The University Of Sheffield.

URBAN FLOWS OBSERVATORY

Measuring urban material stocks & flows

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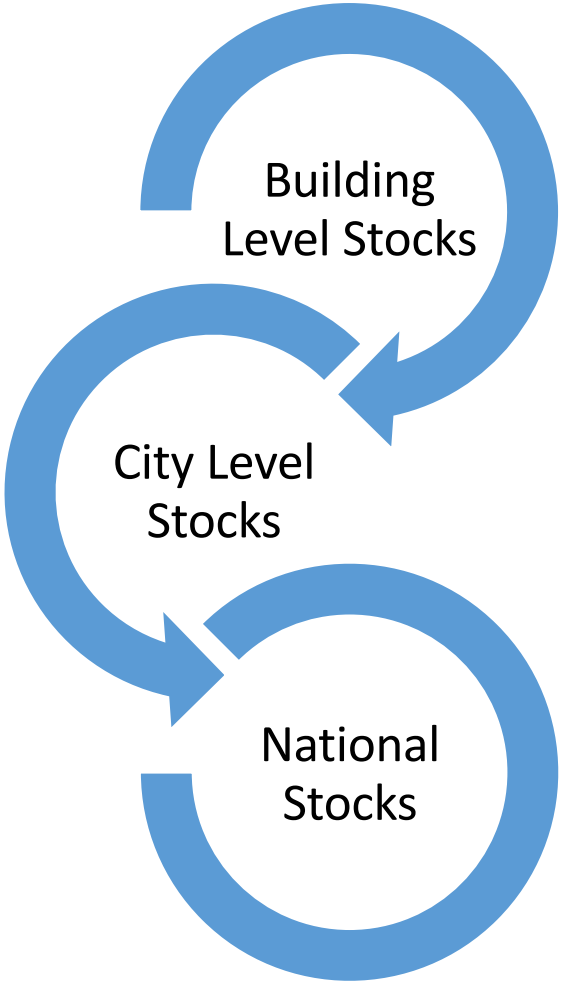
The Vision

- Generate a detailed understanding of material flows and stocks in the built environment
- Provide evidence & estimates of opportunities for embodied carbon reduction & circular economic flows
- Leverage CE opportunities to develop material recycle/reuse roadmaps that will enable sustainable growth within planetary carrying capacity, and
- Enable an inter-scale built-environment development, from design of individual buildings, to local and national planning policy

