Social needs for transport and gaps in transit service: Enniscorthy and other parts of County Wexford, Ireland

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Introduction

The CONUNDRUM project relates to sustainable transport, community mobility and co-creation, and is using Enniscorthy in County Wexford, Ireland, as a test bed. However, assessments and mapping of social needs for transport, and public transport supply provided in Enniscorthy, and how these compare to other places in Ireland, do not appear to be publically available.
Currie et al[1] developed a methodology for assessing spatial gaps between social needs and transit supply An R package[2] has recently been developed that facilitates the calculation of the transit supply levels from General Transit Feed Specification (GTFS) datasets.

This note presents results obtained by applying the gtfssupply index R package to Ireland's GTFS dataset,
with an emphasis on Enniscorthy in county Wexford.

[1] "Quantitative Approaches to Needs Based Assessment of Public Transport Services: The Hobart Transport Needs Gap Study," Journal Article, 2003, https://www.semanticscholar.org/paper/2c049091cafb56c66efc532ad2bdd774d8efc0eb; "Gap Analysis of Public Transport Needs:measuring Spatial Distribution of Public Transport Needs and Identifying Gaps in the Quality of Public Transport Provision," *Transportation Research Record* 1895 (2004): 137–46, doi:10.3141/1895-18; "Identifying Spatial Gaps in Public Transport Provision for Socially Disadvantaged Australians: The Melbourne 'Needs Gap' Study," 2007; Graham Currie, "Quantifying Spatial Gaps in Public Transport Supply Based on Social Needs," *Journal of Transport Geography* 18, no. 1 (2010): 31–41.

[2] See https://github.com/James-Reynolds/gtfssupplyindex

Background

Transit supply

The social needs-gap analysis methodology involves calculating a Supply Index (SI) based on the number of transit service arrivals at stops in and around each area of interest. Adjustments are made for the amount of each area that is within a typical walking distance of each stop, according to the following formula:

$$SI_{area,time} = \sum \frac{Area_{Bn}}{Area_{area}} SL_{n,time}$$

where:

- $SI_{area,time}$ is the Supply Index for the area of interest and a given period of time;
- $Area_{Bn}$ is the buffer area for each stop (n) within the area of interest[3];
- $Area_{area}$ is the area of the area of interest; and
- $SL_{n,time}$ is the number of transit arrivals for each stop within the given time period.

[3] In Currie, "Quantifying Spatial Gaps in Public Transport Supply Based on Social Needs" this was based on a radius of 400 metres for bus and tram stops, and 800 metres for railway stations. The same definition is used here.

As such, the SI combines coverage (accessibility to transit) and service frequency (accibility by transit). The SI is a relative index, allowing comparison between different areas of interest, based on transit supplied over a specific time period. In the results reported in Currie[4] transit supply was assessed based on an entire week, and compared across Census Collection Districts (CCDs) within Greater Melbourne. CCDs were clasify into seven groups based on SI scores[5].

[4] Ibid.

[5] being those with: zero supply; very low, low, or below average supply; and above average, high or very high supply.
CCDs with above and below average SIs were evenly split into each of the three sub-groups, respectively.

Transport needs

Transport needs were similarly assessed using a index score, based on various metrics available from the Australian Bureau of Statistics (ABS). These included the Index of Relative Socio-Economic Advantage/Disadvantage (IRSAD), which is reported directly by the ABS based on 31 weighted indicators and data collected during the census. A transport-specific need index, based on eight weighted indicators[6] was also included, with scores categorised based on three groups below and three groups above the average score across all of Melbourne.

Clearly, the approach used to assess social needs for transport might need to be adjusted to reflect different data availability in different locations or from different editions of a census.

[6] Adults without cars (0.19), distance to the Melbourne Central Business District (0.15), persons aged over 60 years (0.14), persons on a disability pension (0.12), low income households (0.10), adults not in the labour force (0.09), students (0.09) and persons 5-9 years (0.12).

