C COST BENEFIT ANALYSIS

Northern Regional Trails CBA – Final Report

Prepared for Fitzgerald Frisby Landscape Architecture on behalf of the Northern Regional Trails Strategy Collaboration (Banyule, Darebin, Hume, Moreland, Nillumbik & Whittlesea)

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Executive summary

The Northern Regional Trails upgrade project is assessed to establish the merit of the project. SGS modelled the social, economic and environmental costs and benefits. It shows the project is expected to generate a net present value of around $114 million and a benefit cost ratio of 1.6. This indicates that benefits directly attributable to the project will be around 1.6 times that of the investment.

SGS Economics and Planning was engaged by Fitzgerald Frisby Landscape Architecture (FFLA) on behalf of the Northern Regional Trails Strategy Collaboration to undertake cost-benefit analysis (CBA) to assess the merit of expanding the Northern Regional Trail Network. The purpose of this report is to inform due diligence and investment decision making processes by the Northern Regional Trails Strategy Collaboration local government areas (LGAs).

The CBA considers the project case; 10-year staged expansion of the Northern Regional Trails Network, against a counterfactual base case, whereby no additional capital works are undertaken. Only the incremental change between the project case and base case scenario was modelled as a benefit/cost. That is, the change that is directly generated by project case. The assessment has modelled a 30-year benefit period, and standard economic outputs were calculated using a seven per cent discount rate.

The study area – comprising the LGAs of Banyule, Darebin, Hume, Moreland, Nillumbik and Whittlesea – stretches from the inner-city suburbs of Brunswick, Northcote, Alphington and Ivanhoe to the outer areas of Craigieburn and Sunbury, and to the Kinglake National Park and rural and interface communities of Whittlesea and St Andrews.

Incremental costs of the project case

Project capital expenditure (CAPEX) data was provided to SGS by FFLA. CAPEX has been evenly allocated across the 10-year construction rollout period within the CBA model (from FY2023 to FY2032). Project operating expenditure (OPEX) has been assumed at two per cent of CAPEX per year. OPEX ramps up in line with CAPEX over a 10-year period. Undiscounted and present value (PV) CAPEX and OPEX values are shown in Table 1.

TABLE 1: CAPITAL AND OPERATING COSTS

Cost type	Undiscounted value ($m)	Present value (7% discount rate) ($m)
CAPEX	$189.8	$142.6
OPEX	$96.8	$33.6
Total	**$286.6**	**$176.2**

No other costs were identified and quantified.

Incremental monetised benefits of the project case

Three benefits have been monetised within the CBA. These are:

- **Benefit 1.** Health benefits of increased walking and cycling
- **Benefit 2.** Transport network benefits due to a shift in mode share from private vehicle to active transport modes
- **Benefit 3.** Leisure and recreation benefits associated with increased use of the trail network.

Realisation of these benefits is underpinned by an increase in trail demand associated with the project; in particular, an increase in the distance and time that people walk and/or cycle. Demand forecasts undertaken as part of the analysis indicate that use of the Northern Regional Trail Network will increase by around 33 per cent once the entire planned network is delivered. Around two thirds of this uplift would be associated with existing users using the trail more frequently, and one third of the uplift is associated with new users.

Undiscounted and PV incremental project benefits are shown in Table 2. Health benefits associated with increased walking and cycling has been modelled to generate the largest share of benefits.

TABLE 2: PROJECT BENEFITS

Benefit component	Undiscounted value ($m)	PV (7% discount rate) ($m)	% of total benefits (PV) ($m)
PV of health benefit	$541.7	$180.2	62%
PV of transport network benefits	$34.9	$11.6	4%
PV of leisure and recreation benefits	$296.5	$98.6	34%
Total	**$873.2**	**$290.5**	**100%**

Economic appraisal of the project case

Under a seven per cent discount rate, the project results in a net present value (NPV) of around $114 million and a benefit cost ratio (BCR) of 1.6. This means that for each $1 invested, a welfare gain of $1.6 is realised, refer to Table 3.

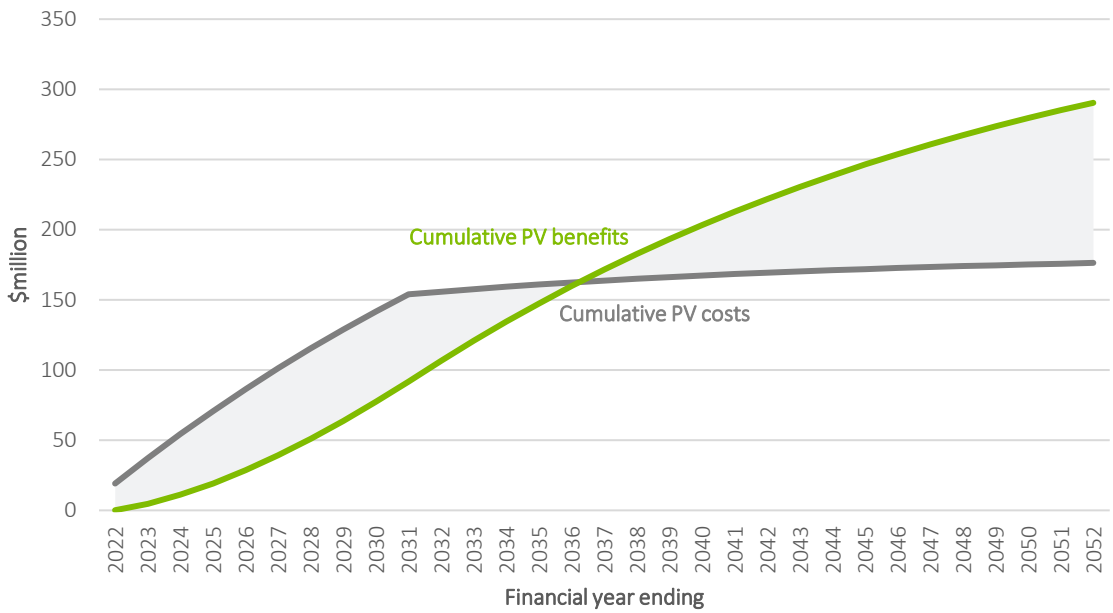
Costs exceed benefits until FY2037, at which point costs increase marginally as per OPEX assumptions, while benefits increase rapidly as users enjoy and gain value from an improved and expanded network. This is illustrated in Figure 1.

TABLE 3: CBA STANDARD OUTPUTS

Cost component	Project case
Total PV cost ($m)	$176.2
Total PV benefit ($m)	$290.5
NPV (benefits minus costs) ($m)	$114.2
BCR	1.6

Source: SGS, 2021

FIGURE 1: CUMULATIVE NPV



Source: SGS, 2021

Conclusion

The analysis indicates that the Northern Regional Trails Network project is economically warranted with consideration of monetised benefits. The case is strengthened when non-monetised benefits are considered. In particular, the upgrade and expansion of the Northern Regional Trails network has potential to lead to increased economic value added derived from additional tourism expenditure, stimulate local businesses, and enhance community cohesion and education opportunities.

1. Introduction

SGS Economics and Planning was engaged by Fitzgerald Frisby Landscape Architecture on behalf of the Northern Regional Trails Strategy Collaboration to undertake cost-benefit analysis to assess the economic merit of expanding the Northern Regional Trail Network. This report contributed to the formulation of the Northern Regional Trails Strategy Review and Update report, which provides an actionable set of recommendations to inform staged investment in expansion of the Northern Regional Trails Network.

1.1 Project background and context

The northern region of Melbourne, encompassing the local government areas of Banyule, Darebin, Hume, Moreland, Nillumbik and Whittlesea, is approximately 1,590 square kilometres and includes a mix of urban, suburban and rural areas. It stretches from the inner-city suburbs of Brunswick, Northcote, Alphington and Ivanhoe to the outer areas of Craigieburn and Sunbury, and to the Kinglake National Park and rural and interface communities of Whittlesea and St Andrews. It is a diverse region, featuring Melbourne's Tullamarine Airport, arts and cultural precincts, the National Employment and Innovation Cluster in La Trobe and new growth communities within the northern peri-urban area.

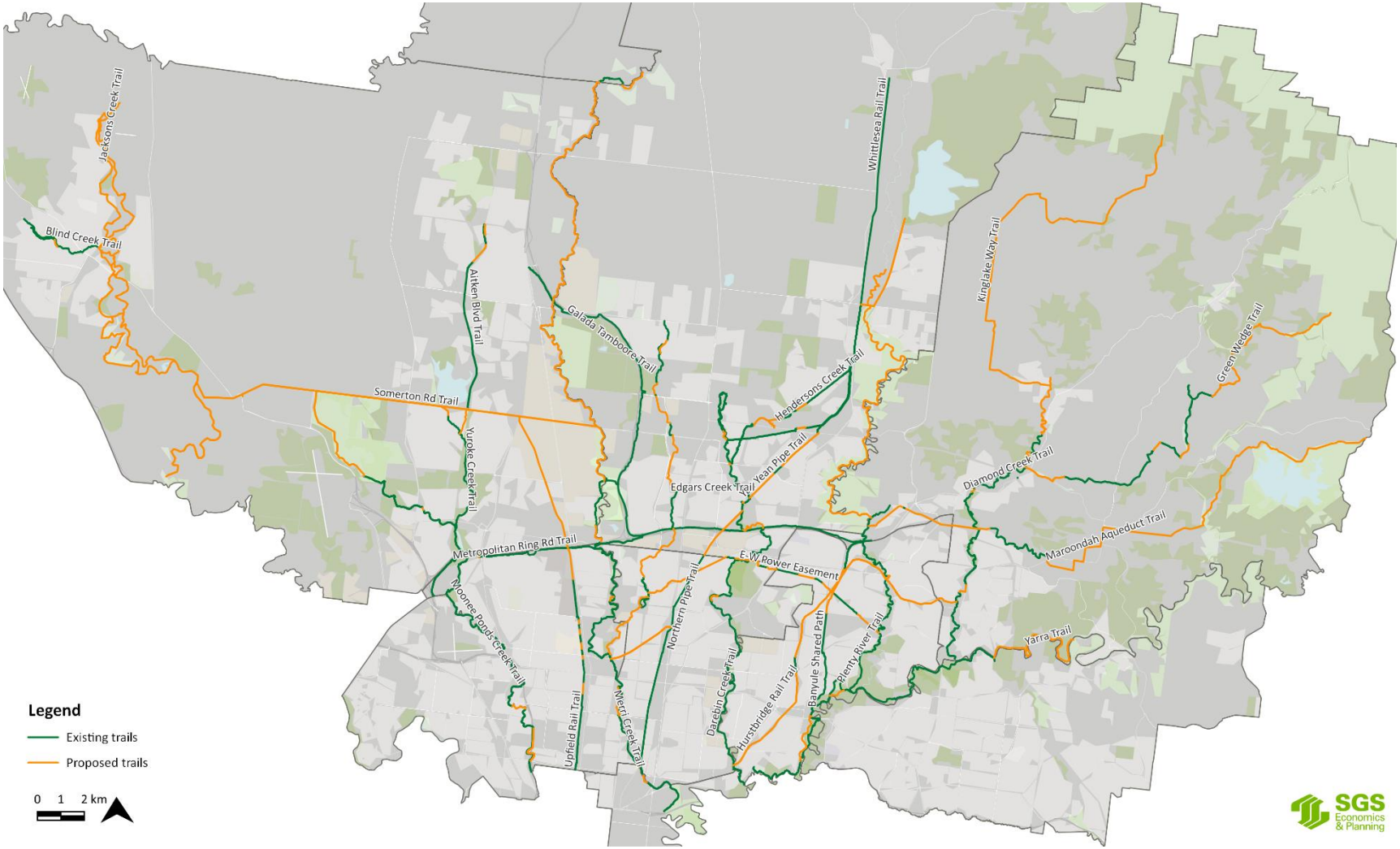
The Northern Regional Trails Strategy was developed in 2016 by the Northern Regional Trails Strategy Collaboration in recognition of the need to plan and deliver appropriate infrastructure to support an increasingly dense urban footprint and population, while providing accessible recreation and active travel opportunities and economic benefits to the communities in Melbourne's north. The 2016 strategy has successfully assisted in securing around $11 million of State Government funding in the last three years to deliver key priorities identified in the strategy. It has also assisted in focusing individual council budget allocations into the planning and delivery of priority trail projects.

