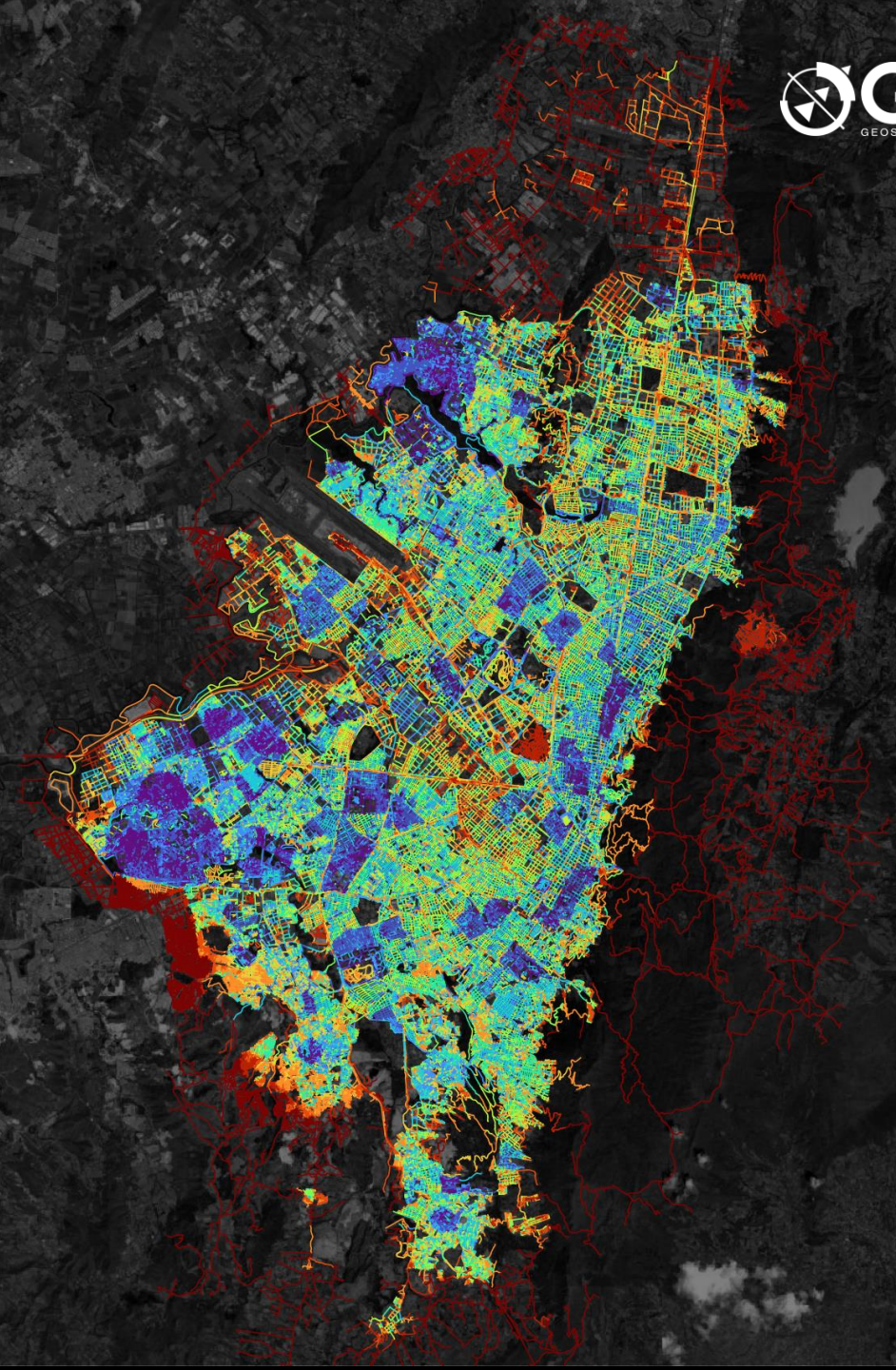
Integrated Digital Solutions for Road and Highways Infrastructure Lifecycle Management

