THE CARTOGRAPHIC PARADIGM
Cartography's Influence on Urban Form

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April 2015

ABSTRACT

Cartography provides identity, clarity and a grounding to the understanding of our cities and long been used as a tool in urban planning. The output of cartography, the map, allows us to place, plan and construct our cities, forming the framework from which we can understand, interpret and forecast its future. This essay introduces the author's theory of the 'Cartographic Paradigm'. A theoretical and case study based investigation explores the hypothesis set out by the theory;

The way we map our cities affects how we plan their future and, therefore, it becomes manifested in reality.

CONTENTS

1863 – The first
regular
parliamentary
sessions of the
Grand Duchy of
Finland are held in
Helsinki. In the
newspapers, they
are heralded as
"the birth of
national
liberation". **The
Finnish language
is accorded equal
status with
Swedish.**

1^6

2^7

1^6

In 1828 the
Emperor ordered
the transfer of the
Royal Academy,
founded in 1640,
from Turku to
Helsinki.

DEFENSIVE
REGION

1^5

1^6

0^8

The Church of Ulrika Eleonora in the
Large Square, now Senate Square, is
demolished, and the parish graveyard
is leveled over.

1^6

1812

Slower speed

LSB.01

OPENING

CUTTING TO 1888 B...

0^8

1808 Russian territory gained - Finland

1^1

1^6

1^6

1906

LC.02

LPP.01

0^9

1908

STATE

PUBLIC

LR.01

State Parliament Building - Finland

1816 ZONEING OF STATE AND PUBLIC

1^6

2^8

LC

INTRODUCTION

Cartography has played a key role in the location, planning and constructing of our built environment. For centuries cartographers have charted territories which represent projections of political and social power, invisible boarders and boundaries and utopic visions. To be more specific, it is the output of their profession, the map, which has been the agent through which the visions of our built environment have been conceived.

We are often drawn to maps as they offer a tangible scaled presentation of territory. The map stands as the middle ground between fictional ideas, visions, and the reality of territory. The urban planning of our built environment has never adopted a tool with greater influence than that of the zenithal, iconographic, planometric map. The ability for the map to interpret and project fictional visions prior to physically altering reality has been one of its greatest assets. The map allows us to transcend between scales understanding the hidden social systems creating a useful tool in the laboratory of urban and master planning.

HYPOTHESIS

With the map being such a widely used tool in the urban planning laboratory and master planning, it would suggest that the map and cartography have an influence over the built environment. This paper sets out the hypothesis that:

The way we map our cities affects how we plan their future and, therefore, it becomes manifested in reality.

METHODOLOGY

The investigation will be divided into two parts; Part One will introduce a cyclical paradigm that forms the framework for the hypothesis. The author has formulated it though a theoretical, academic investigation of the relevant cartographic, geographic, urban planning and architectural disciplines, writings and theorists. This will provide a key understanding that can then be tested using a case study. Part Two will make an investigation of the city of Helsinki to test the hypothesis presented. It will explore three masterplans that were created at key epochs in the history of the capital. We will discover how these future visions of the city were born out of cartographic methods that where influenced by socio-political demands at that time. The case study will highlight how the masterplan becomes manifested in reality. The essay will conclude by using the cyclical model to speculate how new cartographic methods today will affect how we plan, and therefore construct, our future cities.
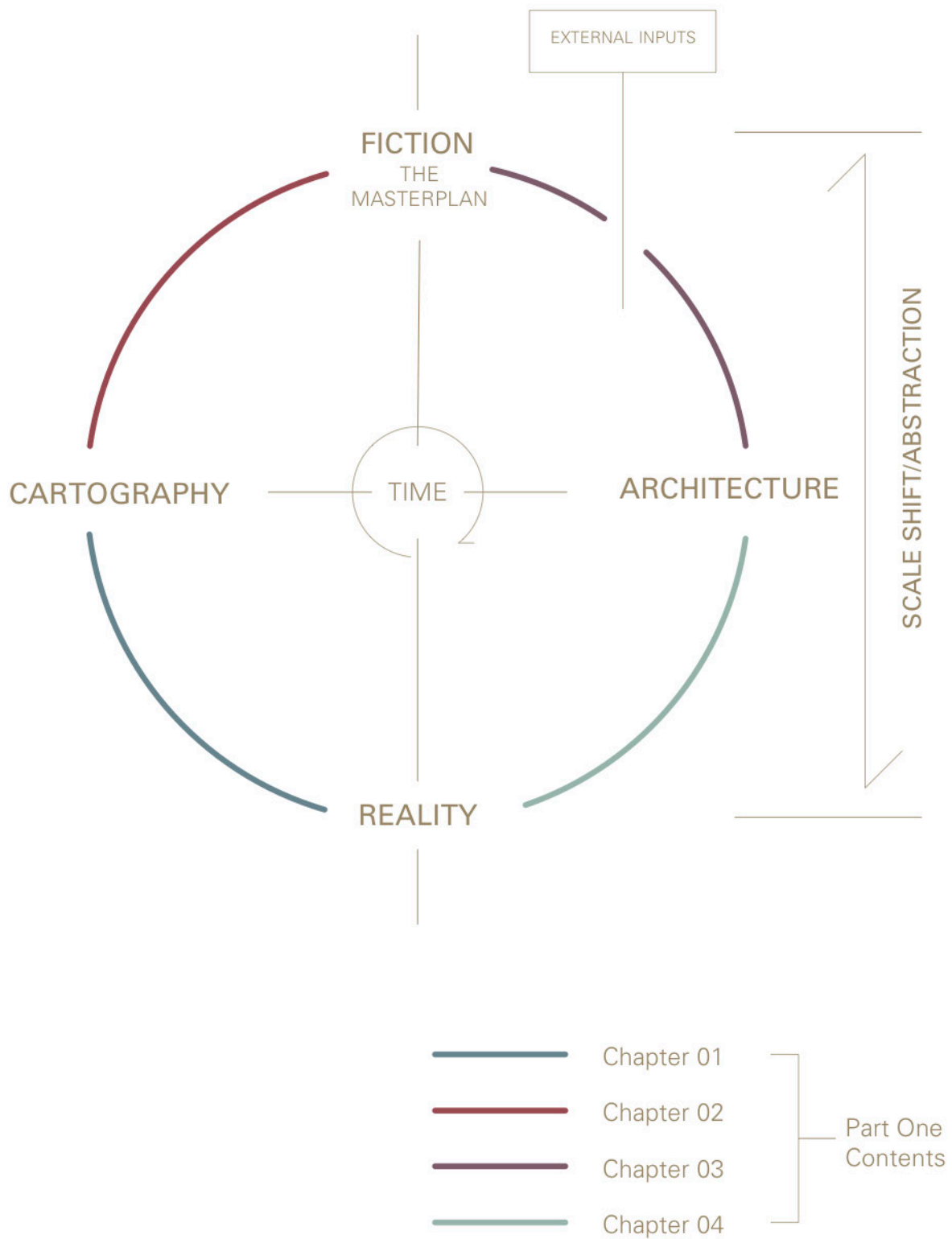
The Church of Ulrika Eleonora in the
Large Square, now Senate Square, is
demolished, and the parish graveyard
is leveled over.

1^5 1^6 0^8

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LSB.01

OPENING SHIPPING TO THE E

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1806 Russian teritory gained - Finland

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STATE

LR.01 PUBLIC

State Parliment Building - Finland

1816 ZONEING OF STATE AND PUBLIC

PART
ONE

1^1 2^8

LC.03 Beside Ka
cemetery a
temporary church
was built, whi
now the Old Chu

5^8 1^4

Publication of the
February Manifesto, the
purpose of which was to
Russify Finland and put an
end to the period of
autonomy the country
enjoyed under Alexander II.

POPULATION GROWS TO 25,519 CITY SHIFTS NORTH WEST

EXTERNAL INPUTS

FICTION
THE
MASTERPLAN

CARTOGRAPHY

TIME

ARCHITECTURE

SCALE SHIFT/ABSTRACTION

REALITY

Chapter 01
Chapter 02
Chapter 03
Chapter 04

Part One
Contents

Figure 1 - The cyclical diagram visualizing the hypothesis of the cartographic paradigm. This arrangement of the agents involved is important to the understanding behind this essay

THE CARTOGRAPHIC PARADIGM

THE CARTOGRAPHIC PARADIGM – REALITY AND FICTION

The 'Cartographic Paradigm' is a cyclical model that aims to show how cartography and the map influence the way we plan our cities and thus impact their manifestation. The model, shown in figure 1, has been constructed by the author to visualize the cyclical nature between the agents at play in the hypothesis. It will be used as a reference point throughout this essay.

The cyclical model was initially based on a theory set out by Lorenz Hurni and Gerrit Sell in their paper 'Cartography and Architecture. : Hurni and Sell investigate how the professions of architecture and cartography are linked through the drawn scale. Although their hypothesis differs from that which is set out in this essay, it provides a useful framework to understand the linking role of the map between these two professions.[1]

The Cartographic Paradigm Model is divided into four quadrants: reality, cartography, fiction and architecture. The concepts move in a clockwise direction with time being the shift between the four agents. The double headed arrow on the right hand side represents a continuum of abstraction and scale. The greater level of abstraction and drawn scale or 'fictional' is at the top and the less abstracted and smaller drawn scale or "reality" is at the bottom.

The following four chapters will examine, in a clockwise direction, the shift between each position. This will provide a theoretical understanding and explanation of the hypothesis.

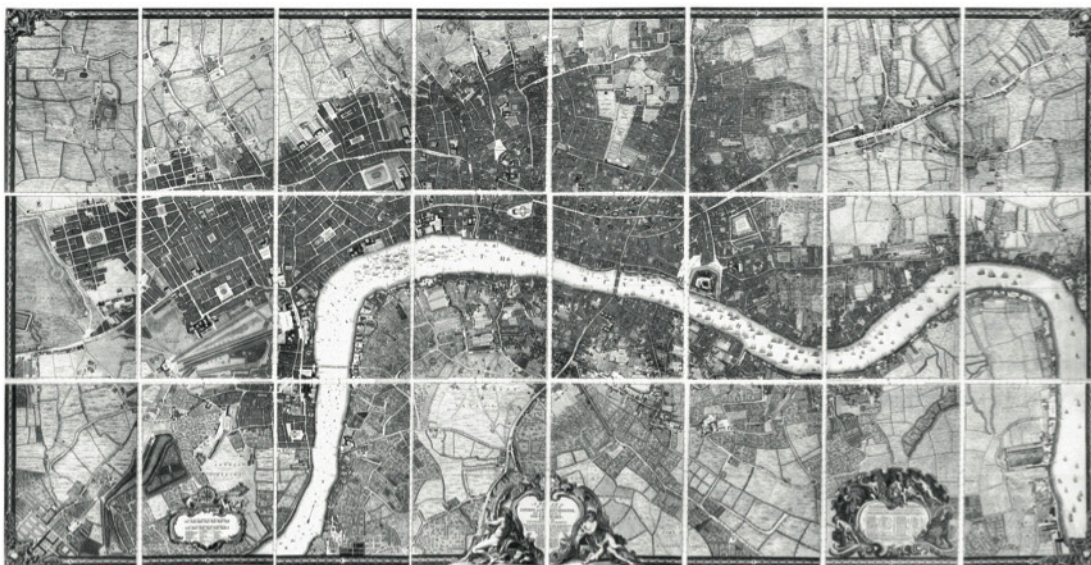Figure 1.1 - 1560 Tudor Birds Eye Map of London by Ralph Agas

Figure 1.2 - 1746 Zenith Map of London by John Rocque.

1 - REALITY – CARTOGRAPHY

This chapter describes how reality is represented by cartography. It will introduce how subjectivity and scale abstract the map from a true image of reality. The effect of time on the reality of the map will also be examined.

Abstraction of Reality - The Advent of the Zenith Gaze

The birth of modern cartography is commonly linked to Europe in the late sixteenth century with the development and use of trigonometry. This new cartographic system allowed territory to be plotted on scientific terms; where each point was proportionally positioned against each other in a plan. This scientific approach allowed a more accurate planometric projection of the city and was dubbed the 'zenith gaze'; recognizable today as the 'z-axis'. This scientific shift gave birth to the first accurate mapping projections of territory and the built environment. It opened up a new perspective on the city where it appeared ordered, rational and structured. [2]

The zenith view differed from the previously recognised image of the built environment. Projections were drawn at the angle of a 'bird's eye', they were perspectival and commonly exaggerated key monuments to emphasis the wealth or power of the city. Hurni and Sell in their examination of cartography and architecture write;

"As with most early cartographic and mapping projections, the main driving force was the delineation of vested rights and territorial claims" [3]

The exaggeration of the early perspectival projections did not allow for accurate planning of the city despite a degree of spatial truth. This was due to the inability of the bird's eye representation to be scaled to represent the wider entity of the city. Therefore in this state it is a limited tool in urban planning. On the other hand, Soderstrom writes;

"[the zenith gaze] renders space homogenous by erasing differences"… " in other words, quality, hierarchy and difference are replaced by quantity, position and measure ". [4]

The scientifically accurate, zenith projection created a commonly accepted image and opened up a new field of cartographic visibility of the city from which it could be planned.

