

# Every bus stop counts

Using the PTDG and GIS tools to build a network-wide picture in Ōtepoti  
Dunedin

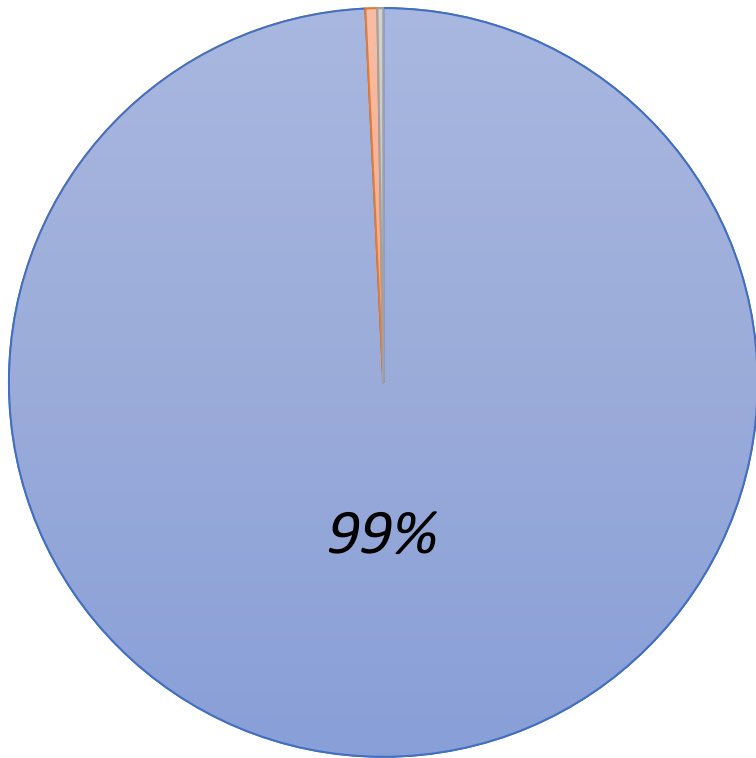
Pim van den Top

Transportation Group Conference 2024

# Key things covered

- Buses are the unsung hero of PT and mode shift
- PTDG guidance is great!
- But what is the next step?
- How do we assess our current stops
- How do we collect better data

# To achieve mode shift, buses will play big role



■ All Bus ■ Train ■ Ferry

NZ – without Auckland and Wellington



## City Rail Link v0.1 – 1920s

### SCHEME ABANDONED.

#### MORNINGSIDE DEVIATION.

Government's Decision Announced by  
Minister of Railways.

UNDERTAKING WOULD COST £2,174,570.

NO SAVING IN GOODS HAULAGE.

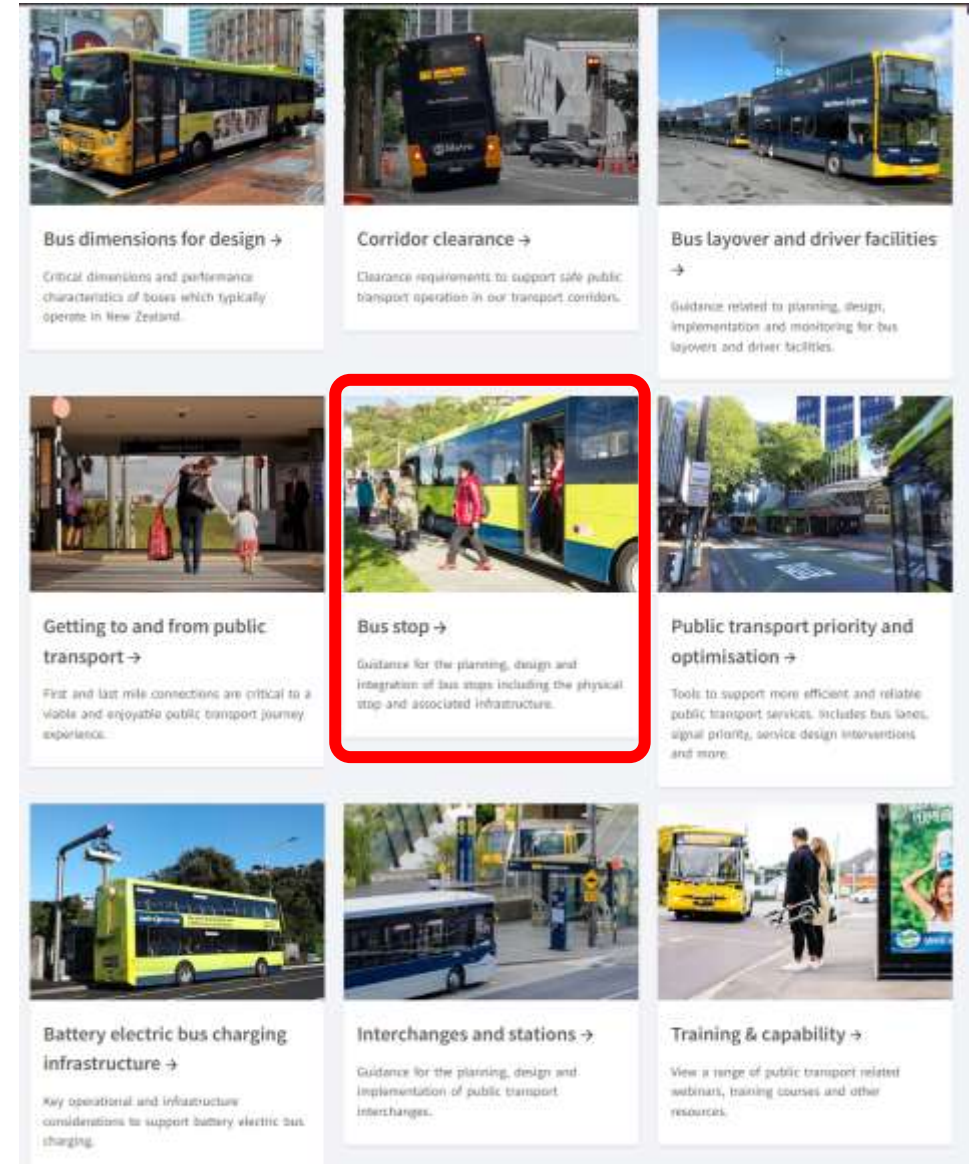
Because of engineering difficulties, the high cost of electrification, the fact that there would be no substantial saving in goods haulage, and the unpromising future of suburban railway transport, the Government has decided to abandon the Morning-



