



KARLSTAD

THE DELTA CITY





KARLSTAD.SE



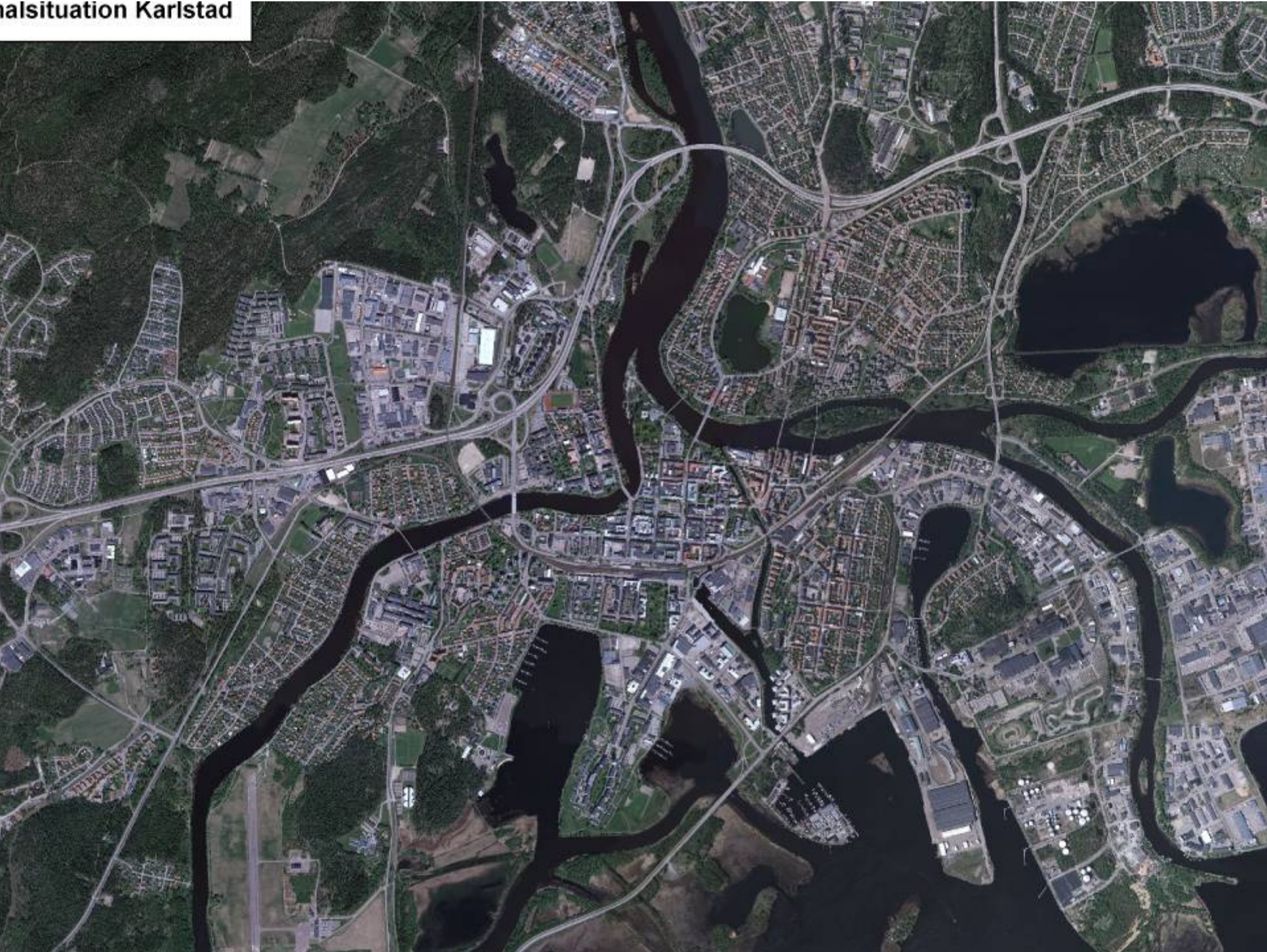
Examples of previous floods in Karlstad

.....1910, **1916**, 1920, 1924, 1927, 1931, 1934, 1951

1957, **1959**, 1962, 1966, 1967, 1985, 1987, **1995**, **2000/2001**.....

