
MĀNGERE E-BIKE TRIAL

STAGE 2: Integrating an e-bike in daily life

Ali Raja | Simon Opit | Hamish Mackie | Karen Witten

IN PARTNERSHIP WITH TIME TO THRIVE, AUCKLAND TRANSPORT,
AND THE MĀNGERE OTAHUHU LOCAL BOARD

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Summary

- Aotearoa New Zealand needs a model for successful e-bike use in lower-income communities so that the convenience, health, environmental and economic benefits of e-bikes accrue to all; and the potential of e-bikes to contribute to a low-carbon mobility future is realised. Without this, the benefits of e-bikes will remain in wealthier communities.
- A three-stage trial process has been conceptualised, building success from increasingly ambitious trials. This report focuses on Stage 2 – e-bikes in everyday life.
- The genesis of the Stage 2 trial was a ‘Give-it a go’ e-bike trial run in Māngere in 2021, delivered by local bike champions Time to Thrive (TTT), which indicated a strong interest in future use of e-bikes but limited familiarity with how they could substitute or complement other forms of daily mobility. Cost was identified as a barrier to purchase.
- The Stage 2 Trial aimed to establish how e-bikes could be integrated into daily travel in Māngere. It was co-designed by TTT and the research team, sponsored by the Māngere-Otahuhu Local Board and funded by Nga Tiriti Ngangahau Vibrant Streets Programme administered by Auckland Transport on behalf of the Auckland Council Climate Fund.
- E-bikes and accessories were made available to forty participants for a 3-month trial period between November 2022 and June 2023. Participant recruitment, skills training, community rides, bike maintenance and social support were undertaken by TTT with programme support and evaluation by the research team.
- Pre and post surveys of travel mode use indicated the e-bikes were well used for recreation, utility neighbourhood trips and commuting, with significant trip substitution from car to e-bike. Kilometres travelled by participants over the trial period, retrieved from odometers, ranged from 36km to 1,057km.
- Benefits of e-bike use included healthy exercise, convenience, fun, access to nature, enhanced mental wellbeing and savings on petrol costs. Barriers to use (or increased use) included safety concerns relating to limited cycling infrastructure, fear the e-bike may be stolen if left in a public space, and lack of cycling confidence.
- All participants enjoyed the e-bike trial experience, and most would like to continue riding, particularly those for whom it had become part of their daily travel routine, and/or resulted in physical or mental health benefits and/or reduced weekly travel costs.
- The training, group rides, and ongoing support provided by TTT were highly valued by trial participants. The administration time involved in delivering the trial and maintaining contact with participants was higher than anticipated which extended the duration of the trial.
- The e-bikes performed well with minimal maintenance required and all bikes were returned in good condition after the trial period. The clear branding of the e-bikes as Māngere community e-bikes may have contributed to their safe return.

- Participants' e-bike use, mode shift, and feedback during the trial suggests that e-bikes have the potential to increase healthy and sustainable transportation in the Māngere area. It is proposed that Stage 3 combines lessons from other trials nationally to support national level policy implementation for equitable e-bike access. Some pilot innovation work supported by Waka Kotahi has been carried out to explore this.



1. Background

Te Tāruke-ā-Tāwhiri, Auckland Council's Climate Plan has set ambitious targets for reducing carbon emissions in the city: halving emissions by 2030 and reaching zero emissions by 2050. If these targets are to be met, a substantial mode shift from motor vehicles to walking, biking and public transport will be essential. E-bikes have the potential to make a significant contribution to meeting these emission targets. However, if our transition to a low carbon mobility future is to be socially just as well as environmentally sustainable, low emitting transport options, including e-bikes, need to be accessible in all communities.

While e-bike use is growing steadily in Tāmaki Makaurau/Auckland, as it is internationally, e-bikes and other forms of micro mobility are less available in lower-income and suburban communities than elsewhere in the city (especially e-bikes and e-scooters provided by private companies and rented via mobile phone apps). To turn this situation around, so that the convenience, health, environmental and economic benefits of e-bikes are accessible to all, we need an effective model to support and grow e-bike access in lower-income communities like Māngere, in South Auckland. Without this, e-bike use will predominantly remain in wealthier areas.

