Transport and Other Legislation (Managing E-mobility Use and Protecting Our Communities) Amendment Bill 2026

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Mr Jim McDonald MP
Chair, State Development, Infrastructure and Works Committee
Queensland Parliament
Cnr of George and Alice Streets, Brisbane QLD 4000

9 April 2026

Dear Mr McDonald,

Please find attached my submission to the Inquiry into the Transport and Other Legislation (Managing E-mobility Use and Protecting Our Communities) Amendment Bill 2026.

I appeared before the Committee on 22 July 2025 as an expert witness during the Inquiry into E-mobility Safety and Use in Queensland, and I appreciate the Committee's and your personal engagement with my testimony at that hearing. I also attended the public briefing in Parliament on 2 April 2026 to hear the brief by TMR Deputy Director-General Mr Andrew Mahon.

The Bill introduces a number of provisions with significant technical implications that require meticulous technical review and specific expertise to assess properly — in particular, the mandatory EN 15194 compliance labelling requirement, the approved testing device framework, and the practical enforceability of the proposed speed limits. These are matters on which I am well positioned to assist the Committee.

I would welcome the opportunity to appear before the Committee again to elaborate on the matters raised in this submission.

Yours sincerely,

Dr Arkadiy Matsekh
Chief Scientist and Director
OKB-42 Pty Ltd / Foucault Dynamics
[redacted]

Submission to the Inquiry into

Transport and Other Legislation (Managing E-mobility Use and Protecting Our Communities) Amendment Bill 2026

Submitted by:

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9 April 2026

Gold Coast, Queensland

AUSTRALIA

Contents

Basis for This Submission

This submission is made in response to the Transport and Other Legislation (Managing E-mobility Use and Protecting Our Communities) Amendment Bill 2026, introduced on 25 March 2026. It builds upon my original submission to the Parliamentary Inquiry into E-mobility Safety and Use in Queensland, dated 20 June 2025, and my oral testimony before the Committee on 22 July 2025, where I appeared as an expert witness alongside representatives from Lime and Neuron Mobility.

This submission is made on behalf of OKB-42 Pty Ltd / Foucault Dynamics, a specialist engineering microbusiness with substantial industrial and academic expertise in electric propulsion systems, in particular in the area of electric motors and electric propulsion. We develop and supply compliant e-bike conversion kits for the Australian market, manufacture motor testing equipment with international sales, and maintain significant collaborative relationships with local universities.

Note: This submission references statements made at the public briefing held in Parliament on 2 April 2026. Direct quotations are taken from the uncorrected proof transcript of the briefing.

I respectfully request the opportunity to appear before the Committee as a witness on the Bill. As a practising technical expert and small industry participant who is deeply familiar with the specific technical matters arising from this Bill, I am well positioned to assess the technical feasibility and consequences of its provisions:

- The Bill introduces provisions that did not exist at the time of the original inquiry, particularly the mandatory EN 15194 compliance labelling requirement, the 10 km/h speed limit on shared paths and footpaths for e-bikes, and the seizure framework for non-compliant devices.
- I can offer the Committee a concrete, deliverable proposal for a retrospective certification framework that would resolve the most damaging aspect of the Bill, using testing infrastructure and expertise already available in Queensland.

Executive Summary

The Bill, as introduced, fundamentally departs from the evidence and expert testimony received during the parliamentary inquiry. Having reviewed the Departmental Brief dated 1 April 2026 and attended the public briefing in Parliament, I submit that the Bill contains critical deficiencies that will cause substantial harm to Queensland citizens while failing to address the actual safety problems identified during the inquiry.

The core problems are:

- The mandatory EN 15194 compliance label requirement — and specifically the EN 15194:2017+A1:2023 revision, which has been mandatory even in Europe for less than one year — combined with the absence of any retrospective certification pathway, will render a very large number of currently legal e-mobility devices illegal overnight. Bicycle Queensland estimates the affected fleet at 230,000 devices representing over AUD 920 million in citizen expenditure. The economic damage is conservatively estimated at a minimum of AUD 230 million, with Bicycle Queensland's assessment approaching AUD 1 billion.
- The 10 km/h speed limit on footpaths and shared paths is below the natural minimum operating speed of a legal pedelec, making compliance physically impracticable. TMR's own published guidance states that bicycles become unstable below 11 km/h.

- The Bill effectively prohibits the entire e-bike conversion kit industry in Queensland and renders the currently legal 200 W e-bike category illegal — eliminating both an established lawful device class and the most affordable pathway to electric transport for cost-of-living-affected citizens.
- The Bill conflates compliant 250 W pedelecs with illegal 3,000–6,000 W devices — effectively electric motorcycles and de facto an entirely different category of vehicle — applying a single punitive framework to both, despite unanimous expert consensus during the inquiry that these are fundamentally different categories requiring different regulatory responses.
- The Bill effectively neutralises the commuting advantages of e-bikes as a transport mode, contradicting the government's own long-term active transport policy objectives and undermining the utility of purpose-built cycling infrastructure.
- The age restriction to 16+ with a learner's licence removes transport autonomy from school-age children who currently rely on e-scooters and e-bikes for independent mobility over typical Australian suburban distances.
- The Bill proposes no buy-back, compensation, waste management or government-funded certification mechanism for the tens of thousands of citizens and retailers whose lawful property is rendered worthless by a purely administrative change.

Every expert witness at the 22 July 2025 hearing — RACQ, Lime, Neuron, myself, QUT, UQ, Bicycle Queensland and Queensland Walks — identified the same priorities: enforcement of existing laws against illegal devices, separated infrastructure investment, and supply chain regulation. The Bill addresses none of these priorities. Instead, it penalises the compliant users that every witness agreed are not the problem.

