

# INFRASTRUCTURE AS AN INCUBATOR

Spatial Strategies for Railway Projects in the Periphery

By  
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# INTRODUCTION



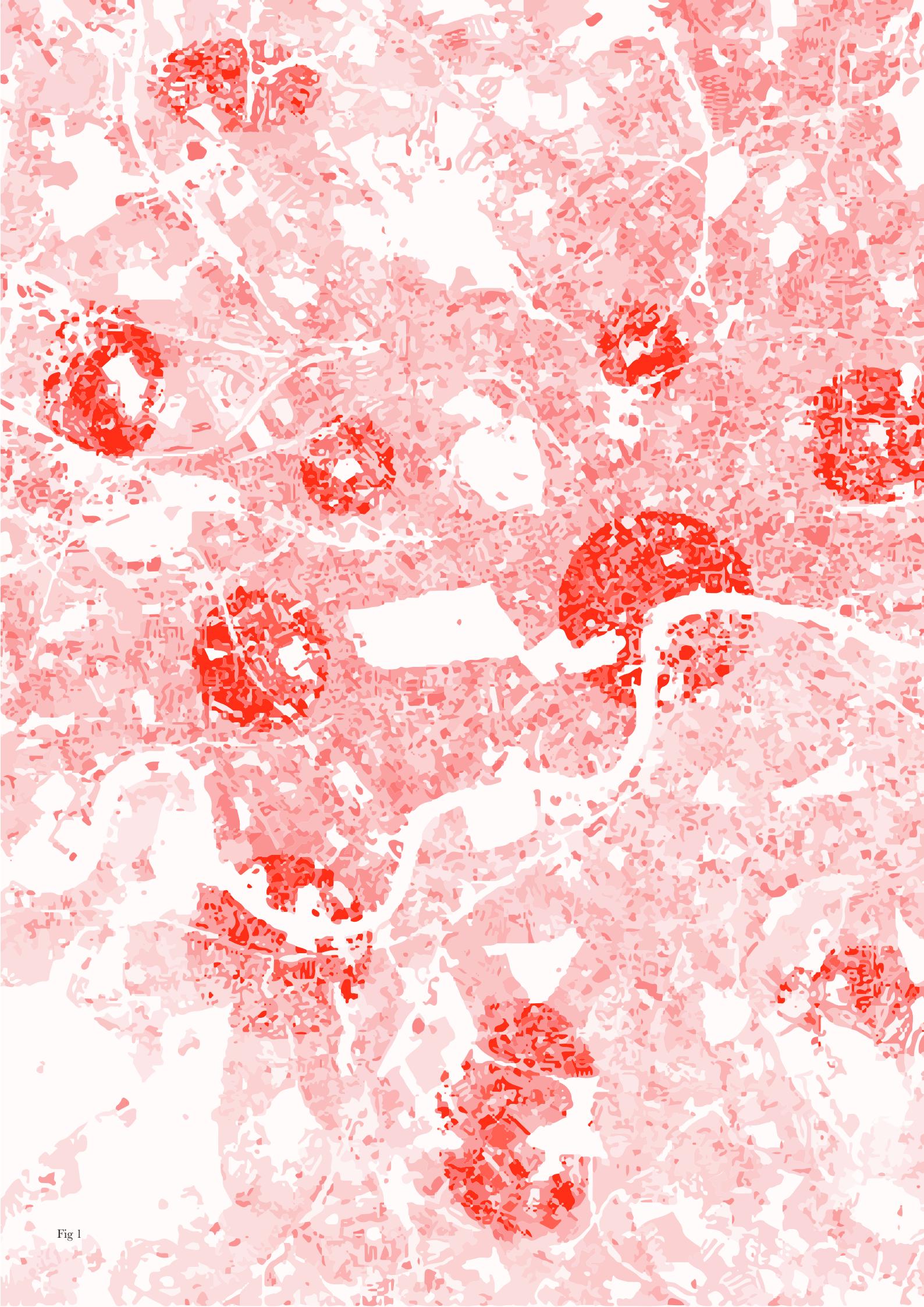


Fig 1



As London attempts to be a more polycentric city, increased infrastructural investment continues to be a primary driver of change.

How should the city plan for the urban transformation that projects such as Crossrail generate?



Fig 2

Over the last few decades, railway stations have been endowed with a reinvigorated significance across Europe. They become key sites of redevelopment and the strategies concerning station areas is an extremely topical urban issue. Station areas are no longer just points of transit but have evolved as urban concentrations where large accumulation of people, activities and functions converge. (Christiaanse, 2005) In light of rapid changes to public infrastructure networks, local authorities are often at a loss to figure out the mechanism of development that could be appropriate to urban areas around these infrastructures. While there is general expectation for a mega change that the infrastructure will bring and that there needs to be ways to enable that change right away, there is a persistent confusion about how to prepare for that. This also starts to be a time problem- who are the actors and stakeholders that can act in time to transform the conditions before you lose the opportunity to gain maximum value and control? In other words, if the train arrives before anything significant has happened, nothing will possibly ever happen. If you develop transport infrastructure and you don't capitalise on the value proposition within a couple of years, you lose the advantage and it becomes increasingly difficult to transform it later. This is especially apparent when it comes to peripheral areas of the city that have more ambivalent patterns of development.

For instance, Crossrail is the most significant infrastructure project in Europe right now. It completely redefines how London is growing and creates an opportunity in making it a more effective polycentric city. Areas like Ilford and Romford are being fundamentally altered by the investment in the infrastructure as they are a part of a much more expanded conception of what these formerly peripheral sites can now be. Romford is now part of a network of interaction that takes full advantage of its position between Essex and Central London so as to reclarify the vocation of this urban area with respect to the larger system.

When we begin to plan the expansion of the transport systems, we look at these areas and their potential as connections. There is a tendency to treat them as points and lines. Naturally, the first line of thought then is that we have to build a new station and extract as much value from it as possible by introducing a plethora of services right at the station. This opens up a whole field of thought about the conjunction of investment in transport infrastructure and the logic of spatial planning. Romford is indicative of this trend. All the masterplans seem to plan a high level of intensity at the station and this seems like a reasonable approach but it also starts to beg the question of what the real value of improving the overall speed and capacity of the metropolitan system is and how we should address the larger urban area and not just the station itself. This in turn has implications on how we plan the immediate station area and also how we think about the wider integration and permeability related to the rail lines itself.

How does one think about the nature of the study area when we are looking at these kinds of sites? This depends on the understanding of what the drivers of change for transformation of these sites are. It begins by building on the concepts of urban area and why it's a little bit different in these sites in contrast to central city environments. The infrastructure plays a critical role in creating connections for new kinds of actors and stakeholders within the area. It is imperative to acknowledge how questions of future mobility also structure one's understanding of connectivity, linkages and capacities of these sites. Morphology and mobility work hand in hand to help one define the study area. These questions will shed some light on how areas such as Ilford, Watford and Romford are looking to improve and transform based upon new patterns of connectivity. Chapter 1 seeks to clarify the tensions and synergies associated with an urban area by analysing why scale, pattern, grain, dimension and mobility systems matter. We see this both by zooming in on the characteristics that make it possible to transform the urban area in different ways as well as by expanding the field of view so we see how urban neighbourhoods coalesce into districts. This sets up the richness and multiscalarity that is inherently embedded in this approach.

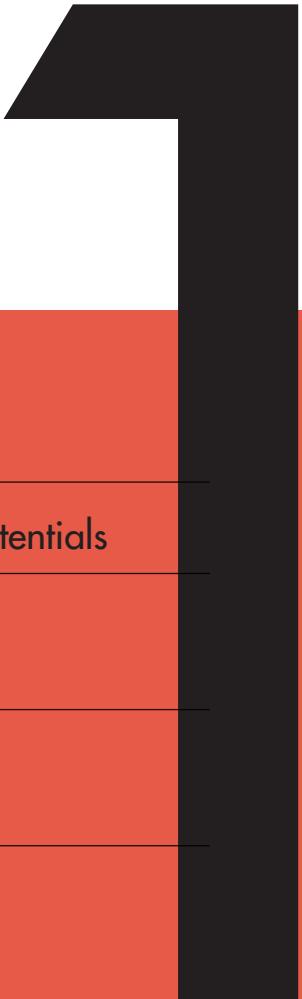
As one understands what are the forces of change, there is a need to simultaneously reflect upon the infrastructure itself. A key part of my investigation is going to be to understand just exactly what the nature of the infrastructure is- what does it do and how does it participate in establishing a sense of concentration, type and pattern? The implications of station design itself is a key aspect of the definition of the urban area. The different approaches of building concentration around the stations- for instance either at a distance or on the station itself has varied effects on the nature of the urban area. The station becomes the starting point to integrate things more effectively over the wider territory. Chapter 2 presents this analysis through the lens of the vocation of the urban area and how the ambition of spatial planning needs to be changed and extended.



The effects of infrastructure are not limited to the immediate station area alone. The extents of the infrastructure have a deep impact on the larger area and establishes differential challenges and opportunities based on whether it is buried underground thereby creating a surface or whether it's visible and acts as an element that structures the space. There is a plethora of examples across the world that utilise and build on these characteristics by acknowledging the infrastructure as already an aspect of the thick 2d metropolis. As we delve deeper into these precedents in Chapter 3, it starts to become clear how the extended concept of the multi scalarity of urban area works.

The central question of this thesis is about how one expands the real value of the investment in the infrastructure. This depends on the attitude of the architecture and planning in acknowledging infrastructure as part of the urban area and its role as an incubator for these peripheral sites. In order to build a system where the whole is hopefully greater than the sum of its parts, we must include the logic of how investment in extensive transportation systems and extracting the potential of this integration and synergy comes together in multiple scales. From this moment of investment, the thesis raises several questions of the planning problems and strategies that we see in projects across the world and challenges those conventions through a method of integrating questions of mobility with strategic spatial planning using tools of precedent and project driven strategies.

## EXTENTS OF THE CHALLENGE



Conceptualization of Urban Area

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The Changing nature of the Periphery and its Potentials

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Morphology in tandem with Mobility:  
Reframing the notion of corridor and urban area

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Station Areas and their Vocation  
Case studies: Orestad, Zuidas and Almere

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Critical Comparison of Precedents  
Parameters: Morphology, Programme and Phasing

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Fig 3 : Street based structure of Fitzrovia



Fig 5 : Streets being the primary ordering device

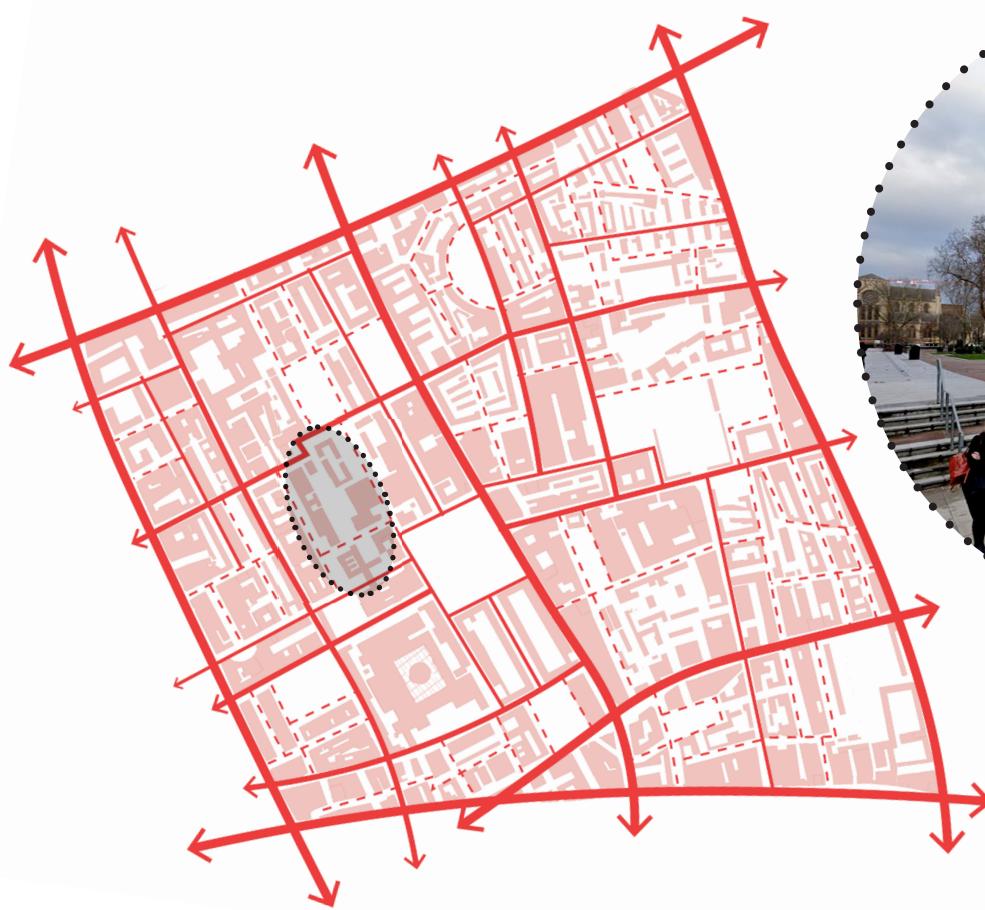


Fig 4 : Campus based structure of Bloomsbury



Fig 6 : Squares and Shared spaces in Bloomsbury

## 1.1 CONCEPTUALIZATION OF URBAN AREA

How do you frame the urban area that needs to be studied in order to understand the forces of transformation at work? Is it the station area alone; is it the larger networks of mobility that shape the city; is it the entire extent of the rail infrastructure or is it simply dealing with areas that are next to a railway line? The answer to that is that the study area is never a single thing. It's a layered concept. There are different ways to think about how you frame an urban area and how you might see it as containing overlaps. So, it depends on how you read its structure and recognise the potentials at multiple scales.

It is useful to reflect on the observations of Rossi and Rowe about the nature of a study area. The city evolves as a set of parts that are highly differentiated in their morphological and sociological characteristics. These distinguished characteristics are a result of a synthesis between functions and values over a period of time. Therefore, the form of the city can be understood as being intricately bound with the city's evolution that starts to provide clues about the way of life in these areas. This is different from simply understanding urban areas as constituents of function as this reduces the complexity of an urban area into a simple question of organisation and circulation patterns. This understanding pre-supposes that the form can only serve a particular function in a static way and doesn't engage with the evolutions possible within those typologies. So, there are two key factors to acknowledge about the nature of an urban area- it is an area that has a complexity that can be described in comparison to other larger elements of the urban structure and that it operates on several scales.

Why is any of this relevant?

Different parts of the city contain a specific natural order, the basis of which is culture. Culture is everyday life, materially understood. This is the lens in which to see if an area is working- how services, work and living environments dovetail each other to work seamlessly. The ability to discover and observe how this layering functions within each particular area starts to be used as a diagnostic tool to evaluate it. When decisions have to be made on how to build in conditions of uncertainty or speculation, understanding of an urban area and its potentials and challenges becomes critical.

For instance, areas like Bloomsbury, Fitzrovia and Soho have an identifiable structure that start to explain the kind of life that they can support. In Bloomsbury, the patterns of movement are campus-based with larger footprints that are organised around a series of squares and shared spaces. This is a direct reflection of the fact that this is an area that houses the University College London that allows for specific synergies to exist within this urban structure. This is in conjunction with other important elements such as the University College Hospital, Euston station and institutions like the British Museum that is indicative of a particular typology of the area where streets are not the primary carriers of the life and instead is reliant on spatial devices that allow an interiorised urbanity to exist. In contrast, areas like Fitzrovia and Soho establish a stronger sense of street life that generates a fairly well-ordered differentiation of parcel and block sizes. This is a more regularised gridded organisation where the buildings offer a variance in terms of transparency and porosity that support functions of various scales, thus making them extremely suitable for the growth of creative industries. Both of these cases establish a distinctive pattern of continuities and differentiations that give rise to different morphologies and spatial ecologies.

As these neighbourhoods get transformed with new replacements and superimpositions, there are still remnants of things that somehow carry a fundamental value within the overall urban area. By viewing urban areas as a landscape of culture, one could speculate that the differences we see today actually extend a long way back and yet both the areas have been transformed radically through different means. If we start to look at Bloomsbury, Fitzrovia, Soho and Covent Garden together they form a well-known recognisable district- London's famed West End. Together they start to coalesce as a centre for culture, arts, entertainment and businesses associated especially with creative industries. We have begun to clarify the multi-scalar relationships of it all, where the whole starts to be greater than the sum of its parts. This is possible both when we zoom in and look closely at the buildings and also when we expand and see how these neighbourhoods form a district.

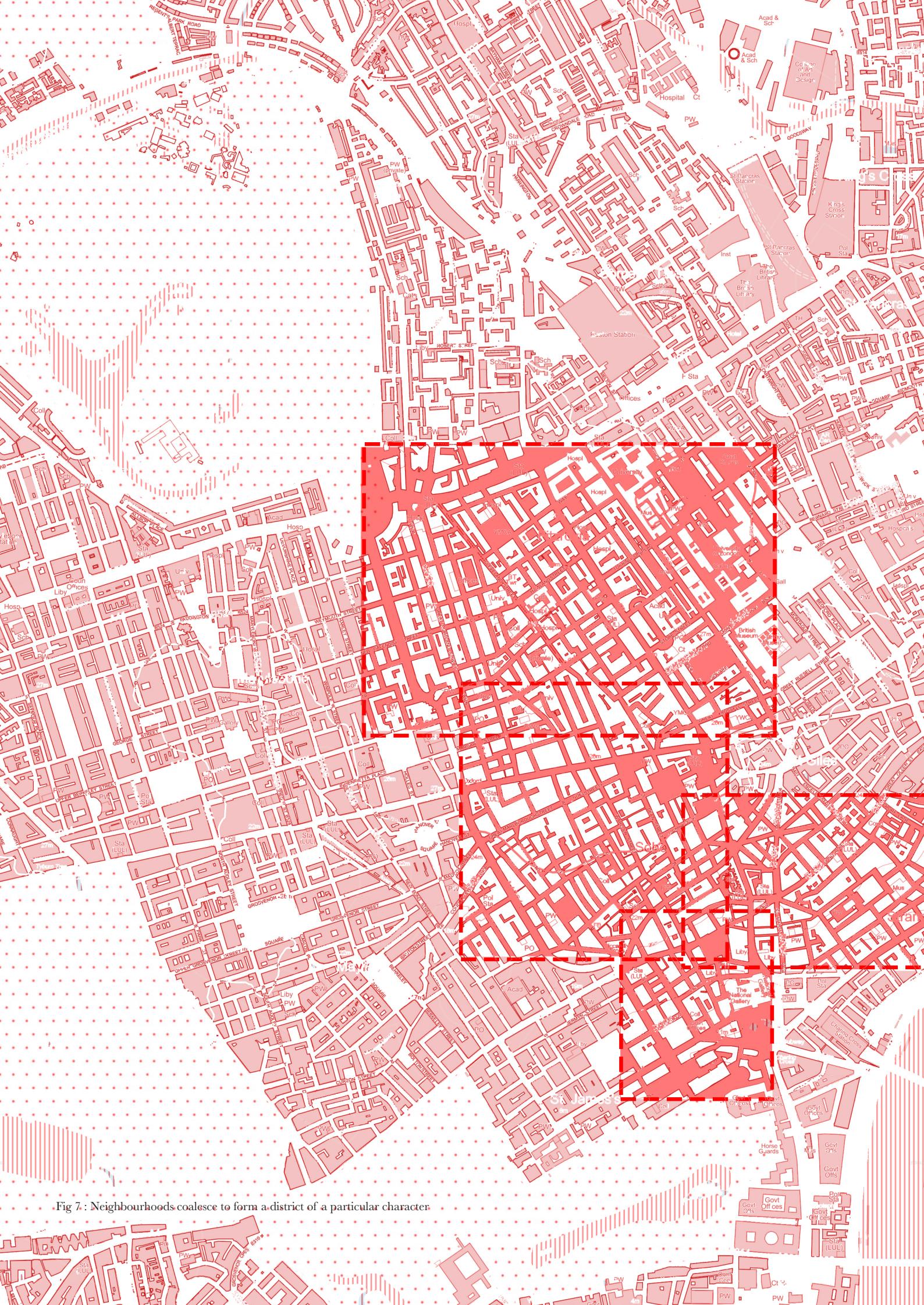


Fig 7: Neighbourhoods coalesce to form a district of a particular character.



As illustrated, it is not difficult to understand the concept of urban area when we look at well-defined areas such as Soho or Bloomsbury. The trouble starts when we try and do the same with sites situated in peripheral areas such as Watford, Zuidas or Romford. By definition, many of these peripheral areas would be lacking in the qualities we are looking for if we wanted to see an easily recognisable structure. Peripheral condition implies a zone of limited political intent where fragmented infrastructure overlaps dispersed urban form and where the historical, the paradigmatic, the natural and the expectant coexist within a continuous milieu. (Woodroffe & Papa, 1994) The key is to not understand these areas as a simple contrast to inner-city neighborhoods but from the point of view of the vocation it carries within the larger metropolitan system. The mobility systems in an urban area carry particular characteristics- they have hierarchy, extension, differentiation in terms of speed and capacity. They also have varying degree of balance and regularity. The understanding of urban area thus already includes extensive transportation systems in enabling wider integration and synergies.

Even as we make efforts to make London a polycentric city, our ability to achieve a compelling level of integration with our peripheral environments is often lacking. The continuous investment in public transport infrastructure to better connect these areas automatically alters the conditions of this peripheral sites and starts to beg the question about how the spatial strategies for these sites ought to be conceived in order to expand on the value of that investment. This is a question that is significant in different parts of the world and there is a lot to learn from the instances where some cities are working really hard achieve this integration such as in the case of Almere. These attempts are conditional on a precise understanding of the urban area and its vocation as that will help us answer questions regarding patterns of accumulation, investment and the ability to build associations between possible actors. If we are to say that an area could be better if we invest in the railway infrastructure, that has to be supported with a knowledge of how this renewed capacity and integration with the larger city will help that particular part of the city.