In 2020, the Northern Regional Trails Strategy Collaboration appointed Fitzgerald Frisby Landscape Architecture (FFLA) to lead development of the Northern Regional Trails Strategy Review and Update report which considers changes to the network over the previous four to five years, as well as changes to trail demand and council priorities. Realigning the Northern Regional Trails Strategy has the potential to serve a wider population of commuters and recreational users, providing for enhanced health, transport network functionality, and recreation benefits.

Figure 2 shows the existing trail network in green and the proposed extensions in orange. Within inner and middle suburban areas, the strategy focusses on closing gaps to deliver a more integrated network, while in outer suburban areas the strategy focusses on network extensions. The existing network contains around 241 kilometres of trail, and the proposed trail extensions will increase this by 68 per cent, to around 406 kilometres.[1]

[1] GIS analysis undertaken by SGS, based on the network shown in Figure 1

FIGURE 2: MAP OF EXISTING AND PROPOSED TRAIL NETWORK



Source: SGS, 2021

Cycling and walking are important to the broader economic and environmental context in Australia. In 2020, the industry output of the Australian cycling economy was estimated at $6.3 billion, generating $3.4 billion as direct value add, and indirectly a further $5.1 billion in value add. Here in Victoria, the economic contribution is $1.93 billion in direct output and nearly 11,000 jobs, increasing to $5.23 billion and over 20,000 jobs when including indirect contributions.[2]

Another recent study places the economic cost to the community of maintaining our current approach to road transport at $865 billion resulting from air pollution, greenhouse gas emissions, noise, and water pollution.[3] Whether one considers the direct and indirect personal health benefits, the transport benefits, the environmental benefits, the economic benefits, the impact of a greater share of the population using active transport for work or for fun is significant. An extended and better integrated and connected trails network is key to this, as "growing cycling engagement and participation relies heavily on the built environment".[4]

1.2 Report structure

The remainder of this report is structured as follows:

- Section 2 sets out the cost-benefit analysis framework
- Section 3 sets out model parameters that were provided by FFLA, sourced from Australian standard economic appraisal guidelines, and developed by SGS through desktop analysis and research
- Section 4 presents the results and findings of the economic appraisal
- Section 5 summarises the analysis and concludes the report

[2] We Ride Australia (2020), The Australian Cycling Economy, Ernst & Young

[3] Australian Conservation Foundation (2021), Local community benefit of zero emission vehicles in Australia, Deloitte Access Economics Pty Ltd

[4] We Ride Australia (2020), The Australian Cycling Economy, Ernst & Young, p. 3

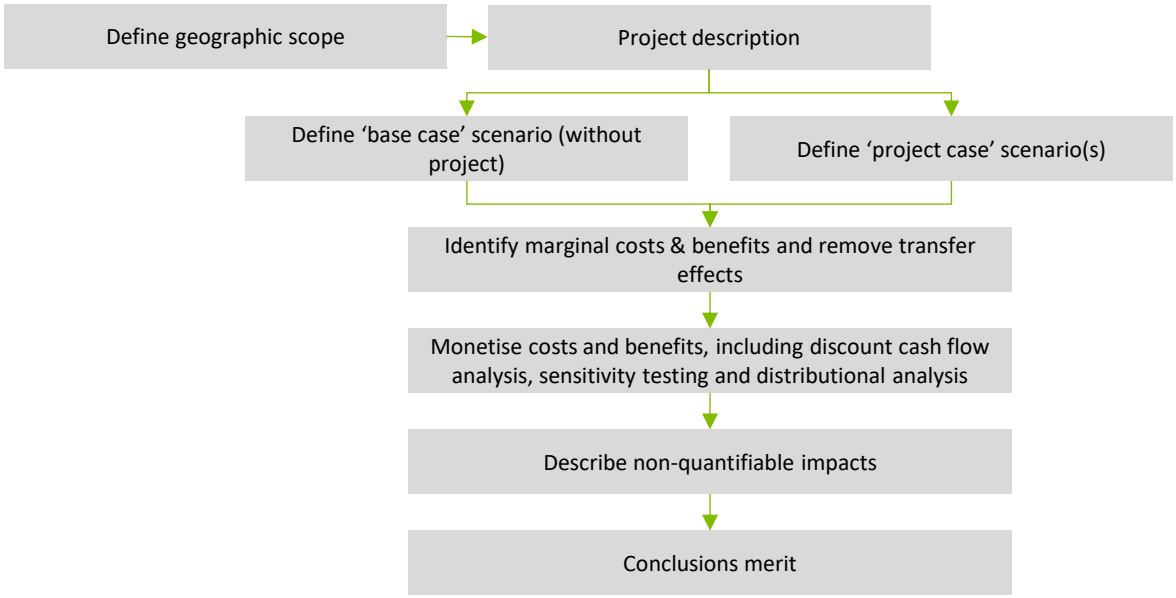
2. Cost-benefit analysis framework

2.1 Overview

Cost-benefit analysis (CBA) provides a framework for assessing projects from the perspective of society as a whole. It considers all impacts on community welfare, whether priced or unpriced in a market. CBA is an effective tool to assess the merit of proposed projects, investment decisions, or management approaches.

The general methodology of CBA is shown in Figure 3.

FIGURE 3: DIAGRAM OF CBA METHODOLOGY (GENERAL)



Source: SGS, 2021

Notes for Figure 3:

- Marginal costs and benefits – CBA is forward looking in scope, and it only models the incremental change between the 'base case' and 'project case' scenario. That is, the change that is directly generated through a particular investment or intervention
- Transfer effects – if a project merely transfers a benefit from one area or group of people to another, there is no net gain or loss. These effects have no bearing on the overall efficiency of resource allocation
- Monetising costs and benefits – not all effects will be traded, and there may not be direct evidence about the value of costs and benefits
- Discount cash flow analysis – a benefit promised in the future generally has a lower value than the same benefit delivered today. Future effects must be expressed in 'present value terms' (PV) to enable direct comparison.

2.2 Quantitative costs and benefits

SGS's analysis takes a high-level approach in that it considers the network as a whole and does not capture discrete current use and future demand on individual trails, or indeed on trails and cycling paths that connect in adjacent local government areas, such as City of Yarra or City of Melbourne. As such, the outputs show the likely social, economic and environmental return on investment within an approximate order of magnitude. Sensitivity testing is conducted to illustrate other potential outcomes.

Within this report, CBA findings are presented through two key economic indicators:

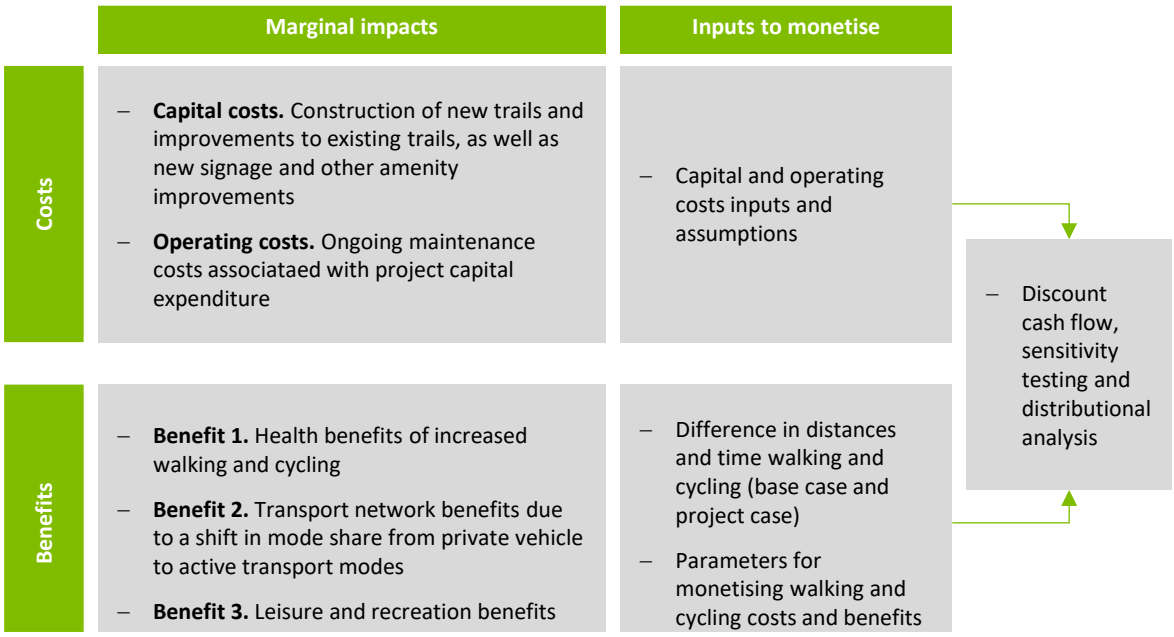
- Net Present Value (NPV) - measures the difference between benefits and costs, while accounting for their varying timing. A project with an NPV greater than zero indicates the PV of benefits exceeds the PV of costs and is considered economically viable.
- Benefit-cost ratio (BCR) - measures the benefits received per dollar of project costs and is used to indicate value for money. BCR is calculated by dividing the PV of all benefits with the PV of all costs (including recurring maintenance). A project with a BCR greater than one means the PV of benefits exceeds the PV of costs and is considered economically viable.

As shown in Figure 3, a project is considered against a counterfactual, or 'base case' scenario. The base case and project case scenarios are defined below:

- Base Case. The base case reflects a business-as-usual scenario; whereby no additional capital works are undertaken to extend or improve the Northern Regional Trails Network.
- Project Case. As shown in Figure 2, the project case involves extending and filling gaps in the existing network. This will enable the Northern Regional Trails Network to cater to more people and/or create a more pleasant and safer trail environment.

Costs and benefits modelled for the Northern Regional Trails Upgrade project are listed in Figure 4.

FIGURE 4: DIAGRAM OF CBA METHODOLOGY (NORTHERN REGIONAL TRAILS UPGRADE PROJECT)



Source: SGS, 2021

Sensitivity testing

This assessment depends on a range of assumptions, both in terms of financial parameters, such as discount rates and cost estimates, as well as demand assumptions and benefit parameters.

The following sensitivity analysis has been undertaken to test potential impacts on economic viability should certain assumptions not eventuate:

- A discount rate of seven per cent will be used as the basis of the assessment, with sensitivity testing conducted with discount rates of 4 and 10 per cent
- Capital expenditure (CAPEX) estimate +/-20 per cent
- Benefits +/-20 per cent
- Optimistic case/pessimistic case scenarios i.e. +20 per cent benefits and -20 per cent costs; -20 per cent benefits and +20 per cent costs

2.3 Qualitative benefits

Other benefits discussed qualitatively within this report include:

- Economic value added derived from additional tourism expenditure
- Stimulation and growth of local businesses
- Increased community use and enjoyment, including from improved social capital and cohesion, and enhanced education outcomes
- Environmental benefit derived from any mode shift from private vehicles to active transport.

