INTERFACES THROUGH URBAN BOUNDARIES: INTEGRATING THE MANHATTAN BRIDGE INTO THE URBAN FABRIC

By

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Jason Vigneri-Beane

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ABSTRACT

Physical, functional and socio-cultural boundaries can emerge in cities over time. These boundaries can be strengthened or weakened by external forces. Since these boundaries affect the integrity of city circulation negatively, their effect should be reduced by design. In this thesis, qualities like mutualism, porosity, permeability and connectivity have been thought of as principles of design for integration. The Manhattan Bridge has been chosen for study. The networks between the *meshworks* are weak in the area where the Manhattan Bridge hits ground level. Continuity can be supplied by strengthening connections between these existing nodes. Creating interfaces and strengthening the existing functions would reduce the physical boundary effect which the bridge creates.

De Landa discusses strengthening the nodes (meshworks in his term):

> "...meshworks and hierarchies not only coexist and intermingle, they constantly give rise to one other (32). …The addition of new nodes to the meshwork as it complexified did not occur according to a plan but simply following internal constraints; that is, each new node had to 'mesh well' with the existing ones (i.e catalyze and be catalyzed by existing nodes)"(81).

Table of Contents

I. Introduction

Potential emergences through boundaries can create an interface effect in related areas. These interfaces can grow/develop with external forces like the environment, technology and money. An integration process can lead these areas to change morphologically as well. New networks will occur and will affect the city circulation through morphogenesis.

Bridges are built to provide connections across rivers which are natural boundaries. However, when connections are provided by building bridges, some borders can be formed in a micro scale. For example, the areas where bridges hit the ground in Manhattan can be thought of as physical borders in the city. These areas and their environments do not mostly have any specific function. In addition they create borders in the city that break continuity.

In this study, the area where the Manhattan Bridge hits the ground has been selected for the project site. How boundary effects could be reduced by design has been researched; reducing boundary effect through creating interfaces and strengthening existing nodes is the goal of the project.

II. Theoretical Approach

Borders and boundaries in the cities define the frontiers through functional, physical, socio-cultural and socio-economical differences. In addition, they limit the flow in some parts of the urban system.

As Soja points out:

> “borders and boundaries are life’s linear regulators, framing our thoughts and practices into of action that range in scale and scope from the intimate personal spaces surrounding our bodies though numerous regional worlds that enclose us in nested stages extending from the local to the global” (33).

The edges are the linear structures that are not considered as paths. They are boundaries between two phases and are the linear breaks in continuity (for example; shores, edges of development, walls). They are lateral references rather than coordinate axes. These edges may be barriers; more or less penetrable or they may be seams that are lines along which two regions are related and joined together. These edge elements are probably not as dominant as paths, but are important organizing features, especially in the role of holding together generalized areas, as in the outline of a city by water or wall (Lynch).

According to Lynch, edge elements, paths, districts and nodes can be organizing elements in the city. For example, the links of paths, districts and nodes in shopping circulations are givens as organizing elements for functional urban borders (Spierings,1-8).

Paths show the routes that people can select to move around the city. Lynch says that paths can have "orienting qualities" since they can direct crowds. For example, non-linear streets can stimulate shoppers to go on walking. These street shapes can increase circulation since they foster a feeling of anticipation. The order of shopping centres generally consists of a few shopping circles to foster people to go on walking. Retail dealers think that people can be transformed into consumers by facing them with more attractive shopping windows (Spiering,1-8).

Districts are the parts of the cities and have certain features. To describe districts, Lynch considered their physical features with the combinations of their useful facilities. The themed sets of leisure facilities together with a built environment which represents amusement rather than function, and a routing between shopping themes; all these make shopping centres the theme areas. To make shoppers spend as much money as possible, entertaining facilities and physical characters are designed and combined with shopping centers (Spierings,1-8).

Nodes are the intersections of streets at which people decide whether to continue walking or not. Lynch mentions that "because decisions must be made at junctions, people heighten their attention at such places and perceive nearby elements with more than normal clarity" (72).

People make up their minds about continuing their shopping walk with connection to their perception of nearby elements. Shopping centres were intentionally designed to attract the attention of shoppers and manipulate their activity. For instance, malls are designed in order to keep shoppers walking around and spending money. This is, in effect, advertisements: the continuous confrontation with attractive shop windows, when walking along curved streets (Spierings,1-8).

It is true that these could be organizing elements in terms of the property issues and country borders. However, these create boundaries which lead to discontinuity in the urban life and affect the urban flow. As Spierings says: the barriers limit the mobility:

> “Lynch defines edges as ‘boundaries between two kinds of areas. Those edges seem strongest which are not only visually prominent, but also continuous in form and impenetrable to cross movement’. Increasing global flows of people, information and capital and the related fragmentation of cities may have dissolved many urban boundaries but also have created new ones. The traditional and often still used conceptualization of a boundary or border is that of a ‘barrier’ limiting or even preventing mobility” (2).

III. Urban Boundaries

A. Types of boundaries in cities

1. Physical boundaries

Some physical elements like fences and walls can be used for determining property issues in the urban system. However, some elements in the cities like bridges and highways can block the urban circulation and form frontiers within the urban system.

> "...cities arise from the flow of matter-energy, but once a town's mineral infrastructure has emerged, it reacts to those flows, creating a new set of constraints that either intensifies or inhibits them. Needless to say, the walls, monumental buildings, streets and houses of a town would make a rather weak set of constraints if they operated on their own. Of course, they do not. ... Although these institutions

are the product of collective human decision making, once in place they also react back on their human components to limit them or control them, or, on contrary, to set them in motion or accelerate their mutation" (De Landa, 28-29).

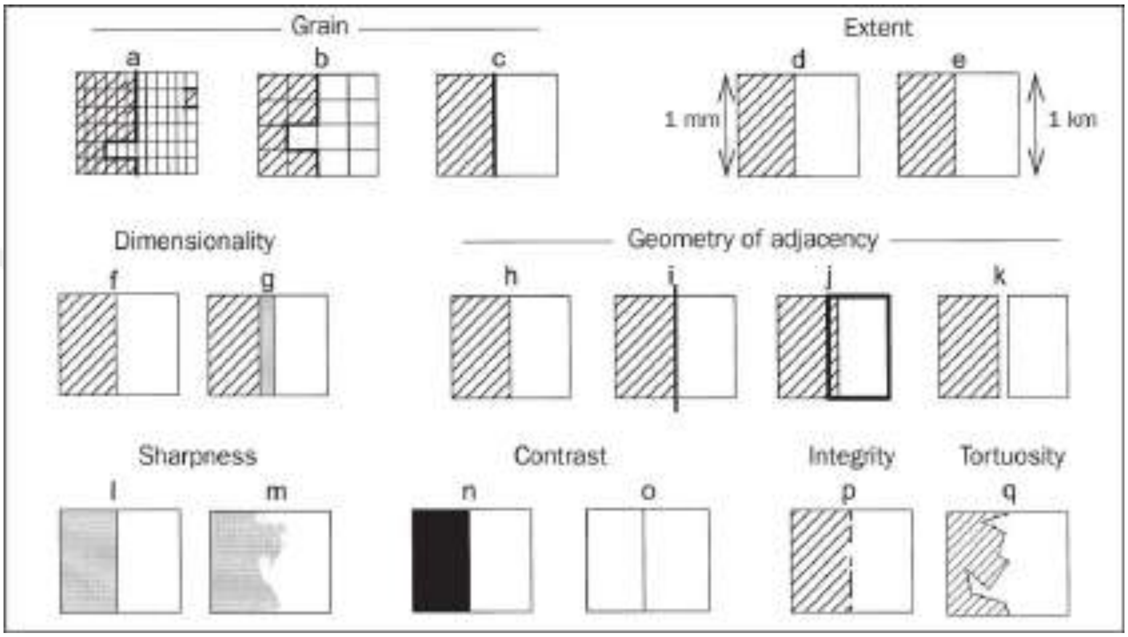


Figure 1. "Some attributes of boundary spatial structure,

a) a boundary defined using a fine grain size

b) the same boundary defined using a medium grain size

c) the same boundary defined using a coarse grain size

d)a boundary of small extent

e) a boundary of large extent

f) an infinitesimally thin boundary

g) a boundary with finite thickness

h) a boundary between two over-lapping patches

k) a boundary between two disjunct patches

l) a sharp boundary

m) a gradual boundary

n) a boundary between two highly contrasting patches

o) a boundary between two slightly contrasting patches

p) a perforated boundary

q) a convoluted boundary" (Strayer et al.)

Figure 2. Manhattan foursquare check-ins. "A Week on Foursquare".

Bridges can effect flow. For example, a map (Figure 2) which was issued by The Wall Street Journal shows that there are less check-ins (through Foursquare) in the area between the Brooklyn and Williamsburg Bridges. This shows that networks between nodes in the area are not strong enough. When the network system becomes strong enough, circulation flow will be affected positively.

2. Natural boundaries

Rivers, lakes, coastlines, mountain ranges and watersheds can be given as examples of natural boundaries. Cities should be built according to these. Since the "deep structure" of nature is very strong, without thinking of geography and the form of nature, the city can be affected negatively. Spirn says that the deep structure can be masked, but it cannot be removed. When surface structure is indistinct or opposite to deep structure, it will require additional energy, materials, and information to sustain. If these resources stop to being applied, the deep structure will assert itself again. Although this kind of ecological approach to urban design is not new, there are few applications in terms of design. However, these kinds of applications are becoming easy to build with new construction methods and technology (10).

Until recent years, classical approaches to urban design led cities to separate themselves from nature. Tunnels have been made to cross mountains, bridges have been constructed to cross rivers. Therefore, in addition to natural boundaries like mountains or rivers, new type of boundaries began to emerge. For example, the Manhattan Bridge has been constructed in order to provide a connection between Manhattan and Brooklyn. However, both ends of the bridge have to affected the urban area by creating a border effect.

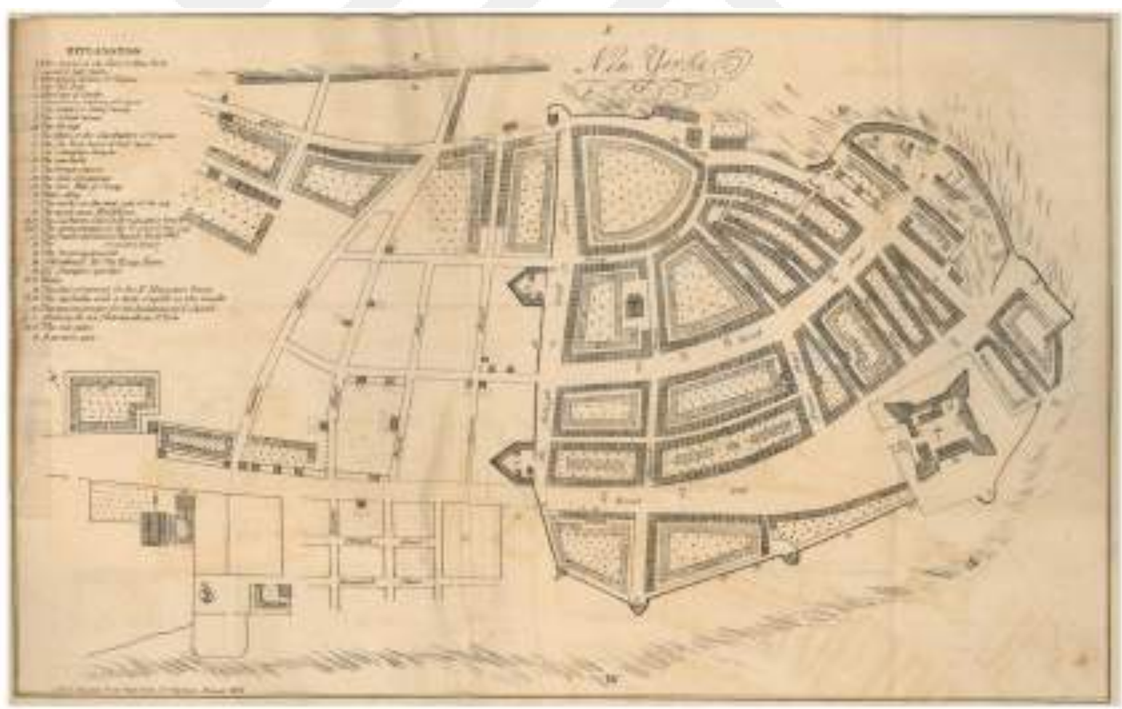


Figure 3. New York 1695.
Natural boundaries were important in old settlements. Most of them were located at the protected areas on the coast such as intra-bay, peninsulas and hillsides. These areas are sheltered and their environment can be easily controlled.

McWilliam points out how to control the residential encroachment in the urban-forest edges. Woodlands adjacent to urban environments play important ecological roles, such as providing natural environment for wildlife. They have significant economic functions: For instance, storm water management and flood control. They also have positive effects on human health. They are very valuable for people living adjacent to them. However, if encroachment is done into these systems by adjacent land uses, their integrity becomes risky. The governments generally think active management of woodlands is very expensive. Hence, they rely on structural solutions, and use fences to manage the physical interface between housing land uses and woodlands. However, it is not clear whether this method is effective to protect natural systems from the impacts. Studies have indicated that the spatial extent of disturbance is a main criterion of human impact on woodlands. Therefore, to specify protective buffer strips, urban planners want to learn how far contiguous land use impacts extend into the edge of the woodland. A related study was carried out to measure the extent of impacts of over 350 residences built next to the suburban woodlands in Southern Ontario. The results showed that the boundary treatments can give long-term protection from the neighborhood residential encroachment. However, generally implemented treatments can be highly developed with the help of the results of the study. Additionally, boundaries between residences and the woodlands must be carefully designed to prevent access. To control the housing/forest interface, it was suggested that forested buffers at least 50 m wide were required to segregate encroachment impacts from suburban woodlands (149-159). (see figure 4)

Figure 4. Boundary treatments

3. Functional boundaries

A boundary is a line, but the uniqueness of it is that it not only divides, but if crossed, induces a sudden or extraordinary change in the traversing body or object. In addition, the significance of boundaries is that they indicate the qualitative difference of two distinct areas (Shields).

Functionally different places can create boundaries between each other. For example, even though the function of the financial district is changing, it has had a unique character for a long time that separates it from other districts of Manhattan. Functional differentiation in the urban system can lead to emergent abstract boundaries.

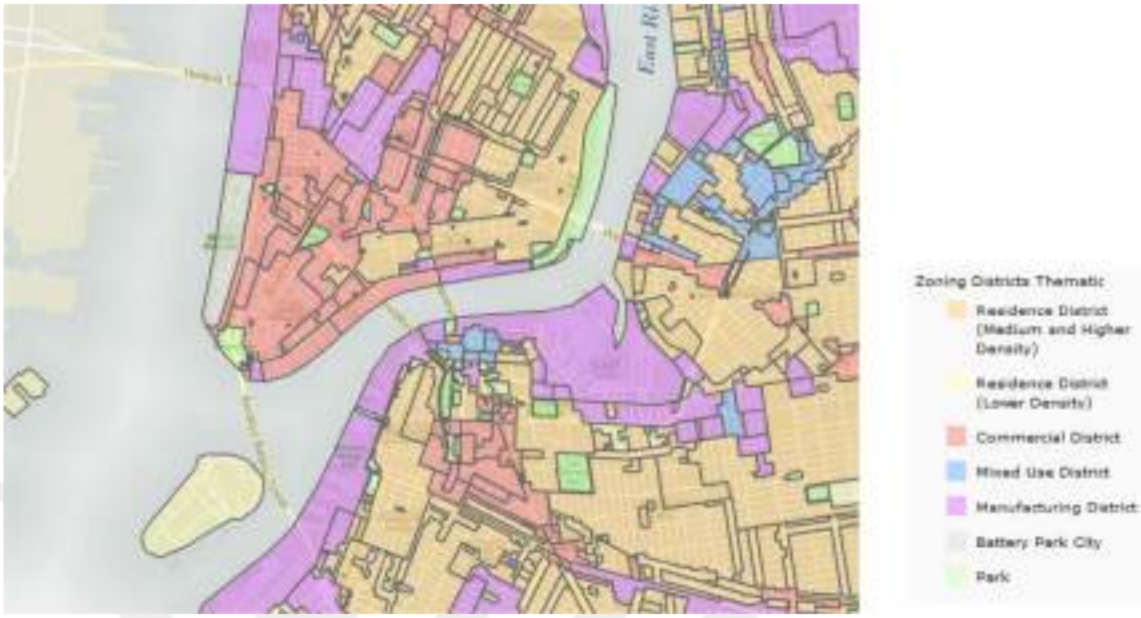


Figure 5. Manhattan functional zoning. Functionally different spaces can create boundaries between them.

Gabriel explains the relationship between cities and urban parks: Today, cities are commonly described as places of development and urban parks are theorized as an indirect reflection of the rising domination of industrial manufacturing in the 19th century. Nevertheless, this historical description says little about the process in which the concepts of the city and nature are generated, or how this information effects the creation of identities of urban people. The inconsistent formation of the city can be found in certain historical times. One is the establishment of urban parks throughout the middle- to late-19th century. This was an instrument to establish a new knowledge of the city by constituting a boundary between the social space of the city and the natural space of the park. Gabriel explored the creation of park subjects throughout this duration and various enlightened economic applications. These applications were once common in and around the city. However, their defacement was a prerequisite for the accomplished formation of an urban discourse organized in connection with the construction of the city/nature boundary (123-141).

4. Socio-cultural boundaries

Urban space is not only related to morphology, but also related to social life and social space. As Lefebvre says, “The significance of the urban fabric is not limited to its morphology. It is the support of a more or less intense, more or less degraded, ‘way of life’: urban society” (72) .

Separation of social classes in a city is a method of organizing and does not a create great effect on the inhabitants. This method does not bring two socially different communities very close to each other. However, without controlling this by city planning, uncontrolled spatial separation can occur, and this can create boundaries between two socially different communities. Paraisopolis favela, Morumbi and Sao Paulo in Brazil are examples of formation of borders as a result of uncontrolled spatial separation. There is a huge contrast between two settlements in terms of socio - economic and cultural situation and a wall (physical boundary) among them that separates them physically. “Boundaries are socially-constructed as shorthand representations. Borders actualise virtualities such as sociocultural divisions. Both borders and boundaries are therefore intimately connected to the epistemological politics and to the disposition of knowledges” (Shields).

Figure 6. Chinatown, New York City. Some communities in the cities prefer to live together. Therefore, they create their own district, and in this context, the boundaries are formed between the socio-culturally different areas. The Chinatown and Little Italy districts in Manhattan can be given as examples of this situation.

Figure 7. Chinatown, New York City.

Figure 8. Chinatown New York City.

Figure 9. Little Italy, New York City.

> "Culturally, borders once established geographical and historical forms of inclusion and exclusion which correlated the local with insiders, presence and the known while the distant is correlated with outsiders, the foreign and absent" (Shields).

However, as Soja mentions, the effect of international boundaries and their degree of permeability to the flow of people, goods, money, ideas, and information have changed in recent years. The border effect among countries has been reduced by the effect of globalization (33-45).

The boundaries were created by people and their organisations. They are not constant and can be reformed. In this respect, from the consequences of present processes of global spatial reformation, two things are especially important: first, a state-centric and only regional understanding of borders are not correct. The significance of other boundaries, notably cultural ones, increases along with political borders that become less stable and more permeable. As Anderson and O'Dowd mention, the countries and their borders are the simplified forms of complex political, economic, social, and cultural restructuring processes. This does not coincide with the nation-state land. Second, as a result, the social formation of boundaries (with the inclusion of political ones) comes to the front more apparently than rigid political borders and precise regional landscapes of country-societies, because of intensive processes of replacement of social environment and cultural characters through the recent worldwide cultural economy. Among other things, this suggests that there is more area and flexibility for people to exceed political borders and expose socio-cultural boundaries. Therefore, dynamic understanding of borders is needed together with a perspective which considers inside - outside, them - us, neighborliness - strangeness, near -far as distinctions which are drawn in the practices of people's everyday lives. This new understanding of distinctions more likely transgress politically drawn borders (595). Paasi has discussed redirection of border studies with the thought of boundaries and spatiality as the extents of daily life practices, which is far off the territorial and administrative consideration of boundaries and spatiality (670). However, this does not suggest neglecting the insights of numerous studies which consider more structural perspectives in realization of the dynamics of rigid borders. But, it suggests the reconsideration of an anthropological perspective in border studies. In order to understand the ways in which socio-cultural boundaries and political borders interact, and also in order to comprehend how regional daily life regenerates and discusses present borders (and at the same time, forms new boundaries), an empirically based analysis of everyday life relations in border areas is essential (Dürrschmidt).

B. Potential emergence on boundaries

1. Integration / interface

> "We are all familiar with the disconcerting effect of the proximity of extremes, or, quite simply, with the sudden vicinity of things that have no relation to each other; the mere act of enumeration that heaps them all together has a power of enchantment all its own" (Foucault, XVI)

Two objects which are functionally, physically or culturally different from each other may have some points to connect. An interface can be a transition area or threshold which can provide this connection.

> "Different states of bodies or objects are required as they pass through the boundary-as-interface." (Shields)

If Classical thought respected boundaries, the Modernists attempted to subvert them and create new ones based on new ideologies. The Postmodernists suggested 'complexity' and 'double-coding', in relation with the disappearance of old boundaries, and the dominance of new ones. Thus, boundary transformed from limit, to frontier, then to interface (Islami).

Integration of different spaces through interfaces can reduce a boundary effect between places. Different spaces (functional, physical and socio-cultural), different urban pattern intersections, public-private intersections, open space-buildings (solid & voids in the urban pattern), natural edges, different demographics can be given as examples of spaces that have boundaries.

Qualities like mutualism, connectivity, continuity, porosity and permeability can be thought of as the design principles of the interface.

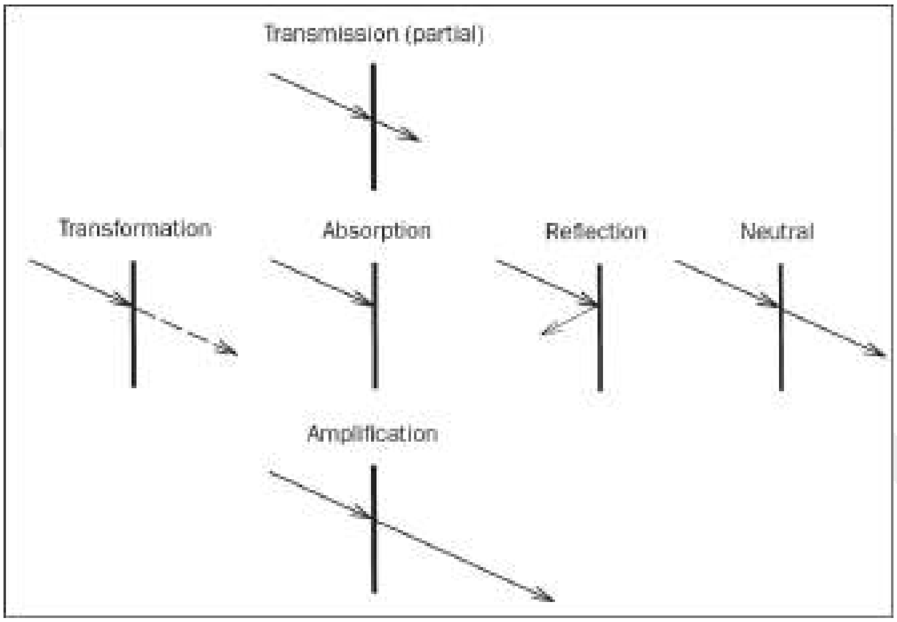


Figure 10. Possible activities of boundaries.

Mutualism can be described, in brief, as positive/positive interaction between species, that is advantageous to both. Direct mutualism: the two species interact physically; indirect mutualism: each species benefits from the other's availability, however, there is no direct interaction. Direct mutualisms are separated into symbiotic and non-symbiotic mutualism by using physiological integration as the fundamental criterion. This approximation is not natural, but it is appropriate, and has little common usefulness. Additionally, other parts of mutualism do not align clearly on a symbiotic/non-symbiotic division. Although exceptions are plentiful, symbiotic mutualisms incline to be co-developed, however optional mutualisms are often non-symbiotic and not co-developed. With these definitions, two observations can be stated. On the one hand, a great number of ecologically and economically significant interactions which are present throughout the earth seem to be mutualistic. On the other hand, very few studies have, in fact, showed enhancements in population growth rate by both of the species in an interaction. Interactions have, in general, been demonstrated to be mutualisms by explaining what is exchanged. Mutualism can be anywhere, however, its presence stands practically unproven.

In mutualism, the exchanges of benefits are a few main types: (1) providing energy, usually from photosynthesis; (2) feeding: either the degradation of substances by digestion for the partner or providing of growth factors or nutrition by synthesizing or concentration; (3) transfer from inconvenient to convenient environments; (4) protection, either from environmental change or from hostiles. Symbiotic mutualists usually interchange the first two activities, sometime the fourth, and seldom the third. Non-symbiotic mutualisms can cover all of them (Boucher et al. 315-347).

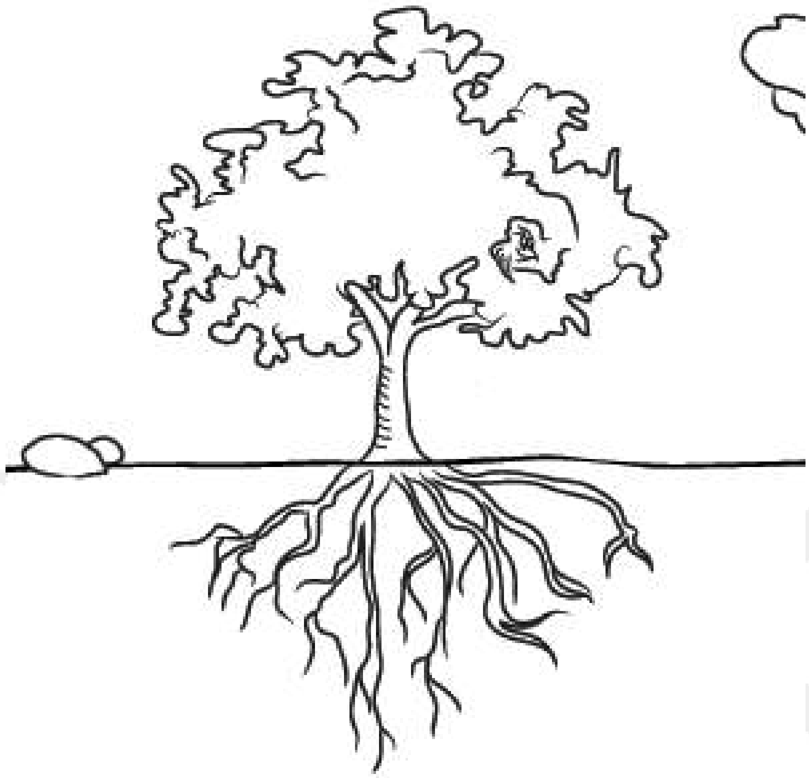


Figure 11. Mutualist environment. There is a border between tree and its roots. But both sides benefit from each other, feed themselves.

In nature there is a physical boundary between tree and its root. However, tree gets the sun and feeds its roots, and roots get minerals to tree to grow. With this mutualist behavior, the tree itself grows and becomes stronger (see figure 7, 8, 9, 10 and 11).

De Landa gives an example from the nature about the barriers which have a potential to be continuous.

> "Many plants are able to hybridize with plants of other species (that is, the isolating barriers retain a measure of permeability), while many microorganisms freely exchange genes with other species during their lifetimes" (138).

Figure 12. Mutualism. “One of the most common mutualisms in the world is that between pollinators and flowering plants, which represent uni-directional consumer-resource mutualisms whereby the pollinators obtain floral nectar (and in some cases pollen) as a food resource while the plant obtains non-trophic reproductive benefits through pollen dispersal and seed production” (Holland).

Figure 13. Mutualism. “Boulder brain coral with a small sharknose goby fish. Coral actually entail two species symbiotic interaction that represents a bi-directional consumer-resource mutualism. The coral itself is an animal consumer that obtains photosynthates produced by zooxanthellae algae, while the algae obtain nutrients and in particular nitrogen from the coral” (Holland).

Figure 14. Mutualism. “An indirect mutualism between cleaner and client fishes in which the cleaner fish species, in this case the smaller ones swimming around the larger client fish, consume ectoparasites of the client fish. Cleaners benefit by obtaining a food resource, the ectoparasites of the client, while the client benefits from reduced parasite loads. Despite close behavioral associations between the cleaner and client fishes, this is an indirect mutualism between the two fish species mediated entirely by a third species, the ectoparasites, which interestingly represents the notion of an enemy of one's enemy is one's friend” (Holland).

Figure 15. Mutualism. “A common uni-directional consumer-resource mutualism between ants and aphids, in which the ants obtain honeydew food resources excreted by aphids while the aphids obtain increased survival by the non-trophic service of ant defense against natural enemies of the aphids” (Holland).

According to De Landa

> "what is true of physical systems is all the more true of biological ones. Attractors and bifurcations are features of any system in which the dynamics are not only far from equilibrium but also nonlinear, that is, in which there are strong mutual interactions (or feedback) between components. Whether the system in question is composed of molecules or of living creatures, it will exhibit endogenously generated stable states, as well as sharp transitions between states, as long as there is feedback and an intense flow of energy coursing through the system. As biology begins to include these nonlinear dynamical phenomena in its models –for example, the mutual stimulation involved in the case of evolutionary 'arms races' between predators and prey – the notion of a 'fittest design' will lose its meaning. In an arms race there is no optimal solution fixed once and for all, since the criterion of 'fitness' itself changes with the dynamics. As the belief in a fixed criterion of optimality disappears from biology, real historical processes come to reassert themselves once more" (14).

2. Morphogenesis through integration

> "A boundary is not that at which something stops but, as the Greeks recognised, the boundary is that from which something begins its essential unfolding" (Heidegger, 332).

An integration process through interfaces will affect the whole urban system gradually. Morphogenesis in the boundary will start at a single point, then it will change its environment. With the successful interfaces, the boundaries will become not just transition areas but also they will be places where the urban structure can benefit. As a result, it will be possible that the urban system will start to shape according to these specific points.

> "Borders are not only limits and edges, but shared edges or thresholds, liminal zones of becoming… The psychoanalyst and artist Bracha-Linchtenberg-Ettinger refers to the border not as a line but as 'borderspace' in which there is a joint, metamorphosis or co-emergence in difference" (Shields).

Exogenous or endogenous forces may tend to maintain or destroy a boundary in time. An example of exogenous forces which can strengthen or weaken boundaries is that plankton may be concentrated into patches by ocean gyres or dispersed by winds or currents. Another example, of an endogenously maintained boundary, is a boundary between two vegetation types that is reinforced by the grazing preferences of herbivores (Strayer et al, 724).

3. Emergence of new networks through integration

Creating interfaces in the boundaries will affect the urban system. It is possible that the system may start to shape new interfaces. This situation may lead to change existing nodes of networks in the urban system.

According to De Landa, new forces grafted into *meshworks (self-consistent aggregates)* become other nodes. Also they participate in a self- reproduction system while the old system is complexified with new components. De Landa describes this kind of formation as below:

> "What about meshworks? Deleuze and Guattari offer a hypothetical diagram for this type of structure, too, but its elements are not as straightforward as those involved in the formation of strada. Perhaps the most studied type of meshwork is the 'autocatalytic loop,' a closed chain of chemical processes, which must be distinguished from the simple self-stimulating dynamics to which I referred many

times in my description of turbulent urban growth. Unlike simple autocatalysis, a closed loop displays not only self-stimulation but also self-maintenance; that is, it links a series of mutually stimulating pairs into a structure that reproduces as a whole.

The physical basis for either simple or complex self-stimulation are catalysts, that is, chemical substances capable of ‘recognizing’ a more or less specific material and altering that material’s molecular state so that it now reacts with certain substances with which it would not normally react. This act of recognition is not, of course, a cognitive act but one effected through a lock-and-key mechanism: a portion of the catalytic molecule fits or meshes with a portion of the target molecule, changing its internal structure so that it becomes more or less receptive to yet another substance. In this way, the catalyst provokes a meeting of two substances, facilitating (or inhibiting) their reaction and, therefore, the accumulation(or decumulation) of the products of that reaction. Under special conditions, a set of these processes may form a closed loop, where the product that accumulates due to the acceleration of one reaction serves as the catalyst for yet another reaction, which in turn generates a product that catalyzes the first one. Hence, the loop becomes self-sustaining for as long as its environment contains enough raw materials for the chemical reactions to proceed” (62-63) .

IV. Case study: Manhattan

A. Bridges as borders

Figure 16. Bridges where they hit the ground in Manhattan. They are being showed as a vacant land in New York City map.

Figure 17. Brooklyn Bridge (Manhattan side).

Figure 18. Brooklyn Bridge (Manhattan side).

Figure 19. Brooklyn Bridge (Manhattan side).

Figure 20. Williamsburg Bridge (Manhattan side).

Figure 21. Williamsburg Bridge (Manhattan side).