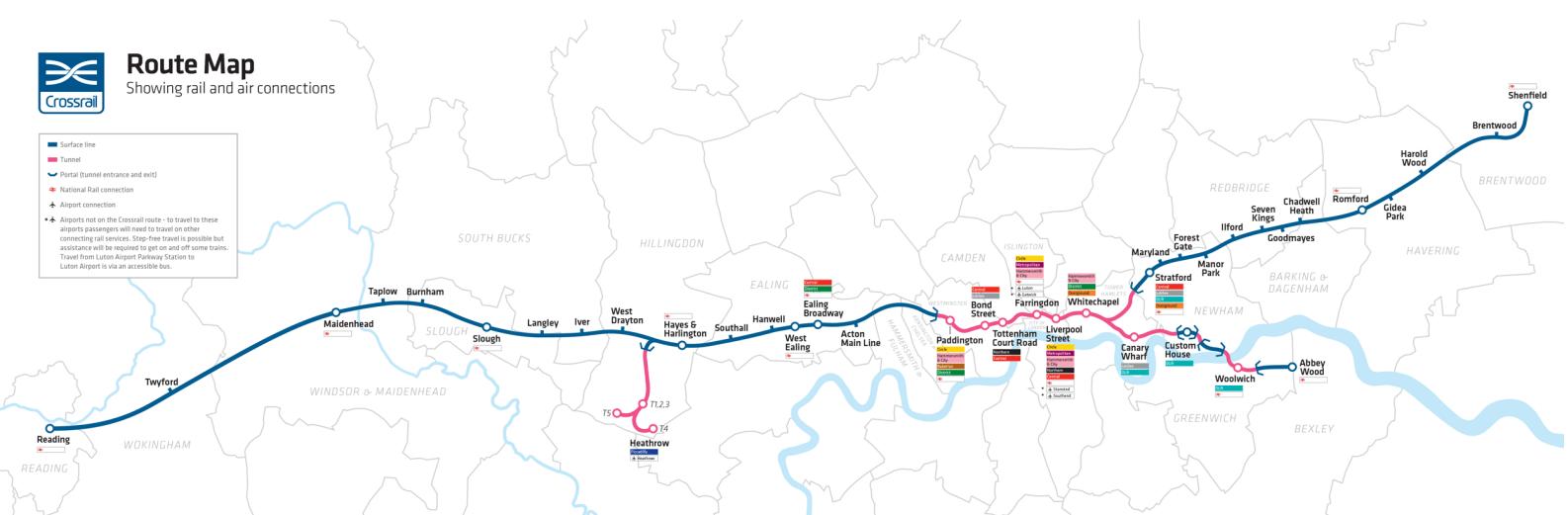


Fig 8 : Crossrail Map

## 1.2 PERIPHERY AND ITS POTENTIALS

The challenge of peripheral urbanisation is a question that has long been part of the discourse of urbanism. There is a tendency either to describe the periphery as an opposite from the central city or to just try and replicate inner city environments in an uncritical fashion in geographies that do not support those structures. The term periphery is a significantly open term, describing often similar physical, social, historical or geographical conditions of disengagement from the center. (Shapiro, 2009) While recognising the ambiguity associated with the term ‘periphery’ it is nevertheless possible to describe the morphological characteristics and spatial challenges of its condition. They are often areas of neglected land and urban voids carved out by the crisscrossing of infrastructure. Another way to describe them is by the concept of ‘edge condition’ and this brings out the interesting duality of their juxtaposition of both a rural and an urban character. They are associated both with the openness of the natural environment as well as the intensity of a city dynamic.

The trickiest question about the periphery is how does one plan for the future when there is no past on which to make assumptions about the direction of its development? They are often devoid of the rich context associated with inner city sites and leads us to address a set of very different questions. The peripheral condition refers to the lack of any apparent hierarchy that can hint at a readable spatial logic and organizational structure of the area. How does one choose a site of intervention or start to speculate the possible actors who can invest in these areas? Given the uncertainty and the prolonged time frame required for development, what is the role of effective phasing of the project?

Creating environments of high density in peripheral areas often do not generate enough capacity for them to be economically viable. The solution needs to combine the complexities of its socio spatial nature with the establishment of sustainable economic processes that can enable the sustained growth of the area. This can only occur when the design is treated as a process that caters to the unpredictability that is associated with these sites. Each part of the project has to be understood as part of a network that is consistently growing and evolving that provide an effect of completeness at every stage so as to achieve the critical mass required to sustain the development. This means that along with the propositions about fixed programmes that envision the mix of high quality residential and public spaces, further attention needs to be paid to the synergies and crossovers possible to expand on the value of existing networks. The approach of introducing a greater mix has to acknowledge its primary goal of being an urban generator in order to deliver the necessary urban intensity.

Projects such as Crossrail fundamentally alter this peripheral character by an increased investment in transport infrastructure and this starts to reframe the vocation of these areas. Areas such as Watford that are extremely well connected afford a different kind of opportunity than those of central city environments. These are areas which attract a whole host of industrial and workspace units owing to the cheaper land value. These are often incubators for creative industries that operate on limited budgets and need cheap flexible spaces. They are reliant on networking, cooperation and face to face contact, thereby forming clusters that act as forces of regeneration. (Beekmans, 2014) Apart from just being accessible to the central city, they also have the unique advantage of simultaneously being fairly well connected to the larger region. For instance, Watford provides an opportunity to be close to Central London as well have good connections to Luton airport, the Oxford Cambridge corridor and adjacent cities like Birmingham. We see something similar in the area referred to as the ‘Hollow Core’ - between the Randstad, Flemish Diamond and the Ruhr Area. Within an hour, residents of the Hollow Core can reach 4 international airports, 8 intercity railway stations, 16 universities, 32 international sports venues, and 64 shopping malls. (Schuller, et al., 2009) These sites make one think about regional densities, networks, data superhighways, compatibilities and accessibilities, all of which enhance the capacity and long-term viability of these areas. These areas offer a level of integration and typological programming that cannot be conceived or sustained within the traditional city fabric.

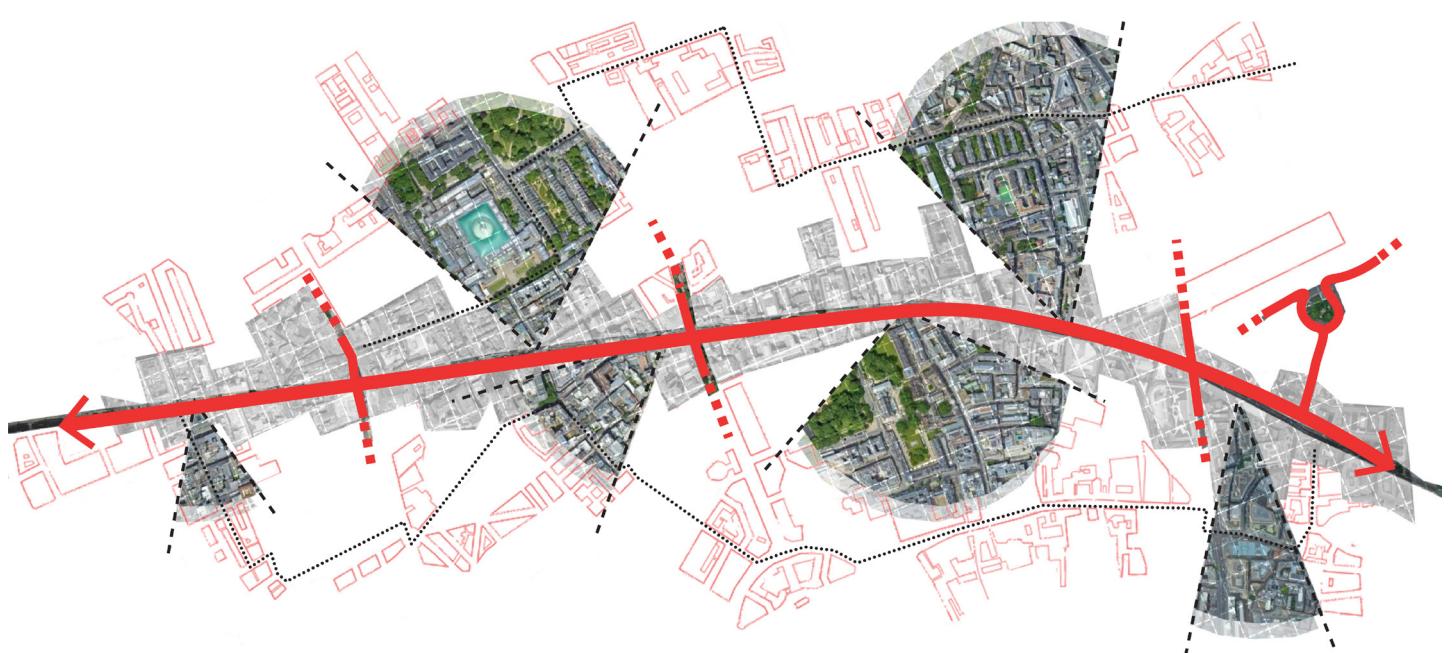


Fig 9 : Shifting from a logic of corridor to that of an area

### 1.3 MORPHOLOGY IN TANDEM WITH MOBILITY

The nature of station areas has been transformed from monofunctional clusters into a hybrid urban typology, often containing high-density mixed-use areas. These 'big' elements within the cities start to coalesce and structure a new form of urbanity. This is a clear departure from the way these were conceived as autonomous elements within an urban fabric that most often created a rupture in the structure of the city. This relevance is in part owing to the renewed interest in investing in public transportation infrastructure.

It is also reflective of the ways in which the nature of mobility itself has changed. People are now more mobile and the nature of work is no longer about being tied down to a particular location but is closely related to issues of networking, collaboration and flexibility. There is an overlap between work and the private life as the work hours are not regimented to a fixed schedule but is adapted to the personalised requirements of individuals. Moments of transit can also be productive spaces with the percolation of advanced telecommunications. All of this also means that micro mobility and the interrelationships between various modes of mobility are extremely vital to the way we live and work in cities today. This invites us to ponder about the spatiality of areas that foster this urban mobility patterns. This adds to the reasoning of why morphology and mobility both work together in structuring an urban area. Questions of sequences, gradients, concentrations and the ability of things to work and expand in multiple directions start to become part of the principles of spatial strategy for these areas.

Why should we be concerned about the larger scale of mobility networks when we talk about a particular urban area? Why are issues of integration important at all? The answer comes back that each of these locations that are now accessible to the rail lines are by virtue of being part of the system itself, attached to larger urban areas such that they now carry a vocation in relation to the city. The significance has to do with the fundamental value of urban systems- Convenience, accessibility, networking, synergy, interactivity etc. Thus, people who support high speed rail infrastructure realise that it's about capacity. It makes everything in the entire system work better such that over a whole series of scales we can start to enable more people to have access to things, especially when we talk about business to business networks. The question of capacity is one of the biggest challenges when we talk about viability of development in peripheral areas. With the eastward growth of London and investment in the Crossrail, several opportunities open up to reconceive these station areas as there is a noticeable improvement in delivering capacities to these sites.

A physical separation is no longer a question of distance but one of time. This is exactly the reason why private developers are now interested in areas like Watford, which can be reached in 20 minutes from Euston even though it is 20 miles away. As the question I am interested in is about the nature of development in these station areas, it is important to integrate questions of mobility from the start. The study area cannot be independent of the infrastructure already in place and has to be a key factor in the way we conceptualise the area. It therefore starts by treating the rail infrastructure as already an aspect of the thick 2d metropolis.

The question then is how well integrated can it be and what are the mechanisms of the integration? These infrastructures provide for a regional, national and global scale- frequently bypassing the spatial localities which the infrastructure passes through. (Hauck & Keller, 2011) There is thus a danger of conceptualising these infrastructure networks in the form of corridors that simply connect point A to B. Corridors link associated elements at a distance- therefore the implication is that neighbouring elements may lack a sense of affiliation when unsupported by the concept of area. That leads us to the local questions of what kind of neighbourhood it is. This shift of the logic from a corridor to a neighbourhood is achieved by using ideas of type, mobility, hierarchy and pattern. All of these point to a web of relationships, rather than a map and a line.



Fig 10 : Services concentrated at the Utrecht Station



Fig 11 : Transformation of King's Cross planned over an extended area

## 1.4 STATION AREAS AND THEIR VOCATION

It is necessary to acknowledge at the outset that the transformation of station areas depends on a lot more factors than just the question of infrastructure. For instance, while it is easy to concur on its potentials, we are also keenly aware of the high costs and risks associated with it. The viability of these projects is hinged on getting the right actors on board and allowing for a sharing of risks and responsibilities. While these issues will be touched upon, an in-depth analysis of institutional frameworks and delivery models is beyond the scope of this thesis. The focus remains on how the design process is instrumental in establishing long term value of these areas and the implications of that process in strengthening the stakeholder assemblies.

While trying to deal with the tricky speculative dynamics, stations have often been transformed into a ‘shopping mall on rail’ (Bertolini, 1998), where all plausible commercial activities are concentrated in the station to derive as much profit as possible. It starts to offer a range of urban services not just to people who are in transit but to the wider population as well. It seeks to become a destination by itself. Looking at a way to build on the increased capacity of these sites due to the increased linkage now possible with this infrastructure, these sites often market themselves as prime office locations or high-end residential areas. The emphasis here is on the indispensable asset of connectivity to larger networks of mobility: local, regional and even international in some cases.

While there might be an extensive list of strategies for such sites, it is useful to deal with the common questions that plague projects of this nature. This study argues that addressing the impact of train station developments needs to tackle questions beyond the station itself. Is it either necessary or sufficient to concentrate all activity at the station in order to tap the potential of the area? What is the role of an open structure that responds to the larger environment in establishing a new form of urbanity? Which typology can support this new form of mobility and the field of actions it involves? Which spatial structure could better engage the urban area into the layering strategy we described earlier?

I will be analysing these questions by using the project of Almere as the primary case study, which will be compared and contrasted with other peripheral site developments driven by an investment in infrastructure networks such as Zuidas in Amsterdam and Orestad in Copenhagen. While acknowledging that there are far too many particularities that drive urban processes in each case, this comparison is meant to be illustrative of the toolkit of possibilities for these conditions and can be used as a diagnostic tool to evaluate missed opportunities or exemplary strategies.

The rationale of the selection of the case studies is based on the methodology of understanding the vocation of an urban area- What exactly is it that they are trying to achieve? What is interesting about this question is that in order to answer it, we must first ask ourselves at what scale should we be asking that question. These two queries become interrelated to move towards a complex negotiated solution. So, the design of the station, which will be discussed to a greater detail in the proceeding chapters, is simultaneously an opportunity to clarify not only the procurement of the materials and actors for building it, but also the institutional and urban arrangements that define the vocation of the station district.

Thus, vocation and form are intrinsically tied together. If the station is a scene of various performance related objectives, we can deliberate that the immediate area around the station can have different roles to perform. It could be that of a place of linkage or service or synergy or a mixture of those characteristics. If we say that the station is a space for linkage, that everyone coming there is passing through from one point to another and then its fundamental role is to facilitate or enable the interconnection amongst modes. There is a competing tradition of seeing it as a space of service, primarily that of shopping. For instance, the Utrecht Station could be considered as an example of a station that is focused on service and on providing access to educational facilities, with a mall and university sitting right on top of it and with other facilities such as the visitor centre in close proximity. But the drawback of the service-oriented Utrecht station is that people often get lost inside this mall and find it difficult to orient themselves within the station. This is a trade off between linkage and service that is quite easy to spot.

Beyond this, an introduction of layering and intensification leads to an environment focused on synergy. It is about getting the right combination of services together so that they themselves give rise to the participation of new actors and stakeholders. King’s Cross is an area that allows for a

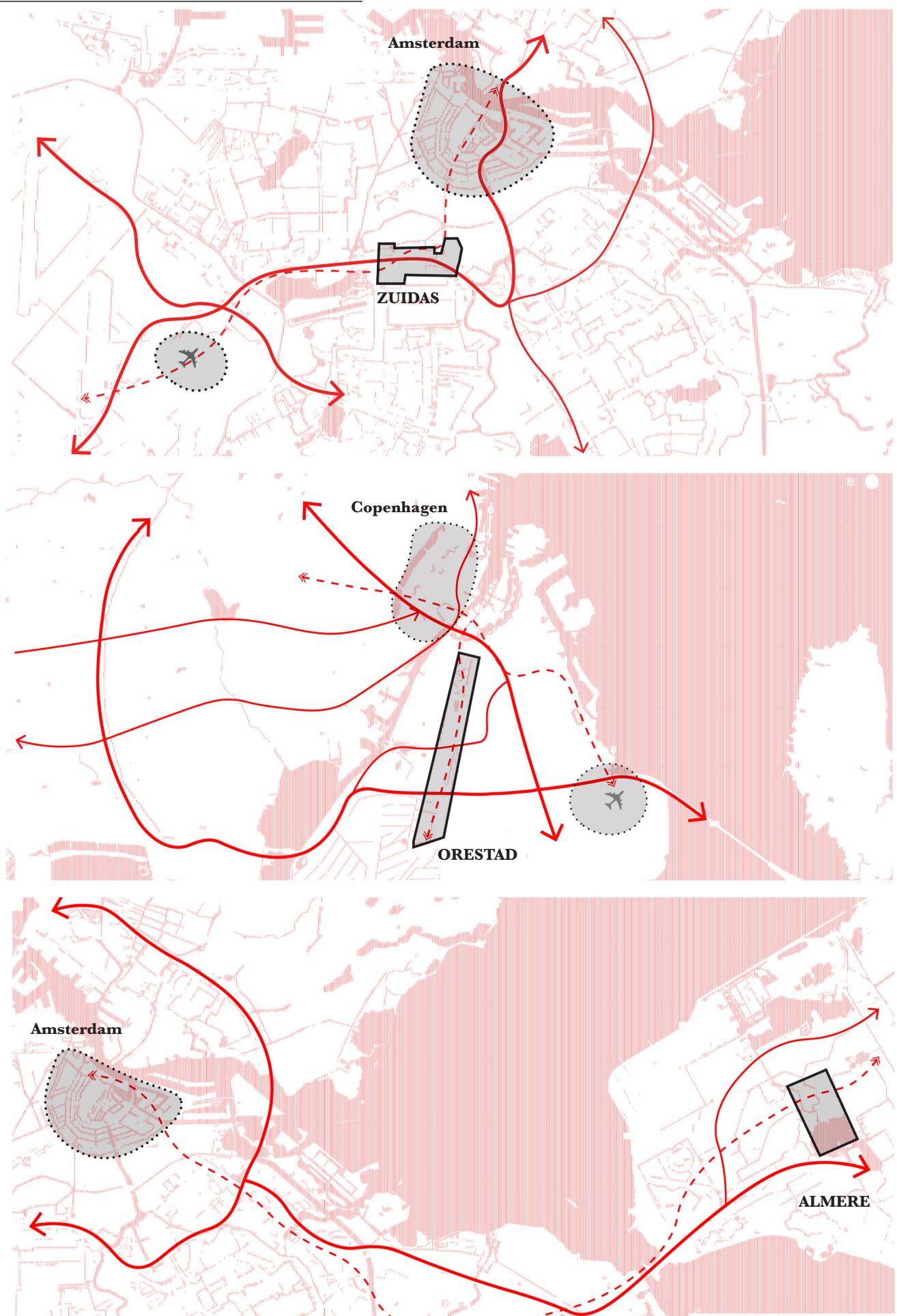


Fig 12 : Strategic Location of Zuidas, Orestad and Almere

— Road Network  
— Rail Network

rich crossover amongst commercial opportunities, residential environments, workspace and education. So, we see station areas can receive a much more complex environment. This starts to link the conceptual basis of an urban area to something that has a tighter focus on several choices to make that are rooted in the description of the vocation.

With this in mind, the three projects will be analysed based on parameters such as the existence of a permeable sequence of shared spaces, a supportive morphology, a synergistic programme and phased development. These will be very instructive to sharpen our understanding of the relationship between form, type and vocation by looking at the relative successes and failures of these projects.

## 1.5 CRITICAL COMPARISION

The three projects chosen have a few similarities- they are all peripheral developments that were reliant in varying degrees to the expansion of infrastructure that allowed these sites to become better connected to the larger region, they all operate in a speculative environment with long planning and implementation time frames and they all seek to deliver dense, lively mixed use environments that can generate meaningful urban intensity. The Orestad project was a result of the building of the bridge between Malmö and Copenhagen that opened up an entirely new international context for this region. This project was mainly a place of linkage and the focus was hence primarily on the development of the metro system. Zuidas was also an extremely well-connected area, not just by the rail network but also through the road and air networks. This became a coveted site that aimed to create very high levels of density right at the intersection of all these infrastructures by creating a hyper mix of functions that sought to achieve a great degree of synergy. Almere seeks to create a new convivial centre that is capable of creating an urban intensity despite its peripheral location owing to its relationship with the surrounding region such as its linkage with Amsterdam.

The subdivision of each of the categories of evaluation is mainly for the purpose of convenience. As one starts analyzing each aspect it becomes apparent that each of these factors are closely linked and start to affect one and other during the developmental process. It is a constant back and forth that is fascinating to examine and dwell upon.