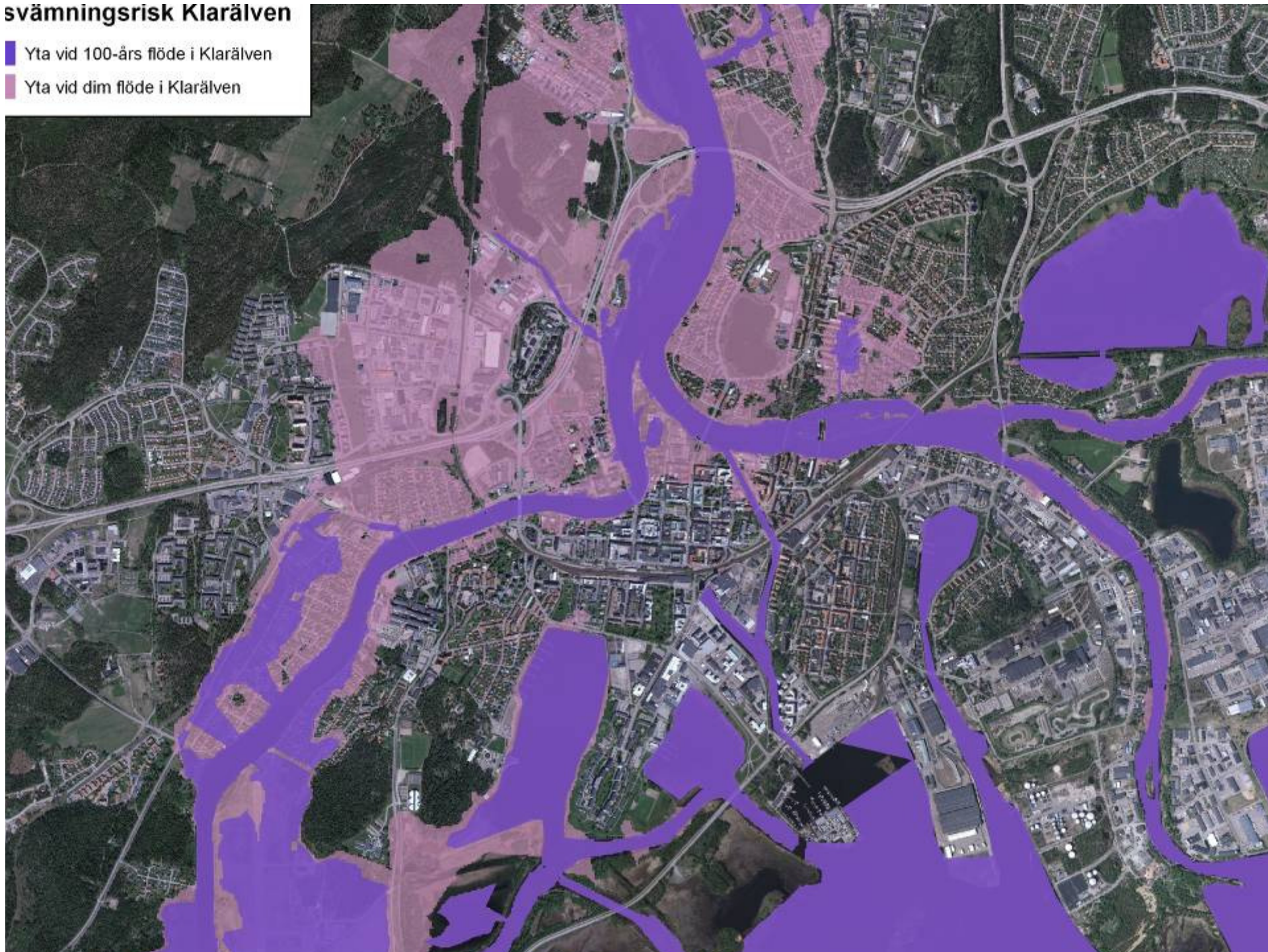


alsituation Karlstad



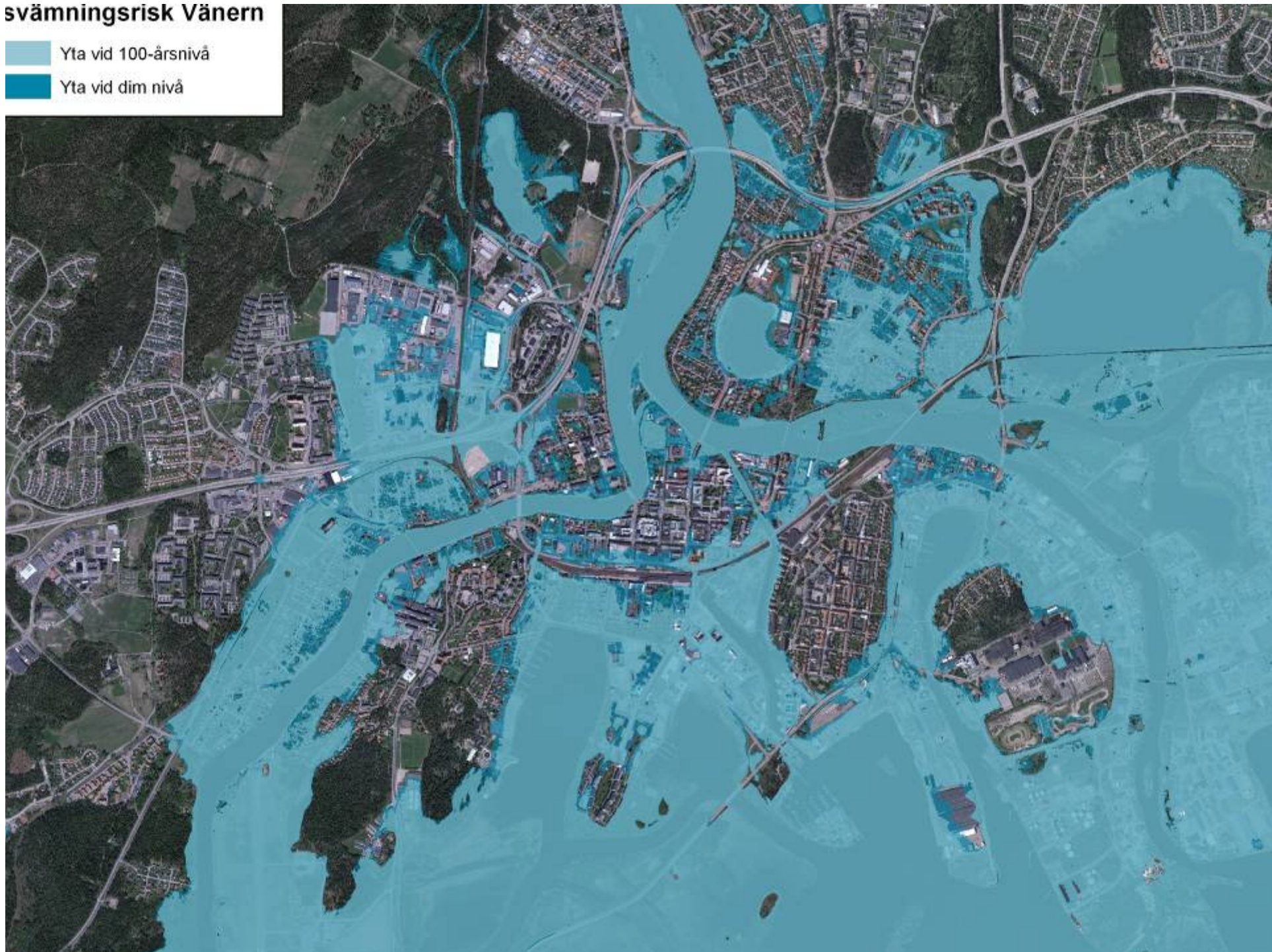
svämningsrisk Klarälven

- Yta vid 100-års flöde i Klarälven
- Yta vid dim flöde i Klarälven



svämningsrisk Vänern

- Yta vid 100-årsnivå
- Yta vid dim nivå





We have done this..