Time to Thrive (TTT) is a community Trust and biking advocacy group that is run by local bike champions from a bike hub located in the heart of Māngere. TTT are stimulating growth of a local bike culture in Māngere, supported by activities such as restoring and distributing donated bikes, running bike skills training courses, guiding 'Keep the Wheels Spinning' groups rides in the neighbourhood and beyond, and hosting all-ages, bike focused events. For several years TTT have owned a few e-bikes, displayed e-bikes at events and sometimes used them in green prescription programmes for patients referred by a medical clinic in the area.

In 2021, TTT delivered a Stage 1 "Give-it-a-go" e-bike trial, in partnership with the research team. It comprised three, two-hour evening skills workshops and a follow-up hui. Participants in this trial were given the chance to try out various e-bikes in a supportive off-road environment. In the follow-up hui participants expressed enjoyment using the e-bikes, recognition that an e-bike could replace certain car trips, and increased opportunities for exercise and recreation. The trial also challenged assumptions that Pacific people, particularly older Pacific women do not bike. Although trial participants were keen to have further access to e-bikes, the purchase cost was identified as a major impediment to future use. The potential for theft or damage to an e-bike and injury to the rider were other concerns.

However, the overall success of the Stage 1 "Give-it-a-go" e-bike trial stimulated interest in the future of e-bikes in Māngere and led to the design of two further trials to systematically explore the potential and practical considerations for routine e-bike use.

Stage 2: Integrating an e-bike in daily life trial: Using e-bikes in daily life based at home, work, and community locations.

Stage 3: Affordable e-bikes for all: Developing and testing mechanisms for affordable, safe, and user-friendly e-bikes. Pilot Waka Kotahi Innovation Fund supported work to build evidence for national policy approaches to equitable e-bike use.

These subsequent trials were co-designed by TTT and the research team, with planning starting from a position of success and designed to slowly introduce, identify, and address barriers that would likely be encountered in considering and using e-bikes in Māngere. It was recognised that while TTT’s promotional activities have raised the profile of biking in Māngere, further support and activations are needed to sustain growth, including developing an interest in e-bikes. The types of interventions required are likely to include a mix of: infrastructure improvements to increase biking safety; biking events to give local people opportunities to gain confidence moving on two wheels around neighbourhood streets; and mechanisms to reduce cost barriers to longer-term bike/e-bike access.

The Māngere Stage 2 trial proposal was sponsored by the Māngere-Otahuhu Local Board and submitted to Ngā Tiriti Ngāngahau Vibrant Streets Programme – Auckland Council’s Climate Fund, administered by Auckland Transport, for funding. The bid was successful and a collaboration between TTT, Auckland Transport (AT), Māngere-Otahuhu Local Board, and the research team was initiated.

The Stage 2 e-bike trial provided 40 individuals with an e-bike for 3 months enabling them to become familiar using the bike as part of their everyday life while also having the ongoing support of TTT for skills training, safe route finding and bike maintenance. The trial introduced a fleet of e-bikes to the streets of Māngere, as part of a broader goal to normalise e-biking as a feasible alternative to car use for some routine daily trips. At the end of this series of incremental trials, we hope that a model for successful e-bike use in a low-income community will have been demonstrated to inform future policy. This report highlights the lessons learnt planning and delivering the Stage 2 trial along with trial outcomes.



2. Integrating an e-bike in daily life trial

2.1 Trial preparation

Aim: To trial and evaluate the use of e-bikes accessed through one or more of the following settings in Māngere: workplaces, public housing, marae, a community bike hub.

To achieve this the trial would:

- Provide skills training and support to Māngere residents, community groups, and workplaces followed by access to an e-bike for personal use for a 3-month trial period.
- Evaluate the participants' use and experience of riding, readiness to continue using an e-bike and potential to change travel behaviour.
- Identify and problem solve barriers to accessing, using, maintaining, and retaining bikes and e-bikes in Māngere.

Organisational responsibilities:

- TTT – had responsibility for local day to day administration and delivery of the trial, including participant recruitment, e-bike purchase specifications, bike skills training, maintenance and repairs, providing safe route information and opportunities for regular community rides, weekly check-ins around bike and rider safety, recording odometer readings, and general support for participants.
- The research team – overall leadership of the trial working with Auckland Transport and TTT, setting up monitoring systems, establishing participation criteria, health and safety requirements, and bike security and storage criteria (in partnership with TTT). Data collection and reporting, including connection with other researchers and policy makers.
- Auckland Transport (AT) – administering the funding, collating regular reports from project partners, hosting regular online team meetings, and general programme support (e.g., printing health and safety documentation).
- Auckland Council – liaison with the Māngere Otahuhu Local Board, and general programme support.

