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From: [Jesse Suskin](#)

Sent: Tue, 19 Nov 2019 16:10:38

To: Noise Regulation

Subject: submission attached

Sensitivity: Normal

Attachments:

[Wing Submission to Dept of Infrastructure Issues Paper - November 2019.pdf](#)

\f0To whom it may concern,

Please find attached Wing's submission to the Department of Infrastructure, Transport, Cities and Regional Development's Issues Paper, Review of the Air Navigation (Aircraft Noise) Regulations 2018 - Remotely Piloted Aircraft.

Best,

Jesse Suskin

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Jesse Suskin

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Submission from Wing Aviation Pty Ltd

Review of the Air Navigation (Aircraft Noise) Regulations 2018 - Remotely Piloted Aircraft

Wing welcomes the opportunity to provide a written submission to the Department of Infrastructure, Transport, Cities and Regional Development's Issues Paper, *Review of the Air Navigation (Aircraft Noise) Regulations 2018 - Remotely Piloted Aircraft*. Unmanned aviation is the rare emerging technology that promises equally significant benefits to local economies, public safety and the environment. Creating a regulatory framework that provides clarity and opportunity for innovation and investment is essential to maintain and enhance Australia's position as a global leader in the development and advancement of a drone ecosystem. A balanced regulatory framework will be important for communities across Australia that currently, and will in the future have drones providing services to them.

As the first company in Australia to offer a commercial drone delivery service, we take seriously our responsibility to provide context and expertise as communities, industry and policymakers work to adopt a regulatory framework. While the industry is in its early stages, the global market opportunity for commercial applications of drone technology is estimated at US\$127 billion (AUD\$186 billion), with drone delivery being the third largest component.¹

The reputation of Australian regulators as forward-thinking supporters of innovation in the drone industry, while maintaining stringent safety standards, informed our decision to invest in Australia. With a balanced regulatory framework, Australia has the opportunity to shape the future of the global drone industry, and be among the first countries to realise the benefits that drones services promise at scale. A regulatory framework that is too rigid or onerous could be a significant barrier to this valuable leadership opportunity in one of the world's most significant emerging technology industries.

Summary

In one year, Australians received 841 million² parcels and 68 million online food orders; this online retail revolution means there are more trucks and cars on the road, adding to the growing

¹ PwC (2016), *Clarity from Above*. Cited in *Faster, Greener and Less Expensive; The Potential Impact of Delivery Drones in the ACT*, (November 2018), AlphaBeta

² Pitney Bowes Parcel Shipping Index (2018). Accessed at: <https://www.pitneybowes.com/au/newsroom/press-releases/pitney-bowes-parcel-shipping-index-reports-australias-parcel-shipping-volume-exceeds-63-million.html> >

problem of congestion in our cities.³ With the booming popularity of online shopping and a rapidly growing urban population, today's infrastructure is under stress and will not be able to cope with increasing demand without radical disruption to current delivery methods.

Drones can help alleviate pressure on infrastructure as our cities grow at unprecedented rates, without the need for significant capital investment from governments. Drone delivery is safe, fast, green and affordable, with the potential to improve the way our cities operate, providing important benefits to society:

- For consumers - the ability to order something and have it delivered to your home in minutes.
- For businesses to consumers - we're connecting businesses to more customers, at a fraction of the time and cost of existing transport services.
- For businesses to businesses - drone delivery will enable thousands of work hours to be recouped, for example, at work sites when tradespeople don't have to leave a site and drive to hardware stores for tools and other materials.
- For the community - all-electric drones can help to reduce emissions, traffic, and car accidents on our roads.

We broadly support many of the recommendations in the Issues Paper, however we are concerned that addressing noise in isolation from the whole of government review of drone regulation, already underway, could lead to policy solutions that deliver unintended and unforeseen consequences for other important areas, such as safety.

We believe there are a few areas that need further review and exploration before being presented as viable policy solutions, which are discussed in further detail below.

- 1) The overall benefits of drones and value for communities goes well beyond medical emergency services, and drone regulation should not be based on a narrow and unclear view of what constitutes 'societal benefit.'
- 2) Local, State and Territory frameworks already exist to regulate neighbourhood noise, and in some instances can be applied to the base of commercial drone operations through the planning process.
- 3) To develop effective solutions, we shouldn't solely rely on the framework for manned aviation. Last mile delivery by drone is more akin to a vehicle transporting goods by road than an airplane transporting passengers or cargo by air.
- 4) The Australian Government should maintain all regulatory oversight of Australian airspace in accordance with long standing principles, and best practices related to aviation safety.

