WALKABILITY IMPROVEMENT TOOL

A DECISION-MAKING GUIDE FOR NEIGHBOURHOOD ENHANCEMENTS

Queensland Treasury

Planning Group

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Foreword

It gives me great pleasure to provide our support to this new Walkability Improvement Tool for Built Environment Professionals.

This tool together with the Model Code for Neighbourhood Design and the new assessment benchmarks in the Planning Regulation 2017, facilitate the urgent need for change to address the major public health problem of physical inactivity.

Heart disease remains the single leading cause of death in Australia with one death every 28 minutes. Physical inactivity contributes over 20 per cent of the burden of heart and blood vessel disease in Australia and so investing in solutions that address rising inactivity levels should be a priority.

Walking improves our physical and mental health and is particularly good for our heart health. Walking also enhances social connection, with people moving more slowly through their communities than when they drive. While walking, we often stop to chat and to make purchases at local businesses. When we choose walking over driving, it reduces pollution and traffic congestion.

Our communities need to be much more 'walkable' for all ages and abilities. A walkable community is one where people feel safe to walk in their neighbourhood, and where they work and play.

As the COVID-19 pandemic has clearly demonstrated, the liveability and walkability of our local neighbourhoods matters for our overall health and wellbeing. We need coordination and connectivity to make our communities more 'walkable'. More than ever, it is important for people to be able to get out into open spaces easily, to walk, ride and play (while continuing to practice social distancing when needed).

Overcoming the many barriers to physical activity requires a response across society, led by governments and implemented at the community level. The Walkability Improvement Tool is representative of this action. It is a fabulous resource to help Built Environment Professionals address the Walkability of local areas, so that walking and other physical activities can be the easy choice for residents to be more active, more often in their neighbourhoods.

We commend and welcome this Queensland Government initiative and are delighted to be able to encourage its use across Queensland.

Adj Prof John G Kelly AM

Group CEO
National Heart Foundation of Australia

Heart Foundation

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1.0 Introduction

Government policies are highlighting the need for residential neighbourhoods to be more pedestrian-friendly or 'walkable'. In response, planning requirements for new developments to be more walkable continue to evolve.

Queensland's planning framework encourages the creation of walkable neighbourhoods. Local government's play a key role in approving future walkable neighbourhoods and improving the walkability of established communities.

Unfortunately, many existing residential neighbourhoods are not conducive to walking. Retrofitting existing environments to improve walkability requires a significant investment involving many challenges. These challenges are not insurmountable with the potential return on those investments up to 13-fold[1].

Some local governments in Queensland may have already developed, or are currently developing, methods of identifying and prioritising walkability improvements. The goal of this document is to complement these existing methods by providing a tool to effectively and efficiently identify and prioritise walkability improvements.

Where only limited funding is available to make walkability improvements in existing neighbourhoods, a pragmatic and prioritised approach is required to identify and implement walkability improvements. Ensuring a greater return on investment is the overarching driver of the methodology outlined in this tool.

2.0 Purpose of the walkability improvement tool

This walkability improvement tool provides built environment professionals with a methodology to identify and prioritise walkability improvements in existing neighbourhoods.

This tool offers a systematic approach to determine how pedestrian-friendly an existing residential neighbourhood is. It also provides guidance on how to achieve a cost-effective approach to implementing improvements as, and when, funding becomes available.

The walkability improvement tool concludes with steps to align recommendations for improvements with budget commitments. Every level of government has a responsibility to ensure it delivers a greater return on investment when spending public funds. This tool will assist in delivering this important objective.

1 Badawi, Y, Maclean, F, and Mason, B, 2018, The economic case for investment in walking. Victoria Walks, Melbourne.

3. Defining the street

The term ‘street’ is used throughout this tool. For the purpose of this tool the term ‘street’ is used to refer to the area between opposing property boundaries. The street therefore includes the verge, footpaths, carriageway and street trees, as illustrated below.

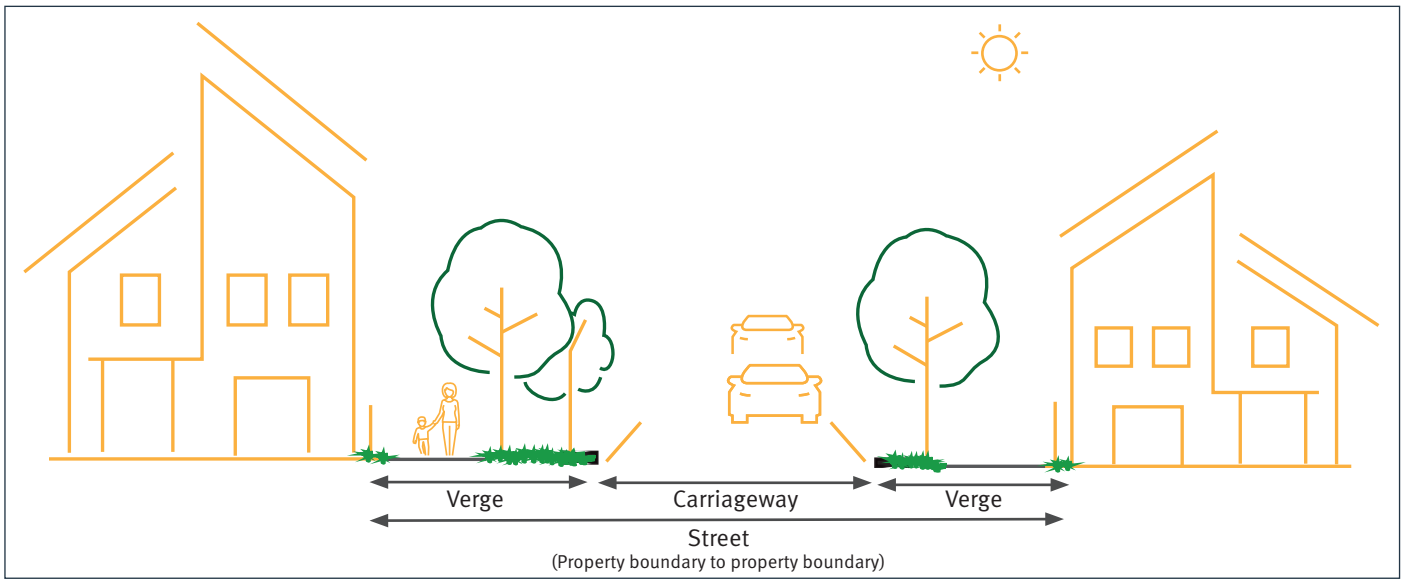


Figure 1: Definition of street used in this document

3. The retrofitting challenge

Many Queenslanders are living in established communities which are unwalkable, with few footpaths, unconnected street layouts and few street trees to provide shade and shelter. Consultation undertaken by the Department of Transport and Mains Roads in preparing the Queensland Walking Strategy 2019 – 2029, highlighted that people walk for a variety of reasons including:

- for health and well-being
- for relaxation and recreation
- as a transport option for short trips.

A walkable neighbourhood is one that caters for a broad spectrum of community members. People with prams, school children, people living with a disability and seniors should all feel comfortable and safe walking around their neighbourhood.

The physical characteristics of neighbourhoods strongly influence whether people choose to walk or not. Key factors that deter people from walking include inadequate or no footpaths, safety concerns, insufficient shade, very long blocks and street networks that are difficult for pedestrians to navigate.

4. Walking safety in Queensland

In Queensland 70 percent of pedestrian fatalities occur in speed zones 60 kilometres per hour or lower and 35 percent of fatalities occurred during daylight hours[2]. Distraction has become more of a risk to both drivers and pedestrians since the invention of the smartphone.

Recent research in Queensland showed that 32 percent of 18-30 year olds reported texting and 27 percent used the internet at high frequency levels while crossing the road[3]. These statistics emphasise the importance of safety as a principle of walkability.

Separation of pedestrians from traffic is important in creating safer walking environments. Retrofitting footpaths on verges, to create this separation, will reduce the number pedestrians forced to walk on the carriageway. Footpaths are key in improving pedestrian safety and walkability in neighbourhoods.

5. Design principles for walkability

This walkability improvement tool focuses on practical opportunities to improve walkability in established neighbourhoods. Key design principles to guide walkability improvements in existing neighbourhoods include:

- **Functionality**
  - well-maintained, intact footpaths free from trip hazards
  - footpaths installed on at least one side of every street, ideally a minimum of 1.5 metres in width
  - directional and distance signage provided where appropriate and possible
  - footpaths with kerb ramps at all crossing points to accommodate prams, wheelchairs, etc.
- **Comfort**
  - frequent trees planted at least every 15 metres, where possible, to provide shade cover along pathways accounting for the Queensland climate
  - seating that provides opportunities to rest between destinations
  - pathways that are highly visible, and afford passive surveillance from motorists, residents and other users of the neighbourhood.
- **Safety**
  - safe street crossings, with good visibility and sightlines, are provided where pedestrian safety is at risk
  - adequate lighting is provided for pathways that are likely to be used at night
  - separation of pedestrians from traffic, wherever possible
  - maintenance of vegetation in proximity to paths and desire lines to allow for clear site lines. Vegetation managed and trimmed between knee and head height in accordance with Crime Prevention through Environmental Design (CPTED) principles.[4]

2 https://www.tmr.qld.gov.au/-/media/aboutus/corpinfo/Media/statements/Pedestrian-fatalities-within-QLD-2017.pdf
3 https://research.qut.edu.au/carrsq/wp-content/uploads/sites/45/2017/12/Pedestrian-Safety-print-1.pdf
4 Crime Prevention through Environmental Design, http;//www.police.qld.gov.au/sites/default/files/2018-08/CPTEDPartA.pdf.

The design principles listed above can be used as a starting point to evaluate how walkable an existing neighbourhood is. In certain circumstances, only some of these design principles will be able to be implemented or improved due to the challenges of installing improvements within an existing environment. For example, major structural changes to existing street and block layouts, changes to land uses and privately-owned properties are rarely feasible.

Attributes of the existing neighbourhood can limit the potential for changes to improve walkability. These can include:

- width of the verge
- crossfall of the verge
- obstructions such as:
  - mature trees and existing vegetation
  - infrastructure including **padmount** substations, drainage and culverts, public transport infrastructure.

Established street trees can inhibit the installation of walkability improvements in existing neighbourhoods, as demonstrated below in Figure 2.

Figure 2: Example of a street tree on the verge that would prevent the installation of a footpath or street lighting

The physical condition of verges without footpaths can deter many people from walking in their neighbourhoods. Verges that are obstructed or not well-maintained (as presented below) may deter people from taking a trip on foot or force them to walk on the carriageway. While safety is an important factor, access to good footpaths is a prerequisite for encouraging people to walk.

The physical condition of verges may also impact the viability of a new footpath or other improvement options. For example, the location of mature trees or large stumps may prevent a new footpath from being installed. However, temporal aspects such as cars parking on verges or overgrown vegetation would not automatically preclude installing footpaths, lighting or other recommended improvements.

