User profiles (age, gender)

Given strict domestic and international data protection legislation and requirements, e-scooter companies only collect the information necessary to provide our service to riders. Nevertheless, we can provide the following general data below from a global rider survey Bird conducted recently and gender is inferred from a riders' name (predicted from census gender distributions). Gender can be inferred from historical name data.

- ○ 42% Female; 58% Male
- ○ Age: Global average age 32 (2021 Bird survey)

2. E-scooter availability, utilization, turnover, parking duration, and charge, by location (including specific neighbourhoods and in close proximity to transit stations)
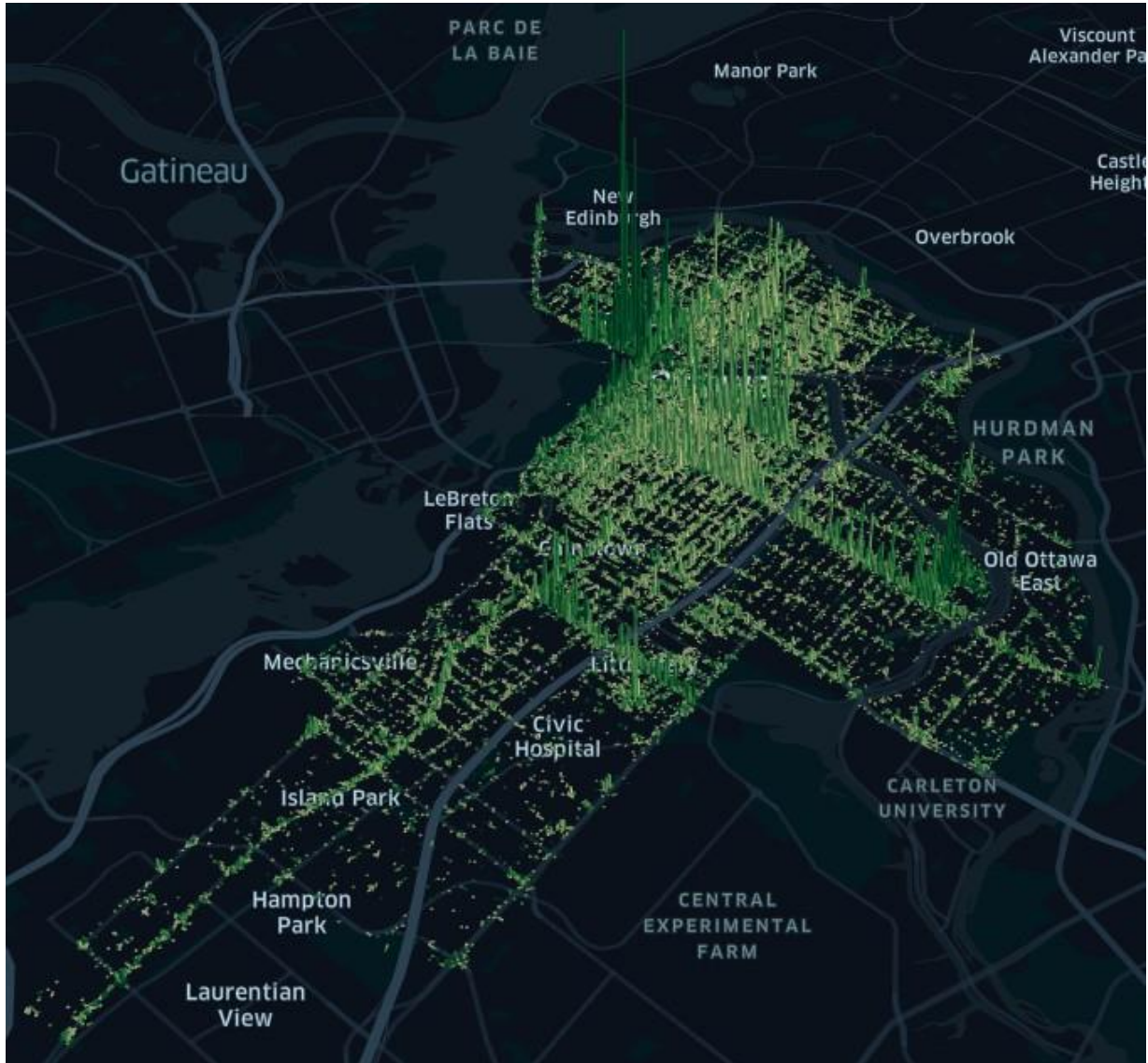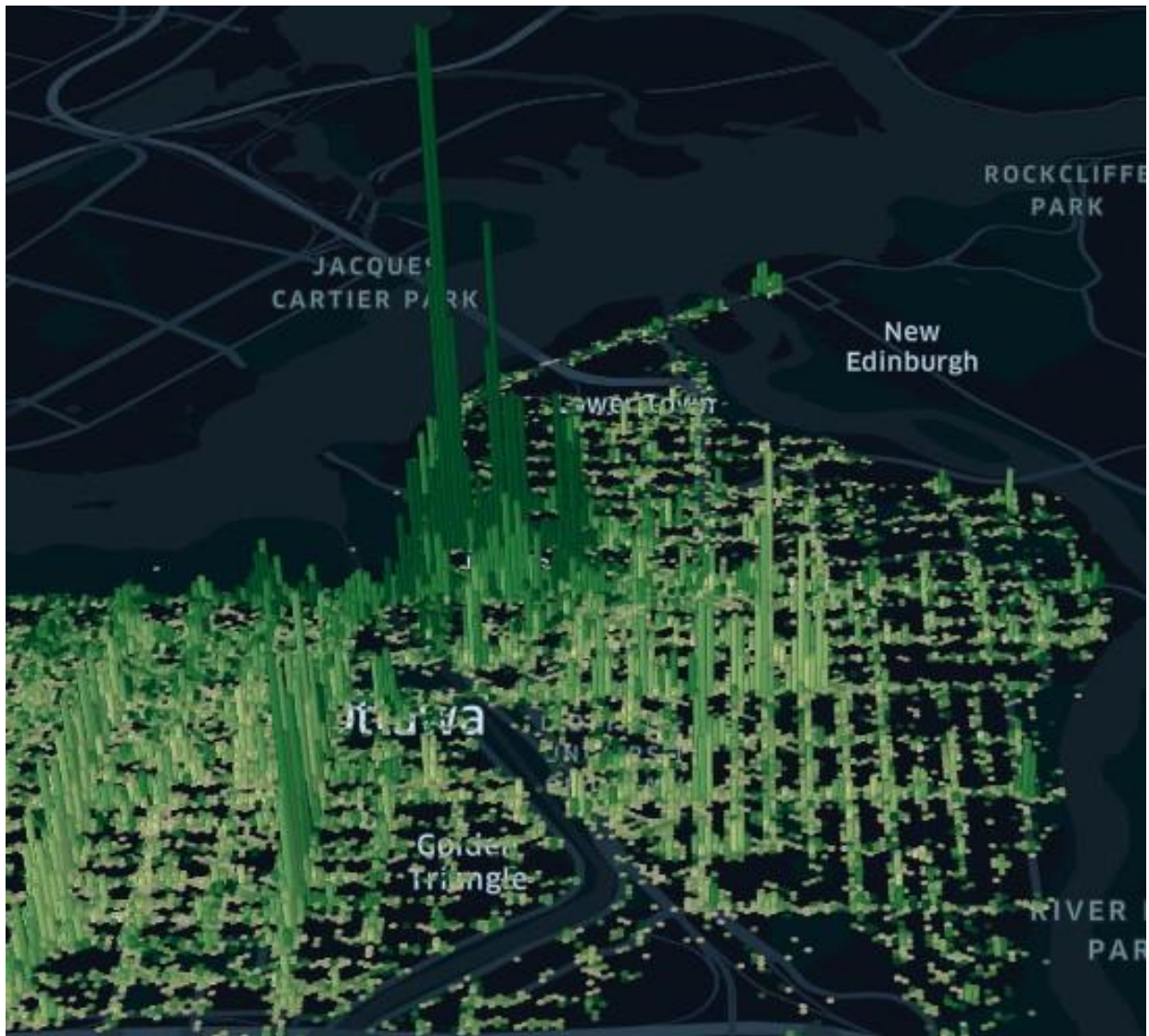
The data can be found here:

- Ottawa Ride Reports
- A condensed table is provided below.

City	Rides Per Deployed Vehicle Day	Average Daily Deployed Vehicles	Deployed On-Street %
Ottawa	4.6	388	85%