Participation in EU project concerning flooding

Flood management coordinator since 2007

Detailed flood inundation maps

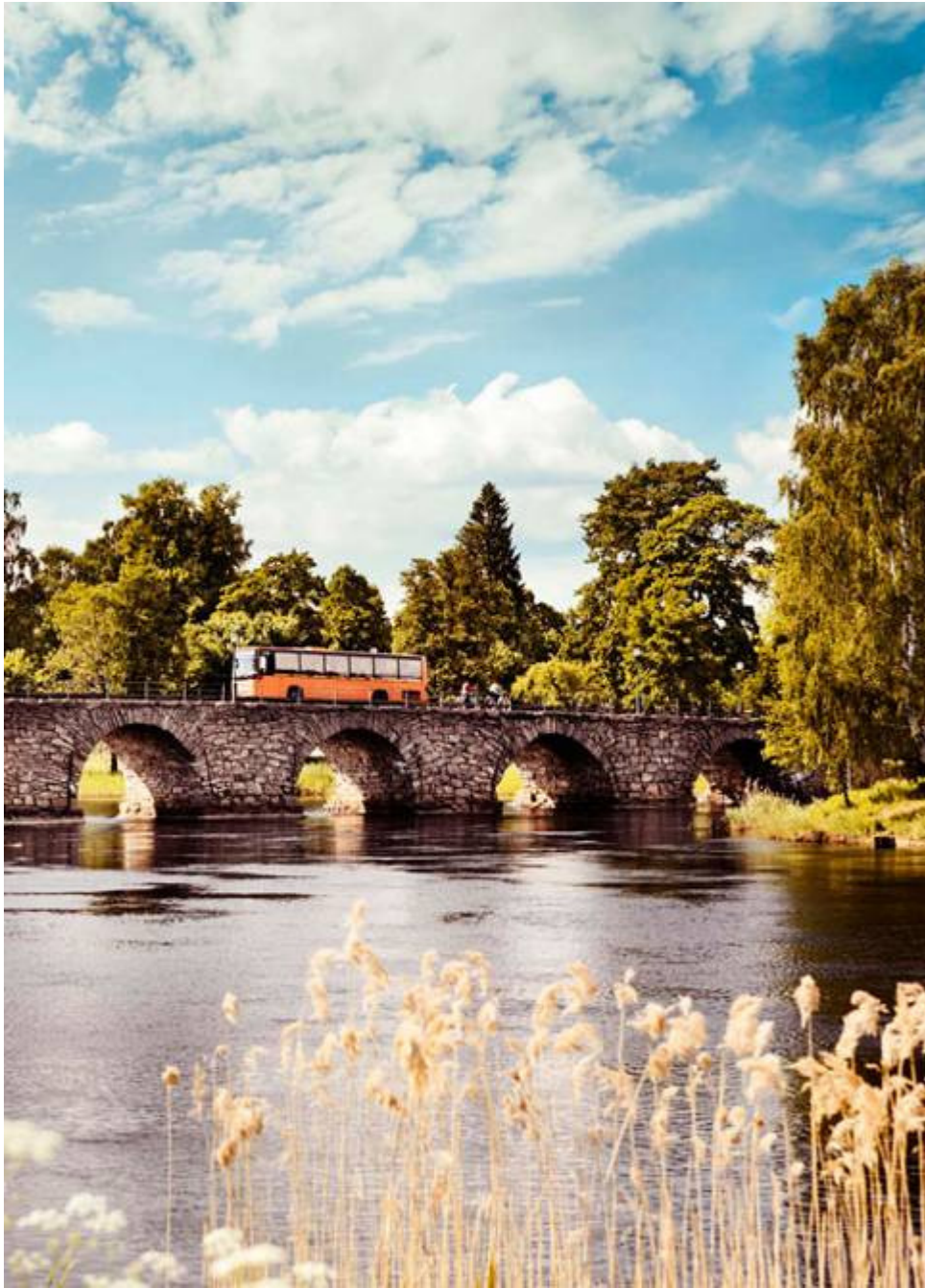
Two investigations from the Swedish meteorological and hydrological institute

Training in climate issues for all employees working in the Municipality of Karlstad.

Cooperation with other municipalities adjacent to Lake Vänern.

Flood mitigation program





This we plan to do...