The EN 15194 Compliance Label Requirement: A Regulatory Dead End

The shift from performance-based to paperwork-based regulation

Under current Queensland law, an e-bike is legal if it factually meets performance criteria: maximum 250 W continuous power, motor cut-off at 25 km/h, pedelec activation, and throttle operation limited to 6 km/h. A separate 200 W category exists for simpler devices. No certification label is required. The operative criterion is what the device does, not what sticker it carries.

These are not new or experimental rules. The 200 W power-assisted pedal cycle category has existed in Australian federal law since the Motor Vehicle Standards Act 1989 — for 37 years. The 250 W pedelec category based on EN 15194 has been recognised in Australia since Victoria adopted it in 2012 — for 14 years. Queensland updated its own road rules to incorporate both categories on 28 June 2019 — 7 years ago. Victoria, which pioneered the adoption of this framework in Australia, continues to apply the same performance-based criteria to this day without requiring certification labels.

It is worth noting that the 200 W category is not an arbitrary number. It represents the upper bound of what most people who are not trained cyclists can sustain through pedalling alone. An average untrained adult can sustain approximately 75–100 W; a reasonably fit recreational cyclist 150–200 W. Only trained competitive cyclists consistently exceed 200 W for extended periods. The 200 W motor category therefore provides electric assistance roughly equivalent to the rider's own maximum sustained capability — a sensible and well-calibrated limit that has

served its purpose for nearly four decades.

Current law also explicitly provides clear examples of illegal devices on the TMR website: petrol-powered engines, 1,000 W / 50 km/h devices, and 750 W throttle-controlled devices. The distinction between legal and illegal is already well-defined. The problem is not a lack of rules; it is a lack of enforcement of existing rules.

Critically, current law explicitly permits converted bicycles — ordinary bicycles fitted with electric conversion kits — provided they meet these performance criteria. This is not a loophole; it is a deliberate and clearly stated provision of existing legislation. Many thousands of such converted bicycles are in lawful use across Queensland. A large proportion of mass-market factory e-bikes are themselves essentially factory conversions built on standard bicycle frames.

The Bill reverses this logic by requiring formal EN 15194 compliance labelling. At the public briefing, Ms Bush directly raised this issue: "This legislation, however, specifies that the standard is EN15194:2017. This is the most recent European standard and has only recently become available in Australia. If you go into any bike retailer, very few bikes have that standard." Mr Mahon acknowledged: "We do not necessarily intend to exclude devices that were compliant with the prior standard before 2023, of which there would be devices on the market, so we will look into that issue." This is a remarkable admission: the Deputy Director-General conceded that the Bill as drafted may produce an outcome TMR did not intend — yet the Bill was introduced to Parliament in precisely this form.

The Bill specifically requires compliance with
EN 15194:2017+A1:2023 — a revision published on 24 August 2023 and mandatory in Europe only since 23 August 2025, less than one year ago. The Departmental Brief refers only to "EN 15194:2017" without mentioning the A1:2023 amendment, raising the question of whether TMR itself fully understands which standard it is mandating.

The A1:2023 revision introduces additional requirements around battery safety documentation and compliance with EN 50604-1. While the EN 50604-1 battery safety standard is undeniably important for new production, the existing fleet of e-bikes in Queensland is sufficiently safe in use to not warrant disposal. These devices have been operating for years without a systemic battery safety crisis. Mandating compliance with a standard effective in Europe for less than a year, as a condition for continued use of existing devices, is disproportionate. This is particularly acute for higher-end e-bikes with integrated battery systems, where battery replacement is complex and costly — and even replacing batteries generates additional lithium-ion waste, compounding the problem the standard purports to address.

The absolute majority of e-bikes sold in Australia do not carry EN 15194 certification of any version. They were manufactured and sold to meet performance specifications without formal European certification. The Bill therefore does not target a fringe of substandard devices. It captures the mainstream of the Australian e-bike market.

No retrospective certification pathway exists

At the public briefing on 2 April 2026, TMR Deputy Director-General Mr Andrew Mahon was pressed by the Member for Cooper, Jonty Bush MP, on how owners of e-bikes purchased from mass-market retailers such as Aldi are supposed to achieve compliance. Ms Bush asked directly: "We are going to have thousands of bike owners going in en masse back to retailers. Some of these bikes have been purchased at Aldi. How are you training the people at Aldi to do that work? The implementation is what I am after. It seems like there are a lot of assumptions here that the retailers will just know what to do, that it will be simple: they will pop a sticker on; they will send it back to the manufacturer."

Mr Mahon's response was that "hopefully the more reputable and larger retailers and/or manufacturers—and there are quite a lot now on Australian shores—will be able to give guidance and advice and respond to customers about how they can get their device legalised or otherwise," adding that "we are largely putting the responsibility on retailers and manufacturers to update those devices and/or ensure they are legal by marking them appropriately." When the Member for Aspley, Bart Mellish MP, asked directly whether the process requires owners to go back to retailers and retailers to go back to manufacturers, Mr Mahon confirmed: "That is the most likely scenario."

When Ms Bush further pressed on the availability of testing technology, Mr Mahon acknowledged: "Right now we do not have those devices. We are going to purchase devices that enable us to test. TMR will go through that process to ensure we are ready in the second half of this year."

These responses reveal a fundamental disconnect between the legislative framework and any practical implementation plan. EN 15194 certification requires laboratory testing of the complete bicycle as an integrated system by one of a small number of accredited certification and standardisation bodies worldwide, such as TÜV Rheinland, TÜV SÜD, SGS, Intertek or Bureau Veritas. It is not a sticker that a manufacturer can retrospectively issue upon request. It is a formal product certification programme with associated costs, timelines and technical requirements.

