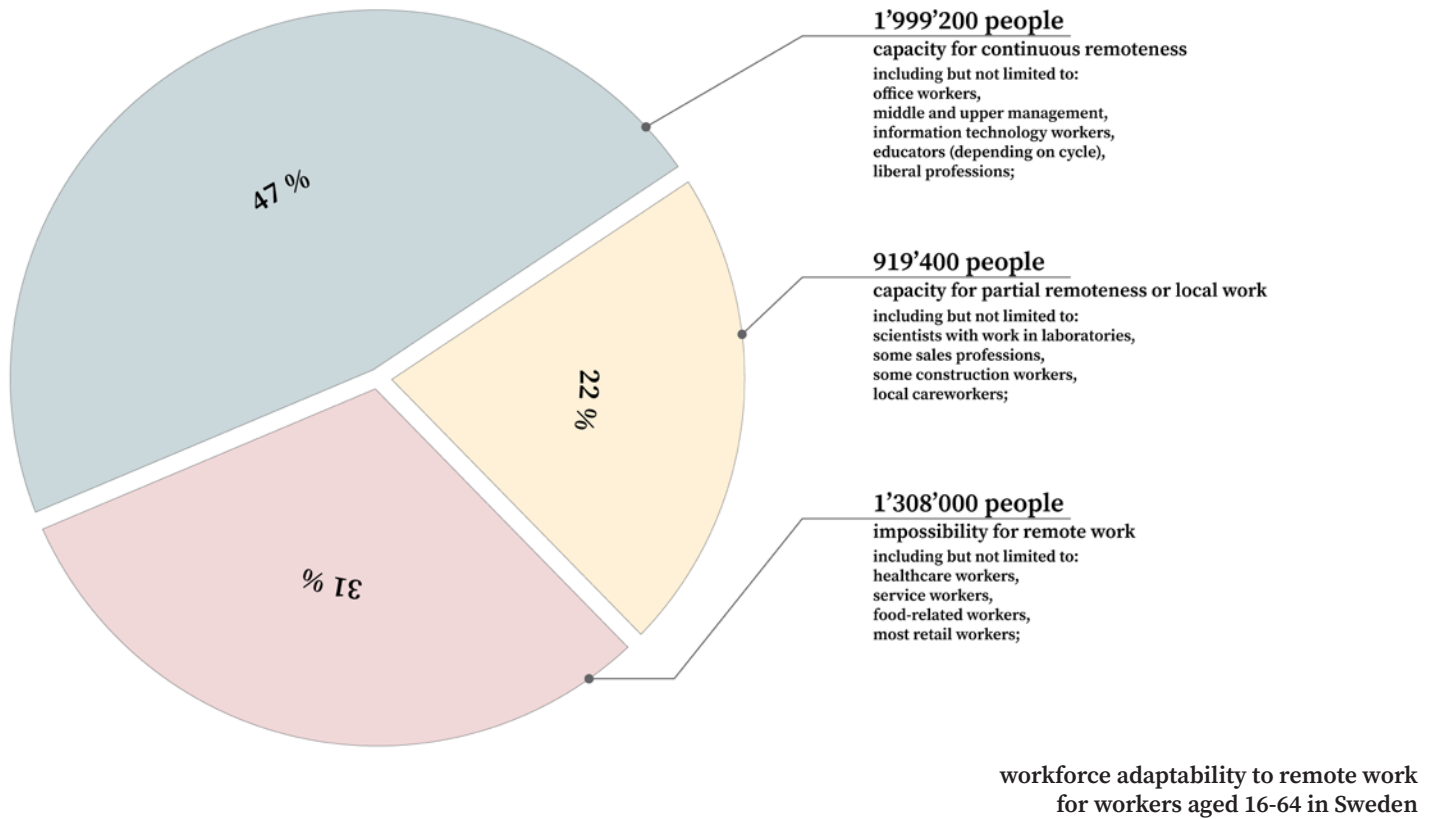


An aerial photograph of a suburban neighborhood. The image shows a mix of residential buildings, mostly single-story houses with orange roofs, interspersed with green spaces, trees, and roads. A prominent road runs diagonally through the center. The overall scene is a dense, planned residential area with significant greenery.

defining densification and greenspace in a post-covid reality

arch 673 - winter 2021
pr. nik luka

nicolas vincent
260746341



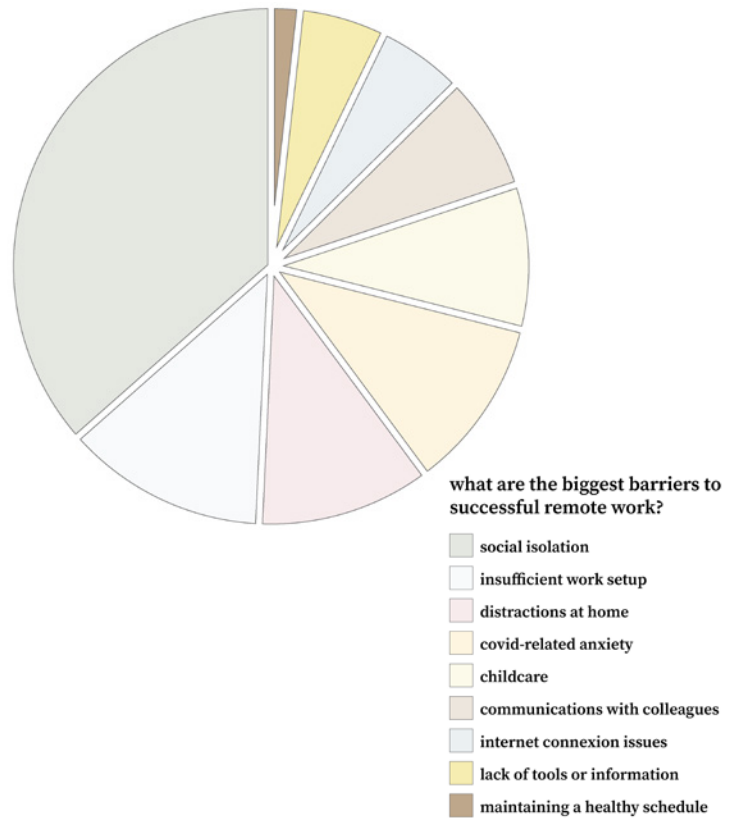
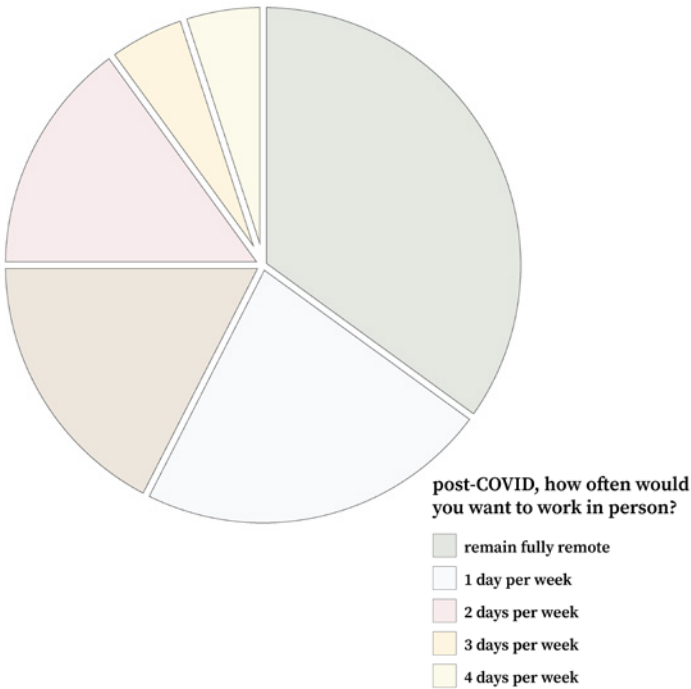
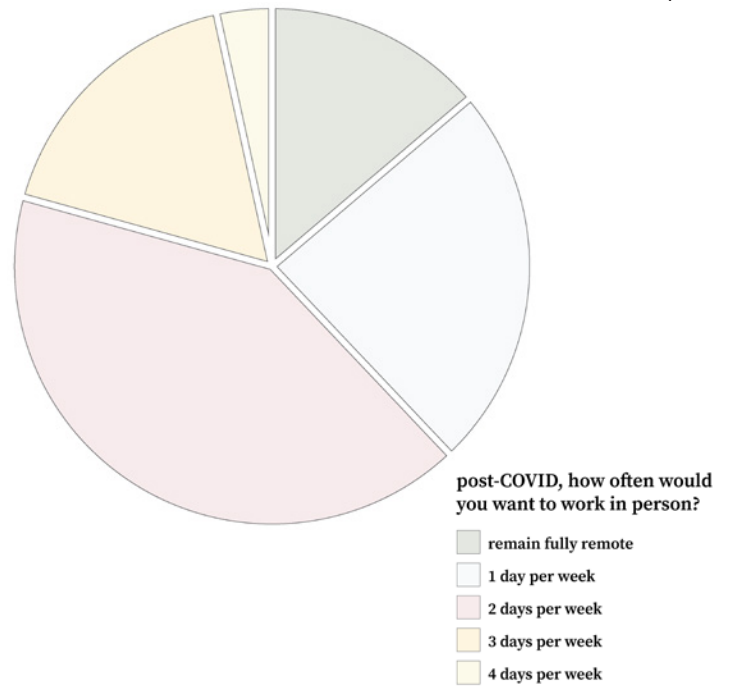
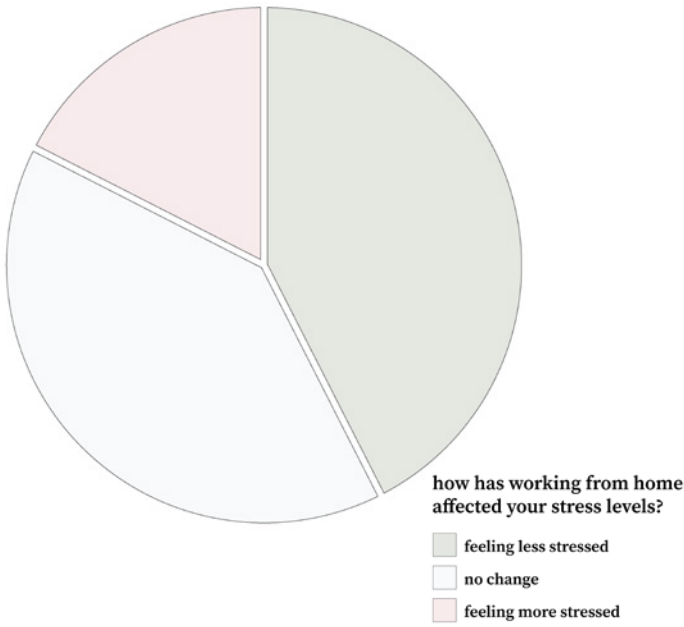
Ever since the beginning of the semester, I have been interested in the relationship between people's movement and the daily rhythms of a city and in the relationship between suburbs such as Knivsta and large city centers. I have been researching the impacts of the COVID-19 pandemic on these rhythms and dualities.

