



Fig. 1: Skarpnäck. En stadsdel i Skarpnäcks stadsdelsområde. (Stockholms stad 2023)

RUHR-UNIVERSITÄT BOCHUM

CASE STUDY SKARPNÄCK-DISTRICT

Stockholm, Sweden

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3. **Urban Heat Island**
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1. Introduction

○ Skarpnäck

- Population: ~ 45.000 people
- Area: 15,66 km²
- Implemented in Stockholm city plan

Case Study consist of following districts:

- Skarpnäcksgård, Bagarmossen, Eskededalen, Kärrtorp, Sköndal, Flaten, Skorhem, Skrubba

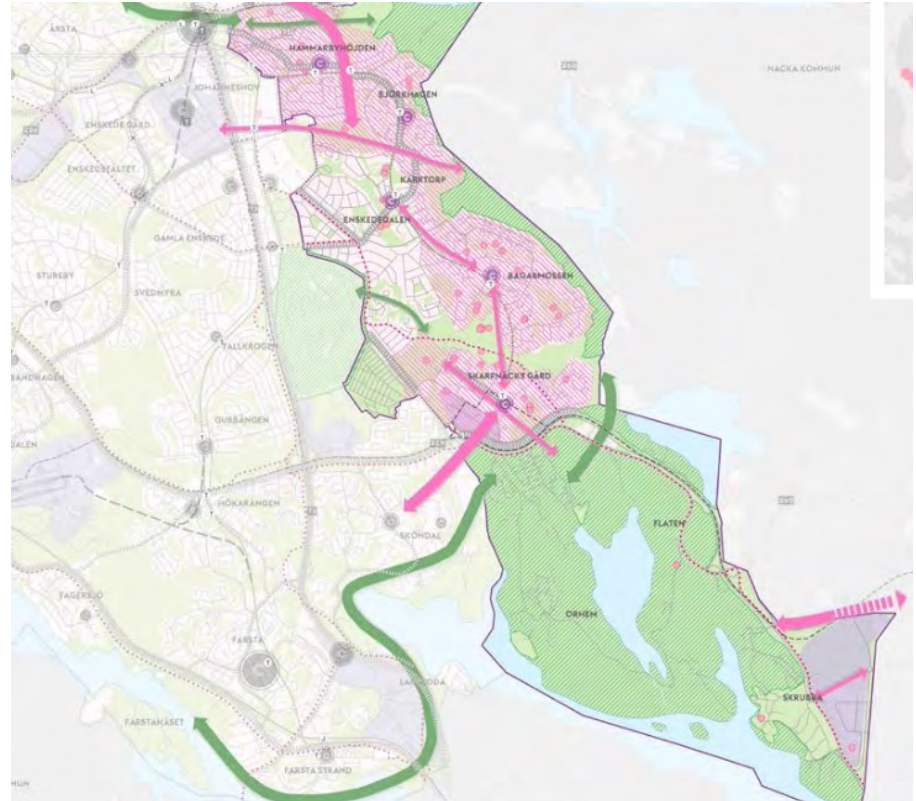


Fig. 2: Skarpnäck City Plan. Urban Development Map (Stockholm Stad n. d.)
(TEEB 2010: 19)

2. Urban Heat Island

2. Urban Heat Island - Indicators

- Urban density
- Residual density
- Population
- Population density
- Percentage of Landscape
- Land surface temperature (LST)
- Difference in LST depending on area (e.g. urban – rural)

