Pedestrian Analytics

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PEDESTRIAN ANALYTICS (PAL) IS A TOOL UTILISING HISTORICAL TRAFFIC SIGNAL TIMING DATA FROM SCATS.

- PAL allows signal engineers to consistently assess and report the impact of traffic signal changes on pedestrian performance.

- Developed by Signal Services in 2024, this web app uses python and streamlit.

ANZAC Station - St Kilda Rd/Domain Rd/Park St

Inputs

PAL Inputs for Anzac Station Signal Changes

Pedestrian Analytics

Editable Data 🔗

site no	P1	P2	P3	P4	P5	P6	P7	P8	include no demand
4536	23	24	25	26	27	28	None	None	☐

Expandable table for analysis of multiple sites

Site level option to calculate delay for missing demand events

Before and After date range inputs

Before period

2025/10/12 – 2025/10/18

After period

2025/11/23 – 2025/11/29

Specific dates to exclude

Filters to exclude day/dates from analysis

select days of the week

Monday ×   Tuesday ×   Wednesday ×   Thursday ×   Friday ×

Total:

07:00 — 18:00

00:00   23:59

AM Peak:

07:00   09:00

00:00   23:59

Inter Peak:

09:00   15:00

00:00   23:59

PM Peak:

15:00   18:00

00:00   23:59

run

Customisable time periods for data aggregation

Outputs

PAL calculates the following metrics from SCATS History data (i.e. .hst files):

| Metric	Unit	Description
Delay	Seconds	The average time from the pedestrian demand to the introduction of the walk (signal group green)
Frequency	No. of events	The total number of walk events (signal group green) across the time period.
Walk Time	Seconds	The average duration of the walk (signal group green).
Walk Per Hour	Min:Sec	The total amount of walk time (signal group green) per hour.
No Demand	%	The percentage of walk events (signal group green) without a preceding pedestrian demand.

Outputs

PAL Output for Anzac Station Signal Changes

None	metrics	Delay	Delay	Delay	Frequency	Frequency	Frequency	Walk_Time	Walk_Time	Walk_Time	Walk_Per_Hour	Walk_Per_Hour	Walk_Per_Hour	No_Demand	No_Demand
	ped_walk_no	before	after	change %	before	after	change %	before	after	change %	before	after	change %	before	after
0	P1(23)	77	61	-20.8	307	320	4.0	18	33	83.9	8:14	15:46	91.4	5	7
1	P2(24)	70	67	-4.9	252	251	-0.3	17	17	-0.1	6:30	6:28	-0.4	0	0
2	P3(25)	88	73	-16.2	303	320	5.5	9	23	155.6	4:08	11:09	169.6	1	2
3	P4(26)	74	70	-5.7	215	226	5.1	8	8	-0.2	2:36	2:44	5.0	0	0
4	P5(27)	61	59	-3.7	271	320	18.0	31	31	-0.8	12:40	14:49	17.0	4	12
5	P6(28)	66	57	-13.6	242	243	0.7	20	31	54.3	7:19	11:23	55.5	2	1

PAL also produces . xsls files containing:

- Query details
- Summary tables
- Detailed timing data for each pedestrian movement and phase

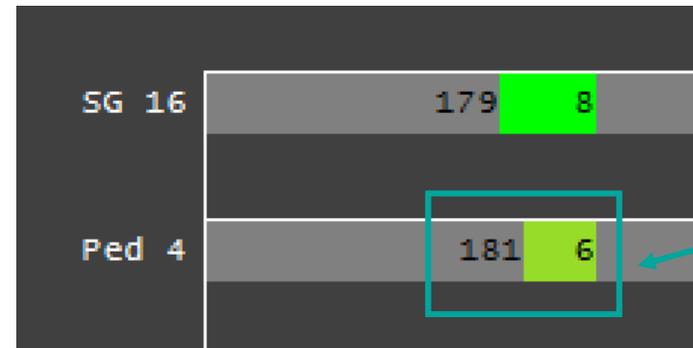# Design Considerations
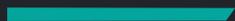
Event Data

Consideration:
- Pedestrian events can be inaccurate

Outcome:
- Used signal group events
- Map pedestrian movements to SGs

Pedestrian events in SCATS history data can misrepresent the walk interval.

P4 (SG16) has a minimum walk of 8s

| 10:29:03 AM AEDT | Pedestrian movement (Region 6.9.4+): Ped 4=[Demand=Off, Interval=Walk] |
| 10:29:09 AM AEDT | Pedestrian movement (Region 6.9.4+): Ped 4=[Interval=Off] |

PAL SG to Ped Mapping input

| site no	P1	P2	P3	P4	P5	P6
4536	23	24	25	26	27	28

Pedestrian Demands

A "pedestrian demand" refers to when a Demand=On event is recorded by SCATS.