3. Modelling parameters

3.1 General appraisal parameters

All costs and benefits are subject to general economic and timing appraisal parameters. These general parameters are shown in Table 4.

TABLE 4: GENERAL APPRAISAL PARAMETERS

Parameter	Value	Comment
Discount rate	7%	Default rate for evaluation (sensitivity tests 4% and 10%)
Appraisal period	30 years of benefits	Standard recommended appraisal period (AustRoads and Infrastructure Australia)
Base year	FY2022	Year zero of project evaluation and cost estimate pricing.
Construction starts	FY2023	First year of construction
Project construction period	10 years	Assumes project works are rolled out over a 10-year period
Benefits ramp up period	10 years	Assumes benefits are delivered incrementally in line with construction. 100% of benefits are delivered only in the first year following the 10-year construction period

Source: SGS, 2021

3.2 Capital and operating cost parameters

Project CAPEX data was provided to SGS by FFLA. A summary of this data is provided in Appendix A. SGS did not undertake a review of CAPEX data.

The undiscounted capital cost of all works sums to $189,795,000. CAPEX has been evenly allocated across the 10-year construction rollout period within the CBA model (from FY2023 to FY2032).

Project operating expenditure (OPEX) has not been modelled in detail. OPEX costs have been assumed at two per cent of CAPEX per year. OPEX ramps up in line with CAPEX over a 10-year period.

3.3 Demand forecast parameters

As outlined in Figure 4, three benefits were monetised via the Northern Regional Trails Upgrade CBA. The benefits are:

1. Health benefits of increased walking and cycling
2. Transport network benefits due to a shift in mode share from private vehicle to active transport modes
3. Leisure and recreation benefits

Realisation of these benefits is underpinned by an increase in trail demand associated with the project; in particular, an increase in the distance and time that people walk and/or cycle. As a starting point for modelling these benefits, SGS has, therefore, undertaken demand forecasting to understand:

- The distance, in kilometres, that people walk and cycle each year in the base case and project case
- The time, in hours, that people walk and cycle each year in the base case and project case

Increased trail usage stems from two user groups:

- Increased use from **existing users** of the Northern Regional Trails network, due to improved connections and amenity
- **New users** of the Northern Regional Trails network, whose use is facilitated by improved connections associated with an expended network and/or improved amenity.

The steps undertaken to forecast demand for these user groups are summarised in Table 5, and detailed further below.

TABLE 5: DEMAND FORECASTING METHOD

Step	Overview
1. Model population within proximity of existing and future trail network	This was undertaken via geographic information system (GIS) analysis.
2. Review survey data	Survey data was analysed to understand: – Cycling and pedestrian mode share/split – User issues with the current network, and how use may change if issues are addressed
3. Review/model existing users of the Northern Regional Trails network	Survey and trail count data was reviewed. This included data provided by Councils and publicly available data (e.g. Bicycle Network Super Tuesday and Super Sunday data, as well as VicRoads and State Government data).
4. Research and develop assumptions relating to cycling and walking time and average walking and cycling speeds	The hours and kilometres that an average user cycles and walks was calculated
5. Model walking and cycling distance and time	Using the findings from steps 1-4, model the distance (in kilometres) and time (in hours) that people walk and cycle by year in the base case and project case

Source: SGS, 2021

Step 1. Model population within proximity of existing and future trail network

GIS analysis was undertaken to determine the population that is currently and forecast to be within 400 metres of the existing and future Northern Regional Trails network. 400 metres was chosen as the buffer distance as this is within a moderate paced five-minute walk and is deemed to be conveniently accessible. This buffer distance aligns with Victorian transport planning practice[5], as well the Victorian Planning Authority regarding open space provision. While this approach and use of this buffer distance does have limitations – in particular, SGS recognises that many people within the 400 metre buffer may never use the trails, and many beyond the distance may – it is suitable in light of limited count data and lack of other suitable data. This is a conservative approach to estimating existing and future users.

Small Area Land Use Project (SALUP) data, prepared by SGS for the Victorian Government, was used to model population growth over the project timeframe.

Outputs of the analysis is shown in Table 6.

TABLE 6: POPULATION WITHIN 400 METRES OF CURRENT AND FUTURE TRAIL NETWORK

Area	2021	2031	2041	2051
Population within 400 metres of existing trail network	373,728	431,722	489,386	555,823
Population within 400 metres of existing and future trail network	455,604	531,493	609,849	695,760
Proportionate population increase within 400 metres of future trail network	21.9%	23.1%	24.6%	25.2%

Source: SGS, 2021

Trail use in the base case and project cases has been modelled to increase in line with population within the 400 metre catchment of the relevant trails network. Although this is an imperfect forecast (not all people within the catchment may use the trails, and others outside the catchment may use the trails), it is considered an appropriate representation of how trail use may change over the appraisal period, all other things being equal.

The population within 400 metres of the existing and future trail network is around 22 to 25 per cent greater than the population that is currently and forecast to be within 400 metres of the existing network only. This suggests that network extensions, without works to fill in small network gaps and amenity improvements, would be likely to generate around a 22 to 25 per cent increase in trail use, assuming the new trails provide similar amenity and connections as existing trails.

Step 2. Review survey data

In addition to changes to trail demand associated with population growth, trail demand will increase if the project case capital works lead to improved connections and/or enhanced network amenity.

[5] For example, provision of car parking differs within 400 metres of the Principal Public Transport Network. Similarly, the Victorian Transport Guidelines for Land Use and Development recommend that dwellings should be within 400 metres of a bus route, as this distance is deemed convenient.

A survey was conducted to understand the community's current use of the trail network as well as their views on how it can be improved to encourage further use. A total of 923 responses were received with the vast majority (91 per cent) being residents of Northern Metropolitan Melbourne. Relevant survey data and SGS analysis of data is provided in Appendix B.

Survey findings that have informed the demand forecasts are detailed in Table 7.

TABLE 7: DEMAND PARAMETERS INFORMED BY SURVEY DATA

Parameter	Value	Comment
Trail use uplift for existing users due to network improvements	12.15% increase	This value was sourced from survey data, however, SGS has applied a significant reduction. Survey findings indicate that existing users would, on average, use the trail network around 53% more if a range of improvements were made. The improvements were comprehensive and included things such as delivery of cafes and community facilities along the trails, safety campaigns, more toilets along the trails, separation of pedestrian paths from cycling paths, and others. These elements, and many others, have not been included/costed within the Northern Regional Trails Strategy (at least not across the full network). Therefore, adoption of the full 53% uplift indicated by survey participants would overestimate impacts. SGS has instead applied an uplift of 12.15%, which is 23% of the 53%. This assumes that three of the core interventions are delivered across the network: more trails, improved connectivity between trails and improved connectivity to destinations. The adoption of this proportion reflects that not all treatments that may lead to increased participation will be delivered but it is known that approximately 23% of indicated behaviour change is likely to occur as part of the Northern Regional Trails project.
Proportion of trail users that walk or undertake a comparative exercise (including running)	47.9%	These values were sourced from survey data. Understanding the mode split on the trail network is necessary to appropriately monetise the benefits associated with each mode.
Proportion of trail users that cycle	52.1%	

Source: SGS, 2021

Step 3. Review/model existing users of the Northern Regional Trails network

Data for the existing trail network was difficult to source, and available data was often incomplete. Available data for the Northern Regional Trails network may not be representative of the entire network due to the following reasons:

- Trail count data is often only undertaken at a single point, and it may omit users who access other parts of the trail
- Bicycle Network Super Tuesday and Super Sunday cyclist counts only capture around two and three hours of the day, respectively
- Count data is often only collected on a single day, and does not account for weekly and seasonal trail use patterns

Due to the above limitations, SGS has taken an alternative approach and assumed that 2.5 per cent of residents within 400 metres of the existing trail network (373,728 people, as per Table 6) use the trails each day. The assumed 2.5 per cent equates to 9,343 users across the entire Northern Regional Trails network each day, or around 3.4 million users each year (see details in Table 8).

TABLE 8: ESTIMATE OF ANNUAL TRAIL USE (EXISTING)

Parameter	Value	Comment
Annual use of the existing trail network per year (2021)	3,410,268 trips per year	This is a daily value of 9,343, multiplied by 365 days (days in year)

Source: SGS, 2021

The use of 2.5 per cent can be considered a conservative estimate, based on the following factors:

- The Capital City Trail, one of Melbourne's most used trails, accommodates more than one million users each year.[6] The Northern Regional Trails Network consists of more than 20 trails, albeit none with uses as heavily as the Capital City Trail, or that connects the same destinations through a highly populated corridor.
- Around six per cent of Melbournians walk or cycle to work each day, and 19 per cent walk or cycle for weekday recreational use/trips.[7] Adoption of these values would over state benefits significantly, as most of these trips are likely to use the road network and footpaths.
- On Census date in 2016, around 8,700 residents within the study area LGAs cycled to work, and 6,800 walked to work. This sums to around 15,500 active transport commuters on a given day within the study area, many of which would use the trails network.
- According to the 2019 AustRoads cycling Participation Survey, around 12 per cent of Melbournians cycled at least once over a one-week period.
- There are around 20 trails as part of the current Northern Regional Trails network[8], and count data across four of those trails sums to around 3,800 users per day:
    - Diamond Creek Trail – daily count: 663 pedestrians and cyclists.[9] This was an average count across two count points, which collected data throughout a 12-month period)
    - Upfield Rail Trail (along the rail line from Parkville to Gowrie) – daily count: 2,096 pedestrians and cyclists.[10] This was an average count across three count points, taken on 5 February 2019 (a Tuesday). This may overstate average daily benefit due to relative warm weather in February
    - Merri Creek Trail and Moonee Ponds daily cyclist count: 626 and 411 cyclists, respectively (this does not capture pedestrians).[11]

[6] Streets Alive Yarra website, accessed February 2022
[7] Department of Transport, Victorian Cycling Strategy 2018-2028
[8] The survey conducted as part of the project lists 19 trails
[9] Count data provided by Nillumbuk Shire, 2021
[10] Count data sourced from City of Moreland website: Upfield Corridor Study, accessed 2021
[11] Count data sourced from The Age: Car parks out, footpaths and cycling lanes in as city prepares for post-COVID commuters, accessed 2021

It is expected that daily use on the remaining trails would elevate network use above the assumed daily volume of 9,343 users per day.

Step 4. Develop assumptions relating to cycling and walking time and average walking and cycling speeds

There was limited data for the time that people spend walking and cycling, and the distance they travel. SGS has, therefore, developed the assumptions outlined in Table 9.

TABLE 9: TRAVEL TIME AND DISTANCE PARAMETERS

Parameter	Value	Comment
Average time walked per person recreationally (base case and project case)	25 minutes	This is based on ABS Physical Activity report.
Average time walked per person commuting (base case and project case)	65 minutes	This is based on ABS commuting to work average walking distance of 5.4 kilometres (two way) considering an average travel time of 5 kilometres per hour
Average time cycled per person recreationally (base case and project case)	27 minutes	This is based on data from the Victorian Integrated Survey of Travel and Activity (VISTA)
Average time cycled per person commuting (base case and project case)	32 minutes	This is based on ABS commuting to work average cycling distance of 11 kilometres, considering an average travel time of 20 kilometres per hour
Average distance walked per person recreationally (base case and project case)	2.1 kilometres	This is based on ABS Physical Activity report which indicates 25 minutes of recreationally walking at an average walking pace of 5 kilometres per hour.
Average distance walked per person commuting (base case and project case)	5.4 kilometres	This is based on ABS commuting to work average walking distance.
Average distance cycled per person recreationally (base case and project case)	9 kilometres	This is based on VISTA recreationally cycling time at an average pace of 20 kilometres per hour.
Average distance cycled per person commuting (base case and project case)	11 kilometres	This is based on ABS commuting to work average cycling distance.

