



**CHALMERS**  
UNIVERSITY OF TECHNOLOGY

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# Peripheral Community Reformation

## An Exploration in Systematizing Urban Design

David Scavo

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Master Thesis  
Urban Challenges, Autumn 2018  
MPARC - Architecture and Urban Design  
Department of Architecture and Civil Engineering  
Chalmers University of Technology  
Göteborg, Sweden

Examinor: Joaquim Tarrassó  
Supervisor: Kengo Skorick





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An Exploration in Systematizing Urban Design  
DAVID E. SCAVO

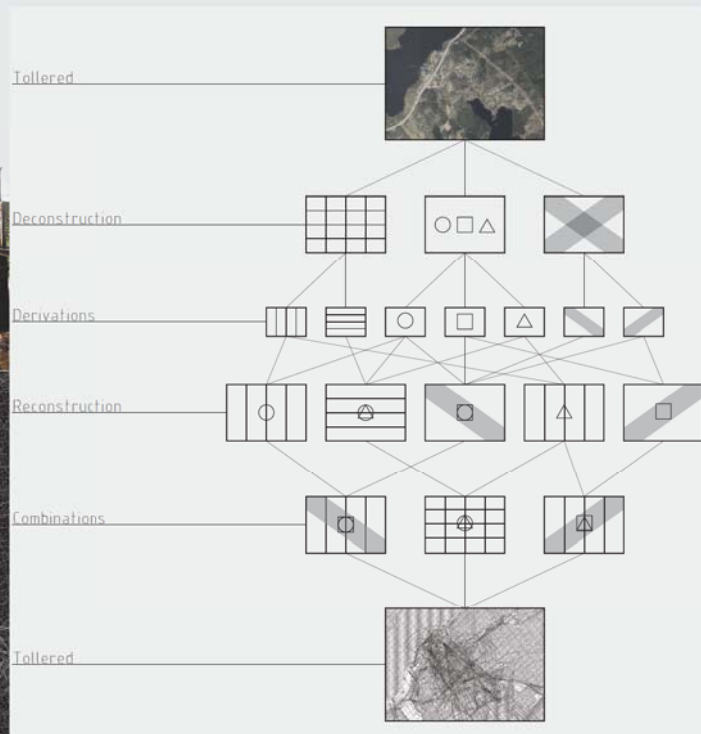
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Cover:  
Old industrial buildings and stream being deconstructed into lines.

# Abstract



The constant march of urbanization proceeds to render peripheral communities superfluous. The migration of both people and establishments from rural areas to larger cities leaves smaller communities without natural venues for social interaction and work.

Tollered is one such peripheral community. An old industrial village centered around the spinning factories of Nääs Fabriker. The village's unique placement on steep incline between two lakes made it an optimal location for a hydro-electrical powered industry just as the industrialization took off in Sweden in the first half of the 19th century. Since then Tollered has grown, formed around the old industrial buildings and hydro-infrastructure, and even though the Nääs Fabriker itself is no longer in business, most of the old industrial buildings are still in use and house an array of different functions.

With this unique local context as a point of departure, this thesis aims to develop a method for how to work with urban design. Designing a system that works as not only as an analytical tool that describes the contexts and its conditions, a method of pinpointing areas where solutions could be implemented, but also as a design generator.

The system itself functions by breaking apart the maps we commonly use as architects into its most fundamental parts and dividing them into separate layers. It is when you start to combine these new layers that interesting interaction occur. By recombining newly generated layers with each other, a new map, with new connections, emerges. Based on the intensity of overlap of the layers used one can distinguish areas in which certain interventions are needed or favored. In these target areas a design can be generated within the system by connecting an interaction between two specific layers to a predetermined architectural element.

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## *Previous Education*

Bachelor in Architecture at Chalmers University of Technology.

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- ARK128 - Architecture and Urban Design
- ARK131 - Matter, Space, Structure
- ARK151 - Architectural Competitions
- ARK440 - Design and Communication Tools
- AUT163 - Future Visions for Healthcare, Housing and Work 1: Residential Healthcare

## *Professional Interests*

The interaction between people and the built environment has always fascinated me. The number of ways we as inhabitants, users or simply passers-by can interact with the architecture itself and each other within its confines are seemingly endless. No matter how much we design or plan the human being will constantly come up with new ways to interact, and it never ceases to amaze me. All we can do as architects is simply to provide the spaces and possibilities for life to happen on its own terms.

I also have a general interest in computers, digitalization and virtual spaces and all the prospects it brings to the world of architecture.

## *Thesis Question*

Can a system, a set of rules and parameters, be used to describe a context, find target sites and generate program in a peripheral community context?

## *Thesis Contribution*

This thesis aims to design a system or work method that describes how to describe a context, find target sites and generate program and design. The end result is aimed to provide general solutions to the problems that smaller peripheral communities are facing as well as specific solutions targeted to the chosen context.

## *Thesis Delimitation*

The system itself is designed to be general and applicable to any context with few modifications. In this thesis however it is only applied to a specific context, which leads to an outcome specific to, and restricted by the limits of the chosen site.

The thesis will focus on the development of the system itself and will focus less on the end result.

## *Point of Departure*

For this thesis I have chosen to work with the village of Tollered. It is an old industrial community in the outskirts of the larger Gothenburg area. It is one of many smaller communities that has suffered under the effects of the ongoing urbanization

This thesis aims to solve some of the problems that many peripheral communities face. Many suburban and rural areas suffer from a lack of activities and risk becoming small residential islands with little to no activity on the streets when most natural venues for social interaction are relocated to larger cities. The main way the thesis and the development of a system will try to combat this is by creating new opportunities for social interaction that are not necessarily tied to a specific service or function.

It will also aim to provide solutions that are specific to Tollered. Finding sites that are important to the community and generating a design that is adapted to the unique context. To be able to do this we must first learn what specific problems Tollered is facing as a community. We also need an initial input of information, something to base the design generating system on, to get started. Both the information regarding to the site specific problems and the basic input we need for the system to work can be gathered by doing a site analysis.

# Vocabulary

<b>Deconstruct</b>	-	The division of the information in map into separate layers
<b>Derivation</b>	-	Information generated from extrapolating existing data
<b>Point</b>	-	The deconstructed representation of a static occurrence on a map
<b>Line</b>	-	The deconstructed representation of a direction or movement on a map
<b>Field</b>	-	The deconstructed representation of a larger coherent area on a map
<b>Map</b>	-	A visual representation of spatial context
<b>Layer</b>	-	The deconstruction of a map. Containing only a subset of the information of said map. The combination/imposion of several layers is referred to as a map
<b>Interaction</b>	-	A specific relationship or intersection between several layers
<b>Insertion</b>	-	A suggested design tied to a specific point

*1.0*

# *ANALYSIS*



TOLLERED, 2018



## Tollered

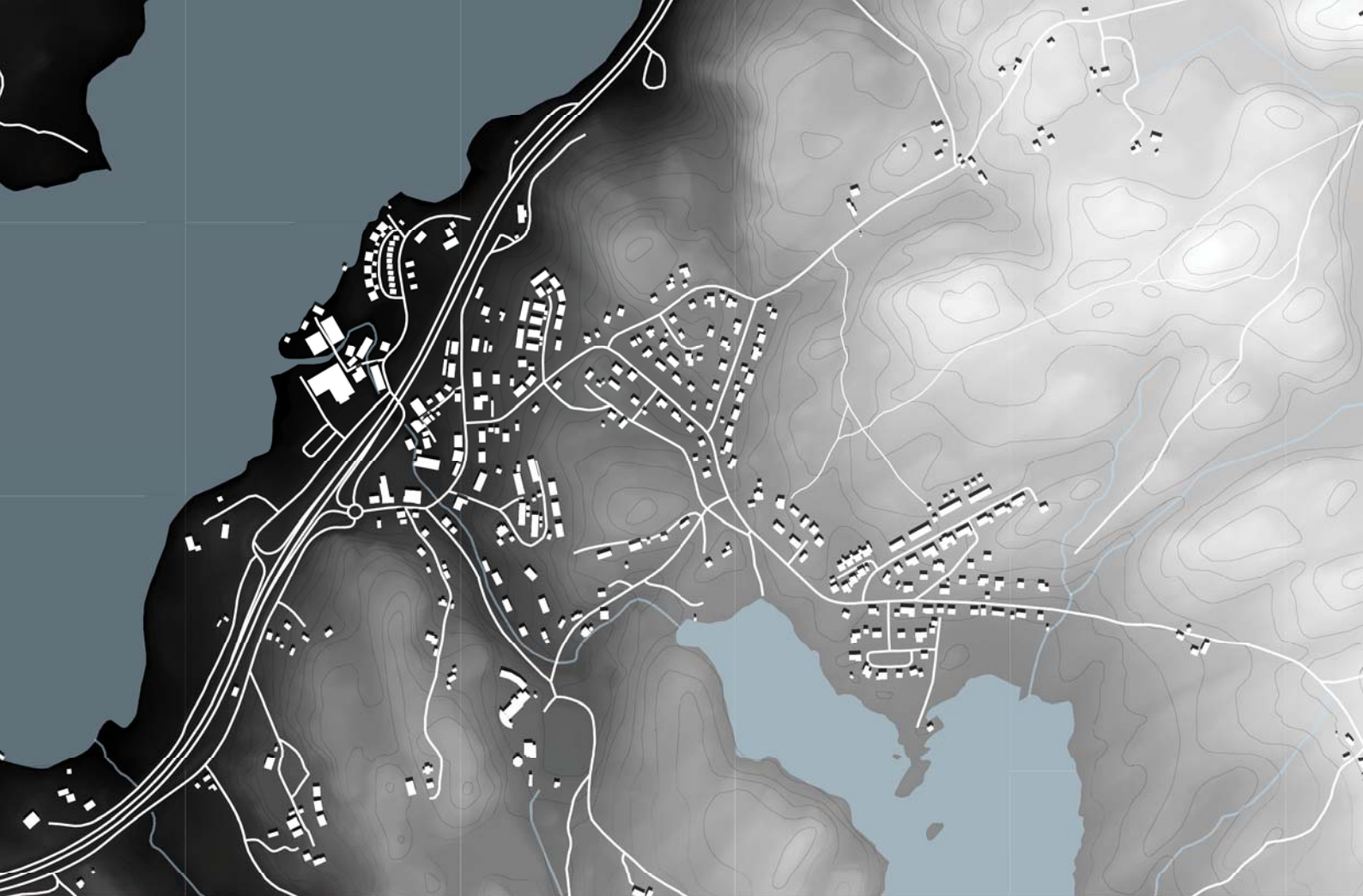
Tollered is a smaller community in the municipality of Lerum located in the north-eastern outskirts of the larger Gothenburg area. The village has just under 1000 inhabitants, some basic functions in the form of a small convenience store, a hairdresser, a primary school and a small library. It also has a multitude of different small organizations that the inhabitants can engage in. These include sports organizations, the scouts, the red cross, IOGT and others.

Tollered is an old, industrial community that formed around the spinning factories of Nääs Fabriker founded in 1833. The village of Tollered is located on an incline between the two lakes Sävelången (53m a.s.l.) and Torksabotten (112m a.s.l.). The incline and the stream between the lakes were used to generate electricity for the old factories.

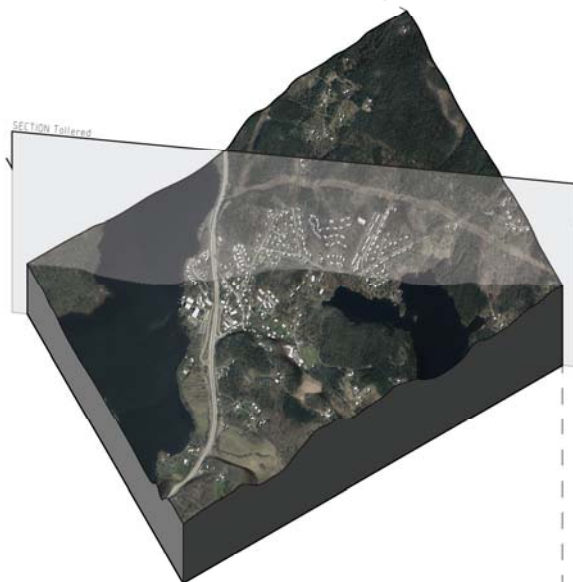
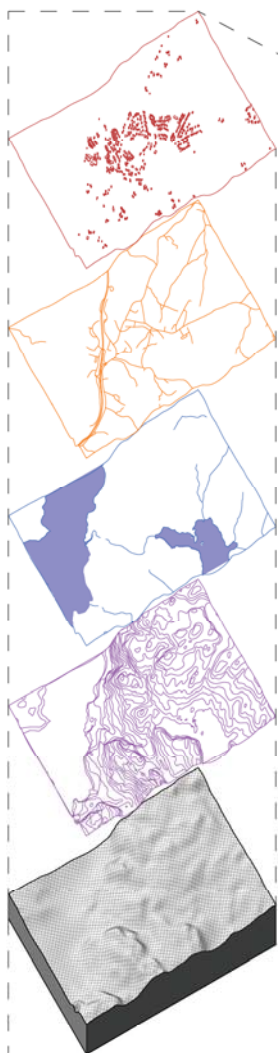
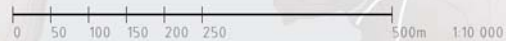


TOLLERED, SECTION





TOLLERED TOPOGRAPHY



# Tollered History

Prior to the construction of Nääs Fabriker in 1835 there was no community to speak of other than the small settlements that surrounded a couple of small farms and sawmills in the area around what now is the village of Tollered. It was the unique context of the height difference, the two lakes and the connecting stream and waterfall that led Peter Wilhelm Berg to take interest in the area. Berg, was at the time a prosperous wholesaler that just had bought a large part of the surrounding areas and moved to the nearby Nääs Slott. He found that on his newly bought land he had the natural prerequisites for some kind of industrial facility that would make better use of the stream than the farmers sawmills. Berg had previously made trips to England where the industrial revolution had just been set in motion and argued that he could create an industry that could produce yarn at a rate that was competitive with the yarn that was imported both in terms of efficiency and cost. So it came to be that the first of the factories of Nääs fabriker was constructed.

As the rural industry that Nääs Fabriker was it had to provide both housing and services for its workers. The settlement that gradually grew around Nääs Fabriker was constructed at the direction of the company. Every building, residential or otherwise, as much a part of the industry as the factory building itself. The industry prospered and the company expanded. Building new facilities and factories, and every time the industry of Nääs Fabriker grew, the village of Tollered also was expanded upon. Providing additional housing and services for the workers corresponding to the need of the industry. As such the village of Tollered gradually climbed the incline, spreading outwards from the stream and factory. The community of Tollered was unique in the sense that it was wholly centered around the industry of Nääs Fabriker. Everyone that lived in the village filled a specific role as part of the community, either as a factory worker or as service to the industry or workers. In return, the company provided services and recreation to everyone that was a part of it. From housing, education and stores to bath houses.



The old factory from 1835



Tollered, 1939



Aerial view over Tollered, 1953



Aerial view over Tollered, ca 1965.



TOLLERED, 1835

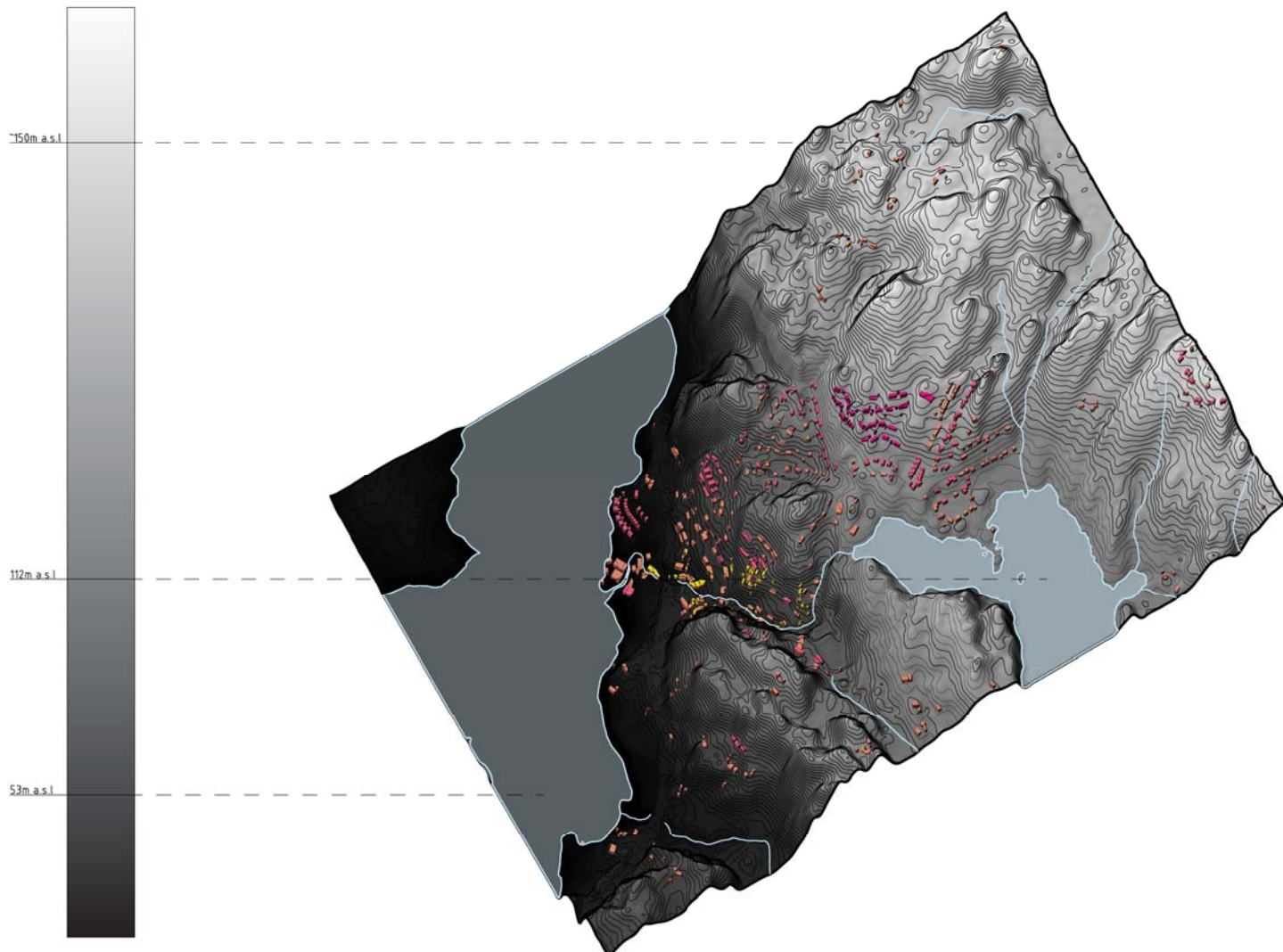
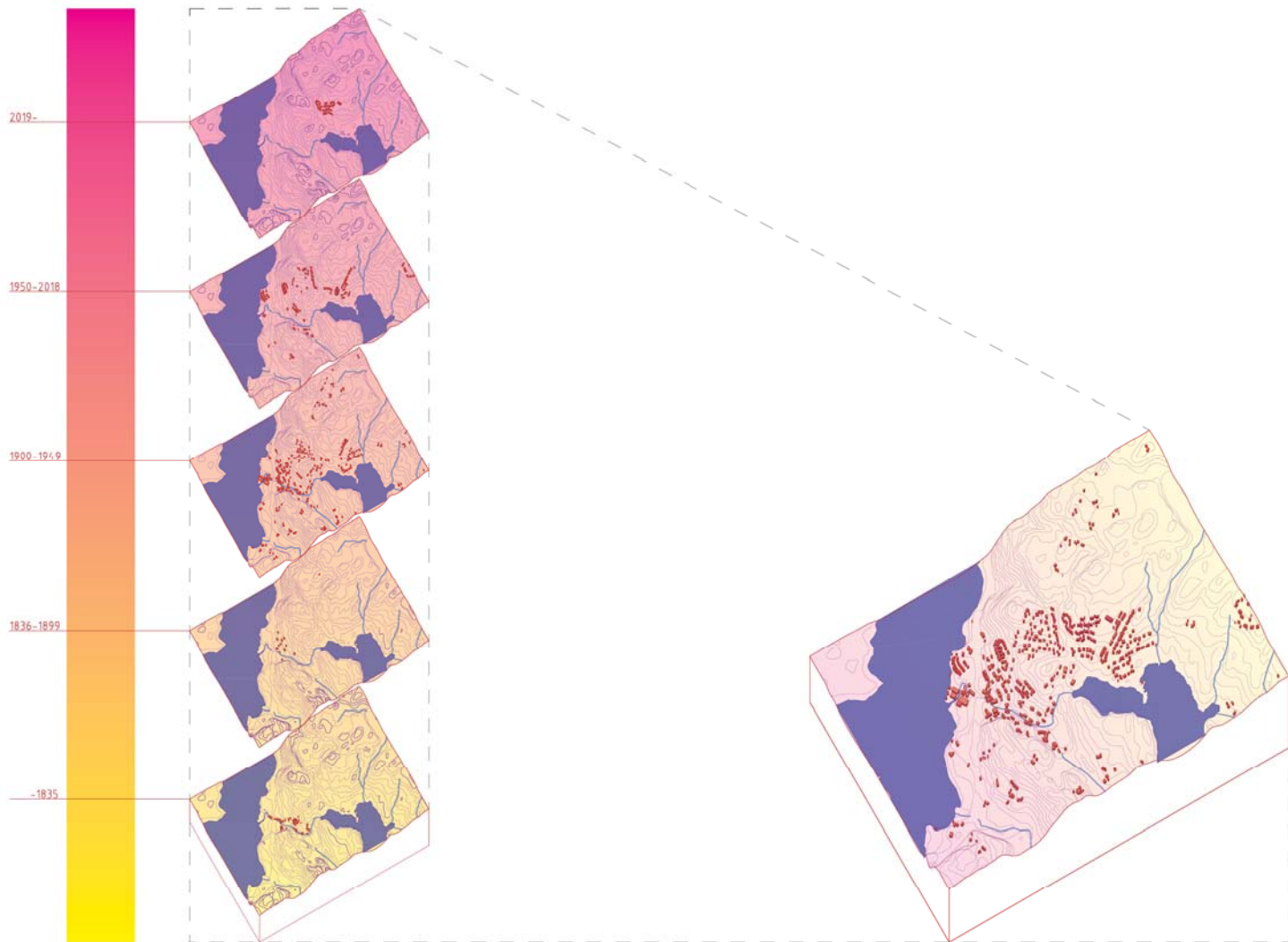
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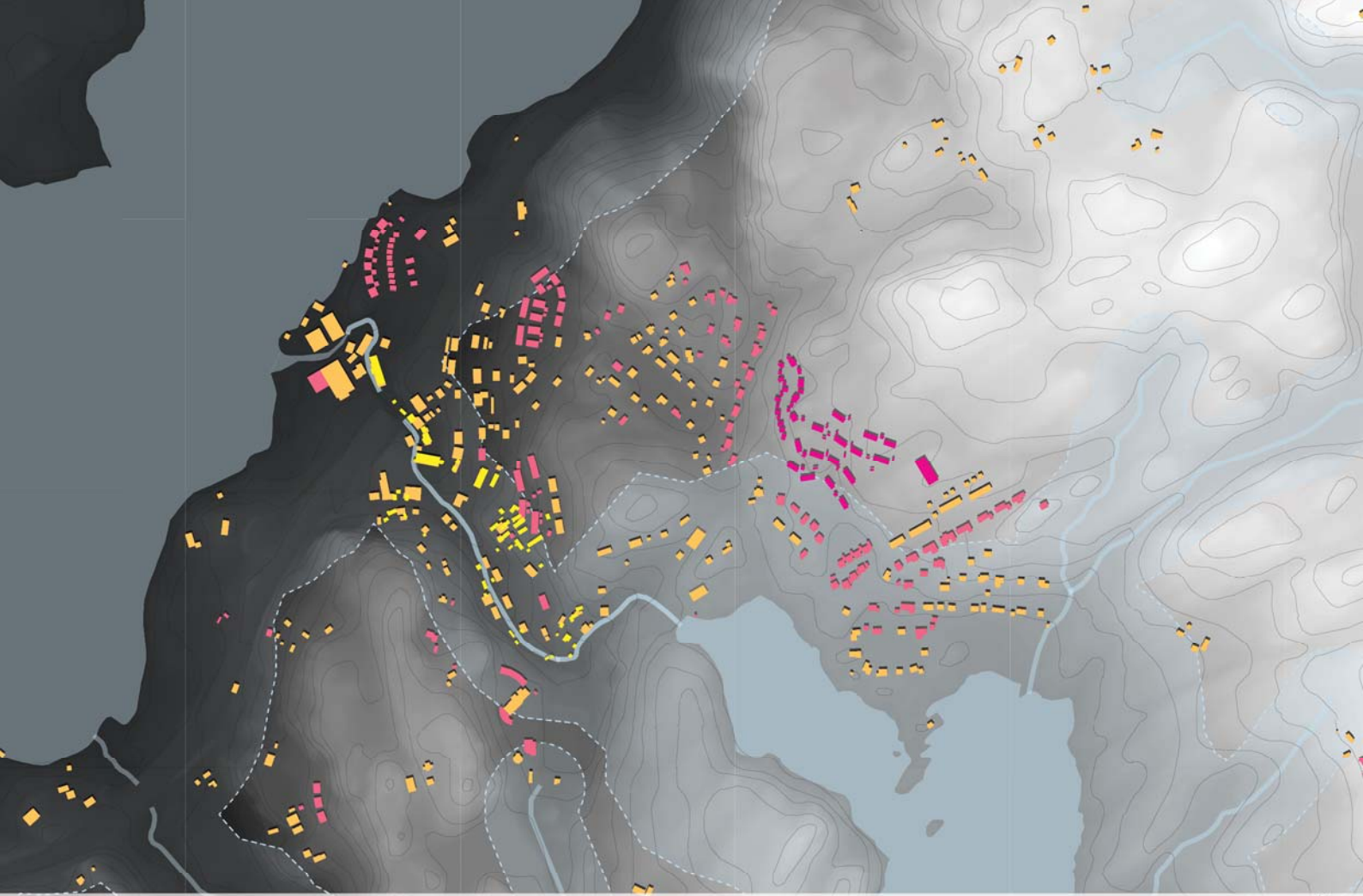


TOLLERED, 1950

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HEIGHT/HISTORY/WATER

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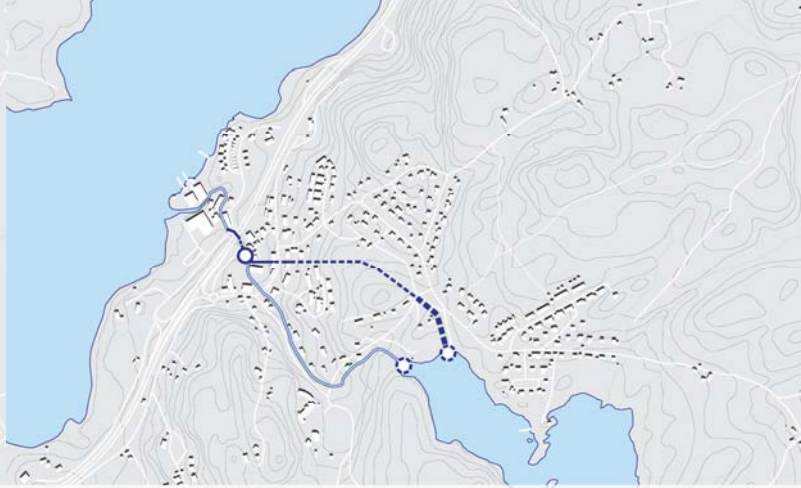


## *Expansion*

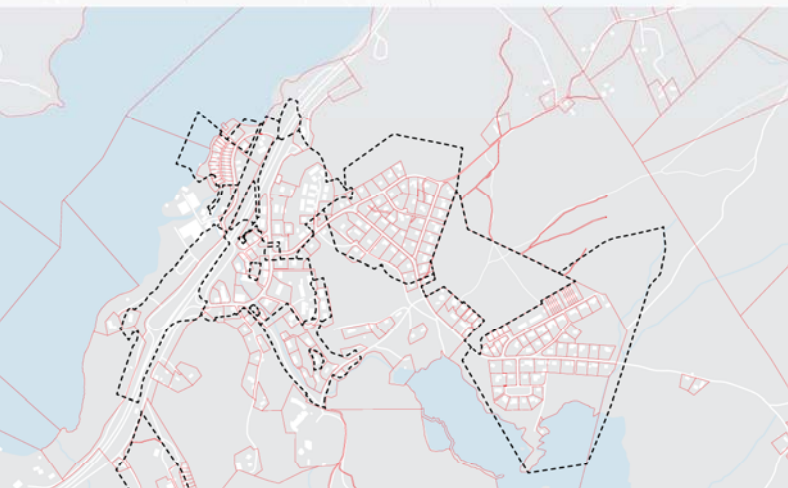
Looking at how and when Nääs Fabriker expanded its industry one can see a similar growth to Tollered. Every time a major industrial facility was built new residential areas were constructed to accommodate the growing work force. Since the industry was closely tied to the hydrostructure in the village one can follow along the time line and realize that the further time went on the higher up the incline the village climbed and further away from the water.



