Assessing New Play Opportunities in Linwood

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GEOG309 – Research for Resilient Environments and Communities

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Executive Summary

In collaboration with the Play Preservation Trust, this project evaluated the Linwood Stream Pathway and Linwood Esplanade Reserve as a potential play space. The objective was to understand how the site is currently used and to explore opportunities for improvement, focusing on community input.

- Children have fewer play spaces due to urbanisation, impacting childhood development. This study aims to utilise available urban green spaces to provide children with more space to play.
- Key reasons behind a lack of outdoor play include parents' concerns about child safety in urban spaces, particularly in areas such as injury from traffic accidents and 'stranger danger', which may limit their time spent playing outdoors.
- Play benefits children through multiple physical, psychological and cultural aspects.
- This study was done in Linwood, Christchurch, New Zealand. The area likely lacks an adequate number of playgrounds; therefore, modifications were suggested to create these, strengthen the bond between children and green spaces, and promote Māori culture and the principles of kaitiakitanga.
- Existing literature emphasised the importance of using reliable data-collection methods and the necessity for community engagement in place-shaping projects.
- Literature also displayed the essential nature of play in childhood development, along with design methodologies for ample play space and safe shared path designs.
- Three methods were chosen: a survey (both in-person and online), a traffic count, and annotated mapping, to capture the views of respondents regarding the pathway.
- The most requested features included playful/interactive elements for children, art and murals, and better lighting. No respondents were in favour of keeping the pathway unchanged.
- Two key points are highlighted from community feedback and traffic data; those surveyed have a clear desire for better utilisation of the study area, primarily through improvements to play and safety.
- A variety of unstructured and structured play recommendations, alongside safety improvements via shared path and lighting changes, have been detailed in this report, along with recommendations for prioritisation depending on available budget.

1. Introduction

The current state of urbanisation results in urban development in such a way that maximises land-use and optimises for economic growth (Zhang, 2016; Ritchie et al., 2025). Minimal consideration is placed on public amenities, including parks and other green spaces, resulting in an observed decline in these amenities (Martin et al., 2022). The availability of public green spaces is linked to improved physical activity, psychological and physical health (Richardson et al., 2013), promotion of activities, and when utilised in combination with effective structured and unstructured play spaces, this can meaningfully impact childhood development and wellbeing (Blaschke et al., 2024; Dadvand et al., 2019; Tang & Woolley, 2023; UNICEF, 2022; Walker, 2022). Structured play involves equipment use with specific goals and purposes, while unstructured play involves children utilising imagination and creativity (Gaworski, 2025).

Despite the benefits of playing outdoors, there is a declining trend in this activity worldwide, particularly within New Zealand's urban areas (Clements, 2004; Kemple et al., 2016; Witten et al., 2013). Beyond the aforementioned lack of play amenities, parental restrictions on children's mobility, stemming from a range of concerns such as public safety fears, and the introduction of electronic devices, have been attributed to this decline (Tranter & Pawson, 2001; Witten et al., 2013). To encourage urban play among the youth population, this report, in collaboration with the Play Preservation Trust, aims to assess the viability of the significantly underutilised Linwood Stream shared pathway, and the attached Linwood Esplanade Reserve in Christchurch, as a potential space for developing urban play opportunities.

This study makes use of a variety of quantitative and qualitative methods, including in-person and online surveys, community participatory/annotative image mapping, and traffic counts, alongside extensive literature review to answer two key research questions: 1: What is the current use of the Linwood Esplanade Reserve and pathway? And 2: What changes/interventions can be made to encourage urban play in this area? This process produced a wide range of community feedback and allowed for the development of a similarly extensive range of recommendations on how to improve the space, both for encouraging play directly, through structured and unstructured play interventions, as well as indirectly, through significant safety improvements.

While this undergraduate study has substantial limitations relating to ethical, time, and research constraints, we are relatively confident through the data collected that the local community supports changes to this space, that changes in this public space will be beneficial to the community, and that the recommendations and ideas presented in this report could be further pursued and consulted on in the development of this area and community.

2. Literature Review

This literature review, while not the extent of our overall research for this report, was utilised to develop a base understanding of best practice for research design and data collection, community engagement, the importance of play, and finally, the best-practice design considerations for spaces for unstructured play and shared paths. The literature review utilised Generative AI, specifically ChatGPT and Copilot, for summarising articles, which were then carefully examined to determine accuracy and develop the key points shown below.

2.1 Data collection/analysis best-practice

The literature shows that carefully selecting data collection methods is key to ensuring that survey response rates meet desirable levels. Utilising credible sources accessible for our target audience can provide clarity around project aims, more effectively approaching a broader audience (Shin et al., 2022). Adding to this, question structures that can be easily understood by participants are shown by literature to benefit survey processes, as when distributing surveys, many within the community may not understand technical jargon and therefore negatively affect the quality of survey results, thereby reducing the effectiveness of relevant data collection (Buschle et al., 2022). Furthermore, focusing on streamlined questionnaires during surveys rather than more analytical data collection methods can be less tedious, allowing for improved response rates and less time-consuming data analysis for researchers (Mela et al., 2025).

Providing incentives for completing surveys is shown by Smith et al. (2019) to provide a boost and offer a gesture of gratitude to the community for their time. However, it is also found that such incentives for filling out surveys can also attract those who may not have interest in the aims of a given study and only interest in the incentive that is provided, especially those in times of hardship, therefore over-representing this demographic and introducing biases to results.

2.2 Engaging with communities

Local community engagement during projects that directly target said communities is critical for appropriate consultation, and for improving the consultation process (Aboelata et al., 2011; Bishop et al., 2009). Ensuring that those who live within a community can be made aware of, understand what changes are being proposed, and how they can make their voices heard will help ensure researchers avoid advocating for changes without consultation and making recommendations that do not reflect the needs or priorities of the community (Aboelata et al., 2011; Bishop et al., 2009). To best ensure that such a negative outcome is avoided and the long-term success of a given project is more likely, building relationships and engaging with the local

community, particularly within historically marginalised groups significantly improves the process and outcome of research. Community engagement should also consider past engagement or lack thereof, as poor engagement often leads to projects going ahead but not meeting community needs (Aboelata et al., 2011). Furthermore, appropriate community engagement can establish a sense of connection which may prevent underutilisation and possible vandalism of a project (Ismail & Said, 2015).

To promote organic community engagement, Carra et al. (2018) shows that citizen-request models in planning processes have encouraged greater involvement and participation within a given community. Carra et al. (2018) makes use of the Italian model: "Quartiere bene commune", which aims to allow local community collaboration and generate a sense of ownership of their local community. Such schemes have the potential to both improve the approval rates of projects for the community and empower grassroots community resilience.

2.3 The importance of play for development

Play is a key step in the development process of a child, with it incorporating areas of high developmental importance into everyday activities aimed at making the process enjoyable for children. Skills such as leadership, risk-taking and general social interactions are introduced into children from an early age by utilising play-based techniques along with physical activity (Senda, 2015; Tang & Woolley, 2023).

