Victoria walks

Road Safety for Pedestrians Who Are Blind or Have Low Vision

Site audits and survey

vision australia
blindness and low vision services

Guide Dogs VICTORIA

“As an older person with both low vision and a physical disability, pedestrian safety is a very important issue in my life.”

Survey respondent

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Executive summary

Victoria Walks, in conjunction with Vision Australia and Guide Dogs Victoria, have developed a comprehensive and robust road safety audit tool focused on pedestrians with a vision impairment. The tool can be used by members of the community and is capable of identifying relevant issues in a form acceptable to road safety authorities. It has been used to audit three areas of Melbourne and two in Geelong, chosen because blindness agencies know that people with vision impairment travel in these areas, either as employees or to access blindness services. The audit tool findings have been cross-checked by surveying pedestrians with vision impairment to ask them about the issues they face in the same local areas.

This report details the findings of the audits and survey responses, and provides a series of recommendations that arise from identified road and pedestrian safety issues. The report seeks to build on the emerging evidence base concerning pedestrians with vision impairment, develop a better understanding of road and footpath environments and work towards addressing identified key road and footpath safety issues in local areas.

Survey

The survey had very strict eligibility criteria, seeking the views only of people who were over 18; vision impaired; and walked in five narrowly defined areas. As a result, almost half of the 113 people who commenced the survey were excluded before answering the detailed questions around road design. Of the 62 that remained, 24 had moderate vision loss, 20 severe, 3 profound and 15 were totally blind.

'Difficulty in judging whether it is safe to cross the road' was the biggest overall concern, judged a significant problem by 36% of respondents and a minor problem by 48%, leaving only 14% who said it was not a problem.

Obstructions or tripping hazards on the footpath was the next most significant overall issue, rated a significant problem by 37% of respondents and a minor problem by 42%.

Pedestrians who have impaired vision face significant challenges at non-signalised crossing points. They have difficulty determining whether/when it is safe to cross, which is compounded by traffic volume and speed. Many respondents indicated they did not cross at non-signalised intersections (47%) or mid-block crossings (46%) in the study areas. Given that the majority of intersections are not signalised, this severely limits the mobility of people who have impaired vision.

There was a high level of concern around driver behavior, even in situations where drivers are required to give way to pedestrians. At traffic lights for example, motorists failing to give way was the biggest concern, rated a significant problem by 38% of respondents and a minor problem by 43%. Respondents also indicated that cars were a risk to them while walking on footpaths – 'motorists failing to give way to you on the footpath, for example, driveways,' was rated a significant problem by 22% of respondents and a minor problem by 38%.

Site audits and analysis

A diverse range of problems were found in each study area and specific recommendations have been made in response. Issues common to most areas were:

- Tripping hazards and obstructions on the footpath such as low hanging tree branches, shop sandwich boards and outdoor dining
- Poor kerb ramp design that would potentially send pedestrians with a vision impairment into the middle of an intersection rather than directly across the road
- Differences between the width of a crossing and the width of the pram ramp used to access it (a potential trip hazard)
- Missing or poorly functioning Tactile Ground Surface Indicators (TGSI) or audio tactiles.

Among other things, the report recommends that raised thresholds (figure 27, page 45) be installed at various unsignalised intersections, because they provide a visual signal to drivers that pedestrians have priority and ensure low speeds at crossing points. This goes some way to address the problems faced by pedestrians with vision impairment at unsignalised crossings and in dealing with motorists. Where there is a need for pedestrians with visions impairment to cross arterial roads, pedestrian operated signals should be installed.

Key site-specific issues are outlined below.

Geelong CBD

The site audit for this area focused on Moorabool Street, from Malop Street south to Little Ryrie Street. A range of problems with intersection design and operation were identified, particularly at Little Malop Street and Little Ryrie Street, where the footpath blends into the road, which can be disorienting for someone with a vision impairment. Compared to other audit areas, a significant number of obstructions were identified on the footpath.

Belmont, Geelong

A number of issues were identified in High Street Belmont, from Barwon Heads Road to Roslyn Road, including:

- A fundamentally poor pedestrian environment at the intersection of High Street and Barwon Heads Road – a complicated intersection of roads with multiple traffic lanes, high traffic speeds and slip lanes without marked crossings
- Major accessways to businesses and shopping centres that cross the footpath and present hazards to pedestrians with a vision impairment
- A range of more detailed problems at various locations, including the Roslyn Road intersection.

Kew

In Kew, the audit found a surprising range of problems in a very short distance between the entrance to Guide Dogs Victoria, just off the Chandler Highway and the nearest bus stops, in Yarra Boulevard. This included:

- Unco-ordinated traffic lights that force blind pedestrians to wait on the traffic island in the middle of the busy Chandler Highway
- No footpath to the bus stop on the south side of Yarra Boulevard

- A stretch of footpath crushed by trucks and strewn with gravel, making it difficult for walkers who have impaired vision to find their way and avoid slipping.

Kensington

The survey and audit assessed Macaulay Road between Macaulay Railway Station and Epsom Road in Kensington. Findings included:

- Concerns about relatively narrow footpaths and lack of separation from vehicle traffic, between Macaulay Station and the Vision Australia offices
- Potential to walk off pedestrian crossings and into the railway tracks south of Kensington Station
- A broad range of detailed design and construction issues.

Kooyong/Hawthorn

The survey and audit looked at Glenferrie Road between Toorak Road in Kooyong and Glenferrie Train station in Hawthorn. Findings included:

- A range of problems with tram stops, all of which require people who are blind to walk into the road to get to the tram.
- Sub-standard shared path on the eastern side of Glenferrie Road, north of the freeway.
- Issues with multiple vehicle entries around the Vision Australia offices at 454 Glenferrie Road, as well as tram stop design and the absence of a crossing to the tram stop on the opposite side of Glenferrie Road.

Introduction

Road and pedestrian safety is a high profile issue in Australia. Australians strongly value their ability to move around in the community – safely and independently. Walking is one of the most common and convenient forms of transport, but for a person with vision impairment, there is added complexity in crossing roads and navigating footpaths.

Our ability to walk from place to place to participate in everyday life, access employment, education, other forms of public transport, and social and economic opportunities and activities relies on a combination of elements that need to work together.

These elements include design of the road and built environment, vehicle design and operation, various rules, all users observing responsible behaviour and individual decision making that is largely informed by our senses, such as sight and hearing.

People with vision impairment face serious challenges in moving safely and independently in the community. A report by Monash University Accident Research Centre found 1 in 12 pedestrians with vision impairment had been hit by a motor vehicle or bicycle in the past five years. This affects not just people who have vision impairments, but all road users.

People with vision impairment employ a variety of techniques to walk in the community, including use of other senses such as hearing, as well as aids and equipment like white canes, dog guides or GPS to navigate roads and footpaths. Blindness agencies provide specialist orientation and mobility training and advice to pedestrians with vision impairment.

Facilities within the road and footpath network including audio tactile devices that emit noise and pulse at road crossings and Tactile Ground Surface Indicators also provide important physical cues and decision making aids in relation to path of travel or nearby hazards.

The behaviour of other road and footpath users also plays a vital role, and people with vision impairment rely on others to observe relevant rules to maximise certainty and minimise potential safety issues.

Project background and description

Road Safety for Pedestrians Who Are Blind or Have Low Vision is a project led by Vision Australia in partnership with Guide Dogs Victoria and funded by the Victorian Community Road Safety Partnership Program, which is managed by VicRoads.

The project has involved various components over a number of years. Most relevantly, it has previously included the following elements:

1. A survey was undertaken of more than 600 people with a vision impairment. This culminated in the Monash University Accident Research Centre report *Road Safety for Pedestrians Who Are Blind or Have Low Vision,* released in December 2012. That report provides some higher level information on the issues facing people who have impaired vision as they walk in the community.

2. Victoria Walks was commissioned to develop an audit tool (provided as a separate attachment) to assess the safety and walkability of urban environments, including roads and footpaths, for people who are blind or have low vision. Input was provided by a working group of Vision Australia and Guide Dogs Victoria representatives, as well as a traffic engineer and Road Safety Auditor.

This report delves deeper into the issues facing pedestrians with a vision impairment as they walk in five particular areas of Melbourne and Geelong. These areas were chosen because they are the site and surrounds of Vision Australia or Guide Dogs Victoria offices and therefore receive a high level of visitation by people who have impaired vision. There were two components to this assessment:

1. A survey of adults who are blind or have low vision and walk regularly in one or more of the audit areas, undertaken in April 2014.

2. Site audits of the five study areas, undertaken in March 2014.

The audit tool has been designed to capture relevant road safety issues and be used by members of the public, for broad benefit. In planning the project it was agreed between VicRoads and Vision Australia that the site audits would be undertaken by volunteers, using the audit tool. In preparing this report, Victoria Walks is reliant on the information generated by those audits.

This report outlines the findings of the survey and audits for the five study areas and provides recommendations arising from them. It also outlines the general findings of the survey and provides overall conclusions.

Figure 1 – sign alerting drivers to blind pedestrians, Kensington

Survey

In April 2014, a survey was undertaken of people with a vision impairment who walked in five particular areas.

The survey asked a range of questions on personal characteristics and people's experience of walking in the identified areas, including collisions or near collisions. Some of the questions were based on the earlier survey conducted and reported on in *Road Safety for Pedestrians who are Blind or have Low Vision* (Oxley et al 2012), to facilitate cross-referencing.

The results for particular areas are reported individually in the remainder of this report and a full report on the general findings is provided as a separate attachment. The key findings are set out below.

The survey had very strict eligibility criteria to help match the survey responses to the specific geographic areas in which the road safety audits were conducted. It sought the views only of people who were over 18; suffered from a degree of vision loss that could not be corrected by glasses; and walked in five narrowly defined areas. As a result, half of the 113 people who commenced the survey were excluded before answering the detailed questions around road design. Respondents were also not required to answer all questions and were filtered out of answering questions on crossing types that they did not use. The more detailed questions were typically answered by between 49 and 57 respondents in total – although the number of respondents in relation to different areas varied significantly. Unsurprisingly, the highly exclusive targeting of the survey translates to small sample sizes. Nonetheless, the survey provides useful, if not statistically representative, information regarding the experience of people who are blind or have low vision in walking in particular areas.

Respondent characteristics and reasons for walking

Of those who said they walked often in one of the study areas, 24 had moderate vision loss, 20 severe, 3 profound and 15 were totally blind. Most (86%) walk without assistance from another person and use a mobility aid most (55%) or some (26%) of the time.

Apart from visiting Vision Australia, the most common reasons for walking in the study areas were to use public transport or access post office/bank/shops (full results in the table below). These results vary somewhat from those reported in *Road Safety for Pedestrians who are Blind or have Low Vision* (figure 6 of that report), where shopping was the main reason for walking and recreation/fitness was a clear second. It seems that respondents walk in our study areas primarily for some form of personal business necessary to live their everyday life, rather than for recreational or social purposes.

Answer Options	Response Percent	Response Count
To visit Vision Australia or Guide Dogs Victoria.	62.5%	35
To use public transport.	44.6%	25
Post office/bank/shops.	39.3%	22
Work.	30.4%	17
Education or training.	28.6%	16
Medical/health appointments.	21.4%	12
Sports/social club.	21.4%	12
Recreation/fitness.	21.4%	12
Visit family/friends.	12.5%	7
Church or place of worship.	0.0%	0
Other (please specify)		5
answered question		56
skipped question		6

Interaction with other road users

In relation to other road users, motorists failing to give way at intersections was the most significant issue. However motorists failing to give way on the footpath and cyclists on the footpath or shared path were also rated a significant or minor problem by the majority of respondents. Full details of responses are set out below.