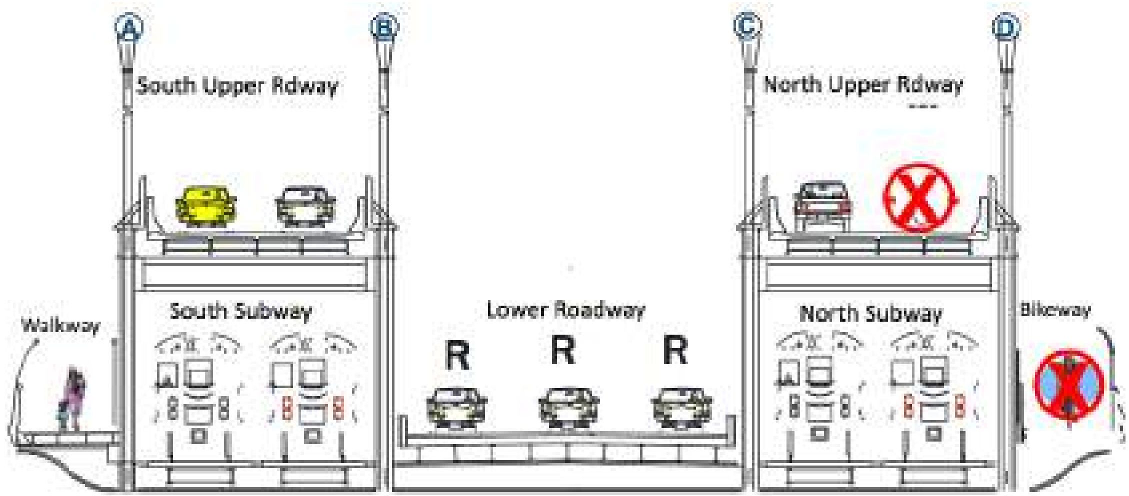


Figure 22. Structure of the Manhattan Bridge.

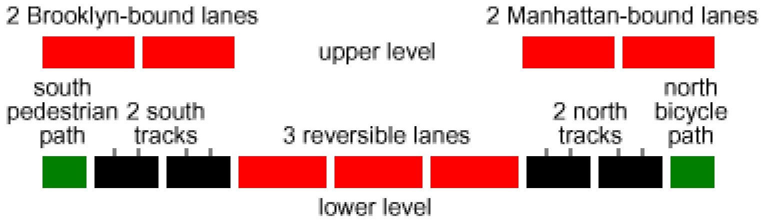


Figure 23. Cross section illustrating the bridge's lane layout.

B. Project proposal

This study is focused on the border effect of the Manhattan Bridge. The border (Manhattan Bridge) has been built over the river in order to connect land masses. However, the bridge creates a physical border in the urban area. This project will research how to reduce this physical border effect. The concepts below have been researched for understanding existing qualities of the site as well as establishing principles of design.

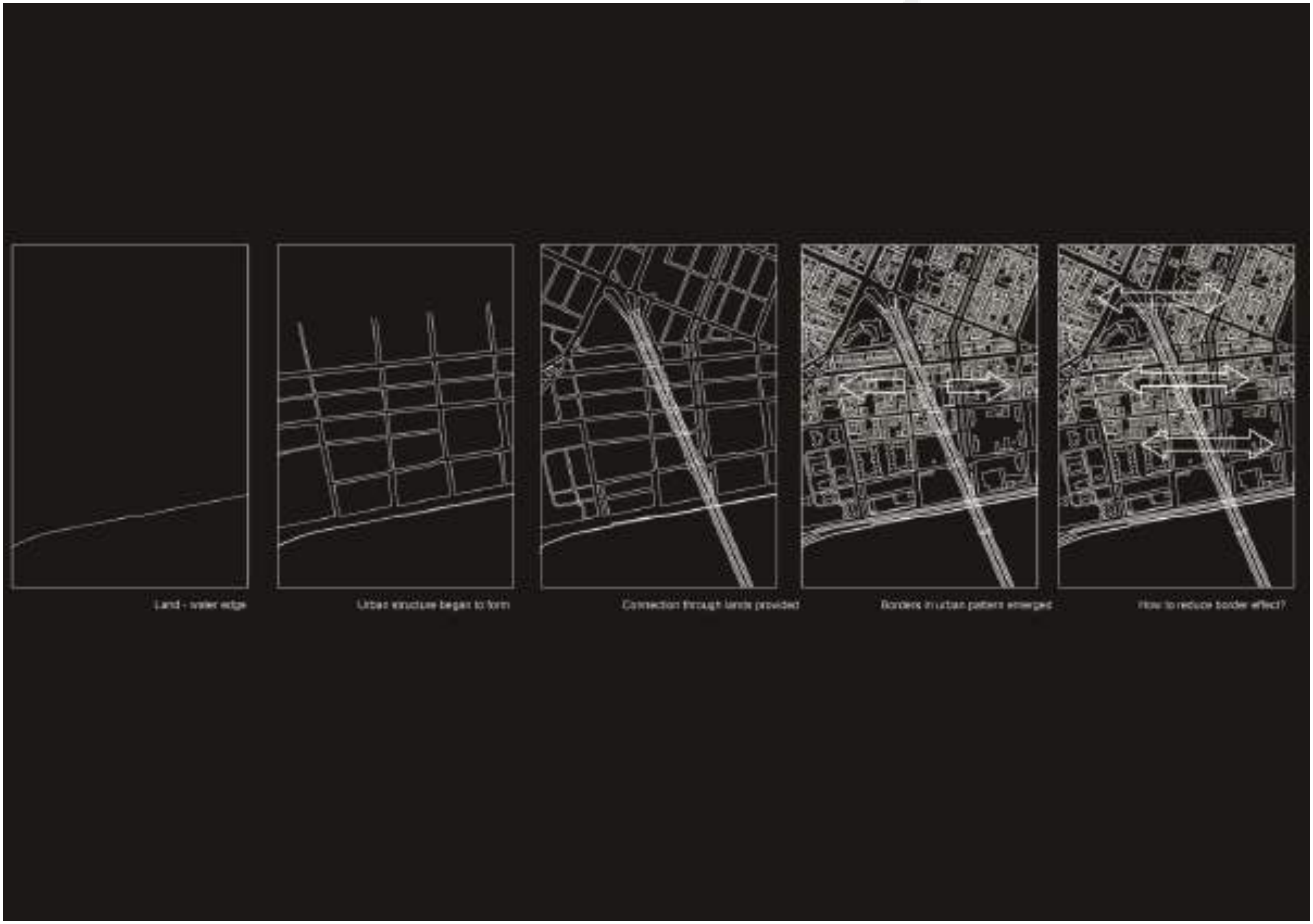


Figure 24. Urban development diagrams

1. Disconnection

There are some activities happening around the Manhattan Bridge. However, these activities have no connections between them because the Manhattan bridge creates a physical boundary in the area. In order to prevent the boundary effect and to strenghten the connections between activities, a project has been proposed. As De Landa mentions, strengthening the nodes where meshworks and hierarchies not only coexist and mix together, they continuously give rise to one other. The supplementation of new nodes to the meshwork as it complexified did not occur in accordance with a plan but just follows internal constraints; that is, each new node had to 'mesh well' with the present ones (i.e catalyze and be catalyzed by present nodes) (32-81). Qualities like permeability, connectivity, porosity and mutualism have been thought of as the principles of the design in this project in order to ‘mesh well' existing activities.

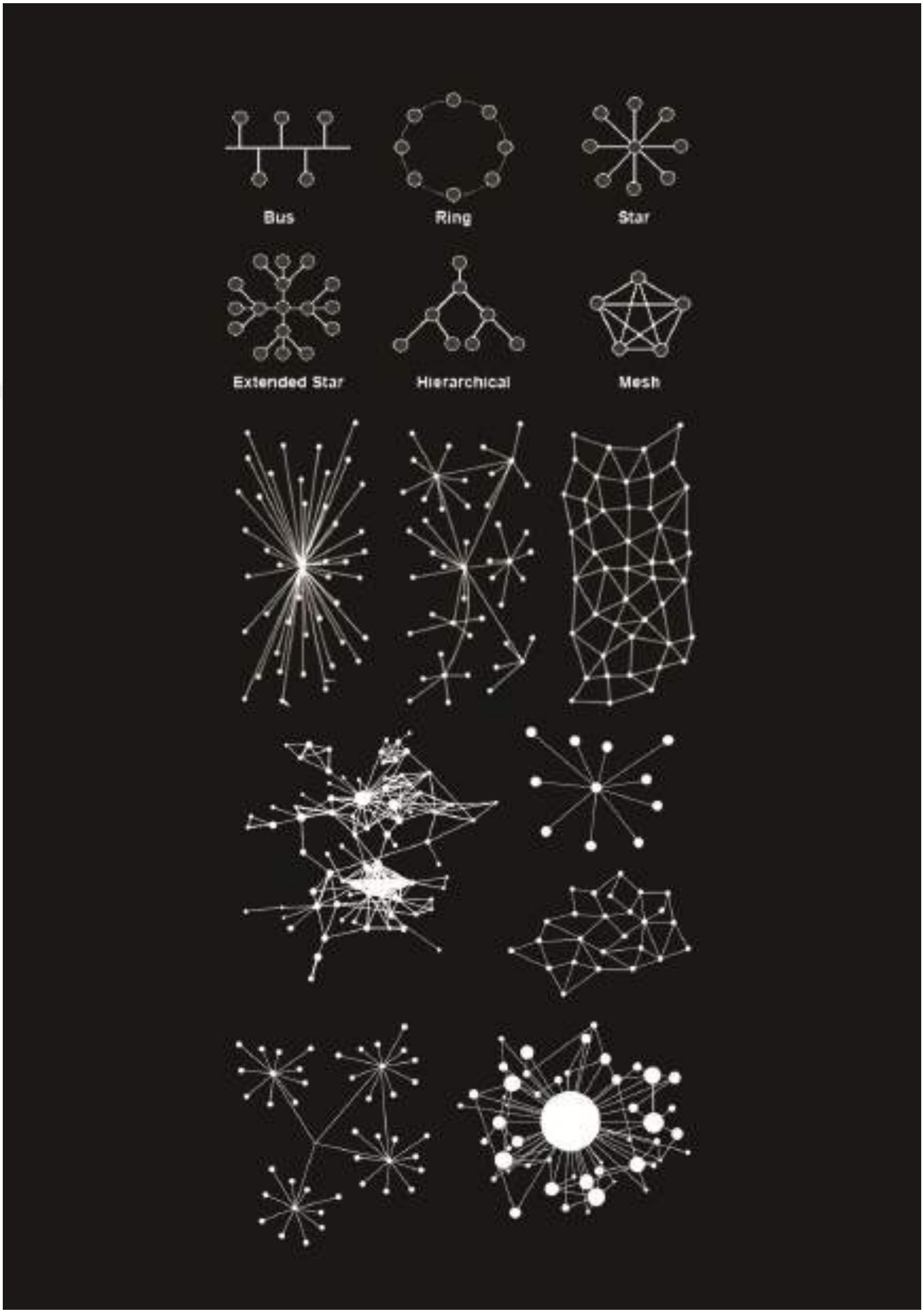


Figure 25. Types of networks

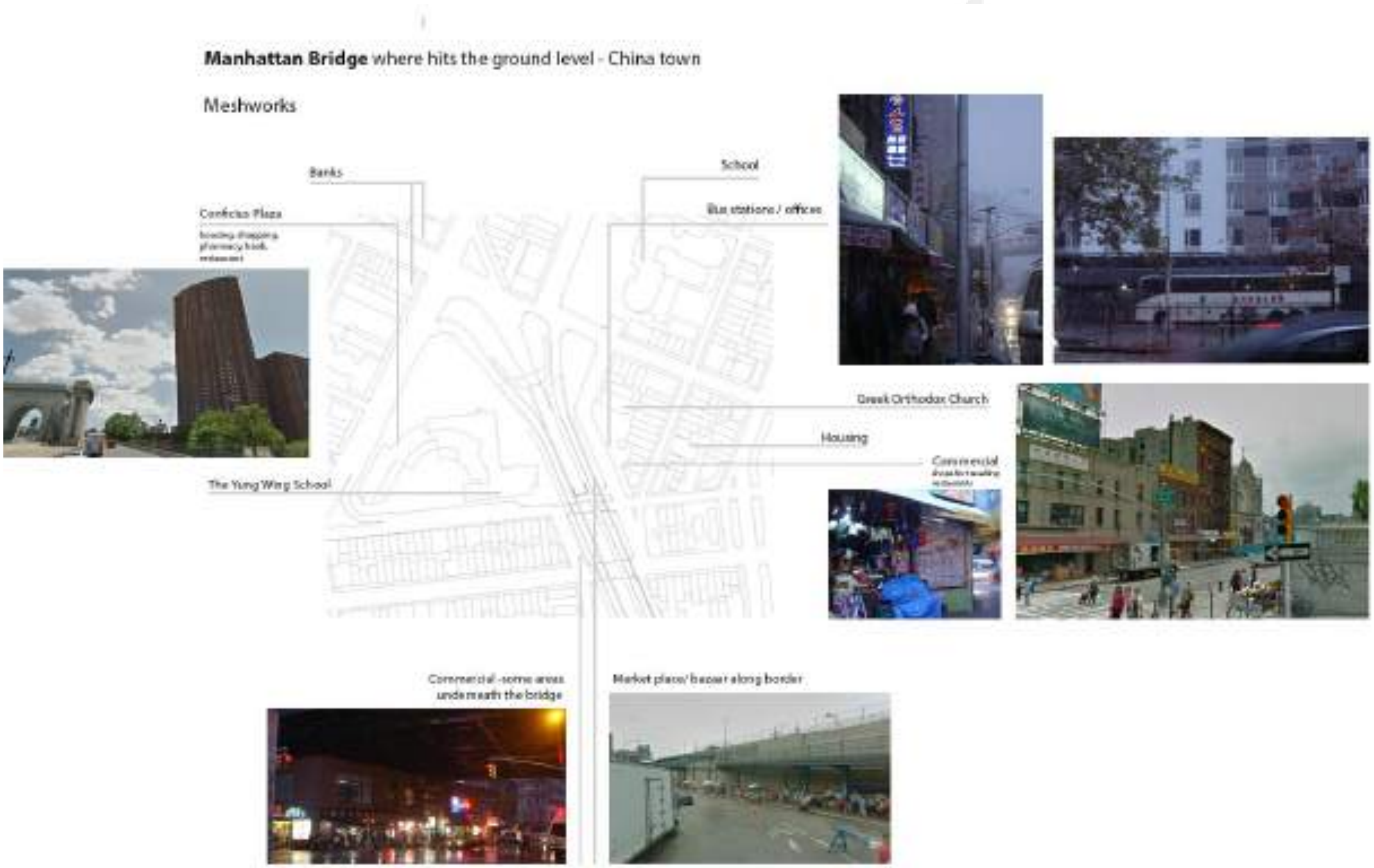


Figure 26. Meshworks in Chinatown

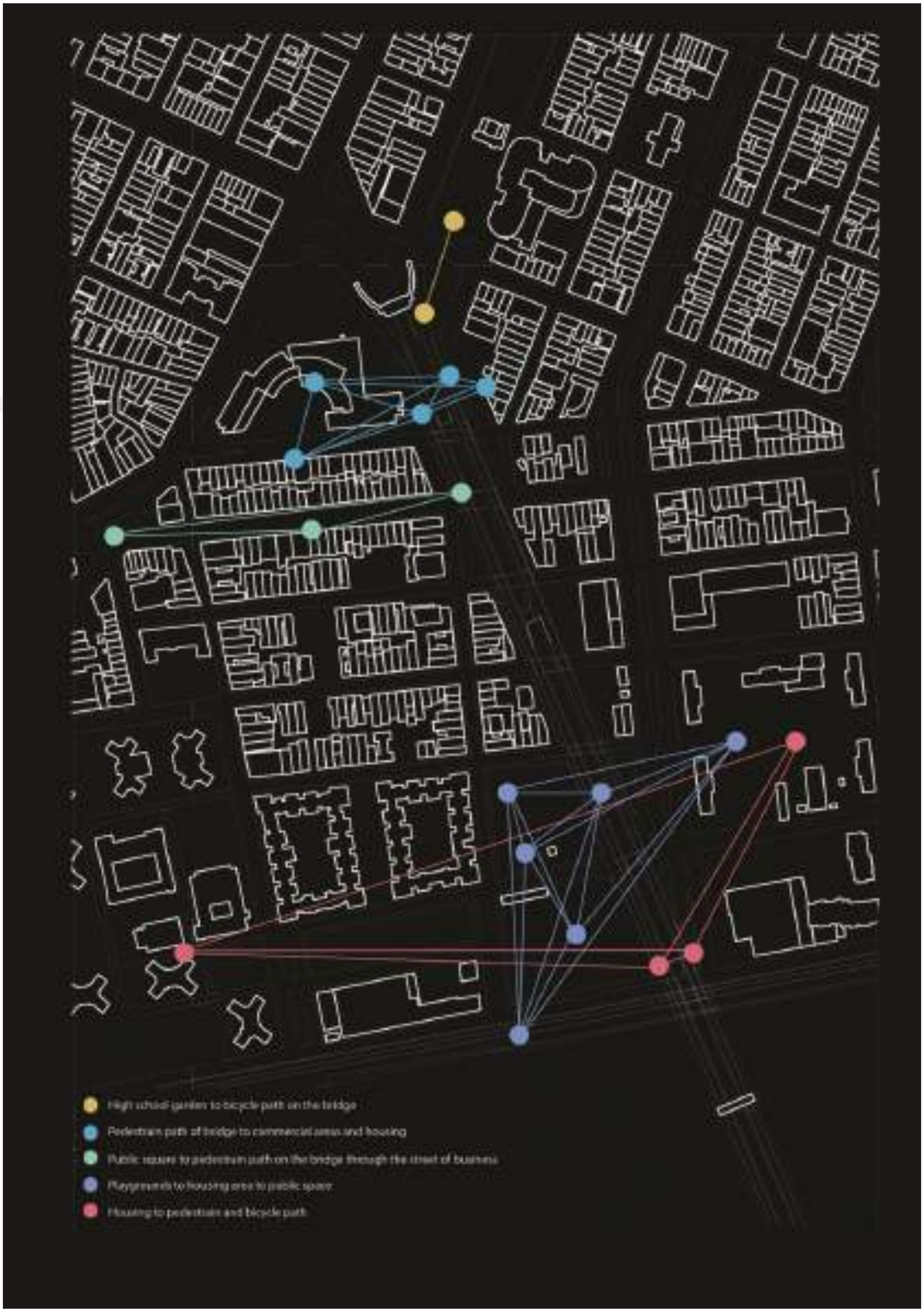


Figure 27. Possible functional connections / Strenghtening nodes

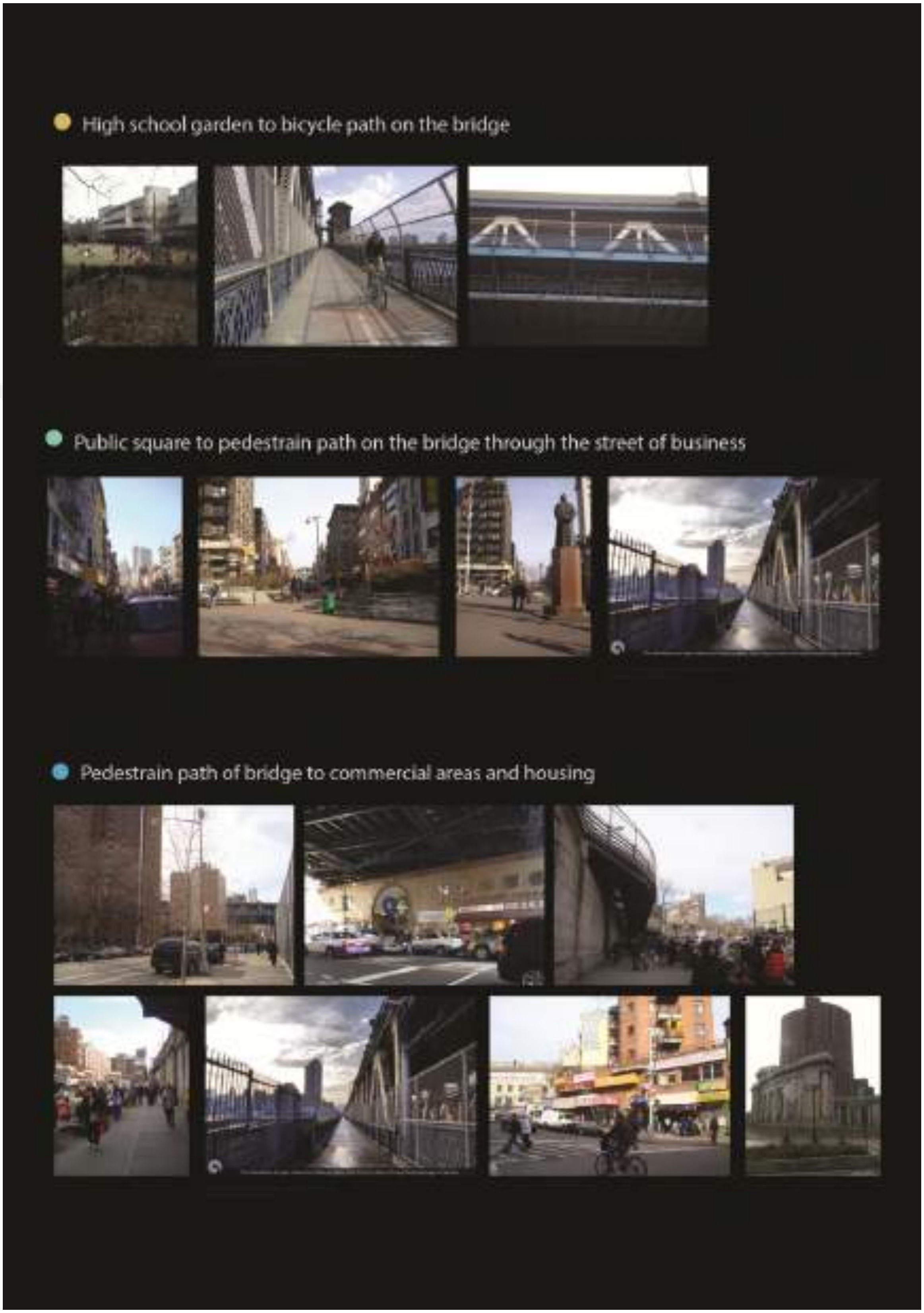
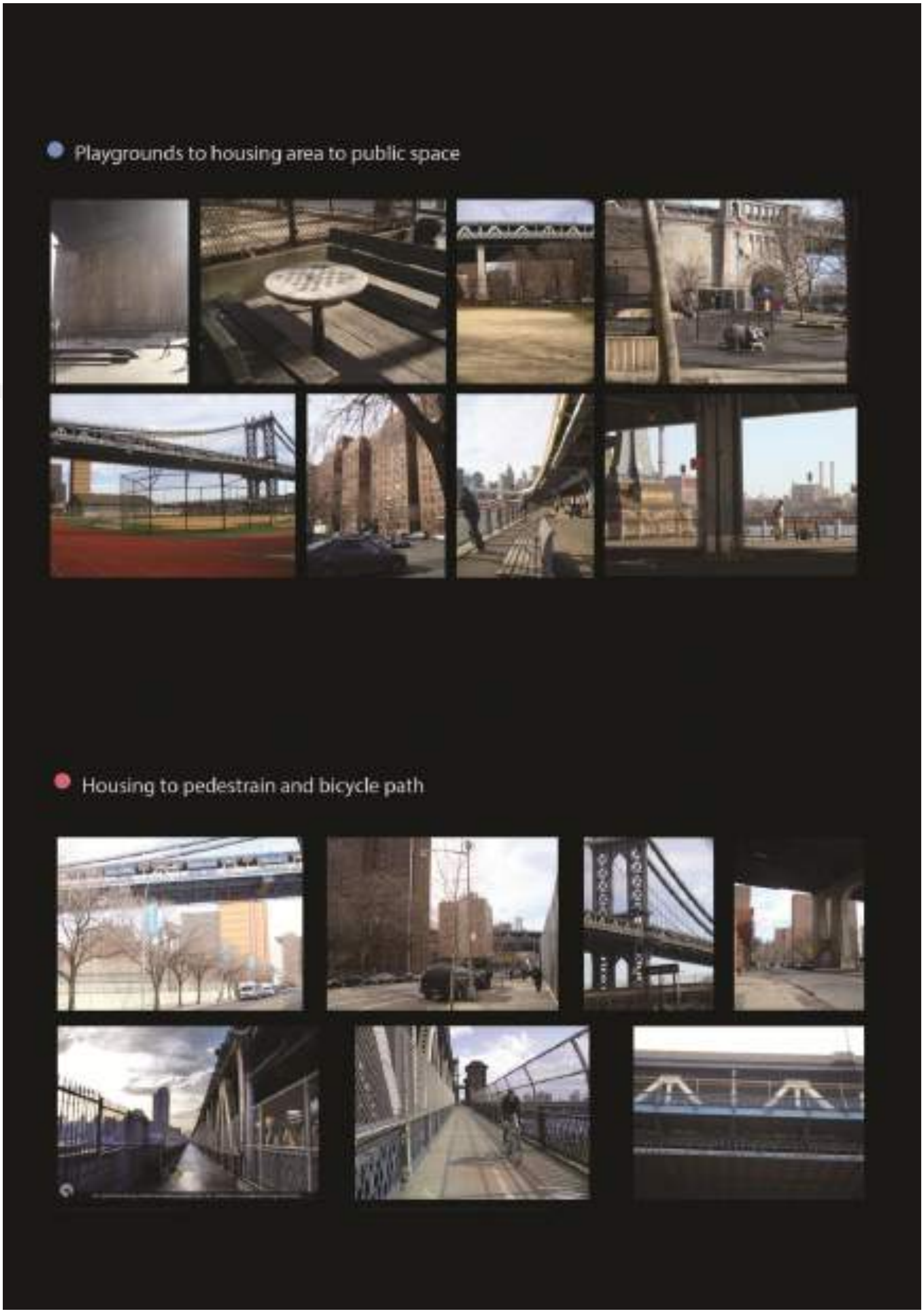


Figure 27 cont.



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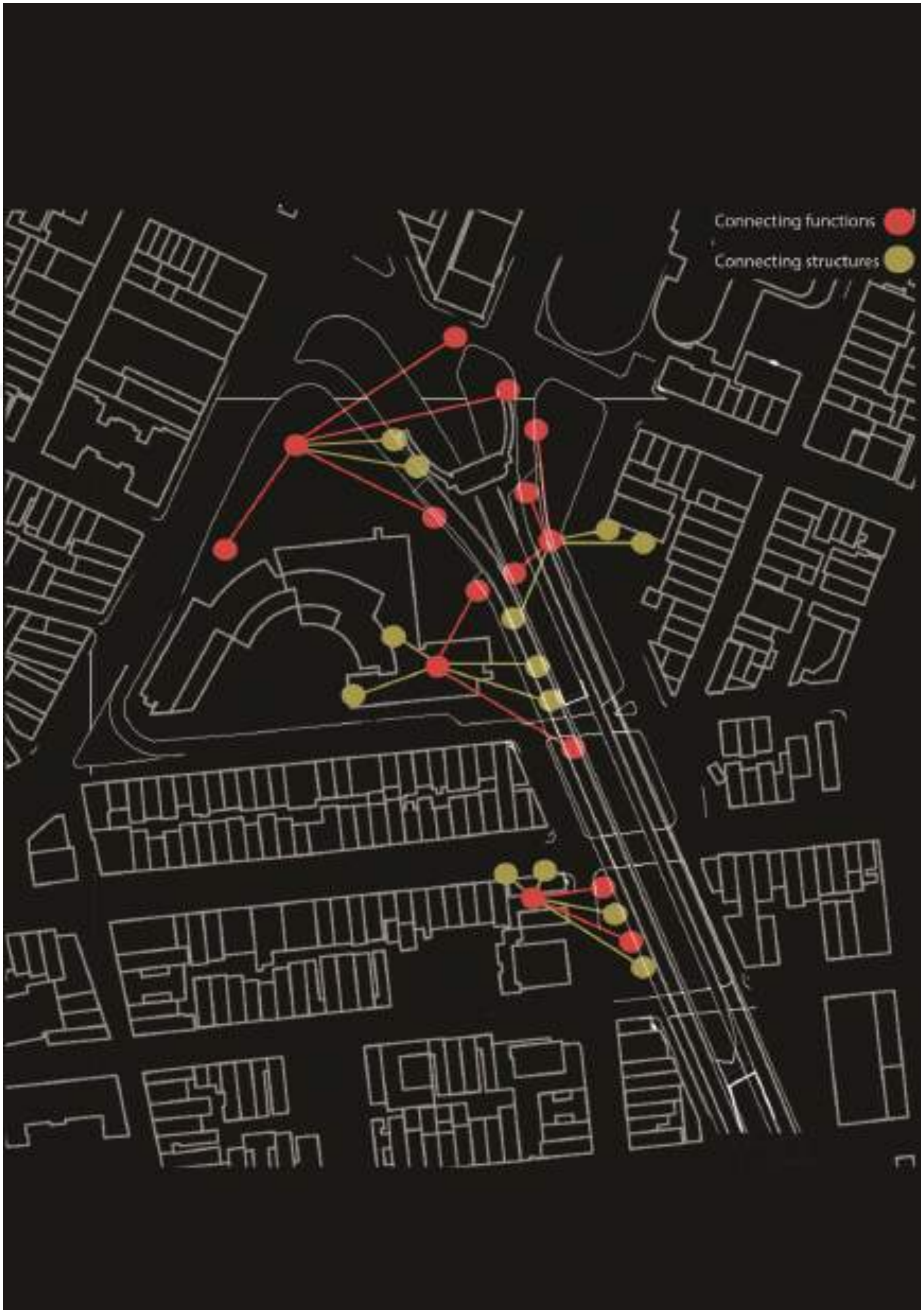


