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# MORE THAN A NEIGHBOURHOOD

## Stakeholder views on the operational, environmental and reporting demands of the Hiedanranta plot handover

Bachelor's thesis
Faculty of management and business
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June 2025

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# ABSTRACT

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The plot handover competition, held in 2023 for the northern plots of Hiedanranta, Tampere offers new examples of sustainable construction and community creation for sustainabile neighbourhood development in Finland. The Three concept plans to be realized in the area are Gemini, Hiilenpesä and Triangeli, which have best answered to the high demands of the competition, run by Hiedanranta development company. The main themes of the competition include environmental and operational aspects as well as comprehensive reporting throughout the planning of the area and its realization. In Hiedanranta, the development is aimed to be environmentally sustainable and cause less emissions during construction and the houses future maintenance as well as push for active community, that can make the new neighbourhood appear more inviting and attractive as well as support sustainable choices in the residents' personal life.

The uncommon and highly detailed competition demands have awakened, both negative and positive reactions from the involved stakeholders, which this thesis will analyze and try to find reasoning for. The collaboration between Hiedanranta development company and the competition winning companies has been somewhat difficult from time to time, and as this project is quite unique precursor for sustainable construction in Finland, it is important to identify the advantages and shortcomings of the collaboration between the parties.

**Keywords**: Plot handover competition, concept plan, neighbourhood development, sustainable neighbourhood, sustainable construction, circular economy, planning policy

# TIIVISTELMÄ

Suvi Ylkänen: Päättäjien ja sidosryhmien näkemykset rakennus-, ympäristö- sekä raportointivaatimuksiin Hiedanrannan tontinluovutuskilpailussa
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Tampereen Hiedanrannan pohjoistonteille vuonna 2023 järjestetty tontinluovutuskilpailu tuo tutuksi uusia toimintamalleja ympäristöystävällisestä rakentamisesta sekä yhteisöllisyyden luomisesta kestävien asuinalueiden kehittämiseen Suomessa. Alueelle toteutettavat kolme konseptisuunnitelmaa ovat Gemini, Hiilenpesä ja Triangeli, jotka ovat parhaiten vastanneet Hiedanrannan kehitysyhtiön vetämän kilpailun korkeisiin vaatimuksiin. Kilpailun pääteemoja ovat ympäristö- ja toimintanäkökulmat sekä kattava raportointi koko alueen suunnittelun ja toteuttamisen ajan. Hiedanrannan kehittämisen tavoitteena on luoda ympäristön kannalta kestäviä asuinrakennuksia ja vähentää rakentamisen aikaisia sekä talojen tulevan ylläpidon aikana koituvia päästöjä. Tämän lisäksi alueen on tarkoitus edistää aktiivisen naapuriyhteisön syntymistä, joka osaltaan tekee uudesta asuinalueesta houkuttelevan ja monimuotoisen, sekä tukee kestäviä valintoja asukkaiden henkilökohtaisessa elämässä.

Epätavalliset ja erittäin yksityiskohtaiset kilpailuvaatimukset ovat herättäneet mukana olevissa sidosryhmissä sekä negatiivisia että positiivisia reaktioita, joita tässä tutkielmassa analysoidaan. Yhteistyö Hiedanrannan kehitysyhtiön ja kilpailun voittaneiden yritysten välillä on ollut ajoittain vaikeaa, ja koska hanke on varsin ainutlaatuinen kestävän rakentamisen edeltäjä Suomessa, on tärkeää tunnistaa osapuolten välisen yhteistyön edut ja mahdolliset ongelmakohdat.

**Avainsanat**: Tontinluovutuskilpailu, konseptisuunnitelma, aluekehitys, kestävät asuinalueet, kestävä rakentaminen, kiertotalous, suunnittelu käytänteet

# CONTENTS

## Table of contents



**TABLES**

# 1 INTRODUCTION

Urban development in the 21st century relies on the three pillars of sustainability: social, economic and environmental dimensions, that together create a foundation for successful and resilient urban development (Bevilacqua et al., 2023). Socially and economically sustainable solutions increase the vitality of new areas and create a foundation for an actively and efficiently used space, further shaped by the local residents and businesses that emerge. Climate friendly choices in construction are slowly becoming more visible. For example, circular economy practices and reuse of materials in new housing could be one of the responses to the environmental goals, set by the European Union as well as individual countries and cities. Circular economy and use of carbon free materials are also in the heart of the development happening in Hiedanranta district, Tampere where a new neighbourhood is being built to a location of an old factory area that has been unused, waiting for a purpose for quite a few years. The plans provided for the new housing in the area have shown that the responsible companies have been able to provide building blocks with less emissions and cut the carbon footprint of the materials as well as use of energy and water, which makes the area stand out as a sustainable and modern neighbourhood.

New urban development in Finland's most vital cities, like Helsinki, Espoo and Tampere, is quite rapid as these cities have been experiencing fast population growth in recent years (Tilastokeskus, 2024). The cities that are currently profiting from migration are expected to grow even more in upcoming years and thus, the need for new neighbourhoods and residential areas is evident, which these cities have recognized and taken action to provide. Urban development in Tampere has been much affected by the local tramline's development and the new opportunities that new forms of public transport can offer to regional development. New neighbourhoods like Hiedanranta are often located along the new tram line, where most of the current urban development projects are planned. Developing neighbourhoods in a sustainable way and extending public transportation facilities are also part of Tampere's urban strategy (Tampere City Council, 2023), and acts that take the city closer to being carbon neutral by 2030 are visible in Hiedanranta's development criteria.

Hiedanranta is one of the areas in Tampere, that has been waiting to be rebuilt and developed into a smart sustainable hub of local residents for years. For the new development, a plot handover competition was held in 2023 to choose the fittest concepts to implement in the new neighbourhood and start the creation of a new area. After the competition, Hiedanranta will have the first blocks under development, and the areas potential will finally be realized in the near future when the plans have been finalized, and the construction of the area has begun. Hiedanranta was bought by the City of Tampere in 2014 and later in 2019 Hiedanranta development company (Hiedanrannan Kehitys Oy) was founded under the City of Tampere to take development plans further and start the planning process of the neighbourhood. Hiedanranta development company got the ownership of most of the land in Hiedanranta and from 2020 onwards they have been responsible of developing the area as a new smart, vital and sustainable subcentre of Tampere. The plot handover competition has sparked conversations about shifts towards more sustainable housing and new aims in climate friendly construction, since the environmental and technical demands in the competition are higher than usual and many of the goals for the area are demanding to achieve. Hiedanranta's development plans stand out from other urban development with for example its ambitious goals in reducing carbon emissions during the construction as well as the whole lifespan of the area. The project leading organization Hiedanranta development company has set strict demands that guide the sustainability aims in the construction, such as use of materials, green mobility, operational services and energy use. Additionally, there are other requirements related to planning and implementation, such as visual restrictions and number of communal spaces and finally, requirements related to the follow-up reporting of the project.

City of Tampere and Hiedanranta development company have set a few goals or so-called visions for the future neighbourhood. In addition to being a precursor for sustainable neighbourhood development, the city of Tampere wants Hiedanranta to be "the neighbourhood of the future" which stands for offering a platform for new ideas, that have certainly been introduced in the plot handover competition. The area is also aiming to be "a versatile and experiential living environment" which can be seen in the diverse acts towards social sustainability and target groups for the housing. The last two aims are to be an "attractive future business environment" and a "smart and green neighbourhood" again both of which have been considered well in the plot handover competitions winning plans (Hiedanranta development company, 2023).

Because of the unique demands and sustainability goals of Hiedanranta's development, this study concentrates on the competitions winning businesses' responds and reactions to the environmental, operational and reporting requirements of the project in relation to the demands, set by Hiedanranta development company. The research question of this case study "How do stakeholders in Hiedanranta perceive the balance between planning demands and opportunities in the creation of a sustainable neighbourhood?" will be answered through a content analysis of the companies' final concept plans and background interviews. Hiedanranta's sustainable construction and development projects have the possibility to be new trendsetters for construction and act as a precursor for urban development in Tampere and in Finland, which makes the cases strengths and shortcomings important to study and evaluate.

**FIGURE 1.** Hiedanranta in 2024, before the new development. (Hiedanranta development company, nd.)

# 2 SUSTAINABLE NEIGHBOURHOODS – A LITERATURE REVIEW

## *2.1 Sustainability through policy*

Most sustainability actions that are implemented in cities are tied to policies somehow, whether on the EU, nation, city or company level. The European Union has set a variety of policies and directives that guide member states production of goods and maintenance of society in different fields of industry and ensures both citizens and natures wellbeing. The 17 sustainable development goals (SDGs) of EU were first set in 2015 and they have been planned to be reached by 2030, meanwhile also promoting the goal of EU reaching climate neutrality by 2050 (European Commission, 2022). One of the 17 SDGs concerns digitalization and infrastructure, which policy areas include sustainable cities and transportation. These actions mentioned in the sustainable cities' agenda are similar to the goals that have been set for the development in Hiedanranta, listing: promotion of social dimensions of sustainable urban development through inclusive and safe cities, green and resilient cities through environmental sustainability, promotion of innovation in sustainable growth as well as good urban governance (European Commission, 2023). Hiedanranta and Tampere as a city has also responded to the EUs transportation agenda that is under the goal of digitalisation and infrastructure, as the development of connectivity, mobility and cuts in carbon emissions have been promoted and achieved with new tramlines and innovative solutions are being implemented to Hiedanranta and other neighbourhoods going through changes. Tampere is also listed as one of the EU mission's climate neutral cities by 2030 as one of the six Finnish cities selected (European commission, 2024), which supports the ideology of sustainable urban development and can be seen as one of the factors that have driven the environmental demands in Hiedanranta forward.