As the world continues to urbanise, the importance of nature declines among the population, so allowing children to play in nature can continue generational recognition of nature (Truong et al., 2022). The ability to play in nature is one that can help children, as adults not only let their children play in nature but advocate for the protection and restoration of areas due to the enjoyment provided to them as children (Truong et al., 2022). Witten et al2013) further explains this in an urban context, showing that preserving and promoting outdoor play is integral due to the decline neighbourhood play by children, partially due to families moving out of neighbourhoods leading to reduced commonality of children playing in the street unsupervised.

2.4 Play space and shared path design

Structured and unstructured play interventions, coupled with improvements to safety and perceived safety of a given space are shown by the literature to improve the success of linear parks and shared spaces. Ensuring sufficient lighting is effective at improving perceived safety (Rahm et al., 2021), while utilising different coloured lighting along pathways can add to the enjoyment of a space while also providing a sense of safety (Hao et al., 2022). Canterbury Safety

Working Party (2004) places this in the context of Christchurch, with best-practice guidance for pathway placement, safe lighting practices, sight-line guidelines, and cycling provisions in high traffic spaces to significantly improve safety of a given space. The width of shared pathways is shown by Chou et al. (2025) to influence safety, showing that cyclists prefer shared pathways that are wider due to increased perceived safety. Chou et al. (2025) discusses how the participants reduced cycling speeds in areas of high pedestrian and vehicle traffic volumes, suggesting that sharing narrow shared paths presents safety challenges related to possible collisions.

(Haider, 2007) shows that a given area must be suitable for the needs of children, as streets and pathways often simply cater to adults, effectively hampering the mobility of children in public spaces. Incorporating inclusive public-space design attributes suggested by Haider (2007) and maximising play opportunities both in terms of structured and unstructured play allows for children of various ages to make significantly better use of public spaces (Tang & Woolley, 2023).

3. Research area and site context

The Linwood ward has a population of 24,300 as of 2024, with a median age of 36.7 years, 0.8 years lower than the Christchurch average of 37.5 years. 75% of the population is classified as European in descent, with 20% as Māori, 11% as Asian, 9.7% as Pacific Peoples, and 1.5% as Middle Eastern, Latin American, or African. 18% of the population is aged under 15 years, higher than Christchurch overall. This ward also has a relatively high level of deprivation in Linwood ward, with ~47% of the local population living in decile 9 or 10 areas compared to the Christchurch average of 16% (Christchurch City Council, 2024). Considering the relatively high youth population and notably that deprivation is partially calculated from lack of public services and amenities, focusing on this general area for improving said amenities and services where they relate to children should be a priority for improving wellbeing in Christchurch.

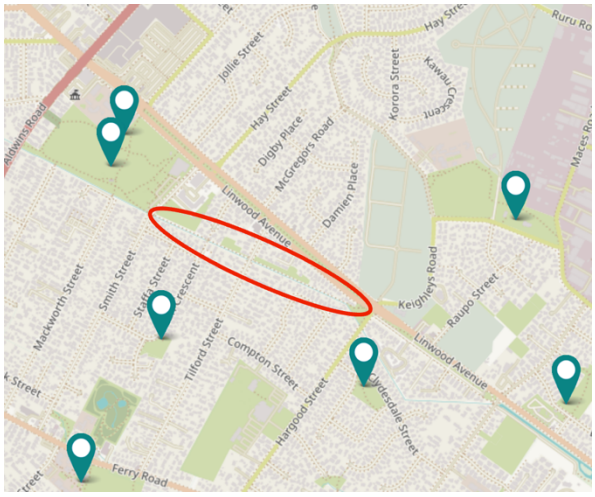

Figure 1. Linwood Stream path and Linwood Esplanade Reserve, highlighted in the red circled area above. Note distance to nearby parks for residents north of the study area.

As a result, this study targets this general area, aiming to utilise and optimise available and particularly underutilised public greenspaces to encourage outdoor urban play. At the

direction of the Play Preservation Trust, this focus was directed specifically to the Linwood Stream path and Linwood Esplanade Reserve; a combined public space and shared pathway located near Linwood Park, as shown in figure 1 (Christchurch City Council, n.d.-a) above.

While a number of parks are shown to be nearby, improving play spaces in the immediate vicinity of those who live north of Linwood Avenue and in the area around Tilford and Hargood Street is key for improving children's accessibility to a play-space. The identified space is also currently highly underutilised as an empty reserve and is wholly owned by Christchurch City Council (K. Cowie, personal communication, October 3, 2025), meaning that potential changes could possibly be made in this space relatively easily and on a low budget, depending on the scope. Running parallel to the pathway is Linwood Stream, a local habitat for Tuna/Eels, as seen in figure 2. The area surrounding the research site also has several significant hazards. Several crash hotspots involving pedestrian and cyclist crashes since 2000 are present at key intersections and main roads in the surrounding area, as shown in figures 3 and 4, respectively (Christchurch City Council, n.d.-c).

Figure 2. Linwood Stream running parallel to the shared pathway and the reserve. Note the presence of a community-installed poster discussing the area as a habitat for Tuna/Eels

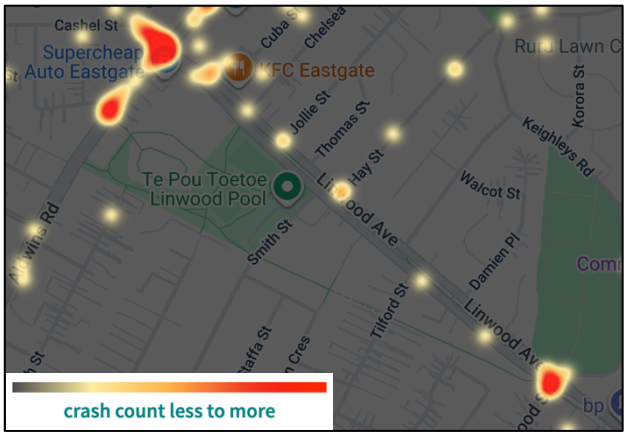

Figure 3. Pedestrian-involved crashes since 2000.

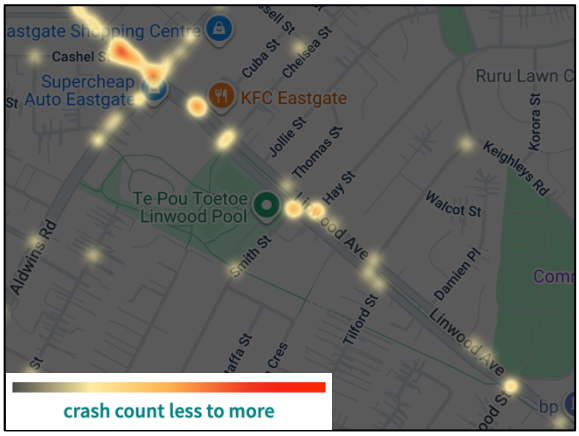

Figure 4. Cyclist-involved crashes since 2000.