The following realities were either not understood or not acknowledged:

- Most overseas manufacturers have no obligation or incentive to retrospectively provide EN 15194 certification for models already sold into the Australian market.
- Many manufacturers may no longer produce the model in question, may have ceased operations, or will simply not engage with individual retailer requests.
- EN 15194 certifies a complete bicycle as an integrated product — frame, motor, battery, controller, brakes, and all components together. It cannot be applied to individual components or to a bicycle assembled from separately sourced parts.
- Repair and maintenance of certified e-bikes becomes problematic: replacement of parts, particularly with non-original equivalents, technically voids the certification. The practical question of how bicycle workshops will manage this is entirely unaddressed.
- Retailers left holding stock they cannot certify face penalties for false declarations, yet have no viable path to compliance.
- Citizens who own existing devices find themselves in an identical dead end: unable to obtain documentation that never existed for a product that was entirely legal at the point of sale.

The Departmental Brief acknowledges a six-month transitional period but proposes no mechanism, no testing framework, no certification and standardisation body, and no budget to make retrospective certification possible. The government is creating an offence ($500 penalty for a fake compliance label, up to $5,007 maximum; Bill, Clause 45) without providing any lawful means of obtaining a genuine label.

Queensland would need to establish several government-funded certification and standardisation centres, sufficient to cover the needs of the state's fleet. As an order-of-magnitude estimate, approximately 100 approved testing devices would be needed — around 10 reference-grade laboratory installations for detailed assessment, and approximately 90 units for routine use by police and verification points — to process 230,000 devices within a reasonable timeframe.

The approved testing device provisions are hollow

The Bill includes provisions for "approved testing devices" (Bill, Clause 40, new Section 121A) to assess whether a vehicle complies with the EPAC standard, including at roadside locations. However, from the public briefing it was clear that TMR has not procured any such devices and has no concrete plans to do so. The provisions exist in the legislation but not in reality.

This is not a trivial gap. Roadside testing of electric motor power output is a technically non-trivial exercise, particularly for marginal cases. Measuring maximum continuous power requires reaching thermal steady state, which takes time and controlled conditions. Different motors behave differently at different speeds and loads. The Bill's requirement that motor output be "progressively reduced as speed increases above 6 km/h" introduces particular complexity: at 6 km/h, a motor operating at maximum power produces very high torque, but this does not necessarily correspond to maximum output power, since power is a product of torque and speed. Testing at low speed and high torque requires specialised equipment and expertise.

In cases of gross non-compliance — a 3,000 W motor on a throttle-controlled device — visual inspection and basic speed measurement suffice. But for the marginal cases that will inevitably arise with the existing fleet of broadly compliant devices, roadside testing by police officers without laboratory training is problematic at best and unreliable at worst.

Furthermore, the Bill does not address marginal non-compliance — devices that may slightly exceed one parameter while being fully safe in practice. A motor that produces 260 W continuous instead of 250 W does not present any greater safety risk than a strictly compliant device. Yet under the Bill, such a device would be a "prohibited bike" subject to seizure and destruction.

Allowable tolerances and margins must be clearly defined. The very definition of continuous rated power is dependent on relatively arbitrary thermal criteria. Depending on the thermal conditions chosen, determining a motor's continuous output may require testing for up to 60 minutes or longer to reach thermal steady state. Moreover, in the absence of a requirement to limit controller output power (which is not mandated by the standard), even a fully compliant motor can produce output several times its rated continuous power for extended periods during normal operation. For an untrained technician, this could appear to be evidence of post-market tampering when it is in fact standard motor behaviour. Detailed in-depth research and development of in-situ testing protocols for propulsion systems on typical light electric vehicles is essential before any enforcement regime based on power measurement can be implemented responsibly.

The 200 W category is eliminated without justification

Current law recognises two categories of legal e-bikes: EPACs (EN 15194 equivalent, 250 W) and 200 W e-bikes. The Bill eliminates this category entirely, requiring all e-bikes to carry EN 15194 labelling. Devices that are by definition less powerful than the EN 15194 standard are swept into illegality alongside genuinely dangerous high-powered machines.

Conversion kits are effectively prohibited

OKB-42 Pty Ltd develops and supplies compliant e-bike conversion kits for the Australian market under the Recycles — Sustainable Urban Mobility brand (https://okb-42.com.au/recycles). Our products are engineered for the 200 W category, with comprehensive instructions enabling customers to limit even peak power output to 250 W — stricter than EN 15194 itself, which regulates only continuous rated power and permits peak outputs of 600 W or more.

EN 15194 certifies a complete bicycle as an integrated product. A conversion kit is not a bicycle. There is no mechanism under EN 15194 to certify a conversion kit. The Bill therefore makes

this entire product category illegal — not by explicit prohibition, but by imposing a certification requirement that is structurally impossible to meet.

To illustrate the practical reality: our motor components are sourced from an overseas supplier. That supplier has no obligation and no commercial incentive to retrospectively provide EN 15194 certification for components already delivered. We possess the technical capability to verify compliance of our own products — we operate a motor testing laboratory — but we are not an accredited standardisation laboratory, and as a small business we cannot risk penalties of up to $5,007 under the Bill's fake label provisions (Clause 45), nor the reputational damage of a prosecution, without obtaining formal approval from TMR. TMR, for its part, has no technical means to test motors in disputed cases — but it does have on paper the non-compliance of a device that lacks a label, and proving the contrary will be effectively impossible. The rational business decision for us, and for any small retailer in an equivalent position, is to write off existing stock as unsaleable, or, if possible, try to refocus on jurisdictions where our products remain legal to use. If the latter proves not possible, the stock goes to waste.

