Assignment 3 (FIT5137) – PTV Assignment Scenario

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Contents

1. Introduction

Public transport accessibility plays a critical role in ensuring access to essential services such as education, healthcare, commercial and more. In metropolitan cities like Melbourne, buses form a major component of the broader transport network, serving as a key connector between residential areas and community service. Understanding the spatial distribution and characteristics of bus services relative to community infrastructure is essential for identifying potential gaps and guiding transport policy.

This report investigates bus accessibility within the Melbourne Metropolitan area, focusing specifically on how bus services connect people to community infrastructure, including commercial areas, educational institutions, and medical facilities.

The primary objectives of this analysis are to:

1. Restore and integrate General Transit Feed Specification (GTFS) data with spatial mesh block datasets.
2. Develop geospatial layers that describe the relationship between bus stops and community categories.
3. Evaluate the extent and frequency of bus services that directly serve or lie within proximity to key community zones.
4. Identify spatial and accessibility patterns using table summaries and map-based visualisations.

Through this analysis, the report provides insights into the alignment between public transport coverage and community needs across Melbourne's landscape.

2. Methodology

2.1 dataset overview

Two main datasets were used in this analysis:

1. GTFS Data (General Transit Feed Specification) provided by Public Transport Victoria (PTV), which contains operational data describing Melbourne's public transport network. This dataset includes eight interrelated tables: agency, routes, calendar, calendar_dates, shapes, trips, stops, and stop_times which overall represents bus routes, service schedules, and stop locations.
2. ABS Geospatial Data (Australian Bureau of Statistics), which includes mesh block boundaries (MB_2021_AUST), local government areas (LGA_2021_AUST), and statistical areas (SAL_2021_AUST). Mesh blocks are the smallest geographic unit in the Australian Statistical Geography Standard (ASGS), each associated with a dominant land-use classification (mb_cat21).

2.2 Data Restoration and Preprocessing

2.2.1 Schema Creation and Data Restoration

A dedicated PostgreSQL schema named ptv was established as the destination for all restored tables. Before restoring the data, the files were checked thoroughly on the terminal, which then resulted in the correct use of unzipping files. Data restoration was then conducted using 'CREATE TABLE' statements aligned with the structure and datatypes of the source files. Most attributes within the tables took datatype 'VARCHAR' since there were values which didn't correspond correctly like empty values or trailing spaces. Further data cleaning was completed on tables like 'stops' after examining the raw data to ensure that there weren't any duplicates using the 'distinct' statement.

After this each GTFS table was restored from corresponding .txt files using the 'COPY' command, while ABS geospatial tables were imported from CSV files. The integrity of all tables was validated using row counts to confirm successful restoration.

A summary of restored tables and record counts are also represented as seen in figure 1. This confirmed that all 11 required tables (8 GTFS and 3 ABS datasets) were successfully restored into the database.

2.2.2 Defining the study area: Melbourne Metropolitan mesh blocks

To focus the analysis on the Melbourne metropolitan region, the mb_2021_aust table was filtered to include only records where the gcc_name21 attribute contained "Greater Melbourne".

This subset was stored as ptv.mb2021_mel, significantly reducing spatial complexity and ensuring computational efficiency. The script to execute this was illustrated in figure 2. This table serves as the spatial boundary for all subsequent bus accessibility analysis.

2.2.3 Preparing bus stop geometries

The original stops table lacked spatial geometry, relying only on latitude and longitude coordinates. To enable spatial joins with mesh blocks, a geometry column (geom) was added using the GDA2020 coordinate reference system (SRID 7844) as shown in figure 3. This step converted each bus stop into a point geometry, allowing for spatial intersection with polygons from the mesh block dataset.

2.2.4 Filtering For bus services

The GTFS routes table includes multiple route types: trains (1), trams (0), buses (3), and others. Since this study focuses exclusively on bus accessibility, records were filtered where route_type = 3.