Zuo, J. et al. (2012) argue in their literature review how companies reporting on sustainability factors has evolved and changed over time in the field of construction. The review shows that there is a clear increase in reporting on sustainability and the reasoning

behind it can be traced to the increase in the companies' value, in the eyes of stakeholders and possible investors (Kolk, as sited by Zuo et al., 2012). This is quite visible in the case of Hiedanranta, as one of the policies of Hiedanranta development company was in fact, strict reporting during and after the construction of the new blocks. The review also argues that lack of a legal requirement or demand from shareholders for reporting as well as lack of support from the management are factors that make it difficult or undesirable to implement sustainable practices in construction. This can be detrimental to the companies, because international contractors and possible investors today pay increasingly more attention to the reporting and achievement of sustainability goals and good results and reporting can be indicators for a company of higher value (Zuo et al., 2012).

*Take aways:* Hiedanranta's goals and demands are well aligned with the European commission's sustainable development goals, especially in urban development, focusing on green and resilient cities and creating sustainable social dimensions. Additionally, Hiedanranta is taking a leap towards more structured reporting, which can make the area seem more attractive to investors or stakeholders.

## *2.2 Neighbourhood development*

Neighbourhood as a term has multiple interpretations, some of which emphasize the social aspects of neighbourhood, using it interchangeably with the term 'community' and some that define the term more as a physically bounded urban construction (Jenks & Dempsey, 2007; Peterman, 1999). Some definitions look into neighbourhoods as subsystems, describing the city as an assemblage of autonomous urban units, that are neighbourhoods (Kallus & Law-Yone, 1997). Despite differences in points of view, it is evident that neighbourhoods cannot be seen as only one or the other, social or physical constructs, but as a combination of social interactions, community, physical surroundings as well as economic factors. These aspects are also not independent, but affect one another, as Naik et al. (2015) argue, physical surroundings shape the social activities, and social activities reflect and predict the changes in physical environment. The multi-level definitions shows that neighbourhood development as well, has social, spatial and administrational levels and it is a holistic process that involves stakeholders, community

members, construction specialists and more commonly today, professionals of sustainability.

Peterman (1999, p.155) states that neighbourhood development is most functional and effective, when there is a creative tension between the community and the government officials. By creative tension, Peterman refers to a relationship between these two parties, where both are willing to work together and compromise but also not being too agreeing on everything. In Hiedanranta this tension is more present between the companies and governmental officials, since there is no active community yet. The creative tension during concept development of Hiedanranta could be one of the driving factors for better achieving the goals that have been set for carbon neutrality, energy savings or communal spaces in the new houses, depending on the companies' response to the tension.

In an article called *Defining the neighbourhood*, Jenks & Dempsey (2007, p.154) state that "Neighbourhood has been given increasing weight as a suitable scale at which to apply urban policy and practice through long-term programs..." (Jenks & Dempsey, 2007). Kallus & Law-Yone (1997, p.111) also argue that ideal neighbourhood development considers management, healing, welfare, association, order, participation, identity and meaning, to create the most resilient and successful neighbourhood. The local stakeholders in Tampere have recognized the possibilities of neighbourhood development, and their role in sustainable urban development in Tampere is central. The main areas that are facing new plans and shifts towards more sustainable housing and infrastructure are in fact, neighbourhoods along the tramline and close to the city centre of Tampere, such as Hiedanranta (Tampereen kaupunki, 2025). The development plans in Hiedanranta are highly sustainability driven and concentrate on ecological solutions in construction and maintenance as well as creating a sustainable community, with carbon free transportation and recycling opportunities.

The development in Hiedanranta really started from the concept plan competition by Hiedanranta development company, that was held in 2023 to get ideas for the plots that are being developed into housing blocks (Hiedanranta development company, 2024). Tampere has recently integrated concept planning into the urban development of several neighborhoods, meaning that the area has a clear goal and vision for the development and wanted outcome, that is delivered through the decided concept. These plans have considered social, physical, and environmental aspects, indicating that the concept development in Tampere is currently successful at the planning level. Kallus

& Law-Yone (1997) also bring up the fact that developing neighbourhoods as units is beneficial, as the work done towards growth in the units allows growth of the city, without interrupting the function and identity of places outside the neighbourhood that is facing development.

*Take aways*: Reflecting on Jenks & Dempsey (2007) and Peterman (1999) definitions of neighbourhood, Hiedanranta answers to both social and physical dimensions of neighbourhood in its development plans through operational and environmental demands. Hiedanranta's physical environment is also developed and planned to reflect the policies of social sustainability and vice versa. In addition, Hiedanranta could be thought as an autonomous urban unit, since the development is managed under a semi-private company (Hiedanranta development company) and the areas goals are more specified than the city's broader goals. These aspects make the area fit under Kallus & Law-Yone's (1997) identification of a neighbourhood as an urban unit. However, the project can also be described as transit oriented urban development, because Hiedanranta strongly supports use of public transport, like the tram and cycling, which are important elements of environmentally sustainable neighbourhoods.

## *2.3 Community development*

Community is one of the main focuses in research about neighbourhoods and neighbourhood development. The sense of community and possibly lack of it, are factors that can either drive development onwards or create difficulties in implementing efficient and meaningful changes to a neighbourhood. According to a book called *Neighbourhood Planning and Community-Based Development,* it is the strength and quality of interactions between the residents that define the role of community in a neighbourhood. In Hiedanranta's development plans, creation of a community is visible in a few ways. The area is planned to have a beach for swimming and leisure activities, few shared use cars that the members of the neighbourhood can use when needed as well as some green rooftops, shared recycling centre and a block yard and lastly, communal spaces that will take 0,5 % of the buildings floor area. In addition to the physical facilities, a data base service is to be developed for the blocks common use (Hiedanranta development company, 2023). All these spaces can increase the number of interactions between the

residents, possibly creating a stronger sense of community, that is foundational for a vital and attractive neighbourhood.

Communal spaces are one of the most significant, non-environmental goals of the housing buildings in the new neighbourhood. Hiedanranta development company has evidently recognized the importance of community and social activities in shaping and creating a successful neighbourhood, because the company has set a goal to create the community through communal spaces that allows meeting neighbours, hosting group activities or to find services (Hiedanranta development company, 2023). In the first three plot handover blocks in northern Hiedanranta, there are at least three multiuse communal spaces in the housing buildings, that are directed to be 32 m², 63 m² and 83 m² in size and in addition to them, there will be multiple communal spaces and storages in the old factory building that can be used for multiple purposes. The location of these spaces is pre-decided and then implemented by the construction companies (Hiedanranta development company, 2023).

Gehl (2011) discusses how public spaces are used and what kind of active or passive, social activities can emerge in different environments. Gehl's book introduces a division for city environments or sites that can for example, integrate or segregate, invite or repel, assemble or disperse and close in or open up (Gehl, 2011). Gehl (2011) says that the way a site is planned and executed has impact on how well individuals and groups can use it and if events in these places can stimulate one another or interact. It is also important to note that more than one of the mentioned divisions can be simultaneously relevant depending on site (Gehl, 2011). The broader purpose of communal spaces in Hiedanranta is somewhat known as they are meant to serve residents as common rooms that can be booked through a service system. However, there is some room for natural organization, since many of the social spaces do not have clear objectives or directions to serve any specific activity.

*Take aways*: Community creation and sense of belonging are in a key position in neighbourhood development, which is considered in the planning of Hiedanranta. However, the purpose of social spaces of the new houses is not fully determined, which opens a question of whether they are actively used and by who. Some public spaces like lobby's are just passive spaces where residents might occasionally meet during the day, but the planned club rooms could have a clearer purpose and objectives to help the space

meet the users' needs. Lastly, Peterman's (1999) creative tension is present in Hiedanranta, but it is seen as partially negative by the involved companies.

## *2.4 Sustainable construction*

Sustainable construction is one of the key methods that can be used to create neighbourhoods and urban environments with lower emissions. "Sustainable construction aims at reducing the negative environmental impact of a building over its entire lifetime, while optimizing its economic viability and the comfort and safety of its occupants" (Wiley & Sons, J., 2013, p.16). Sustainable construction is something that needs to be normalized and carried forward in order to change the worrying numbers on construction-based greenhouse emissions in the European Union. As construction of new residential houses and neighbourhoods will be inevitable in growing cities, the building and renovation methods need to be reconsidered and changed into more climate cautious practices.

Circular economy is argued to be one of the main practices, that has a straight impact on the sustainability of urban development and on the field of construction. Geisendorf & Pietrulla (2017) state that the aim of circular economy is to reuse materials as efficiently as possible and maintain their economic value throughout their lifespan and explain that circular economy has gained popularity in the recent years because of the perceived urgency for better resource efficiency, that is seen all around the world because of climate change (Geisendorf, S. & Pietrulla, F., 2017). The European Union has also set goals and policies regarding decreases in carbon emissions as the goal of the EU is to be climate neutral by 2050. (European Commission, 2021). This creates a pressure on countries to act towards sustainability also on a national level, which might mean shift towards circular economy, at least in some places.

Mercader-Moyano, P. & Esquivias, P.M., (2020) emphasize the use of already existing materials in housing construction and neighbourhood environments, making the lifespan of different materials longer. Studies have shown that the building industry is one of the key sources of carbon emissions within the European Union, forming up to 36 % of all greenhouse emissions of the EU's total waste generation (Mercader-Moyano, P. & Esquivias, P.M., 2020). Because of this, the change towards circular economy practices

and use of carbon neutral materials is central in the transition towards sustainable construction.

Mercader-Moyano, P. & Esquivias, P.M., (2020) argue that renovating and decarbonizing old buildings to be more environmentally friendly and energy efficient, is more beneficial and effective, than construction of new carbon free buildings. Implementation of energy saving technologies in heating and cooling systems are as well, in a highly relevant position in lowering the buildings total greenhouse emissions (Mercader-Moyano, P. & Esquivias, P.M., 2020). Mercader-Moyano, P. & Esquivias, P.M., (2020) also underline that decarbonizing needs to consider much more than savings in energy consumption during the lifespan of the house. In fact, much of the decarbonizing actions should already happen during the construction phase as well as the manufacture of building materials. This statement clearly supports the ideas of circular economy and use of low carbon materials in construction that will be implemented in Hiedanranta for the new blocks.