Example 1: Stormwater drain prevents installation of footpaths

Example 2: Tree obstructing footpath extension

Example 3: Narrow width of verge prevents installation of footpaths or lighting

6. Walkability improvement tool

This walkability improvement tool will help to analyse how walkable an existing neighbourhood is. The tool also provides a methodology to assist in developing a list of recommendations to improve walkability within a defined study area.

The methodology outcomes can then be used to form part of a pitch for funding or to fit within an allocated budget.

The tool provides for the analysis of walkability for two main project types:

1. improving walkability to and from a specific site (for example: a school, local centre or railway station). Steps 1-9 are applicable.
2. improving walkability conditions within a specific area (for example an area of an established neighbourhood). Steps 1-2 and Steps 5-9 are applicable.

How to use this tool – a case study from Rockhampton

Appendix 1 contains a case study that illustrates how this tool can be used. The case study undertakes Steps 1-9 to identify and prioritise walkability improvements for a project with a specific site and focal point.

This case study is based on a school in the neighbourhood of Frenchville in Rockhampton. This location was chosen as it is in a well-established area and illustrates a range of the considerations and limitations that need to be considered when planning to improve walkability in existing residential neighbourhoods.

For the purpose of this tool, the case study is based on the assumption that walkability improvements will increase the number of children walking to and from the local school. The case study is used to work through a practical example of using the tool and focuses heavily on the desired standard of footpaths, which are fundamental to improving walkability.

The case study also demonstrates how the methodologies in this tool can assist in prioritising walkability improvements with a limited budget.

Step 1 - Identifying the purpose of the project and the primary audience

The aim of Step 1 is to identify the purpose of the project, which involves establishing:

- the project objective
- the primary audience intended to benefit from the walkability improvements.

Define project objectives

When using this tool, the primary objective for undertaking the analysis of walkability should be established. Clarifying the objective will guide the prioritisation of improvements in later steps. For example, the objective could be:

- to provide walkability improvements within a general area of a neighbourhood
- to increase walkability around a focal point:
  - to and from a school or other education facility
  - to and from a local shopping precinct
  - to and from high capacity public transport nodes
  - to and from community services
  - to and from local parks; or
- a combination of the above.

Identify the primary audience

Clarifying the project objectives will enable the primary audience to be identified. This audience will be the sector or sectors of the community that the project is aimed at assisting. For example, if the purpose of the project is to increase walkability to and from a public transport node, the primary audience will be the locals that use that node. This could include commuters, students and others. Some of this audience will likely walk from the node to their houses when it is dark. This highlights the need to consider lighting as a priority for this audience, particularly in winter months.

It is important to note that any walkability improvements implemented will also benefit the broader community. For example, improved walkability for school children to and from a school will improve walkability within the neighbourhood for all community members. Once the purpose and the primary audience of the project has been identified, a study area map will be prepared to inform subsequent steps.

Step 2 - Identifying the study area

The purpose of Step 2 is to prepare a map illustrating the project area boundary or any focal point(s) for the project area.

Step 2 provides two options to identify the study area. These options reflect the two primary types of projects:

a) improvements within a general area of a neighbourhood

b) improvements around a focal point.

Improvements within a general area of a neighbourhood

The methodology for this type of project is relevant where a funding program or corporate commitments have been given to deliver improvements within a defined area.

Step 2 for this type of project will involve identifying and mapping the area for which the analysis will be undertaken. In order to narrow the scope of the study, a radius can be marked around the identified area, for example, a 400 metre radius equates to an area of 50 hectares. This will not be necessary where the project has a clear area identified, given the analysis area will already be limited.

The outcome of this task will result in the study area map being prepared around the area for general improvements. For this type of project, go to Step 5 as the next step.

Improvements around a focal point

The focal point option should be chosen where the purpose of the project is to implement improvements to and from a particular area or node. This task involves preparing an initial radial map of the project area, using a walkable catchment or 'ped shed'.

A ped shed is an analysis which maps the walkable catchment from a specific point. This methodology defines the walkable catchment as the area covered by a median five or ten minute walk to or from a destination.[5]

A ped shed analysis will be set around an identified centre of interest, or focal point. The purpose of the walkability analysis (e.g. increase walkability to a school, park, etc.) is used to define the logical centre i.e. the focal point of the study area. This involves:

- selecting a preferred site (e.g. school, train station, shops) on a map and mark the site boundary
- identifying the main point(s) which pedestrians will use to access the site (e.g. main entrance to a school, multiple entrances to a shopping centre), these will become the focal point(s)
- draw a radius around the focal point(s). This could result in multiple radii being produced for one centre of interest. For example, a large shopping centre with multiple entrances will have a number of radii, this may result in overlapping of radii and may not include the shopping centre site itself.

5 Active Communities, http://www.activehealthycommunities.com.au/plan/gis-analysis/walking-cycling-pedshed-analysis/

The radius size will change depending on the focal point of the analysis:

- if the focal point is a high-capacity public transport node, it is recommended that a ten minute walking distance is used
  - this should be marked with an 800 metre radius around this focal point (resulting in a study area of 200 hectares)
- if the focal point is another activity (e.g. school), it is recommended that a five minute walking distance is used
  - this should be marked with a 400 metre radius around the focal point (translating to a study area of 50 hectares)

This task will result in the first study area map, identifying the site area and a study area radius around the focal point (Figure 3).

For further guidance refer to **Step 2** of the case study in Appendix 1.

Figure 3: Identifying a 400 metre radius around a focal point

Step 3 - Identifying the walkable catchment

The aim of Step 3 is to identify the walkable catchment around the focal point.

Using the map prepared in Step 2, measure along all existing pedestrian walking routes using the nominated distance identified in Step 2 (i.e. 400 metres for a five minute walking distance) to map all available routes for pedestrians. This step can be done by using the measuring tool available on Google Earth Pro.

The pedestrian routes will generally follow the street network and via parks and publicly accessible open space (Figure 4).

At this point, areas for exclusion from further investigation may be identified. For example, an industrial area in a quarter of the radius will be excluded from further investigation when the primary audience is school students walking to and from a school. Ensure all considerations and rational are recorded for each step, especially when excluding areas from investigation and when refining the study area (Figure 5).

Figure 4: Identifying walkable routes

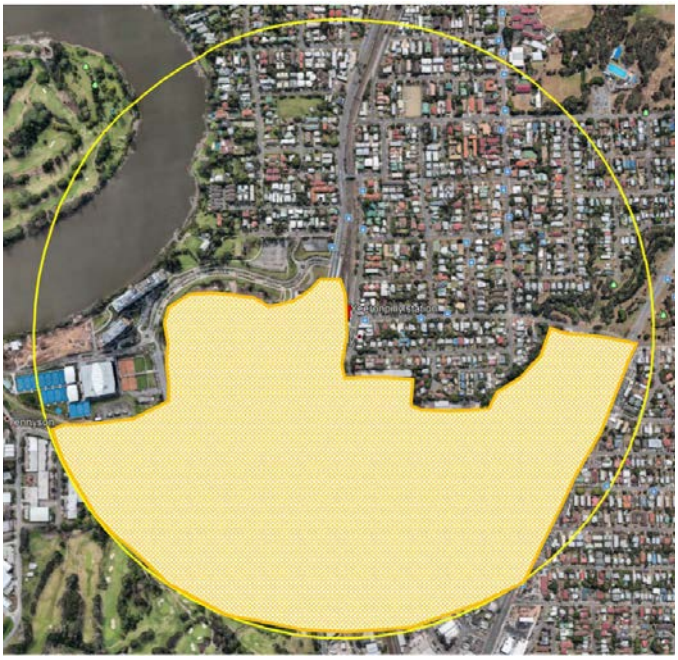


Figure 5: Excluding industrial area from further investigation

Once the walkable catchment routes have been identified, dwellings along the routes can be identified. To do this, use the identified pedestrian routes and shade the areas that represent residential dwellings adjoining the identified routes. This task helps to understand the potential number of end users that will benefit from improvements within the identified study area (Figure 6).

The outcome of this task will result in a refined study area map. This will inform the preparation of the final study area map.

For further guidance refer to **Step 3** of the case study in Appendix 1

Figure 6: Shading dwellings along identified routes

Step 4 - Preparing final study area map

The purpose of Step 4 is to prepare a map that depicts the final study area. This map will inform the detailed desktop and field analysis.

The final study area map is prepared by creating a subset of the study area. This will focus the attention on the improvements most critical to enhancing walkability to and from the focal point.

In order to prioritise areas that will provide 'bang for the buck' improvements, a smaller radius should be identified around the focal point. This is done by mapping a smaller catchment area, for example, a 200 metre radius is likely to yield the highest number of end users, to improve walkability to the focal point.

The refined radius can be assessed in terms of how many lots or dwellings have direct access to the pathway. This will inform which pathways yield the highest catchment and will be more effective in achieving walkability.

This information can be used to prioritise pathways that should be retained in the final study area. High yield catchment pathways should be prioritised and retained. Pathways that represent a lower yield can be removed from the final study area. Removing pathways from the final study area should be determined on a case-by-case basis. Considering the number of end users that would likely benefit from improvements. This information can also be used when prioritising specific improvements. This is outlined in Step 9.

At this point, it may also be appropriate to expand the study area, based on the outcomes of the yield analysis. If there are areas outside of the pathways identified that are likely to be more effective in achieving walkability, the map should be expanded to include these areas. This could include, for example, analysis of enrolment data if the study area involves a school as the focal point.

Figure 7 depicts 200 metre radii around a focal point. In this instance, it may be appropriate to extend the pathways to meet the boundaries of the 200 metre radii. Doing this will increase the catchment of end users likely to walk to this focal point.

The final study area map prepared in this step will be used as the basis for the detailed desktop and field analysis.

For further guidance refer to **Step 4** of the case study in Appendix 1.

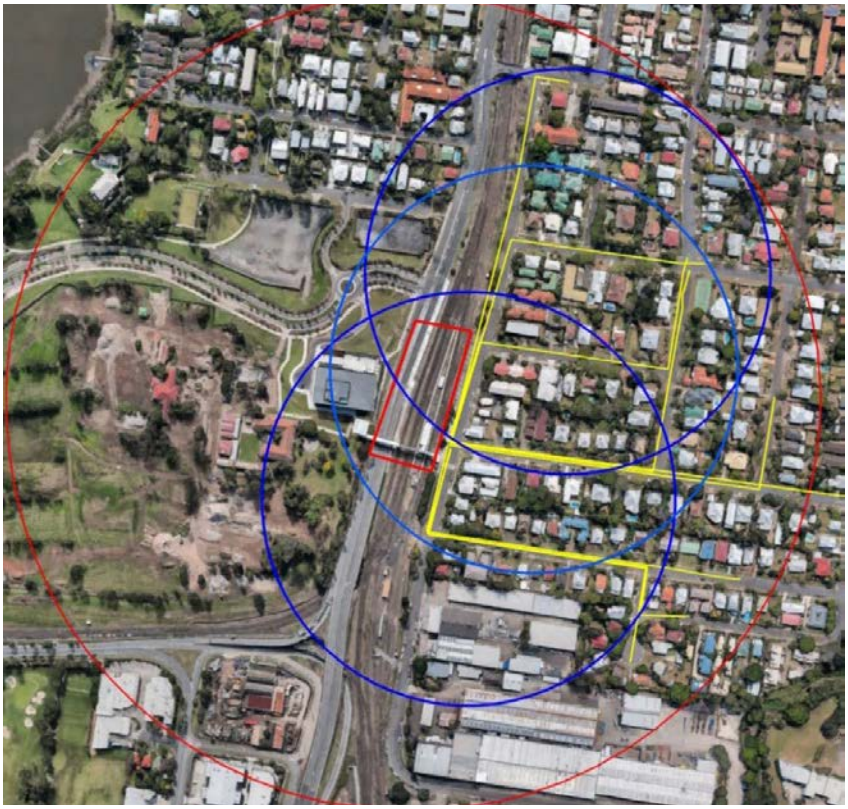


Figure 7: Identifying 200 metre radii around the focal point

Step 5 - Undertaking the detailed desktop analysis

The purpose of Step 5 is to undertake a desktop analysis of the study area.