To explore bus accessibility further a new table, ptv.stops_routes_mel, was created to capture only Melbourne's bus stops and their associated route details. The tables stop_times, trips and routes were used when joining to illustrate the connection and relationship of each table which results in an accurate overview of the ptv.stops_routes_mel table. This produced a cleaned dataset containing only active bus stops within the metropolitan region, each with an assigned route and vehicle type through the execution shown in figure 4. Not having the join with the mb2021_mel table results in over 30,000 values whereas having the join results in around 28000 values which represents accuracy despite a minor decrease.

2.3 Data Analysis and Visualisation

2.3.1 Community Services Perspective

To evaluate how well bus services connect with essential infrastructure, mesh blocks were filtered for land-use categories indicating community services as shown in figure 5. This allowed for spatial intersection with bus stops to determine which stops fall within, or directly serve, commercial, educational, and medical mesh blocks.

2.3.2 Linking bus stops with community mesh blocks

The 'ST_Intersects' function was used to identify all bus stops located within these community mesh blocks represented through figure 6. This formed the base analytical table showing direct bus accessibility within each type of community zone.

2.3.3 Enriching with temporal service information

To integrate operational data such as arrival/departure times and service schedules, additional joins were made with the stop_times, trips, and calendar tables as represented through figure 7. This created a dataset describing both where and when buses serve community zones which is useful for the user when wanting to know what time and day best suits them.

2.3.4 Summary and Aggregation

A summarised table was produced to quantify service frequency and operating hours by mesh block and service type as shown through figure 8. It considers distinct service id's whilst using 'string_agg' for the route numbers to ensure that each stop appears once showing all bus routes that pass through instead of repeating rows. This refines the analysis more making it more insightful and readable for the user.

2.3.5 Stop Density and Route Diversity Analysis

To evaluate how many bus stops and routes service for each community mesh block, a summary table (ptv.mb_stop_stats) was created as represented in figure 16. This process used a 'LEFT JOIN' between the mesh block data (mb2021_community) and the stop-level accessibility dataset (bus_access_community). The query calculated the total number of unique stops and bus routes per mesh block using 'COUNT(DISTINCT stop_id)' and 'COUNT(DISTINCT route_number)', grouped by mesh block ID and land-use category. This provided a spatial measure of service density highlighting areas with higher bus stops or route diversity, which can be seen as zones of stronger transport accessibility.

2.3.6 Identifying Major Bus Routes

The ptv.top_routes_community table was produced as represented in figure 18 to identify which bus routes most frequently serve key community zones. By grouping and ranking routes by the number of unique stops within community mesh blocks, the query revealed the top 50 most active routes. This helped identify which specific services play the largest role in connecting commercial, educational, and medical regions across Greater Melbourne.

2.3.7 Proximity and Accessibility Measurement

To assess accessibility in terms of distance, the ptv.mb_nearest_stop table was generated as illustrated in figure 21. This analysis calculated the distance from each mesh block to its nearest bus stop using the centroid of the mesh block polygon as a representative point for that

area. The ‘ST_Distance()’ function was further used to measure the shortest linear distance between the mesh block centroid and all bus stop points. A ‘LATERAL JOIN’ combined with the ‘<->’ operator was used to efficiently select the closest stop based on spatial ordering. This provided a quantitative measure of accessibility. Smaller distances indicated better connectivity and closer distance to transport services.

3. Results

The analysis revealed distinct patterns of bus service coverage across community land-use types:

- Commercial areas exhibited the highest density of bus stops, with most operating across all seven days of the week. This aligns with the concentration of employment and retail activity requiring consistent public transport access.
- Educational zones showed moderate coverage, with frequent weekday services but reduced weekend availability. This pattern reflects school timetabling.
- Medical zones had relatively fewer stops, although service frequency within those zones was consistent throughout the week, an indication of prioritised access for healthcare facilities.

Aggregate service counts confirmed that weekday services were predominant as seen in figure 10 after executing the script in figure 9.