Details of the how the programme would be delivered and monitored were discussed between stakeholder representatives during regular fortnightly online meetings. Key matters resolved in the planning phase were:

- Risk assessment and communication: There was agreement amongst stakeholders that the trial required a careful and cautious approach to ensure participant safety and adherence to legal requirements for the safe running of the trial. However, there was a shared acknowledgement that riding a bike had inherent dangers and there was always a risk of injury.

- E-bike loss or damage: Theft or damage to e-bikes was a concern. To reduce the possibility of theft, the bikes were attractively branded as Māngere community bikes, participants were provided with folding locks, and had to demonstrate they had safe and secure storage for the e-bike at their home. The locks were a relatively secure option while not being as large and heavy as chain locks.
- Participant recruitment criteria: To be eligible for participation, individuals had to be at least 18 years old, reside in the Māngere area (though some participants who commuted to major employers in the area were also included), agree to take part in the research components of the trial, have secure home storage for the e-bike, and not be a regular e-bike user. Additionally, they were required to participate in a bike skills assessment at the training and e-bike handover session. Initially, three recruitment waves were planned with 20 participants in each, but this was subsequently reduced to two waves once the administrative requirements around the trial were better understood.
- Ownership of trial e-bikes: Borrowing e-bikes from a retailer or a shared micro mobility operator or buying e-bikes outright were the options considered. Ultimately, it was decided to purchase 22 new e-bikes. The e-bikes are owned by AT but loaned to TTT for the trial and their bike activation activities at least until the end of the Ngā Tiriti Ngāngahau programme (mid 2024). Initially TTT was disappointed not to own the e-bikes outright, but having access to them for an extended period with few conditions was still advantageous. Insurance cover for the e-bikes was investigated but no viable option was found, hence a 'self-insurance' model was adopted.
- E-bike specification and purchase: AT procured a range of e-bikes from two suppliers based in Auckland, with guidance from TTT regarding their specific needs. These included: 15 step-through bikes, most of which were rear hub motored and a couple with mid-crank motors; five higher-powered e-bikes with crossbars; and two cargo e-bikes, one longtail (with an extended rear bench) and one front-loader (with a large bucket between the rider and the front wheel). TTT trialled various e-bike designs to assess which designs were more popular among the participants. The following accessories were procured: helmets, locks, pannier bags, lights, mirrors, and waterproof bike covers.
- E-bike maintenance: Participants were given general guidance on e-bike maintenance but also made aware that TTT would be available if they had any concerns and weekly check-ins were arranged to ensure the e-bikes remained in good condition. The bike retailers were available for back-up support if necessary.

2.2 Trial implementation

An e-bikes blessing was held at the TTT Māngere Community Bike HUB on 22nd September 2022, officiated by Te Ākitai Waiohua kaumātua David Wilson Takaanini.

The trial was launched on Friday 14th October 2022 at the Māngere Cosmopolitan Club. During this event, most Wave One participants signed up for the trial. This involved instruction on riding, storing, and maintaining the e-bike, agreeing to obey the road code and to adhere to

bike care and maintenance requirements, consenting to take part in the evaluation, and completing baseline data collection. Those participants who completed all steps on the day were issued with an e-bike and all necessary riding accessories.

Wave One was centred on individual riders from the community in Māngere. TTT looked to select participants who had demonstrated an interest in getting involved in their work and group rides.

Wave Two focused on commuters traveling to local employment. Participants were recruited from four workplaces: Air New Zealand Cargo, Turuki Health Care Māngere, Nga Iwi School, and Papatūānuku Kōkiri Marae. These participants included commuters residing within and outside Māngere. TTT and research team members visited the workplaces, introduced the trial to staff and recruited interested individuals into the trial. On a later occasion, these new trial recruits visited the TTT Māngere community bike hub for their trial induction session and to collect a bike. A Wave Two launch was held for participants at the TTT Māngere community bike hub.

A programme of group rides was set up by TTT with attendance on an “as and when you can” basis. The guided rides were an opportunity to introduce participants to new on and off-road routes, trouble shoot any issues the rider was having and have fun. Rides had a celebratory atmosphere and sharing food at the end was an important aspect of the ride. TTT also had drop-in sessions during the week to support the riders and check on the bikes. When the e-bikes were returned to TTT at the end of the trial period, an odometer reading was recorded.