*Take aways:* Building new housing and residential areas is inevitable in growing cities. At the same time field of construction is one of the largest emitters inside the European Union. The EU has set a goal of being carbon neutral by 2050, which is why sustainable construction practices and repurposing or renovating old buildings is necessary, to be able to eventually meet that goal. Hiedanranta, as a unique project is using sustainable construction practices, like low carbon concrete materials as well as circular economy in the areas development, which gives the project a higher value.

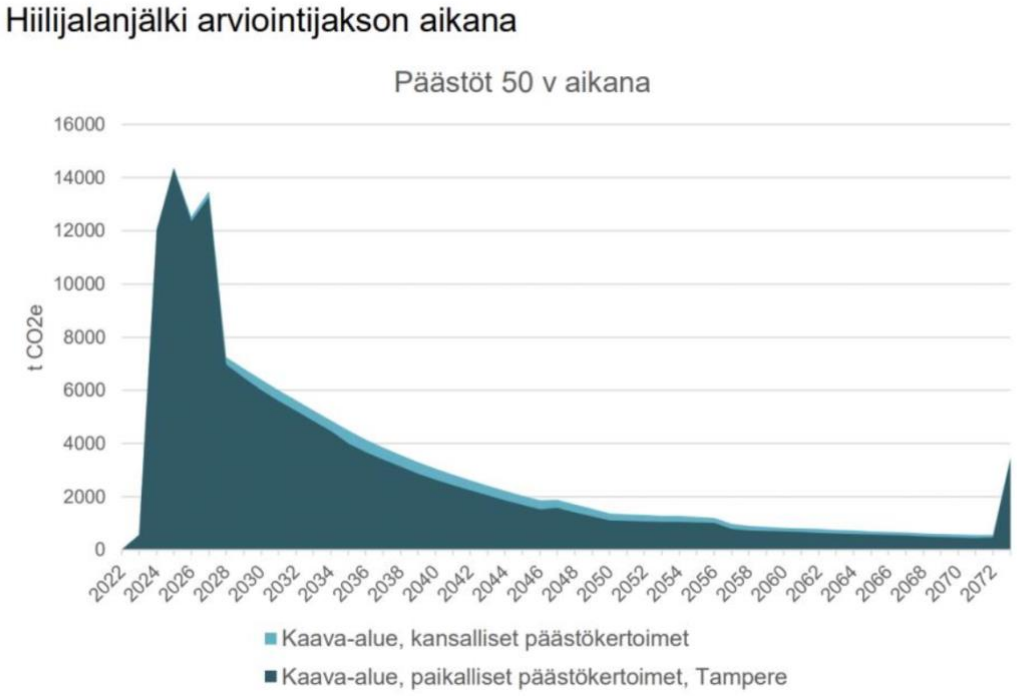


**FIGURE 2.** "Carbon footprint during the evaluation period of the area."
CO2 emissions over a 50-year time span.
Dark blue = local emission factors & light blue = national emission factors.
(Hiedanranta development company, nd.).

# 3 DATA AND METHODS

This thesis is a qualitative case study of the Hiedanranta plot handover competition, done in Tampere, Finland in 2023. The thesis focuses on reviewing the involving stakeholders' perception of the balance between planning demands, restrictions and opportunities in sustainable development of the new residential area in Hiedanranta. The analysis is executed by doing a document review on competition materials by Hiedanranta development company, winning concept plans by private companies and stakeholder interviews, relating to Hiedanranta's development case. The analysis part of the thesis focuses on observing and reviewing the documents of Hiedanranta supported by the stakeholder interviews, to answer the research question about stakeholders' reactions and opinions towards the planning demands as well as identifying the possible gap between the finalized concept plans and the work behind them. City of Tampere and Hiedanranta development company's webpages provided the general plans for the new housing area as well as visual presentations of the future development and justifications for the plans. The concept plans of Setlementtiasunnot Oy & A-Kruunu Oy, TA-Asumisoikeus Oy and Avain Yhtiöt Oy have been gathered through Matias Ståhle, who has worked with Hiedanranta's case in the Nordic Superblocks as Decarbonization Catalysts - research project, that is done in Tampere University. Similarly, the plot handover competition's evaluation documents of the winning concepts as well as the competition guidelines and demands were found through Markus Laine.

The aim of the analysis is to identify how companies reacted to the competition demands of Hiedanranta development company. Do the high demands offer new opportunities or are they restricting in the companies' eyes and how do stakeholders feel about implementing them in the plans of the area? The analysis concentrates on the discussion around operational and social aspects of buildings, environmental demands in the process as well as reporting demands during and after the project. The data includes both public documents as well as private interviews, which have been conducted by researchers of Tampere University and given to me confidentially to use on this thesis.

All the personal information of the interviewees is kept anonymous, and the interview files will be deleted after this thesis is finished.
Interview quotes have been translated from Finnish to English by the author.

**TABLE 1.** Table of data sources:

| **Source/ publisher** | **Document** | **Length in pages:** | **Date of publishing** |
|---|---|---|---|
| Setlementtiasunnot Oy & A-kruunu Oy | Triangeli concept plan | 23 | 2023 |
| Avain yhtiot Oy | Hiilenpesä concept plan | 9 | 2023 |
| TA-yhtiöt | Gemini concept plan | 4 | 2023 |
| Hiedanranta development company | Competition criteria and demands | 33 | 19.4.2023 |
| Hiedanranta development company | Evaluation & justification of Gemini, Hiilenpesä and Triangeli | 6 | 22.12.2023 |
| **Nordic superblocks interviews - concepts:** | **Interviewee:**[1] | **Length in pages:** | **Date of the interview** |
| Gemini (TA) | Plot developer | 9 | 25.4.2024 |
| Gemini (Skanska) | Interview with construction company | 9 | 13.3.2024 |
| Gemini (Anonymous architect) | Architect | 10 | 3.2.2025 |
| Hiilenpesä (Avain) | Plot developer | 8 | 24.4.2024 |
| Hiilenpesä (HMV) | Architect | 9 | 27.5.2024 |
| Triangeli (Settlementti asunnot) | Plot developer | 11 | 6.5.2024 |
| Triangeli (A-Kruunu) | Plot developer | 12 | 16.4.2024 |
| Triangeli (NCC) | Construction company | 12 | 6.5.2024 |
| Triangeli (NOAN) | Architect | 13 | 23.5.2024 |

[1] Interviews are referred to, by their chronological number. Interview 1. = first conducted interview.

# 4 ANALYSIS OF THE CONCEPT PLANS AND STAKEHOLDER INTERVIEWS

Urban developers in the 21'st century are looking for new opportunities in circular economy and use of carbon free materials to construct more climate friendly housing. Trends in sustainable construction highlight cuts in emissions and promote a sustainability through the buildings' life span but are also overarching to social sustainability and promoting sustainable actions and development in all aspects of urban life. The case of Hiedanranta offers a holistic view on what Tampere as a city is seeking for in development of new residential areas and more interestingly, how capable the city's partners are in responding to the city's needs and demands in Hiedanranta. Literature shows that concept-based neighbourhood development is fairly new as an idea, but the outcomes so far have shown good results and proved that neighbourhood is a perfect scale for successful urban development (Kallus & Law-Yone, 1997).

Hiedanranta development company launched their plot handover competition as a joint effort with the city of Tampere for the three plots that take up 391 000 km2 of the area in the north side of Hiedanranta on 19.4.2023. The new housing is planned to accommodate around 18 500 new residents, and the first homes should be ready in 2026 (Hiedanranta development company, 2023). The deadline for joining the competition with a concept plan was later on the same year on 29.9.2023 giving the companies relatively short period of time to create their competition plans. The competition outlines by Hiedanranta development company set a high standard for plot developers to respond to, with multiple environmental, building and reporting requirements that are part of the evaluation criteria. The three main themes of the competition are: Innovative living as part of the city, circular economy or energy consumption and emissions as well reducing construction emissions (Hiedanranta development company, 2023). From these main themes, the companies' concept plans have to incorporate at least one theme in their concept. In addition to the chosen theme, Hiedanranta development company has had demands concerning for example, the modifiability of apartments, common rooms and

social spaces in the blocks, services, such as recycling opportunities and green outdoor spaces as well as low-emission energy systems and water saving water systems. All concepts also have to have one of these environmental certificates: RTS, Breeam or Leed and promote low carbon construction methods during the implementation of their projects (Hiedanranta development company, 2023). The set demands are quite ambitious, but in the end the chosen plans have offered feasible solutions and responses to the demands and even exceeded the competitions criteria on some aspects, offering for example higher cuts in emissions, like Gemini or better carbon footprint than was expected, like Hiilenpesä.

The three concept plans that will be realized in Hiedanranta are Triangeli, with three buildings: the joint Triangeli 2A & 2B and Triangeli 3, Gemini with twin1 buildings and Hiilenpesä with one building, and together the develelopoment in Hiedanranta will cover around 47,5 ha of the area (Hiedanrantadevelopment company, 2023). The Triangeli 2A & 2B blocks are emphasizing special housing as their main theme and for Triangeli 3 the theme is energy savings and lower emissions during and after construction. In addition to the building specific themes, Triangeli also has circular economy as an overarching theme, that affects the planning of the block as a whole. The concept plan also states that smart use of resources, digitalisation and strong community are key elements that will be implemented or considered during the project's development (Settlementti & A-Kruunu, 2023). The second concept plan, Gemini has circular economy as well as lower energy and construction emissions as main themes, which can be clearly seen based on the reuse of concrete elements and low carbon materials that create the base structure for the two Gemini buildings (TA-yhtiöt, 2023). The plan for Gemini is centralized around the CE materials that are used in the frame of the building and counting the emissions of the construction, which differentiates it form Triangeli block that is highlighting the future residents and their needs in the plan. Finally, the block of Hiilenpesä [Carbon's nest], which name connects it to its main theme, concentrates on lowering carbon emissions during the building's construction and through its life span as well as highlight energy efficiency (Avain-yhtitöt, 2023). The plan of Hiilenpesä implemenets multiple designs that support carbon neutrality and emission cuts but also promotes Hiedanranta development company's social goals and has paid attention to greenery around the block (Avain-yhtiöt, 2023).