Thinking about your experience in walking around this area, and your interaction with other road users there, rate the following issues					
Answer Options	**Not a problem**	**Minor problem**	**Significant problem**	**Rating Average**	**Response Count**
Motorists failing to give way at intersections.	13	24	18	1.09	55
Motorists failing to give way to you on the footpath, for example, driveways.	19	24	10	0.83	53
Cyclists on the footpath or shared path.	21	21	11	0.81	53
Other pedestrians or dogs on the footpath or shared path.	21	20	9	0.76	50
Cyclists on the road.	23	25	6	0.69	54
Other pedestrians on the road.	36	12	2	0.32	50
			answered question		57
			skipped question		5

Figure 2 – cyclist riding on the footpath, High Street Belmont

Crossing at traffic lights

We know from the previous survey (Oxley et al 2012) that pedestrians with a vision impairment have a much higher level of confidence crossing at traffic lights than at other crossing points. But that does not mean signalised crossings do not have issues. Once again, motorists failing to give way emerges as a significant problem in our survey, with poor design that does not guide people to cross in the right direction the next most significant. For people with no useable vision (profound vision loss or totally blind), poorly functioning or located audio tactiles were also important (a significant problem for 7 of the 14 respondents). Interestingly, this was the only issue in the survey that was considered a notably bigger problem by this group than respondents generally, although they did demonstrate a higher degree of avoidance of mid-block crossing.

Thinking about your experience in crossing at traffic lights in this area, rate the following potential issues.						
Answer Options	**Not a problem**	**Minor problem**	**Significant problem**	**N/A**	**Rating Average**	**Response Count**
Motorists failing to give way.	8	22	18	1	1.21	49
Poor pram ramp design, or alignment of features that does not guide you to cross in the right direction.	16	13	15	2	0.98	46
Absence of audio tactiles.	21	9	14	3	0.84	47
Not enough time to cross.	19	17	10	1	0.80	47
Poorly functioning audio tactiles or difficulty reaching the button.	20	13	10	2	0.77	45
Having to cross slip lanes.	18	12	9	7	0.77	46
Absence of Tactile Ground Surface Indicators (TGSI) at crossing points.	20	19	4	2	0.63	45
Absence of pram ramps at crossing points.	24	14	4	4	0.52	46
					answered question	50
					skipped question	12

Unsignalised intersections

A substantial proportion (43%) of respondents indicated they did not cross at unsignalised intersections in the relevant area. This suggests that many pedestrians with a vision impairment avoid unsignalised intersections. For some they may be prohibitive barriers to walking. The results for the 30 respondents who do cross at these intersections indicate the significant issues they face. Difficulty determining when it is safe to cross, traffic volume and speed are all rated serious problems and are connected issues. Motorists failing to give way remains a significant problem.

Thinking about your experience in crossing at other intersections in this area, where there are not traffic lights, rate the following possible issues.						
Answer Options	**Not a problem**	**Minor problem**	**Significant problem**	**N/A**	**Rating Average**	**Response Count**
Difficulty determining when it is safe to cross.	6	8	16	0	1.33	30
Volume of traffic.	5	12	12	0	1.24	29
Speed of traffic.	8	13	9	0	1.03	30
Motorists failing to give way.	9	12	8	1	0.97	30
Confusion about who has to give way.	11	13	6	0	0.83	30
Absence of Tactile Ground Surface Indicators (TGSI) at crossing points.	12	10	6	2	0.79	30
Poor pram ramp design, or alignment of features that does not guide you to cross in the right direction.	15	10	3	1	0.57	29
Absence of pram ramps at crossing points.	20	8	0	3	0.29	31
					answered question	31
					skipped question	31

Mid-block crossing

Once again, nearly half of the respondents indicated they did not cross at places where there is no intersection or signalised crossing. And once again, the results for remaining respondents indicate why. Virtually all of the possible issues we identified were confirmed as serious problems, with very similar weighting to unsignalised intersections.

Thinking about your experience in crossing, or wanting to cross, at places where there is no intersection or signalised crossing in this area, rate the following potential issues.

Answer Options	Not a problem	Minor problem	Significant problem	N/A	Rating Average	Response Count
Difficulty determining when it is safe to cross.	4	10	13	0	1.33	27
Volume of traffic.	4	10	12	1	1.31	27
Speed of traffic.	7	8	11	0	1.15	26
No pedestrian crossing where I cross, or would like to cross.	6	12	10	0	1.14	28
Motorists failing to give way to you at pedestrian crossings.	6	12	8	1	1.08	27
Difficulty determining the right place or direction to cross.	11	7	8	1	0.88	27
Difficulty in negotiating the kerb.	11	12	4	0	0.74	27
				answered question		28
				skipped question		34

Off-road issues

Tripping hazards and obstructions in the path of travel were the most significant problems in an off-road context. A clear majority found interaction with cyclists to be a problem, but only 7 rated it a significant problem. Accessing public transport and walking through car park areas were lesser issues, but still rated either a significant or minor problem for the majority of respondents.

Thinking about your experience in walking on footpaths or shared paths in this area, rate the following potential issues.

Answer Options	Not a problem	Minor problem	Significant problem	N/A	Rating Average	Response Count
Tripping hazards within the path of travel.	12	20	17	1	1.10	50
Obstructions such as vehicles, advertising boards, seating or construction blocking the path.	13	19	15	1	1.04	48
Interaction with cyclists.	13	24	7	3	0.86	47
Difficulty in finding public transport stops or poor design of public transport stops.	21	15	12	1	0.81	49
Walking through car park areas.	22	15	10	2	0.74	49
Difficulty in determining appropriate direction or path of travel.	27	15	4	1	0.50	47
No footpath.	28	6	6	6	0.45	46
				answered question		50
				skipped question		12

Overall issues

The results for overall issues tend to confirm the earlier results. 'Difficulty judging whether it is safe to cross' was rated the most significant problem. It is notable however that obstructions or tripping hazards on the footpath is rated as a significant problem even when compared to road crossing concerns. Crossing at roundabouts did not emerge as a significant problem, but that is likely to reflect the general absence of roundabouts in the study areas.

Thinking about your experience overall in walking around this area, rate the following potential issues.

Answer Options	Not a problem	Minor problem	Significant problem	N/A	Rating Average	Response Count
Difficulty in judging whether it is safe to cross the road.	6	21	20	1	1.30	48
Obstructions or tripping hazards on footpaths.	8	22	15	0	1.16	45
Crossing at intersections where there are no traffic lights or roundabouts.	12	14	16	4	1.10	46
Interaction with motorists.	10	20	14	1	1.09	45
Speed of traffic.	11	24	13	0	1.04	48
No formal crossing where I cross or would like to cross.	12	18	11	5	0.98	46
Interaction with cyclists.	13	16	12	3	0.98	44
Absence of or problems with Tactile Ground Surface Indicators, pram ramps or audio tactiles.	16	21	9	2	0.85	48
Crossing at roundabouts.	16	14	5	11	0.69	46
				answered question		49
				skipped question		13

The survey also asked about site specific issues and collision history. Of 49 respondents, 3 had been involved in a collision and 20 a near collision in one of the study areas. These issues are best considered in the context of the specific study areas and are detailed in the following sections.

Additional issues

The survey generated significant interest in the blind community and it prompted a number to write with additional comments. Problems at roundabouts were raised by a number of correspondents.

> "…I cannot be sure whether cars swinging round the roundabout are going along Main St/Nepean Hwy or are turning into McDonald St. If I guess wrong, I get abuse from drivers as well as a fright."

> "My pet hate is roundabouts located at intersections where there is no provision for pedestrians. In Pakenham where I live, there is a roundabout right in the middle of the main shopping area. Of the four entrances to the roundabout, there is only one with a pedestrian crossing. For me and many others who are elderly or disabled, this roundabout virtually makes it impossible to move about to shops and other businesses with any ease."

A strong theme emerging from the survey is concern around driver behavior. The issues are well described in an email we received:

> "I realise that you are only interested in specific areas but I would like to relate my general experiences to you. I regularly have cars come through against the lights at the pedestrian crossings at the Essendon roundabout, Mount Alexander Road outside the Post Office and at Moonee Ponds Junction when crossing to or from the Tram Stop. Particularly at the Junction, the

> light signals are shared and cars are advised to “give way to pedestrians”, I cannot believe that there have not been people killed or injured there. In the City, I have experienced 2 incidents in the last few weeks at the intersection of Collins and Elizabeth, whereby a Taxi turned right out of Collins into Elizabeth against the lights through pedestrians crossing and on the other occasion a pedestrian started to cross against the lights when a car was coming through... As I travel on the Airport West Tram to and from the City regularly another hazard which occurs too frequently are cars passing the Tram when passengers are alighting from it. The drivers usually can see this coming and “ding their bell” as a warning, but to no avail... As a Vision Impaired person I always am very careful, however, I cannot understand why something isn’t done about driver and pedestrian education, and Policing, to make our roads safer for all.”

One correspondent had a specific suggestion for construction sites:

> “The witches hats on a footpath with the plastic rope between them is not enough. A new standard should be that when such works are being carried out, that either the water filled bins be used, or some other form of barrier that can be also shorelined against.”

Geelong CBD

Survey

Only three people answered questions specific to this area. Two had moderate vision loss, one severe and none were totally blind.

Given the low number of responses in this particular area, the value of analysing the response to broader questions is debatable. However one area was specifically identified as unsafe:

> "The pedestrian crossing leading through the bus bays and taxi rank, to the outside street. There are no TGSI installed at the main vehicle access point. TGSI were removed when repairs were made, but never replaced after the remedial work was done."

Although not specified, this comment appears to relate to the Geelong railway station.

Site audit

The site audit for this area focused on Moorabool Street, from Malop Street south to Little Ryrie Street. Guide Dogs Victoria has a new office at 199 Moorabool Street.

A number of relatively minor issues were identified at the intersection with Little Malop Street (See Geelong CBD map **point 1**), including:

- Slow phase of audio tactiles was not audible over ambient traffic noise
- There is a gap of approx. 400mm between end of directional TGSI's and warning TGSI's
- The pedestrian lights (green/red man) on the south side are not directly visible from all areas of the kerb ramp as they face towards the intersection of Moorabool St and Little Malop St (**figure 3**)
- Difficult to distinguish contrast between footpath and road
- Directional TGSI link to building line on north side only
- The warning TGSI's do not stretch the length of the pram ramp. The pram ramp being 2.9m and the tactiles 2.4m located on the audio tactile (east) side of both the north and south crossing points (**figure 4**).

Figure 3 – poorly oriented pedestrian signals at Moorabool and Little Malop Streets

- The TGSI could be confused with the decorative tiles that surround them.

The main intersection in the audit area is the intersection of Moorabool and Ryrie Streets (**point 2**), with multiple lanes on all crossing points. One issue identified was that the audio tactiles (fast and slow phases) were not audible in the middle of the crossing.