Fig 13 : Distinct and independent projects in Orestad

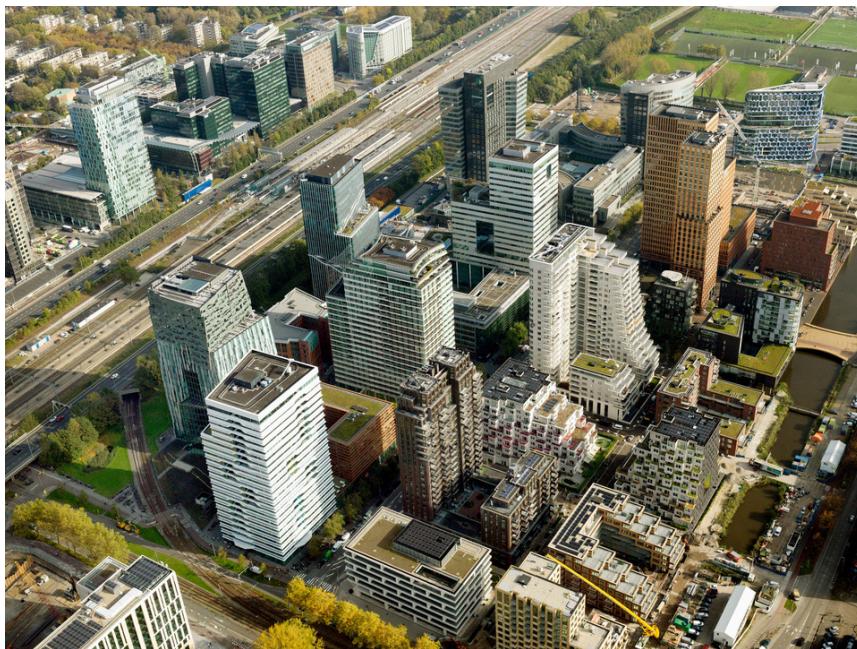


Fig 14 : Zuidas attempting synergy through a street network



Fig 15 : A more layered environment in Almere

### Morphology and Scaling up of Shared Spaces

Morphology is a key ingredient in our ability to understand how cities evolve and transform. This is more than a rudimentary understanding of classification and form. Morphology should be understood as an inner structure or logic that carries and distributes difference, enables and supports change, and defines patterns of coherence and continuity. (Barth, 2019) As we look at images of the three projects, (Fig 13-15) we can easily see that the division into discrete and independent projects is the clearest in Orestad and reduces considerably as we move to Almere. There is something in the character of this plan that allows us to see a more extended layering. Morphology starts to distinguish the potential for this layering in each of these plans.

The built environment in Orestad is characterised by exciting and autonomous architectural projects spread over a large area that have very little interaction with their surroundings and indifferent to the associational value possible between different buildings. Orestad provides us with insightful lessons of the perils of ineffective risk sharing mechanisms. The process innately locked the actors into an overdependence based on one particular outcome- without the metro, the project is not financially viable as the land value was determined by it. This led to a series of design decisions driven by financial need that hurt the long-term prospects of creating a vibrant neighbourhood in the region.

There was a reduction in the urban quality of the spaces designed and there was very little effort made to temper the instincts of private developers to maximise profit at the cost of a meaningful layering and coordination between different developments. The hierarchy of spatial organisation is heavily watered down and large parts of the area are dominated by surface parking. Instead of creating a sequence of spaces that enable the scaling up of activities, there is one very long structure that creates homogenous civic spaces. Thus, despite their innovative approaches of each specific building, the lack of coherence between projects detracts from the individual successes. Lene Tranberg, co-founder of Lundgaard and Tranberg Arkitekter, summed up this experience of Orestad by observing:

“every building is standing shoulder by shoulder, but none of them are shaking hands.”  
(Butler, 2016)

In the case of Zuidas, its primarily planned as a gridded structure that resembles that of Manhattan- with small block sizes and a relatively narrow street system. Mahler, the central office area for instance, consists of six blocks separated by streets approximately 10 m wide. (Trip, 2007) There is a clearer sense of hierarchy with the different projects adjacent to wider roads that can accommodate servicing and traffic and the internal streets having a more pedestrian character. The organisation is such that the office buildings will be clustered on the edges of the development and the public functions concentrated towards the centre, especially on the surface that is planned to tuck the infrastructure under the ground. This leads to two possible problems: The insistence of small blocks and an over reliance on a street-based organisation can start to become too rigid that doesn't allow for a diversity in the area. The mechanism of dealing with the severed site was through the realisation of the dock model that seeks to ‘heal the urban tissue’ by creating a two stacked tunnel that starts to integrate all the infrastructure networks. This is a very complex engineering task that requires high levels of funding and yet this was considered to be the only viable solution, despite the existence of other options.

Almere provides an interesting contrast to the notion that a fine grain urban structure is inherently necessary to ensure an urban intensity. They adopted the strategy of a megastructure thus bringing in a completely different scale to the context. By systematically superimposing the various uses along with the stacking of the infrastructure, it starts to resemble a layered cake, carefully crafted to ensure that the separation between each layer is as diffused as possible. There is no attempt to continue the existing grid structure and the design instead strives for a vertical zoning that attempts to coordinate disparate programmes together. Visual linkage and connectivity are achieved in a way that has now come to be hallmarks of an OMA project. This concentration is used as a means to derive an urban identity in a site that hardly possess any. This starts to highlight the potential of the superblock in creating urban intensity in peripheral sites. This variation in scale also allows for a differentiation in shared spaces generated, that makes use of the depths of the building to deliver an interiorised urbanity.

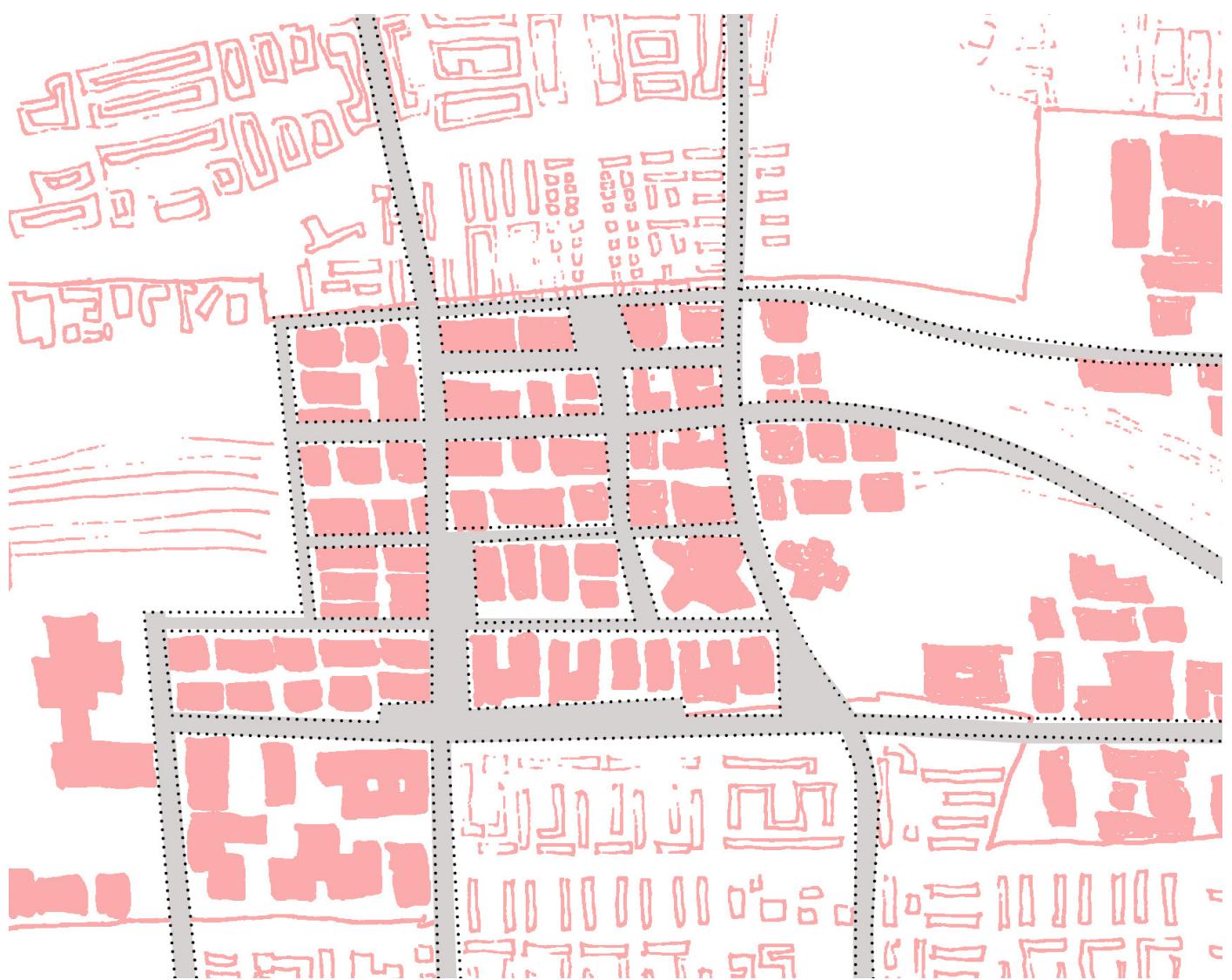


Fig 16 : Public spaces reliant on street network- Zuidas

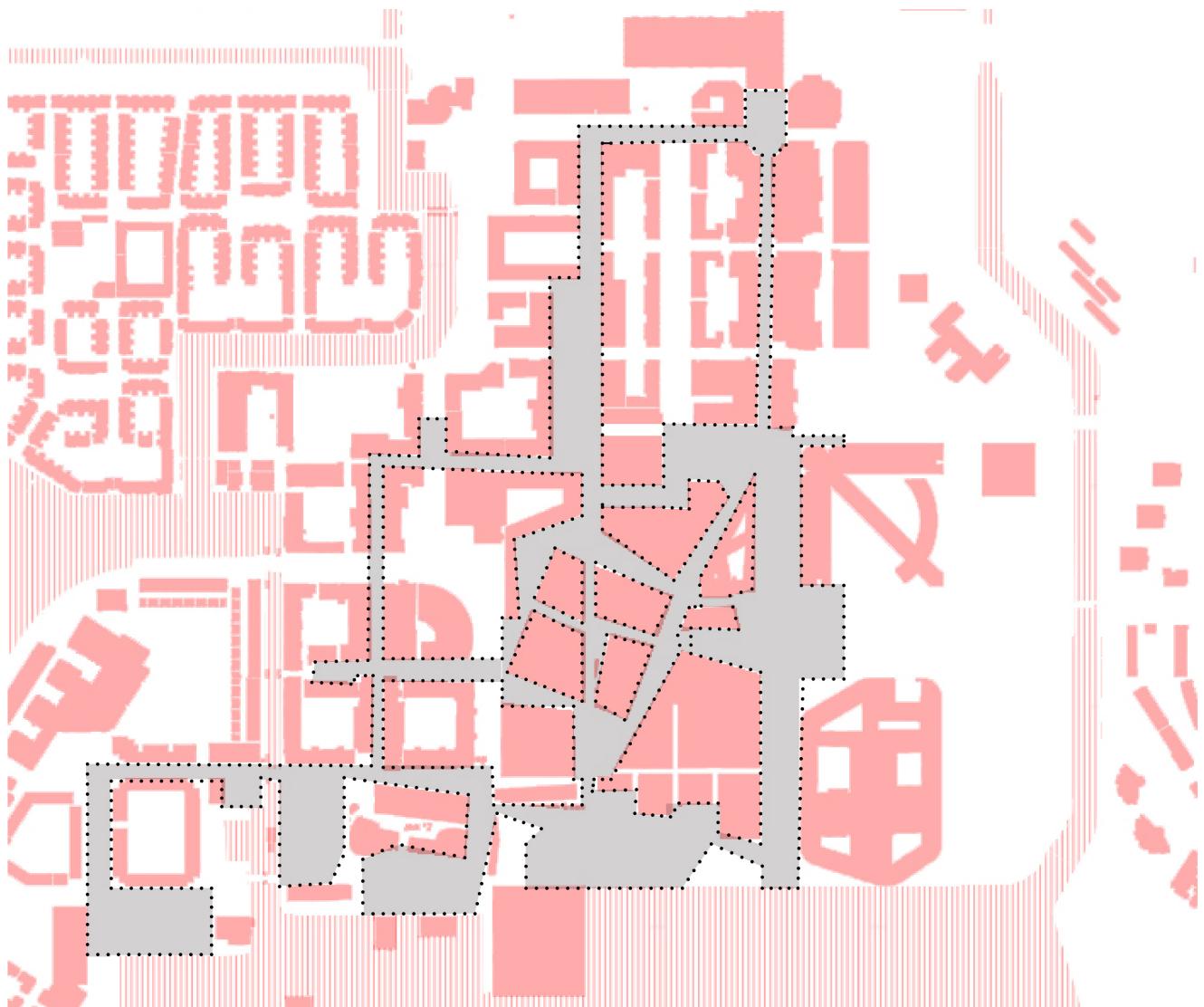


Fig 17 : Differentiated sequence of shared spaces- Almere

The project's approach to creating a centre for the new city can be argued to be more of an architectural approach than an urban one. But what this project exemplifies is that the constant back and forth between scales is required to deliver a kind of layering and complexity to an urban area. So, while Zuidas and Almere attempt to establish an urban intensity based on different approaches of pattern, grain and concentration, the Orestad development almost becomes too diffused as each parcel of land is regarded as a separate island of activity.



Fig 18 : Mall in Orestad

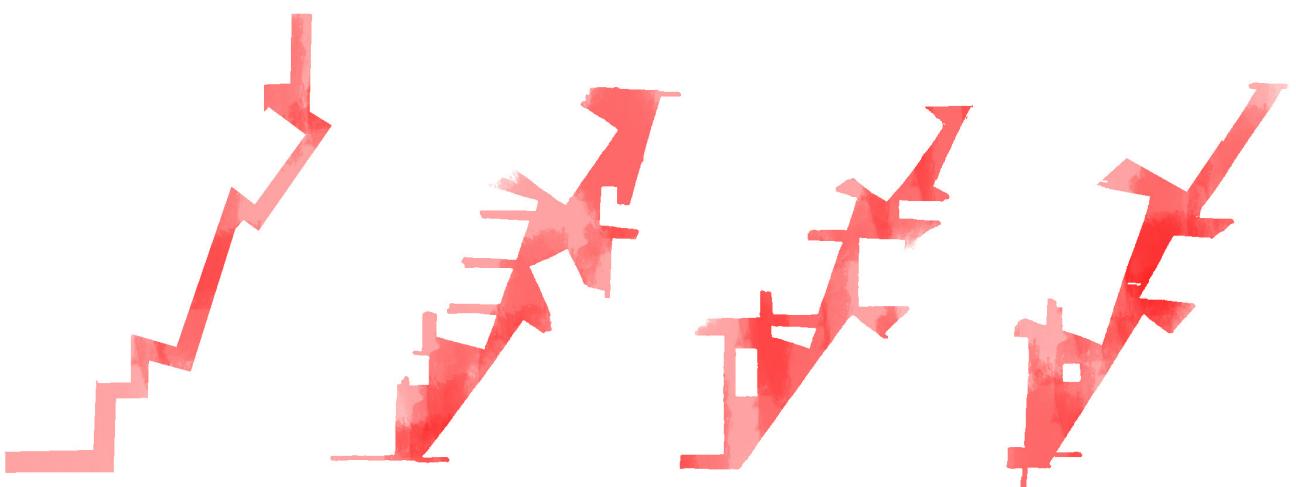


Fig 19 : Study of possible diagonal routes that connect the shopping streets in Almere

### Synergistic Programme

Functional diversity is incredibly important to create vibrant urban areas that directly correlate to issues such as safety and liveliness. This refers to the envisioned mix both in qualitative and quantitative terms- by which we mean the kind of interdependencies and synergies possible between various functions. They need to work in tandem and complement each other rather than competing for attention. While each of the projects aspire to being vibrant mixed-use environments, the way these functions are organised and integrated begin to show differential results.

In the case of both Orestad and Zudais, they are primarily viewed as coveted office development areas that wanted to attract firms of an international stature. Even though this is accompanied with a host of other programmes, there is a danger of the user group being too homogenous. Even though Zuidas has a rich variety of existing functions such as the university, the theatre, the hospital, an Olympic stadium and the court of justice in the surrounding area, it fails to capitalise on this and instead focuses entirely on creating a high density right at the station. In the case of Orestad, several urban amenities such as a theatre, sports hall and a flea market have been dropped from the plans owing to financial constraints, which again reduced the vitality of the neighbourhood. Furthermore, the retail is concentrated in the massive shopping mall that was built to please private investors which resulted in underutilised streets and weakened micro mobility networks. This reflects a complete lack of understanding of the local needs of the neighbourhood and the absence of their involvement during the developmental process.

In Almere, the compression of the various programmes together was with the intention of sparking a chain reaction of interactivity between the various functions. Programmatically, this kind of vertical juxtaposition has been implemented in OMA projects before, deriving from Koolhaas's observations of the Downtown Athletic Club in New York. The grid extends for a little while on top of the multiple decked ground but is subsequently broken by a diagonal route that connects two existing shopping streets. This stitches together functions across site and transforms it into a bustling shopping area. This layering mixes infrastructure, public space, retail, leisure and residential uses in a compact, delicately contrived form. (Provoost, 1999) All three projects plan for a high degree of programmatic mix, but Zuidas and Orestad fail to build on networks of association that undercuts the strength of the mixed environment delivered.

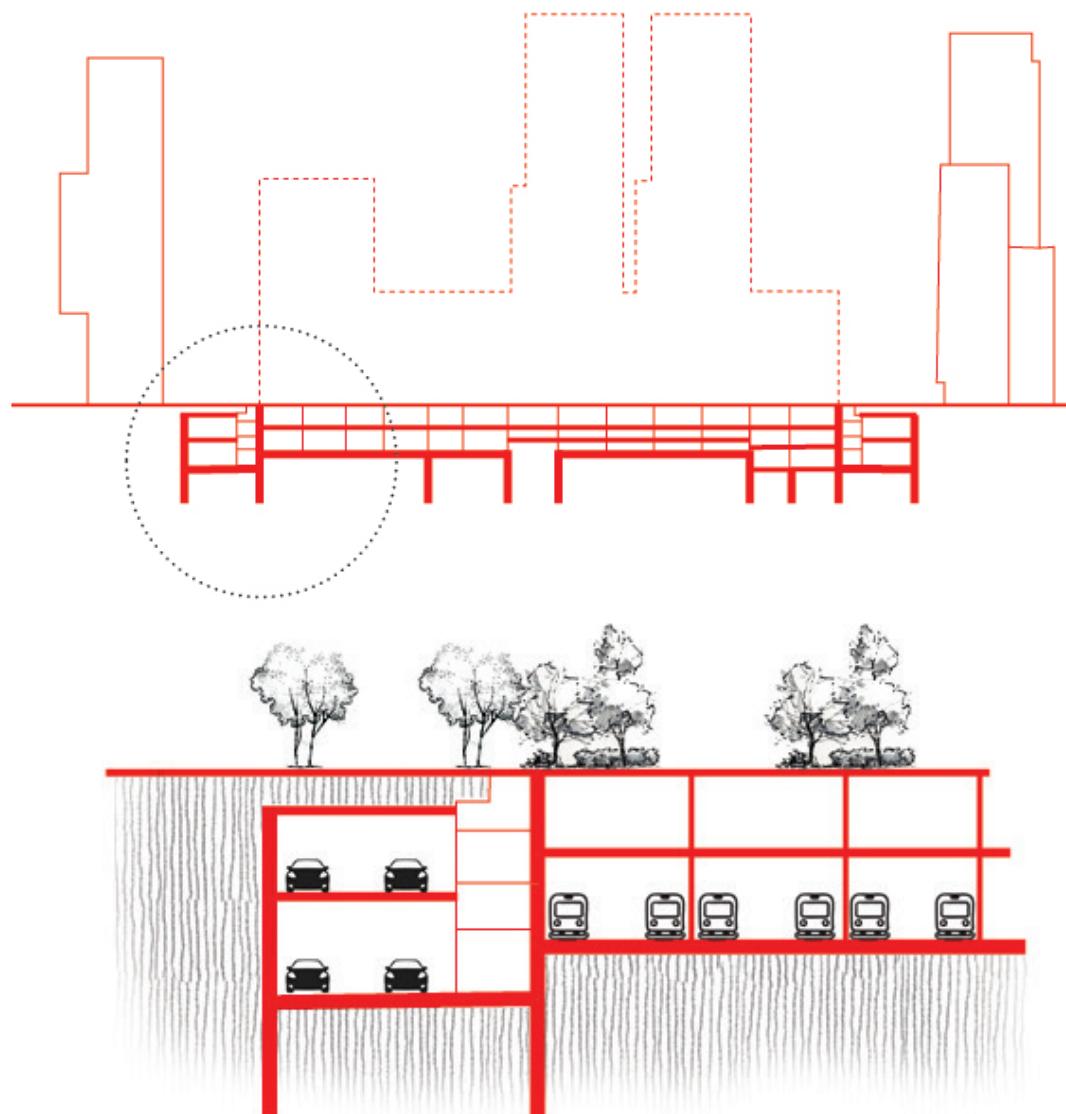


Fig 20 : The dock model in Zuidas

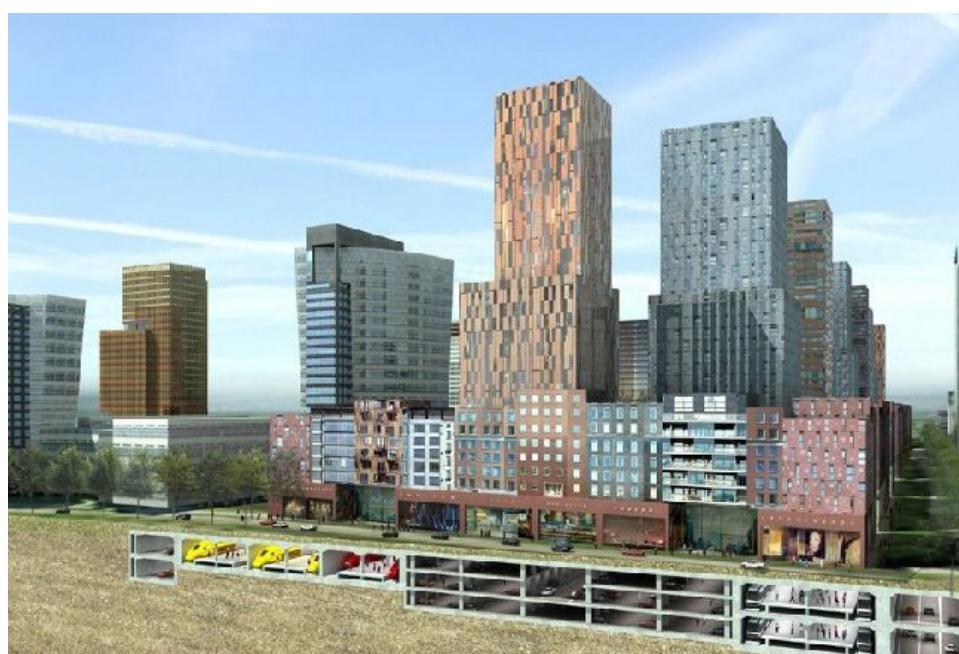


Fig 21 : The stacking of infrastructure with high density of built structure

## Phasing

Phasing is a very critical aspect in delivering projects of this scale. As noted earlier, especially when working in peripheral environments each phase of the development has to achieve a sense of completeness so that a critical mass can be achieved at every stage. This is necessary to deal with the speculative nature of these projects and enabling a capacity to reinvent the larger area as an attractive and viable environment.