Needs-gaps

The final step was to compare social needs for transport with the amount of transit supplied in each area of interest. A key finding was that "8.2% of Melbourne residents ha(d) 'very high' needs but 'zero', 'low' or 'very low' public transport supply", reflective of areas of greater need often being in places on urban fringes or otherwise often remote from transit infrastructure and services.
More broadly, it was suggested that the developed methodology might be "substantially more useful than the presentation of anecdotal evidence which is the most common means of identifying transport needs in local transport studies throughout the world"[7].

[7] Currie, "Quantifying Spatial Gaps in Public Transport Supply Based on Social Needs."

Methodology

Supply Index

This analysis used the all-Ireland GTFS dataset, downloaded on April 23, 2025 and reporting scores for transit services provided on that same date (the first Wednesday after Easter). The "Small Area" National Statistical Boundaries from 2022 were adopted as the areas

of interest, with the indexing of supply based on the average score across the County of Wexford.

Needs

The Irish Census (2022) reports various indicators for "Small Area", but these do not match those used in the Currie (2007) or other previous needs-gap analyses. However, there are some that are similar[8], but there does not appear to be a IRSAD or similar socio-economic indicator available.

As such, this analysis adapts the Currie (2007) approach and uses the same weighting for the following indicators: households without cars (0.19); distance to Wexford (0.15); persons aged 60 years and over (0.14), persons unable to work due to permant sickness or disability (0.12), those aged 15 years or older who are not at work; students (0.09) and people aged 5-9 years (0.12). Each of these indicators were normalised across all of the "Small Areas" in County Wexford, and weighted as indicated to develop an indicator of social need for transport to be used in this analysis.

Results

Transit supply

The distribution of social need for transport by population across County Wexford is shown in @ref(fig:cars-plot). Figure 2 shows the distribution of transit supply by Small Area. 50% of County Wexford's residents live in areas with lower than the average supply level, including the 32% living in Small Areas that have no transit service at all, while In general, and as might be expected, transit supply appears to be focused most in the urban areas of Wexford (town), Enniscorthy, Gorey and New Ross,

Figure 4 shows transit supply in Enniscorthy and Wexford (town). In Enniscorthy 22% of residents live in Small Areas with less than the (County-Wexford-wide) average transit supply. This compares to only 18% in Wexford (town)[9].

Figure 4 shows transit supply in Gorey and New Ross. Differences between Enniscorthy and Goery were statistically significant[10]. In Goery 56% of residents live in Small Areas with less than the (County-Wexford-wide) average transit supply, which is a greater proportion than in Enniscorthy (22%) Differences between Enniscorthy and New Ross were not statistically significant[11], with 18% of New Ross residents living in Small Areas with less than the (County-Wexford-wide) average transit supply.

[8] Item T15_1_NC is the number of households without a motor car. Items T1_1_AGE60-64T, T1_1_AGE65-69T, ... T1_1_AGE80-84T and T1_1_AGE85T report persons aged 60 years and older; T8_1_UTWSDT reports the total number of people unable to work due to permanent sickness or disability; T8_1_TT reports the total population aged 15 years and over, while T8_1_WT reports the total at work, thereby allowing calculation of the number of adults (15+) not in the labour force; T8_1_ST reports the number of people aged 15 years and over who are students; and T1_1AGE5T, T1_1AGE6T ... T1_1AGE9T report the number of people aged 5 through 9. There does not appear to be any data available about low income households at the "Small Area" geographic area.

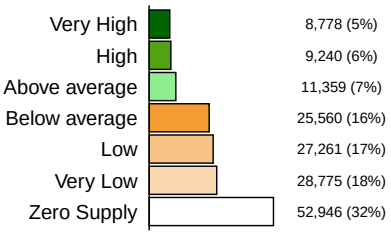

Figure 1: Transit Supply across County Wexford, by population

[9] Differences between Enniscorthy and Wexford (town) are statistically significant^($\chi^2(5) = 17.17$, $p = .004$