Temporary flood protection and pumps for preparedness

Technical measures to reduce the risk of flood inundation

Continued cooperation with other actors

Participate in the UNISDR international campaign



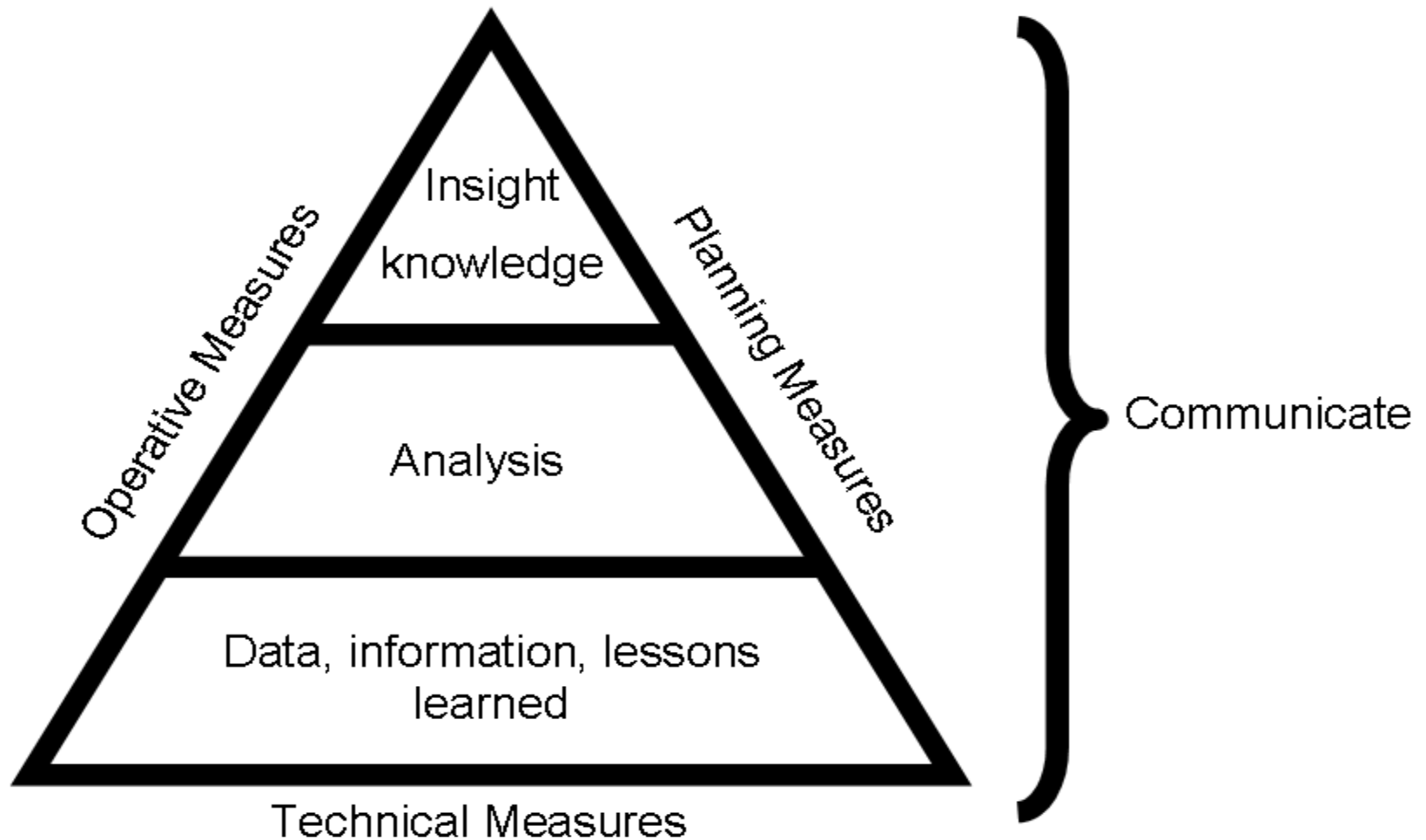
Objectives for Flood management programme

To ensure that Karlstad City is prepared in the short and long term to manage flooding and minimise damage from flooding, we will:

- establish guidelines for planning and building and set functional requirements for key societal functions
- implement operational, technical and planning adaptation measures
- Provide information and communicate openly



Karlstad's Planning Approach



Operational adaptation measures

- Action plan, preparedness plan, investment in emergency rescue resources
- Develop and document organisation for flood management
- Purchase pumps and temporary barriers
- Flooding exercises



Technical adaptation measures

- Measures for critical points in el supply grid
- Continue the measurement programme
- Forecast and warning system for Klarälven
- Extensive dredging of Klarälven delta
- Flooding protection at sensitive locations e.g. Skåre and inner harbour)
- Study connection between flood levels, leakage and spillways for wastewater system
- Protect quality of drinking water
- Investigate effects of Skåre and Sjöstad sewage plants



Planning adaptation measures

- Guidelines with functionality requirements for planning and building permits
- Flood analysis in connection with planning and building permits
- Adaptation of new buildings to meet tomorrow's climate
- Continued collaboration around lake Vänern
- Collection of data, measurement and information management (GIS)



Proposed planning levels for new homes

Starting point is to remain living in **your own home** so water, drainage, electricity and heating must **work as normal**, and you must be able to get to and from your own.

The functionality of new homes must meet a level of lake Vänern with a safety margin of 120 cm

The functionality of new homes must meet a flow of river Klarälven according to latest model calculations with a safety margin of 35 cm.



Existing structures

Guidelines apply for new planning and new building.

For existing structures, the guidelines are **targets that should be aimed for** during renovation and refurbishment and when projecting and executing safety measures concerning flooding.