³ Banney, A, "Australians spend \$1,590 each year on delivered food", Finder.com.au (9 February 2018). Accessed at: <<https://www.finder.com.au/australians-spend-1590-each-year-on-delivered-food>>

About Wing in Australia

Wing, a subsidiary of Alphabet, has built a small, lightweight aircraft and navigation system that can deliver small packages, including food, medicine and household items, directly to homes in minutes. Created in 2012, Wing has conducted more than 80,000 flights across three continents. Wing has been trialling drone delivery in Australia since 2014 and in 2019 used learnings from those trials to establish two ongoing commercial operations in Gungahlin, Australian Capital Territory (ACT) and Logan, Queensland (QLD).

Wing has a growing staff in the ACT, QLD and New South Wales, and continues to invest in the hiring of pilots, aircraft engineers, software engineers, customer service representatives, logistics experts, merchant relations managers, corporate affairs and other roles that will fall into the “jobs of the future” category. Wing has also been approached by a number of Australian states and local councils inquiring about bringing drone delivery to their areas.

While Wing is also operating a delivery service in North America (Virginia, USA), and Europe (Helsinki, Finland), it has made its first and most significant investment in Australia. Australia has proven to have an interested, tech-forward population, a talented and experienced unmanned aviation workforce, and enthusiastic and innovative businesses and government partners. This landscape has enabled Australia to stake out a global leadership position in the advancement of drone technology, and we believe that is why some of the most significant drone developments in the world are happening here.

Benefits of drones

Drones have the potential to enhance and strengthen a number of industries; drones can make survey work of power lines, bridges and other infrastructure significantly safer, and far quicker. They can assist emergency services -- from providing real-time imagery from vantage points not able to be captured by any other means, to delivering equipment or other essentials on a moment's notice. The potential for saving lives, making dangerous work more safe, and increasing productivity are endless as drone technology, and its applications are just getting started.

We have concerns with regulating drone deliveries based on an unclear definition of ‘societal benefit’ as proposed in the Issues Paper. ‘Societal benefit’, a subjective criteria, is not an assessment used for other modes of transportation; a car may well be taking a doctor to work at a hospital, a student to school, or a family on a trip to the supermarket. Australians look at cars for the total value they bring to society, and although some cars give way to other vehicles, like ambulances, there are not different regulations imposed on car-users based on the reason for the car trip.

We believe the societal benefit of drones operating in communities goes well beyond just delivering medical equipment and for emergency uses (though there is immense value in those

use cases, and Wing hopes to be using our service to assist in such scenarios soon). Using drones for delivering goods around cities or suburbs has the ability to take millions of vehicle-kilometres off the road, reduce emissions by hundreds of thousands of tonnes, and prevent thousands of road accidents.⁴

Drones have the potential to deliver significant environmental benefits. In Canberra, the ACT Government has set aggressive emissions targets, reducing greenhouse gas emissions to 40 per cent below 1990 levels by 2020, and achieving net zero emissions by 2045⁵. Because 69 per cent of ACT emissions derive from vehicles (versus 16 per cent nationally) drone delivery offers a way to reduce emissions immediately, and at no cost to the ACT.⁶

In Logan, Queensland, one of the fastest growing areas in both Queensland and Australia, residents already face congestion at a higher rate than those in greater Brisbane, or anywhere else in the state. South-East Queensland's transport network is facing growing capacity constraints because the number of interregional work trips is forecast to increase. Presently, one in three commuter trips to the Brisbane CBD comes from outside of the local government area, and this is forecast to more than double by 2031. If everyone in South-East Queensland travelled by car, it would require 11 more lanes going into the CBD to cater for peak hour periods.⁷

In Logan and Gungahlin, both home to Wing's delivery service, every trip made by car that is taken off the road counts. With customers taking advantage of Wing's fast drone delivery service, we're already seeing those extra trips on the road being eliminated.

Regardless of locality, working parents, people with a disability, elderly people without access to a car, or people underserved by public transport stand to benefit from drone delivery in their communities.

