City of Bayside: social needs, gaps in transit

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In Victoria, public transport is managed by the state government, although Local Government Authorities (LGAs) may have some influence on service levels through planning processes, advocacy etc. However, not much is known about how much transit is supplied or whether social needs for transport are being met within each LGA's boundaries. This note explores social needs-gaps in the City of Bayside, using the Currie and Sendbergs (2007) methodology[1]. It is part of a series examining each LGA in Greater Melbourne[2].

Methods

This note maps transport supply and a composite needs indicator based on Australian Bureau of Statistics (ABS) data. The methodology is as per Reynolds, Currie and Qu (in drafting)[3], and involves Transit Supply Indication (SI) scores, which are based on service frequency and how much of an area is within walking distance of stops/stations[4]. Results are shown for ABS' Statistical Area 1s (SA1s), categorized into seven groups based on the average scores for SA1s across the Melbourne Greater Capital City Statistical Area (GCCSA).

Results

In 2021 most of the City of Bayside's population lived in SA1s with Very High levels of transit (Figure 1, left)[5]. However, as shown in Figure 2, coverage and frequency of transit appears to have increased by 2023 for more of those in the City of Bayside than in other parts of the Inner South SA4 ($\chi^2(8) = 62.58$, $p < .001$ or the rest of Melbourne ($201 \chi^2(9) = 79.33$, $p < .001$).

Social needs for transport in the City of Bayside in 2021 were High or Very High for half the population (Figure 3, left), similar to other parts of the Inner South SA4 but more than for other parts of Melbourne[6]. Figure 3 (right) shows how transit service levels changed between 2021 and 2023 for those who were living in SA1s with needs above, but supply below, the GCCSA average[7]. Those SA1s with the largest gaps in the City of Bayside in 2021 mostly have similar levels of, or more, transit in 2023.

Overall, the City of Bayside appears well supplied with transit and, compared to other parts of Greater Melbourne, has lower gaps between social needs and transit supply[8]. Those with the largest

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[1] Graham Currie and Zed Senbergs, "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_melbounre_LGA_2024` but lookout, I misspelled "Melbourne"

[3] Forthcoming hopefully, but using the *gtfssupplyindex* R package (see `https://github.com/James-Reynolds/gtfssupplyindex`) to process the Victoria GTFS feed. Note that results represent what is in the GTFS feed for August 2021 and 2023, which may not match services provided.

[4] 400m for tram and bus, 800m for train.

[5] Differences with the Rest of the Inner South SA4 (covering Glen Eira and parts of Stonnington, Kingston and Monash), by SA1, are statistically significant in 2021 ($\chi^2(6) = 30.51$, $p < .001$) and 2023 ($\chi^2(8) = 62.58$, $p < .001$). Differences with the rest of Melbourne are also statistically significant (2021: $\chi^2(6) = 181.73$, $p < .001$, 2023: $\chi^2(9) = 79.33$, $p < .001$).

[6] City of Bayside vs rest of Inner South differences were not statistically significant, $\chi^2(5) = 13.98$, $p = .016$, but differences with the rest of GCCSA were $\chi^2(5) = 40.35$, $p < .001$).

[7] Fisher's tests show significant differences between the City of Bayside and the rest of the Inner South SA4 (p = 2.34e-06) or the Rest of the GCCSA (p = 3.64e-10).