Step 5. Model walking and cycling distance and time

Based on parameters outlined in step 1 through to step 4, the distance and time that people spend walking and cycling on the Northern Regional Trails network in the base case and project case was modelled. Refer to Table 10 for distance data and Table 11 for time data. It has been assumed that the increased use in the project case is a true increase, and not associated with any transfer effects.

TABLE 10: ESTIMATE OF TOTAL KILOMETRES WALKED AND CYCLED ANNUALLY

Mode	Scenario	2021	2031	2041	2051
Walking	Base case	4,138,214	4,780,369	5,418,871	6,154,514
	Project case (existing users existing users due to improvements)	4,641,007	5,361,184	6,077,264	6,902,288
	Project case (new trail use)	1,016,748	1,251,187	1,529,147	1,784,351
	Project case (total)	5,657,754	6,612,372	7,606,411	8,686,639
	Incremental difference (project case minus base case)	1,519,541	1,832,002	2,187,539	2,532,124
Cycling	Base case	16,414,571	18,961,736	21,494,406	24,412,397
	Project case (increased trail use from existing users due to improvements)	18,408,942	21,265,587	24,105,977	27,378,503
	Project case (new trail use)	4,033,015	4,962,940	6,065,488	7,077,776
	Project case (total)	22,441,957	26,228,526	30,171,465	34,456,279
	Incremental difference (project case minus base case)	6,027,385	7,266,791	8,677,058	10,043,882

Source: SGS, 2021

TABLE 11: ESTIMATE OF HOURS WALKED AND CYCLED ANNUALLY

Mode	Scenario	2021	2031	2041	2051
Walking	Base case	827,643	956,074	1,083,774	1,230,903
	Project case (increased trail use from existing users due to improvements)	928,201	1,072,237	1,215,453	1,380,458
	Project case (new trail use)	203,350	250,237	305,829	356,870
	Project case (total)	1,131,551	1,322,474	1,521,282	1,737,328
	Incremental difference (project case minus base case)	303,908	366,400	437,508	506,425
Cycling	Base case	820,729	948,087	1,074,720	1,220,620
	Project case (increased trail use from existing users due to improvements)	920,447	1,063,279	1,205,299	1,368,925
	Project case (new trail use)	201,651	248,147	303,274	353,889
	Project case (total)	1,122,098	1,311,426	1,508,573	1,722,814
	Incremental difference (project case minus base case)	301,369	363,340	433,853	502,194

Source: SGS, 2021

3.4 Benefit parameters

Economic valuation parameters for the benefits have been sourced from Australian Transport Assessment and Planning (ATAP) documentation and survey data.

Benefit 1. Health benefits of walking and cycling

The 2007-2008 National Health Survey identified that physical inactivity is related to chronic health conditions including ischaemic heart disease, stroke, Type 2 diabetes, kidney disease, osteoarthritis, osteoporosis, colorectal cancer and depression. Active travellers, including walkers and cyclists, tend to be healthier than people who are relatively inactive or sedentary and suffer less from medical conditions that reduce their life expectancy. Healthy individuals place less demand on the health system for diagnosis, surgery and recovery.

The types of health-related benefits attributable to active travel which have been quantified as part of the CBA are:[12]

- Morbidity and mortality benefits: people who are active get sick less often and have a longer life expectancy than people who are inactive
- Reduction in health system costs: active people are less likely to need medical and hospital care.

Improved mental health is recognised as a positive impact associated with active travel, however, this benefit is not quantified within the CBA.

As outlined earlier in the report, the project case is expected to lead to greater use of the Northern Regional Trail network, though increased use from existing users and attraction of new users. This will lead to increased kilometres walked and cycled, thus generating important health benefits for the community.

Health benefit parameters are outlined in Table 12.

[12] ATAP M4 Active Travel, 2016

TABLE 12: HEALTH BENEFIT PARAMETERS

Parameter	Value	Comment
Kilometres walked and cycled per year	As per demand forecasts. Refer to Table 10	
Health benefit of one kilometre walked	$3.26	These values are derived from ATAP M4 Active Travel document. Data is from FY2013, and has been indexed to the current financial year using consumer price index (CPI) data sourced from the Reserve Bank of Australia (RBA).
Health benefit of one kilometre cycled	$1.65	

Source: SGS, 2021; ATAP M4 Active Travel, 2016

Benefit 2. Transport network benefits

Active travel initiatives, such as the Northern Regional Trail Upgrade project, have the potential to lead to a mode shift from private vehicle to active travel modes. Closing gaps in the inner and middle-ring suburban areas of Melbourne would improve the speed and safety at which people may be able to travel between their place of residence and their place of work via active modes.

This benefit is only applicable to the proportion of users that use the trail network as a means to get from one place to another. That is, the benefit is not applicable to recreational users.

Transport network benefit parameters are detailed in Table 13.

TABLE 13: TRANSPORT NETWORK BENEFIT PARAMETERS

Parameter	Value	Comment
Kilometres walked and cycled per year	As per demand forecasts. Refer to Table 10	
Proportion of commuter trail users	14.39%	This value was sourced from survey data (see Appendix B). While the proportion is expected to change slightly in the project case, 14.39% has been adopted and is considered suitable for the analysis. While the figure is likely to be high for the users in the northern part of the region, it is considered low for the more urbanised parts of the region closer to the CBD.
Value of one kilometre travelled	$0.66	This is derived from ATAP M4 Active Travel document. It comprises decongestion, savings in car user costs, parking saving costs, air pollution reduction, noise reduction and greenhouse gas reduction. Data is from FY2010, and has been indexed to the current financial year using CPI data sourced from the RBA.

Source: SGS, 2021

Benefit 3. Leisure and recreation benefits

The utility derived from using the trails presents a benefit to users of the trail. In terms of the benefit provided to the regional community, this can be calculated through summing the utility derived from all local users of a trail.

As access to the trails are free of charge, the utility provided to resident users has been quantified using the Travel Cost Method (TCM). Under the TCM, the time taken to travel to and from the trail, as well as the time using the trail, are used to place a value on the benefit derived. SGS has modelled the leisure and recreation benefits using an adapted version of the TCM where only the time spent using the trail has been used to model the benefit. This is conservative, as it excludes additional travel time associated with accessing the trails. Additionally, the TCM has only been modelled for the recreation proportion of trail users, and it excludes those who commute. This is also a conservative approach, as commuters are also likely to place a recreation benefit on their commute, rather than viewing their trip purely a means of transport.

Leisure and recreation benefit parameters are detailed in Table 14.

TABLE 14: LEISURE AND RECREATION BENEFIT PARAMETERS

Parameter	Value	Comment
Hours walked and cycled per year	As per demand forecasts. Refer to Table 11.	
Proportion of recreation trail users	85.6%	This value was sourced from survey data
Value of leisure time (per hour)	$17.32	This is derived from ATAP PV2 Road Parameter Values document. Private travel time was valued at 40% of seasonally adjusted full time average weekly earnings. The parameter value within the ATAP document is $14.99 and is from FY2013. This has been indexed to a current financial year value using wage price index (WPI) data sourced from the Australian Bureau of Statistics (ABS)

Source: SGS, 2021

4. Cost-benefit analysis results

4.1 Capital and operating costs

There is no CAPEX in the base case as the existing network is retained in its current state. CAPEX in the project case sums to $95,911,000 and has been evenly allocated across a 10-year construction period. The PV of CAPEX in the project case is around $72 million.

OPEX has been assumed to be the same for the elements of the base case that are retained in the project case. Incremental OPEX in the project case has been assumed at two per cent of CAPEX per year. The PV of OPEX in the project case is around $17 million.

Refer to Table 15.

TABLE 15: PRESENT VALUE OF COSTS (7% DISCOUNT RATE)

Cost component	Base case	Project case
CAPEX ($m)	$0	$142.6
OPEX ($m)	$0	$33.6
Total ($m)	**$0**	**$176.3**

Source: SGS, 2021

4.2 Quantitative benefits

The quantified present value of benefits associated with the Northern Regional Trails project is outlined in Table 16.

TABLE 16: PRESENT VALUE OF BENEFITS (7% DISCOUNT RATE)

Benefit component	Project case	Proportion of total benefits
PV of health benefit ($m)	$180.2	62%
PV of transport network benefits ($m)	$11.6	4%
PV of leisure and recreation benefits ($m)	$98.6	32%
Total ($m)	**$290.5**	**100%**

Source: SGS, 2021

These benefits stem from a 33 per cent uplift in trail use, compared to the base case. Around two thirds of this uplift stems from increased use by existing users, while one third is due to new users.

The 33 per cent uplift in use has been modelled to be a direct result of amenity and network connectivity improvements, as well as extending the entire trail network by around 68 per cent. The growth in use by new users has been modelled in line with the population that is within 400 metres of the existing and future network, rather than the degree to which the network is extended. That is, much of the trail network extensions will service lower density areas than the existing network.

Health benefits generate the greatest share of benefits, at just over 60 per cent of total benefits.

4.3 Economic appraisal of results

Standard outputs

Under a seven per cent discount rate, the project results in a net present value (NPV) of around -$1.99 million and a benefit cost ratio (BCR) of 1.6. This means that for each $1 invested, $1.60 of benefits is generated, indicating that the Northern Regional Trails Upgrade project constitutes an economically warranted investment.

The NPV of $114 million is for a 30-year appraisal period and translates to an average annual net benefit of around $3.8 million. For the 2051 population within 400 metres of the existing and future trail network, this equates to net present welfare benefit of around $5.5 per person per year over the 30-year period.[13]

Refer to Table 17 for standard CBA outputs.

TABLE 17: CBA STANDARD OUTPUTS

Cost component	Project case
Total PV cost ($m)	$176.6
Total PV benefit ($m)	$290.5
NPV ($m)	$114.2
BCR ($m)	1.6

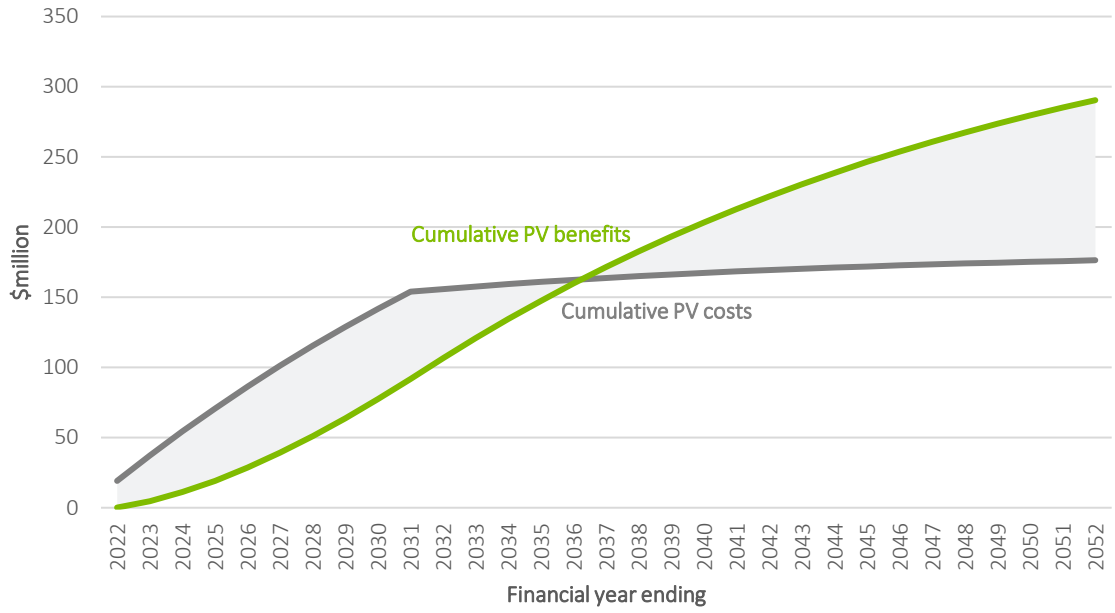
Source: SGS, 2021

As previously detailed within this report, the CAPEX has been modelled to be evenly distributed across a 10-year period. Benefits ramp up accordingly. The cumulative PV of costs and benefits is shown in Figure 5.