**FIGURE 3.** Reference picture for new housing in the Hiedanranta district (Hiedanranta development company, nd).

The evaluation document about the winning concepts state that the plans highlighted different strengths and well responded to the set demands, offering feasible and smart solutions for the buildings (Hiedanranta development company, 2023). Hiedanranta development company has recognized some difficulties in the realization of the plans, which are stated in the evaluation document, but also gives positive feedback to the companies' concrete and versatile solutions that combine multiple competition themes.

The original evaluation criteria of the competition has three themes which are: technical requirements, other requirements and reporting. "Technical" requirements include many of the environmental acts that are taken, and "other" demands include most of the operational demands. However, some of the criteria under technical and other demands are grouped together under environmental related criteria to better show, the sustainability aspects of the whole project and identify the acts that differentiates Hiedanranta from other neighbourhoods in Finland. Similarly, some technical demands are more related to the design of the buildings, which is why they are grouped under operational criteria. The classification has been identified based on the literature that was

introduced in literature review as well as the main topics and reoccurring themes in the Hiedanranta case study. The first category, operational demands include the demands that have been set to guide the consideration of social sustainability and versatility of the blocks meaning for example, services, social spaces and other communal aspects of the future neighbourhood. Second, environmental demands focus on technical and operational demands that aim to create cuts in carbon emissions, energy use or support other environmentally sustainable solutions in the buildings. Lastly, the third category, reporting refers to the demands which concern the communication and consumption data shared between the companies and Hiedanranta development company, during and after the construction.

## *4.1 Comparison of the blocks under operational demands*

### 4.1.1 Versatile living

The operational demands on the Hiedanranta neighbourhood focus on the social sustainability of the area and providing necessary services for the residents and creating an atmosphere where residents can meet and connect with each other. One of the aspects of Hiedanrantas sustainability comes from the establishment of an active community that can take the environmental goals of the area further and support them with personal actions. The set demands for the buildings include for example, opportunities for versatile living, modifiable homes to ensure the resilience of the area as well as common services like laundry rooms, common rooms and green outdoor spaces for residential use. All of the three concept plans provided good solutions for ensuring the needed common services and spaces, but in the aspects of versatile living and green spaces there are some differentiations on the performance of the blocks.

Triangeli's concept is diving deep into the versatility of the block, with the angle of special housing that highlights community and sharing economy. The aspect of versatile living has been taken into account in many different ways, which can be seen in the services that are aimed at different age groups like spaces for play, remote-working spaces and supporting services for the elderly or inhibited individuals (Settlementti & A-Kruunu, 2023). Especially the building 2B is focusing on accessibility in the common rooms and modifiability of the homes, which highlights its difference from the other concepts with

its specialization to supported living. The block of Gemini is said to be providing mostly family housing and modifiable homes that can follow the different needs of the residents in different stages of life, but the objectives towards versatility of the homes are not specified in the concept plan, unlike in the plan for Hiilenpesä, in which the choices for modifiable homes are visualized and shown to be suitable for the residents' different needs. For the aspect of versatile living, the block of Triangeli, and especially Triangeli 2B is unquestionably the most comprehensive and tackles a variety of needs, whereas Gemini does not provide clear solutions for ensuring versatility. Lastly, even though Hiilenpesä focuses more on reducing emissions and lowering the carbon footprint of the block, the plan still takes note of the goal of diversity and provides examples on how that can be achieved, which sets it higher than Gemini but does not compare to Triangeli 2B.

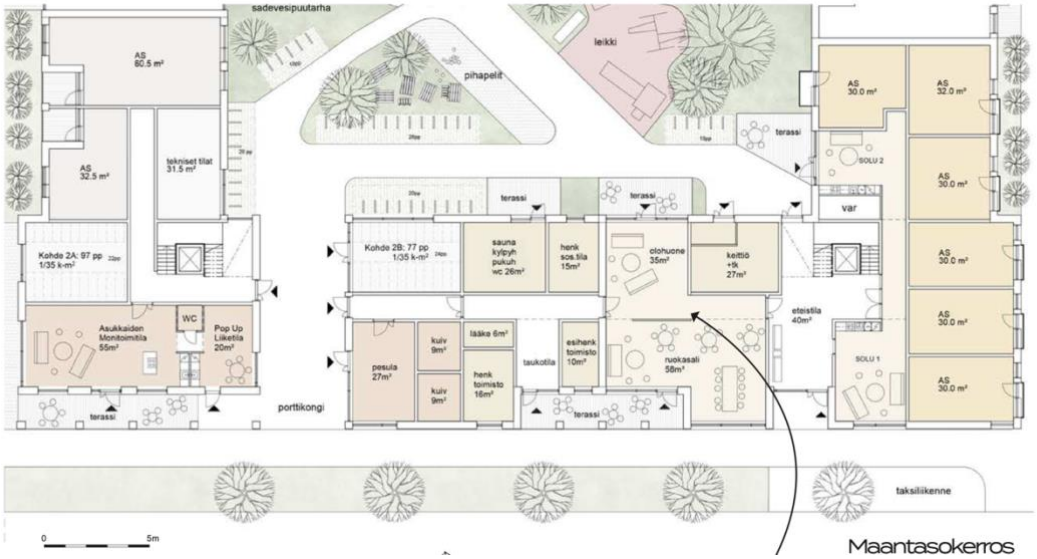


**FIGURE 4.** Triangeli 2B base floor illustrates supported living apartments, communal living room and dining room, supported with outdoor play areas and terraces. Together these spaces answer to the criteria of versatile living, better than the other concept plans.

### 4.1.2 Services & common spaces

As one of the goals in Hiedanranta is to create a neighbourhood with a strong community, the common spaces and services for residents are high in the demands' hierarchy, after the environmental goals. Common spaces are closely tied to the aspect of versatile living and thus, the solutions offered by the plot developers are overarching with the common-

and service spaces. However, the plot developers are only responsible for allocating the space for the facilities and furnishing them, after which spaces like clubrooms and guestrooms in the blocks have to be rented to Hiedanranta services Oy [Hiedanrannan palvelut Oy], which is a subsidiary of Hiedanranta Oy and the responsible party for operating the spaces and managing their customers (Hiedanranta development company, 2023). All three blocks have shared laundry rooms, clubrooms and saunas within themselves like for example, Triangeli, which has divided the communal spaces and service spaces between the three buildings quite equally, offering different services in different buildings (Settlementti & A-Kruunu, 2023).

The operational demands for the blocks are clearly less dominant than the technical and environmental demands, which shows that the priority of the area is to become environmentally sustainable, with the acknowledgement of social sustainability. It is well recognized that social sustainability is a necessity for supporting the areas environmental goals and keeping the neighbourhood resilient and lively. The green spaces and block yards of the plans are possibly one of the most visible communal spaces in the blocks, especially during summer. Communal yards are found in all of the concepts, but again, Triangeli is the one taking the most holistic approach in the yard design, responding to all age groups and tenants of the supported living centre. and simultaneously fulfilling the demands about greenery and vegetation in the blocks. Hiilenpesä and gemini have a bit less focus on blockyards, although Hiilenpesä has taken vegetation close to the individual homes in the form of greenrooms in the balconies. Given Hiedanranta's potential future identity as an environmentally considerate and sustainable neighborhood in Tampere, it is surprising that the appearance of its yards and facades does not significantly differ from regular neighborhoods. This is unexpected, especially since the area's goal is to encourage more sustainable behavior among residents. An interviewee pointed out that the residents should be considered more, when thinking how the area is presented to the target audience. The impact of the image and look of the neighbourhood could be something that really differentiates the area from other neighbourhoods in the eyes of the residents, who might not be familiar with for example, the building materials or carbon cuts in the construction phase, which are significant, but quite hidden aspects of the area’s sustainability.

### 4.1.3 Interview discussions about operational demands

The stakeholder interviews show the background development of Hiedanranta in the eyes of the winning companies of the plot handover competition. The fulfilment of the operational demands and especially inclusion of communal spaces and service spaces has shown a somewhat reserved reaction from the stakeholders of the project. The difficulties in the planning of communal spaces are mostly rooted in the number of separate companies and stakeholders, who all have to communicate with each other, as well as with the umbrella organization Hiedanranta development company, which many have experienced to be burdening because "*you have to be aware of the whole process when planning: the zoning, demands and goals*" (Interview 1., 2024). The friction between the different parties might be due to different interests and motives in development or possibly different working styles, roles or even level of commitment. If these styles and expectations do not meet between the parties, it can be a cause for stress and misunderstandings.

In a discussion about communal yards of the blocks, one of the interviewees stated that since there are three different plots, the developers of each are only responsible of their own area, which means that "*their plans and construction ends precisely on the boarder of their plot"* (Interview 7., 2024). This implies that the collaboration of the three plots is not as smooth as it could be, even though Hiedanranta is planned to have communal yards that are shared with the three blocks. As another stakeholder mentioned "*the plans of private actors often cross each other"* (Interview 7., 2024). The critique about the companies strict site boundaries and crossing plans implies that there could be a communication gap, different expectations between the parties, or some other factor that causes these negative reactions towards the collaboration.

Another critique about the communal spaces from the stakeholders is that based on previous experience of the companies, spaces like clubrooms or remote working spaces are highly underused and mainly a cost rather than a financial benefit for the housing company (Interview 2., 2024). The interviewee also analyses that the reason that spaces are often left unused, is the lack of a clear purpose. "*For example, changing a general free space into a bike fixing station or a gym instantly makes the space more appealing and inviting of users*" (Interview 9., 2025). Although the collaboration of different stakeholders was seen as a burden, the interviews convey that the companies experience with underused communal spaces, did make the idea of shared communal spaces of

Hiedanranta show a positive side for the stakeholders, because of the shared responsibility.