[10] ($\chi^2(5) = 18.82$, $p = .002$

[11] ($\chi^2(3) = 1.76$, $p = .624$

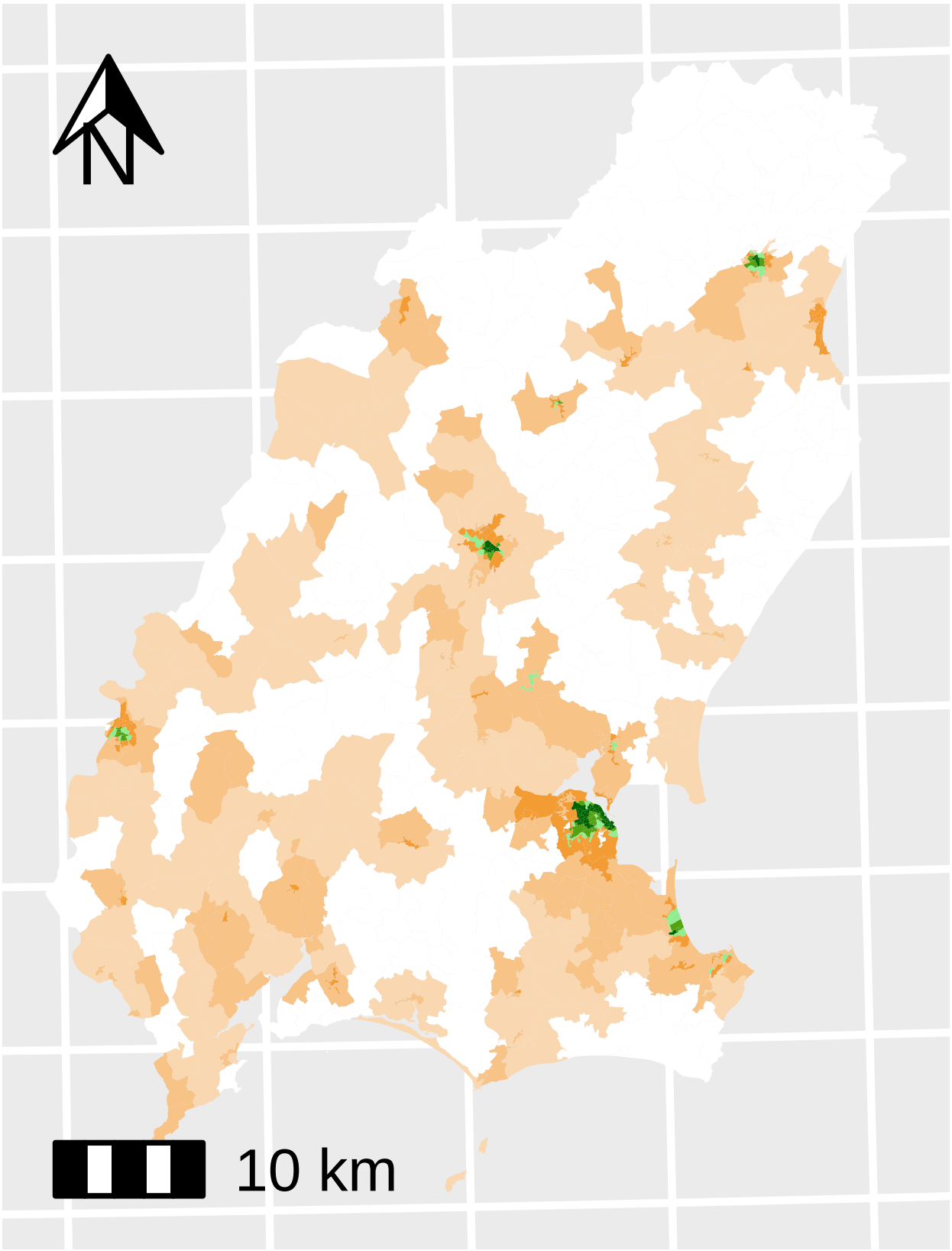

Figure 2: Transit Supply across