[13] This is not an exact value as the benefits are not evenly distributed across the appraisal period, and the 2051 population is not reflective of population throughout the entire appraisal period. The $6 per year has been modelled to illustrate order of magnitude annual benefits for members of the community who may use the network.

Costs exceed benefits until approximately FY2037, at which point costs increase marginally as per OPEX assumptions, while benefits increase rapidly as users enjoy and gain value from an improved and expanded network.

FIGURE 5: CUMULATIVE NPV



Source: SGS, 2021

Sensitivity testing

Standard outputs are based on CAPEX data provided by FFLA, demand forecasts, survey data, assumptions made by SGS about annual OPEX and current trail use, benefit parameters, and financial parameters. There is uncertainty with all parameters used and sensitivity testing has been undertaken to assess how the economic viability of the project may change should certain parameters and assumptions not hold true throughout the period.

The sensitivity tests undertaken are detailed below:

- Discount rates of 4 and 10 per cent (standard testing used a discount rate of seven per cent)
- Capital expenditure (CAPEX) estimate +/-20 per cent
- Benefits +/-20 per cent
- Optimistic/pessimistic case scenarios i.e. +20 per cent benefits and -20 per cent costs; -20 per cent benefits and +20 per cent costs

Sensitivity test outputs are shown in Table 18. All outputs generate positive BCRs, with the pessimistic case scenario resulting in a BCR of 1.1, and the optimistic case scenario resulting in a BCR of 2.5. It is important to note that the sensitivity tests undertaken do not illustrate the bounds of possible outcomes. In particular, project costs and benefits may vary by greater than 20 per cent of what was modelled as part of standard outputs.

TABLE 18: CBA SENSITIVITY TESTING OUTPUTS

Sensitivity test	NPV ($m)	BCR
Varying discount rate		
4%	235.1	2.1
10%	48.5	1.3
Varying benefits		
+20%	172.2	2.0
-20%	56.1	1.3
Varying costs		
+20%	78.9	1.4
-20%	149.4	2.1
Optimistic/pessimistic case scenarios		
Optimistic case (+20% benefits & -20% costs)	207.5	2.5
Pessimistic case (-20% benefits & +20% costs)	20.8	1.1

Source: SGS, 2021

4.4 Qualitative benefits

The Northern Regional Trails Upgrade project is likely to generate a range of wider socio-economic benefits that have not been included in the CBA, due in part to difficulty in monetising these benefits. While these benefits are discussed qualitatively only, their impact may have real economic value to community members and visitors to the northern region. Application of CBA techniques or development of assumptions to assess these benefits within the CBA would strengthen the economic merit of investing in the Northern Regional Trails Upgrade project.

Qualitative benefits include, but are not limited to:

- Economic value added derived from additional tourism expenditure
- Stimulation and growth of local businesses
- Increased community use and enjoyment, including from improved social capital and cohesion, improved heritage and historical outcomes, and enhanced education outcomes

These benefits are described further below.

Economic value derived from additional tourism expenditure

Some trail projects have potential to facilitate an increase in visitors and the economic yield that the surrounding area receives from tourism. Within Victoria, these trails are generally iconic regional trails, such as old rail trails or trails within Victoria's high environmental amenity areas.

Increased economic value added derived from additional tourism expenditure is generally only a monetisable benefit when the additional tourism expenditure is from interstate or international visitors, as Victorian expenditure would be viewed as a transfer effect; i.e. it would offset spending elsewhere in Victoria.

Upgrading the Northern Regional Trails network is unlikely to generate significant additional tourism to Victoria, however, there may be some minor benefits from interstate and international visitors who may spend more money in Victoria due to the trails, either due to spending greater money each day, or extending their stay beyond what they otherwise would have without the project.

Not upgrading the Northern Regional Trail Network would mean that Victoria, and in particular the northern LGAs of Melbourne, would miss out on an opportunity to attract more visitors and to capitalise on the growth of tourism to the State.

Stimulation and growth of local businesses

An increase in people walking and cycling can attract a larger pool of customers to businesses. Combine this with the fact that people who walk and cycle spend more overall than those who drive[14], and this can lead to increased business confidence and increased investment in the areas serviced by the trail network. Further opportunities for businesses can include bike hire sales and servicing, pop up cafes and other mobile food and beverage businesses.

Improved cycling and walking facilities can support locations that vie for tourism activity[15] which may benefit the more regional areas of the trail network, while the more built-up areas of the metropolitan area will benefit from the higher spend and increased foot traffic that accompanies improvements to active transport infrastructure and amenity.

Increased community use and enjoyment

Improved social capital and cohesion

An improved trail network can support anchor points for the northern LGAs of Melbourne, creating an enhanced sense of community pride. Having more social interactions along the pathway would also aid in social cohesion, with connections developed on the pathway being reinforced as time goes on.

[14] Transport for London (2018) walking & cycling - the economic benefits; Lee and March (2010), Recognising the economic role of bikes - sharing parking in Lygon Street, Carlton, *Australian Planner*, vol 47, no. 2, pp. 85-93; Angelopoulos S., Boymal J, de Silva A., (2019) Economic benefits of 20-minute neighbourhoods, RMIT Placemaking Economics Group, Melbourne

[15] Town of Gawler (2019), Visitor Economy + Cycle Tourism Situation Analysis, Tourism e-school.

Enhanced education outcomes

Walking and cycling paths present a unique opportunity for education. People of all ages can learn more about nature, culture or history. They can give people a sense of place and an understanding of the enormity of past events and an understanding of what is at stake if the environment is not properly cared for.

The increased awareness of immersion in nature leads to more respect for the environment, and a desire to protect it, across a wide range of cohorts.

5. Conclusion

The Northern Regional Trails Network serves a valuable function for the surrounding community and its continued development is important to capitalise on the benefits of walking and cycling, particularly in response to an increasingly dense urban footprint and population. An expanded trail network can provide accessible recreation, active travel opportunities, and economic benefits not only to the communities in Melbourne's north, but to a wider population of commuters and recreational users.

While the economic impact of cycling and walking is repeatedly and widely demonstrated both across Australia and around the world, the cost benefit analysis for this network program is shown to offer potentially significant gains to Melbourne's population. Through a combination of health benefits, transport network benefits, and leisure and recreation benefits, the benefit-cost score delivers a BCR of 1.6, offering 1.6 times the economic payout over time than the costs.

This is significant for a number of reasons. First, assumptions about future demand are conservative. It seems very likely that demand for walking and cycling will continue to increase.

Second, there are a host of additional economic, social, health, and environmental benefits to society and individuals resulting from an increase in walking and cycling that have not been monetised within the CBA, such as increased tourism, the stimulation and growth of local businesses, the increased social capital and cohesion of the local community and increased educational outcomes. Beyond these benefits, there are further significant financial savings to individuals and society from improved mental and physical health[16], improvements to workplace productivity[17], and a range of further environmental benefits.[18]

[16] Garrard J. (2009), Active Transport: Adults – An overview of recent evidence, VicHealth; Claris S & Scopelliti D (2016), Cities Alive – Towards a walking world, Arup

[17] Leyden 2003; Claris S & Scopelliti D (2016), Cities Alive – Towards a walking world, Arup

[18] Massink R, Zuidgeest M, Rijnsburger J, Sarmiento O, & van Maarseveen M (2011), The Climate Value of Cycling, *Natural Resources Forum*, vol. 35

Appendix A: Project capital costs

Project Description	Location: Trail Name	Cost estimate
Provide wayfinding signage along the length of the trail	Aitken Boulevard Shared Trail	$50,000
Construct new section of trail on the eastern side of Aitken Boulevard from the Aitken Creek to Craigieburn Road	Aitken Boulevard Shared Trail	$215,000
Construct new section of trail from Brookfield Boulevard to Highlands Shopping Centre	Aitken Boulevard Shared Trail	$315,000
Construct new section of trail from the Yuroke Creek Trail to Somerton Road following duplication of Somerton Road and a safe crossing point being constructed	Aitken Boulevard Shared Trail	$430,000
Construct new section of trail from Wattle Drive north to Watsonia Station	Banyule Shared Trail	$250,000
Construct new section of trail from Watsonia Station north to Grimshaw Street	Banyule Shared Trail	$335,000
Construct new section of the trail from Banksia Street south to the Yarra Trail just north of McArthur Road	Banyule Shared Trail	$660,000
Realign trail at playground on River Gum Walk to reduce incline	Banyule Shared Trail	$75,000
Provide wayfinding signage along the length of the trail	Banyule Shared Trail	$50,000
Provide a grade separated north-south walking and cycling link across Grimshaw Street at the Greensborough Bypass	Banyule Shared Trail	$1,700,000
Plan for a new section of trail from the rail line in Sunbury east to Jacksons Creek and The Nook/Bicentennial Park	Blind Creek Trail	$310,000
Provide wayfinding signage along the length of the trail	Blind Creek Trail	$50,000
Investigate the feasibility of realigning the underpass at Riddell Road to cater to all users (cyclists) and improve access and safety	Blind Creek Trail	$1,700,000
Investigate a pedestrian priority crossing with wayfinding signage at Phillip Drive	Blind Creek Trail	$450,000
Investigate a pedestrian priority crossing at Elizabeth Drive	Blind Creek Trail	$450,000
Investigate a pedestrian priority crossing with wayfinding signage at Racecourse Road	Blind Creek Trail	$450,000
Upgrade section of trail at lake adjacent to Salesian College Sunbury	Blind Creek Trail	$110,000
Construct new section of trail on the western side of the creek from the train underpass east of Epping Station to Greenbrook Drive	Darebin Creek Trail	$150,000
Upgrade section of trail between Gona Street and Southern Road	Darebin Creek Trail	$200,000
Investigate the feasibility of an underpass or bridge crossing Plenty Road intersection to avoid section of trail on Plenty Road footpath	Darebin Creek Trail	$1,700,000
Construct a new section of trail on the eastern side of the Darebin Creek from Dunne Street to Chenies Street including an underpass at Dunne Street and Chenies Street	Darebin Creek Trail	$1,900,000
Investigate the feasibility of an underpass or signalised pedestrian crossing at Settlement Road to improve trail continuity	Darebin Creek Trail	$1,700,000
Construct a new section of trail that follows the creek from the Metropolitan Ring Road through the Darebin Creek Linear Reserve to connect to the new section of trail	Darebin Creek Trail	$510,000
Elevate the section of the Darebin Creek Trail where it passes beneath the Western Ring Road to avoid flooding	Darebin Creek Trail	$250,000
Investigate the feasibility of an underpass and bridge crossing at McKimmies Road to avoid section of trail on McKimmies Road bridge	Darebin Creek Trail	$1,700,000