Abstraction From Reality - Scalar Shift

"if the horizontal gaze places itself at the level of the citizen and authorities empathy, the zenithal gaze literally places itself at an abstract level, since the viewer must abstract him- or herself from everyday, ordinary experience of urban space to understand it." [5]

Soderstrom highlights how the map removes or abstracts the individual from the reality to present a scaled experience of the built environment. This would suggest that in the scaling process from reality to cartography a degree of homogenization must take place. It is impractical for maps to be drawn at scale of 1:1 and so they cannot produce the same level of visual resolution. Therefore cartography must consolidate the information taken from reality.

SCALE
SHIFT

REDUCTION
IN
VISUAL
DETAIL

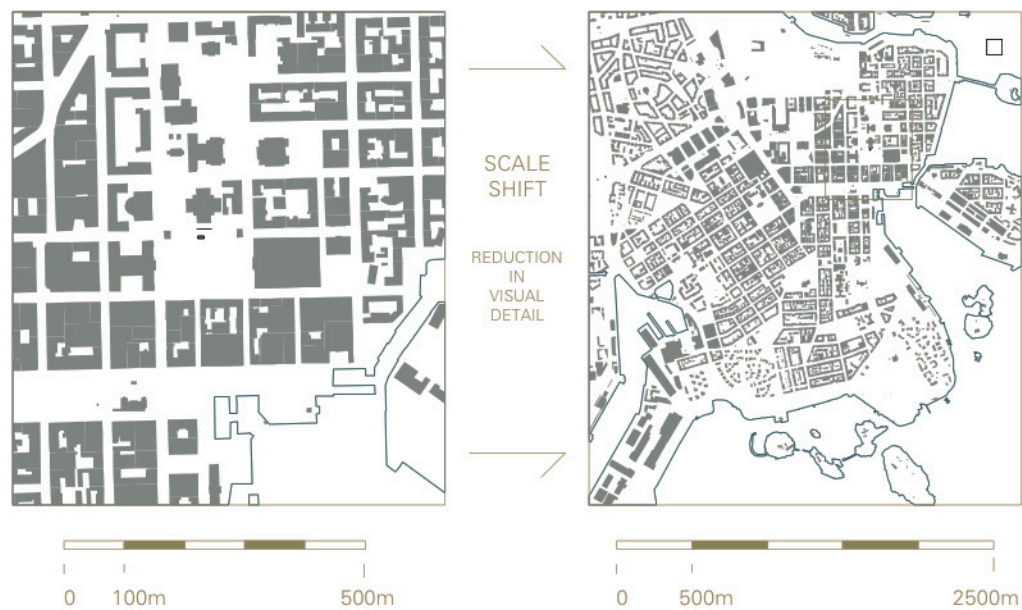| 0 | 100m | | 500m |
| 0 | 500m | | 2500m |

Figure 1.3 - Shows two maps of Helsinki - The map becomes more abstracted from reality when scaled.

Figure 1.3 shows how the map removes detail of reality when it is scaled and creates a fictional view of reality. When we shift the scale, for example from 1:1 to 1:10,000 (the common city planning scale) or to 1:2500 (the common masterplan scale), the map must homogenize reality in order to present a legible representation of the city.

The process requires the mapmaker to filter real information which, in turn, introduces a level of subjectivity onto the map. Therefore the map cannot be a true representation of reality but a fictional abstracted view. From the cyclical conceptual model, in moving clockwise from reality to cartography the level of abstraction has increased.

A mapmaker's, or as we later define as the 'sensor', interpretations of reality can take many forms as the map is no longer directly related to reality which allows a new perspective to be produced. A clear example of this is seen in how different projections affect the visualization of the world map.
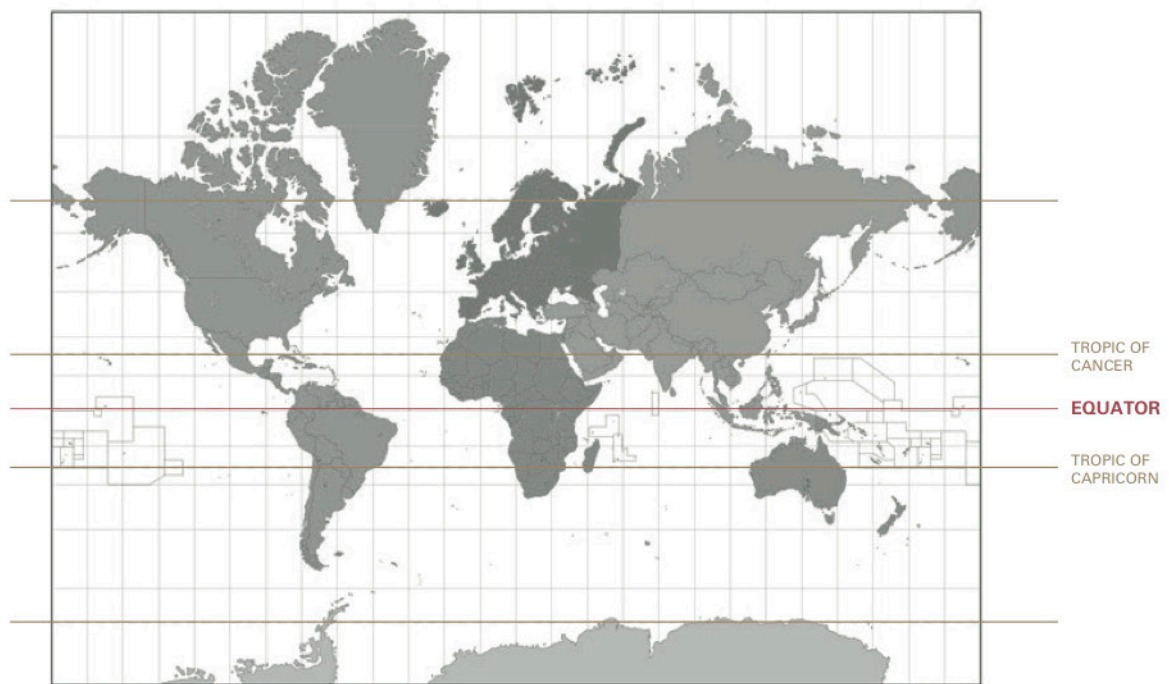
15

TROPIC OF CANCER

EQUATOR

TROPIC OF CAPRICORN

Figure 1.4 - Mercator's projection of the World (1569)
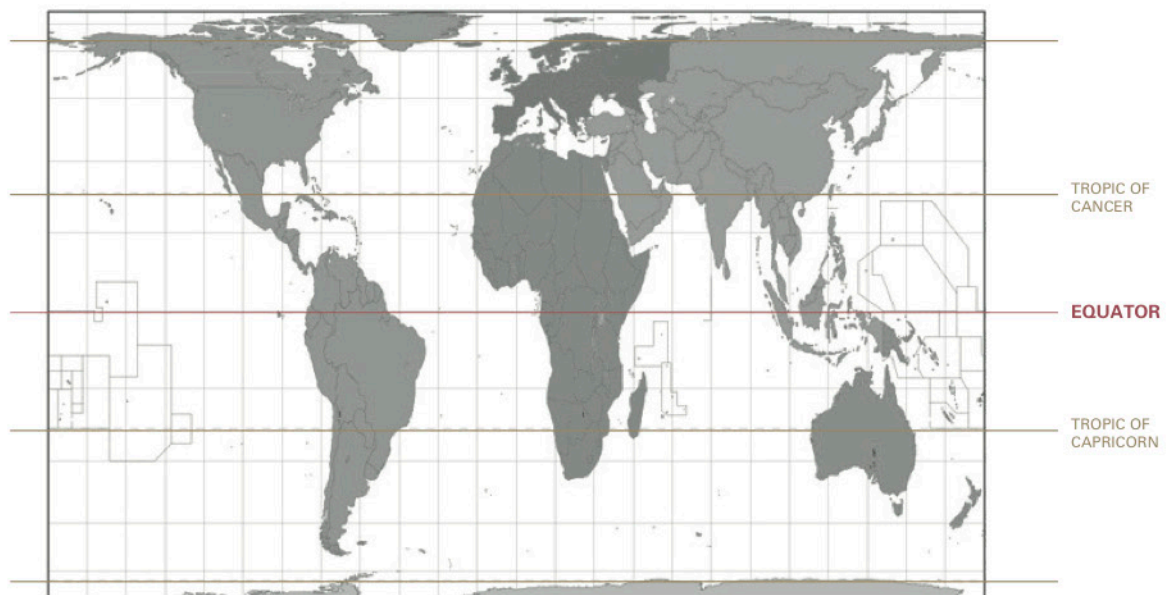

TROPIC OF CANCER

EQUATOR

TROPIC OF CAPRICORN

Figure 1.5 - Peter's projection of the world map. (1973)

Figures 1.4 and 1.5 show two world maps that are vastly different. They prioritise the representation of different geographic information in different ways. Their form has also been influenced by different political agendas of the mapmaker. Figure 1.4 shows a Mercator's projection which adjusts the spacing of the North/South grid to shift the Equator southwards and emphasises the visual size of Europe.[6] Figure 1.5 shows a Peter's projection, that aims to more accurately depict the relative geographical area of each country. The apparent enlargement of Africa from the Peter's projection, in comparison to Mercator's projection, shows the level of distortion that can be produced.

MERCATOR PROJECTION GRID (1569)   **PETERS PROJECTION GRID (1973)**

THE POLITICAL CARTOGRAPHIC GRID
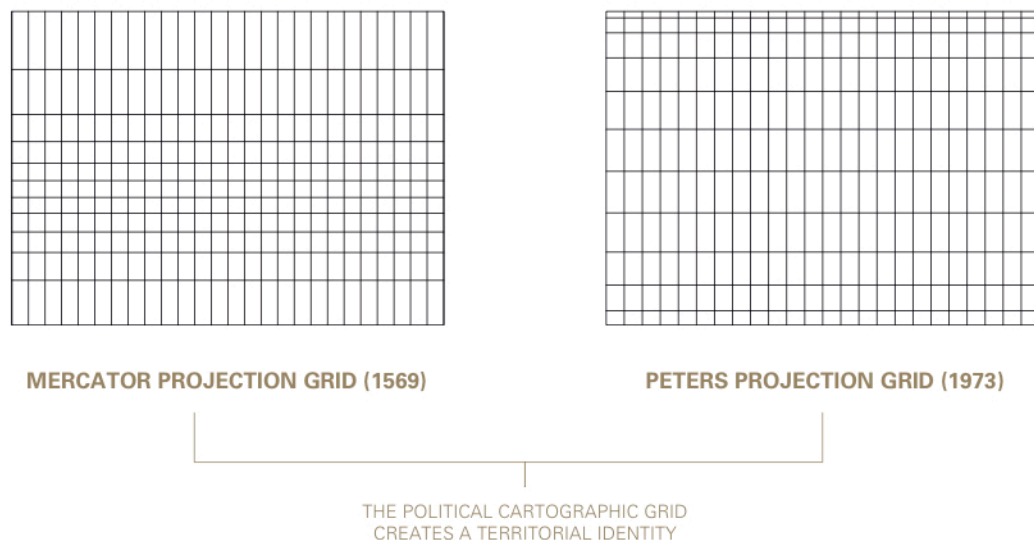CREATES A TERRITORIAL IDENTITY

Figure 1.6 - Show how the grid can be manipulated to create hierarchy

These two examples highlight how maps might be used to promote socio-political agendas. In other words, power and agenda are two protagonists in the visualization of information on a map. This further abstracts the map from reality as it distances the viewer from the 'everyday, ordinary experience of urban space'. Therefore, in reference to this paper's hypothesis, the way that the built environment is mapped will determine how it is visualized in the masterplan.

<u>Lag</u>

As introduced earlier from the cyclical conceptual model, there is a passing of time between the four different phases. Within the mapping process, and in its role as the agent between reality and cartography, there is also a factor of time which will now be examined in more detail.

We understand that the map is a representation of reality and it is based on measurements taken by the mapmaker. However, these readings that form the map are time specific. In other words, the mapmaker can only plot what exists at that present time. Therefore we can better define maps as being fictional snapshots of reality. This would also suggest that by the time that the map is completed it is already obsolete. What is discovered here, and define as, is something called 'Lag'. Lag suggests a time-based distance from one state to another. The computer game industry offers a useful definition:

"Lag is the noticeable delay between the action of the players and the reaction of the server" [7]

Urban planning uses the definition 'players' as the inhabitants and the 'server' as the built environment that reacts to the inhabitants. Today, in our ever fluid, dynamic and changing cities this can be most apparent. Many forces operate within the city that influence change in the urban fabric, no more so than the inhabitants themselves. With population increases in our cities leading to their rapid expansion, the maps that are being drawn are becoming out of date by the time they are completed. A good example of this is Google's updating of its digital worldwide maps. It is not updated in real time therefore produce subtle redundancies within it.

Denis Wood describes in his analysis of the static nature of maps (note: this is the original punctuation):

18

"Soon enough we have forgotten this is a picture someone has arranged for us (chopped and manipulated, selected and coded)." He goes on to say; *"Soon enough… it is the World, it is real, it is…Reality"* [8]

Wood describes that due to the static nature of the production of these publications, we begin to see 'past' mappings being taken as the 'current' reading of the cities reality despite the redundancies caused by lag. The danger of lag is that when these faults are accepted as truth they become engrained in the fictional reality of the city and its identity.

