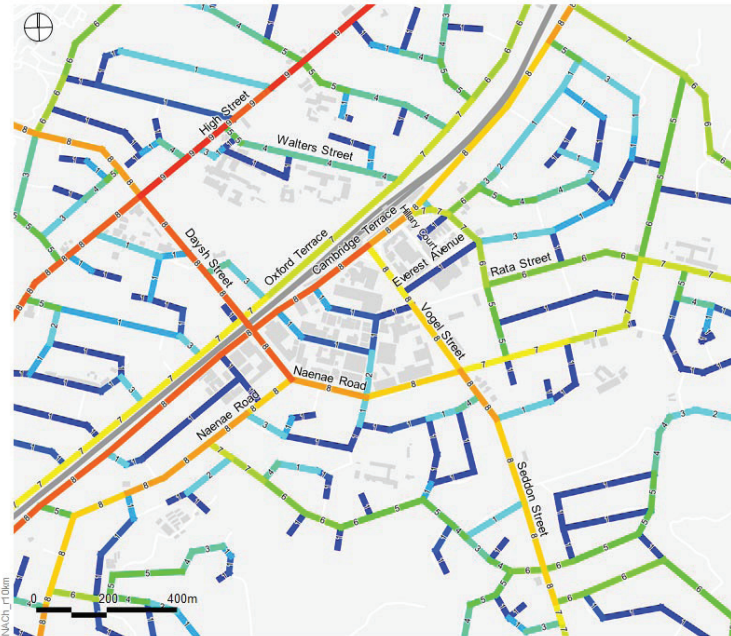
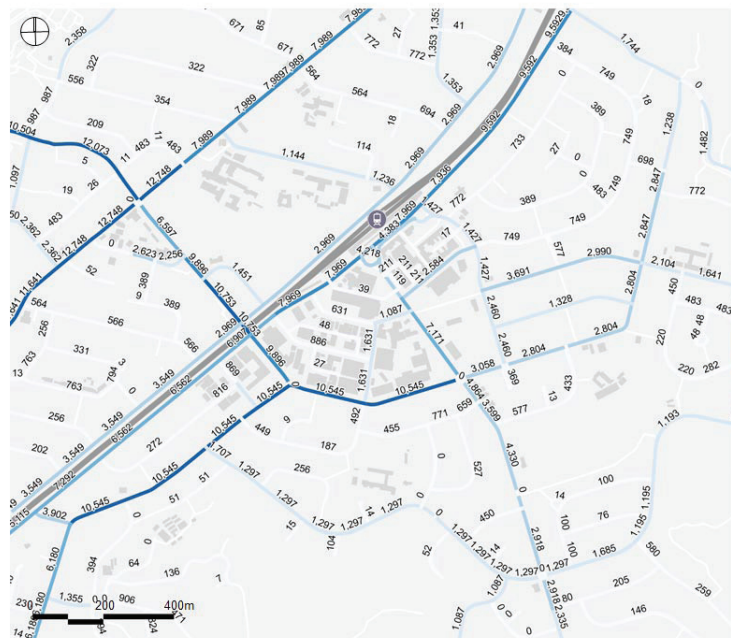


Spatial Layout Attraction Vehicle 10km Existing



Vehicle volumes October 2018



The Vehicle Spatial Layout Attraction Model of Naenae includes vehicle routes and excludes pedestrian-only routes such as Hillary Court. The model measures the vehicle movement potentials of each street segment for a 10km catchment. The analysis identifies that:

- Cambridge Terrace, Naenae Road and Vogel Street are significant vehicle routes around the town centre
- Daysh Street from the north west, Cambridge Terrace and Naenae Road from the south west and Seddon Street from the south form key approaches to the town centre
- the commercial centre at Everest Avenue/Hillary Court is located away from these key routes with consequently low 'through movement' potentials.
- In contrast, the historic route of High Street, further north, has the highest levels of Spatial Layout Attraction.