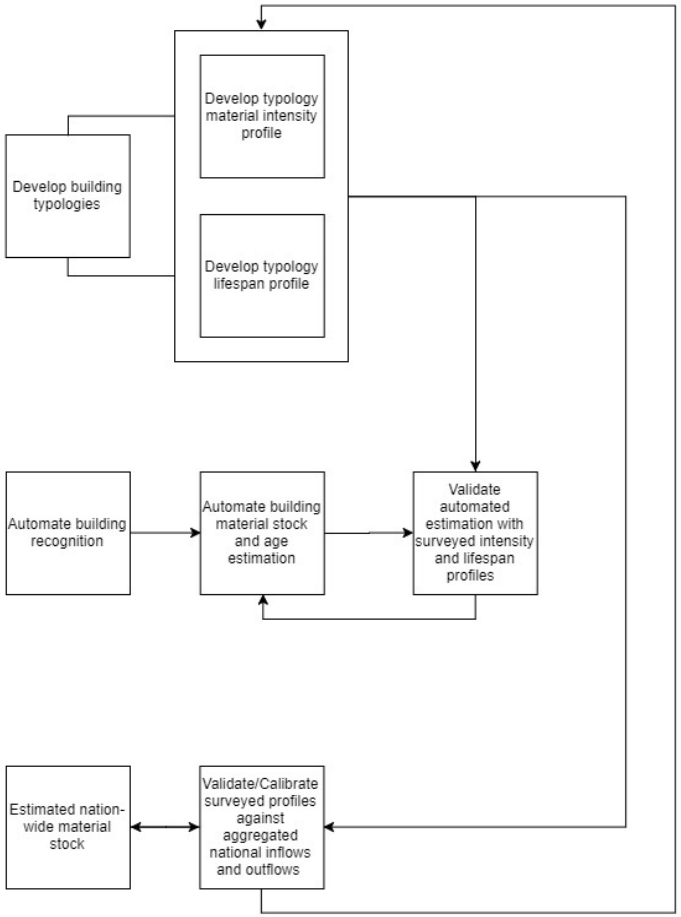
Working Across Scales



Understand building level material intensity and lifespan

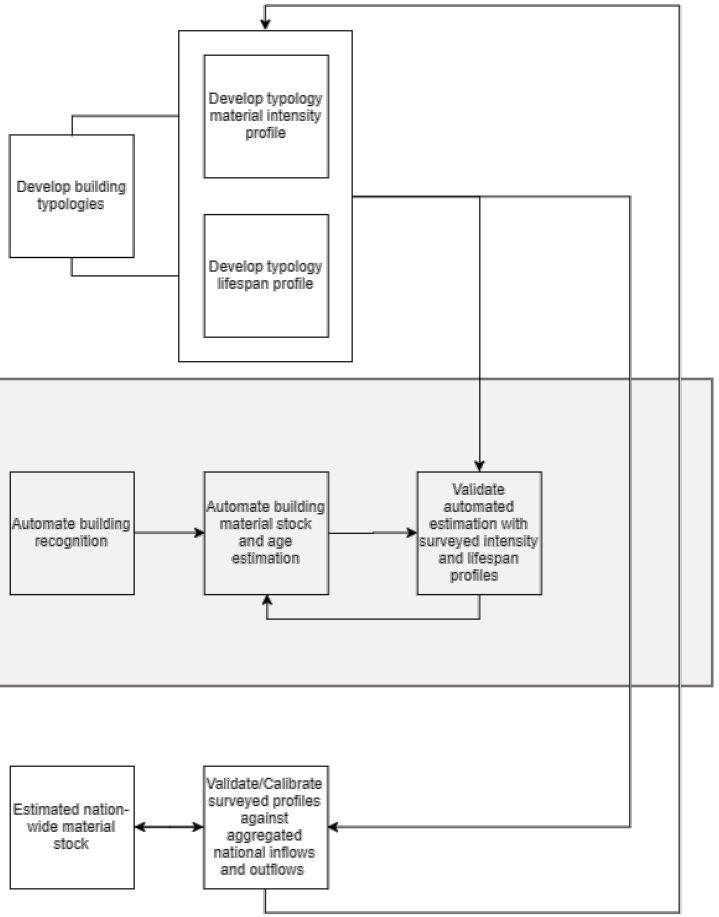
Estimate city level material stock and lifespan

Extrapolate disaggregated geographically detailed country-wide building/construction material stock



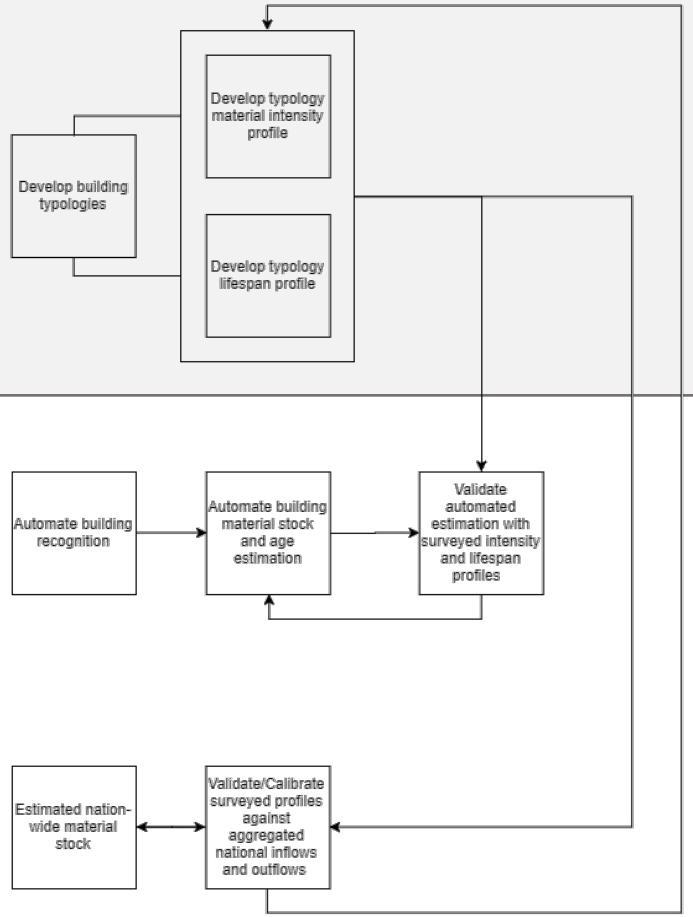
Urban Scale Pilot Project – starting Feb

Sheffield Urban Observatory Project using machine learning to categorize façade material types.
Will use LiDAR, visual & thermal data measured in the city.
Plan to compare accuracy of high resolution data to google street view – what's the margin of error?



Proposed Project

Bottom-up case study sampling to establish realistic building material intensity, embodied carbon & circular economic potential, representative of different building designs and typologies



Proposed Project – further details

- Non-residential, UK focus
- Large case study sample desired 200+ buildings
  - Potential data inputs: BIM files, drawings & bills of quantities
- Focus on structure – but will include facades
  - Can features of facades be used to identify structural type?
  - Would it be useful/possible to include M&E
- Buildings will be categorised by structural type & use type
  - Also filter by age & number of storeys?
- Material intensity, embodied carbon & circular economic potential (develop method) assessed
- Explore different circular economic scenarios for different planning strategies, e.g. adaptation vs deconstruction

Over to you for discussion….

- Immediate thoughts & interest levels in being involved?
- How might you use project outputs?
- Are there other criteria it would be useful to look at?
  - E.g. cost, wider environmental impacts
- Building lifespan estimates for different use types – would be useful to build this in, but data collection potentially challenging, ideas?