Figure 28. Selected connections / proposal

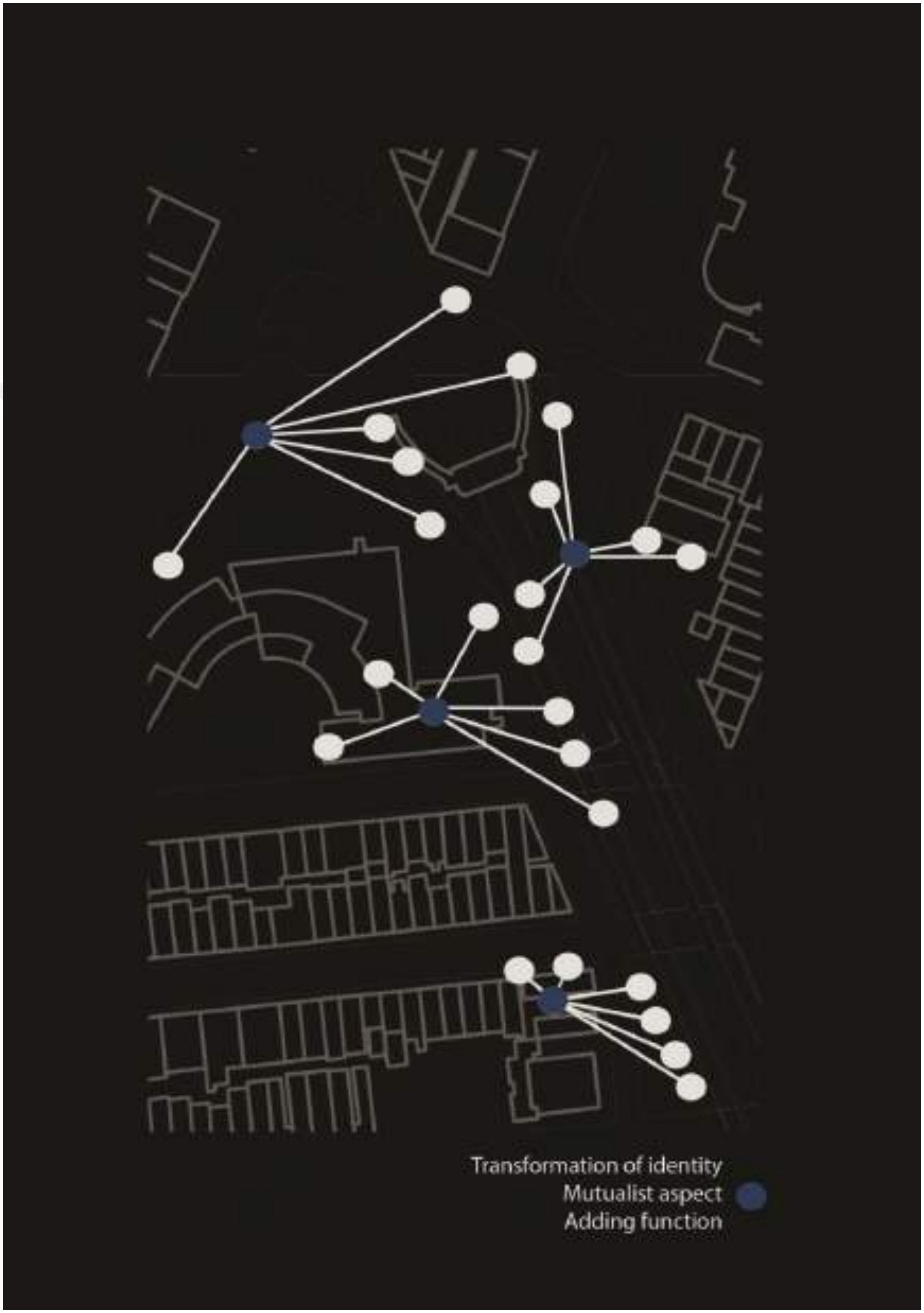


Figure 29. Transformation of identity in the selected nodes

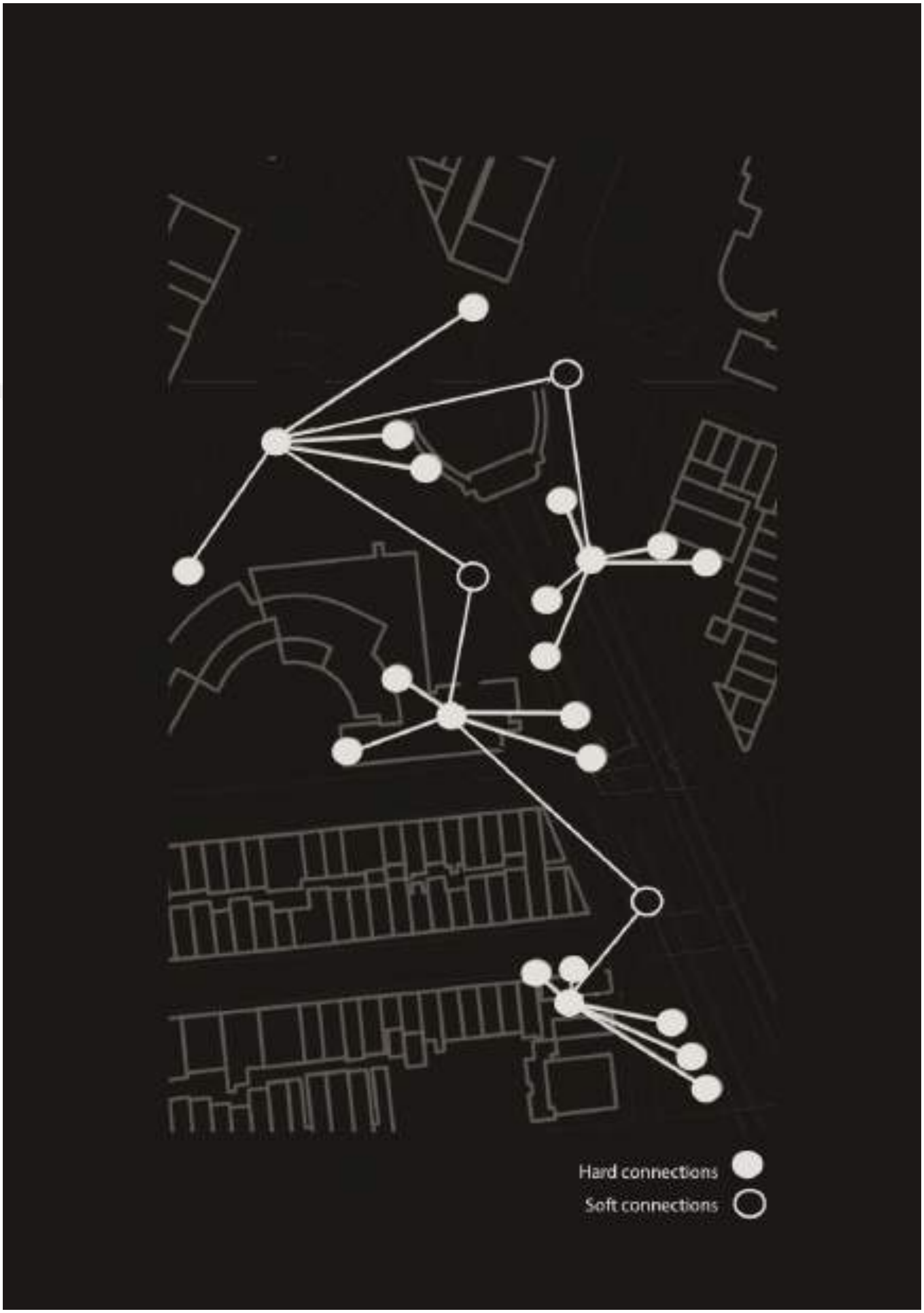


Figure 30. Soft and hard connections

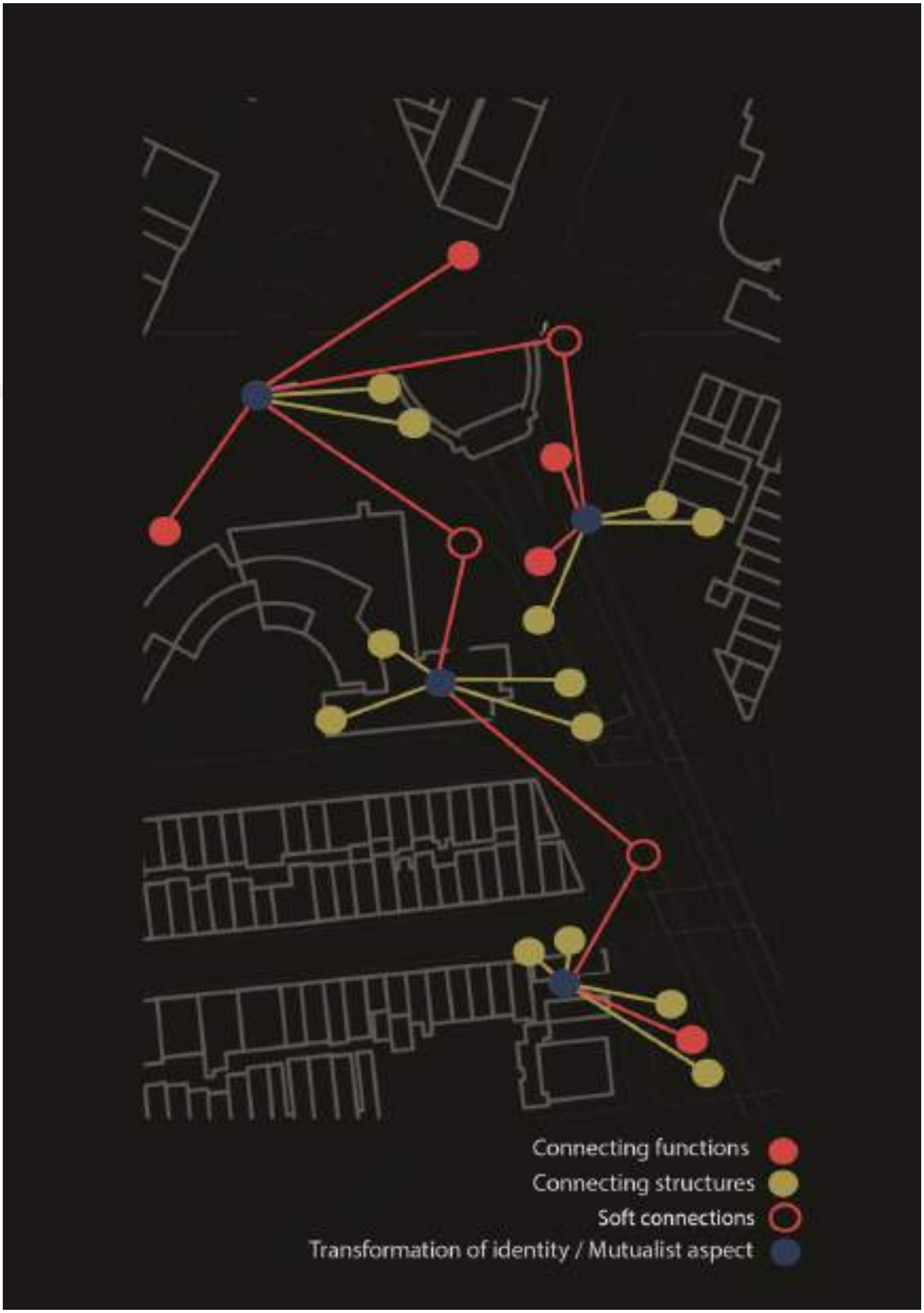


Figure 31. Connection of functions and connection of structures

2. Infrastructure

As fluid urban conditions change the direction of architects' attention towards the links that establish themselves between objects and buildings, naturally they enforce their interest in infrastructures. With urban projects that carried an infrastructural meaning, they attempted to integrate urban fabric, not only because of their size, but also because of the large-scale forces. This suggests that architecture is currently shifting toward the field of infrastructure (Delalex,53).

Delalex mentions that according to Stan Allen, architects have started to focus on infrastructures. Allen called this approach infrastructural urbanism, since the architecture began to deal with territorial scales. Questioning scale, use, movement, flow and exchange leads architects to move toward infrastructural design. Regarding the notion of flow, design allows us to channel, distribute, orientate, or diffuse flows (54).

> "It is clear from the work of Lynn, Allen, Zaera-Polo and Lerup that the notion of field has infiltrated many architectural discourses . The term *field* refers to a new form of urbanisation concomitant with the intensification of global exchanges . It points to an urban condition where global flows turn the traditional city into a thick and complex topography, a vast plenum of matter predominantly constituted by motion and temporalities. Because of their dependence upon economic flows, cities are developing a more flexible structure. In order to fix flows of people and capital, and transform them into urban matter, they adopt a loose and fluid organisation that allows their urban fabric to adapt to the fluctuations of the market . They expand horizontally giving rise to flat and amorphous peripheries, absorbing indifferently suburbs, zones of commercial activities and infrastructures" (Delalex, 54-55).

3. Mutualism

In the concept of mutualism Boucher points out “different kinds of organisms help each other out” (1). This behavior in nature is called a mutualist behavior which can be thought of as a design strategy in architecture. As in the mutualism principle, functions can benefit from each other, while connectivity is provided in the selected area. For example, the bus-stop function can be thought of as a public space at the same time. Also, the roof of a school can be used as a playground, while it is connected to a pedestrian path on the Manhattan Bridge. These interactions between functions will create multi-functional spaces which will be the nodes for connective networks. These nodes will help to minimize the physical border effect of the Manhattan Bridge in the area.

4. Composites

The project proposal consists of many layers like main structure, sub-structures and landscape through differentiation of layers. Also, it is possible to see the differentiation of functions. For example, bus-stop and public space identities turn into a pedestrian way and then the pedestrian way is connected to the pedestrian path on the bridge. The multiple identity and multiple layers of structures create a composite design which leads to heterogeneous look.

> “What makes a material increasingly rich is the same as what holds heterogeneities together without their ceasing to be heterogeneous.” (Deleuze and Guattari, 363)

5. Tectonics

According to Schmidt, the tectonic movement in the mid nineteenth century attempts to explain architecture and arts as meaningful, although it does not seem to be so from the rational point of view. However, the tectonic practice in architecture has changed spatially and organizationally due to the new technological paradigm (11-31).

> "The relationship between the technical and the articulatory dimension of the build environment leads to the concept of *tectonics*, here understood as the architectural selection and utilization of technically motivated, engineered forms and details for the sake of an articulation that aims at legibility. There are plenty of examples in the history of architecture where architectural elements and features with technical functions become the object of articulatory ("ornamental") endeavours. This is the domain of tectonics. For many architectural theorists tectonics is the very essence of architecture. However, for these theorists the point of tectonics is the didactic, visual clarification of the building's material and technical constitution" (Schumacher).

The work of Frampton was rather influential, but it was also highly controversial because it was realized as utopian – how was the ordinary architect to live up to the tectonic ideals in the contemporary context? From the author's point of view, this objection was particularly correct, because Frampton restricted his interest in tectonics to the tectonic edifice (Schmidt,13).

If the tectonics are described as the strategic usage of an element's technically induced morphology, in order to address social functions in the articulatory dimension, then tectonics can be redeemed and integrated within contemporary conceptions of handling form-function relations. We may call this strategy of using technical details as *tectonic articulation* (Schumacher, 20-21).

6. Organics

> "Organic architecture is rooted in a passion for life, nature, and natural forms, and is full of the vitality of the natural world with its biological forms and processes" (Pearson,8).

The domination of the 20th century of the rectilinear, orthogonal mode is a reflection of materialist values of an industrially driven age. The post-industrial age is awakening to a new world, which also reflects an older and wiser vision. The reappearance of organic design displays a new freedom of thought; an expression of hope for the future. This is affecting most fields of design from products and furniture, lighting and textile design to architecture, landscape architecture, and interior design. As this occurs, organic design is becoming more popular than the mainstream design trend (Pearson,8-9).

Modern information technology and the fast spread of computer-aided design (CAD) to all fields of architecture and design, has made the design and designers' creative processes independent. The latest three-dimensional design software makes it much easier to design and model sophisticated and complex shapes and forms. The straight line, right angle and cube are not necessary as dominant features (Pearson,8-9).