Applying Arup's Staterra toolkit with C40 Cities in Bogota, Colombia



ADRIEN FRIESEN

1-05-2026

Staterra

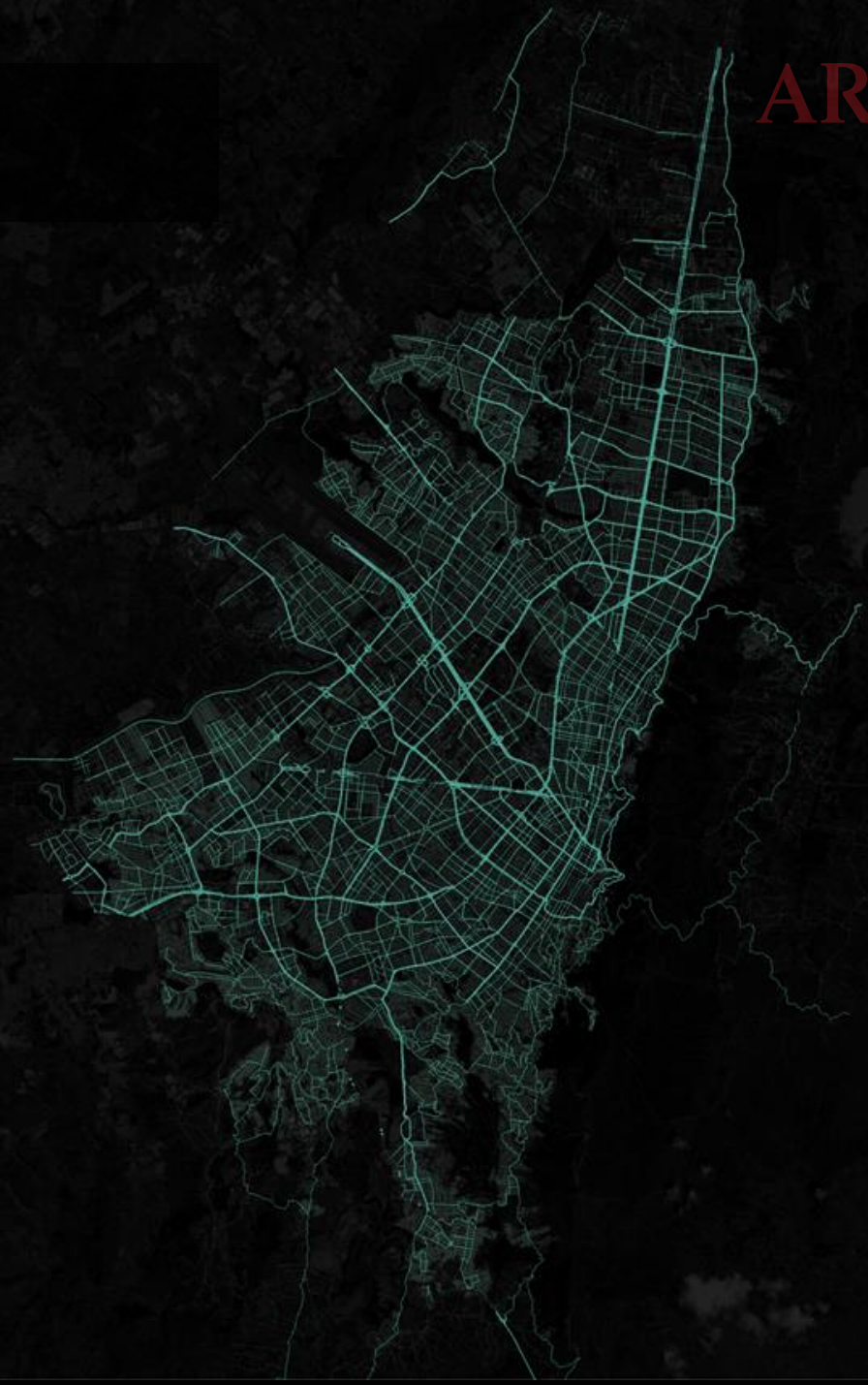
C40 Cities – Colombia

Examining pedestrian policy in Bogota, Colombia

Arup worked with C40 Cities to update the pedestrian public policy strategy for Bogota's District Secretary of Mobility.