It is undeniable that the pandemic has affected the movement of many workers and disrupted the rhythms that were insofar taken for granted. Almost as soon as it began, confinement has caused us to question when and how we could safely return to the world before the coronavirus. This question has only managed to get harder and harder to answer as the epidemic has gone on.

Working off demographic data from Statistic Sweden, I've estimated that a little less than half of the Swedish workforce would be able to adapt their lives to remote work or studies. An additional 23% would probably be able to adapt their

lifestyle to at least partial remote work or studies, or programs could incentivize local work rather than longer commutes. This leaves us with 31% of the Swedish workforce which cannot realistically adapt to working remotely or are tied to physical institutions such as hospitals. The research I embarked on therefore had to ensure that none of these groups are left behind.

I was also specifically interested in how the situation would evolve after the pandemic subsides. This slide represents the results of a poll run by my office in August. These results are all extremely valuable, but the most important data shown here is that despite some of the significant barriers to the successful practice of working from home none of the respondents desired to return to in situ work full time. Most of the polled responded that they wished to return one or two days a week, to satisfy the requirement for team or project meetings and help combat social isolation.



internal poll run by architecture firm in August 2020 regarding morale and remote work

Given these results, I posit that the question at hand is no longer **how can we return to the world before, but rather **how can accepting that we will never again reach the world as we knew it help us shape the world beyond?****

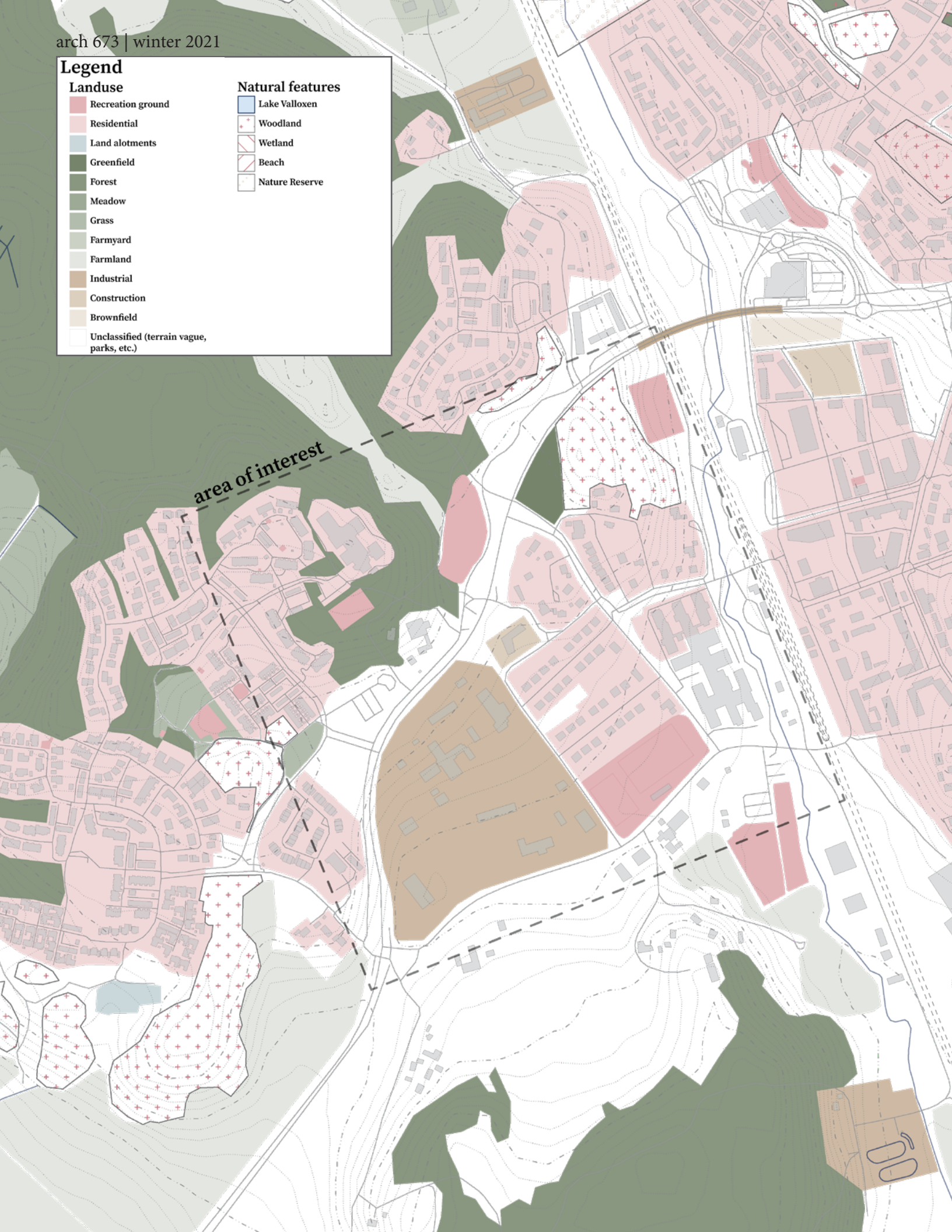
Legend

Landuse

- Recreation ground
- Residential
- Land allotments
- Greenfield
- Forest
- Meadow
- Grass
- Farmyard
- Farmland
- Industrial
- Construction
- Brownfield
- Unclassified (terrain vague, parks, etc.)

Natural features

- Lake Valloxen
- Woodland
- Wetland
- Beach
- Nature Reserve



How can accepting that we will never again reach the world before help us shape the world beyond?

A reduction in the quantity of commuters creates a newfound importance on local environment, a burden emphasized by the urban exodus of the pandemic

Smaller scale transport networks promote the use of active transport methods such as walking or cycling and connect to public transit

Mobility loops at various scales can ensure equity for those who cannot adapt to a more local lifestyle.