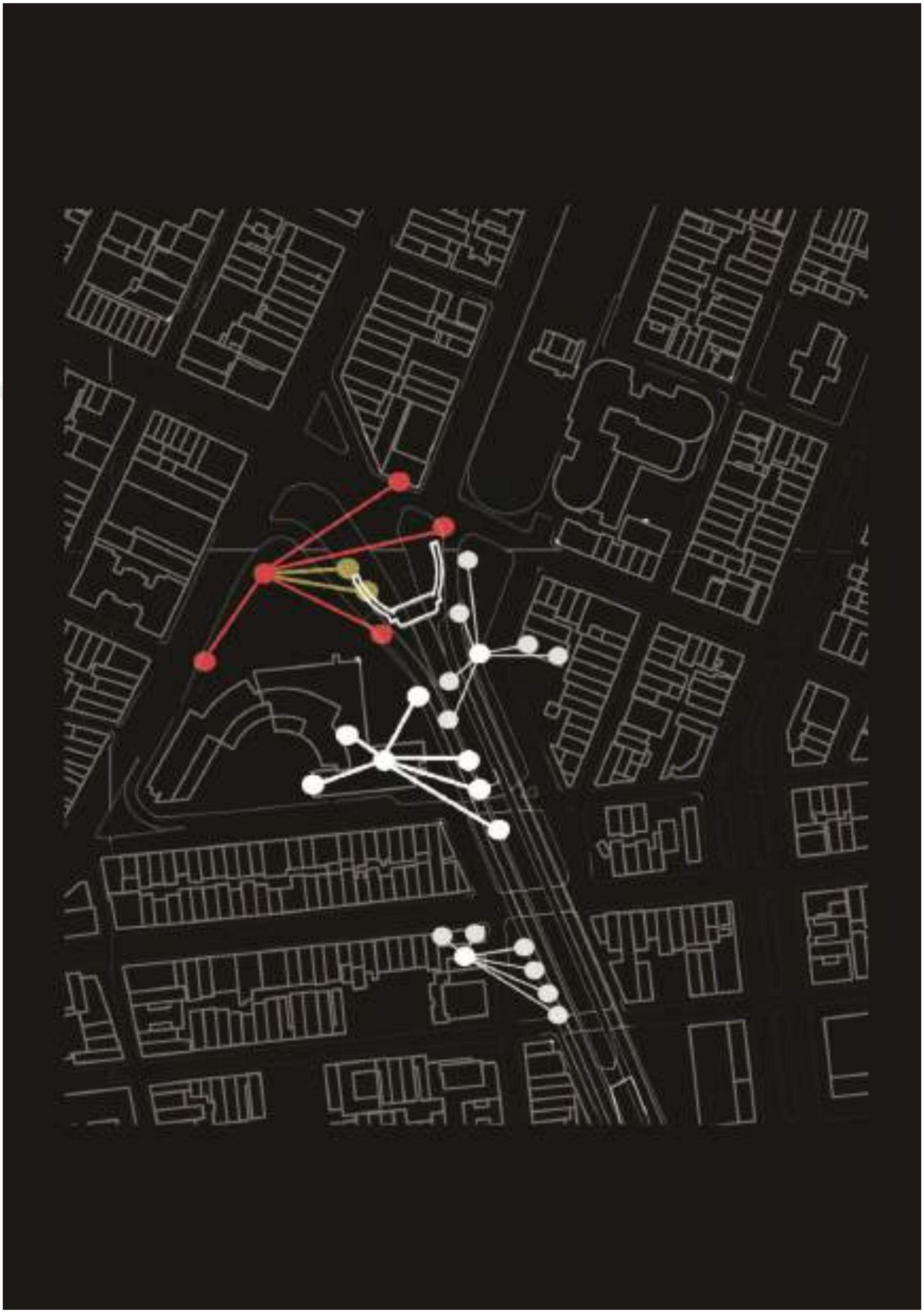


Figure 32. Prototype 1

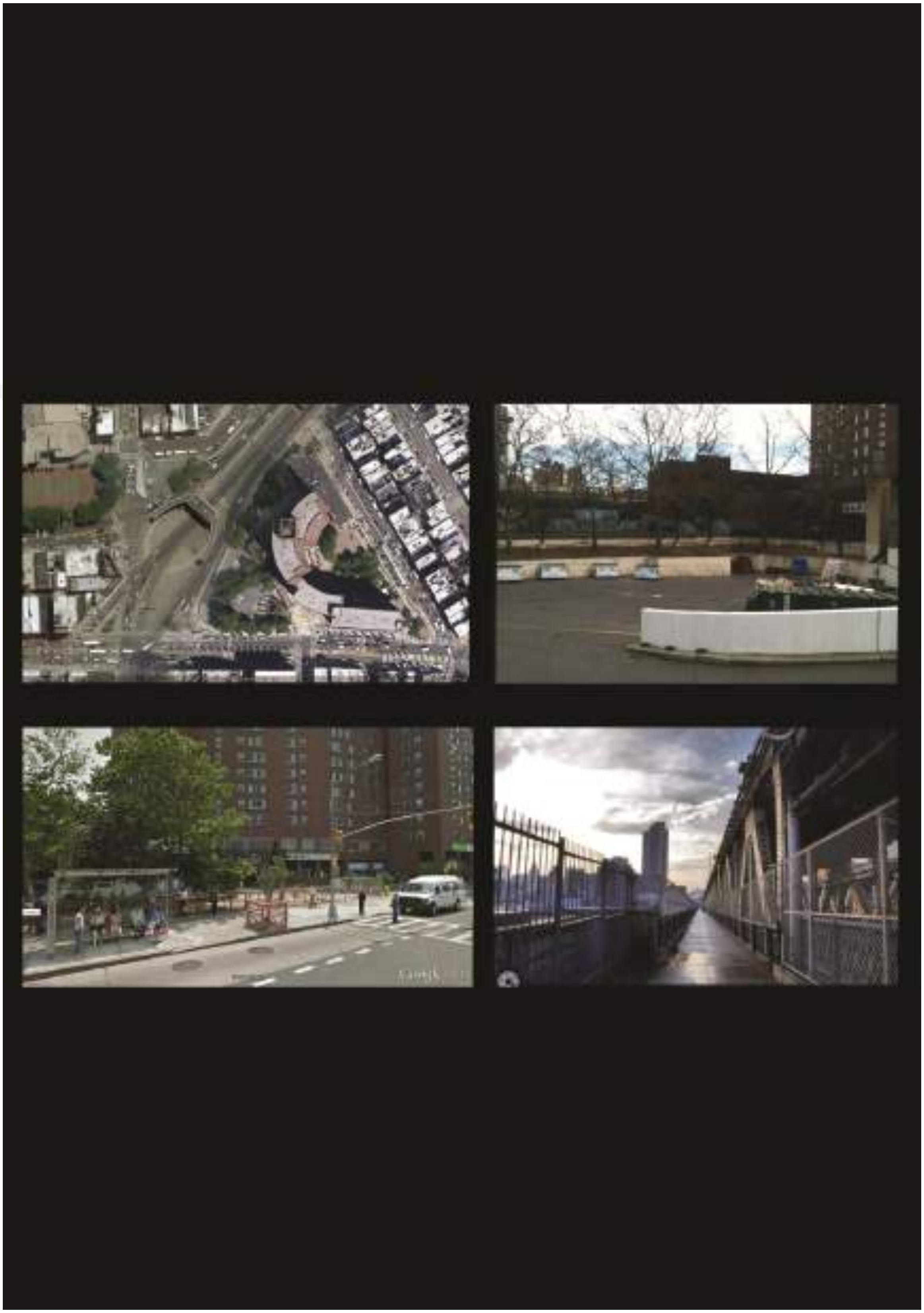


Figure 33. Functional connections of prototype 1

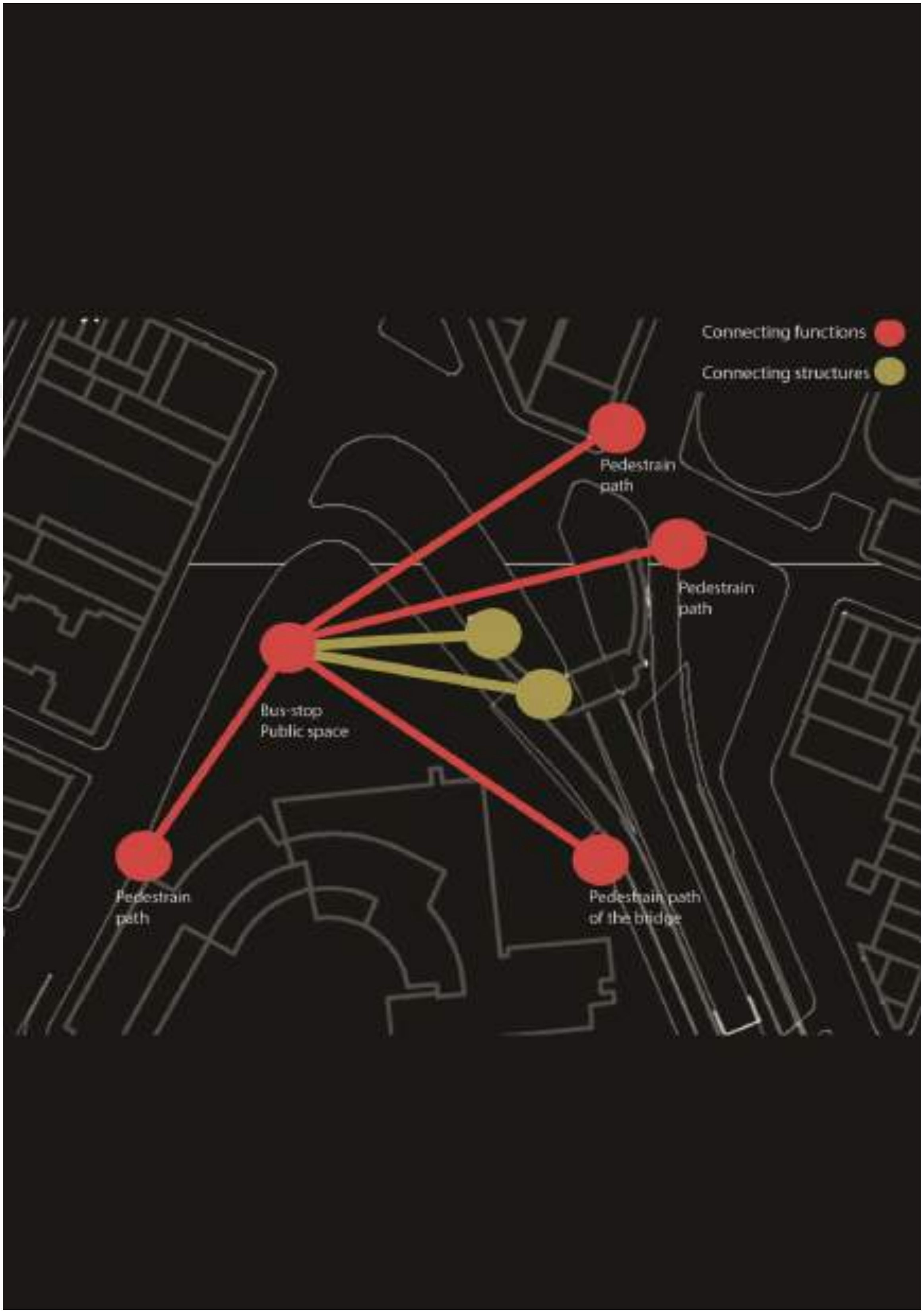


Figure 34. Connecting disconnected flow

Figure 35. Network topology

Figure 36. Morphing topology

Figure 37. Tectonic to smooth / structure to volume

Figure 38. Tectonic versus organic

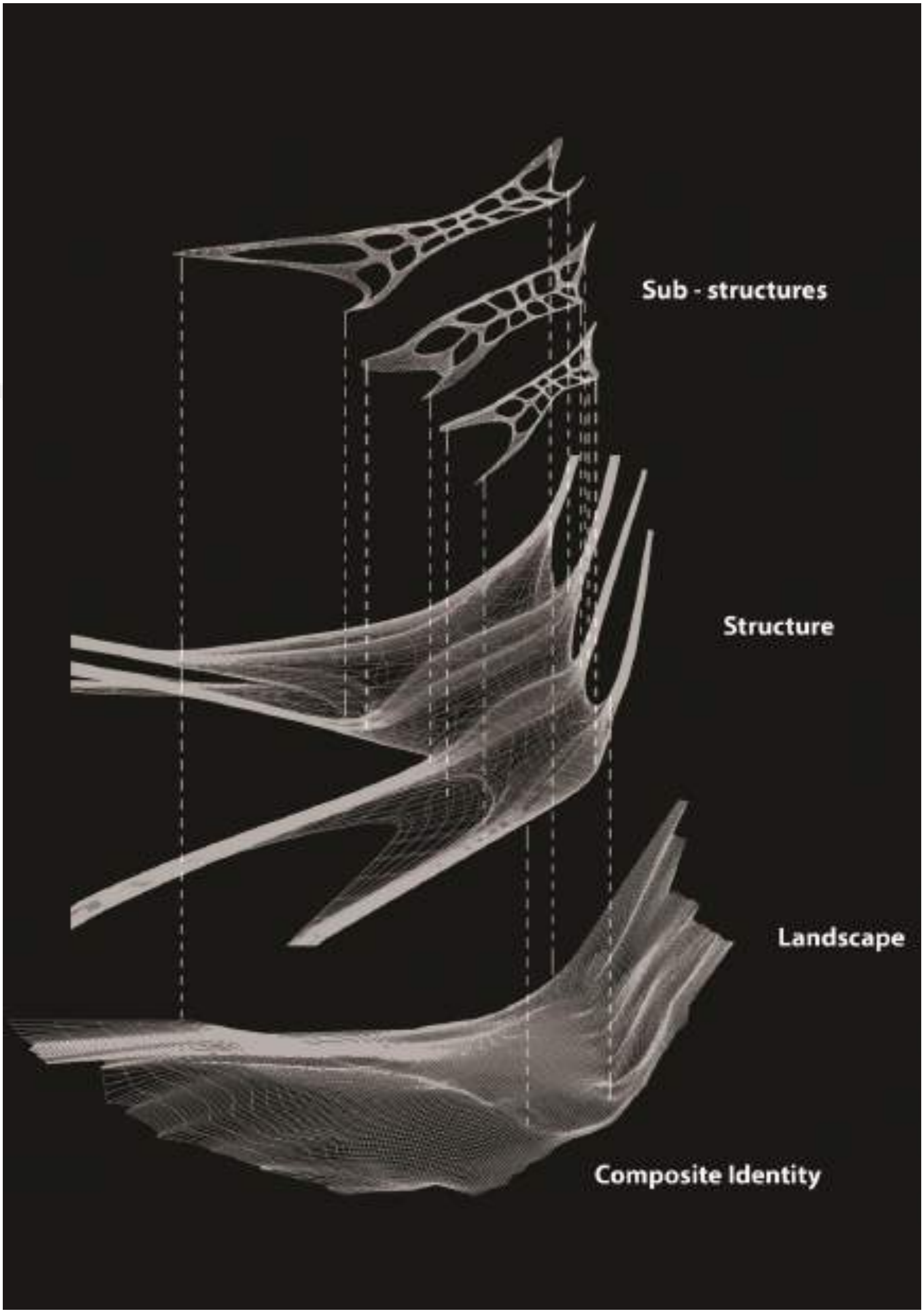


Figure 39. Composite identity of prototype 1

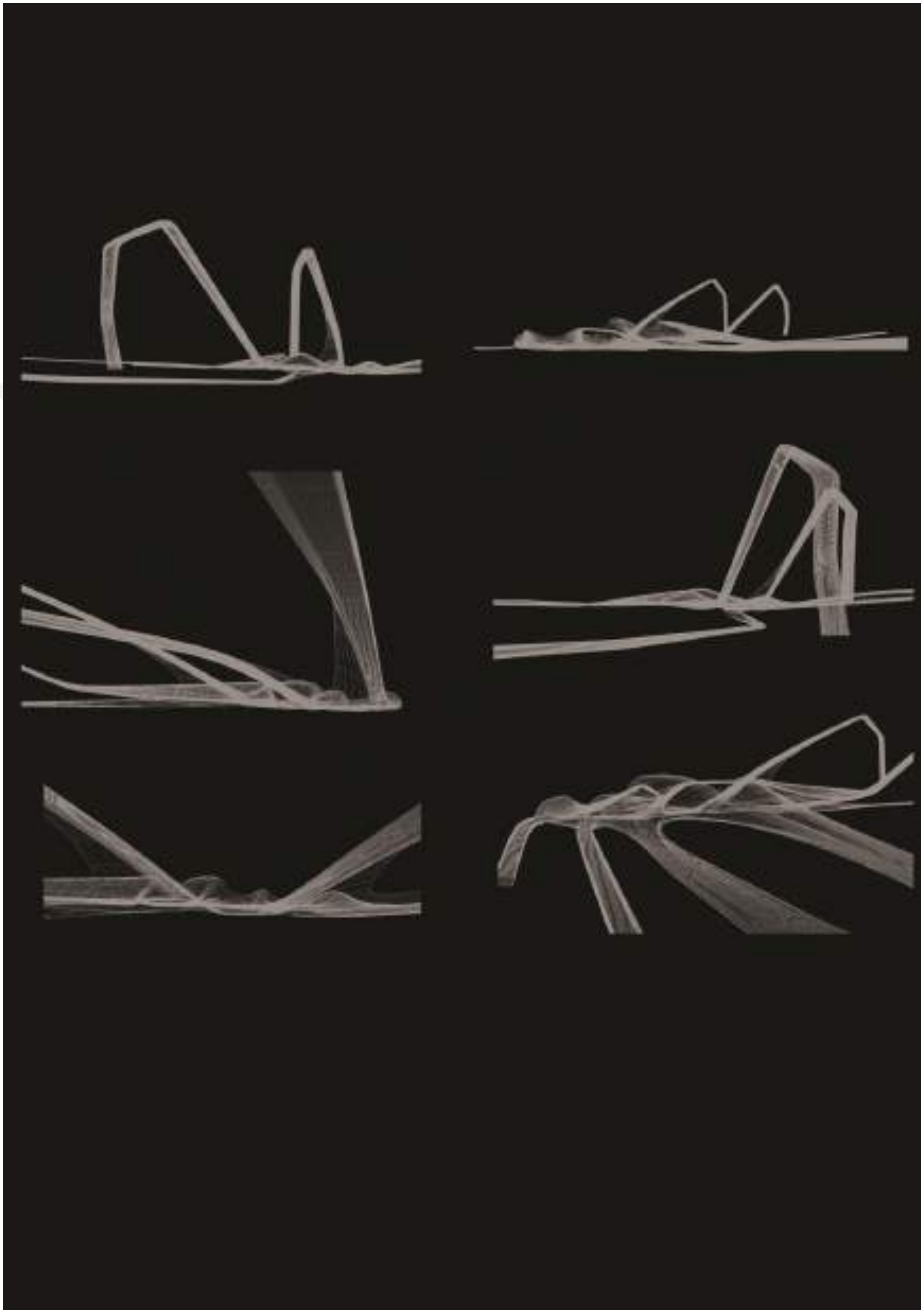


Figure 40. Typomorphology of prototype 1

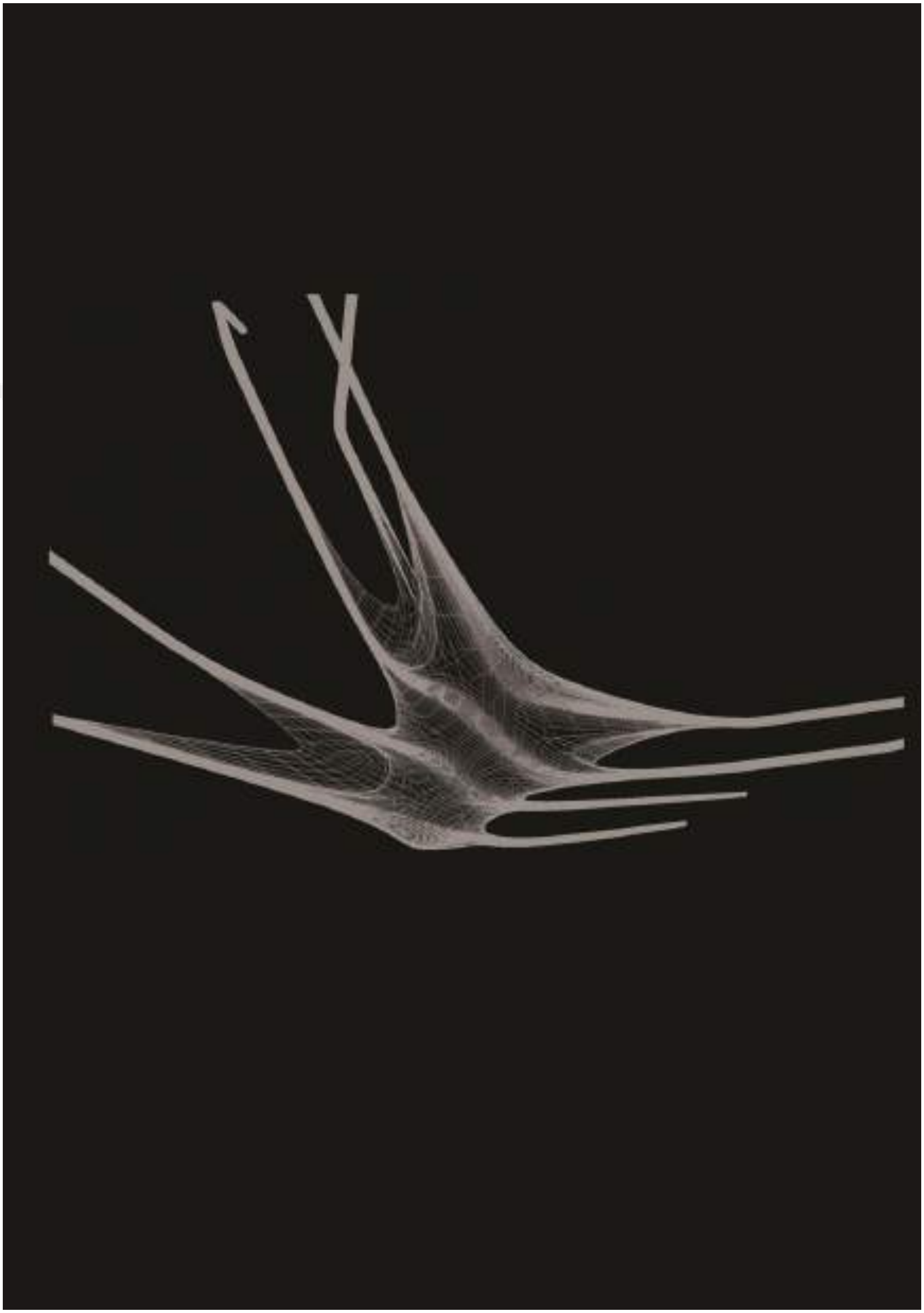


Figure 41. Tectonic versus organic form of prototype 1

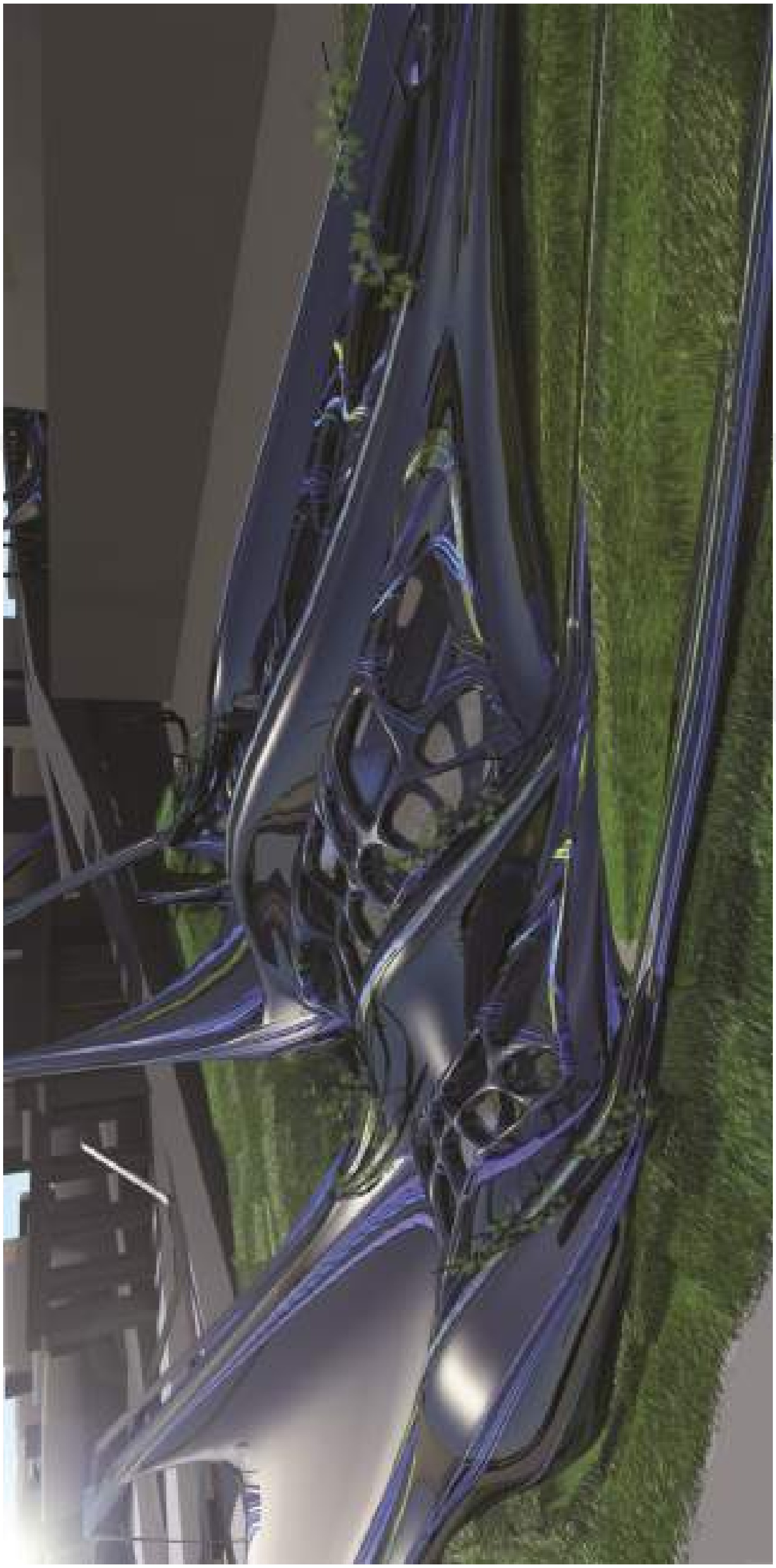


Figure 42. Prototype 1

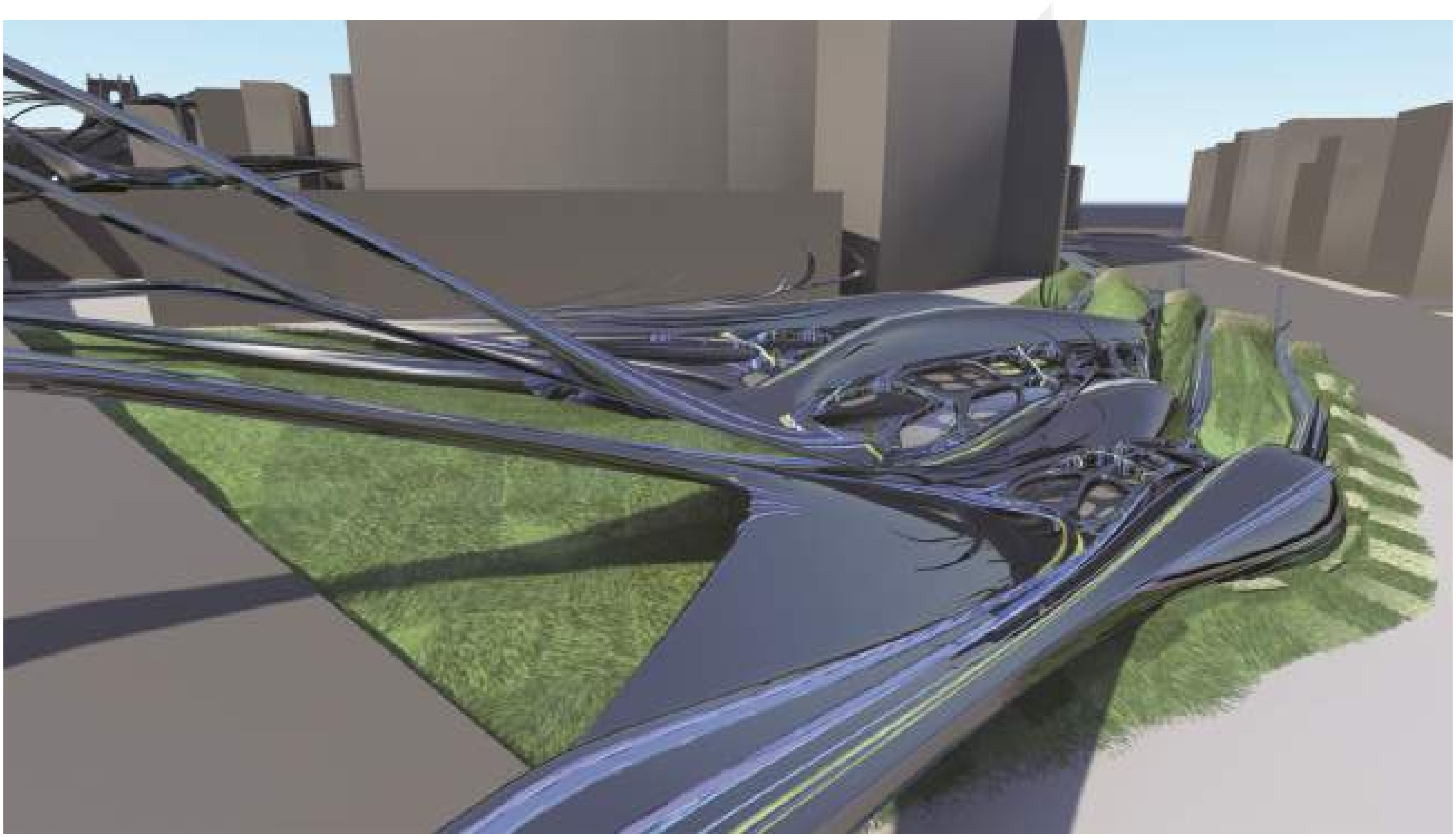


Figure 43. Prototype 1

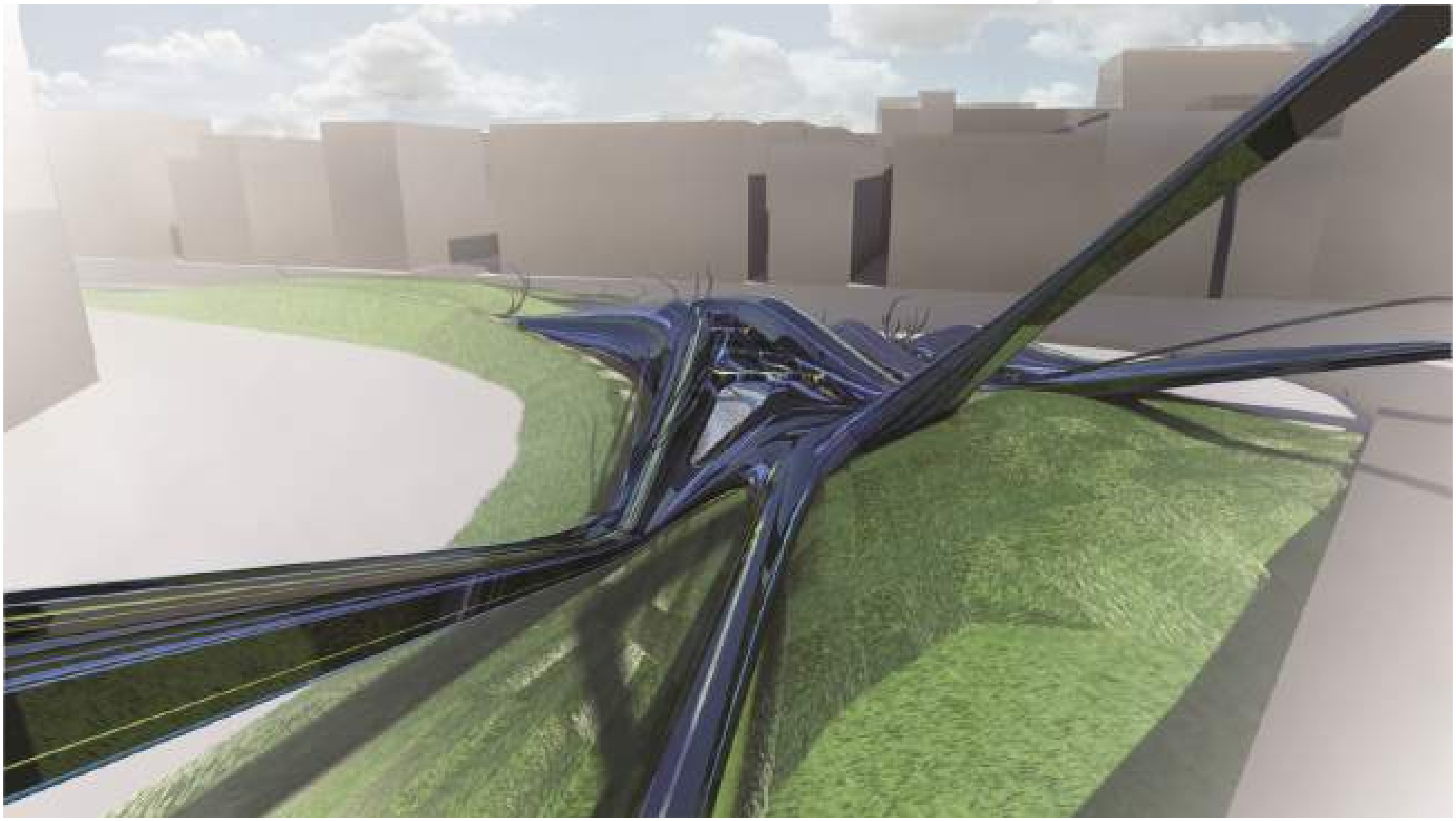


Figure 44. Prototype 1

Figure 45. Prototype 1 interior view

Figure 46. Prototype 1 interior view

Figure 47. Prototype 1