Three major parts to the project:

1. **Review and optimise the existing strategy of identifying and prioritising future improvements across the pedestrian network**
2. Define a set of pedestrian circuits that citizens can use to navigate their way across the city
3. Deliver a new, proprietary digital tool that would help quantify the benefits of walking, considering reduced CO2 emissions and maximised health benefits for Bogotanos.



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Examining pedestrian policy in Bogota, Colombia

Client discussions shortlisted several metrics to consider walking quality, some of which were already part of the base Staterra model.

Metrics included:

green space, pavements/walkways, proximity to public transport, street lighting, accident statistics, and more.

Calle 81 – Zona T

Calle 65j sur – Bosa

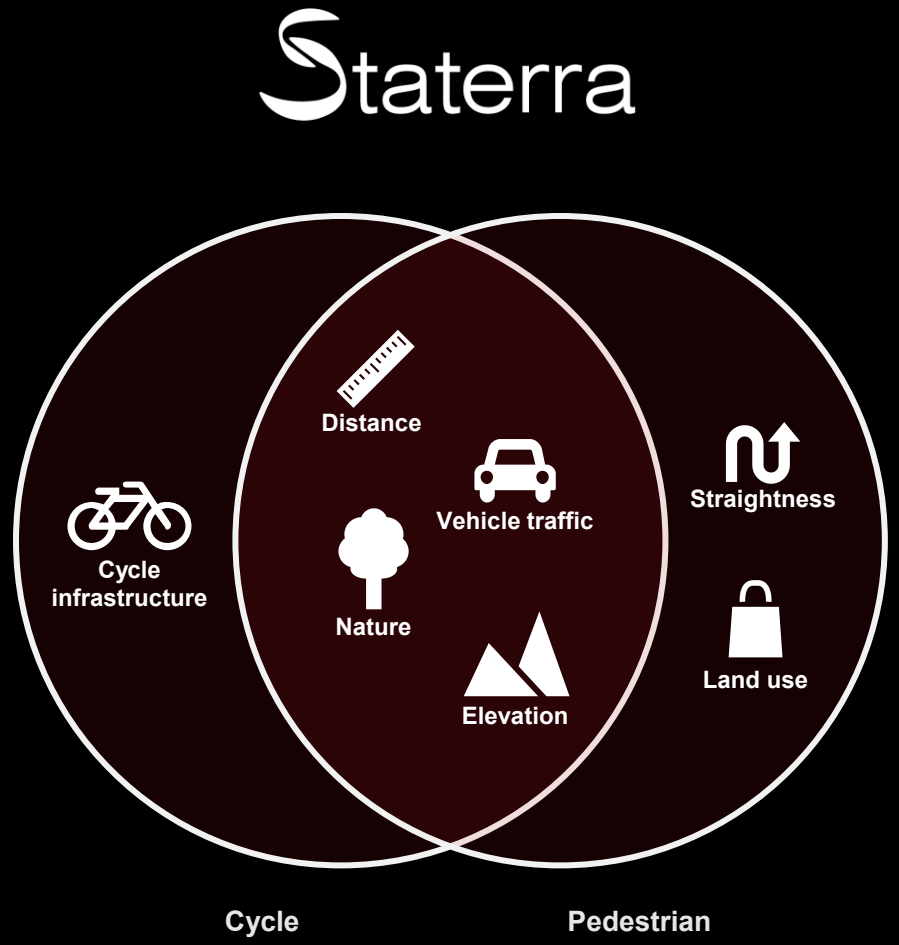
Staterra

Staterra

ARUP

Arup's Staterra model: understanding the quality of the streets we walk on

- Data-driven toolkit to understand the conditions of walking and cycling quality.
- Measures quality for both cycling and walking along each street, drawing on large open datasets.
- Distance, elevation (slope), natural spaces (green and blue), and motor traffic are considered.
- Flexibility in tooling allows for adaptation and refinement to ingest client-side data.