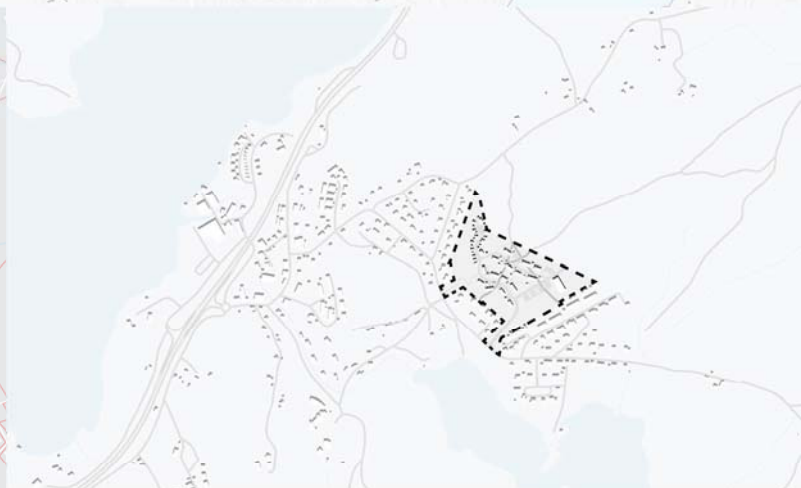
CIRCULATION INTENSITY



HYDROSTRUCTURE



AREAS & PROPERTIES



PLANNED EXPANSION



## Circulation

Tollereds is mainly accessed from the E20 highway. From the entrance of the village, the main road is split in two roads that circle around the village. From this main circulation, most of the residential areas are reached through branching roads or paths.

There is also a number of important pedestrian paths intersecting the village. Among them is a scenic path that follows the lake of Torskabotten, going past the dam and eventually ending down by the school area.

To provide the best possible accessibility and visibility the program should take the existing communications into consideration. This would mean that the suggested site should either be along the main circulation or in one of the more trafficked junction.

## Hydrostructure

The village of Tollereds main function was to supplement the spinning industry of Nääs Fabriker. Both as residents for the workers, but more importantly to supply electrical energy to the factory. Much of the old infrastructure can still be seen throughout the village. Mainly in the form of the old steel pipeline supplying water to the factory and the hydroplant in the lower areas of the village.

The pipeline was built in the beginning of the 20th century together with a canal that could provide it with water from the lake. As the pipeline was gradually removed the canal was also developed and was filled in 1981. Where the canal once originated there is now a small embankment where people keep small boats.

## Planned Expansion

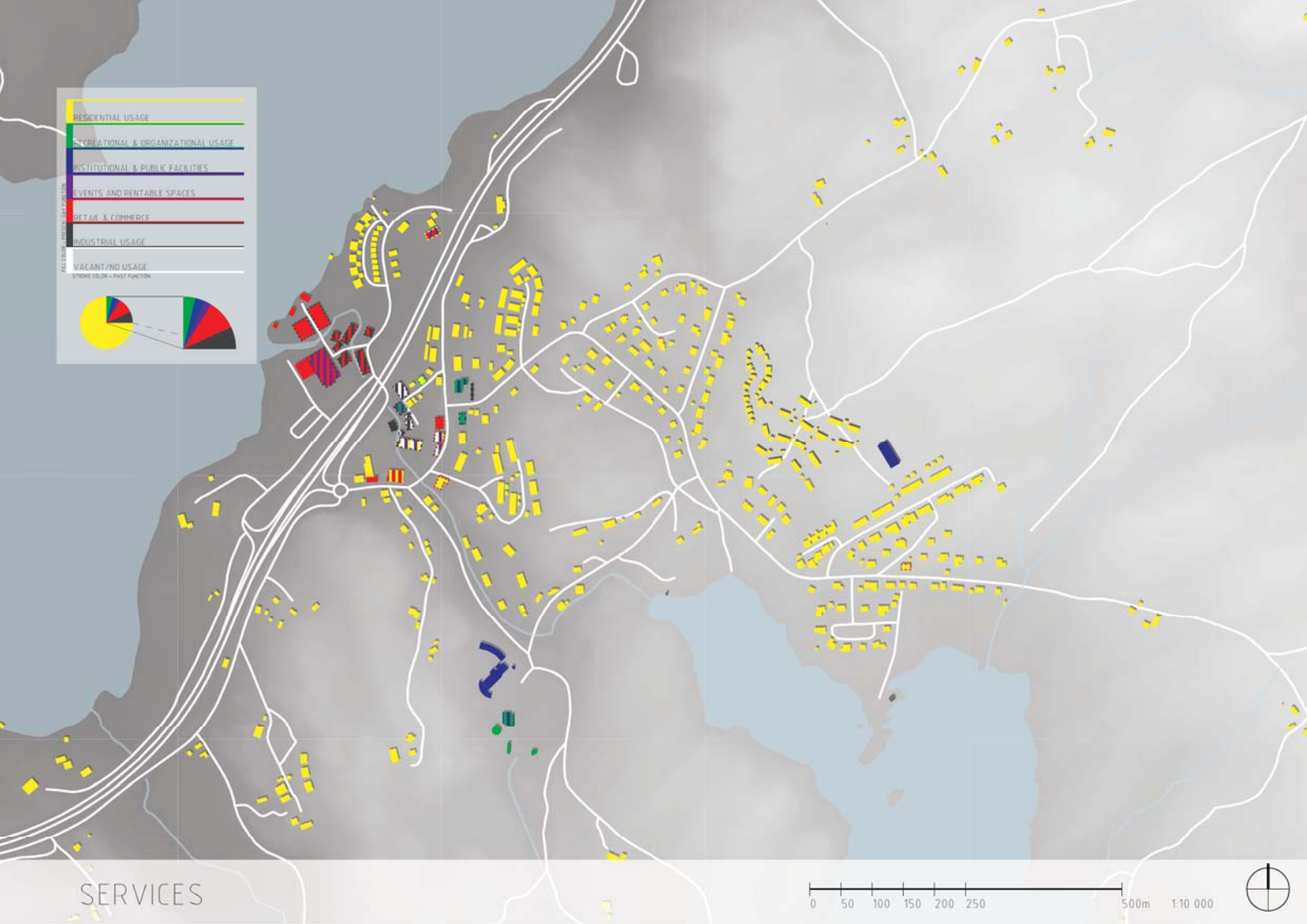
The municipality of Lerum currently has plans to exploit a previously uninhabited part of upper Tollereds. This will in time facilitate the construction of 85 residences and a new preschool. The residences themselves are proposed to be varied, with tenancies, condominiums, detached, and semi-detached villas. This is, according to the description of the plan, to attract a variety of different demographics to the neighborhood.

With an increase like this, which compared to the current size of Tollereds is quite extensive, the need for connectivity between the different parts of the village and its functions becomes even more important. An increase in inhabitants can lead to a revitalization of the village, but this is only if its functions and venues are readily accessible.

## Areas & Properties

Tollereds mainly consists of detached and semi-detached villas divided into several residential areas. The areas themselves have sprung up around one or several nearby, older buildings and have been added to over the years. Even though there are no clear borders more than distance and stretches of forest between the areas, the division can be quite clear. The areas are fairly alike and homogeneous, but are somewhat different in types of typology, plot site and connectivity.

To allow better connectivity and accessibility to the different areas and functions the program should be focused on the space between the residential areas. This falls well in line with the conclusions made in the case of communications.



## Services

As many suburban communities, Tollerød consist of mainly residential buildings. It has however a large number of buildings that facilitate services of different types relative to the small size of the village itself.

These services can be found in two main areas. The first and largest one is tied to the old industrial buildings. This is where most of the commerce and organizational related facilities can be found. The second area is located around the primary school and is focused more on education and physical activity.

Even though the village has a relatively large number of services and functions, most of them are located in somewhat secluded areas that are not really inviting to the inhabitants or visitors of Tollerød

In the map above the buildings that currently facilitates or that at some point has facilitated services are highlighted. Indicated By fill color and outline color respectively. Here one can get a sense of the services that has relocated from the community to larger cities as an effect of the urbanization.

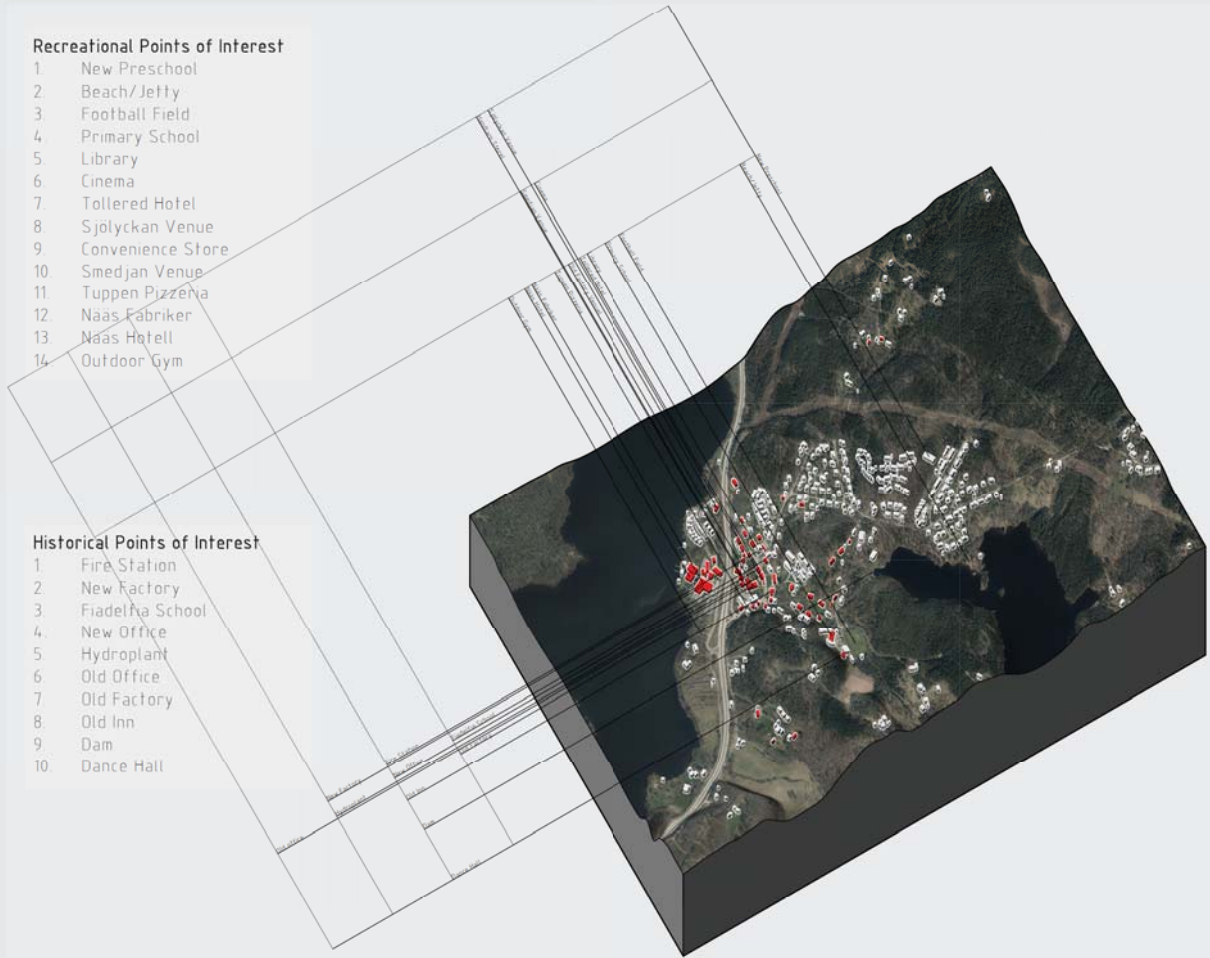
# Points of Interest

## Recreational Points of Interest

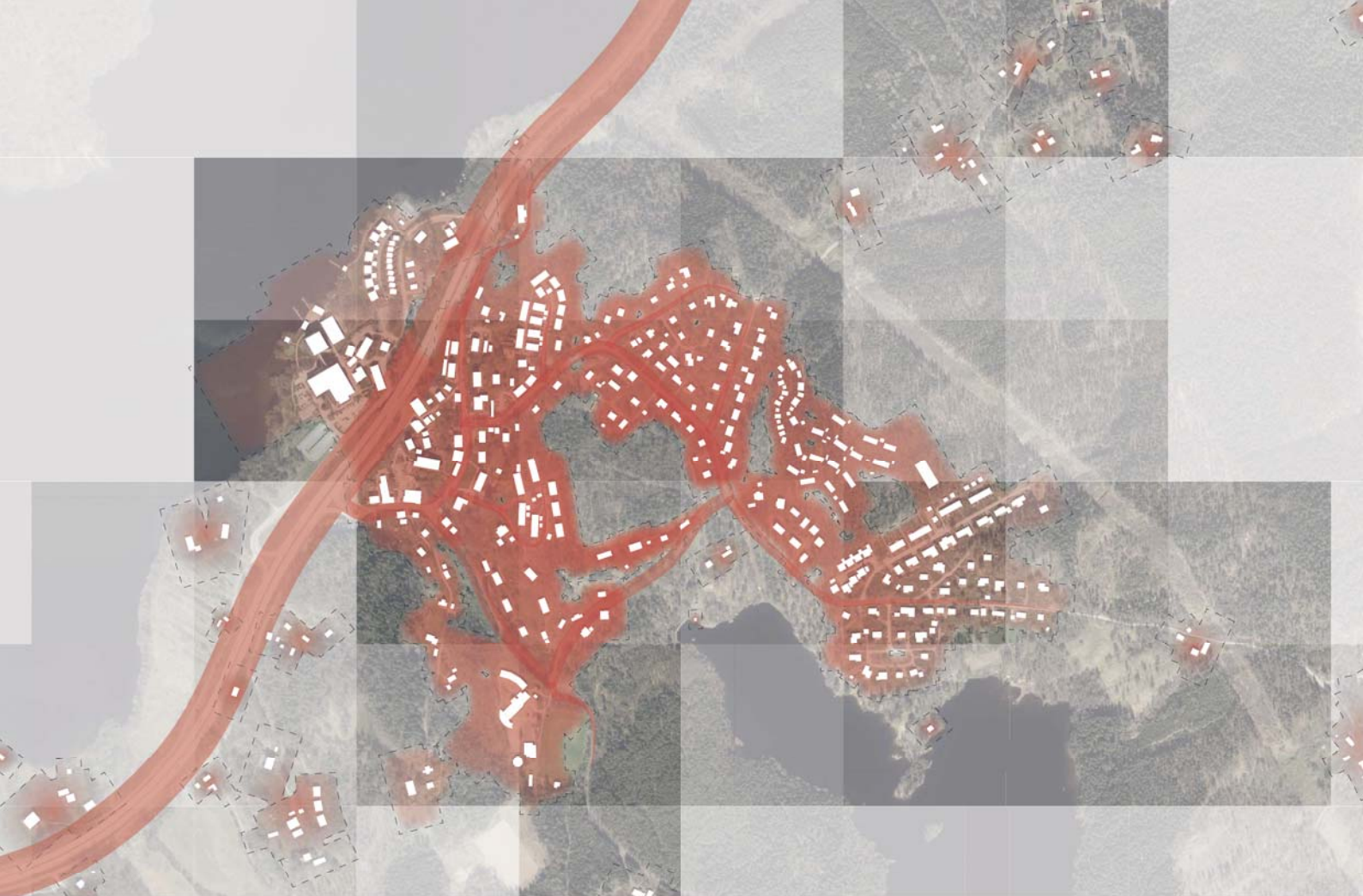
1. New Preschool
2. Beach/Jetty
3. Football Field
4. Primary School
5. Library
6. Cinema
7. Tollered Hotel
8. Sjölyckan Venue
9. Convenience Store
10. Smedjan Venue
11. Tuppen Pizzeria
12. Naas Fabriker
13. Naas Hotell
14. Outdoor Gym

## Historical Points of Interest

1. Fire Station
2. New Factory
3. Fiadelfa School
4. New Office
5. Hydroplant
6. Old Office
7. Old Factory
8. Old Inn
9. Dam
10. Dance Hall







BUILDING INTENSITY

0 50 100 150 200 250 500m 1:10 000



RECREATIONAL INTENSITY

0 50 100 150 200 250 500m 1:10 000



**STRANDEN VID NÅÅS FABRIKER:**  
Fika  
Skidor  
Skridskor  
Kanot  
Bad  
Fiska

**STRANDEN SÖDER OM NÅÅS FABRIKER:**  
Kanot  
Bada  
Fiska  
Grilla  
Fika  
Lugn och ro  
Fågelsång  
Titta på naturen  
Utsikt  
Vacker plats

**MELLAN ÅBACKEN OCH FURÅSEN:**  
Grön oas  
Vacker plats  
Odling  
Brasa  
Fika  
Mötesplats  
Utsikt

**MELLAN TOLLERED STRÖM OCH LÅNGSLIA:**  
Kulturhistorisk miljö  
Vacker plats  
Lek  
Mötesplats  
Grilla  
Fika  
Promenad

**DÄMMET:**  
Grön oas  
Bad  
Vacker plats  
Mötesplats  
Lek  
Promenad  
Rasta handen  
Grilla  
Fika  
Lugn och ro  
Fågelsång  
Titta på naturen  
Utsikt  
Vacker plats

**CENTRALA SKOGSOMRÅDET:**  
Grön oas  
Lek  
Fågelsång  
Titta på naturen  
Lugn och ro  
Promenad  
Rasta handen

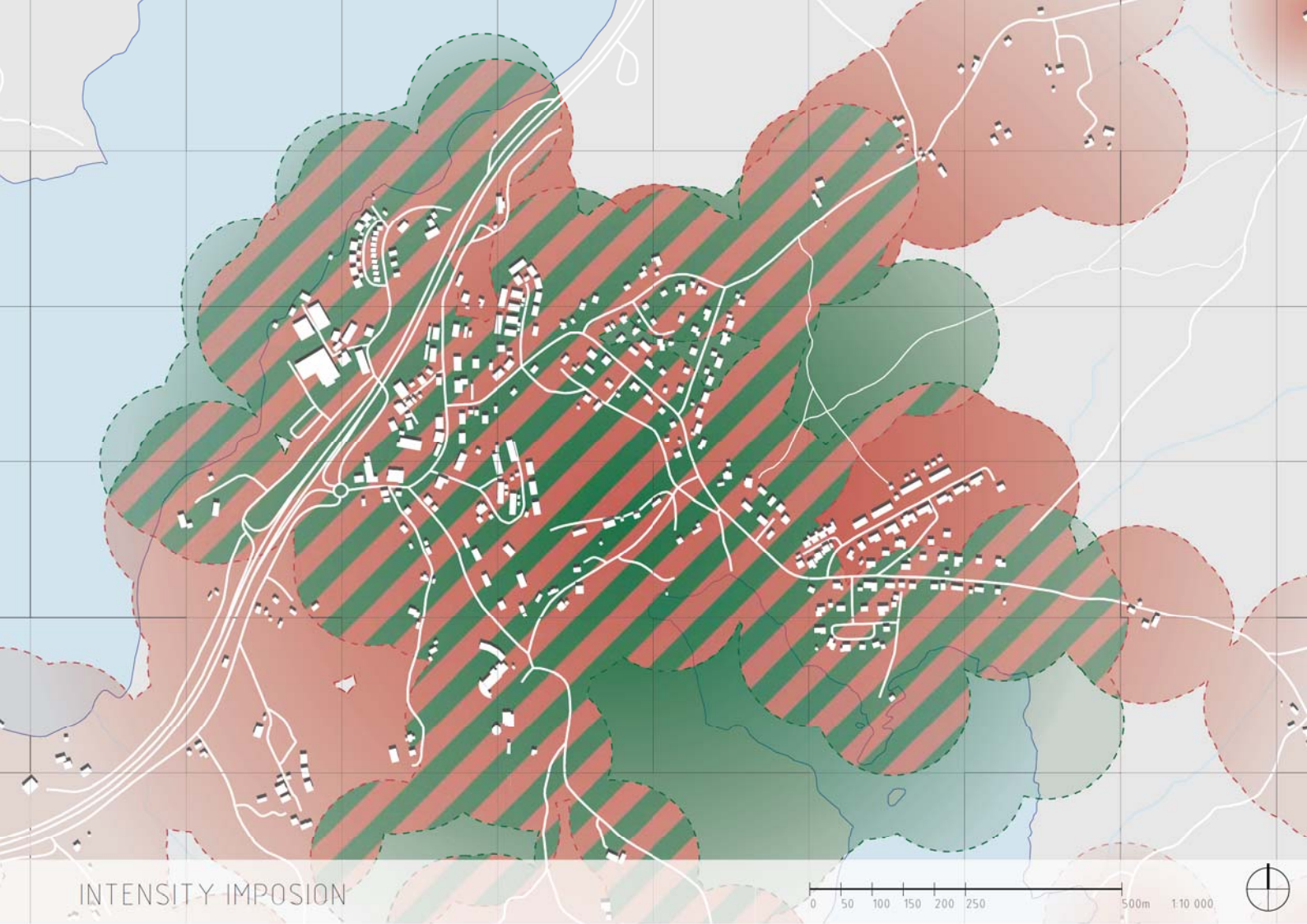
**SMPÅS:**  
Skidor  
Promenad  
Rasta handen  
Lugn och ro  
Vacker plats

**KAJEN:**  
Grön oas  
Kanot  
Utsikt  
Lugn och ro  
Rasta handen  
Titta på naturen

**BADPLATSEN:**  
Bad  
Grön oas  
Fika  
Mötesplats  
Lek  
Lugn och ro  
Promenad

**SCOUTERNAS VINDSKYDD:**  
Utsikt  
Lugn och ro  
Grilla  
Fika  
Vacker plats

**UDDEN VID BADPLATSEN:**  
Bad  
Lugn och ro  
Utsikt  
Vacker plats  
Mötesplats  
Grilla  
Fika  
Fågelsång  
Grilla



INTENSITY IMPOSITION

## *Built Environment*

The map above highlight the intensity of the built environment based on number of household/inhabitants and size of the functions associated with the building. Each building is given an individual value based on usage/size. It can be used as a map of assumed energy consumption in the village since a larger household/functions displays a higher level of intensity.

The main goal is to increase connectivity between high-intensity areas as well as highlight them. One could also chose to focus on the areas with high intensity to provide better visibility or to focus on low-intensity area to create a more homogeneous environment.

## *Intensity Imposition*

If we assume that every building, point of interest and recreational incentive has a direct effect on its surrounding area. We are left with large fields overlapping each other in the village's geographical center.

There are two ways of reasoning when it comes to what to take from this map. One can take it that it means that the program should be located in either of the field and serve as a complement to its surrounding area.

One could also assert that the program should be located in the area where the two fields overlap. The argument being that in a higher intensity area the program would be easier to access.

## *Recreation*

This map highlights the intensity of recreational qualities. Each separate point is given an individual value based on the activity it refers to. For instance a point highlighting a nice view has less intensity than a soccer field. The map shows that most of the recreational qualities are centered around the two lakes. Red buildings have a high cultural value and the stars indicate some of the inhabitants favorite locations.





SUGGESTED SITES

## Conclusion

As with many suburban and peripheral communities, one of Tollered's main problems is one of connectivity. As a smaller community the village functions mainly as a residential "island" that the inhabitants commute from for both work and leisure activities. The village as a whole suffers from a lack of street activity due to both the lack of venues for social interaction and a lack of adequate connections to the ones that exist.

Within the village the smaller residential areas feel disconnected both from each other and the venues in which social interaction can occur. Due to this one can conclude that a possible solution would be to strengthen the connections between the different elements that makes up the village as well as provide new venues at strategic points to further promote both inhabitants and visitors of Tollered to spend their time populating the village itself.

2.0

# *DESIGN SYSTEM*

# Design System



The notion to deconstruct the village of Tollerred to its most simple form. Paths, roads and direction become lines. Junctions, buildings and qualities become points. Larger coherent areas become fields.