Walking and driving to undertake field analysis of a study area can be time consuming. In order to undertake the field analysis efficiently, it is recommended that some prior analysis of the study area is undertaken using readily available desktop tools. Aerial mapping platforms such as google maps or nearmap, plus their associated street view capabilities, provide the ability to undertake a limited, desktop analysis of the study area.

Although there are a number of aspects that contribute to improving walkability, the pre-requisite to create a walkable environment is footpaths. A walkable neighbourhood should have:

- footpaths installed on at least one side of every street
- footpaths having kerb ramps at all crossing points to accommodate all users (e.g. example users with prams or walking aids)
- well maintained footpaths free from trip hazards and overgrown vegetation.

Footpaths should be the primary focus of the desktop analysis and should consider:

- existing footpaths within identified pathways
- high level condition analysis of identified footpaths
- identifying footpath 'gaps' along pathways (i.e. where there is not at least a path on one side of every pathway).

Other considerations for the desktop analysis are:

- street lighting locations
- existing shade trees or appropriate locations to plant proposed shade trees
- kerb ramps
- particular 'hot spots' or locations for targeted field analysis
- particular streets or locations that may not warrant field analysis (e.g. industrial areas)
- route planning, such as indicating the sequence of streets and routes to be accessed during the field analysis.

The desktop analysis is primarily used to prepare an annotated plan or map of the study area. This will then be used to efficiently guide field analysis and should always be followed up on ground investigations. Even the best available desktop tools have limitations in terms of resolution and currency of available imagery.

Images of the information collected during this step should be taken (Figure 8) and annotated on the Final Study Area Map prepared in Step 4.

For further guidance refer to **Step 5** of the case study in Appendix 1.

Figure 8: Using street view tools to undertake desktop analysis

Step 6 - Preparing for the field analysis

Prior to commencing the field analysis it is essential to undertake the necessary planning and preparations, including:

- confirming the study area
- confirming available field analysis resources (for example is the task being undertaken by a team, an individual, an individual with a driver etc.)
- making provision for relevant workplace health and safety items (sunscreen, hats, high visibility vests, water, appropriate footwear etc)
- ensuring all relevant equipment is available to undertake the field analysis
- outlining a field analysis logistics plan, this should consider:
  - time of day for analysis
  - outline the routes to be taken.

The final study area map should be used as the starting point for the field analysis. This map will be annotated with the information gathered when undertaking the desktop analysis in Step 5. Using these maps, route planning should be undertaken to ensure the field analysis is undertaken as efficiently as possible (Figure 9).

Figure 9: Preparing walking route for the field analysis

Observing pedestrian activities can also support an understanding of how the study area is being used, this can be conducted by:

- undertaking pedestrian and vehicle counts
- observing live pedestrian behaviour close to the focal point
- gathering evidence of desire lines, indicating the desired route pedestrians take (Figure 10)
- observing obstacles and potential hazards or barriers to pedestrian movement
- observing how people use an area, for example:
  - is the area used at night?
  - do people socialise in the area?
  - are there areas of high usage and gathering points?
  - are there any conflict points?
  - is space used in the way it is intended?
  - do public amenities exist and are they used?
  - where do people cross the roads?
  - is there appropriate landscaping in the area?
  - is the lighting adequate?

Figure 10: Example of a desire line

Community surveys

While it is not necessary to conduct community surveys, the field analysis could also include a survey to gain additional insight from locals. If a community survey is going to be undertaken, prepare a list of questions and confirm the primary audience.

Conducting surveys and interviews needs to be done consistently and professionally. Further guidance on undertaking surveys or interviews can be found at: https://www.qgso.qld.gov.au/about-statistics/collecting-data/survey-methods.

For further guidance refer to **Step 6** of the case study in Appendix 1.

Step 7 - Undertaking the field analysis

Guided by the work done to date, Step 7 is undertaken to identify opportunities to improve walkability and any existing characteristics that will impede the delivery of improvements.

Step 7 will involve using the routes maps prepared in Step 6 and annotating the information collected as the field analysis is undertaken. This will also involve making recommendations, if any, for each street and pathway analysed. As the field analysis is undertaken, photographs should be taken as a reference point to make recommendations (Figure 11).

For further guidance refer to **Step 7** of the case study in Appendix 1.

Figure 11: Images from field analysis

Step 8 - Preparing a preliminary list of recommendations

The purpose of Step 8 is to prepare a preliminary list of recommendations to enhance walkability within the study area.

This preliminary list of recommendations is prepared from the outputs from the field analysis. Table 1 below provides an example of how the recommendations can be articulated to compile a complete list of works.

Table 1: Preliminary list of recommendations

Street	Side	Section	Recommendation
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner Frenchville & Beasley
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner of Boyd and Beasley
Beasley Street	Eastern side	Refer Map 1A	Footpath from Frenchville to Boyd
Beasley Street	Eastern side	Refer Map 1A	Plant 3 low growing street trees for shade
Boyd Street	Eastern side	Refer Map 1A	Footpath from Beasley Street to Murphy Street
Moyle Street	Western side	Refer Map 1A	Kerb ramp corner of Moyle Street and Beasley Street
Moyle Street	Eastern side	Refer Map 1A	Kerb ramp corner of Moyle Street and Beasley Street
Moyle Street	Western side	Refer Map 1A	Footpath from Beasley Street to Kerrigan Street

Step 9 - Prioritising the list of recommendations

The purpose of Step 9 is to prioritise the list of recommendations, identified in Step 8.

To assist with prioritising the list of recommendations, a ranking system is recommended. Figure 12 below depicts the ranking system that can be applied.

Essential
These improvements are critical to improving walkability within the study area
Note: a pre-requisite for a walkable neighbourhood is the provision of footpaths

Important
These improvements are important to improving walkability within the study area, however there may be an ability to consider alternatives to the recommendation

Non-essential but nice to have
These improvements will assist with improving walkability within the study area, however the existing condition and use of the network in this area is not essential to the overall success of the project

Figure 12: Ranking system

Ranking the recommended improvements

Assign a ranking to each of the recommendations, being mindful of:

- the project purpose
- the primary audience
- the pragmatics or achievability of the recommended improvements
- the potential cost of the recommended improvements.

Table 2 below provides an example of how the list of recommendations can be prioritised.

Table 2: Initial ranking of recommendations

Street	Side	Section	Recommendation	Rank
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner Frenchville & Beasley	Important
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner of Boyd and Beasley	Important
Beasley Street	Eastern side	Refer Map 1A	Footpath from Frenchville to Boyd	Essential
Beasley Street	Eastern side	Refer Map 1A	Plant 3 low growing street trees for shade	Non-essential
Boyd Street	Eastern side	Refer Map 1A	Footpath from Beasley Street to Murphy Street	Essential
Moyle Street	Western side	Refer Map 1A	Kerb ramp corner of Moyle Street and Beasley Street	Important
Moyle Street	Eastern side	Refer Map 1A	Kerb ramp corner of Moyle Street and Beasley Street	Non-essential
Moyle Street	Western side	Refer Map 1A	Footpath from Beasley Street to Kerrigan Street	Essential

Approximate costing

If working within an allocated budget, allocate an approximate cost for the recommendations identified as essential.

Table 3 below provides an example of how the list of essential improvements can be costed.

Table 3: Approximate costing

Street	Side	Section	Recommendation	Rank	Approx $
Beasley Street	Eastern side	Refer Map 1A	Footpath from Frenchville to Boyd	Essential	$1,500
Boyd Street	Eastern side	Refer Map 1A	Footpath from Beasley Street to Murphy Street	Essential	$1,300
Moyle Street	Western side	Refer Map 1A	Footpath from Beasley Street to Kerrigan Street	Essential	$1,600
				Total:	**$4,400**

Re-prioritising

At this point the list of recommendations can be reviewed to determine if the improvements will either fit or exceed the allocated budget. From here if the recommendations:

- fit within an allocated budget - the recommendations identified as important can be costed
- exceed the allocated budget - the priority ranking system should be used to re-prioritise the essential recommendations.

This process can't be done until a list of recommendations is established that fits within an allocated budget.

Table 4 below is an example of how the list can be expanded to include the improvements identified as important, if the allocated budget allows it.

Table 4: Re-prioritised list

Street	Side	Section	Recommendation	Rank	Approx $
Beasley Street	Eastern side	Refer Map 1A	Footpath from Frenchville to Boyd	Essential	$1,500
Boyd Street	Eastern side	Refer Map 1A	Footpath from Beasley Street to Murphy Street	Essential	$1,300
Moyle Street	Western side	Refer Map 1A	Footpath from Beasley Street to Kerrigan Street	Essential	$1,600
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner Frenchville & Beasley	Important	$800
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner of Boyd and Beasley	Important	$800
Moyle Street	Western side	Refer Map 1A	Kerb ramp corner of Moyle Street and Beasley Street	Important	$800
				Total:	**$6,800**

Removing recommended improvements

Before removing items that are categorised as 'important' or 'non-essential' that exceed an allocated budget, each item should be considered. Determining if alternatives are available to the recommendation provided. This should involve considering what will provide best value for money (e.g. less mature planting stock or removing improvements in areas that are less likely to be used etc). If the list of recommendations cannot be adjusted to include alternative options, recommendations can then be removed in their entirety where the budget is exceeded.

At the end of Step 9 a prioritised, within budget, list of recommendations will have been established.

7. Walkability improvements wrap up

In carrying out a walkability improvement analysis, remember to:

- reflect on the principles of walkability when undertaking any analysis for neighbourhood improvements
- keep in mind the purpose for the walkability enhancements and how the purpose serves the primary audience for walkability
- note that any improvements to walkability will also benefit members of the community who are not the primary audience
- ensure the proposed priority elements maximising the walkability of the study area
- reflect on whether the proposed enhancement options are providing the best value for money to improve walkability within the community
- consider if the cost of implementing walkability enhancements outweighs the benefit of providing walkability along the route.