3. Trip origins and destinations by street segment/zone (to be specified by the City)
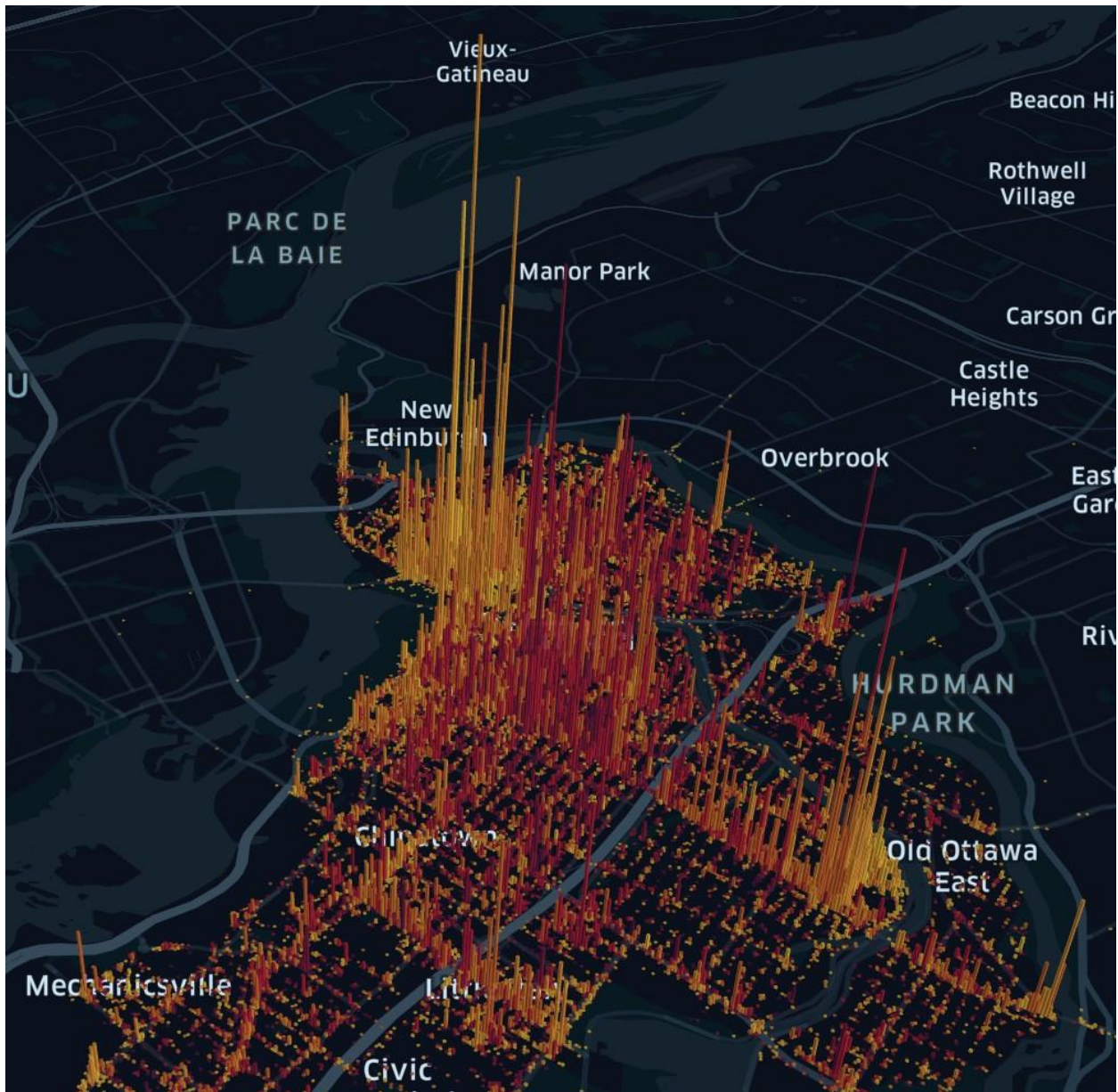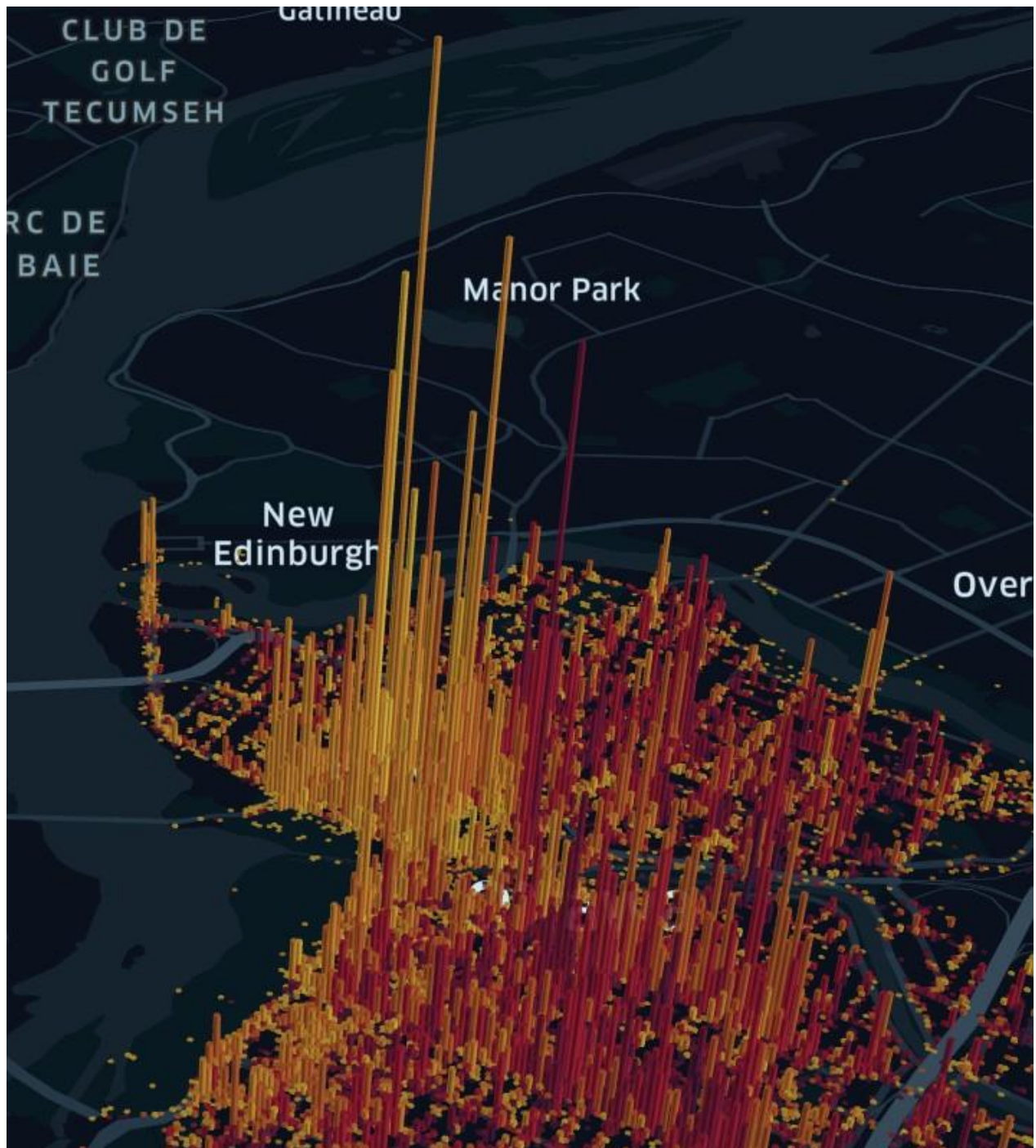
See data and visuals provided below.

The vast majority of Ottawa residents started their rides at: 1) Byward Market (York St) 2) Elgin St 3) Bank St / Somerset (Centretown) 4) Laurier/Ottawa U area/Sandy Hill)

There was a high level of commuting behaviour, with the majority of rides ending at 1) Byward Market 2) Laurier/Ottawa U area/Sandy Hill 3) Bank St (Centretown)/Elgin St 4) Lansdowne

Aerial view of ride starts and ends. Ride Starts are in light blue and Ride Ends are in dark blue. Majority of rides start from the Byward Market area yet many end all over the city, away from downtown.

Ottawa Neighbourhood Metrics

Ottawa Neighbourhoods	Rides Per Deployed Vehicle Day	Rides Per Deployed Vehicle Hour	Rides	Average Daily Deployed Vehicles	Average Daily Street Vehicles	Downtime On Street %	Releases	Releases Into Highlighted Cells	% Pct Releases Into Highlighted Cells	% Unfulfilled Sessions (copy)	Sessions	Sessions per Day	% of Total Rideable Vehicle Hours	% of Total Rides	Avg. Zone Size (Km²)
Total	4.57	0.19	225,744	269	316	15.0%	81,649	46,003	56.3%	31%	129,969	8	1	1	2.17
Ottawa - Centretown	5.12	0.21	79,634	85	99	14.4%	13,842	7,500	54.2%	30%	44,236	22	0.3150131168	0.3527624211	3.82
Ottawa - Byward Market	4.76	0.20	36,039	41	49	15.8%	5,923	2,389	40.3%	21%	14,369	8	0.1531334989	0.1596454391	1.37
Ottawa - Sandy Hill	5.41	0.23	31,534	32	38	15.6%	2,069	683	33.0%	29%	25,288	13	0.1179264862	0.1396892055	2.12
Ottawa - West Centretown	3.48	0.14	17,989	30	33	9.2%	4,107	2,970	72.3%	36%	10,380	7	0.1046889817	0.07968761074	2.05
Ottawa - Glebe Dows Lake	4.60	0.19	16,707	20	23	13.2%	1,591	631	39.7%	42%	8,954	5	0.07345305463	0.07400861152	2.90
Ottawa - Lansdowne Park	7.69	0.32	11,368	9	10	14.9%	2,712	0	0.0%	20%	4,553	4	0.02991998137	0.05035792756	0.24
Ottawa - University of Ottawa	4.85	0.20	8,125	9	11	11.4%	1,702	454	26.7%	23%	6,935	5	0.03391602867	0.03599209724	0.37
No Neighborhood	1.88	0.08	5,925	17	23	24.9%	49,154	31,215	63.5%				0.06365487602	0.02624654476	
Ottawa - Hintonburg Mechanicsville	4.22	0.18	5,689	8	10	15.7%	368	160	43.5%	54%	4,112	3	0.02728792832	0.02520111276	1.98
Ottawa - Lowertown	3.62	0.15	5,100	8	9	18.3%	17	0	0.0%	36%	4,306	3	0.02848569774	0.02259196258	0.87
Ottawa - Old Ottawa East	2.89	0.12	4,248	8	10	13.0%	29	0	0.0%	50%	4,363	3	0.02970238962	0.01881777589	1.97
Ottawa - Island Park Wellington Village	3.17	0.13	1,597	3	4	16.3%	130	1	0.8%	55%	1,072	2	0.01018689958	0.007074385144	2.81
Ottawa - Civic Hospital-Central Park	2.72	0.11	933	2	3	15.9%	3	0	0.0%	70%	848	1	0.006942949254	0.004133000213	8.63
Ottawa - Lebreton Development	3.05	0.13	856	2	3	22.0%	2	0	0.0%	45%	553	1	0.005688115004	0.003791905876	0.84

- [Ottawa Ride Reports](#)

5. Distance travelled from the initial e-scooter "find query" to the e-scooter

Proximity to Nearest Bird (m)		Average per day
0-20	% of Total app_opened along Proximity to Nearest Bird (m)	17%
	app_opened	2,134
20-100	% of Total app_opened along Proximity to Nearest Bird (m)	27%
	app_opened	3,347
100-250	% of Total app_opened along Proximity to Nearest Bird (m)	20%
	app_opened	2,348
250+	% of Total app_opened along Proximity to Nearest Bird (m)	11%
	app_opened	1,103
Unknown	% of Total app_opened along Proximity to Nearest Bird (m)	26%
	app_opened	2,254