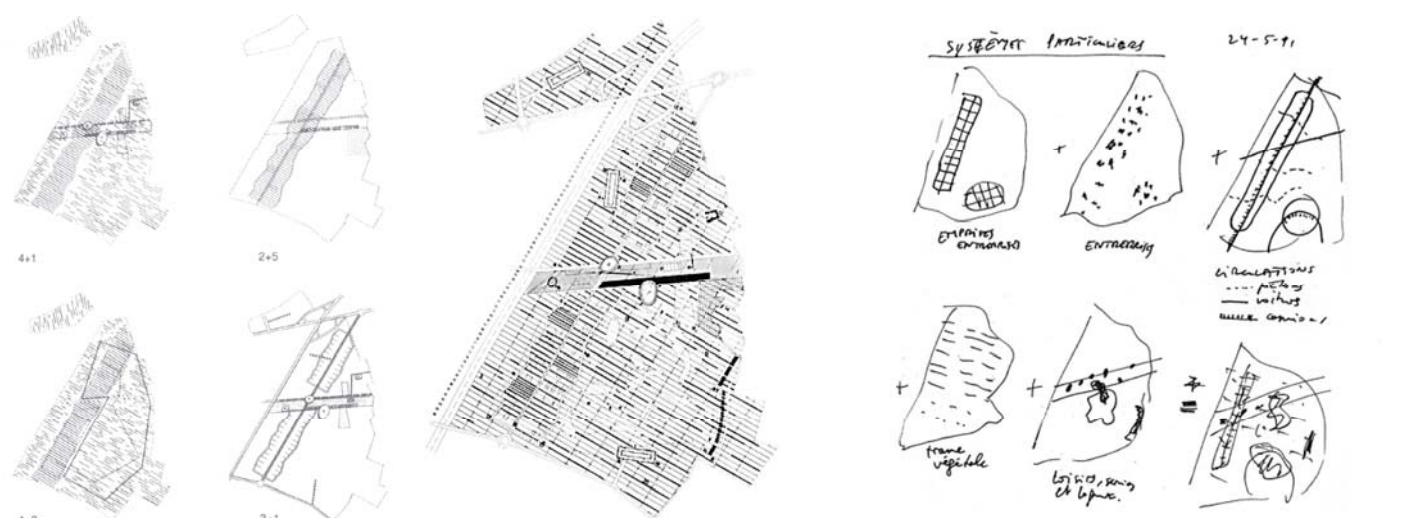
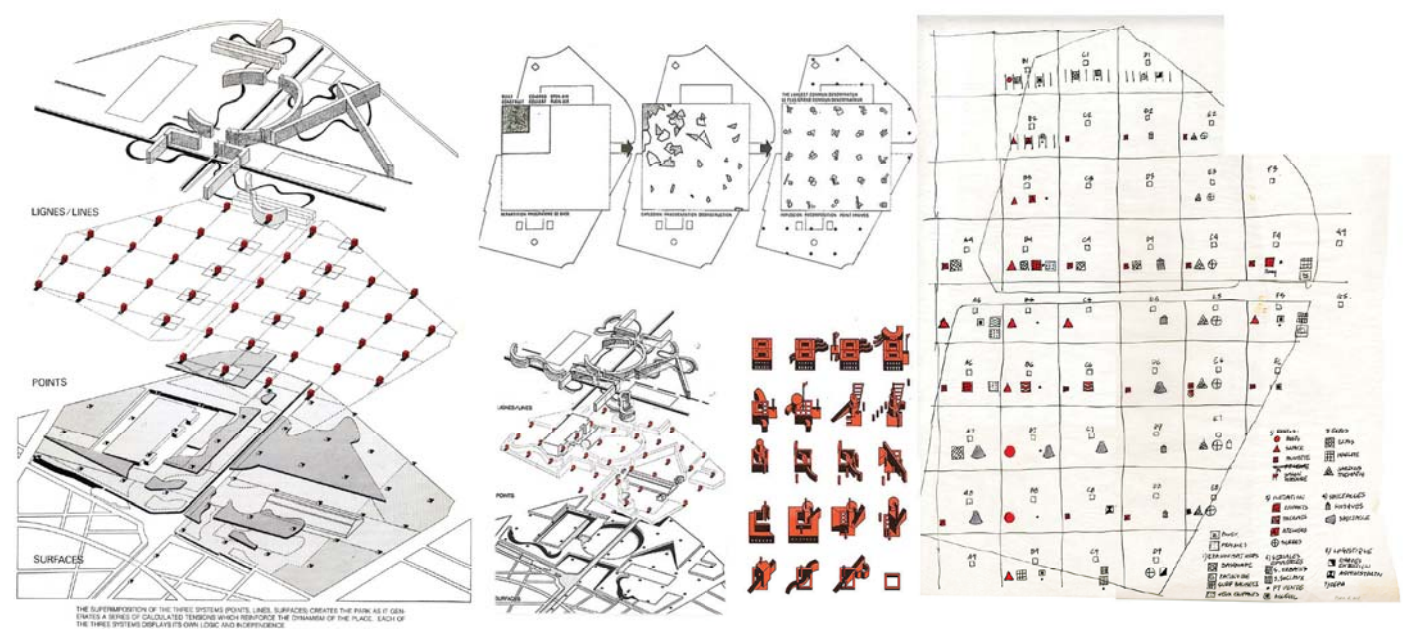
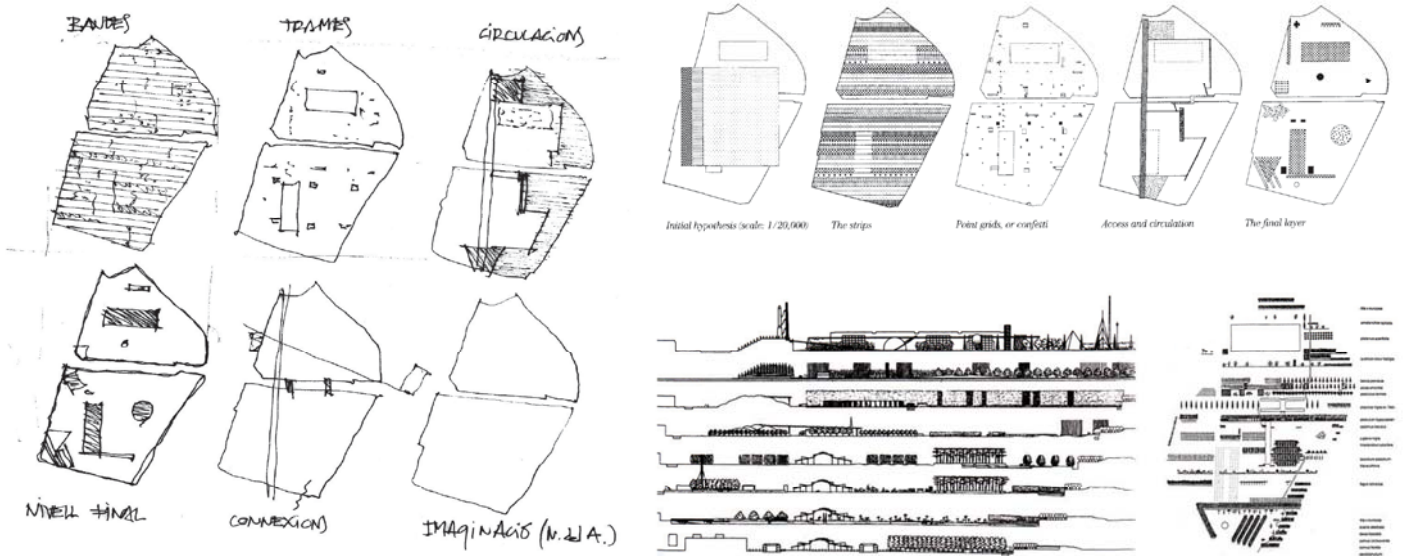
When everything is broken down, new information that takes other shapes can emerge. For instance, a cluster of points extracted from buildings can generate a line if they are aligned in a specific way. This newly generated line could have a previously unnoticed orientation independent from the lines generated from existing roads and facades, and thus new information is gained. If done enough times and on a large enough scale the result will be an overlapping grid of new layers that have its own sense of direction, its own points of interest, unique events and connections. This could then be used to create a new map over Tollerred separate and new, yet by its definition integrated in the village's most simple and essential elements.

Every new layer created could represent a separate system by itself. For instance, directional lines derived from the two lakes could be used as a schematic for where new paths should be. This would be the most basic

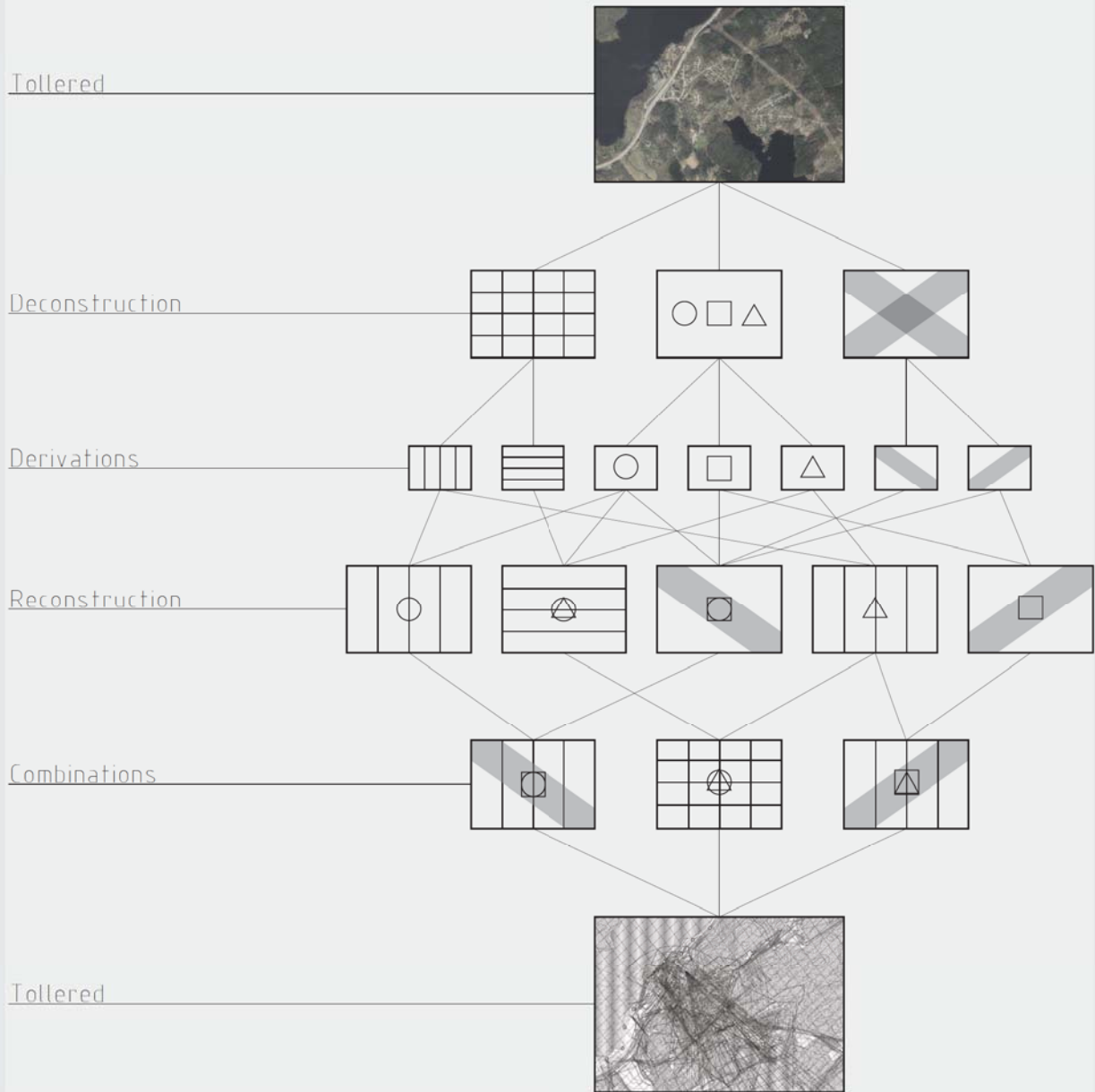
way of using this system in a design. The next step is to combine newly generated layers with the existing ones. This could mean that you instead combine the directional lines from the lakes with preexisting paths, and where these two layers intersect, you get a new junction or point where you according to this system should place an event or design. In this case the design intervention could be something as simple as a bench, something that according to the previous analysis is something that the inhabitants of Tollerred feel is needed along the lake. In the same way that new layers can be combined with preexisting ones new layers can also intersect each other, and this is where you get the most interesting results. The more systems that overlap at a specific location would when using this system signify the call for a larger design intervention or combination of multiple smaller ones.

The notion of systemizing the design this way partly inspired by several of the contributions for the design competition of Parc de la Vilette in 1992. The designs from OMA and Bernard Tschumi both show some form of functional layering. Bernard Tschumi has also design similar projects such as Chartres Business park which shows a similar way of thinking.

# References

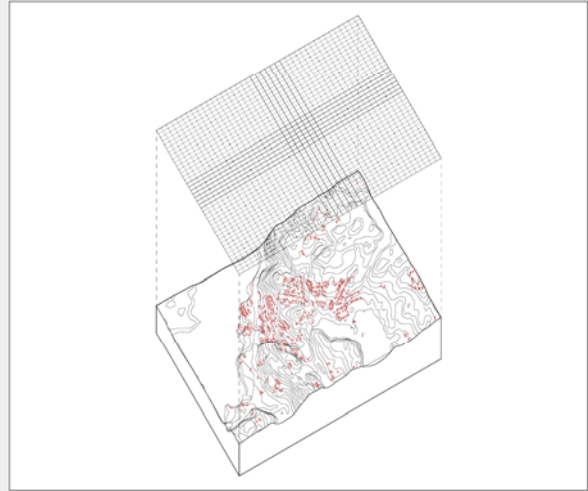


# Workflow



## System Presets - Layers

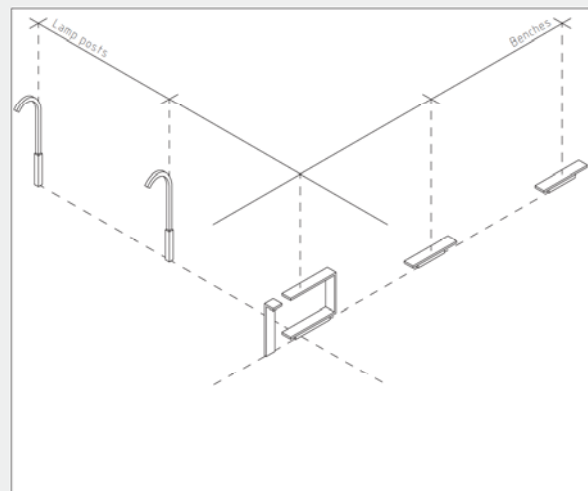
The idea is to overlay the entirety of Tollerred with overlapping layers. The layers can vary in size. From just affecting a small part of a specific path to layers that span kilometers encompassing the village as a whole.



## System Presets - Intersections & Overlap

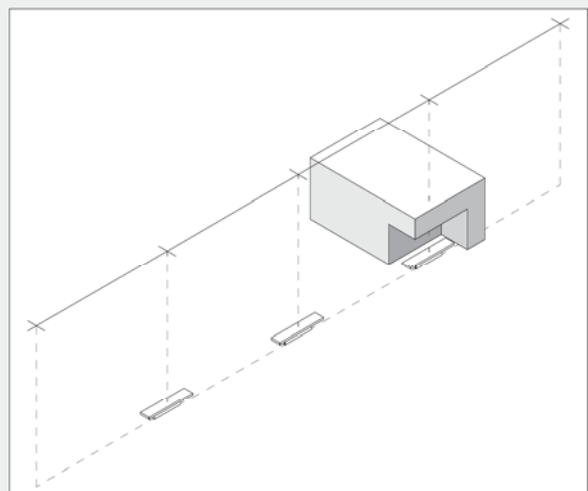
When several layers of different types intersect interesting things occur. From an analytical standpoint it would imply that this particular location is in some way significant. This then probably means that said location should have an insert that reflects that. So instead of the insert at the location simply being bench + bench the sum becomes greater than its parts. Keeping to the bench example this could mean that instead of two benches places next to each other, the insert could be something more akin to a lounge, with multiple seating solutions and room for a fireplace etc.

The more intersections and overlap of layers in a location equals larger and more elaborate inserts.



## System Presets - Overruling Context

The new layers and the insertions they represent are meant to exist separately from preexisting context. This means that, when designing this way one could end up with interactions that seem unwanted (Inserts intersecting with buildings, or paths crossing water etc.), but consistency is important to understand the system as a whole. This means that the new layer must be allowed to overlap what already exists and new solutions must be found. Maybe it is possible to cut out parts of existing buildings to make room for a bench, or it could be painted onto the facade. Maybe floating buoys replace inserts that otherwise should be placed in water.





## *Deconstruction*

The simplest representation of a static occurrence, regardless of its size, orientation or direction is the point. Direction or movement becomes lines and larger coherent areas becomes fields. By doing this one can examine the information separately and come to new conclusions.

The original map of Tollerod is deconstructed into eight separate base layers and two special layers, each only containing information on a specific part of what makes up Tollerod.

The base layers are comparable to the maps that architects commonly use to describe a context. With layers such as buildings, services, recreation and circulation. Only instead of using the maps to describe as much as possible they are stripped bare of any excess information.

Containing information on one single aspect of the village.

The first of the special layers is the height line layer. Even though the layer consists of simple lines, the lines of this layer functions vertically rather than horizontally and does not interact with the other layers in the same way. This layer is important however when describing a spatial context, and will come to use in later stages of the system.

The second special layer is the sites and paths of interest from the analysis. This layer mainly exists as a reference for the later phases, where we can compare if the result provided by the system corresponds with what we evaluated as important. It is not considered a base layer in later calculations to not influence the result in a certain direction.



## *Derivation*

Whereas the deconstructed base maps provides information that describes Tollerated as we see it, the derivation maps draws new conclusions from the limited information represented in the base maps.

Two points can be read as endpoints of a line. A line that might not be represented in real life but carries information nonetheless. The newly drawn line can be interpreted, just like in a deconstructed map, as the most simple description of a movement or direction.

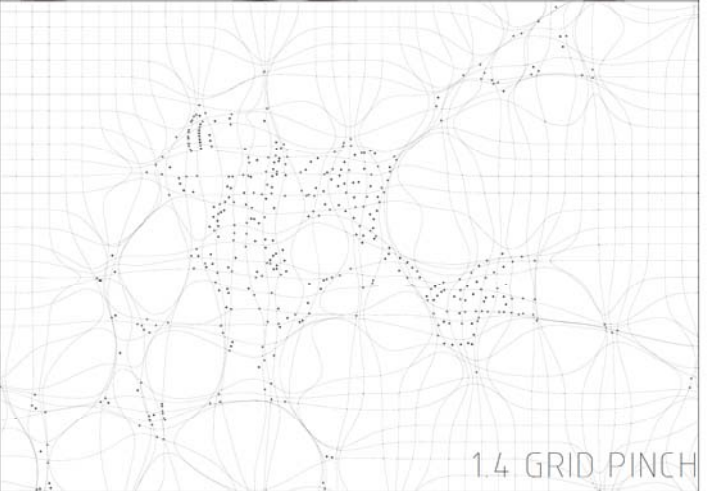
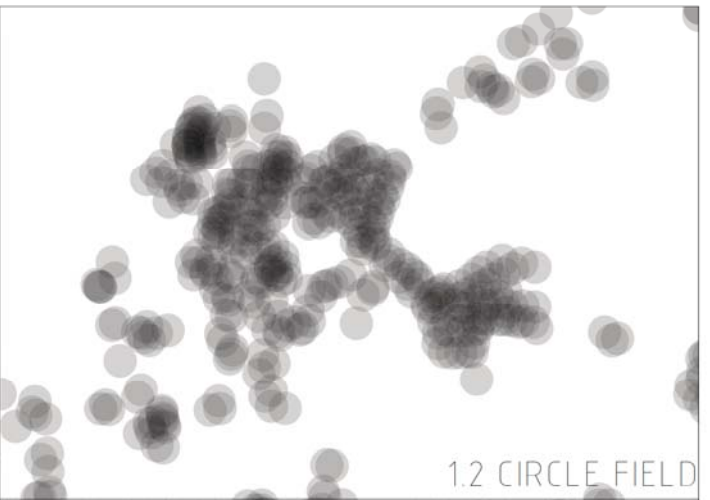
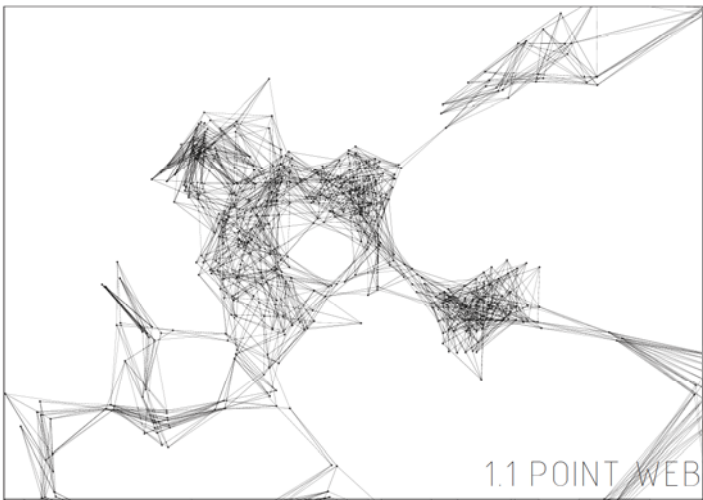
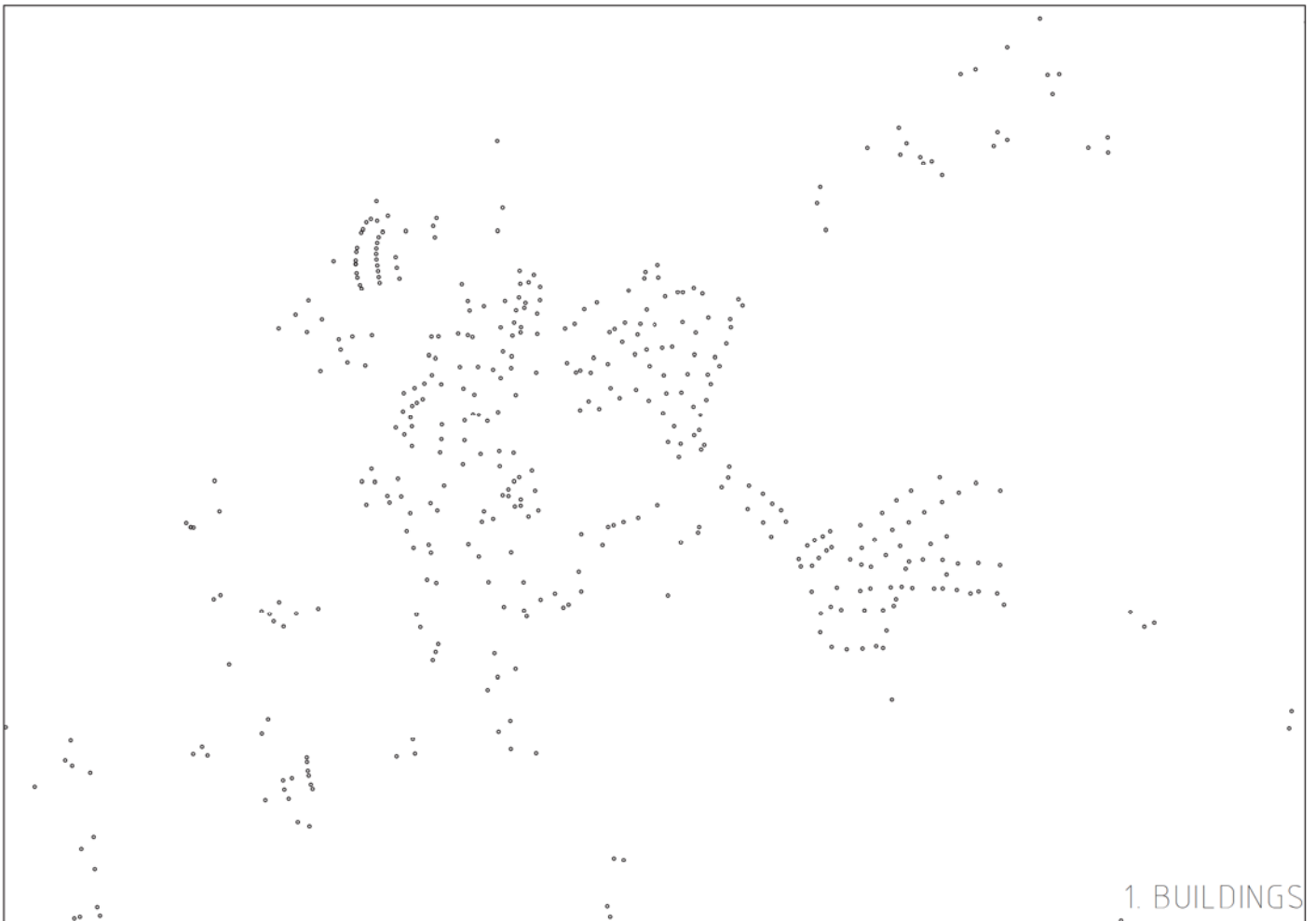
For every given base layer map there are a subset of corresponding derivation maps. Some are general and can be applied to all maps with the same map typing, and some are exclusive to the information provided by a specific map.

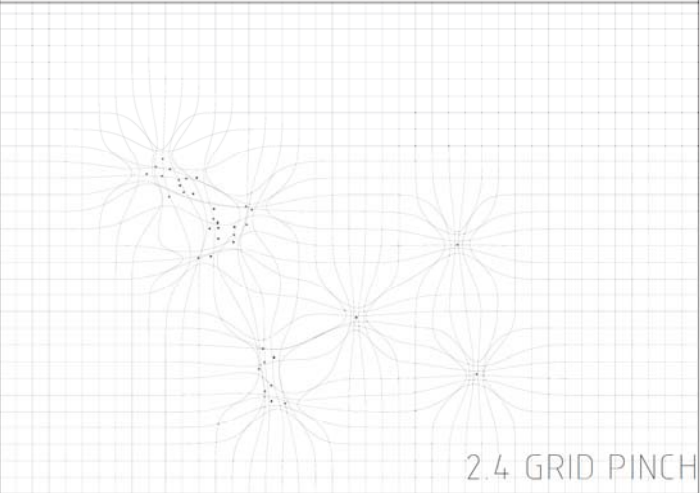
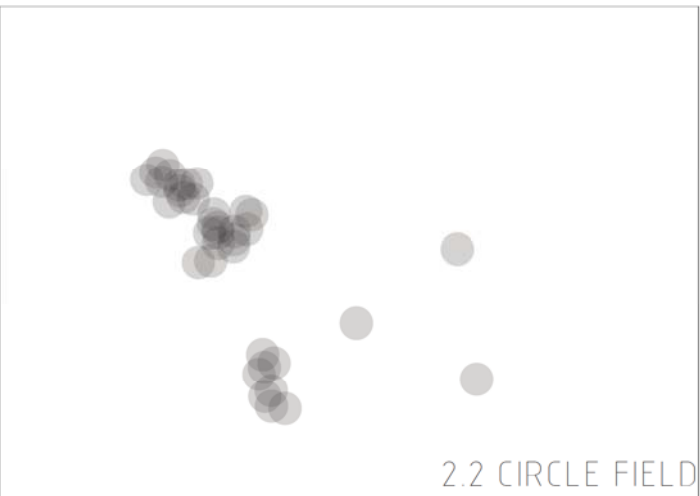
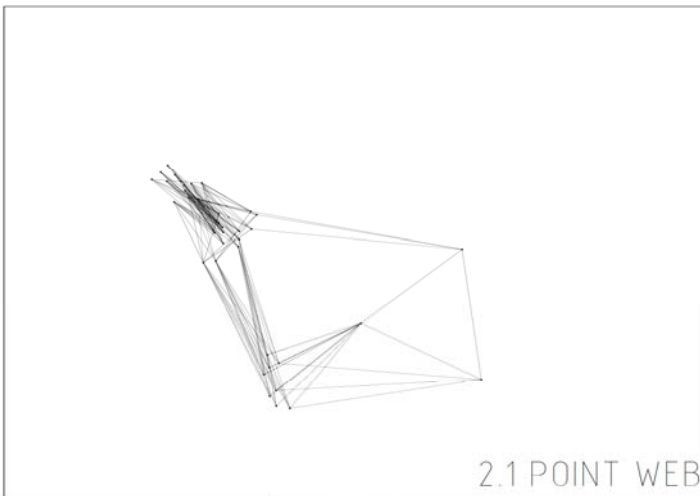
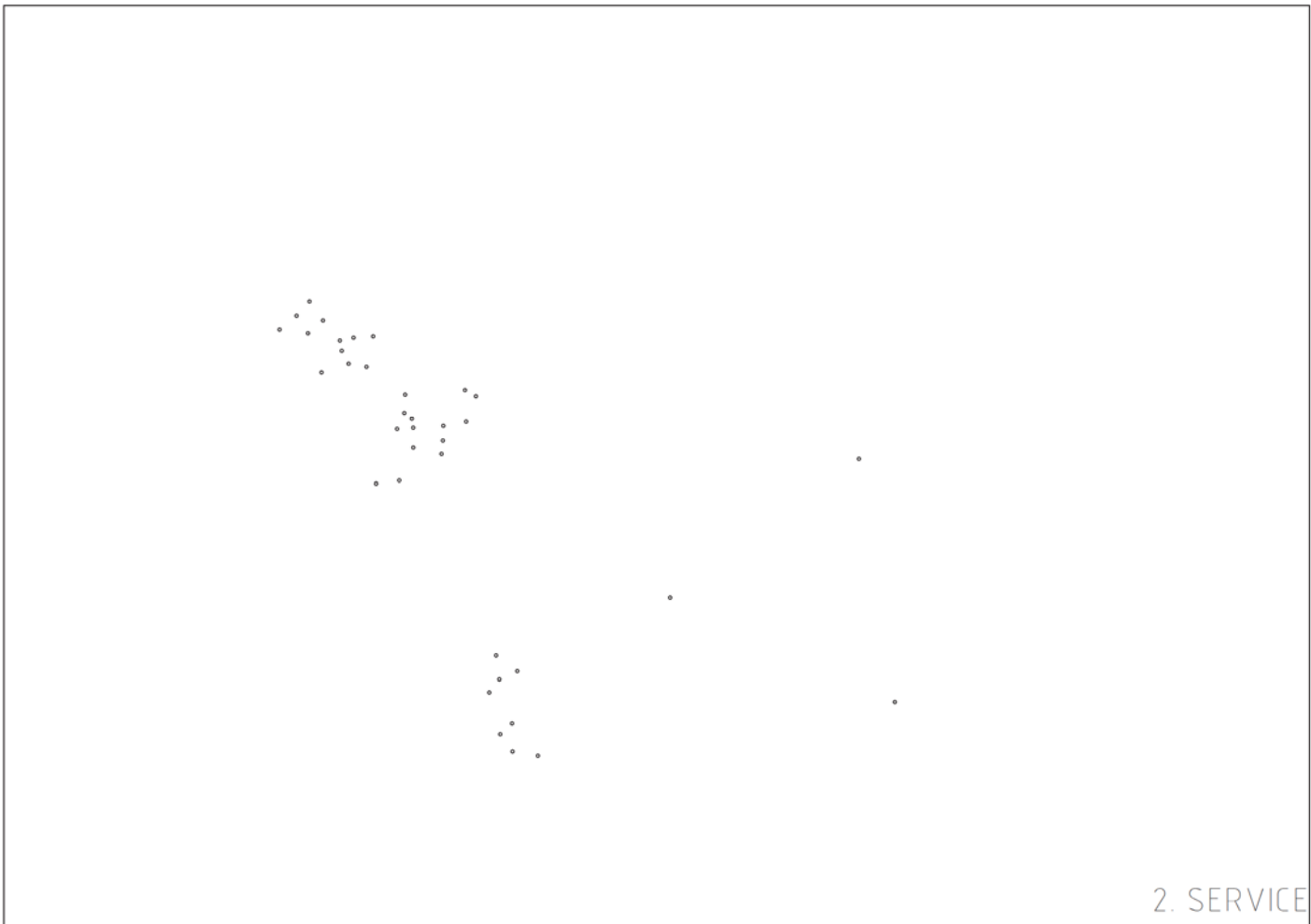
The point web derivations generated from point based maps represents the shortest routes between two static occurrences within a set distance. These newly generated lines can be read as direction or movement.