According to interviewed stakeholders, some operational demands of the buildings are difficult to implement in the plans, because of the fixed detailed zoning that was decided before the competition started. This caused negative reactions in the part-taking companies, since modifications and changes are highly difficult to take forward, because the detailed zoning will not be changed (Interview 8., 2024). As an example, a stakeholder mentions that "*the competition criteria demanded modifiable lofts in the buildings, which was difficult to fulfil, because of decisions in the detailed zoning that could not be later changed*" (Interview 7., 2024). For example, in Triangeli the apartments balconies had to be morphed into the buildings walls, even thought that does not support the pillar structure that was originally planned for the apartment building. One of the interviewees even states that the competition was "*promoted with misleading information*", since the zoning plan had been decided beforehand, but not clearly informed in the invitation for the plot handover competition. Some plans were affected by this, after the competition was finished, and the companies did not find this order of development very positive (Interview 8., 2024).

Finances and the funding from the *Centre for State-Subsidized Housing Construction* are a central topic in the operational aspects of the blocks. As argued by a stakeholder, the buildings funded by the organization have detailed criteria that needs to be met, and the houses include only what is highly necessary. Because of this, some cuts have been made in the plans for the blocks after the competition, and for example some room sizes have been reduced from the original. During the discussion, the interviewee mentions that "*there is an insane need today, to make everything as efficient as possible, and compress everything to minimum*" (Interview 7., 2024). The financial restrictions of the project, rooted in the state funding and the current climate of the construction and housing markets are seen in every decision that is being made of the buildings. Simultaneously, the demands of Hiedanranta development company maintain a level of high quality in the process and ensures that the companies cannot offer the minimum in their concept plans. Based on the interview discussion, it seems that the funding of the *Centre for State-Subsidized Housing Construction* is not fully harmonized with the high demands of the buildings environmental and operational elements and causes difficulty in the blocks planning and implementation.

## *4.2 Comparison of the blocks under Environmental demands*

### 4.2.1 Low carbon concrete & circular economy

Environmental demands in the case of Hiedanranta are possibly one of the most definitive and ambitious ones, alongside with operational demands on building design, which together are in a key position in determining the future identity and success of the area, because of the highlighted importance of green spaces, versatile living and visibility of environmental cautiousness in all aspects of the neighbourhood. The most concrete environmental demands in the competition criteria set by Hiedanranta development company concern the building materials used in the buildings. The elements are advised to be low carbon concrete, which GWP (Global Warming potential index) should be less than 70. Makhnatch & Khodabandeh (2014) elaborate that "GWP is the index, which compares the global warming impact of an emission of a greenhouse gas in relation to the impact from the emission of similar amount of CO2". Both Gemini and Hiilenpesä answered to the low carbon concrete demands well, with Gemini reusing concrete pillar elements from another building in Tampere and implementing low carbon elements in the buildings frame (TA-yhtiöt, 2023). Like Gemini, Hiilenpesä is using low carbon materials in the construction of the block and the buildings' façade will be made out of carbon negative materials. Overall, the concrete elements are aimed to be at least GWP 55 or less, which exceeds the goals of Hiedanranta development company (Avain-yhtiöt, 2023). Within the Triangeli buildings, it is clear that Triangeli 3 is more focused on the environmental aspects than buildings 2A and 2B, which concentrate more on the social side of living and common services for the residents. Triangeli 3 will implement some reused metal elements in the façade of the building as well as partially reused tiles and utilize some lightweight elements in the frame that makes it easier to save in materials (Settlementti & A-Kruunu, 2023).

Comparing the blocks performance based on building materials it can be said that Gemini concept plan offers the most thorough and in-depth explanation of how the use of low carbon concrete and CE pillars will be implemented and how it effects the buildings environmental status. Geminis concept plan is very focused and has a clear angle on the block's environmental sustainability acts. Hiilenepesä on the other hand has more variety in the sustainability acts taken, and the details in materials and their production has been considered comprehensively in the light of carbon emissions. The

Hiilenpesä concept plan also suggests using wooden materials in the buildings structure which cuts the emissions a great amount and simultaneously stores carbon (Avain-yhtiöt, 2023). Similarly, wooden materials are also implemented in the Triangeli 3 buiding, with the reasoning towards wooden elements low emissions and cost efficiency (Settlementti & A-Kruunu, 2023). However, if the concepts were to be ranked based on their indidvidual goals in environmetal aspects, Gemini and Hiilenpesä would outperform Triangeli with more diverse and thorough sustainability acts, because of their ambitious and expectations exceeding plans. Although it is good to mention that Triangeli is still providing plans that meet the environmental goals of Hiedanranta development company and the blocks have a more unique focus on the versatile living and modifiable housing that was highlighted in the operational demands. All plans responded to the demands of low carbon building materials well, with circular economy practices, reused concrete elements and wooden structural materials, which shows that the plot developers are ready to offer multiple solutions on the high demands and feasible ways to lower the carbon emissions of the houses. The solutions in low carbon materials have been done with mostly already existing practices, but new ways of implementing circular economy are also present in the Gemini concept plan, because of the use of CE concrete pillars in the buildings frame, which has previously been done only with storage spaces and garage buildings but not homes.

### 4.2.2 Energy systems & water management

The three blocks are expected to consider the emissions and efficiency of water and energy systems in the buildings design. Some of the demands are for example implementation of water saving water-furniture alongside with modern centralized LVIS connections as well as air conditioning system that is powered by water managed radiators (Hiedanranta development company, 2023). The acts towards sustainable water and energy management have provided smart solutions to the demands, again exceeding the expectations of Hiedanranta's stakeholders on few aspects. The concept of Hiilenpesä set a great example of ways to manage energy use of the building, through the design of the homes and without the need for any exceptional technology systems. The block is planned to use solar panels as an energy resource, but some of the savings are planned to come with the right management of temperature, which is done with green rooms that are

designed to be in connection with the balconies (Avain-yhtiöt, 2023). The main goal of the green rooms is to prevent overheating of the homes during summertime, but they simultaneously respond to some of the operational guides concerning greenery in the blocks.

Both Hiilenpesä and Triangeli aim to provide emission free energy for the buildings systems through solar panels, which in the concept of Hiilenpesä also provides solar energy for residential use. Hiilenpesä and Triangeli provide more information about the energy systems of the blocks and their emissions than Gemini, which concept is much focused on the circular economy building elements. Gemini's concept plan mentions that energy use will be considered and managed, but concrete examples are yet to be seen. Water saving water furniture is implemented in all of the future blocks as was demanded by Hiedanranta development company and additionally, the green rooftop of Hiilenpesä is utilizing storm water for its vegetation, which saves water in the maintenance of green spaces (Avain-yhtiöt, 2023). Based on the concept plans of the blocks, the common trend is to use solar energy as an emission free resource, directed towards some of the property's maintenance and residential energy use. The concept of Hiilenpesä certainly outperforms Gemini and Triangeli in terms of energy saving solutions and efficiency, which can be seen on the diverse acts that take place, both in the design of the block and in the utilization of emission free energy systems, carbon cuts and monitoring of consumption.

### 4.2.3 Interview discussion about environmental demands of the project

The environmental demands and restrictions have been central in the concepts and the process of creating them throughout the competition, but as the published concept plan only shows the final product of the companies, it is likely that the process has not been as clean and easy as it seems. From the interviews with different parties in Hiedanranta's development, it is clear that the collaboration with Hiedanrannna Kehitys Oy and the competition demands, divide opinions and experiences between the plot developers, architects and construction companies. The positive side of the demanding goals and restrictions in for example carbon emissions is that they have worked as a backbone for the architect's ability to push for a better design. Some of the architects thought that without the guidelines and demands, it would have been easy to justify not following

carbon limits with the lower cost as one of the interviewee states: "*The demands made it possible to actually implement nice, quality materials and beautiful solutions for the façade*" (Interview 9., 2025). The backbone for the sustainable solutions is important as the recession in building industry takes a fraction of the development in every project and sustainability is often not the first priority in construction, unlike it is in Hiedanranta. The environmental requirements that Hiedanranta development company has set for the neighbourhood are one objective that obligates companies to follow methods of sustainable construction and sustainable neighbourhood development which can be seen as positive and welcomed from the environmental perspective.

In the same interview it is commented that efficiency and savings driven practices are especially common with construction companies, which usual premise is to aim for a cheaper outcome. Although unpleasant, the need for a lower cost is understandable, since the buildings of the plot handover competition are funded by the Finnish *Centre for State-Subsidized Housing Construction,* that has very clear frames and qualifications for which housing plans they will fund. One of the relevant questions in these cases usually concerns finances, which is also the next reoccurring theme in almost all the interviews. Multiple interviewees mentioned that the current state on the field of construction and city development is not the most fruitful for large scale, expensive projects, which inevitably effects the development of Hiedanranta and "*overshadows everything*" (Interview 5., 2024). An interviewee states that "*the housing funded by the Centre for State-Subsidized Housing Construction only implements what is necessary"*, to be able to fit into the organizations wanted price range (Interview 2., 2024), which implies that in the case of Hiedanranta the equation of tight resources and high demands is difficult and can be one of the factors making the planning process more burdening and complicated for the plot developers and their partner companies.

Another point brought up by an architect in the discussion about finances, is that "*the field of construction lacks standardized market for circular economy concrete elements"* which challenges the use of CE products in building (Interview 7., 2024). In Hiedanranra, the reused concrete elements for the Gemini buildings were found from Tampere, after an office building was demolished and some of its elements were bought for the Gemini project (Interview 1., 2024). Even though CE elements were found for Hiedanranta near and easy, there is a demand and supply gap for a standardized market of CE concrete elements in Finland. Some of the benefits of the market would be regulated price range of the products, and the availability of materials would be better.

The existence and visibility of the CE market for concrete elements would be central for pushing companies to use circular economy practices more and take acts towards a more environmentally friendly construction. The interviewee mentions that "*the price of CE elements in construction at the moment is not much lower than the price of new materials"*, which is another issue that a standardized market could try to improve.

