



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



Estimating waste at household level

Johan W. Joubert - 22 July 2020

Make today matter



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Faculty of Engineering,
Built Environment and
Information Technology

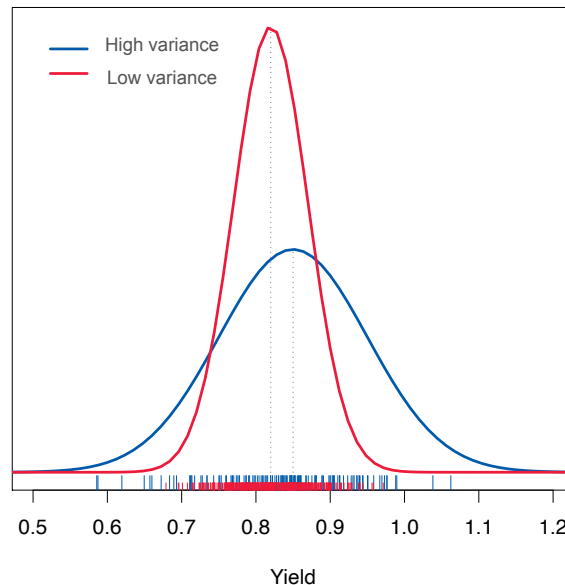
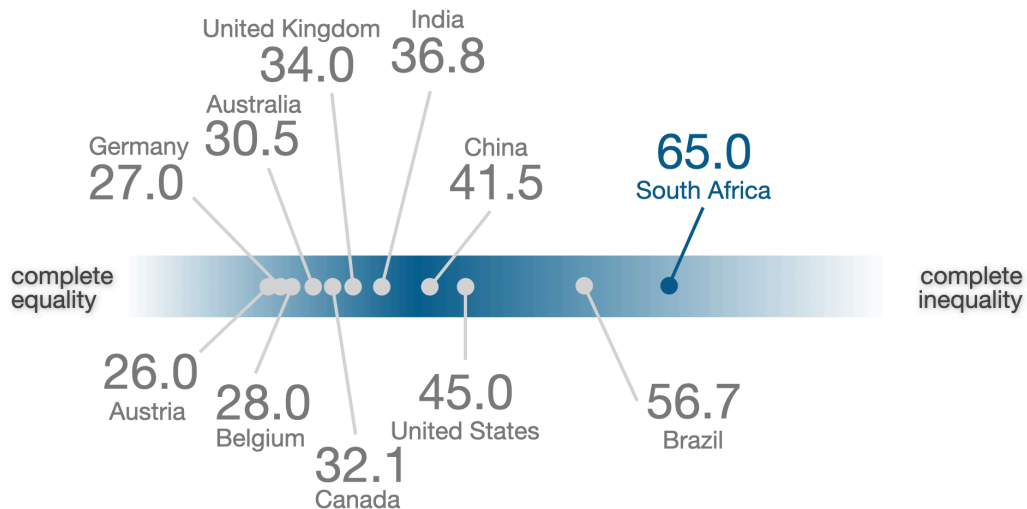
Fakulteit Ingenieurswese, Bou-omgewing en
Inligtingtegnologie / Lefapha la Boetšenere,
Tikologo ya Kago le Theknolotši ya Tshedimošo



Why do we need household estimates?

The “average household” is not good enough

Larger variance in the data requires larger sample sizes, not smaller because of limited budgets.



Generating populations

Making data accessible

Individual

Age
Completed education
Current education
Employment
Gender
Personal income
Race

Household Id



Household

Household income
Car access
Tenure
Home coordinate (sub place)
Main dwelling type
Number of dwelling rooms
Piped water
Toilet facility