County Wexford, by Small Area

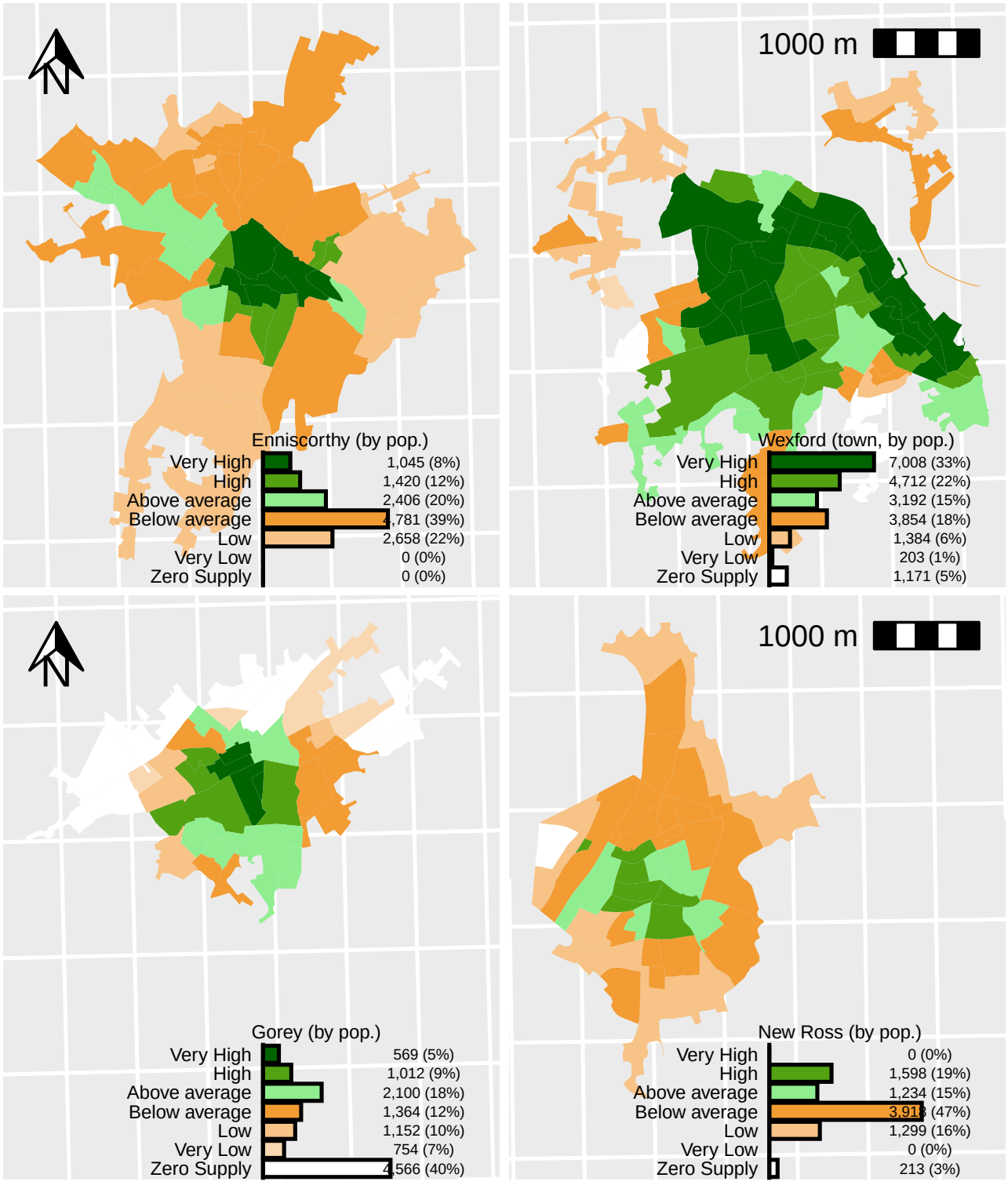

Figure 3: Transit Supply across towns, by Small Area (maps) and population (charts)