This eliminates the most affordable pathway to electric transport in Queensland. A conversion kit costing several hundred dollars allows a person to electrify an existing bicycle. By contrast, mid-range to high-end EN 15194 certified pedelecs from established brands typically retail at AUD 2,000–5,000. During a cost-of-living crisis, the Bill forces the most price-sensitive citizens toward the most expensive option — or off electric transport entirely.

I note that our business can continue to sell into other Australian jurisdictions where the 200 W category and conversion kits remain legal, delivering low-cost and sufficient-performance devices to citizens in those states. The harm of this provision falls not on our business alone, but on Queensland citizens who lose access to the most affordable form of electric transport.

Seizure and Forfeiture: Punishing Compliant Citizens

The Bill introduces a comprehensive seizure and forfeiture framework (Bill, Part 2, new Part 5 of the PPR Act) under which a device is treated as a "prohibited bike" unless the owner provides evidence to the contrary. This reversed burden of proof, combined with the absence of any practical means of demonstrating compliance for uncertified but functionally compliant devices, creates an enforcement regime that will inevitably capture lawful users.

While the legislation includes provisions for review through the Queensland Civil and Administrative Tribunal (QCAT), the practical reality is that QCAT is already substantially overburdened. Contested matters routinely take months or years to resolve. The people most likely to have their devices seized — lower-income commuters, delivery workers, young people — are precisely those least likely to have the financial resources, legal knowledge or time to pursue a tribunal challenge. In practice, the review mechanism is a procedural formality rather than a genuine safeguard: devices will be seized, owners will lack the means to contest the seizure, and the devices will be destroyed.

The Bill provides that storage and disposal costs are recoverable from the owner as a debt to the State (Bill, new Section 123S). A person whose compliant device is wrongfully seized may end up not only without their transport, but owing the government money for destroying it.

This framework is designed and may be justified for genuinely illegal high-powered electric motorcycles. Applying it indiscriminately to the broad fleet of currently legal and physically safe devices — solely because they lack a certification label — is a disproportionate and punitive use of state power against citizens who have acted lawfully under rules the government maintained for years.

The 10 km/h Speed Limit: Physically Impracticable and Counterproductive

TMR's own guidance contradicts the proposed limit

TMR's own published technical guidance, "Speed management on shared paths" (August 2020), contains the following in Section 2, "Bicycle operating requirements":

> "On well-designed paths and in good conditions, people riding bikes can travel comfortably at speeds of between 15–25 km/h with minimum risk or decrease in amenity to people walking.
>
> An analysis by Transport and Main Roads of its permanent bicycle counters in the south-east Queensland region found that people riding bikes travel, on average, at a speed of 20 km/h. As is the case in on-road situations, the small percentage of riders travelling at excessive speeds (not appropriate to the prevailing conditions) presents the largest concern to the safe operation of shared paths.
>
> Studies of bicycle operational stability during the last century have shown that a bicycle can become unstable at speeds below 11 km/h. The degree of stability depends on a number of factors: the skill of the rider; the design of the bicycle; and environmental factors such as path surface and slope.
>
> Requiring people riding bikes to travel at speeds which may detrimentally affect their stability (and safety) on inadequately-designed paths, shared with other users insensitive to their operational needs, is not an equitable or safe path management strategy.
>
> ***Any regulatory device which instructs people riding bikes to undertake a behaviour that will compromise their safety cannot expect compliance and damages the credibility of the device and should be replaced with a more suitable treatment.***"

Figure 1.1 from this document (reproduced below) illustrates the typical speed ranges of shared path users.

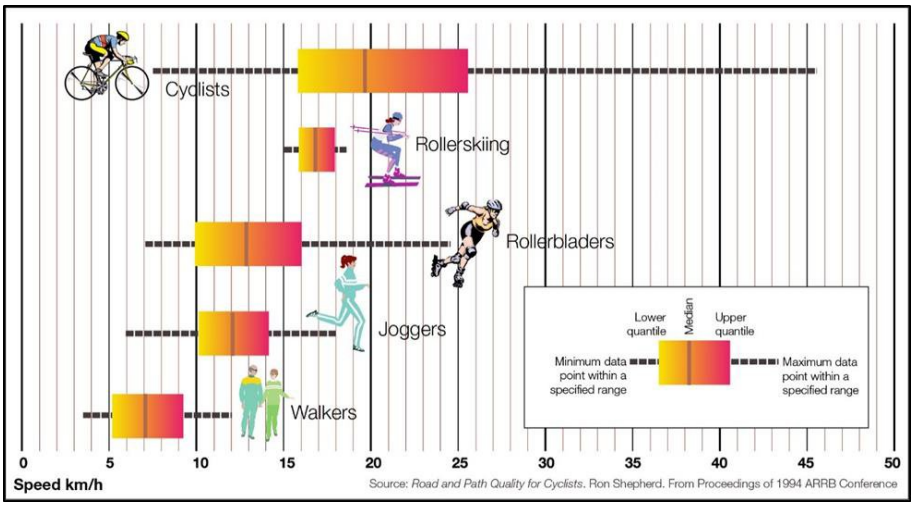

Figure 1: Typical speeds of shared path users. Source: TMR, "Speed management on shared paths" (August 2020), Figure 1.1, originally from Ron Shepherd, "Road and Path Quality for Cyclists", Proceedings of 1994 ARRB Conference.

The same TMR document further states:

> "Since bicycles are not required to have a speed-measuring device (and many do not have one), mandatory speed limits and their enforcement are not a viable option, even if they could be enforced; however, advisory speed signing and warning signage on paths where there are large numbers of slower users can be effective when used selectively at appropriate locations, and in accordance with the prevailing conditions."