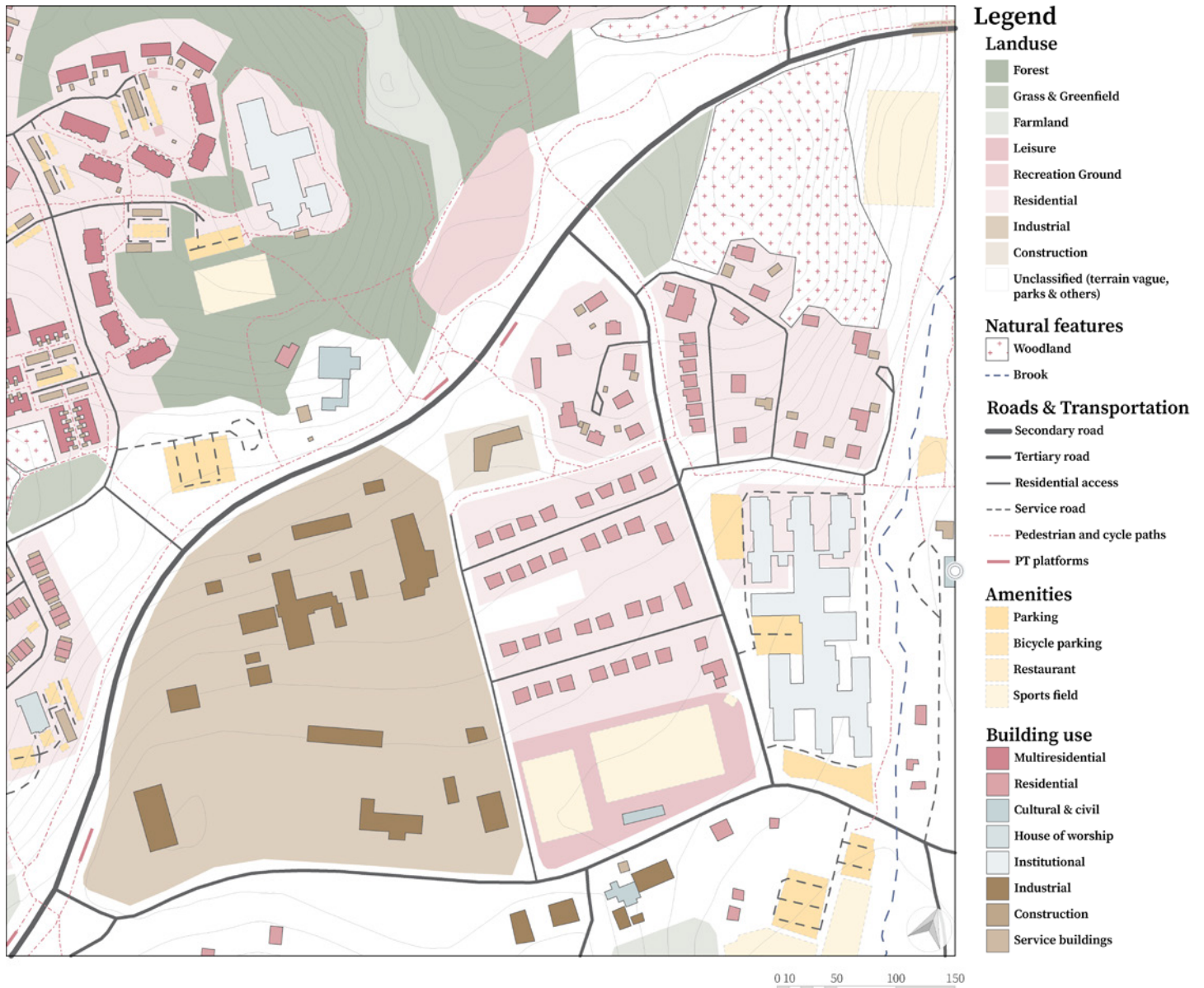
Early planning of green corridors help unify a fragmented landscape and connect urban and peri-urban areas

My study of Knivsta began as many did with the study of the land-use in the town. As we can see, most of it is dedicated to residential development. I was personally interested in the region directly to the west of the train station, delimited by two main streets, Knivstavagen and Gredelbyleden.

As with the general city, a great part of the land use is residential. Lower-density developments consist of semi-detached or detached housing, with newer elements consisting of terraces or blocks of flats. One of the interesting elements of this area which sets it apart is the large in-

dustrial complex lying at the intersection of the Gredelbyleden and Knivstavagen. It consists of scrap-yards, equipment rental, and other light to mid industrial elements sitting in a fenced yard which is already set for redevelopment. Finally, the civic area contains the hospital complex of the town as well as a slowly emptying elder care center on the northern end.

This area is currently of quite low density. Looking at how the commune plans to apply their densification goals, we can see that the area I've explored is set to receive a massive development with a density goal of 150 units per hectare.





terrace housing



townhouses and semidetached buildings



industrial area near residences



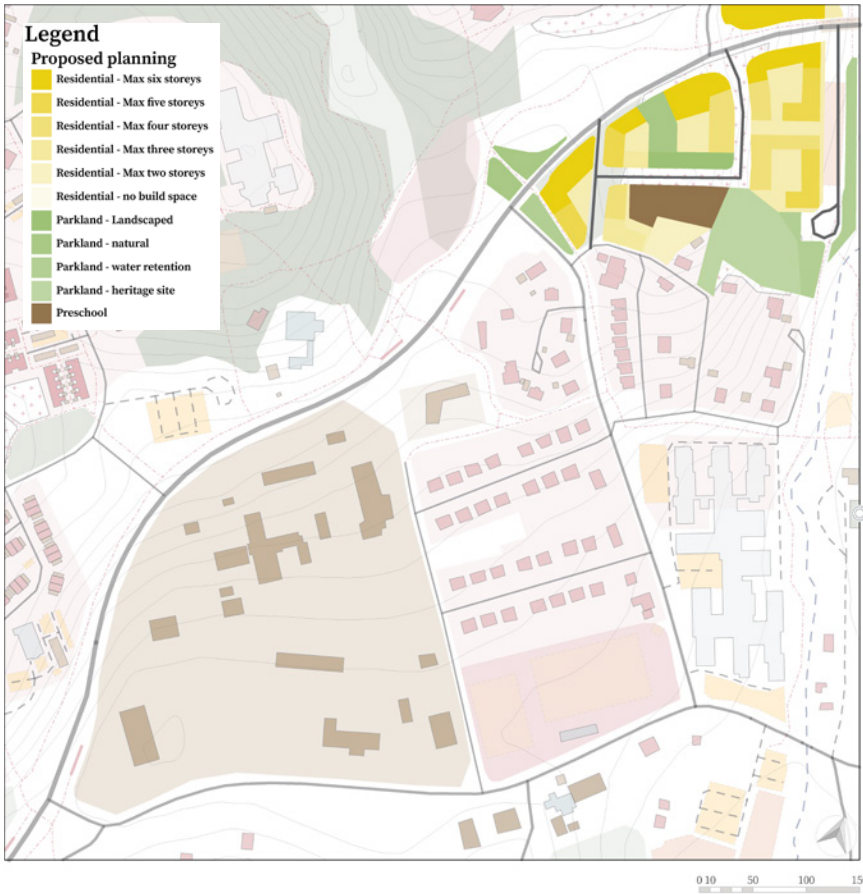
industrial area near intersection of G and K streets



elder care residences



entrance to hospital complex



More specifically, the city of Knivsta has already demonstrated interest in the northern end of this site. The plan submitted by the commune shows the use of perimeter blocks running up to 6 storeys and the addition of generous new streets.

The area is currently covered in a dense greenspace through which run some trails and sport fields. Through google maps, we can see that they have already broken ground on this area, razing a section of the greenspace.



Sketch, main street



Recent bloc development, Trunstavägen

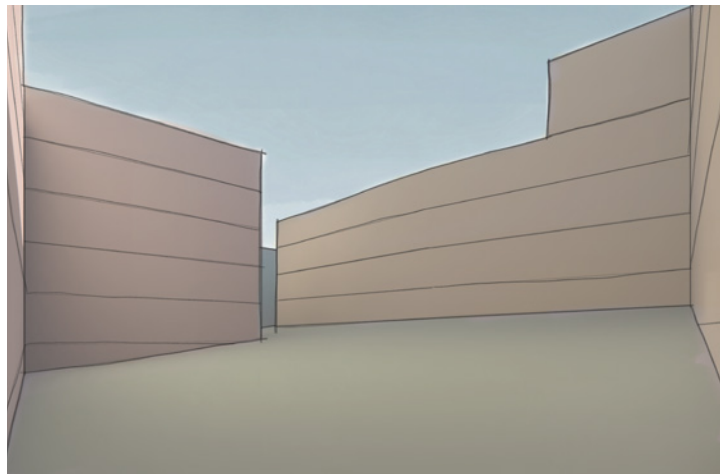


11+ hours / day

0 hours / day

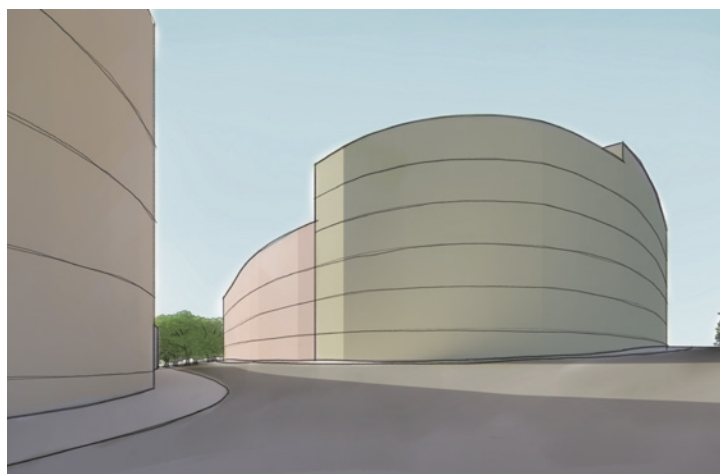


The other side of G street offers a glimpse of what may come on this site: linear, tall blocks of flats served by parking lots and imagined for car users. The proposal, modelled here to study its experiential qualities, creates narrow corridors facing tall, uniform blocks. I take this as a poor example of the creation of interesting or active space as the blocks are all turned inwards. There may be an access, but it is implied that it is reserved to residents.