[8] Only 50.8% of City of Bayside residents had above average social needs for transport but below average transit supply, compared with 32.8% in the rest of the Inner South SA4 and 41.8% across the rest of Melbourne.
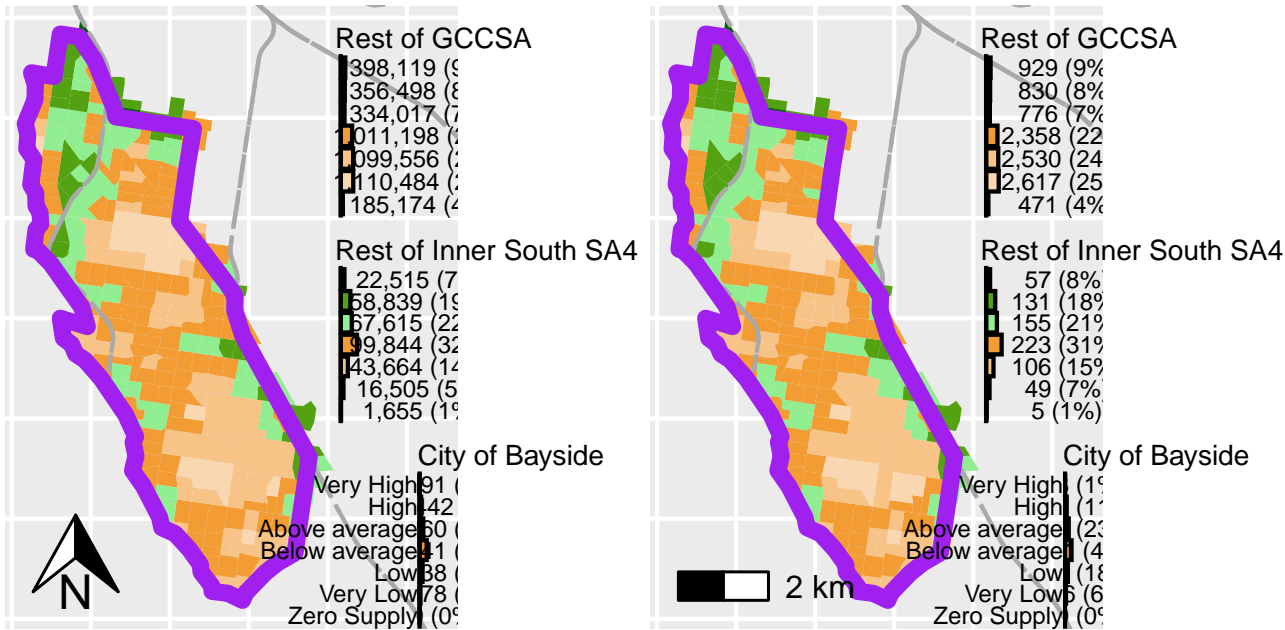
Figure 1: Transport Supply 2021 (left, by population) and 2023 (right, by SA1)

needs-gaps in 2021 appear to have similar or more transit in 2023.

```
##  transit_supply City of Bayside Rest of Inner South SA4
##      Zero Supply               0                        5
##        Very Low               15                       48
##            Low                45                      102
##   Below average              106                      227
##   Above average               55                      155
##           High                26                      135
##      Very High                 3                       54

##  transit_supply City of Bayside Rest of Inner South SA4
##      Zero Supply        1.280738                 3.719262
##        Very Low        16.137295                46.862705
##            Low         37.653689               109.346311
##   Below average        85.297131               247.702869
##   Above average        53.790984               156.209016
##           High         41.239754               119.760246
##      Very High         14.600410                42.399590

##  transit_supply City of Bayside Rest of Greater Melbourne
##      Zero Supply               0                      484
##        Very Low               15                     2629
##            Low                45                     2544
##   Below average              106                     2358
```

City of Bayside

Not served in 2023	0 (0%)
Reduced 10% or more	0 (0%)
Reduced 3 to 10%	4,533 (4%)
Reduced 1 to 3%	4,746 (4%)
Within 1%	77,409 (69%)
Increased 1 to 3%	9,722 (9%)
Increased 3 to 5%	9,498 (8%)
Increased 5 to 10%	6,042 (5%)
Increased 10% or more	0 (0%)
New service	0 (0%)

Rest of Inner South SA4	Rest of GCCSA
1,655 (1%)	180,796 (4%)
24,182 (8%)	166,507 (4%)
17,008 (5%)	327,989 (7%)
22,870 (7%)	261,627 (6%)
127,626 (41%)	2,051,640 (46%)
49,932 (16%)	653,854 (15%)
27,084 (9%)	248,795 (6%)
30,790 (10%)	191,778 (4%)
9,490 (3%)	387,022 (9%)
0 (0%)	25,038 (1%)