Social need for transport

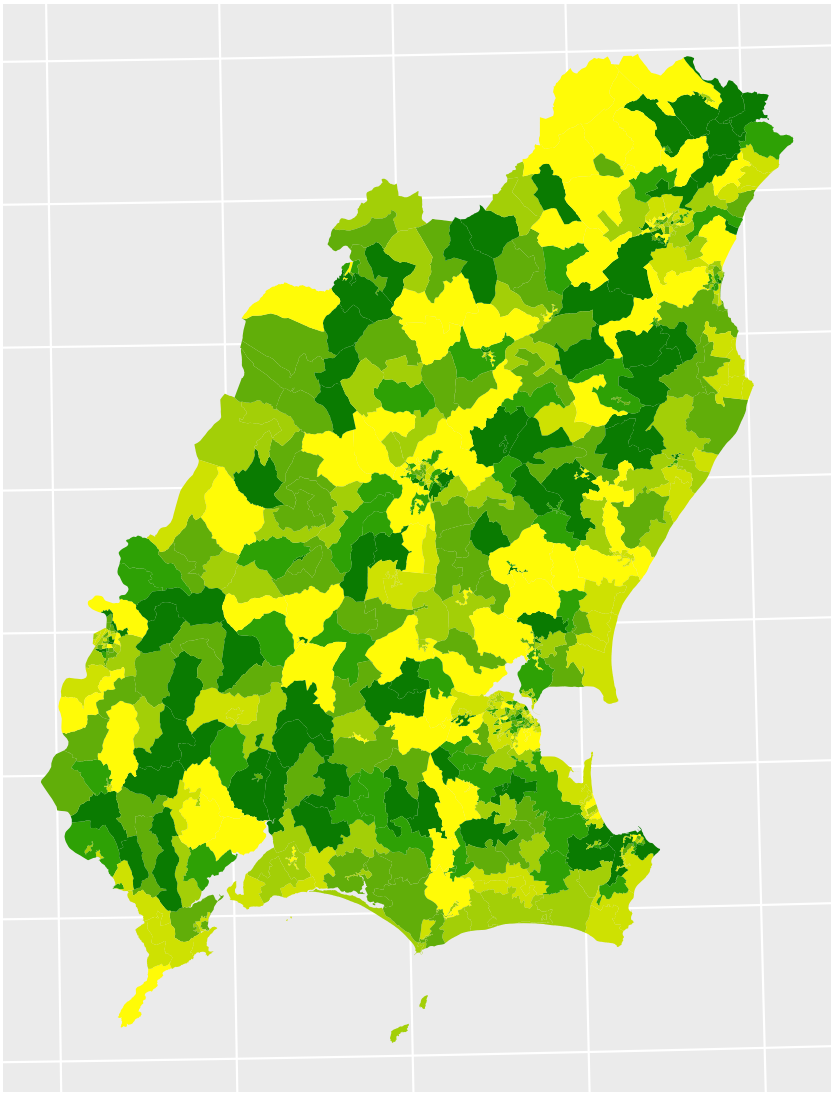

Figure 4: Wexford: Distribution of categories of social need index scores

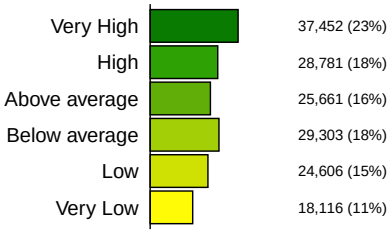

Figure 5: Transit Supply across County Wexford, by population

The distribution of social need for transport by population across County Wexford is shown in Figure 4, while Figure 5 shows the distribution of social need for transport by Small Area. 56% of County Wexford residents live in Small Areas that have social needs for transport that are above the average, including the 23% living in Small Areas with Very High social needs for transport.