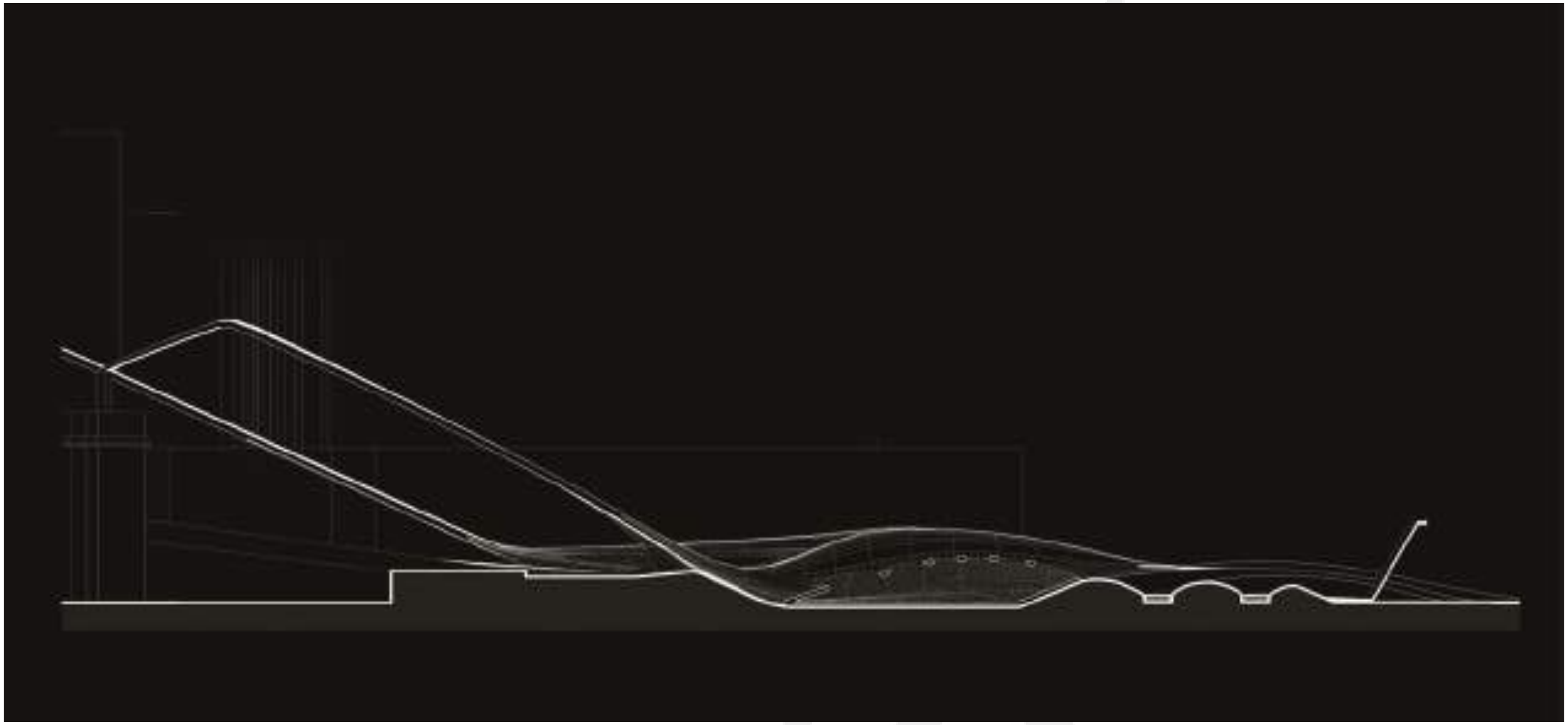


Figure 48. Prototype 1 section

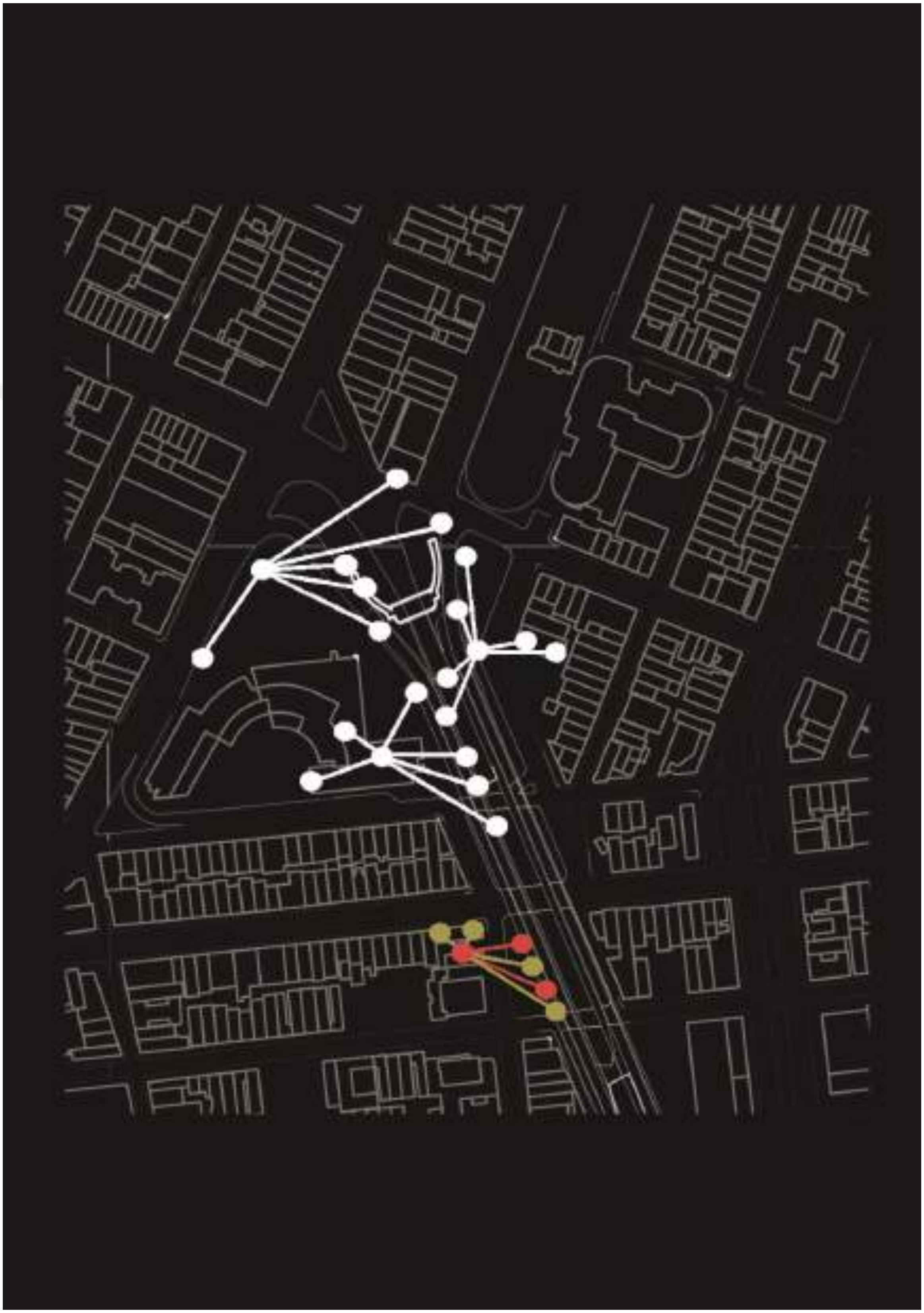


Figure 49. Prototype 2

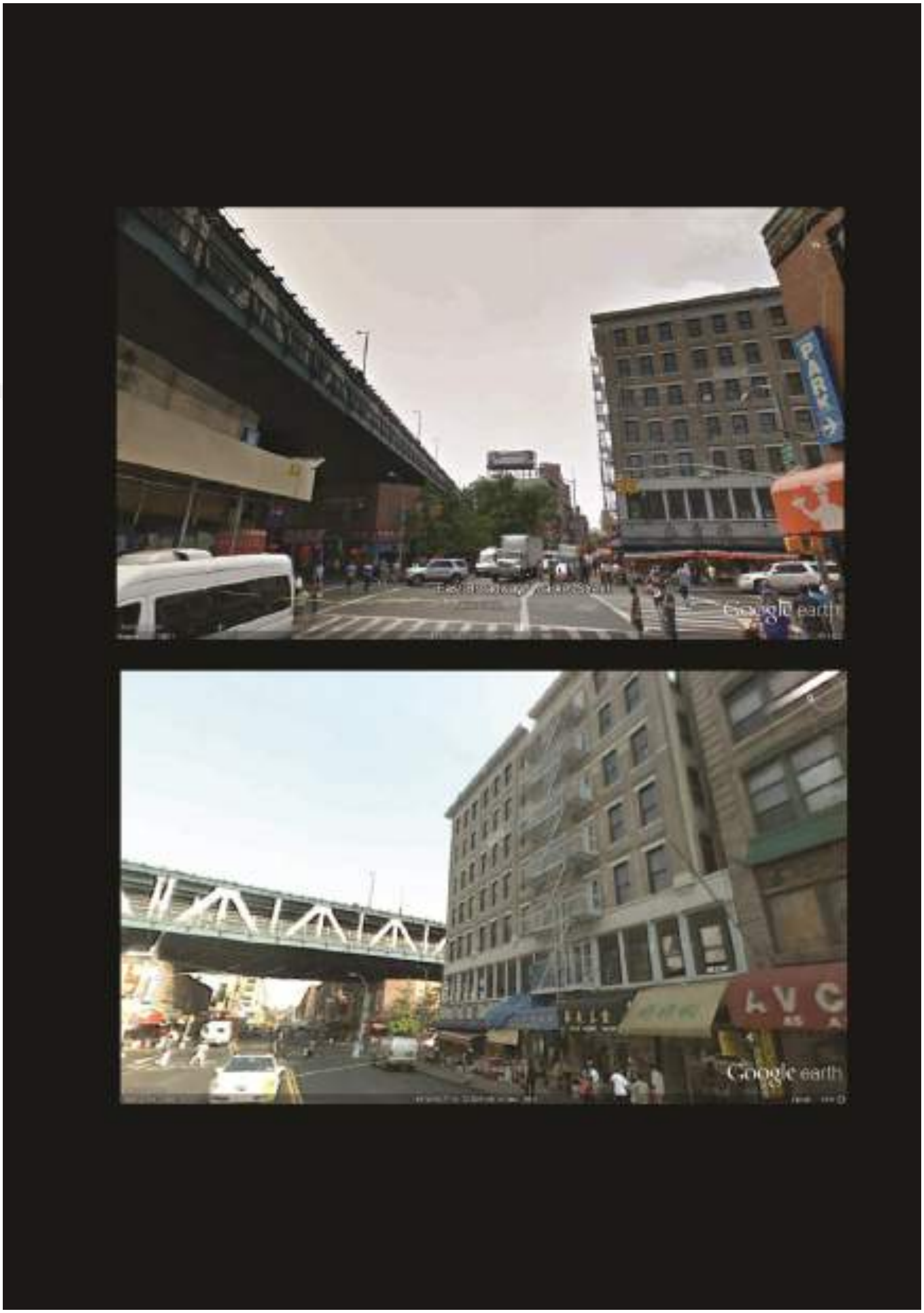


Figure 50. Functional connections of prototype 2

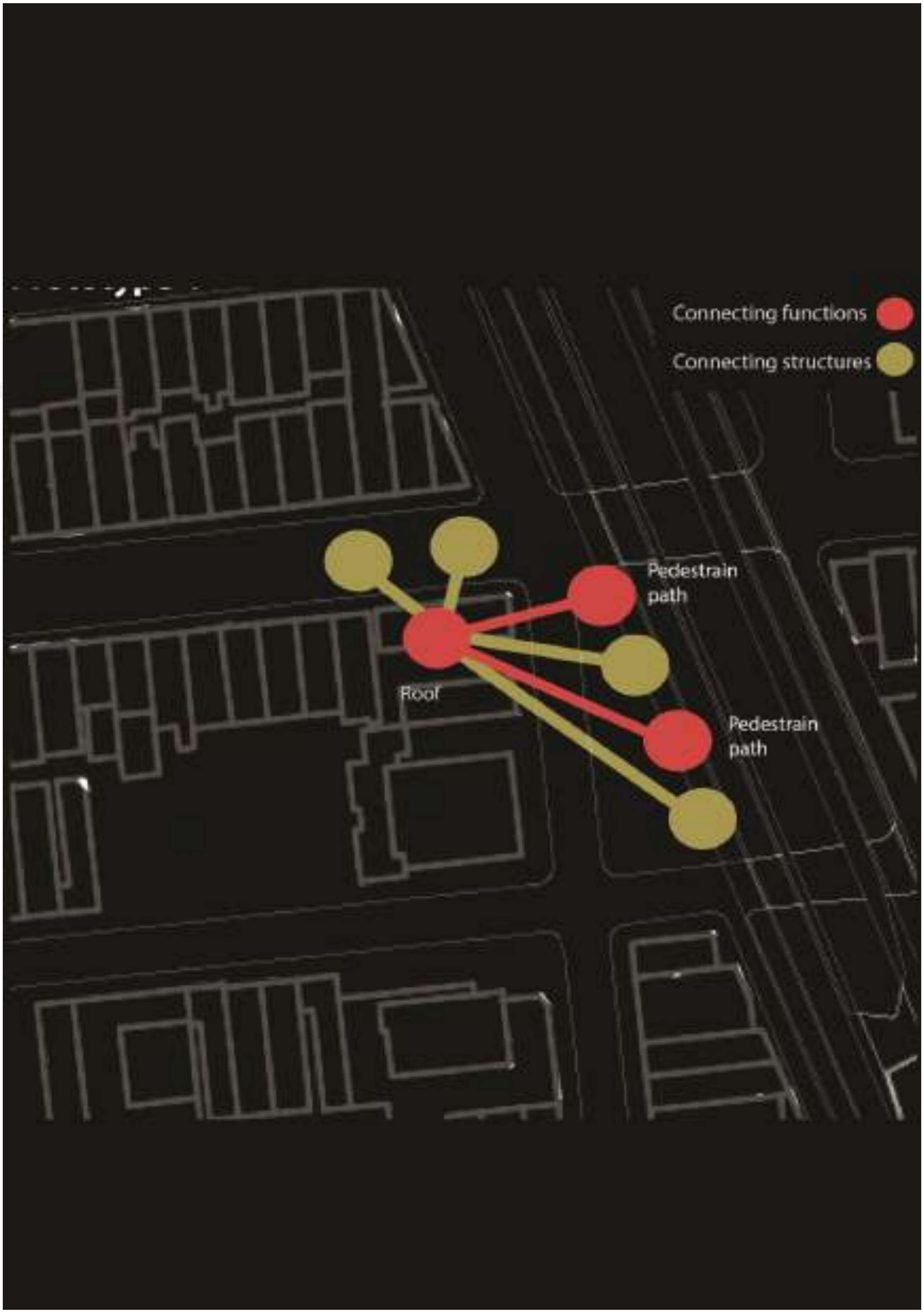


Figure 51. Connecting disconnected flow

Figure 52. Network topology

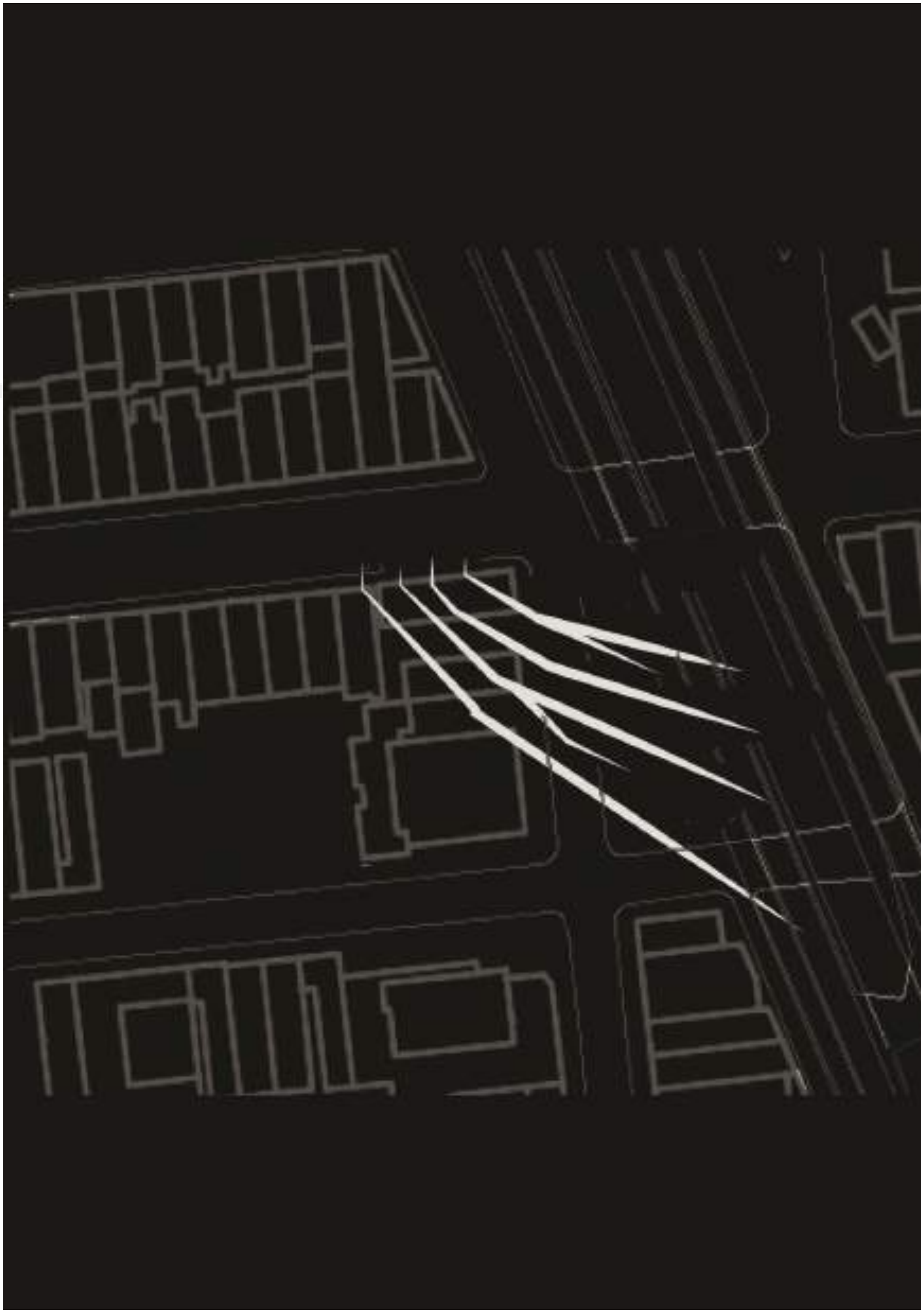


Figure 53. Morphing topology

Figure 54. Tectonic to smooth / structure to volume

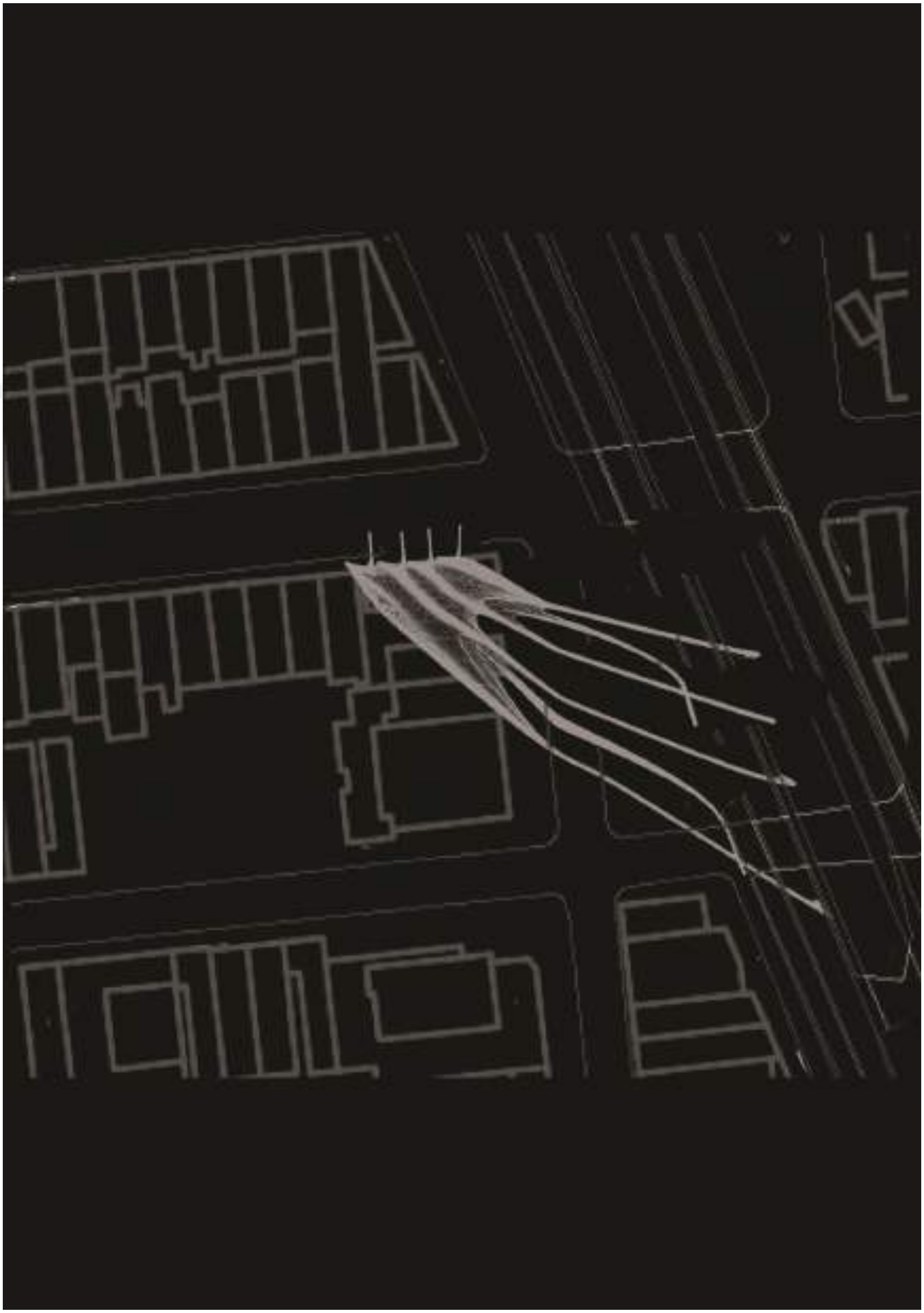


Figure 55. Tectonic versus organic

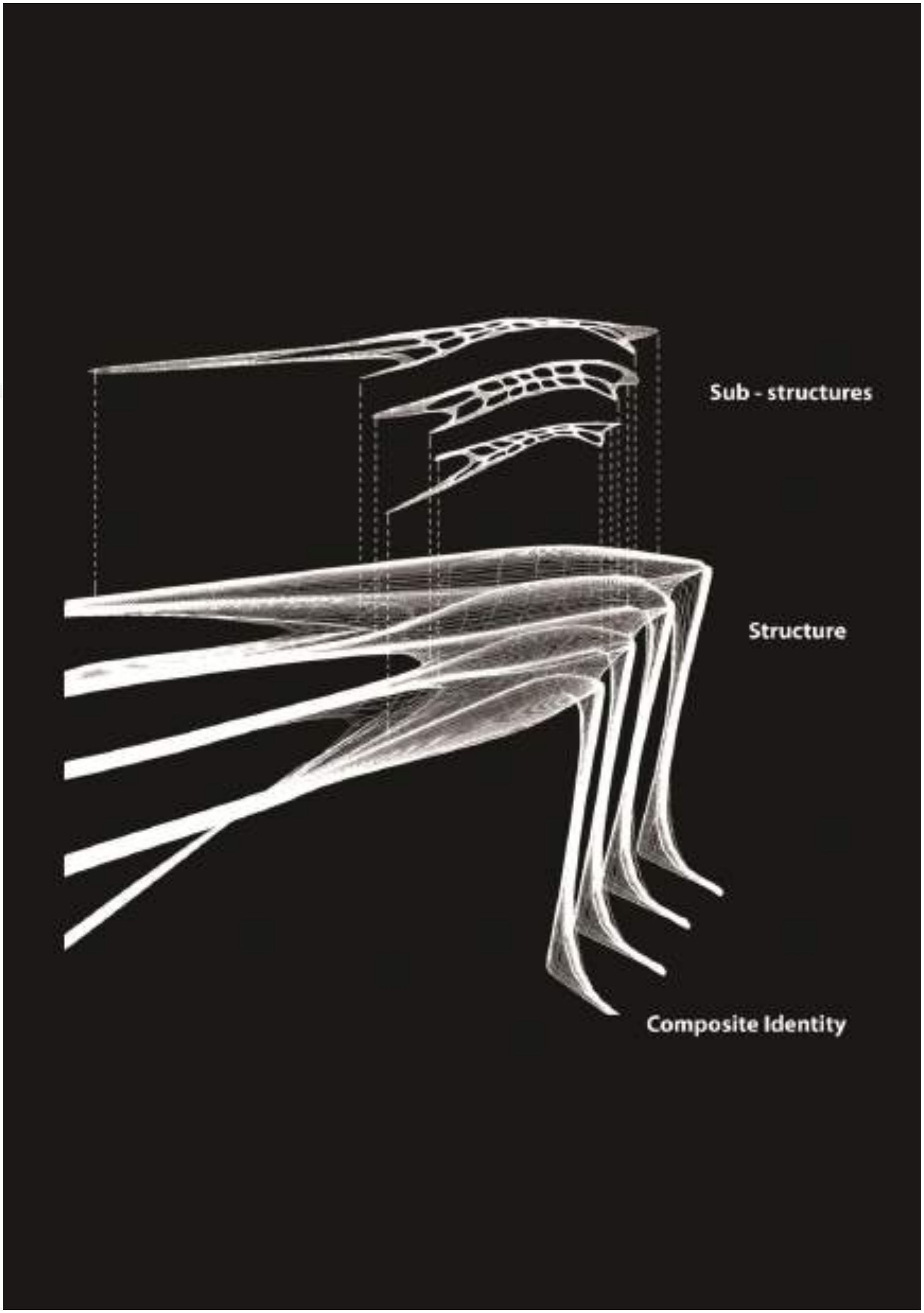


Figure 56. Composite identity of prototype 2

Figure 57. Typomorphology of prototype 2

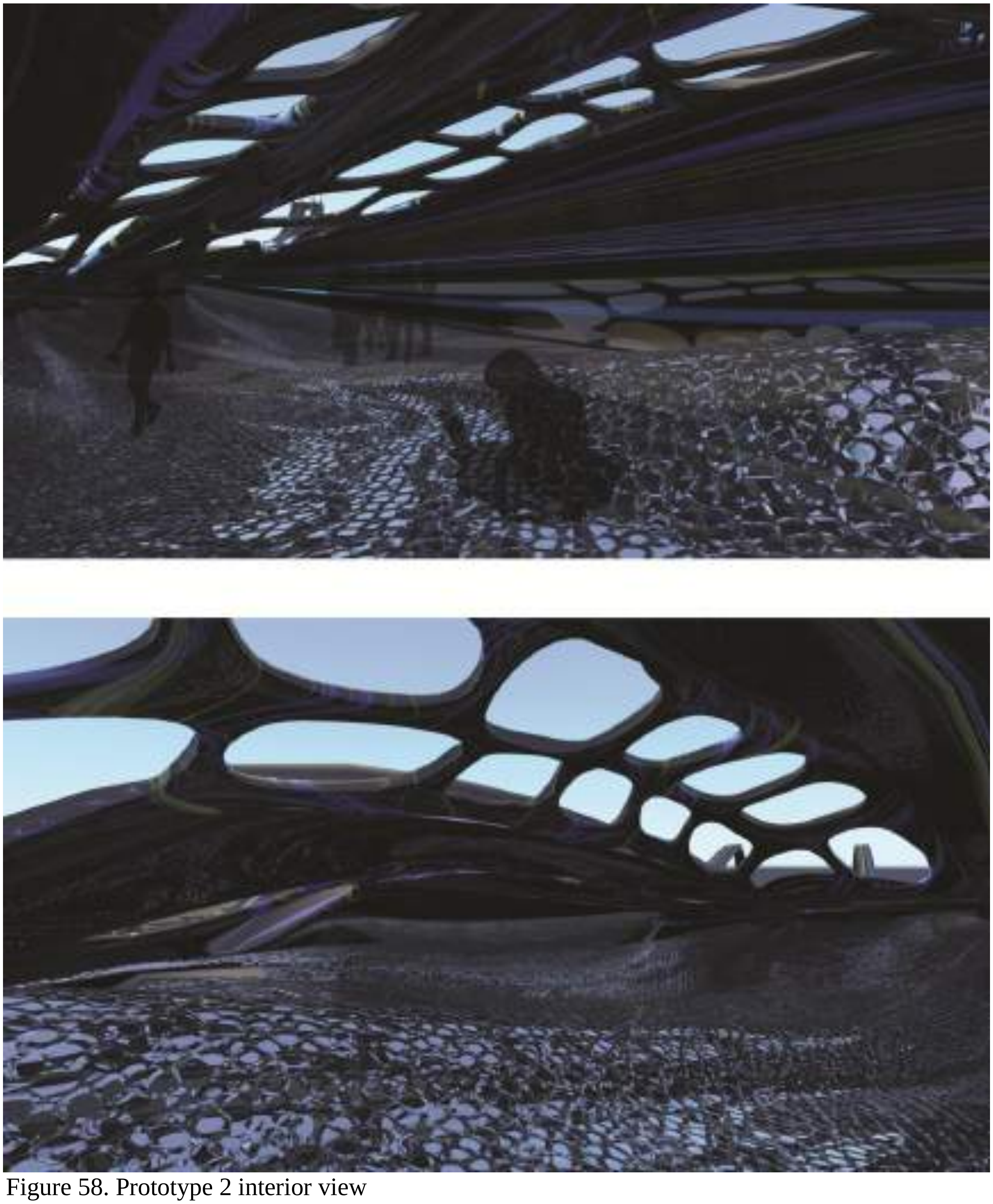


Figure 58. Prototype 2 interior view

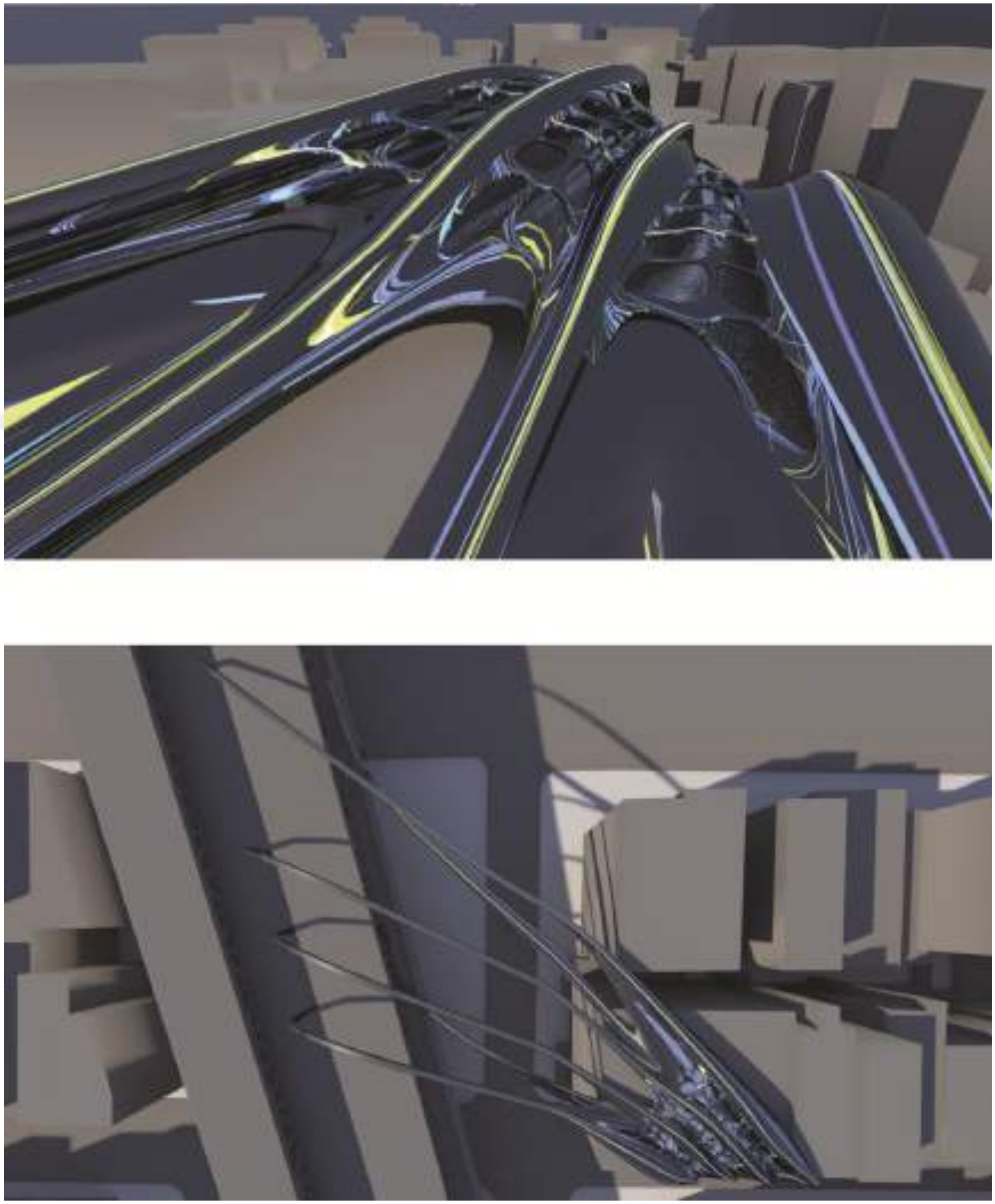


Figure 59. Prototype 2

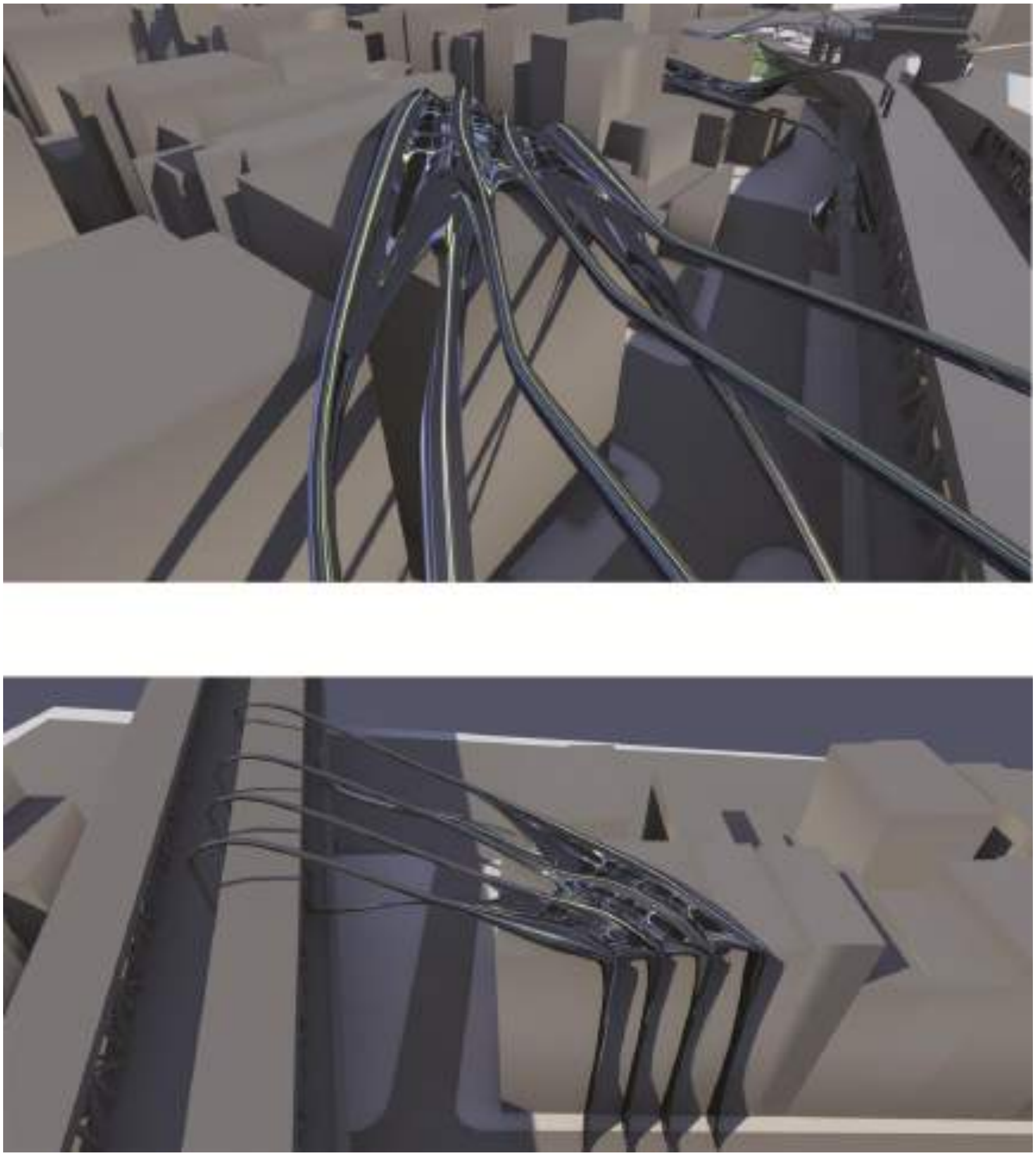


Figure 60. Prototype 2

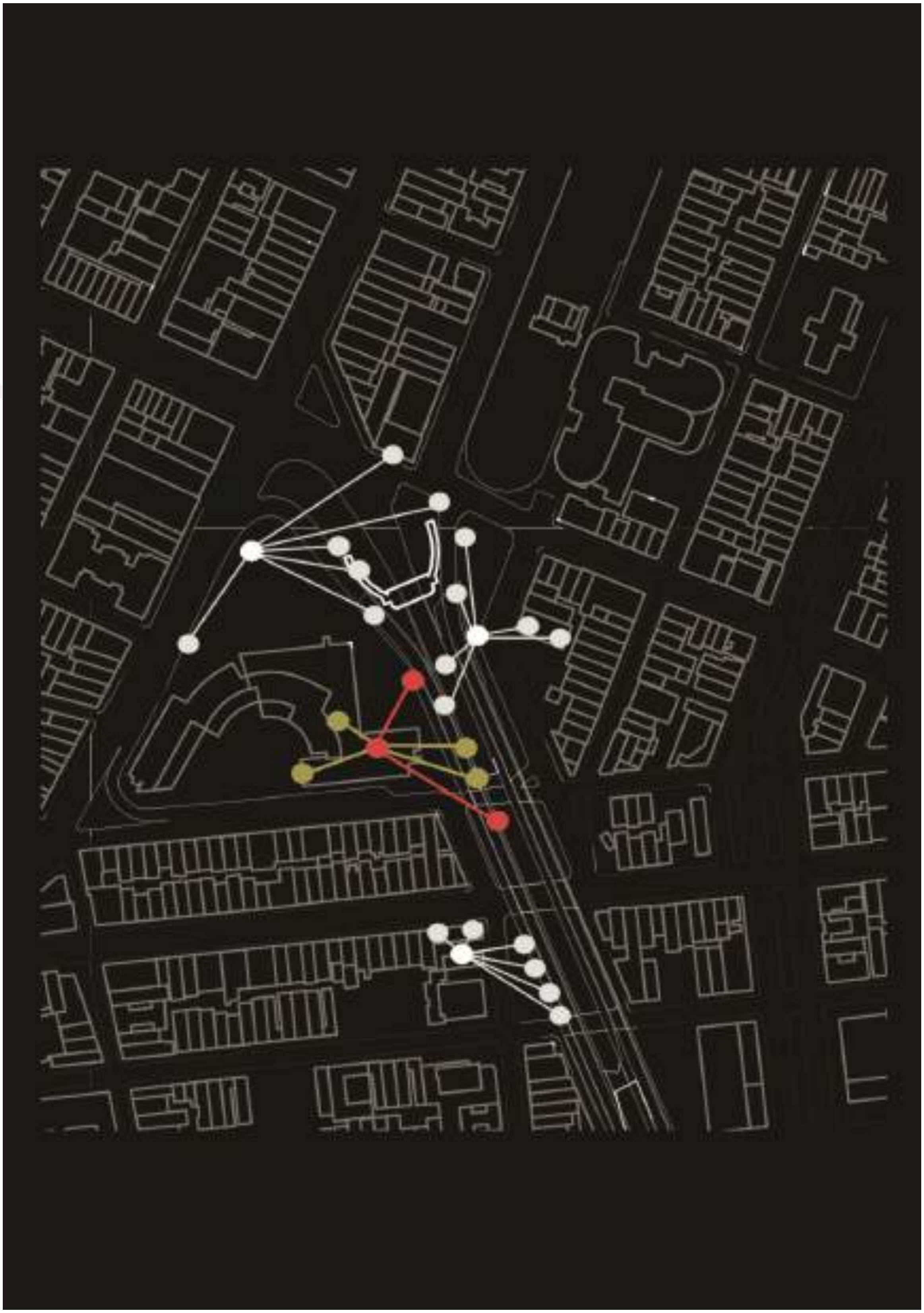


Figure 61. Prototype 3