In Orestad, the mechanism for financing the metro that acted as the primary catalyst of the development was through the revenue generated by the sale of the plots. This interdependency became detrimental to the project as a whole. It is similar to what Richard Sennett refers to as ‘the closed system’- ruled by the balance of income and expenses.

“The closed system ruled by equilibrium derives from a pre-Keynesian idea of how markets work. It supposes something like a bottom line in which income and expenses balance [...] familiar to urban planners in the ways infrastructure resources for transport get allocated.” (Sennett, 2006)

There was hardly an attempt to bring the involved actors together to build a coherent design strategy that can better establish the multi-layered associations necessary for a vibrant neighbourhood. This is reflective in the kinds of design decisions made, for instance, to overturn Dutch policy and establish a shopping mall to meet financial needs, that completely oriented any activity inwards and made no attempt to activate the neighbouring area.

Zuidas also exhibits the mistakes of over reliance on a single move that makes or breaks the project. In this case, the ‘dock’ model- a tunnel that accommodates the road and rail networks which will be stacked with a collection of office and residential developments, dictates the developmental process of the project. This complex engineering endeavour is the most preferred option by the municipality to ‘heal the urban tissue’, even though it is the most expensive one. They disqualified the possibilities of using mechanisms other than burying the mobility networks, methods that pose a far lesser risk financially. The funding for the dock has not been finalised even after 25 years of the initial design proposal. (Majoor, 2008) In order to fend off the risk of this high investment, developers necessarily have to plan for highly dense agglomerations. Therefore, the risks keep piling up, and they pile up for all the developers as a whole. Simply put, this scared the market away.

In the case of Almere, the complexity of the programme and the design percolates to the process itself. ‘So complex become all the interconnections, the mutual dependencies, the proliferation of interfaces, the superimposition of users and owners that together they form a group of prisoners, shackled by mutual obligation, exacerbated by the very complexity that you offered unwittingly.’ (Provoost, 1999) Once there was a consensus on the soundness of the design, all the parties were determined to see it through. This was part of their attempt to serve their own interests through mutual cooperation and negotiation. What is noteworthy is that unlike the open-ended plans for Zuidas, Almere was a very specific design solution with a very particular form that was able to sustain the changes, market analysis, tactical reasoning and the politics of the process. This is not to say that it was a design incapable of being dynamic and elastic. We have seen this even in OMA’s design of the Seattle public library where they abandon the generalisations and instead seek to design a variety of spaces that allow a plethora of activities to occur.

Both Zuidas and Orestad display a lack of an understanding of hierarchy, layering and possible synergies between stakeholders that can be built into the design process itself. Zuidas is a very clear illustration of the vital role of design in the planning process. By clarifying the design direction and expanding existing networks in the area, long term value can be established. While Zuidas makes the mistake of directing the planning of a very high quantum on one area, Orestad doesn’t attempt to have any control and simply allocates parcels to build on. Almere project relies on a finely orchestrated design in order to deliver the promise of the development. Projects that employ the strategy of megastructures often falter in responding to the changing urban conditions with inadequate strategies of phasing, integration and synergy with their larger environment. Therefore, the quality of the design is particularly important in this case, where it has to serve as the catalyst for bringing the right actors together to facilitate a new productive urban intensity.

## THE STATION AREA



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Introducing Test Site: Romford

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The Question of Concentration

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A Better Modal Balance

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Station as a Multi Modal Transfer Point

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The Quest for Differentiation



Fig 22 : Parking structures



Fig 23 : Romford Station area



Fig 24 : Low density housing



Fig 25 : Underused industrial fabric

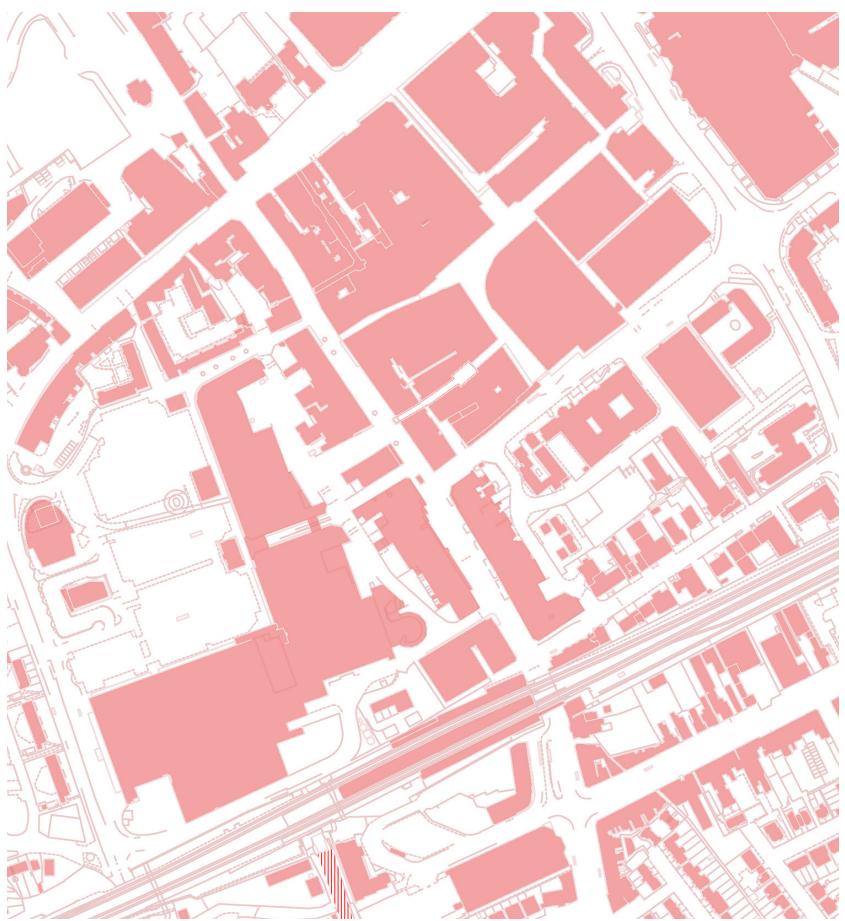


Fig 26 : The presence of large footprints and street orientation



Fig 27 : Low density housing south of the town centre

## 2.1 INTRODUCING ROMFORD

Romford is a peripheral area of London in the borough of Havering, about 16 miles from the central city. It is part of a series of areas being transformed due to the introduction of Crossrail that will vastly improve the region's connectivity. Therefore, as we move forward, this piece of London will have a pretty good infrastructural package that is going to enable both businesses and residents to benefit from greater accessibility to the wider metropolis. This is the fundamental driver of change in this area.

Romford has historically been a market town with a strong focus on retail, not just for the immediate local community but to the borough and surrounding areas as well. It is not far from areas such as Brentwood, Ilford and Stratford. Romford is located 5 miles from the M25, which makes it particularly accessible to national road links. (Havering, 2015) One of the most characteristic features of the Romford city centre is the ring road that surrounds it that creates an island effect from the rest of its surroundings. Therefore, the linkage beyond the town centre is generally restricted with most of the connections being subway paths rather than surface crossings. This is an environment that privileges the vehicular movement as compared to the pedestrians. The housing in this area is mainly low rise, detached or semi-detached units along with a few apartment blocks (Fig 27). The town centre hosts three large shopping centres which are characterised by large floorplates with an inward-looking orientation, an expansive system of blank or service facades that front important pedestrian routes and are surrounded by wide vehicular roadways and multi storey car parks (Fig 26). There is therefore a mix of street-oriented blocks that run along the historic core along with the presence of these large footprints that lack permeability or any cohesive network of movement within the larger context. It is noteworthy that there is such a drastic shift in the morphology in figures 26 and 27, even though the areas are quite close to each other.

While this might seem to be a very specific description of a particular site, we can start to notice that the questions Romford grapples with are very familiar to what we see happening across a range of areas. These kinds of territories typically have a problem of blight that arises due to a specific relationship between a rail station that was fairly insignificant in the past and a relatively over built road system, where the combination is no longer suitable for the changing needs of the area. Secondly there are landscape qualities that are present but hidden, in this case River Rom, which could be channelled to assist the strategies of mobility and integration. Third, there is an overall organisation to the urban area that is yet to be revealed and its currently constrained in terms of its vision being perceived only around the immediate station or infrastructure. Lastly, it also lacks a consensus from a series of actors and stakeholders of what the ambition of this region should be and the means of getting there. Thus, the area contains all the usual suspects such as multi storey car parks, shopping centres, market street, landscape features, a couple of churches and listed buildings typical of peripheral sites but does not possess the accessibility and a system of services that can either provide greater convenience or synergy between all these elements.

Obviously, every place is specific and there are unique factors that arise during the developmental process. Nevertheless, these persistent questions that keep cropping up in conditions like Romford can only be evaluated and dealt with by understanding the critical position and shortcomings of projects like Almere, Zuidas, Orestad etc. The significance is this is not so much that you will start treating this exactly as this project or site but as a set of general challenges that projects of this nature have to manoeuvre. When issues such as prioritization of larger logistical corridors over what a piece of the city can become arise, we must build a capacity to question the premise of those arguments. If we have to change a whole series of these places into something that works far more effectively on the basis of rail and multi modal surface kinds of movement, what would those environments look like? What are the principles and material outcomes generated in these case studies that will help us learn what to do in sites like this?



Fig 28 : Possible vocation of Romford as an intermediary zone

There will be two broad questions that will be answered through this process-

- a) The stance on concentration around the station and the corresponding coordination between different modes of movement
- b) The challenge of creating differentiated urban environments and their importance, especially in station areas.

There will be other projects introduced along the way that can shed some light on how project as a proposition can begin to question and transform the urban area by building an ambition and mechanism of change. Romford contains the challenges and opportunities that are present in peripheral sites with a very real constraint of what can be meaningfully achieved in the city centre. It starts to be an interesting midpoint between the larger region and the city of London, thereby being an attractive option for populations that require that flexibility between high costs and expanded opportunities. It is a place that can extend on its integration and create opportunities for a typological evolution that is not possible within traditional city centres. The critical analysis of the above questions has to be considered through the lens of this possible vocation of the area.

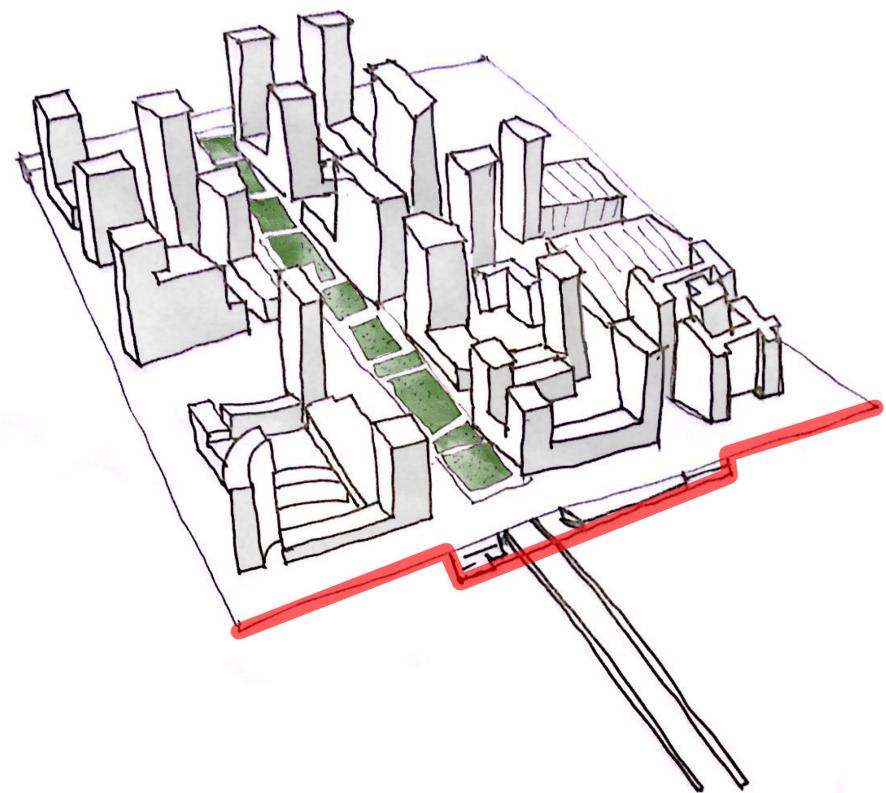


Fig 29 : Development concentrated near the station in Zuidas

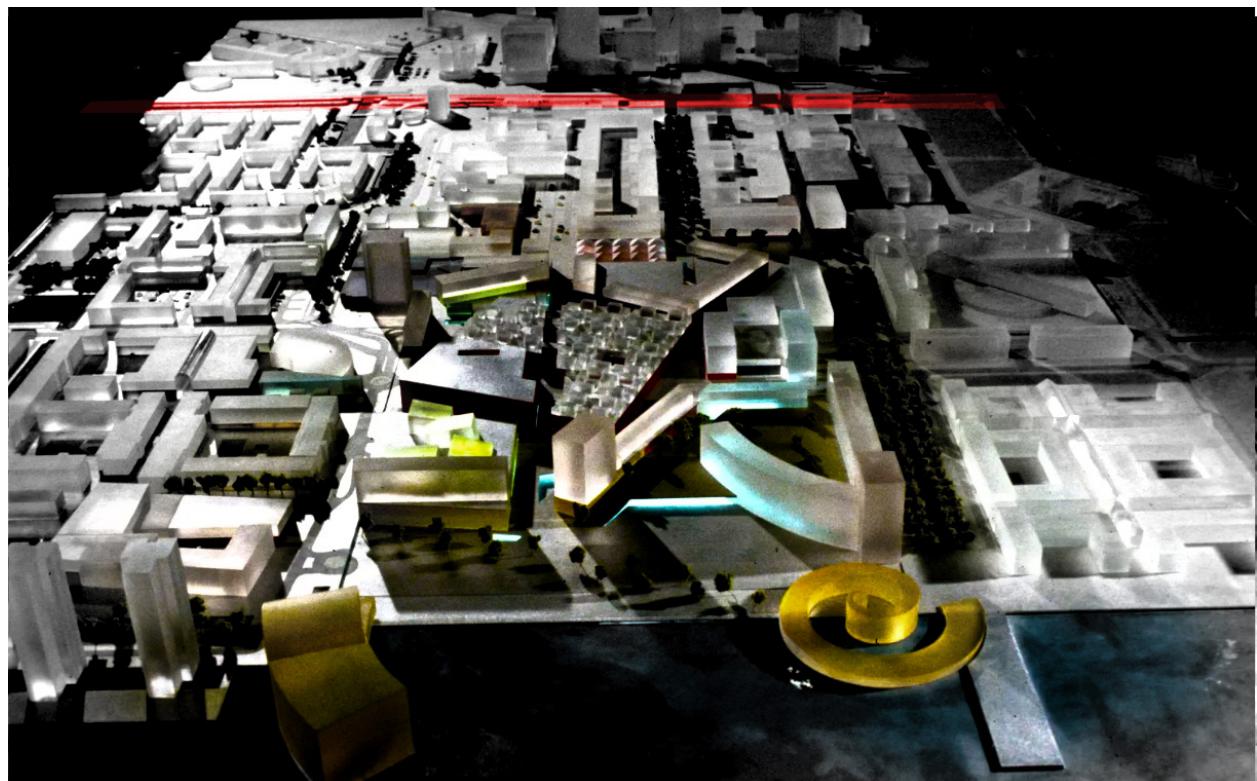


Fig 30 : Development spread over a larger area in Almere

## 2.2 THE QUESTION OF CONCENTRATION

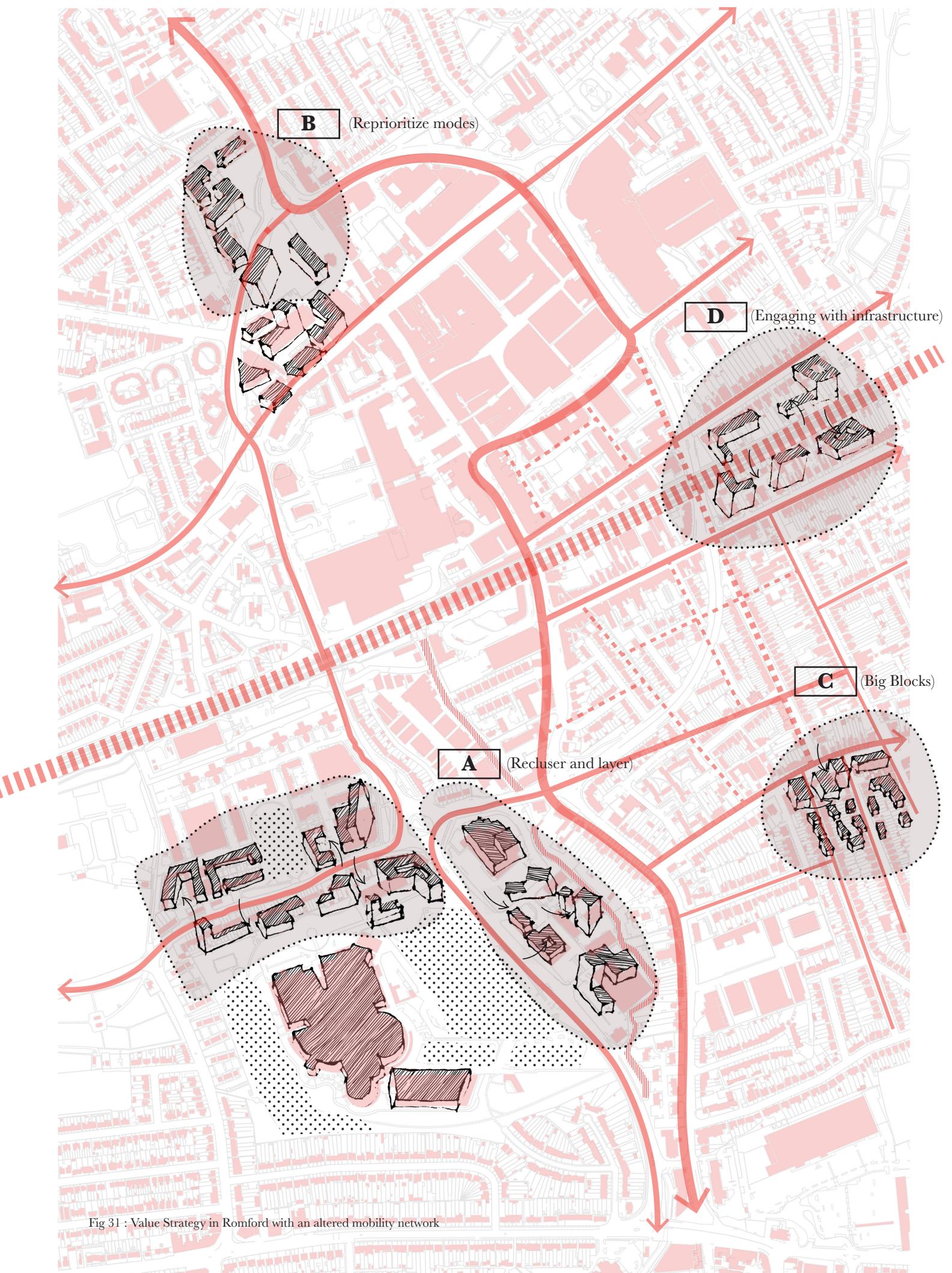
As the investment in infrastructure is the primary driver of change, there tends to be an expectation for the immediate station area to deliver high levels of density. In Zuidas, the problem was they began to conceive the point of maximum accessibility as being right on top of the station and everything else paled into insignificance. It attempts to deliver a hyper synergy in an area that is already rich with a mix of institutions around it. But the methodology used is not by building on the existing networks such as the Olympic stadium, the university and the hospital; but by establishing a model that seeks to deliver an unbelievably high quantum of office development right next to the station. The rationalisation for this is through the ambitious dock model that seeks to radically transform the nature of this extremely well-connected site. This continues to feed into the financial speculation of this area making it a risky bet for all parties involved. Meanwhile, all possible investments in the surrounding area reduce since all possible quantum for the next 30 years is envisioned on that one concentrated area. This is exactly the wrong approach to take. Instead it has to be conceived as an area, a fairly extensive field that builds on intricate local adjacencies.