The notion of lag has its biggest effect when change is taking place rapidly such as in Slums, making them impossible to map accurately. In our cyclical diagram this would suggest that if they cannot be mapped they cannot be planned. Therefore, how does cartography offer a tool to the rational planning of the future if 'lag' occurs? This is explained in the next shift in the model from cartography to fiction.
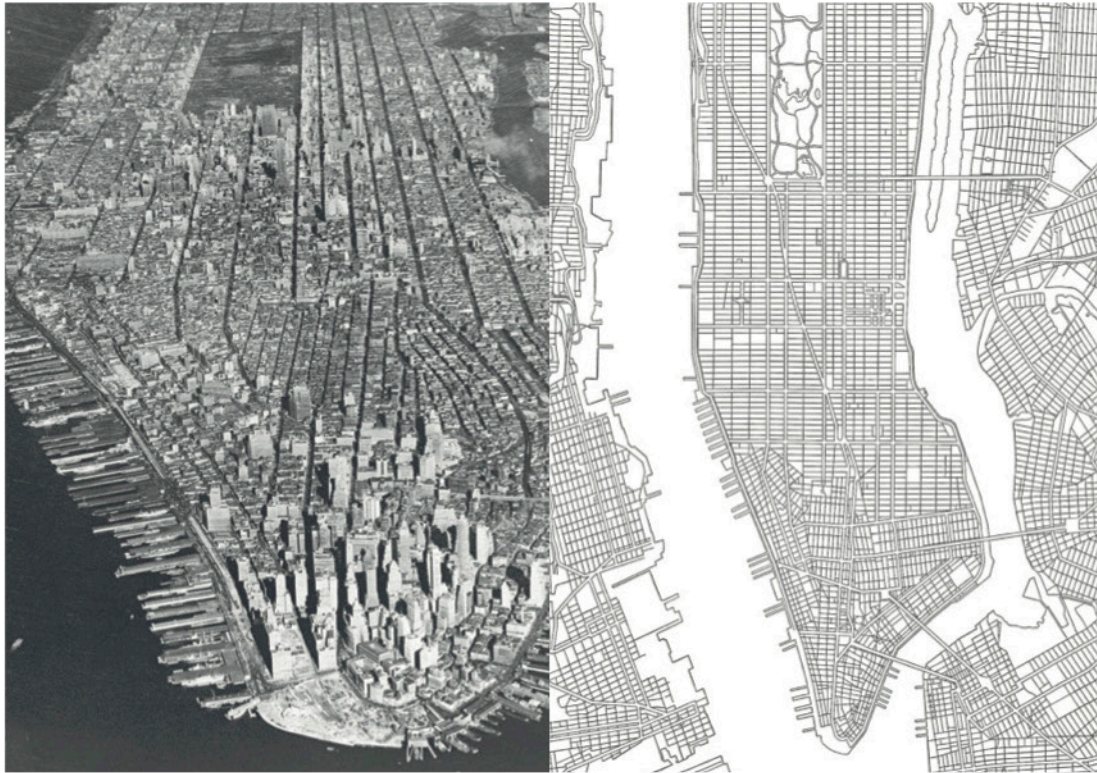
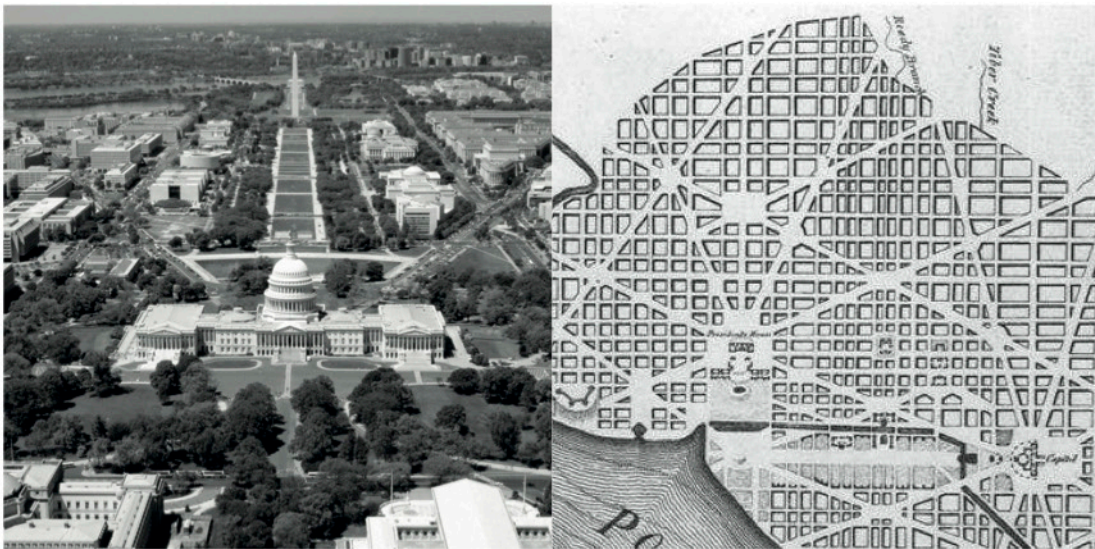Figure 1.7, 1.8 - Image and drawing of the grid layout of the city of New York

Figure 1.9, 1.10 - Image and drawing of the grid layout of the city of Washington D.C

2 - CARTOGRAPHY – FICTION

2

An interesting symmetry occurs between the notion of 'lag' and the masterplan. Lag suggests that all plans are out of date by the time they are drawn whereas the city plan and the masterplan aim to construct a map of something that has not yet happened.

The Cartographic Paradigm model positions the masterplan following on from cartography. This is because, despite the notion of lag, the cartographic map is used as the foundation for future representations of the city. Cartography offers us a tool to observe, understand and visualise the built environment from which it can be altered. James Corner writes:

'Mappings discover new worlds within past and present ones; they inaugurate new grounds upon hidden traces of a living context.' [9]

Therefore the profession of cartography not only charts the static physical built environment but it also can expose invisible social and political forces that are at play within our cities. These readings can help to create a rational future plan for the city.   The masterplan map becomes a hybrid form of the cartographic projection. It uses the map as a tool to understand the city through past mappings and as a framework to forecast future representation.

We can see from our cyclical model that the masterplan stands as the most abstracted fictional position on the diagram. This is because the masterplan employs the abstracted cartographic map as a framework to then

create a desired future of the city. In this process the master planner speculates, visions and projects illusionary worlds. Therefore, the map becomes more abstracted as it drifts from a map of reality to a map of a future fictional desired representation of reality.

Given that the masterplans reliance on the map and cartographic techniques it must therefore influenced by its form. Hurni and Sell write:

"the starting point for any map is the 'reality'"… "the perception of the 'reality' is largely dependent on the type of 'sensor' used, and also on the kind of data collected: a cartographer might depict visible objects like buildings, topography or land use, but [also] non-apparent, invisible phenomena like economic or political data" [10]

Using Hurni and Sell's analogy, it highlights that the 'sensor' and the 'data' chosen influence the cartographic projection. Therefore, these inputs that form the maps of the city must also affect the basis of the city and masterplan. In other words, if Mercator's and Peter's projections were used to form the basis of the masterplan two very different future fictional visions would be manifested. Furthermore, given master planning's reliance on the cartographic projection of reality; it would suggest that similar map making methods are employed across both disciplines. What both these points suggest is that the first part of our hypothesis is correct; the way we map our cities influences the way we plan their futures.

3 FICTION - ARCHITECTURE

3

In the shift around the cartographic paradigm, it is seen that cartography has formed the basis of master planning. Therefore continuing this process it would suggest that the master plan provides the basis to architecture and buildings.

Architecture plays a crucial role in the realization of the masterplan. However, it is rare that it is constructed as a direct manifestation as originally set out because architecture is influenced by many inputs. If we briefly assume, in this section, that the only input is that of the masterplan, we can see how the fictional vision can become realised. The master plan sets out a rulebook for architecture to follow. The role of the architect is to extract the set of codes in order to manifest the intended vision. If we examine briefly some of principles of the architecture profession we will see how this is pos-sible.

Architectural process begins with a site, that is usually set by a territorial boundary marked by the masterplan, for example a plot, traditionally drawn at the scale of 1:500 or 1:1000. The plot will carry a coded description setting out the maximum height, building use, façade position etc. The preliminary drawings by the architect will apply these codes to create the envelope study creating a new set of drawings at   a scale of 1:200. As the building develops the drawn scale will decrease: floor plans at 1:100; Structural details at 1:50; façade details at 1:20; and culminating in the drawing of the door handle at 1:1. What is observed in this architectural sequence is the ability to descend the drawn scale from the drawing of the

fictional masterplan to the drawing of reality, the door handle. Hurni and Sell state:

"the map as a document is the result of a process of abstraction, while on the other hand, architecture becomes reality in scale 1:1. Each discipline starts where the other ends. Architecture means creating space on the basis of the territory, cartography is the documenting this territory for further intervention and this process leads to a circular flow of interdependency" [11]

Hurni and Sell also highlight how architecture and cartography are connected.[12] In this brief sequence it is seen that the master plan can be manifested directly by architecture. It would suggest that the cartographic model is conceptually correct as the process reflects a shift from the initial input of the map through to its influence on the built environment.
The 'cartographic paradigm' has been returned to its origin and what is found is a new reality that has been influenced by the masterplan through architecture. This aligns with the original hypothesis:

The way we map our cities affects how we plan their future and therefore it becomes manifested in reality.

However, there are many inputs that might manipulate the architectural process and the master plan is only one of them. Many external forces affect the final construction of the master plan and often over shadowing it resulting in the realisation being far from perfect. Therefore, if external inputs have a greater influence over the true manifestation of the master plan, it would suggest that the profession of master planning and its output are redundant or only have a minor role in the planning of our cities.

4 ARCHITETCURE – REALITY

The Unbuilt Master Plan

'Nighty-four per cent of masterplans fail' [13]

This quote would suggest that the role of the urban masterplan and its profession is being side-lined or even is redundant. However, this clearly is not the case. What Cowan highlights is that it is common that the plan remains in a fictional state. However, if the plan does not directly become manifested through architecture into reality how does the masterplan influence urban form from this fictional position?

As we have discovered, the city and masterplan assesses socio-political, geographic, economic factors of the city in order to create a fictional vision of the city that is influenced by the mapping of that territory. In simple terms, it coordinates the future physical, social, political needs of its inhabitants. The map allows the master planner to visualise the invisible ideologies of the current inhabitants and then to employ these ideas to create a 'multi-view pointed' vision of the future city that guides its creation.

The ability to represent the ideologies of the 'players' becomes a tool that influences both future masterplans and their manifestations. In other words, it may not be the first masterplan that gets built but it guides, directs and emphasises principles that future masterplans employ and therefore become indirectly manifested in reality. It is important to state that the masterplan projects a future vision cast 20 or more years from its conception. In the time taken to realize the plan the whole world can change. Therefore,
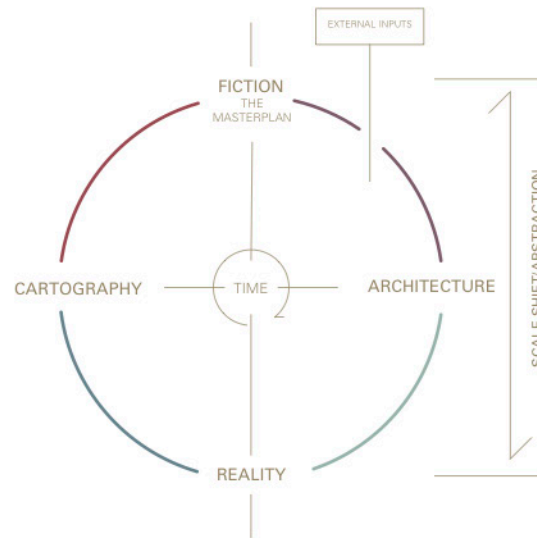
Figure 1.11 - The Cartographic Paradigm Model

the masterplans remain in the fictional state and are used as a tool to generate discussions and make decisions. This would explain the truth in Cowan's statement that '94% of masterplans fail'

A New Reality

An understanding of this "new reality" can be best explained by using the cyclical conceptual model. If a fragment of the original masterplan is then built it will still generate a new reality. As further iterations are made around the cyclical model a new altered cartographic map will be formed, followed by a 'new' fragment and its ideologies of the previous plan will influence the 'new' masterplan. It can be seen that the principles of the original readings of reality will play a continuing role in shaping the urban form of the city.

This section highlights that, through the masterplan and architecture, the original readings of the city can influence the manifestation of urban form. Therefore, this aligns and supports the hypothesis;

The way we map our cities affects how we plan their future and therefore it becomes manifested in reality.

SUMMARY TO PART ONE

Cartography provides identity, clarity and a grounding to the understanding of our cities. The output of cartography, the map, allows us to place, plan and construct our cities, forming the framework from which we can understand, interpret and forecast its future. However, the map presents a fictional world, as it is scaled from reality, subject to variations of projection and can be influenced by external inputs, such as of power and political agenda. The map is used in master planning as the basis for developing the blueprint or vision, from which architecture takes its initial brief. What is eventually built will, in turn, affect future representations of the city and the mindsets of those who map them. Therefore, the map and the masterplan acts as the means of crossover for socio-political and economic factors into the built environment.