On the eastern side of Moorabool Street at Little Ryrie Street (**point 3** and **figure 5**), the footpath blends into the road, with no distinct kerb. A white line is used to define the edge of the road and TGSI are provided in one crossing direction, but it is possible for someone with a vision impairment to miss the TGSI and deviate into the road. This is particularly true of someone approaching along Little Ryrie Street. TGSI are placed too close to the border of the road and kerb. In one case they are half on, half off the kerb edge. The absence of a kerb also potentially enables cars to cut across the notional footpath.

Figure 4 – TGSI not extending across the width of the crossing and potentially confused with surrounding decorative tiles, Moorabool and Little Malop Streets

Generally there is a clear path of travel along the building line on Moorabool Street. However the audit did identify a number of obstructions including:

- Public seating near 147 Moorabool St.
- Sandwich Boards at Geelong Bakehouse, 151 Moorabool St; and Top One French Bakery, 143 Moorabool St.
- Al fresco furniture at Ebony & Ivory Café, 189 Moorabool St.
- Loose wiring hanging from National Hotel at 191 Moorabool St.

One trip hazard was identified – a slippery grate outside 199 Moorabool Street.

There is a taxi rank at the Moorabool Street bus interchange between Malop and Little Malop Streets (**point 4**), but it only operates between 1am and 6am Sunday.

Figure 5 – footpath blending into the road, Little Ryrie Street

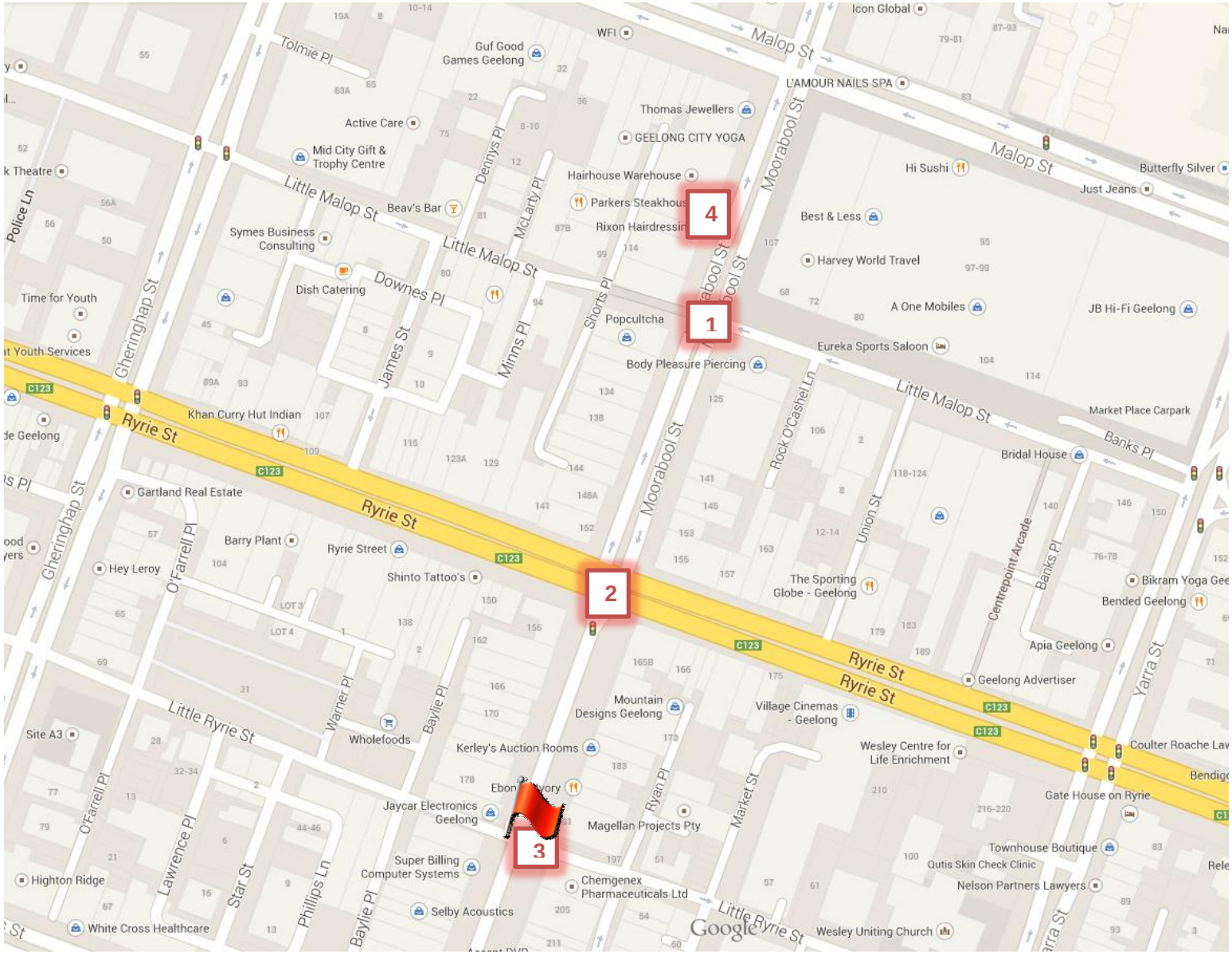
Conclusions and recommendations

A range of issues have been identified through the survey and audit. These are mostly superficial issues that could be addressed at limited cost. The blended kerb at the intersection of Moorabool and Little Ryrie Streets is the most significant safety issue for pedestrians with vision impairment.

Recommendations

1. Ensure appropriate TGSI are provided at entrance to Geelong Railway Station.
2. Review positioning and operation of signals and organisation of paving and TGSI at intersection of Moorabool and Little Malop Streets.
3. Address the volume of fast phase audio tactiles to ensure they can be heard from the centre of the Ryrie St crossing (travelling north/south along Moorabool St).
4. Remodel kerb at the intersection of Moorabool and Little Ryrie Streets, to provide a more conventional configuration of kerb, kerb ramps and TGSI; or use warning TGSI to clearly delineate between the footpath and the road in all locations and stop cars cutting the corner.
5. Work with traders to ensure that a clear path of travel is maintained along the building line of Moorabool Street.

Geelong CBD map



Key

1 Issue points
(see text for description)

Particular hazard areas

Belmont, Geelong

Survey

Nine people answered questions specific to this area – High Street Belmont, from Barwon Heads Road to Roslyn Road. Four had moderate vision loss, two severe, one profound and two were totally blind.

Eight respondents walked in the area to access post office/bank/shops; seven to use public transport and six to visit the Vision Australia office at 79 High Street.

In relation to other road users, cyclists on the footpath and shared path were rated a significant problem by three respondents and a minor problem by four. 'Motorists failing to give way to you on the footpath, for example, driveways' was also rated a significant problem by three and a minor problem by three.

Eight people answered questions on crossing at traffic lights in this area. Four regarded 'Poor pram ramp design, or alignment of features that does not guide you to cross in the right direction' as a significant problem and one a minor problem. Poorly functioning audio tactiles or difficulty reaching the button and 'not enough time to cross' were both rated a significant problem by three people and a minor problem by three.

Figure 6 – entrance to Tyrepower on High St, looking north to intersection with Barwon Heads Rd and Barrabool Rd

One respondent indicated they would like a pedestrian crossing at "Corio Street, near the High Street intersection" (just to the south-east of the study area).

Six people answered questions in relation to non-road environments. Two identified 'walking through car park areas' as a significant problem and three described it as a minor problem.

Six people answered questions on overall issues. 'Speed of traffic' and 'difficulty judging when it safe to cross were identified as a significant problem by two respondents and a minor problem by the other four. Obstructions or tripping hazards on footpaths were also identified as a significant problem by two respondents and a minor problem by three.

The areas that were specifically identified as unsafe were:

- "High Street Roslyn Road intersection - too many roads and angles"
- "Intersection of High Street and Mt Pleasant Road...sometimes the motorists don't give way, plus the traffic going down High Street is so fast I always feel unsafe even when standing on the kerb/footpath."
- "Herd Rd Belmont" (outside the study area, to the east)

A middle-aged woman said she had been involved in a collision "crossing High Street against the lights." She did not specify what type of vehicle was involved, but no-one was hurt and the incident was not reported.

The reported circumstances of near collisions were:

- “Driveway at shopping centre”
- “Various areas”
- “Entrance driveway to Kmart car park in High street, Belmont” (**point 3** on audit map)

Site audit

The northern limit of the audit area was the intersection of High Street and Barwon Heads Road (**point 1** on the audit map). This is a generally poor pedestrian environment with a complicated intersection of roads with multiple traffic lanes, high traffic speeds (60km/h except on Barrabool Rd) and slip lanes without marked crossings. Traffic signals including audio tactiles appear to be operating appropriately, although at one location TGSI were overgrown with grass. The uncontrolled crossing points in particular are potentially prohibitive barriers for pedestrians with vision impairment.

Figure 7 – trip hazard opposite Nandos

The vehicle accessway from High Street to Tyrepower is designed to facilitate vehicle access at speed. This presents a potential hazard for pedestrians, especially those who have a vision impairment. At this point also the edge between the footpath and the road (a 60km/h traffic lane) is poorly defined.

South-west of this intersection, there is a bus stop on the northern side of High Street, adjacent to Cameron Park (**point 2**). There are no TGSI identifying the point to wait at this bus stop.

Trip hazards were identified on either side of High Street near Nandos (71 High Street, **point 4** and one example in **figure 7**). Next door, at 73 High Street, a small wall runs parallel to the footpath (**figure 8**). Painted black, this wall has little visual contrast with the footpath and could constitute a trip hazard.

At the intersection of High Street and Mount Pleasant Road, auditors reported that the audio tactiles were not audible on all crossing legs.

Figure 8 – wall at 73 High Street

The intersection of Roslyn Road, High and Corio Streets (**point 5**) is a complex one. However the capacity to cross Corio Street and Roslyn Road in one movement is a strongly positive aspect of the configuration. Apart from the complexity of the intersection, some issues identified included:

- On the east side of High Street the audio tactile is not within arm's reach for a pedestrian waiting at the ramp and TGSI were damaged.
- At the time of the audit a roadworks sign created an obstruction and a tripping hazard at one corner (**figure 9**).
- On one leg the TGSI do not align with the crossing (**figure 10**).
- Audio tactiles on two legs had only a low pulse.

Figure 9 – a poorly located construction sign presents a trip hazard at the Roslyn/High/Corio Street intersection

Figure 10 – poorly aligned ramps, TGSI and crossing at the Roslyn/High/Corio street intersection

Conclusions and recommendations

The intersection of High Street and Barwon Heads Road is perhaps the most concerning area in this audit, in that it is likely to pose the greatest barrier to pedestrian movement. However there may be little demand for pedestrians with a vision impairment to walk north of this intersection, and a design response is likely to be difficult and/or expensive, so we have not made recommendations in relation to this intersection.

Vehicle crossovers providing direct access to businesses is a general problem in this area. The two High Street entries to the K-Mart shopping centre would appear to be the most significant examples and we recommend that raised thresholds be installed there. However in this area of high activity by pedestrians with a vision impairment, a broader program of footpath resurfacing that crosses vehicle accessways, emphasising pedestrian priority, would be ideal.

Recommendations

1. Install raised thresholds at the High Street entrances to the K-Mart shopping centre (**point 3** on audit map).
2. Undertake a program of footpath resurfacing that crosses vehicle accessways, emphasising pedestrian priority, as part of longer term footpath asset management on High Street, between Barwon Heads Road and Roslyn Road.
3. Install TGSI at the Cameron Park bus stop on the north side of High Street (**point 2** on audit map).
4. Resurface footpath to address trip hazards on either side of High Street near Nandos (71 High Street).
5. Paint wall at 73 High Street in colours that provide a greater visual contrast with the pavement.
6. Check volume of audio tactiles at intersection of High Street and Mount Pleasant Road.
7. Upgrade infrastructure for vision impaired pedestrians (audio tactiles, TGSI, ramp alignment) at the intersection of Roslyn Road, High and Corio Streets.