Consideration:
- Demands may not be registered

Outcome:
- 'Include No Demand' option
- 'No Demand' metric
- Supplementary templates and guidance

Scenario	Demand event recorded by SCATS
Pushbutton pressed	Yes
Permanent demand via XSF/SF	No
Demand via SCATS VR90	Yes
Auto introduction via XSF/SF	No
Late introduction via XSF	Not always stored

PAL Inputs/Outputs
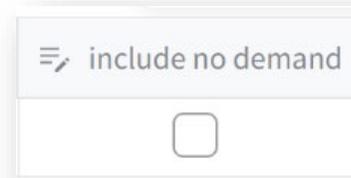
No_Demand	No_Demand
before	after
5	7

Time Periods

Consideration:
- Edge events need to be handled appropriately

Outcome:
- Walk event must start within specified period
- Include ped demands from 5min prior
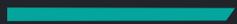- Error returned if walk does not finish within 5min of interval

AM Peak Events:

AM Peak:

07:00   09:00

00:00   23:59

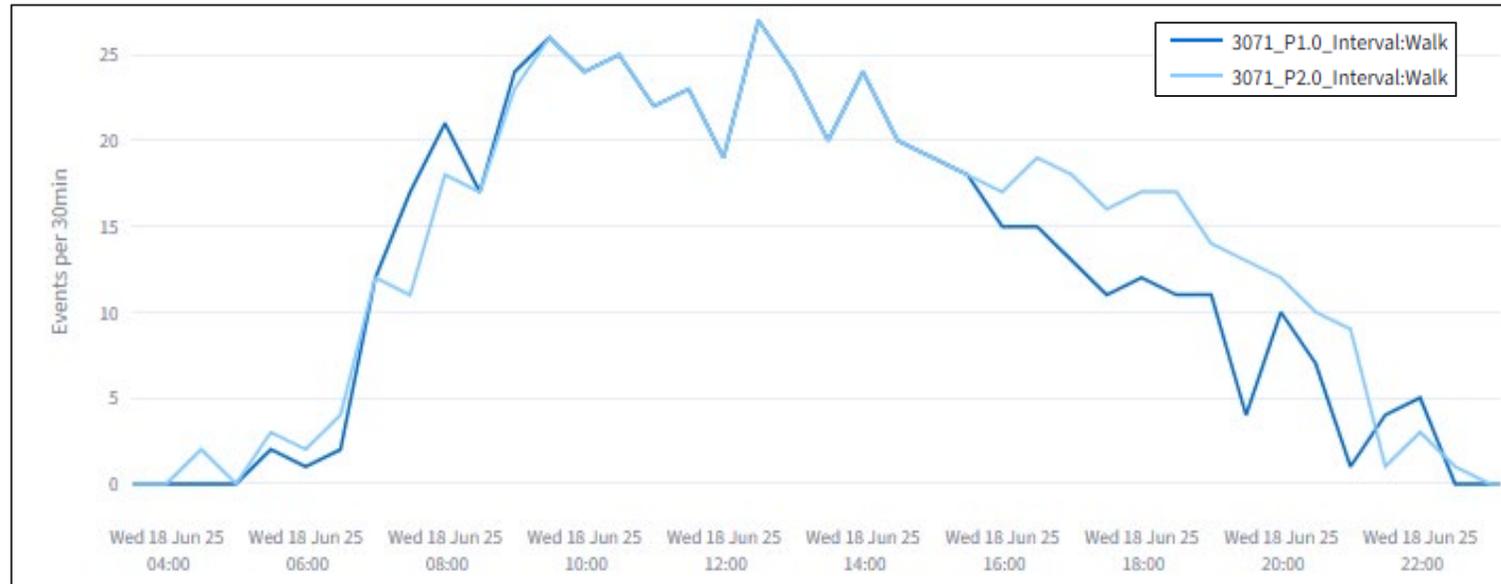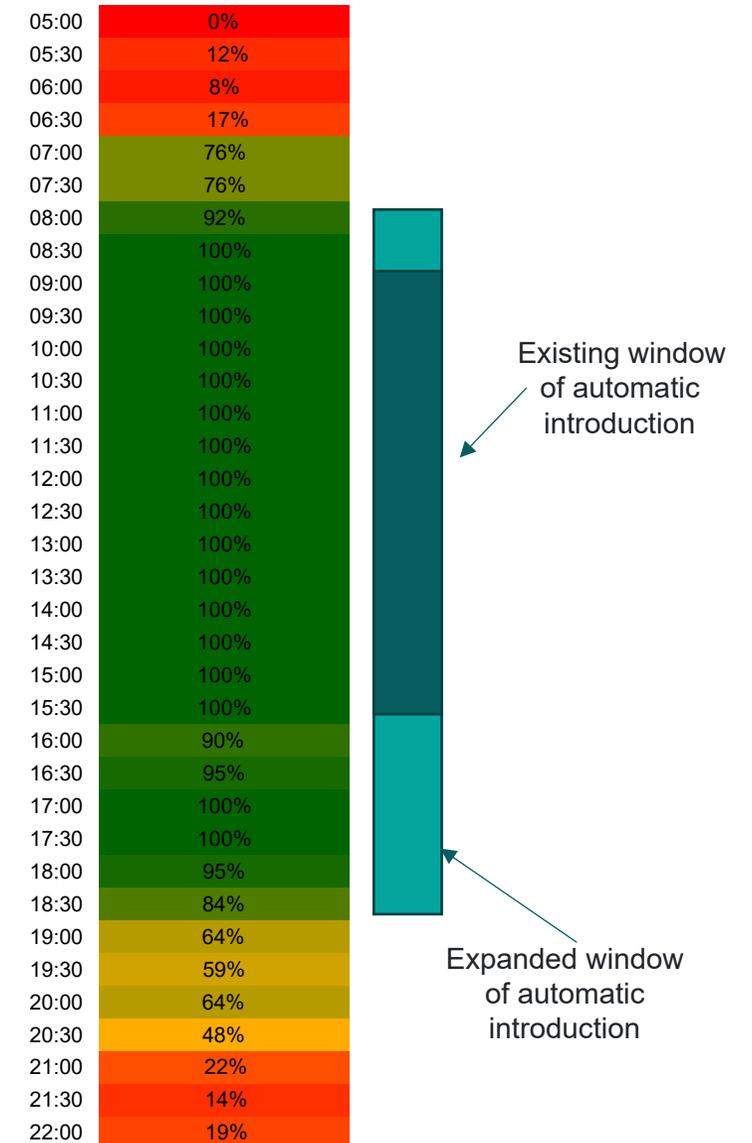| Demand	Walk On	Walk Off	Included
6:59:45	6:59:55	7:00:05	No
6:59:55	7:00:05	7:00:15	Yes
6:54:55	7:00:05	7:00:15	Walk only (no demand)
8:59:45	8:59:55	9:00:05	Yes
8:59:55	9:00:05	9:00:15	No
8:59:45	8:59:55	9:05:05	Error!