Figure 2.1 - A map of the digital idenity of Helsinki on 28th September 2014

DEFENSIVE REGION

PART TWO

Arrival into the new capital

Slower speed on approach

LSB.01

OPENING SHIPPING THE EAST

1906 Russian territory gained - Finland

LPP.01

LC.02

Statal Parliment Building - Finland

LC.03 Beside Kamppi cemetery a temporary church was built, which is now the Old Church.

1860
Finland receives its own cu
The Finnish mark is valued
one-quarter of a gold roubl

1865
The Finnish mark is index-
the price of silver, and deli
the rouble.

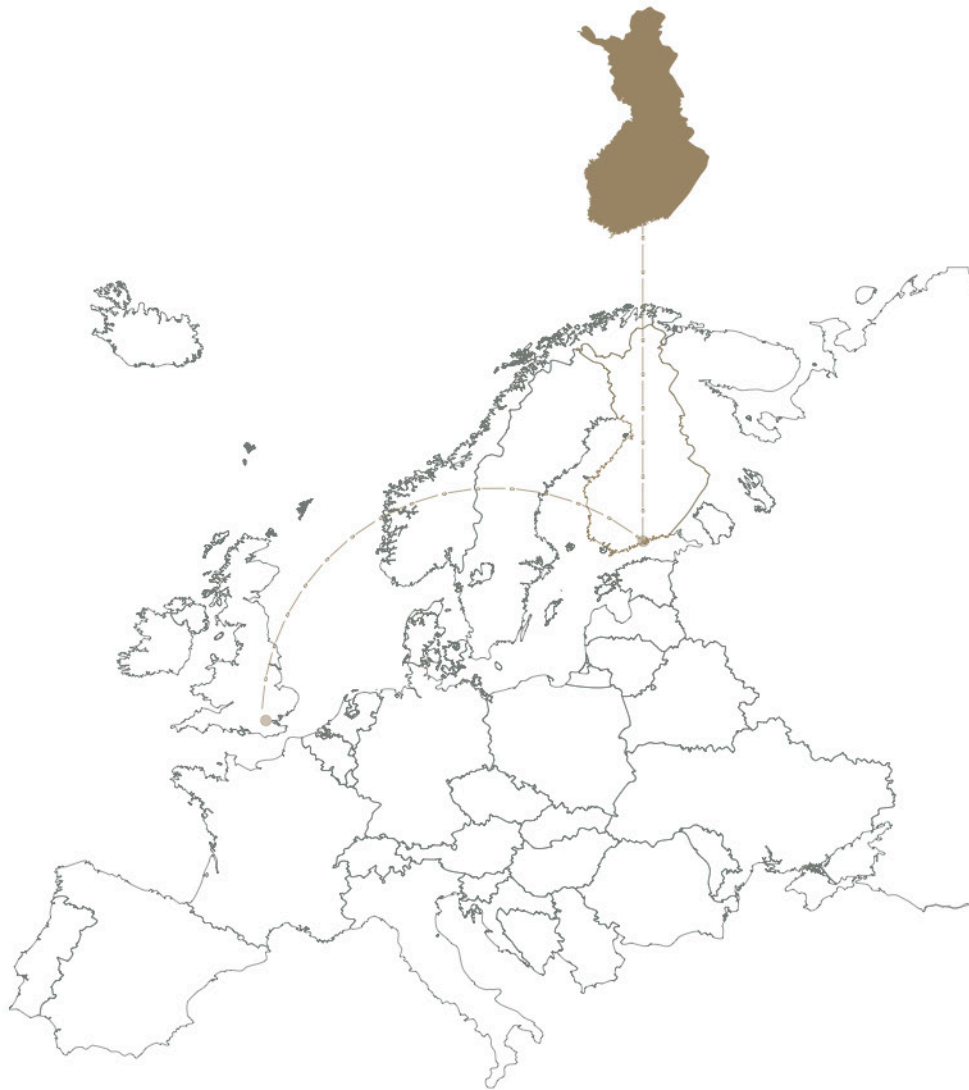Figure 2.2 - Location Map of Helsinki, Finland

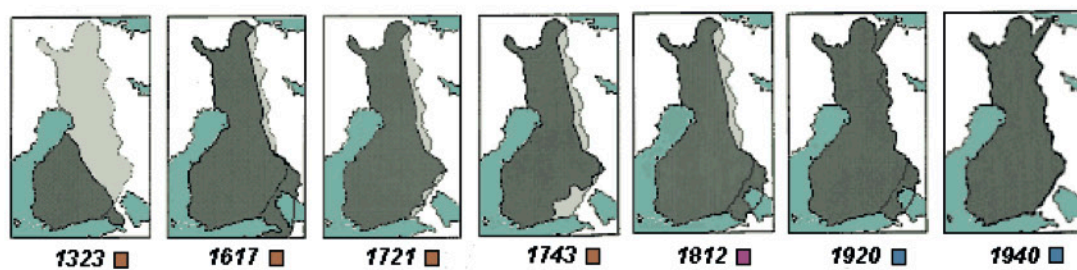| 1323 ◻ | 1617 ◻ | 1721 ◻ | 1743 ◻ | 1812 ◻ | 1920 ◻ | 1940 ◻ |

Figure 2.3 - Territoray map of Finland over time.

CASE STUDY: HELSINKI, FINLAND

Case Study: Helsinki, Finland

Having explained the cyclical conceptual model theoretically, including the thought and rational behind the hypothesis, it is now possible to illustrate a case study to help validate and prove that the model works in reality, which in turn will support the hypothesis. The capital city of Finland, Helsinki, has been chosen for its unique political background, allowing us to explore three epochs in the history of the capital that have fashioned three different masterplans.

Finland and the Identity Map

The identity of Finland has always been closely tied to the map and how its territory has been depicted. In its history it has been a territory of Sweden to the west, a branch of the Soviet Union to the east and an extension of the European Union to the south. Its boarders have shifted throughout its history, drawn and redrawn to suit the occupying country of that time.[15] Diagram 2.4 shows a timeline of occupation of Finland by the East and West and Diagram 2.3 shows the cartographic display of its fluctuating territorial boundaries. Pelkonen, writing about the Finnish identity wrote:

"we can also look to maps for expressions of Finish identity. Although we might consider them to be raw blueprints of physical territory, maps are, in fact, mediated representations rather than disinterested factual documents. Cartography, as the visual representation of geography, reflects ideas about physical, political and ethnic affinities and territorial interests" [16]

At the start of the eighteenth century, Helsinki had become the fourth most important port of importation after Stockholm, Gävle, and Gothenburg. The town had grown into an important military centre also. The fortification of Sveaborg – Viapori in Finnish – was the home port of the Swedish coastal fleet.

1808

1800

1815

1825

1835

1845

1855

1865

1875

1885

1905

1915

1600

1400

C12th

1200

TIMELINE

HELSINKI

The Sweden-Russia War was waged on Finnish soil from 1808-1809. Russia occupied Helsinki on 3 March 1808

1917 - The Senate of the Grand Duchy of Finland declares Finland an independent republic

1925

1935

1945

1955

1965

1975

1985

STOCKHOLM, SWEDEN

LOCATIONS FROM HELSINKI

2045

2035

2025

2015

2005

BRUSSELS (EU HEADQUARTERS), BELGIUM

2014 - EU

1995

MOSCOW, RUSSIA

A referendum on EU membership is held, as a result of which Finland joins the Union in 1995.

SWEDISH RULE
(12th Century - 1808)

RUSSIAN RULE
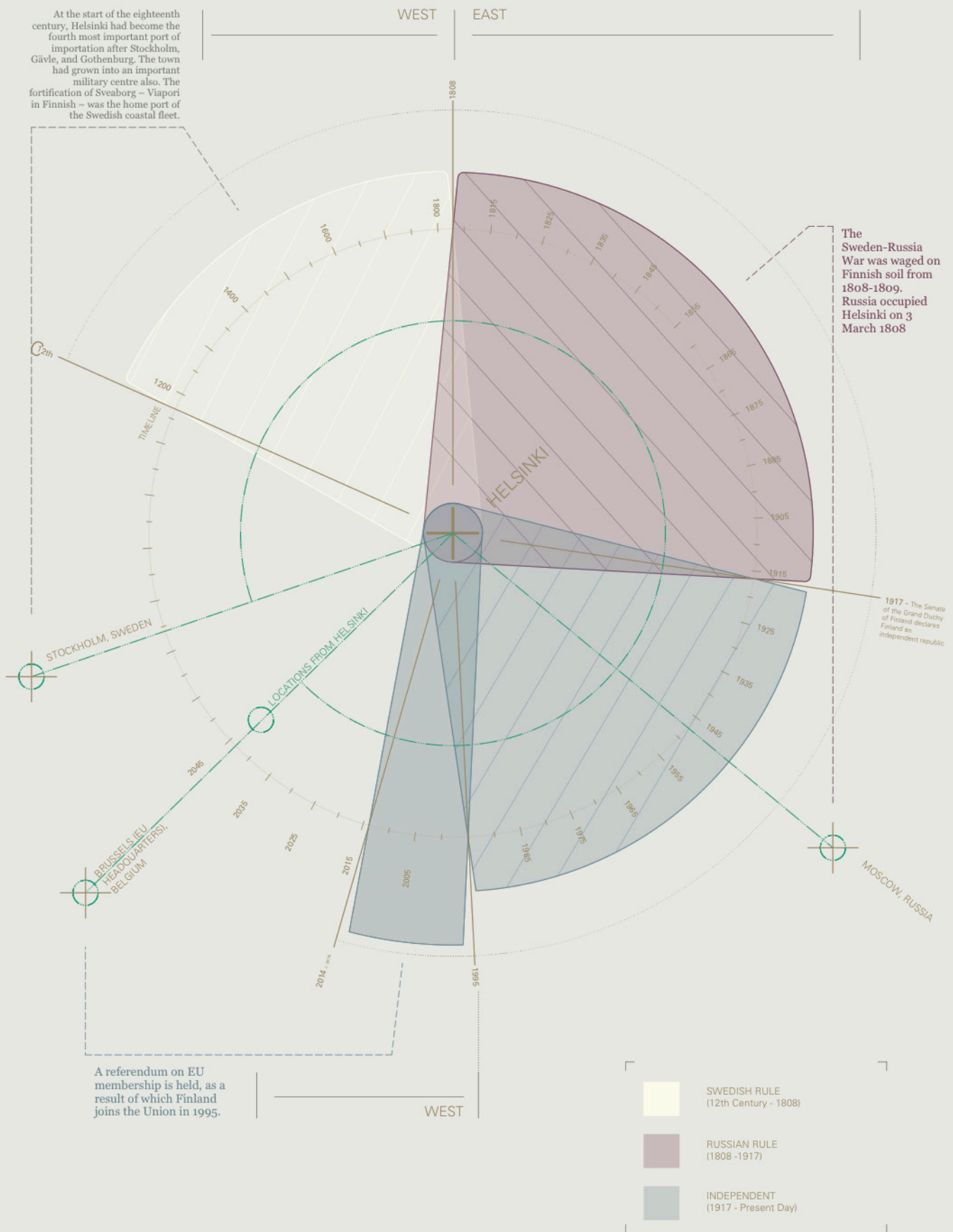(1808 -1917)

INDEPENDENT
(1917 - Present Day)

Figure 2.4 - Historical political timeline of Finland

We can see that in the shifting territorial boundaries, socio-political forces are in action. These forces have adjusted the mapped political identity of the country. Therefore, the map can act as a membrane to host identity and it can allow the reality of territory to be manipulated by power and social pressures. This would suggest that the map is the key protagonist in the shaping of urban form.

Helsinki: The Mapped Capital

Helsinki, is today's recognized capital of Finland, however, it used not to be. Prior to 1812 the capital of Finland was Turku, about 150 kilometres west of Helsinki. Due to Russian occupation of Finland in 1812 it was deemed that the capital city should be closer to the Russian boarder and the control of the Grand Duchy, Alexander the First. [17]

In the moving of the capital we see a shift in the use of the map from depicting the current reality of the political territory of Finland to a planning tool to present a fictional vision for a new capital. Helsinki, therefore, is a unique city, with no medieval grounding or placement and rare amongst European Capitals in that it has been completely planned by the map and the masterplan.[18] It is therefore the ideal city to use as a case study to discover how the map influences urban form.

There are three masterplans that can be explored that represent key shifts in the socio-political visions of the city. These offer the opportunity to explore how different maps and their representation of power have influenced the masterplan and thus its urban form. In this way it is possible to see how cartography influences urban form.

1

1815

The new city plan for the Capital, 1815–1816 by Albrecht Ehrenström.