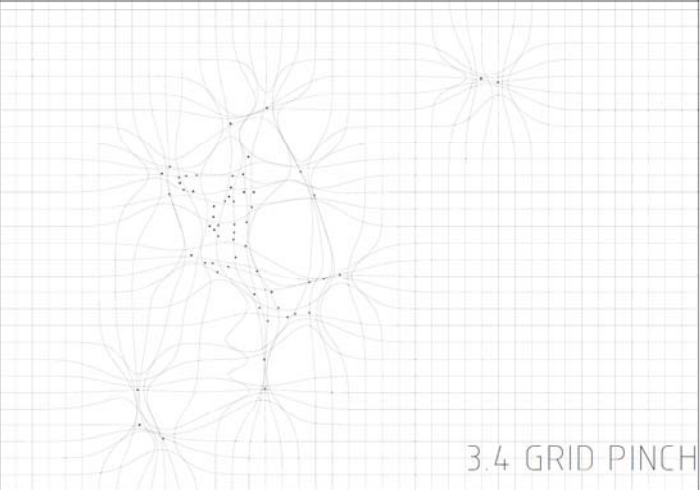
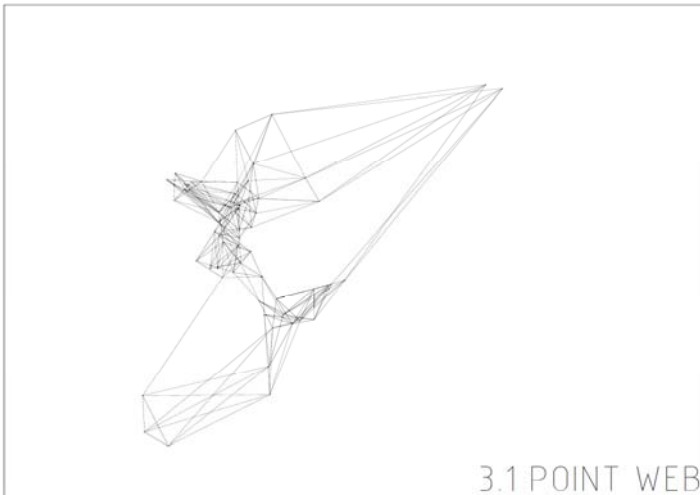
The circle field derivations are generated from point based maps, where every point is given a circular field with the point as its centroid. The dimensions on said field is based on a distance that is commonly accepted as a normal walking distance.

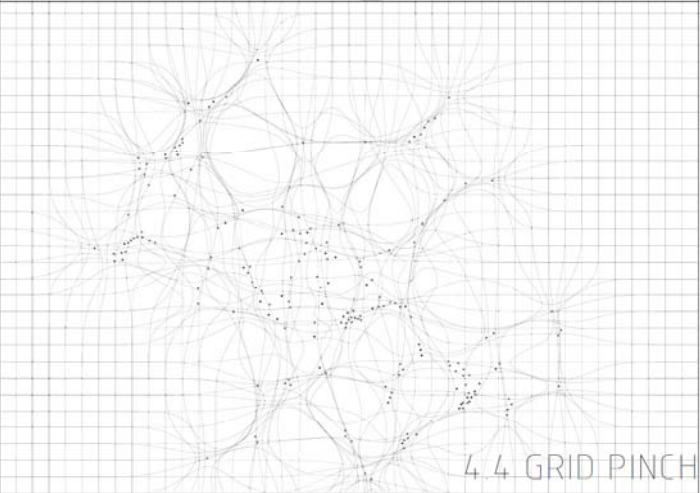
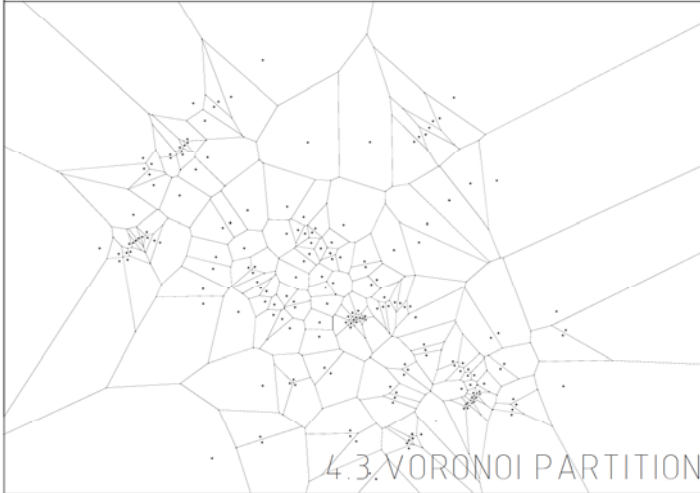
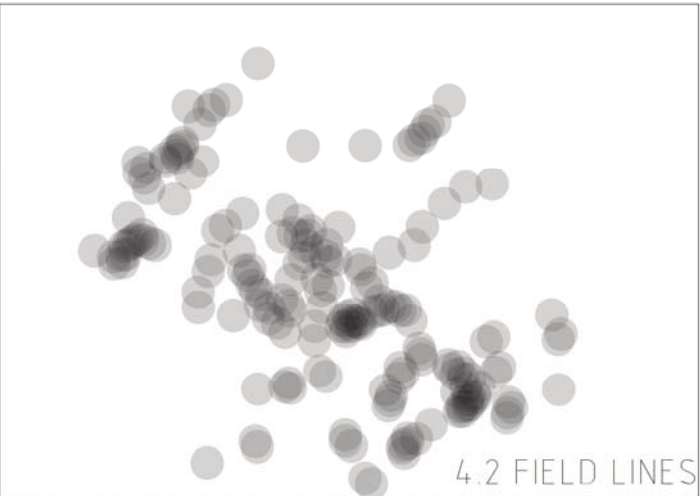
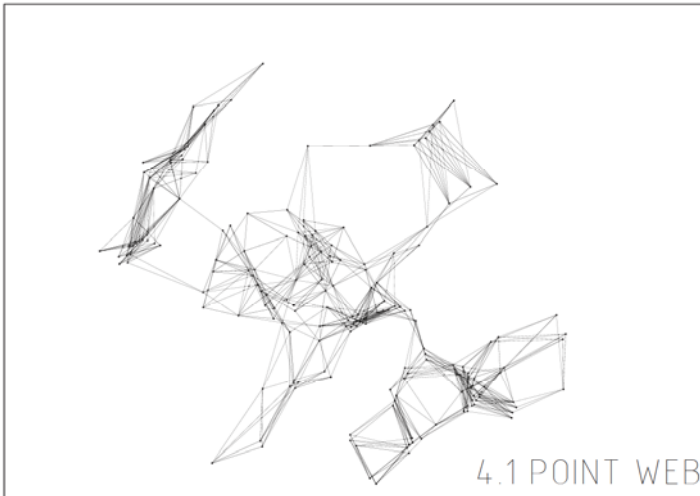
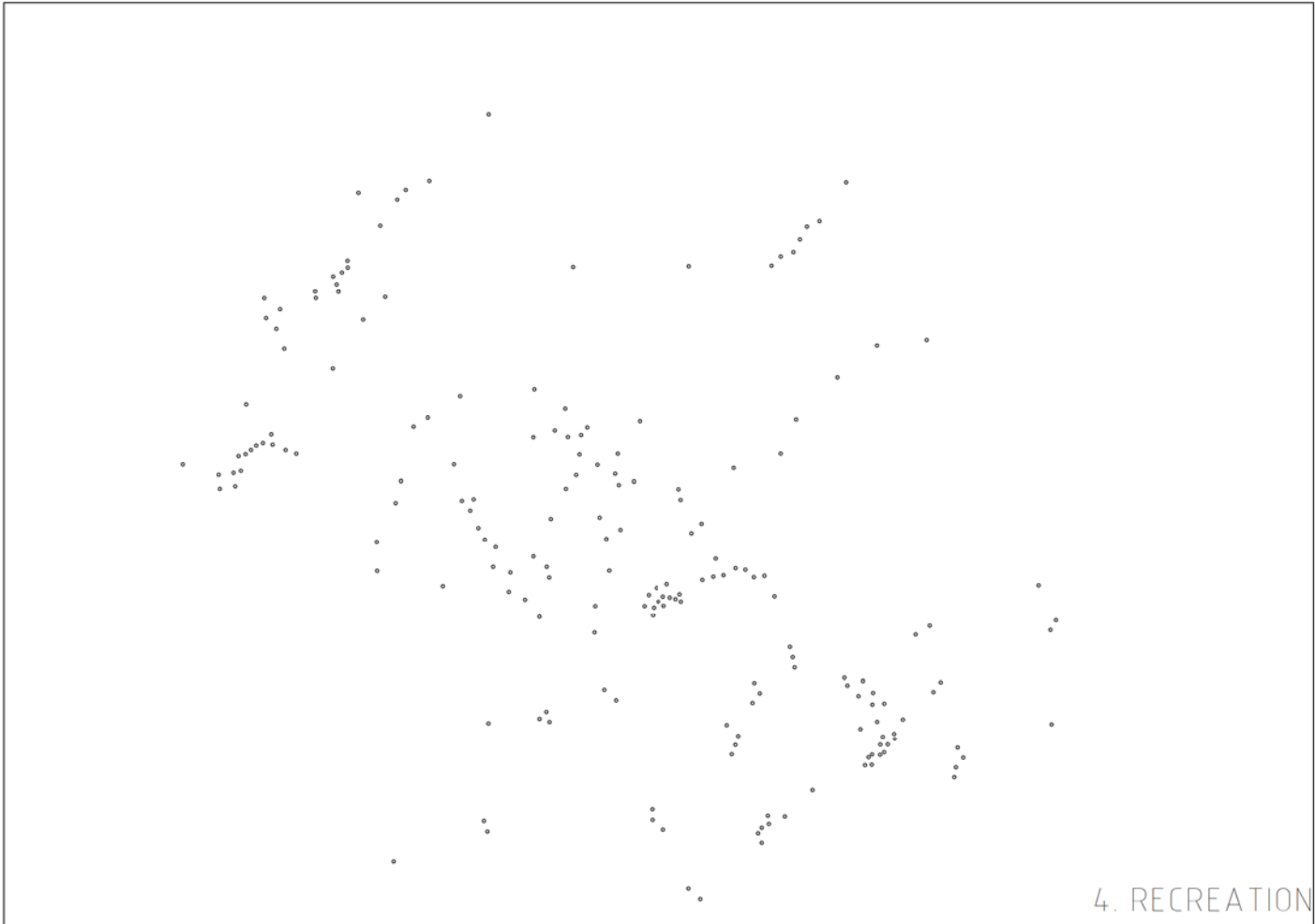
The voronoi partition derivations consists of fields based on points. For each point there is a corresponding region consisting of all points closer to said point than to any other. Can be interpreted as a visualization of land use.

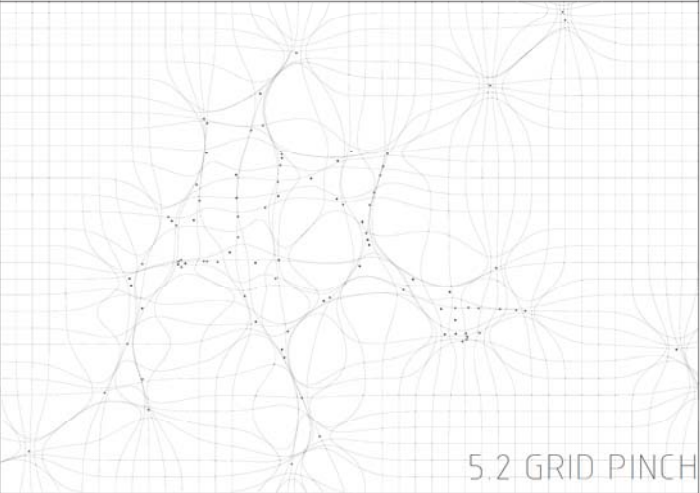
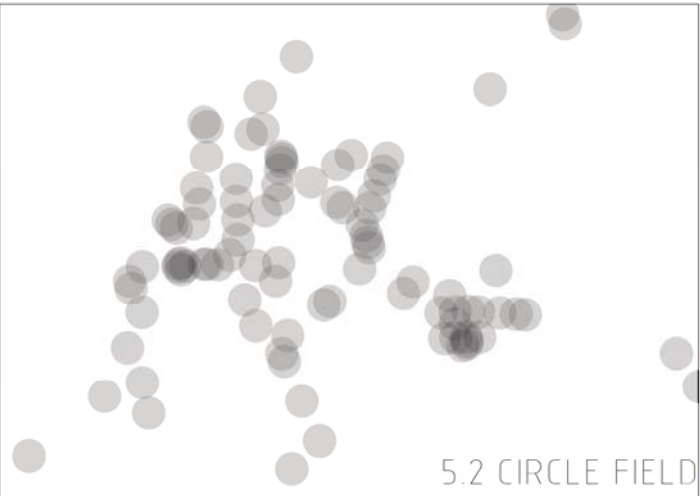
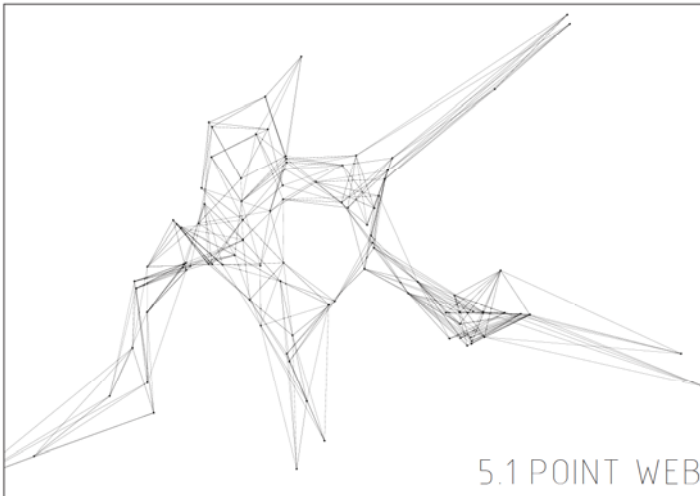
The grid pinch derivations consists of a grid warped by the provided points. Each point is given a set attraction value and is affecting the grid equally. The newly generated lines can for instance be interpreted as optimal paths connecting nearby points.

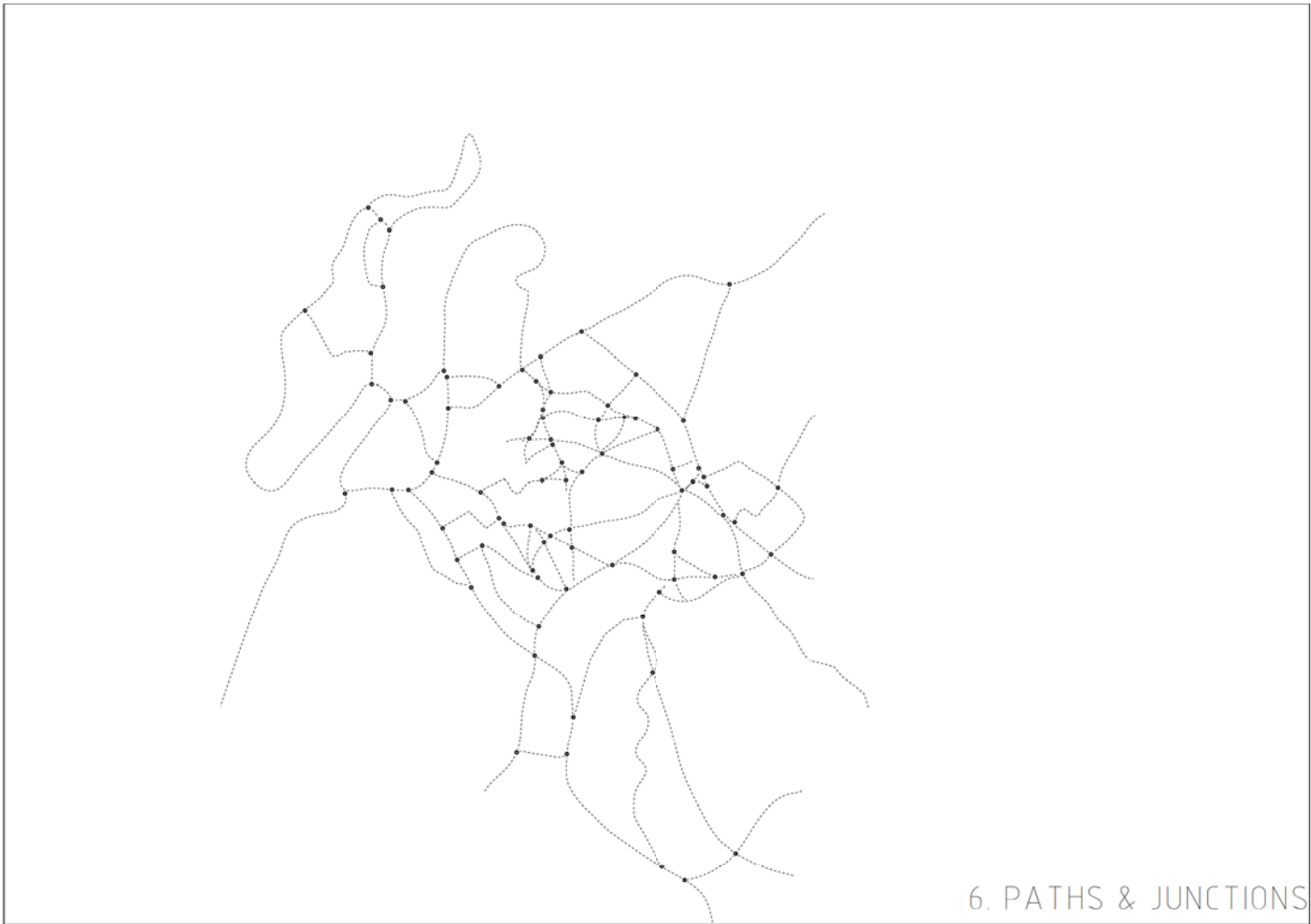




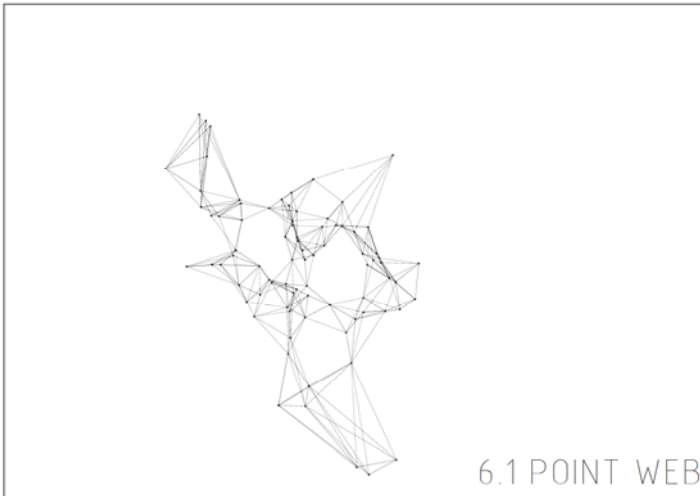




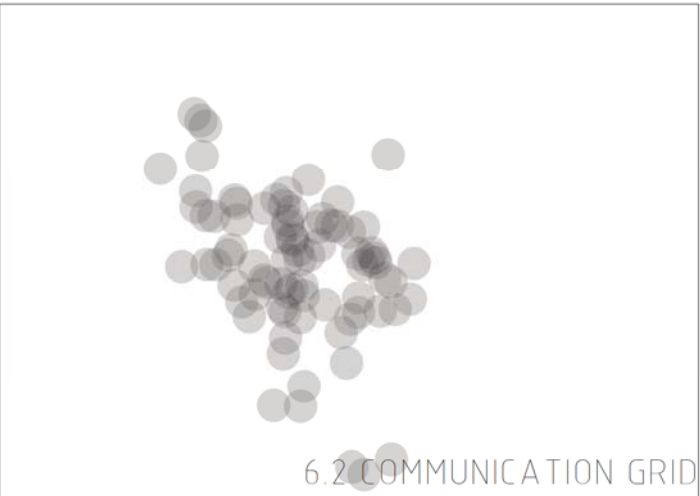




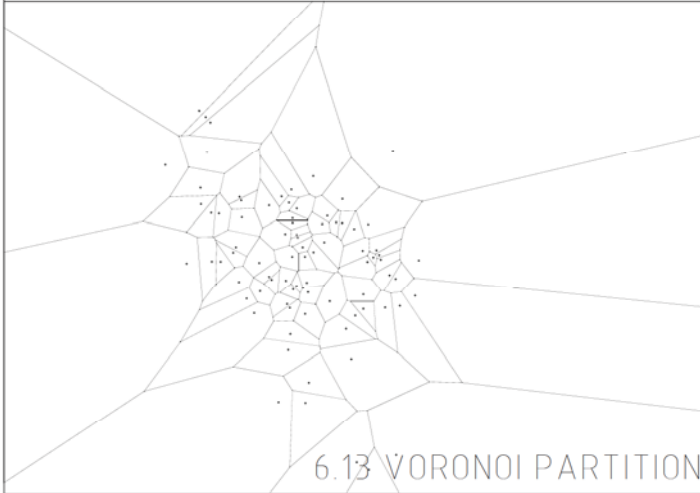
6. PATHS & JUNCTIONS



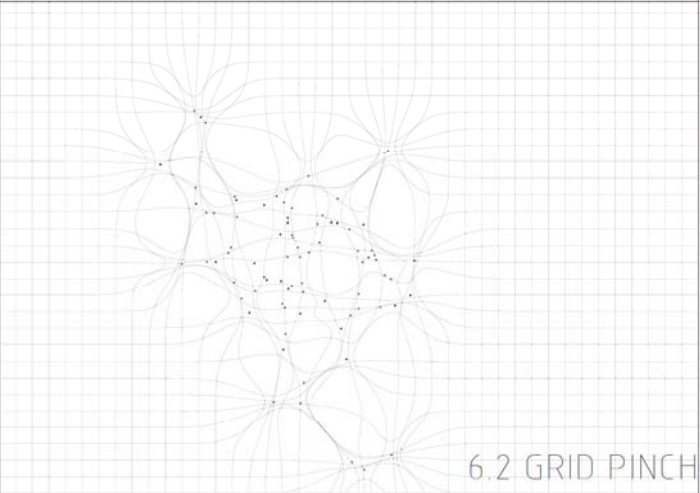
6.1 POINT WEB



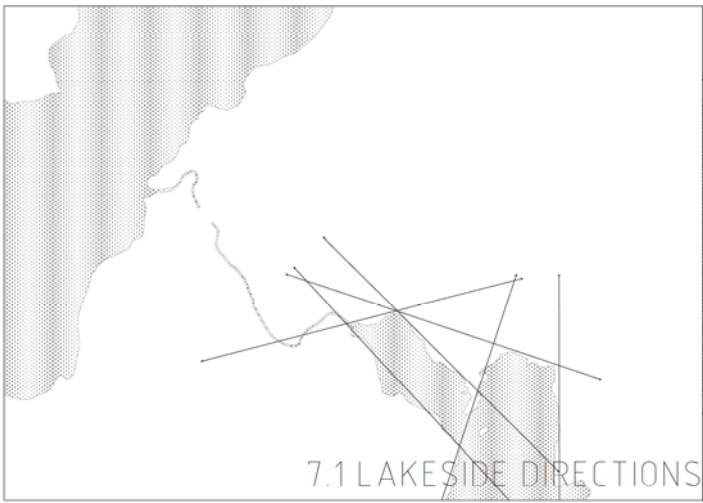
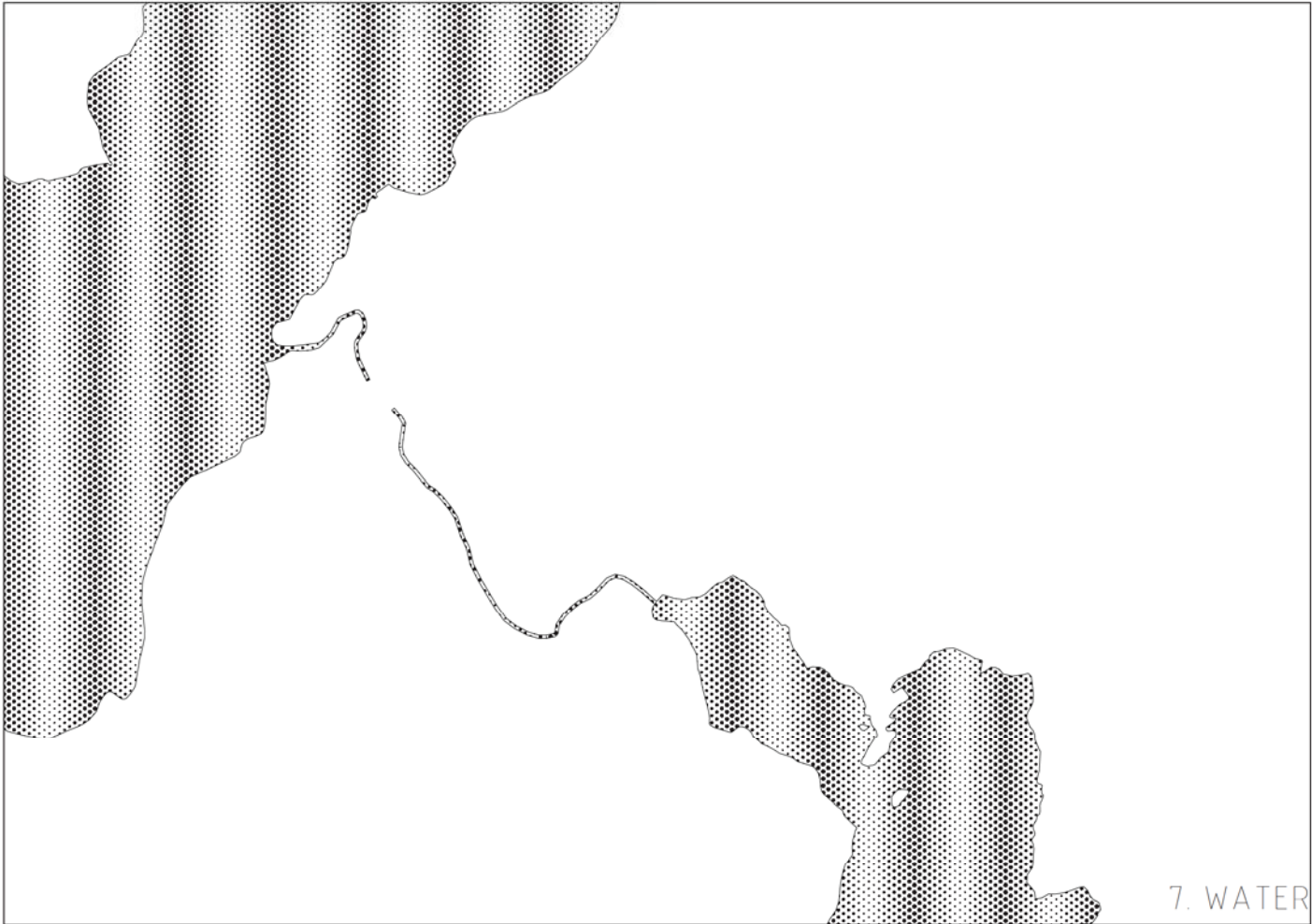
6.2 COMMUNICATION GRID