Furthermore, crime data from (New Zealand Police, n.d.) makes visible a substantial crime cluster surrounding the nearby Eastgate commercial centre. While this is not particularly high when compared to the rest of Christchurch and cluster is less present when property crimes such as burglary are excluded (appendix 4), which arguably are less relevant to a public space, this remains notable as it may influence a parent's decision-making regarding allowing their children in public.

With the high Māori population relative to Christchurch overall, consideration of Māori principles for this project is critical. Walker (2022) emphasises the connection between Māori and the land they live on, with Māori perceiving the land as part of their family and as something that requires kaitiakitanga, or guardianship from those who inhabit it. This emphasis is shown in figure 5 (Mental Health Foundation of New Zealand, n.d.), which shows that having connection to land is fundamental factor to wellbeing. As a result, increasing play opportunities in the context of urban green spaces, when designed to appropriately consider the Māori population, may have strong benefits for Māori children by strengthening their connection to the land.

Figure 5. The Te Whare Tapa Whā, showing the 5 walls needed to build a healthy individual, depicted as a Marae. Note the presence of Land as strong foundation.

4. Method

The methods used in this analysis included an in-person interview style questionnaire as well as annotated mapping, a physical count of the pathway users, and an online survey. These methods were chosen to maximise community engagement before continuing with recommendations based on prior research. The same design was used for the in-person and online survey with minor modifications (i.e. end response). The purpose of the in-person survey was to have an opportunity to speak with respondents personally and develop a deeper understanding. The primary concern with this was non-response bias, missing out on valuable input from those who were not at the event. Hence, the online survey was used to further increase response rate and gain data from a broader range of respondents across the Linwood ward.

4.1 Survey Development

The survey was designed based on research done by Mela et al. (2025). The aim was to create a comprehensive, concise survey that would avoid questionnaire fatigue and ensure thoughtful and accurate feedback (Appendix 8). Qualtrics software was used to create a 17-question survey divided into five blocks (Appendix 1) namely demographics, general, feelings and perceptions, features and design, and engagement. A filter question at the start of the survey was used to exclude any responses from those under 18 years of age for ethical reasons. A Qualitative Pretest Interview (QPI) was used from Buschle et al. (2022) to test comprehension and flow of the survey prior to formal data collection.

4.2 In-person survey & annotated mapping

On the 16th of August 2025, the in-person survey was conducted along the pathway to capture feedback from users actively engaging with the space. An incentive for participation was provided in the form of a free sausage sizzle and baked goods (provided by the Play Preservation Trust) for all those in attendance. Two sets of day and night annotated maps (Figures 10 & 11, page 11) were generated from feedback. A basemap showing the study area was used to invite participants to mark areas they felt were pleasant or problematic (e.g., unsafe, hazardous, or lacking) to help identify spatial patterns of use. The second set was to allow for children to participate; however, no data from those maps were included in this analysis due to ethical restrictions for this project.

4.3 Traffic count

A manual traffic count was conducted over two time periods on a Wednesday morning and afternoon (Appendix 2). This was to assess the general use of the pathway as well as predominant modes of transportation (e.g. walking, bicycle, scooter).

4.4 Online survey

The online survey was distributed by the Play Preservation on the Inner East Burbs Facebook group to capture a wider range of respondents. A prize draw with two $25 gift vouchers was included as an incentive to encourage a higher response rate and to reduce response bias. To effectively maintain survey anonymity, a separate survey was created that gave respondents the option to enter the draw using their emails. The link was inserted into the closing statement of the primary survey (Appendix 3), which separated respondents' emails from their responses, keeping the collected data anonymous and adhering to ethical guidelines.

The combination of qualitative and quantitative methods enabled a holistic understanding of the community's needs. The results below summarise key findings and highlight recurring themes.

5. Results

5.1 Survey

The results from both the online and in-person surveys were combined and analysed as a whole. The raw data was exported to Microsoft Excel (Version 2509 Build 16.0.19231.20138) and used to create a series of graphs and pivot tables. There was a total of 42 responses after cleaning the data (i.e. removing incomplete responses and responses flagged by Qualtrics as duplicates) with most respondents aged between 35 and 44 years old (Figure 6). 36 respondents indicated that they live in the Linwood suburb with the majority (30) indicating that they have children under the age of 18.

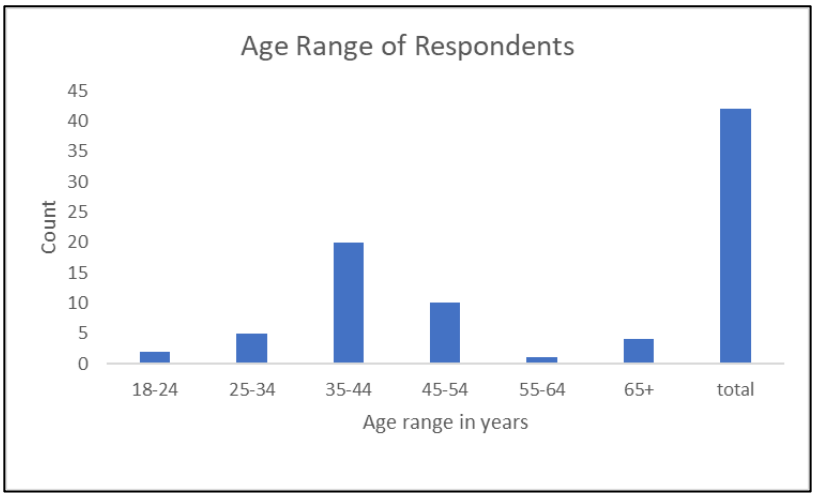

Figure 6. Count of age ranges of survey participants.

The pathway was mostly used 2-4 times per month (Figure 7) primarily for exercise and recreation. Smaller portions used the path for commuting and escorting children. When asked if respondents had noticed children or youth using the pathway, the majority (14) responded "occasionally" with the average response leaning towards "rarely".

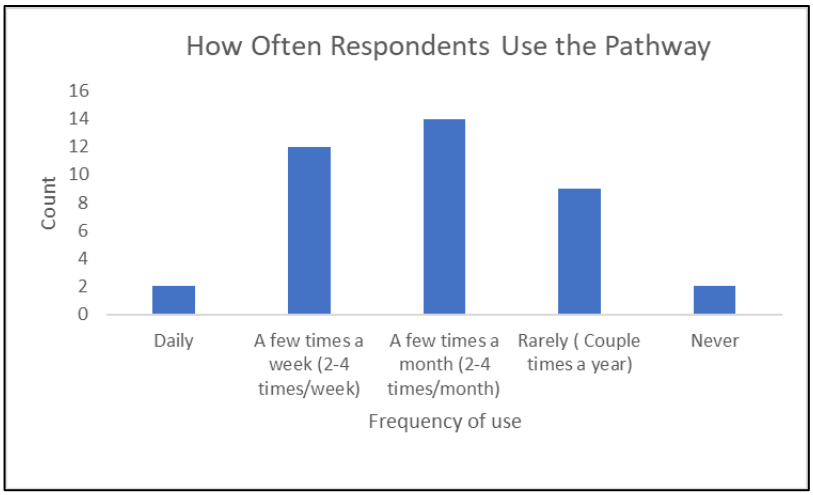

Figure 7. Frequency of pathway use of survey participants.