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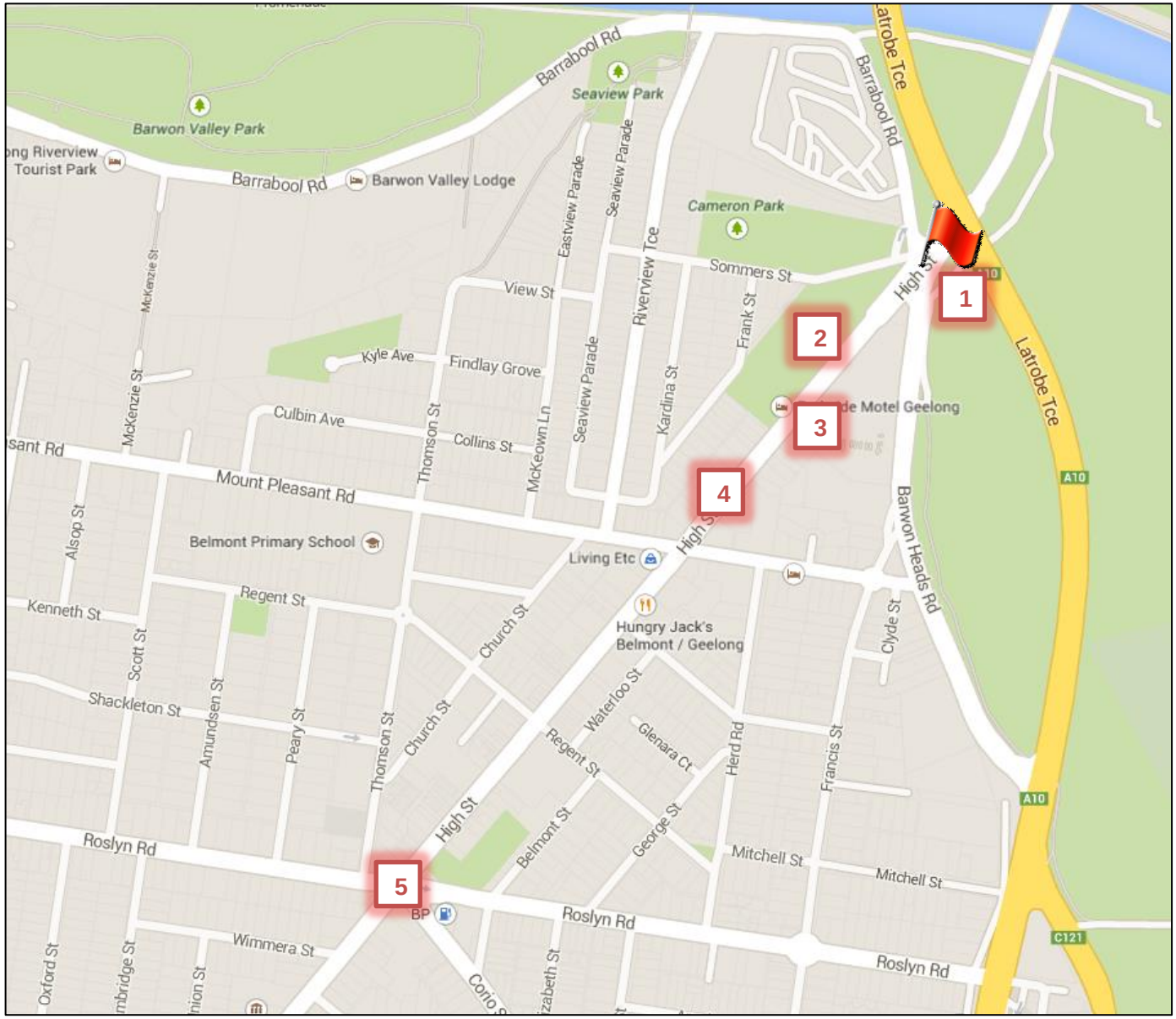
Belmont, Geelong map



Fairfield/Alphington/Kew

Survey

Four people answered questions specific to this area, which was defined in the survey as: "Fairfield/Alphington/Kew – Station St from Duncan St to Heidelberg Rd; streets next to Fairfield Station; Heidelberg Rd from Station St to Chandler Hwy; Chandler Hwy south to Eastern Freeway." One had moderate vision loss, one severe and two were totally blind.

In relation to other road users, cyclists on the footpath and shared path raised the most concern, with two rating it a significant problem and the other two a minor problem.

In crossing at traffic lights in this area, two respondents regarded an absence of or poorly functioning audio tactiles as a significant problem. At unsignalised intersections, three rated 'motorists failing to give way' as a significant problem and two identified 'volume of traffic' as a significant problem. Volume of traffic was also raised as an issue at points where respondents would like to cross mid-block.

One respondent indicated they would like a pedestrian crossing at the corner of Earl Street and Wellsmere Road (a roundabout outside the anticipated study area, but located as **point 1** on the map).

In relation to non-road environments, three respondents identified 'walking through car park areas' and 'difficulty in finding public transport stops or poor design of public transport stops' as significant problems. Obstructions on the footpath and interaction with cyclists were also identified as a significant problem by two.

In terms of overall issues, the factors identified as a significant problem by two respondents were:

- Crossing at unsignalised intersections
- Difficulty in judging whether it is safe to cross the road
- Obstructions or tripping hazards on the footpath.

The areas that were specifically identified as unsafe were:

- "Near Guide Dogs centre on Chandler Highway - not clear where to go"
- "Virtually anywhere used by cyclists in large numbers."

Two respondents had been involved in a near collision while walking in this area – both with a bicycle. One described the circumstances "Crossing at a pedestrian crossing in Station St where a cyclist failed to give way and 'nearly' collided with me."

Site audit

The site audit for this area focused on the approaches to the Guide Dogs Victoria (GDV) office on the Chandler Highway in Kew (**point 2** on map), particularly the route to the nearest bus stops.

Figure 11 – maintenance track crossing footpath at entrance to GDV

Figure 12 – pedestrian operated signals crossing Chandler Highway

Figure 13 – south side of Yarra Boulevard looking west towards bus stop

There are bus stops on either side of Yarra Boulevard (**point 3**) immediately opposite the entrance to Guide Dogs Victoria. In other words, the bus stops are 'across the road' from the office. The number of problems in this very short distance is surprising.

At the entrance to Guide Dogs Victoria, a maintenance track running parallel to the Chandler Highway crosses the footpath (see **figure 11**). This has resulted in damage to the footpath and gravel across it, presenting a trip/slip hazard. For a pedestrian with vision impairment there is an additional risk of disorientation and confusion between the footpath and the road.

After negotiating this area, a walker then needs to travel approximately 30 metres south along the Chandler Highway (60km/h speed limit) to a pedestrian operated signal in order to cross the highway (**figure 12**). There are two crossing legs divided by a large central median. These signals were operating appropriately at the time of the audit, but the crossings do not directly align and the signals are independent of each other, which forces the pedestrian to wait on the island before crossing.

After crossing the Chandler Highway, the pedestrian can walk to Yarra Boulevard and around the corner, but here the footpath ends, well short of the bus stop on that side of the road (**figure 13**). The absence of a footpath presents significant trip hazards and orientation difficulties for a pedestrian with low vision.

There is another bus stop on the other (northern) side of Yarra Boulevard, so accessing it requires crossing the road. At the intersection this involves three crossing legs, two of which are uncontrolled (there is a marked pedestrian crossing at the slip lane). This is probably acceptable for an able-bodied pedestrian who can visually judge approaching traffic, which will be travelling relatively slowly

as they turn the corner from Chandler Highway or exiting from Yarra Boulevard. However it is likely to be difficult for a pedestrian with no or low vision to safely negotiate. Compounding this problem are the high volumes and speed of traffic at this uncontrolled intersection, which is likely to mean that drivers will be focused on finding gaps in traffic rather than scanning for pedestrians.

Neither of the bus stops on Yarra Boulevard provide any shelter to waiting pedestrians and there are no shops or other structures that can provide weather protection.

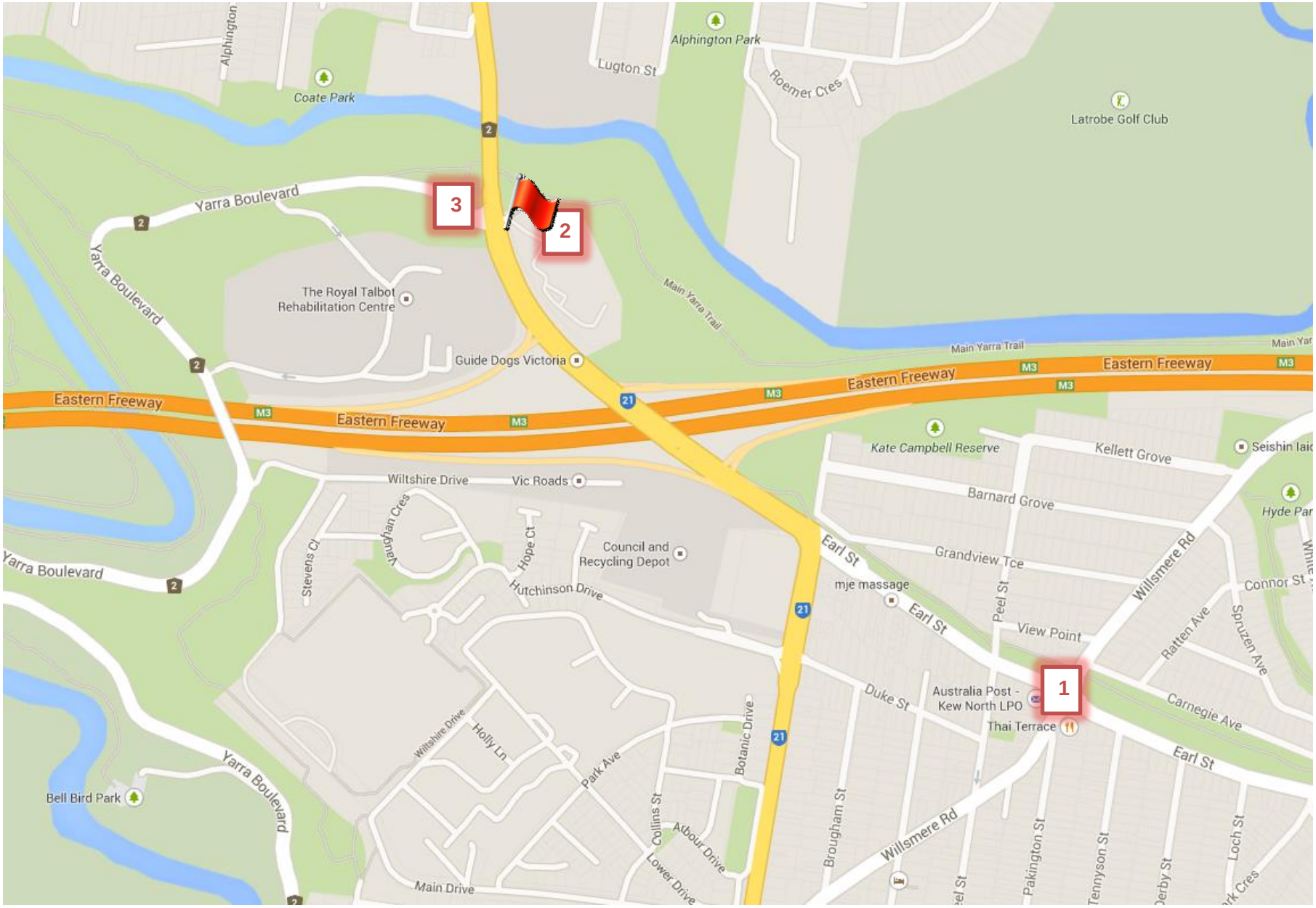
Conclusions and recommendations

The site audit identified some significant issues in the immediate environs of the Guide Dogs Victoria office, which was also identified as a problem site in the survey.