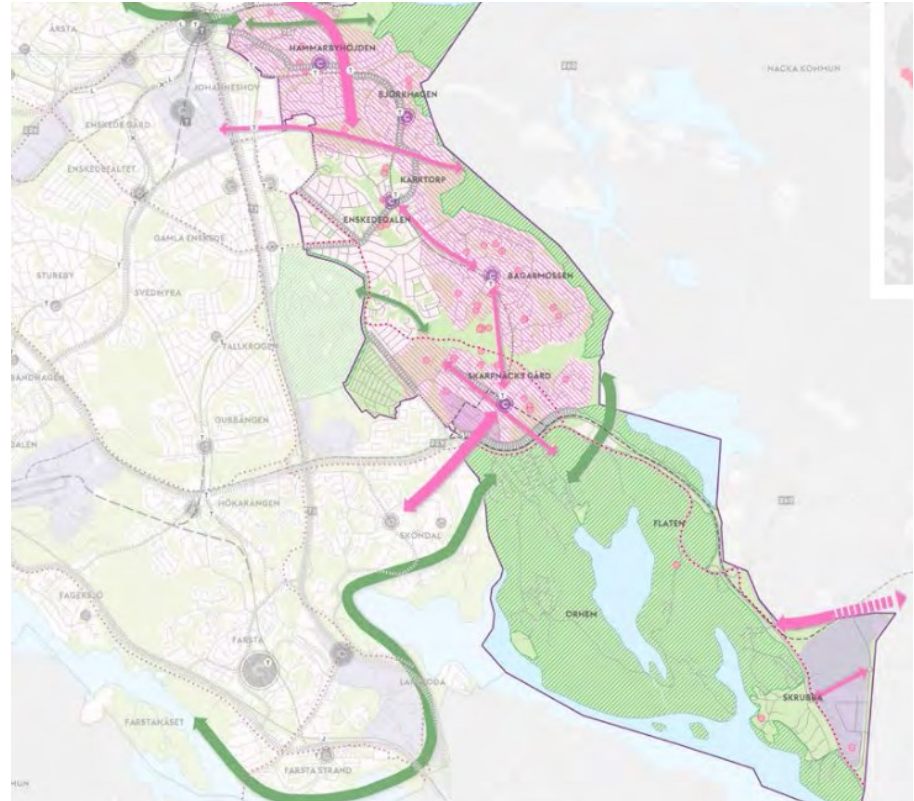


Fig. 2: Skarpnäck City Plan. Urban Development Map (Stockholm Stad n. d.)
(TEEB 2010: 19)

2. Urban Heat Island – High Risk Areas in Skarpnäck

Closed Apartment blocks throughout the District (Eskededalen, Skarpnäck, Bargamossen) → High density (Urban, residual, Population)

→ Low percentage of Landscape, High urban density,

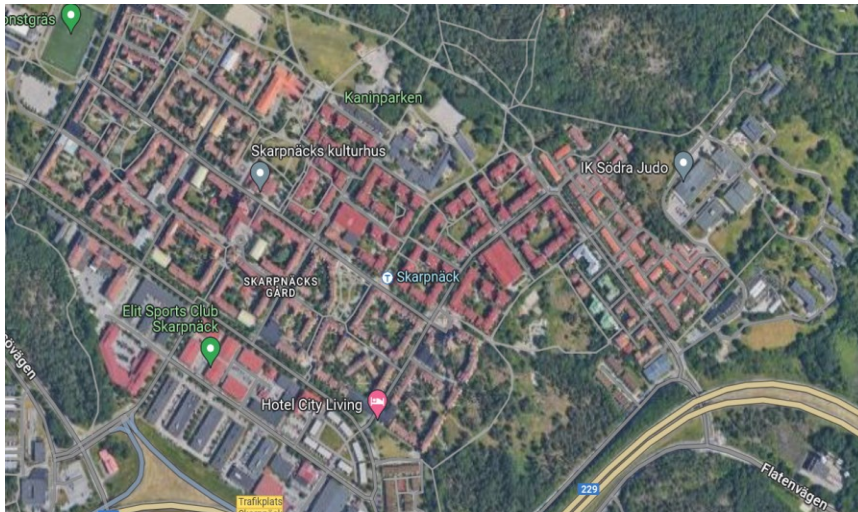


Fig. 3: High density areas in the district of Skarpnäck 1. (Google Maps)



Fig. 4: High density areas in the district of Skarpnäck 2. (Google Maps)

2. Urban Heat Island - Stockholm City Plan

- **Good distribution of urban and natural habitats**
- **LST doesn't differentiate a lot from other places**
- **Living districts already very green**
- **Implementing more open water spaces**

2. Urban Heat Island - Supporting ES

- **Moderation of climate extremes**
- **Urban temperature regulation**
 - **Urban green spaces, water bodies, wetlands, forests**
- **Global Climate regulation**
 - **Agriculture, forests, wetlands**