We see a very similar situation occurring in Romford, where there is no deliberation of the potential of intensification of the areas outside the immediate station area. The ring road is a barrier not just in terms of its physicality but also intellectually when the involved actors attempt to reconceive the area. Areas such as the hospital, the gas holder site and the surrounding residential districts are not crucial parts of the long-term strategy by the Borough which instead focuses most of its energy on how to work within the extremely constrained town centre. A larger benefit can be achieved simply by intensifying the existing neighbourhoods such that you can provide good quality environments that are fairly accessible to the station. Almere offers a different solution to this question of concentration. The project uses a dialectical contrast of concentration and emptiness- OMA uses only half of the area allocated for the project thereby treating that emptiness as a spatial promise that allows for unpredictable future developments. This also let the other areas elsewhere remain undisturbed for the time being which is often collateral that projects of this scale have to deal with. While it does propose a large area of office development next to the station, it recognises the need to disperse the development across the wider area.

The hypothesis of this thesis stands in opposition with the strategies which advocate for the station as the necessary point of departure- we believe in a much more distributed urban field. The tendency to focus on the linkage associated with the station inhibits our ability to plan more ambitiously and broadly. Governments invest so much money into these projects and fail to be ambitious about the change it can generate and instead rely far too much on the few opportunities near the station. In the larger scheme of things that is unimportant. The approach of considering the extended field of opportunity is critical in projects of this nature. As we start to apply this in the case of Romford, the question becomes- what is the conceivable value strategy around the station area that we can build on?

For example, the area to the south of the railway station presently contains a mix of retail, transport services, industry, workspace and residential elements. Even though it has a great potential to be a vibrant mixed-use environment, it does not have a strong sense of coherence and integration and is generally underutilised. The varied morphology of this site affords great opportunities to cluster and reorient the area to expand on the local synergies along the hospital, river Rom and the home base site. This means that by inverting the logic and by building the areas where people actually want to live already, which is a bit further away, it allows a better opportunity to build sustainable, dense and resilient environments in the station vicinity later on. The station remains a crucial driver of change that enables conditions of attractiveness and diversity. Changes in the immediate terrain of the station have to avoid being speculative and focus on providing meaningful improvements that allow them to better integrators of the region.

This approach of an extensive field relies on the idea of project driven strategy, defined not by overarching geometrical schemas but by intricate local connections. Interval, repetition and seriality are key concepts. (Allen, 1999) Analysing the strategic potential of the station area is not a quest for the ‘right’ solution capable of solving all the problems of the site or to create a masterplan for the whole area. It is about understanding how to transform a piece of the city that illustrates the mechanism of the multiscalar urban processes and the way in which project driven strategies are capable of augmenting the productive value of this larger area.



We can start to build a series of scenarios to explore how these project driven strategies enable change in the case of Romford.

**A**

## RECLUSER AND LAYER

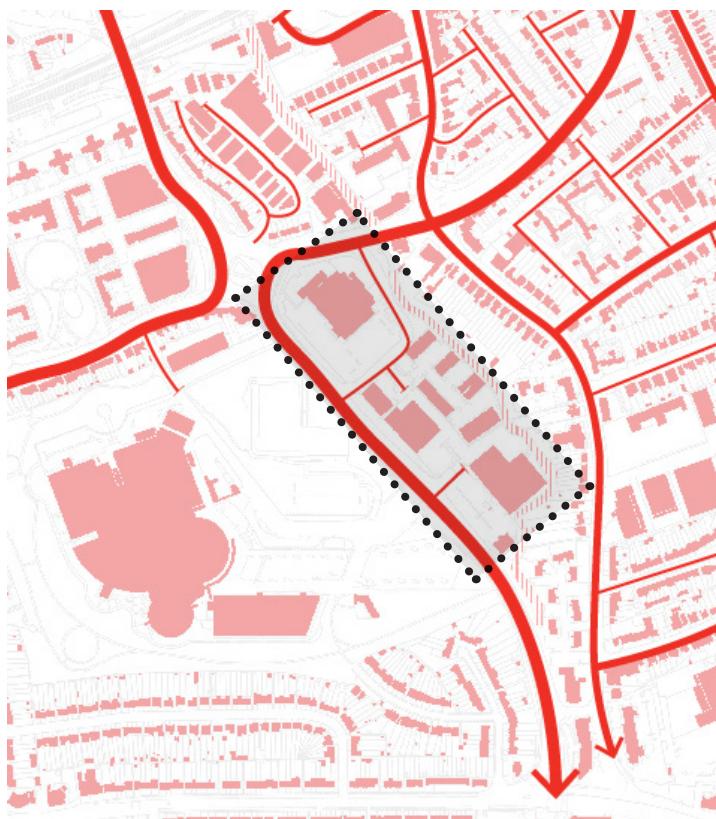


Fig 32 : Existing mobility network and morphology

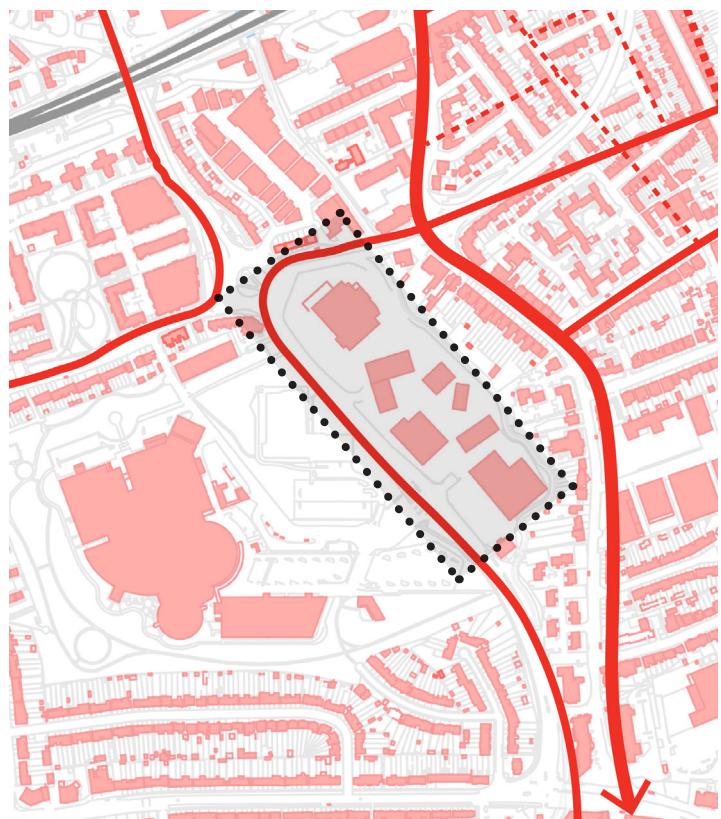


Fig 33 : Reclustering to enable a scaling up of shared spaces

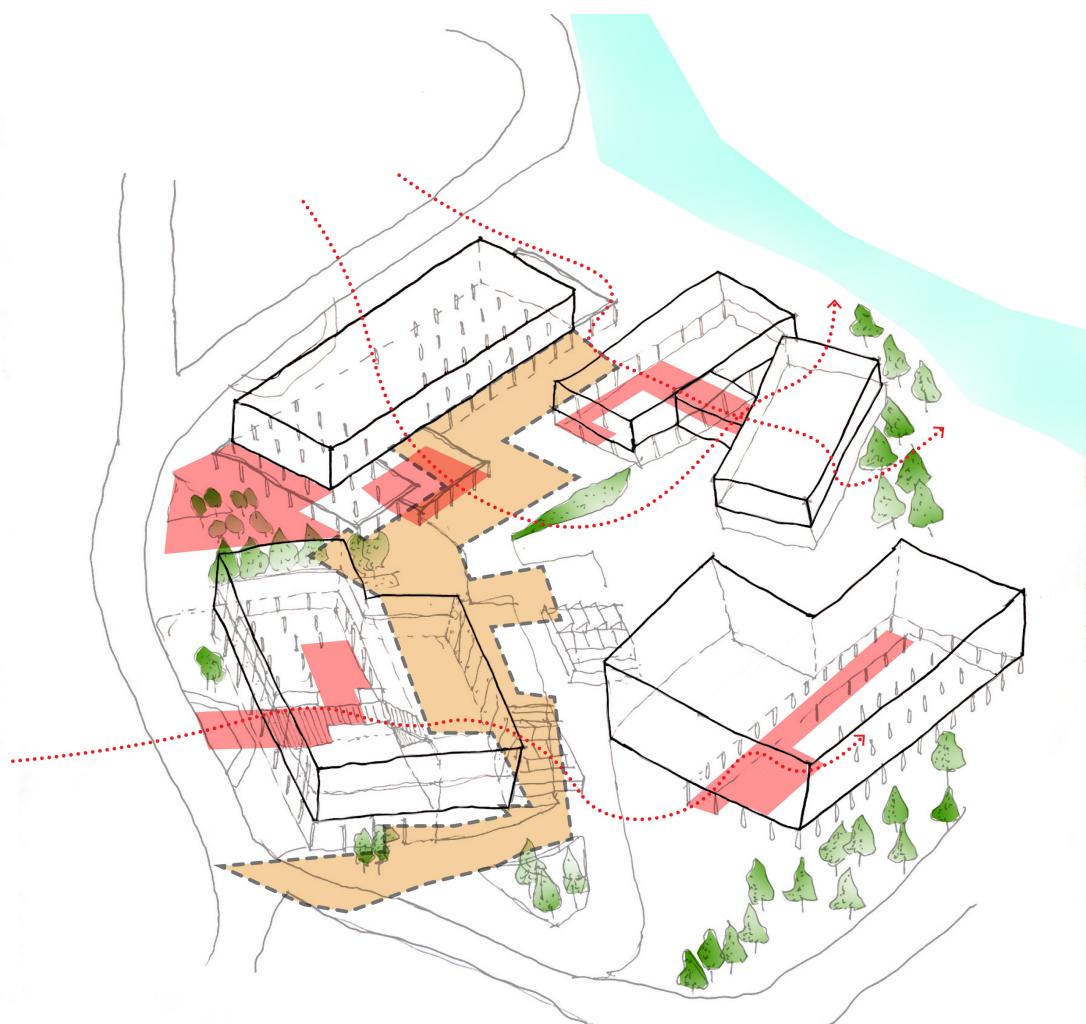


Fig 34 : Clustering and Layering of the ground to enable micromobility

### 2.3 A BETTER MODAL BALANCE

It is not enough to assume that dispersing development across the station area automatically leads to better integration. If we are to say that the obvious solution to the Zuidas problem is to do what was done in Orestad, which is to spread everything out, we can see there is a further difficulty. There isn't enough clarity about the hierarchy and differentiation within the overall system. This is a system that over privileges the movement of automobiles and lorries and under privileges the other modes within the system. At the scale of this larger urban area, we are going to have to conceive it and make adjustments to the mode balance in the system and that will have implications for the buildings that are planned and their specific architecture. It's a field where mobility and the integration of multiple modes matters, each of which do slightly different bits of work in the overall scheme. Therefore, the question of density and concentration cannot be answered without understanding the related question of the balance of modes of mobility in the area.

If Romford is to make a change from a peripheral site overly reliant on the road network to one that is better integrated, one of the first challenges to tackle is the ring road. If we are to provide a better balance in the modes of mobility, how do we change the ring road- do we slow it down, change it into a boulevard or rearrange the traffic circulation? The traffic planners will almost always say that any such change will affect the overall efficiency of the ring road as a logistical network and hence cannot be done. What this line of reasoning overlooks is the idea of what this area can fundamentally be and achieve as a piece of London. The traffic expert aims to succeed in aspects such as accessibility and circulation; his or her essential challenge is 'to make the machine go.' (Meurs & Verheijen, 2003) But one needs to think about how we can generate value in these sites as opposed to simply solving a 'problem'. We cannot make this long-distance corridor work simultaneously as high streets or commercial corridors as this puts way too much burden on them. We see a similar problem even in central city environments such as Euston where the expectation is to constantly activate the street as well as ensure it functions as a major artery.

The answer need not be to simply pedestrianize the whole thing, but to reconfigure the hierarchy in order to make it work like a piece of the grid in the city. If we look at the current hierarchy in Romford and at the secondary streets in particular, one glaring problem is that they do not provide any extension and end up as dead end corridors (Fig 32). The overall grid lacks consistent extension and as a consequence in local areas what we fundamentally lack is integration, accessibility and balance. One possibility is to extend the existing streets to form better continuities and to increase the number of streets to facilitate better movement within the blocks. The problem with redrawing it this way is to say the answer to every problem is a new street. But this is exactly where the new question arises- do we really have to build a bunch of new streets at the public expense or do we begin to look at a new morphology that makes use of the generosity of the floor plates that allows us to experiment with an alternative pattern of mobility. By redefining the hierarchies and clustering the existing morphology more efficiently, we can start to identify these 'strips' of secondary circulation in the generously sized parcels (Fig 34). They can perform as a pathway or a green corridor or a cycling route, it starts to bring together a better balance while retaining the advantages of a varied morphology.

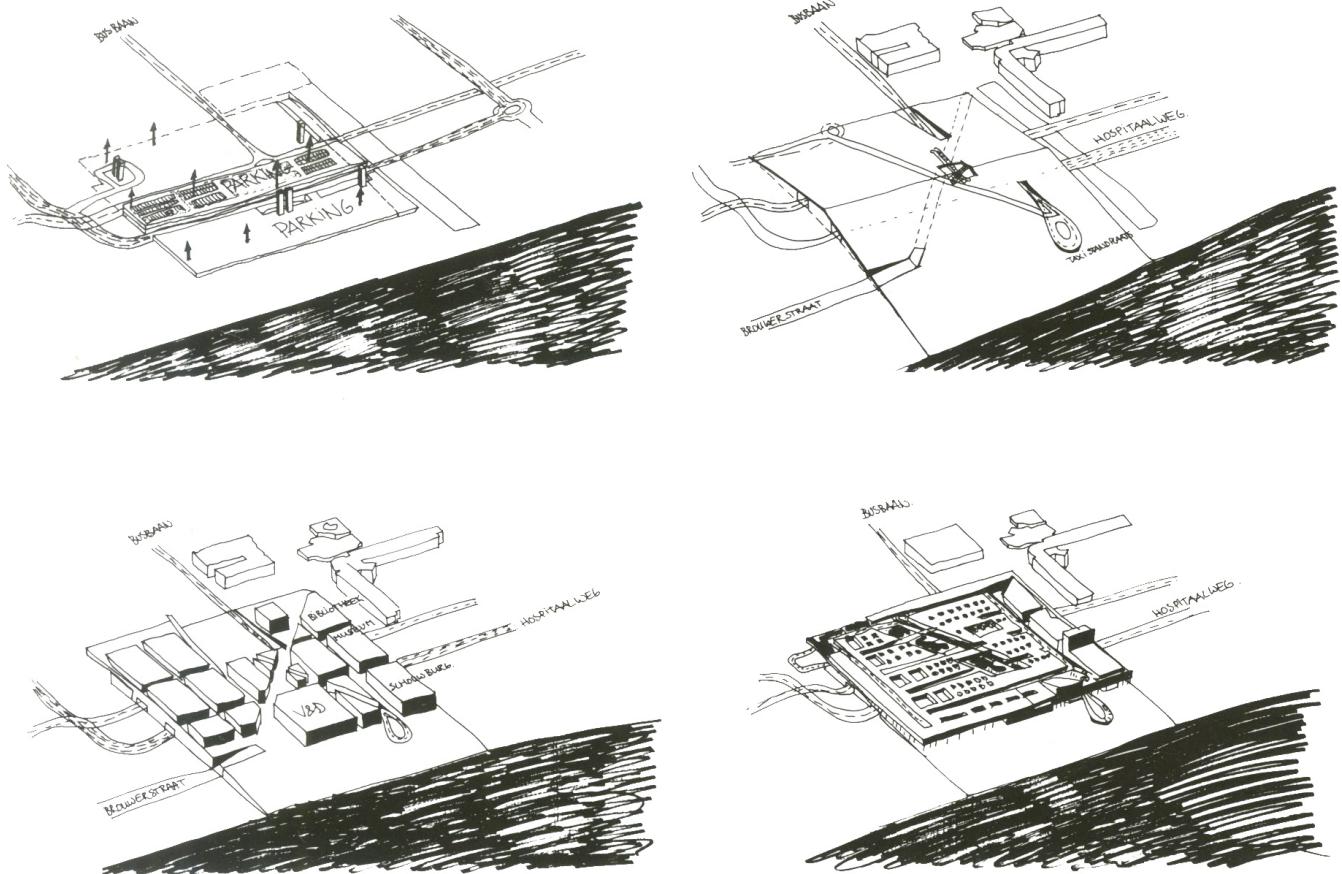


Fig 35 : Organisation of the urban area in Almere using the curved ground plane

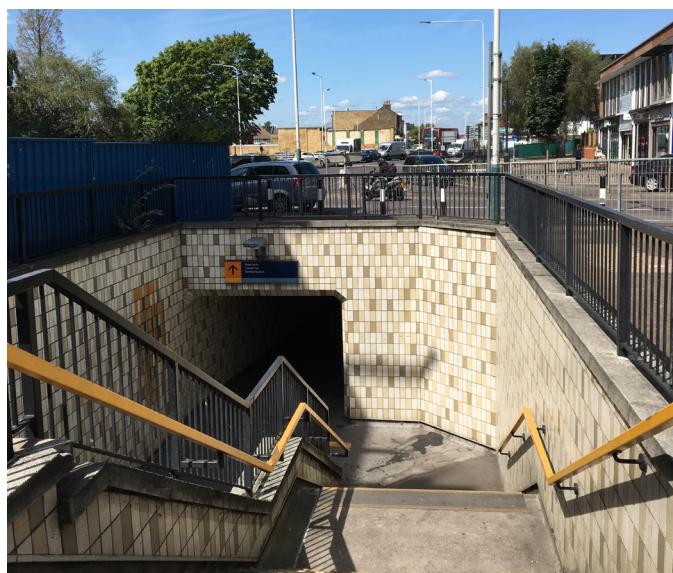
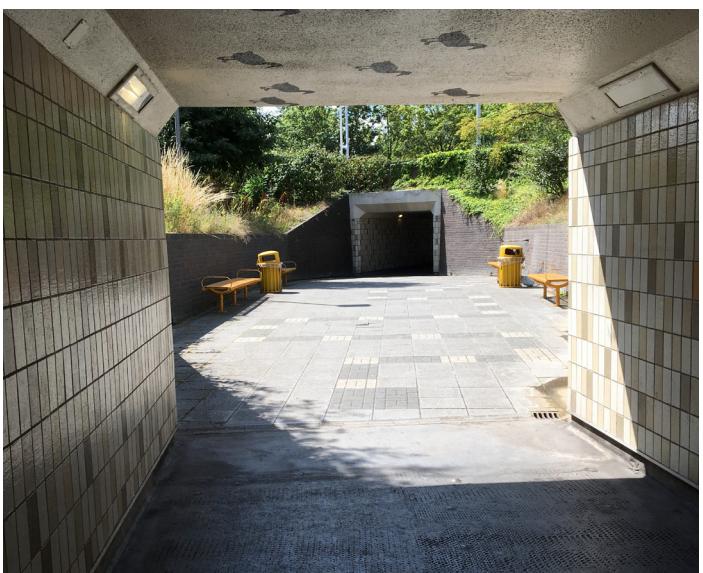


Fig 36 : Nature of subway crossings in Romford



The response to the dogma that a corridor needs to run uninterrupted can be found in the Almere project that simply allows the road to pass underneath the structure (Fig 35). The scheme is based on the idea of multiplied grounds with a curved deck that resolves the barriers of the infrastructure networks by simply folding over them. This method does more than simply stacking the modes of mobility on top of one and other. This diffused separation allows for the crisscrossing of pedestrian routes by tying the different levels together through programmes of retail, amenities and servicing. This rising ground plane is manipulated such that the object and the ground are not considered to be mutually exclusive but rather mutually reinforcing, building on their respective capacities as a performative structure.

There are elements of this already present in Romford with the underground subways that connect across the ring road (Fig 36). However, this is still quite a hostile environment to the pedestrians where the priority is that of uninterrupted vehicular flow. The learnings from Almere can be used to reimagine the hierarchy of the different modes. Almere does not romanticize the notion of pedestrian movement by completely disregarding the importance of logistics for the functioning of the city. Instead it works to give them both considerable importance and seeks to create as much linkage as possible that allows a smooth transition from the different modes of mobility. While it is difficult to completely eradicate the function of the ring road as a high-speed corridor, the network can be modified to redirect patterns of traffic such that a part of the ring road can be retained as an intersection while the other parts work as slower branches of the network. The performance of the subway crossings can be enhanced if it is more ambitious about the scale and generosity of that space. That allows an accumulation of actors and activities that doesn't exist currently and allows it to be a platform for the continuation of urban life (Fig 37). This makes use of the layering and braiding of levels and the generosity and values attached to each layer. Development of infrastructure and restructuring of the urban realm should be conceived simultaneously instead of as an afterthought. This allows the investment to percolate in creating wider opportunities, often by utilising the sectional potential of these infrastructures.