Noise during drone delivery - cruise and hover

During its operation, a Wing drone emits sound in two different stages. The first is from the drone's cruise phase (or overflight) and the second is during hover phase (while a delivery is taking place).

Cruise sound

Sound from the cruise phase of a delivery flight is generated from forward facing propellers. In both Canberra and Queensland, Wing is flying at approximately 40-60 metres above the ground

⁴ *Faster, Greener and Less Expensive; The Potential Impact of Delivery Drones in the ACT*, (November 2018), AlphaBeta, pg 22-25

⁵ *ACT Climate Change Strategy 2019-25* (2019), ACT Government; Department of Environment, Planning & Sustainable Development, pg 1

⁶ *Faster, Greener and Less Expensive; The Potential Impact of Delivery Drones in the ACT*, (November 2018), AlphaBeta, pg 24

⁷ *"How Queensland Travels" A decade of household travel surveys in Queensland*, QLD Department of Transport and Main Roads (April 2017), Queensland Government, pg 2018

while cruising. The average, or equivalent continuous sound pressure level (L_{eq}) from our drone from the ground during overflight has been independently measured at 55 dB(A), with a possible maximum sound pressure level (L_{MAX}) of 66 dB(A)⁸. If a person is inside their home with a window open, those measurements can drop to 45 dB(A) and 56 dB(A) respectively.⁹

As our cruise speed is approximately 125 km/h, the sound experienced by someone on the ground is for only a brief duration. Sound levels generated by our drone overflying a home at 40 metres above ground are measured to be less than that of a car driving by a home at a distance of 7.5m and 50 km/h (see Exhibit A).