Respondents expressed moderate levels of safety overall, with concerns over insufficient lighting and lack of amenities. However, many respondents described the pathway as peaceful and scenic. When asked what they liked most, participants frequently mentioned the natural environment, including the eels in the stream, and the quiet atmosphere away from traffic. The most common concerns were related to litter and the lack of lighting. Respondents replied with "Very secluded, bad lighting at night, rubbish", and

"Lack of lighting, feels a bit unsafe, especially if it was later at night or in the dark." In terms of improvements, respondents show strong support for features that make the pathway more inviting and creative. The top three most requested features include playful/interactive elements for kids, public art/murals, and better lighting (Figure 8). Some examples of quotes from the survey when asked what could make the pathway more engaging include: "Enhance the greenspaces to create reasons for people to stop - seating, picnic tables, play elements, planting, signage - even some wayfinding signs and names for different areas.", and "Murals or painting on the fences and maybe games on the footpath along the way maybe even basic jokes".

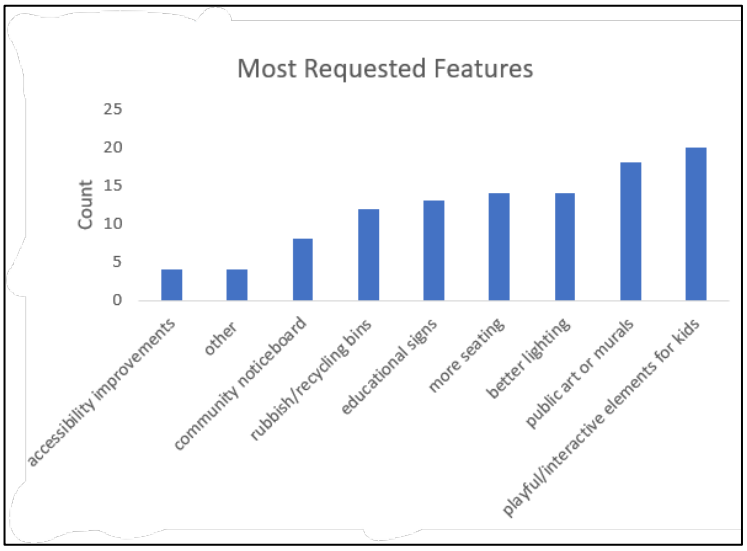

Figure 8. Most requested features for the study area by survey participants.

5.2 Annotated Mapping

Distinct spatial variations in user satisfaction can be seen across both the day and night maps, with most of the negative feedback (in the form of orange and red frowning faces) clustered around the open fields of Tilford Street. For the day map (Figure 9), respondents added sticky notes of where they would like to see features added, such as rubbish bins, picnic tables, amenities, and a playground. In comparison, the night map (Figure 10) showed a decline in overall satisfaction across the pathway noting that it is too dark to walk at night.

Figure 9. Annotated image map - Day map.

Figure 10. Annotated image map – Night map.

5.3 Traffic Count

From 8 am to 9 am, adults were the predominant pathway users, particularly cyclists, with nearly 3 times more adults than children (Figure 11). Pedestrian and dog-walker counts were moderate, while push scooters were rarely observed. In total, 44 pathway users were observed.

In contrast, the overall traffic volume for the 3 pm to 4 pm session was lower but showed a more balanced distribution between children and adults (Figure 12). Pedestrian traffic increased relative to cyclists, and no dog-walkers were observed.

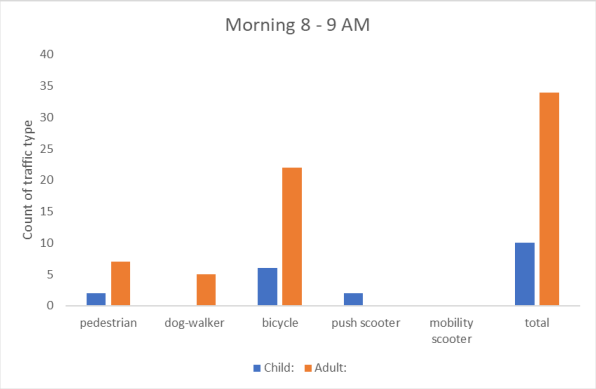

Figure 11. Traffic count of pathway users and their mode of transport between 8am and 9am.

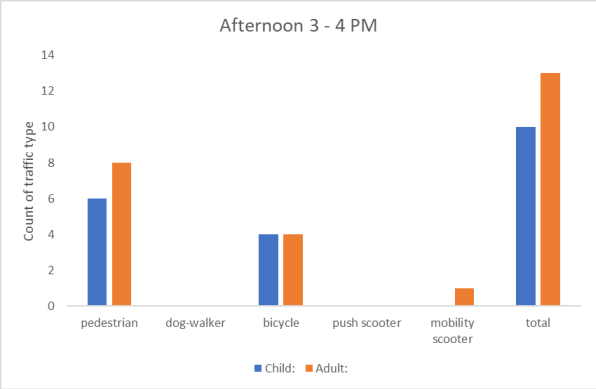

Figure 12. Traffic count of pathway users and their mode of transport between 3pm and 4pm.

6. Discussion and Recommendations

The data collected from the community in this report highlights two key points: that those surveyed have a clear desire for the space to be better utilised, and that this should primarily take the form of improvements to play and safety in the area. As play improvements, murals, public art, better lighting, and various amenities comprise the vast majority of community suggestions, this report's recommendations are primarily centred around these key areas. Other recommendations are primarily centred around improved safety, due to community safety concerns, high bicycle traffic volumes compared to pedestrians, and a necessity to plan for increased bicycle and traffic volumes expected from the increased amenity in the area.

Based on collected data and community feedback, various play and safety interventions are recommended to encourage use of the study area and improve urban play locally. As no specific budget has been specified for this project, these recommendations are comprehensive and utilised in coordination to maximise the effectiveness of this intervention, and cost-saving options are detailed. An overall conceptual design has been developed to visualise the scope of the recommendations listed in this section of the report, shown below in figure 13, using background aerial imagery from Land Information New Zealand (2023).

Figure 13. Linwood Esplanade Reserve improvements conceptual design. Background imagery: Land Information New Zealand (2023) .

6.1 Greenspace and play space utilisation

Based on our discussed data above, the green spaces within the project area could be better utilised through a variety of structured, unstructured, and nature play interventions, as well as community engagement spaces to better encourage people of all ages to utilise the space. As structured play equipment is particularly useful for very young children, it is recommended for use alongside unstructured and nature play, which is, in turn, more effective for older children. (Tang & Woolley, 2023). At the same time, utilising unstructured and natural play at a young age remains strongly beneficial (Dankiw et al., 2020), so a mix of this alongside structured play elements is therefore recommended. Structured play elements recommended include use of a small traditional playground with nature play elements, alongside a long flying fox for older children to make best use of the linear nature of the project area. Examples of these can be seen in figures 14 and 15 (Christchurch City Council, n.d.-b), (Peak Playgrounds, n.d.) respectively.