Figure 62. Functional connections of prototype 3

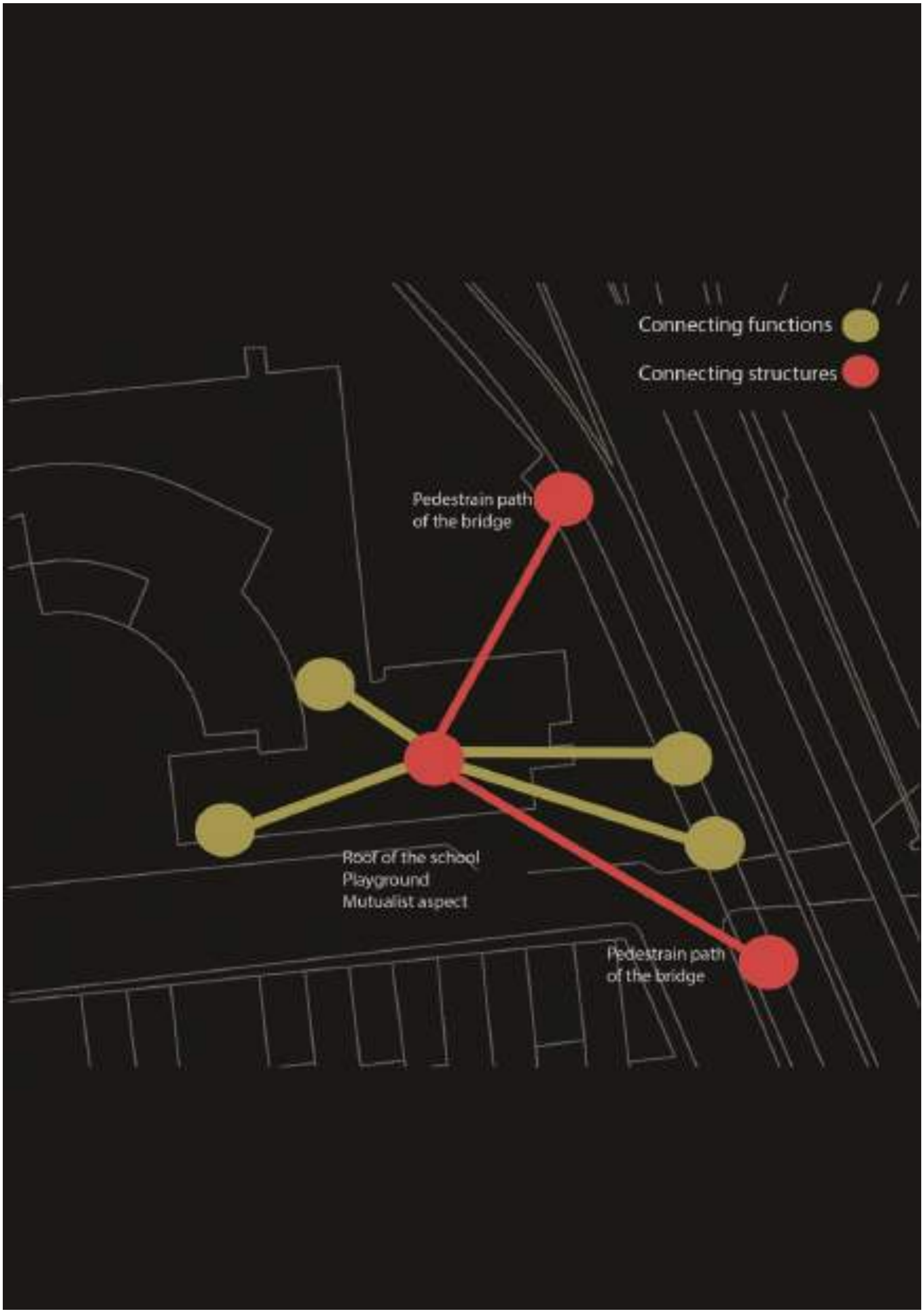


Figure 63. Connecting disconnected flow

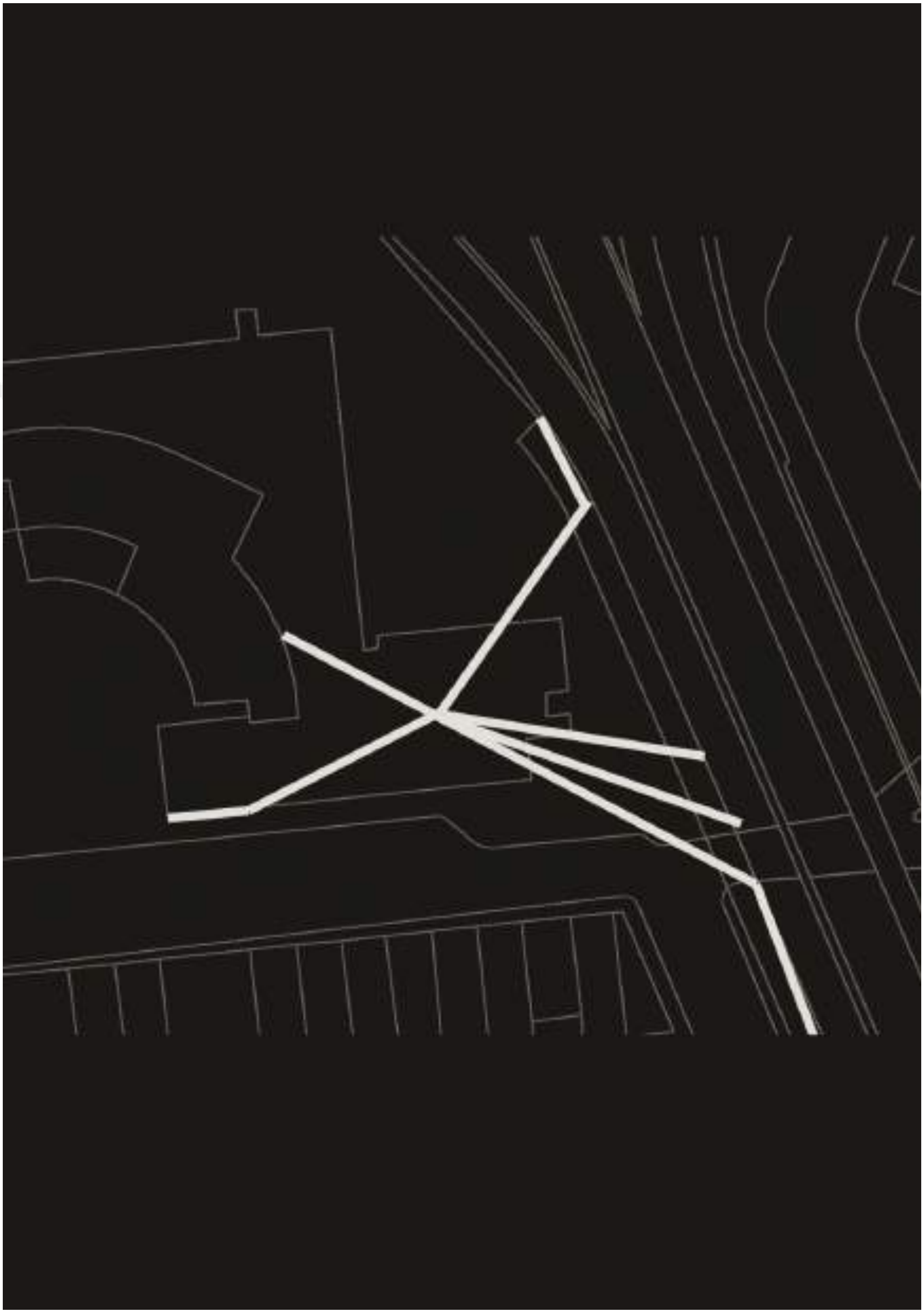


Figure 64. Network topology

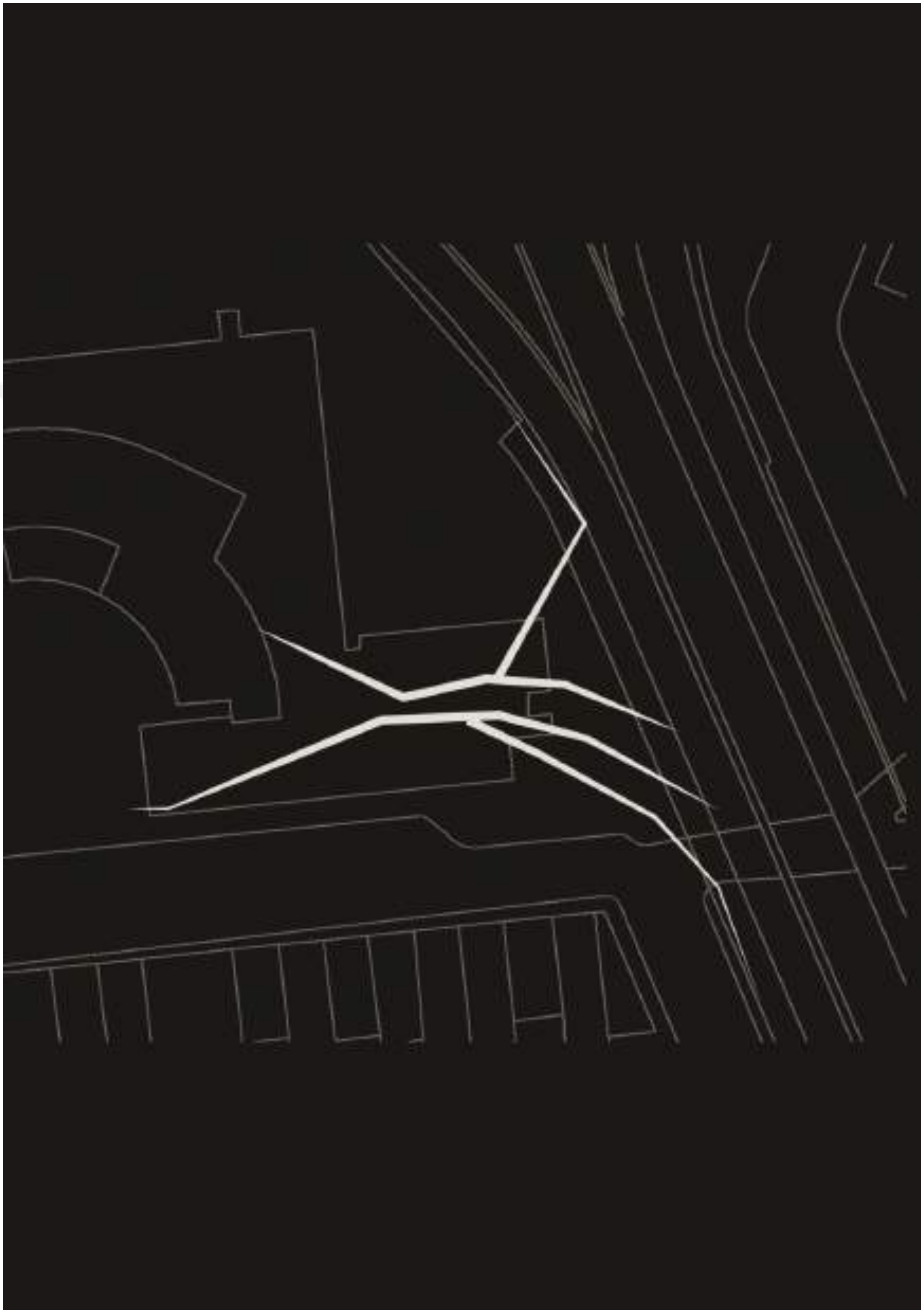


Figure 65. Morphing topology

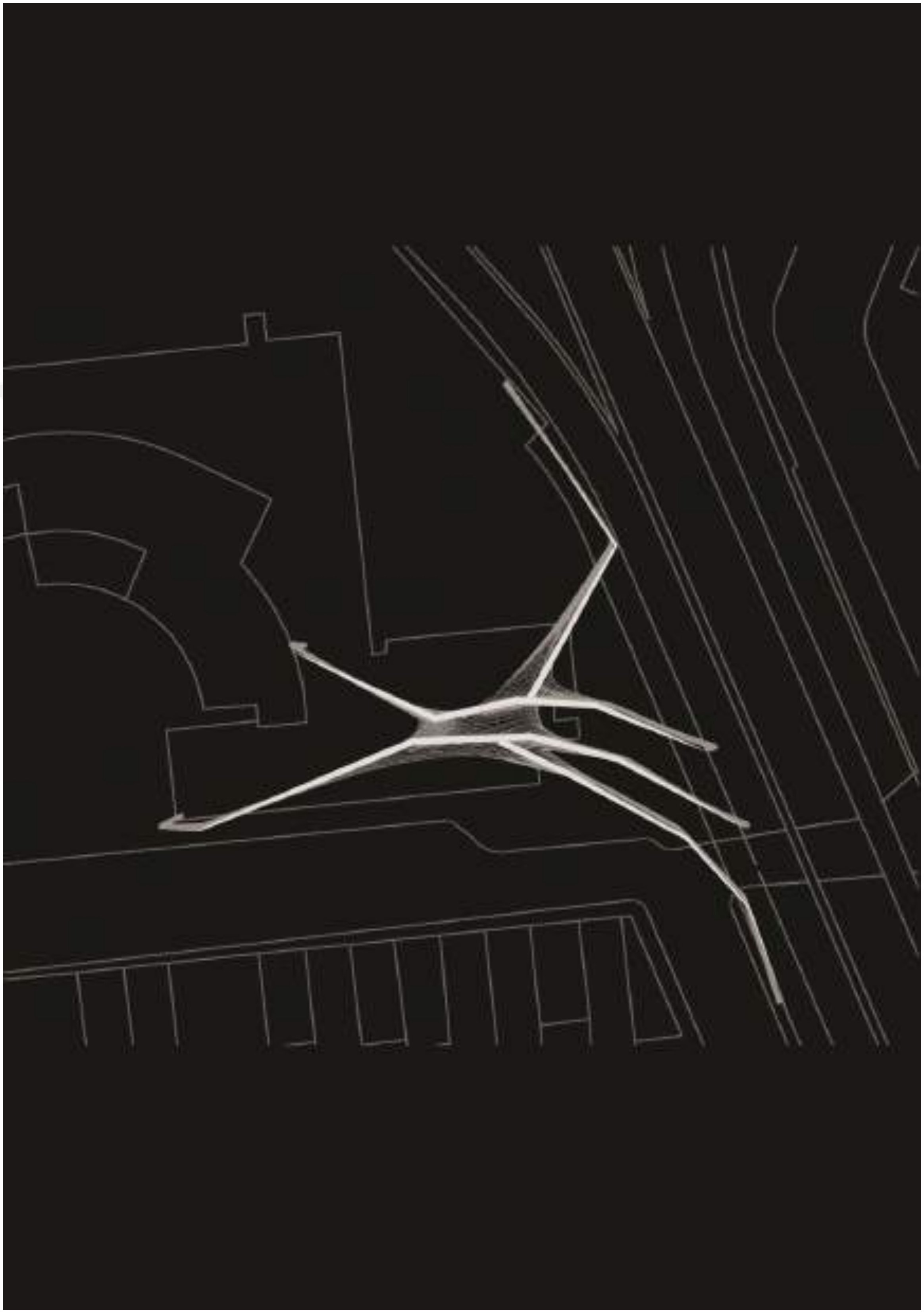


Figure 66. Tectonic to smooth / structure to volume

Figure 67. Tectonic versus organic

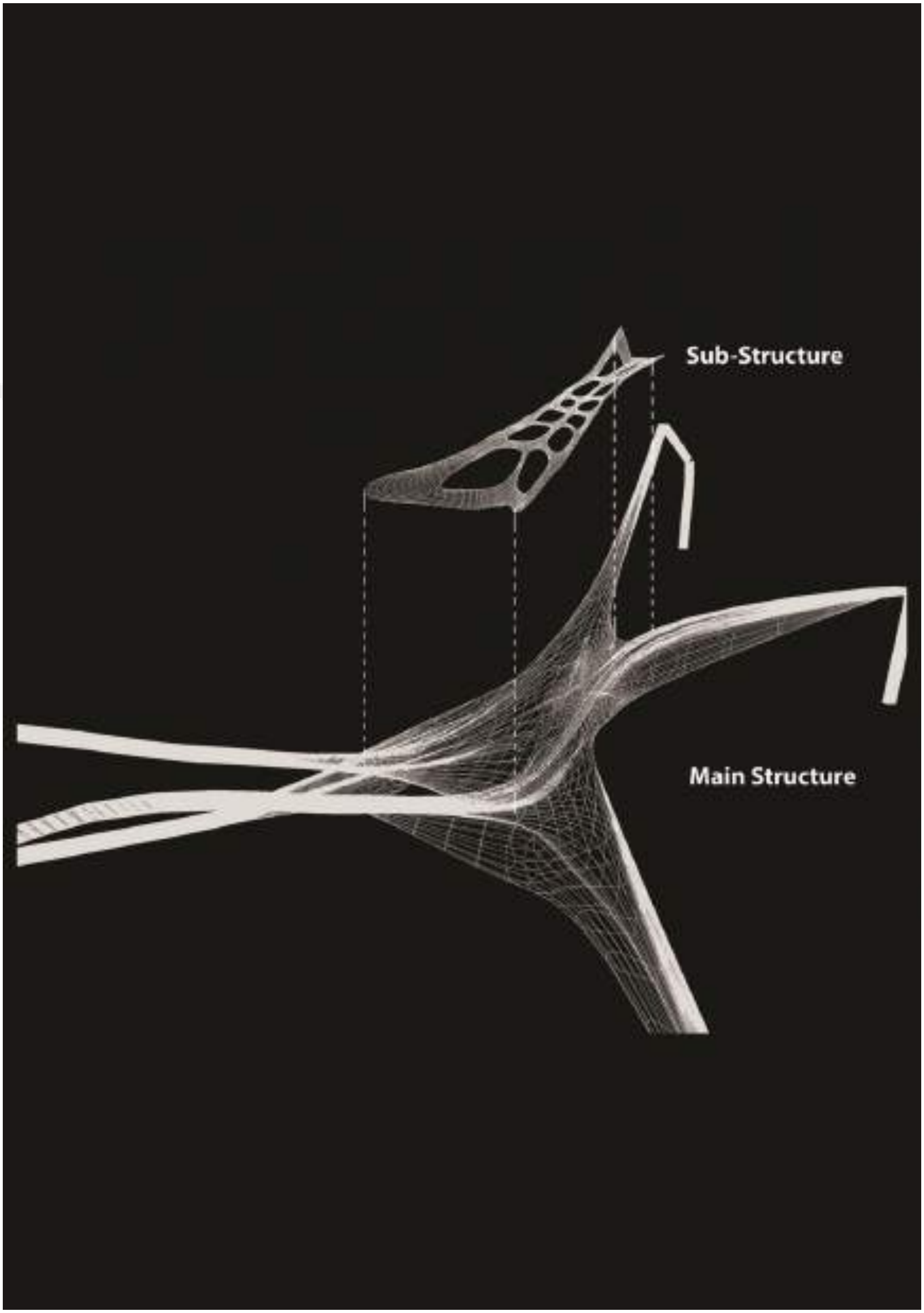


Figure 68.Composite identity of prototype 3

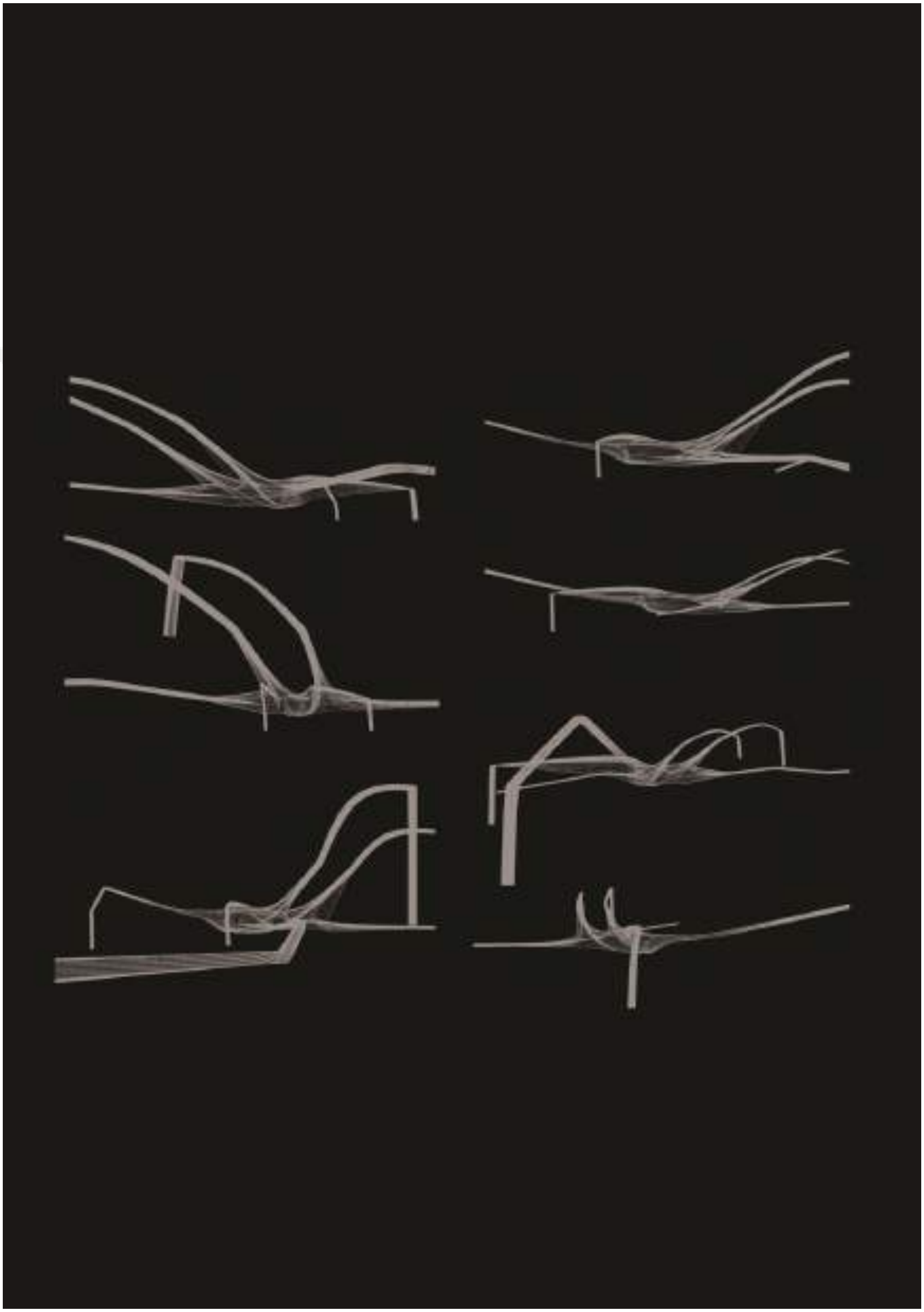


Figure 69. Typomorphology of prototype 3

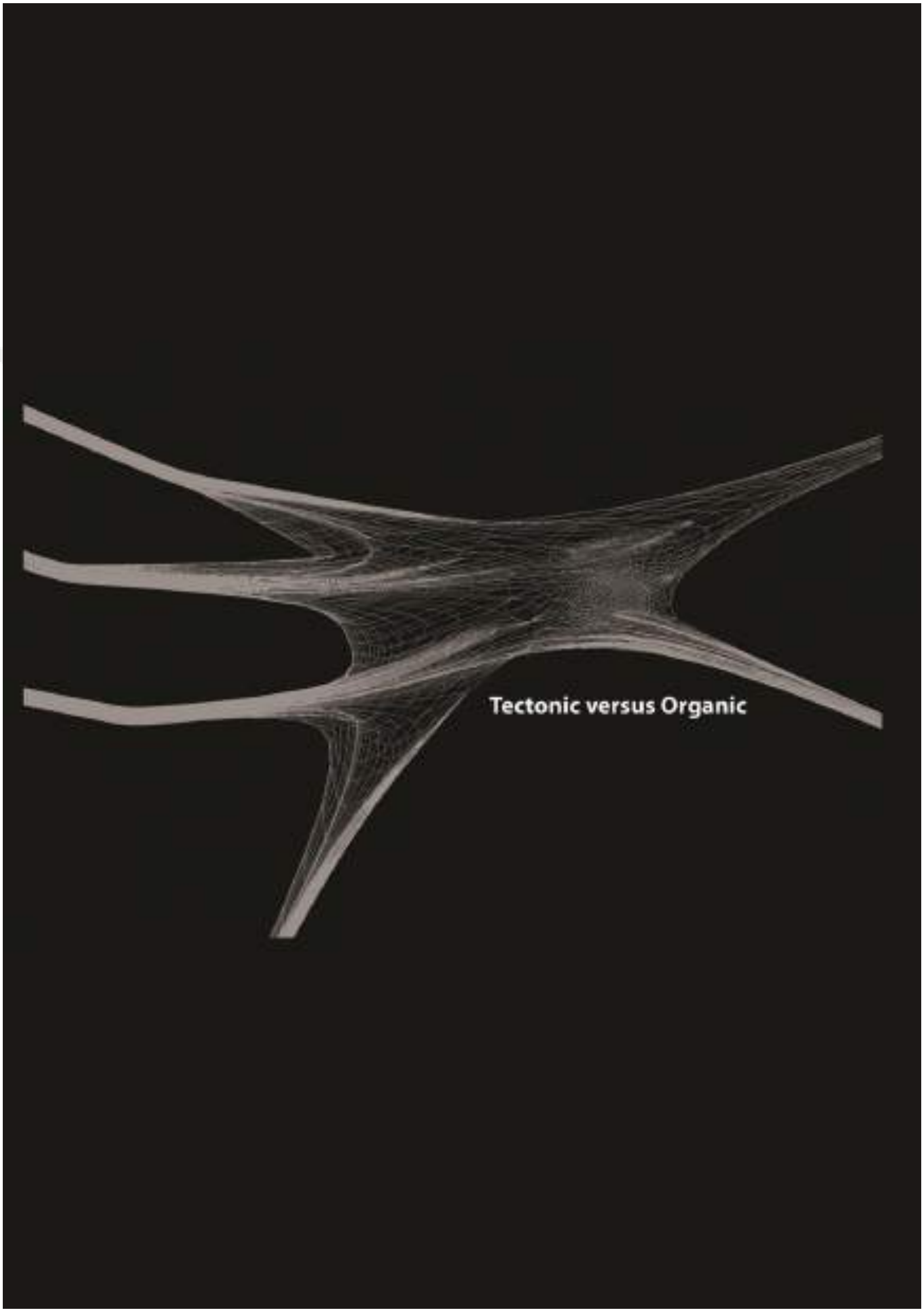


Figure 70.Tectonic versus organic form of prototype 3

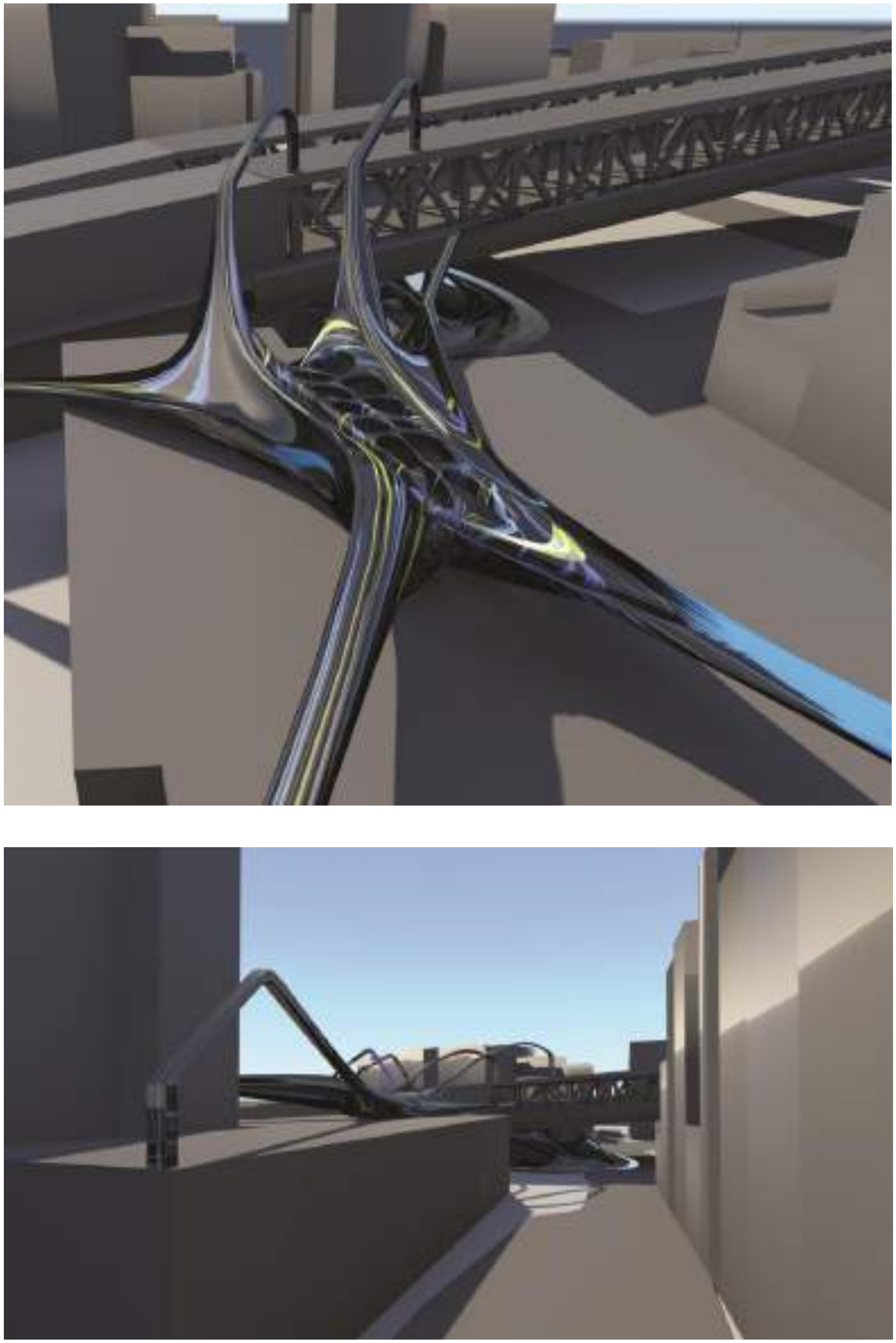


Figure 71. Prototype 3

Figure 72.Prototype 3

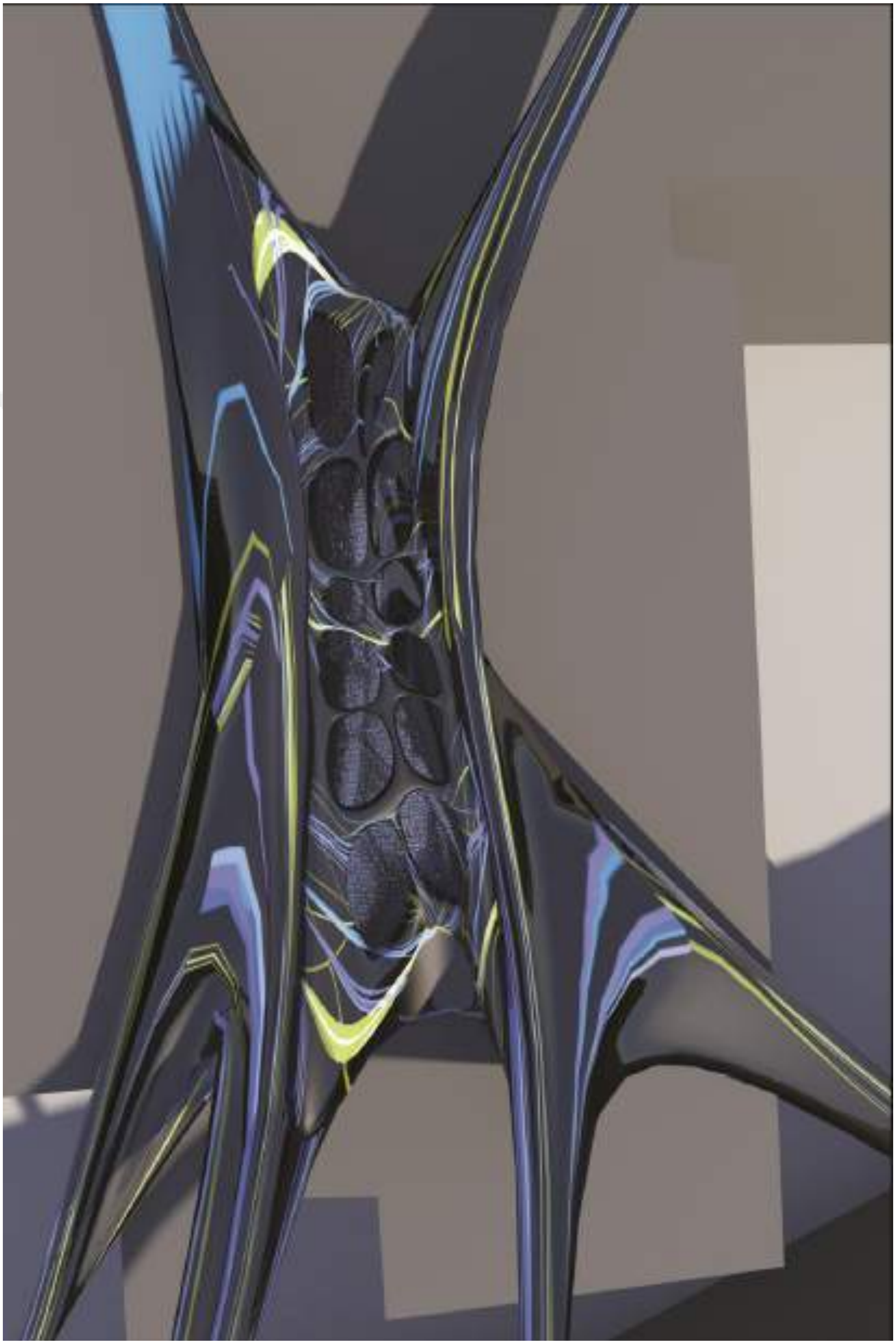


Figure 72.Prototype 3

Figure 73. Prototype 3

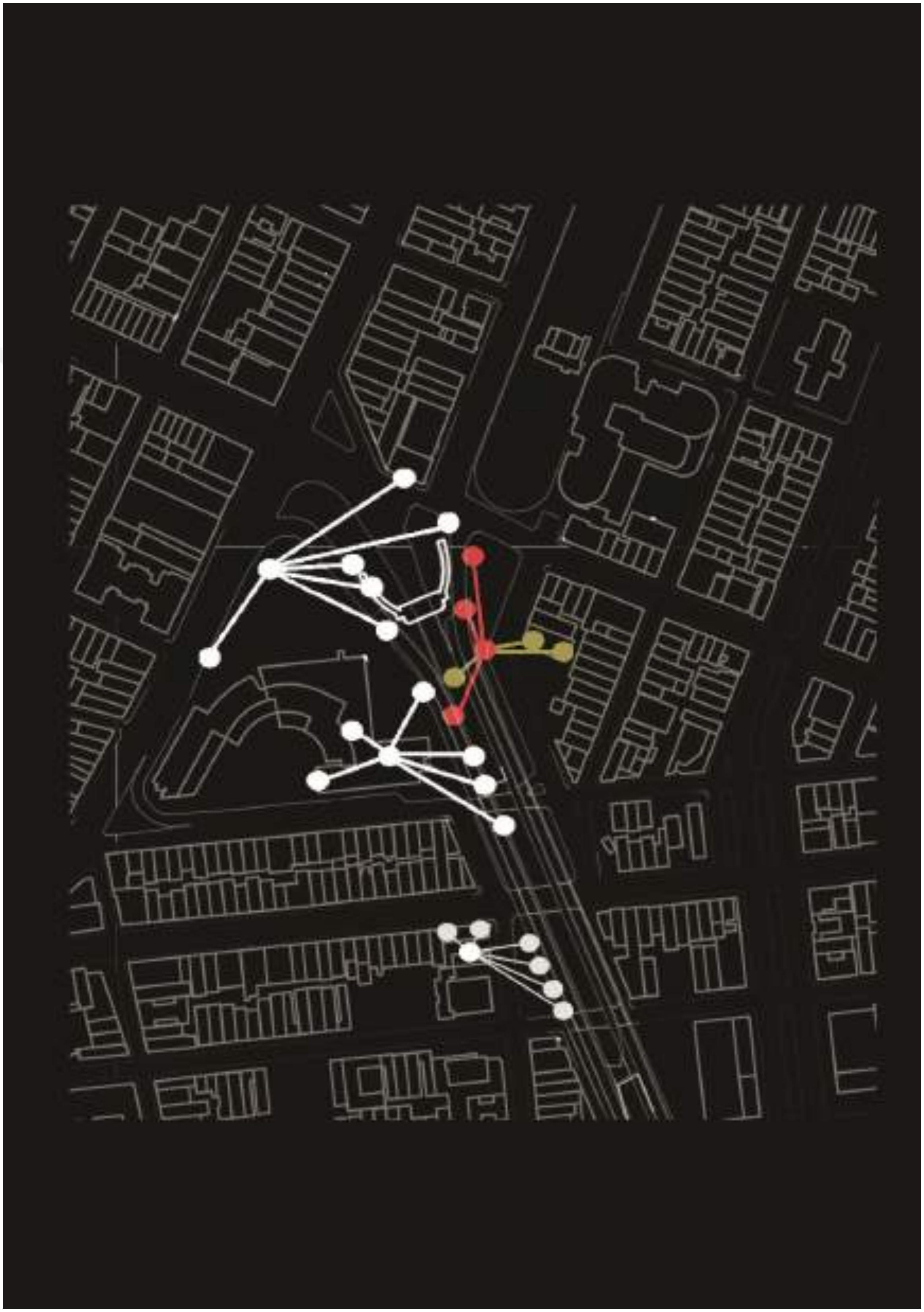


Figure 74. Prototype 4

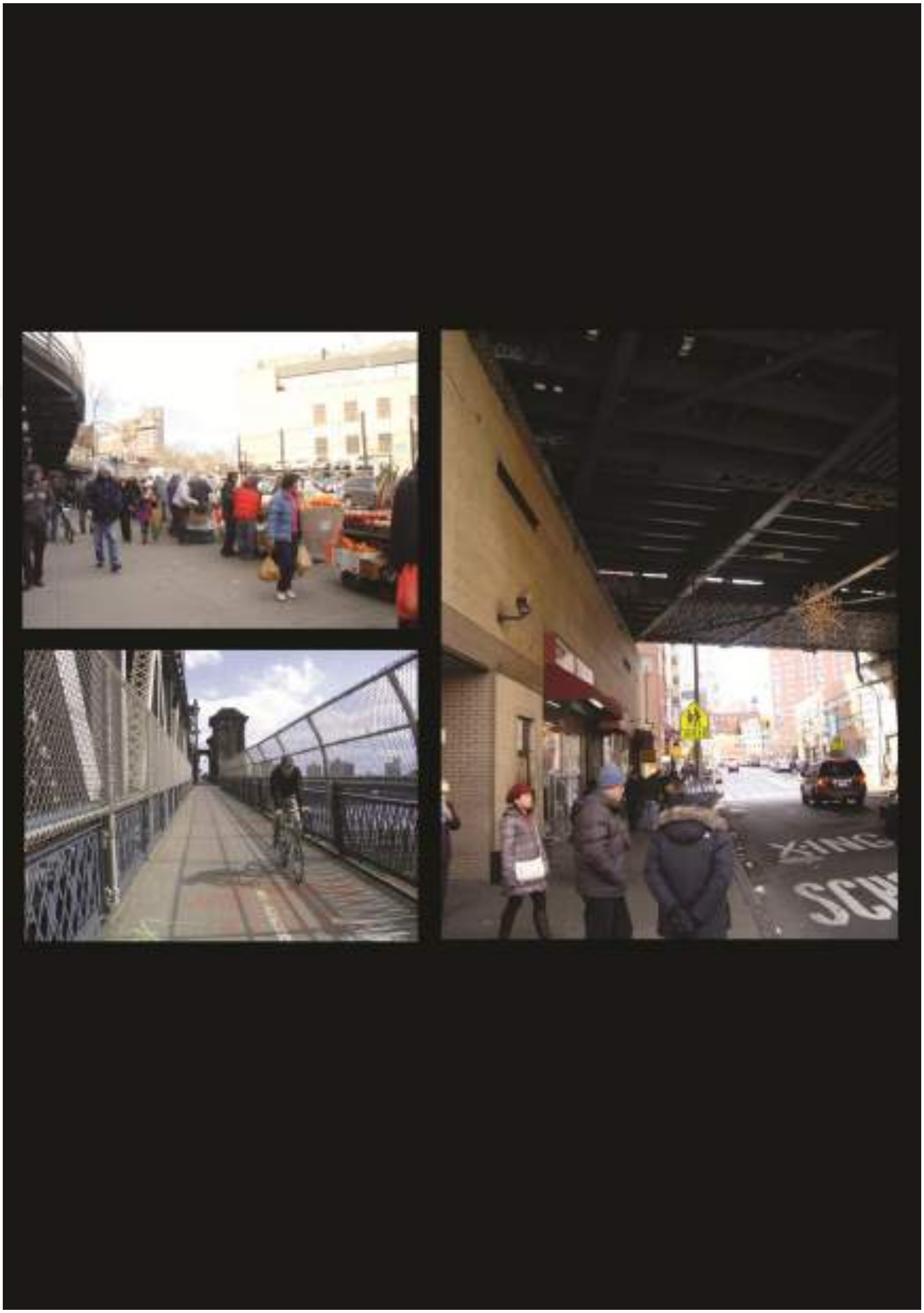