**And it all starts with... The mighty bus stop!**

# PTDG guidance – released starting 2020

- Great resource, offering a nationally consistent base for all PT planning and design
- Bus stop section offers great guidance on bus stops
- How can we use it with existing stops?
- What about a whole network of stops?



# PTDG guidance – stop classification

5 bus stop classifications:

- Public transport interchange
- Premium
- Intermediate
- Standard
- Basic

| ONF Place scale | Indicative land use or sense of place  | ONF public transport descriptor*   | Passenger volume at stop† | Bus stop classification                 |
|-----------------|--|--|---------------------------|---|
| P1              | Very high density mixed-use (high-rise apartments and office towers), downtown retail and commercial centres, civic spaces, shared spaces, downtown precincts and waterfronts. | Dedicated (PT1), spine (PT2), (and regional services)                              | High                      | Public transport interchange or premium |
|                 |  |  | Moderate                  | Premium or intermediate                 |
| P2              | Diverse mixed use, low-rise apartments, special zones, high-density commercial/retail and main street promenades.  | Dedicated (PT1), spine (PT2), primary (PT3) (and possibly inter-regional services) | High                      | Premium or intermediate                 |
|                 |  |  | Moderate                  | Intermediate                            |
| P3              | Medium-density and mixed-use residential/commercial, villages, urban greens and stopping places.   | Spine (PT2), primary (PT3), targeted (PT5)   | High                      | Intermediate                            |
|                 |  |  | Moderate                  | Intermediate                            |
|                 |  |  | Low                       | Standard                                |
| P4              | Mostly low/medium density residential neighbourhoods in urban and peri-urban areas. Lifestyle blocks in peri-urban areas.  | Secondary (PT4), targeted (PT5)  | Moderate                  | Intermediate                            |
|                 |  |  | Low                       | Standard                                |
| P5              | Mostly rural, except for motorways and expressways in urban areas  | Targeted (PT5)   | Low                       | Basic                                   |

# PTDG guidance – bus stop components

| Stop classification  | Public transport Interchange | Premium   | Intermediate | Standard    | Basic    |
|--|------------------------------|-----------|--------------|-------------|----------|
| Accessibility  |                              |           |              |             |          |
| Recommended minimum kerb height at front door (& ideally rear door): 150mm for normal kerb, 160mm for accessible kerb* | Essential                    | Essential | Essential    | Recommended | Optional |



**Bus stop component**



**Component requirement**

# PTDG guidance – bus stop components

| Public transport interchange   |             |
|--|-------------|
| <b>Accessibility</b>   |             |
| Recommended minimum kerb height at front door (& ideally rear door): 150mm for normal kerb, 160mm for accessible kerb* | Essential   |
| Paved clear stand area (hardstand)   | Essential   |
| Tactile ground surface indicators  | Essential   |
| Connecting footpath to/from bus stop   | Essential   |
| Crossing facility close to bus stop  | Essential   |
| <b>Signs and road markings</b>   |             |
| Bus stop sign (R6-71 or R6-71.1) †   | Essential   |
| Bus box road marking (M3-2 or M3-2A) †   | Essential   |
| 'Bus Stop' text road marking (M3-2 or M3-2A) †   | Essential   |
| 'No Stopping' road marking   | Essential   |
| Coloured surface treatment   | Optional    |
| <b>Safety and security</b>   |             |
| Street lighting  | Essential   |
| Shelter with lighting  | Essential   |
| Emergency help point   | Essential   |
| CCTV cameras   | Recommended |