Figure 14. Structured play equipment with nature play elements in Richmond, Christchurch.

Figure 15. Example of a flying fox that is suitable for a width-constrained area.

Unstructured play, on the other hand, can be catered for through junk playgrounds, climbing logs, encouraging tree climbing, practice bike tracks, and various activity-encouraging pavement markings, as shown in figures 16 and 17 (Igel et al., 2020), and 18 (Boffa Miskell, 2019).

Figure 16. Example of a junk playground/mud kitchen in Richmond, Christchurch

Figure 17. Pavement markings in Leipzig, Germany, used to encourage spontaneous active play in public spaces

Figure 18. Example of climbing logs and nature play.

Alongside these play space improvements, it is also critical to consider the role of the space for adults. If adults are encouraged to make use of the space alongside children, rather than simply being there to supervise them, it encourages them to come more often, thereby allowing very young children who require supervision to use the space more often as well (Carroll et al., 2015). As a result, this report recommends that parts of the reserve space be utilised for uses such as a park café, similar to figure 19, and a mini-library or book exchange. Extensive use of community-developed murals and information boards explaining the area, its history, and connection to mana whenua and mahinga kai, with connections to the Tuna (eel) population, are also recommended for use along the pathway and in reserve spaces as per community feedback.

Figure 19. Example of a park café in Richmond, Christchurch. Note that this is in the same area as figure 16.

6.2 Safety Improvements

Alongside the increased utilisation of green spaces within the study area, various safety improvements are recommended. This is due to both community feedback highlighting issues with the safety of the pathway and the expected increase in pedestrian and cycle traffic from the implementation of the aforementioned green space and play space interventions.

Firstly, it is recommended that the pathway be widened and that pedestrians and cyclists be mode-separated where space allows. Much of the pathway is too narrow for mode-separation and cannot be meaningfully widened due to proximity to property and stream boundaries; however, the reserve areas could provide the needed width to reduce traffic conflicts along the pathway. With the pathway currently at between 2.0m and 2.2m wide, adding a separate 1.5m wide footpath (Christchurch City Council, 2022), such as in figure 20 (Viastrada, 2008) below, to separate pedestrians from bicycles would significantly improve safety, especially as even wide shared paths are generally unsafe for young children, who lack the spatial awareness to avoid bicycles (Hatfield & Prabhakharan, 2016; Tabibi & Pfeffer, 2003). To further improve safety in these areas, bicycle traffic calming, such as the barrier design developed by (Viastrada, 2025) (Figure 21) recommended as the most effective method for reducing bicycle speeds while maintaining access. The most suitable position for such traffic calming devices is likely near the Tilford Street intersection, as incidents have occurred here previously.

Figure 20. Matai Street separated footpath and cycleway (left image) (Viastrada, 2008), as compared with a conceptual footpath added to the side of the Linwood Esplanade Reserve shared path (right image).

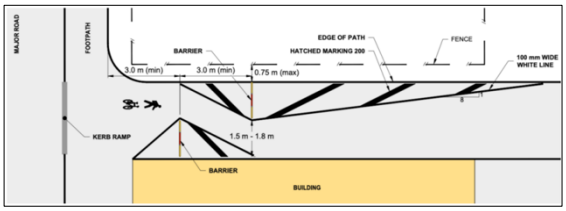

Figure 21. Viastrada shared path traffic calming

Secondly, upgrading the existing raised crossings at Smith and Tilford Streets to shared-path zebra crossings, as shown in Figure 22, is recommended, as increased use of the pathway and greenspace may generate increased pedestrian-vehicle interactions, with current vehicle yield behaviour likely being relatively unpredictable (Anciaes et al.,

Figure 22. Example of a shared path zebra crossing; recommended at Tilford and Smith Street crossings.

2020) due to no give-way requirement. This presents a risk to children, who are less capable of crossing streets safely (Tabibi & Pfeffer, 2003).

Thirdly, it is recommended that pathway lighting be improved, as good lighting at night may improve public safety perceptions of the space, even if crime rates are low and improve usage. (Marquet, 2020; Suau, 2006). The current lamp spacing of ~40m between Tilford Street and Linwood Avenue, and the near absence of lighting between Tilford and Smith Streets, is likely inadequate for ensuring CPTED principles, as seen in the community feedback specifically requesting lighting improvements. Replacing existing lamps with brighter LEDs, installing new lamps where lighting is poor, and providing even lighting distribution are therefore recommended.

Finally, replacement of the wire fencing alongside the stream with a safer, more durable alternative is recommended. This could consist of a cost-effective option, such as Future Post, for example, which uses post-consumer soft plastics for fenceposts. While these are primarily for agricultural applications (Future Post, n.d.), they may prove safer and more durable than existing wire fencing.

6.3 Budget considerations

Due to high safety improvements costs, this report recommends that greenspace utilisation and play interventions be strongly prioritised over safety improvements along the pathway if budget is a constraining factor or a quick-build solution is needed, as safety improvements will likely only have an additive impact on usership of the space. It is also far easier to make use of low-cost options regarding play recommendations, especially the novel play solutions discussed.

Many of the recommended interventions for the Linwood Esplanade Reserve and pathway come with significant costs, particularly regarding safety improvements. Comprehensive pathway upgrades and resurfacing can be expected to cost ~$250,000, with footpaths being more expensive (~$100/$m^2$) (Digwork, n.d.) than street surfacing (~$41/$m^2$) (Waka Kotahi, 2021). The Tilford Street crossing could become similarly expensive if increased width requirements require reconstruction. Furthermore, each streetlamp replacement/addition costs between ~$750 and $10,000 as of 2017 (Christchurch City Council, 2017). Partial improvements, including only resurfacing significant hazards, installing the new pedestrian-only path without resurfacing the existing path, and painting zebra markings with no reconstruction on Tilford Street, would likely dramatically reduce costs and could be more easily applied to a quick-build or low-budget solution. Simply widening the shared path rather than mode-separating would likely also reduce complexity, further reducing costs.

7. Limitations

The most significant limitation was that the online survey did not have a large enough sample size to be representative of the Linwood Ward overall, as our survey produced 42 responses: lower than a statistically significant sample size of 379 (Appendix 7), at a population size of 24,300 (Christchurch City Council, 2024). Given that this survey is a key influence for our recommendations, keeping the survey open may have yielded better results. Doorknocking was another consideration for increased response rates to reduce response bias. Despite this, it should be emphasised that the usefulness of the survey results is considerable, and it is likely that existing results are at least partially sufficient for such a localised project.

Another key limitation is that ethical approval for this study was limited to the adult population, requiring that no data would be collected from children. This notably means that we were required to rely entirely on adults for recommendations for play spaces, even though the target population of said spaces is children. Safety recommendations are likely less impacted by these restrictions, as they more directly involve the adult population alongside children.