Member Ids

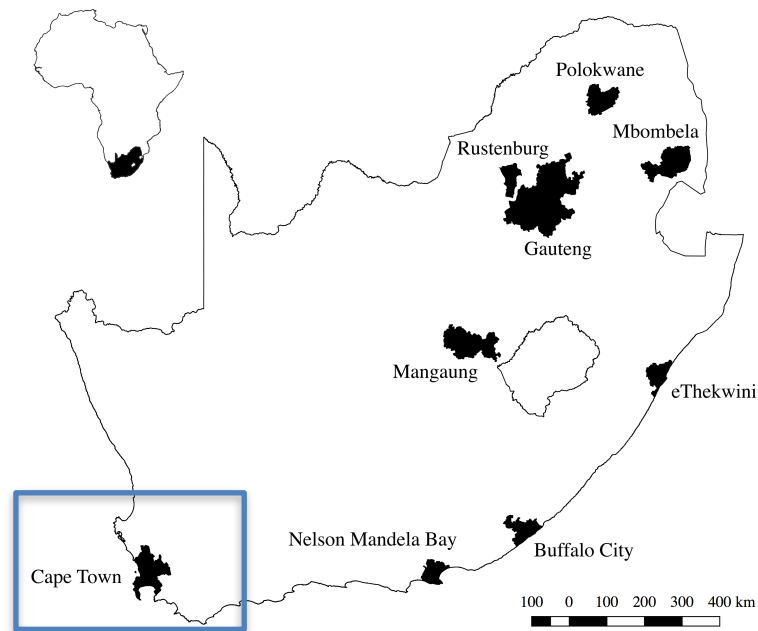
Generating populations

Making data accessible (also for scrutiny)

Available in the public domain for nine areas*.

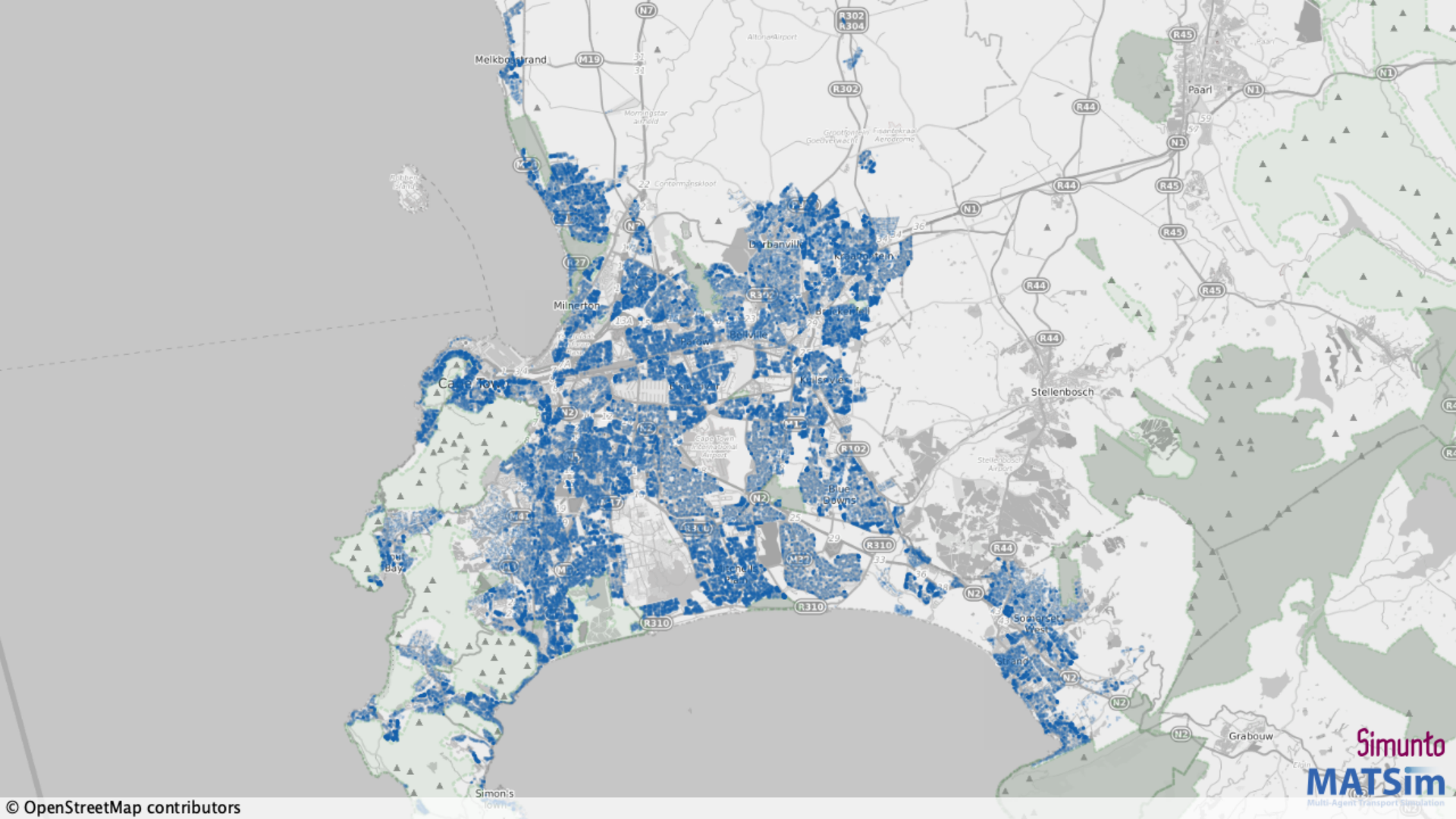
Updated 2019 populations will likely be released on the University of Pretoria's own Open Data Platform.