Spatial visualisation from the heatmap seen in figure 12 through the table in created in figure 5 highlights clusters of strong bus accessibility in Melbourne’s inner suburbs, including the CBD, Carlton, and Clayton and Melbourne Airport with weak accessibility in other areas around greater Melbourne which is further expressed through the legend in figure 13 showing the amount of bus stops. Additionally, executing the script from figure 7 gives the meshblock for a certain area along with the specific details as shown in figure 11, assisting the user get a better understanding.

Executing the script from figure 8 represents the results in figure 13 which is beneficial for the user as explained in section 2.3.4. This summary can be further aggregated to represent each category along with their total stops, routes as well as the average services per stop. From the results from this table, it can be illustrated how more focus can be put towards hospitals as there isn’t as much compared to commercial or education. This is further expressed through figure 15 and how there are only 84 stops for hospitals compared to 1590 for commercial. However, the total routes and average services per stop for hospital is a better ratio compared to the other two. The results from figure 17 also represent which meshblocks have no stops which can be used as tool to focus on these areas.

The top routes with the greatest number of stops as shown in figure 20 illustrates which areas need more focus on and why the top routes are in that place. Figure 22 is also a beneficial tool for users to see what the closest stop is in each meshblock and how far they must travel, allowing them to plan well and be aware.

4. Discussion

4.1 Main Findings

This study highlights clear spatial and operational patterns in the distribution of Melbourne's bus services relative to community infrastructure. Commercial areas demonstrated the strongest accessibility, featuring the highest density of stops and route diversity. Educational mesh blocks exhibited moderate accessibility, with service frequency peaking on weekdays and lowering on weekends, reflecting school and university timetables.

Medical zones, although featuring fewer total stops, displayed more consistent service coverage throughout the week. This suggests an effort within the system to maintain accessibility to healthcare facilities, even during off-peak periods. However, the comparatively low number of stops in these zones implies limited spatial coverage, particularly in outer-suburban areas.

Overall, the findings suggest that while Melbourne's bus network is well integrated with major commercial and educational hubs, opportunities exist to improve coverage and accessibility for medical and low-density community areas.

4.2 Methodological Reflection

Integrating GTFS operational data with ABS geospatial datasets showed to be an effective strategy for evaluating spatial accessibility. The use of 'ST_Intersects' provided a precise way to identify stops physically located within community mesh blocks, while the 'ST_Distance' function offered an additional layer of analysis by calculating proximity between areas and the nearest bus stop. Combining these spatial techniques with operational data from stop_times, trips, and calendar allowed both spatial and temporal dimensions of accessibility to be explored.

Despite these strengths, some challenges were encountered during data preparation. The size and complexity of the GTFS dataset required careful data type management, especially with data type inconsistencies and null values.

4.3 Limitations

Several limitations constrain the scope of this study and offer directions for future enhancement:

- Scope of Transport Modes: The analysis focused solely on bus services. Integrating tram and train routes could provide a more beneficial understanding of public transport accessibility.
- Temporal Accuracy: GTFS data represents scheduled services. Incorporating real-time GTFS feeds could reveal operational discrepancies such as delays or cancellations, offering a more accurate reflection of service reliability.

Appendix

```
with tbl as
(select table_schema, TABLE_NAME
 from information_schema.tables
 where table_schema in ('ptv'))
select table_schema, TABLE_NAME,
(xpath('/row/c/text()', query_to_xml(format('select count(*) as c from %I.%I', table_schema, TABLE_NAME), FALSE, TRUE, '')))[1]::text::int AS rows_
from tbl
order by table_name;
```

tables 1

Enter a SQL expression to filter results (use Ctrl+Space)

	table_schema	table_name	rows_n
1	ptv	agency	10
2	ptv	bus_route_lines	6,508,001
3	ptv	calendar	380
4	ptv	calendar_dates	15
5	ptv	lga_2021_aust	368,286
6	ptv	mb_2021_aust	368,286
7	ptv	routes	3,300
8	ptv	sal_2021_aust	368,286
9	ptv	shapes	9,757,418
10	ptv	stop_times	8,122,810
11	ptv	stops	27,683
12	ptv	stops_raw	27,821
13	ptv	trips	236,613