Further Development

Frequency Analysis

- Frequency of pedestrian movements over the day can help inform automatic introduction.

Frequency Plot of P1 and P2

Heatmap of P1 OR P2 in Walk

Time	%
05:00	0%
05:30	12%
06:00	8%
06:30	17%
07:00	76%
07:30	76%
08:00	92%
08:30	100%
09:00	100%
09:30	100%
10:00	100%
10:30	100%
11:00	100%
11:30	100%
12:00	100%
12:30	100%
13:00	100%
13:30	100%
14:00	100%
14:30	100%
15:00	100%
15:30	100%
16:00	90%
16:30	95%
17:00	100%
17:30	100%
18:00	95%
18:30	84%
19:00	64%
19:30	59%
20:00	64%
20:30	48%
21:00	22%
21:30	14%
22:00	19%

Existing window of automatic introduction

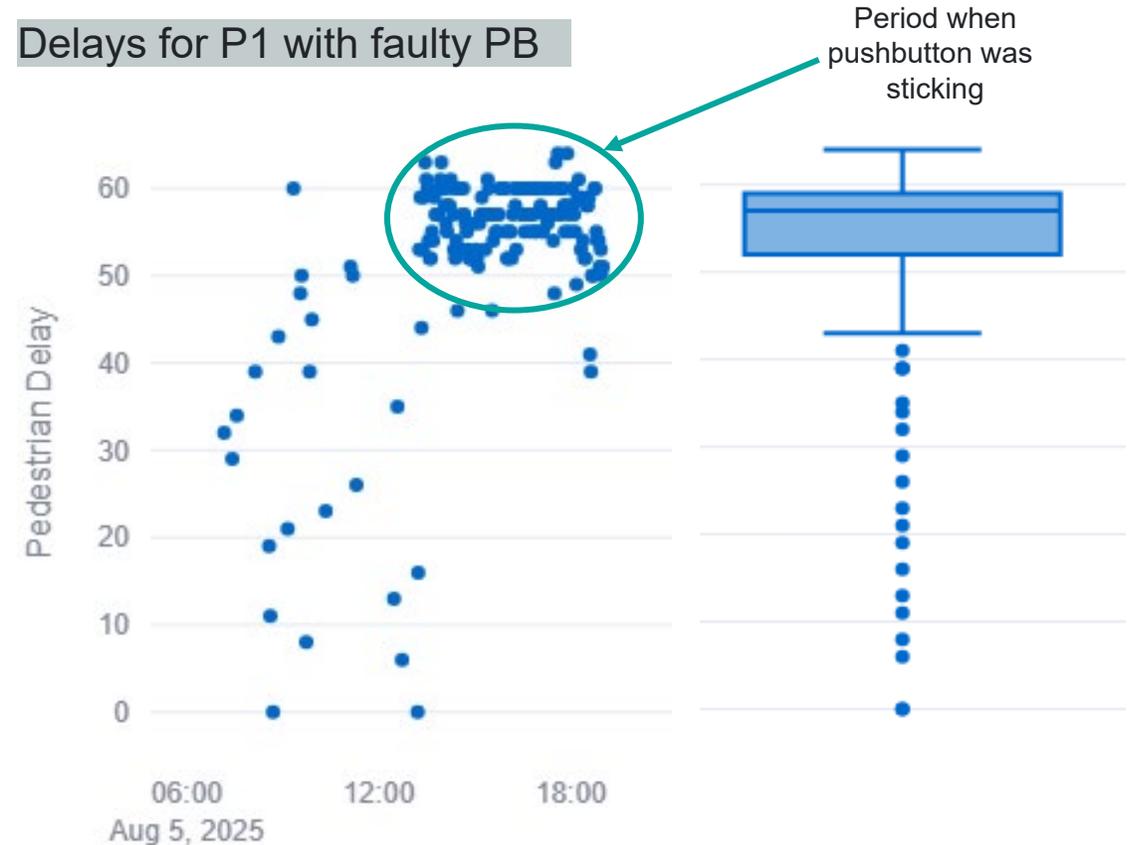Expanded window of automatic introduction

Delay Visualisations

- Visualising delay data can show how variable pedestrian wait times are.
- Plots can also help determine if abnormal or faulty conditions influenced aggregated delays.

Typical Delays for P1
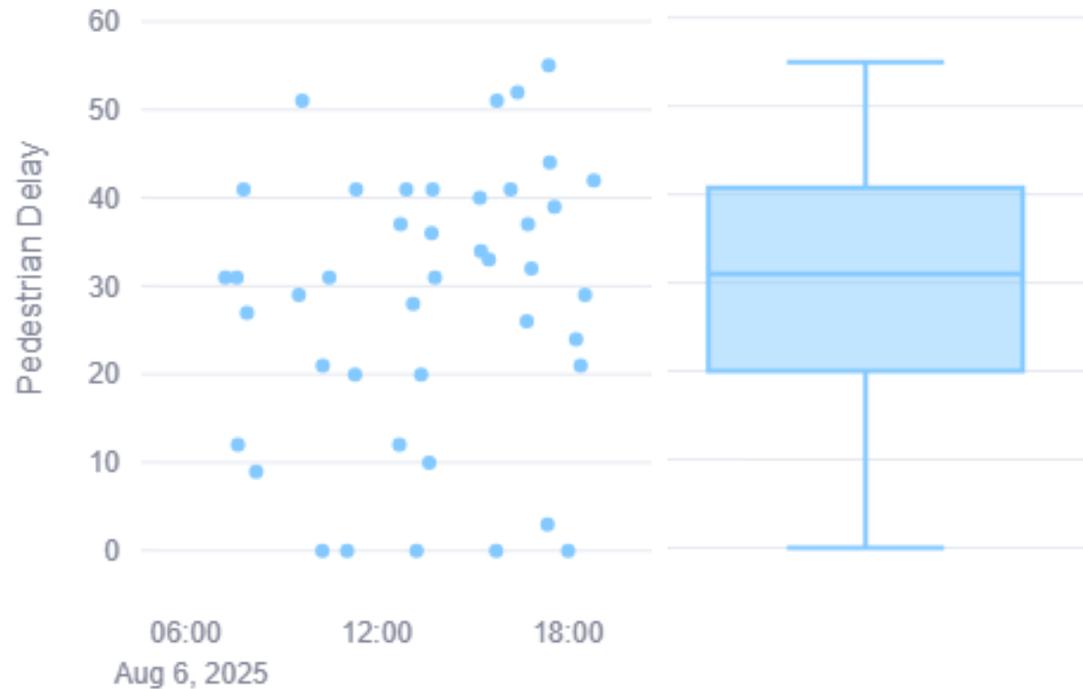
Delays for P1 with faulty PB

Period when pushbutton was sticking

Thank you

Victoria State Government | Department of Transport and Planning