5. Trip distance (average and distribution)

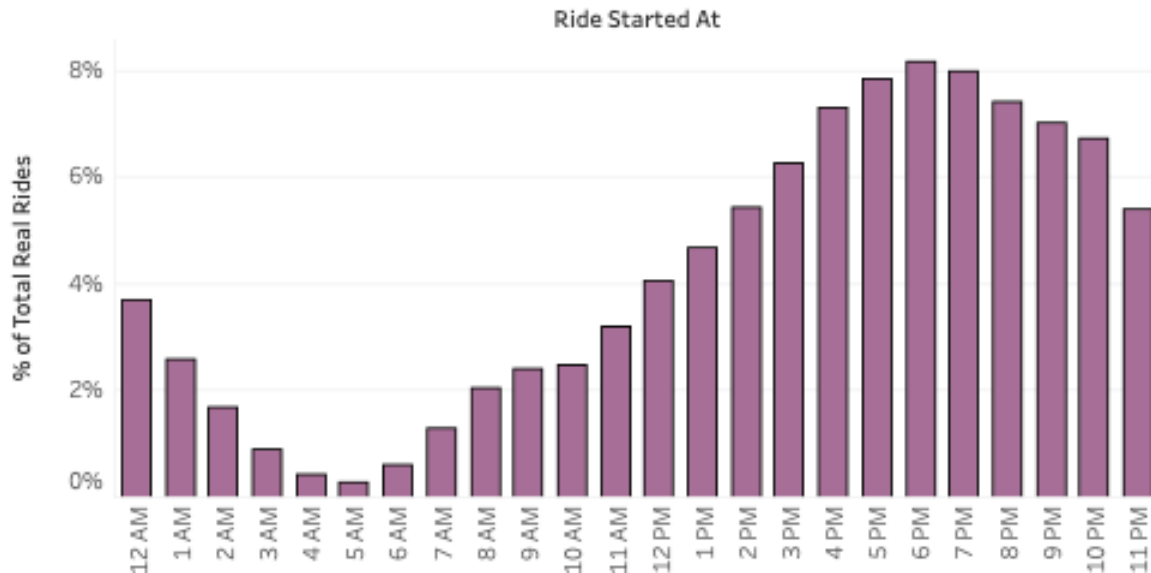● Average ride distance: 2.3 km

6. Total trips for the reporting period

● 231,168

7. Trip profile by month, day of week, time of day (total trips, trips per vehicle)
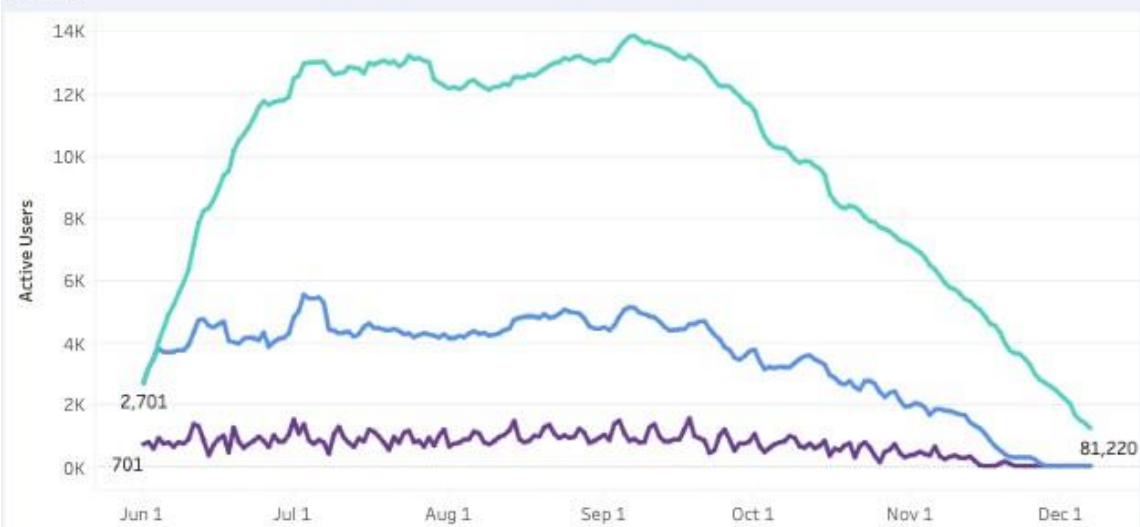
Rides by Time of Day

Ride Started At

Riderbase Metrics

Daily, Weekly, and Monthly Active Users

How many users are currently active in a market? How many have been active in the last day, week, or month?

Time Window

Monthly Active Users   Weekly Active Users   Daily Active Users
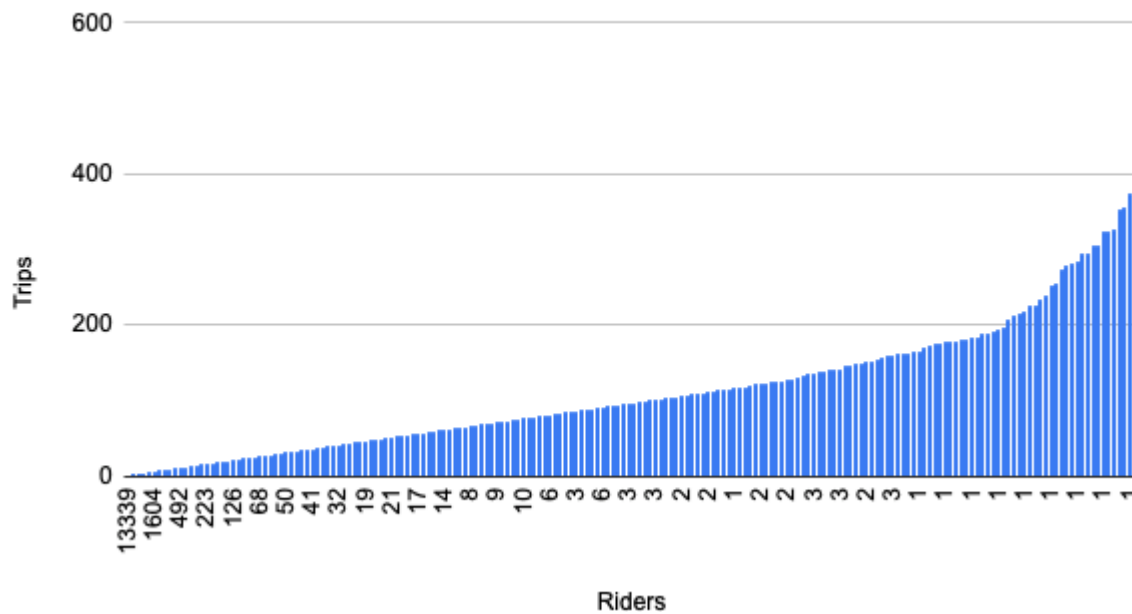
8. Number of Unique riders for the reporting period

- 41,896 for the period of May 28 to Nov 30, 2021.

9. Number of trips per rider (average and distribution)

- Average number of trips per rider: 5.802620647
- See distribution here: Link

Trips vs. Riders

10.   Number of riders using monthly passes

- Not applicable

12,. Number of riders who paid on a per trip basis

- 100%

Reported comments, complaints, and injuries

- Total Re-parking Requests: 89

Injuries

- 1 injury reported to Bird Canada

Incidents of theft and vandalism

- 10

Education and outreach activities completed

Education and outreach activities have encompassed the following:

Bird Canada Safe Street Team patrols

Bird Canada has uniformed staff out patrolling key areas of the City on foot. This team speaks to members of the public, educates them on local rules (no sidewalk riding, etc.) in addition to addressing issues in real time, such as a misparked e-scooter from any e-scooter company. The Team is out daily from 2pm to 10pm in the Byward Market area, Eglin Street, Bank Street, Preston Street, Byward Market area, The Glebe and Westboro, etc.

Using the unique "licence plate" # on each e-scooter, the Team issued warnings, fines, and suspensions to riders for sidewalk riding and other egregious behaviour.

Bird Canada also established 311_ottawa@birdcanada.co: when emailed it forwards directly to our on street local operations team. This is in addition to our toll-free phone # and in-app reporting via our "Community Mode" feature for riders and non-riders.

Bird Canada Led Industry Collaboration on On-going Public Education Efforts

Exercising its local leadership, Bird Canada brought the local e-scooter industry together to produce public education material to be used by the e-scooter industry in Ottawa. Example email to all riders and social media included below.
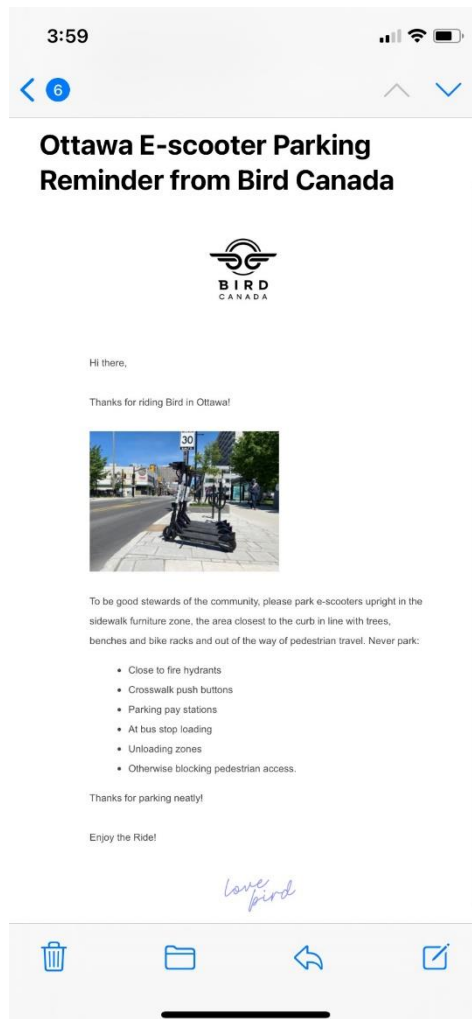
Bird Canada Held "Safe Streets" Public Education Events

Bird Canada regularly hosted "Safe Streets" public education events where we educated riders and the general public on safe and proper e-scooter riding and parking in compliance with local rules, in addition to distributing helmets to those that completed our training. For example, in collaboration with the Bank Street BIA, Bird Canada hosted an event on July 10th. Photos from various "Safe Streets" public education events are provided below.

R W Percy @percyjourno · Aug 14
Took a bit but we are up and running at Ottawa and Pierre in #YQG.
Want to take a @BirdRideCanada #BirdScooter for test spin and get a free helmet? Head on down!
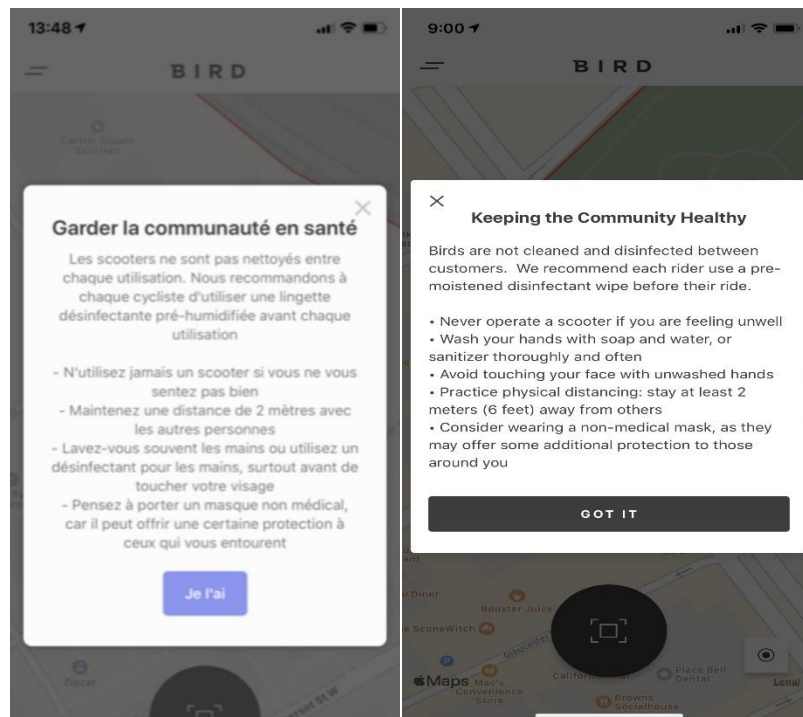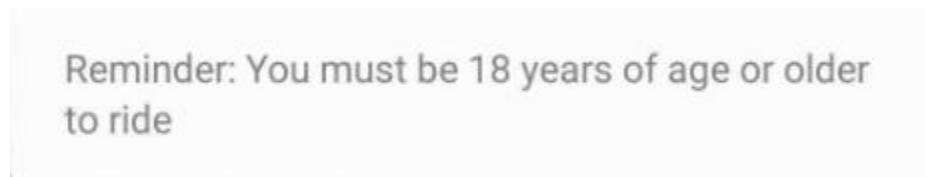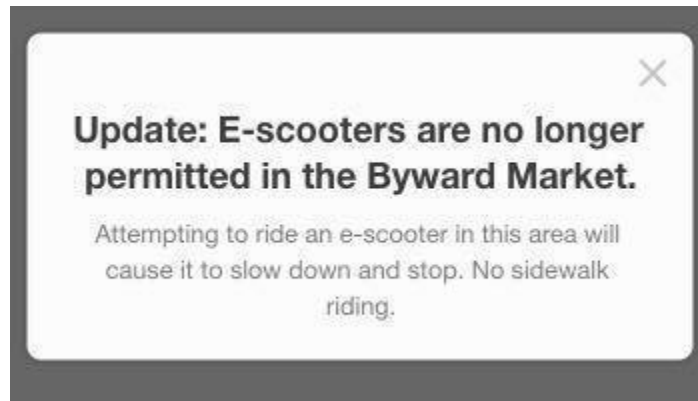
Bird Canada On-Going In-App Education

Bird Canada used an in-app tutorial + reminder pop-up in app messaging / push notifications, email, etc. to educate riders in Ottawa throughout the e-scooter pilot. See examples below.