It should be acknowledged that e-bikes generally do have a digital speedometer, although the EN 15194 standard does not require the electronic control unit to incorporate one, nor that a speed display be visible to the rider at all times during riding. Not all compliant e-bikes are equipped with a display showing speed.

> "A review of national and international literature has demonstrated speed limits for people riding bikes are not used or recommended as a safety device, with the exception of the rule which states the speed limit of the adjacent roadway shall apply to any road-related area."

As established earlier in this submission, legal e-bikes with motors of 200–250 W operate at human-scale power levels and, in combination with the 25 km/h motor engagement speed limit — which coincides with the upper quartile boundary for cyclists in Figure 1 — become indistinguishable from cyclists riding at a similar power level. TMR's own research on bicycle operating requirements therefore applies to them directly. The proposed 10 km/h speed limit represents an alarming departure from the core principles declared in TMR's own published guidance and from a shared path management policy grounded in physical reality and meticulously presented scientific evidence. TMR's own document explicitly warns that any regulatory device which instructs cyclists to undertake behaviour that compromises their safety cannot expect compliance and damages the credibility of the device. The 10 km/h limit is precisely such a regulatory device.

The Bill proposes a 10 km/h speed limit for e-bikes on shared paths — 1 km/h below the threshold at which TMR's own guidance says bicycles become unstable, and directly contradicting TMR's own published position that mandatory speed limits on paths are not viable or recommended. At the public briefing, Mr Mellish directly put this contradiction to Mr Mahon, quoting the department's own guidance that "a bicycle can become unstable at speeds below 11 km/h" and asking him to explain the discrepancy. Mr Mahon's response was that the guidance "does say 'may cause some instability', so it is not a certainty," that the 2020 document "does not really incorporate e-mobility devices," and that the department needed to "consider balancing all of those issues, not just one." This response does not withstand scrutiny. The age of the document is irrelevant: bicycle stability is governed by the physics of two-wheeled vehicles, which has not changed since the 19th century and will not change because more e-bikes appear on the market. As established throughout this submission, legal e-bikes with 200–250 W motors are fundamentally indistinguishable from conventional bicycles in their handling, dynamics and kinematics. They may accelerate somewhat faster than an average rider can on pedals alone, but this is still an extremely gradual acceleration — human-scale power produces human-scale dynamics. The additional mass of the motor and battery, if anything, makes low-speed stability *harder*, not easier. TMR's own research applies to e-bikes at least as strongly as to conventional bicycles, and dismissing it on the basis that it predates the current e-bike market is not a technical argument — it is an evasion.

It is also worth noting, with reference to Figure 1, that the median speed of joggers sits just above 12 km/h, while rollerbladers and rollerskiers can reach speeds above 18 km/h. Neither joggers, rollerbladers nor rollerskiers are restricted by the Bill. All methods of human-powered

propulsion — with or without mechanical mechanisms, but without electric assistance — are thus permitted to travel faster on shared paths than e-bikes, solely by virtue of the discriminatory restriction on electrically assisted vehicles.

Field test evidence: confirming TMR's own findings

I conducted a field test on a safe, flat section of footpath. The results are entirely consistent with the TMR research quoted above, and demonstrate that the proposed 10 km/h speed limit is below the natural minimum operating speed of a legal pedelec:

- At the lowest level of motor assistance, with minimal pedalling to keep the motor engaged, my heavy cruiser e-bike (with child seat) naturally settles at 12–14 km/h. This is its slowest comfortable operating speed.
- Attempting to maintain 10 km/h required constant start-stop pedalling and intermittent braking — a riding pattern that is objectively less safe than smooth, continuous riding at 12–15 km/h.
- The only way to reliably maintain 10 km/h was to switch off the motor entirely and pedal as on a conventional bicycle, which itself requires deliberate effort to stay at or below 10 km/h on level ground.

From my everyday experience of commuting on a low-powered e-bike: when climbing steep hills with a child seat passenger, my bike slows to 10.5–11.5 km/h. This is not optional speeding — it is the minimum speed required to prevent the motor from stalling. Maintaining this speed on a gradient requires comparable physical effort from the rider to keep the motor going and the heavy bicycle balanced. If the motor is allowed to slow further, it simply cannot sustain the climb. Requiring a rider to remain at or below 10 km/h under such conditions is simply an impossible demand, divorced from the physical reality of cycling physics.

I should note that my ability to maintain balance at speeds between 11 km/h and 15 km/h, while uncomfortable, reflects above-average bicycle handling skills developed over more than 20 years of daily and competitive racing cycling. I am an outlier. The expectation that an ordinary rider could comfortably and safely balance a bicycle at speeds below its natural operating regime — the way people have been riding since the invention of the safety bicycle in the late 19th century — is unrealistic. The most probable e-bike user will not necessarily possess the skill to ride safely at or below 10 km/h, and should not be expected to.

Despite deliberately attempting to ride as slowly as possible, my e-bike inevitably settled at approximately 15 km/h — the lower quartile boundary for cyclists shown in Figure 1. This is simply the objective physical reality of how bicycles operate, a reality well captured in a study commissioned by TMR itself six years ago.

The speed limit is internally inconsistent and discriminatory

At the public briefing, Mr Mahon confirmed that the proposed speed limit provisions do not apply to conventional (non-electric) bicycles. This creates absurd outcomes.

An e-bike rider whose electric propulsion system is switched off is riding a device functionally identical to a conventional bicycle, powered entirely by pedals. Yet the Bill requires this rider to observe a 10 km/h limit, while an identical rider on an identical bicycle without an electric system faces no such restriction. A rider can comfortably reach 15–20 km/h on pedals alone.