3. Loss of Biodiversity

3. Loss of Biodiversity - Connectivity

„The degree to which the landscape facilitates or impedes movement among resource patches“

-Taylor et al. (1993)

3. Loss of Biodiversity - Why is connectivity important?

→ The exchange of genetic Material between different Populations of the same Species benefits the fitness of the individuals in that **Population** (Leimu et al. 2006)

→ To ensure effective nature conservancy it is important to understand the movement of Organisms between different **Habitats** (Luque et al. 2012)

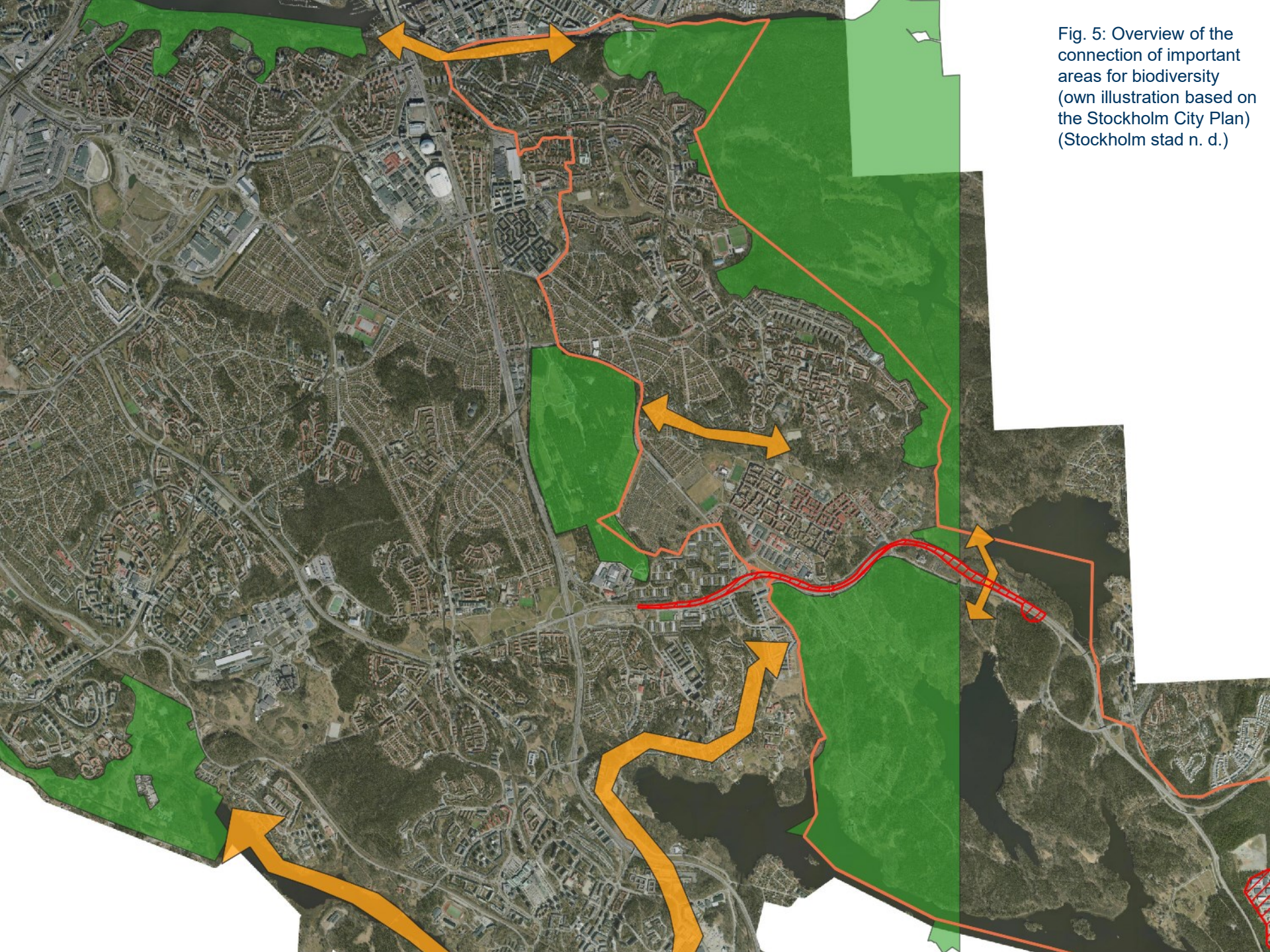


Fig. 5: Overview of the connection of important areas for biodiversity (own illustration based on the Stockholm City Plan) (Stockholm stad n. d.)