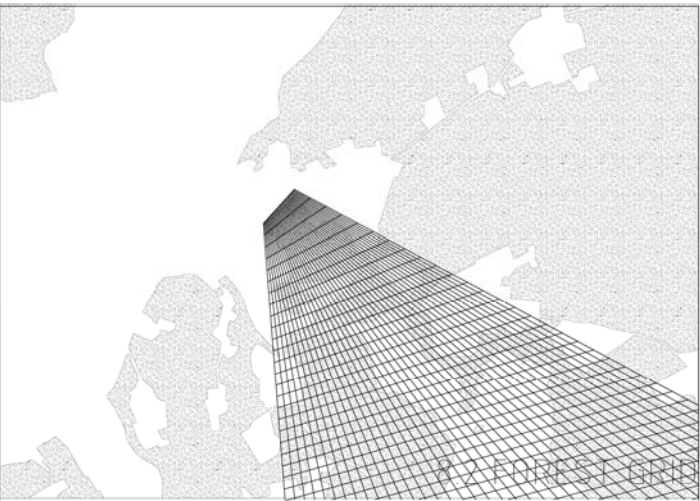
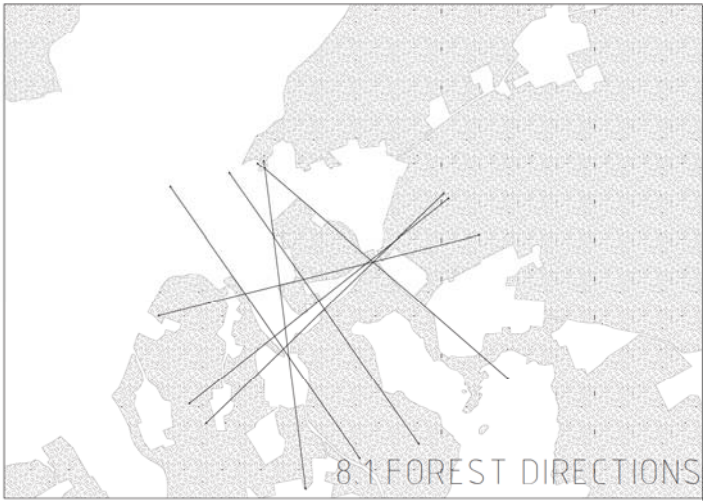
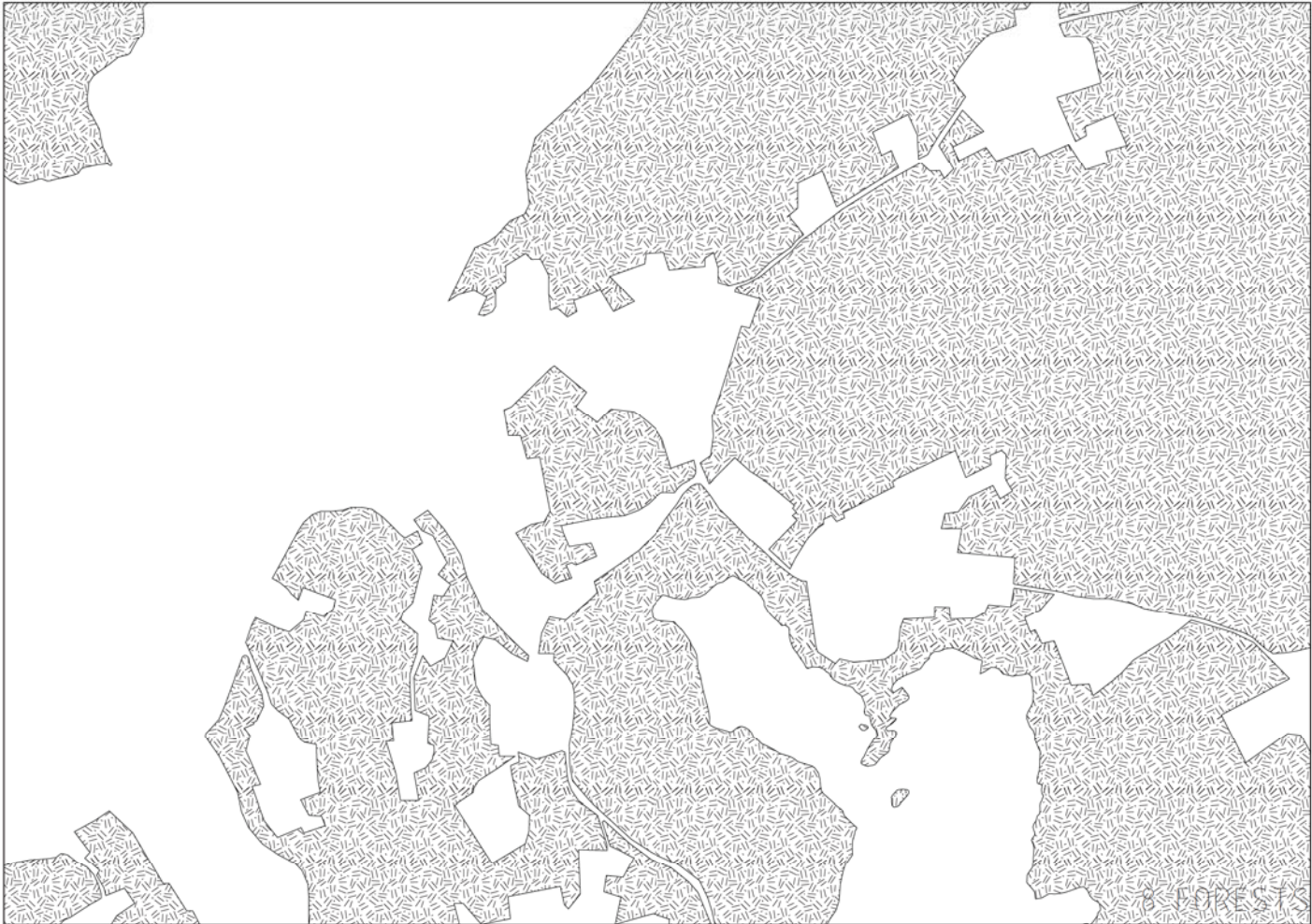


6.13 VORONOI PARTITION



6.2 GRID PINCH









# Layer Typing

Each map may be deconstructed and represented in its simplest form, but there is still a lot of information contained in each layer. Just based on what type of information it contains we can draw certain conclusions. Each layer is attributed a soft program and parameter intensity corresponding to the information it represents. A map made up of points representing static occurrences such as buildings is given a soft program of a stop, whereas a map made up of lines representing for instance roads would have a soft program of movement or direction. The parameter intensity is then determined by either the duration of time you would spend at a certain stop or by the speed you would travel along the line. One spends a longer of time in their home than at a store, or moves faster on a highway than on a pedestrian path.

Since the derivative layers generate new information different from the layer it originated from (generating lines between points etc.). They have, in almost every case, a different layer typing than its parent layer. Which in turn also means that they are given an opposite soft program and parameter of intensity. This gives layers that previously could not interact a new way to do so.

Since the parameter of intensity is also inverted from the derivative layers parent layer. Their new intensity is based on an assumption on how long you would stop along a movement base layer( for how long does one stop along a pedestrian path?), or move between points in a stop base layers (how fast does one move between different services?).

Base Map	Map type	Soft Program	Parameter Intensity		Design Element
			Duration (t)	Speed (t)	
Buildings	Points	Stop	Long	-	Building
Services	Points	Stop	Medium	-	Building
Historical	Points	Stop	Short	-	Building
Recreation	Points	Stop	Long	-	Varies
Roads	Lines	Movement	-	Fast	Roads
Bike Path	Lines	Movement	-	Average	Bike Path
Pedestrian Path	Lines	Movement	-	Slow	Gravel/Natural Path
Water	Fields	-	-	-	-
Forest	Fields	-	-	Slow	-
Height Lines	Lines	-	-	-	-

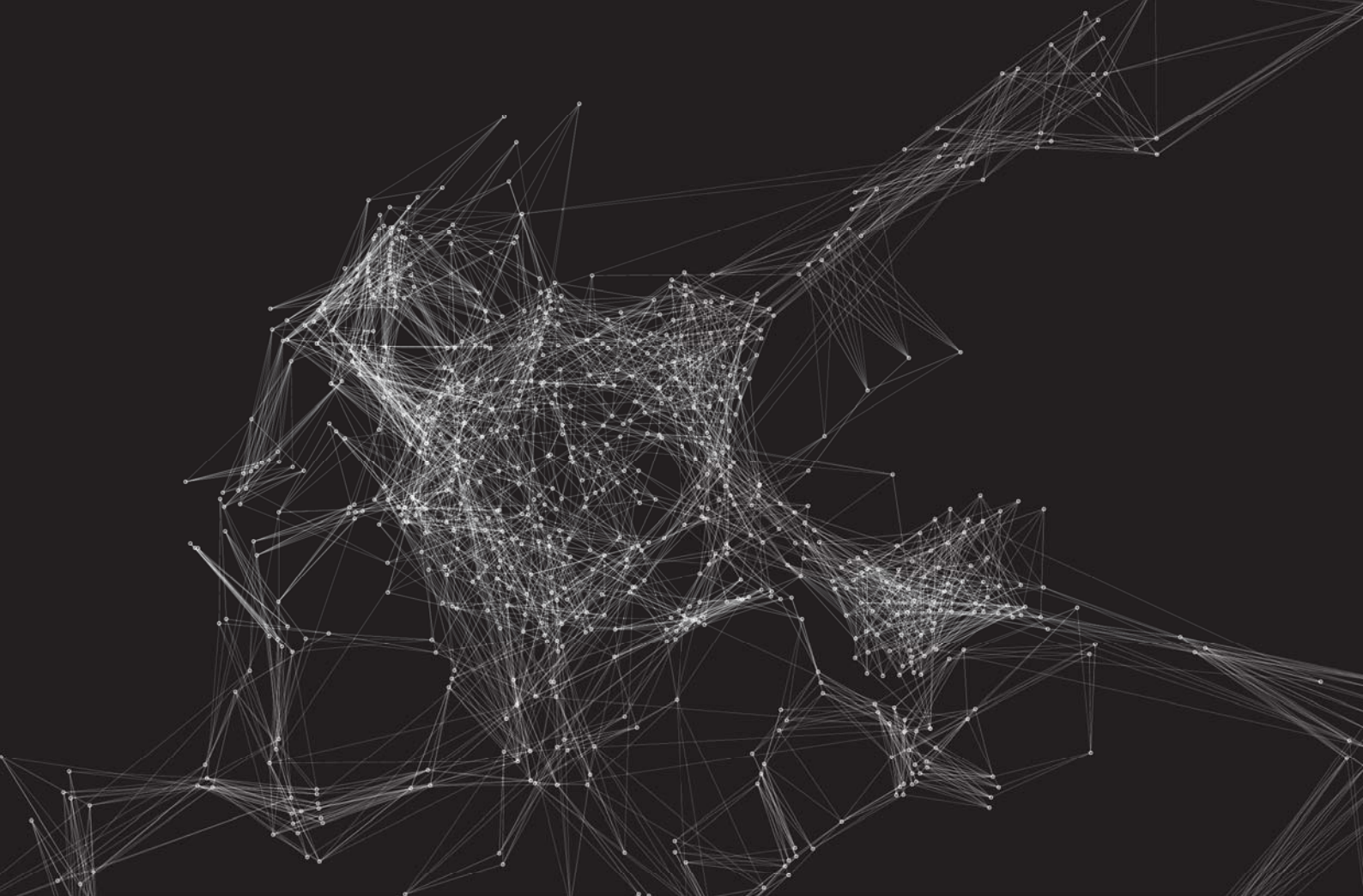
Derivation Map	Map type	Soft Program	Parameter Intensity		Design Element
			Duration (t)	Speed (t)	
Buildings	Lines	Movement	-	Fast	Road
Services	Lines	Movement	-	Medium	Bike Path
Historical	Lines	Movement	-	Slow	Gravel/Natural Path
Recreation	Lines	Movement	-	Slow	Gravel/Natural Path
Roads	Points	Stop	Short	-	Junction
Bike Path	Points	Stop	Medium	-	Junction
Pedestrian Path	Points	Stop	Long	-	Junction
Water	Lines/Grid	Movement	Long	Slow	Landing
Forest	Lines/Grid	Movement	Short	Slow	Post
Height Lines	-	-	-	-	-

# *Imposition*

Each separate layer and derivation only holds a specific type of information about Tollerred. When overlapping different layers a few interesting things occur. The most apparent is that the different layers containing information completely unrelated to one another will start to intersect. This interaction between layers indicates an event and a new type of generated information. These new points of intersection contains the information from both its parent layers, and signals a point of interest for a new program. By overlapping more layers we can increase the number of intersections exponentially. In some places there might be a multitude of layers intersecting in the same point, which would strengthen the notion that, that specific point is significant.

The second thing we notice is that even though we add more information to the map we can no longer discern information specific to any given layer. For instance, in an imposition map containing all point web derivation layers, we can no longer tell the difference between what layer originated from which base layer. Even though specific layer information might get lost when imposing, we can instead read larger trends, patterns and relationships spanning the entirety of Tollerred village in the map.

By overlapping every single layer we get the superimposition map. In the superimposition every single possible point of interaction between the layers provided is represented.