Sources

Mapzen

EU | ESA
sentinel-2
COPERNICUS

Staterra

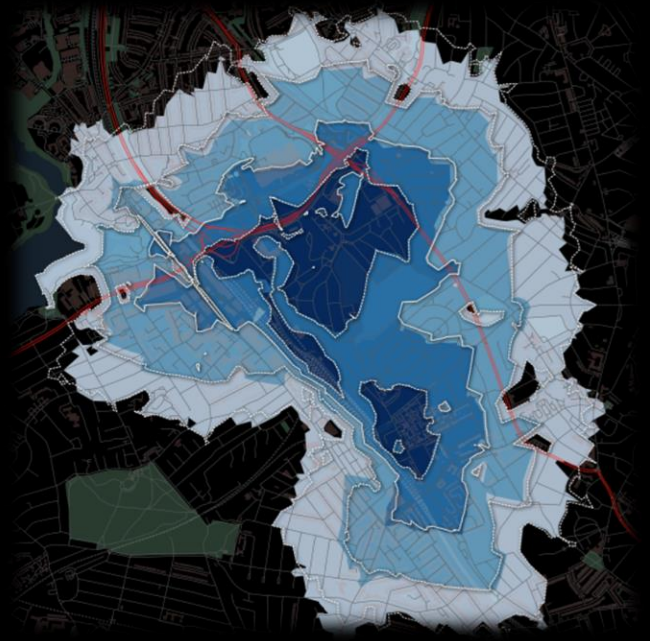
ARUP

Arup's Staterra model: understanding the quality of the streets we walk on

Application

Explore questions when shaping highway infrastructure for pedestrians:

- Understanding **potential footfall** demand and shifts with new developments.
- Identifying **key access routes** for the "last mile" to central transportation hubs, highlighting points of severance or breaks in quality.
- Using the **quality factored perceived distance** metric to conduct **O-D analyses for** optimal quality-weighted routing.



Staterra - NDWI water index

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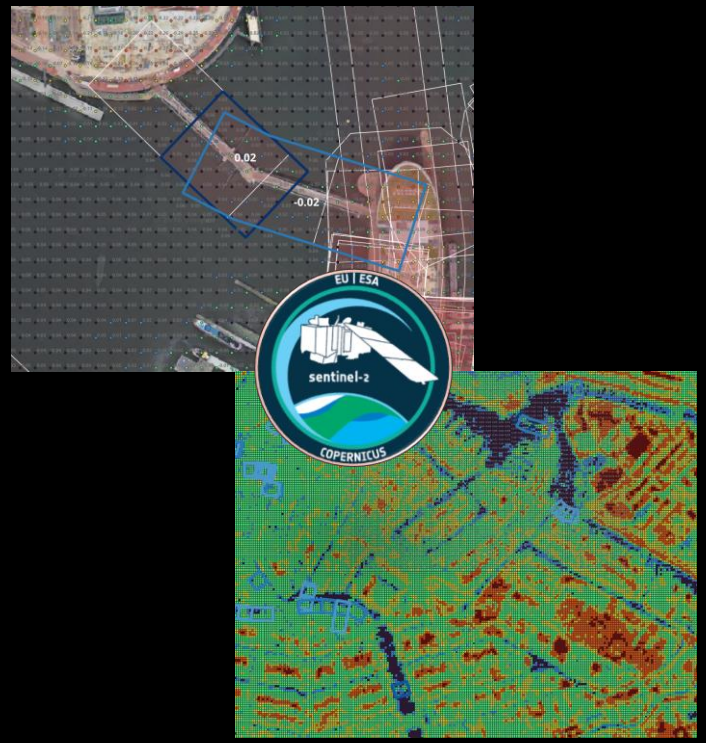
Satellite imagery for water averaging