Inner courtyard. perimeter block

I have also analysed how this planning responds to sunlight. The average daily sunlight of this new development lies at approximately 5 and a half hours, meaning that the deep courtyard and streets will most often be in darkness, even during the day. With this development acting as backdrop and the premises in mind, I began planning a counterproposal for the area between Gredelbyleden and Knivstavagen.



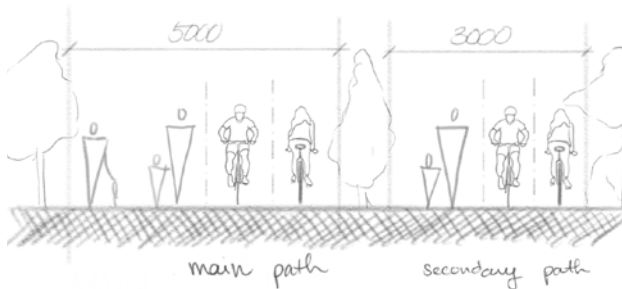
Junction of the development and G street

Erickson's theory on the urban armature argues that movement structures are usually the basis for the rest of the city fabric, like a series of voids around which the city is constructed. These different scales of movement represent the different ways one moves through the city. The nature of different transport methods and the relationship between their scale and flexibility has particularly interested me. We can imagine that active transport methods such as walking and cycling are especially flexible because the decision to stop somewhere between points A and B does not require any added actions. To create more interesting and flexible spaces without planning for large swaths of parking, it follows that the active and flexible forms of transport should be favoured.

The proposed development at the heart of this project is therefore centred around two concepts: generous shared active paths providing shortcuts to and from the center and train station, and a series of wide green corridors framing these paths and connecting the greenspace within and outside the town.

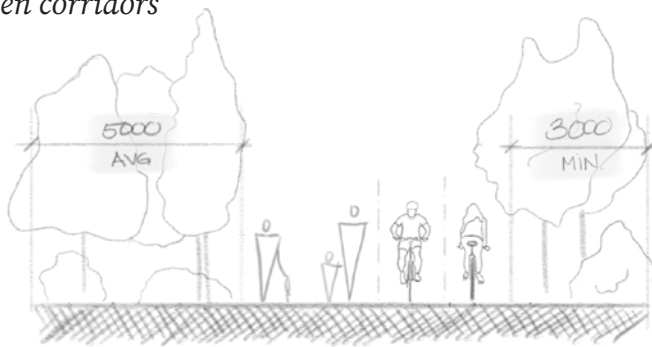
In the negative space, the fabric fills the voids with a mixture of multi-use zoning at the northern and southern ends of the development, medium-density residential development, and existing housing tracts not set to be rezoned. These zones could form the basis of a new network of elements geared towards working remotely or favouring local work opportunities

Dedicated, mixed active paths



Wider active paths which connect to the existing trails or bike paths and take the quickest route towards the train station and the rest of town. This would facilitate the movement locally and towards forms of long-distance transport. As these paths would add non-negligible areas of pavement to an already damaged landscape, more resilient modes of construction such as permeable pavements should be used to limit the impact of water runoff.

Green corridors

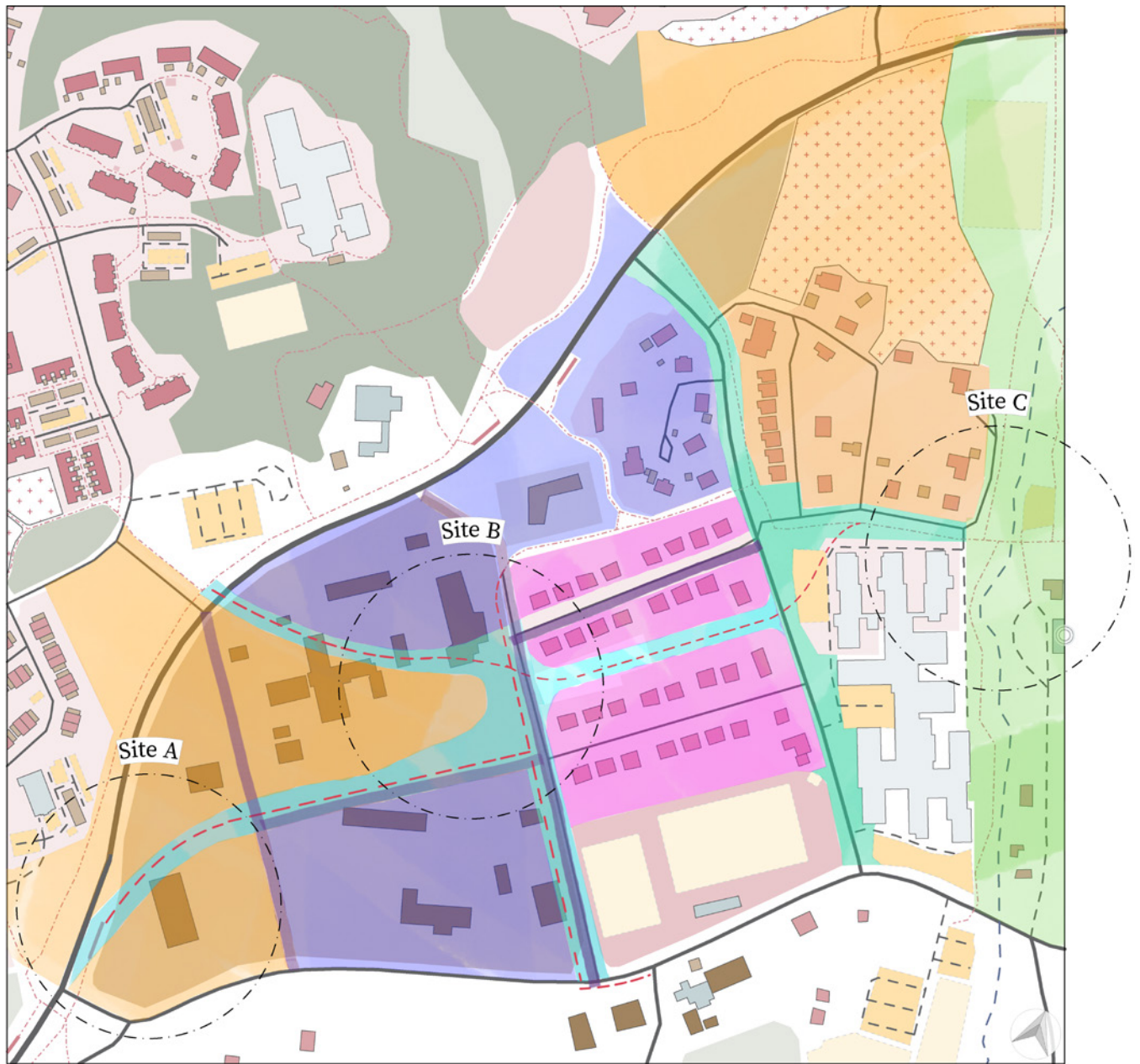


To help connect these paths to the greenery which lines the railroad and the wooded areas outside of the G-K area, I propose the introduction of the linear green streetscapes along the paths and existing streets of the development. These would also create buffer zones helping for the protection of the active paths as well as reducing wind tunnel effect and noise pollution.






Shared streetscapes






Two additional streets would be narrow to limit speed, and offer parking perpendicular to the street, meant to protect bike lanes and pedestrian paths. Intersections between active and vehicular paths are planned as a reversal of the traditional roles. The active path becomes like a railroad crossing, forcing cars to stop and giving priority to the more vulnerable users.





Proposed planning

-  New street
-  New active transport path
-  Greenspace to be maintained
-  Green streetscape A
-  Green streetscape B

-  Mixed-use development
-  Medium-density residential
-  Later redevelopment / no action