2.3 Trial evaluation

The evaluation had both process and outcome measures, with the outcomes focussing on immediate use and experiences. The logic for the trial is that, if successful, then expanded implementation would lead to emissions reduction, cost, and health and wellbeing benefits. The measures and data collection had four main components:

- Brief **pre- and post-trial surveys** were completed by participants assisted by a research team member. The primary data collected were travel behaviours in the seven days prior to starting the trial and the final week of the trial. The number of trips the participant had taken to various destinations (e.g., work, recreation, shopping etc.) and the mode used (e.g., driving a car or as a passenger, public transport, walking, push bike etc.) were recorded. The survey also collected standard demographic information, and the location of participants' home and places of work and/or study. Collecting these data pre- and post-trial has enabled a comparison of mode used for routine trips. As recall data, they give a general indication of mode shift rather than a precise measure of mode shift. The information also provided a useful prompt for discussion in post-trial interviews.
- The e-bikes were also equipped with **odometers** making it possible to keep track of the **total distance travelled by each participant**.
- An **interview, either face to face or by phone**, was conducted with participants after they had completed the trial period. Interview questions focused on how individuals used the e-bikes, their positive and negative experiences of the e-bike and of riding, as well as their interest in, and barriers to, further use of an e-bike.
- Two key TTT staff members involved in the delivery of the trial were interviewed after Wave One to record their **experiences of delivering the trial** and to assess trial features that had worked well and things they would change delivering Wave Two.

The research team maintained regular contact with TTT to offer support where needed and document the trial phase, including any challenges faced by the community group or participants and any issues that might be encountered with the bikes. Additionally, during the trial, team members participated in group rides organised by TTT along with the participants. This allowed team members to gain first-hand experience of the trial, which proved to be valuable in providing insights that were later discussed in post-trial interviews.

2.4 Trial findings

Indications suggest the trial has been highly successful, with many participants using their e-bikes extensively and reporting a growing confidence in using an e-bike as a form of travel, recreation, and exercise.

Mode use

Figure 1 below shows a comparison of the proportion of weekly trips (before the trial and in the final week of the trial) made by motor vehicle, cycling (push bike or e-bike), and other modes (e.g., walking or public transport). Combining results from all participants who completed the travel surveys, over a third (33%) of weekly trips were made by cycling while on the trial, and trips made by motor vehicle reduced by 25%.

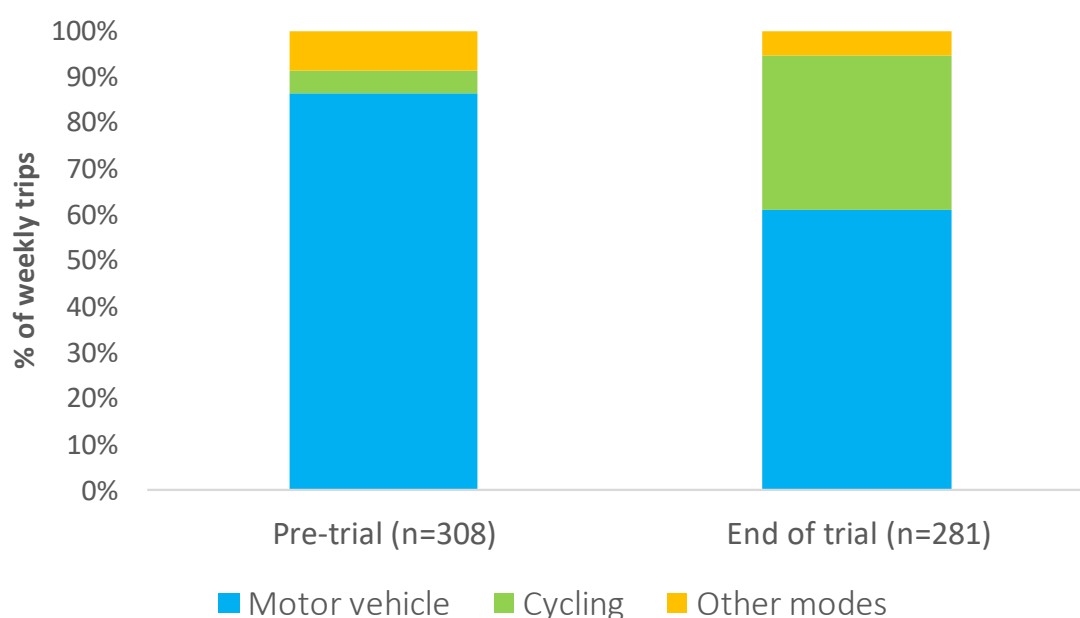


Figure 1: Weekly trips, by mode, pre- and end of trial. n values shown are total trips reported. Data from 22 participants