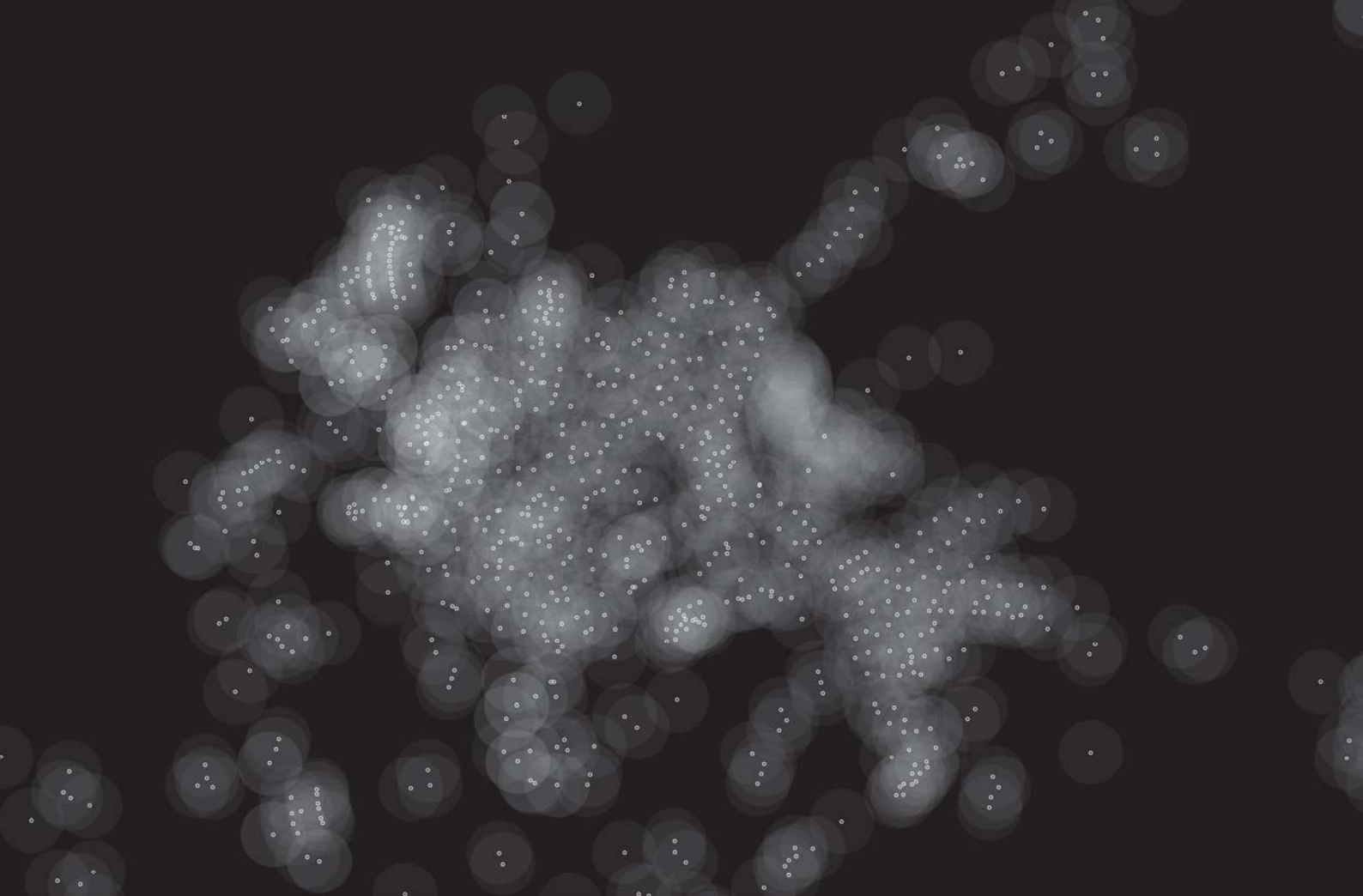


POINT WEB IMPOSITION

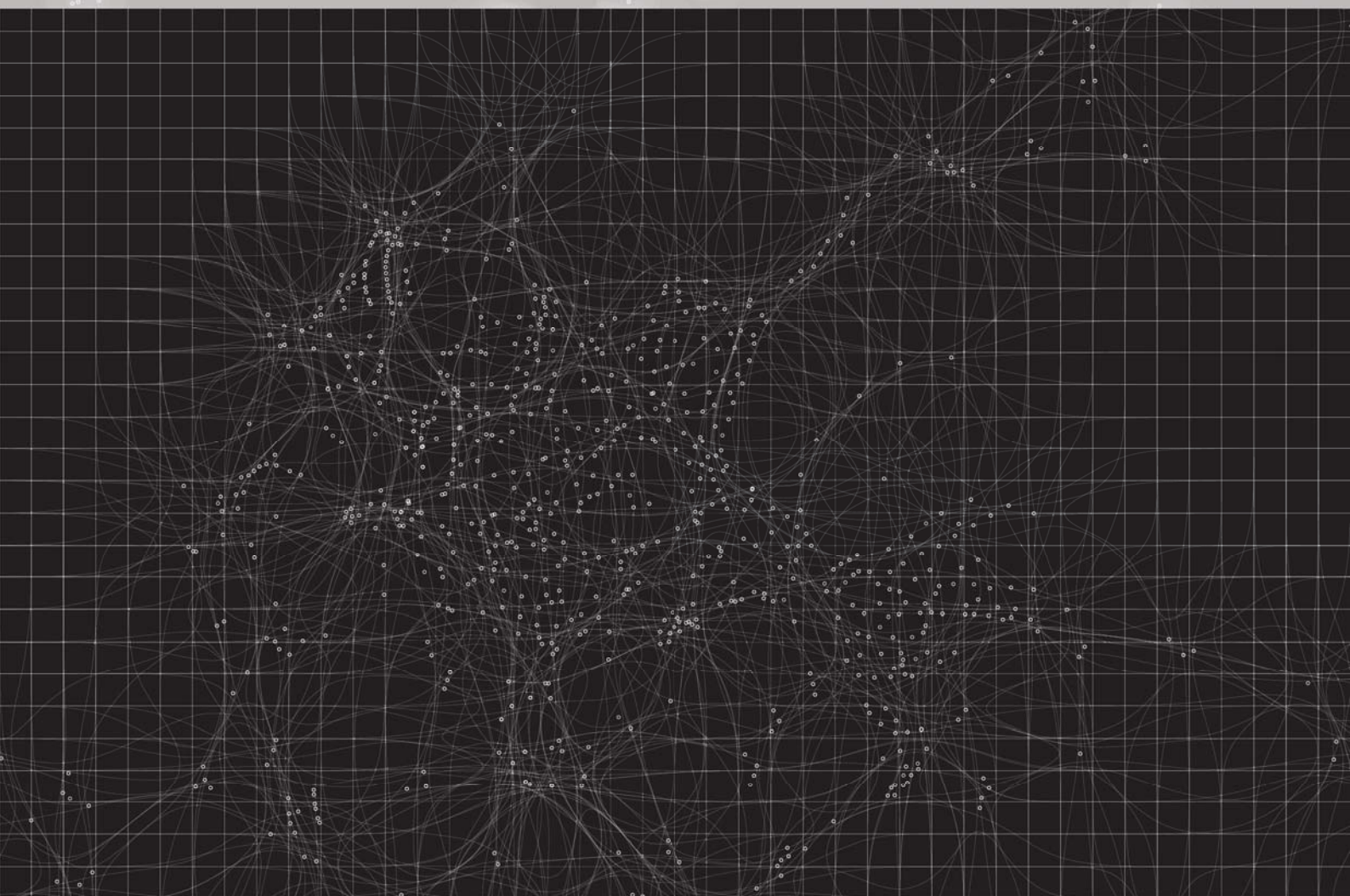


VORONOI IMPOSITION



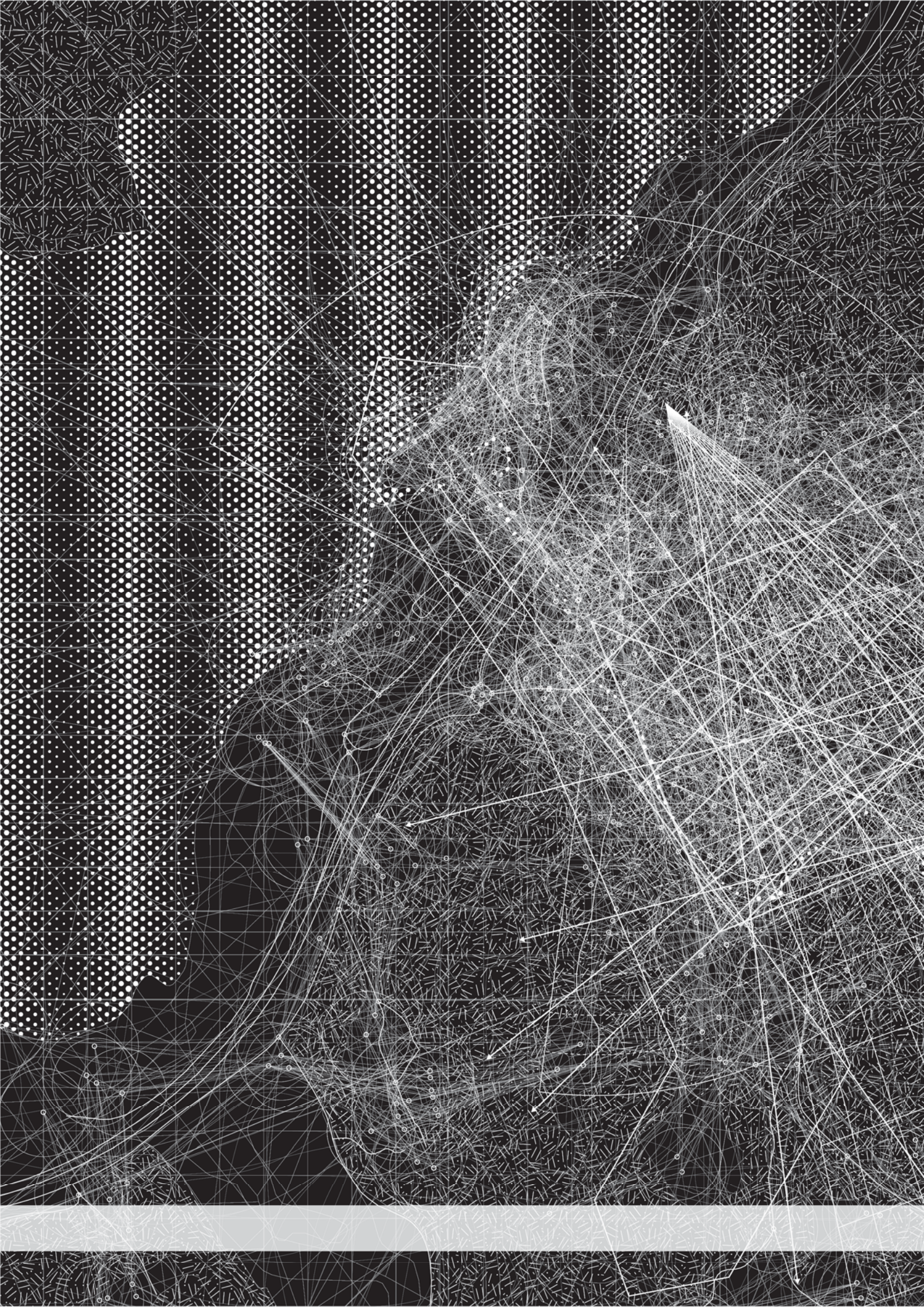


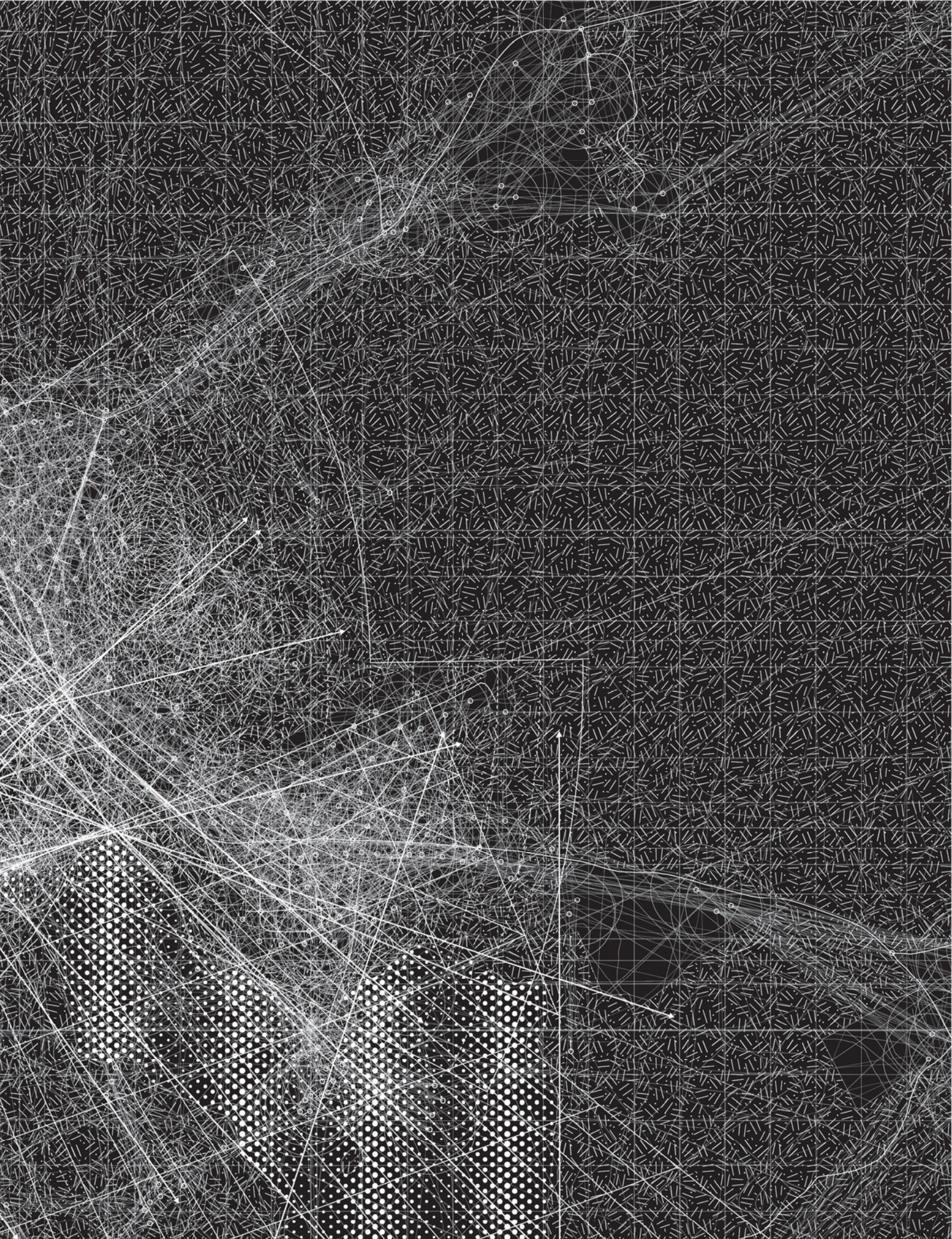
CIRCLE FIELD IMPOSITION



GRID PINCH IMPOSITION



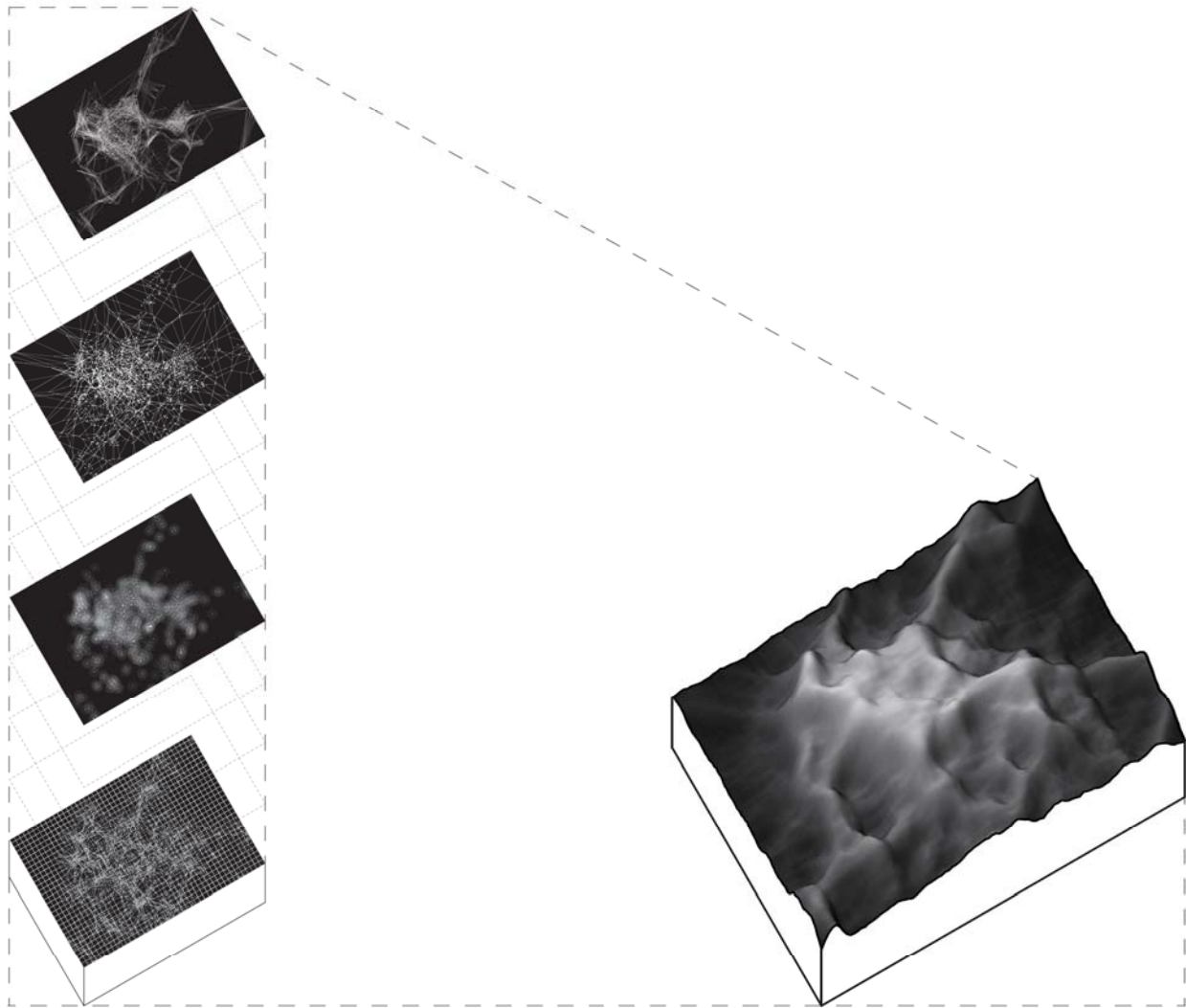




SUPERIMPOSITION



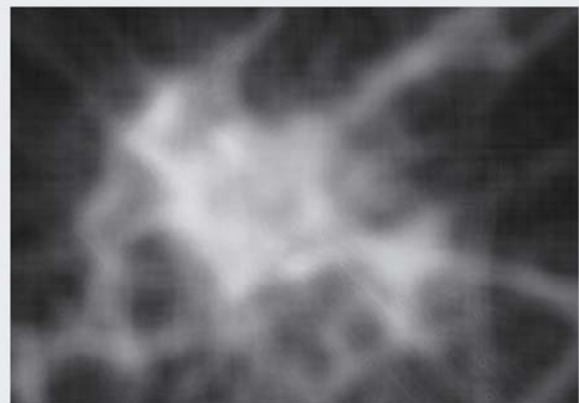
# *Imposion Intensity Axonometric*



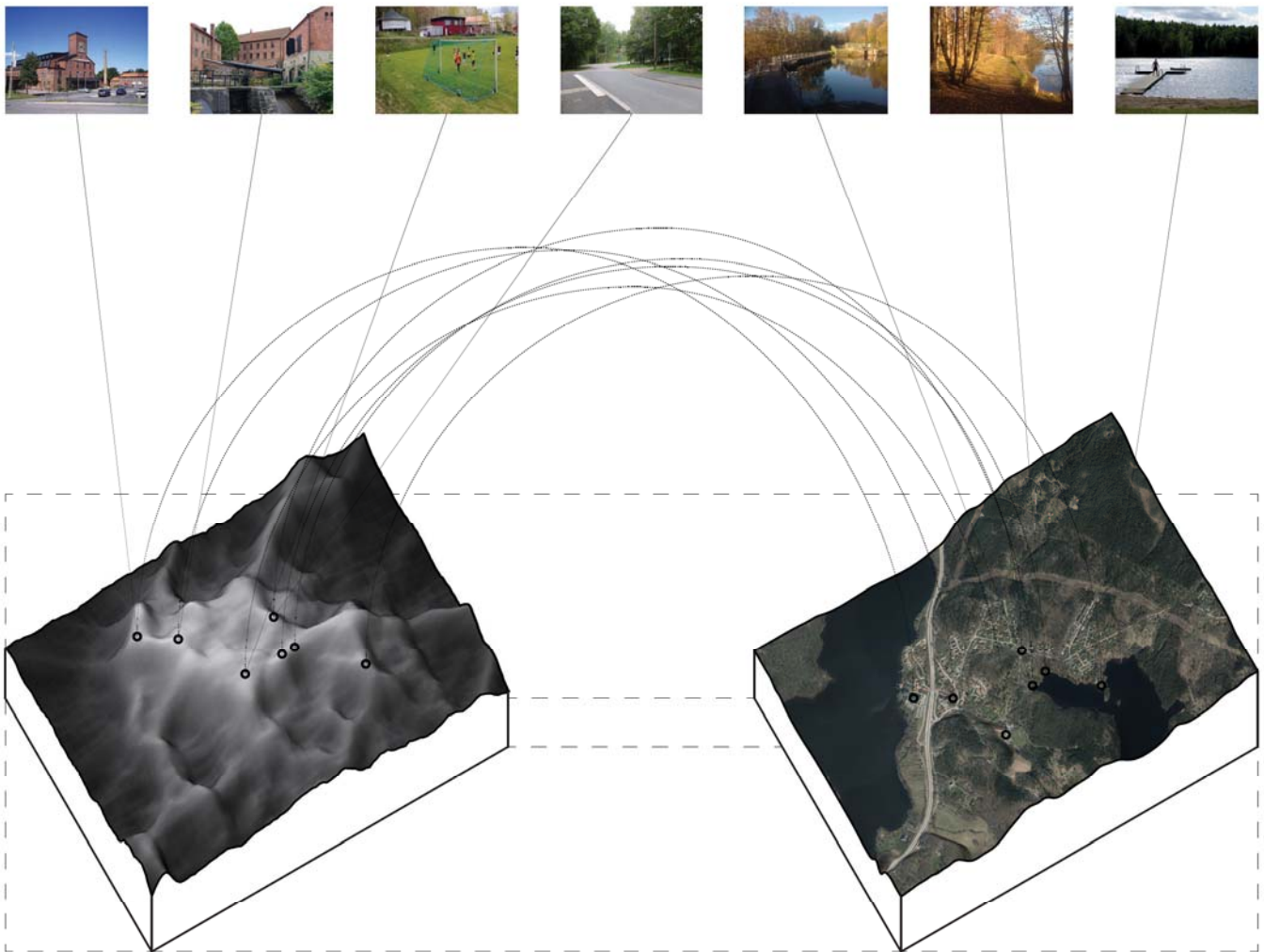
## *Information Intensity*

In the superimposition map the intensity of where the most layers overlap and interact can be read. These high intensity points can be assumed to be important nodes in the community's context.

Above visualized as an information topography. The peaks of which corresponds to the areas with the highest density of layer interaction. We can then compare the information peaks position to their corresponding position on the actual map of Tollerred. The information peaks does, perhaps unsurprising, match up to very relevant sites in the village.



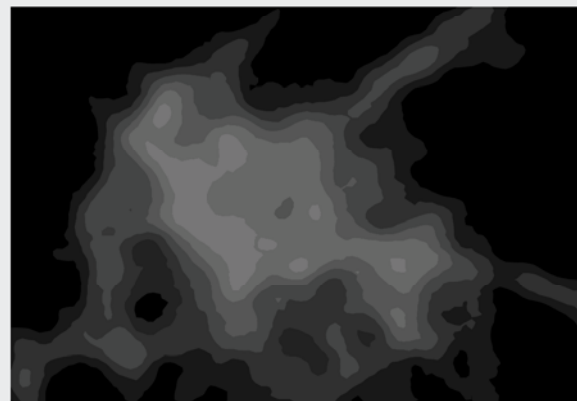
# Information Comparison Axonometric

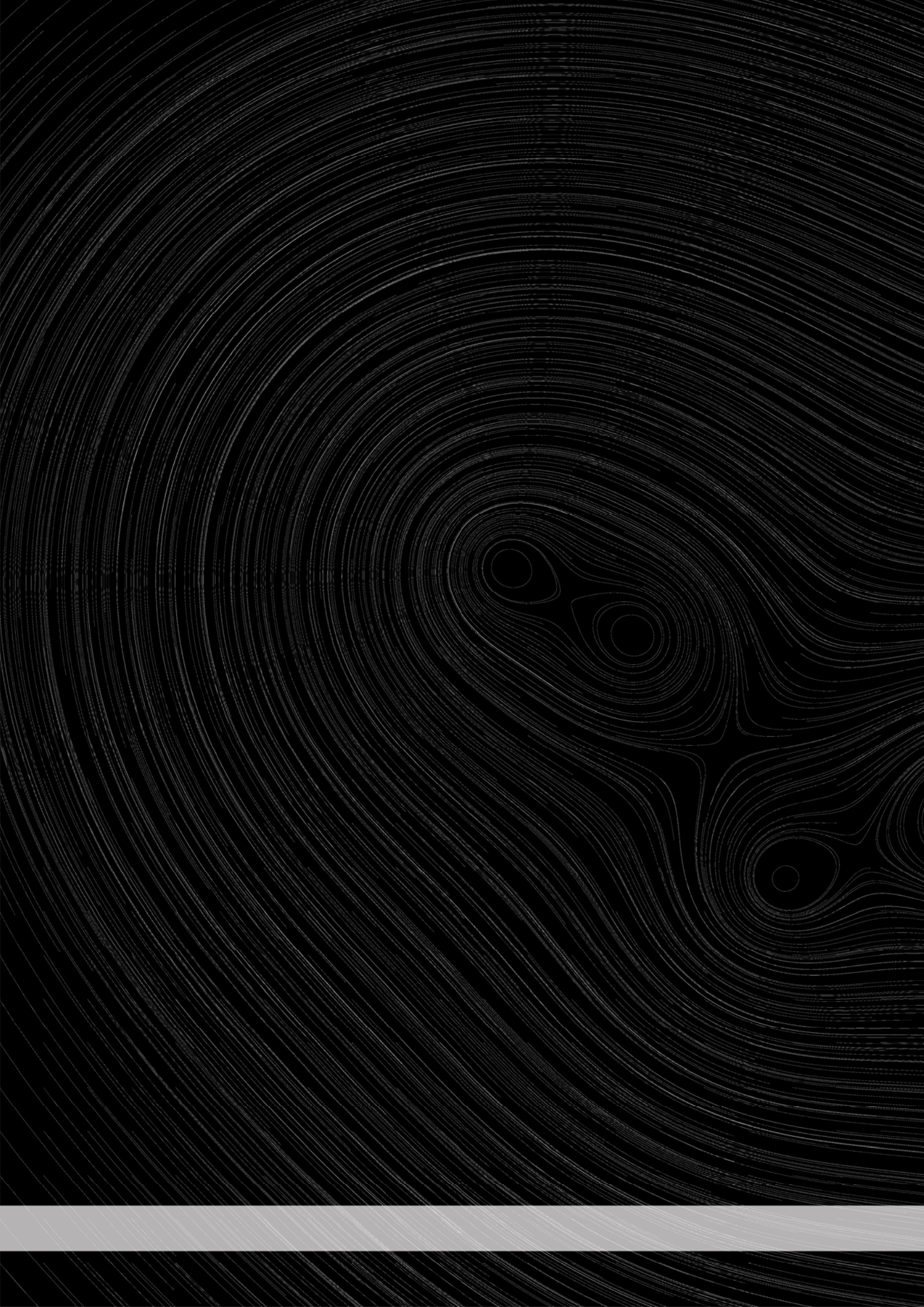


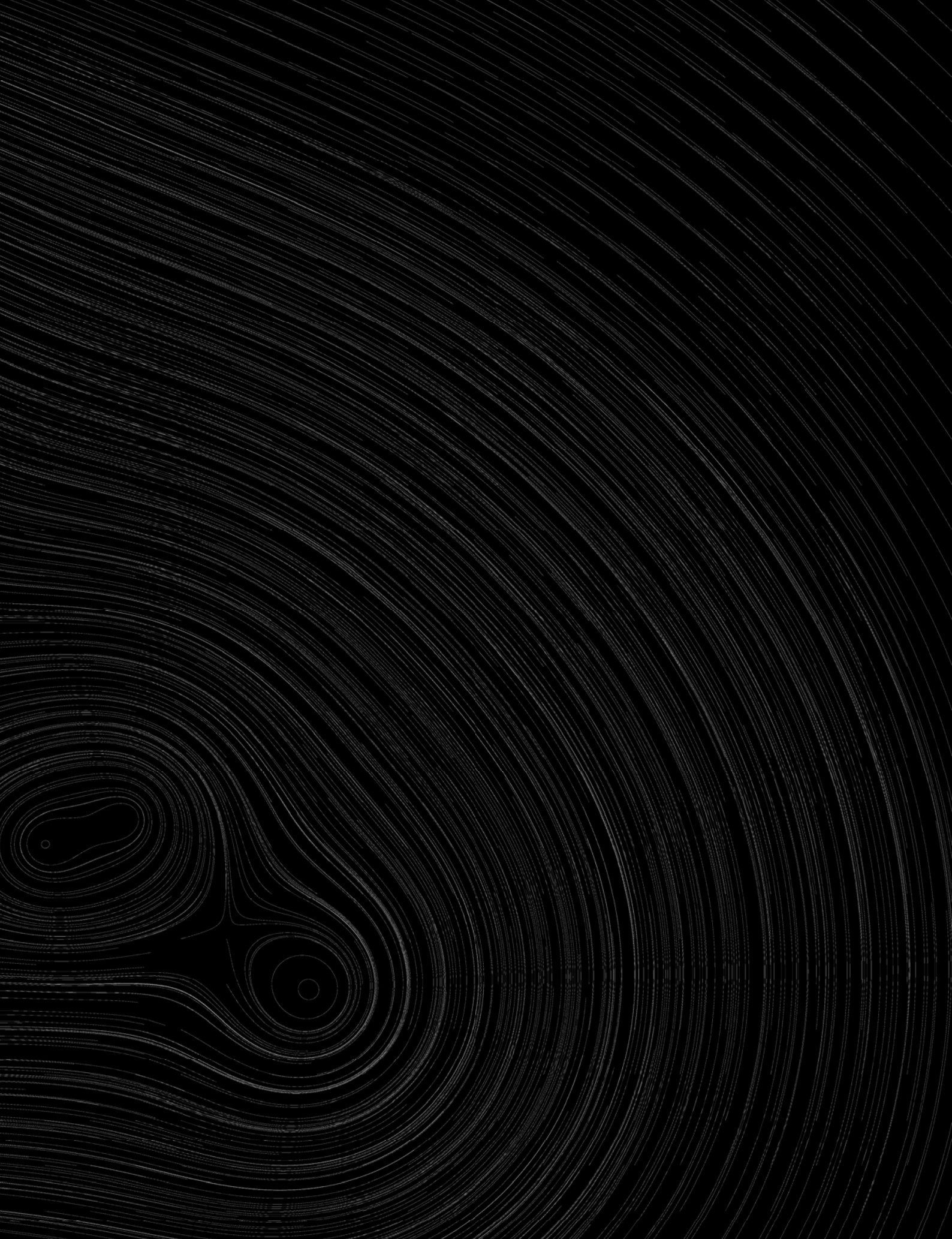
## Target Sites

The new information points is a way for us to target specific sites. Even though the system is meant to encompass the entirety of Tollerød it is valuable to know what sites to give extra attention. The target sites can also be used for discerning where important connections should be. Creating new paths and roads that might not exist that then also becomes a part and can interact with the layering system.

In the images on the following pages are derivation layers of the high intensity points showing how the importance of the points can warp and distort the layers around them.

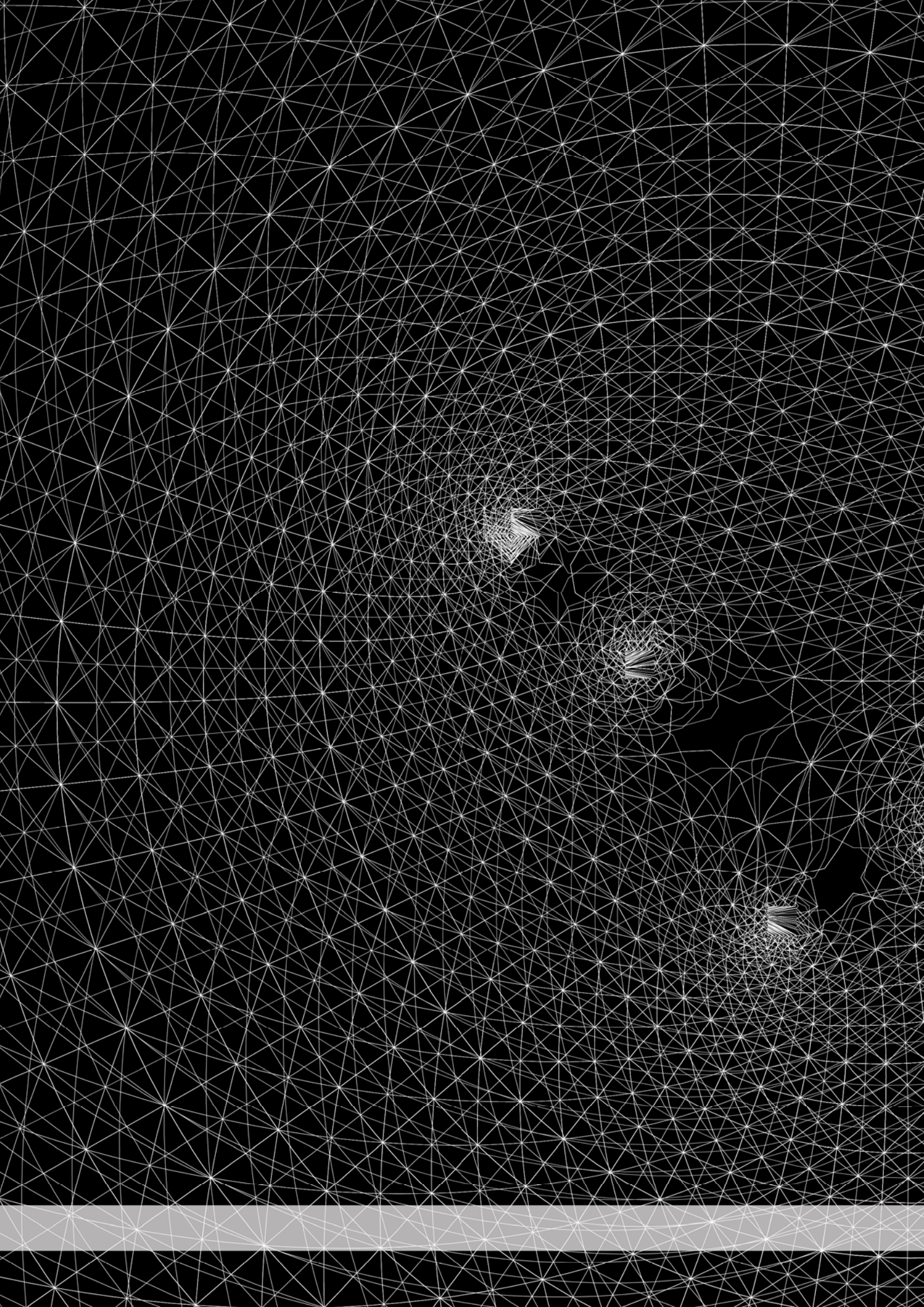


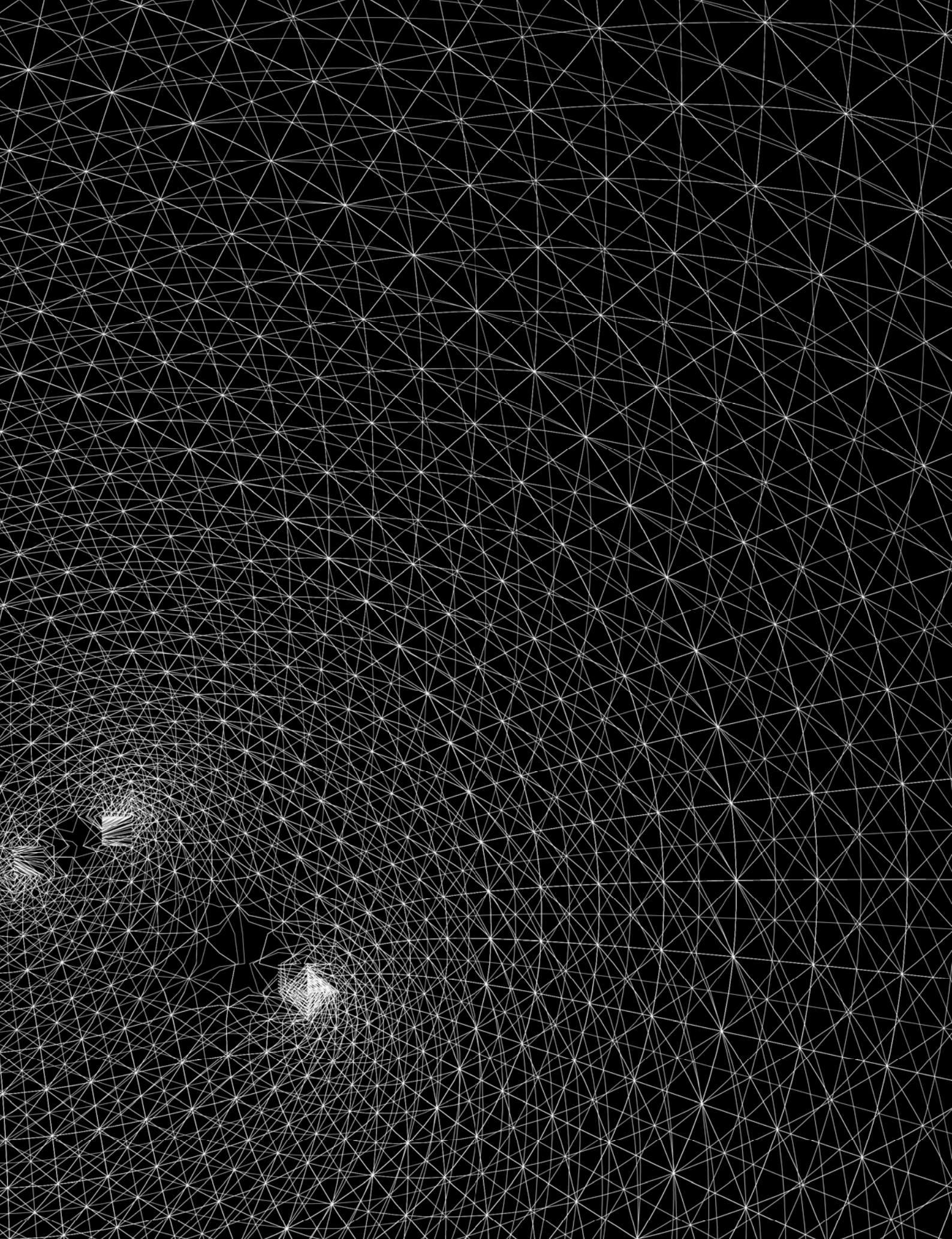




MAGNETIC FIELD







RHEOTOMIC GRID



# Generating Program

The final role the system has is as a design generator. The impositions gives us every possible point of interaction that is of interest when placing an architectural insertion. Since the insertion points contains the information of both its parent layers it does not only hold information on its location, but also on its orientation, based on the direction of its movement parent layer, and two sets of parameter intensity.