| Street furniture                                  |             |
|---|-------------|
| Seating   | Essential   |
| Shelter ‡   | Essential   |
| Rubbish bin                                       | Essential   |
| Recycling bin                                     | Recommended |
| Ticket sales/top-up services (machine or counter) | Essential   |
| Cycle parking                                     | Essential   |
| <b>Stop-specific information</b>                  |             |
| Bus stop flag                                     | Essential   |
| Stop number                                       | Essential   |
| Direction of travel                               | Essential   |
| Site-specific fare information                    | Essential   |
| Stop-specific timetable (departure times)         | Essential   |
| Stop-specific route diagrams                      | Essential   |
| Information telephone number or web address       | Essential   |
| Stop name   | Essential   |
| Wider area fare information & zone map            | Essential   |
| Wider area route map                              | Essential   |
| Real-time information signs                       | Essential   |
| <b>Enhancements</b>                               |             |
| Landscaping                                       | Recommended |
| Public art  | Recommended |
| Community notice board                            | Recommended |
| Vending machine                                   | Recommended |



# PTDG guidance – bus stop components

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| Paved clear stand area (hardstand)   | Essential                    | Essential   | Essential    | Essential   | Recommended |
| Tactile ground surface indicators  | Essential                    | Essential   | Recommended  | Recommended | Optional    |
| Connecting footpath to/from bus stop   | Essential                    | Essential   | Essential    | Recommended | Optional    |
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| 'No Stopping' road marking   | Essential                    | Essential   | Recommended  | Recommended | Optional    |
| Coloured surface treatment   | Optional                     | Optional    | Optional     | Optional    | Optional    |
| <b>Safety and security</b>   |                              |             |              |             |             |
| Street lighting  | Essential                    | Essential   | Essential    | Recommended | Optional    |
| Shelter with lighting  | Essential                    | Essential   | Essential    | Recommended | Optional    |
| Emergency help point   | Essential                    | Recommended | Recommended  | Optional    | Optional    |
| CCTV cameras   | Recommended                  | Recommended | Recommended  | Optional    | Optional    |

| <b>Street furniture</b>                           |             |             |             |             |             |
|---|-------------|-------------|-------------|-------------|-------------|
| Seating   | Essential   | Essential   | Recommended | Recommended | Recommended |
| Shelter ‡   | Essential   | Essential   | Essential   | Recommended | Recommended |
| Rubbish bin                                       | Essential   | Essential   | Recommended | Recommended | Optional    |
| Recycling bin                                     | Recommended | Optional    | Optional    | Optional    | Optional    |
| Ticket sales/top-up services (machine or counter) | Essential   | Recommended | Recommended | Optional    | Optional    |
| Cycle parking                                     | Essential   | Recommended | Recommended | Recommended | Optional    |
| <b>Stop-specific information</b>                  |             |             |             |             |             |
| Bus stop flag                                     | Essential   | Essential   | Essential   | Recommended | Optional    |
| Stop number                                       | Essential   | Essential   | Essential   | Recommended | Optional    |
| Direction of travel                               | Essential   | Essential   | Essential   | Recommended | Optional    |
| Site-specific fare information                    | Essential   | Essential   | Recommended | Recommended | Optional    |
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| <b>Enhancements</b>                               |             |             |             |             |             |
| Landscaping                                       | Recommended | Recommended | Optional    | Optional    | Optional    |
| Public art  | Recommended | Recommended | Optional    | Optional    | Optional    |
| Community notice board                            | Recommended | Recommended | Optional    | Optional    | Optional    |
| Vending machine                                   | Recommended | Recommended | Optional    | Optional    | Optional    |

# A few key challenges

- Data – availability and usefulness
- Scale – 800 stops x 35 components = 28,000 things to measure (Dunedin)
  - For comparison, Nelson has  $\sim 200 \times 35 = 7,000$
  - Auckland has  $\sim 6,000 \times 35 = 210,000$
- Local context
  - Some councils only have 1 or 2 bus stop types
  - Priorities may differ from guidance

# Data and scale

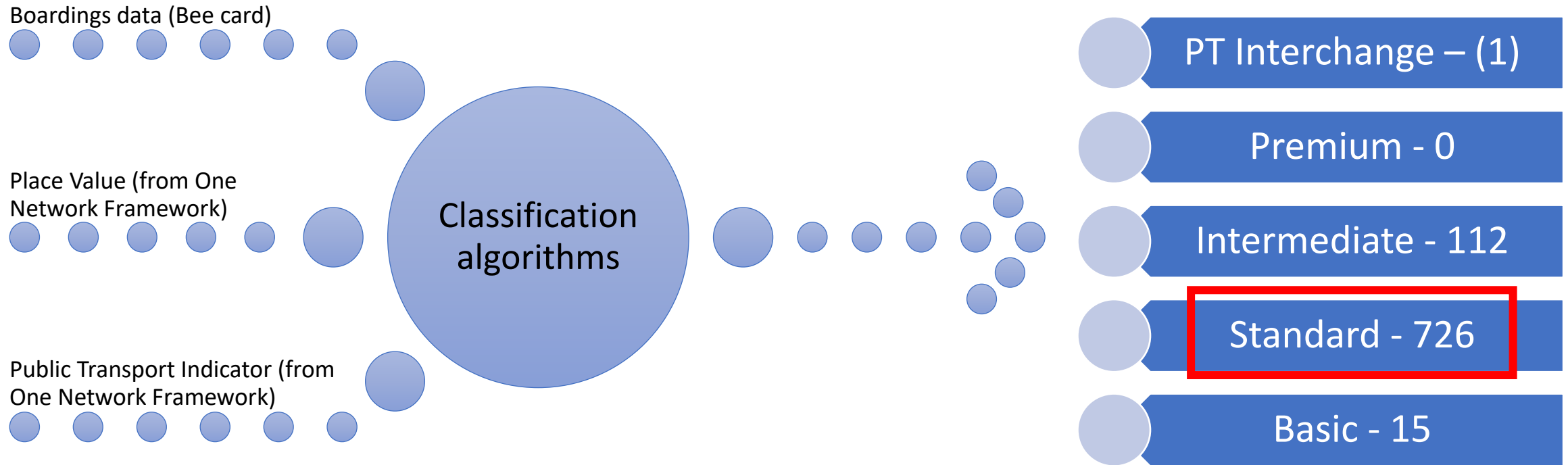
- Worked with the client to select most important and relevant bus stop components
- Decision on what aspects of a component to capture – presence? Quality? Type? Etc.
- What data is already available?