Odometer readings

The kilometres travelled ranged from 36km to 1057km for participants where the odometer readings were available, as displayed in Figure 2, and the median was 299km. This figure shows that the extent of e-bike use differed among participants. Those with lower numbers of kms travelled explained they would use the e-bike occasionally for a recreational ride, while those with higher kms travelled would use it daily, often for multiple trips, such as commuting or regular exercise. It is important to understand these findings in the context of an individual participant's cycling journey – many had limited experience with cycling, and a weekly or monthly recreational ride represented a significant step in their cycling journey.

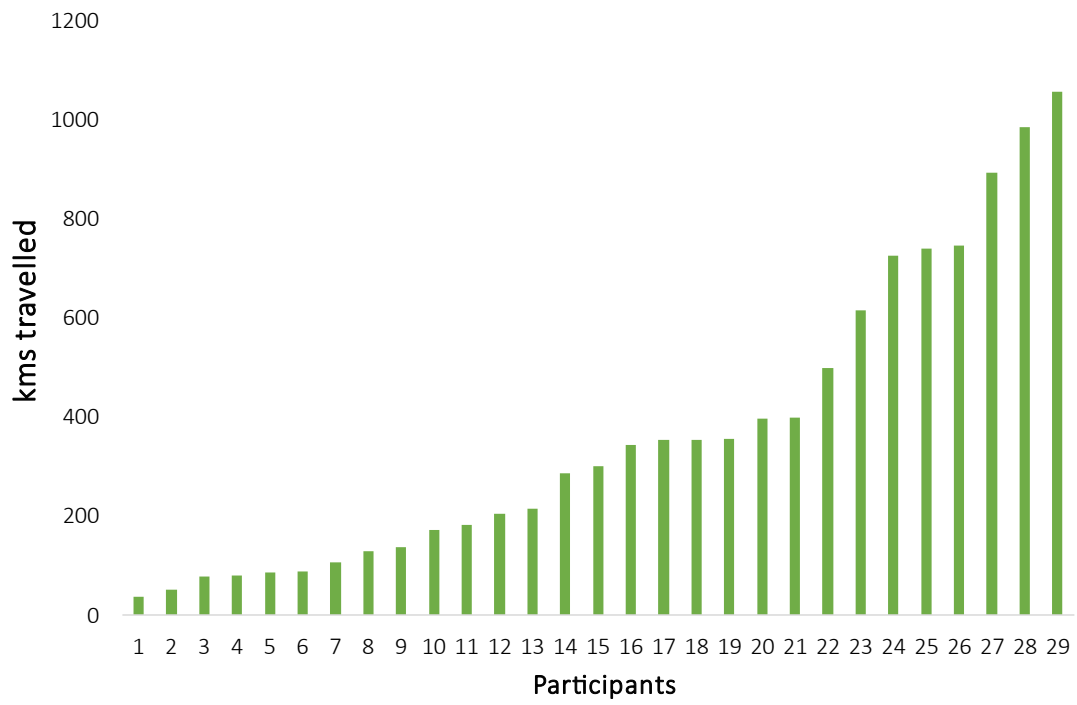


Figure 2: Kilometres (km) travelled by participants while on trial.



Participants' experience of the trial

Pre-trial biking experience varied from participants who had seldom ridden a bike, to competent push bike riders. The experienced riders used the power and speed of the e-bike to extend the distance and frequency they rode, while those with little to no experience often took several weeks to over a month to feel comfortable riding the e-bike to travel to destinations. Prior experience of an e-bike was limited to those who had taken part in the Give-it-a-go trial. Others were curious but hadn't had an opportunity to try one.

"I'd always wanted to trial an e-bike, but I didn't know of anyone who had one or know of any other places where you could go and try one".