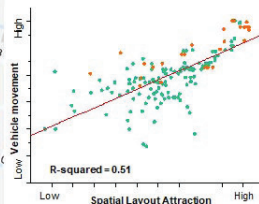
The spatial arrangement of Naenae, with a retail centre that is detached from the movement network, is typical of post-war town planning, unlike in historic towns where the commercial centre would have evolved along through routes/High Streets that captured longer-distance movement.

For these reasons, retail and other commercial uses in post-war towns often perform below the levels of historic high streets

Spatial Layout Attraction
High = 10
Low = 1

Comparison can be made between the results of the Vehicle Spatial Layout Attraction Model and actual vehicle volumes as measured in October 2018.

Visual (left) and statistical (below) comparison of the data shows a close association between levels of Spatial Layout Attraction and actual movement patterns. The key street segments identified by the spatial modelling exercise correspond to those with the highest vehicle flows: Days Street, Naenae Road and Vogel Street in the town centre, with highest overall flows on High Street further north.



Vehicle movement
Average cars per day
0 - 1,000
1,000 - 2,500
2,500 - 5,000
5,000 - 7,500
7,500 - 10,000
10,000 - 20,000
20,000 - above

05

SPATIAL ATTRACTION ANALYSIS

05.01 INTRODUCTION

05.02 DEVELOPING AN EVIDENCE BASELINE

To enhance the evidence base for improvements in Naenae town centre, Space Syntax was engaged to analyse existing and future urban structure. Space Syntax is an international company which has pioneered a unique, space-based approach to the modelling of human activity patterns in buildings and in urban systems. Its' models integrate multiple influences on behaviour including:

- '*spatial layout attraction*', from more accessible to less accessible places
- '*land use attraction*', in terms of the location and scale of different land uses
- '*transport attraction*', including the location of transport nodes and capacity of transport connections.

Space Syntax models can simultaneously analyse pedestrian, cycle and vehicle movement networks and these models have been applied in urban planning and design projects worldwide. Applications include the creation and evaluation of proposals for urban and architectural change at every scale, from regional urban analysis and the planning of entire cities to the design of urban neighbourhoods, site layouts, parks, and public spaces.

Space Syntax's approach combines this extensive global experience with robust and continuously developing technologies to forecast the effects of urban planning and design decisions on the movement and interaction of people in buildings and urban areas. The results are highly graphic and capable of providing rapid feedback to planners and designers. Models are used to test proposals from concept design through to delivery.

'Spatial Layout Attraction' modelling is one of the techniques that identifies the relative importance of each street segment – each piece of street between two intersections - for people moving within towns and cities.

By finding the simplest routes from all origins to all destinations – the shortest routes that involve the fewest twists and turns - an algorithm calculates how likely it is that movement will pass along any individual segment or route.

Figure 42. -
Space Syntax model predicting spatial attraction at a 10km radius. (Image Source: Space Syntax)

Figure 43. -
Actual vehicle volumes. (Image Source: Space Syntax)

Segments that are part of straighter, more connected, and more central streets tend to be used more frequently as part of journeys across the urban network. However, the overall importance of any street segment may vary depending on the scale of the journey. Some segments are more likely to be used as part of longer journeys, some as part of shorter journeys, some at both scales and some at neither.

For this reason, Spatial Layout Attraction modelling is undertaken at two different scales: first, for a catchment of 10km, which typically identifies the movement hierarchy of people making longer journeys in vehicles and on bikes; second, for a catchment of 1.2km, which typically picks up the hierarchy of shorter journeys made by people on foot and on bikes.

Undertaking this kind of 'multi-scale' analysis of spatial layouts, allows short-and long-distance journeys to be simultaneously evaluated and shows how different parts of the same network are used differently, depending on the scale of journey.

Frequently, the same parts of the network are used on both short- and long-distance journeys. While this can create conflicts between the needs of different transport modes, land use analysis shows that these 'multi-scale' places are often successful commercial locations, thus demonstrating the importance of careful spatial layout design in creating multi-scale opportunities for retail and commercial activities to trade to more than one scale of movement.