BIRD
CANADA

Update: E-scooters are no longer permitted in the Byward Market.

Attempting to ride an e-scooter in this area will cause it to slow down and stop. No sidewalk riding.

Reminder: You must be 18 years of age or older to ride

BIRD

Garder la communauté en santé

Les scooters ne sont pas nettoyés entre chaque utilisation. Nous recommandons à chaque cycliste d'utiliser une lingette désinfectante pré-humidifiée avant chaque utilisation

- N'utilisez jamais un scooter si vous ne vous sentez pas bien
- Maintenez une distance de 2 mètres avec les autres personnes
- Lavez-vous souvent les mains ou utilisez un désinfectant pour les mains, surtout avant de toucher votre visage
- Pensez à porter un masque non médical, car il peut offrir une certaine protection à ceux qui vous entourent

Je l'ai

BIRD

Keeping the Community Healthy

Birds are not cleaned and disinfected between customers. We recommend each rider use a pre-moistened disinfectant wipe before their ride.

- Never operate a scooter if you are feeling unwell
- Wash your hands with soap and water, or sanitizer thoroughly and often
- Avoid touching your face with unwashed hands
- Practice physical distancing: stay at least 2 meters (6 feet) away from others
- Consider wearing a non-medical mask, as they may offer some additional protection to those around you

**GOT IT**

16

Bird Canada in Local Ottawa Media

Representatives from Bird Canada were regularly interviewed in local press: newspaper, radio and television. An image below is shared from a CTV media hit our Ottawa General Manager Austin Spademan did in August 2021.

In this CTV Ottawa interview, Austin demonstrated how to properly park an e-scooter safely and responsibly in the street furniture zone of a sidewalk, the importance of maintaining sidewalk clearance, no sidewalk riding and of wearing a helmet.

GHG Reporting

Bird Canada takes its environmental responsibility seriously in Ottawa:

- Bird Canada e-scooters produce zero emissions which can help the City of Ottawa reduce its GHG emissions by 2050.

- Bird Canada has recycled 100% of our end of life batteries locally within Canada and 100% of our end of life spare parts locally in Ottawa.

- In Lansdowne, Bird Canada was 100% carbon neutral.

- Bird Canada's warehouse re-uses all available e-scooter parts for repairs and general maintenance.

- In-zone charging enabled Bird Canada to be more efficient with battery charging in Ottawa. See image below of our in-zone charging located on private property in the Byward Market.
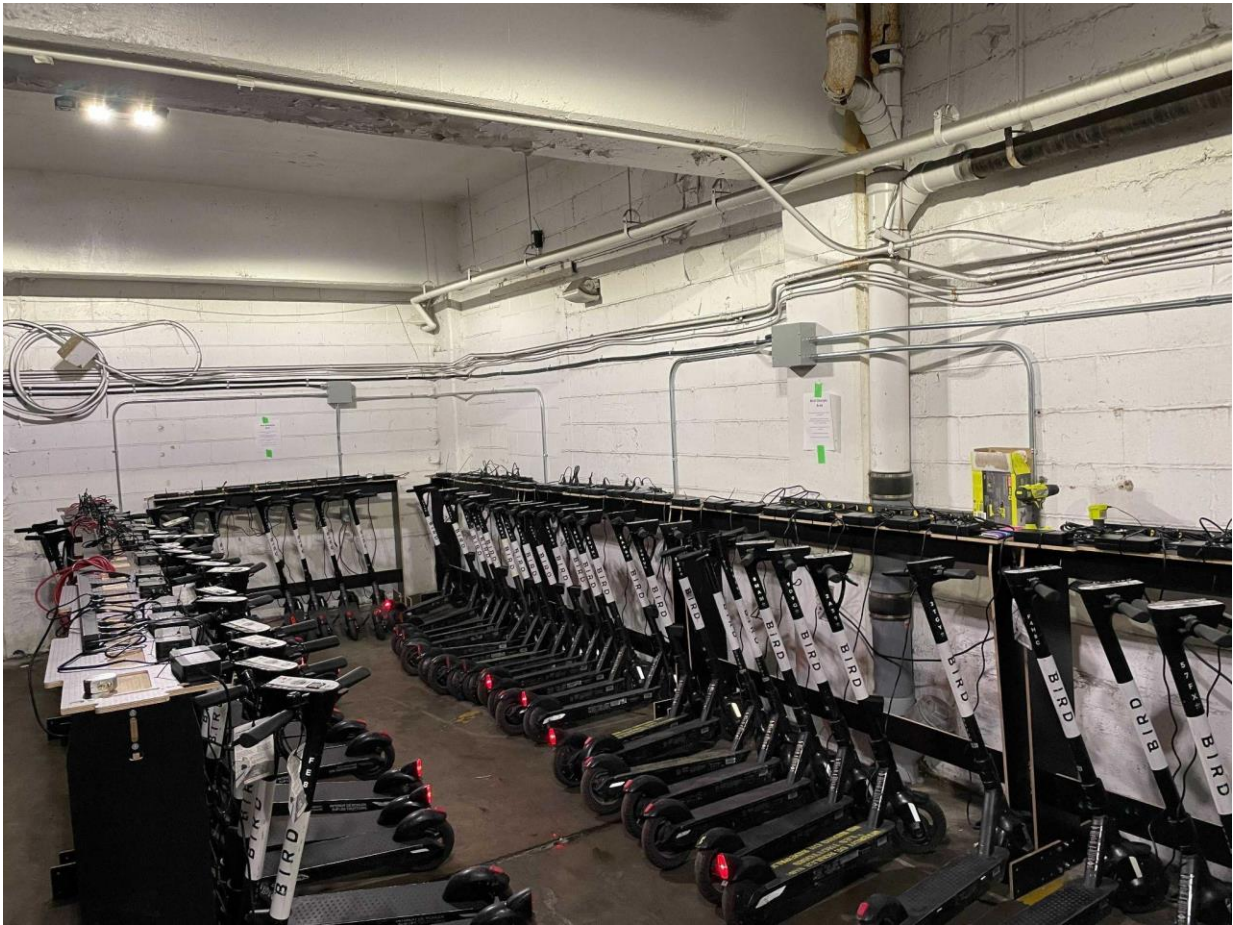
14. Any additional data which the City may request from time to time to assess the pilot programs

- Not applicable - City did not request any additional data.

Bird Canada: Lansdowne E-scooter Technology Pilot Report

From September 30th to November 7th, 2021, Bird Canada showcased our new Bird Three e-scooter model and new technology innovations at Lansdowne Park. Many of these technological innovations directly address concerns raised by accessibility advocates in the community.

Ottawa is the first Canadian city to preview these new features, which promote proper parking, curb sidewalk riding, and provide audible noise emissions that ensure e-scooters can be heard by individuals with visual impairments. The technology demonstrated at Lansdowne will be available for the full Bird Canada fleet for the 2022 season throughout the entire operating zone.

Pilot / Data Collection Period

The Lansdowne pilot took place from September 30th to November 7th, 2021. The pilot took place in Lansdowne Park (Bird Canada enjoys exclusive permission in this area to deploy e-scooters). This area was ideal as we could operate it separately from our main operational service area as a unique area to pilot and test new e-scooter technologies.

Technological Innovations

The Lansdowne pilot used the latest generation Bird Three, the most advanced vehicle safety technology in the industry. The Bird Three is also the most eco-conscious electric scooter. The Bird Three is Bird's latest vehicle from our in-house team of designers and engineers and includes a custom Operating System (Bird OS), extended chassis for improved stability, and an impact resistant frame for increased durability.

Bird Three is the culmination of over 100 million rides, cutting-edge engineering, structural testing and rigorous road testing. It exceeds the highest safety standards including, but not limited to: only using ISO 9001:2015 certified suppliers; the German eKFV standard; an IP68-rated waterproof battery; and an UL 2272 certification for vehicle electrical safety. It is also one of the world's first smart e-scooters, powered by hundreds of sensors and an advanced onboard computer that brings unique safety systems to our riders. Bird's in-house team of engineering and vehicle design experts developed the Bird Three to

provide the safest, smartest riding experience possible—all with an unrelenting focus on accessibility and sustainability.

Data-Driven Insights from the Pilot

The Bird Canada Lansdowne pilot successfully demonstrated a variety of new technologies that proved capable of curtailing sidewalk riding, creating virtual parking corrals with high precision, and noise emission.

Bird Canada commits to providing an entire fleet of these advanced Bird Three scooters for 2022, meaning that city-wide noise emission will be possible, and that all major streets could have Sidewalk Detection and Precision Park technologies ready.

WIth respect to measuring and analyzing the feedback from the pilot, Bird Canada recorded information in the following ways:

1. Qualitative feedback from stakeholders
2. Quantitative data from Bird backend systems, which was focused on two specific subsections of the Lansdowne pilot:
   a. Sidewalk riding detection and prevention
   b. Precision Parking
3. In-person study data collected by Bird Canada Safe Streets Patrol representatives who logged insights into a daily tracking document

Qualitative Feedback from Stakeholders:

Bird Canada utilized the pilot to solicit feedback from key stakeholder groups from a variety of backgrounds and interests. We initially reached out to City Staff and City Councilors and extended several invites to meet in person and demo the technology through the 5 week period of our Lansdowne pilot.

Bird Canada received positive feedback from the Chair of the Transportation Committee, Councillor Menard's office, and Councillor Fleury's office in particular. Questions and feedback were largely technical in nature, looking to better understand how the technology worked, if it would be available on the full fleet for the 2022 e-scooter season, and how noise emission technology could potentially be rolled out.

Further, the accessibility community in Ottawa was also approached, particularly with respect to the demonstration of our noise emission technology. Some members of this community with which we engaged included the Canadian Council for the Blind, CNIB, City of Ottawa Accessibility Advisory Committee, and the Alliance for Equality of Blind Canadians. Each of these stakeholder groups received an open invitation to meet in person for a demonstration of the technology with Bird Canada, and to explore the technology at their leisure at Lansdowne for the duration of the pilot.

Through these interactions, we received valuable feedback on our efforts. For example, Bird Canada was originally exploring a geofenced noise emission method that had the Bird Three e-scooters beep only when in the Lansdowne area, and more frequently when on the sidewalk. It was discovered through feedback that this was not optimal as per the needs of the accessibility community, which sought a more consistent noise emission, which we can provide.

On November 4th, city staff coordinated a demonstration and testing event focused on noise emission with members of the accessibility community. At this event, Bird Canada presented consistent beeping/noise emission to stakeholders. This was well received, and most of the participants noted that Bird Canada's approach to noise emission was the most audible and most helpful of the three e-scooter providers.

The participants also noted that perhaps the noise emission could be louder. Bird Canada expressed that while higher volume was an option available for a rollout in 2022, the volume presented was determined through striking a balance between audibility on major roads versus quieter side streets.

Quantitative Data Analysis:

a. **Sidewalk riding detection and prevention:**
   Bird Canada collected the following data from Sept 30 to Nov 1:

   - There were 1.9K rides and of that total ride volume, 804 rides attempted to ride on the sidewalk area (*Note - during the duration of our Lansdowne e-scooter technology pilot we were encouraging participants to ride on the sidewalk and constantly testing the*

technology ourselves on the sidewalk, thus the higher than normal incidence of sidewalk riding in these results that does not reflect normal riding behaviour).