E-bikes were used for leisure, exercise, travelling to local destinations and for commuting. Commuting trips were mostly within the Māngere area or nearby (e.g., to the airport and Papatoetoe) but a few were longer (e.g., Parnell (≈15km) and East Tāmaki (≈13km)). For some participants, the e-bike became fully integrated into their daily travel patterns, replacing previous motor vehicle trips for those who owned cars, or providing an additional option to those who were reliant on others for their transport.

"Since the trial started, I've been in my car probably about only five times ... I've used the bike every day".

"I was able to go and see people and go to functions at the marae, and didn't need to ask people for a ride to go places".

"it was like putting your shoes on...you put your shoes on to walk outside. The e-bike was my shoes, I needed it every day".

A small number of participants made minimal use of the e-bike because they did not have time to ride and build up their confidence. Poor weather conditions during Wave 2 of the trial also limited use of the e-bikes, and some participants felt they didn't have a chance to build a regular habit of cycling during the trial period. Although all participants were provided with locks, fear that the e-bike could be stolen if left in public places also limited the types of trips taken by some participants.

Benefits of the e-bikes, for those who substituted car trips with e-bike trips, included savings on fuel: *"Usually on the pay cycle, my petrol tank is damn near empty ... Then we got the e-bikes ... when I got paid again ... it had only gone down by half, because it had pretty much just sat in the driveway."*

Other participants noted that they enjoyed the regular exercise, with one commenting he lost weight during the trial. *"I loved it...It's sort of woken up the body"*. Several participants noted taking a longer route during their commute to get more exercise. The e-bikes were also seen as a more comfortable option to increasing exercise, as you could control your level of effort: *"there's no barriers in terms of what size you are to be able to ride a bike"*. One participant also noted that the e-bike assisted them greatly in recovering from a previous knee injury.

E-biking was also seen to have mental health benefits with many participants saying it made them feel happy, relaxed, and more connected with their environment: *"The bike has become a life saver to me ... suddenly all my senses came alive ... an experience of freedom ... similar to*

what I experienced back in my childhood". The e-bike was also commonly identified as a motivator to go outside, get fresh air and experience nature: *"It made me get out on the weekends instead of staying at home in bed"*.

Participants also commonly expressed their surprise at how fast the e-bike could comfortably travel and how far you could travel on the battery. Their fears of the battery running out were mostly not realised.

The e-bikes allowed participants to travel farther than they normally would have for exercise and recreation, and this helped in developing confidence and a sense of enjoyment. Participants also noted the benefits of exploring Māngere on the bike: *"you see everything from a different perspective, not just sitting in your car"*.



Problems with the e-bikes were rare. There were a few punctures and the odd mechanical issue (stuck chain). TTT repaired the e-bikes if participants could not. One bike had an electrical issue and was returned to the retailer for repair. A few participants ran out of battery power during rides, possibly through not being aware of how often to charge the bike or how much battery power higher assistance levels would drain. However, this experience was described as important in learning how to use the e-bike efficiently in the future. One participant noted falling off her bike. She was uninjured but it temporarily knocked her confidence, although it did not deter her from riding again.

Future access to an e-bike was desired by most participants. Several felt reluctant to return the e-bike as it had become a part of their daily travel routine. This was particularly true for commuters who commented on the benefits to their physical and mental wellbeing and the cost savings of reducing their reliance on using a car. These participants were looking at options to buy an e-bike, but most felt that the price might be too high.

“I really want to have an e-bike of my own ... it means a lot to me ... it’s going to be very very hard to get off it”.

A few participants that had previous experience with riding a push bike noted that their time on the trial made them rediscover enjoyment from cycling. One participant asked TTT to provide her access to a push bike after the trial so that she could continue cycling.

“It made me feel like a big kid again”.

Barriers to use, or to additional use, related to a lack of useable cycling infrastructure, feeling unsafe around cars, concern about theft, a lack of confidence, bad weather, and not enough time or storage space. Some participants overcame the barriers, but others felt more restricted by them.

Enablers of use included the training and group rides organised by TTT, access to the bike hub for help, time to build confidence, the convenience of using an e-bike, and the additional sense of security that having electric motor assistance offered.

“I felt more confident because you’ve got a group of people, so cars are more aware when they see a lot of riders”.

“Being on an e-bike gave me more of a sense of security, knowing that if I wasn’t able to make it up hills ... then I had the e-bike to help me ... around traffic, just having that little throttle ... it was just brilliant”.