Figure 1

```
CREATE TABLE ptv.mb2021_mel AS
  SELECT *
  FROM ptv.mb_2021_aust
  WHERE gcc_name21 ILIKE '%Greater Melbourne%';
  select * from ptv.mb2021_mel;
```

Figure 2

```
-- add 'geom' column to stops table
ALTER TABLE ptv.stops ADD COLUMN geom geometry(Point, 7844);
UPDATE ptv.stops
SET geom = ST_SetSRID(ST_MakePoint(stop_lon, stop_lat), 7844);
```

Figure 3

```
drop table ptv.stops_routes_mel;
create table ptv.stops_routes_mel as
SELECT DISTINCT
    s.stop_id,
    s.stop_name,
    s.geom,
    r.route_short_name AS route_number,
    r.route_long_name AS route_name,
    r.route_type AS vehicle_type
FROM ptv.stops s
JOIN ptv.stop_times st ON s.stop_id = st.stop_id
JOIN ptv.trips t ON st.trip_id = t.trip_id
JOIN ptv.routes r ON t.route_id = r.route_id
JOIN ptv.mb2021_mel m ON ST_Intersects(s.geom, m.wkb_geometry)   -- Only keep stops inside Greater Melbourne
WHERE r.route_type = 3;
```

Figure 4

```
DROP TABLE ptv.mb2021_community;
CREATE TABLE ptv.mb2021_community AS
SELECT *
FROM ptv.mb2021_mel
WHERE mb_cat21 IN ('Commercial', 'Education', 'Hospital/Medical');
```

Figure 5

```sql
CREATE TABLE ptv.bus_access_community AS
SELECT
    c.ogc_fid AS meshblock_id,
    c.mb_code21,
    c.mb_cat21,
    c.gcc_name21,
    s.stop_id,
    s.stop_name,
    s.route_number,
    s.route_name,
    s.vehicle_type,
    s.geom AS stop_geom,                -- bu
    c.wkb_geometry AS meshblock_geom    -- me
FROM ptv.mb2021_community c
JOIN ptv.stops_routes_mel s
  ON ST_Intersects(s.geom, c.wkb_geometry);
```

Figure 6

```sql
CREATE TABLE ptv.bus_access_community_enriched AS
SELECT
    c.ogc_fid AS meshblock_id,
    c.mb_code21,
    c.mb_cat21,
    c.gcc_name21,
    s.stop_id,
    s.stop_name,
    s.route_number,
    s.route_name,
    s.vehicle_type,
    st.arrival_time,
    st.departure_time,
    t.service_id,
    cal.start_date,
    cal.end_date,
    cal.monday,
    cal.tuesday,
    cal.wednesday,
    cal.thursday,
    cal.friday,
    cal.saturday,
    cal.sunday,
    s.geom AS stop_geom,
    c.wkb_geometry AS meshblock_geom
FROM ptv.mb2021_community c
JOIN ptv.stops_routes_mel s
  ON ST_Intersects(s.geom, c.wkb_geometry)
JOIN ptv.stop_times st
  ON s.stop_id = st.stop_id
JOIN ptv.trips t
  ON st.trip_id = t.trip_id
JOIN ptv.calendar cal
  ON t.service_id = cal.service_id
WHERE s.route_number IS NOT NULL;
```

Figure 7

```sql
CREATE TABLE ptv.bus_access_community_summary AS
SELECT
    meshblock_id,
    mb_cat21,
    stop_id,
    stop_name,
    string_agg(DISTINCT route_number, ', ') AS routes_served,
    MIN(arrival_time) AS first_arrival,
    MAX(departure_time) AS last_departure,
    COUNT(DISTINCT service_id) AS num_services
FROM ptv.bus_access_community_enriched
GROUP BY meshblock_id, mb_cat21, stop_id, stop_name;
```