8. Glossary

Design principles - walkability design principles of functionality, comfort and safety.

Desire lines - a path created as a consequence of erosion caused by foot traffic. The path usually represents the shortest or most easily navigated route between an origin and destination.

Focal point - the main point of interest.

Padmount - a ground mounted electric power distribution transformer in a locked steel cabinet mounted on a concrete pad.

Ped shed - short for pedestrian shed is the area encompassed by the walking distance from a focal point. Ped sheds are often defined as the area covered by a five minute or 400 metre walk. A synonym for ped shed is walkable catchment.

Street - the whole street reserve between opposing property boundaries. Including verges, street trees and the carriageway.

9. Further information

Further information on walkable neighbourhoods is available at:

- Model code for neighbourhood design
- Planning (Walkable Neighbourhoods) Amendment Regulation 2020
- Queensland Walking Strategy 2019 - 2029
- Institute of Public Works and Engineering Australasia Queensland (IPWEAQ) Street Design Manual: Walkable Neighbourhoods
- The Heart Foundation community walkability checklist
- Good for Busine$$ - The benefits of making streets more walking and cycling friendly
- Australian heart maps
- Movement networks

Appendix 1: Walkability Improvement Tool - Case Study

How to use this tool – Frenchville State School, Rockhampton

This case study is designed to illustrate how the walkability improvement tool can be used to analyse walkability around a specific site. The case study demonstrates how recommendations to improve walkability can be prioritised to provide 'bang for the buck' when seeking to enhance walkability within an existing neighbourhood.

The case study undertakes Steps 1-9, focusing on prioritising walkability improvements for a project with a specific site and focal point. The case study is based is a well-established area identifying a range of considerations and limitations and assumes that walkability improvements will increase the number of children walking to and from school.

Case Study

Step 1 - Identifying the purpose of the project and the primary audience

The purpose of Step 1 is to define the project objectives and identify the target audience.

The case study is based around Frenchville State School in Rockhampton. In completing Step 1, it has been identified that:

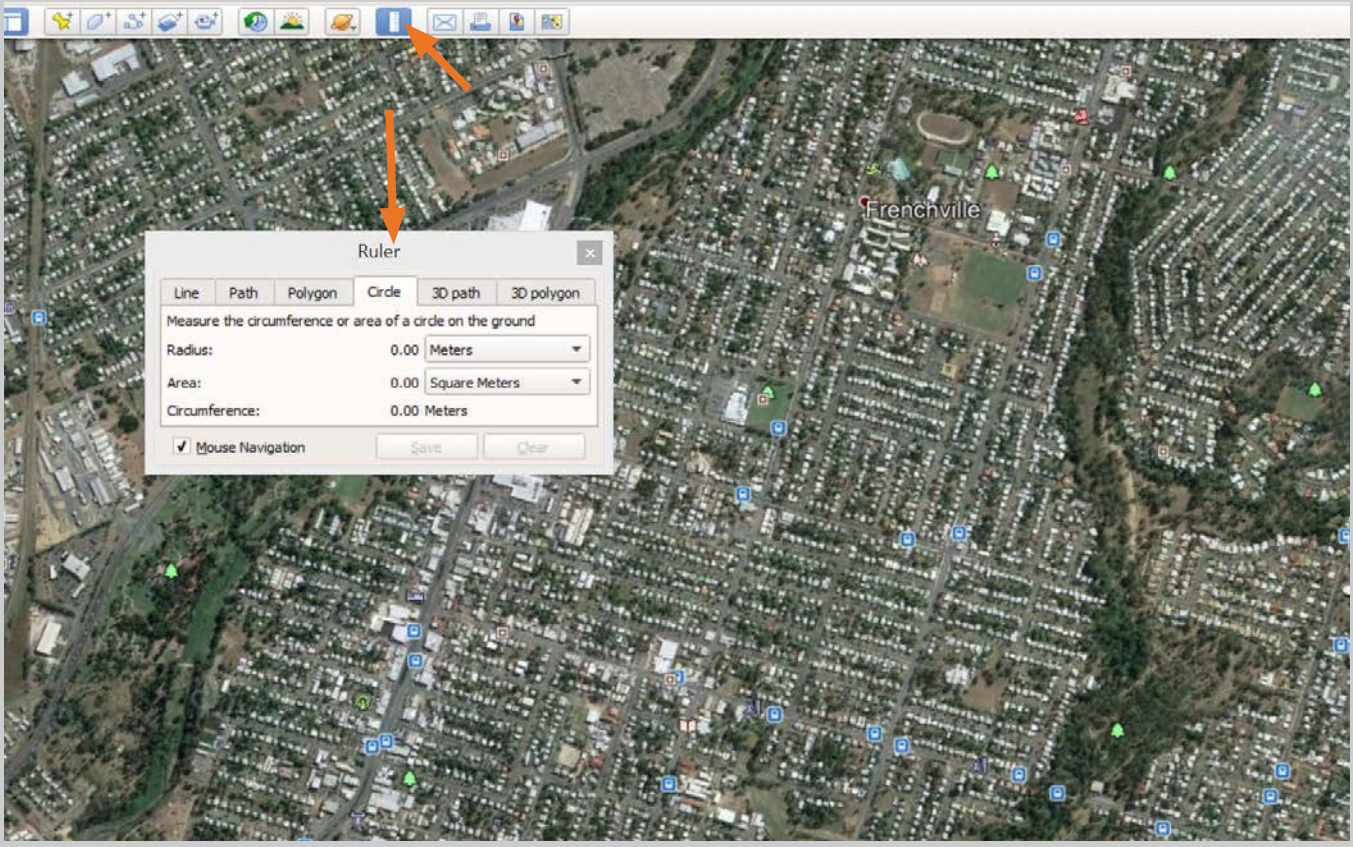
- the project objective is to improve walkability to and from Frenchville State School
- the primary audience is primary school aged children, their families and school staff.

Step 2 - Identifying the study area

The purpose of Step 2 is to prepare a map illustrating the project area boundary and any focal point(s) for the project area.

TOP TIP

Throughout this case study Google Earth Pro is used as the mapping platform. Other platforms can be also be used, such as NearMap. The ruler feature identified below is used to measure the radius, pathways and shade polygons as demonstrated in the steps throughout this case study.



Case Study

Site boundary and focal point

The map below identifies the property boundary of Frenchville State School. The school entrance has been identified as the focal point, this is marked with a red pin icon (Map 1). This is the starting point for the ped shed analysis.

The case study has one entrance that was used as the focal point. It is noted that there may be scenarios where multiple focal points are identified.

Map 1: Example site boundary and focal point of the ped shed analysis.

Case Study

Mapping the radius

The next step is to identify the radius on the ped shed map. This is done by marking a circle around the focal point or points. The case study has used a five minute walking distance, which equates to a study area of 50 hectares.

The distance tool in Google Earth Pro was used to identify the radius. The red circle indicates a 400 metre radius around the main entrance to the school (Map 2).

Map 2: Draft ped shed analysis with circular parameter.

Case Study

Step 3 - Identifying the walkable catchment

The purpose of Step 3 is to identify the walkable catchment around the focal point using the map produced in Step 2. Step 3 is undertaken to further refine the study area and is undertaken to complete the ped shed analysis.

Measuring pedestrian routes

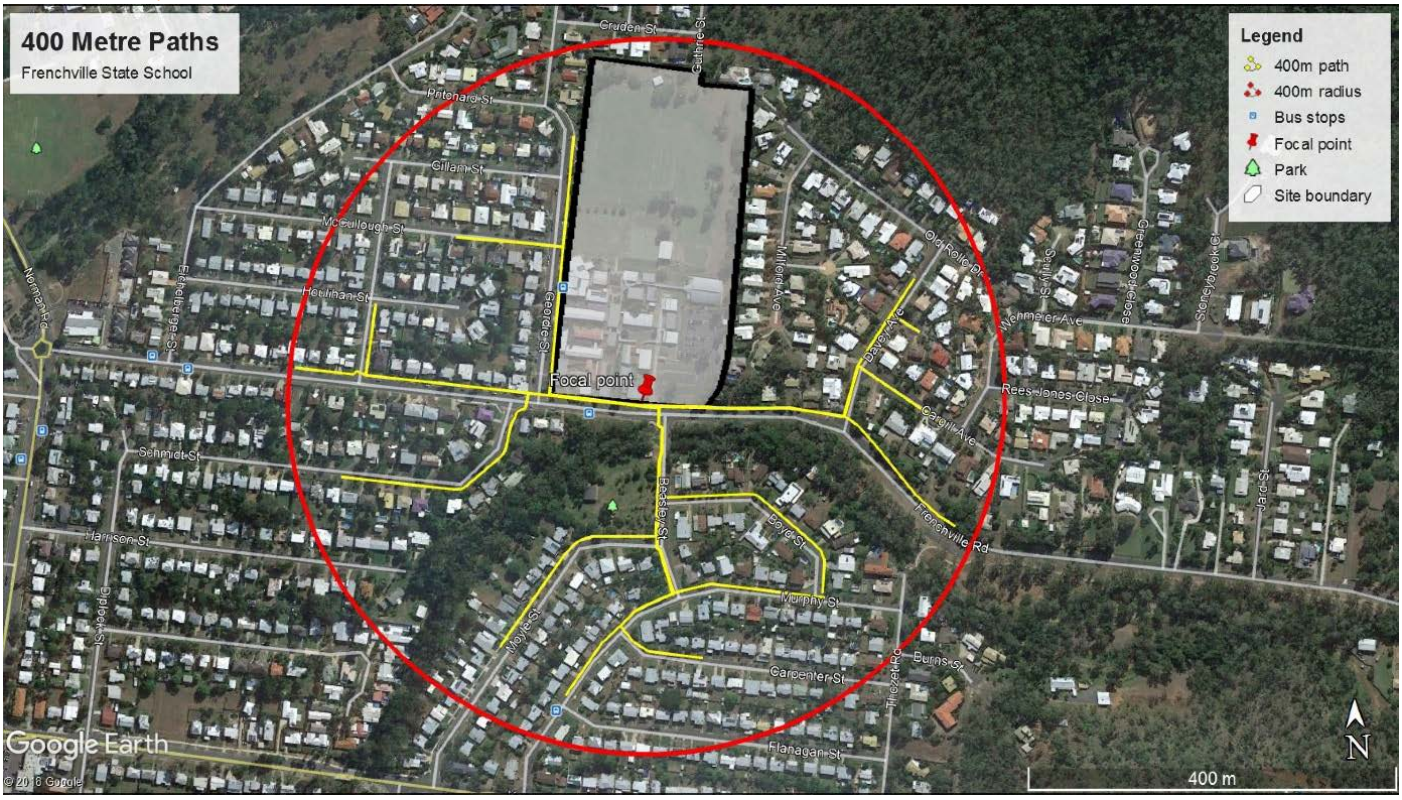
To complete the ped shed analysis measure all existing pedestrian routes from the focal point

Using the map produced in Step 2, mark existing pathways from the focal point to the nominated distance, the case study used 400 metres. Pathways will typically follow the street network but can include other existing pedestrian routes such as pedestrian trails or segregated paths. The 5 minute walkable catchment for the school was identified using 14 existing pathways from the focal point.