The TTT group rides were often participants’ first experiences of riding on roads or even on protected cycleways on the sides of busy roads. For several participants the group rides were challenging and took them outside of their comfort zone, but ultimately were a rewarding experience. The guidance of the attending TTT members was praised highly.

“Riding alone, you get a good rush out of it, but riding as a group...you get a sense of belonging towards a family”.

Participants from Wave Two of the trial also highlighted the motivation and encouragement they would get from their colleagues who were also on the trial. Many would arrange group rides on the weekends, or commute together to work. One group said that they would encourage each other to go for rides together after work, noting that before the trial they would have just gone home.

“We gained much more than just the physical aspect”.

Strategies to increase e-bike riding in Māngere identified were to make e-bikes more accessible, build more protected cycleways, and to support the work of TTT. Several participants commented that if it was easier to try riding an e-bike, more Māngere people would understand the benefits and likely want one.

“wouldn’t mind having another try, but other people in the community gotta have a turn as well so they can feel what they’re missing out on”.

Participants also thought that seeing more people cycling in Māngere would encourage others to ride, with many recounting being approached while riding by members of the public curious about the e-bike. One participant noted that TTT group rides, in which people were riding

safely, in an organised manner, and wearing safety equipment, would provide an example to others of safe adult cycling in Māngere.

TTT experiences of delivering the trial

The motivation for TTT to collaborate on the trial was to get e-bikes into the Māngere community and give local people the experience of their regular use. TTT noted the importance of the “Give-it-a-go” trial to get a measure of interest, and what would be needed to bring the community on board for the Stage 2 trial. Stage 2 trial enabled TTT to deliver on the goal of introducing e-bikes to Māngere: *“So Stage 2, linking that together, and being able to give them trust to say, hey, look, we have kept our word”*.

TTT is a well-known and well-regarded community organisation with strong relationships within the Māngere community. The TTT interviewees felt this contributed to participants’ having *“respect for our equipment, respect for our team and respect for our community”*. Relationships within the community facilitated recruitment of participants to Wave One and strategically inviting a participant from certain organisations on to Wave One helped set up workplace recruitment for Wave Two.

While delivering the trial, TTT’s goal was to support participants and take the worries out of having an e-bike, allowing people to concentrate on enjoying riding.

Guardianship of the equipment and the safety of participants were serious responsibilities for TTT. They recognised that the *“equipment will make or break our trial. If we lose half of it, then we can’t continue”*. Reducing the chance of e-bike theft was bolstered by getting confirmation (via in-person visits or photographs) of where participants would store e-bikes at home, a time-consuming but worthwhile process. Personal safety was in part achieved by allocating the e-bikes based on an assessment of participants’ riding skills. As a TTT team, *“together we did everything possible to manage the risks for people’s safety”*.

A key learning for TTT was the benefit of flexibility during the trial period, for example:

- to account for the variable amounts of time it took for people to gain confidence riding the e-bike, ie. a 20km group ride was suitable for some participants, a 5km ride was better for others.
- to extend the trial period from two to three months to allow time for some participants to absorb the experience and gain enough confidence to ride regularly.
- to accommodate the unexpected like the Auckland anniversary weekend floods and the emotional impacts they had on the Māngere community.

The flexibility to slow the pace of the trial and *“actually go with the pace of our community and not just bombard people”* was valued, and delaying Wave 2 avoided potential bike damage - *“you know, we could have had some bikes flooded and possibly could have lost some”*.

The budget to deliver the trial was *“about right”* although more time to spend with participants one-on-one may have enable some to increase their skills and confidence more quickly and move from off-road riding to cycle path or on-road trips sooner. TTT felt supported by the wider

team and appreciated the regular online catchups and attendance by Auckland Transport and the research team representatives at events like the trial blessing, participants meet & greet BBQs and group rides.

The trial and the strong branding of the bikes as belonging to the Māngere community has raised the profile and the possibility of e-bikes as a transport mode for Māori and Pacific people in the Māngere community. People have dropped by the bike hub to inquire about how they can have a go.

The e-bikes performed well and all were returned to TTT after the trial. TTT assisted with minor repairs during the trial (e.g., punctures) and at completion four lights, four throttles, two charges and two batteries needed replacing, and repairs were needed for a buckled front wheel, new wheel, and power switch in the fleet of 22 e-bikes.