Figure 75. Functional connections of prototype 4

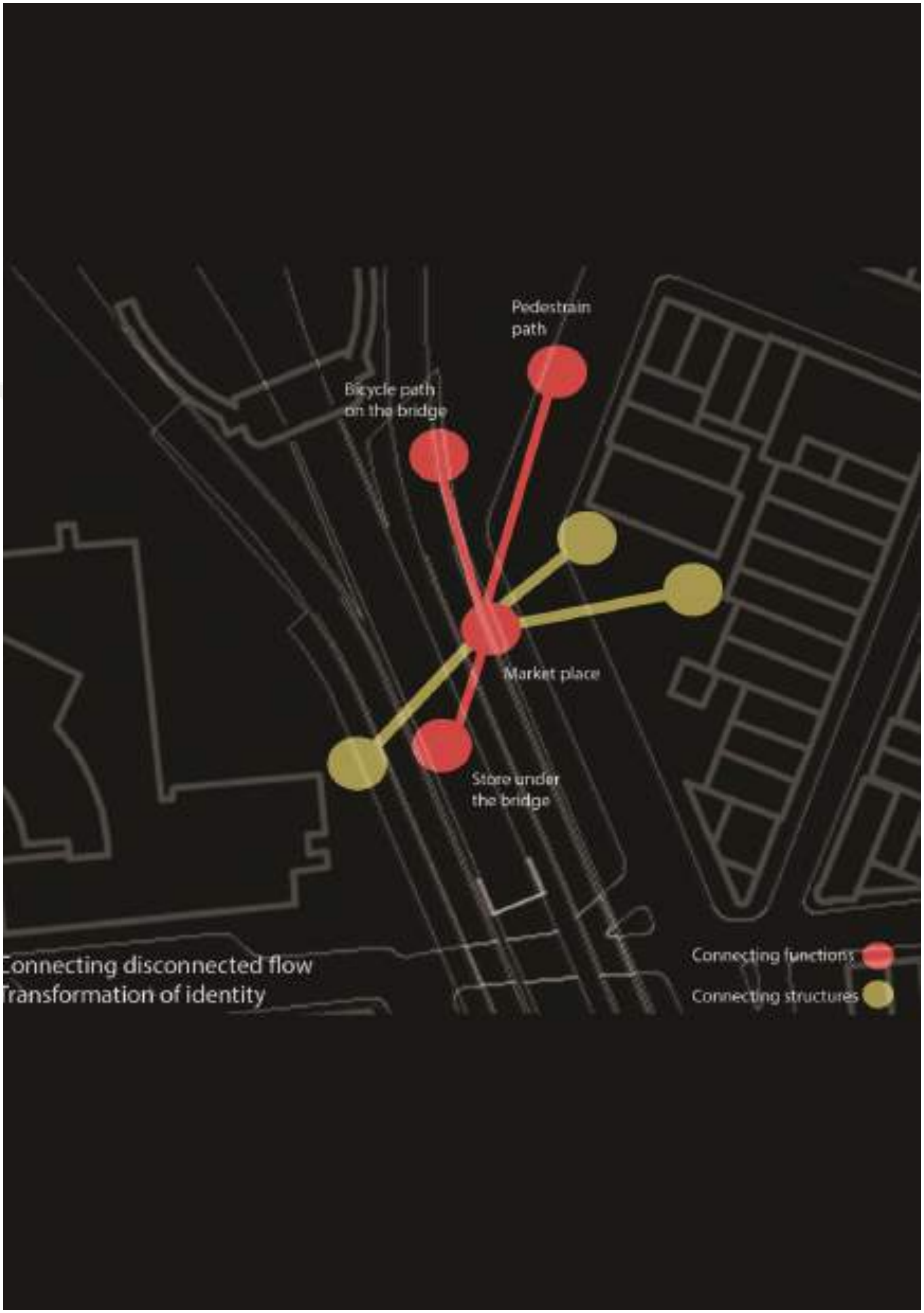


Figure 76. Connecting disconnected flow

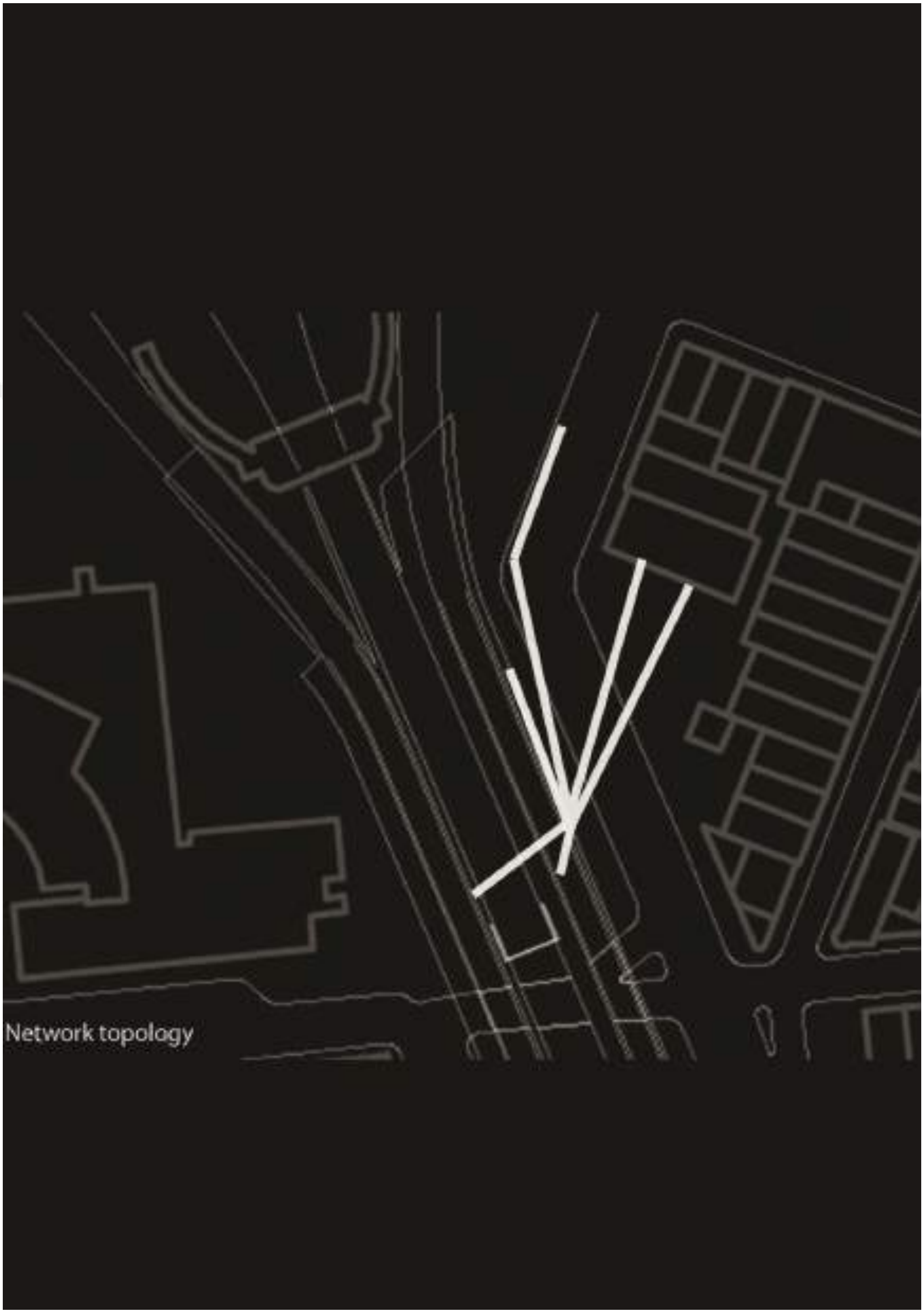


Figure 77. Network topology

Figure 78. Morphing topology

Figure 79. Tectonic to smooth / structure to volume

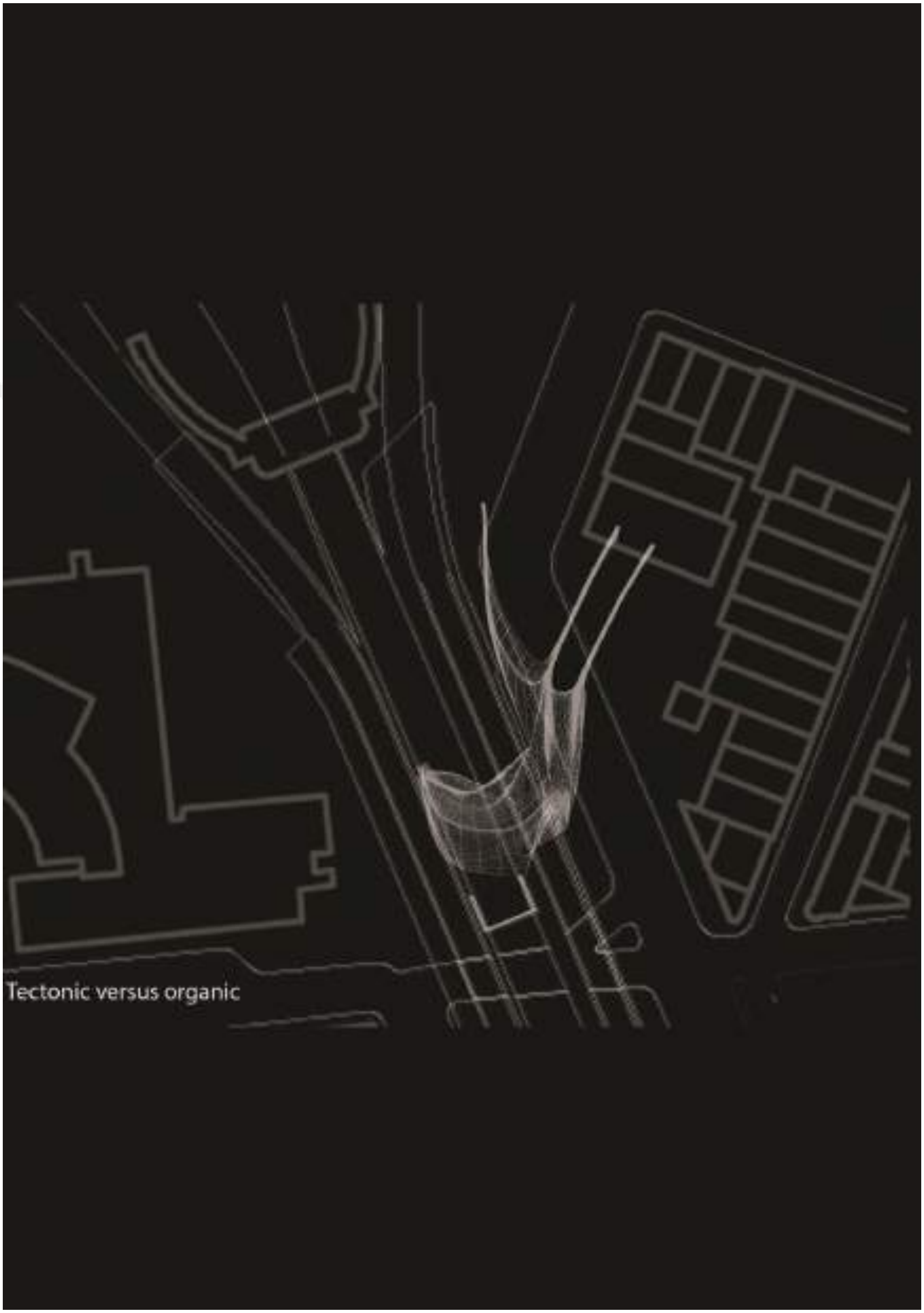


Figure 80. Tectonic versus organic

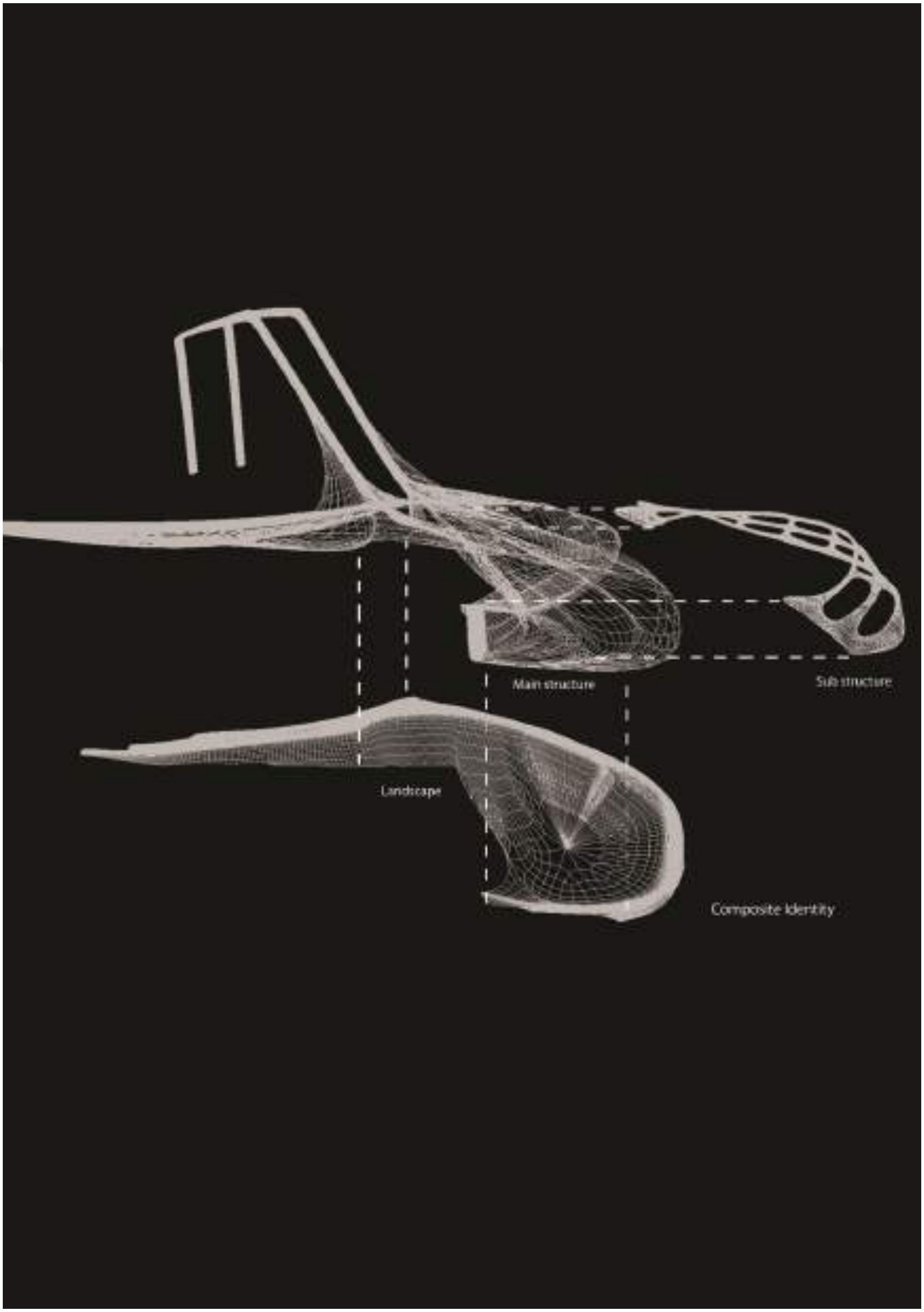


Figure 81. Composite identity of prototype 4

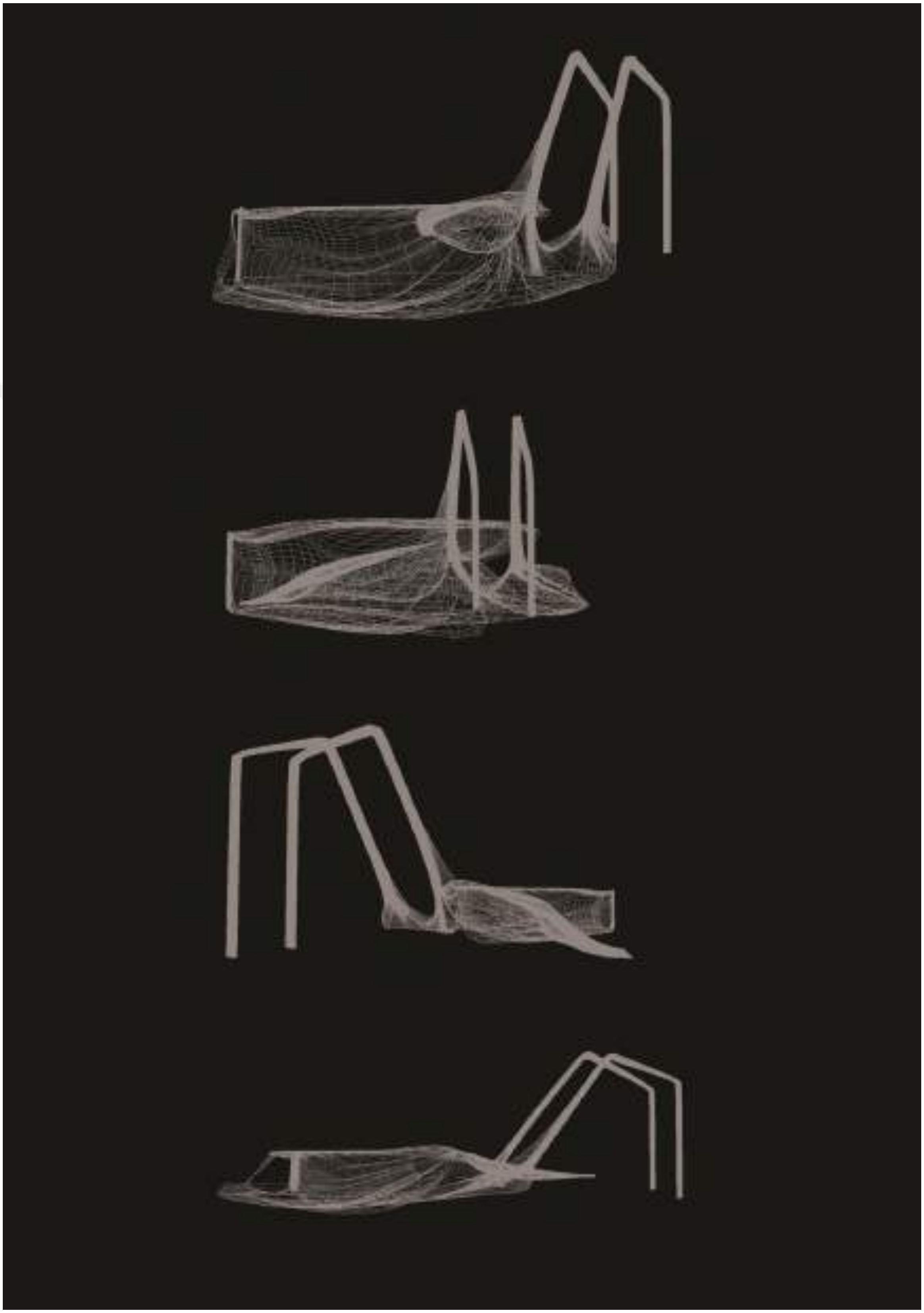
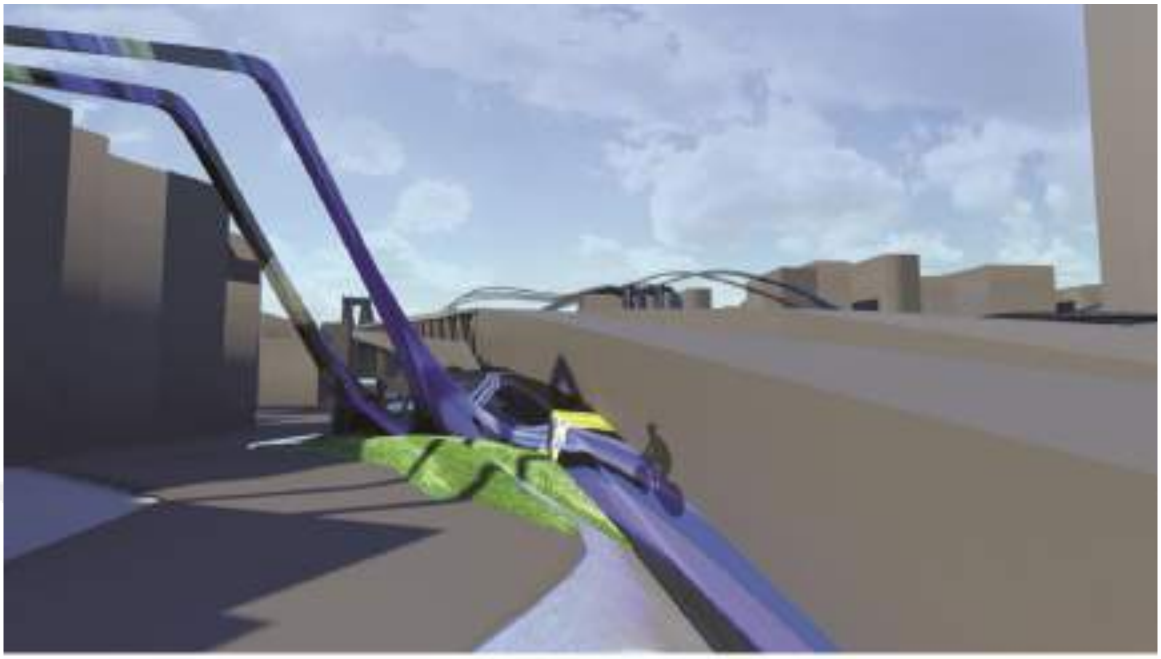


Figure 82. Typomorphology of prototype 4

Figure 83.Prototype 4 interior view

Figure 84.Prototype 4



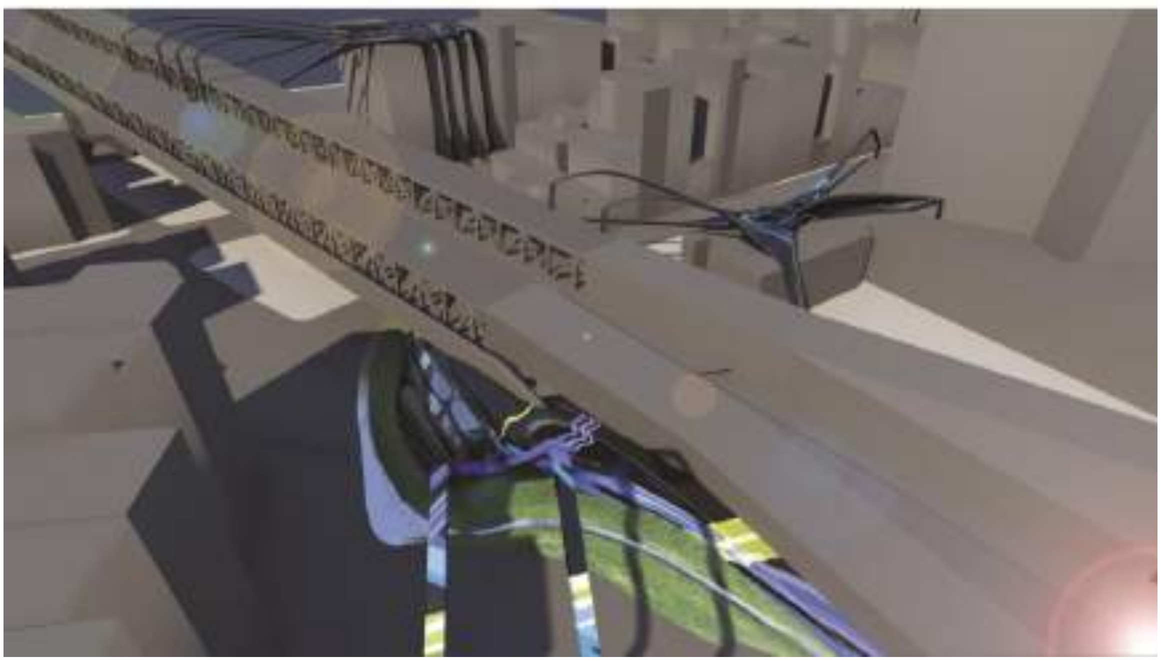


Figure 85.Prototype 4

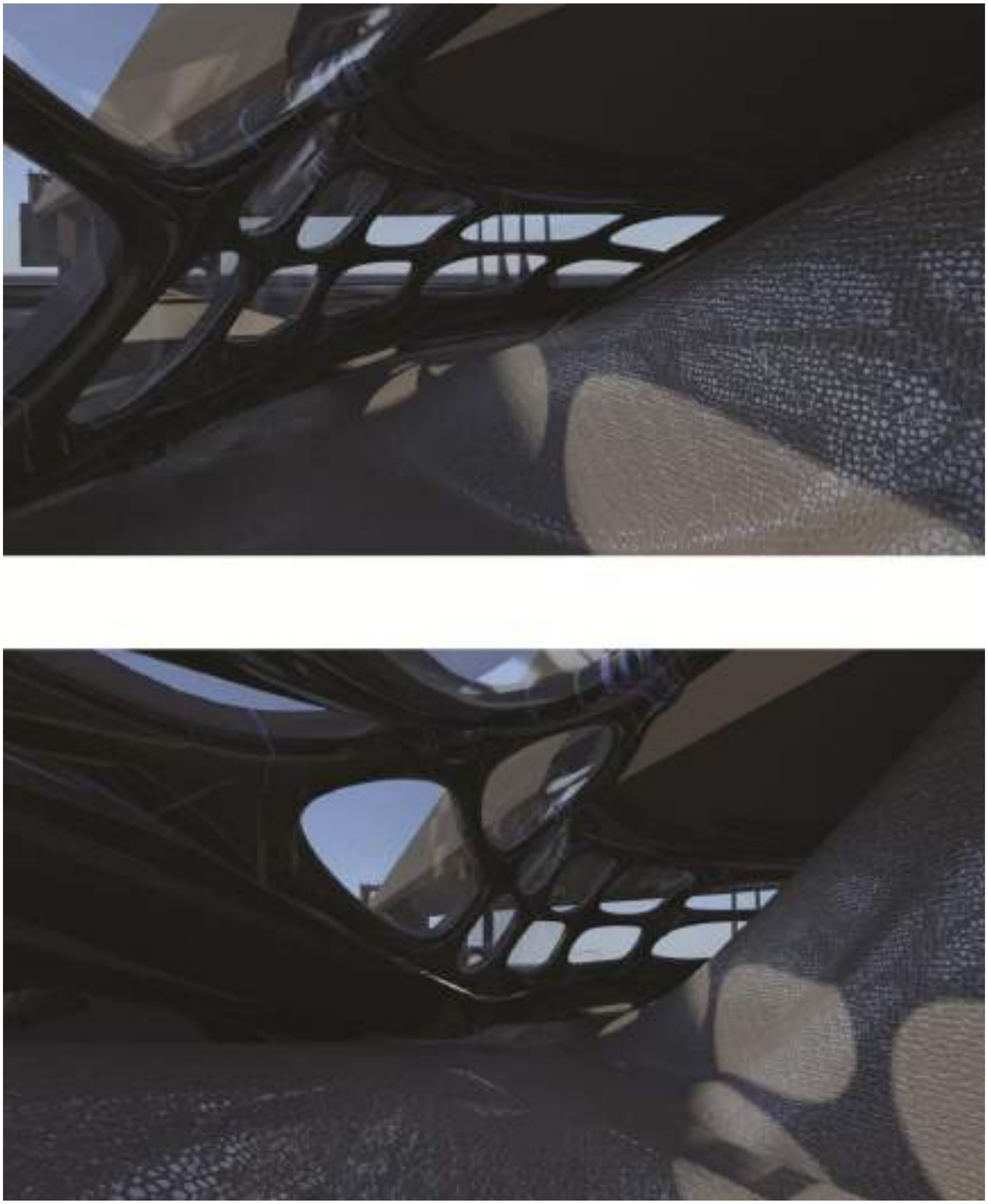


Figure 86. Prototype 4 interior views

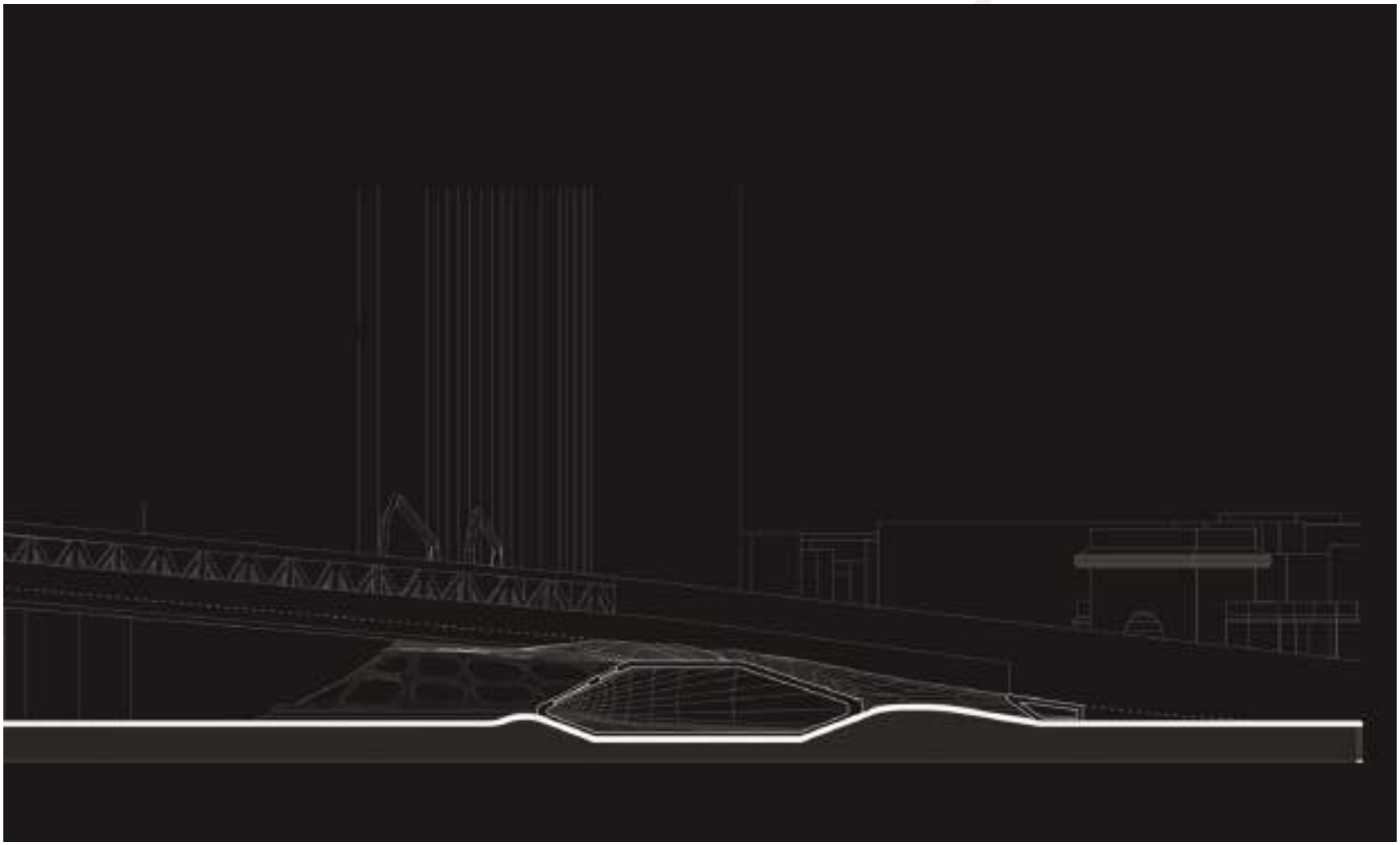


Figure 87. Prototype 4 section

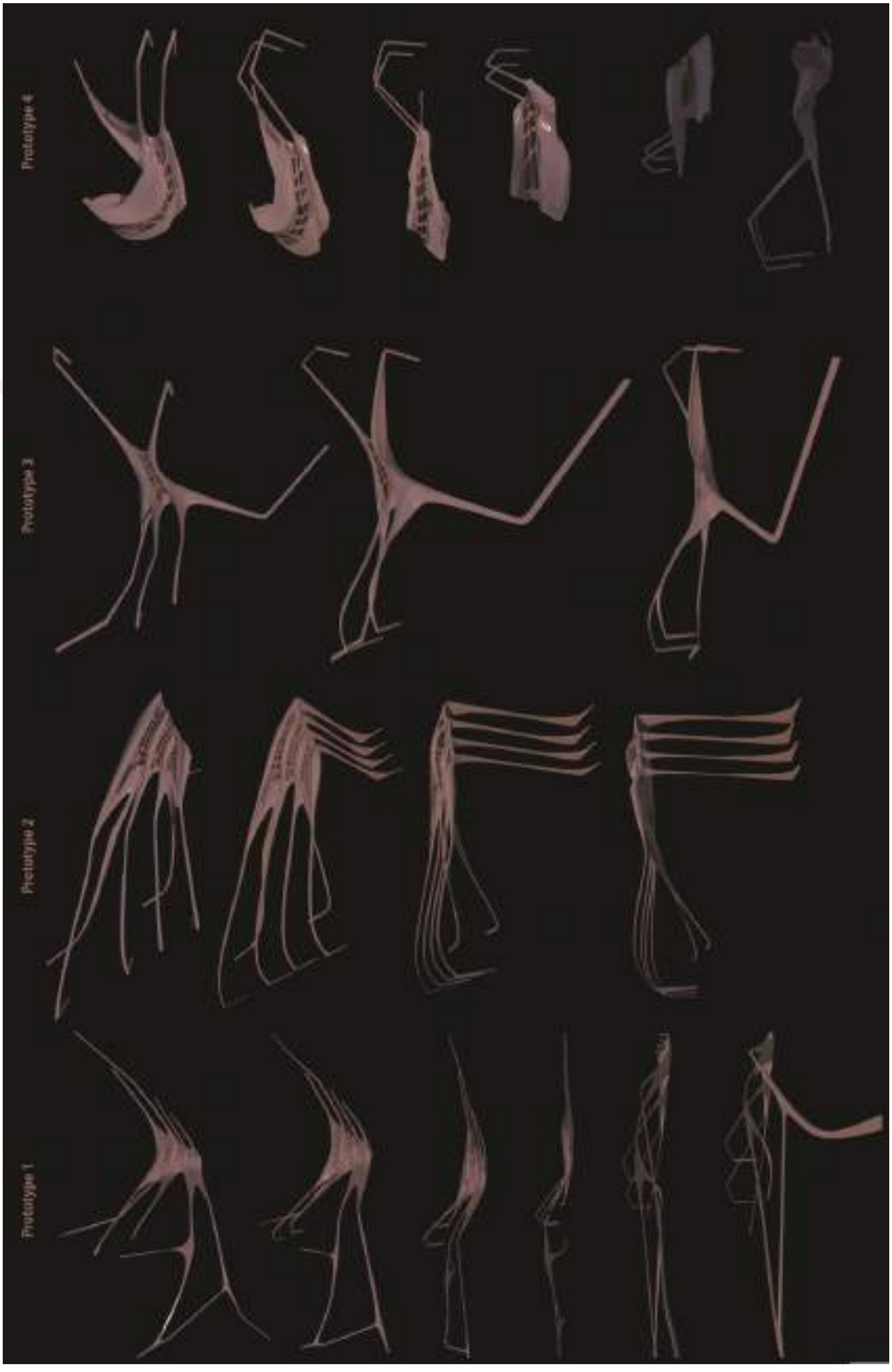


Figure 88. Typomorphologies

Figure 88 cont.