In Figure 42, a 'Vehicle' model of the area surrounding Naenae will first be presented, which calculates Spatial Layout Attraction for each street segment within a longer journey catchment of 10km. Figure 43 shows actual vehicle volumes and the clear correlation between these volumes and the spatial model.

Then a 'Pedestrian' model of the existing Naenae area is presented in Figure 44. This does the same for a shorter journey catchment of 1.2km. Finally, the results of both models are combined in a 'Multi-Scale' model shown in Figure 45. This is then analysed to create a set of 'street types', which shows those street segments that are more important for longer journeys and those that are important for shorter ones; as well as those that are important for both, and those for none.

Figure 44. - Space Syntax model predicting spatial attraction at a 1.2km radius. (Image Source: Space Syntax)

Spatial Layout Attraction Pedestrian 1.2km Existing



The Pedestrian Spatial Layout Attraction Model includes pedestrian routes and excludes vehicle-only routes such as State Highway 2. The model measures the pedestrian movement potentials of each street segment for a 1.2km catchment. The analysis identifies that:

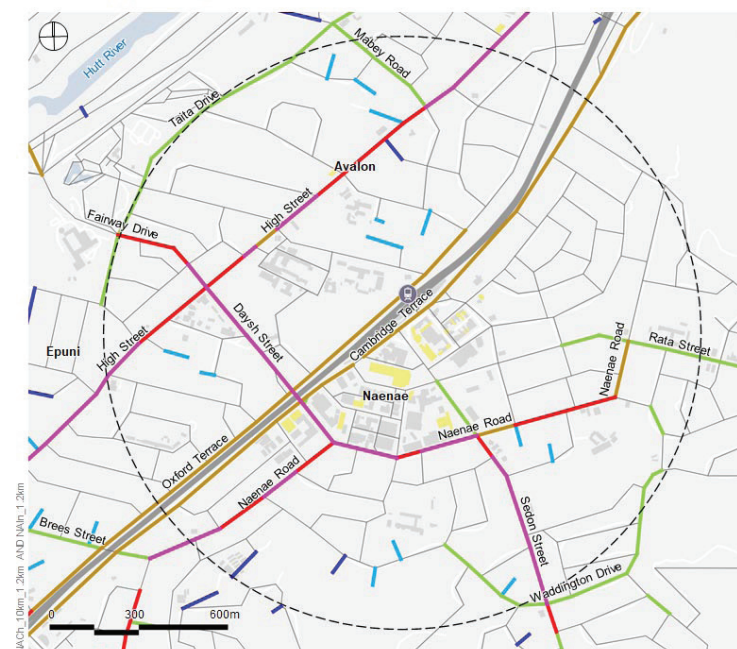
- the retail centre at Hillary Court and Everest Avenue are relatively spatially isolated within the movement network of the town centre
- greater movement potentials exist on peripheral streets including Daysh Street, Naenae Road, Vogel Street and Seddon Street

As was seen with the Vehicle Model, the spatial arrangement of Naenae is typical of post-war town planning, and not like in historic towns where the commercial centre would have evolved along through routes/High Streets that captured shorter as well as longer-distance movement.

For these reasons, retail and other commercial uses in post-war towns often perform below the levels of historic high streets.

Spatial Layout Attraction
High = 10
Low = 1

Street type analysis Combined Vehicle + Pedestrian Model



By combining the outputs of the Vehicle and Pedestrian models, 'Street type analysis' provides an assessment of the opportunities and constraints facing the future development of Naenae town centre.

The results suggest that spatial interventions could be made to re-engineer the 'movement economy' of the town. Doing so could mean:

- the creation of new walking and driving linkages
- the construction of new commercial uses on the most important street segments
- the relocation of some existing uses.

Image Source: Google Maps

Station
Google Live Centres and AOIs
Street types
Very important (longer + shorter)
Important (longer + shorter)
Important (longer only)
Important (shorter only)
Isolated
Very isolated
Background network

Figure 45. - Multi-Scale model of spatial attraction. (Image Source: Space Syntax)