- Of the 804 scooters that entered the sidewalk area, the Sidewalk Detection technology engaged all 804, and successfully slowed the vehicle to a speed of under 5 km/h for 794 of the 804 rides.

  - Note that once a vehicle enters the sidewalk, the current sidewalk riding technology piloted by Bird Canada slows them down to under 5km/h. This is done in order to alert the rider that sidewalk riding is not permitted and allow them to return to riding on the roadways as per the City of Ottawa rules.

  - Bird Canada believes that having the scooter slow down to under 5km/h is safer than having vehicles come to a complete stop - a complete stop is more likely to lead to abandoned scooters in the middle of the sidewalk and does not necessarily give riders an opportunity to rectify their behaviour.

  - With that said, Bird Canada's sidewalk riding technology can be set to have e-scooters come to a complete stop when riding on a sidewalk, if desired by the City.

- This would indicate that 43% of all rides through the pilot period crossed into the sidewalk area while riding, 98.8% of them were fully slowed down.

- This aligns closely to what our Bird Canada Safe Street Patrol observed in person. They witnessed 364 riders attempt to ride on the sidewalk and noted 357 completely slow down (98.1%). (Recall, at Lansdowne we were encouraging, in a controlled and safe manner, riders to attempt sidewalk riding for the purposes of demonstrating and testing our anti-sidewalk riding technology, hence the significantly higher than normal instances of sidewalk riding).

- This is extremely encouraging given the Lansdowne Park area does not have a traditional curb delineating the sidewalk from the road, thus presenting unique challenges for rider education and for the technology to recognize curbs.

- Each Bird Canada rider is invited to provide a ride rating at the end of a trip - this is optional rather than mandatory. During the Lansdowne pilot, we observed a slight decrease in overall ratings as well as a higher likelihood to rate the ride with a lesser score if it was slowed down to a 5km/h for sidewalk riding. This aligns with other cities Bird operates in globally where behaviour changes are forced through technology - some riders who may have preferred to ride on the sidewalk are unhappier with the ride.

- The table below illustrates the data captured from the sidewalk riding prevention demonstration at Lansdowne:

Segment	Rides	Cancelled Ride	Slowed Ride	Full Slowdown	Avg Distance (KM)	Avg Rating	Rides w/ Rating
Sidewalk	804	0	804	794	3.37	4.04	429
Non-Sidewalk	1078	52	N/A	N/A	3.25	4.34	349
Total	1882	52	43%	98.8%			

b. **High Precision Parking:** This technology creates a virtual parking "corral" in a 4m wide specific area that forces a rider to park an e-scooter in that location and that location alone. If a rider fails to park in the specific virtual corral, the ride will not end and the e-scooter rider will continue to be charged for that ride.

Bird Canada leveraged the advanced GPS technology in the Bird Three scooter to track the exact distance between where the e-scooters were parked to the centre point of the 5 virtual corrals that were created in Lansdowne for our e-scooter technology pilot.

It is important to note that the parking numbers reflected in this data are exclusively for the Bird Three scooter, which was the only model available at Lansdowne through the duration of our pilot. Out of the 402 parking

instances at Lansdowne throughout the duration of the pilot, the average distance from the exact median of the virtual corral was +/- 1.76m or a 3.5m circumference from the centrepoint. The corrals were set up with a minimum buffer zone of 4 meters, indicating that there was 100% compliance with the virtual corral.

"Attempts" refer to the rider attempting to end the ride, which is higher than the 402 accepted parking instances. There were also 36 parking attempts above what the Precision Park system accepted - these were outside of the designated corral and were thus not accepted - reflecting the success of the system in correcting bad parking behaviour. Each of the riders eventually ended the ride in the virtual corrals even after originally attempting to park outside of it, demonstrating the positive educational impact of the technology. These riders followed the on-screen guidance to move the scooters towards a designated virtual parking corral and did so in order to finish their ride.

A table illustrating the precision parking / virtual corral parking data is below:

Parking Instances B3	402
Corrals Available	5
Parking Attempts Made	438
Parking Accepted	402
Avg Distance (Metres)	1.76
Avg Circumference (Metres)	3.52

These insights were again echoed by Bird Canada observational data, with our Safe Streets Patrol at Lansdowne logging 287 observations of attempted parking with 287 of those ending in designated digital corrals.

We created the video shown below for those who were not able to attend the precision parking / virtual corral parking demo at Lansdowne (see link in email):
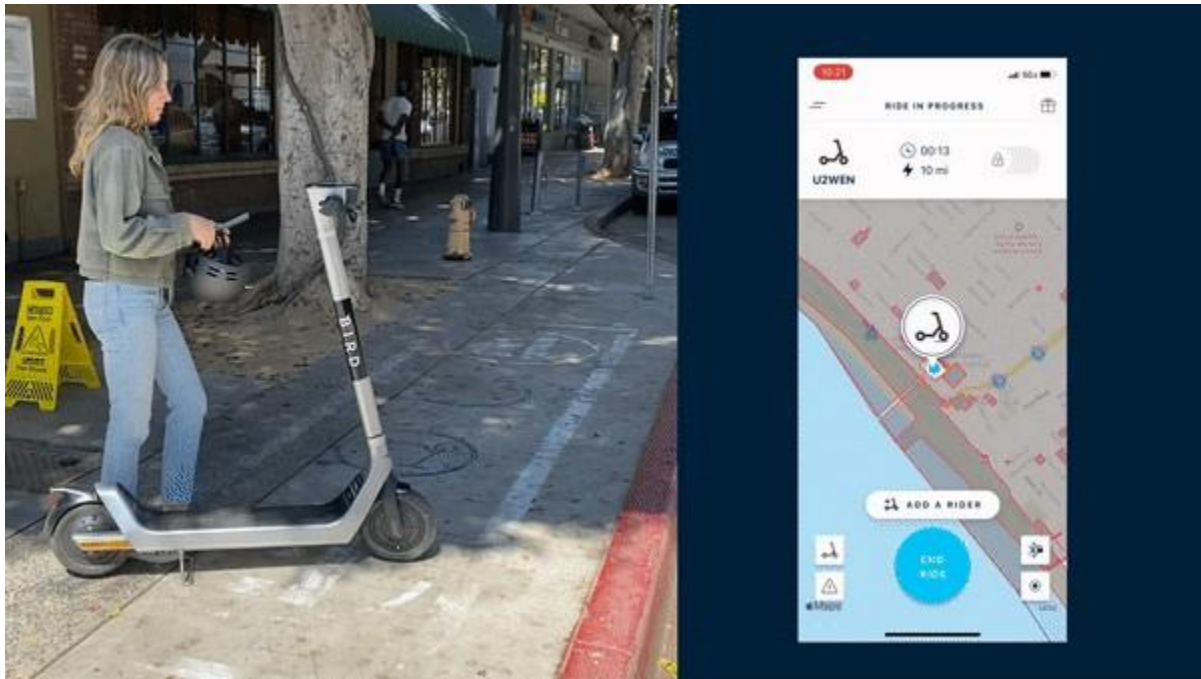
2. **In-person study data:** As noted above, Bird Canada conducted a thorough in-person study through daily foot patrols in the Lansdowne area with our SafeStreets Patrol. Every day for at least one full-time shift (8 hours) during peak periods, a Safe Streets Patrol member was present in person on the property
logging their observations. This gives us confidence that the quantitative insights provided are accurate and reflect the reality on the ground for the pilot.

To summarize the observations:
- There were 502 rides observed from Oct. 1 through November
- 364 instances of sidewalk riding with 357 visibly halted with sidewalk detection
- 287 attempted parks with all ending in approved designated digital corrals.

    https://docs.google.com/spreadsheets/d/1Jd8C8j3Ko4PVZcTWEDrwCWTTtQalpi-FqFot7X43TFU/edit?usp=sharing

In conclusion, we would categorize the Bird Canada Lansdowne e-scooter technology pilot as a success. Through our proprietary technology deployed, we
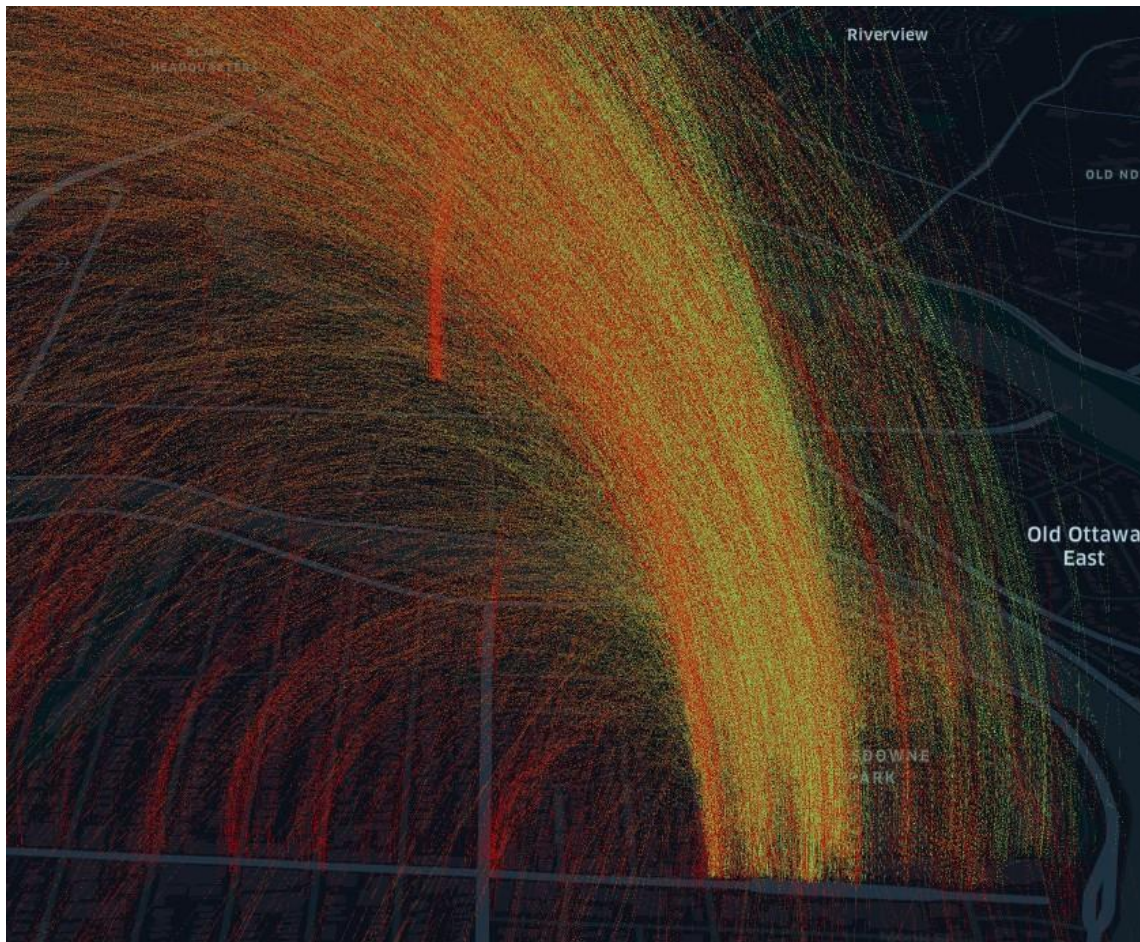
were able to not only correct poor rider behaviour, but were also capable of training riders to improve their behaviour.