Additional (census) variables can be added to the households. Contact us if you have specific use cases.



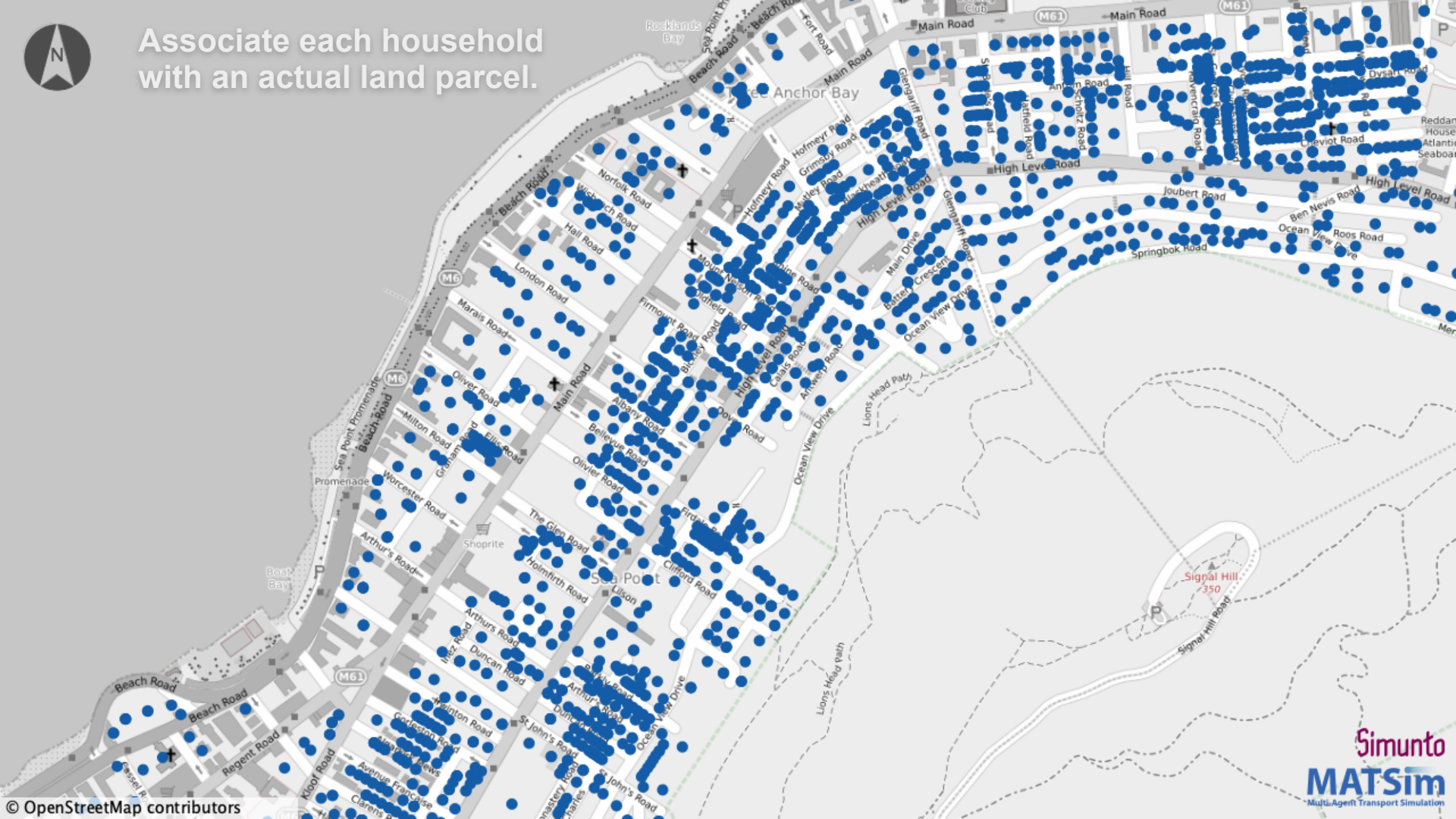
* Joubert, J.W. (2018). Synthetic populations for South African urban areas. Data in Brief, 19, 1012-1020.