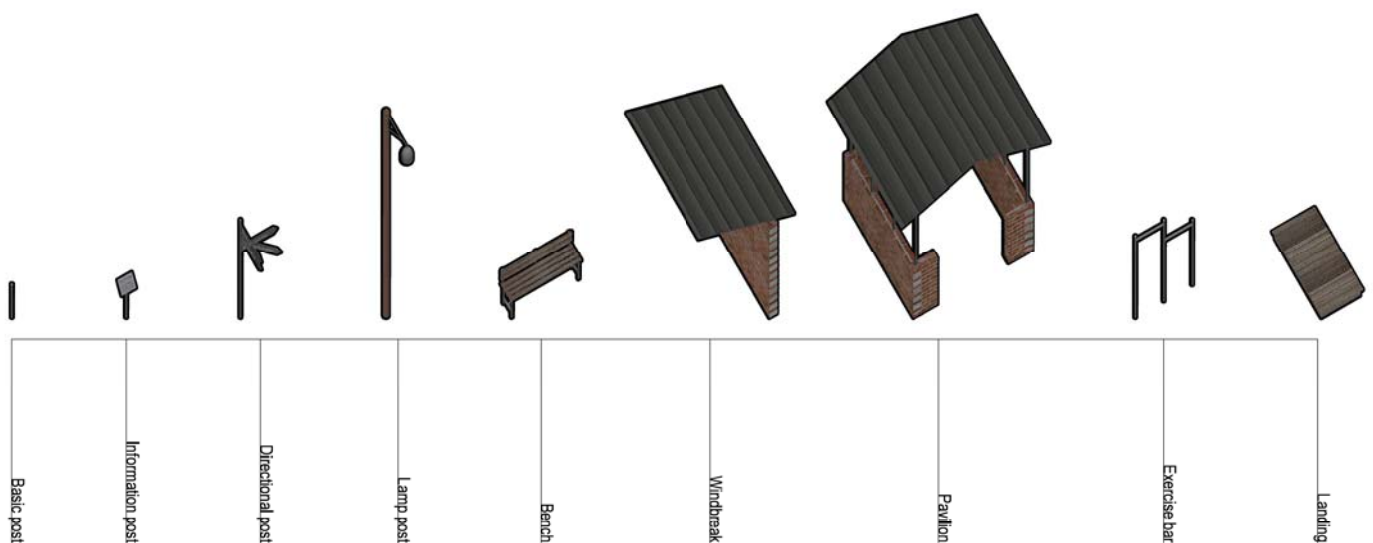
Based on each separate layer parameter of intensity we can assign an architectural element to every given layer interaction. The combination of speed and movement parameters of the intersecting layers gives us information on what type of program the insertion should have, and an appropriate insertion can be chosen. For instance, a intersection between a layer with a duration(T) parameter of medium and a speed(T) of slow would result in a bench as its insertion element. In the tables every possible interaction between two layers is represented. Based on this we can discern nine distinct combinations, translated into nine distinct architectural elements.

The nine insertions are all sampled in one way or another from the local context. Smaller architectural elements such as the lamp post or benches are direct re-creations of elements already present in the village of Tollered. Larger ones, such as the pavilion or windbreak, use recognizable features inspired by surrounding architecture.

Some of the elements only occur when interacting with specific layers. For instance all the layer interactions with a water based layer always yield some form of landing or crossing connected to the water. The largest one, the pavilion, can only be found in the intersections with layers with the Long duration(t) parameter. Signaling that this element is only suited for interactions where one can be assumed to spend a longer amount of time.

The simplicity of the insertion is by design. In certain high density areas where a lot of interaction happen, the insertions will intersect, and generate larger amalgam structures. The larger structures can then be used as a base for creating more complex programming.

## Architectural Elements



## Base Layer Typing

Base Map	Map type	Soft Program	Parameter Intensity		Design Element
			Duration (t)	Speed (t)	
Buildings	Points	Stop	Long	-	Building
Services	Points	Stop	Medium	-	Building
Historical	Points	Stop	Short	-	Building
Recreation	Points	Stop	Long	-	Varies
Roads	Lines	Movement	-	Fast	Roads
Bike Path	Lines	Movement	-	Average	Bike Path
Pedestrian Path	Lines	Movement	-	Slow	Gravel/Natural Path
Water	Fields	-	-	-	-
Forest	Fields	-	-	Slow	-
Height Lines	Lines	-	-	-	-

## Derivation Layer Typing

Derivation Map	Map type	Soft Program	Parameter Intensity		Design Element
			Duration (t)	Speed (t)	
Buildings	Lines	Movement	-	Fast	Road
Services	Lines	Movement	-	Medium	Bike Path
Historical	Lines	Movement	-	Slow	Gravel/Natural Path
Recreation	Lines	Movement	-	Slow	Gravel/Natural Path
Roads	Points	Stop	Short	-	Junction
Bike Path	Points	Stop	Medium	-	Junction
Pedestrian Path	Points	Stop	Long	-	Junction
Water	Lines/Grid	Movement	Long	Slow	Landing
Forest	Lines/Grid	Movement	Short	Slow	Post
Height Lines	-	-	-	-	-

## Insertion Table

Interaction Element		Speed (T)			Duration (T)			Water Base	Water Der.	Forest Der.
		Slow	Average	Fast	Long	Medium	Short			
Speed (T)	Slow	Directional post	Directional post	Directional post	Pavilion	Bench	Info post	Crossing	Bench	Post
	Average	Directional post	Directional post	Directional post	Windbreak	Gym	Lamp post	Crossing	Lamp post	Lamp post
	Fast	Directional post	Directional post	Junction	Home	Service	-	Bridge	-	-
Duration (T)	Long	Pavilion	Windbreak	Home	Pavilion	-	-	Bath/Pier	Pavilion/bath	Cabin
	Medium	Bench	Gym	Service	-	-	-	Jetty	Bench/Jetty	Windbreak
	Short	Info post	Lamp post	-	-	-	-	Landing	Lamp post	Bench
Water Base		Crossing	Crossing	Bridge	Bath/Pier	Jetty	Landing	-	-	-
Water Der.		Bench	Lamp post	-	Pavilion/Bath	Bench/Jetty	Lamp post	-	Pavilion/Bath	-
Forest Der.		Post	Lamp post	-	Cabin	Windbreak	Bench	-	-	Post

# Interaction Table

	Paths der.	Paths	Service der.	Roads der.	Roads	Recreation der.	Buildings der.	Culture der.	Water	Water der.	Forest der.
Paths der.											
Paths											
Service der.											
Roads der.											
Roads											
Recreation der.											
Buildings der.											
Culture der.											
Water											
Water der.											
Forest der.											

# Insertion Table

	Paths der.	Paths	Service der.	Roads der.	Roads	Recreation der.	Buildings der.	Culture der.	Water	Water der.	Forest der.
Paths der.											
Paths											
Service der.											
Roads der.											
Roads											
Recreation der.											
Buildings der.											
Culture der.											
Water											
Water der.											
Forest der.											

## *Point map*

By now the system has, with only basic information as an input, provided a way to describe the context with the base and derivation layers, a way to find target sites with both the layer interactions and the intensity peak points and a way to generate both program and design based on the layer typing and layer combination insertions. The point map is in a sense the end result the system has provided us with

103 299 points. Every single one with their own unique location, orientation, program and design element. Examining this map we can conclude that the system has yielded a satisfactory result. Points representing pavilions are located in areas with high recreational density, benches follow along paths and information post are in areas tied to the historical parts of Tollerred.

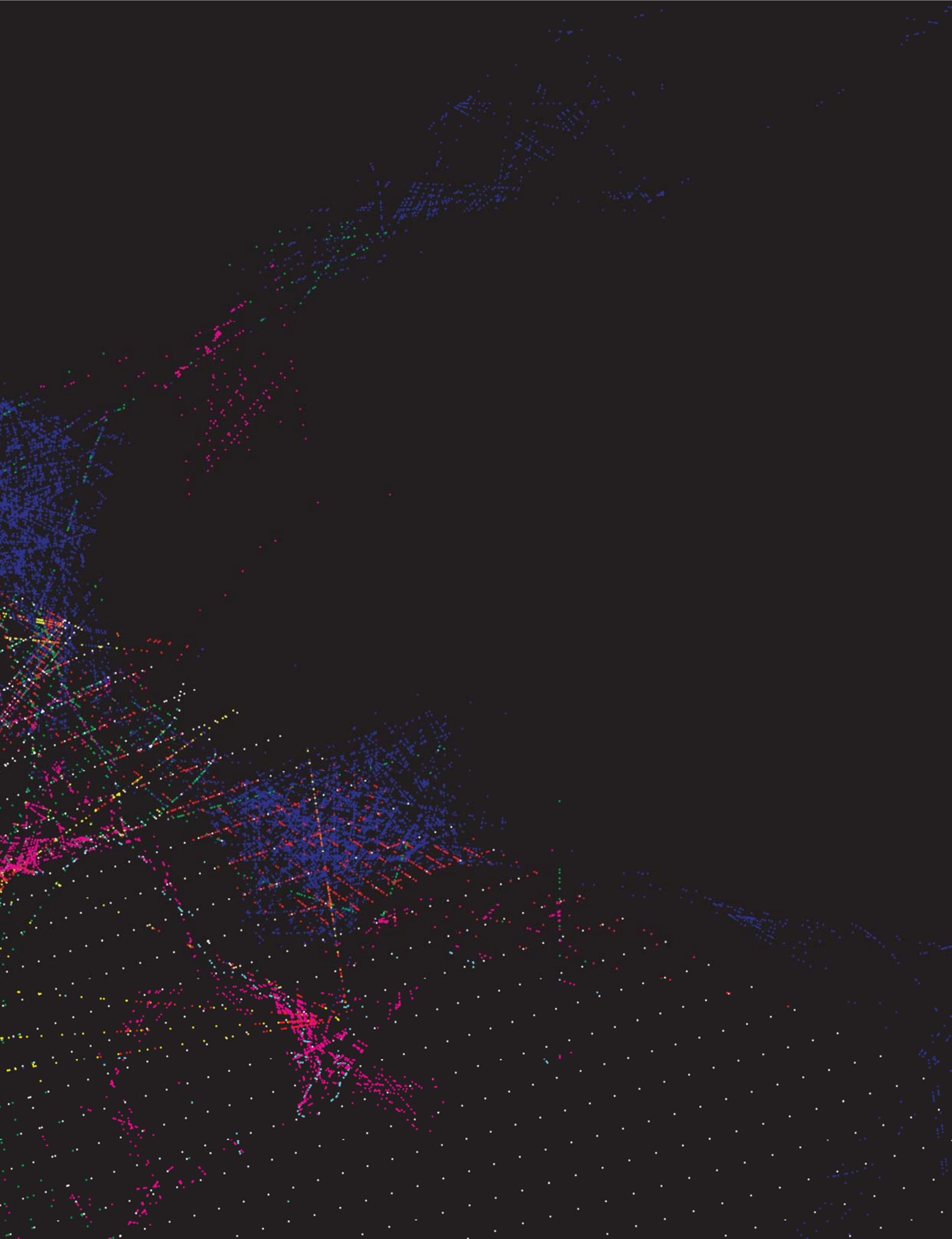
## *Incidents*

The sheer number of insertions is too large for a smaller community such as Tollerred and it makes it difficult to evaluate the success of the system. There are two routes to take in this situation, one can either develop a way for the system to cull a subset of points. This however would sacrifice some of the consistency and be detrimental to the idea that the design implementations should heighten the spatial awareness of the inhabitants and visitors of Tollerred.

By applying the design generation to the target sites provided by the intensity peaks yields we can get a sense of the provided outcome in the areas with the highest density of interaction. The design elements overlap and intersect one another creating the framework for larger amalgam structures. This is partly by design however. This is the system's way of creating larger structures where it deems needed. Every amalgam structure is unique and does not exist on any other point on the map, but its part are based in the logic of the system and every direction and intention can still be read. This makes every structure a celebration to the uniqueness of its specific location, its connections and relationships.

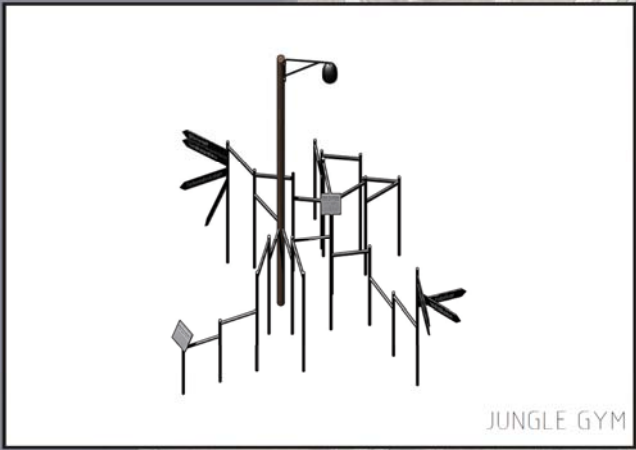
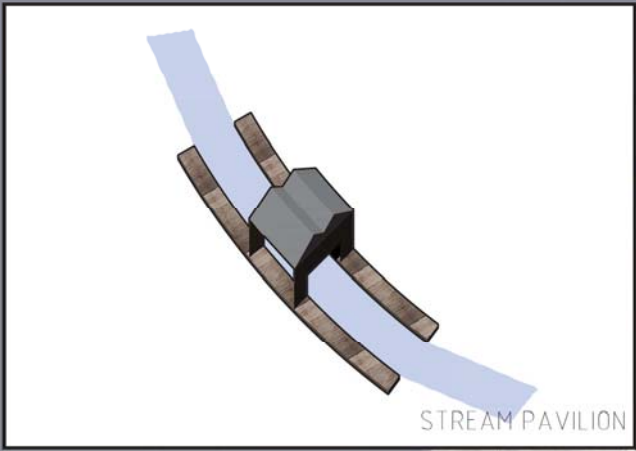
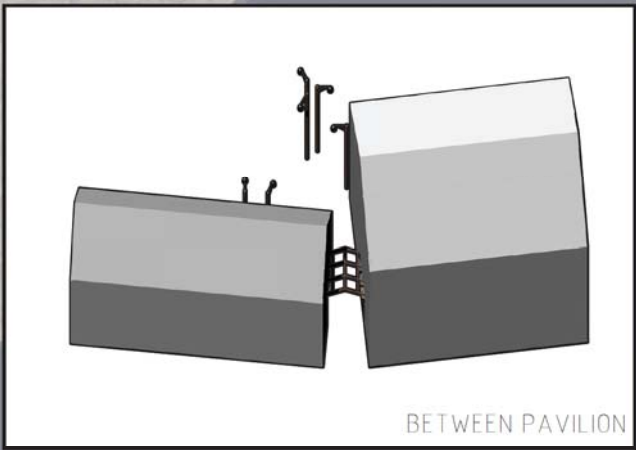
- BASIC POST
- INFORMATION POST
- DIRECTIONAL POST
- LAMP POST
- BENCH
- WINDBREAK
- PAVILION
- EXERCISE BAR
- LANDING

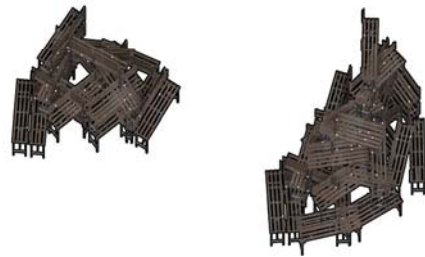
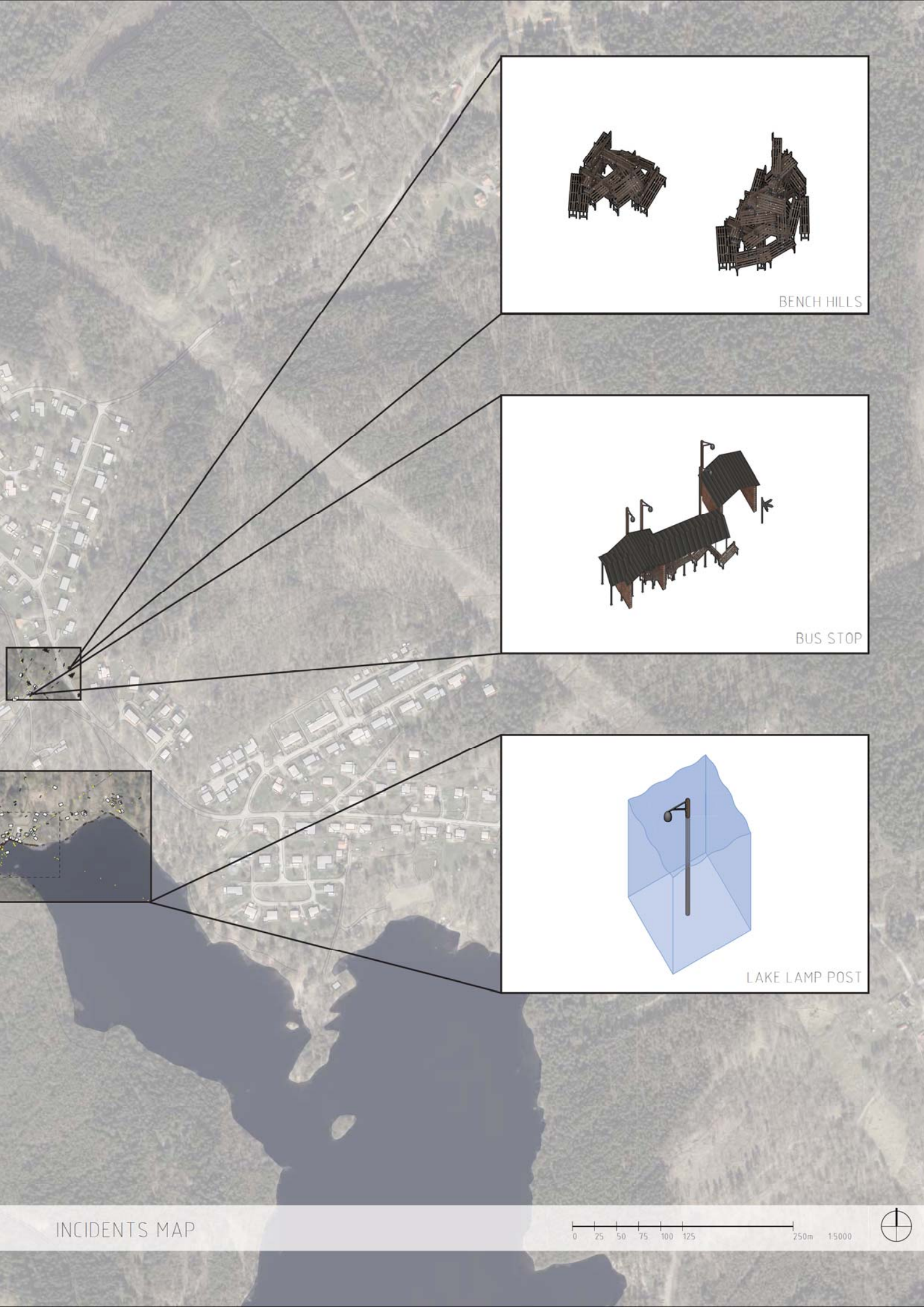




INTERSECTION POINT MAP







BENCH HILLS

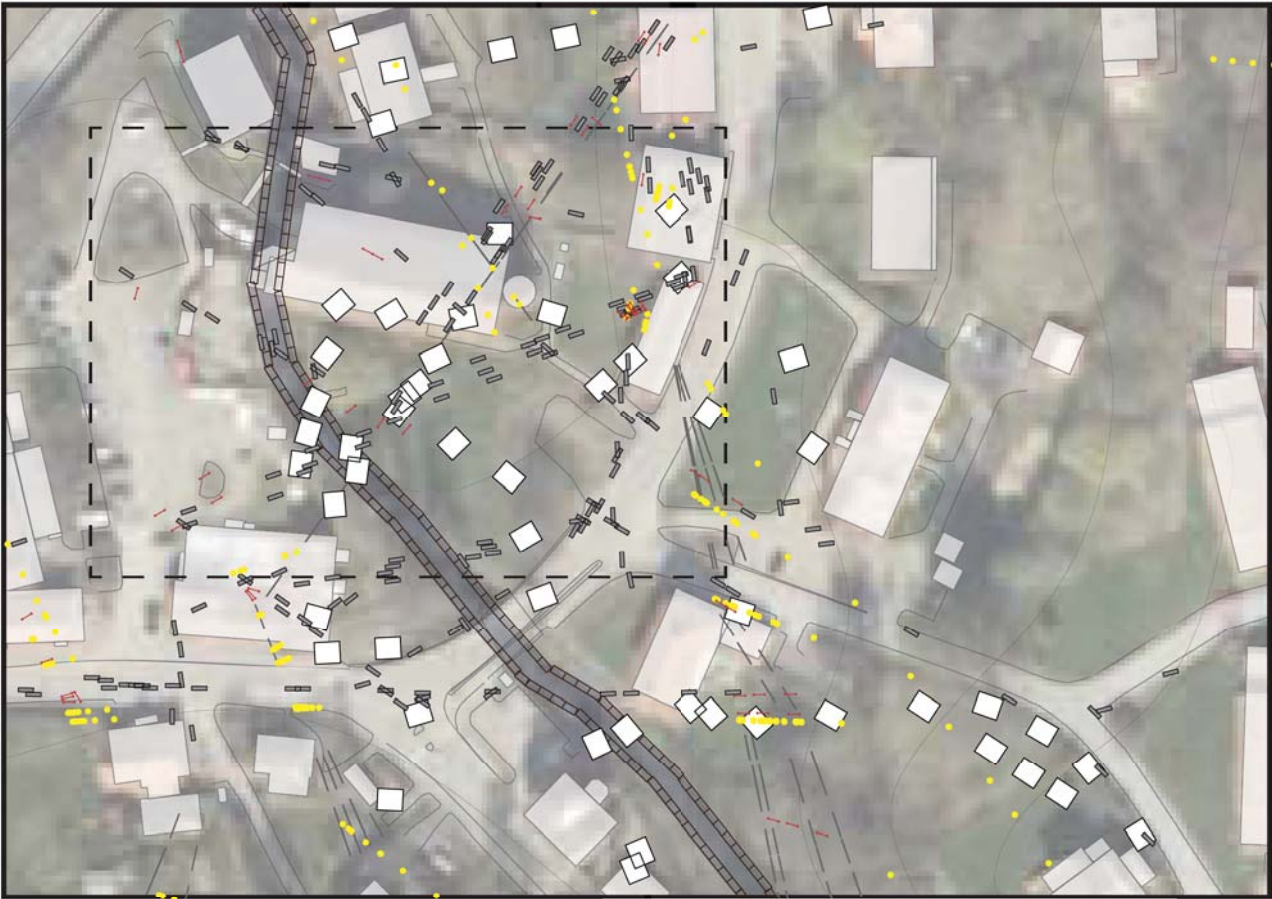


BUS STOP

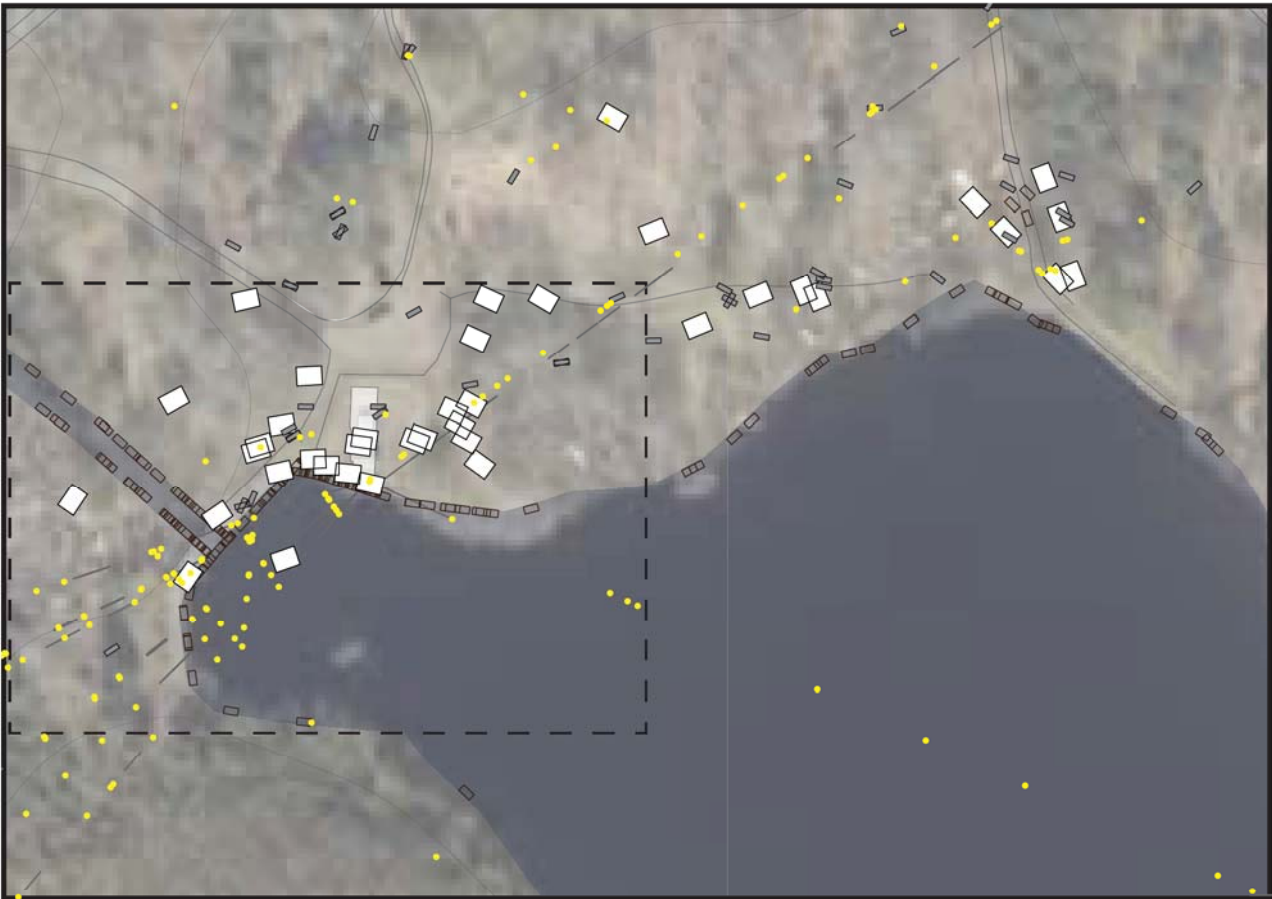
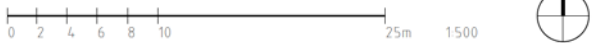