Aside from the new technology demonstration data,, we also have provided below diagrams that show the end location of riders who started a trip in Lansdowne. (green = Ride Start, red = Ride End).
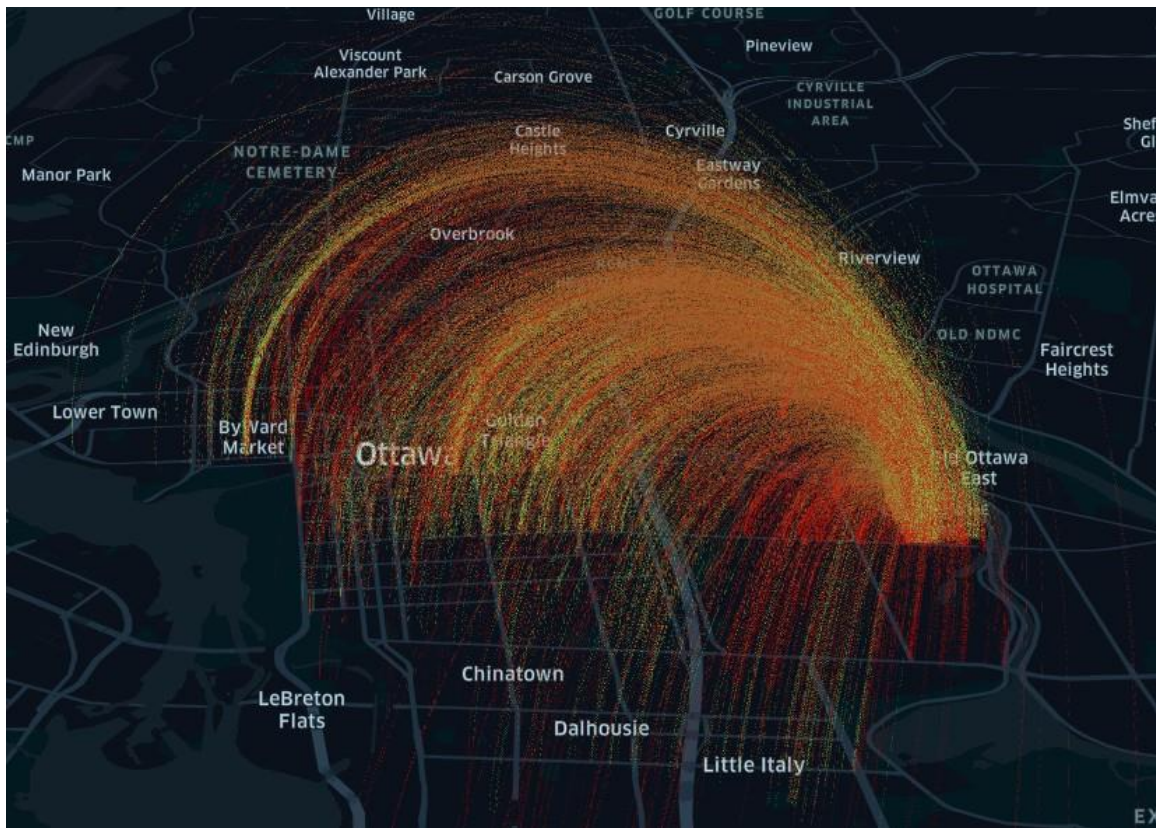
Summary of the new technological features available in the Bird Three e-scooter

Below are the technical details behind the features demonstrated in the Bird Canada e-scooter technology Lansdowne pilot:

1. High Precision Parking

AI-Verified Parking Compliance. While geofencing works well to prevent riders from parking in large predetermined areas, accuracy limitations make it unreliable when trying to determine if a rider has parked a device within a smaller space like a designated parking location or "virtual" or "physical" corral or parking location.

In response, Bird's engineers have developed a new advanced parking solution using a Camera Positioning System (CPS) that's 10 times more accurate than traditional GPS.

Designed with support from a global leader in positioning technology, CPS works well in dense urban environments and enables us to validate parking compliance within 20 centimeters or less.

Virtual Docks. Bird Canada's High Precision Parking technology allows for the deployment of extremely accurate virtual docks within regions of the City where parking space is limited, such as dense urban cores.

How It Works: Bird's parking system uses 3D City mapping and sophisticated AI to direct riders to proper parking locations and confirm in real time whether or not a device is within a designated parking spot before enabling the rider to end their ride.

> Step One - 3D City Mapping. Our team creates a high-accuracy 3D scan of the buildings and architecture surrounding each approved parking area.

> Step Two - Rider Interface. At the end of their ride, riders are instructed via the Bird app to scan their e-scooter's QR code and then point their camera at the surrounding buildings.

> Step Three - AI Analysis. Our advanced AI system analyzes the rider's images in real time and finds a feature of the nearby buildings that is clear and unique, then compares it to our 3D scan of the area. By identifying the buildings in the image and the perspective from which they are viewed in the image, the system determines the precise location of the e-scooter.

> Step Four - End of Ride. If the e-scooter is parked within a City-approved area, the system will enable the rider to end their ride. If the e-scooter is outside an approved parking location, our app instructs the rider to relocate the device to an approved area to complete their ride.

Rider Interface:
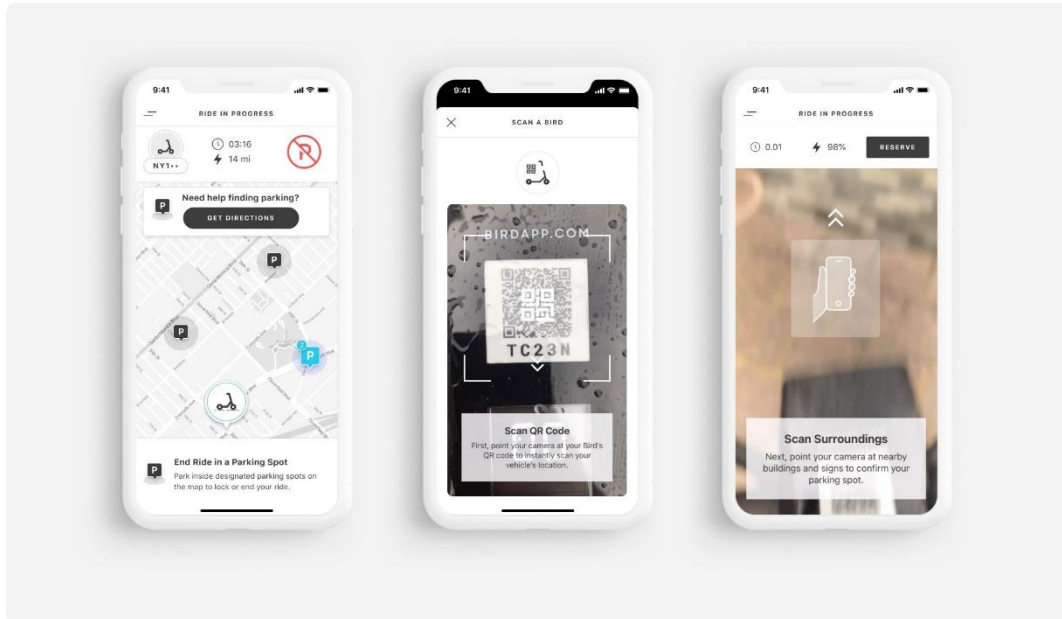
1. In-App Map:
We feature approved parking locations on our in-app map and mark them with a "P" icon.
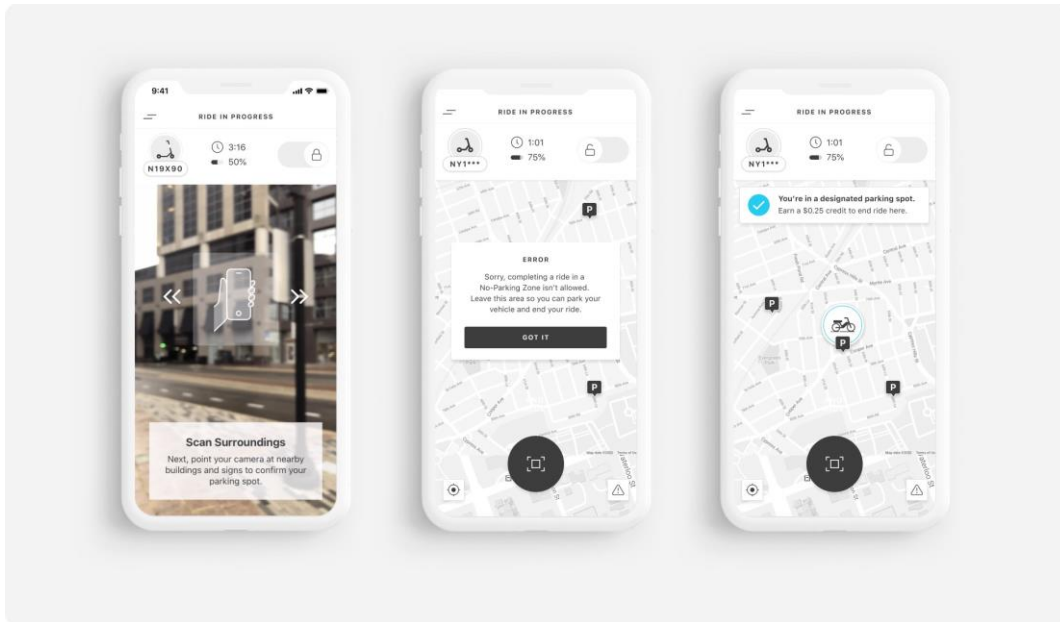
2. QR Scan:
At the end of the ride, we instruct riders to scan their e-scooter's QR code. .

3. Scan Surroundings:
We then require the rider to scan nearby buildings with their phone tilted upwards. If the phone is not titled up high enough, an on-screen indicator alerts the rider to adjust their phone's position.

4. Scan Surroundings:
When the rider points their phone up, an on-screen indicator directs them to scan the buildings to their left and right. We use these images to triangulate their precise location.

5. Non-Approved Location:
If the rider is not in a designated space, a message appears asking them to relocate to an approved location or pay an out-of-hub fee to park in the non-designated area.

6. Approved Location:
Once the system determines the e-scooter is parked in an approved location, or an out-of-hub fee has been paid, the rider can end their ride.

2. Geofencing & Vehicle Location System (VLS)

Bird Canada's technological advancements to improve vehicle location accuracy and geofence responsiveness, has set the industry benchmark for location-based fleet management and compliance. Our advanced geofencing technology were demonstrated at our Lansdowne pilot in the following ways:

- Mitigate collision risk to pedestrians with geospeed management in high-traffic areas.
- Prevent e-scooter access to prohibited areas with no-ride zones.
- Improve parking compliance with no-parking zones.

Industry's Most Advanced Geofencing Capabilities

Bird Canada's next-generation geofencing system is built upon three core pillars, including onboard maps, precise map data, and improved device location accuracy, to provide the fastest and most accurate enforcement of no-ride, no-parking and slow zones in the industry.