Figure 8

```sql
-- Count how many active bus stops per community type, grouped by day of week
SELECT
    mb_cat21,
    SUM(CASE WHEN monday = 1 THEN 1 ELSE 0 END) AS weekday_services,
    SUM(CASE WHEN saturday = 1 THEN 1 ELSE 0 END) AS saturday_services,
    SUM(CASE WHEN sunday = 1 THEN 1 ELSE 0 END) AS sunday_services,
    COUNT(DISTINCT stop_id) AS total_stops
FROM ptv.bus_access_community_enriched
GROUP BY mb_cat21;
```

Figure 9

	A-Z mb_cat21	123 weekday_services	123 saturday_services	123 sunday_services	123 total_stops
1	Commercial	784,212	673,393	500,456	1,590
2	Education	161,727	126,263	93,375	604
3	Hospital/Medical	43,812	33,008	24,383	84

Figure 10

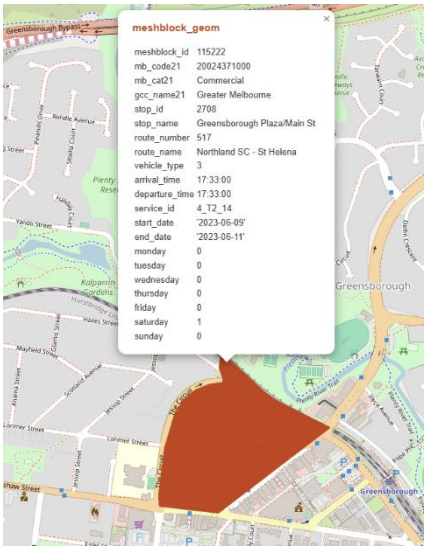

Figure 11

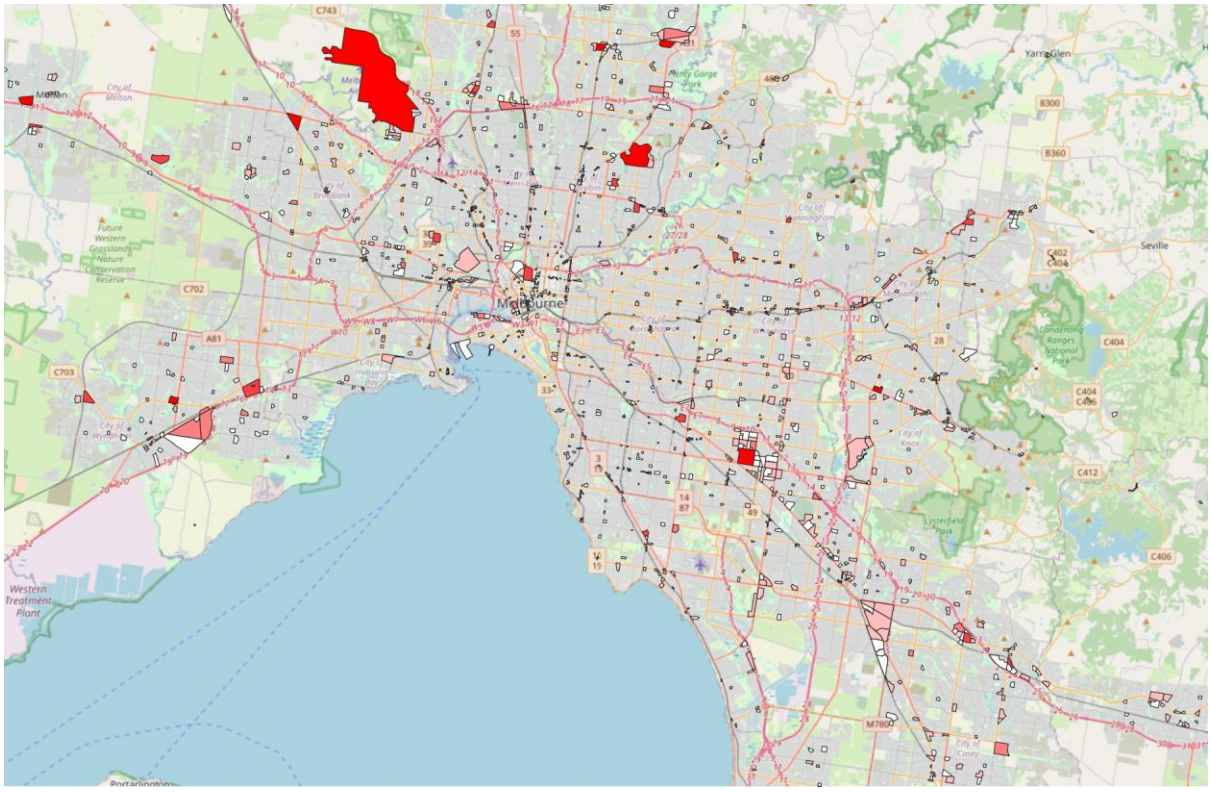

Figure 12

Symbol	Values	Legend
☑	1.000 - 1.000	1 - 1
☑	1.000 - 3.000	1 - 3
☑	3.000 - 5.000	3 - 5
☑	5.000 - 10.000	5 - 10
☑	10.000 - 25.000	10 - 25

Figure 13

	meshblock_id	mb_cat21	stop_id	stop_name	routes_served	first_arrival	last_departure	num_services
1	114,375	Commercial	113	Seddon St/Upper Heidelberg Rd	548	06:35:00	19:13:00	6
2	114,404	Commercial	5549	Cape St/Burgundy St	546, 903	05:22:00	24:30:00	20
3	114,404	Commercial	5550	Hawdon St/Burgundy St	513, 514, 546, 903	05:22:00	24:30:00	33
4	114,495	Commercial	8819	Opp 15 Livingstone St	510	05:54:00	21:19:00	10