LAKE LAMP POST

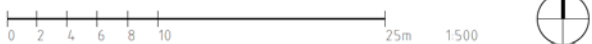


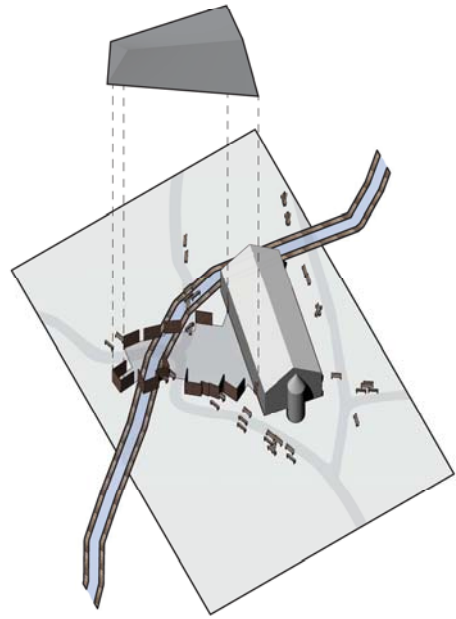
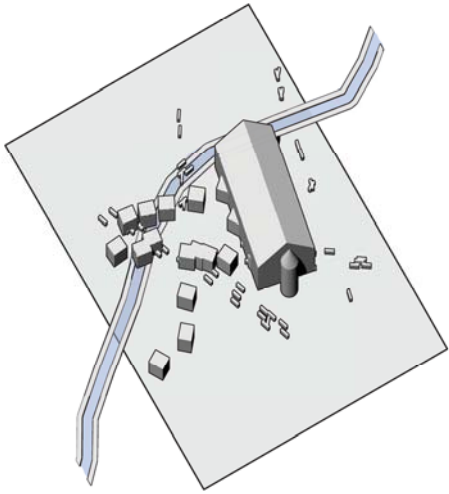


TARGET SITE - LOWER TOLLERED

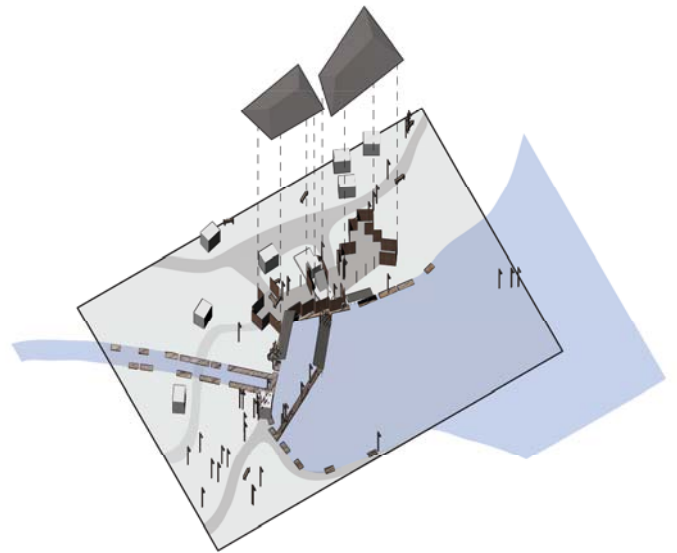
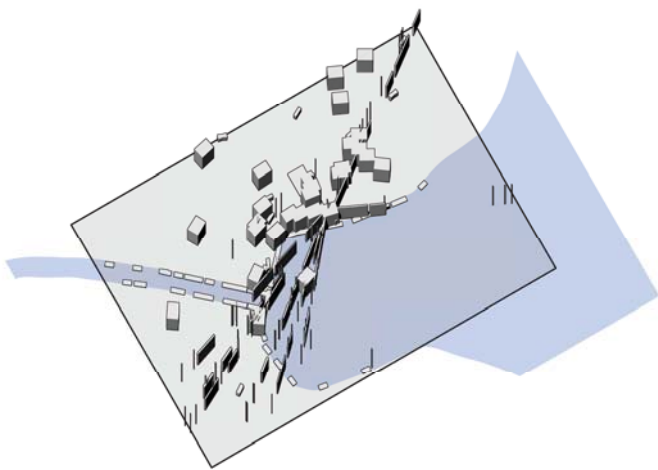


TARGET SITE - DÄMMET





OLD FACTORY WING



DÄMMET - BATH & SAUNA





**Gamla Kontoret**  
Kontorsbyggnad, byggd 1845. Näs Fabrik.

Byggnaden var kontor- och lagerbyggnad för hamn och åkerbyggeri.  
Första byggnaden under utövning med till Östra Fabrikens tredje utövning.  
Första av gårdens byggnad, av 2-3 av sina rader, utgörande förbindelse  
mellan kontoret och fabriken. För 1845 utgör en utövning. Den  
har utövning till förbindelse med utövning och andra i utövning  
som utövning (jag utövning) och utövning i utövning.  
I utövning har utövning till till utövning. För hamn-  
byggeri har utövning till utövning. Källor.





BUS STOP

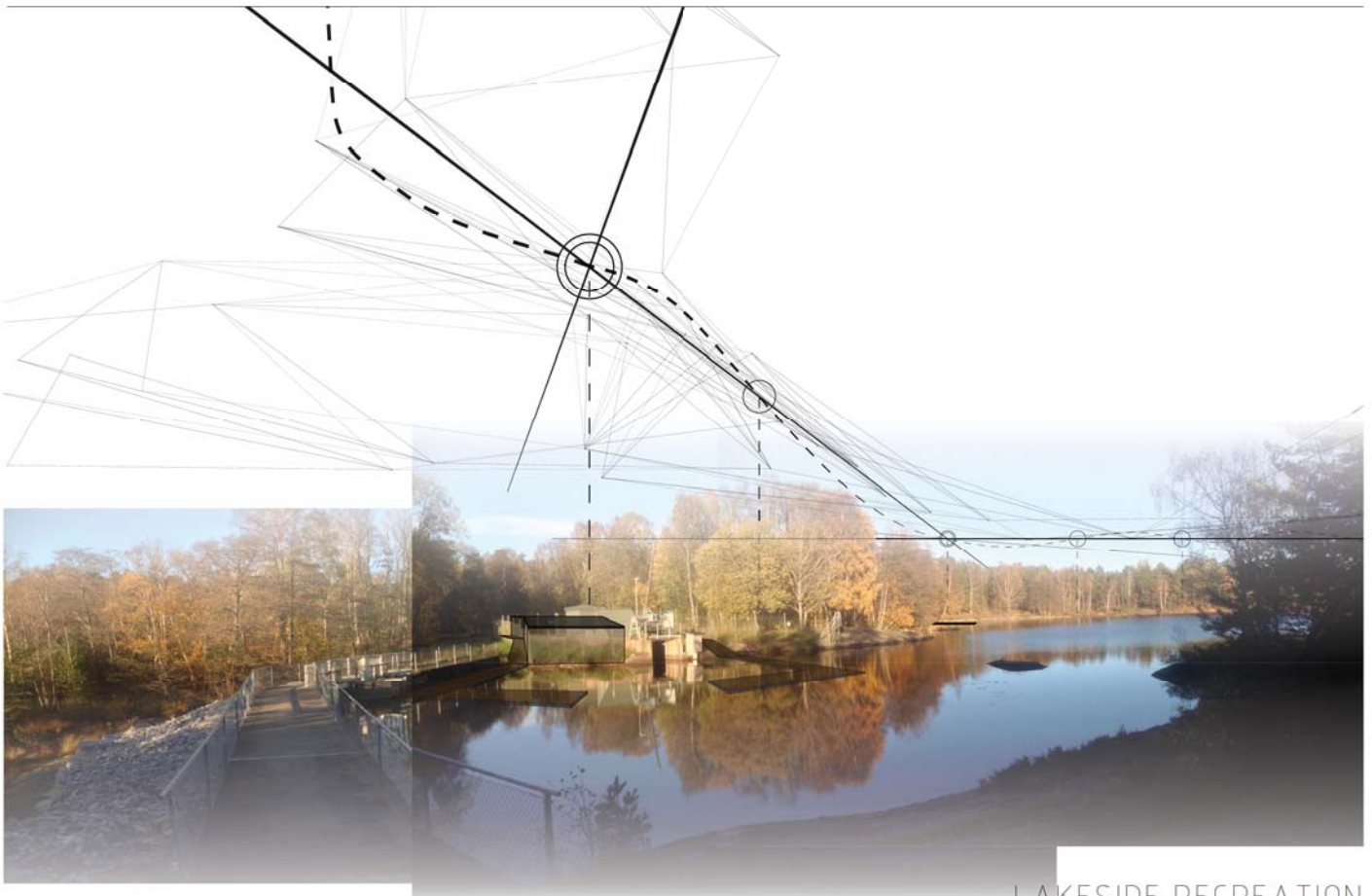
3.0

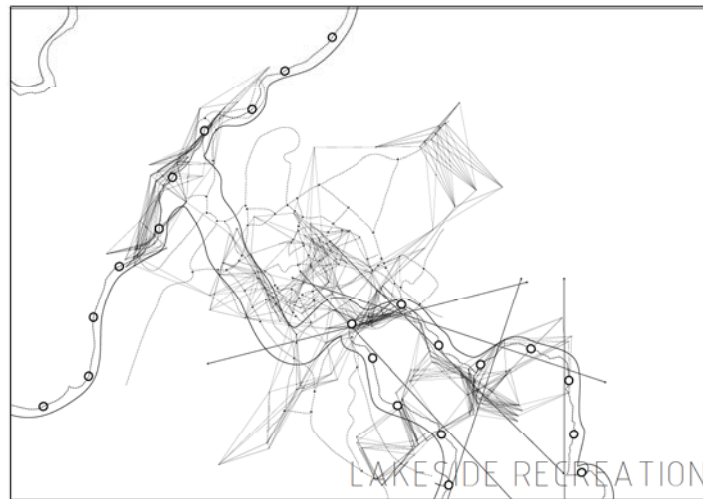
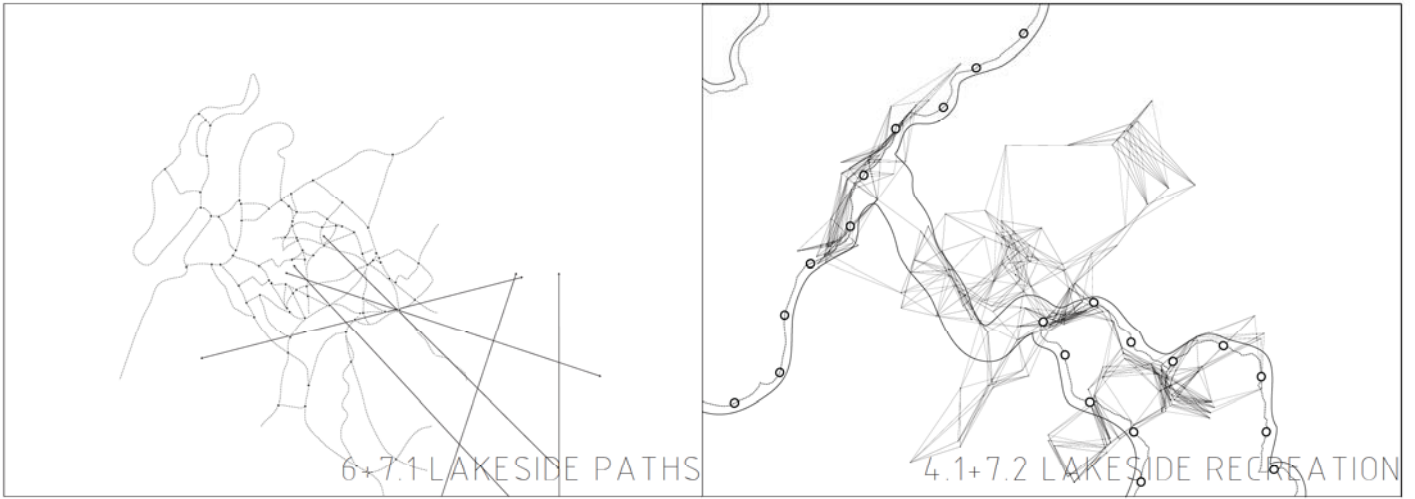
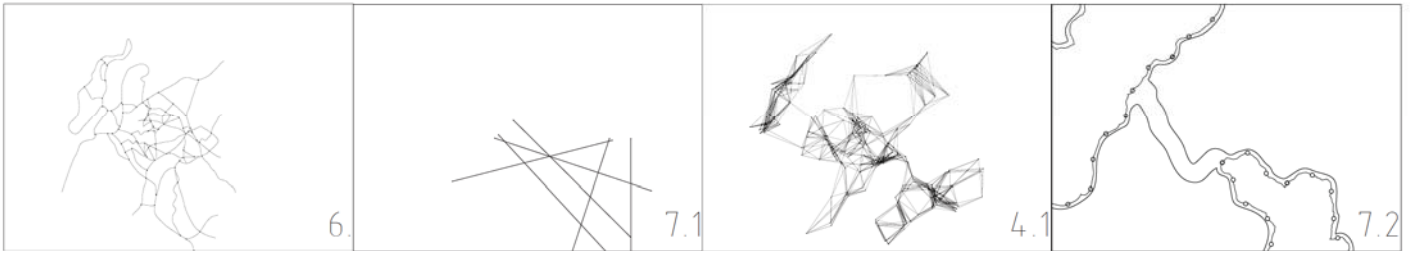
# *CONCLUSIONS*

## *Early Attempt - Site Specific Interaction*

This example was an early attempt in generating a design based on layer interaction. It involved manually searching out sites with a high density of layer interaction, looking at what layers interacted and where and giving a specific design element to each separate layer interaction.

Although this way of using the system is not inherently wrong and can yield satisfying results, it does only look at the layers interacting at chosen sites. Which can be problematic when the layers interact on a larger scale.



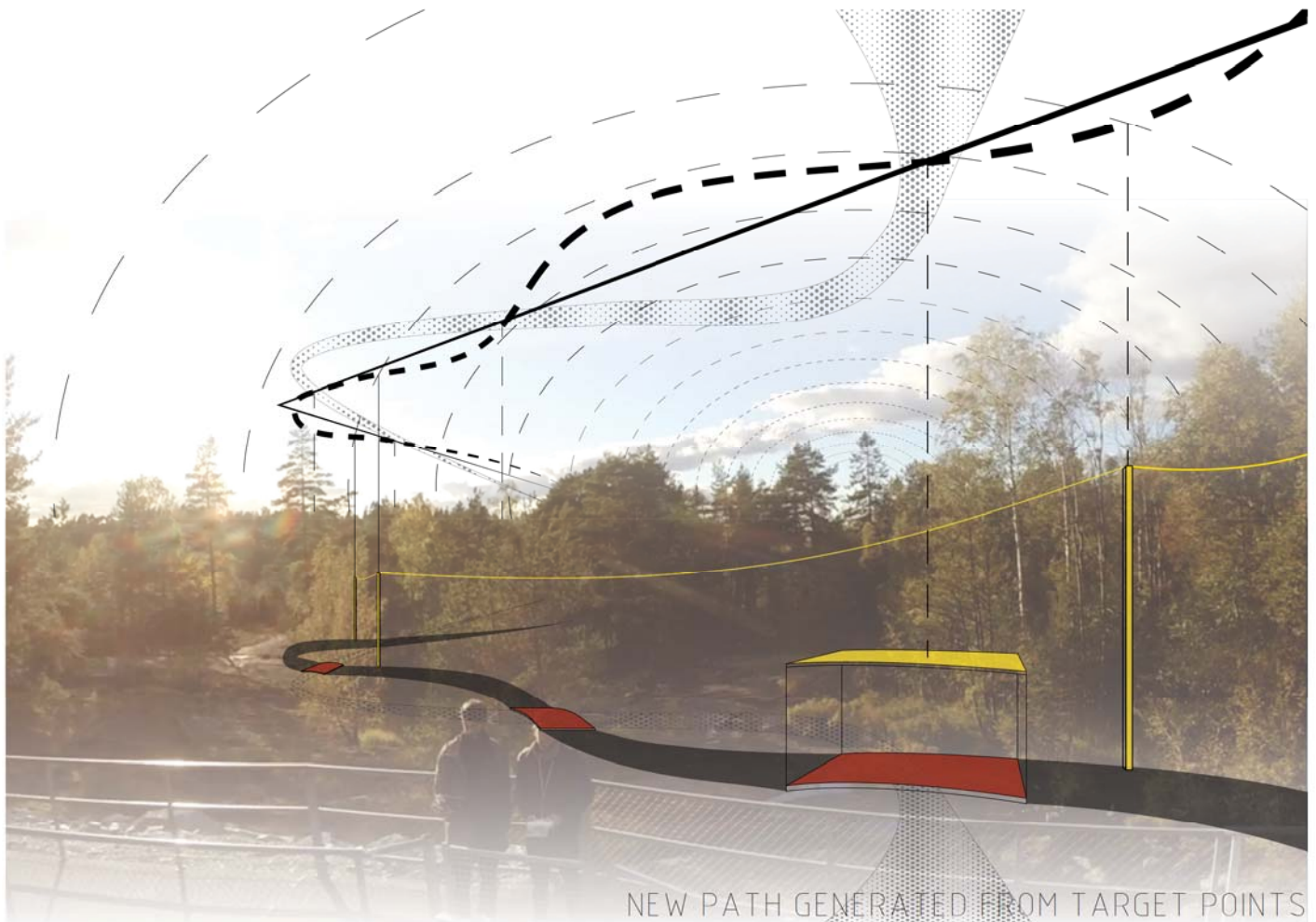


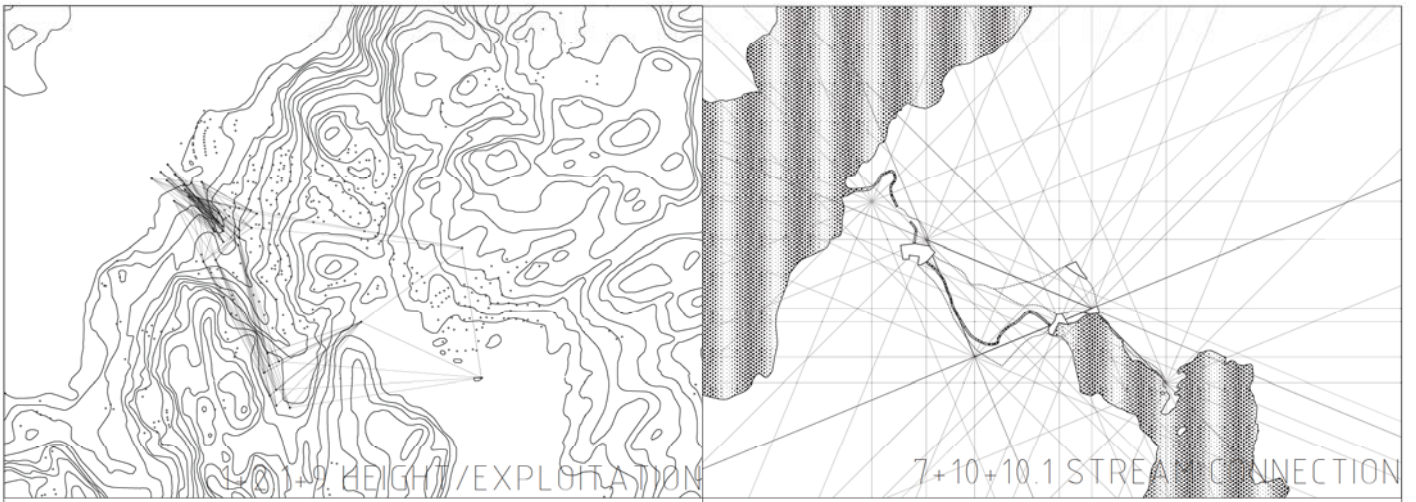
## *Early Attempt - Forced Interaction*

Forced interaction refers to manipulating the system to accomplish a specific goal. In this example the goal was to create a new path between two target points. Instead of letting layers freely interact with one another you only chose specific interaction and create new derivative layers that generates the wanted result.

Forced interaction in itself seems counterintuitive to what the system tries to accomplish. That being generating both target sites and generating program for the interaction without the need for outside influence.

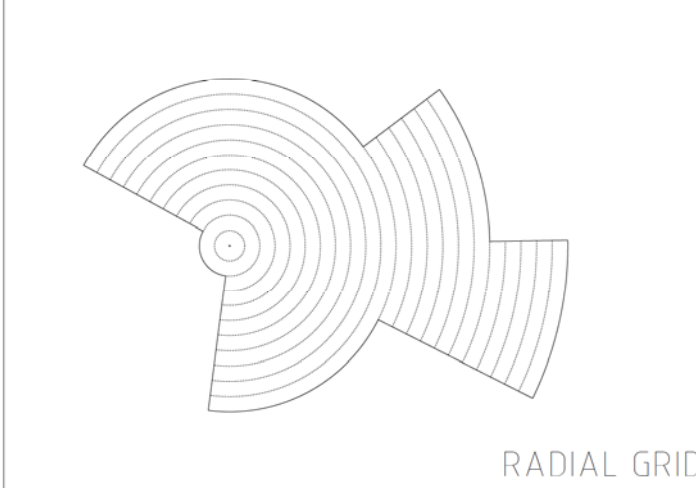
The two target points for the path later coincided with high intensity points and a equivalent solution was achieved by the system without forced interaction.



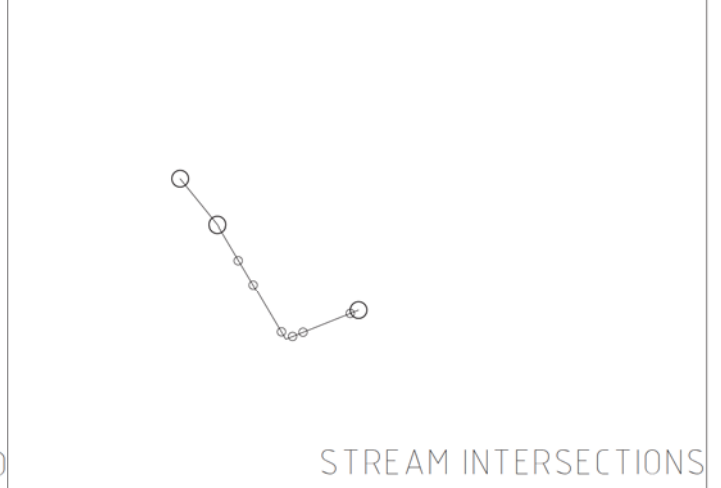


7+10+10.1 HEIGHT/EXPLOITATION

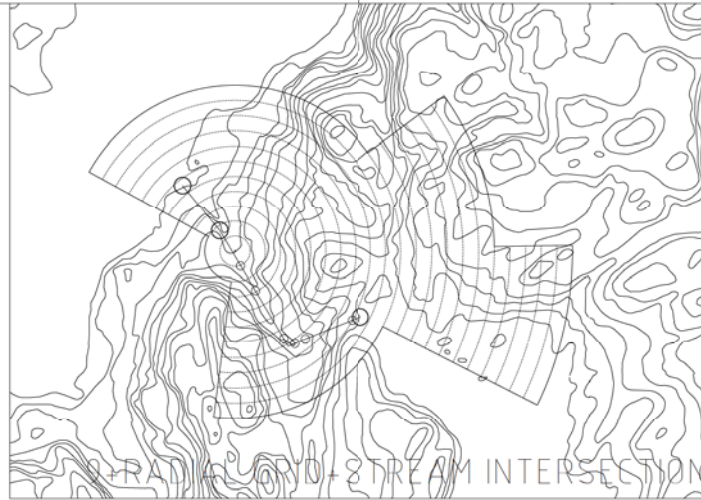
7+10+10.1 STREAM CONNECTION



RADIAL GRID



STREAM INTERSECTIONS



RADIAL GRID + STREAM INTERSECTION



STREAM PATH

# Conclusions

As I see it, the base layers all describe the physical context of the village and the derivation layers is the system's way of describing previously unseen connections, relationships and qualities.

The fact that that the target sites provided by the system corresponded to the sites suggested in the analysis conclusion and other important places in Tollerod signifies that the method is working, and the system has provided a way for us to find target sites where programming could be placed. The comparison tells us that the result yielded by the system is of equal standard to the result we came to by our own evaluation. It is important to note however that this way of finding target sites does not take unexploited areas into account and might forego low intensity sites with high potential completely. With a variety of base layers highlighting different aspects of the village this could be remedied to some extent. For example an area that is not highly exploited by buildings and services might still contain a large amount of recreational values and is therefore valued the same within this system.

I would like to point out that the equalization of different information in the deconstruction phase is an important part as to why the system in some cases seemed to balance itself out. The idea that an important building such as the primary school being given the same value as a small cabin in the building base layer might seem detrimental to the end result, but the school was also represented in both the service base layer as well as the historical building base layer, effectively giving it a value three times the small cabin in later calculations. This self-balancing act could also be found in other aspects of the system where important buildings or nodes generated a large amount of connections in the derivation layers, which in turn led to a larger amount of layers intersecting around that area. Deconstruction layer strips every event of all properties except its location, but those very same properties can later be read in the multitude of derivation layers. Each derivation representing a singular quality of said event

The way information was represented throughout the thesis became vital for its success. There were many instances in which how something was represented graphically could change the outcome of the generated result. The superimposition and the information intensity peaks were two such instances. Based on how the representation of each separate layer was visualized (line weight, opacity etc.) the intensity peaks could have been skewed. The aim was to equate as much of the information as possible, but in some cases their visual representation had to be changed to not distort the end result.

In this case the point web derivations that signified connections and preexisting circulation layers were used. This led to a result mainly focused on connectivity and stops, which was one the problems that the thesis initially aimed to solve. It also led to an overrepresentation of certain inserted elements such as the directional post due to many of the input layers being tied to movement and circulation. The generated program and design naturally reflects the inputted layers, and due to this one can always experiment with input layers to generate an output that corresponds to the problems the chosen context is facing. In this regard the system provides a great deal of flexibility.

When it comes to generating program and design the system filled its function and generated an overall design. Applying the design generation to the target sites provided by the intensity peaks yields some interesting results. In some places the system has generated a satisfying result, and in some there are a clear overrepresentation of certain insertions. This is likely due to not understanding the system in its entirety when providing the system input information and can be adjusted with further adjustments. When completely understanding what input yields specific results this method of systematizing urban design is both flexible enough to be applicable to a variety of sites, powerful and relatively easy to use.

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