Recommendations

1. Reconstruct the footpath at the entrance to Guide Dogs Victoria on the Chandler Highway, Kew where it meets the maintenance track running parallel to the Highway.
2. Construct a footpath from the Chandler Highway to the bus stop on the south side of Yarra Boulevard.
3. Construct shelters at the bus stops on either side of Yarra Boulevard.
4. Co-ordinate pedestrian operated signals on the Chandler Highway near Yarra Boulevard to minimise pedestrian wait times in the central median.
5. Construct a raised pedestrian crossing across Yarra Boulevard at the intersection with Chandler Highway.
6. Alternatively, signalise the intersection of Yarra Boulevard and Chandler Highway (allowing removal of the pedestrian operated signals).

Fairfield/Alphington/Kew map



Kensington

Survey

There was an excellent response to the survey in relation to this area, with 25 people indicating they walked most often in "Kensington – Macaulay Rd from Kensington Rd to Citylink, streets next to Macaulay and Kensington Stations." Ten had moderate vision loss, eight severe, one profound and six were totally blind.

The most common reasons for walking in the area were to visit Vision Australia (17of 21 respondents), education or training (14), work (10), post office/bank/shops (9) and to use public transport (8).

In relation to other road users, motorists failing to give way at intersections raised the most concern, with eight (of 22 respondents) rating it a significant problem and eight a minor problem.

In crossing at traffic lights in this area, motorists failing to give way was rated a significant problem by 38% of respondents and a minor problem by 52%. Poor pram ramp design was rated a significant problem by 35% of respondents and a minor problem by 25%.

A substantial proportion of respondents indicated they did not cross at unsignalised intersections in this area. Of the 14 that answered:

- Five rated 'difficulty determining when it is safe to cross' as a significant problem and two as a minor problem
- Four identified 'volume of traffic' as a significant problem and five as minor problem
- Four identified 'motorists failing to give way' as a significant problem and four as a minor problem.

Thirteen respondents answered the question about their experience in crossing, or wanting to cross, at places where there is no intersection or signalised crossing in this area.

- Six rated 'difficulty determining when it is safe to cross' as a significant problem and four as a minor problem
- Four rated 'no pedestrian crossing where I cross or would like to cross' as a significant problem and five as a minor problem
- Four identified 'motorists failing to give way to you at pedestrian crossings' as a significant problem and five as a minor problem.

Respondents indicated they would like pedestrian crossings:

> "Half way down Stubbs Street across from cheeky Brothers Café" (not part of the study area).
>
> "Macaulay Rd, between Stubbs St and Barnett St (close to Barnett St)"
>
> "At the railway exit near Kensington Station to get to the cafés and shops ok the other side of the road"
>
> "Kensington railway station."

The question regarding footpaths and shared paths was answered by 21 respondents. Tripping hazards were a significant problem for six respondents and a minor problem for nine. Obstructions on the path were a significant problem for four respondents and a minor problem for eleven.

In terms of overall issues:

- ‘Difficulty judging whether it is safe to cross’ was rated as a significant problem by 35% and as a minor problem by 40%.
- Crossing at unsignalised intersections was rated as a significant problem by 39% and as a minor problem by 22%.
- Interaction with motorists was rated as a significant problem by 28% and as a minor problem by 50%.
- Obstructions or tripping hazards on the footpath was rated as a significant problem by 22% and as a minor problem by 56%.

Areas specifically identified as unsafe

Areas that were specifically identified as unsafe included:

> “Crossing Macaulay Rd between Stubbs St and the Kensington Station.”
>
> “Footpath between Macaulay Station and Vision Australia, Kensington is far too narrow to accommodate vision impaired pedestrians with aids and other passing pedestrians who may not be aware that the person they are approaching is blind or vision impaired. Heavy traffic is frighteningly close to the edge of this narrow footpath.” (**figure 14**)
>
> “Macaulay Road bridge over river at Macaulay railway station, foot path on side of bridge to narrow. I have witnessed people being hit by mirrors from cars and trucks traveling to close to footpath. There is no barricade between traffic and pedestrians.” (**figure 14**)
>
> “Barnet motor body repairs near Kensington station always put their cars on pathway.”
>
> “Macaulay road going across the bridge! It's not wide enough and a fence to keep myself safe on the road side would be a lot better.” (**figure 14**)

Figure 14 – the footpath on the north side of the Macaulay Road bridge underneath Citylink, identified as a concern by several respondents

A number of additional areas were identified as unsafe nearby, but outside of, the study area:

> “Pedestrian crossing on Macaulay Road, near Macaulay train station. Broken & uneven ground tactiles at Boundary Rd & Steel St.”
>
> “Intersection on Racecourse Rd (Subway cnr) cars don’t stop for red light – often.”
>
> “A cross without traffic light and audio near Macaulay station and Langford street. The crossing between Macaulay Rd and Boundary Rd doesn’t have an audio.”
>
> “Traffic lights on Flemington Rd, at Abbotsford Rd outside the Childrens Hospital. I am unsure whether I am supposed to stop halfway across or just hurry quicker. I have had a few incidents at this crossing.”

Collisions and near collisions

Two respondents had been involved in a collision while walking in this area. Both said they were hurt but did not require medical attention and the collision was not reported. Only one described the circumstances – "On shared footpath outside Childrens hospital, pathway running north, beside number 55 tram route" (outside the study area). This collision was with a cyclist, who was also hurt.

Three people said they had experienced near collisions with cars in this area. The circumstances were:

> "Racecourse Road, cars not stopping for red light" (outside the study area)."
>
> "Signaled, zebra crossing pedestrian crossing - cars often drive straight through."
>
> "Macaulay Road and Stubbs Street walked into car on crossing when pedestrian light was green."

Figure 15 – poorly aligned crossing at Bent Street

One person said they had been involved in a near collision with a truck – "Long semi-trailer turned left out of Stubbs St into Macaulay Rd at start of pedestrian audio crossing signal. Dangerous event for a white cane user, and hard on the nerves because I've been run over by a semi on a previous occasion."

One person said they had been involved in a near collision with a cyclist at a signalised intersection "near Vision Australia."

Site audit

The starting point for the audit was Macaulay Railway Station, but no issues were identified at this location.

At the intersection of Bent Street and Macaulay Road, power poles are located very close to crossing points and have the potential to be obstacles for pedestrians with a vision impairment (**point 1, figure 15**). Compounding this issue, kerb ramps are not completely aligned.

Vision Australia has an office at the intersection of Stubbs Street and Macaulay Road. A positive aspect of this intersection is the use of yellow colouring to highlight the pedestrian crossing (**point 2, figure 16**). A negative aspect is the poor alignment of TGSI, the crossing and the pram ramp. If a blind pedestrian follows the cue of the TGSI, they will walk down the edge of the crossing and potentially trip over or be confused by the raised median. If they follow the cue of the pram ramp they will walk into the middle of the intersection. The auditor suggested the pole on the south side of the intersection,

Figure 16 - pole obscuring view to the east at crossing of Macaulay Road, Stubbs Street

next to the Macaulay Road crossing, may obscure the view of traffic (**figure 17**).

This intersection was specifically identified as a problem by two survey respondents.

> "Intersection closest to Vision Australia heading towards Macaulay station. Often have semitrailers turning there and their tyres go onto the footpath where you would normally wait to cross."

> "Crossing the main road from Macaulay train station to Kensington Vision Australia."

Figure 17 – crossing of Stubbs Street from Macaulay Station to Vision Australia

On the footpath on the south side of Macaulay Road, east of Albermale Street, a street tree was growing into the path of travel outside 369-391 Macaulay Road. There was also a tripping hazard outside 369 Macaulay Road (**point 3**).

Outside 425 Macaulay Road the footpath appears to have subsided and has created a significant trip hazard (**point 4, figure 18**). There are also two double width access ways crossing the footpath at this point, introducing a potential conflict between vehicles and pedestrians. There is another notable commercial driveway at 451 Macaulay Road.

At the crossing of Eastwood Street, on the south side of Macaulay Road, the kerb ramps potentially direct pedestrians with a vision impairment into the centre of the intersection (**point 5, figure 19**). There are no TGSI on the eastern side of the street. The nearby crossing of Bellair Street presents similar issues.

The level crossing of the railway line on the south side of Macaulay Road presents significant problems as currently configured. This is a fairly complicated 'dog leg' configuration, but the minimal TGSI provided are set well back from the crossing and do not provide any useful direction for pedestrians who are vision impaired. There is a strong potential for them to walk off the crossing and into the railway tracks.

On the north side of Macaulay Road, there is a significant commercial accessway at 352 Macaulay Road which could potentially allow vehicle access at speed, presenting a risk to pedestrians. However the materials of the footpath cross the accessway, which makes this more acceptable.

There are no TGSI at the intersection with Barnett Street (**point 6**). On the western side of Barnett Street it is difficult to ascertain where the footpath ends and where the ramp begins. Even if there were TGSI, an uncontrolled crossing is undesirable given the location on a key route between the Vision Australia offices and the Kensington Railway Station and shops.

There does not appear to be any formalised crossing of Macaulay Road between the Stubbs Street signals and the pedestrian operated signals between Bellair and Gower Streets. This is a significant issue because there is no safe crossing opportunity for people walking to the

Figure 18 – footpath outside 425 Macaulay Road

Kensington Station and shops from the south east (areas east of Eastwood Street such as Hardiman Street).

At the Macaulay Road, Rankin Road, Eastwood Street intersection a pedestrian directional sign on the north-east side is damaged (**figure 21, point 7**) and would prevent a person from crossing at that location. There is an offset raised crossing located approximately 15 metres north up Eastwood Street from Macaulay Road, but there is no directional indication to guide people to the crossing.

In the audit of the Bellair Street shopping strip, some advertising and café seating was found in the path of travel. On the eastern side of Bellair Street, a tree was encroaching above the footpath. Unpaved areas around street trees present a possible trip hazard, but they are located adjacent to the kerb. However the biggest issue on Bellair Street is the lack of a pedestrian crossing between the railway station and the shops on the other side of the road. Anyone who is not confident in crossing at an uncontrolled mid-block crossing, including most people with a vision impairment, have the option of walking down to Macaulay Road in order to cross at the raised threshold, but there is no formal crossing opportunity between the railway station and the shops (**point 8**). Not only was this crossing need identified by two survey respondents, it was also identified as a hazard by one. For those who are vision impaired, pedestrian operated signals might be ideal, but a raised crossing is likely to operate more effectively in this location as able bodied pedestrians may ignore the signals, or activate them but then cross when there is a gap in traffic rather than waiting for the walk signal.