3. General trial observations and lessons

- The trial has been highly successful. It has increased exposure to e-bikes in the Māngere community and for trial participants established if and how an e-bike could be integrated into their household travel patterns. A significant amount of trip substitution from car to e-bike occurred while participants had access to an e-bike, although not for all participants.
- TTT's knowledge of the Māngere community, the relationships formed, and support provided to participants, were crucial to the success of the trial.
- The trial was co-designed but community-led. TTT's approach to running the trial was purposefully low key, starting with participants known to the organisation. The trial was not advertised widely or openly but community awareness and interest grew through word of mouth and the visibility of the e-bikes on local streets.
- Flexibility was needed to ensure the trial moved at a manageable pace, organisationally for TTT, and to accommodate the different riding skills and confidence levels of trial participants. Further, the administration and participant support aspect of the trial were more resource intensive than initially envisaged so the planned three waves of recruits were reduced to two, and each wave extended to three months. This could have created tension with funders, but Auckland Transport were very understanding of the need for the trial to be responsive to community need, which was appreciated.
- Fear that the e-bikes could be stolen was shared by all – TTT, participants and the wider team. The trial protocol was successful in that it resulted in no loss or damage to the e-bikes but a downside of the cautious approach to e-bike security was some participants felt hesitant to lock and leave the e-bike (an expensive item on loan to them) in public spaces, which restricted their use of the e-bike for certain trip types.
- Early on, the inclusion of participants from a nearby public housing development was proposed. The development included a locked bike cage. However, the outcome of TTT's previous experience running a workshop there made the team wary as pushbikes donated by TTT had been vandalised within a few days. The risk of a loss of an e-bike was assessed as too high for the trial, illustrating a tension between the desire to be as inclusive as possible, with the need to ensure the safety of riders and e-bikes.
- Wave Two of the trial seemed more challenging than Wave One, possibly due to the colder and wetter winter months, but also since participants were a step further removed from the TTT whānau. Furthermore, there was little evidence of employers taking advantage of the trial for further adoption, although it wasn't pitched as a workplace led initiative for health and safety and liability reasons.
- The obvious success of the trial, and inequities of access due to the upfront cost of an e-bike, raised questions around how e-bikes access in the Māngere community could be sustained. Discontinuing individual's access without identifying a pathway for participants to gain more permanent access was problematic, although a further year of

access to the e-bikes has been ensured for those who have shown the greatest desire to continue to use e-bikes.

- This prompted the research team to seek funding for a Stage 3 trial – exploring suitable pathways to permanence, which has been supported by the Waka Kotahi Innovation Fund, and facilitated by AT agreeing the e-bikes could remain with TTT for the duration of the Ngā Tiriti Ngangahau programme, until at least mid-2024.



4. Conclusion and next steps

The success of Stage 2 of the Māngere E-bike Trial has provided valuable lessons on the potential for e-bike uptake in Māngere, and for running e-bike trials in similar communities. The Trial has shown that, when provided access and support, participants have integrated e-bikes into their travel patterns in different ways – from occasional recreational rides to daily commutes. All participants have noted the numerous physical and mental health benefits experienced from e-bike use, and the potential for significant motor vehicle trip reduction and economic benefit through reduced vehicle running costs is also indicated.

Following the trial, most participants indicated they would like continued access to an e-bike; however, cost remains the primary barrier to widespread e-bike uptake in Māngere. Further work is being done to understand incentive scheme models that are best suited to encourage equitable e-bike access in Māngere, and a trial of a TTT Community E-bike Library is currently underway. There remains an opportunity to explore incentive models that reduce the upfront cost of an e-bike, such as purchase discounts or loan-to-own schemes.

Stage 1 and Stage 2 of the Trial have shown that the model of “giving-it-a-go” followed by continued access over a longer-term period is an effective way of increasing familiarity with an e-bike and allowing participants to explore its integration into their weekly travel patterns. The model has also relied on TTT as a committed and resourced community partner, providing local knowledge, bike expertise, skills training, group rides, and ongoing support for participants. These findings can be applied to future e-bike trials in other communities to ensure the trials are set-up for success.

Stage 3 will focus on ‘e-bikes for all’ and has begun by exploring incentives. A strong recommendation is that the lessons from this trial are combined with those of other trials nationally to inform policy development and adoption, to ensure future e-bike adoption is equitable, and the benefits of them are maximised across Aotearoa.