Fig. 6: Ecological corridor between Årstaskogen and the Nacka nature reserve.
(own illustration based on the Stockholm City Plan) (Stockholm stad n. d.)



Fig. 7: Ecological corridor between Skogskyrkogården and Bagarmossenskögen, which is connected to the Nacka nature reserve.(own illustration based on the Stockholm City Plan) (Stockholm stad n. d.)



Fig. 8: Ecological corridor between Skogskyrkogården and Bagarmossenskogen, which is connected to the Nacka nature reserve. (own illustration based on the Stockholm City Plan) (Stockholm stad n. d.)

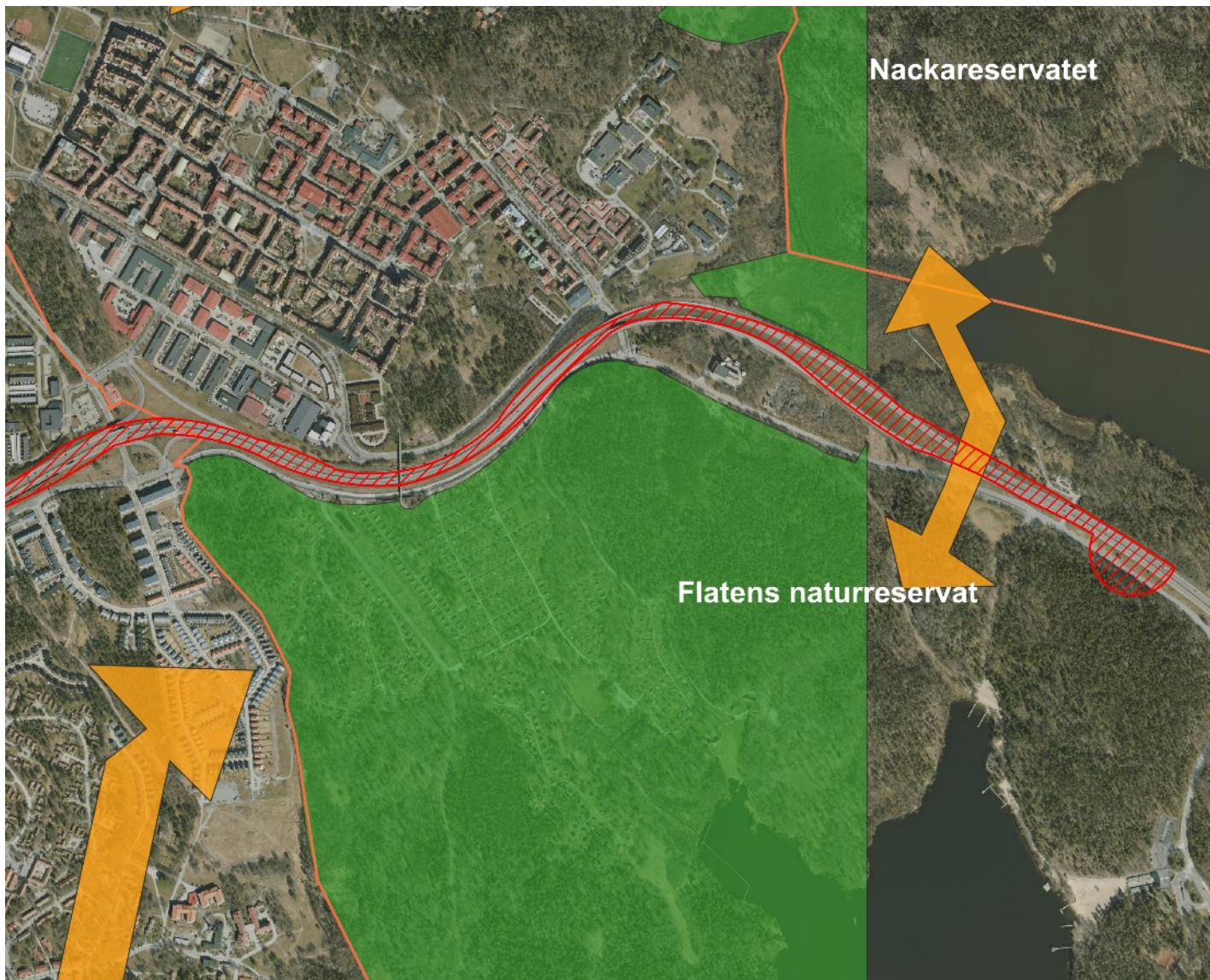


Fig. 9: Ecological corridor between the Nacka nature reserve and the flats nature reserve. These two Areas are separated by the Tyresövägen main road. (own illustration based on the Stockholm City Plan) (Stockholm stad n. d.)



Fig. 10: Skrubba industrial area. Located in the south-eastern corner of Skarpnäck. Bordering the municipalities of Nacka and Tyresö. (JOSM n. d.)

4. Flooding Risks

4. Flooding Risks

- **High surface runoff of water**
- **Climate Change**
 - Precipitation
 - Rising water levels
- **Impervious surfaces**
- **Anthropogenic infrastructure** (streets, buildings, parking lots, etc...)
- **Flood Risk Reduction**
- **Green Infrastructure** (Wetland, Grassland, Forests, etc..-)

(Gencer et al. 2018; Vicuña et al. 2018; Maes et al. 2020; NLWKN 2005)



Fig. 11: Dubai flooded with year's worth of rain in just 12 hours (CNN 2024)

4. Flooding Risks - Indicators

- **Topography**
- **Biotope Classification**
 - Waterbodies

Negative Effects:

- Urban grey structure
- **Imperivious surface**

Positive Effects:

- Open Land (Wetland, Grassland) Shrubland
- Forest/ Wooded land
- **Water infiltration**

(Gencer et al. 2018; Vicuña et al. 2018; Maes et al. 2020)