**B**

## REPRIORITIZE MODES

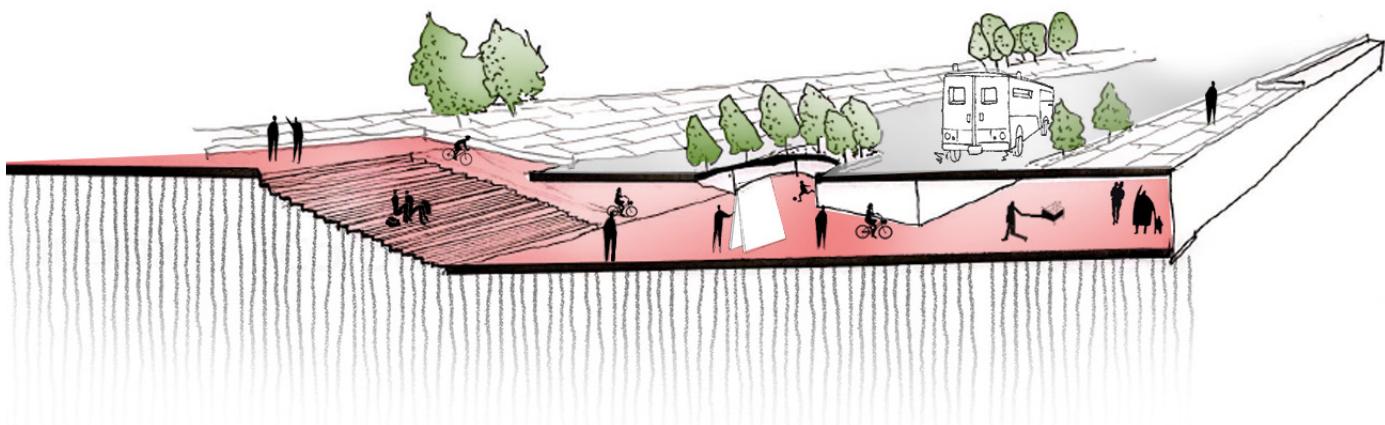


Fig 37 : Expanding the priority and generosity of the underground connections

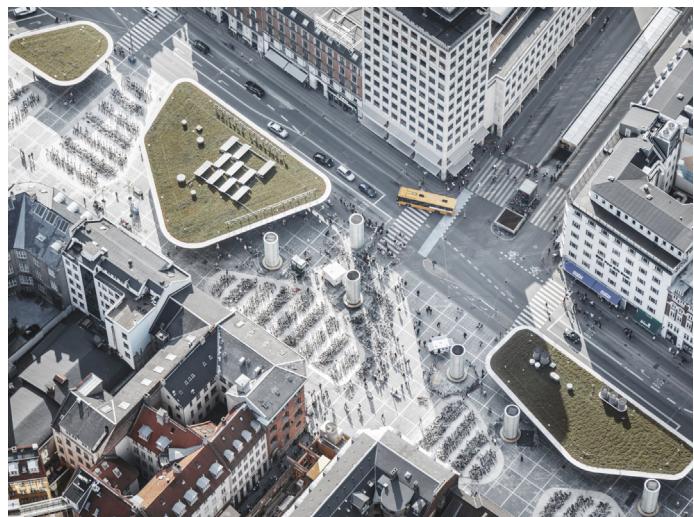


Fig 38 : Station's forecourt as an extension of the city floor



Fig 39 : Facades offering high visual permeability

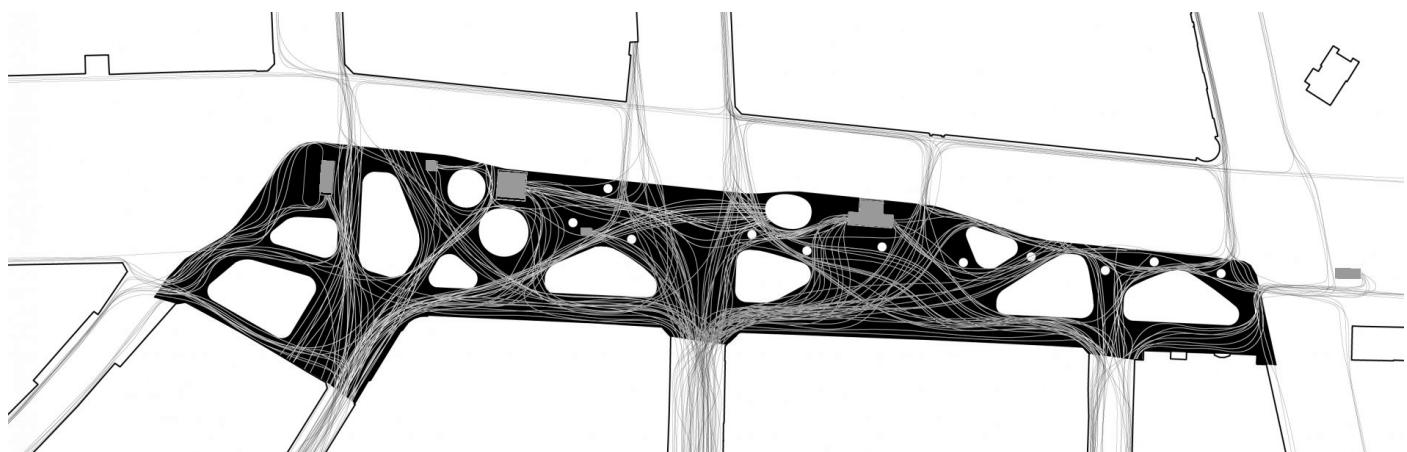


Fig 40 : Analysing the flow and mobility networks

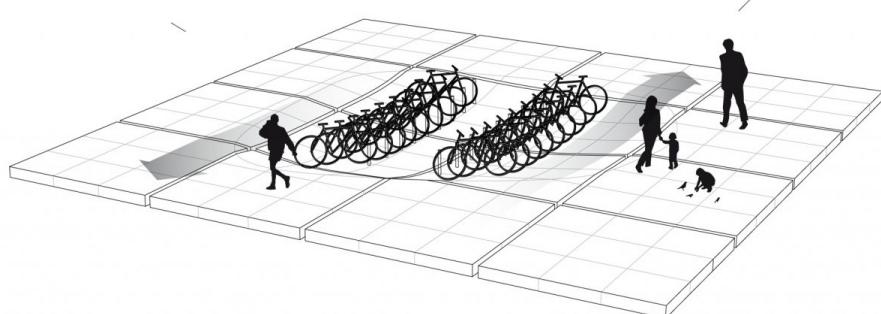


Fig 41 : Accommodation of bicycles by manipulating the ground plane

## 2.4 STATION AS A MULTI MODAL TRANSFER POINT

The station itself is undeniably an important aspect in the structuring of the station area. The implications of the station design have been widely discussed in the field. They are often termed as ‘gateways’ due to its role as a node, that acts as a crucial point of access and as a place, in its ability to shape the identity of the area. Nevertheless, it is easy to realise that the influence of a station goes beyond its immediate surroundings. Therefore, any limitation of the exact extent of its influence is somewhat arbitrary. It is thus important to leave behind the older language of the station being a gateway and we start to see it as something already a part of the immediate local area rather than just being a part of a larger infrastructure.

If the vocation of Romford is centred around being an important area that can connect the talent populations farther away to central parts of London, then it has to be able to provide a good quality living environment with a varied kit of possible modes of transport and amenities. The station can contribute towards that vision by moderating issues of linkage and servicing. From this point of view, we can start to look at one small segment or problem where the station and the rail line and the surface road corridor all come into relative juxtaposition. How do we approach that problem? This requires an understanding of the modes of mobility as layered in three dimensions. Instead of overemphasising on just the big elements one must seek to improve the transitions between each of these modes and the way in which they contribute to the services and accessibility of the area.

Two station projects by COBE start to provide some insight into the way to negotiate these issues. The Norreport Station in Denmark is a traffic hub that is an important intersection of the city’s infrastructure with regional trains, metro lines, bus networks as well as a heavy flow of cyclists and vehicles. As soon as one exits the station, they have to almost always cross a busy road. The station roofs and buildings are redesigned to lie between the main flow lines of people, thereby prioritising the spaces in between the built structures (Fig 40). The strategy for organising the bike parking is through the manipulation of the ground plane that sets a clear hierarchy between these spaces of servicing and movement (Fig 41). The traffic arteries are rerouted, thereby designing the station’s forecourt as an extension of the city ‘floor’ (Fig 38). The architecture of the station contributes in emphasising the clarity of the layout with the rounded glass facades that does not have any backs or corners. (Fig 39)

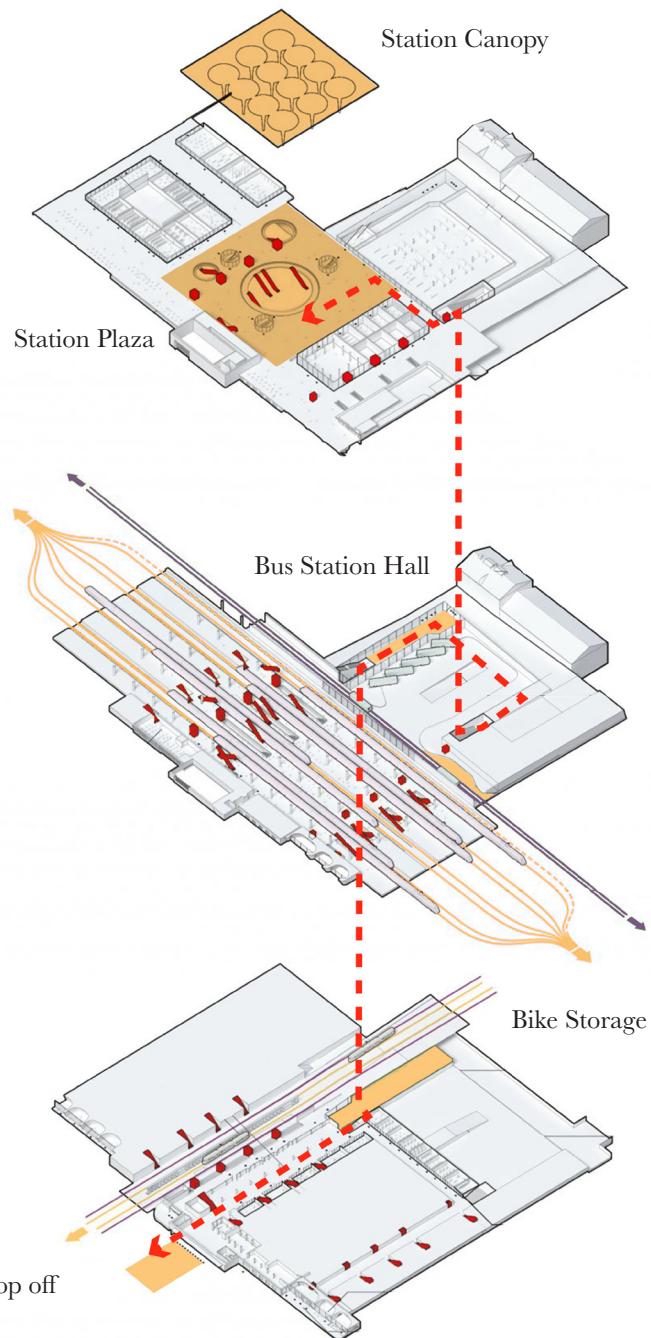


Fig 42 : Station accomodating multiple modes of transport

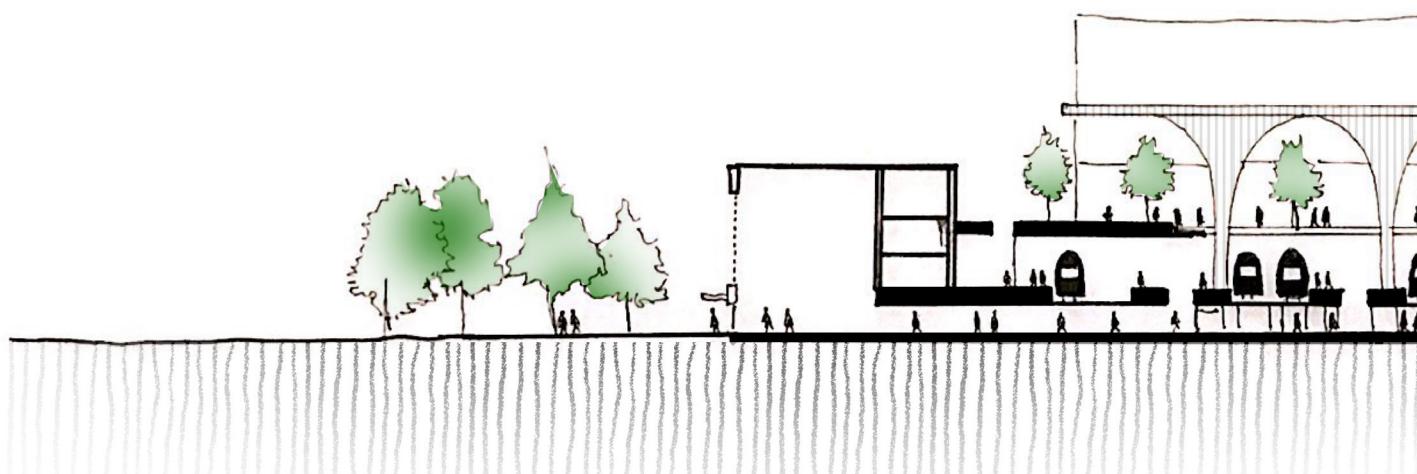


Fig 43 : Use of sectional arrangement to stack multiple modes

The Tampere Travel and Service Centre in Finland deals with the disjunction of the railway lines by utilising the topographic conditions to extend the urban grid over the infrastructure. This is a good example of utilising the idea of multiple grounds to negotiate points of access between varied programmes. It relocates the bus and tram stops along with a provision for the bicycle parking that again seeks to provide a balance in the modes of mobility and create interesting crossovers and options to personalise the way one moves across the city. The element of the raised infrastructure is also utilised to deliver urban spaces that capitalise on the synergies of the site, with the canopy being a predominant figure that ties everything together.

In both these projects, the way in which architecture delivers the intensification of the ground plane becomes critical. Infrastructure's relationship with the surface paves the way for future events through shaping networks of movement and servicing, by being architecturally specific but programmatically flexible (Fig 42,43). By superimposing different networks of mobility which by themselves have their own sequence of logic and repetition, we create moments of intensity against the stable field. These specific moments generate a means to negotiate these transitions from one mode to another thereby utilising the concept of the thickened surface.

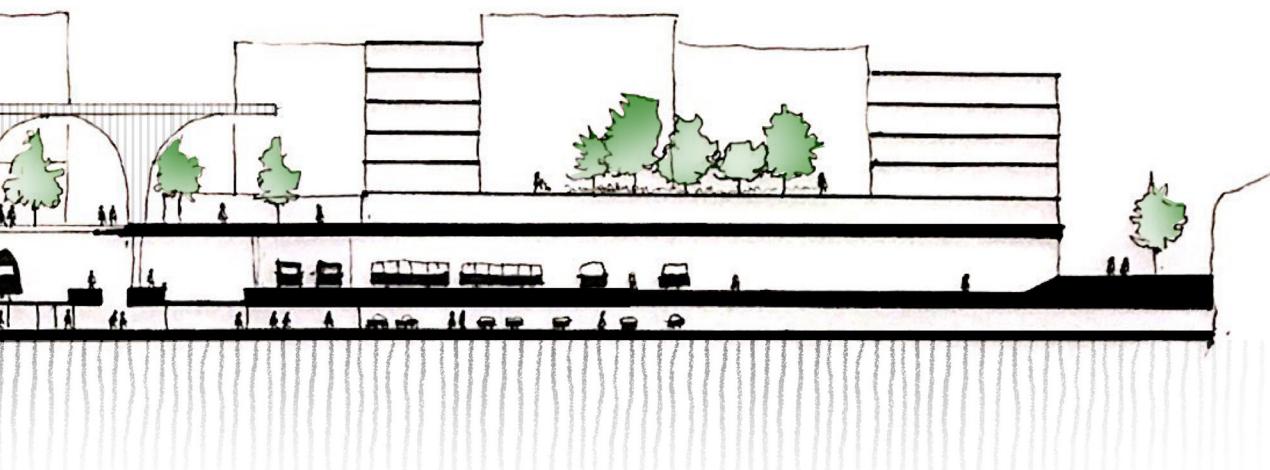




Fig 44 : King's Cross Station

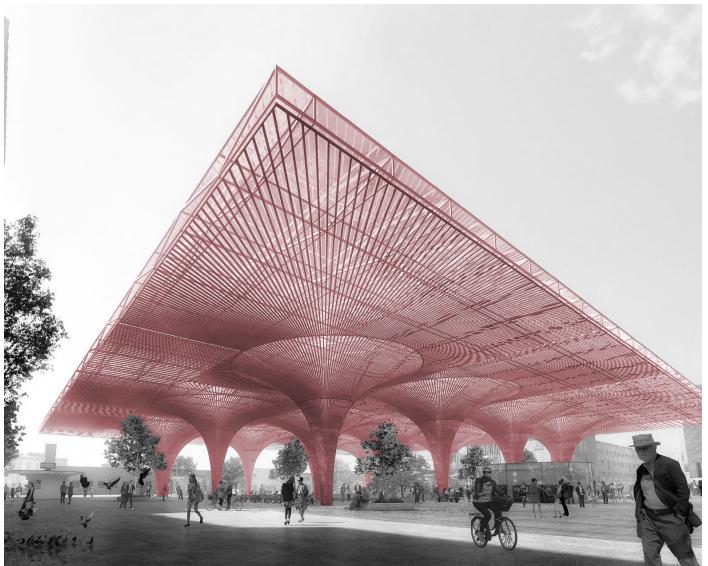


Fig 45 : Tampere Service Centre



Fig 46 : Norreport Station

These stations also hint at a particular architectural diagram where they turn the station into almost just a canopy (Fig 44-46). This acts as the dominant experiential element, whether it is a simple canopy like in the case of Norreport or ostentatious ones like King's Cross, Rotterdam Central or Tampere. This is important as this starts to negotiate the tension between linkage and service by opening up the space and enabling a sense of orientation. All the varied activities in the station comes together with increased permeability that allows way finding and servicing to occur simultaneously.

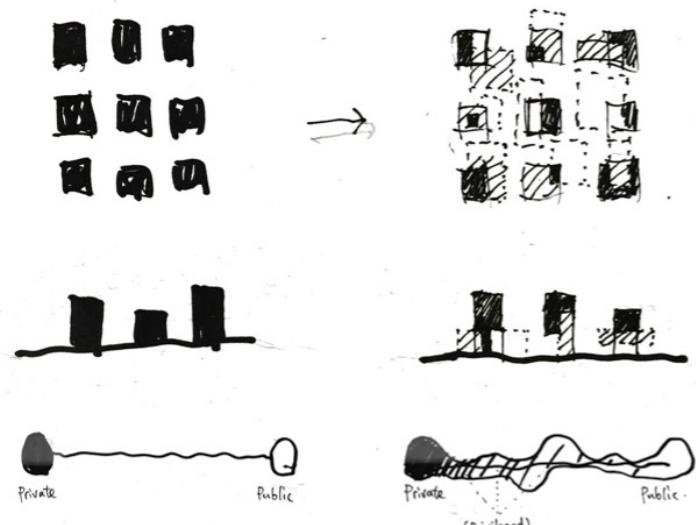


Fig 47 : A new understanding of the Nolli Plan

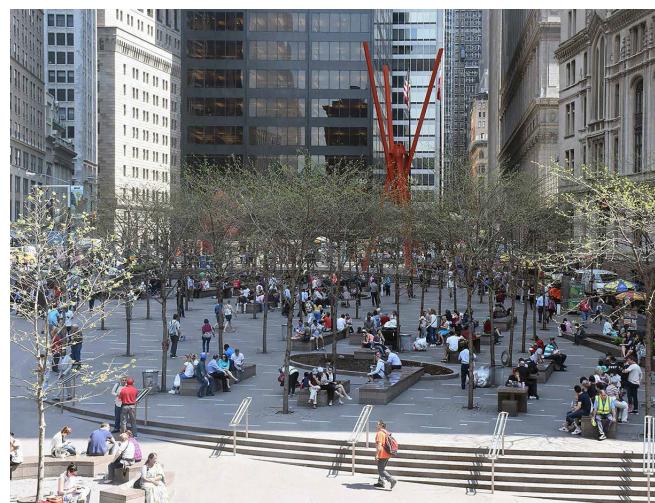


Fig 48 : Privately owned Public Spaces that link several buildings



Fig 49 : Evolution of the Manhattan Grid from rigid blocks to a layered network

## 2.5 THE QUEST FOR DIFFERENTIATION

The reading of the urban morphology in terms of its dimensions, textures, patterns, elements and artefacts register a differentiation that treats each area as a distinctive part. This set of parts contributes to the whole by having specific qualities that make visible the possible everyday patterns of living. We have to recognise that effective urban areas have a differentiation of floor plates, pattern and grain such that it starts to accommodate a diversity of programmes and patterns of living. This becomes especially important near station areas, as they are often sites for services and perhaps even institutionally substantive services. But in order to work effectively to generate larger synergies it's going to have to have balance- it needs to have small businesses, residences, an array of amenities etc. As a consequence, we need a planning approach that allows us to develop a logic within this field that doesn't retain everything as overly large or too extensive in that area. At more than one scale we have to think about how urban areas work as socio economic environments.