5	114,617	Commercial	10966	The Mall/Bell St	513, 514	05:45:00	22:14:00	19
6	114,617	Commercial	720	The Mall/Oriel Rd	250, 350, 549, 903	02:34:00	26:44:00	19
7	114,633	Commercial	10055	Warringal SC/Cape St	513, 514	05:22:00	22:02:00	19
8	114,634	Education	10973	Heidelberg Primary School/Darebin St	513, 514	05:20:00	22:00:00	19
9	114,717	Commercial	10972	Warringal SC/Cape St	513, 514	05:12:00	22:24:00	19

Figure 14

	mb_cat21	total_stops	total_routes	avg_services_per_stop
1	Commercial	1,590	723	15.813836478
2	Education	604	351	13.5397350993
3	Hospital/Medical	84	66	14.5357142857

Figure 15

```
    SELECT
        mb_cat21,
        COUNT(DISTINCT stop_id) AS total_stops,
        COUNT(DISTINCT routes_served) AS total_routes,
        AVG(num_services) AS avg_services_per_stop
    FROM ptv.bus_access_community_summary
    GROUP BY mb_cat21
    ORDER BY total_stops DESC;
    select * from ptv.bus_access_community_category_summary;
```

Figure 16

```
CREATE TABLE ptv.mb_stop_stats AS
SELECT
  m.ogc_fid AS meshblock_id,
  m.mb_code21,
  m.mb_cat21,
  m.gcc_name21,
  m.areasqkm21::double precision AS area_km2,
  COUNT(DISTINCT b.stop_id) AS num_stops,
  COUNT(DISTINCT b.route_number) AS unique_routes
FROM ptv.mb2021_community m
LEFT JOIN ptv.bus_access_community b
  ON m.ogc_fid = b.meshblock_id
GROUP BY m.ogc_fid, m.mb_code21, m.mb_cat21, m.gcc_name21, m.areasqkm21;
```