Figure 2.5 - Albert Ehrenström's Masterplan, 1815

2

1918

The Greater Helsinki Plan, 1918 by Eliel Saarinen

Figure 2.6 - Eliel Saarinen Masterplan, 1918

3

2013

The Greater Helsinki '2050' Plan, 2013 by Helsinki City Planning Department
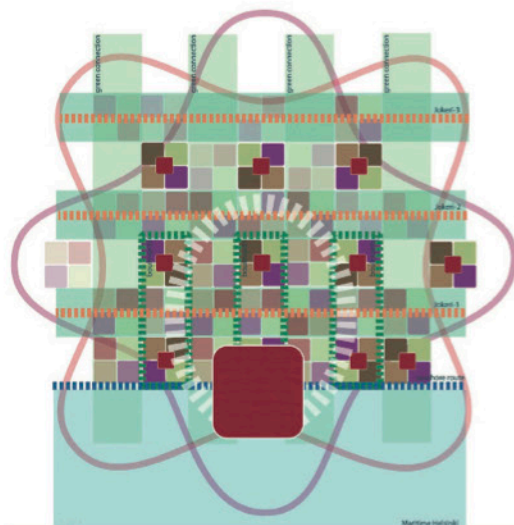

Figure 2.7 - Helsinki Planning Department '2050' Masterplan, 2013

THREE MASTERPLANS OF HELSINKI

This section will explore three masterplans that were created at key epochs in the history of the capital. Each plan will test the 'cartographic paradigm' hypothesis to discover how these future visions of the city were born out of cartographic methods that where influenced by socio-political demands at that time. The investigation of them also identifies how the masterplans have become manifested in reality and therefore how cartography influences urban form.

The masterplans are approximately a century apart: 1815; 1918; and 2013. This will help discover how cartography of this city and its resulting masterplan have changed and therefore shows that the way we map our cities influences how we plan their futures.

For each masterplan there is a corresponding map, drawn by the author that identifies the relevant abstract political factors to try and demonstrate tangibly the invisible forces that have influenced the masterplan at that time. These political and socio-economic forces are subtle, so these maps help aid the discussion to validate the hypothesis.

THREE SOCIO-POLITICAL MAPS OF HELSINKI

GRID EAST - 1808- 1916

The first map is drawn to grid north. A Grid system can be orientated and enforced on the landscape at the total behest of the cartographer. Its use here reflects this deterministic attitude and willingness of man to want to control nature. It is the most fictional vision that can be imposed on the landscape. It also positions east at the top of the map, contrary to convention, to align with the geographic location of Russia, the controlling power at the time.

MAGNETIC WEST - 1917-1954

The second map is drawn to magnetic north. Magnetic north is seen as the 'citizens's north', available to everyone, acting as a social compass to the individual and unique to the any point in the world. It positions west at the top of the map, to demonstrate hierarchy and to highlight independence from east.

TRUE SOUTH - 1955-2014

The Third map is drawn to true north. True north reflects the orbital centre of the Earth, is common to international standards and is used as the bearing for digital mapping. It aligns to the south, common with Europe and the country's affiliation to the European Union.
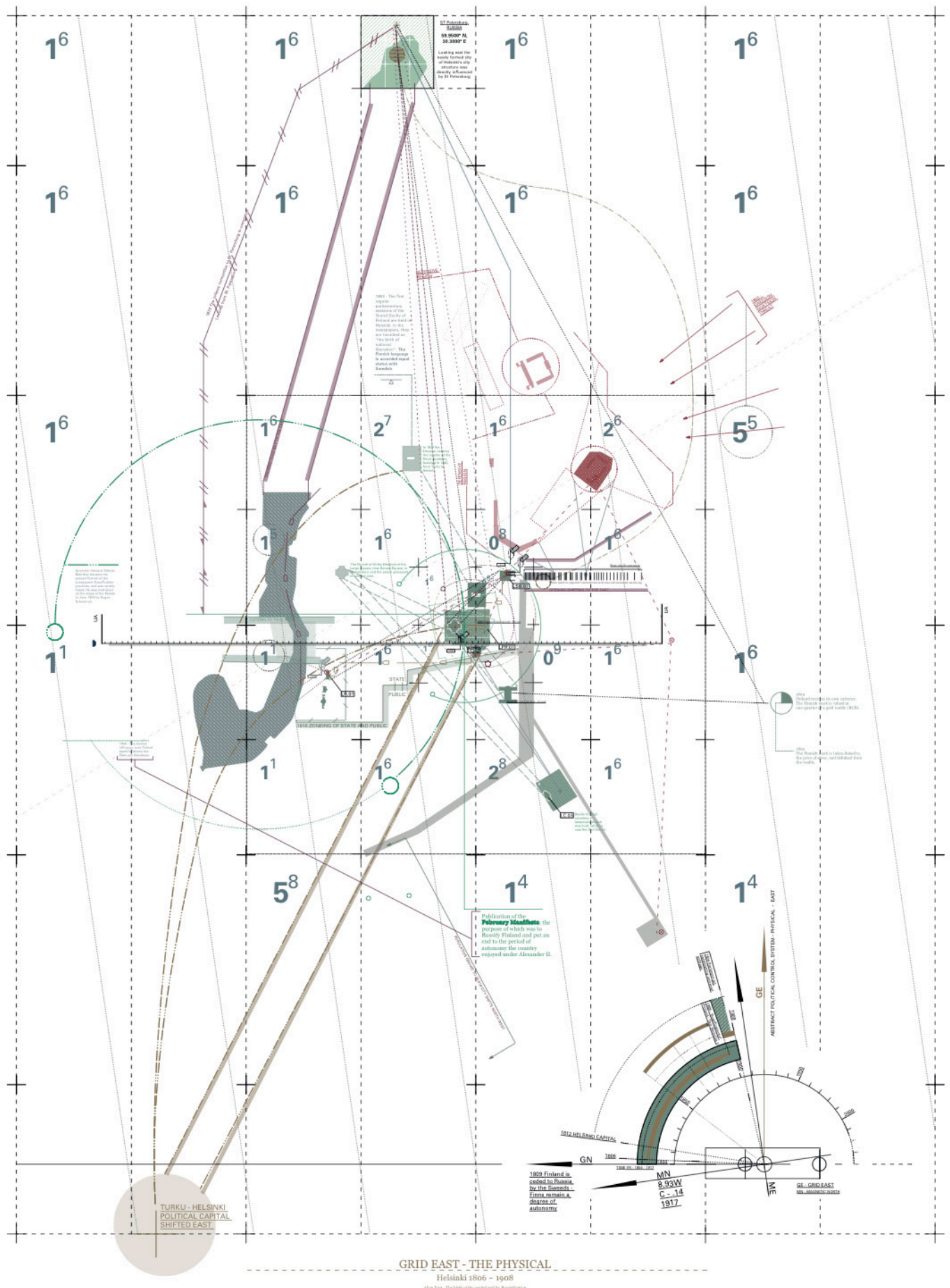
1^6 1^6 1^6 1^6

1^6 1^6 1^6

ST.Petersburg
RUSSIA
59.9500° N,
30.3000° E

Looking east the
newly formed city
structure of
Helsinki. In the
newspapers, they
are heralded as
"the birth of
national
literature". The
Finnish language
is accorded equal
status with
Swedish.

1^6 2^7 1^6 2^6 5^5

1^5 1^6 0^8 1^6

1^1 1^1 1^6 0^9 1^6 1^6

STATE
PUBLIC

ZONING OF STATE AND PUBLIC

1^1 1^6 2^8 1^6

5^8 1^4 1^4

Publication of the
February Manifesto, the
purpose of which was to
Russify Finland and put an
end to the period of
autonomy the country
enjoyed under Alexander II.

ABSTRACT POLITICAL CONTROL SYSTEM - PHYSICAL - EAST

GE

1812 HELSINKI CAPITAL

GN

1809 Finland is
ceded to Russia
by the Sweeds -
Finns remain a
degree of
autonomy

MN
8.93W
C - .14
1917

ME

GE - GRID EAST
MN - MAGNETIC NORTH

TURKU - HELSINKI
POLITICAL CAPITAL
SHIFTED EAST

GRID EAST - THE PHYSICAL
Helsinki 1806 – 1908

Figure 2.8

1^4 1^6 0^6

Vaasa North West from Helsinki

1906 Meilahti becomes part of Helsinki

1^7 1^2 0^6

1914-1917 THE GREAT WAR PERIOD

Vaasa the capital of the "whites"

A 1912-18

1^9 1^2 1^8

1919
The form of government is confirmed: the newly
independent Finland is to be a parliamentary
republic.

SCALE SHIFT

3^1 3^1

Helsinki is the capital of "red" Finland

1^6 1^8 1^8 4^6

4^7 1^6 1^2

6 December
1917
The Senate
of Finland
declared
an independent
republic, and
Helsinki its capital.

30,000 former Viborg residents arriving in Helsinki

1906 Tuomala becomes part of Helsinki

1914-1917 THE GREAT WAR PERIOD

In the Paris Peace Treaties of
1947, Finland loses **twelve per
cent of its territory to the
Soviet Union.** Eleven per cent
of the population lose their
homes.

B 1914-17

1920
The Treaty of Tartu is signed between Russia and Finland. The borders of the Finnish republic are confirmed.

St Petersburg,
Russia

MW
GW
GN

MN
8.93W
C - .14
1917

GN - GRID NORTH
MW - MAGNETIC WEST

MAGNETIC WEST - THE SOCIAL
Helsinki 1908 – 1995

Figure 2.9

TRUE SOUTH - THE DIGITAL

Helsinki 1952 – 2014

Align South Positive (+) 0° - International identity shifts to radiante
with Europe

Figure 2.10

Figure 2.11 - Albert Ehrenström's Masterplan, 1815

Figure 2.13 - The University Building to the South of Senate Square

Figure 2.14 - Sketch of Ehrenström's Masterplan

MASTERPLAN ONE
1815-1816 THE NEW CITY PLAN

1

Creating a Physical Identity

As already discovered, there is a close inter-relationship between the political territorial map and the identity of Finland. The birth of Helsinki was the result of political projects when Finland was annexed to the Russian Empire in 1809. The creation of the capital became the means of expression of Russian Imperial power. The fictional vision of a desired future for the city, therefore, reflected an architecturally and ideologically Imperial style.[19] Johan Albert Ehrenström (Figure 2.11)., whom headed the appointed 'Reconstruction Committee', drew up the first masterplan of Helsinki in 1815.

The 'Sensor' – The Mapmaker

"the 'reality' represented mimetically by the map not only conforms to a particular version of the world, but to a version which is specifically designed to empower its makers" [20]

Pinder helps us to define the 'sensor' in the creation of the first masterplan as that of the power and identity of the Imperial Russia. As a point of note in this process there is always a degree of subjectivity as the mapmaker can alter the ingredients to create a certain fictional vision of reality. The 'sensor' removes and suppresses information that does not align with the agenda. As Pinder suggests the map is 'actively involved in the social construction' [21] of the intended vision. Therefore, we must ask how the masterplan can display identity, power and mark territory.
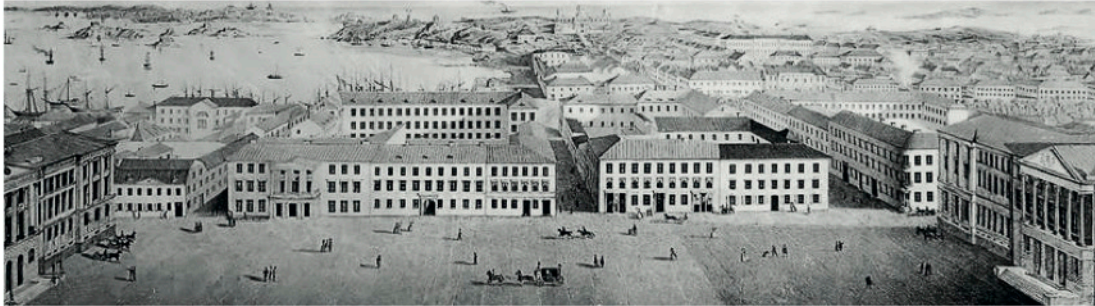
Figure 2.15 - Sketch of Helsinki in 1843

Territory, Power and Identity

The sensor has a dominant role, in the development of the first masterplan, especially over the mappings of power and identity in the city. A fire in 1806 reduced the town of Helsinki to ashes therefore there was no existing city or town to be mapped. This allowed an entirely fictional vision to be manifested.

The influence of power, identity and control over the landscape poses the question of how is this represented on the map? The map, as a political tool, can chart the territory of the boarders of Finland. However, how can this be done in the fictional scale of the masterplan of a capital? David Gissen writing in 'Territory: Architecture Beyond Environment' states:

"Territory charts out a position for architecture beyond the entanglements with 'environment' – understood as that socio-natural setting which pre-exists the production of new things" [22]

Gissen provides a useful analogy that the map is a tool 'beyond the entanglements with the environment' from which territory can be asserted. Because of its scalar abstraction the map has freedoms, away from the built form and the environment, to impose a representation of territory in a fictional vision of the city. Therefore, if these territorial concepts only exist on the fictional map Ehrenström must have employed cartographic mapping techniques to apply it to the masterplan.