Article doi: [10.1016/j.dib.2018.05.126](https://doi.org/10.1016/j.dib.2018.05.126); Data doi: [10.17632/dh4gcm7ckb.1](https://doi.org/10.17632/dh4gcm7ckb.1)





Associate each household
with an actual land parcel.



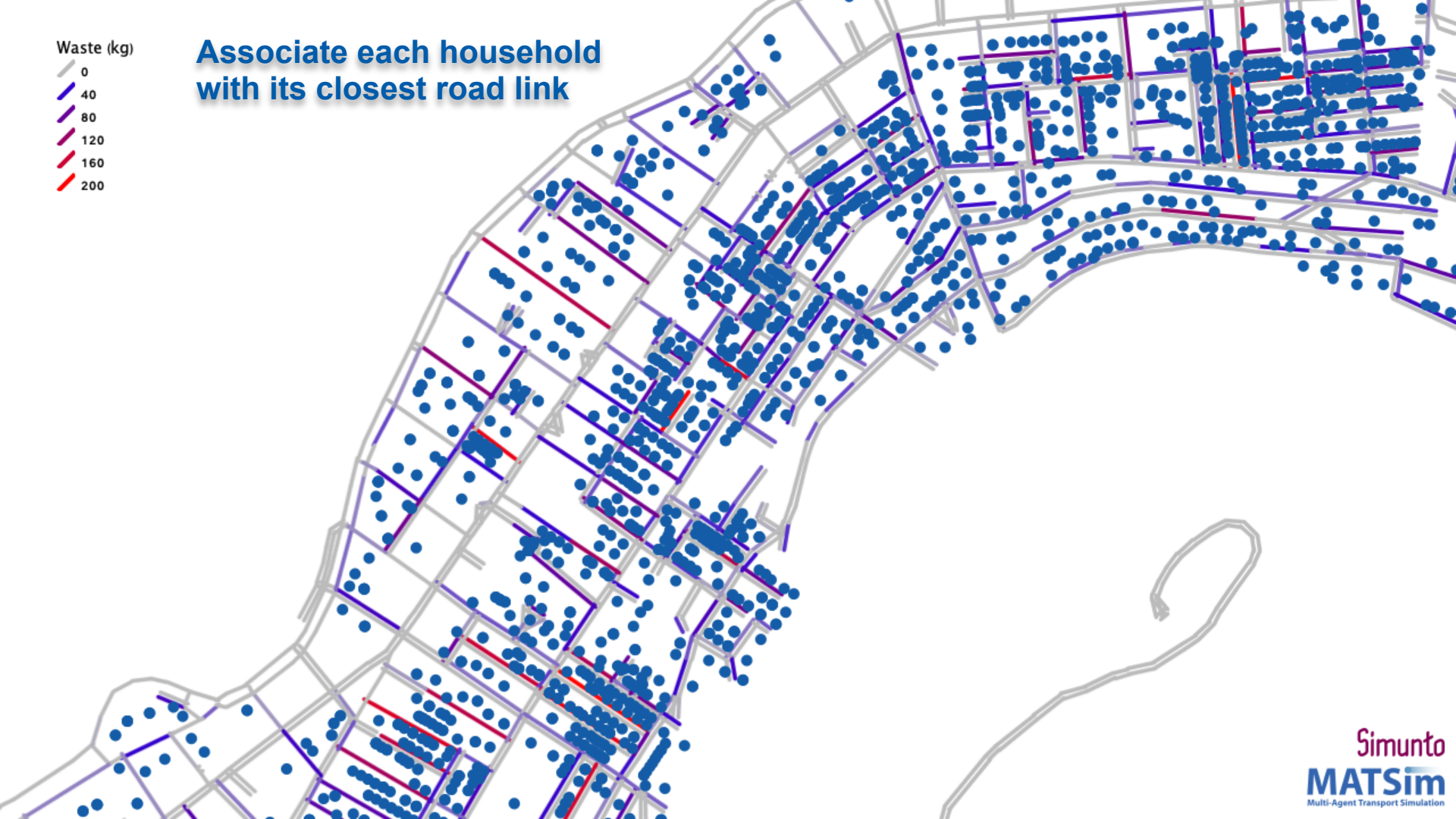




Waste (kg)



