A1 Initial Research Questions

1) Can Micromobility Safely Share Footpaths?

2) Is hired micromobility safer/less safe than owned?

3) How wide do footpaths need to be for micromobility to share them?
4) Facility design elements contributing to or mitigating risk

5) At what speed does micromobility cause DSI in a collision with pedestrians?

6) Is the perception of safety concern from micromobility a deterrent to walking?
7) Is there a perception of a safety risk?
8) Is this a deterrent from walking?
9) Is the perception of risk higher than risk
10) Does micromobility cause a transportation inequity?

11) Should micromobility users need to use helmets?
12) Does a helmet protect against common injuries?

13) What are the emissions of micromobility compared with other modes?

14) Is micromobility replacing short car trips? Is it replacing walking or cycling trips?
15) To what degree are micromobility trips being used to get to Public transport and what effect has micromobility had on public transport
16) What is the impact of micromobility on levels of physical activity?
17) Is micromobility more or less dangerous than cycling to pedestrians?
18) How significant is skill level in crash results?
19) Skill = number of trips before crash
20) How percentage of accidents occurred with 2 riders?
21) What is the percentage of crashes that have occurred under the influence of drugs or alcohol?

22) At what speed environment can micromobility safely share with motorised vehicles?
23) What types of vehicles can travel at these speeds?
24) How much and what type of traffic do we have to get rid of for micromobility riders to be comfortable on the road? (speeds and volumes)

25) How does the risk of different micromobility modes compare to each other and other activities?
26) Overall mode share for auckland?
27) DSI per distance travelled
28) DSI per time travelled.
29) Gender split
30) Micromobility risk profiles, including exposure measures and user attributes.

31) What is the role of near misses in forming perceptions of e-scooter safety among e-scooter riders and non-riders?

32) Impact of pricing mechanisms on safety for shared micromobility

33) Impact of facility condition and maintenance on risk
34) Surfaces on Queen Street are apparently causing so much juddering it keeps speed down
35) Smooth surfaces (eg Fort St) may be dangerous to e-scooters
36) Non-user safety, including consideration of the severity of crashes/incidents
37) Pedestrian vs micromobility and cyclist vs micromobility interactions
38) How current guidance and operations are/aren't complementary to safely accommodating micromobility

39) Barriers to micromobility achieving more positive outcomes and addressing the challenges faced by Auckland's Transport system:
40) is Helmet use a barrier ?
41) Availability?
42) Cost?

Infrastructure availability?

A2 Gap Analysis

Research Idea	Why important	Data Required	Data Currently Available Y/N	Can Data Be Obtained in Time? Y/N/M	Data Collection Methodology	Pursue as concept Y/N	Prioritisation	AT Comment
Can Micromobility Safely Share Footpaths?	To assist regulators and other decision makers in determining whether they permit different forms of micro mobility onto footpaths.	1.X-KEMM-X 2.Speed data from operators 3. speed of modes on shared paths	1.N 2.N 3.N	Y	Ped Modelling Width of shared paths Speed guns X-KEMM-X modelling Speed data from operators processing Data requests	Y	High	
Is hired micromobility safer/less safe than owned?	To assist regulators and other decision makers in determining whether to continue hire use micromobility schemes and to determine what investments should be made into training programmes.	(crash data and periods where there where no operator present in auckland) 1.Slow speed zones 2.Use of helmets 3.Speeds 4.Skill 5. big Survey	1.N 2.N 3.N 4.N 5.N	N	Speed guns X-KEMM-X modelling Speed data from operators processing Survey Data requests	N	Low	

Research Idea	Why important	Data Required	Data Currently Available Y/N	Can Data Be Obtained in Time? Y/N/M	Data Collection Methodology	Pursue as concept Y/N	Prioritisation	AT Comment
How wide do footpaths need to be for micromobility to share them? 1. Facility design elements contributing to or mitigating risk	To assist regulators in determining where to allow different forms of micro mobility devices.	1.X-KEMM-X 2.Speed data from operators 3. speed of modes on shared paths 4.grass areas present (for peds to move on if needed) 5. The lowest width of a street. 6. Pedestrian volumes	1.N 2.N 3.N 4.Y 5.Y 6.N	Y	Speed guns X-KEMM-X modelling Speed data from operators processing Data requests		High	Good one
At what speed does micromobility cause DSI in a collision with pedestrians?	To assist regulators in determining safe and appropriate speeds for different forms of micro mobility	1.X-KEMM-X	N	Y	X-KEMM-X modelling for different VRU Data requests	Y	High	
Is the perception of safety concern from micromobility a deterrent to walking? 1. Is there a perception of a safety risk? 2. Is this a deterrent from walking?	To deepen understand on the wider impacts that micro mobility has on peoples lives. so that regulators and other decision makers can make	1.Survey 2.Talk to disability organisation	1.N 2.N	Y	1.Survey 2.Talk to disability organisation Data requests	Y	High – lit review parly answers	Yes

