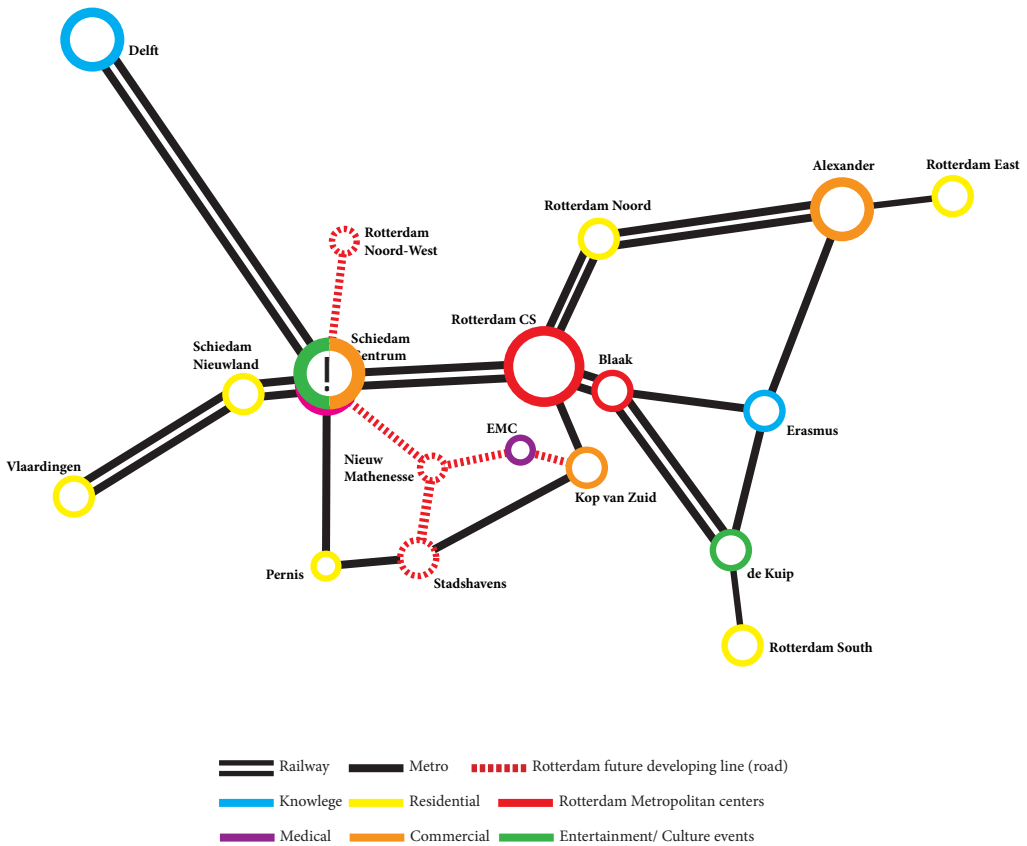




After



Schiedam Centrum Station surroundings as a new commercial and entertainment/culture node in Rotterdam Metropolitan networks.



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REFERENCE

- Atelier Zuidvleugel 2007, Space and line, Nova Terra, vol. February 2007, pp. 11-16.
- Bach, B & Jong, TM de. 2006, Urban design and traffic : a selection from Bach's toolbox, CROW, Ede.
- Batten, DF 1994, Network Cities: Creative Urban Agglomerations for the 21st Century, Urban Studies, Vol. 32, pp. 313-327
- Bertolini, L & Spit, T 1998, Cities on rails: The redevelopment of railway station areas, E&FN Spon, London.
- Bertolini, L & Dijst, 'M 2003, Mobility Environments and Networks Cities', Journal Urban Design, vol. 8, no. 1, pp. 27-43.
- Calthorpe, P 1993, The Next American Metropolis: Ecology, Community, and the American Dream, Princeton Architectural Press, New York.
- Carmona, M 2007, Public places - urban spaces : the dimensions of urban design, Architectural Press, Oxford.
- Curtis, C; Renne, JL & Bertolini, L 2009, Transit oriented development : making it happen, Ashgate, Farnham.
- Dieleman, FM & Faludi, A 1998, 'Polynucleated metropolitan regions in Northwest Europe: theme of the special issue', European Planning Studies, vol.6, no. 4, pp. 365-377.
- Engel, H 2008, OverHolland. Dl. 7. 5x5 projecten voor de Hollandse stad, SUN, Amsterdam.
- Gemeente Schiedam 2008, Hoogbouwvisie Schiedam 'High-rise vision Sciedam', < <http://www.schiedam.nl/>>.
- Gehl, J 2006, New City Life, Danish Architectural Press, Copenhagen.
- Kusumo, C 2007, Railway Station, Centers and Markets: Change and Stability in Patterns of Urban Centrality, PhD thesis Delft University of technology, Delft.
- Peek, GJ & Hagen, M 2002, 'Creating synergy in and around stations: Three strategies in and around stations', Transportation Research Record, vol. 1793, pp. 1-6.
- Peek, GJ & Louw, E 2008, 'Integrated Rail and Land Use Investment as a Multi-disciplinary Challenge, Planning', Practice & Research, vol. 23, no. 3, pp. 341-361.
- Poticha, S 2008, 'Why Transit? Why TOD? Why Now?', Reconnecting America, viewed 14 December 2009, <<http://www.reconnectingamerica.org/public/download/rvclimatechange>>.
- Royal Institution of Chartered Surveyors 2000, Transport Development Areas, Guide to Good Practice, viewed 20 October 2009, <http://connectedcities.eu/downloads/3rdparty/rics_tda_mainreport.pdf>.
- Smart Growth Online Smart Growth Resource Library, 'Smart Growth In Action: Rosslyn-Ballston Metro Corridor, Arlington County, Virginia', Smart Growth Network, viewed May 2009 <<http://www.smartgrowth.org/library/articles.asp?art=1824>>
- TU Delft, Connected City, viewed September 2010, <<http://connectedcities.eu/showcases/stedenbaan.html>>
- Zandbelt & vanden Berg 2005, 'Emerging Network for the Randstad Metropolis', Nova Terra, vol. 2005, pp. 25-29.
- Zimmerman-Bergman, S 2008, 'Equity and Transit-Oriented Development: Trends and Opportunities for Reform', Reconnecting America, viewed 14 December 2009, <http://www.reconnectingamerica.org/public/display_asset/goodjobsfirstsz>.