Maps 3 and 4 demonstrate how this step is undertaken for each stage of the study area development.

The distance tool in Google Earth Pro was used to identify the 400 metre (five minute) walkable pathways from the main entrance to the school.

Map 3: Drawing a 400 metre pathway from the focal point.



Map 4: Drawing all 400 metre pathways from the focal point.

Shading the walkable catchment

In order to understand the number of possible end users that will benefit from walkability improvements. Map 4 is shaded around the areas that represent residential dwellings adjoining the marked routes to clearly identify the potential walkable catchment for the school. A polygon was overlaid on the lots which have direct access to the 14 pathways identified from the focal point.

Map 5: Complete ped shed catchment map.

Case Study

Step 4 - Preparing the final study area map

The purpose of Step 4 is to prepare a map that depicts the final study area. This map is intended to inform the desktop and field analysis.

Refine the study area

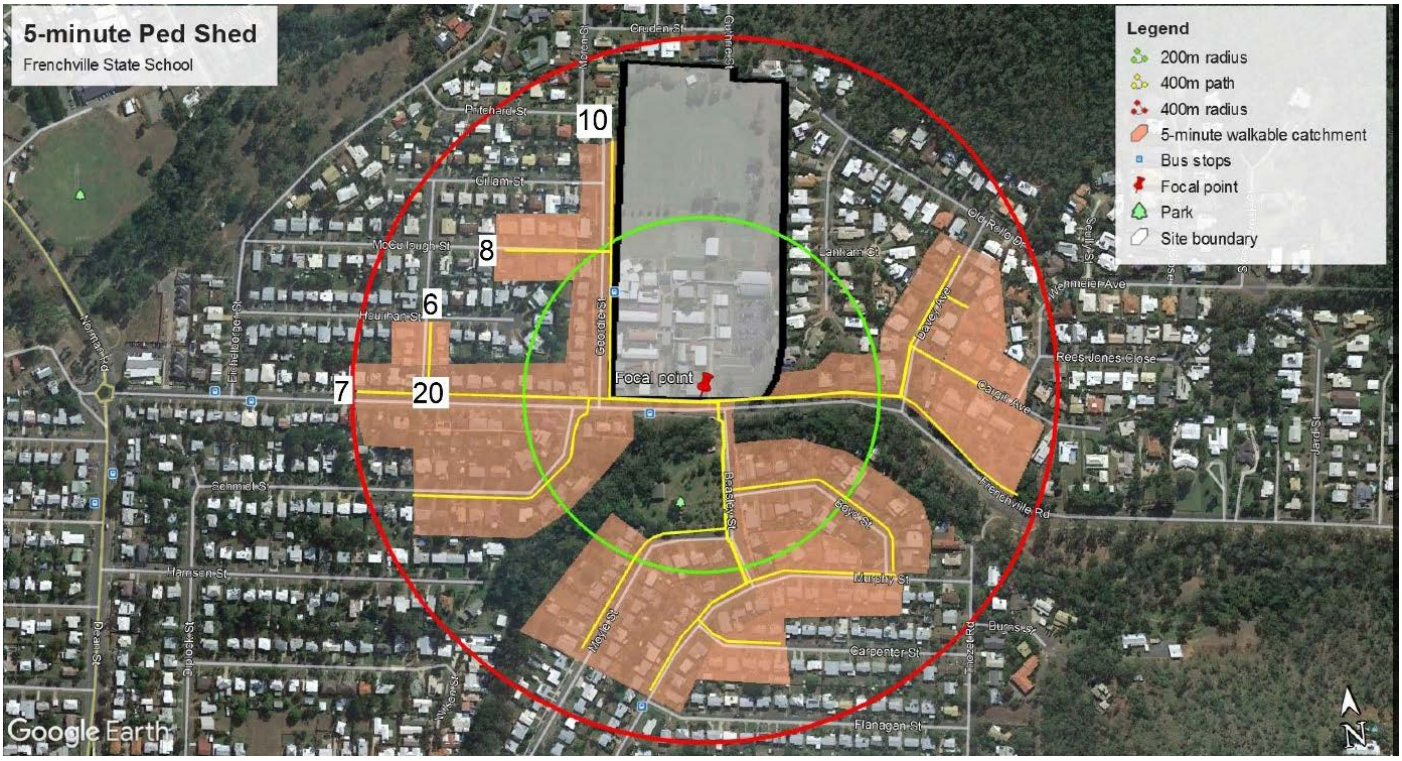
The final study area map for the case study has been prepared by creating a subset of the study area. This is intended to focus the attention on the improvements most critical to enhancing walkability to and from Frenchville State School. In order to prioritise areas that will provide 'bang for the buck' improvements, a smaller radius has been identified around the focal point.

From the focal point, a 200 metre radius was drawn as a green circle (Map 6) to help identify the area most is likely to yield the highest number of end users.

The neighbourhood around the school consists of single dwelling lots. To understand the relative yields of each pathway a basic lot count is undertaken. This was done for the western catchment of the study area map (Map 7).

Map 6: Ped shed analysis including a 200 metre radius.

The number of residential lots along the pathways of the western side of the school catchment were counted and annotated on the Map 7.



Map 7: Basic lot count of the western catchment at the end of each pathway.

Study area based on end user

The five minute ped shed was used to identify the walkable catchment around the school. In some instances, it may be appropriate to expand the study area based on the project objective and primary audience.

Given the primary audience for the case study is school children, the study area was expanded to areas where enrolment data showed this would significantly increase the number of students within the catchment. Map 8 shows how the study area was expanded (in yellow), this indicates that by expanding the study area to include the yellow shaded area, a total of 23 additional lots are included in the catchment.

Map 8: Lot count of the expanded study area, beyond the 5 minute walkable pathway.

Case Study

Step 5 - Undertaking the detailed desktop analysis

The purpose of Step 5 is to undertake a desktop analysis of the study area, this can be undertaken using Google 'street view'.

The desktop analysis is used to narrow the scope for the field analysis of the study area. It is intended to determine existing aspects of walkability and identify opportunities to be further investigated and also assist with determining:

- above ground or underground infrastructure such as powerlines and telecommunication pits that may affect the ability to install footpaths and street trees
- trees or verge gradients that may impede installation of a footpath
- street light locations
- existing shade trees or appropriate locations to plant proposed shade trees
- pedestrian crossings
- kerb ramps
- street signs

A desktop analysis has limitations and will not identify all obstacles or opportunities such as topography (e.g. steepness of slope) or overhanging trees. This will be considered as part of the verification during the field analysis.

The Map prepared in Step 4 should be used to annotate any information gathered during Step 5.

Footpath analysis

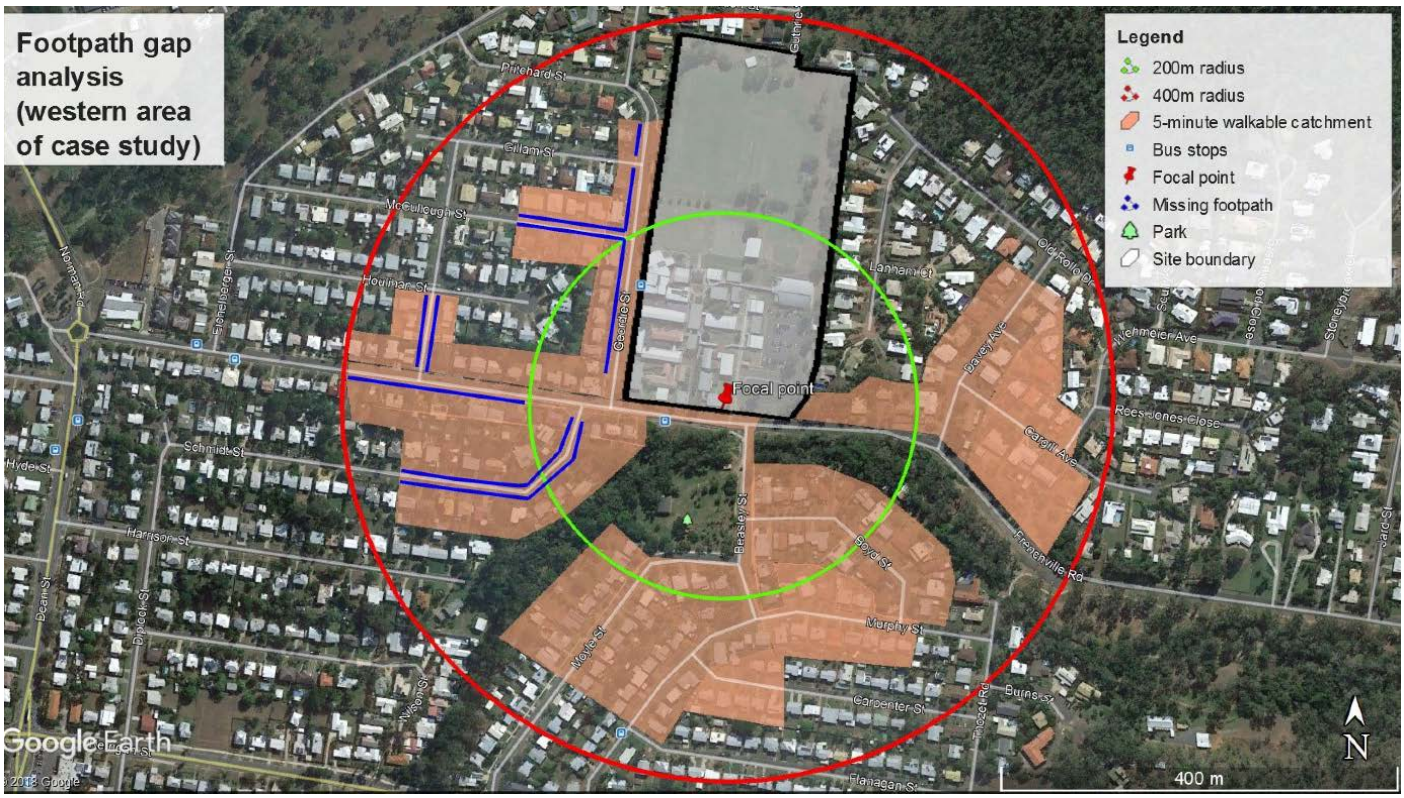
Footpaths should be the primary focus of the desktop analysis. The footpath analysis for the case study was mapped to identify where existing footpaths are missing within the walkable catchment (Maps 9 and 10). Figure 3 and 4 below shows that the footpath of the western side of the road ends at the pedestrian crossing.

This analysis will include recommending on ground investigation on whether an extension of the footpath north along the street should be recommended.

Figure 3: Footpath analysis of the western side of Geordie Street.