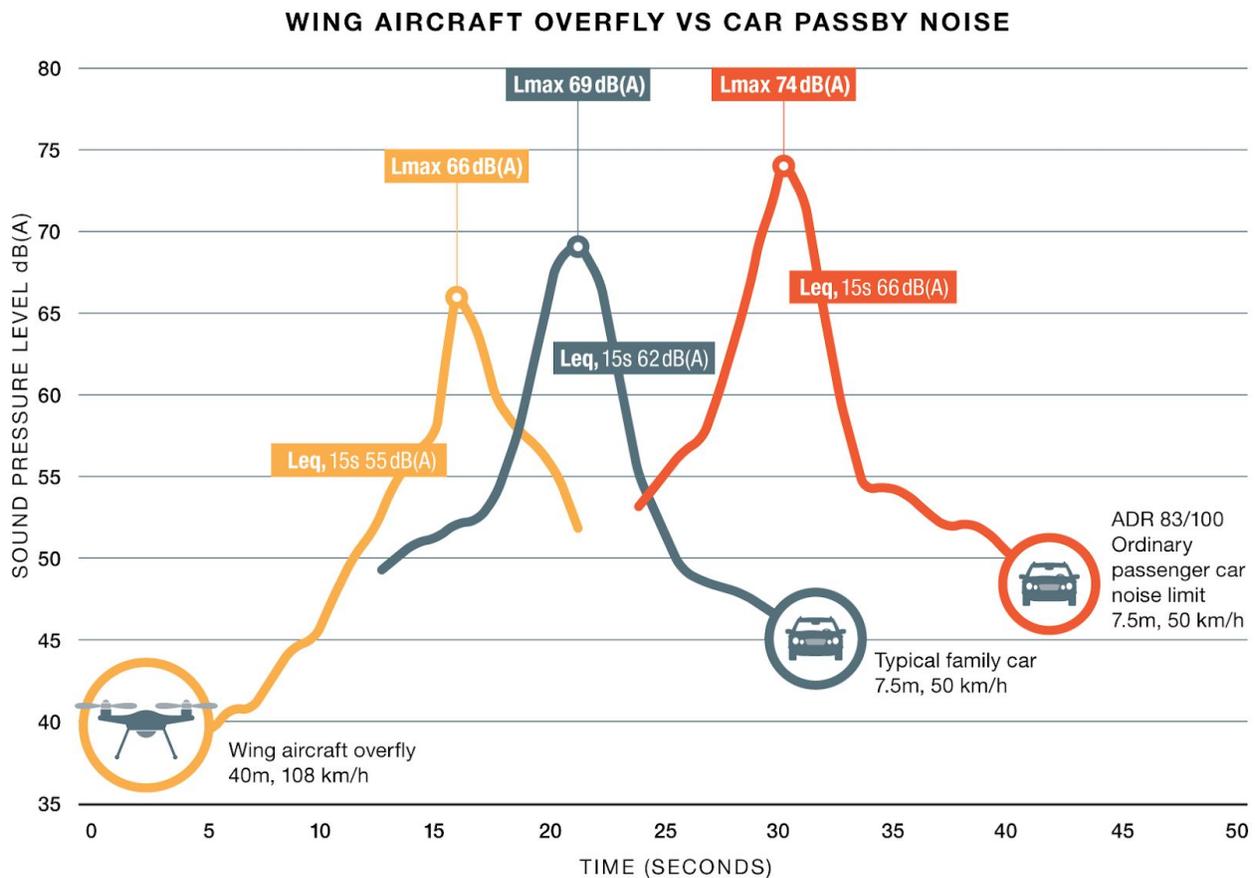


Exhibit A
Source: WSP Analysis

Hover sound

The second type of sound from our drone is during the delivery, or hover phase. This lasts for less than 60 seconds from start to finish as the drone descends to the delivery height to lower the package and ascends to cruise height to return to the delivery facility. The sound is generated from our hover propellers. It is unlikely people will experience considerable or

⁸ WSP, 2019.

⁹ Environmental Noise Guidelines for the European Region (2018), World Health Organisation

repeated noise events during the hover phase, as it is limited to the immediate vicinity of the delivery location. The sound that occurs during the delivery phase has been independently measured at two distances, 15 metres and 30 metres (see Exhibits B and C). Measurements were taken at these distances to represent a realistic scenario – a typical distance to a person in a home adjacent to the customer receiving a delivery.

At 15 metres, the average, or the equivalent continuous sound pressure level (L_{eq}) during delivery is 60 dB(A), with a possible maximum (L_{MAX}) of 69 dB(A), and if a person is inside their home with a window open, those measurements can drop to 50 dB(A) and 59 dB(A) respectively.