42

The Grid System:

Jill Grant states:

"it [the grid] imposes a rational conceptual order that transcends time and space and proclaims the control and power of central authorities" [23]

     Ehrenström's uses a strong grid system in his fictional masterplan of Helsinki imposed onto the craggy terrain of the Helsinki peninsular. This grid system originates from the cartographic mapping techniques used to map the city. The zenith cartographic tradition places north at the top of the map and employs a grid system on the north-south axis as a method to organize and position readings of reality on a blank page. The grid and the north orientation act as a scale and visual locational reference to the reader, also governing the visual perception of space. (This has been widely written about; see Soderstrom, Grant, Gissen, et al) The way that the world map can be used to manipulate power has already been described in the first section, where the projections of Mercator and Peter were explained. Therefore, the way in which the 'sensor' maps the grid on the masterplan will create a recognized physical image of hierarchy and power when it descends from fiction to reality. Returning to Grant's investigations on grids and power, she says;

"the grid creates an ordered system, consciously planned to symbolize control over a landscape (and perhaps also its inhabitants)".. "uses are distributed within the grid, with nodes for key functions of governance" [24]

It can be seen clearly in Ehrenström's masterplan a grid system that has been laid out on the north-south axis, which has arguably descended from the mapping techniques that display power and control in the fictional realm. Diagram 2.16 also shows the 'union axis' which is the main street that is plotted north-south. Ehrenström places the key 'nodes' of governance along
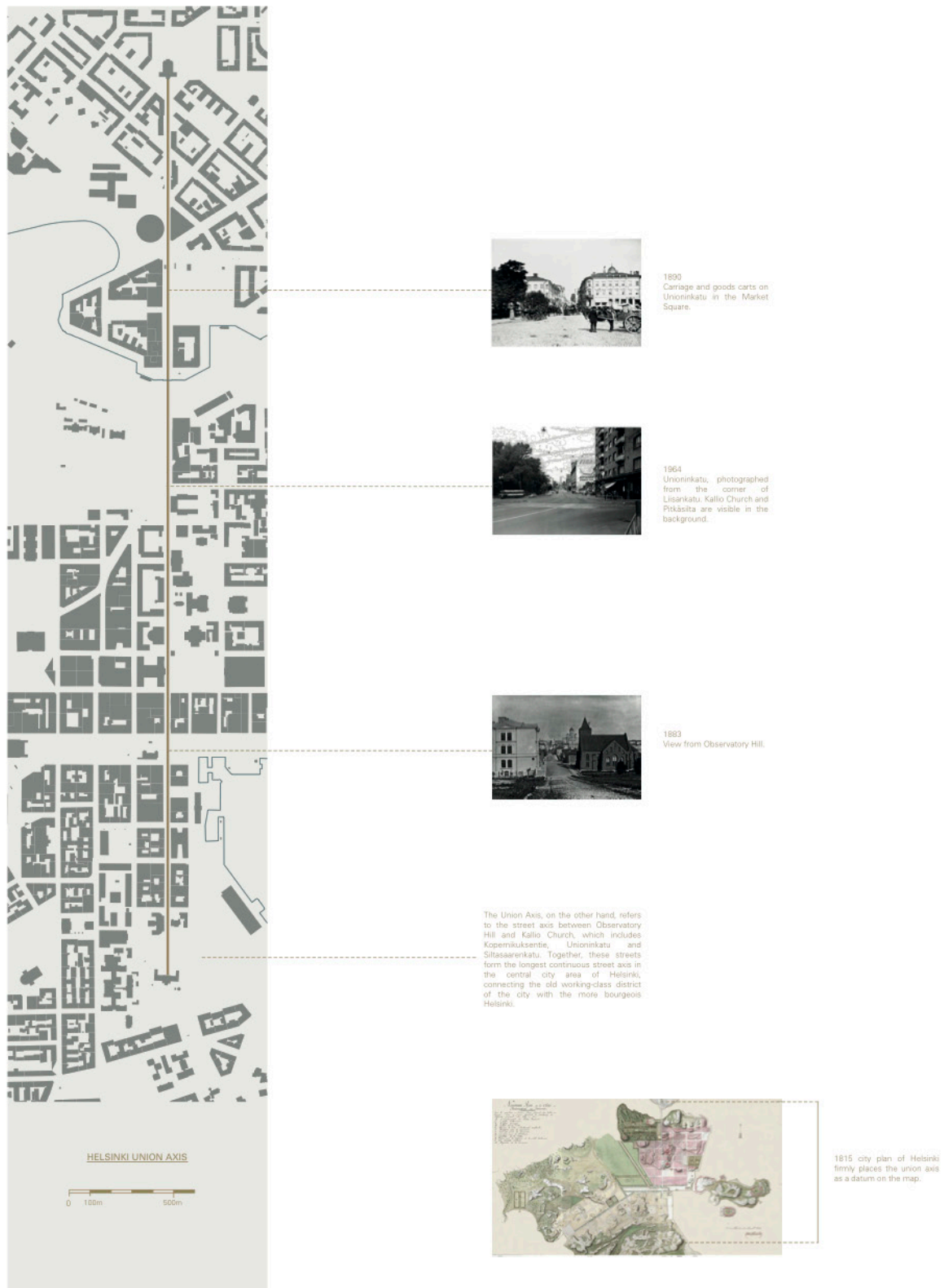
HELSINKI UNION AXIS

0   100m   500m

1890
Carriage and goods carts on Unioninkatu in the Market Square.

1964
Unioninkatu, photographed from the corner of Liisankatu. Kallio Church and Pitkäsilta are visible in the background.

1883
View from Observatory Hill.

The Union Axis, on the other hand, refers to the street axis between Observatory Hill and Kallio Church, which includes Kopernikuksentie, Unioninkatu and Siltasaarenkatu. Together, these streets form the longest continuous street axis in the central city area of Helsinki, connecting the old working-class district of the city with the more bourgeois Helsinki.

1815 city plan of Helsinki firmly places the union axis as a datum on the map.

Figure 2.16 - Union Axis - a datum to the fictional grid.

this axis. What is fascinating is that this street falls exactly north to south on the traditional grid north map, therefore it would suggest that this straight line has not be born out of the readings of the landscape nor from an existing city map but directly from the mapping techniques. The desire to present order and control over the landscape, which is a man-made process, descends directly from the map. This highlights that our original hypothesis that the map is the key protagonist in the shaping of urban form is correct.

Furthermore, the development of medieval settlements planned at the scale of the inhabitant at ground level react to the topography of the landscape, shaping the city to the hills and valleys of the site. However, the zenith projection suppresses topographic information as pronounced in Ehrenström's masterplan. The result is large cuttings into the granite peninsular to be able to impose the grid. In a direct way this highlights further how the map can influence urban form.

It is worth noting that Carl Ludwig Engel, whom is widely regarded as the main architect of Helsinki, was introduced into the 'Reconstruction Committee' in 1816 to help construct the city. Although he had great influence over the architectural manifestation of Ehrenström's masterplan, he was not directly involved in its master planning. [25]

Figure 2.17 - Eliel Saarinen's Masterplan, 1918

Figure 2.18 - Photography of Helsinki 1872

Figure 2.19 - Early sketch of Saarinen's masterplan, 1916

MASTERPLAN TWO
1918 - THE CAPITAL PLAN

2

A New Social Agenda

Following the destruction of the First World War, the Armistice gave birth to a new political order and alignment of national states. In 1917, Finland was separated from the grip of Russian control and became an independent republic. Helsinki remained the natural capital after the War and it began to assert itself as a governing capital. In 1918 Eliel Saarinen, to mark a new era in Finnish identity drew up the 'Greater Helsinki' masterplan, shown in figure 2.17.

This masterplan was developed over 100 years after the construction and realization of the imperial capital. The influence of the social and political mappings of the city on the masterplan will be investigated, illustrating how the vision of the city was both created and thus manifested Two zones will be explored, to see how different readings of socio-political forces, through cartography, affected Saarinen's plan. They are; the 'Daughter towns' to the north that aimed to deal with the population pressure and secondly, the Töölönlahti bay area that establishes ideologies of identity for the capital.

The Greater Helsinki Plan – 'Daughter Towns'

At the end of First World War and on Helsinki's independence the significant population pressures on the city became the main focus in Saarinen's plan. Saarinen used demographic forecasts for Helsinki and the surrounding areas to formulate three population counts for 1945: 550,000,

450,000 and 375,000 [26]. These calculations allowed him to plan accordingly to this projected demand. Returning to our theoretical investigation, Hurni and Sell defined the 'data' of the city as a key influence to the cartographic projection:

"the perception of the 'reality' is largely dependent on the type of 'sensor' used, and also on the kind of data collected: a cartographer might depict visible objects like buildings, topography or land use, but [also] non-apparent, invisible phenomena like economic or political data" [27]

The 'data' allows the 'sensor', Saarinen in this scenario, to visualize the non-visible future on the map. It is important to understand that the map as a tool has subtly changed from that we observed in the formation of Ehrenström' masterplan a century earlier. Then the agenda was governed centrally and hierarchically to form the plan whereas now, post WW1, we see social forces of the city influencing its form. It is the 'player', in our definition of 'lag', that is demanding 'the server' to react. James Corner offers a useful analogy of this shift in mapping:

"the emphasis shift from static object-space to the space-time of relational systems" [28]

In Corner's definition, the 'static object space' is Ehrenström's plan from on high. The 'space-time relational systems' are masterplans that employ readings of the present to forecast a time based future state of the city, such as Saarinen's population predictions. Therefore, the data influenced the form of Saarinen's Greater Helsinki Area map. Saarinen devised a scheme to deal with the population rise, what he called 'Daughter towns' [29] and resembled the garden towns that we know today in the United Kingdom [30]. He positioned them to the north of the city and adjusted their location and size based on transport distances and times from the re-positioned main railway station. The transport map used for this is shown in figure 2.20.
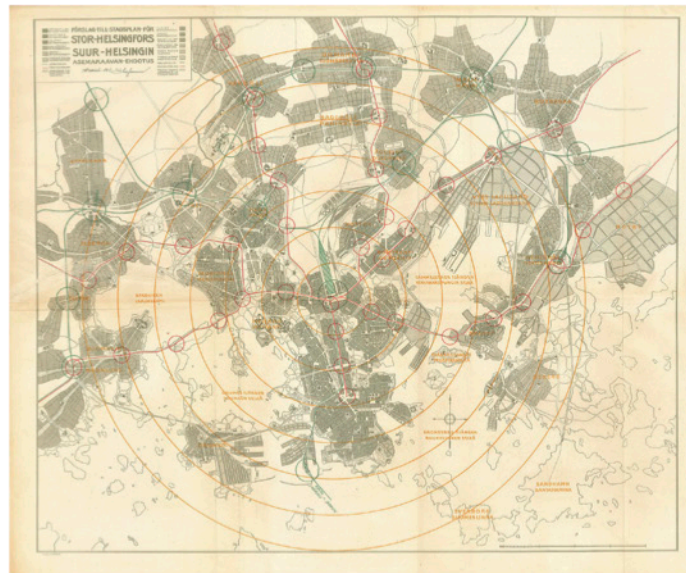
Figure 2.20 - Saarinen's Traffic plan 1918

In this analysis we are less concerned about the exact layout and form of the 'daughter towns' but more to highlight that the cartographic readings of the city, used to predict population growth, has directly influenced the masterplan. Kirmo Mikkola provides an interesting comment in his analysis of Saarinen's 'Greater Helsinki Plan' to highlight our investigation:

"If we asses the population of Helsinki and environs to be 550,000 in 1945, according to Saarinen's maximum estimate of 1915, and subtract the maximum population… (280,000 according to Jung) and the projected maximum population of Munkkiniemi-Haaga [the main town to the north-east of Helsinki] (approx. 170,000) we are left with 8-10 outlying 'daughter towns' of 10,000-12,500 inhabitants" [31]

Mikkola's calculation emphasizes that the masterplan has been influenced by Saarinen's prediction of population. This is because we see redundancies in the form of '8-10 outlying 'Daughter towns' in 1945, if we use Bertal Jung's population readings. This analysis of Saarinen's fictional masterplan and the 'Daughter towns' aligns with Hurni and Sells formula;

'the perception of the 'reality' is largely dependent on the type of 'sensor' used, and also on the kind of data collected' [32]

We can argue using Hurni and Sells' formula that the mapping of the population predictions affected Saarinen's future 'perception of reality'. Therefore, this would give further evidence to support the first part of our hypothesis:

The way we map our cities affects how we plan their future.

Töölönlahti Bay Area – 'Identity Shift'

With Finland's independence came a drive to create a Capital that could generate its own identity,away from its former Russian influence. Saarinen's masterplan set out a grand proposal for the City Centre. It was to fill the Töölönlahti bay area. The bay and surrounding land lies to the west of Senate Square and Ehrenström's imperial master planned zone. This demand for identity for the city is highlighted by the layout of the bay. (shown in Figure NUM) Once again, we see the strong grid system with a central axis running north-northwest. The axis was aptly named 'Kuningasavenue' (King's Avenue) to celebrate the monarchy at the time and was later changed to Valtakunnankatu (Nation Street). Kolbe states:

'The Kuningasavenue' (King's Avenue) … symbolized Helsinki's political role as a national centre.' [33]

Saarinen's map of a future vision of Helsinki has the ability to represent the ideology of the inhabitants at that time. He does this by attaching symbolic value to the Töölönlahti bay area, creating a new centre to the west of city that shifts the political power away from the Russian and Imperial Senate Square to the east. Therefore what we observe is the ability for the map to visualize the invisible ideologies of the inhabitants.