Other limitations include the traffic count's reduced accuracy due to limited data collection times, equipment constraints, and overall study time constraints. If the study were over a longer timeframe, it likely would have been possible to conduct door-knocking and run the online survey for a longer duration. Furthermore, additional equipment, notably automated bicycle traffic counters, would likely have resulted in more representative and therefore valuable data.

8. Conclusion

Research shows that outdoor play is an essential aspect of childhood development, indicating the necessity for more engaging outdoor areas for children. This project found that the Linwood Pathway and surrounding green space would make a suitable site for upgrades, which would benefit the development of children in the area. Through various qualitative and quantitative survey methods, it was found that there is, in fact, a desire for the space to be upgraded. No respondents were found to be in favour of retaining the pathway in its current state, suggesting features such as children's play areas, lighting, seating, and general amenities. Based on these suggestions and the data collected, a variety of recommendations have been made for the space, aiming to dramatically improve the area as a space for both structured and unstructured play.

9. Acknowledgements

We want to extend our gratitude to Naomi Ishihara and Emma Woods of the Play Preservation Trust for their continual support throughout this project. We would also like to thank our supervisor, Dr Elora Raymond, for her insight and feedback, as well as Prof. Simon Kingham, Rob Spiers, and Justin Harrison of the University of Canterbury - School of Earth and Environment.

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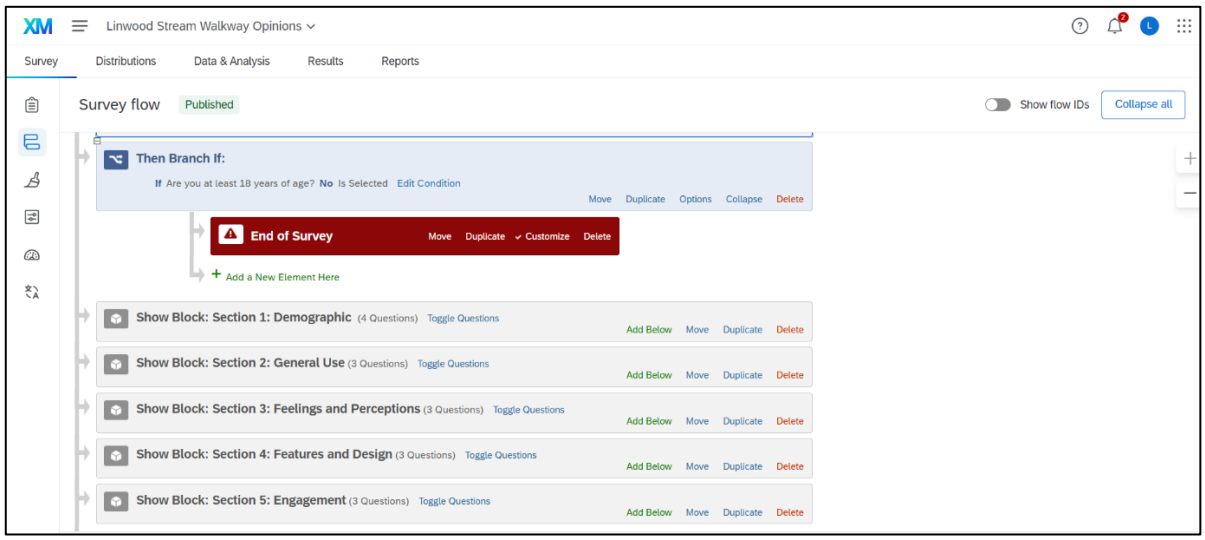
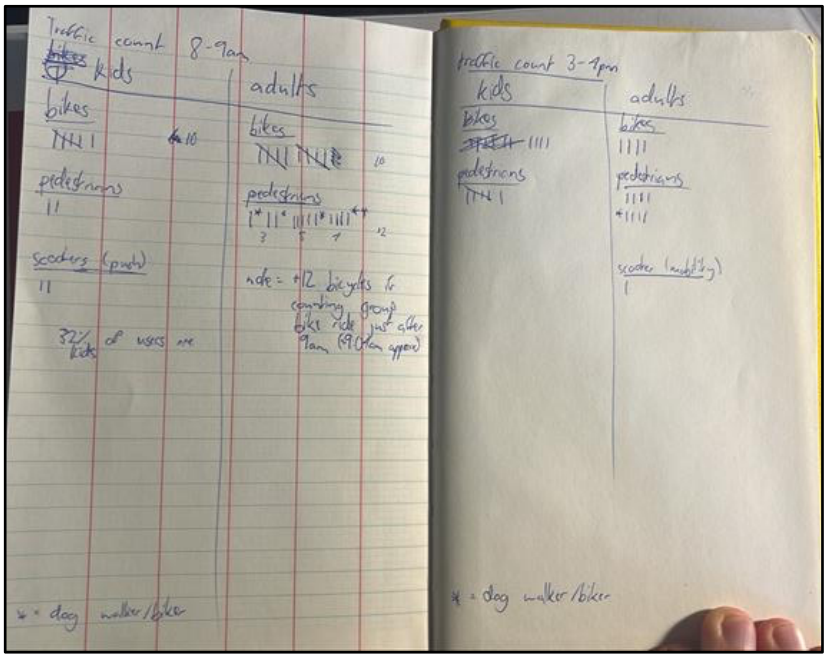
11. Appendix



Appendix 1 – Flow of survey used in study, taken from Qualtrics



Appendix 2 – Raw traffic count data with morning tallies (left) and afternoon tallies (right).

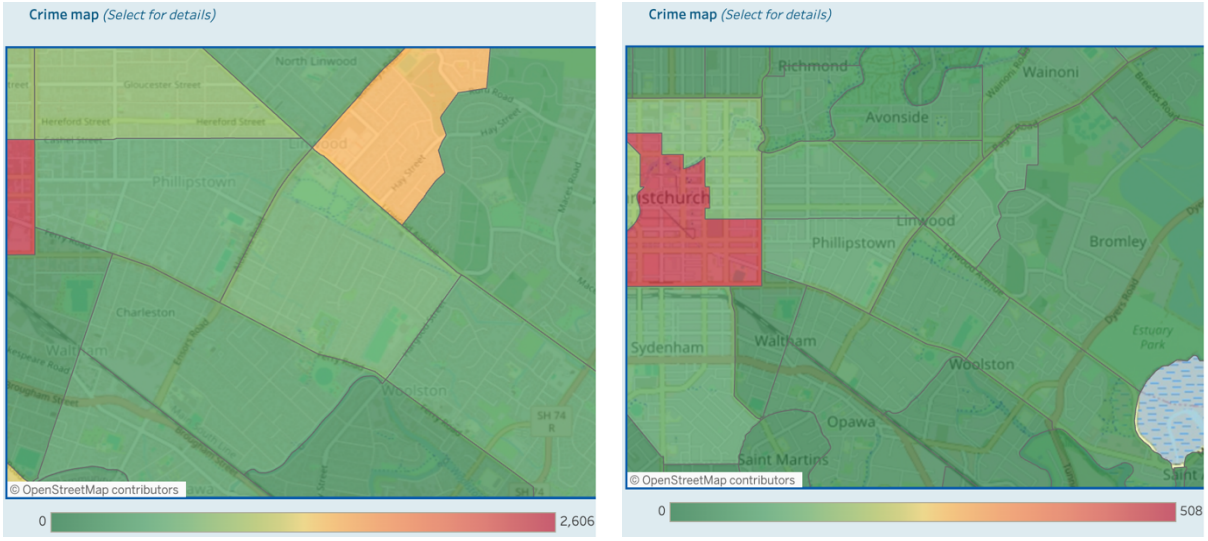
Thank you for taking the time to respond to our survey.