# Data collection process

- ArcGIS FieldMaps
  - Simple interface
  - Preloaded and locked fields, depending on previous answers
- No expertise required, just some basic training
- Data goes straight to the cloud
- Photos so that data can be checked and updated later, or to provide further context

The screenshot shows the mobile application interface for a 'Dunedin Bus Stop Audit'. At the top, the status bar shows the time 3:15, signal strength, and battery level at 83%. The app header includes a close button (X), the title 'Collect', and a checkmark. Below the header, the location is identified as 'Dunedin Bus Stop Audit' with coordinates 45.893513°S 170.498609°E. Two buttons, 'TAKE PHOTO' and 'ATTACH', are visible. The main form contains two sections: 'Road markings \*' with a question 'Is there a bus box? \*' and radio button options for 'Yes' and 'No'; and 'Paved clear area \*' with a question 'Hardstand / clear paved area \*' and radio button options for 'No defects', 'Minor defects', 'Major defects', and 'No hardstand'. A final question 'Is there a clear paved area directly adjacent to the bus stop kerb?' is partially visible at the bottom.

# Stop classification



# Stop classification

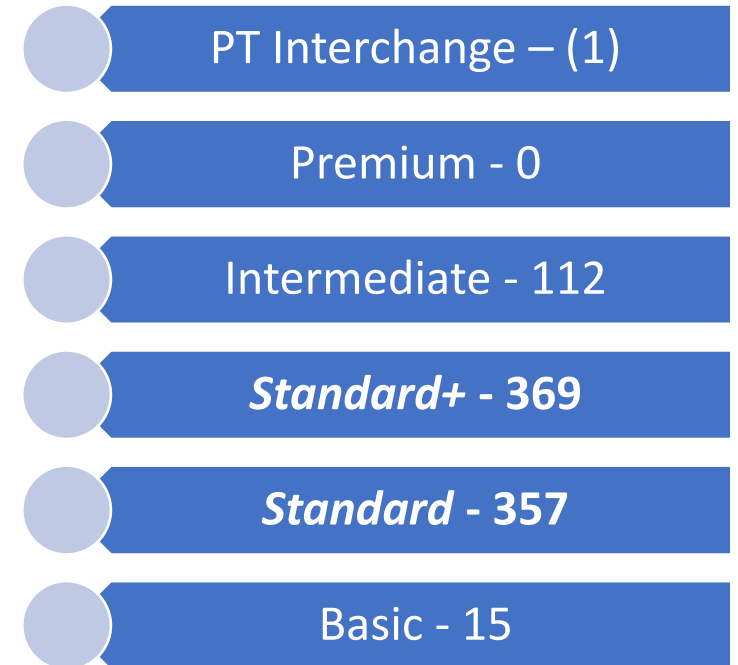
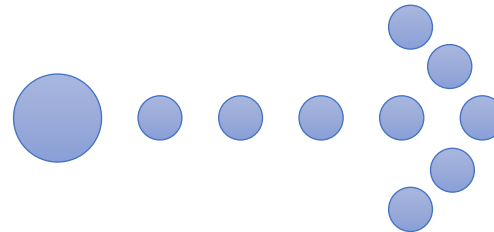
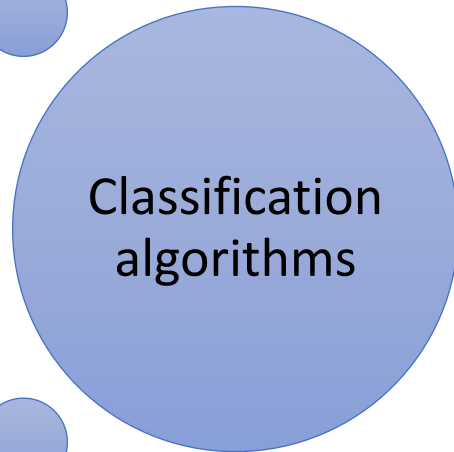
Boardings data (Bee card)