Some of the positive outcomes of the demands are worded as opportunities to learn and develop companies' skills in the changing environment of construction and architecture. One of the architects views this project as an opportunity to start changing the way buildings and housing development is traditionally seen and conducted, and state that for their company "*the inspiration* [for the competition] *was that we need to learn more about lowering the carbon footprint and energy savings in building"*. The case of Hiedanranta is the first, where they have had to follow such strict restrictions in carbon emissions and use low carbon materials (Interview 8., 2024). Another interviewee comments that "*the construction companies do have the skills and ability to implement what has been demanded in this project, even though they might be working with new types of circular economy elements"* (Interview 1., 2024). This highlights that it is not the lack of knowledge in construction that prevents these environmentally friendly systems and elements to be used in other projects too, but more of a motivational and financial question. For example, Helsinki shows high motivation towards carbon neutrality, which is implied in a commentary of a construction professional, who discusses that the city of Helsinki has set a standard for apartment buildings maximum carbon footprint (Interview 1., 2024).

The city of Helsinki states on their website that "the total carbon footprint of an apartment building must not exceed 14 kg of carbon equivalent per square meter, when calculated over a 50-year operating span" (Helsingin kaupunki, 2023). The same construction professional in the project of Hiedanranta compares that "*most of our company's buildings are closer to 20 kg of carbon equivalent per square meter"*, which is much higher than what is expected in Helsinki. This shows than legal requirements and demands about sustainability should be more commonly used, to make a change, since just support or encouragement to be environmentally sustainable does not have the same effect as demand or obligation from the city. In Tampere, Hiedanranta is in the forefront of the cuts in carbon emissions in construction projects and showing example to possible future projects, that could possibly guide Tampere to the same level as Helsinki. As it has been stated in the interviews, the strict and very concrete demands concerning carbon

emissions in Hiedanranta have been quite new and unfamiliar to many of the stakeholders. However, the companies have now taken the needed steps towards carbon cuts in the Hiedanranta project and hopefully these practices will be implemented later in other areas and become regular expectations.

## *4.3 Comparison of the blocks under reporting demands*

### 4.3.1 Reporting of planning and construction

The demands concerning reporting and communication during the planning phase of the neighbourhood and now in the start of construction are tight. The companies and stakeholders are in close connection with Hiedanranta development company, and all plot developers must keep Hiednarannan Kehitys Oy updated about the materials, emission numbers and how the planning is progressing. The reporting demands include for example, submission of environmental certificates, energy certificates and property specific consumption data meanwhile all the properties must be connected to Hiedanratnta's official data base. Information about base structure of buildings, façades, room objectives and materials must be submitted as IFC[2] models to the umbrella organisation (Hiedanranta development company, 2023). Especially the data base and the amount of structured and specific reporting style in the project has been viewed as quite laborious. In addition to these, the companies must commit to reporting after the construction has been finished and inform Hiedanranta development company for example, about the building-specific care fees and number of residents (Hiedanranta development company, 2024). This is due to the goals in carbon cuts during the life span of the blocks and the overall success of the area as a sustainable and environmentally conscious neighbourhood.

The reporting demands have been set higher than what the companies involved have previously been used to. According to the stakeholders the communication between the different parties under and with Hiedanranta development company is frequent, meaning information exchange as well as monthly meetings with the umbrealla organisation. As sustainability of the area is highly demanded, the companies are expected to be able to report their actions and efficiency of for example, the energy and water systems and fulfil

[2] IFC is a type of 3D model that is used to visually present the building systems

all the guidelines of the environmental and operational demands during and after the project, which include large scale guidelines as well as smaller details, like type of water furniture. The companies' agreement to the reporting is separately confirmed in two out of three concept plans, but assumingly all three blocks have taken this responsibility to carry. Even through companies have committed to the reporting demands, the discussions had during stakeholder interviews show that the process has not been entirely seamless

### 4.3.2 Interview discussions about reporting

The interview discussions with Hiedanrantas stakeholders show that the amount and frequency of reporting has felt quite burdening and differentiated this project from the companies' previous cases and collaborations. *"Feels a bit frustrating to have such complicated puzzle of agreements, authorities and parties involved – different from other projects"* (Interview 3., 2024). Multiple interviewees state that collaboration with Hiedanranta development company has acquired hundreds of agreements, which was somewhat a surprise to many of the companies in the beginning of the project. One of the interviewees describes that the "*discussion loop in the planning process is extensive and feels tiring, because certain things must be discussed separately multiple times with different groups and stakeholders"* (Interview 9., 2025).

One of the discussants in the loop are the quality groups that are observing all the development plans and deciding whether the plans reach the demanded level of sustainability and quality and can be accepted. A stakeholder argues that they have faced an information gap in the discussions with the quality groups and felt that the members of the group have not studied the background of the plans thoroughly enough and are missing certain information that would be essential to know before evaluating the plans. During the interview they mention that *"Sometimes it feels like the quality groups are against the planner"* highlighting the frustration that they feel towards the groups work (Interview 9., 2025). On the contrary one of the stakeholders says that "*the close communication with Hiedanranta development company has been good in terms of progress, because they ensure that the plans go forward and that they correspond to what is desired*" (Interview 6., 2024). An interviewee also points out that the demands have been very clear from the start and they were discussed and written well, which is positive (Interview 4., 2024). The feedback towards the quality groups is more negative than

towards Hiedanranta development company, which is the organization that oversees all the plans and agreements in the area. The quality groups have much less in their hands, which seems to show as less commitment to the project, which again, is seen in the lack of background work and study towards the companies' plans, causing friction between the stakeholders and the quality groups.

However, another stakeholder thinks that the whole process has turned out to feel like Hiedanranta development company is "*meddling" into the companies' process of creating the blocks*", and dictates how the plans should be made, which exposes some negative reactions about the conversations and emphasizes that the collaboration with Hiedanranta development company as well, has been challenging from time to time (Interview 6., 2024). The same interviewee elaborates that *"The process as a whole, has been very intensive*" when discussing about the early reporting and collaboration during the planning phase of the area. The interviews show that the collaboration of the parties has caused extra efforts from the companies and surprisingly stressful bureaucratic discussion cycles that many of the stakeholders have experienced as burdensome and frustrating. Although, many still emphasize that the existence of a third party - Hiedanranta development company - outside the normal customer and supplier relationship has had benefits as well, in ensuring wanted progress and pushing for new standards in sustainable neighbourhood development.

The interviewed stakeholders share concurring opinions and thoughts about the intensive reporting and communication during the early phases of the project, recognizing difficulties but also describing the guidelines themselves as positively demanding. The reporting criteria concerning the data base of Hiedanranta and IFC models of the buildings are much less criticized than the discussions between the quality groups and the involvement of Hiedanranta development company. The stakeholders state that they were surprised by the number of agreements that needed to be made before the process started and that the case of Hiedanranta differs from previous cases that they have been involved in and many of the practices were new to them.

# 5 DISCUSSION

Hiedanranta has answered to many of the policies and goals that have been set by the European commission in their sustainable cities agenda. The goals which include for example, promoting social sustainability and ensuring greenery, safety and resilience in urban areas are well aligned with the specific goals for Hiedanranta and support the demands that Hiedanranta development company has set for the plot handover competition. The overlapping of the competition demands, and EU's future goals gives justification and motivation for the ambitious sustainability actions in Hiedanranta and take Tampere as city closer to being climate neutral by 2030. As some of the stakeholders stated, the project has also made new aspects of sustainability in neighbourhood development and cooperation style with the city more familiar and made the process educational and interesting to be part of. The collaboration between Hiedanranta development company, quality groups and the plot developers, construction companies and architects has shown to be difficult in certain aspects. The difficulty and negative feelings within the discussion loops could be due to gaps in communication, motivation or level of commitment that different roles hold in the project.

The structured reporting that is central in the case is understandable as Zuo J., et al (2012) stated, that sustainability reporting makes projects and companies more valuable and inviting of investors. Strict reporting demands also show that Hiedanranta development company is motivated to complete the project with the best possible outcome, meeting all the goals in carbon cuts and energy or material savings, creating the recipe for a sustainable neighbourhood. Because the case is quite unique in Finland, comprehensive reporting can also be very useful for developing neighbourhoods in the future and for educational purposes along with making the project more transparent. Despite the benefits of well managed reporting, the companies' reaction towards the demands has been partially negative, because of the number of different parties that are involved in the discussions and frequent meetings with Hiedanranta development company, which some have felt as unnecessary. Possibly the most specific critique from companies was targeted towards the quality groups that are part of the plans realization

process. The working styles and lack of commitment from the members of the groups was questioned, and companies felt that the groups' efforts did not support the plans progressing as they hoped for.

Considering neighbourhood development in Tampere, Hiedanranta is taking extra steps in creating a physical environment that uses sustainable choices in the construction and community creation, possibly making it a precursor for sustainable neighbourhood development in Finland. One of the goals for the area is to also bring sustainability to residents' personal life and promote for example, use of green energy and recycling facilities, that have been listed in the planning demands. It is yet hard to know how the sustainability acts are viewed or embraced by the residents, since first habitants will move to the area shortly, in 2026. However, in stakeholder interviews it was stated that the sustainability aspect should still be made more visible for the residents within the community and the blocks. This would help the area not only to make a positive impact on the environment by promoting ecofriendly choices but also to achieve the wanted identity as a sustainable neighbourhood. As the future identity and special process of planning and creating Hiedanranta is separated from the city of Tampere and is developed by a semi-private company, the area will also be an example of this fairly unusual tyle of regional development in Finland. Applying the EU's urban policies and setting higher demands than the city is possible in Hiedanranta because of the autonomy of Hiedanranta development company, and the possibility has clearly been taken advantage of. The benefits of autonomous administration have been visible in for example the way the high demands have set a backbone for implementing low carbon and circular economy materials in the buildings and been successful in pushing companies towards sustainable construction methods, creative solutions in the buildings' design, and inclusion of social spaces. However, the involvement of Hiedanranta development company as an extra party has also caused some negativity from the companies, since it has the ultimatum for the plans in Hiedanranta. Some stakeholders argued that "*it seems like Hiedanranta development company is mandating the whole process*", which they think to be unnecessary, since their concept plan has already been accepted as one of the winners in the plot handover competition.