Research Idea	Why important	Data Required	Data Currently Available Y/N	Can Data Be Obtained in Time? Y/N/M	Data Collection Methodology	Pursue as concept Y/N	Prioritisation	AT Comment
3. Is the perception of risk higher than risk 4. Does micromobility cause a transportation inequity?	informed choices regarding e-scooters.							
Should micromobility users need to use helmets? 1. Does a helmet protect against common injuries?	To assist regulators in determining if they should make the use of helmets mandatory. To assist all decision makers in determining if they should try to promote the use of helmets on forms of micro mobility.	1.X-KEMM-X 2.ACC data 3.	1.N 2.Partially 3.Y	Y	Lit review and data requests		Will likely be answered by the ACC data and the lit review	
What are the emissions of micromobility compared with other modes?	To deepen understand on the wider impacts that micro mobility has.	1.Lifecycle assessments	1.N	N	Data requests	N	No go (Very difficult to analyse, changing rapidly)	
Is micromobility replacing short car trips? Is it replacing walking or cycling trips? 1. To what degree are micromobility trips being used to get to Public transport and	To deepen understand on the wider impacts that micro mobility has on peoples lives.	1.Operator trip data 2.Survey 3.Household travel survey	1.N 2.N 3.Y	Y	Compare median or average trip length to other modes	M- partly	Lit review will indicate towards an answer to this	Yes

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what effect has micro mobility had on public transport 2. What is the impact of micromobility on levels of physical activity?	So that decision makers can make informed choices regarding e-scooters.	(ask them to record this going forward)			Look into the trip types for other modes Look at the bus stations and see how many trips end at these location Survey required until enough data from household travel survey is available			
Is micromobility more or less dangerous than cycling to pedestrians?	To deepen understanding of micromobility by comparing it to other modes	1.X-KEMM-X 2.ACC data	1.N 2.Partially		X-KEMM-X modelling for different VRU	Y		
How significant is skill level in crash results? 1. Skill = number of trips before crash 2. How percentage of accidents occurred with 2 riders?	To assist regulators and other safety groups determine where best to invest there resources to	1.Survey 2.Rental vs Owned 3.E-scooter sales data	1.N 2.N 3.N		On-street counting On site survey	Y		Yes – useful for deciding on training

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3. What is the percentage of crashes that have occurred under the influence of drugs or alcohol?	achieve the greatest safety outcome (e.g. should extra investment be made into training programmes).							
At what speed environment can micromobility safely share with motorised vehicles? 1. What types of vehicles can travel at these speeds? 2. How much and what type of traffic do we have to get rid of for micromobility riders to be comfortable on the road? (speeds and volumes)	To help decision makers make informed choices on prioritisation of modes, speed and street design.	1.X-KEMM-X 2.Vehicle collisions 3.CAS 4.Lit review resources	1.N 2.Y 3.Y 4.Y		X-KEMM-X modelling for different VRU	Y	High	
How does the risk of different micromobility modes compare to each other and other activities? 1. Overall mode share for auckland? 2. DSI per distance travelled 3. DSI per time travelled. 4. DSI per trips. 5. Gender split	To help decision makers make informed choices on prioritisation of modes, speed and safety choices regarding different micromobility modes	1.ACC 2.total km travelled per each mode (MoT, NZTA and AT) 3.Journey to work data E-scooter dashboards	1.Partially 2.N 3.Y	Y	Data requests	Y	High	5 a (risk profiles) is from scope.

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a. Micro-mobility risk profiles, including exposure measures and user attributes								
What is the role of near misses in forming perceptions of e-scooter safety among e-scooter riders and non-riders?	To deepen understanding of micromobility'safety, risk and perceptions	1.*555 data 2.Survey	N	Y			Low	
Impact of pricing mechanisms on safety for shared micro-mobility	To help decision makers make informed choices regarding the influence they have on pricing models in order to decrease risk.	1.Find out about the different operator pricing mechanisms 2.Survey 3.Operator reported crashes	1. 2. 3.				High - Very difficult	From scope
Impact of facility condition and maintenance on risk • Surfaces on Queen Street are apparently causing so much juddering it keeps speed down • Smooth surfaces (eg Fort St) may be dangerous to e-scooters	To help decision makers make informed choices on prioritisation of modes, speed and street design.	1.CRM data 2. Speed camera data	1. 2. 3.		Speed gun		High	From scope
• Non-user safety, including consideration of the severity of crashes/incidents o Pedestrian vs micro-mobility and cyclist vs		1.X-KEMM-X			X-KEMM-X modelling		High	From scope

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micro-mobility interactions								
• How current guidance and operations are/aren't complementary to safely accommodating micro-mobility		Review findings against the code of practice and the new legislation					High	From scope
• Barriers to micro-mobility achieving more positive outcomes and addressing the challenges faced by Auckland's Transport system • is Helmet use a barrier • Availability • Cost • Infrastructure availability		1.Slow speeds zones 2.Survey					High	From scope