Figure 2: Change in SI score between 2021 and 2023 by SA1 and population

Figure 3: 2021 needs (left) and change in SI to 2023 for those SA1s with needs above average, but below average supply (by 2021 populations, right)

```
## Above average                  55                    765
## High                           26                    813
## Very High                       3                    918

## transit_supply City of Bayside Rest of Greater Melbourne
## Zero Supply         11.24431                  472.7557
## Very Low            61.42552                 2582.5745
## Low                 60.14776                 2528.8522
## Below average       57.24375                 2406.7562
## Above average       19.05027                  800.9497
## High                19.49168                  819.5083
## Very High           21.39671                  899.6033

## transit_supply City of Bayside Rest of Inner South SA4
## Zero Supply                0                         5
## Very Low                  16                        49
## Low                       45                       106
## Below average            101                       223
## Above average             58                       155
## High                      27                       131
## Very High                  3                        57

## transit_supply City of Bayside Rest of Inner South SA4
## Zero Supply         1.280738                  3.719262
## Very Low           16.649590                 48.350410
```

```
##             Low      38.678279               112.321721
##   Below average      82.991803               241.008197
##   Above average      54.559426               158.440574
##            High      40.471311               117.528689
##       Very High      15.368852                44.631148

##   transit_supply City of Bayside Rest of Greater Melbourne
##      Zero Supply               0                        471
##         Very Low              16                       2617
##              Low              45                       2530
##    Below average             101                       2358
##    Above average              58                        776
##             High              27                        830
##        Very High               3                        929

##   transit_supply City of Bayside Rest of Greater Melbourne
##      Zero Supply        10.94229                   460.0577
##         Very Low        61.16997                  2571.8300
##              Low        59.82251                  2515.1775
##    Below average        57.12759                  2401.8724
##    Above average        19.37552                   814.6245
##             High        19.90986                   837.0901
##        Very High        21.65226                   910.3477

##          ratio_binned City of Bayside Rest of Inner South SA4
##   Increased 10% or more               0                     24
##     Increased 5 to 10%              15                     74
##      Increased 3 to 5%              22                     60
##      Increased 1 to 3%              22                    113
##               Within 1%             166                    306
##        Reduced 1 to 3%              12                     