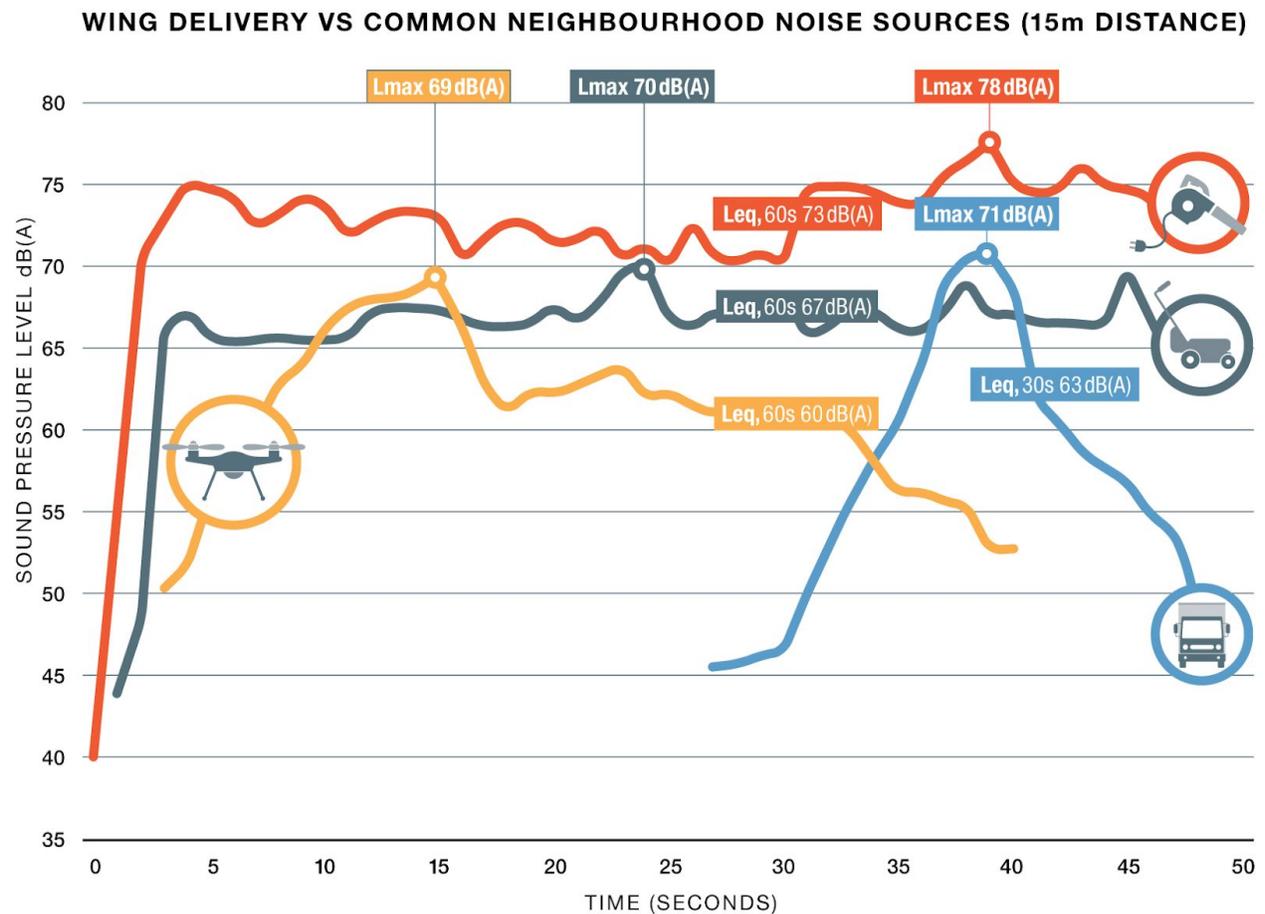


Exhibit B
Source: WSP Analysis

At 30 metres, the average, or the equivalent continuous sound pressure decibel level (L_{eq}) is 57 dB(A), with a possible maximum (L_{MAX}) of 65 dB(A), and if a person is inside their home with a window open, those measurements can drop to 47 dB(A) and 55 dB(A) respectively.

WING DELIVERY VS COMMON NEIGHBOURHOOD NOISE SOURCES (30m DISTANCE)