Phasing

-  Phase 01
-  Phase 02
-  Phase XX

0 10 50 100 150



Site A

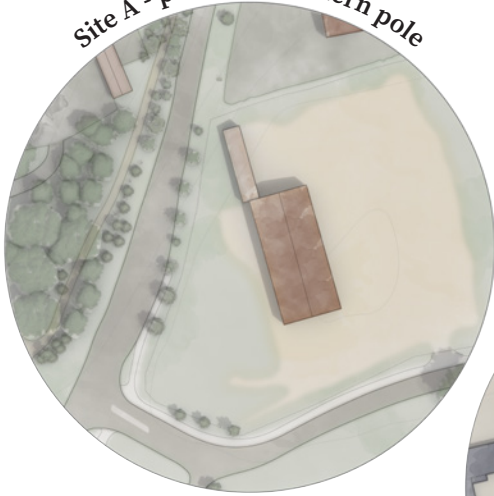


Site B



Site C

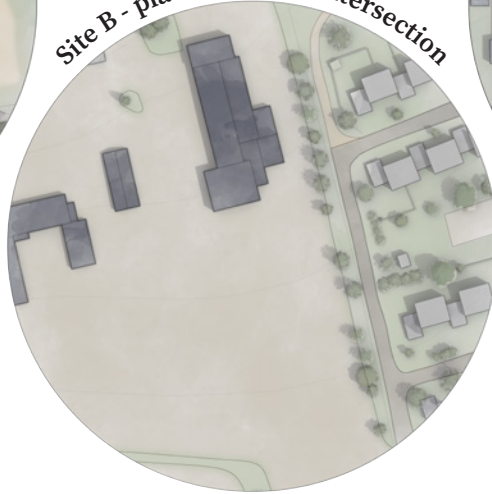
Site A - planned southern pole



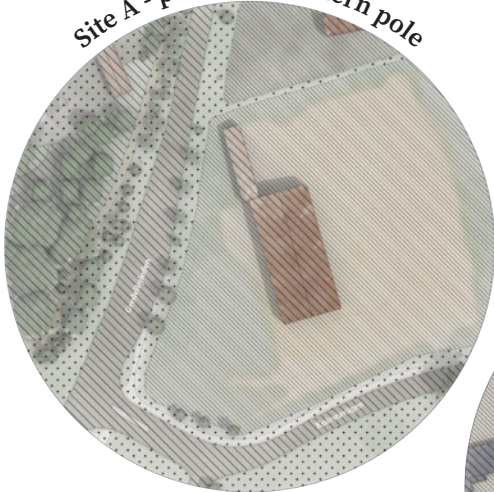
Site C - station vicinity



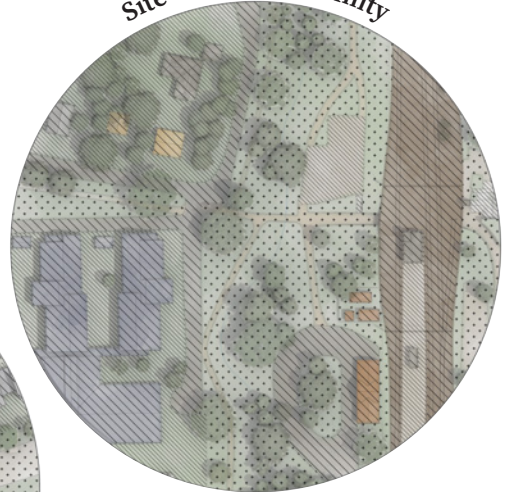
Site B - planned active intersection



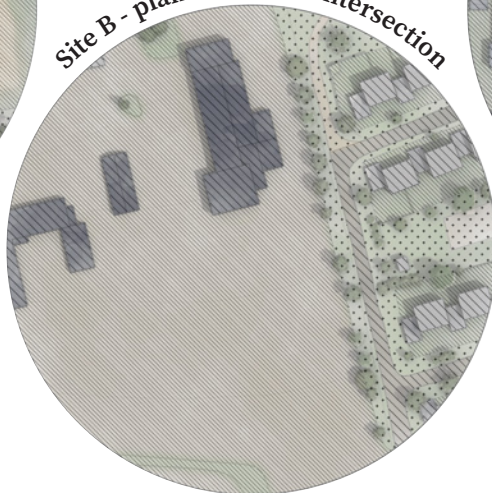
Site A - planned southern pole



Site C - station vicinity



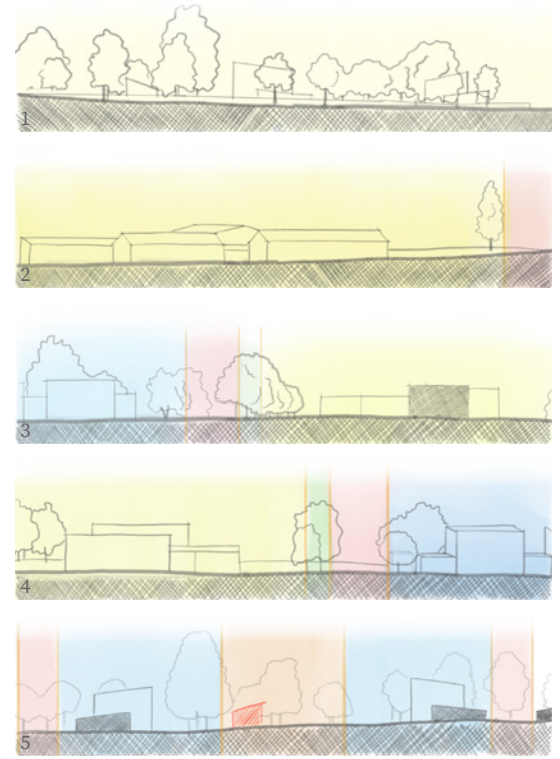
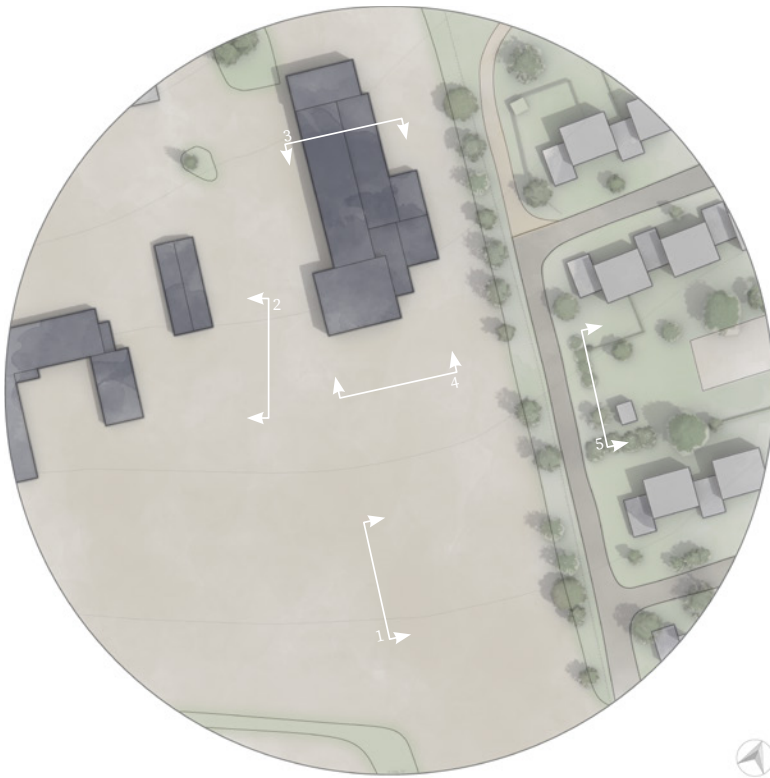
Site B - planned active intersection



Porosity - Accessible

- Non-porous
- Porous; inaccessible
- Porous; accessible





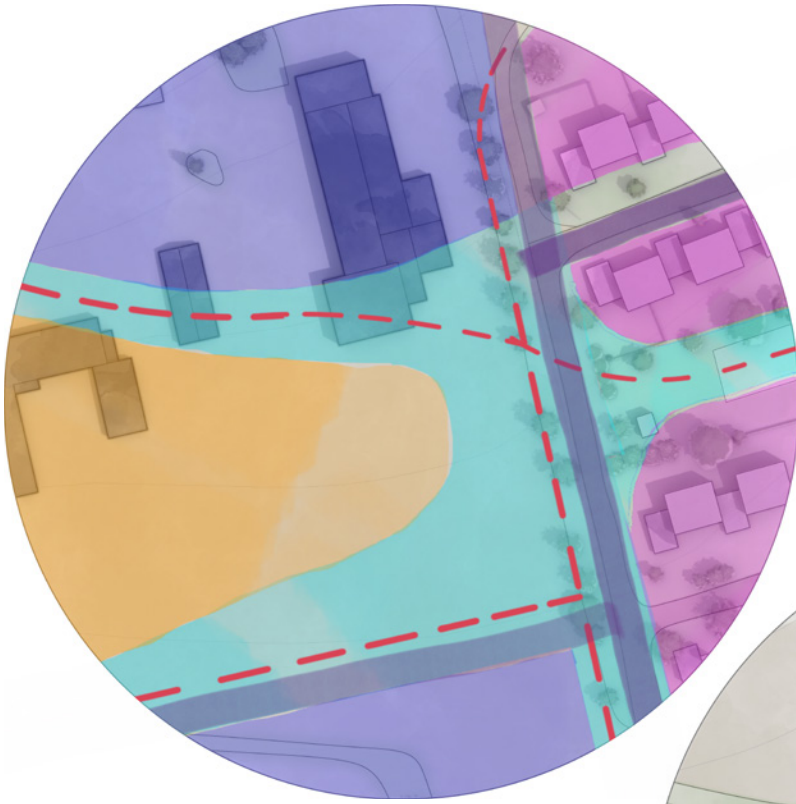
Industrial land
 Road
 Greenspace
 Public use
 Private residence

To study the expression of porosity within the realm of the G-K area, I looked at 3 different sites along the newly created corridor. Site A, on the southern end of the area, Site B, at the intersection of the active paths, and site C, in the vicinity of the train station.

I was interested in the difference between the experiential and accessible qualities porosity. Here, the space hatched in crosses is read as open space. Streets, as they cannot be inhabited safely, are not counted. Then, applying a filter for what is genuinely accessible of this porosity, the condition dramatically deteriorates. Fences, hedges, and other barriers create inaccessible elements of porosity. Site C ranks best here, with accessible, porous space representing 45% of the area represented.