There is a pedestrian operated crossing of Macaulay Road between Bellair and Gower Streets (**point 9**). There are no TGSI on the north side of the crossing. Further west at the corner of Gower Street (outside Kensington Pizza) a loose utilities cover creates a tripping hazard.

The intersection of Macaulay, Kensington and Epsom Roads (**point 10**) is an unusual Y shaped intersection. Issues identified at this intersection included:

- Absence of TGSI at some crossing points.
- Audio tactiles on most crossing legs were not within arm's reach of a pedestrian waiting at the kerb ramp.

Figure 19 – pedestrian crossing of railway line, south side of Macaulay Road

Figure 20 – Poorly configured ramp and absent TGSI (other side of the road) at Eastwood Street

- A slower pedestrian may not have sufficient time to cross Kensington and Macaulay Roads with the signals.
- One audio tactile did not appear to be emitting sound during both the walk and wait phases, the volume of the slow phase was not audible above ambient noise on all legs and the fast phase was not audible from the middle of the crossing on all legs.
- Not all kerb ramps aligned with those on the other side of the road.

Conclusions and recommendations

The survey and audit have identified a significant number of issues in this area. The footpath between Vision Australia and Macaulay Station, including across the bridge, was not identified as a significant problem in the site audit. However the survey suggests that this is a significant concern for people with a vision impairment who walk in this area. That concern is understandable, because there is no separation between them and the traffic lane, so there is no margin for error in their walking. Victoria Walks does not usually support pedestrian fencing, but in this case it may successfully address a particular safety concern. Between the bridge and Stubbs Street, there appears to be an opportunity to reconfigure the footpath and use landscaping to provide a separation from Macaulay Road.

Figure 21 – damaged sign at Macaulay Road, Rankins Road, Eastwood Street

It should be noted that at end of May 2014, the Minister for Police and Emergency Services, announced the operation of a traffic safety camera at the intersection of Macaulay Road and Stubbs Street. The traffic camera was specifically installed at the request of Vision Australia to the Fixed Camera Committee, following a series of serious collisions in 2010 between vehicles and pedestrians with vision impairment at the intersection.

The absence of a crossing of Macaulay Road was raised in the survey and one respondent suggested a crossing "between Stubbs St and Barnett St (close to Barnett St)." From a broader pedestrian perspective, the crossing should be located as close as possible to Eastwood Street. If not, it may not be utilised by residents of Eastwood Street and the various streets that feed into it.

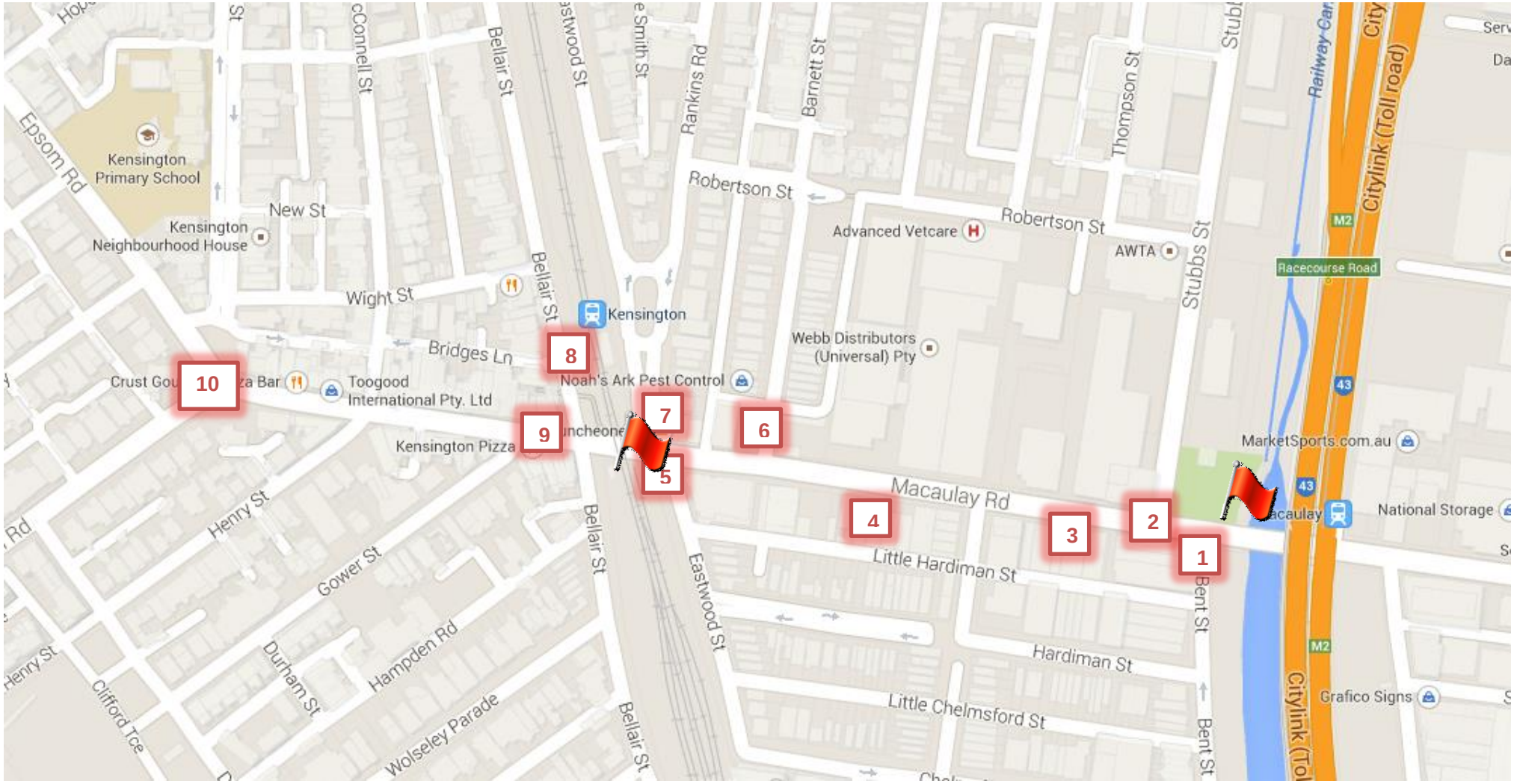
The survey results tend to validate the issue of poorly oriented pram ramps identified at a number of intersections in the audit.

Recommendations

1. Install pedestrian fencing between the footpath and the road on the north side of the Macaulay Road bridge, underneath Citylink. On the northern side of Macaulay Road between the bridge and Stubbs Street, rebuild the footpath and provide a landscaped separation between the footpath and the road.
2. Reconstruct the north-east corner of the Stubbs Street, Macaulay Road intersection, to ensure pedestrians waiting to cross are in a space protected from trucks that might mount the kerb, and that ramps and TGSI align to direct pedestrians with a vision impairment across the crossing appropriately.
3. Construct raised thresholds with appropriate TGSI across Bent, Eastwood and Bellair Streets at their intersection with Macaulay Road (south side).

4. Remake the footpath outside 425 Macaulay Road, in a manner that intuitively indicates pedestrian priority to drivers.
5. Construct a raised threshold with appropriate TGSI across Barnett Street at the intersection with Macaulay Road (north side).
6. Provide a pedestrian operated signalised crossing of Macaulay Road at Eastwood Street.
7. Install a comprehensive suite of warning and directional TGSI to guide pedestrians with a vision impairment across the railway line on the south side of Macaulay Road.
8. Replace pedestrian directional sign at intersection of Rankins and Macaulay Roads and install TGSI to direct pedestrians to the crossing of Rankin Road and Eastwood Street.
9. Enforce controls on café seating and signage to ensure a clear path of travel in the Bellair Street footpath.
10. Install a raised crossing at Bellair Street immediately opposite the entrance to the Kensington Railway Station.
11. Install TGSI at pedestrian operated signals on Macaulay Road between Bellair and Gower Streets and fix nearby utilities cover (corner of Gower Street outside Kensington Pizza).
12. Upgrade infrastructure for vision impaired pedestrians (audio tactiles, TGSI, ramp alignment) at the intersection of Macaulay, Kensington and Epsom Roads.

Kensington site map



Hawthorn/Kooyong

Survey

There was an excellent response to the survey in relation to this area, with 21 people indicating they walked most often in “Hawthorn – Glenferrie Rd from Toorak Rd to Glenferrie Station; streets next to Kooyong Station.” Seven had moderate vision loss, eight severe, one profound and five were totally blind.

The most common reasons for walking in the area were to visit Vision Australia (9 of 20 respondents), to use public transport (8), or work (7).

In relation to other road users, motorists failing to give way at intersections raised the most concern, with six (of 19 respondents) rating it a significant problem and nine a minor problem. Motorists failing to give way on the footpath was the next most significant issue.

In crossing at traffic lights in this area, absence of audio tactiles was rated a significant problem by 40% of respondents and a minor problem by 33%. Motorists failing to give way was rated a significant problem by 40% of respondents and a minor problem by 27%. ‘Not enough time to cross’ was rated a significant problem by a third of respondents and a minor problem by another third.

Once again, a substantial proportion of respondents indicated they did not cross at unsignalised intersection. Of the 10 people that answered:

- Eight rated ‘difficulty determining when it is safe to cross’ as a significant problem and the other two rated it a minor problem
- Five identified ‘volume of traffic’ as a significant problem and four as a minor problem.
- Four identified ‘speed of traffic’ as a significant problem and four as a minor problem.
- Four identified ‘motorists failing to give way’ as a significant problem and four as a minor problem.

Only six respondents answered the question about their experience in crossing, or wanting to cross, at places where there is no intersection or signalised crossing in this area. Notably, all of the potential issues identified in the survey were rated as a problem by the majority of respondents. Five of the six said ‘no pedestrian crossing where I cross or would like to cross’ was a significant problem.

One respondent indicated they would like a pedestrian crossing “Between Malvern vale hotel pub and shop on Malvern Rd near Merdieth St.” This is outside the study area.

In relation to footpaths and shared paths:

- Tripping hazards were rated a significant problem by 53% of respondents and a minor problem by 35%.
- ‘Difficulty in finding public transport stops or poor design of public transport stops’ was rated a significant problem by 47% of respondents and a minor problem by 35%.
- Obstructions on the path were rated a significant problem by 38% of respondents and a minor problem by another 38%.

In terms of overall concerns, all of the potential issues identified in the survey were rated as a problem by the majority of respondents, except for roundabouts, which are not a feature of this area. In particular ‘difficulty judging whether it is safe to cross’ was a significant problem for exactly 50% of the respondents and a minor problem for the other 50%. Obstructions or tripping hazards on the footpath was also an area of particularly strong concern, rated as a significant problem by 40% and as a minor problem by 53%.