Communication measures

- Support external stakeholders with knowledge
- Develop information about flooding on City's website, karlstad.se



Our Objective

The City of Karlstad will through operative, technical and planning measures prepare itself to be able to meet the threat of floods and to minimize damages when a flood occurs



Summary

- Good information, good and safe data
- Lessons learned
- Analysis and conclusions
- Insight and knowledge
- Performance

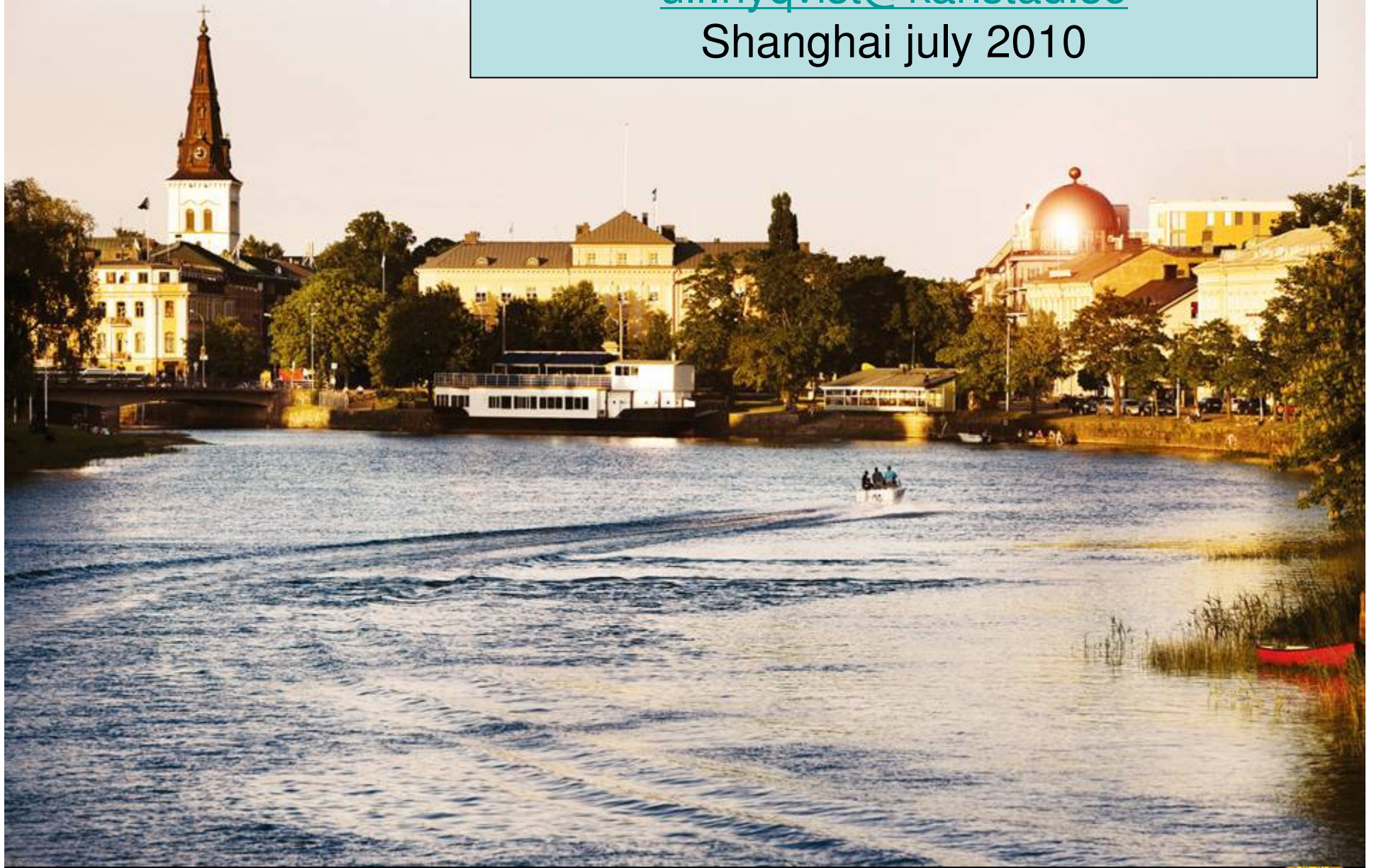


The work of the City in a larger context

- How is Karlstad performing?
- Regional perspective
- National perspective
- International perspective
- Continued work and collaboration with others



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