To create a proof of concept for the intervention, I have chosen to study more deeply site B, the site of the planned intersection. Site B lies at the intersection between the light industrial area and an older residential development consisting of semidetached, two-storey housing.

Looking at how this space is divided currently, most of the area, of course, is the inaccessible industrial area. There are very few spaces left for public use, main of which is a dilapidated park and sports field between the rows of housing, represented in orange on section 5



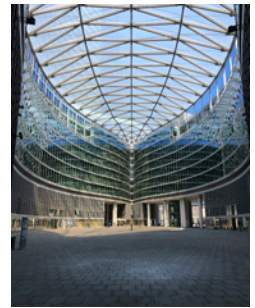
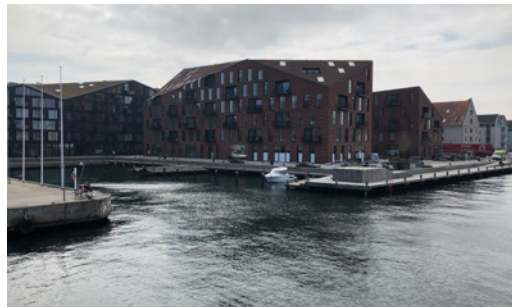
Site B represents the junction of the two branches of the main corridors, a secondary path, and new streets. It also shows larger green spaces and a conjunction of mixed use and medium density residential developments.

As mentioned earlier, I foresee that the integration of the paths does not have to wait for the breaking of ground of the built development. Rather, an early integration would allow for the growth of greenery and building a use habit out of nearby residents.



Before embarking on the design of the massing of the new spaces, I studied the ways in which density is generated using different typologies. I've found that plex dwellings have the highest proportion of porosity, but lowest unit density potential. The plinth and tower model is the polar opposite, offering nearly unlimited unit density and tremendous flexibility of space at the detriment of ground porosity and accessibility of the façade. Finally, the perimeter block offers a middle between these two options.

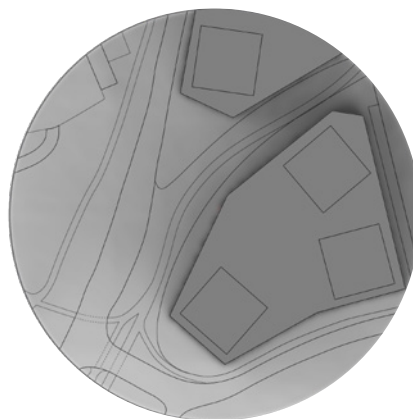
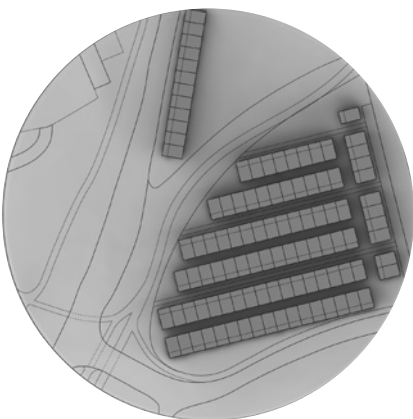
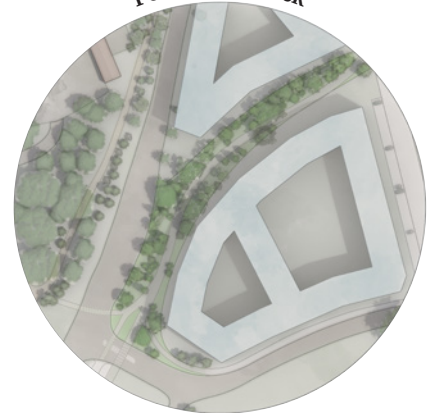
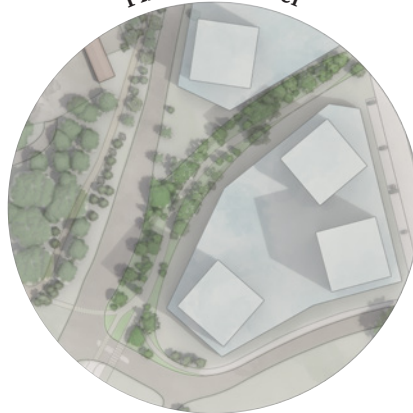
Once again at the suggestion of reviewers, I completed my analysis with the study of sunlight for all these options. Due to their small scale, the plex offers the most sunlight, with the plinth and tower close second. The perimeter block, as we saw earlier, is not conducive to well-lit spaces. The conclusion I have reached is that the low Swedish sun dramatically affects the quality of spaces around buildings.



Plex dwellings

Plinth and tower

Perimeter block



Two-storey, two unit plexes

3-storey plinth and 17-storey towers

5-storey perimeter block

Habitable area: 12 500 m²

Habitable area: 92 750 m²

Habitable area: 37 625 m²

Unit density: 66 unit/ha

Unit density: 286 unit/ha

Unit density: 132 unit/ha

Porosity at ground: 54 %

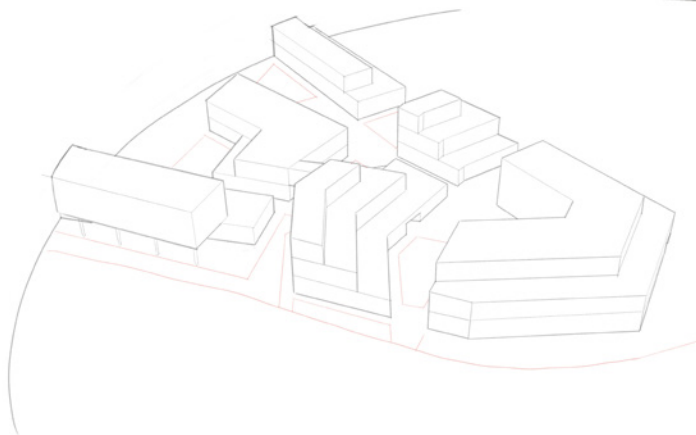
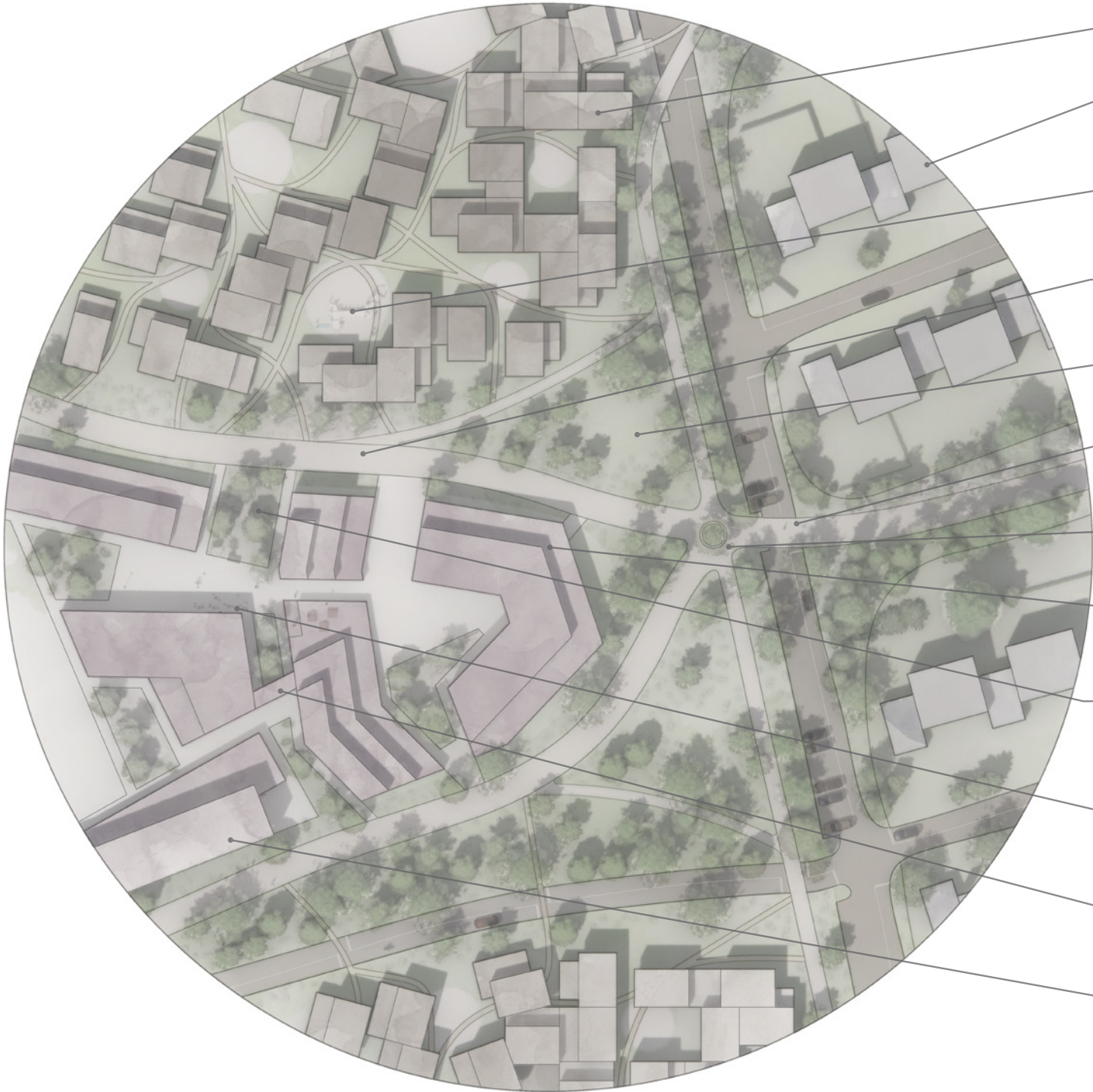
Porosity at ground: 40 %