52
##       Reduced 3 to 10%              13                     38
##     Reduced 10% or more               0                     54
##     Not served in 2023               0                      5

##          ratio_binned City of Bayside Rest of Inner South SA4
##   Increased 10% or more        6.147541              17.852459
##     Increased 5 to 10%       22.797131              66.202869
##      Increased 3 to 5%       21.004098              60.995902
##      Increased 1 to 3%       34.579918             100.420082
##               Within 1%      120.901639             351.098361
##        Reduced 1 to 3%       16.393443              47.606557
##       Reduced 3 to 10%       13.063525              37.936475
##     Reduced 10% or more      13.831967              40.168033
##     Not served in 2023        1.280738               3.719262
```
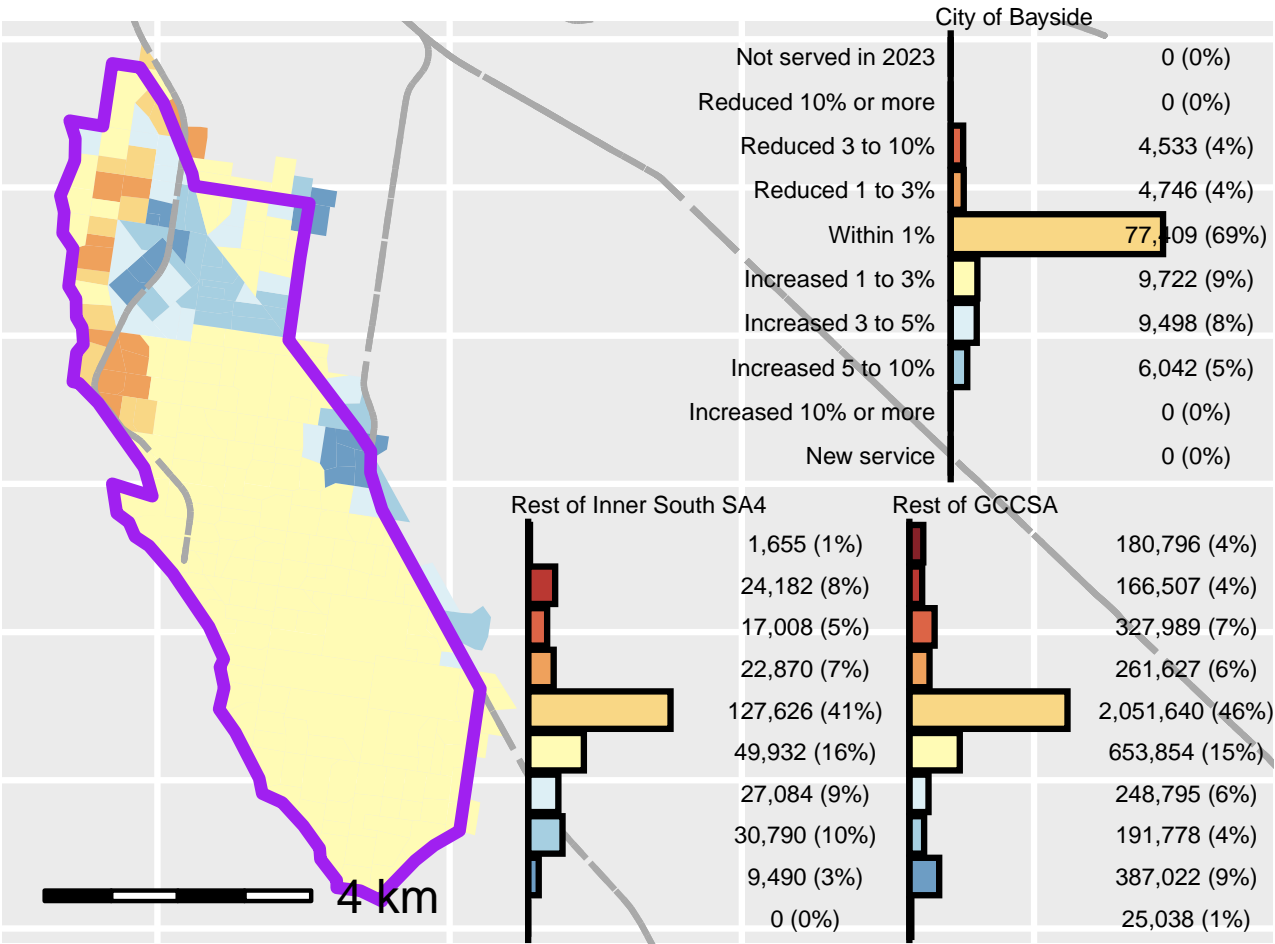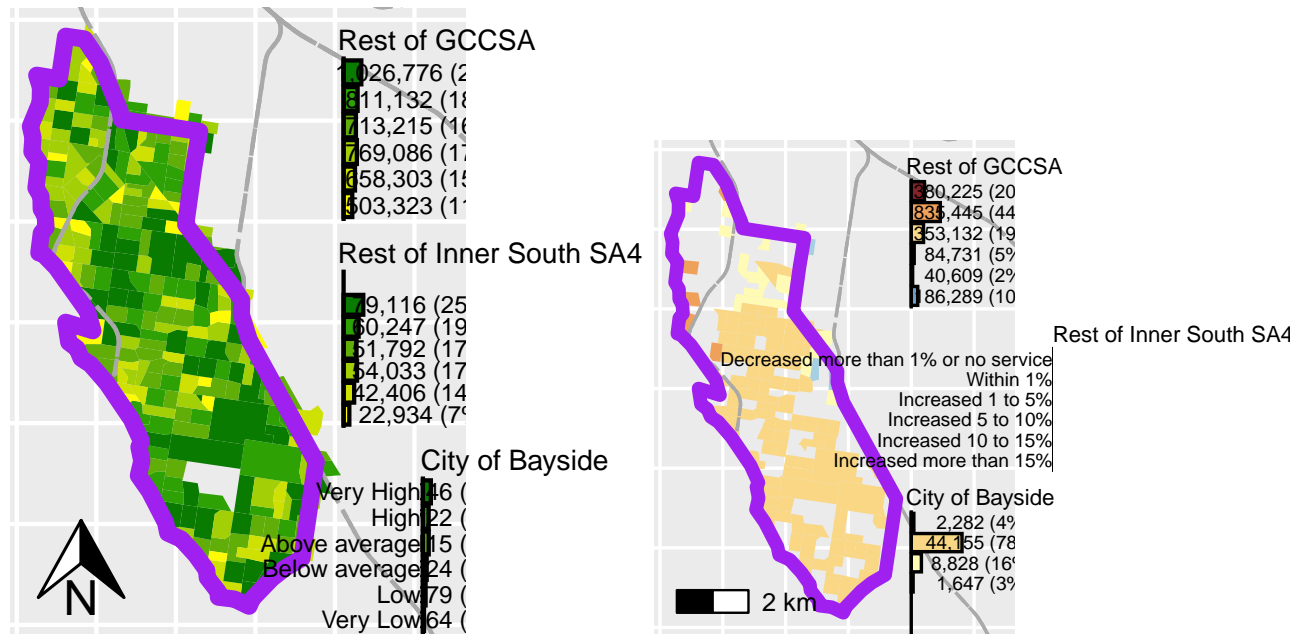
```
##            ratio_binned City of Bayside Rest of Greater Melbourne
##             New service                0                          59
##     Increased 10% or more              0                         864
##       Increased 5 to 10%              15                         449
##        Increased 3 to 5%              22                         559
##        Increased 1 to 3%              22                        1524
##                Within 1%             166                        4820
##         Reduced 1 to 3%               12                         610
##        Reduced 3 to 10%               13                         759
##     Reduced 10% or more                0                         396
##       Not served in 2023              0                         471

##            ratio_binned City of Bayside Rest of Greater Melbourne
##             New service         1.370690                    57.62931
##     Increased 10% or more      20.072484                   843.92752
##       Increased 5 to 10%       10.779667                   453.22033
##        Increased 3 to 5%       13.497816                   567.50218
##        Increased 1 to 3%       35.916736                  1510.08326
##                Within 1%      115.834960                  4870.16504
##         Reduced 1 to 3%        14.450330                   607.54967
##        Reduced 3 to 10%        17.935136                   754.06486
##     Reduced 10% or more         9.199888                   386.80011
##       Not served in 2023      10.942292                   460.05771

##   composite_needs City of Bayside Rest of Inner South SA4
##          Very Low               18                        89
##               Low               34                       129
##     Below average               41                       140
##     Above average               55                       115
##              High               47                       118
##         Very High               54                       123
##                NA                1                        12

##   City of Bayside Rest of Inner South SA4
## 1       27.66667                 79.33333
## 2       42.14642                120.85358
## 3       46.80062                134.19938
## 4       43.95639                126.04361
## 5       42.66355                122.33645
## 6       45.76636                131.23364

##   composite_needs City of Bayside Rest of Greater Melbourne
##          Very Low               18                      1929
##               Low               34                      1872
##     Below average               41                      1854
##     Above average               55                      1508
```