At any equivalent speed, an e-bike poses no greater risk than a conventional bicycle. The two are close in mass, and the dominant mass of the system is the rider, not the bicycle. For all practical purposes, an e-bike with its motor disengaged and a conventional bicycle are identical

in terms of kinetic energy, braking characteristics and rider visibility. The distinction is not based on any physical safety characteristic; it is a discriminatory restriction on a specific vehicle class. The appropriate standard is that the rider exercise due care and attention, which is already required under existing law.

Dangerous misconceptions informing enforcement

Mr Mahon stated at the briefing: "If they pull over a device because they put a radar gun on it and it is doing 60 kilometres an hour, it is unlikely to require testing because it is clearly illegal." This demonstrates a fundamental unfamiliarity with how both bicycles and electric motors actually behave.

On a sufficiently steep and straight downhill gradient, any ordinary bicycle will freely accelerate to 50–60 km/h under gravity alone, without violating any speed limit or other road rule. Critically, a legal e-bike motor *cannot be engaged* at such speeds. The back-EMF (electromotive force) generated by the spinning motor at speeds above approximately 38–40 km/h exceeds the battery voltage, making it physically impossible for the motor to drive the wheel. Even with a fully charged battery and no speed limiter, the motor simply cannot contribute propulsion at 60 km/h. The bicycle is coasting on gravity alone — exactly as a conventional bicycle would. A speed gun reading at such speeds tells the officer nothing about whether the device is legal or illegal.

Moreover, even moderate gradients that appear nearly flat to an untrained eye can easily accelerate a bicycle to 40 km/h or more. Under the Bill's enforcement framework, a citizen riding a fully compliant e-bike downhill at 45 km/h — with the motor physically incapable of contributing any power — could be stopped, have their device seized as a "prohibited bike" on the basis of a speed gun reading, and be required to prove their innocence. The citizen would have committed no speeding offence, no dangerous riding offence, and would be riding a fully legal device — yet the burden of proving all of this falls on them, not on the state. The Bill explicitly establishes a presumption of guilt: a device is treated as a prohibited bike unless the owner provides evidence to the contrary (Bill, new Section 123SA).

This is the direct consequence of legislation drafted by people who either do not understand or do not take into account the nuance of the technical characteristics of the devices they are regulating, combined with an enforcement framework that presumes guilt. It opens a Pandora's box of wrongful seizures, destroyed property and legal challenges — all directed at compliant users.

The Bill neutralises e-bikes as a transport mode

E-bikes give regular people the opportunity to commute 10–15 km safely and on par with cars, comparable to trained cyclists but without sweating and riding in regular everyday clothes. This is their core value proposition as a transport mode and, combined with extreme energy efficiency far exceeding that of regular or electric cars by at least a factor of 20, is the reason governments around the world invest in active transport infrastructure.

The 10 km/h speed limit strips this advantage away. With a maximum of 10 km/h, the realistic average speed — accounting for realistic riding profiles, manoeuvring and other essential delays — would be approximately 8 km/h. An e-bike commute of 10 km would take 75 minutes, compared to roughly 27 minutes at a realistic average of 22 km/h under the current 25 km/h motor cut-off. The rider would also be forced to brake continuously on any downhill gradient, accelerating brake wear and creating a less safe riding pattern. No commuter will choose a mode of transport that takes nearly three times as long as the alternative, while enduring the continuous discomfort of trying to comply with impossible speed limit instructions.

The alternative to shared paths is riding in the flow of motor vehicle traffic. The vast majority of commuters will not feel comfortable riding on car-dominated roads, particularly in Australia's car-centred cultural environment where cyclists are widely perceived as an inconvenience to motorists. This is objectively dangerous and will inevitably lead to a reduction in the uptake of light electric transport — the opposite of the stated policy objective.

The absolute majority of cycling infrastructure in Queensland consists of shared paths. Even dedicated cycling corridors are legally classified as shared paths. This means that even in the absence of any pedestrians, riding an e-bike above 10 km/h would constitute a violation of the law.

As a case in point, the Coomera Connector (M9 motorway) between Loganholme and Nerang includes a dedicated active transport corridor alongside the motorway. When fully completed, all 45 km of this purpose-built cycling infrastructure will be subject to the 10 km/h speed limit for e-bikes under this Bill. The government is simultaneously investing hundreds of millions of dollars in cycling infrastructure and legislating away its utility for electric commuters. If the goal is to stimulate active transport and increase safety, the proposed legislation is an evident policy failure.

Evidence from the inquiry contradicts this approach

Dr Richard Buning of the University of Queensland presented data to the Committee showing that separated infrastructure directly produced road rules compliance. Simply changing road rules had no measurable effect on behaviour. The 10 km/h limit is precisely the type of rule change that the inquiry's own evidence base shows will not work, while simultaneously undermining the infrastructure investment that the evidence shows does work.

The Age Restriction: Removing Transport Autonomy from Young People

The Bill requires all riders of e-bikes and PMDs to be at least 16 years old and to hold a learner's licence (Bill, Clause 34, new Section 78B). This provision is not supported by evidence presented during the inquiry.

Currently, many children aged 12–16 actively use e-scooters for independent commuting to school. In typical Australian suburban environments, even within a school catchment area, the distance from home to school commonly reaches 3–5 km or more. These distances are impractical for commuting on foot, primarily due to the distance itself, and children typically use the same shared path infrastructure that serves all active transport users.

E-scooters and e-bikes have given these young people a degree of transport autonomy that many had not previously experienced. The age restriction would immediately remove this autonomy, forcing children back into parental cars or onto overcrowded, slow school bus services — where students often must leave home more than an hour before school starts to cover a distance of just 5 km, enduring multiple stops, noise and crowding along the route. Children of this age are fully capable of safely operating bicycles and e-scooters at legal speeds; there is no evidence-based justification presented in the Bill for removing their access to these devices.