If you would like to enter the draw to win 1 of 2 $25 Woolworths giftcards, please follow the link below.

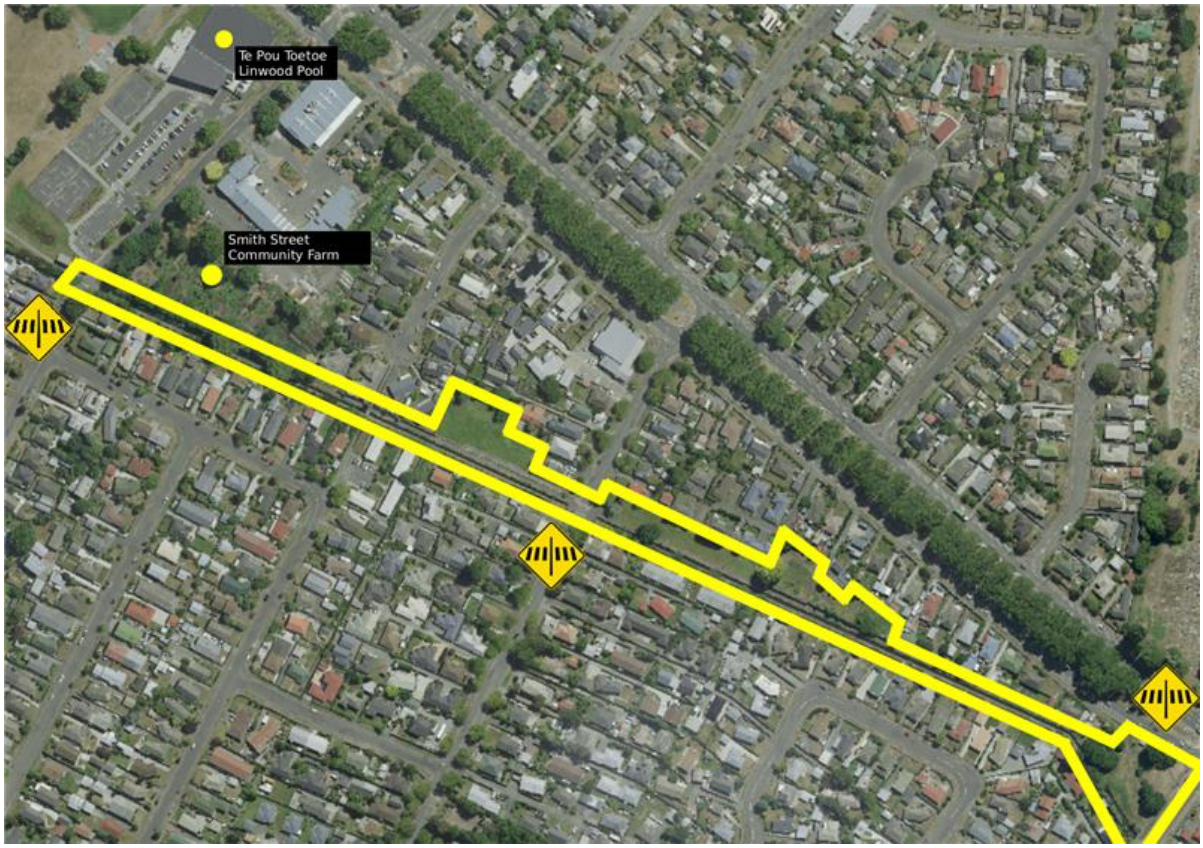
https://qualtricsxm5zqxgbwls.qualtrics.com/jfe/form/SV_5133L2snTpik3bM

Responses will remain anonymous.

Appendix 3 - End response for online survey including link for prize draw to separate respondents' emails from their emails.



Appendix 4. Christchurch crime snapshot map from New Zealand Police (n.d.). All crimes between July 2024 and August 2025 are shown on the left map, while the right map shows only crimes against person over that period.



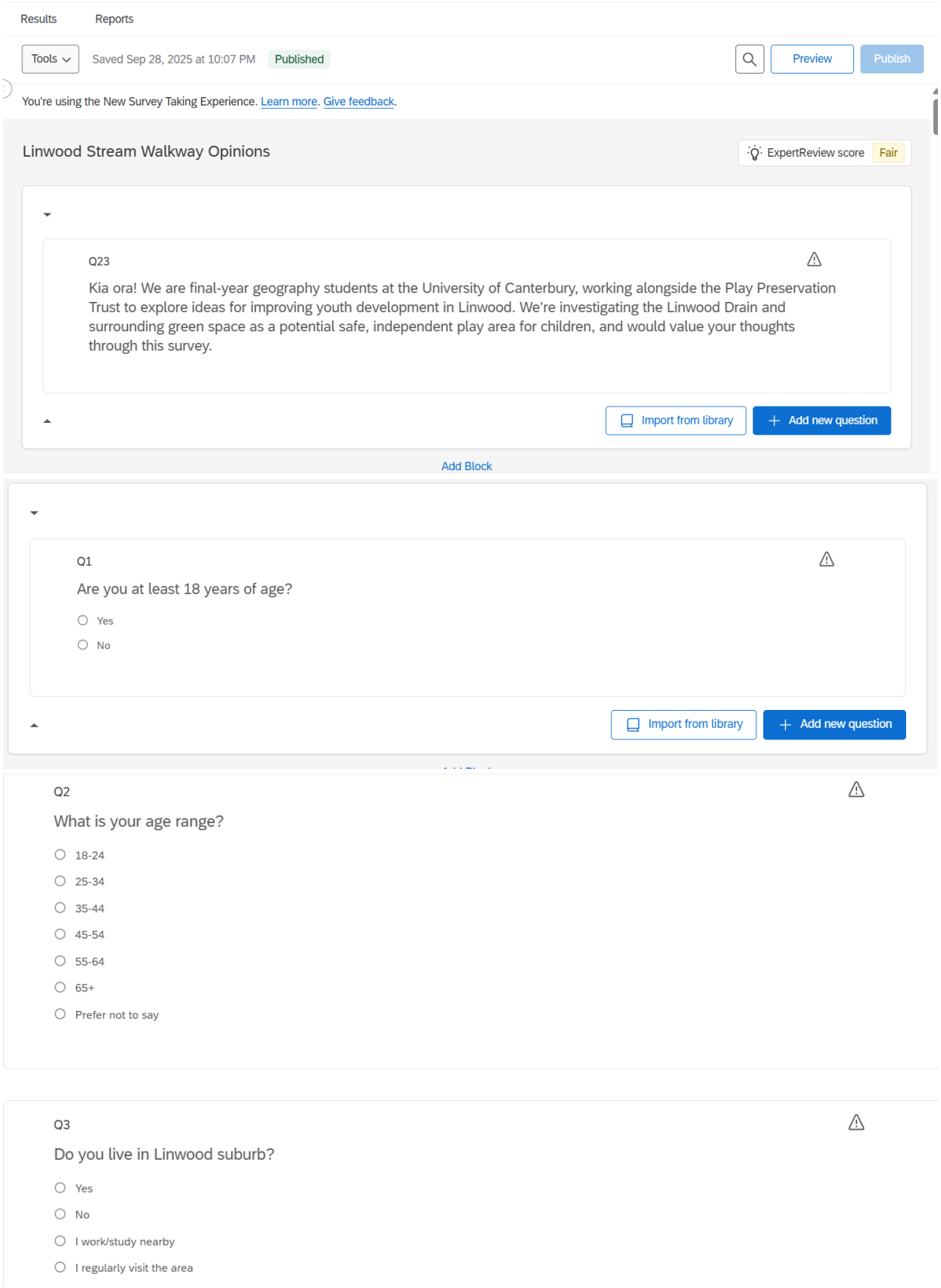
Appendix 6. The map used for annotative image mapping during community engagement. Participants were able to place post it notes and stickers onto the map, providing spatial feedback and suggestions for this report.