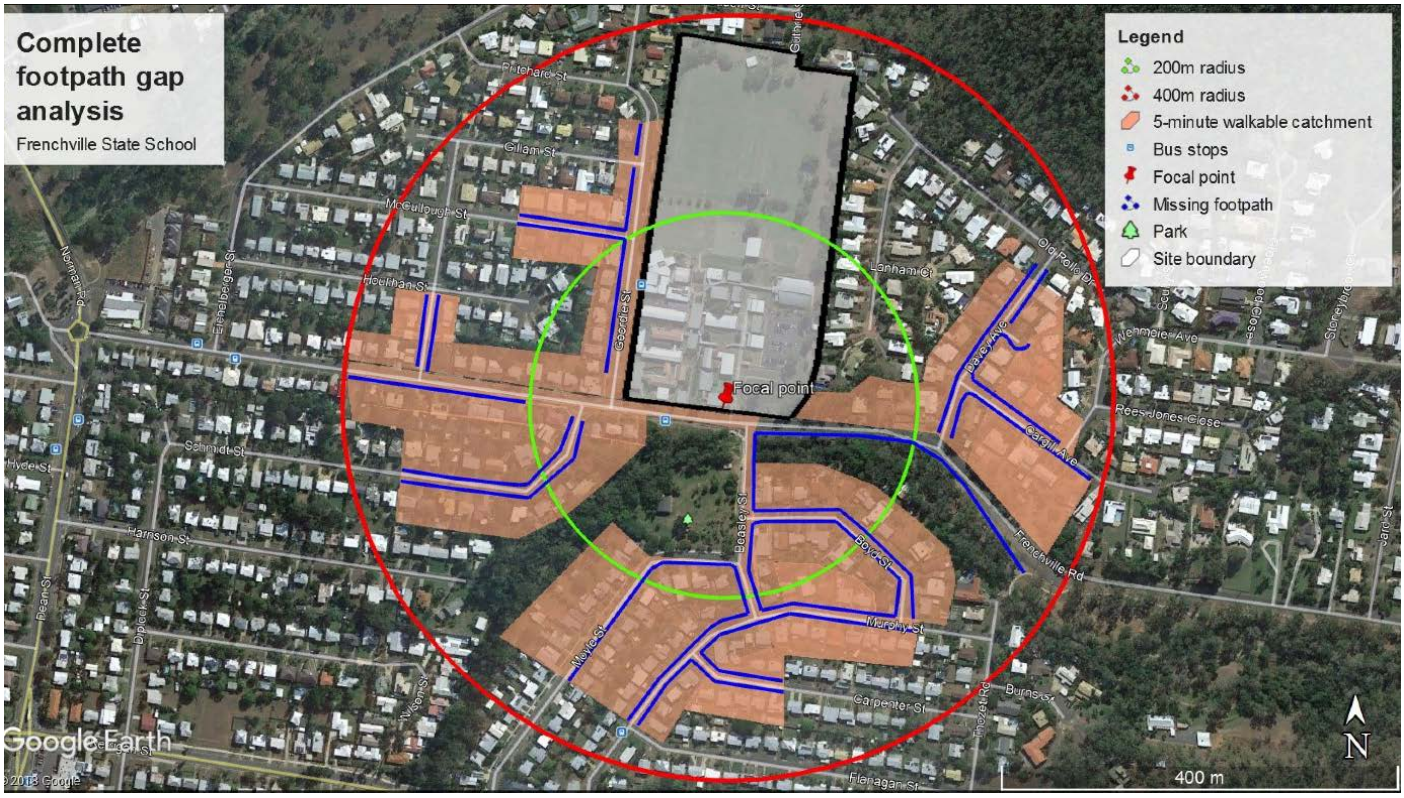
Case Study

Figure 4: Geordie Street aerial view identifying gap in footpath, ending at pedestrian crossing on western side of the street.



Map 9: Example of footpath analysis - western area of case study.

Case Study



Map 10: Complete footpath analysis for all areas 400 metres from focal point.

Map 11: Final study area for undertaking detail analysis.

Case Study

Detailed investigation of walkability in the study area

The desktop analysis should also involve identifying other attributes that can improve walkability. Figures 5, 6 and 7 depict the investigations undertaken for the case study.

Map 12 identifies the areas investigated in the desktop analysis and forms the basis for preparing for the field analysis.

Map 12: Final study area annotated with numbers of street view images, for detailed desktop investigation of walkable elements.

Figure 5: Street view 1: Beasley Street near Frenchville Road - looking south.

Case Study

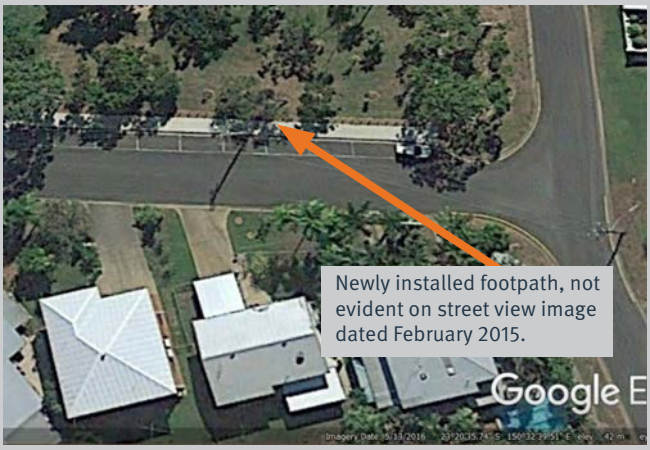
Figure 6: Street view 2: Boyd Street at Beasley Street - looking east.

Figure 7: Street view 3: Moyle Street at Beasley Street - looking west.

Case Study

TOP TIP

'Street view' images can often be an older than the aerial view maps, as illustrated below. It is important to take note of the 'imagery date' when using Google or NearMap, etc when undertaking desktop analysis.



Step 6 - Preparing for the field analysis

The information gathered during the desktop analysis should be transferred to a map to identify where possible walkability improvements could be recommended within the study area. The desktop analysis will assist with identifying the scope and scale of field analysis.

The field analysis should be carried out with supporting information. For example, a map of walkability improvement opportunities identified from the desktop analysis.

It is also recommended that specific routes are identified and mapped. To ensure the field analysis is undertaken in an efficient manner, the study area can be broken into section with clearly defined boundaries e.g. roads or railway lines. This will make the field analysis more manageable. For example, smaller sections help may support sharing the work amongst multiple teams or field analysis to be completed over multiple visits. Defining clear boundaries reduces the risk of gaps or ambiguity in the field analysis.

Some considerations for field analysis include:

- the project purpose and primary audience of the analysis – for example, a walkability analysis for walking to and from a primary school should be undertaken during the day. Whereas an analysis of trips to and from a public transport node may need to be done during both day and night
- planning the most efficient and effective route will walk to save time on the ground
- the most appropriate way to record information – an example of a field log is at Appendix 2
- annotated maps for each section of the study area with section boundaries clearly marked.

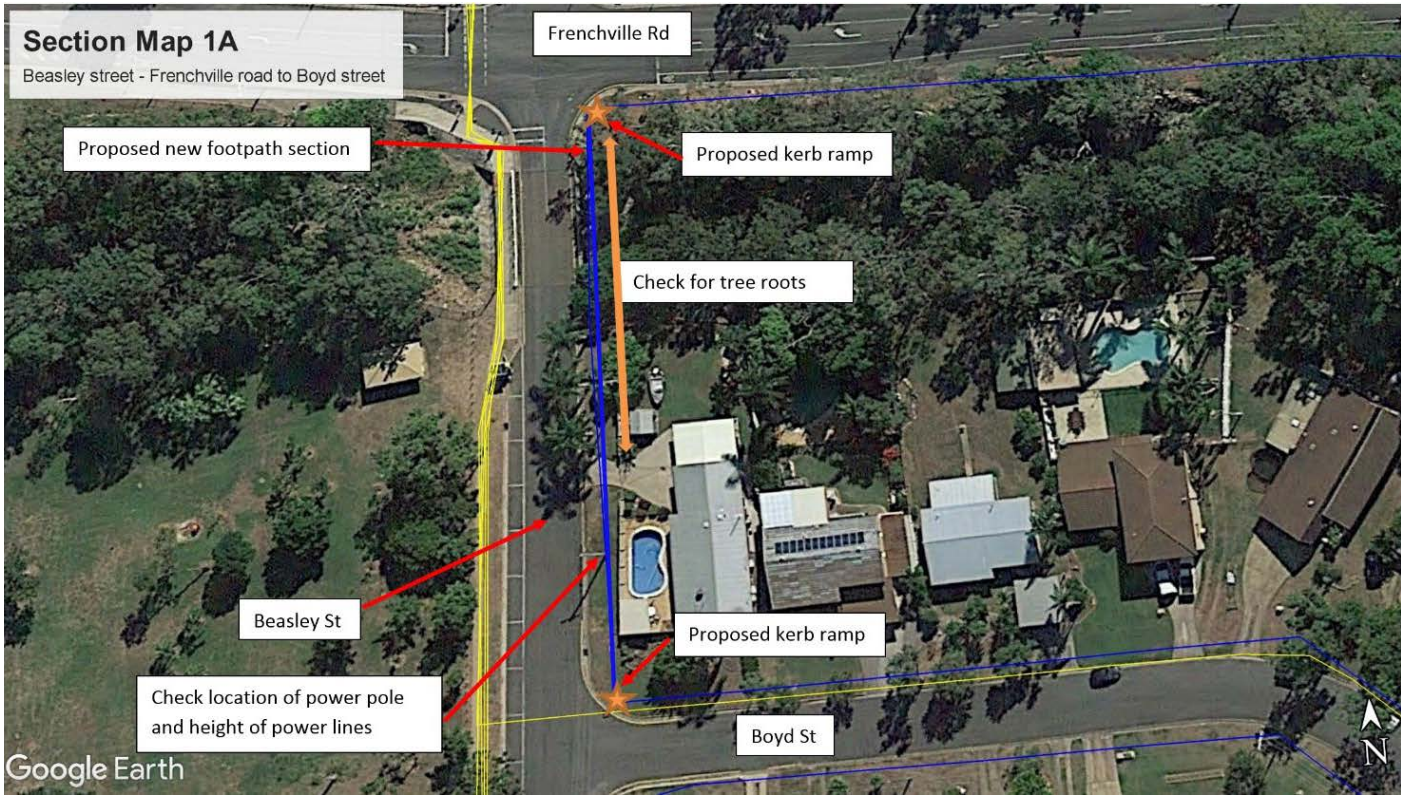
Maps 13, 14 and 15 were used to annotate the investigation areas and walkability improvements that are to be considered in the case study.