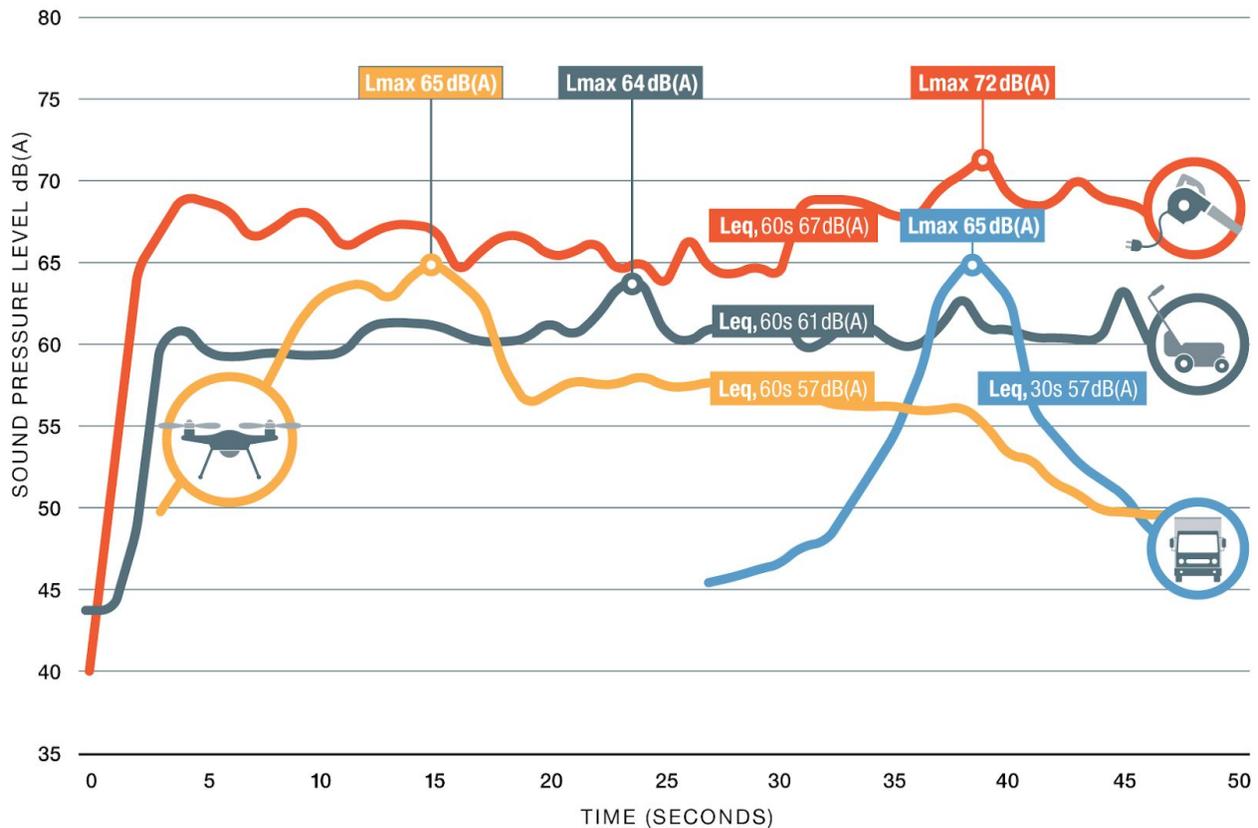


Exhibit C
Source: WSP Analysis

During the delivery phase, at both 15 and 30 metre distances, the drone remains quieter than most common neighbourhood noises, as presented in Exhibits B and C.

Wing and other drone manufacturers are making rapid advancements in their technology, including in the abatement of sound, and we expect the industry will make incremental advancements towards operating more quietly, through engineering changes to both the drone, as well as in flight planning software.

Applicability of current neighbourhood noise frameworks

Neighbourhood noise regulations and policies in Australia are in place to account for noise from fixed infrastructure, including residential uses; for example, an air conditioning unit on an adjacent house is a common type of equipment that falls within this framework. However, there are many noise sources commonly heard in residential neighbourhoods that are exempt from regulation at a State and Territory level in Australia, including gardening tools (e.g. lawnmowers) and maintenance / repair tools (e.g. power tools).

These transient sources lawfully exceed neighbourhood sound regulations every day - it is how cars can drive by a home, how grass can be cut, how repair work can be done at a private residence, and how drones can fly over a home in the neighbourhood. Examples of commonly heard noise sources and the associated range of noise levels are presented in Exhibit D.