Porosity at ground: 50%

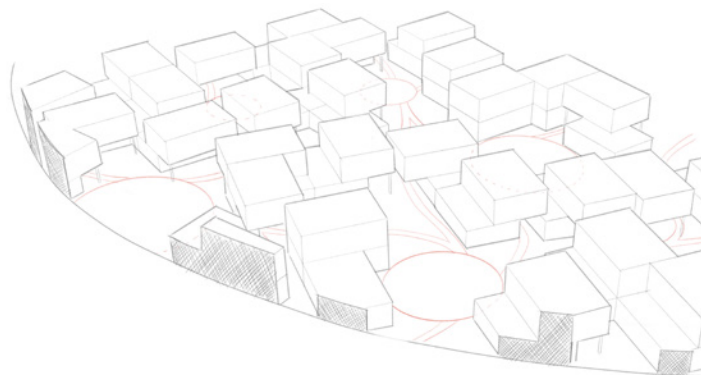
Average daily sunlight 8.6 hrs

Average daily sunlight 8.5 hrs

Average daily sunlight 7.4 hours



New mixed-use developments



New residential developments

New residential development. Each block represents an average apartment

Existing residential development. Lot sizes untouched, growth to occur over time

Small public spaces for residences. To be self-organized by residents. e.g. playground, garden, etc.

Widened active paths to simplify access to city centre

Open and public greenspace in the form of a park

Inverted road crossings. Cars to stop and priority given to most vulnerable

Intersection between active paths. Can act as a nexus and bridge between programs

New mixed-use development. Step improves sunlight at back

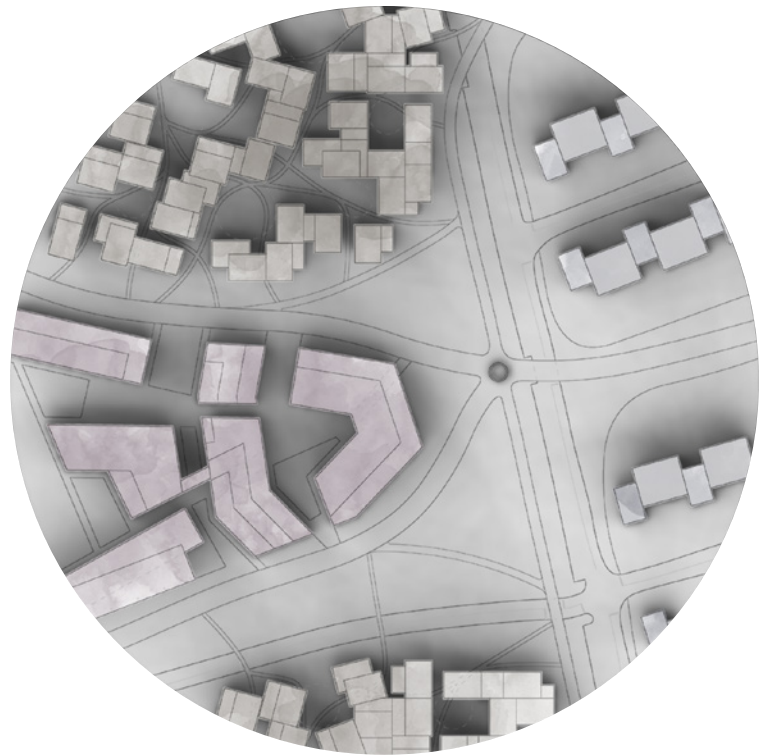
Green space penetration. Green elements intrude into the multi-use development to reduce scale

Inhabited square. Provides activity throughout day and beyond the office hours

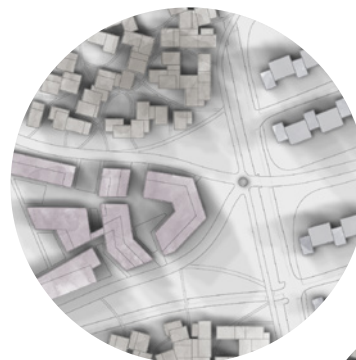
Connections between buildings. Becomes important during winter months

Staggered forms on south end. Can be enclosed in winter to provide heated, sunlit space

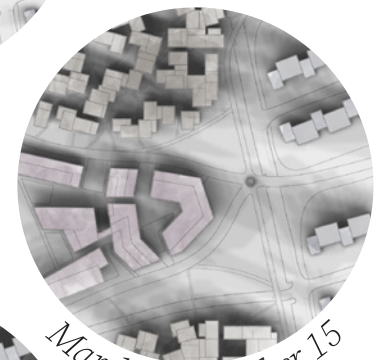
Applying the research and premises, this proposal creates a variety of spaces which provide adequate density while still maintaining porosity. The staggered blocks of the residential development massing each represent the area of an average flat, around 68 square meters. With these forms and orientation, we can reach an average daily sunlight of 6.75 hrs, a significant improvement on the earlier plan, without sacrificing much on density.