Other considerations

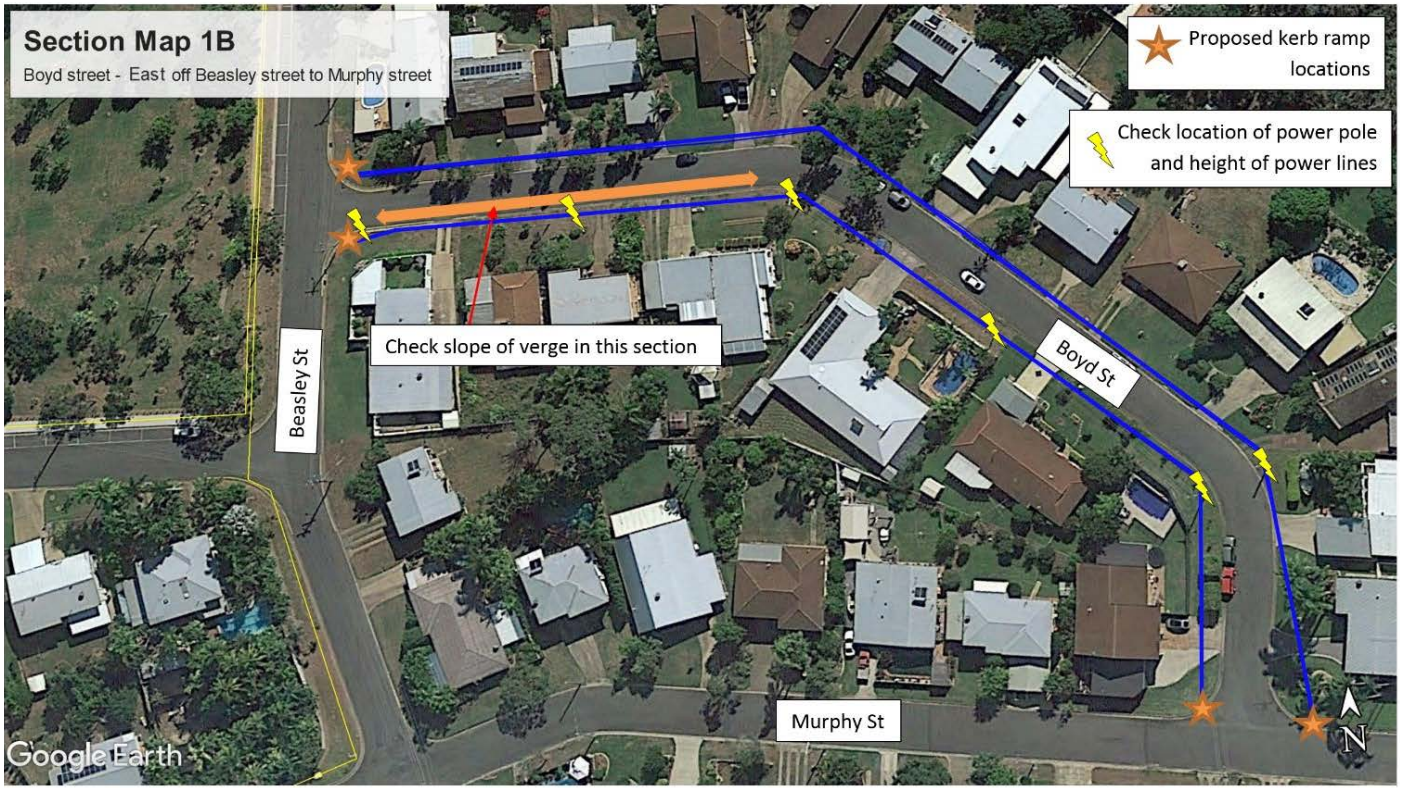
- Consider including pedestrian surveys to gather local knowledge from the people who already walk in the area.[1] Local walking groups could be contacted to provide further insight on walkability in the study area.[2]
- Consider the target audience and if there are any organisations or community groups who may have information about improvements for walkability. For example, if the target audience is school children and the purpose is defined as walking to and from school, consider talking to the school about information they may hold about walkability in the school catchment area. They may be able to engage directly with the school community by putting a call out in the school newsletter for suggestions to improve walkability.

1 http://www.activehealthycommunities.com.au/plan/gis-analysis/neighbourhood-planning-promoting-walkability/
2 https://walking.heartfoundation.org.au/walking/#map

Case Study

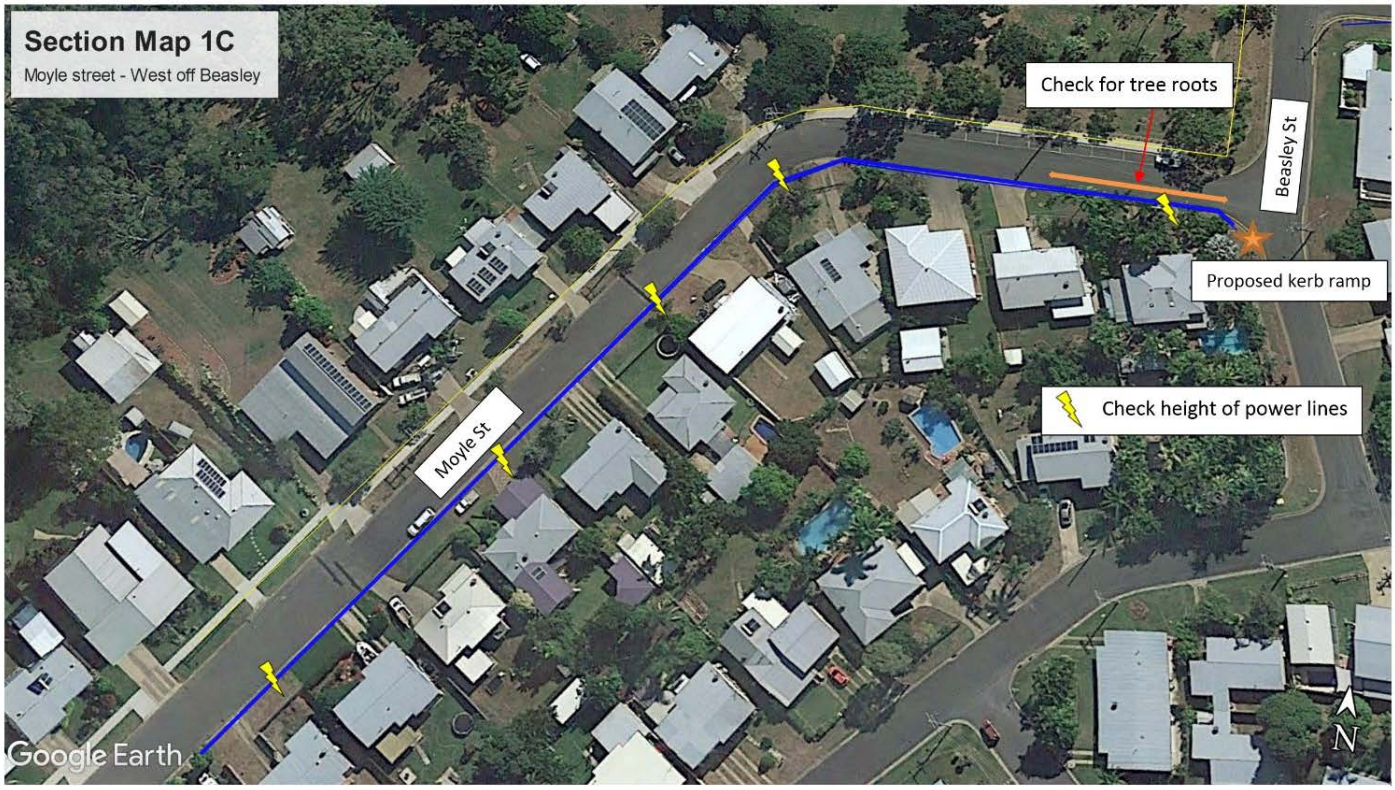


Map 13: Annotated street section map Beasley Street.



Map 14: Annotated street section map Boyd Street.

Case Study



Map 15: Annotated street section map Moyle Street.

Step 7 - Undertaking the field analysis

Step 7 involves undertaking the field analysis by completely a field log and annotating observations on a map(s).

Considerations when conducting the field analysis

The purpose for of undertaking field analysis is to ground truth into what was found during the desktop analysis and to fine-tune which walkability improvements will work best in the given environment. Workplace Health and Safety should be considered when working in the field, especially when in close proximity to a road reserve. Field officers should ensure they are aware of their surroundings and potential safety hazards.

When conducting the field analysis:

- follow the prepared route, record any obstacles and opportunities in the field log and annotate the prepared section map. Include comments of a qualitative nature and take photos, linked to the map, to document observations and issues identified within the study area
- observe pedestrian activities can support an understanding of how many people walk in the neighbourhood, where they walk, what they do and what kind of facilities are offered for walking.

TOP TIPS

- Looks for evidence of desire lines, indicating the desired route pedestrians take.
- Take photos and record their location, as these will be helpful when undertaking post-field analysis.
- Remember to look for obstacles to walkability and potential hazards and note these on the map and field log. Look both up and down to check for hazards such as tree roots coming out of footpaths, sloped driveways, and street trees hitting power lines.

Case Study

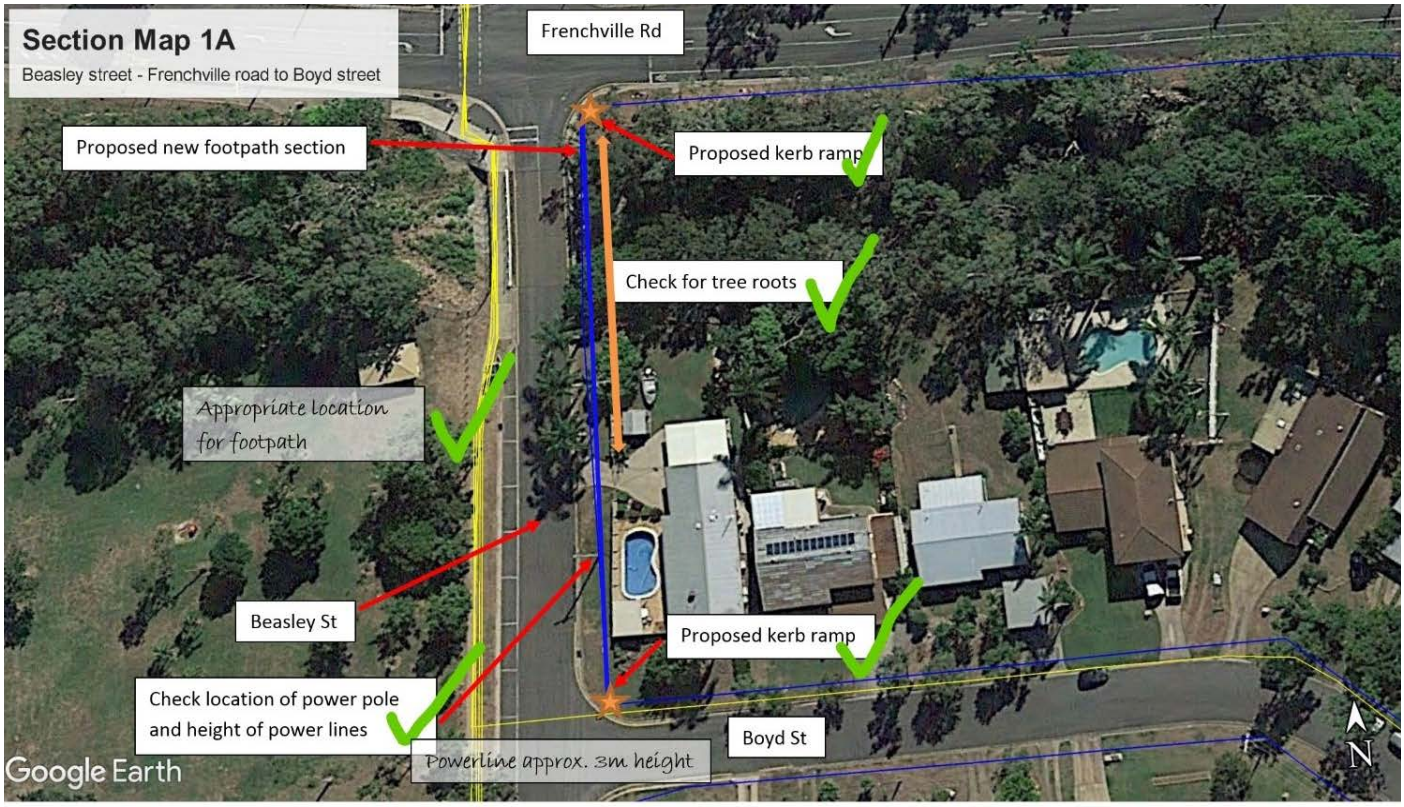


Figure 8: Example field map for analysis and prioritisation.