Figure 17

	meshblock_id	mb_code21	mb_cat21	gcc_name21	area_km2	num_stops	unique_routes
1	114,346	20015570000	Education	Greater Melbourne	0.0297	0	0
2	114,374	20015851000	Commercial	Greater Melbourne	0.0041	0	0
3	114,375	20015852000	Commercial	Greater Melbourne	0.0038	1	1
4	114,404	20016150000	Commercial	Greater Melbourne	0.0234	2	4
5	114,422	20016332000	Commercial	Greater Melbourne	0.0066	0	0
6	114,423	20016333000	Commercial	Greater Melbourne	0.0119	0	0
7	114,446	20016560000	Education	Greater Melbourne	0.0329	0	0
8	114,477	20016870000	Education	Greater Melbourne	0.0202	0	0
9	114,481	20016910000	Education	Greater Melbourne	0.0794	0	0
10	114,495	20017050000	Commercial	Greater Melbourne	0.018	1	1
11	114,508	20017180000	Education	Greater Melbourne	0.0072	0	0
12	114,549	20017600000	Education	Greater Melbourne	0.0234	0	0
13	114,617	20018250000	Commercial	Greater Melbourne	0.043	2	6
14	114,633	20018400000	Commercial	Greater Melbourne	0.0281	1	2
15	114,634	20018410000	Education	Greater Melbourne	0.0212	1	2
16	114,678	20018851000	Commercial	Greater Melbourne	0.0082	0	0
17	114,679	20018852000	Commercial	Greater Melbourne	0.0052	0	0
18	114,716	20019231000	Commercial	Greater Melbourne	0.0064	0	0
19	114,717	20019232000	Commercial	Greater Melbourne	0.0145	2	4
20	114,721	20019270000	Education	Greater Melbourne	0.0699	1	3
21	114,753	20019580000	Education	Greater Melbourne	0.0277	1	1
22	114,755	20019610000	Education	Greater Melbourne	0.0386	0	0
23	114,781	20019871000	Commercial	Greater Melbourne	0.0086	0	0
24	114,782	20019872000	Commercial	Greater Melbourne	0.0051	1	1
25	114,834	20020391000	Commercial	Greater Melbourne	0.0233	3	3
26	114,835	20020392000	Commercial	Greater Melbourne	0.0075	0	0
27	114,836	20020393000	Commercial	Greater Melbourne	0.0048	0	0
28	114,839	20020420000	Hospital/Medical	Greater Melbourne	0.2382	6	4

Figure 18

```sql
CREATE TABLE ptv.top_routes_community AS
SELECT
  route_number,
  route_name,
  COUNT(DISTINCT stop_id) AS num_stops_in_community
FROM ptv.bus_access_community
GROUP BY route_number, route_name
ORDER BY num_stops_in_community DESC
LIMIT 50;
```

Figure 19

	route_number	route_name	num_stops_in_community
1	903	Altona - Mordialloc	84
2	902	Airport West - Chelsea	81
3	901	Melbourne Airport - Frankston	70
4	703	Middle Brighton - Blackburn	51
5	959	City - Broadmeadows	48
6	207	City (Queen St) - Doncaster SC	44
7	737	Croydon - Monash University	39
8	811	Dandenong - Brighton	38
9	220	Sunshine Station - Sunshine Station	37
10	742	Ringwood Station - Chadstone SC	36
11	693	Oakleigh - Belgrave	35
12	200	City (Queen St) - Bulleen	35
13	624	Kew - Oakleigh	33
14	804	Dandenong - Chadstone SC	33
15	862	Dandenong - Chadstone SC	32
16	514	Glenroy - Eltham	32
17	812	Dandenong - Brighton	31
18	802	Dandenong - Chadstone SC	31
19	800	Dandenong - Chadstone SC	30
20	350	City (Queen St) - La Trobe University	30
21	788	Frankston - Portsea	29
22	907	City (King/Lonsdale Sts) - Mitcham	29
23	828	Hampton - Berwick	29
24	513	Glenroy - Eltham	29
25	732	Box Hill - Upper Ferntree Gully	27
26	781	Mornington Peninsula - Frankston Station	27
27	785	Frankston - Mornington East	26
28	250	City (Queen St) - La Trobe University	25
29	305	City (King/Lonsdale Sts) - The Pines	25
30	216	City (Queen St) - Sunshine Station	25
31	922	St Kilda Station - Southland SC	25
32	566	Northland SC - Lalor	25
33	382	Northland SC - Whittlesea	25
34	246	Clifton Hill - Elsternwick	24
35	631	Southland SC - Waverley Gardens SC	24
36	967	Glen Waverley - Bayswater	24
37	981	Dandenong Station - Cranbourne Park	24
38	302	City (Lonsdale St) - Box Hill Station	24
39	906	City (King/Lonsdale Sts) - Warrandyte	24
40	548	La Trobe University - Kew	24
41	670	Ringwood - Lilydale	24
42	926	Fountain Gate SC - Pakenham Station	24
43	733	Oakleigh - Box Hill	23
44	303	City (Queen St) - Ringwood North	23
45	691	Waverley Gardens SC - Boronia	23
46	309	City (Queen St) - Donvale	22
47	477	Moonee Ponds - Broadmeadows Station	22
48	476	Moonee Ponds - Watergardens	22
49	908	City (King/Lonsdale Sts) - The Pines SC	21
50	281	Templestowe - Deakin University	21