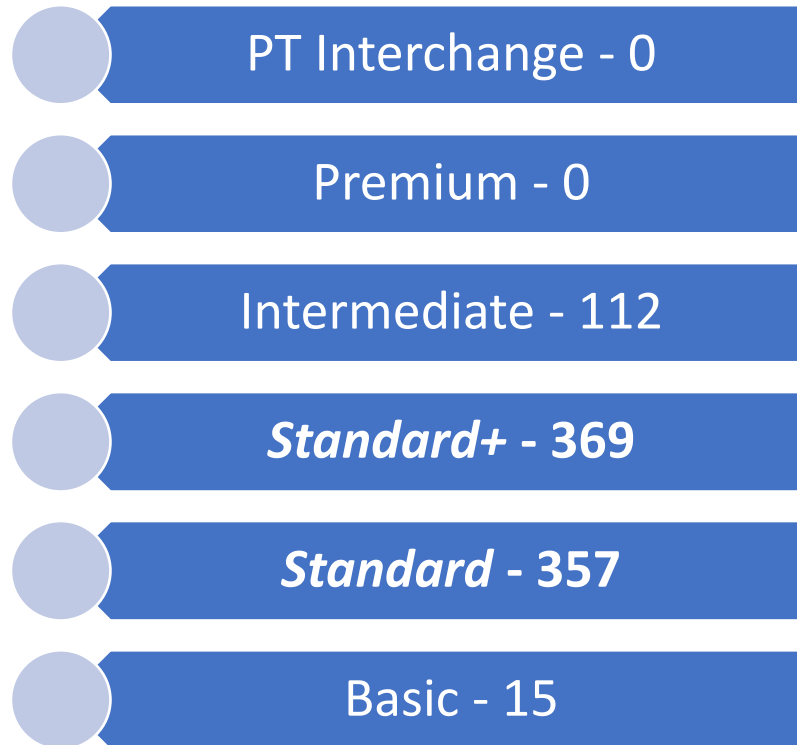
Place Value (from One Network Framework)



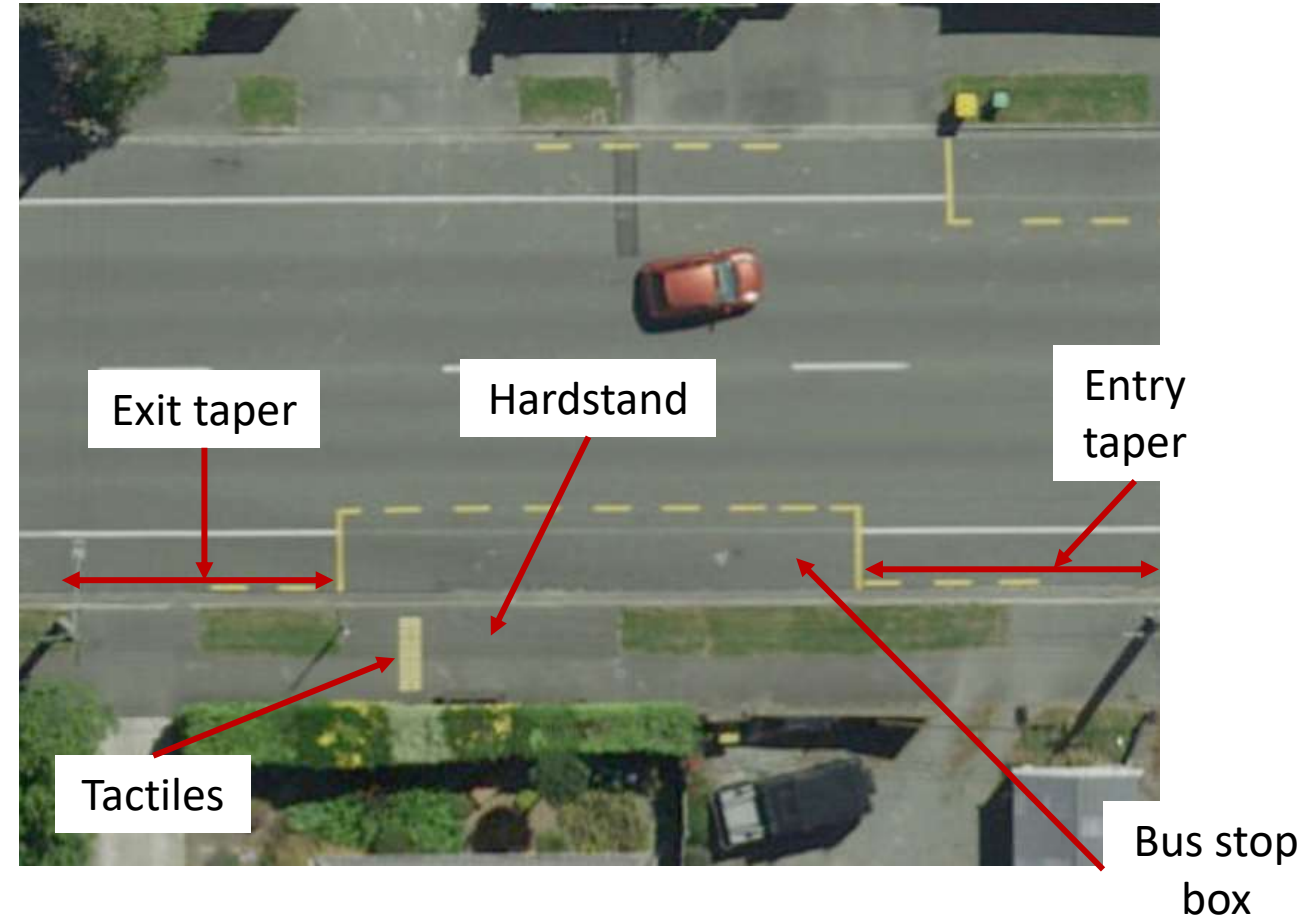
Public Transport Indicator (from One Network Framework)