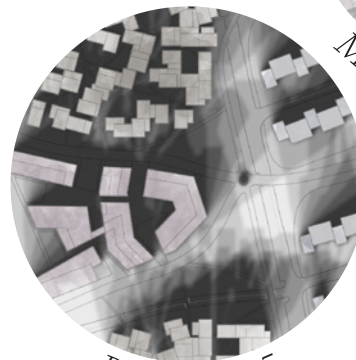
*Average daily sunlight:
6.75 hrs*



June 15



March / September 15

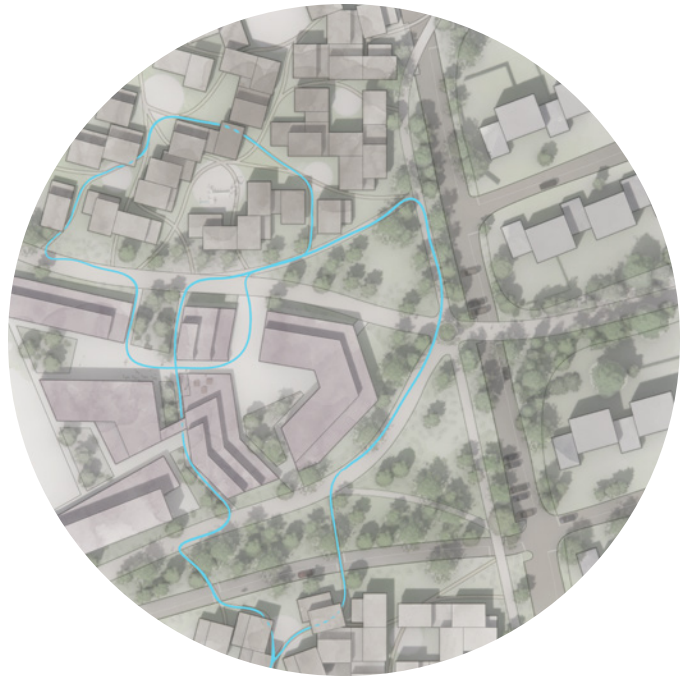


December 15

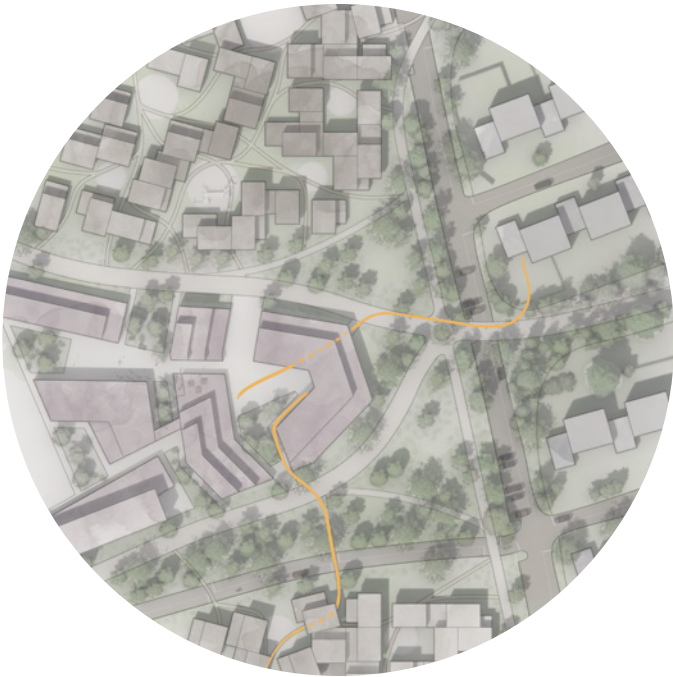


*Connections to public transit,
highway, city centre*

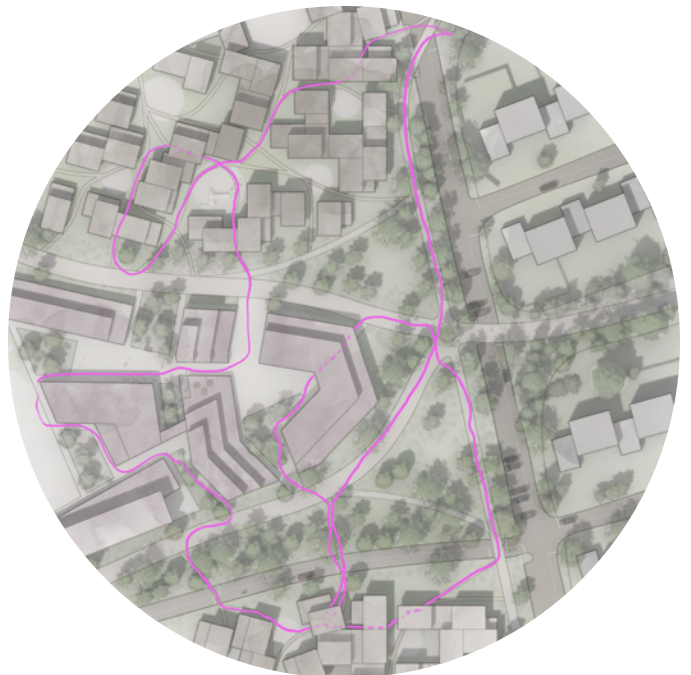
*Local promenade,
dog walking*

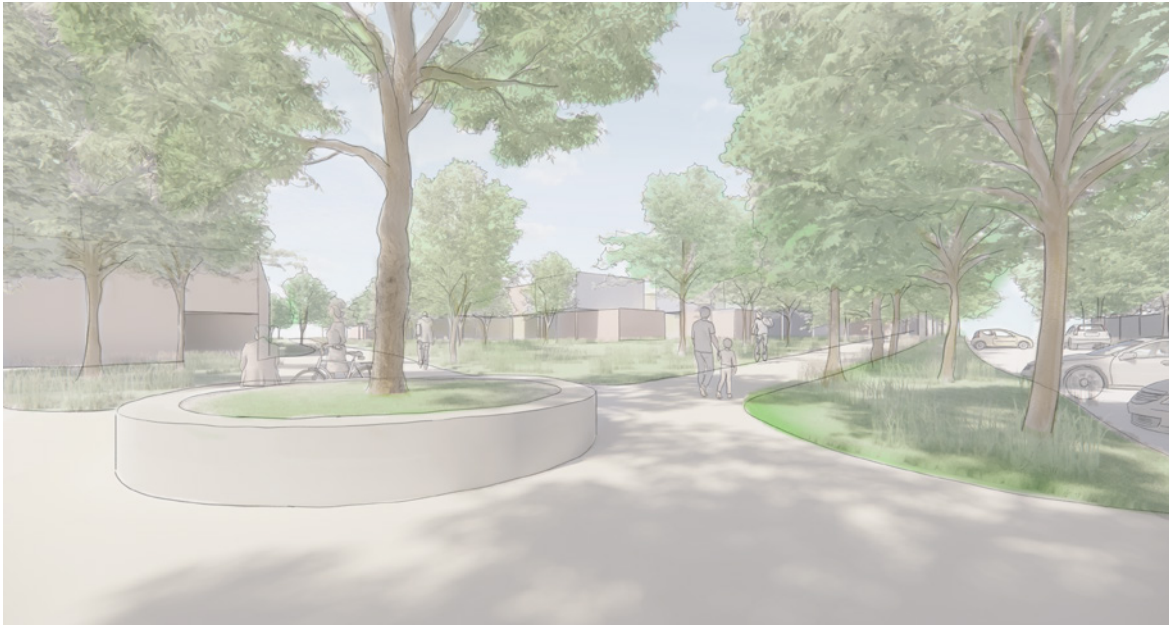


*Local workers, users of
mixed use dev.*

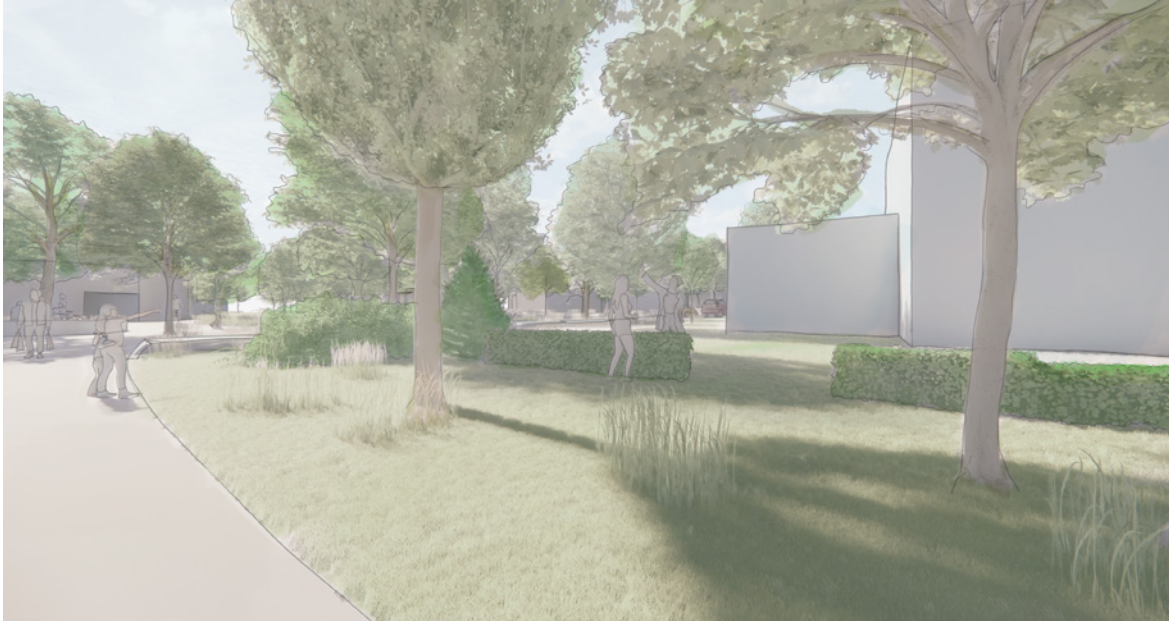


*Idle or leisurely,
long-distance*

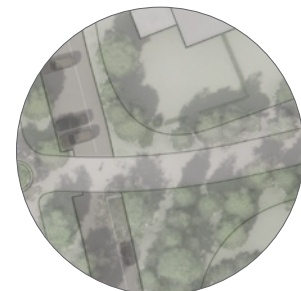




The spaces created are organized around the mobility network. The intersection at the center of this area can serve as a nexus, a meeting point. It also offers public greenspace at the centre of the three programs



In the existing residential area, the corridor can become a back alley giving directly into the backyards of the residences. The hazy boundary between private and public space typical of Swedish culture can make for social interaction between residents and those passing through.



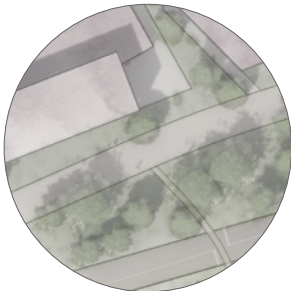


The blocks of flats, staggered and oriented in a variety of ways, create a multitude of spaces organized around the needs of the residents. Shown as an example, the establishment of a playground within a clearing. Despite the high porosity of this development, it can reach up to 140 units/ha locally. The paths crossing through the blocks create a form of parallax enticing the user to explore.



Moving into the mixed use development, public squares can serve as larger gathering spaces. They can also be occupied by the local retail and service industry such as a café or restaurant, creating activity and a stop along the way for travellers.





Finally, near the additional streets, more outdoor public space can be arranged for use outside of typical work hours. Such spaces could also be enclosed in the winter to provide an additional sunlit space for users.

The new importance of the local space cannot simply be mitigated by few large-scale public areas. Rather, smaller, more intimate areas are created at every point in the development.

The mobility loops at the heart of this development have varied scales and multiple pathways to access. They connect to the public transit and vehicular nodes of Knivsta at large, but also favour smaller, local loops for users, both pragmatically through shortcuts and interestingly for more leisurely movement.

Finally, the creation of a large network of greenspace creates connections between the more heavily paved regions near the train station and the wooded areas outside of the development.

Moving forward into next fall, I'd like to study how similar developments could be created which respond to other location-specific criteria, specifically in North America. The *relance économique* promised by both federal and provincial governments here in Canada will undoubtedly include the creation of large-scale transit routes and the rise of new districts. They would provide an exceptional sandbox for such research.