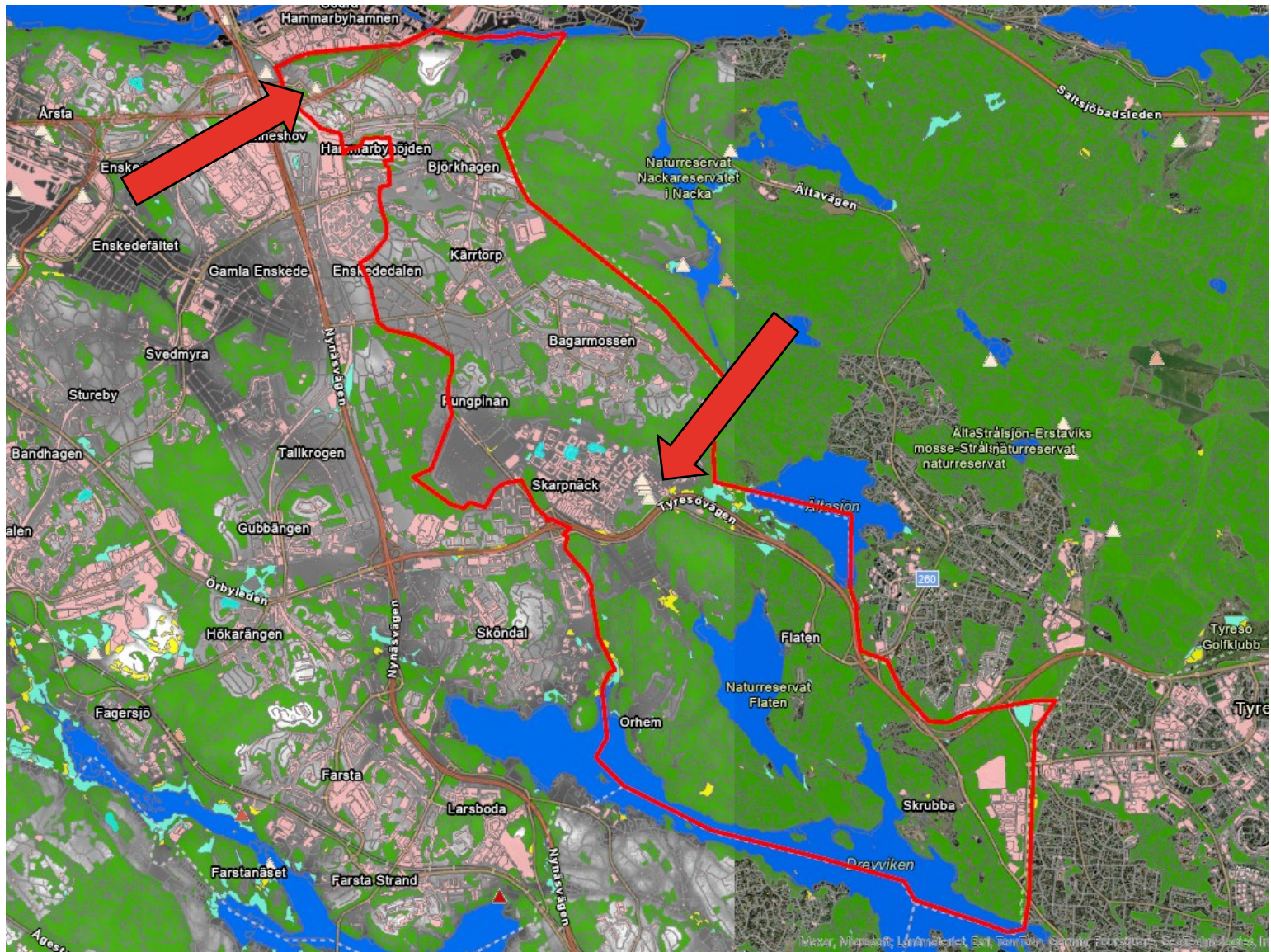


Fig. 12: Biotope classification map. District of Skarpnäck in Stockholm. (own illustration based on Skånes 2022) (Esri 2024)

5. Social cohesion & Quality of life

Definitons

Social Cohesion:

- First: mix of unity and group consciousness
- Later additions:
 - > Shared experiences - Social networks - Social Mobility - Sense of belonging/identification

Council of Europe defines social cohesion **“as the capacity of a society to ensure the well- being of all its members - minimising disparities and avoiding marginalization - to manage differences and divisions and ensure the means of achieving welfare for all members”**

->

Aims: reducing disparities between groups and strengthening social relationships

Problems: inequalities, precarity and segregation

(Moustakas 2023)

Definitons

→ Quality of life

Psycho-social well-being, physical health, living conditions

→ four social characteristics that have an impact on individuals:

1. the degree of economic security
2. the degree of social inclusion
3. the extent of social cohesion
4. and the degree of autonomy or empowerment.

(Council of Europe 2005)

Indicators

- Amount of green space per inhabitant / of the total area of the city
- Surface area of cultural and sports infrastructure
- Availability of local shops
- Availability of medical services and pharmacies
- good access to public transport, shopping, services, playgrounds etc.
 - > enable social contact between local residents
 - > identifying and addressing areas that lack such meeting places

(Council of Europe 2005)

Numerous neighborhoods are primarily residential and should be developed to include a wider variety of functions



Fig. 13: Neighborhoods in Skarpnäck. (own illustration in ArcGIS Pro)

(Stockholms stad (n. d.))

Barriers

- Creates sense of distance
- Streets not always used effectively
- Transforming over-sized roads into urban corridors



Fig. 14: Streets in Skarpnäck. (own illustration in ArcGIS Pro)

(Stockholms stad (n. d.))

Bild Park

- **Nacka nature reserve**
- **Great value (Cultural Services – ESS)**
- > **More and clearer entrances**



Nacka nature reserve next to Skarpnäck. (own illustration in ArcGIS Pro)

(Stockholms stad (n. d.))

Thank you very much for
listening!

Any Questions?

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