## Bus stop classification



## Bus stop components



# What now?

# Turning classification and components into something useful

- In PTDG, classification is used to tell us what components are more important than others, depending on the stop context
- We can combine stop features and their quality with how important/necessary they are at a stop. Once we've done this, it gives us two things:
  - How does each stop perform against the guidance?
  - What is the network-wide picture of each component?



# Remember this big table from before?

|  | Public transport interchange | Premium     | Intermediate | Standard    | Basic       |
|--|------------------------------|-------------|--------------|-------------|-------------|
| <b>Accessibility</b>   |                              |             |              |             |             |
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| Coloured surface treatment   | Optional                     | Optional    | Optional     | Optional    | Optional    |
| <b>Safety and security</b>   |                              |             |              |             |             |
| Street lighting  | Essential                    | Essential   | Essential    | Recommended | Optional    |
| Shelter with lighting  | Essential                    | Essential   | Essential    | Recommended | Optional    |
| Emergency help point   | Essential                    | Recommended | Recommended  | Optional    | Optional    |
| CCTV cameras   | Recommended                  | Recommended | Recommended  | Optional    | Optional    |

We combine the classification of a stop...

With the ideal level of provision of a component...

And combine this with the status of a given component...

| Feature requirement | Status        | Potential deficiency |
|---------------------|---------------|----------------------|
| essential           | not present   | high                 |
| essential           | quality issue | medium               |
| essential           | present       | none                 |
| recommended         | not present   | medium               |
| recommended         | quality issue | low                  |
| recommended         | present       | none                 |
| optional            | not present   | none                 |
| optional            | quality issue | low                  |
| optional            | present       | none                 |

...to get a potential level of deficiency

# Now we can build a score for each stop...

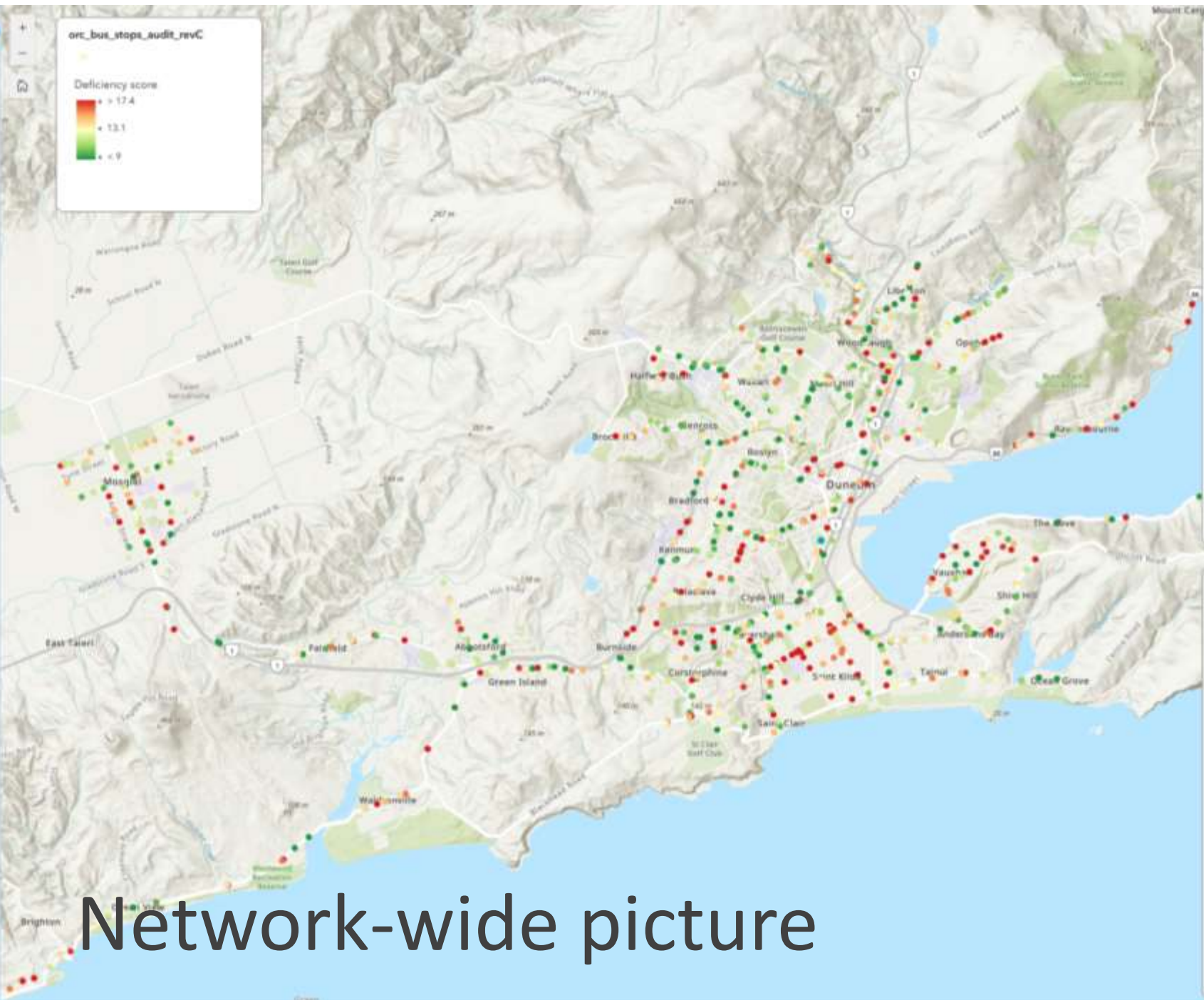
| Potential Deficiency |           |        |                     |                   |               |         |               |                     |                 |                  |         |         |             |               |                         |            |                       |
|----------------------|-----------|--------|---------------------|-------------------|---------------|---------|---------------|---------------------|-----------------|------------------|---------|---------|-------------|---------------|-------------------------|------------|-----------------------|
| kerb height          | hardstand | TGSI   | connecting footpath | crossing facility | bus stop sign | bus box | bus stop text | no stopping marking | street lighting | shelter lighting | seating | shelter | rubbish bin | recycling bin | stop-specific timetable | public art | community noticeboard |
| medium               | none      | medium | none                | medium            | none          | none    | medium        | low                 | none            | high             | low     | medium  | none        | none          | none                    | none       | none                  |