The friction between Hiedanranta development company and the private actors could be what Peterman (1999) would call creative tension in neighbourhood development. By Petermans theory, small tension between public and private actors makes development more fruitful and effective, which is somewhat visible in Hidanranta,

but not a complete truth. The concept plans provided very ambitious but feasible solutions for the housing and partially offered more than was originally demanded, but from the stakeholder interviews, it can be found that the tension also includes frustration towards the quality groups and difficulty to get plans forward. For example, one thing that the plot developers criticized is the detailed zoning, that was decided prior to the actual competition, which made the stakeholders feel like the competition was promoted with missing information. The zoning included details that from time to time, made it difficult for planners to implement some solutions to the operational demands in the buildings design.

The operational demands of the blocks reflect how community has been considered as a vital part of the area's attractiveness and resilience in the future, making it one of the main focuses for example in the Triangeli block. Gehl (2011) argues that a places layout and execution have a direct connection to how it is used. The social spaces in Hiedanranta, like clubrooms, storages and lobbies are planned to be quite flexible in the way they can be used or modified for different purposes, which can be very beneficial as the residents have more freedom to organize the space to respond to their needs, but simultaneously a stakeholder commented that adding specific furniture, tools or objectives can increase the number of users. They reflected that it is "*very common for club rooms to be highly underused*" in Finnish apartment buildings, and this could be considered in the plans for Hiedanranta blocks to ensure that community can truly benefit from their local resources. After all, active community is one of the central factors that make the area thrive and show as an interesting neighbourhood to visit or to live in, and community creation is one of the important steps before that achievement.

In addition to a sustainable community of the future, one of the achievements that Hiedanranta will be known for is the sustainable construction of the area that has brought new standards known for the companies and taken steps towards building houses with less emissions, promoting use of circular economy practices as well as low carbon materials. Projects are usually measured in money, making savings and materials of a lower cost seem more appealing to the plot developers or construction companies. However, in the case of Hiedanranta it is important to note that even though finances are in a central part of the development and has caused some difficulties or change of plans, the area has value in itself as a recipe for a sustainable neighbourhood. The example and the progress that Hiedanranta shows as a precursor for sustainable construction and environmentally conscious neighbourhood development is remarkable in the Finnish

context, making the project worth of studying. The demands of the competition and the planning process with Hiedanranta development company has been "*different from previous projects*" according to the private companies that are involved in the process. Notable carbon cuts and the detailed reporting demands have increased the overall workload of the stakeholders but also worked well in ensuring that the areas development continues as planned. For the companies the involvement in this project has been seen as a possibility to learn more about new sustainable construction methods and materials and to lower the overall carbon emissions of the buildings over their life span. As an example, Hiilenpesä is implementing new kinds of carbon neutral materials in their façade and exceeds expectations in the carbon cuts in their block, meanwhile Gemini is implementing circular economy concrete pillars in their apartment buildings, as one of the first ones in Finland. Both of these concept plans have introduced something new to the field of construction in Finland, creating great externalities for this project and introducing new possibilities for buildings.

Something that the competition and companies concept plans also showed, is that the high demands in sustainability and operational aspects were answered well, despite their ambitious nature. This shows that when there is motivation, it is possible to create environmentally and socially sustainable housing that implements circular economy practices, lowers carbon emissions of the buildings over their lifespan and supports versatile living in the blocks. One of the interviewees even stated, that the construction professionals have all the knowledge and information to implement new kinds of materials and follow practices of sustainable construction, if it is wanted. The reason these practices are not so widely used could be due to lack of motivation, ambition or funding. In the interviews it is mentioned that the construction process has not started as was wished for, because of the current recession on the field of construction, that is regularly commented on in different parts of the interview discussions. The instability and lack of finances is causing multiple construction projects to wait for development, which is visible in Hiedanranta as well. For example, the companies have had to discontinue some plans that don't have the funding of the Centre for State-Subsidized Housing Construction and continue the planning with just the ones that have state funding. The financial obstacles have caused some negative reactions in the stakeholders, since some of the plans didn't realize.

As Hiedanranta has now set quite ambitious demands for the development, it is possible that the experience and examples from this project can be used in other cases in

the future, to keep creating more sustainable neighbourhoods all over Tampere and Finland. The negative reactions that emerged in the stakeholder interviews are mainly related to the cooperation of the stakeholders with the third party, Hiedanranta development company and the excessive amount of agreements, meetings and extra work in the planning phase, which has felt sometimes impractical. The high demands of the competition are seen as somewhat difficult, but they are also viewed highly, because of their uniqueness and clear goal in making the area sustainable and resilient, standing out from other neighbourhoods and traditional neighbourhood development.

Lastly, it is important to note that there are limitations to this thesis, that might affect the analysis or conclusions that have been made. The analysis has been done from the viewpoint of a student of urban development, and not an architect or a civil engineer, mainly who have created the analyzed concept plans. This can possibly cause misinterpretations on for example, use of certain building materials or building processes that are relevant in the analysis. Additionally, the data that has been used, only includes the most central documents of the Hiedanranta plot handover competition and interviews, which have originally been collected for another research project. Because of this, there is a possibility that relevant information or important background knowledge has been excluded without an intention to do so. Lastly, as the process of building Hiedanranta to a neighbourhood is still in the process, it is possible that some information might change after the area has been built and this thesis has been published.

# 6 CONCLUSION

The stakeholder reactions towards the high operational, environmental and reporting demands of Hiedanranta plot handover competition have brought light to new practices in sustainable construction and neighbourhood development in Tampere. The demands are reflective of the three pillars of sustainability: social, economic, and environmental dimensions (Bevilacqua et al., 2023), that together are expected to make Hiedanranta successfully a sustainable subcentre of Tampere and fulfill Tampere's vision about a "smart and green" neighbourhood as well as respond to the European Union's sustainable development goals of 2015. Operational demands of the neighbourhood ensure the versatility and social inclusiveness of the area, offering services and modifiable housing for supported living and paying attention to the needs of different age groups. The three winning concept plans: Gemini, Triangeli and Hiilenpesä all respond to the demands of the competition, highlighting different themes and focuses in their plans, but together creating a holistic and multidimensional neighbourhood environment that has capabilities to be a lively and resilient urban unit in the future.

Hiedanranta has been waiting for repurposing and new development for a long time, and as the plans are finally realized the area should really stand out from other areas in Tampere or even in Finland, because of the extend of the environmental and operational demands and the standard that has been set for carbon emissions in the new housing. As Jenks & Dempsey (2007) argue, neighbourhoods can be described both as physical and social constructs, which depending on context can reflect to either physical surroundings or existence of a community. In Hiedanranta, both aspects are present in the planning and show that the area is aiming to maximize its resilience in the future and maintain and active climate conscious community that can further develop the area as a sustainable neighbourhood of Tampere.

The qualitative content analysis that has been done for the competition documents and Nordic superblock interviews has shown that the main themes that are reoccurring in the competition and in Hiedanranta are environmental consciousness, reflected in the demands about low carbon construction elements, energy savings and decrease in overall

emissions of the project. Along with the environmental consciousness is social sustainability, which is reflected in the demands about versatility, services and social spaces in the new blocks and finally comprehensive reporting, which is seen in the amount of communication, meetings and agreements between Hiedanranta development company and the involving companies.

The solutions displayed in companies concept plans are creative and feasible, while also maintaining the ambitious level of sustainability, that Hiedanranta development company has set. In contradictory, the interviews show the hidden part of the plans, presenting difficulties and setbacks in the planning process, due to the overall recession in the field of construction as well as the burden of having multiple parties involved in the development project, resulting in numerous meetings and agreements. According to the interviewees, the high demands have worked as a backbone for creating ambitious plans that include modern building materials and implementing systems that promote energy savings and cuts in emissions but also made the planning slightly difficult from time to time, due to budget restrictions. Because of this, the stakeholder reactions varied from negative to positive, depending on topic and discussant. However, it is clear that the negative reactions are associated with the amount of background work, detailed agreements and close cooperation between the plot developers and Hiedanranta development company. The positive reactions reflect the possibilities that the competition has given to the developers, architects and construction companies in terms of ambitious guidelines towards environmental acts and community development.

The project in Hiedanranta has highlighted the practices of sustainable construction, including use of CE materials, low carbon concrete and energy saving systems in the buildings, while also highlighting the importance of social sustainability and existence of an active versatile community. As building industry is one of the key sources of carbon emissions within the European Union (Mercader-Moyano, P. & Esquivias, P.M., 2020), the improvements and sustainability acts in Hiedanranta are remarkable, in the Finnish context and especially in Tampere as they are driving change and trends in sustainable construction. The high sustainability demands of the plot handover competition have brought attention to the much-needed change in the building industry and taken the standard of neighbourhood development in Tampere higher than previously. Additionally, the project of Hiedanranta has potential to work as an example for future planners and stakeholders and offer data about the success of the demands during the planning and after the area has been finished. Further research about the plot handover

competition and sustainable neighbourhood development in Hiedanranta could possibly concentrate on identifying the most significant problem areas in the process and solving how the cooperation between the organizations could be improved or made more seamless. Another interesting topic is, how all the environmental acts such as carbon cuts and energy savings are visible in the residents' life in the future and how life in the sustainable neighbourhood of Hiedanranta is experienced.