Project Description	Location: Trail Name	Cost estimate
Investigate the feasibility of an underpass and bridge crossing at Childs Road to avoid section of trail on Childs Road bridge	Darebin Creek Trail	$1,700,000
Investigate the feasibility of an underpass and bridge crossing at Findon Road to avoid section of trail on Findon Road	Darebin Creek Trail	$1,700,000
Provide a pedestrian priority crossing at McDonalds Road roundabout	Darebin Creek Trail	$50,000
Construct new section of trail from Wilson Road to Graysharps Road, Hurstbridge.	Diamond Creek Trail	$1,650,000
Construct new section of trail from Graysharps Road to Fergusons Paddock	Diamond Creek Trail	$450,000
Construct an underpass at Main Hurstbridge Road, Diamond Creek to avoid busy traffic crossing	Diamond Creek Trail	$1,700,000
Widen trail surface from Allendale Road north to Main Hurstbridge Road	Diamond Creek Trail	$850,000
Install a signalised/ pedestrian priority crossing at Allendale Road	Diamond Creek Trail	$450,000
Maintain/ upgrade sections of bitumen trail surface through Eltham North Reserve, Research Gully, Eltham North Playground, and Edendale Community Farm	Diamond Creek Trail	$550,000
Realign the section of trail at the Wattletree Road underpass to create a gentler grade and wider trail surface	Diamond Creek Trail	$270,000
Construct new section of trail with wayfinding signage along Main Road and Diamond Street, Eltham to fill the gap in the trail and direct users to the continuation of the trail	Diamond Creek Trail	$600,000
Upgrade surface of existing trail between Susan Street Oval and Ely St, with wayfinding or line marking to create a consistent and legible trail	Diamond Creek Trail	$290,000
Provide wayfinding signage along the length of the trail	Diamond Creek Trail	$75,000
Maintain/ upgrade sections of bitumen trail surface through Eltham Bushland Reserve alongside Main Road	Diamond Creek Trail	$260,000
Realign/ enhance the section of trail through the Eltham Lower Park.	Diamond Creek Trail	$245,000
Realign/ enhance the existing underpass beneath Gastons Rd	Diamond Creek Trail	$270,000
Realign the sharp bend in the trail between Laurel Hill Drive and Allendale Road	Diamond Creek Trail	$120,000
Provide wayfinding signage along the length of the trail	East West Power Easement Trail	$50,000
Construct a section of trail from the Northern Pipe/ St Georges Rd/ Cheddar Road Trail north west along the vacant pipe reserve	East West Power Easement Trail	$865,000
Construct a section of trail from the Northern Pipe/ St Georges Rd/ Cheddar Road Trail south east along the vacant pipe reserve to Edwardes Lake Park	East West Power Easement Trail	$750,000
Construct a section of trail along Holt Parade to connect to the Darebin Creek Trail (at Valley Road)	East West Power Easement Trail	$100,000
Investigate the feasibility of a new section of trail, including a new bridge crossing, from the Darebin Creek Trail, at Holt Parade, around Mount Cooper to connect to the existing section of trail at Snake Gully Drive	East West Power Easement Trail	$1,900,000
Construct a section of trail from Reedy Rise to Plenty Road including a new pedestrian priority crossing at Plenty Road	East West Power Easement Trail	$1,100,000
Investigate options for providing a new section of trail from Dilkara Avenue to Gleeson Drive	East West Power Easement Trail	$300,000
Construct a section of trail from the existing trail on Morwell Avenue to Watsonia Station	East West Power Easement Trail	$600,000

Project Description	Location: Trail Name	Cost estimate
Upgrade existing footbridge over the rail line at Watsonia Station including an underpass/ overpass at Greensborough Road to avoid footpath and multiple road crossings	East West Power Easement Trail	$1,700,000
Construct a new section of trail along Wendover Place and Yallambie Road, along the easement to the Plenty River Trail	East West Power Easement Trail	$3,000,000
Construct new section of trail from the Merri Creek Trail to Ronald Street on the west bank	Edgars Creek Trail	$250,000
Construct new section of trail from Ronald Street to Carrington Road. Consider keeping the trail away from the creek and along development frontages	Edgars Creek Trail	$520,000
Construct new section of trail from Strahalbyn Chase to Contempo Boulevard	Edgars Creek Trail	$160,000
Construct a new section of trail along the creek from Carrington Road to Edwardes Lake. Explore the feasibility of a trail between Kia Ora Road and Henty Street on the east bank.	Edgars Creek Trail	$830,000
Construct a separate cycling only trail through Edwardes Lake Park	Edgars Creek Trail	$270,000
Construct a dedicated shared trail from the public toilets in Edwardes Lake Park, around the car park and over Leamington Street	Edgars Creek Trail	$575,000
Investigate the feasibility of an underpass and bridge crossing at Broadhurst Avenue	Edgars Creek Trail	$1,700,000
Construct a section of trail along the creek from Glasgow Avenue to the Metropolitan Ring Road	Edgars Creek Trail	$4,600,000
Upgrade surface of trail between Main Street and Melaleuca Drive	Edgars Creek Trail	$145,000
Construct section of trail between German Lane and Kingsway Drive, Lalor	Edgars Creek Trail	$360,000
Construct section of trail along the street from Deveny Road to Cooper Street, Epping	Edgars Creek Trail	$360,000
Construct a section of trail along the creek from Jersey Drive to Rockfield Street	Edgars Creek Trail	$600,000
Construct section of trail along the creek from Sheba Way to Snowy Place	Edgars Creek Trail	$685,000
Provide wayfinding signage along the length of the trail	Edgars Creek Trail	$75,000
Provide wayfinding signage along the length of the trail	Galada Tamboore Pathway/ Craigieburn Shared Path	$50,000
Reinstate centre line marking along the trail	Galada Tamboore Pathway/ Craigieburn Shared Path	$50,000
Construct a new section of trail east from the Diamond Creek Trail at Wattle Glen Station along Watery Gully Creek to existing trail on Watery Gully Road		$2,200,000
Construct a new section of trail from Couties Road to Alma Road		$720,000
Construct a new section of trail along Long Gully Road from Alma Road to Turnung Road		$260,000
Construct an extension of the trail from the intersection of Clintons Road and Spanish Gully Road to the Marshalls Road car park within the Kinglake National Park		$2,000,000
Upgrade existing sections of to match width and material treatment of new sections		$3,600,000

Project Description	Location: Trail Name	Cost estimate
Provide wayfinding signage along the length of the trail		$75,000
Provide wayfinding signage along the length of the trail	Hendersons Creek Trail	$50,000
Provide a signalised/ pedestrian priority crossing over The Lakes Boulevard and Glenorchy Way	Hendersons Creek Trail	$450,000
Upgrade trail surface from Gordons Road to Darius Terrace	Hendersons Creek Trail	$350,000
Construct a section of trail from Darius Terrace to The Lakes Boulevard (at Findon Road) including a bridge crossing to connect to existing trail	Hendersons Creek Trail	$180,000
Provide a signalised/ pedestrian priority crossing over The Great Eastern Way	Hendersons Creek Trail	$450,000
Provide a signalised/ pedestrian priority crossing at Findon Road	Hendersons Creek Trail	$450,000
Upgrade trail surface from Findon Road to McDonalds Road	Hendersons Creek Trail	$470,000
Provide a signalised/ pedestrian priority crossing at McDonalds Road	Hendersons Creek Trail	$450,000
Provide a signalised/ pedestrian priority crossing or Underpass at Childs Road to connect to the Darebin Creek Trail	Hendersons Creek Trail	$1,700,000
Construct a new section of trail along the Hurstbridge rail line from the Darebin Creek Trail north to Rosanna Station	Hurstbridge Rail Trail	$1,800,000
Construct a new section of trail along the Hurstbridge rail line north of Davies Street to Ruthven Street	Hurstbridge Rail Trail	$250,000
Construct a new section of trail along McNamara Street from Ruthven Street to Macleod Station	Hurstbridge Rail Trail	$180,000
Construct a new section of trail along the Hurstbridge rail line from Macleod Station to Elder Street	Hurstbridge Rail Trail	$850,000
Construct a new section of trail along the Hurstbridge rail line from Elder Street to the Plenty River Trail	Hurstbridge Rail Trail	$1,300,000
Construct a new section of trail along the Hurstbridge rail line from the Plenty River Trail to the Diamond Creek Trail	Hurstbridge Rail Trail	$1,300,000
Construct new section of trail from Harker Street to Hammersmith Court	Jacksons Creek Trail	$580,000
Construct a new section of trail on both sides of the Jacksons Creek Corridor from Childs Road south to Bulla Diggers Rest Road	Jacksons Creek Trail	$22,000,000
Construct a new section of trail Bulla Diggers Rest Road to Organ Pipes National Park	Jacksons Creek Trail	$4,200,000
Establish a new trail from Hurstbridge to Arthurs Creek	Kinglake Way Trail	$7,500,000
Construct new section of trail connecting the Plenty River Trail near Lear Court, east along the aqueduct across Diamond Creek Road to the Diamond Creek Trail at Allendale Road.	Maroondah Aqueduct Trail	$1,800,000
Construct new section of trail from Main Road Diamond Creek, along Eltham-Yarra Glen Road, Creek Road, Eltham Road, Carters Lane and along Fryers Gully Drain while ensuring minimal impact to the Warrandyte - Kinglake Nature Conservation Reserve	Maroondah Aqueduct Trail	$3,600,000
Construct new section of trail from Warrandyte Kinglake Road, north along Westering, Ridge and Muir Roads to Skyline Road	Maroondah Aqueduct Trail	$3,250,000
Extend the trail west from Godber Road to connect to the Diamond Creek Trail	Maroondah Aqueduct Trail	$165,000

Project Description	Location: Trail Name	Cost estimate
Provide wayfinding signage along the length of the trail	Maroondah Aqueduct Trail	$75,000
Realign section of trail either side of Afton Street to reduce grade	Maroondah Aqueduct Trail	$475,000
Extend the Merri Creek Trail from the south end of Merri Concourse to Premier Drive	Merri Creek Trail	$360,000
Extend the Merri Creek Trail from Premier Drive to Cooper Street	Merri Creek Trail	$2,500,000
Extend the Merri Creek Trail from Cooper Street Epping to Oherns Road	Merri Creek Trail	$1,500,000
Extend the Merri Creek Trail from Oherns Road to Craigieburn Road	Merri Creek Trail	$3,700,000
Extend the Merri Creek Trail from Craigieburn Road to Summerhill Road	Merri Creek Trail	$1,900,000
Extend the Merri Creek Trail from Summerhill Road to Donnybrook Road	Merri Creek Trail	$3,700,000
Extend the Merri Creek Trail from Donnybrook Road to the Northern End of Moxham Drive	Merri Creek Trail	$955,000
Complete section of trail from the Metropolitan Ring Road to existing section of trail south of Horne Street	Merri Creek Trail	$415,000
Provide and upgrade line-marking to ensure continuous white lines indicating trail flow/ direction in high traffic areas	Merri Creek Trail	$50,000
Realign section of trail south of Heidelberg Road to reduce steep grade	Merri Creek Trail	$200,000
Provide a bridge crossing over the creek near the St Georges Road Bridge	Merri Creek Trail	$1,700,000
Relocate and widen trail from Merri Creek Primary School to Sumner Park outside of the flood zone	Merri Creek Trail	$540,000
Realign and widen trail north and south of Moreland Road	Merri Creek Trail	$200,000
Modify existing bridge alongside Moreland Road vehicular bridge to better serve pedestrians and cyclists	Merri Creek Trail	$1,700,000
Replace the Harding Street Bridge to cater for shared use	Merri Creek Trail	$1,700,000
Widen and reduce the steepness of the boardwalk section of trail from Edna Grove to Bell Street and create a new connection at Bell Street	Merri Creek Trail	$180,000
Widen and realign path outside of flood zone between Basil Nursing Home and Parker Reserve	Merri Creek Trail	$240,000
Construct a new section of trail from Vervale Avenue to the bridge crossing to the north to provide an alternative route with a gentler grade	Merri Creek Trail	$110,000
Provide wayfinding signage for Fawkner section of the Merri Creek (as per Moreland's Merri Creek Action Plan)	Merri Creek Trail	$50,000
Provide wayfinding signage along the length of the trail	Merri Creek Trail	$75,000
Provide wayfinding signage along the length of the trail	Metropolitan Ring Road Trail	$50,000
Investigate the feasibility of realigning the section of trail east of the Moonee Ponds Creek towards Jacana to reduce the incline	Metropolitan Ring Road Trail	$240,000
Advocate for an upgrade to the existing overpass at overpass at Jacana Station with wayfinding signage to improve connectivity and continuity	Metropolitan Ring Road Trail	$170,000
Upgrade section of trail between High Street and Dalton Road	Metropolitan Ring Road Trail	$510,000
Create a trail head at northern end of the trail at Marker Road ensuring alignment is outside federal airport boundary to avoid land access issues	Moonee Ponds Creek Trail	$600,000