Onboard Maps. Bird's geofences are applied at the vehicle level via Bird Three's onboard embedded computer, which can store over 25,000 geozones per city. This allows for highly accurate detection and enforcement within 0.3-0.5 seconds. Our new system differs significantly from operators that rely solely on the cloud or GPS to enforce geofences. Those first-generation systems lose valuable seconds as the vehicle must communicate with the cloud to determine geofence permissions, resulting in a response lag of up to 30 seconds. This means an e-scooter traveling at 16 km/h will travel the length of over one football field before it responds. By processing geofencing in near real time, Bird Canada's system significantly increases both rider and pedestrian safety.


Map Data: Sub-Meter Accuracy. For geofencing to work effectively, each zone must be drawn and virtually mapped—based on local rules—to create boundaries that govern the service area. However, existing GIS and satellite imagery often prove unreliable for zone creation due to lens distortion, image warping, and tectonic plate movement.

To address this, Bird has built a new robust process that enables our teams to create geofence zones with sub-meter precision.

1. We begin by outlining the geofence from satellite imagery or City GIS data.
2. The team then uses high-accuracy GPS to measure the location of three landmarks.
3. We compare the landmark points to the satellite imagery to determine offsets and rotations.
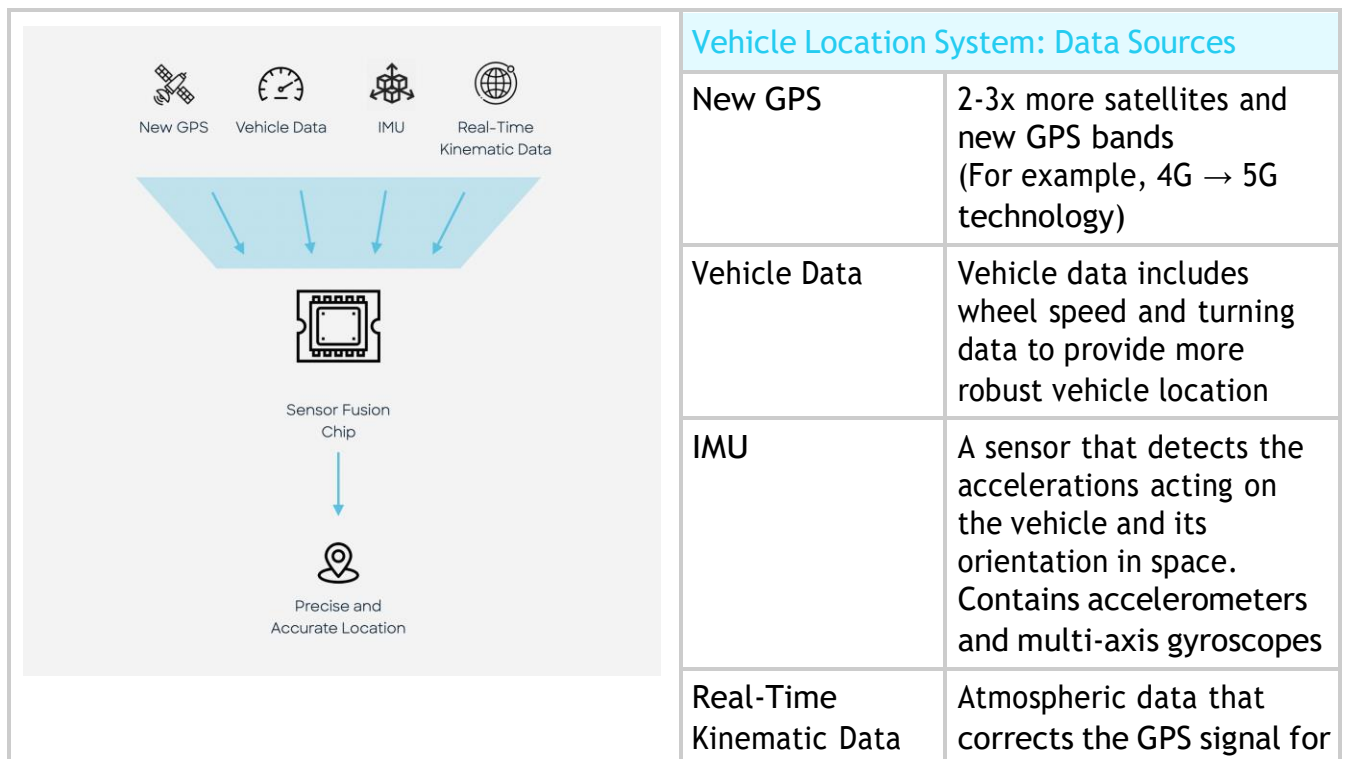
4. Using the offsets and rotation values, we then shift and transform each geofence outline.
5. We upload the high-accuracy map over the air to the e-scooters' onboard embedded computers.
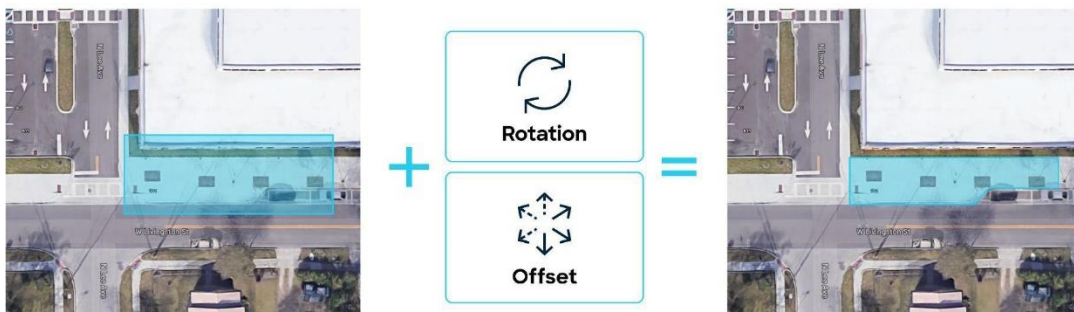
Using Offsets and Rotation Values to Create Accurate Geofence Maps

Location Accuracy. The Bird Three e-scooter is equipped with our advanced Vehicle Location System (VLS) that uses a proprietary sensor fusion microchip to fuse real-time data about the vehicle (e.g., wheel speed, turning history) with GPS signal to provide richer, more robust vehicle location information and position.

Vehicle Location System: Data Sources	
New GPS	2-3x more satellites and new GPS bands (For example, 4G → 5G technology)
Vehicle Data	Vehicle data includes wheel speed and turning data to provide more robust vehicle location
IMU	A sensor that detects the accelerations acting on the vehicle and its orientation in space. Contains accelerometers and multi-axis gyroscopes
Real-Time Kinematic Data	Atmospheric data that corrects the GPS signal for

		Ionospheric interference

For standard GPS to work effectively, the location chip on a device needs to "see" a GPS satellite. Interference can be caused by obstructions like inclement weather or large buildings, resulting in an urban canyon effect that dulls or blocks the GPS signal. To address this, we designed our sensor fusion chip to prioritize redundancies to provide a fault-tolerant system that can continue operating properly even if one or more components fail. As a result, our VLS tracks a device's accuracy within as little as one foot in even the most challenging environments to ensure geofence enforcement is never compromised.

2. Sidewalk Riding Prevention

Bird Canada's latest devices harness our VLS on-vehicle sensors and next-generation geofencing technology to detect and prevent sidewalk riding in real time. The system educates riders via an audible and visual "No-Ride Zone" warning that is sent to their mobile device and on-vehicle display within 0–2 seconds of mounting a sidewalk. The vehicle then safely reduces speed or comes to a complete stop until the rider exits the sidewalk, depending on the preference of a City and it's local rules.

By calculating inertial measurements and wheel speed, our VLS can pinpoint vehicles within 30–90 cm. Our sensor fusion algorithm synthesizes data from GPS signals and on-vehicle sensors to deliver the most accurate vehicle location data in the industry. Unlike camera-based solutions which are less weatherproof and prone to damage and failure, VLS is power efficient, scalable, and delivers highly stable performance in all weather conditions.

Our technology is the only integrated solution that addresses all requirements of a successful solution:

- Hyper-accurate locations of moving vehicles
- Precise sidewalk measurements
- Immediate enforcement
- Scalability

It can be implemented at scale without risk of damage caused by weather or vandalism, unlike expensive, externally mounted cameras.

Should unlawful sidewalk riding occur for any reason, despite VLS preventative measures, Bird Canada will send the rider a warning with community-minded education outlining the risks sidewalk riding poses for vulnerable pedestrians. Additional attempts to ride on sidewalks will be met with escalating fines and penalties.

3. <u>Acoustic Vehicle Alert System</u>

We understand the need to ensure our e-scooters are able to be heard by the accessibility community. We go above and beyond industry standards to prioritize safety, especially among vulnerable pedestrians and sidewalk users.

We have developed built-in noise features to alert all road users when e-scooters are in operation. Bird e-scooters can emit a low-volume, non-intrusive ambient noise to better aid the awareness of other road users. The artificial noise piloted during the Lansdowne pilot may also be updated on-demand with the volume adjusted for the local environment via our over-the-air firmware updates.

<u>Other key features available with the Bird Three E-scooter:</u>

Dynamic Stability Control Steering (DSCS)

Bird Three is the first e-scooter to introduce the Dynamic Stability Control Steering (DSCS) safety system. DSCS responds in real-time to stabilize out-of-control, sudden or erratic movements by steadying the handlebars which helps guard against unsafe turns or overcorrections caused by uneven surfaces, potholes or sudden stops.

Skid Detection

Bird Canada's industry-first skid detection technology detects reckless riding in real time, increasing e-scooter safety and rider compliance, including frequent skidding stops, which can be dangerous to riders and pedestrians. Excessive skidding results in an on e-scooter audible and visual rider warning. If the behaviour continues, our system automatically slows the device to a stop, asking the rider to end their ride immediately. We then issue follow-up education at the end of the ride on safe riding practices to correct unwanted behaviour. If flagged multiple times for reckless riding, Bird Canada can fine, suspend/terminate the rider's account.

Double Riding Detection

With our new Bird Three rollout in the Lansdowne pilot, Bird Canada also began internal testing of the industry's first double-riding detection technology. Powered by the e-scooters' 200+ sensors and advanced communication system, this first-of-its-kind safety system tracks the average watts per km each rider uses across every ride. If the system detects a drastic change in the device's efficiency and battery degradation compared to the rider's historical ride data, it will flag the ride as double riding.
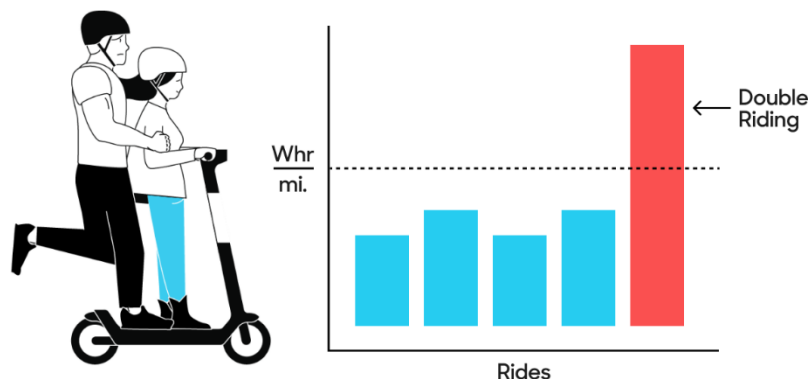
The rider will then automatically receive an email informing them Bird Canada has identified their last ride as a possible double ride. The email will remind them that double riding is strictly forbidden, and if they are flagged for this behavior again, they may be fined or have their Bird account suspended or terminated.