Figure 6 shows social needs for transport in Enniscorthy, Wexford (town), Gorey and New Ross. In Enniscorthy 47% of residents live in Small Areas that have higher than the (County-Wexford-wide) average social need for transport. There were no significant differences

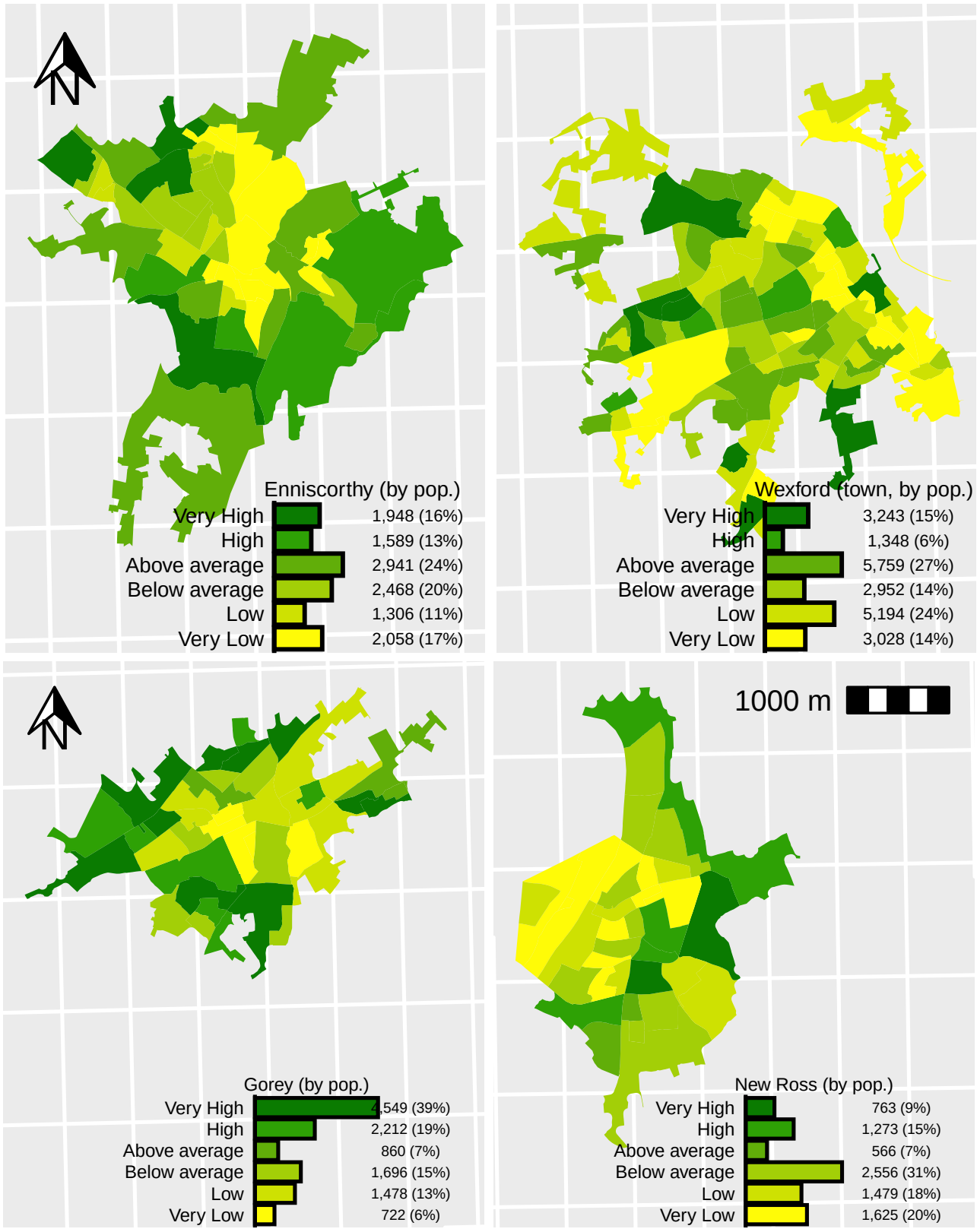

Figure 6: Social need for transport, by Small Area (maps) and population (charts)

in the share of Small Areas in each social need category between Enniscorthy and the other towns[12].

[12] Enniscorthy and Wexford (town) $\chi^2(5) = 6.39$, $p = .270$, Enniscorthy and Goery ($\chi^2(3) = 7.49$, $p = .058$, Enniscorthy and New Ross ($\chi^2(4) = 4.48$, $p = .345$. Note: categories combined where necessary to meet the assumptions of the chi-square test.