Project Description	Location: Trail Name	Cost estimate
Upgrade surface and width of trail from Marker Road to and around Willowbrook Reserve to regional trail standard	Moonee Ponds Creek Trail	$1,260,000
Upgrade surface and width of trail from Willowbrook Reserve to Westmeadows Reserve to regional trail standard	Moonee Ponds Creek Trail	$720,000
Construct a new section of trail from Marker Road to Living Legends/ Woodlands Historic Park	Moonee Ponds Creek Trail	$2,000,000
Construct a new section of trail from Living Legends/ Woodlands Historic connecting to Somerton Road Woodlands entrance	Moonee Ponds Creek Trail	$600,000
Provide wayfinding signage along the length of the trail include at crossing points, connections to other trails and where appropriate to direct users to optimal trail route where alternatives occur	Moonee Ponds Creek Trail	$75,000
Upgrade surface of trail from the rail line south to the Essendon Baseball Club	Moonee Ponds Creek Trail	$360,000
Construct section of new trail between Primrose Street and Vanberg Road	Moonee Ponds Creek Trail	$360,000
Upgrade trail surface from Boeing Reserve, Strathmore, to Brunswick Road to improve safety and cross grade	Moonee Ponds Creek Trail	$3,600,000
Resurface trail connection from Gladstone Park down the hill to main trail	Moonee Ponds Creek Trail	$360,000
Construct a new section of trail from Union Street to the Hope Street pedestrian bridge. Consider a new bridge using former off ramp to Denzil Don Reserve to Victoria St as an alternative if required	Moonee Ponds Creek Trail	$540,000
Extend the Northern Pipe/ St Georges Rd/ Cheddar Road Trail north to the Metropolitan Ring Road	Northern Pipe/ St Georges Rd/ Cheddar Road Trail	$820,000
Improve access at the St Georges Rd/Merri Parade/ Charles St intersection to connect the Merri Creek Trail to the Northern Pipe Trail and create a direct access point to and from the trail with pedestrian and cyclist priority	Northern Pipe/ St Georges Rd/ Cheddar Road Trail	$400,000
Widen and resurface the section of trail between Clarke Street and Arthurton Road to align with newly constructed sections of trail	Northern Pipe/ St Georges Rd/ Cheddar Road Trail	$310,000
Advocate for trail alignment alongside the train line from Garden Street to Cheddar Road to replace section of trail on the footpath	Northern Pipe/ St Georges Rd/ Cheddar Road Trail	$760,000
Widen trail surface in the Cheddar Road central median from High Street to Hickford Street	Northern Pipe/ St Georges Rd/ Cheddar Road Trail	$540,000
Construct a new section of trail from High Street (near the Melbourne Water Reservoirs) along the vacant pipe reserve to the Merri Creek Trail at Murray Road	Northern Pipe/ St Georges Rd/ Cheddar Road Trail	$2,600,000
Extend trail east to Mclaughlans Lane	Plenty River Trail	$220,000
Upgrade and widen section of trail from Punkerri Circuit to Booyan Crescent	Plenty River Trail	$650,000
Realign section of trail to reduce grade and provide an underpass at Booyan Crescent	Plenty River Trail	$1,700,000
Widen section of trail under the Greensborough Bypass	Plenty River Trail	$250,000
Upgrade and widen section of trail at Main Street	Plenty River Trail	$250,000
Provide wayfinding signage at Poulter Reserve to direct users to the wider trail on the western side	Plenty River Trail	$50,000

Project Description	Location: Trail Name	Cost estimate
Construct a new section of trail at Bicton Street	Plenty River Trail	$150,000
Upgrade and widen section of trail with wayfinding signage at Montmorency Park	Plenty River Trail	$220,000
	Plenty River Trail	$900,000
Provide wayfinding signage along the length of the trail	Plenty River Trail	$75,000
Upgrade pedestrian bridges on the Plenty River Trail where required and improve sight lines where appropriate	Plenty River Trail	$1,700,000
Investigate the feasibility of realigning the Plenty River Trail to the eastern bank of the Plenty River between George Court and Para Road in order to avoid the steep grade on the west bank	Plenty River Trail	$165,000
Construct a new section of trail along the creek through The Plenty Gorge Parklands to Bridge Inn Road	Plenty River Trail	$1,800,000
Extend the trail from Bridge Inn Road north to Hazel Glen Drive	Plenty River Trail	$900,000
Advocate for the construction of a new trail along Somerton Road from Jacksons Creek to the Merri Creek Trail	Somerton Road Trail	$1,500,000
Construct new section of trail from Box Forest Road north to Metropolitan Ring Road	Upfield Rail Trail	$510,000
Advocate to Department of Transport to construct a new section of trail from the Metropolitan Ring Road to Upfield Station	Upfield Rail Trail	$1,500,000
Create a signalised pedestrian crossing over the road and train line at Boundary Road	Upfield Rail Trail	$400,000
Construct an off-road shared path along Bain Avenue	Upfield Rail Trail	$125,000
Widen section of trail between Plaisted Street and Shorts Road	Upfield Rail Trail	$150,000
Construct an off-road shared path along Ararat Avenue	Upfield Rail Trail	$125,000
Provide a signalised/ pedestrian priority crossing over Bakers Road	Upfield Rail Trail	$400,000
Construct an off-road shared path along Renown Street	Upfield Rail Trail	$160,000
Construct an off-road shared path along Batman Avenue	Upfield Rail Trail	$125,000
Upgrade and widen trail from Victoria Street to Jewell Station	Upfield Rail Trail	$360,000
Provide a signalised/ pedestrian priority crossing over Albert Street	Upfield Rail Trail	$400,000
Consider long term feasibility of separated cycle path between Park Street and Tinning Street		$1,600,000
Create a signalised pedestrian crossing over the road and train line at Box Forest Road	Upfield Rail Trail	$400,000
Create a signalised pedestrian crossing over the road and train line at O'Hea Street	Upfield Rail Trail	$400,000
Create a signalised pedestrian crossing over the road and train line at Albion Street	Upfield Rail Trail	$400,000
Create a signalised pedestrian crossing over the road and train line at Victoria Street	Upfield Rail Trail	$400,000
Construct a new trail along the train line from Mernda Station to Laurel Street, Whittlesea. Ensure there is provision to horse riders on parts of the trail	Whittlesea Rail Trail	$3,600,000
Provide a pedestrian priority crossing at the Lakes Boulevard	Whittlesea Rail Trail	$400,000

Project Description	Location: Trail Name	Cost estimate
Provide wayfinding signage along the length of the trail	Whittlesea Rail Trail	$50,000
Construct a new section of trail from The Metropolitan Ring Road Trail and the Northern Pipe/ Cheddar Road Trail to the Darebin Creek Trail	Yan Yean Pipe Track	$540,000
Construct a new section of trail from the Darebin Creek Trail to Childs Road	Yan Yean Pipe Track	$1,600,000
Construct a new section of trail from Childs Road to McDonalds Road and the Plenty Valley Activity Centre	Yan Yean Pipe Track	$1,300,000
Construct a new section of trail from Bridge Inn Road to the Yan Yean Reservoir and creating a connection to the Plenty River Trail	Yan Yean Pipe Track	$170,000
Construct a bridge crossing over the Yarra River to Banksia Park at the eastern end of Yarra Street, Heidelberg	Yarra Trail	$1,700,000
Undertake improvements to the Main Yarra Trail at Banyule Flats	Yarra Trail	$360,000
Realign the section of trail at the Banksia Street underpass to create a gentler grade and wider trail surface	Yarra Trail	$150,000
Upgrade surface and width of existing trail from Banksia Street to Yarra Street	Yarra Trail	$240,000
Upgrade surface and width of existing trail from junction with Plenty River Trail to Fitzsimmons Lane Reserve	Yarra Trail	$2,200,000
Provide wayfinding signage along the length of the trail	Yarra Trail	$75,000
Construct shared use trail from the Mullum Mullum Creek Trail to the Warrandyte State Park	Yarra Trail	$2,400,000
Construct a bridge crossing over the Yarra River to Birrarrung Park	Yarra Trail	$1,700,000
Construct a bridge crossing over the Yarra River to Bulleen Park	Yarra Trail	$1,700,000
Construct new section of trail along the Melbourne Water Pipe Track from Greenvale Reservoir Park south to the existing section of the Yuroke Creek Trail	Yuroke Creek Trail	$660,000
Provide wayfinding signage along the length of the trail	Yuroke Creek Trail	$50,000
Investigate the provision of a pedestrian priority crossing at Dimboola Road and remove bicycle chicanes from either side. And improve the path intersection treatment	Yuroke Creek Trail	$400,000
Provide a pedestrian priority crossing at Somerton Road to connect trail to Greenvale Reservoir	Yuroke Creek Trail	$400,000
Undertake a staged upgrade of the trail to a regional standard width with line marking	Yuroke Creek Trail	$2,200,000
TOTAL		**$189,795,000**

Source: FFLA, 2021

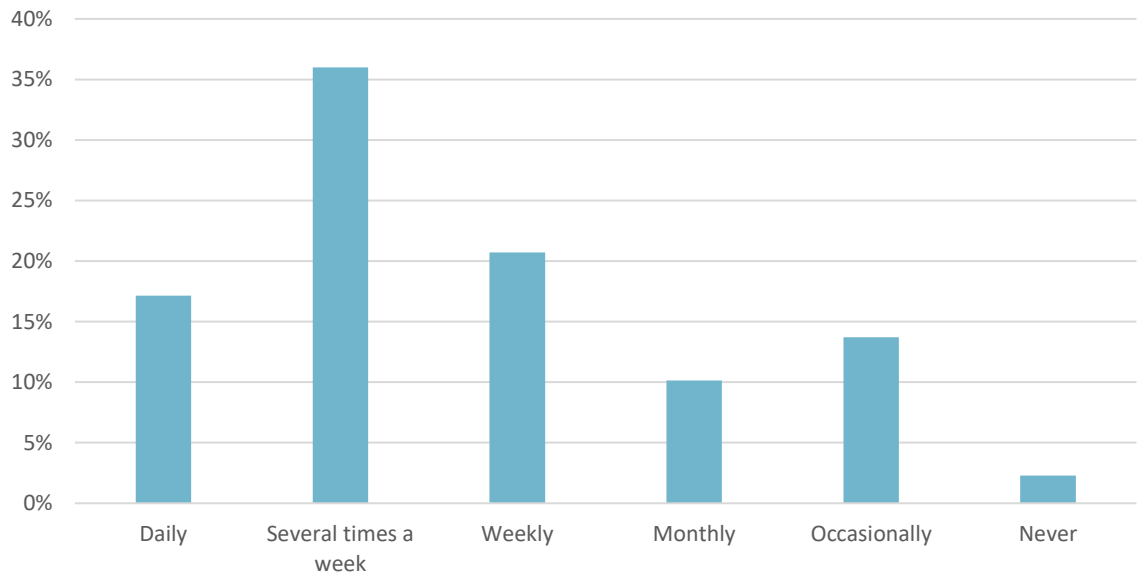
Appendix B: Key survey results

A survey was conducted to understand the community's current use of the trail network as well as their views on how it can be improved to encourage further use. There was a total of 923 responses, the vast majority of which (91%) were residents of Northern Metropolitan Melbourne.