**2 + 0 + 2 + 0 + 2.... Etc.**

**Total score = 15**

Repeat this for every stop....

- Network view
- Kerb Height
- Handstand
- TGSI
- Connecting footpaths
- Crossing facility
- Bus stop sign
- Bus box
- Bus stop text
- Taper
- Street lighting
- Shelter lighting
- Seating
- Shelter
- Rubbish bin
- Stop-specific timetable
- Public art
- Community noticeboard



Princes St, cnr Manor Pl

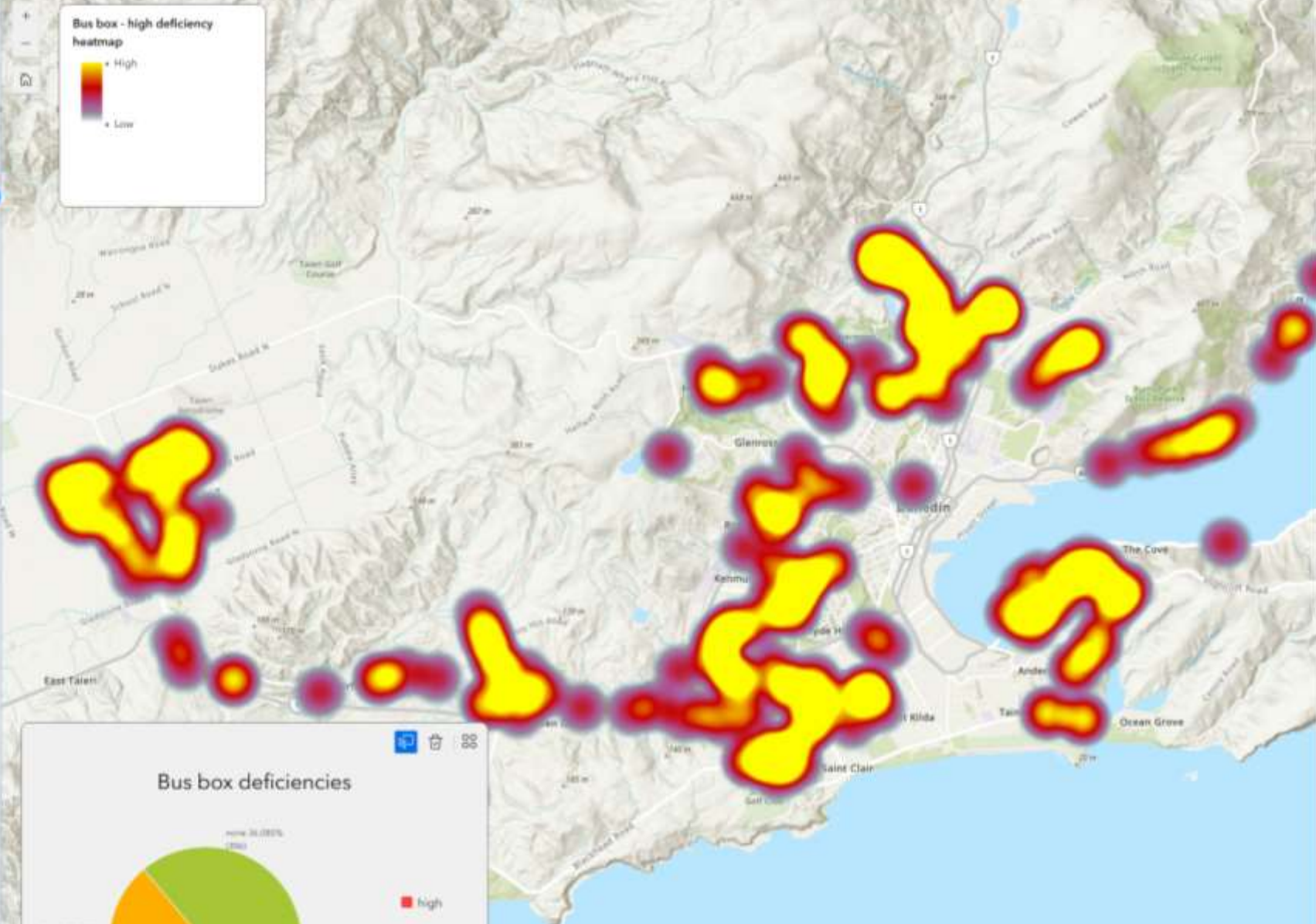
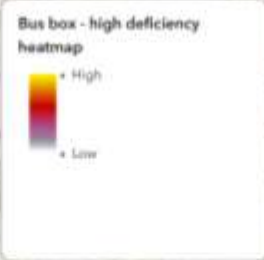
Stop summary