Figure 20

```sql
CREATE TABLE ptv.mb_nearest_stop AS
SELECT m.ogc_fid AS meshblock_id,
       m.mb_code21,
       m.gcc_name21,
       s.stop_id,
       s.stop_name,
       ST_Distance(
         ST_Centroid(m.wkb_geometry)::geography,
         s.geom::geography
       ) AS distance_m
FROM ptv.mb2021_community m
CROSS JOIN LATERAL (
  SELECT s.stop_id, s.stop_name, s.geom
  FROM ptv.stops_routes_mel s
  ORDER BY m.wkb_geometry <-> s.geom
  limit 1
) s;
```

Figure 21

	meshblock_id	mb_code21	gcc_name21	stop_id	stop_name	distance_m
1	119,336	20065963000	Greater Melbourne	18826	Canterbury Rd/Union Rd	57.12843639
2	114,346	20015570000	Greater Melbourne	759	Morobe St/Oriel Rd	139.41729102
3	114,374	20015851000	Greater Melbourne	114	Upper Heidelberg Rd/Seddon St	37.92842939
4	114,375	20015852000	Greater Melbourne	113	Seddon St/Upper Heidelberg Rd	19.36402284
5	114,404	20016150000	Greater Melbourne	5549	Cape St/Burgundy St	93.35162752
6	114,422	20016332000	Greater Melbourne	506	Rosanna Railway Station/Turnham Ave	59.16145554
7	114,423	20016333000	Greater Melbourne	1701	Grandview Gr/Lower Plenty Rd	152.61166976
8	114,446	20016560000	Greater Melbourne	11026	Crampton Cres/Finlayson St	236.35823883
9	114,477	20016870000	Greater Melbourne	699	Carmichael St/Lower Heidelberg Rd	212.39481043
10	114,481	20016910000	Greater Melbourne	16646	Marshall St/Lower Heidelberg Rd	417.65714794
11	114,495	20017050000	Greater Melbourne	8819	Opp 15 Livingstone St	84.71566732
12	114,508	20017180000	Greater Melbourne	111	Ivanhoe Civic Centre/Upper Heidelberg Rd	110.12873495
13	114,549	20017600000	Greater Melbourne	511	Banyule Primary School/Banyule Rd	110.53089418
14	114,617	20018250000	Greater Melbourne	10966	The Mall/Bell St	112.90997843
15	114,633	20018400000	Greater Melbourne	10055	Warringal SC/Cape St	117.76190942
16	114,634	20018410000	Greater Melbourne	10973	Heidelberg Primary School/Darebin St	111.31767644
17	114,678	20018851000	Greater Melbourne	46480	Carwarp St/Erskine Rd	170.09567723

Figure 22