Associate each household
with its closest road link



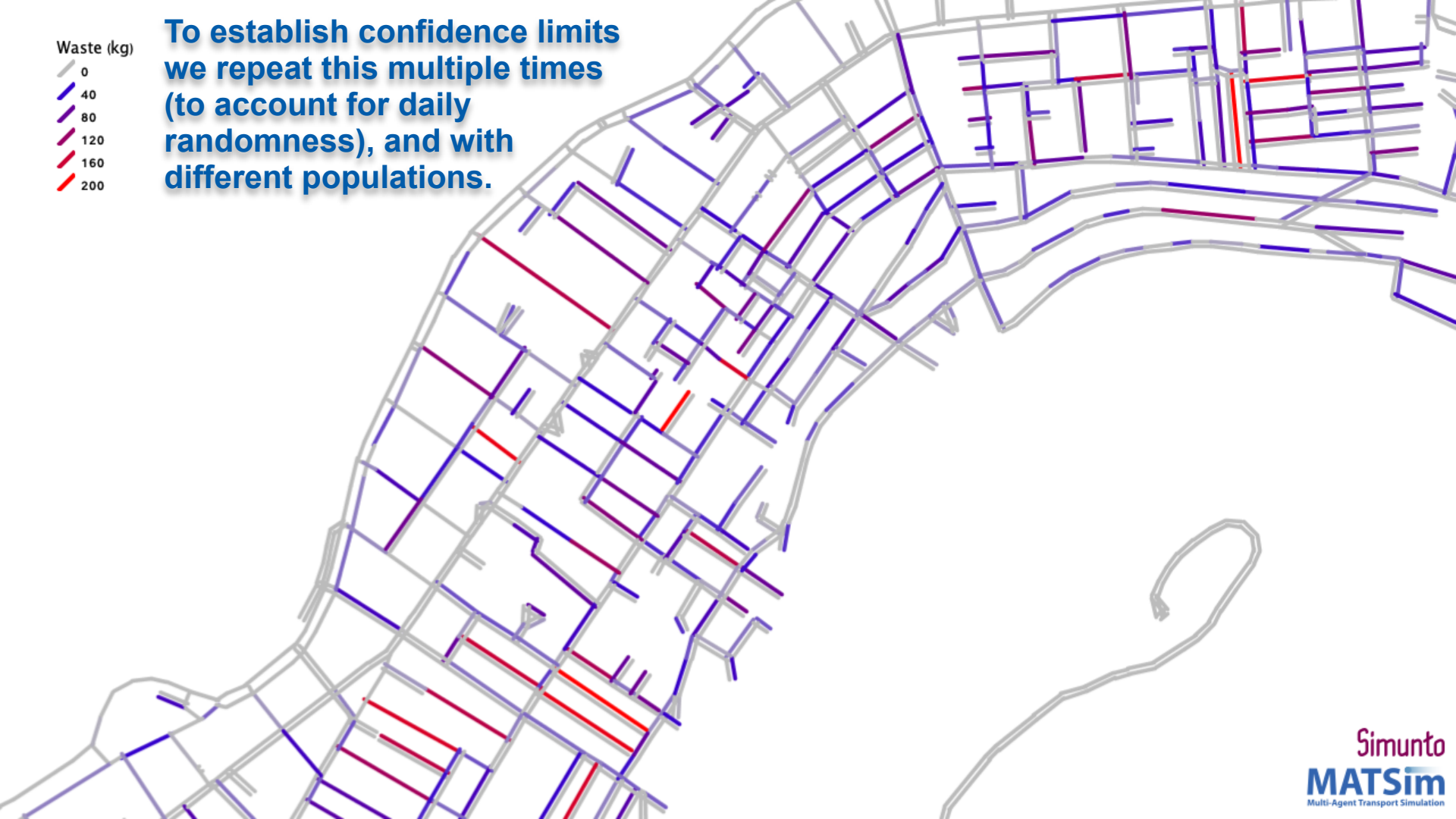
Waste (kg)



Waste (kg)



To establish confidence limits we repeat this multiple times (to account for daily randomness), and with different populations.



Peculiarities

Like the population, housing is not “one size fits all”



Grassy Parks

Single Residential Zoning 1: Conventional housing (SR1)



Delft

Single Residential Zoning 2: Incremental housing (SR2)

Next steps

- Establish different waste generation rates (for households), and evaluate the sensitivity of the rates on the aggregated results.
- Establish robust (yet simple) service design algorithms for municipalities:
 - Designated service days
 - Fleet design
 - Route optimisation

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- Establish different waste generation rates (for households), and evaluate the sensitivity of the rates on the aggregated results.
- Establish robust (yet simple) service design algorithms for municipalities:
 - Designated service days
 - Fleet design
 - Route optimisation
- What is an “optimal” route?
 - Operational cost
 - Environmental cost
 - Societal cost



Thank You

Linda Akromah (PhD)

Jeanne-Marie Hugo (MEng)