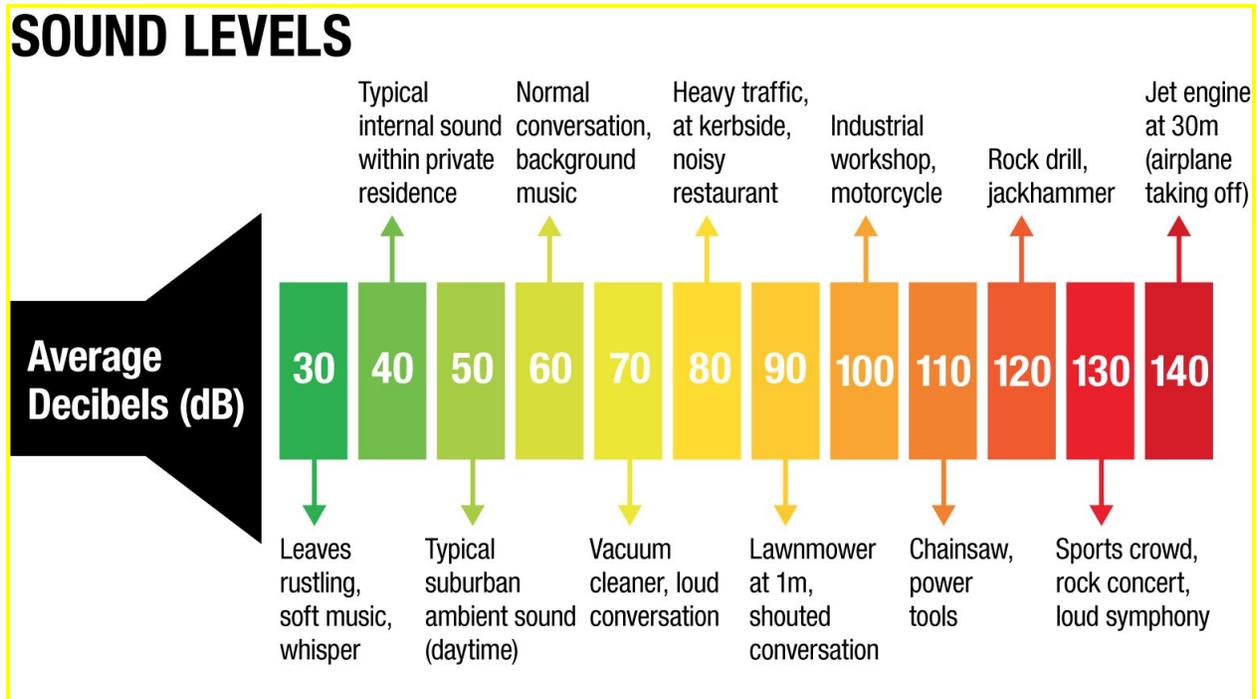


Exhibit D
Source: WSP Analysis

Wing's experience in communities

Community feedback has been the most important driver of our operations since we concluded our trials and shifted to commercial operations in both Canberra and Logan. The trials we ran in Australia, notably in Bonython, demonstrated that small businesses and residents found value in drone delivery. Our customers numbered in the hundreds, ranging from grandparents, to working families who were time poor, or residents who were immobile and underserved by last mile delivery options. The trials demonstrated that people found value in having small convenience items delivered in a matter of minutes. There was also feedback from some in the community that we had work to do in community outreach and education about drones, as well as to find a way to operate a drone that emitted a different sound, mainly one with a lower pitch.

Since our trial in Bonython concluded, we've developed and deployed propellers on our drones that reduce the sound and pitch from the drone significantly. Based on feedback, we've also adjusted the routes of our drones, and reduced our speed to drop the decibel level during overflight. This feedback has been invaluable -- it's helped us connect with small businesses,

interest groups and community members, and improved our service by, among other things, driving us to make our drones quieter.

In the areas we operate in commercially, we've also invested in extensive community engagement and outreach such as regular information stalls, community circulars and live delivery demonstrations - to ensure we're offering a service that the community finds acceptable. At the time of filing this submission, we will have completed more commercial deliveries to Gungahlin than we did during our trial in Bonython, and have received over 80 per cent less feedback about noise. We attribute such a significant drop to changes we've made to our aircraft, to our routing, and because of community engagement and outreach. Our understanding is that both ACT and Australian Government bodies that would receive feedback about our service have also seen a substantial drop in feedback related to noise.

Though we just started our operations in Logan in October 2019, we're pleased that we haven't received a single piece of feedback related to the noise of our aircraft or operations.

We believe the significant drop in feedback from Canberra and that there has been no feedback in Logan is important context to consider. In both locations we're flying over populations of 20,000 or more residents, five days a week, in the morning, afternoon and early evening, on both weekdays and weekends.

It is paramount for our business that we operate in a neighbourly way, and that includes offering a drone delivery service that our customers find useful, and in which the sound from our drone is considered acceptable to the community in the neighbourhoods in which we operate. Though we don't expect everyone to be supportive of our operations, we are encouraged by the significant reduction in noise-related feedback. We will continue to engage and learn from the feedback we receive, and this continues to drive our approach to community engagement, technical development and operations.

State and Local Solutions

As Wing is already operating in different Australian jurisdictions, we have experience in working with different local, state and territory governments to ensure we are offering our service in a neighbourly and responsible way. There are already mechanisms that exist in which a state or local government can have a say over drone operations.

One such tool already afforded to governments is the Development Application (DA) process. Wing drones take off and land from a site, and in our experience in the ACT and QLD thus far, those sites have required a DA. In Australia, a DA generally requires public notice, conversations with local planning authorities and the need to abide by planning and zoning rules and regulations. In practice, a state or council could use the DA process to review and approve or disapprove the siting of a drone delivery service in a certain location, and when a jurisdiction approves a development application, the city or state granting authority can put certain

parameters on an operation via the DA like any other business. It's one mechanism afforded to a local jurisdiction to assess if the location of operations are appropriate for the community. State, territory and local governments have helped Wing identify areas that would be sensitive to delivery and overflight, and we have worked with those jurisdictions to identify and abide by operating hours that ensure we are operating in line with when other neighbourhood noises occur.