Walkability Improvement - Field log sheet

Audit location: Frenchville Qld
Primary user: School children
Purpose of audit: Walkability to and from Frenchville State School
General locational observations: Frenchville road is reasonably busy, side streets much less traffic, 3 groups of people walking children to school 5 senior adult walkers observed

Date: 19/8/2019
Time: 8:00 - 8:45am
Location: Frenchville road to Beasley and Boyd St
Weather conditions: Clear sunny day

Street	Side	Section	Photo number	Observations	Recommendations
Beasley Street	Eastern side	Refer Map 1A	1-2	No kerb ramp, minimal shade trees, observed two mothers walking with prams	- Add kerb ramp at intersection of Frenchville & Beasley
Beasley Street	Eastern side	Refer Map 1A	3-4	No kerb ramp	- Install kerb ramp corner of Boyd and Beasley
Beasley Street	Eastern side	Refer Map 1A	5-9	No footpath, Telstra pits outside lot 436	- Install footpath along western side of street
Beasley Street	Eastern side	Refer Map 1A	9-13	overhead powerline along street	- Consider planting low growing species for shade trees
Boyd Street	Northern & Southern side	Refer Map 1B	14	No kerb ramps	-Install 2 kerb ramps corner of Boyd and Beasley
Boyd Street	Northern & Southern side	Refer Map 1B	15-18	No footpath	- Install footpath along Northern & Southern sides of street to Murphy St
Boyd Street	Southern side	Refer Map 1B	19-22	overhead powerline along street, limited shade	- Consider planting low growing species for shade trees
Boyd Street	Eastern & Western side	Refer Map 1B	23-24	No kerb ramps	-Install 2 kerb ramps corner of Boyd and Murphy St
Boyd Street	Northern side	Refer Map 1B	25-27	Limited shade between lots 249-259	- Consider planting low growing species for shade trees

Figure 9: Example field log for analysis and prioritisation.

Case Study

Step 8 - Preparing a preliminary list of recommendations

The purpose of Step 8 is to compile the results from the field analysis to develop a preliminary list of recommendations.

Collating the proposed walkability improvements

At this point, analysis has been undertaken to understand the gaps in the walkability of the study area.

The analysis of each street section during the field analysis should identify the recommendations.

Using the information from Step 7, list the recommended improvements. This should involve considering any challenges there may be in constructing / installing the recommendations in the study area, such as:

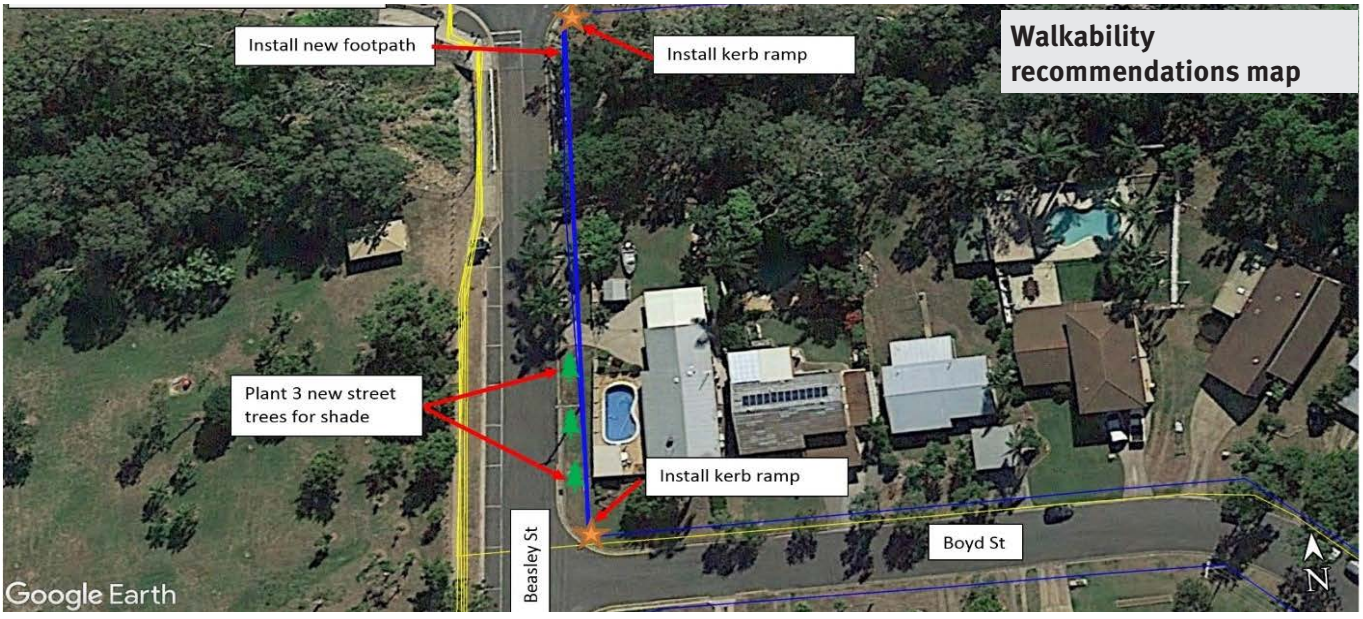
- is the proposed implementation of the walkability improvement achievable within the existing environment?
- is it cost effective to implement the improvement in this area given the walkable catchment it will achieve?

Once the list of recommendations is complied, these can be annotated onto an aerial of the study area to create a 'Walkability recommendations map'.

Table 1 provides an example of how the recommendations from the case study have been complied. These recommendations have been annotated on Map 16 below.

Table 1: Preliminary list of recommendations.

Street	Side	Section	Recommendation
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner Frenchville & Beasley
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner of Boyd and Beasley
Beasley Street	Eastern side	Refer Map 1A	Footpath from Frenchville to Boyd
Beasley Street	Eastern side	Refer Map 1A	Plant 3 low growing street trees for shade
Boyd Street	Eastern side	Refer Map 1A	Footpath from Beasley Street to Murphy Street
Moyle Street	Western side	Refer Map 1A	Kerb ramp corner of Moyle Street and Beasley Street
Moyle Street	Eastern side	Refer Map 1A	Kerb ramp corner of Moyle Street and Beasley Street
Moyle Street	Western side	Refer Map 1A	Footpath from Beasley Street to Kerrigan Street



Map 16: Annotated street section of walkability recommendations.

Case Study

Step 9 - Prioritising the list of recommendations

The purpose of Step 9 is to prioritise the list of recommendations, identified in Step 8.
The case study used the following ranking system:

Essential
These improvements are critical to improving walkability within the study area
Note: a pre-requisite for a walkable neighbourhood is the provision of footpaths

Important
These improvements are important to improving walkability within the study area, however there may be an ability to consider alternatives to the recommendation

Non-essential but nice to have
These improvements will assist with improving walkability within the study area, however the existing condition and use of the network in this area is not essential to the overall success of the project

Table 2 below depicts how the recommendations were ranked.

Table 2: Initial ranking of recommendations

Street	Side	Section	Recommendation	Rank
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner Frenchville & Beasley	Important
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner of Boyd and Beasley	Important
Beasley Street	Eastern side	Refer Map 1A	Footpath from Frenchville to Boyd	Essential
Beasley Street	Eastern side	Refer Map 1A	Plant 3 low growing street trees for shade	Non-essential
Boyd Street	Eastern side	Refer Map 1A	Footpath from Beasley Street to Murphy Street	Essential
Moyle Street	Western side	Refer Map 1A	Kerb ramp corner of Moyle Street and Beasley Street	Important
Moyle Street	Eastern side	Refer Map 1A	Kerb ramp corner of Moyle Street and Beasley Street	Non-essential
Moyle Street	Western side	Refer Map 1A	Footpath from Beasley Street to Kerrigan Street	Essential

Initial costing

The recommendations identified as essential were then costed, as shown in Table 3.

Table 3: Approximate costing

Street	Side	Section	Recommendation	Rank	Approx $
Beasley Street	Eastern side	Refer Map 1A	Footpath from Frenchville to Boyd	Essential	$1,500
Boyd Street	Eastern side	Refer Map 1A	Footpath from Beasley Street to Murphy Street	Essential	$1,300
Moyle Street	Western side	Refer Map 1A	Footpath from Beasley Street to Kerrigan Street	Essential	$1,600
				Total:	**$4,400**

Case Study

Re-prioritising

Using a budget of $10,000 the recommendations were re-prioritised to include recommendations identified as important. These recommendations were costed, at this point if the total cost exceeded the budget, recommendations would be removed to fit within the allocated Table 4 shows the re-prioritised list and final recommendations for the case study.

Table 4: Re-prioritised list

Street	Side	Section	Recommendation	Rank	Approx $
Beasley Street	Eastern side	Refer Map 1A	Footpath from Frenchville to Boyd	Essential	$1,500
Boyd Street	Eastern side	Refer Map 1A	Footpath from Beasley Street to Murphy Street	Essential	$1,300
Moyle Street	Western side	Refer Map 1A	Footpath from Beasley Street to Kerrigan Street	Essential	$1,600
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner Frenchville & Beasley	Important	$800
Beasley Street	Eastern side	Refer Map 1A	Kerb ramp corner of Boyd and Beasley	Important	$800
Moyle Street	Western side	Refer Map 1A	Kerb ramp corner of Moyle Street and Beasley Street	Important	$800
				Total:	**$6,800**

Appendix 2: Example field log template

Walkability Improvement - Field log sheet					
Audit location:				Date:	
Primary user:				Time:	
Purpose of audit:				Location:	
General locational observations:				Weather conditions:	
Street	Side	Section	Photo #	Observations	Recommendations

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Queensland Government