This is effectively a blow to young people's recently acquired freedom of movement, with no clear evidence-based rationale provided in the amendment Bill.

Economic Damage, Waste Crisis and Government Responsibility

Scale of economic harm

The Australian e-bike market was valued at approximately USD 740 million (approximately AUD 1.15 billion) in 2024 (IMARC Group, Australia E-Bike Market Report 2024). Bicycle Queensland estimates the Queensland fleet at 230,000 compliant e-bikes representing over AUD 920 million in citizen expenditure since 2017. The affected fleet is considerably larger than any single year's market, as e-bikes are durable goods used for many years.

Based on 230,000 devices, even at the most conservative replacement cost of AUD 1,000 per device — representing the cheapest possible replacement option, which assumes that compliant devices would suddenly appear on the market in quantities of hundreds of thousands — the direct economic damage amounts to at least AUD 230 million. This is an extremely conservative figure: the median cost of a device subject to administrative obsolescence under this Bill is substantially higher than AUD 1,000, and Bicycle Queensland's estimate of AUD 920 million more closely reflects the actual citizen expenditure at stake. Our conservative estimate of AUD 230 million represents approximately 25% of the total value of the affected fleet — a floor, not a ceiling.

It is notable that at the public briefing, Mr Mahon offered no comment on the economic impact of the Bill on existing device owners. From this, it may reasonably be inferred that TMR has not studied or modelled the question, and may have given it no consideration whatsoever.

An unplanned waste management crisis

The Bill proposes no mechanism for managing the mass disposal of devices rendered illegal. Written-off e-bikes, e-scooters and conversion kits contain lithium-ion batteries — the same batteries that Associate Professor Watts of QUT's Energy Storage Research Group described to the Committee as posing serious fire and toxic hazard risks when improperly handled. Professor Watts noted that QUT's domestic testing and recycling capacity is already overwhelmed by current demand.

Resale interstate is not a viable solution. A mass sell-off of tens of thousands of devices would flood the second-hand market in neighbouring states, particularly New South Wales — which is itself transitioning to EN 15194. The resulting oversupply would collapse resale values, and the sheer volume makes it unrealistic to expect the interstate market could absorb the Queensland fleet. The predictable end point for the majority of these devices is disposal, not resale.

The sheer volume of devices rendered illegal simultaneously would overwhelm even standard waste processing and recycling channels, which are not designed for a sudden mass influx of hazardous electronic waste. The inevitable result is chaotic disposal — batteries discarded in household bins, abandoned in public spaces, or stockpiled unsafely by owners and retailers with no clear avenue for proper processing. The government would be generating a mass flow of hazardous waste through its own legislation while having made no provision for safe processing. This is an environmental and public safety failure embedded in the Bill itself.

The government bears responsibility for the consequences of its own administrative changes

Citizens purchased e-mobility devices in good faith under a reasonable policy framework. The 200 W category has existed in federal law since 1989; the 250 W pedelec framework has been in use across Australia since 2012; and Queensland's own rules have been in force since 2019. Retailers built businesses around these rules. Manufacturers designed products to meet them.

The Bill introduces a purely administrative change: mandatory certification labelling. It does not require any physical modification to any device. It does not change the performance criteria. A device that was legal yesterday and is functionally identical today becomes illegal tomorrow solely because of a documentation requirement that did not previously exist and cannot be retrospectively satisfied.

A government acting in good faith and in the interests of its citizens must bear responsibility for the consequences of arbitrary administrative changes to established rules — changes that do not necessarily produce any technical substance or tangible safety improvement, but merely an additional administrative hurdle. This includes the obligation to provide and fund a retrospective certification pathway, or alternatively to establish a buy-back or compensation mechanism for citizens and retailers whose personal property — in many cases essential daily transport infrastructure for these people — is rendered worthless, or indeed a liability, by government lawmaking action, rather than externalising the full cost of its own regulatory change onto the citizens it claims to protect.

What the Bill Ignores: The Unanimous Evidence of the Inquiry

The Departmental Brief states that "External and public consultation has not been undertaken, noting that the Committee consulted extensively with the community through the Parliamentary Inquiry." Yet the Bill implements almost none of what the inquiry heard.

What every expert witness recommended:

- Enforce existing laws against genuinely illegal high-powered devices (3,000–6,000 W, effectively electric motorcycles) — already unlawful under current legislation.
- Invest in separated infrastructure, which the inquiry's own evidence showed is the only intervention that directly improves compliance and safety.
- Regulate the component supply chain to prevent the import and sale of non-compliant motors, controllers and kits.
- Introduce a graduated classification system distinguishing between different power categories, as per European Pedelec standards.
- Restore the connection between federal import requirements and Australian use standards, severed in 2021.

What the Bill delivers instead:

- A paperwork-based certification mandate with no retrospective pathway, rendering a large portion of the existing legal fleet illegal.
- A 10 km/h speed limit below the minimum operating speed of legal equipment — and below the stability threshold identified in TMR's own published guidance.
- A seizure and forfeiture framework with reversed burden of proof.
- No supply chain regulation. The Bill rejects the Committee's own Recommendation 12 that non-compliant devices be sold only by licensed motor traders — leaving the "private property use only" loophole wide open.
- No infrastructure funding commitments.
- No graduated classification.

- No buy-back, compensation, waste management or government-funded certification mechanism.

RACQ's Dr Michael Kane told the Committee: "With e-bikes, we are saying there is no real problem with e-bikes and we should not be getting caught up with legal e-bikes. They are a good thing." The Bill does the opposite.