Current use

Most survey respondents use the regional trails at least weekly (74%). 36% of respondents use the trails several times a week and 17% use them daily. The Merri Creek Trail was identified as having the most regular use, with 14% of respondents using the trail daily or several times a week. The next most used trails were Darebin Creek Trail and Yarra Trail with 9.5% and 7.5% respectively.

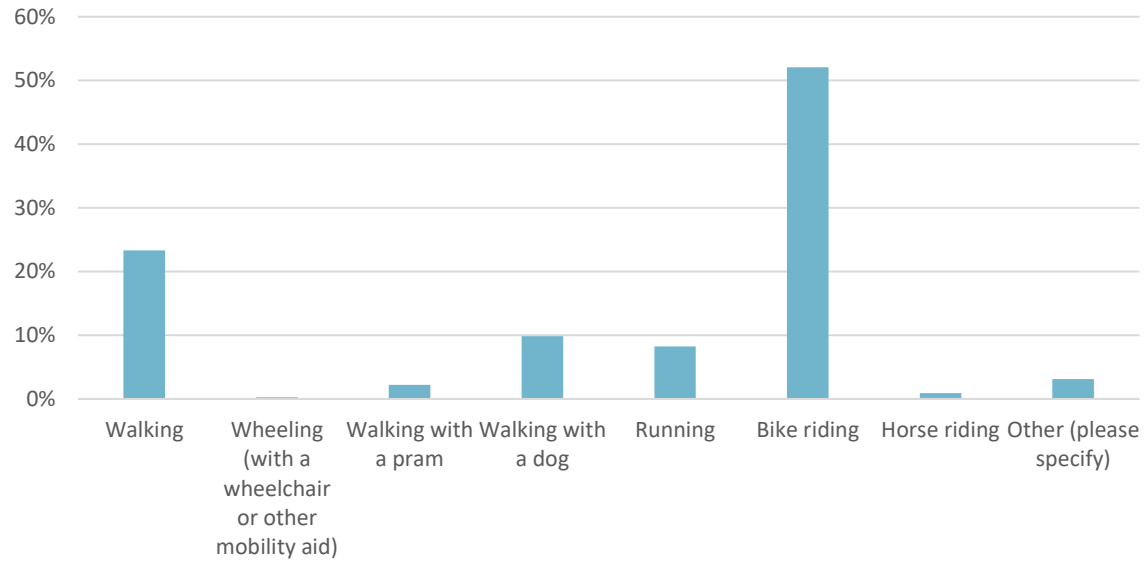
FIGURE 6: RESPONSES TO: HOW OFTEN DO YOU CURRENTLY USE THE REGIONAL TRAILS IN NORTHERN MELBOURNE?



Source: Survey results provided to SGS by FFLA, 2021

Approximately half of survey respondents predominantly use the existing trail network for bike riding (52%), followed by walking (23%). The distribution of other mode shares such as running is relatively even.

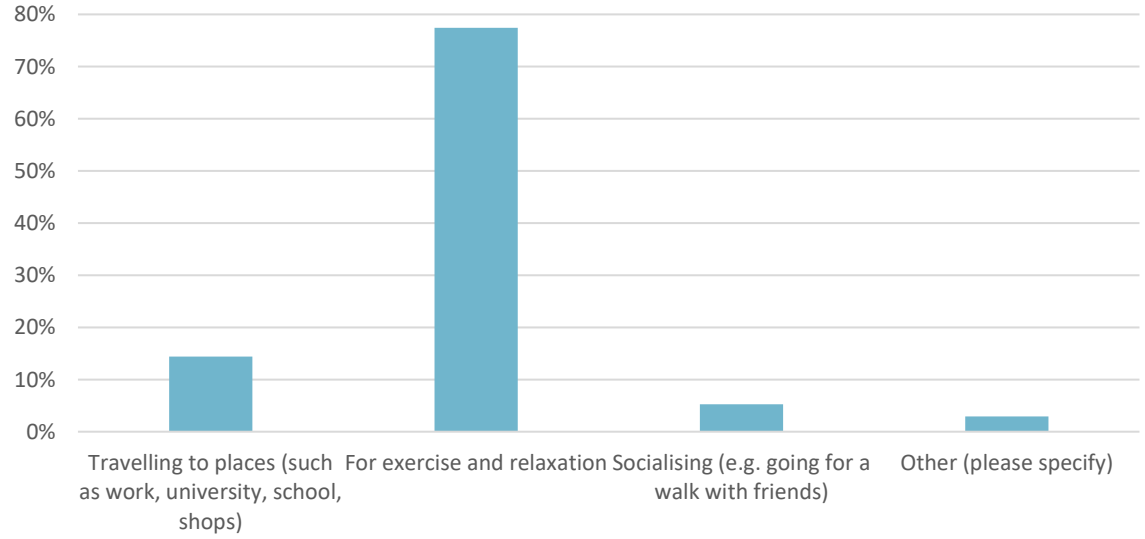
FIGURE 7: RESPONSES TO: HOW DO YOU MOST OFTEN USE THE REGIONAL TRAILS IN NORTHERN MELBOURNE?



Source: Survey results provided to SGS by FFLA, 2021

The most common driver of use of the regional trails is for exercise and relaxation with an overwhleming 77.5%. Use of trails as a means of travel from point A to point B accounts for 14% of use among survery respondents.

FIGURE 8: RESPONSES TO: WHY DO YOU MOST OFTEN USE REGIONAL TRAILS IN NORTHERN MELBOURNE?

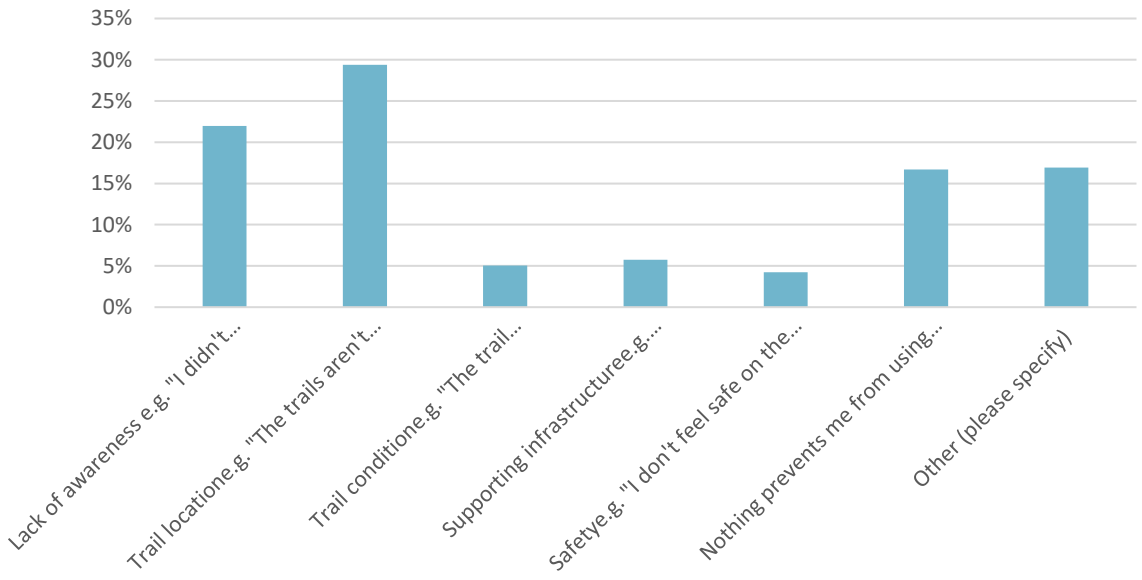


Source: Survey results provided to SGS by FFLA, 2021

Improvements

Nearly a third of respondents (29%) noted that the current location of trails prevents them from using the network more. This is likely contributing to why the trails are predominantly used for exercise and recreation rather than as a transport route. The other most common factor preventing further use is a lack of awareness about the trails (22%).

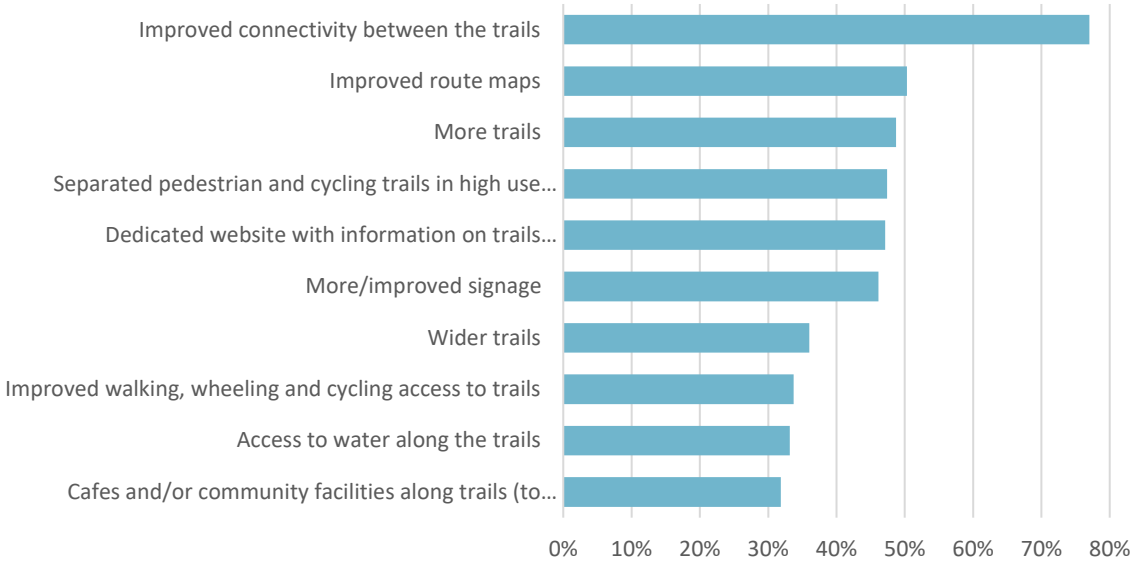
FIGURE 9: RESPONSES TO: WHAT IS THE MAIN REASON PREVENTING YOU FROM USING THE REGIONAL TRAILS MORE?



Source: Survey results provided to SGS by FFLA, 2021

Survey results indicate that increasing usage of trails is mostly dependent on physical changes to the trail network or improving information at varying capacities. The most common improvement identified was increasing the connectivity of the trail network, with support from 77% of respondents. Other desired physical changes to the network included adding more trails (49%), separating pedestrian and cycling trails in high use areas (47%), and widening trails (36%). Multiple improvements to information regarding the trails were also listed as having potential to increase usage. These included improved route maps (50%), a website dedicated to the trails and better marketing (47%), and more signage throughout the network (46%).

FIGURE 10: RESPONSES TO: WHICH OF THE FOLLOWING COULD INCREASE YOUR USAGE OF THE TRAILS? (TICK ALL THAT APPLY) (GRAPH SHOWS TOP 10 RESPONSES ONLY)



Source: Survey results provided to SGS by FFLA, 2021

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