Thinking Beyond Manned Aviation

Frameworks for traditional aircraft are not appropriate for lightweight commercial drones. As established above, our delivery drones flying over a neighbourhood generate noise comparable to cars, and are replacing trips that are traditionally made by cars. The sound from our drone is also not the same as a traditional commercial aircraft on approach for landing or while taking off - the drone is much quieter, and takes place over a significantly smaller window of time.

We have concerns that some of the proposed recommendations that treat a 5kg drone as if it is a 500,000kg airplane. Caps on flights or movements, typically applied to passenger airplanes, should not be applied to drone movements. As delivery drones currently flying in Australia replace deliveries made by cars and light trucks to homes (either delivery by courier or by a person driving from their own home to the shops), not airplanes headed to airports, we'd suggest it is more appropriate to start with a regulatory framework that is more applicable to cars than commercial airlines. Drones are also more analogous to road vehicles in the profile of sound they make during overflight, they generate less sound than common neighbourhood noises including cars, trucks and buses, lawnmowers, and leaf blowers, and the sound exists for a very short amount of time.

People accept the noise from cars and other common utilities in their communities, because of what cars and utilities afford their communities. We believe that in time, delivery drones will be viewed similarly, because of the value they bring to the community. Regulations restricting the number of trips a person can take by car based on the value proposition of the trip would not be acceptable to the community. We question why such an argument should be applied to drones.

Regulation for commercial operators, not recreational drone flyers

Wing supports recreational drones being exempt from these regulations. The Wing team is made up of all types of aviation enthusiasts, from licensed GA pilots and flight instructors to drone operators and competition RC aircraft pilots, and safety is our foundational principle. Our experience has taught us that a collaborative, industry-provided ecosystem of tools and services will be critical to allow unmanned aircraft to reach their full potential and coexist with other aircraft while ensuring safe, efficient, and equitable access to the sky.

OpenSky, a UTM solution for all drone users, is Wing's contribution to that collaborative ecosystem. In 2019, Wing released an OpenSky app for use by drone flyers in Australia, the first

in what will be a range of OpenSky products that will help users, both commercial and recreational, comply with local rules and plan flights more safely and effectively. When a drone flyer enters a location, the Australian OpenSky app provides a checklist covering a range of critical factors, including airspace restrictions, known hazardous situations, and proximity to airports and heliports. Our hope is that OpenSky will ultimately allow all drone operators to fly with greater confidence in operating safely.

With new technology, flying safely and following the existing regulations has never been easier, and it should be an uncommon occurrence for a recreational drone user to significantly impact residential areas.

Australian and international standards

We believe strongly that once a drone is in the air, it's important that it remains under Australian jurisdiction, mainly for safety reasons. If noise regulations are developed at a state or local level and isolated from one another, it may place the safety of unmanned aircraft as a secondary priority, which would be inconsistent with the Australian Government's aviation objectives. A balkanised airspace for drones would be unworkable (not just for delivery, but for the entire ecosystem), and immediately stifle innovation and investment in this growing space.

With constant advancements in both hardware and UTM flight planning software, it is also important that any new framework has the flexibility to support and facilitate rapid changes; it's not something that has necessarily happened with fixed wing aircraft.

Some early work in other jurisdictions, including in Europe, have started to tackle this issue. The European Aviation Safety Agency (EASA) has started down a path of setting measurement guidelines and decibel limits for drones based on a number of different factors. Their early framework proposal is worth considering for this review, though like Australia, they are in the early days of developing a policy framework.

In the event that jurisdictions introduce a performance and risk based type certification process for drones, we agree that that guidance should be accepted as one form of compliance for noise. This has worked for other modes of transport such as airplanes and cars. Uniform guidelines encourage responsible innovation that can be efficiently deployed. A patchwork of noise standards will slow development and adoption of drone technology.

However, until a type certification process is developed, we think measures should be taken to allow for operators to innovate and invest, while also keeping in line with community standards -- for example business hours of operation or location of the business.

Conclusion

As Australia was the first country in the world to introduce commercial drone delivery, it now has the challenge of finding workable and flexible solutions to these complex and challenging regulatory issues. We look forward to continuing our collaborative work with government and communities as Australia shapes a world leading framework that will enable companies such as Wing, and others, to continue investment in Australia.