Bird's engineers are also working on solutions that detect and prevent double riding in near real time. By analyzing vehicle speed patterns and historical rider data, double riders will trigger a response within seconds of starting the ride. This will result in the e-scooter safely and slowly reducing its speed until coming to a gradual stop and asking the riders to end their trip. Simultaneously, we use the on-e-scooter display and audible alerts to inform the rider that double riding is not allowed and that the second passenger must disembark in order to resume the ride.

Tip Detection & Mitigation

In addition to an anti-tip kickstand, each Bird e-scooter features several sensors, including a gyroscope that checks in every 30 seconds when idle or 5 seconds while being ridden. The system automatically alerts our local operations team if a device has been left (intentionally or unintentionally) on their side. Once we have been alerted that a vehicle is tipped over, we dispatch a team member to adjust and properly repark the vehicle.

Bird Three e-scooters are equipped with large reflective stickers on the underside of their footboards that display the message "Please help me up" when tipped over. This friendly Public Service Announcement (PSA) is designed to connect with the hearts and minds of the public and encourage them to help us keep public spaces clear and Birds standing on their own two feet.

Technical Specifications of the Bird Three E-Scooter:

BirdThree

Battery	36 V, 21.0 Ah 10S6P
Charge Time	5.8 hrs
Range	35 miles
Braking	Regen; Drum (front), disc (r)
Wheels	10" pneumatic
Top Speed	15 mph
Dimensions	47.7 in. x 19.3 in. x 46.8 in.
Lights	Front / Rear LEDs

BIRD

Throttle-Brake Interlock
Automatic safety actions to protect against accidentally holding the throttle.

Enhanced Lighting

Anti-Theft Encryption
Enhanced encryption keeps our riders safe and helps deter theft

Autonomous Damage Sensors
Self-reporting damage sensors and automotive-inspired diagnostic technology

Seamless Screws
Protection against injury and theft with no exposed screws

Puncture-Proof Tires
10" tires feature puncture-proof tech, higher traction, and decreased vibration.

Industry's Longest-Lasting Battery
Automotive-grade battery management system. Largest, safest, only operator with IP68 integrated battery

Tip Detection Technology

Anti-Tip Kick Stand
With a dual anti-tipping kickstand, this Bird stands on its own two feet.

Dual Wiper Throttle
Automotive-grade functional safety and guaranteeing absolute speed-control accuracy

Dynamic Stability Control Steering (DSCS)
Stabilizes out-of-control, sudden or erratic movements, guards against unsafe turns or over-corrections.

Status Indicator

Skid Detection
Only vehicle with skid detection technology to prevent improper riding behavior.

Performance
A rear motor gives Bird Three faster acceleration and more control in critical situations.

Performance
AEB brings the vehicle to a stop in the event of a brake failure.
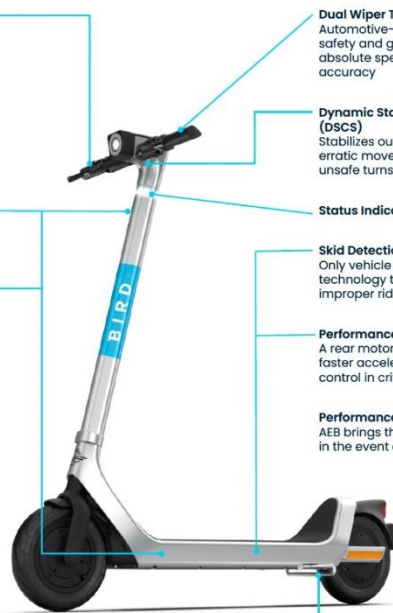
1

Operating Parameters, Safety Features & Safety Systems

Bird Three includes all of our most advanced Safety Features and Safety Systems. Additional details on Key Safety & Operating Systems are provided below.

Parameter	Value
Maximum Speed	24 km/h (can be set at desired lower speed maximum)
Adjustability of Speed Governor	Infinitely Adjustable - the speed governor can be adjusted to any speed required by the City
Motor Power Rating	200W (nominal) 33 Nm (max torque)
Responsiveness to Geo-fencing	0.3 - 0.5 seconds due to geofence data being stored locall on the vehicle's onboard computer
Weight of the Micro-mobility Device	52.9 lbs
Expected Wind Speed at Which a Stationary / parked Micro-mobility Device could Tip Over	Sustained Wind Speed Tolerance - 64 km/h The Bird Three, with its 8" wide, dual, center kickstand, has been wind tunnel tested to withstand sustained wind speeds of up to 64 km/h without tipping over. Wind tunnel testing was conducted at multiple angles that included maximum and minimum surface areas exposed to the wind. Further, the B3 was subjected to sustained swirling winds of up to 64 km/h without tipping over. Gusting Wind Speed Tolerance - 100 km/h With the Bird Three's 8" wide, dual, center kickstand, that extends 1" beyond the e-scooter deck on both sides, the expected gusting wind speed at which a stationary / parked B3 e-scooter could tip over is 100 km/h.
Maximum Operating Surface Grade	Sustained 20% grade @ 250 lbs rider weight

Tire Size Information	10" outside tire diameter x 2.5" wide - Automotive-Grade, Self-Sealing Pneumatic Tires
Any Other information Available	
Physical Properties & Operating Parameters	
Physical Dimensions (L x W x H)	47.7" x 19.3" x 46.8"
Usable Deck (L x W)	26" x 6.2"
Deck Height	6.85"
Ground Clearance	3.9"
Kickstand	8" Wide, Dual, center kickstand - extends 1" beyond e-scooter deck on both sides
Drive Wheel	RWD
Communications	Bird VCM 4.0 GPS Bluetooth VLS
Display Tech	240 x 240 LED
Multi-Material Chassis:	Material properties include aerospace-grade aluminum, which provides best-in-class durability.
Impact Resistant Chassis	Independently tested and verified to withstand more than 60,000 curbside impacts, Bird Three is built for the rigors o shared use.
Max Payload	250 lbs
Operating Temperature Range	-20°C to 60°C
Safety Features	
Dual Independent Brakes	Superior braking performance on each wheel results in a stopping distance of less than 7 ft at full weight capacity (250lbs).

Tires	Automotive-Grade, Self-Sealing Pneumatic Tires: Our proprietary tire design ensures a soft ride over all surfaces without risk of getting flat or requiring complicated suspension systems that are prone to safety issues.
On-Scooter Helmet	Bird will equip Bird Three with an attached helmet using our integrated Bluetooth lock. Riders using the provided helmet can unlock it using the Bird app and must reattach it at the end of their ride. Our teams sanitize the helmets daily using Health Canada-approved disinfectants. However, during this time of increased health concern, we understand many riders may not be comfortable with a shared-use helmet. For this reason, we continue to offer a free personal helmet through the Bird App.
Headlight	German-certified white light that can be clearly seen at least 500 feet from the front
Tail Light	German-certified red light that can be clearly seen at least 500 feet from the back
Reflectors	Front, rear and side amber reflectors (UN ECE R3) that can be clearly seen at least 160 feet from behind when a vehicle's headlights shine on it.
Horn / Bell	Bell
Vehicle ID Stickers	Every vehicle in our fleet is equipped with multiple, unique character, reflective Vehicle ID stickers using letters and numbers that are 33mm tall.
Self-Centering Assisted Steering	The only e-scooter that provides self-centering steering assistance to improve safety and stability when riding over rough terrain.
Antimicrobial Grips	Added protection helps keep all riders healthy and safe.
Wider Handlebars	A wider grip makes Bird Three's handlebars easier to grasp and provides better handling.
Extended Chassis	A longer wheelbase provides more stability on all terrains,

	creating a better vehicle fit for people of all shapes and sizes and improving riders' overall comfort.
2x Hidden Brake Cables	Hidden and covered brake cables to increase protection against weather damage and vandalism.
Over-the-Air Upgrades	Our industry-leading operating system allows us to instantly and wirelessly apply the latest system updates to Bird Three.
Automatic Brake Calibration	Brake sensors are automatically calibrated to ensure accuracy and safety.
Dual-Sensor Throttle	Automotive-grade acceleration that provides functional safety and absolute accuracy in speed control through two independent measurements.
Accurate Geofences	Bird's Operating System (OS) enforces strict adherence to speed limits, no-ride and slow zones in cities.
Neck Status Light	Highly visible status indicator lets riders and team members immediately know the health and charge of a vehicle even from across the street.
Safety Systems (see below for detailed descriptions)	
High Precision Parking	A new advanced parking solution using a Camera Positioning System (CPS) that's 10 times more accurate than traditional GPS
Vehicle Location System (VLS)	Next-generation on-vehicle sensors can pinpoint vehicles within 30-90 cm
Autonomous Emergency Braking (AEB)	The industry's only active safety technology designed to detect brake failure and intervene to prevent an accident
Acoustic Vehicle Alert System	Bird Three e-scooters will emit a low-volume, non-intrusive ambient noise to better aid the awareness of other road users
Dynamic Stability Control Steering (DSCS)	Stabilizes out-of-control, sudden or erratic movements by steadying

	the handlebars
Skid Detection	Detects frequent skidding stops, which can be dangerous to riders and pedestrians
Double-Riding Detection	Powered by the e-scooters' 200+ sensors and advanced communication system, Bird Three will introduce the industry's first double-riding detection technology
Tip Detection & Mitigation	Bird Three's internal gyroscope checks in every 30 second when idle or five seconds while being ridden. The system automatically alerts our local operations team if a device has been left (intentionally or unintentionally) on their side
Vehicle Identification & Community Mode	Multiple, highly visible Vehicle IDs comprised of 3 alphanumeric characters that are reflective and 33mm tall along with an easy system for riders and non-riders to report poor rider behaviour
Beginner Mode	A gentle acceleration option that lets new riders gradually work their way up to full speed.
Safe Start	Pre-ride, cognitive assessment that is designed to prevent users from riding when intoxicated
Enforcement of Safe Riding	Bird Canada's Advanced Rider Assist delivers next-generation safety features to ensure riders and non-riders are always protected
COMING SOON Bird Maps	Maps that provide audio and turn-by-turn directions via th on-vehicle display and optimizing route for the use of bike lanes, quiet roads, and wider surface areas when possible.
COMING SOON Call for Help	If an unexpected fall during a ride is detected, a pop-up notification on the rider's phone is triggered that will call local emergency services when clicked.

Battery	
Battery CapaCity / Type	763 Wh (21.0 Ah) Lithium Battery (60-cell)
Battery Enclosure	Fixed, under the deck
Voltage	36V (nominal) 42V (max)
Range (maximum distance)	55 km
Most Sustainable Battery	Industry's best protection against water and dust damage keeps Bird Three batteries safely running past 22,000 vehicle kms. We engineered our batteries to last up to four times longer than our e-scooters and ensure they are responsibly recycled at their end of life. Bird is also exploring giving these cells a second life in other devices.
Part of the Structure	Like the batteries used in the newest Tesla models, Bird's structural batteries reduce vehicle mass, improve range and sustainability, and remain connected to Bird Three's telematics and clou communications.
Smart Battery Management System	Our Advanced Battery Management System alerts our loc teams to immediately unplug when charging is complete, reducing strain on the battery and extending life. Longer-lasting batteries with longer range means fewer batteries needed and a lower carbon footprint.
Weather Rating	
Chassis	IP 67
Motor	IP 67
Brain (internal computer)	IP 67
Battery	IP 68 - 2m submerged depth for 2 hours