Areas specifically identified as unsafe

Comments in relation to areas that were specifically unsafe included:

> "Need to be very alert all the time when travelling."
>
> "Car parks between roads that do not have defined paths of travel. Also, moving out of footpath area into road to access public transport (eg tram). As you age, your feet turn to jelly, and it reduces confidence in moving around."
>
> "Glenferrie Road near the station as many businesses have stands set up outside their shop on the footpath. I have young children and it is really hard trying to get a double pram through this area combined with other pedestrians going both ways on the same footpath."
>
> "Crossing Talbot Crescent and Kooyong train station."
>
> "Denbigh Rd & Avondale Rd" (outside the study area)."
>
> "Crossing Glenferrie Rd anywhere where there are no lights"

Collisions and near collisions

Six people said they had experienced near collisions, all with cars, in this area. Four described the circumstances:

- "Trying to catch a tram on Glenferrie Rd outside Vision Australia, tram heading south. I fell over backwards. A car passed the tram." The person was hurt, but did not require medical treatment.
- "Pedestrian crossing in Talbot Crescent. Vehicle proceeded through crossing while I was on the road section of the pedestrian crossing."
- "Car run over my both feet when they drove back out of their driveway, while I walked slow on path in late evening."
- One person said they had been involved in a near collision at a signalised intersection "Continue of Riversdale Rd & Elgar Rd."

Site audit

Glenferrie Road is a tram route and a range of issues were identified at tram stops. At tram stop 64 on the eastern side of Glenferrie Road just north of Mernda Road, there is a pole sign identifying the stop, but no TGSI or other tactile indicators and no paving across the nature strip. The tram stop on the western side of Glenferrie Road, a little further south has the same problems (**point 1** on site map). Other tram stops along Glenferrie Road also did not have appropriate TGSI, including stop 67 at Gardiner Street, stop 68 at Callantina Road and stop 69 at South Street. All of the tram stops are traditional stops where pedestrians have to enter a tram from the roadway and are reliant on drivers to give way to them.

Figure 22 – poorly maintained footpath, corner Glenferrie and Toorak Roads

At the intersection of Glenferrie and Toorak Roads (**point 2**), the footpath on one corner is poorly maintained, creating a trip hazard at a particularly dangerous location (**figure 22**). At another corner the TGSI are in poor condition and need to be replaced.

Large tree branches were growing over the footpath at 402 Glenferrie Road (**point 3**). This was also recorded as a problem north of the Freeway (**figure 24**).

At Monomeath Ave (western side of Glenferrie Road) there are no TGSI or other facilities to support crossing. This is a common issue, recorded at other side streets as they meet Glenferrie Road, including Monaro Road.

On the western side of Glenferrie Road, the level crossing of the railway line is problematic (**point 4**). There is a 'dogleg' in the crossing meaning that blind pedestrians approaching from the south (crossing Warra Street) are likely to walk into the railway crossing sign (**figure 23**). The level crossing of the railway line on the eastern side of Glenferrie Road is relatively straightforward but could be improved with the introduction of directional TGSI to guide people across.

At the entrance to the Vision Australia offices at 454 Glenferrie Road (**point 5**), there are 2 two-way vehicle access points. There is one clearly defined pedestrian access point, but otherwise there are no TGSI to warn of the accessways and no road or driveway treatments that force vehicles to slow. This arrangement provides excellent vehicle access, but is a poor environment for pedestrians who are blind or have low vision. It does not appear to be necessary to have this number of vehicle access points for the on-site car parking. The situation is compounded by another two-way vehicle access immediately to the north, serving the parks and other facilities in this area.

Figure 23 - poor alignment of road and railway crossings, Warra Street

There is a tram stop outside Vision Australia and another (for trams heading north) on the opposite side of Glenferrie Road. However there is no crossing of Glenferrie Road that would allow a pedestrian with a vision

impairment to safely access that stop. A crossing at this location would have the added benefit of providing a safe crossing for patrons of the tennis centre to access the stop outside Vision Australia.

There is a pedestrian operated signalised crossing of Glenferrie Road underneath the Monash Freeway. TGSI on the eastern side of the road were in very poor condition.

On the eastern side of Glenferrie Road underneath the Freeway is a shared path. Further north (**point 6**), the footpath is not divided but appears to be signposted as a shared path. However there were no symbols on the path and the pole signage of the shared path seemed to be limited. Nonetheless the path was certainly utilised by cyclists, with the volunteer auditor recording three on the path in just a five minute period and observing "cyclists come at high speed." The volunteer auditor recorded the width of the path as 1.5 metres, well below the minimum 2 metre width for a shared path (VicRoads Cycle Notes 21). Shared paths present problems for pedestrians with a vision impairment, even when they are well-designed.

Figure 24 – overhanging branch, east side of Glenferrie Road, between Callantina and Riversdale Roads

At Gardiner Road, there are no TGSI to identify the crossing point, which is relatively wide and has no pedestrian refuge or any other infrastructure to assist crossing. In the opinion of the auditor, the grade change at the ramp had the potential to cause someone to stumble. However traffic on this street appears to be relatively light. The tram stop on the western side of Glenferrie Road, opposite Gardiner Road (**point 7**), has fencing adjacent to the pole where people would normally wait to board, blocking access between the road and the footpath at the stop. This is a potential hazard for pedestrians with a vision impairment, who may be prevented from accessing the footpath after disembarking from a tram.

At Wellesley Road, the footpath continues across the street, which is cobbled with bluestone. This provides a good intuitive signal to drivers that they should watch for pedestrians. Unfortunately however there are no TGSI to alert a blind pedestrian to the fact that they are about to cross a road. A similar situation occurs further north at Lisson Grove.

At the intersection of Callantina and Glenferrie Roads (**point 8**), there were no TGSI and pram ramps did not align with the other side of the road, but headed into the centre of the intersection. The same problems are found at the intersection of Riversdale and Glenferrie Roads (**figure 26**) and the crossing of Hawthorn Glen (**figure 25**). An associated problem is kerb radii that allow vehicles to turn the corner at speed.

There is a tram stop immediately north of Riversdale Road, on the eastern side of

Figure 25 – poorly oriented kerb ramps, and corners that allow higher speed turning, Hawthorn Glen

Glenferrie Road (**point 9**). At this stop a mixture of fencing, bins and café furniture clutter the space and limit the potential for pedestrians to access a tram on the road. This combination of features is a potential hazard for pedestrians with a vision impairment, who may be prevented from accessing the footpath after disembarking from a tram.

At the intersection of Urquhart Street, a pedestrian refuge assists crossing, but there are no TGSI.

On the western side of Glenferrie Road just south of Manningtree Road (**point 10**), a 7-Eleven service station has two double width accessways onto the street, providing potential for vehicles to enter at speed, presenting a risk to pedestrians. The northern entry/exit coincides with a tram stop – effectively encouraging passengers to wait in the vehicle access.

Vehicles exiting Luton Lane (**point 11**) have no visibility of pedestrians on the footpath, especially those approaching from the south, until they are on the footpath.

There are no TGSI at the crossing of Wattle Road or at Burwood Road, which is a major signalised intersection.

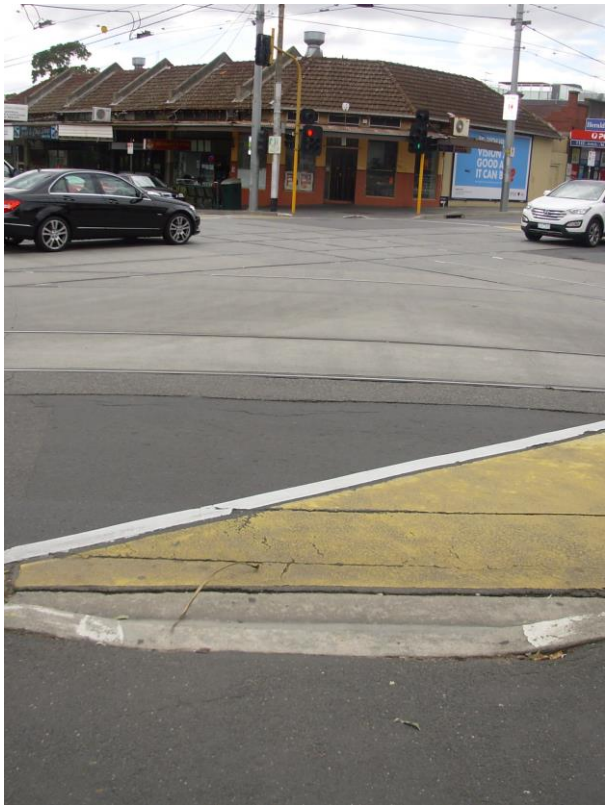


Figure 26 – kerb ramps oriented towards the centre of the intersection, rather than the direction of the crossing (highlighted in yellow), corner Riversdale and Glenferrie Roads

Conclusions and recommendations

Glenferrie Road is a tram route and all the stops in the audit area are traditional stops, where pedestrians have to venture into the road to access a tram. This is a particularly hazardous scenario for a person who is vision impaired. One of our correspondents acknowledged that tram drivers did their best to assist, but in doing so, they highlighted the extent of the risk in this situation.

> "The tram drivers are also extraordinarily helpful in shielding blind riders from harm as they negotiate the frightening dangers between tram and curb."

We have made some recommendations that address particular problems at existing stops, but this should be a priority area for a general upgrade of stops to meet contemporary access standards.

The shared path on the eastern side of Glenferrie Road north of the freeway is an exceedingly poor piece of infrastructure and hazardous to pedestrians with a vision impairment. It is entirely inappropriate that a standard width footpath should be signposted as a shared path, given the likelihood that people who are blind or have low vision will be walking in this area. The intersections where pram ramps are oriented towards the centre of the intersection rather than aligned with the crossing are also particularly hazardous.

Recommendations

1. Create a paved area and install directional and warning TGSI at tram stop 64 (both sides of Glenferrie Road) to provide a clear and appropriate place to wait for a tram.

2. Install appropriate TGSI at all tram stops along Glenferrie Road between Toorak Road and Wakefield Street, including stop 67 at Gardiner Street, stop 68 at Callantina Road and stop 69 at South Street.

3. Install appropriate TGSI at the crossing of all side streets that intersect with Glenferrie Road between Toorak Road and Wakefield Street, including Monomeath Ave, Urquhart Street, Lisson Grove, and Monaro, Wattle, and Wellesley Roads.

4. Install a comprehensive suite of warning and directional TGSI to guide pedestrians with a vision impairment across the railway line on both sides of Glenferrie Road at Kooyong Station.

5. Close one of the vehicle access points to the Vision Australia offices at 454 Glenferrie Road.

6. Install speed control devices and threshold treatments to accentuate the need to give way to pedestrians on the footpath, at all remaining vehicle entrances to Vision Australia, and at the vehicle entrance to the parklands immediately to the north.

7. Upgrade the tram stops outside the Vision Australia offices at 454 Glenferrie Road to provide quality access for passengers with a vision impairment. As part of this upgrade, provide a safe crossing of Glenferrie Road.

8. Replace TGSI on the eastern side of the pedestrian operated signalised crossing of Glenferrie Road underneath the Monash Freeway.

9. Close the footpath to cyclists on the eastern side of Glenferrie Road, north of the freeway. If this is not possible, construct a separated off-road cycle path to run parallel.

10. Remove pedestrian fencing on the south side of the pole sign at the tram stop on the western side of Glenferrie Road opposite Gardiner Road.

11. Remake kerbs to provide appropriately oriented kerb ramps and install TGSI where Glenferrie Road meets both Riversdale Road, and Callantina Road.

12. Install a raised threshold with appropriate TGSI across Hawthorn Glen at its intersection with Glenferrie Road.

13. Rationalise street furniture at the tram stop immediately north of Riversdale Road, on the eastern side of Glenferrie Road, to provide a clear path between the footpath and a tram on the road.