Figure 2.21 - Saarinen's fictional sketch of Töölönlahti bay area, 1918

However, this section of the masterplan was never manifested due to external influences that affected it. As we discovered in our theoretical analysis, in the shift from fiction to architecture, many external factors or epochs cause the realisation of the masterplan to be imperfect. Here these factors included developments in shipping technology and the opposition to moving the railway station. Returning to Mikkola's analysis of Saarinen's 'Greater Helsinki Plan' he states:

"the current direction of growth is not the one envisaged by Saarinen. The axis through Helsinki today is a horizontal one, while in the Greater Helsinki Project it grew to the north. This reversal is largely due to the emphasis placed on harbours at the start of the century.' He goes on to say; 'the siting of the railway station and the future of Töölönlahti bay remained stumbling blocks.' [34]
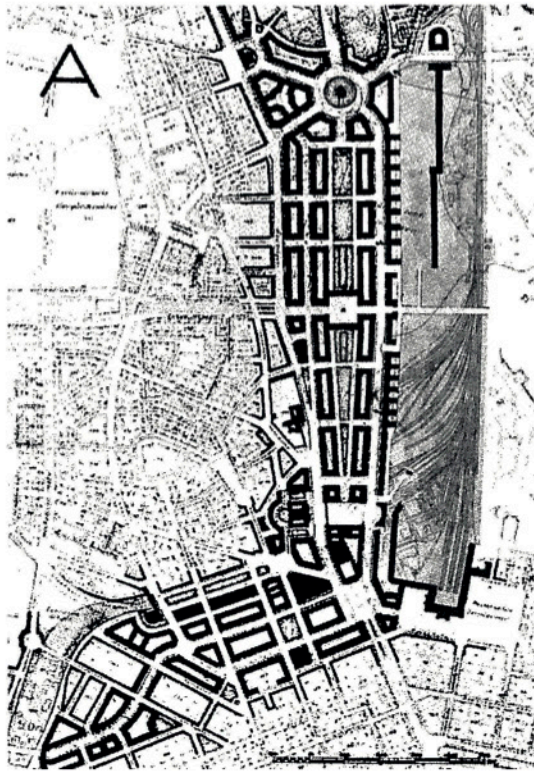
Figure 2.22 - Olivia Kallio, proposal for Helsinki, 1927
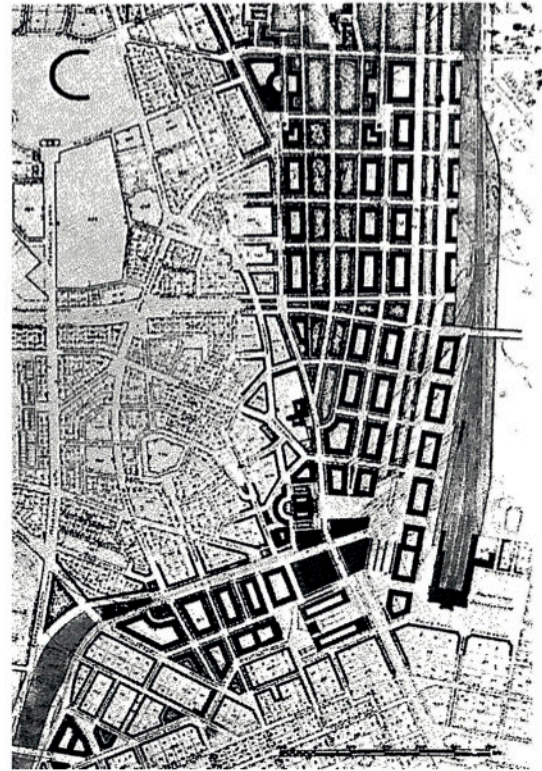
Figure 2.23 - Proposal made by Helsinki Planninng Dept. 1937

Figure 2.24 - J.J Sirén parliment building 1930

Figure 2.25 - Alvar Aalto's Civicl Centre, 1964

52

The Saarinen's masterplan of the bay may have never been realised as he envisaged but it remained as a fictional vision hosting of Finnish ideologies that continued to influence the capital throughout the Twentieth Century. The principle that the masterplan may not directly be established in reality but instead act as a tool to map the ideologies at that time, and therefore influence the positions of future plans, can be clearly seen in the manifestation of the new parliament building, completed twelve years later. (see figure 2.24)

Designed by J.J Sirén, the parliament building was part of a competition held in 1923. Although not directly realised from Saarinen masterplan, Sirén employed the ideologies of the plan and placed the parliament building to the west of the bay shifting the centre away from the old Imperial Russian centre to the east. [35]

Alvar Aalto placed prominence on the Töölönlahti bay area almost half a century later. In his 1964 masterplan it once again looked to the bay to site the new city centre.[36] After coming out of two wars with the Soviet Union (1939-1940, 1941-1944) Finland looked to rebuild its identity. Aalto positioned the new Civic Centre on the banks of the bay aligning with the principles of the 1918 masterplan. Only Finlandia Hall, completed 1975, (see figure 2.25) was constructed out of the scheme but the placement of this, arguably once again, is due to the symbolic value Saarinen placed on the area. Figures 2.22 and 2.23 show the continued emblematic significance of the bay to schemes today.

We have discovered through this example that the shift of architecture to reality, ashypothesised in the cyclical model is correct. The fictional, unrealised masterplan through presenting future ideologies can influence the future form of architecture and the city. The analysis of the 'Daughter towns' and the Töölönlahti bay area gives further credence to the hypothesis:

The way we map our cities affects how we plan their future and, therefore, it becomes manifested in reality.
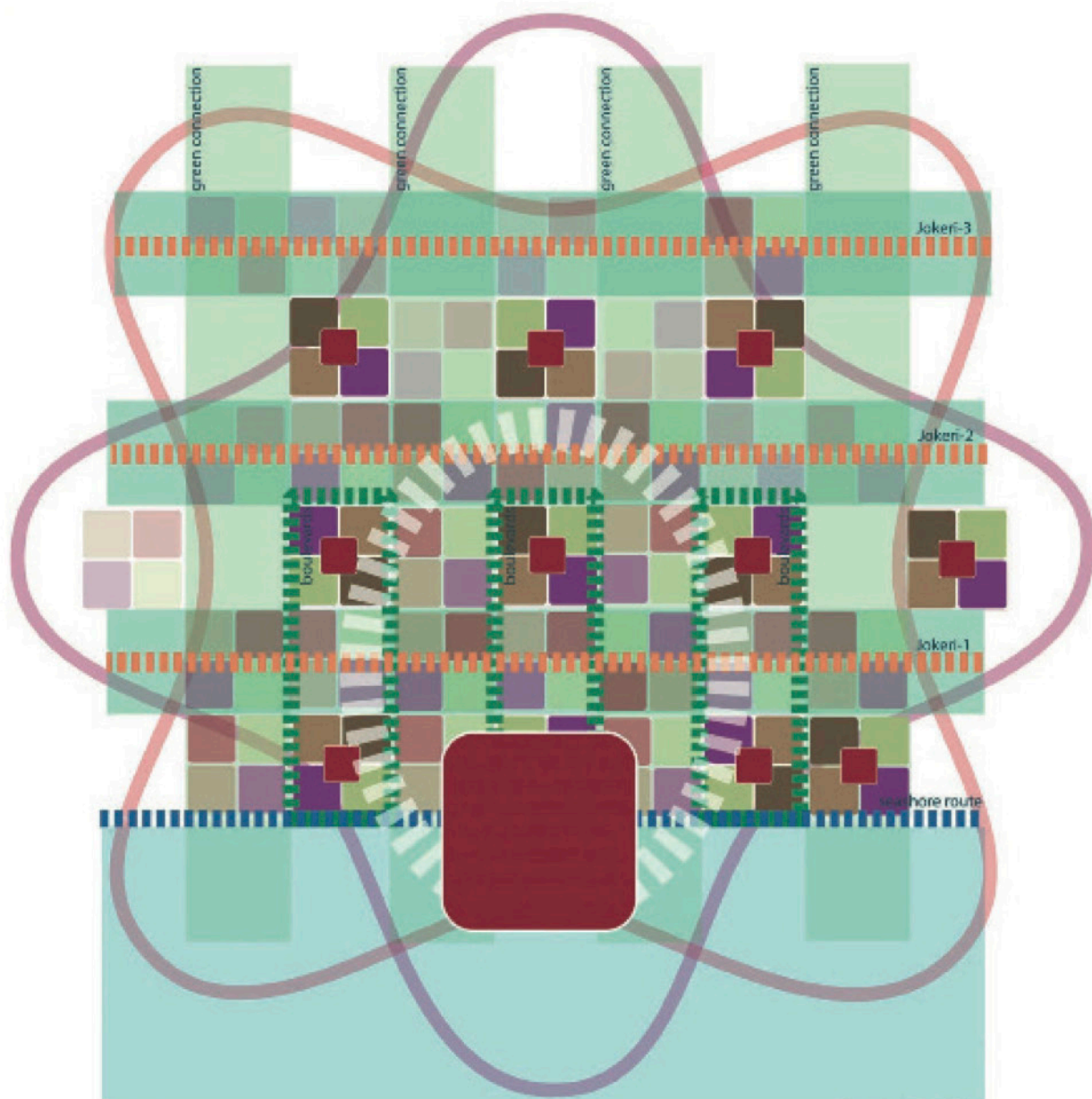
Figure 2.26 - Helsinki Planning Department's 'Greater Helsinki '2050' Plan', 2013

NETWORK CITY

- new urban living and work development areas
- thriving city centre diverse sub centres
- extended city centre
- new boulevards
- improved transversal connections
- green network
- Maritime-Helsinki
- seashore route
- Jokeri-1, -2 ,-3 new tramlines
- city-region

CITY URBANITY

- living
- connectivity and mobility
- economy
- green areas-recreation
- sea
- transnational
- urbanism

An Abstract Fictional Ideology

Saarinen's masterplan visualized future ideologies that guided the urban form of Helsinki despite remaining in a fictional state. The study of the 'Greater Helsinki 2050 Plan', issued by the Helsinki City Planning Department in 2013, will investigate how it is possible to specifically design a masterplan map that remains in the fictional state to guide the production of urban form.

Along with the masterplan a report was released outlining the key mappings that generated the form of the 'Goal-orientated future view of Helsinki in 2050'.[37] In the introduction an interesting observation of the map is made;

"The city plan guides land use, but the plan's underlying values, predictions and strategic guidelines are often overshadowed by the map presentation" [38]

The acknowledgement that maps often overshadow guidelines is fascinating. The city planning board have decided to generate a masterplan that is more akin to a graph than a map (see figure 2.26). The map produced is extremely abstracted baring almost no resemblance to reality. However, the principles behind its formation are similar to those we have discovered in previous examples. It has emerged from seven different readings of the city, ranging from; 'Helsinki - a city of appealing living options' to 'International Helsinki and Helsinki as part of the region'. In order to understand why this has been done and how it can influence urban form one of the mappings will be explored.
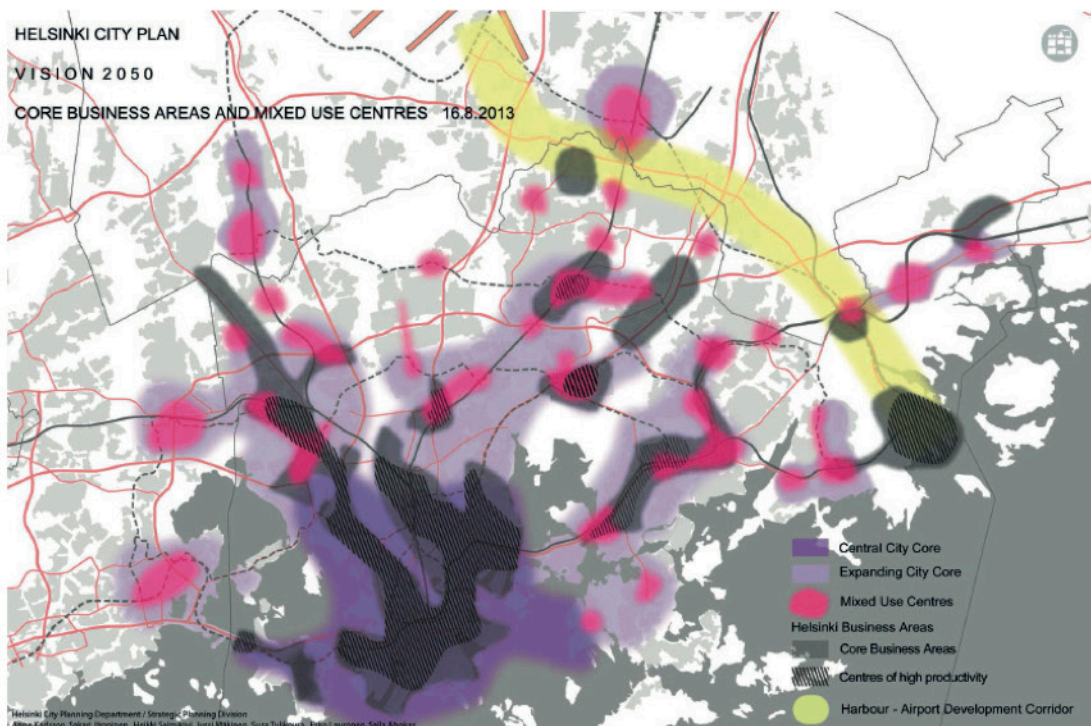
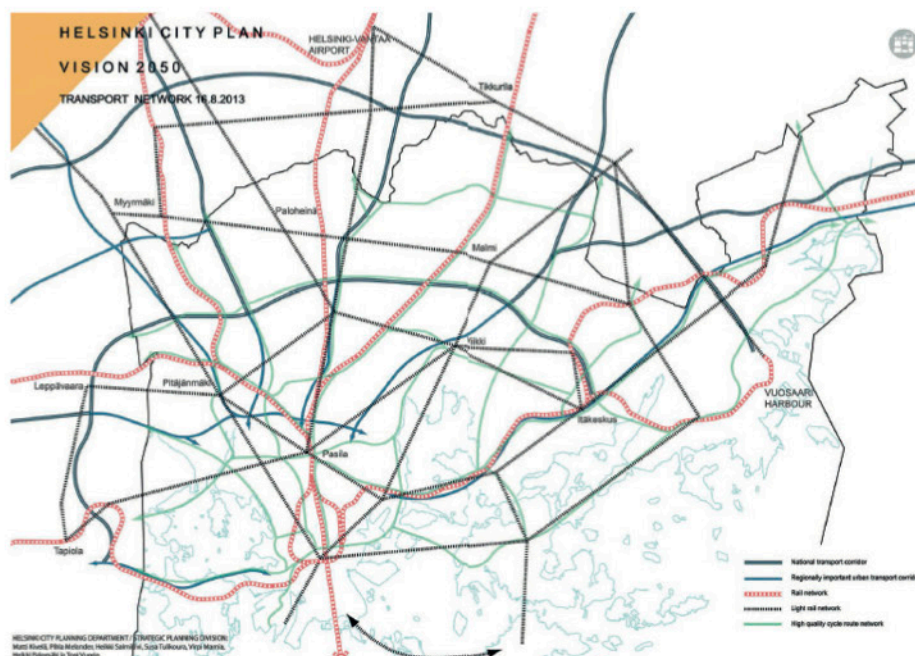Figure 2.27 - Helsinki Core Business Areas. 2013