# APPENDICES

## 6.1 Environmental demands

| Concept: | Environmental demands from Hiedanranta development company | The company's response to it | Positive or negative reaction / impact? |
|---|---|---|---|
| **Gemini** | 1. Low carbon concrete (GWP[1] < 70)<br>2. Modern centralized LVIS connections<br>3. AC power and water managed radiator<br>4. Water saving water furniture<br>5. Water networks pressure<br>6. Property has to get environmetal sertificate (RTS, Breeam or Leed)<br>7. Carbon footprint has to be measured<br>8. Low carbon construction site & Carbon free transport for materials<br>9. Low construction waste & recycling | Gemini uses CE / low carbon concrete in building. (1, 8, 9)<br>There are measuring systems for water and electricity savings. (7)<br>Fills all technical requirements and exceeds the goals set for cuts in carbon emissions. (2, 3, 4, 5)<br>Has low emission energy systems and recycling systems. (3)<br>Will fill criteria for their wanted environmental certificate. (6) | Mainly positive. Plans highlight use of CE elements and low carbon materials. |
| **Triangeli** | 1. Low carbon concrete (GWP < 70)<br>2. Modern centralized LVIS connections<br>3. AC power and water managed radiator<br>4. Water saving water furniture<br>5. Water networks pressure<br>6. Property has to get environmetal sertificate (RTS, Breeam or Leed)<br>7. Carbon footprint has to be measured<br>8. Low carbon construction site & Carbon free transport for materials<br>9. Low construction waste & recycling | Triangeli 2 A & B + Tiangeli 3: Uses CE elements in the frontage + carbon sinks. (1, 8)<br>Low carbon footprint promised and low carbon construction is implemented. (7, 8, 9)<br>Emission free electricity is provided in property. (3)<br>Energy class A.<br>Does not mention which certificate they are aiming for. | Mainly positive. Triangeli 3 most focused on environmental aspects. |
| **Hiilenpesä** | 1. Low carbon concrete (GWP < 70)<br>2. Modern centralized LVIS connections<br>3. AC power and water managed radiator<br>4. Water saving water furniture<br>5. Water networks pressure<br>6. Property has to get environmetal sertificate (RTS, Breeam or Leed)<br>7. Carbon footprint has to be measured<br>8. Low carbon construction site & Carbon free transport for materials<br>9. Low construction waste & recycling | Low carbon materials are used and construction can be done with less materials. (1, 8, 9)<br>Solar panels + utilization of stormwater. (4) Temperature stabilizing green rooms and recycling utilities.<br>Aiming for 4-star RTS certificate. (6)<br>Water and energy efficient and uses water saving water furniture and water + has water pressure stabilizing system. (2,4,5) | Mainly positive. Specializes in carbon cuts and sinks. |

## 6.2 Building / loft demands

| Concept: | Building/ loft demands from Hiedanranta development company | The company's response to it | Positive or negative reaction / impact? |
|---|---|---|---|
| **Gemini** | 1. Outdoor lighting cannot produce light pollution & has to be energy efficient<br>2. Acustics & noise cancelling mechanics<br>3. Versatile housing, 1/3 has to be family homes<br>4. Joint arrangements & services of the blocks<br>5. Modifiable lofts<br>6. Outdoor vegetation & care plan | Versatile housing + family housing. (3)<br>Common spaces and service spaces. Offers recycling utilities. (4)<br>Modifiable homes. (5) | Neutral. Geminis focus is more on CE elements. |
| **Triangeli** | 1. Outdoor lighting cannot produce light pollution & has to be energy efficient<br>2. Acustics & noise cancelling mechanics<br>3. Versatile housing, 1/3 has to be family homes<br>4. Joint arrangements & services of the blocks<br>5. Modifiable lofts<br>6. Outdoor vegetation & care plan | Special / versatile housing. (3)<br>Multiuse yard and common rooms. Green block yards. (6)<br>Modifiable. homes (5)<br>service rooms + club and workspace. (4) | Positive. Plans focus on versatility and community development |
| **Hiilenpesä** | 1. Outdoor lighting cannot produce light pollution & has to be energy efficient<br>2. Acustics & noise cancelling mechanics<br>3. Versatile housing, 1/3 has to be family homes<br>4. Joint arrangements & services of the blocks<br>5. Modifiable lofts<br>6. Outdoor vegetation & care plan | Versatile housing + family homes. (3)<br>Modifiable homes. (5)<br>Green rooftop and block yard with garden. (6)<br>Communal spaces like clubroom and workspace. Offers recycling utilities. (4) | Mainly positive. Versatility and community are well acknowledged. |

## 6.3 Reporting demands

| Concept | Reporting demands from Hiedanranta development company | The company's response to it | Positive or negative reaction / impact? |
|---|---|---|---|
| **Gemini** | 1. Property has to be connected to Hiedanratnta's Data base<br>2. Consumed / produced energy has to be measured<br>3. Property's temperature measurements<br>4. IFC [2] models for City of Tampere<br>5. Delivery of the building's energy certificate<br>6. Property specific consumption data<br>7. delivery of building-specific care fee and number of residents data | Commits to all reporting demands. | Neutral. |
| **Triangeli** | 1. Property has to be connected to Hiedanratnta's Data base<br>2. Consumed / produced energy has to be measured<br>3. Property's temperature measurements<br>4. IFC models for City of Tampere<br>5. Delivery of the building's energy certificate<br>6. Property specific consumption data<br>7. delivery of building-specific care fee and number of residents data | Not specified in concept plan but assumingly commits to reporting demands. | Some negative reactions. |
| **Hiilenpesä** | 1. Property has to be connected to Hiedanratnta's Data base<br>2. Consumed / produced energy has to be measured<br>3. Property's temperature measurements<br>4. IFC models for City of Tampere<br>5. Delivery of the building's energy certificate<br>6. Property specific consumption data<br>7. delivery of building-specific care fee and number of residents data | Commits to all reporting demands. | Some negative reactions. |

# 7 LITERATURE


Avain-yhtiöt. (2023). HIILENPESÄ: Hiedanranta Pohjoiskortteleiden tontinluovutus -konseptikilpailu. (p. 9) Avain-yhtiöt.

Bevilacqua, C., Balland, P.-A., Kakderi, C. and Provenzano, V. (2023). New Metropolitan Perspectives: Transition with Resilience for Evolutionary Development. https://surl.li/enhsiv

European Commission (2021). European Climate Law. [online] climate.ec.europa.eu. https://surl.li/cjgvns

European Commission (2022). Sustainable Development Goals. [online] international-partnerships.ec.europa.eu. https://surl.li/dlxpwa

European Commission (2023). Sustainable cities. [online] International Partnerships. https://surl.li/elpjwc

European Commission (2024). EU missions - Publications Office of the EU. [online] Publications Office of the EU. https://surl.li/kxgngo

Gehl, J. (2011). Life between buildings: using public space. Ebook Central. https://surl.lu/udhwvq

Geisendorf, S. and Pietrulla, F. (2017). The circular economy and circular economic concepts-a literature analysis and redefinition. Thunderbird International Business Review, 60(5), pp.771–782. doi: https://doi.org/10.1002/tie.21924.

G., R., Nagadevara, V., Naik, G. and Suraj, A. (2010). Public Private Partnerships. https://surl.li/ayjext

Helsingin kaupunki . (2023, October 19). Hiilijalanjäljen raja-arvo. Helsingin Kaupunki. https://surl.li/yfqqip

Hiedanranta development company (2023). Hiedanranta | Pohjoiskorttelien konseptikilpailu. https://surl.lu/lzhkig

Hiedanranta development company .(2023). Hiedanranta Pohjoiskortteleiden tontinluovutus -konseptikilpailu [Review of Hiedanranta Pohjoiskortteleiden tontinluovutus -konseptikilpailu]. 6.

Hiedanranta development company & Tampereen Kaupunki (2020). Hiedanranta Yleissuunnitelma. https://surl.lu/kzdlcj

International Conference on Sustainable Design and Construction, et al. ICSDC 2011 : Integrating Sustainability Practices in the Construction Industry : Proceedings of the 2011 International Conference on Sustainable Design and Construction, March 23-25, 2011, Kansas City, Missouri. American Society of Civil Engineers, 2012. https://surl.li/mvodfn Tuni

Jenks, M. and Dempsey, N. (2007). Defining the neighbourhood: Challenges for empirical research. Town Planning Review, [online] 78(2), pp.153–177. doi: https://doi.org/10.3828/tpr.78.2.4.

Kallus, R. and H. Law-Yone (1997). Neighborhood - The metamorphosis of an idea. [online] 14(2), pp.107–125. https://surli.cc/kyhwwl

Makhnatch, P. and Khodabandeh, R. (2014). The Role of Environmental Metrics (GWP, TEWI, LCCP) in the Selection Of Low GWP Refrigerant. [online] ScienceDirect. https://doi.org/10.1016/j.egypro.2014.12.023

Mercader-Moyano, P. and Esquivias, P.M. (2020). Decarbonization and Circular Economy in the Sustainable Development and Renovation of Buildings and Neighbourhoods. Sustainability, 12(19), p.7914. doi: https://doi.org/10.3390/su12197914.

Ministry of the Environment (2023). Rakentamis-laki sujuvoittaa rakentamista ja edistää päästö-vähennyksiä ja kierto-taloutta. https://surl.li/zeqdap

Naik, K.H.N.K., Bhimareddy, A. and Naik, N. (2015). Do people shape cities, or do cities shape people? ChemInform, 46(41), p.no-no. doi: https://doi.org/10.1002/chin.201541240.

Peterman, W. (1999). TUNI Web Login - Loading Session Information. [online] Proquest.com. https://surl.lu/nsjhzj

Settlementti & A-Kruunu. (2023). Hiedanrannan pohjoiskortteli J2 TRIANGELI (p. 21). Settlementti & A-Kruunu.

Tampereen kaupunginvaltuusto (2023). Tekemisen kaupunki - Tampereen strategia 2030. https://surl.li/dwrqmb

Tampereen kaupunki (2024). Kehitysohjelmat [Tampereen kaupunki]. [online] Tampere.fi. https://surl.li/osknzt

TA-yhtiöt. (2023). Hankekonseptiehdotus Gemini (p. 4). TA-yhtiöt.

Tilastokeskus (2024). Väkiluvun kasvu suurin lähes 70 vuoteen | Tilastokeskus. Stat.fi.

https://surli.cc/aqmwnl

Wiley & Sons, J. (2013). TUNI Web Login - Loading Session Information. [online] Proquest.com. https://surl.lt/wpacdh

Zuo, J., Zillante, G., Wilson, L., Davidson, K. and Pullen, S. (2012). Sustainability policy of construction contractors: A review. Renewable and Sustainable Energy Reviews, 16(6), pp.3910–3916. doi: https://doi.org/10.1016/j.rser.2012.03.011.