$$Z = 1.96;\ p = 0.5;\ Error = 0.05; N = 24{,}300$$

$$n0 = \frac{Z^2 p(1-p)}{Error^2} = \frac{1.96^2 * 0.5 * 0.5}{0.0025} = 384.16$$

$$n = \frac{N * n0}{n0 + N - 1} = \frac{24{,}300 * 384.16}{384.16 + 24{,}300 - 1} = 378.19 \sim 379$$

Appendix 7. Equation used to calculate minimum number of respondents for statistical significance with a confidence interval of 95%.



Q4

What is your ethnicity?

- European
- Māori
- Pacific
- Asian
- Middle Eastern/ Latin American/ African
- Other: (Please specify)

Q5

Do you have children or care for children under 18?

- Yes
- No
- Prefer not to say

Section 2: General Use

Q6

How often do you use the walkway ?

- Daily
- A few times a week (2-4 times/week)
- A few times a month (2-4 times/month)
- Rarely (Couple times a year)
- Never

Q7

What is your main reason for using the walkway? (Select all that apply)

- [ ] Commuting (e.g., to school, to work)
- [ ] Exercise (walking, running)
- [ ] Walking the dog
- [ ] Recreation or leisure
- [ ] Escorting children
- [ ] Other (please specify):

Q8

At what time do you usually use the walkway?

- [ ] Morning
- [ ] Afternoon
- [ ] Evening
- [ ] Night
- [ ] Varies

Section 3: Feelings and Perceptions

Q10

Which of the following best describes how you feel when using the walkway? (Select all that apply)

- [ ] Relaxed
- [ ] Alert or cautious
- [ ] Connected to nature
- [ ] Bored
- [ ] Inspired
- [ ] Anxious or uneasy
- [ ] Other (please specify):

Q9

How safe do you feel using the walkway?

Q11

Have you noticed children or youth using the walkway?

- Yes, often
- Occasionally
- Rarely
- Never
- Not sure

Section 4: Features and Design

Q12

What do you like most about the walkway?

Q13

What do you like least, or what concerns do you have?

Q14

Which features would you like to see added or improved? (Select all that apply)

- [ ] More seating
- [ ] Better lighting
- [ ] Public art or murals
- [ ] Educational signs
- [ ] Playful or interactive elements for kids
- [ ] Community noticeboard
- [ ] Rubbish/recycling bins
- [ ] Accessibility improvements
- [ ] Other (please specify):

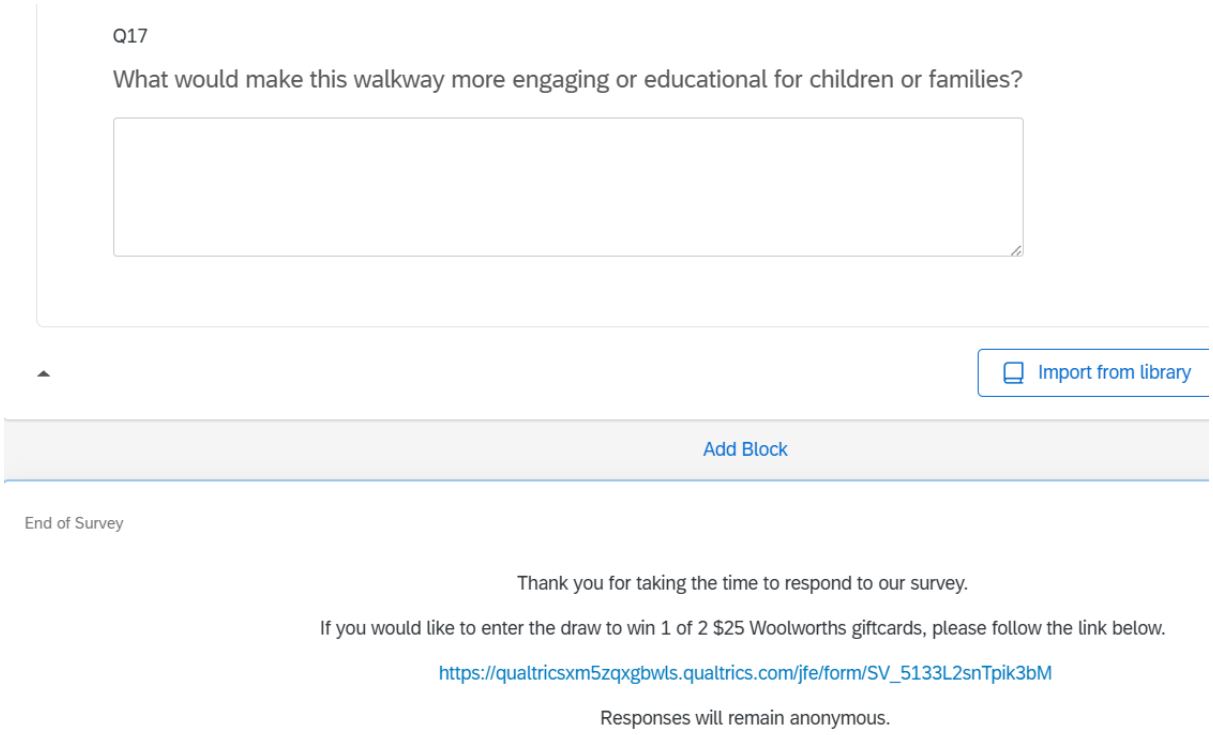
Q15

Do you think the current walkway is suitable for children to use on their own?

Q16

Would you support community initiatives to enhance the walkway for child learning and play?

- ○ Yes
- ○ Maybe
- ○ No
- ○ Not sure



Appendix 8. Full online and in-person survey created using Qualtrics (user perspective)