```
##          High                  47                         1512
##     Very High                  54                         1500
##            NA                   1                          336

##   City of Bayside Rest of Greater Melbourne
## 1        46.50835                   1900.492
## 2        45.52897                   1860.471
## 3        45.26621                   1849.734
## 4        37.33567                   1525.664
## 5        37.24012                   1521.760
## 6        37.12068                   1516.879

##                        ratio_binned_less City of Bayside Rest of Inner South SA4
##             Increased more than 15%                   0                        6
##               Increased 10 to 15%                     0                        2
##                Increased 5 to 10%                     3                       16
##                 Increased 1 to 5%                    18                       45
##                        Within 1%                     86                       85
##   Decreased more than 1% or no service                5                       36

##                        ratio_binned_less City of Bayside Rest of Inner South SA4
##             Increased more than 15%           2.2251656                 3.774834
##               Increased 10 to 15%             0.7417219                 1.258278
##                Increased 5 to 10%             7.0463576                11.953642
##                 Increased 1 to 5%            23.3642384                39.635762
##                        Within 1%            63.4172185               107.582781
##   Decreased more than 1% or no service      15.2052980                25.794702

##                        ratio_binned_less City of Bayside Rest of Greater Melbourne
##             Increased more than 15%                   0                      313
##               Increased 10 to 15%                     0                       72
##                Increased 5 to 10%                     3                      150
##                 Increased 1 to 5%                    18                      624
##                        Within 1%                     86                     1472
##   Decreased more than 1% or no service                5                      673

##                        ratio_binned_less City of Bayside Rest of Greater Melbourne
##             Increased more than 15%           10.262295                302.73770
##               Increased 10 to 15%             2.360656                 69.63934
##                Increased 5 to 10%             5.016393                147.98361
##                 Increased 1 to 5%            21.049180                620.95082
##                        Within 1%            51.081967               1506.91803
##   Decreased more than 1% or no service      22.229508                655.77049
```