Proposed Alternatives and Recommendations

Current legislation is already sufficient

It is our primary position that the existing performance-based regulatory framework already contains all the necessary rules for the safe use of e-bikes in Queensland. The performance criteria — 250 W continuous power, 25 km/h motor cut-off, pedelec activation, throttle limited to 6 km/h — define a clear and enforceable standard that has been in place for years. What is needed is not new legislation imposing administrative burdens on compliant users, but better enforcement of existing laws against the genuinely illegal high-powered devices.

A sensible approach to any regulatory tightening would be to introduce new requirements with a multi-year lead time, applying them only to new production and new sales, while allowing existing devices to remain in lawful use until the end of their natural service life. This is standard practice in vehicle regulation. The question then becomes: what exactly is wrong with the devices already produced and lawfully sold? If the answer is "nothing, except they lack a sticker" — then the entire legislative exercise is redundant.

In addition, the ageing legacy fleet should be phased out extremely gradually — over years, not months — through natural attrition, with clear forward-looking requirements for new production and new sales from a defined future date.

Retrospective certification as a fallback option

Should the government wish to introduce a formal labelling requirement, it must provide and fund a retrospective certification pathway for existing devices. This should be:

- **Free or nominal cost** — AUD 10–15 for the certification label at most.
- **Routinely available** — performed on a standardised test rig at any TMR office in Queensland.
- **Performance-based** — applying existing compliance criteria rather than requiring European paperwork.
- **Issuing standardised government documentation** — a government-issued certificate of compliance.

The government has the resources for this. It is orders of magnitude cheaper than inflicting economic damage on citizens in the midst of an economic and fuel crisis. The transitional period must be planned over years, not months, reflecting that e-bikes are long-lived devices and the underlying framework dates back decades.

This is a significant undertaking requiring substantial preparation, but the expertise in testing and protocol development exists in Queensland. OKB-42 Pty Ltd / Foucault Dynamics already manufactures motor testing equipment with international sales and has significant academic connections with local universities. We have the technical capability to design, build and deploy testing equipment suitable for this purpose.

There is also scope for developing a dedicated Australian standard, reflecting local conditions. We are not Europe, and our regulatory framework should reflect Australian specifics.

A graduated classification system

We recommend a graduated classification system consistent with jurisdictions where active transport is most successful:

- **200 W power-assisted pedal cycles:** the existing category, explicitly preserved. No licence required. Full access to bicycle infrastructure.
- **Standard pedelecs (250 W / 25 km/h):** compliant with EN 15194. No licence required. Full access to bicycle infrastructure.
- **Speed pedelecs:** up to 500 W / 45 km/h. Registration and insurance mandatory. Primary use on roads, with access to high-quality cycling infrastructure where appropriate.
- **Cargo e-bikes:** a separate category with a 25 km/h speed limit and motor power up to 1,000 W, recognising their essential role in replacing car trips for urban logistics and family transport. The Netherlands, Germany and Denmark recognise cargo bikes as a distinct category with proportionate regulation.
- **Electric mopeds and motorcycles** (with or without pedals, excluding cargo e-bikes): above 500 W. Full motorcycle licensing and registration. Road use only.

Additional recommended amendments

- Remove all discriminatory speed restrictions for legal e-bikes and treat them identically to conventional bicycles under the road rules. Legal e-bikes operate at human-scale power levels and achievable speeds; standard cycling road rules, including the obligation to ride with due care and attention, are fully sufficient.
- Preserve the legality of conversion kits that meet performance criteria.
- Remove the age restriction for e-scooters and low-powered e-bikes, retaining the current rules that have allowed school-age children to commute independently and safely.

The above recommendations illustrate what a strong, well-prepared legislative framework with properly completed policy groundwork would look like. The solution is on the surface: current legislation is already sufficient as the baseline; the ageing legacy fleet should be phased out gradually over years through natural attrition; and retrospective certification should be available as an optional pathway in disputed cases, with standardised government documentation issued upon compliance.

Conclusion

The Committee conducted a thorough inquiry and received unanimous expert evidence on the real problems facing Queensland's e-mobility landscape and the real solutions available. The Bill introduced by the government, however, disregards that evidence almost entirely. TMR has produced legislation that penalises compliant users, destroys functional equipment, eliminates affordable transport options, removes transport autonomy from young people, and creates an unplanned waste crisis — all while failing to address the illegal high-powered devices that prompted the inquiry in the first place.

We note that our position is closely aligned with that of Bicycle Queensland, the peak representative body for bicycle users with over 12,000 members, whose submission to this inquiry calls for the same fundamental changes. Like Bicycle Queensland, we call for:

- A clear and workable e-bike definition that does not retrospectively render the existing fleet of over 200,000 compliant devices illegal;
- The removal of licensing requirements, the 10 km/h speed limit and age bans for legal e-bikes, which are unreasonable, unsupported by evidence, and unnecessary if enforcement is properly directed at illegal devices; and
- Genuine investment in active transport infrastructure, as recommended by the Parliamentary Inquiry but entirely absent from the Bill.

We are not opposed to regulation. We have experience in designing and sizing compliant, safe propulsion systems, and have offered our technical expertise to support sensible regulatory reform. What we oppose is regulation drafted without the technical competence to understand what it requires, and implemented without any willingness to bear the consequences of its own administrative changes.

The testing capability, the expertise and the willingness to help exist — in Queensland, locally, and ready to deploy. So does the rising need for people to move around at a fraction of the cost and energy consumption that cars can offer, and with far greater overall safety — given how little momentum and destructive potential a bicycle rider possesses in comparison to even the lightest car.

I respectfully request the opportunity to appear before the Committee to elaborate on these matters in person.