|                                |                          |
|--------------------------------|--------------------------|
| stop_id                        | 99000781                 |
| stop_name                      | Princes St, cnr Manor Pl |
| Stop classification            | Intermediate             |
| Deficient elements (%)         | 50%                      |
| Non-deficient elements (%)     | 50%                      |
| Low deficiency elements (%)    | 1.54%                    |
| Medium-deficiency elements (%) | 38.89%                   |
| High-deficiency elements (%)   | 5.54%                    |
| Deficiency score               | 18                       |



# Network-wide picture

- Network view
- Kerb Height
- Handstand
- TGSi
- Connecting footpaths
- Crossing facility
- Bus stop sign
- Bus box**
- Bus stop text
- Taper
- Street lighting
- Shelter lighting
- Seating
- Shelter
- Rubbish bin
- Stop-specific timetable
- Public art
- Community noticeboard

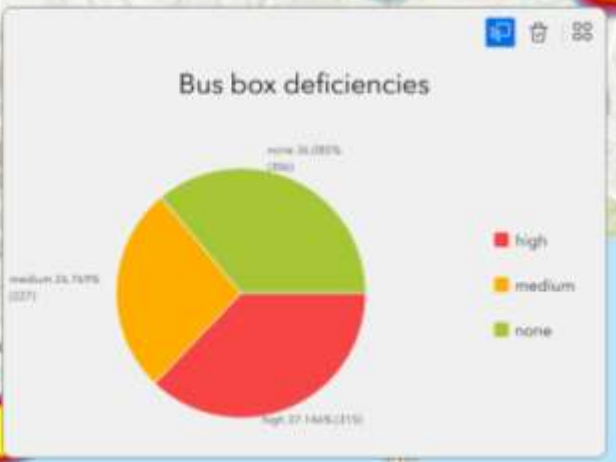


< 731 of 848 >

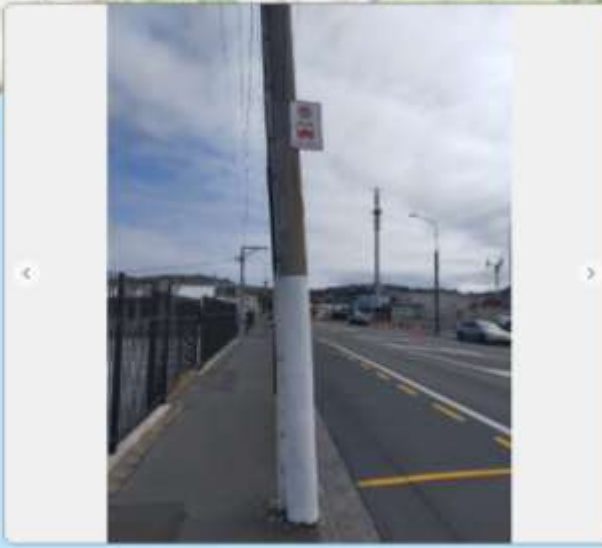
**Hillside Rd, 319**

Bus box info

|                      |                  |
|----------------------|------------------|
| stop_id              | 590016d1         |
| stop_name            | Hillside Rd, 319 |
| stop_classification  | Standard+        |
| Bus box road marking | 13.20            |
| Bus box presence     | Yes              |
| Driveway in bus box  | Middle           |
| bus_box_req          | Essential        |
| bus_box_comp         | Quality Issue    |
| bus_box_def          | medium           |



By component



Special thanks to Jack Cowie and the ORC team

Ngā mihi | Thank you

**VIA**STRADA

TRANSPORT PLANNING AND DESIGN  
TE WHAKAMAHERE ME TE HOAHOA WAKA