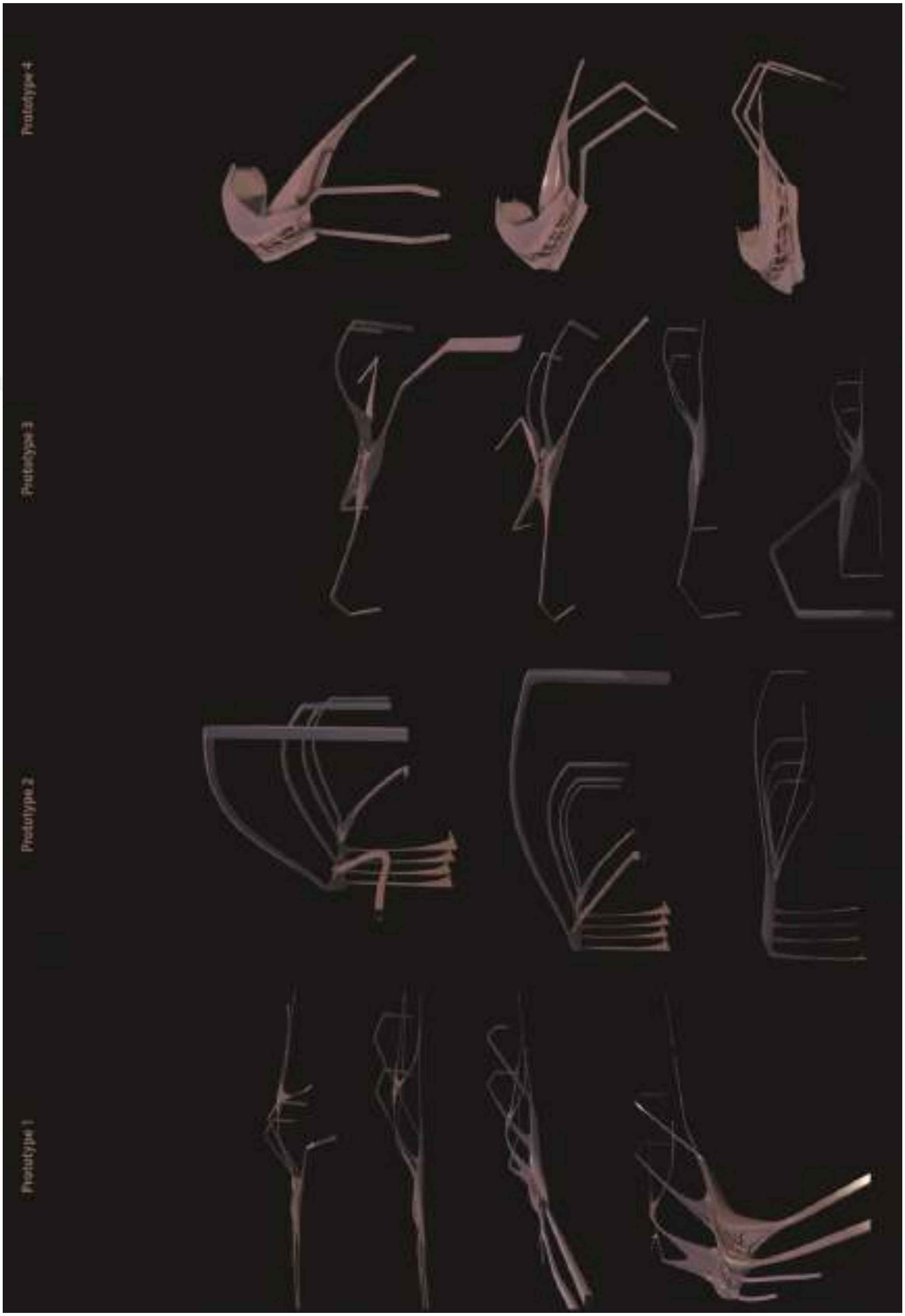


Figure 88 cont.

7. An infrastructure of composite identities

In this project proposal, an infrastructure has formed by using tectonic and organic forms together. Since the city has been developed with tectonic ideas until recent years, it has a tectonic infrastructure and structures. Referring to these existing tectonic structures, the system of the same tectonic structures like bridge structure, pedestrian paths, bicycle paths, rooftops and building structures are used for starting and finishing points of a new infrastructural system. Through this new infrastructural system, a new type of organic structure has been created at certain points (determined nodes). A principal of composite identity has been achieved for new infrastructure by using organic and tectonic form together.

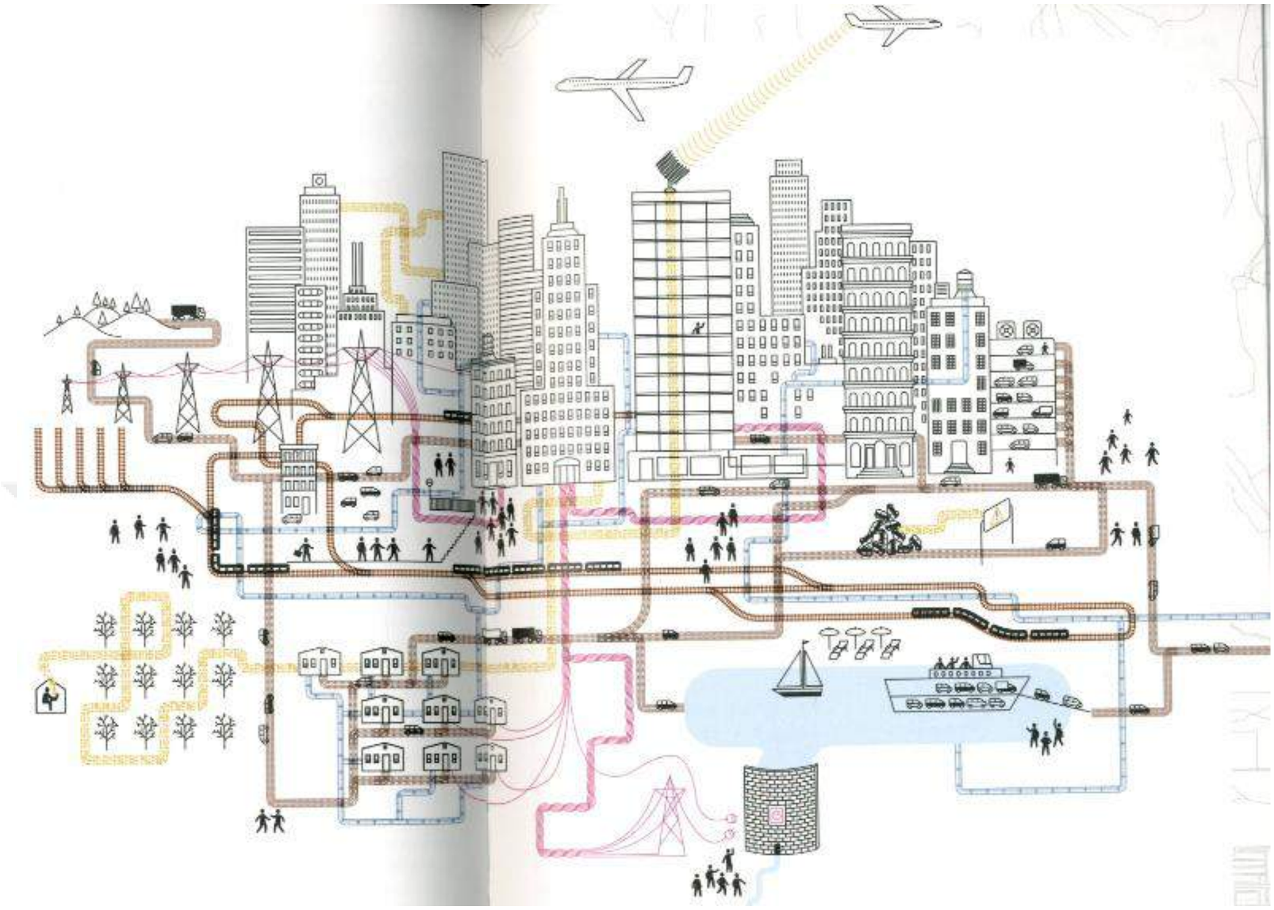


Figure 89. New York City Infrastructure. (Niemann)

“The assignment I received from the art director of New York Times Magazine who originally commissioned this piece was to illustrate the complexities and importance of infrastructure in our daily lives. I wanted to use a very technical style, since most of the elements have to do with engineering of some sort. Another important element I wanted to highlight, though, was that all of these technical elements end up forming an almost organic system that we all depend in our daily lives” (Niemann).

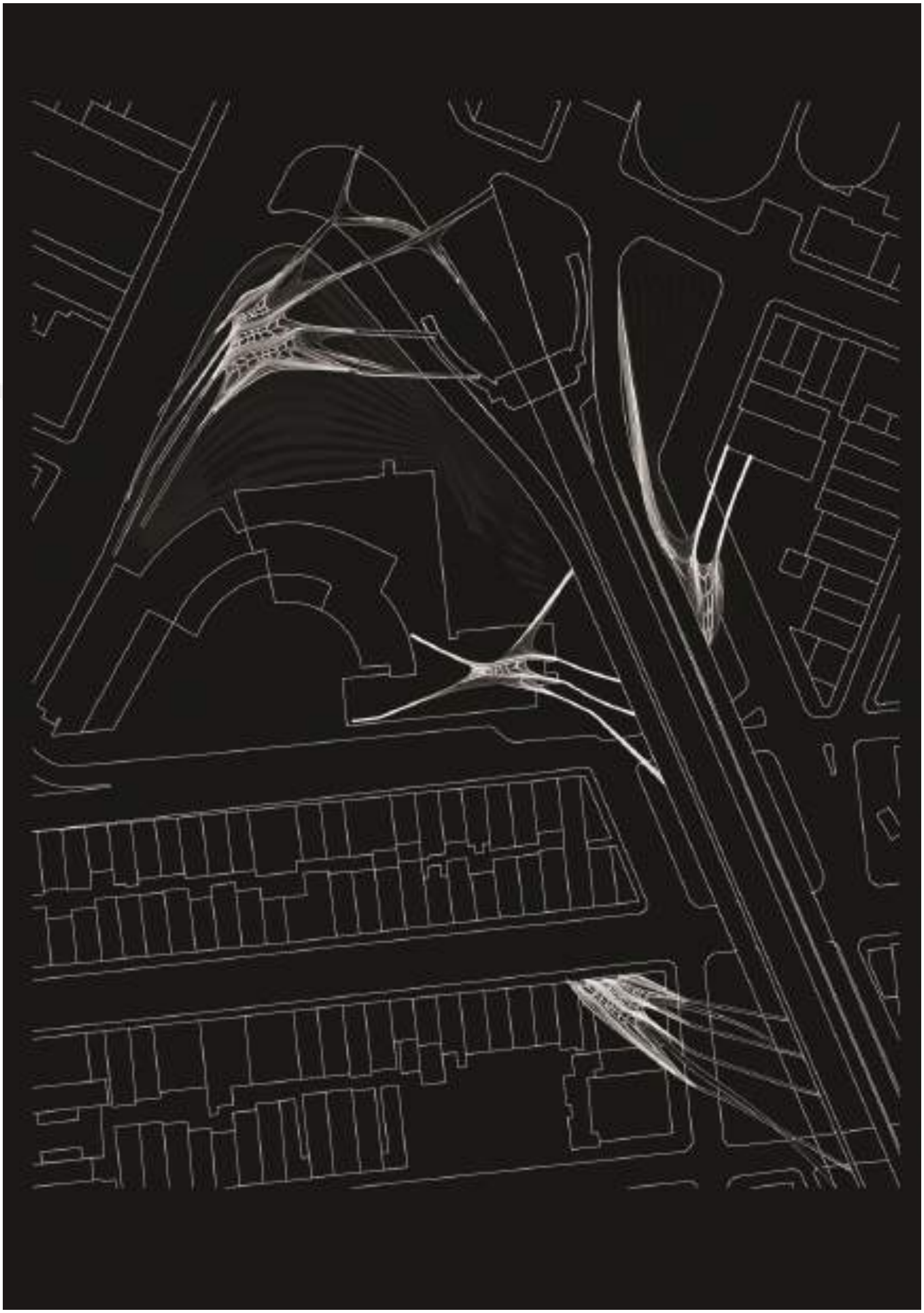


Figure 90. Site plan

Figure 91. General view

Figure 92. General view

List of Illustrations

Images cited

Figure 1. Strayer, L. David, et al. "A Classification of Ecological Boundaries." *BioScience 723*, Vol. 53 No. 8, August (2003): 723-729.

Figure 2. http://graphicsweb.wsj.com/documents/FOURSQUAREWEEK1104/

Figure 3. http://www.nyctourist.com/historic-nyc-maps.htm

Figure 4. Photo by MonarchPark, Kitchener. in McWilliam, Wendy, et al. "The housing-forest interface: Testing structural approaches for protecting suburban natural systems following development." *Urban Forestry & Urban Greening* 9. (2010): 149–159.

Figure 5. http://gis.nyc.gov/doitt/nycitymap/

Figure 6. http://www.new-york-chinatown.info/

Figure 7. http://www.new-york-chinatown.info/

Figure 8. http://www.new-york-chinatown.info/

Figure 9. http://www.littleitalynyc.com/

Figure 10. Strayer, L. David, et al. "A Classification of Ecological Boundaries." *BioScience 723*, Vol. 53 No. 8, August (2003): 723-729.

Figure 11. http://udl.concord.org/artwork/plant_34/pl_34_index.html

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Figure 13. http://www.nature.com/scitable/knowledge/library/population-dynamics-of-mutualism-61656069

Figure 14. http://www.nature.com/scitable/knowledge/library/population-dynamics-of-mutualism-61656069

Figure 15. http://www.nature.com/scitable/knowledge/library/population-dynamics-of-mutualism-61656069

Figure 16. http://gis.nyc.gov/doitt/nycitymap/

Figure 17. earth.google.com

Figure 18. earth.google.com

Figure 19. earth.google.com

Figure 20. earth.google.com

Figure 21. earth.google.com

Figure 22. http://www.streetsblog.org/category/landmarks/manhattan-bridge/

Figure 23. http://en.wikipedia.org/wiki/Manhattan_Bridge

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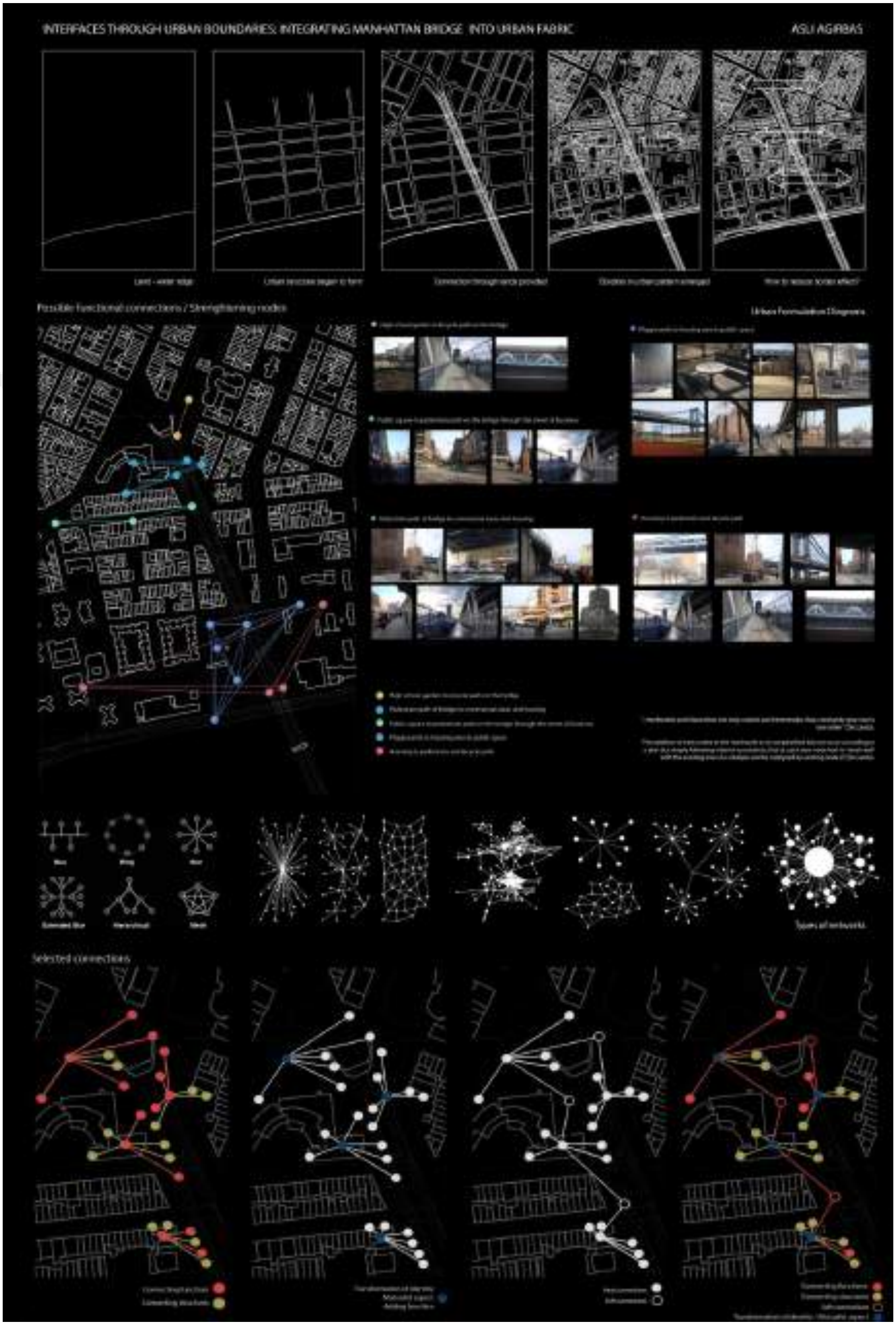
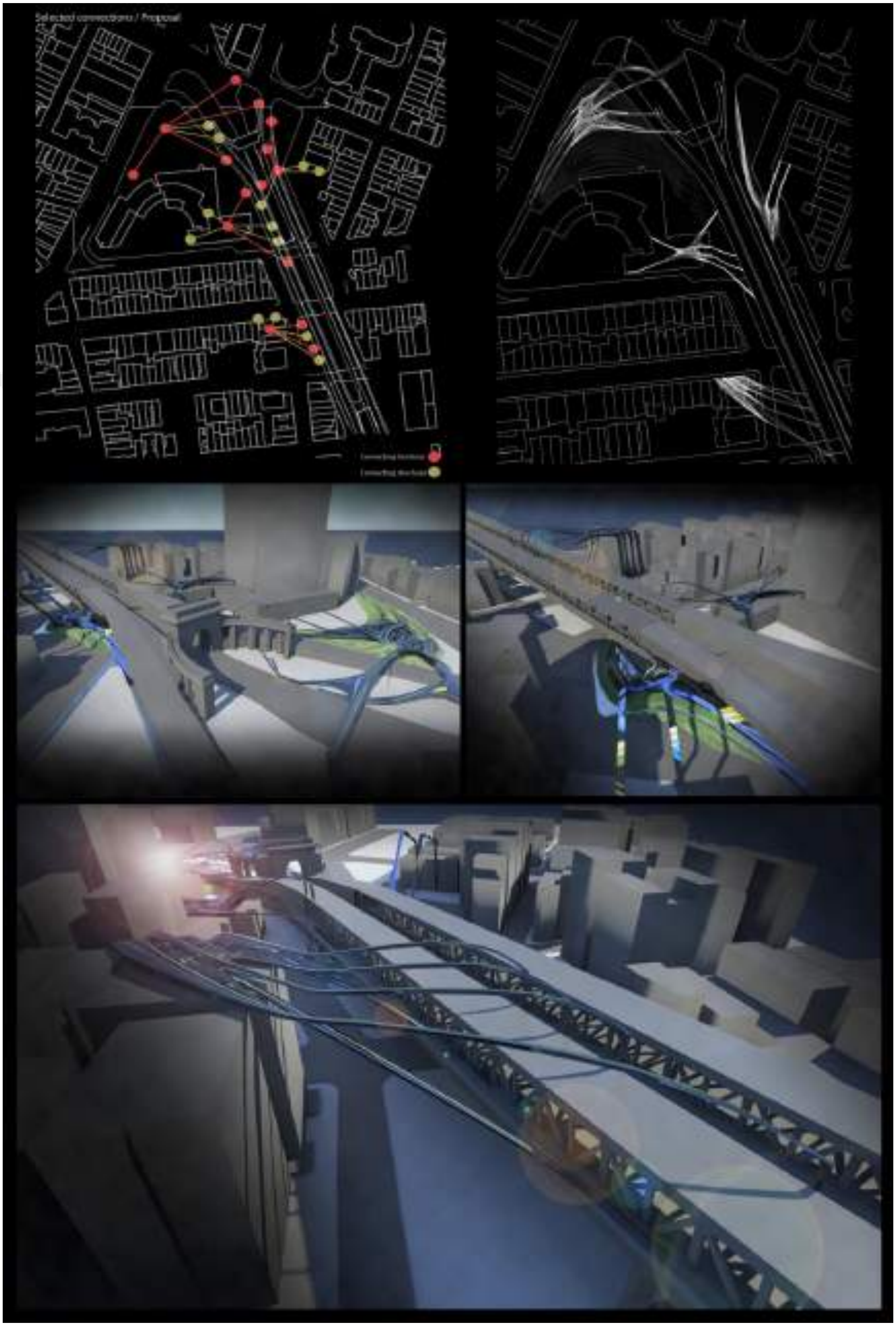
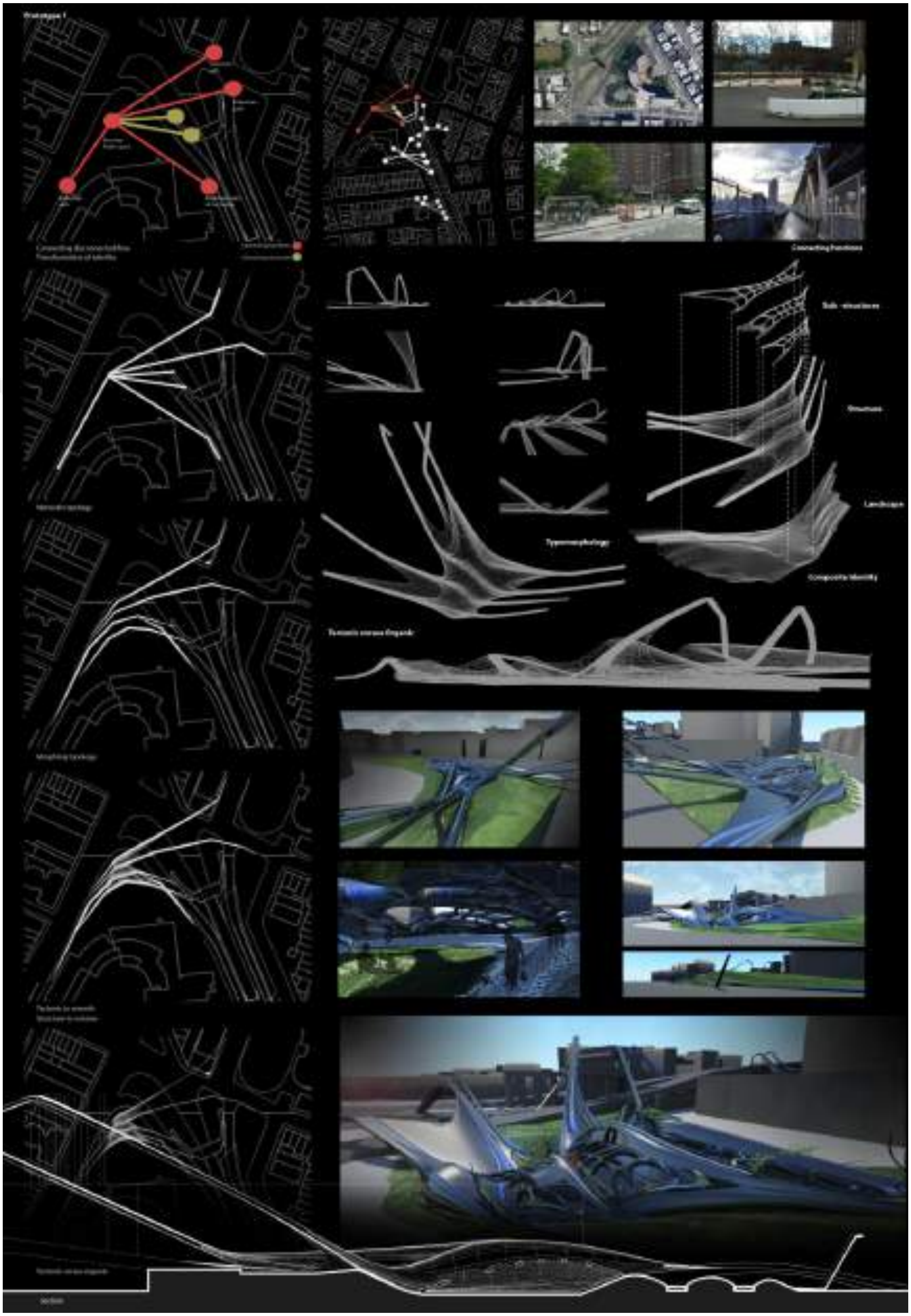
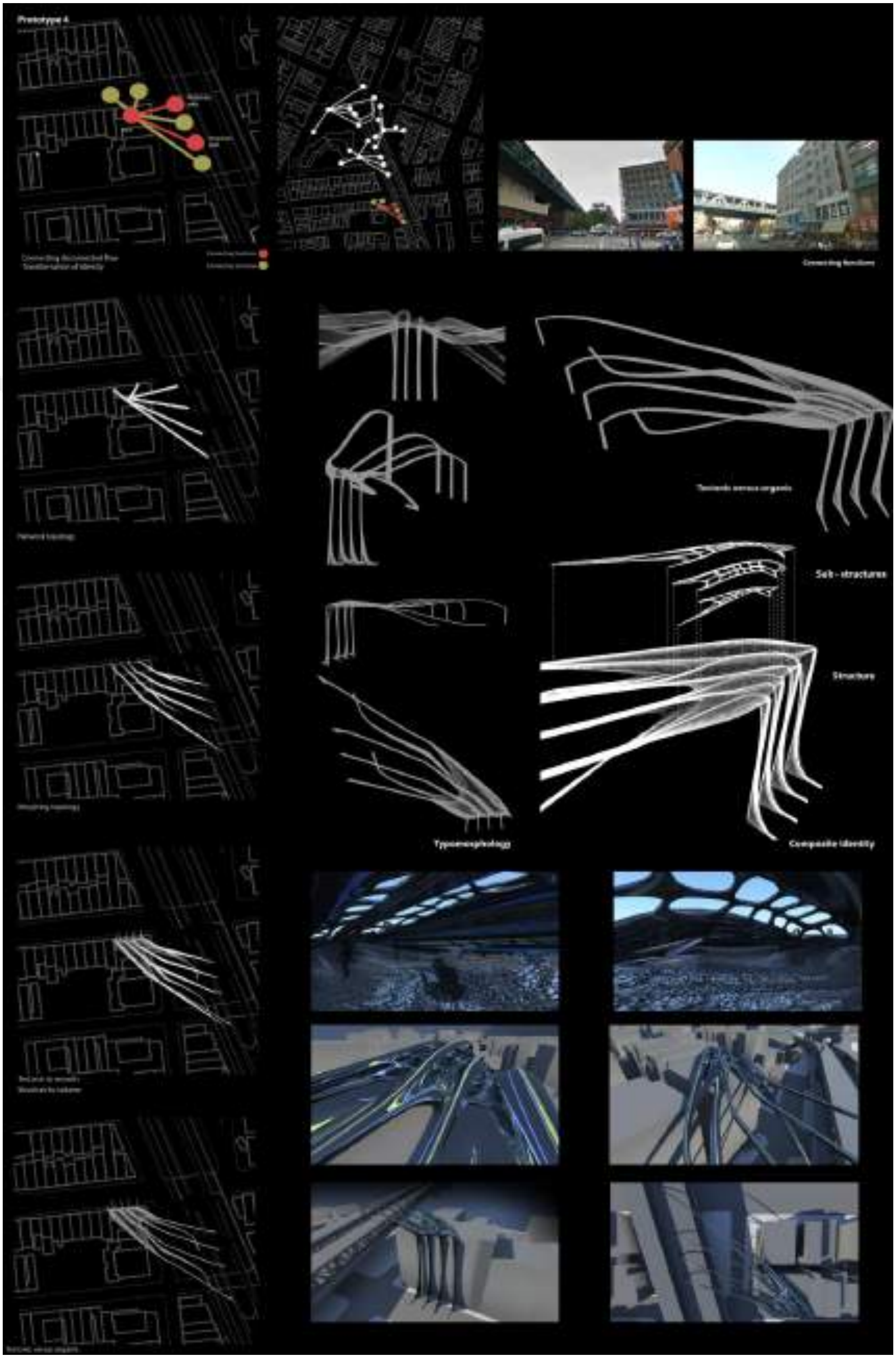
Appendix

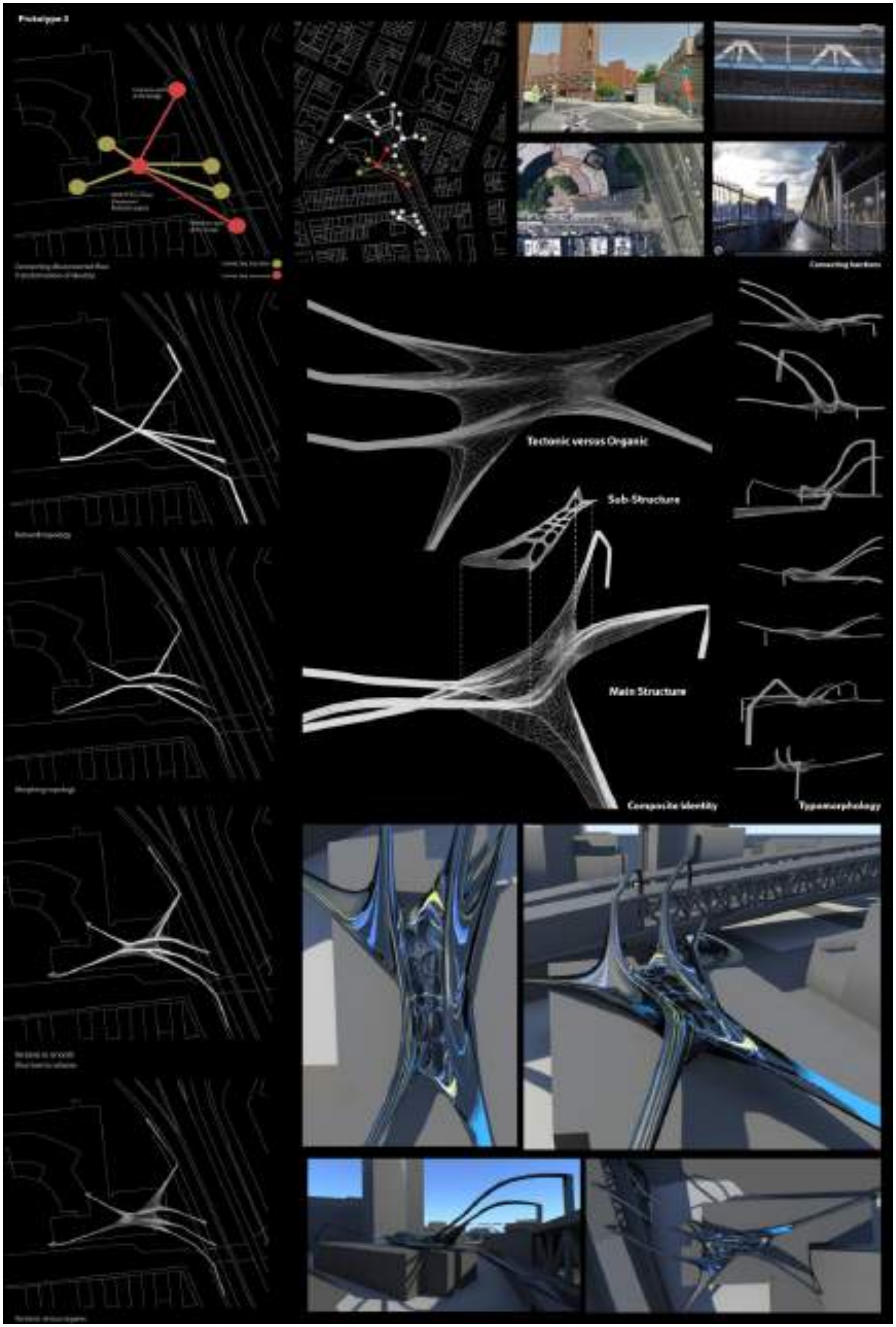
Final boards


INTERFACES THROUGH URBAN BOUNDARIES: INTEGRATING MANHATTAN BRIDGE INTO URBAN FABRIC
ASLI AGIRBAS
Possible functional connections / Strengthening nodes
Types of networks
Selected connections


Selected connections / Proposal




Prototype 4
Connecting functions
Tectonic versus organic
Sub - structures
Structure
Typomorphology
Composite identity



Prototype 3
Connecting bastions
Tectonic versus Organic
Sub-Structure
Main Structure
Composite identity
Typomorphology