14. Provide threshold treatments at the 7-Eleven service station on the western side of Glenferrie Road, just south of Manningtree Road, to limit the potential for vehicles to enter at speed and accentuate the need to give way to pedestrians on the footpath. The northern accessway should be narrowed to avoid conflict with the tram stop, or the stop should be upgraded and/or relocated.

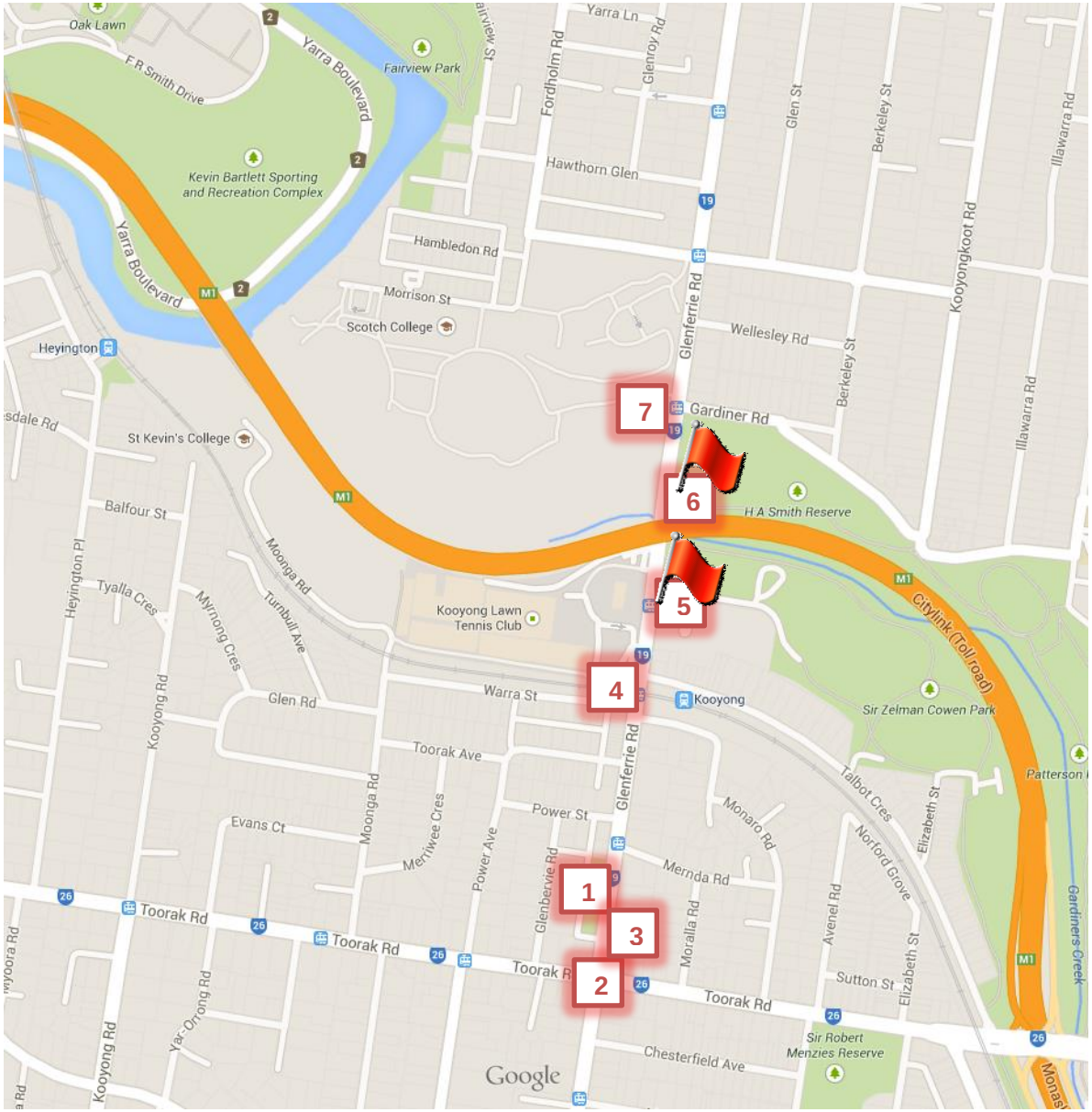
15. Install speed control device at the entrance to Luton Lane, where it meets Glenferrie Road.

16. Install TGSI at all crossing points of the Burwood and Glenferrie Roads intersection.

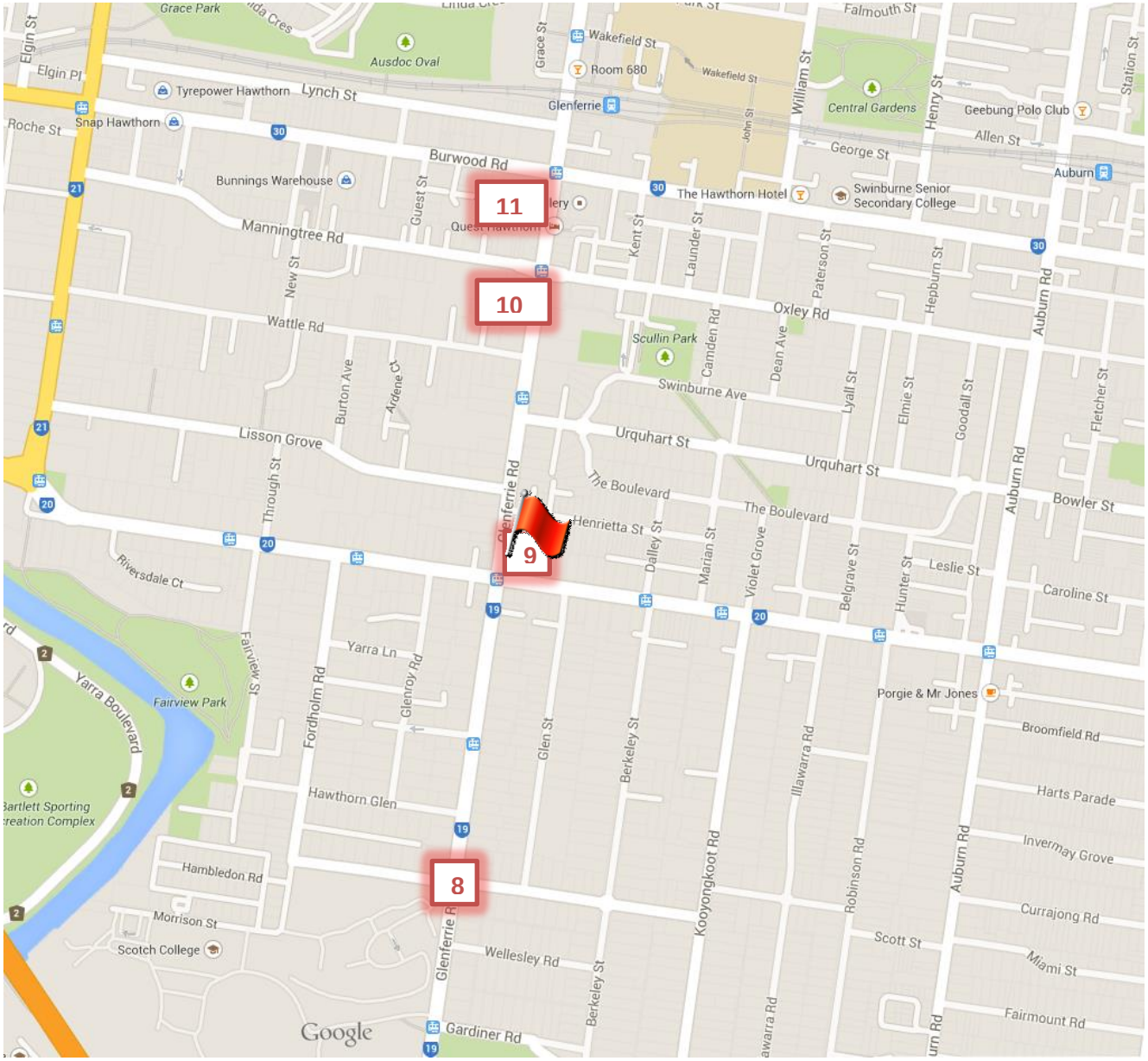
17. Undertake regular pruning of vegetation intruding into the path of travel along the footpath of Glenferrie Road, between Toorak Road and Wakefield Street.

18. In the medium term, upgrade all tram stops along Glenferrie Road between Toorak Road and Wakefield Street to be provide appropriate access for passengers who have vision impairment at contemporary standards.

Hawthorn/Kooyong map (southern section)



Hawthorn/Kooyong map (northern section)



General study conclusions

The survey results highlight the issues pedestrians who have impaired vision face when they are walking, particularly at non-signalised crossings. Many respondents indicated they did not cross at non-signalised intersections or crossings in the study areas, but given that the majority of intersections are not signalised, this severely curtails the potential to walk.

Another strong theme emerging from the survey is concern around driver behavior and motorists failing to give way at intersections or when crossing the footpath. This is acutely felt by pedestrians who are vision impaired, but is also a broader issue for walkers. Research by the Transport Accident Commission (*Exploring the Pedestrian Crash Problem from the Perspective of Injured Pedestrians*) suggests that the majority of collisions impacting pedestrians are the fault of the driver. Giving way to pedestrians when required should be a focus of road user education programs and advertising.

Figure 27 – raised threshold

These issues can also be addressed through infrastructure. We have recommended that raised thresholds (**figure 27**) be installed at various unsignalised intersections, because they provide a visual signal to drivers that pedestrians have priority and ensure low speeds at crossing points. This goes some way to address the problems faced by pedestrians with a vision impairment at unsignalised crossings and in dealing with motorists. If successful in the locations we propose, we would recommend a broader roll out of raised thresholds along streets that are well utilised by pedestrians who have impaired vision. Where there is a need for pedestrians with a vision impairment to cross arterial roads, pedestrian operated signals should be installed.

An issue commonly raised by volunteer auditors as a concern was cars parking close to intersections and other obstructions to visibility at crossing points. It is difficult to validate these concerns, so we have not generally made any recommendations in response. We have also tended to focus more on traffic hazards. There will be additional trip hazards beyond those we have explicitly identified, and the survey results confirm that this is a serious concern for those who are blind or have low vision.

A common issue was poor kerb ramp design that would potentially send pedestrians with a vision impairment into the road. Similarly, differences between the width of the crossing and the width of the pram ramp – a potential trip risk – is so common as to be the norm, so we have not identified specific examples of this. These may be issues that need to be addressed in broader engineering standards or practice.

A diverse range of recommendations have been made, specific to each study area. We have endeavoured to limit recommendations to priority issues or those that should involve minimal cost. It is perhaps a conservative approach and there is certainly an argument that more should be done. For example, we have not generally proposed additional mid-block crossings unless we see an acute and identified need, even though the evidence suggests that pedestrians who have impaired vision will find it difficult to cross many roads without them. Similarly we have not recommended any broad reduction in speed limits, even though traffic volume and speed is clearly a problem for those who have impaired vision.

Our recommendations to address site-specific problems are preliminary suggestions based on our general understanding of the problem and potential solutions. Audits and analysis were not conducted by traffic

engineers. More detailed site-specific analysis and consideration of alternative solutions may be warranted in some cases.

Overall, a broad range of road and pedestrian safety issues were identified by this audit and survey activity, which contribute to better understanding of the relative complexity of the built environment and road safety systems which pedestrians with vision impairment are required to navigate in order to access employment, education, social and economic activities.