The mechanisms of change to transform an area is driven by this morphological reading that suggests an evolution through different operations, whether it is by typological change or infill or accumulation and so on. To select mechanisms of change depends not only on a reading of continuities, but also on the visions, values, and scenarios of an emerging urbanity. They must be responsive both to current cultures and fresh opportunities in a way that supports emerging patterns of living, working and learning. One way of looking at it is of course by the idea of clustering and the sequence of interstitial spaces that it generates which in turn has the ability to support communal life. But this becomes a purely morphological understanding of the ways to create a layered environment. This discourse can be enriched by delving deeper into how 'type' can be employed as a distinctive strategy. This raises questions regarding the typological variation, scaling up of shared spaces and that of permeability that were used to evaluate the previous case studies.

### **Typological Evolution:**

One method is to accept the existing morphology and ask ourselves how that can be evolved. That means we can more or less keep the form of the preexisting buildings but as we replace them, we do with things that improve the value of the ground. For example, in Zuidas, the rigid street network can be improved to achieve the values of synergy and networking through the idea of reconfiguration of the ground. There has been a considerable shift in the reading of urban areas from a black and white Nolli plan to that of a more layered structure (Fig 47). The boundary between internal and external environments is becoming diffused which allows the expansion of the street into the interior of the building, creating crucial interstitial spaces that can support urban life. The way the Manhattan grid evolved over time is indicative of this approach (Fig 49). It is not enough to create 'open spaces', but to think of them as something that contain specific intentionality and purpose. Therefore, we need to look for an improved balance, mix and integration and this can only occur through stronger patterns of proximity and micro mobility.

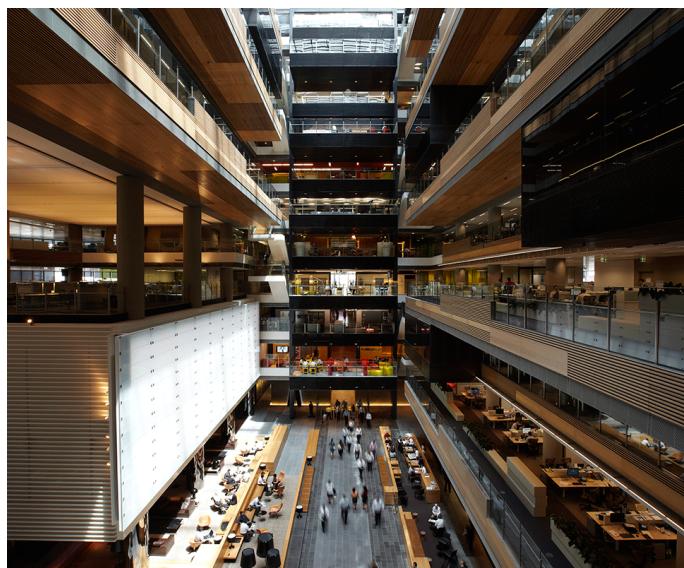


Fig 50 : Spaces offered by deeper floor plates

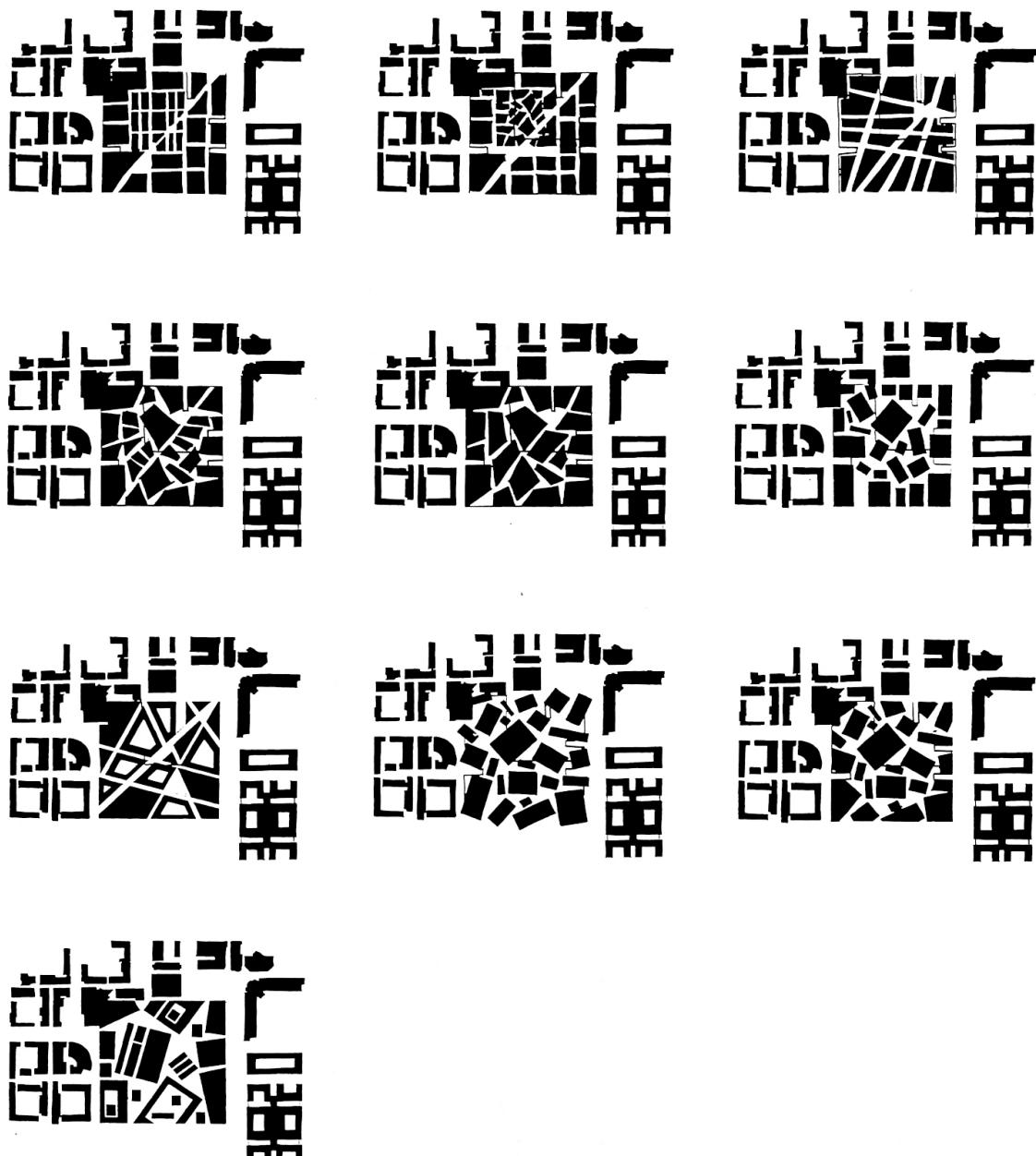


Fig 51 : Study of the arrangement of the blocks along a diagonal route- Almere

**Value of Deeper Blocks:**

The learnings from Zuidas also starts to beg the question about the alternatives to this street-based network with a fine grain. The changing nature of the work practices today starts to have an effect on the diversification of workspace environments. The insistence on flexibility, specialization and team work means that workspaces have a wider range of facilities and functions such as hosting, presentations, workshops and research units. Buildings become deeper, more spatially diverse, more layered and visually interconnected (Fig 50). Almere takes this one step further by generating the diversity by employing the strategy of a mega form. The architectural section performs a key role in orchestrating urban intensification and this is illustrative again of the diffused differentiation between the interior spaces and their external environment. Buildings are no longer objects to represent an identity, but are instead concentrations of a layered and extensive series of multiscalar urban ecologies.

Almere also links urban morphology and mobility to a series of scenarios capable of continuity and change (Fig 51). The stacking of major vehicular movement on the bottom layer meant that there was considerable freedom to organise the upper layers without the hinderance of issues such as turning radii for massive lorries etc. As most of the servicing occurs in the bottom layer, the surfaces of the retail elements above did not need to be distinguished as front and rear facades. The block organisation above was driven by the linking of key shopping streets with the introduction of a diagonal route cutting across the curved ground that stitches the different parts together. The way the diagonal route manoeuvres across the ground becomes the basis for the organisation of the blocks. There is a direct relationship between the morphology and mobility in this case that starts to elaborate an alternative way in which movement and services can be organised. This also meant that a rich diversity of grain was achieved that allowed the juxtaposition of varied programmes such as a theatre, apartment buildings, car parks, supermarkets, restaurants, shops etc. This is an exemplary example of a project driven strategy that showcases the potential of architecture as urbanism.

Romford needs a strategy that does not overtly depend on building of a bunch of new streets but based on that of a morphology structured by mobility that makes use of the diversity that bigger and deeper blocks can offer in conjunction with those that privilege a street frontage. For example, if we strategically insert deeper blocks in the existing residential grain of Romford, it has the potential to deliver crucial urban amenities as well as organise housing (Fig 52-54). Supporting these forms of clustering and accumulation can create new activity patterns and built forms that support one and other that make generation of new attachments possible. This should not be thought about as the creation of hubs or singular concentrations at a point, but instead as an extensive and balanced urban network. A balanced and diversified mobility system is pivotal to the creation of this integrated piece of the city as they start to suggest lines of enhancement and continuation of the morphology.

**C**

## BIG BLOCKS

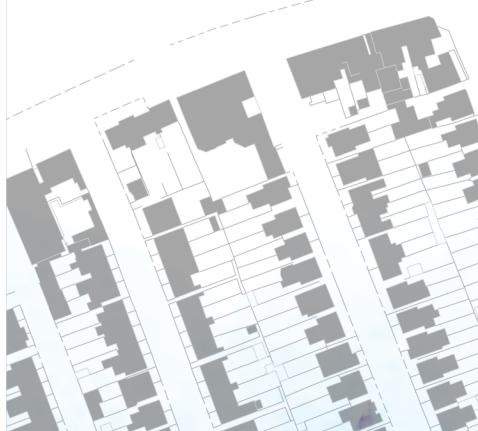


Fig 52 : Existing grain of housing

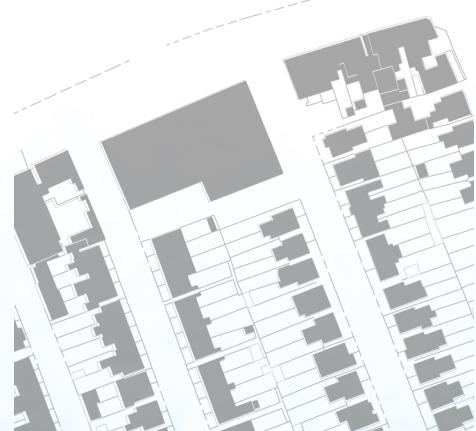


Fig 53 : Insertion of deeper block

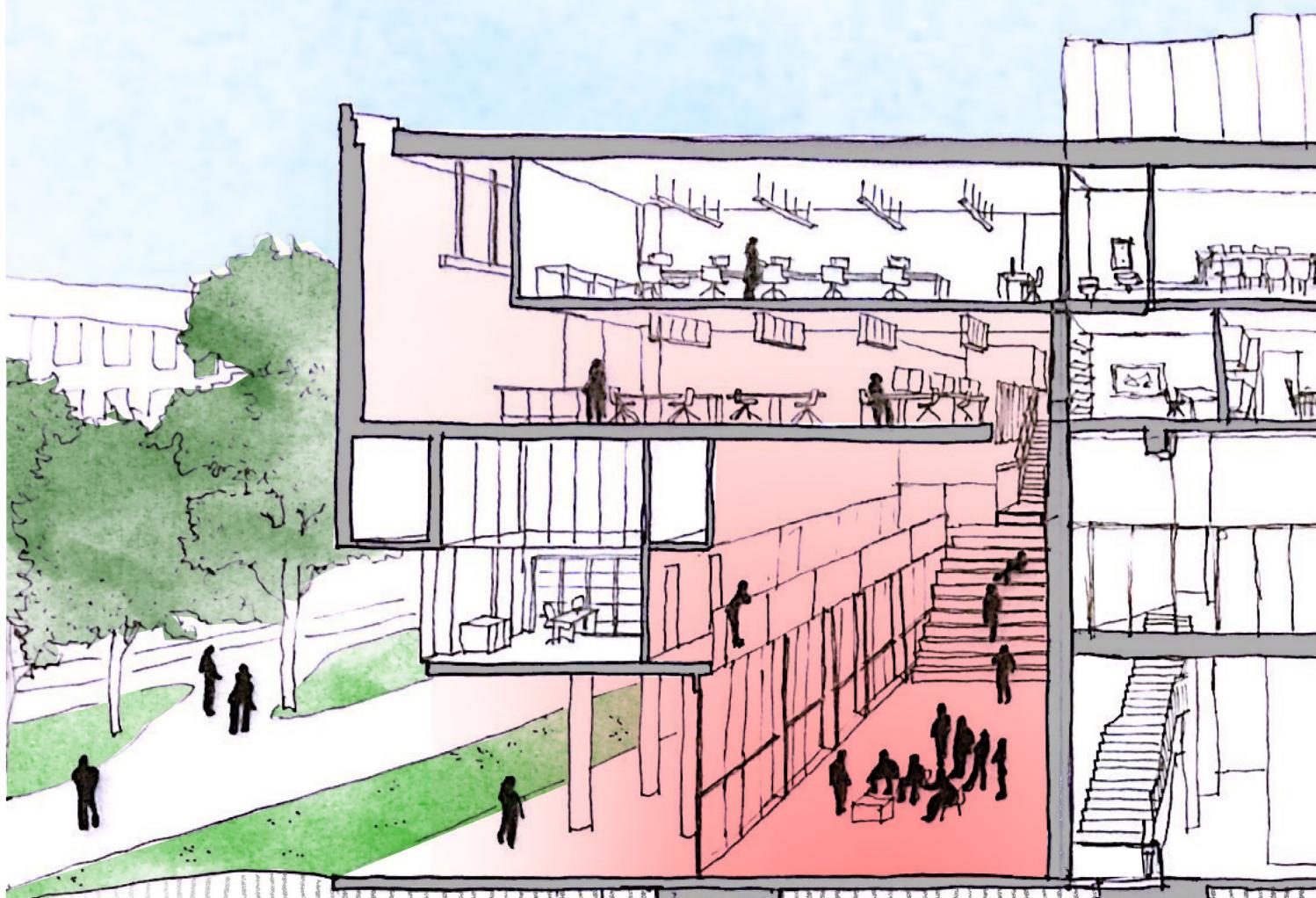


Fig 54 : Organisation of amenities and housing using a deeper block



## EXTENTS OF THE OPPORTUNITY



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Infrastructure as thick 2d

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The question of Raising vs Burying

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Reconfiguration of Surface

---

Requalification of Element

---

Hybrid Solutions

---

An Evolving Residential Attitude



Fig 55



Fig 56

- Fig 55 : The Highline, New York  
Fig 56 : Olympic Structure Park, Seattle  
Fig 57 : The Viadukt, Zurich  
Fig 58 : Faraday House, London



Fig 57



Fig 58

All these images are of projects that showcase the design possibilities and the range of opportunity embedded in the extended nature of the infrastructure networks. Apart from just the immediate station zone, it is important to once again zoom out and acknowledge the impact that this infrastructure has along its vast extents. The relationship of the railway lines with their surroundings is as much a function of topography as it is about the kind of design attitude projects adjacent to the railway lines exhibit. This begins by changing the way we conceptualize these infrastructures- not as a line of transport that is in principle separate from the city but through the existing three dimensionalities of its structure in the city in terms of the thickened ground or as Stan Alan calls it- the thick 2d. The thick 2d operates in different scales and sites in these peripheral environments. This once again cements the idea that rather than conceiving the transformation using a masterplan, we subject ourselves to a pragmatics that privileges project driven strategies.

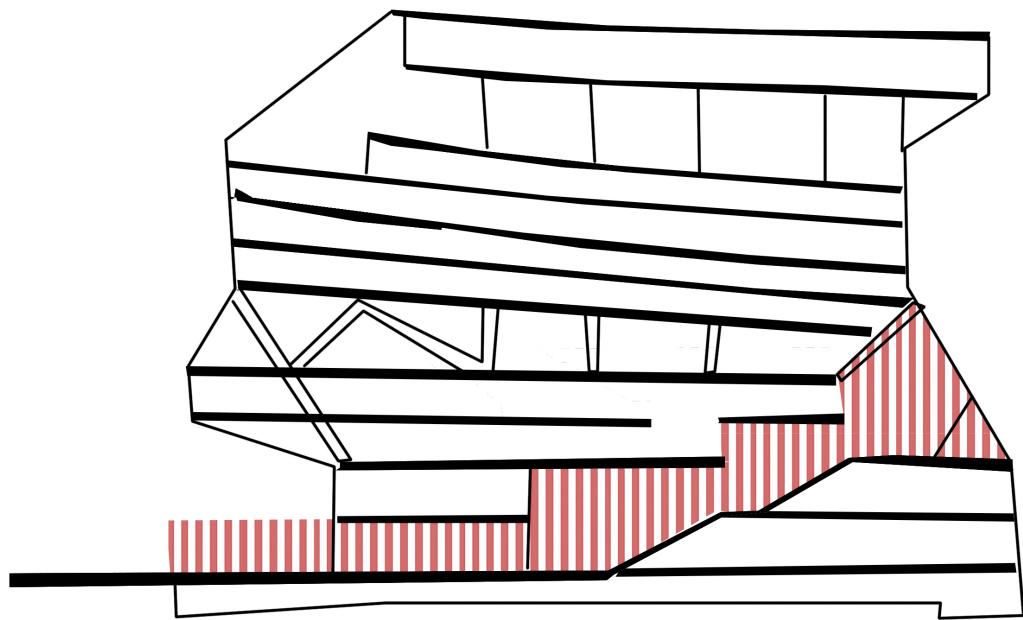


Fig 59 : Extension of the ground plane in Seattle Public Library

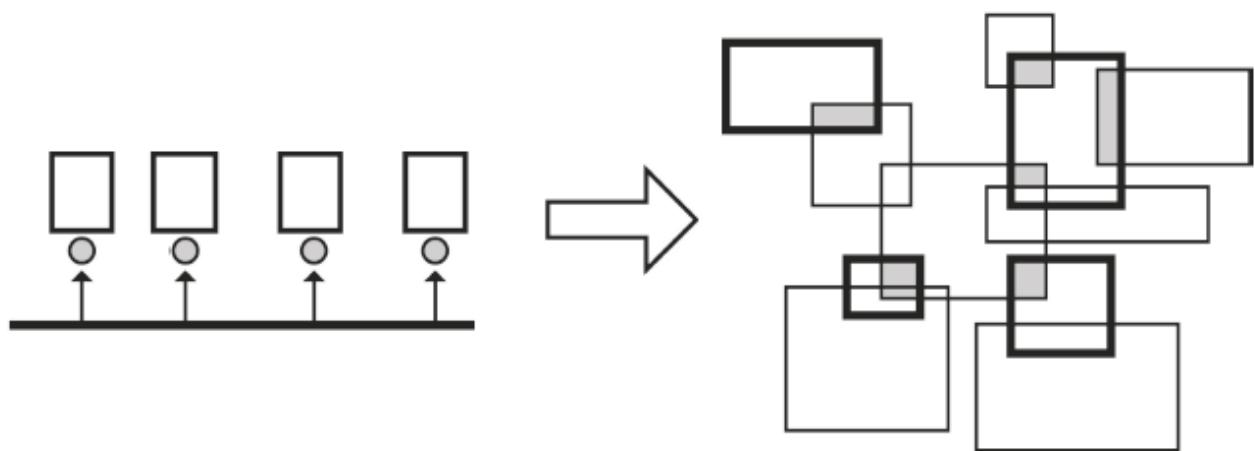


Fig 60 : Spine and Spur to Layering

### 3.1 INFRASTRUCTURE AS THICK 2D

Integration of urban infrastructure into its surroundings can mean several things- hiding it, making it seamlessly integrate by camouflaging it etc. Another possible strategy is using it as a way to create a new composite. In this sense, infrastructure seeks to achieve more than being in accordance with its existing context- it reconfigures the context into a new setting. Infrastructure is visible and yet dependent on its relationship to its surroundings. The manipulation of the ground plane and creation of various topographies is an example of such fusion- something that we notice in projects such as the Highline where the infrastructure is requalified to generate civic value. It is developed as a specific solution.

We can observe this being manifested in several different ways across projects and scales. It trickles down to the level of architectural articulation as well. If we consider the Seattle Public Library, the programme is driven and enabled by the layered ground that starts to articulate the organisation of spaces sectionally. These generate immense flexibility, not by creating generic floor plates but by specifically designing a variety of spaces that enable different activities. The ground as a surface becomes the staging area for various events to unfold. It moves away from being a passive platform into an agent that can evolve new forms of collective life. This becomes relevant as one of the key challenges to address is the severance infrastructure creates and find ways to bridge those gaps by creating meaningful adjacencies that enable new programmes to exist. This strategy of employing the thick 2d of infrastructure is especially important in these sites that attract workspace environments. Workspaces that require collaborative networks can no longer rely on spine and spur circulatory strategies that do very little in tying various environments together and need to start having a more layered conception of the ground plane.

If we start to think of this infrastructure not as an object placed on site, but as an extension of the ground itself- that has moments of intensity and experience; this layering in this context enables us to read the ground as a thickened surface as opposed to being a series of demarcated lines. These moments of intensity can be linked together to form a network and hierarchy in the urban field. The thickened surface can reconnect, reincorporate, exemplify, crystallise and multiply programmatic associations making it an ideal testing ground in creating meaningful civic spaces. (Shannon & Smets, 2010)

The proliferation of infrastructure in creating these environments generates possibilities at a city level to typologically integrate the different conditions created by it into a coherent system, rather than isolated interventions without any horizontal linkages. They start to become part of a series of manmade landscapes. The ground becomes a structuring element and a medium of redesign of the urban conditions that responds differentially to local settings while still remaining part of a system. When we talk about sites that are close to major infrastructures with poor lines of integration, the ambition of the project has to encompass how this piece of the city can contribute to the larger station district. Therefore, the focus has to be beyond the site lines and about creating cross connections using concepts of permeability and layering. This will result in utilising infrastructure as an urban generator as the sheer extent of it creates large number of possibilities to design a spatial sequencing that enables different forms of life around it. This ability of infrastructure to engage with the ground's performative structure becomes critical to the discourse on peripheral urbanity.