Figure 2.28 - Helsinki, Transport links, 2013

Helsinki – 'The City of Economic Growth and Jobs'

Economic growth plays a key role in shaping the masterplan and the city's identity as it aims to create an 'internationally attractive metropolitan area'. The principle theory behind increasing economic growth in the city is to connect business hubs together through transport links[39]. A map, shown in figure 2.27 is employed to represent where the key 'cores' of business and the centres of high productivity are. The map generated appears extremely abstracted and undefined suggesting a degree of fluidity to the readings. It highlights the ambiguous, unspecific nature of mapping the invisible forces that operate within the cities. The intangible, non-physical relationships generally produce ill-defined maps because many factors impact the data. It therefore becomes very difficult to forecast an exact future masterplan based on these readings. Inevitably the data collected will experience the notion of lag, becoming quickly out of date. The 2050 masterplan acknowledges that a representation of reality will be redundant and therefore looks to a more fictional map to convey ideologies behind the map. It remains in a fictional state therefore negating the need to represent a true vision of a future reality.

The system bares resemblance to how Saarinen's masterplan became indirectly realised. It produced a visual ideology reflected from readings of the city that influenced urban planning, architecture and the built form for almost a century. Pinder states:

"the map does not provide a direct view on reality like a 'transparent window on the world', or reflect like a 'mirror of nature' but can be better understood as a form of discourse which is actively involved in the social construction of that reality" [40]

Pinder suggests that the role of the masterplan map is closer to that of the diagram. Its involvement in the social construction of the built environment happens by outlining principles and ideologies taken from the city and not

in representing a direct static image of new 'reality'. The diagram allows for a more fluid dialogue between the mapmaker and the inhabitants of the city because the city's evolution is not governed by the fixed 'view of reality'. It therefore allows for more specific secondary masterplans to evolve over time, aligning closer to the changes on the ground that begins to negate the effects of lag.

Arguably these diagrams can only influence when the city is already established because there must be an ideological base from which to generate the initial cartographic.. This example proves the masterplan can be designed to remain in an abstracted fictional form whilst still affecting the built environment. Therefore, despite the level of abstraction the map still plays a key role in influencing urban form.

SUMMARY TO PART TWO

The case study of Helsinki has attempted to validate the theoretical hypothesis proposed in Part One. The exploration of the key masterplans has shown how the map can display identity and power which influences the creation of a capital. These socio-political mappings of the city that help represent ideologies that influence future plans and urban form. It also shows a the masterplan can be drawn as a fictional map to try and negate the affects of 'lag' and provide a common goal for the city. The analysis of Helsinki has been an invaluable example in supporting the 'Cartographic Paradigm'.

2^7

1^6

1^6

0^8

In 1827 the
Emperor ordered
the transfer of the
Royal Academy,
founded in 1640,
from Turku to
Helsinki.

DEFENSIVE
REGION

1^5

1^6

The Church of Ulrika Eleonora in the
Large Square, now Senate Square, is
demolished, and the parish graveyard
is leveled over.

1^6

neral Nikolai
ame the
n of the
ussification
l was widely
s shot dead
of the Senate
by Eugen

CUTTING TO Toolo B

1^1

1^6

LR.01

STATE

PUBLIC

LC.02

LPP.0

1906 - the Russian
influence over finland
starts to disove the
February Manifesto

1816 ZONEING OF STATE AND PUBLIC

1^1

1^6

5^8

2^8

CONCLUSION

EXTERNAL INPUTS

FICTION
THE
MASTERPLAN

CARTOGRAPHY
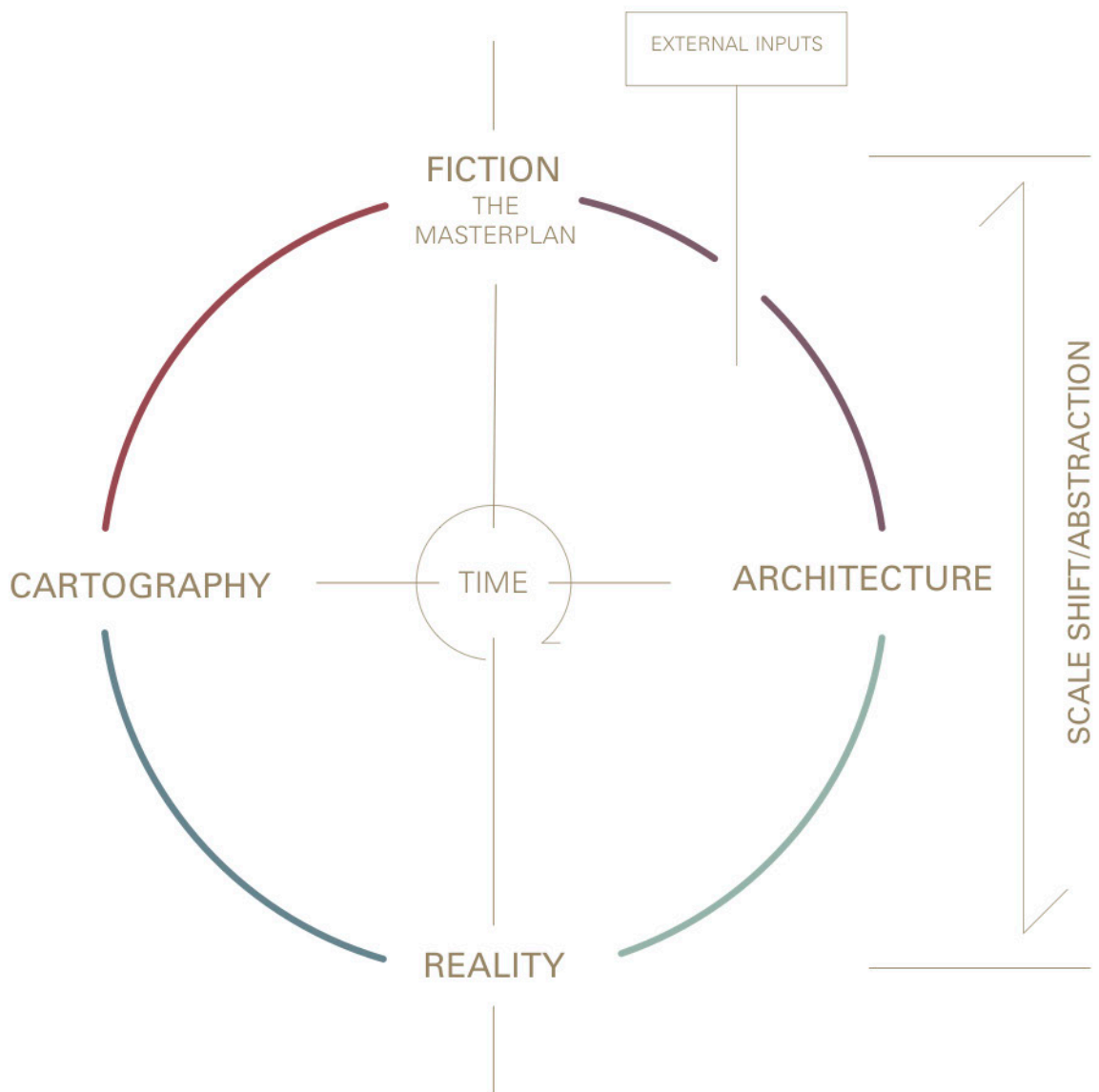
TIME

ARCHITECTURE

REALITY

SCALE SHIFT/ABSTRACTION

Figure 2.29 - The Cartographic Paradigm Model

CONCLUSION

Through an analysis of the professions of cartography, architecture, urban design and urban planning, a theoretical understanding of the cartographic paradigm can be achieved. It supports the hypothesis that:

The way we map our cities affects how we plan their future and, therefore, it becomes manifested in reality.

The birth of the zenith, planometric projection has allowed the map to produce a scientifically accurate plan of the built environment. However, in order to project an image of the city it must be scaled. This process abstracts and homogenises reality, as the map cannot represent the same visual resolution. The mapmaker acts as a 'sensor', sifting information and data to form a representation of the territory. This in turn introduces subjectivity that allows political, economic, social agendas and power to manipulate the visual form of the map. This shifts it from a view of reality to a fictional representation.

  The map also introduces the notion of 'lag'. This is time-based distance from one state to another. The city will evolve by the time the map is finished, therefore, the map becomes obsolete or out of date. However, these redundancies become engrained on the map and are accepted as a true representation of reality.

  The masterplan is a hybrid form of the cartographic projection. It employs the abstracted cartographic map as a tool to understand the socio-politcial and economic demands of the city and as a framework to project visions of an imagined future for the city. The masterplan's reliance on the map and cartographic techniques shape its form. Therefore, the way we map our cities affects how we plan their futures. The 'cartographic paradigm' places the masterplan at the most fictional position because it not only employs the abstract cartographic projection but also builds a future vision of the city that is abstracted once again by the agenda of the 'sensor', the

master planner. Therefore, the masterplan is the agent that allows the means of crossover for socio-politcial and economic factors into the built environment.

Architecture provides a process that can descend the drawn scale to realise the masterplan, which closes the loop of the cartographic paradigm. It can manifest the vision directly in reality. However, commonly the masterplan remains in the fictional state hosting ideologies that act as a guide to both future projections and architecture.

Helsinki provided a case study to validate the theoretical study. Finland and its capital are the result of a series of political projects. The exploration of three masterplans, produced at key epochs in its history, discovered how different maps can display identity, power and mark territory, which in turn influences the built environment.

In 1809 under the agenda of Imperial Russia the capital was moved from Turku in the west to Helsinki in the East. This shift demanded a new city plan that reflected the Imperial Russian agenda. Ehrenström's masterplan employed a strong grid system to the masterplan of the city as a display of power. The sensor can manipulate the grid system to accentuate hierarchy and power. Investigation of Mercator's and Peter's world maps proved that this influence originated from how the map was drawn. The scalar abstraction of the zenith map created freedoms, away from the built form and the environment, to impose a representation of territory in a fictional vision of the city. The fictional position abstracted the view of the topography of Helsinki allowing the grid to be manifested.

The analysis of the 'Daughter towns' and the Töölönlahti bay area in the second masterplan, gave further credence to the hypothesis. Saarinen's 1918 plan, although un-built and unrealised, remained in the fictional state presenting future ideologies that influenced the future form of architecture

and the city for over a Century. This is most obvious in the effect on Alvar Aalto's, Finlandia Hall and J.J Sirén's Parliament Building.

The 'Greater Helsinki 2050' masterplan described how a purely fictional map, with no intention of realization, allows for a more fluid dialogue between the mapmaker and the inhabitants of the city. The city's evolution here is not governed by a fixed 'view of reality'.

The case study of Helsinki provides a real example of how the 'Cartographic Paradigm' can influence urban form, giving further credence to this paper's hypothesis.

A Glance to the Future:

Applying the Cartographic Paradigm to future mapping techniques a speculation can be formed of the resulting future urban form. As the ability to photograph, three dimensionally scan and real time mapping becomes established this will begin to eliminate the notion of 'lag' because the map will reflect a true reality. Arguably this will affect the way the masterplan is formed. If the image of reality is less abstracted by new mapping techniques it would suggest, according to the model, that the resulting urban form will align closer to the individual. Given that the map is the agent that allows the means of crossover for socio-political and economic factors into the built environment the new 'digital' map will arguably align closer to the demands of the inhabitants that any agenda driven centrally or through a hierarchy.

However, despite the shift in technology, the way we map our cities will still have an effect on how we plan their futures and, therefore, how the masterplan becomes manifested in reality.

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THE CARTOGRAPHIC PARADIGM

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32.   Hurni, L., & Sell, G. (2009). pp.327
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PART ONE

FIG 2.1   Author's own
FIG 2.2   Ibid.
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FIG 2.11   http://www.helsinki200.fi. (First accessed 24 September 2014)
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FIG 2.27   Ibid. pp.33
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