Water Score

Low High

Staterra

Staterra - NDVI vegetation index

ARUP

Satellite imagery for vegetation averaging

Green Score

Low — High

Staterra

Staterra – Footfall Estimates

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Relative Footfall

Develops high-level relative footfall estimates across large areas when proprietary data is sparse.

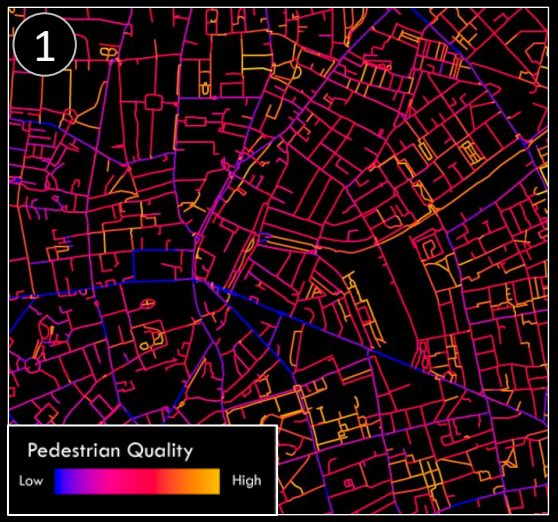
Incorporates Staterra's walk quality with demand proxies.

Calculates demand proxies based on:

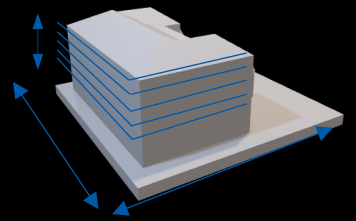
- Total area of building footprints
- Number of storeys (height)
- land-use/building category (e.g., commercial or transit will have higher turnover and throughput)

The demand proxies are intended as approximation when other sources are not available (e.g., spot counts, surveys, camera/AI, mobile phone data).

Pedestrian quality



Demand generation



Relative footfall

Staterra

C40 Cities – Colombia

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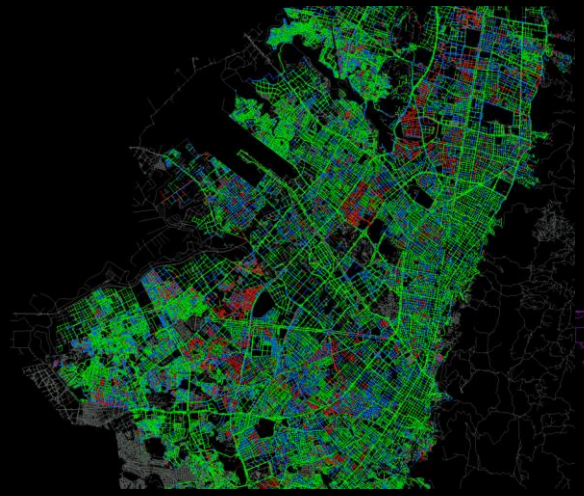
Examining pedestrian policy in Bogota, Colombia

Enabled flexibility to adopt the client's desired datasets into the analysis, applying weighted composite scores across the network. This ultimately provided a rich dataset to lay foundation to the work moving forward with the next two stages of the project.

1. Sidewalks
2. Green Space
3. Public Transport
4. Care Services
5. Tree Cover
6. Street Lighting
7. Urban Furniture
8. Traffic Safety and Accidents
9. Footfall Busyness
10. Economic Density

Sidewalks/Pavement



Economic Density

Public Transport

Urban Furniture

Staterra

Questions & Connect

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