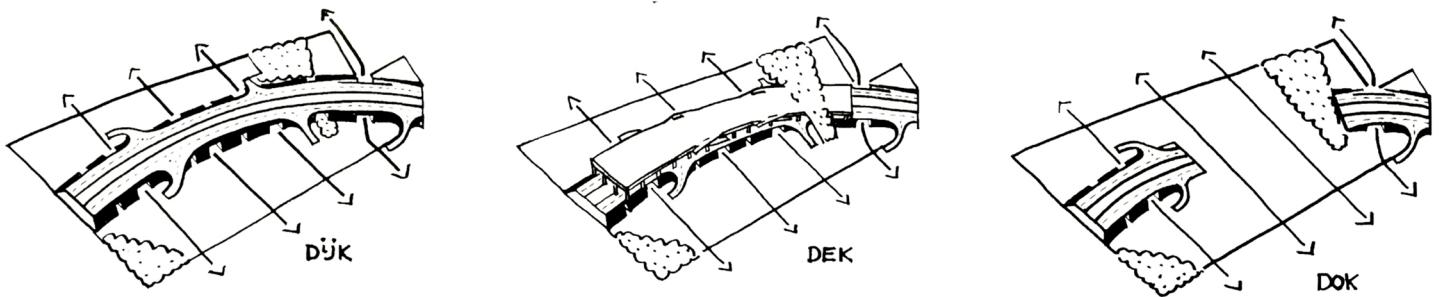


Fig 61 : Possibilities of raising vs burying in Zuidas



Fig 62: Plaza connecting amenities below with shared spaces on surface



Fig 63: Variance of spaces using the ground

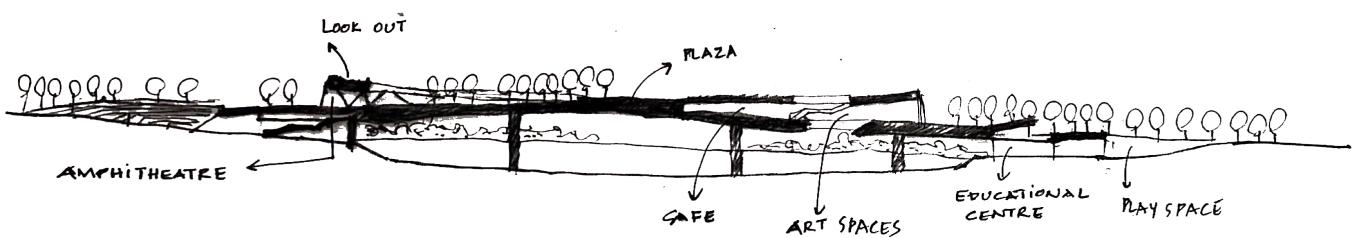


Fig 64: Programming the elevated ground

### 3.2 RAISING AND BURYING

Another persistent question one comes across in the development of station projects, is the choice between burying and hiding the infrastructure, so as to utilise the surface generated or by retaining and elevating it to utilise the spaces created by it. Of course, this is also largely dependent on the topographical conditions on site but we can begin to notice a general propensity to favour the method of hiding the infrastructure to avoid the disruption to the urban fabric. There has been an enormous amount of investment in sinking or decking over these infrastructures as illustrated in the case of Zuidas. In the case of Romford, the railway infrastructure is placed at a height but has no relationship with what is occurring next to it along its edges. Zuidas is a great example of a situation where multiple options were available to deal with a fragmented site- the dyke, deck and dock model (Fig 61). Each of them provides a very different but nevertheless reasonable solutions to stitching the fragmented urban fabric. We can call these strategies as that of requalification of the element, reconfiguration of the surface and a hybrid of the two. Looking at precedents of projects that illustrate each of these approaches provides a means of evaluation of how one extracts the values and opportunities presented by these conditions.

While the potential of utilising the new surfaces created by the decked surface are enormous, this thesis argues that there are a lot of other ways of productively engaging with these infrastructural elements that not only saves a lot of money and inhibits speculation, but also allows for spaces in the city to deliver unexpected uses and programmes that transforms infrastructure from a mono functional element into a more hybrid and vital structure. Expansion of this knowledge base is critical so as to avoid the mistakes of Zuidas during the design process.

### 3.3 RECONFIGURATION OF SURFACE

This method often focuses on the creation of a new urban surface that hides the infrastructure underneath it to continue the urban grid or to provide added value to the city by enabling green networks and communal spaces. Examples range from completely hiding the infrastructure like in the case of the Central Artery Tunnel in Boston, or by adaptively reusing the infrastructure like in the case of Highline, New York. While adaptive reuse is often used to transform outdated or derelict pieces of infrastructure, hiding the entire system is more common when it comes to active transportation networks.

Twelve elevated lanes of traffic were dismantled and then placed in an underground tunnel to provide a central urban space and reestablish the connection between central Boston and the water. (Busquets, 2006) The high cost of this method can possibly be justified if it provides a surface that does more than just being an open space. It has to be able to support a life around it. For example, projects like the Schouwburgplien in Rotterdam or OMA's proposal for the 11th Street Bridge park go beyond just creating a civic presence and instead intelligently use the layering of different programmes to create meaningful adjacencies. Both of these projects manipulate the ground plane to create a spatial sequencing that allows a wide range of activities to occur. While OMA does this by crisscrossing the ends of the bridges to create an X form (Fig 63,64), Schouwburgplien uses the underground parking as a means to set the stage for numerous fine grain open spaces operating in a loose system above (Fig 62).



Fig 65 : Affordable Workspaces



Fig 66 : Maltby Street Market

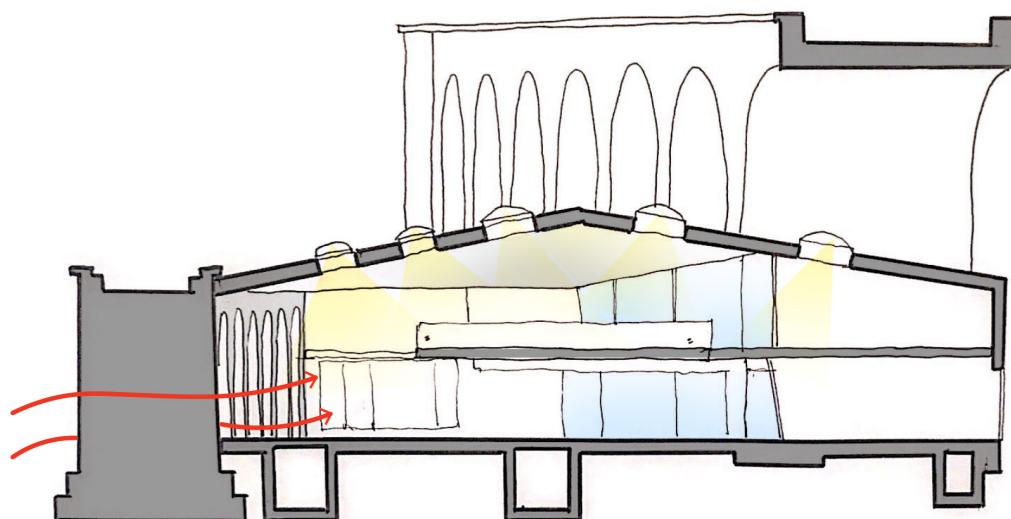


Fig 67 : The Viadukt, Zurich

### 3.4 REQUALIFICATION OF THE ELEMENT

Requalification of the infrastructure shows that the continuity of urban form is not simply based on that of a legible image of a seamless surface but lies in the ability to deal with the incompatibility and friction of various juxtapositions. Dissolving this discontinuity requires an activation of various scales and approaching the infrastructure as an architectural endeavour that brings together elements of landscape and engineering. Therefore, extracting the potential of the element lies in the ability of the designer to use the architectural section as a highly operative device that can act as a primary source in the development of an organizational scheme. (Busquets, 2006) We don't always have to depend on an idealized blank state condition but seek to address the synergies and reciprocities of various programmatic components to create a hybrid evolutionary quality. (Weiss/ Manfredi, 2015) We need to stop ignoring these systems spatially and start instrumentalizing them to generate differentiation in the city.

For instance, the utilization of the spaces under the railway arches in London to deliver vibrant city spaces such as Borough market and Maltby street market highlight the enormous potential of retaining these elements within the city (Fig 65,66). There is no shortage of examples across the territory of the city that not only use the 'residual' left over spaces as civic entities but also as cheap workspaces, small scale businesses, retail, amenities related to health and well being etc. Projects like the Viaduct in Zurich showcase how an infrastructural element can be reprogrammed to become a part of the urban system (Fig 67). These projects are committed to expanding the value of these infrastructures in creating points of intensity that calibrate the friction between the different systems to generate multi layered adjacencies.

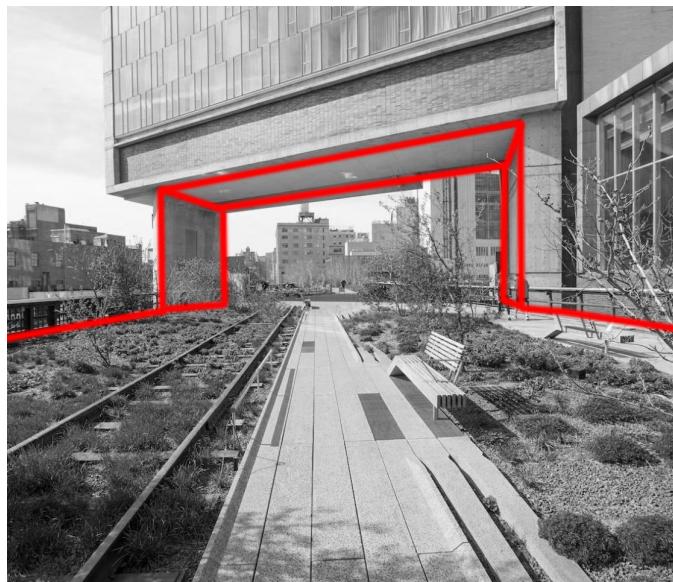


Fig 68 : Architecture responding to the Highline

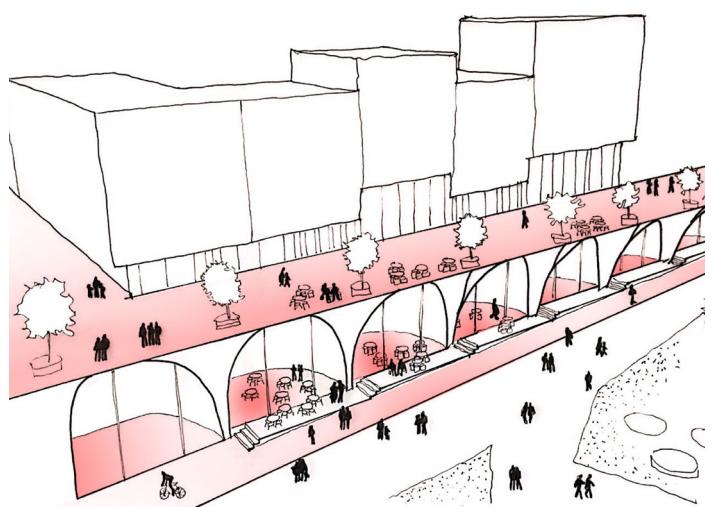


Fig 69 : Urban spaces created using topography in Tampere

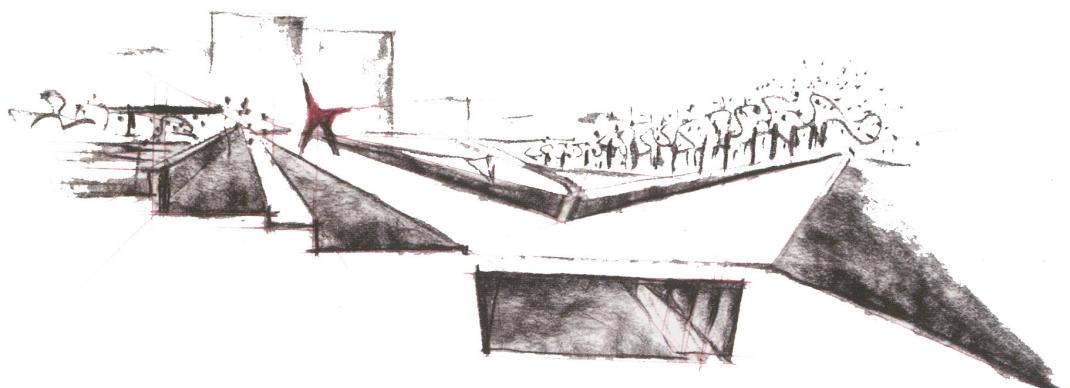


Fig 70 : Weaving and bridging over infrastructure in Seattle Olympic Park



Fig 71 : Infrastructure providing wider opportunities in Tokyo

### 3.5 HYBRID SOLUTIONS

Projects such as the Seattle Olympic Sculpture Park and Tampere Travel and Service Centre showcase how both of these strategies can come together to strengthen the opportunities available. In Seattle the challenge of three fragmented pieces created by the rail and road networks was tackled by introducing a green carpet as a zig zagged landform which alternatively conceals and reveals the infrastructure below. This becomes the primary staging device that utilises the sectional poche created by the crisscrossing of these infrastructural networks and reorganises parking, cultural, recreational with the hierarchies of varied modes of mobility. The project capitalises on the power of the section to calibrate the linear infrastructure and the residual spaces (Fig 70). In Tampere the urban fabric is stitched together both by decking over the rail lines as well as using the topographic shift to accommodate a series of spaces that reprogrammed the leftover spaces (Fig 69). The Highline also utilises similar concepts by juxtaposing spaces such as the meat packing industry with that of a civic domain, and also starts to be a primary factor in the way the architecture around responds and integrates with this infrastructure (Fig 68). The Highline is thus significant not just because it is a fantastic civic space but, in its ability to determine the form of the city and be a driver of change.

However, these are all instances of transforming the collateral created by existing infrastructure development and this approach is often constrained in terms of the programming possible within those restricted heights. On the other hand, we see fascinating examples in Singapore, Japan and China where they take this potential one step further and start to conceive the development of an area and its infrastructure together by building considerably higher structures that can accommodate entire buildings underneath. Thus, the variation in scale and dimension afford different opportunities that can enable richer typological explorations. The investment in infrastructure is driven not just with an intent of improved connectivity but also through the emergence of a new hybridity that adds to the urban quality.

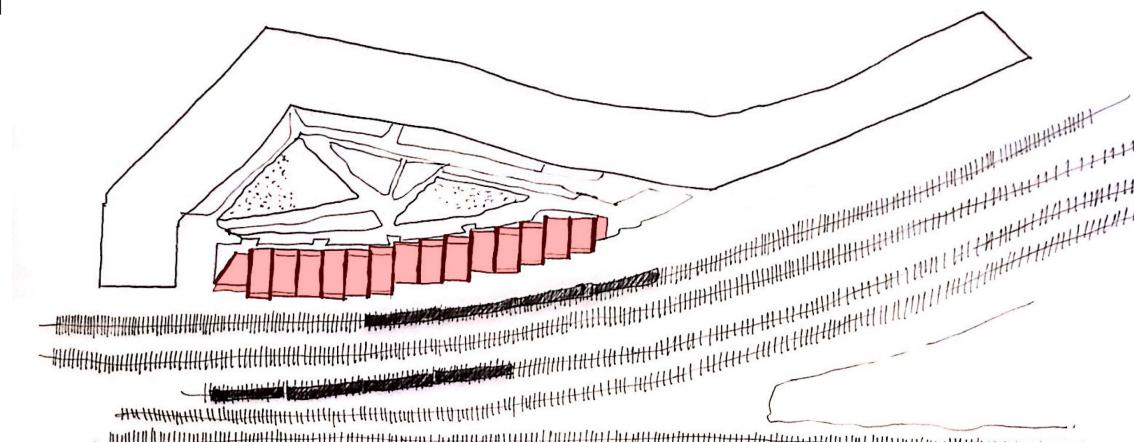
**D** ENGAGING WITH INFRASTRUCTURE


Fig 72 : Use of the linear block next to railway lines



Fig 73 : Varied ground in Lokdepot



Fig 74 : Use of arches in Faraday House to provide amenities



Fig 75 : Sites next to railway used as parking in Romford



Fig 76 : Underused railway arches in Romford

### 3.6 AN EVOLVING RESIDENTIAL ATTITUDE

Apart from solutions of requalification or reconfiguration of the infrastructure, engagement with these structures is also dependent on the design attitude of projects next to these conditions. Traditionally areas next to the rail line have often been places of industry and transportation with large imposing footprints which offer very little to the larger urban area. While there is ample amount of potential in adaptively reusing or transforming the industrial shed typology, there needs to be a renewed focus on how residential environments can cluster and accumulate in these areas. Requalification in tandem with introducing high quality housing environments that respond to these infrastructures will help in moving towards a neighbourhood understanding that make these areas far more resilient.

Projects such as the Faraday House in London or the Lokdepot in Berlin illustrate a new way of engaging with railway infrastructure- that doesn't turn its back to it, but instead embraces it as part of the urban experience. They both utilise long linear blocks that orient themselves to the rail line that have very high levels of permeability and openness, for instance by providing large openings and dual aspect views (Fig 72). They break the long linear building mass by staggering and cantilevering the units at regular intervals. Both projects use the performative aspect of the ground to great effect. Facing the rail line on one side and a courtyard on the other, the ground floor of both the projects seek to be spaces of distribution of amenities and services. The Faraday house successfully utilises the railway arches in expanding the capacity of the ground in delivering and hosting new activities and providing connections beyond the site (Fig 74). The Lockdepot creates a layered ground that organises the bicycle ramp, playground and the German museum of technology and creates effective synergies that strengthens one and other (Fig 73).

There are a lot more examples of such projects and this is reflective of a trend where we reevaluate our relationship with the infrastructure networks to deliver value, instead of seeing it as something that always needs to be buffered or tucked away. This principle is applicable to sites like Romford which currently try to either completely ignore the railway line or designate the spaces adjacent to it as parking lots and underused warehouses (Fig 75,76).

Through the course of this chapter, the sheer extents of value generation possible next to infrastructures become apparent. This is sorely missing in the way station areas are planned and envisioned currently. We can start to see how this thick 2d operates in different scales and sites in these peripheral environments and allows us to spot the great range of opportunities that can never really be captured through a masterplan. Especially in light of the speculative nature of peripheral development, design decisions have to be made by prioritising what an intervention can achieve not just by itself but as a starting point that enables the growth and strengthening of the spatial network around it.

Therefore, the planning methodology should be expanded to consider this wider range of possibilities and embrace the back and forth between scales that allows for a richer specificity and complexity. This begins with the acknowledgment of how localised interventions and strategies can exert a much wider influence and the role of the architectural project in this process.

# CONCLUSION

Studies like these invite people to think about the conceptualisation and decisions about the development of rail infrastructure together with a relatively extensive spatial planning that can link scenario and morphology together. This demands an understanding of how morphology and mobility operate in conjunction with one and other by looking at these transport networks not merely as corridors but as a function of urban areas that can support differentiation. The thesis uses project as a proposition to question the urban area. Through the use of precedents, it seeks to build the question of mechanism and ambition of change as exploration of urban change requires a critical comparison. We can see how some projects differ materially from previously established ideas, thereby building the ability to see conceivable future directions and ways to evaluate them.

This thesis argues for a wider value proposition that spreads the solution over a larger area rather than concentrating right at the station in an attempt to get a return on the investment. The ambition has to be much broader and have the ability to continuously build on existing values and associations over the long term. But how does one get there?

It begins by reframing the concept of the urban area and recognising the multi scalarity of it. We need to move away from thinking within jurisdictional boundaries and understand it through a vocabulary of dimension, vocation, pattern, mobility and how they aggregate over scales. This becomes even more pertinent for peripheral sites due to the speculative nature of development. The question of the periphery should be investigated by matching the potentials of an increased capacity with the quality of built environments.

Once we recognise the extents of the challenge, we can have a richer understanding of how to deal with the station area itself. Through the exploration of projects like Zuidas, Almere and Orestad, we can begin to understand the means of evaluating development in sites being transformed by Crossrail, for instance- Romford. By questioning conventional approaches such as street oriented morphology, the over prioritization of transport networks or pedestrian paths we systematically unravel the complexity present in each design decision. The study enables the investigation of architectural logic and its effects on the wider urban area through operations such as typological evolution, insertion of bigger blocks and using the ground as a tool for layered environments. While the station itself is critical in enabling a balance between the modes of mobility that make up these layered networks, we must also move away and see the effects of infrastructure on the wider area. By treating the infrastructure as part of the thick 2d, we being to develop projects that are associated with using either the surface or the element. This is in line with the argument of looking for ways of spreading the solutions to tackle the disjunction that is often created by these infrastructures. We need to include these large elements to create conditions that generate a value-based response that prioritizes integration and synergy.

This work is intended to equip designers in being reflective of the shortcomings that are prevalent in projects of this nature. It highlights the importance of linking issues of governance, investment and spatial planning right from the start. Development of infrastructural corridors and reorganisation of the urban realm should occur in tandem to create a system where the whole is hopefully greater than the sum of its parts.

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## ILLUSTRATION CREDITS



**Introduction:**

Fig 1: Polycentric London, by the author

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DISSERTATION TITLE: Infrastructure as an Incubator

COURSE TITLE: MA Dissertation

TUTOR: Lawrence Barth

DECLARATION:

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