

# 2022 Shared E-scooter Season Data Analysis

## End of Season Summary

### 2021 vs 2022 Season Summary

#### Changes to the 2022 Season

- Restrictive Parking Model: operating area was fully geofenced as a “no parking zone” with parking only permitted in designated parking zones. Geofencing technology prohibited the parking of e-scooters outside dedicated parking spaces.
- Geofencing and Artificial Intelligence technology detected sidewalk riding and alerted users while bringing the e-scooter to a stop.
- E-scooters were equipped with technology to emit continuous sound when in use and in motion.

#### Season Length

- 2022 season started on July 6 and ended on November 15 (**133** days) for Neuron e-scooter availability.
- Bird Canada e-scooter availability started July 15 and ended October 31, 2022.
- By comparison, the 2021 season started May 28 and ended on November 30, 2021 (**187** days).
- The 2022 season was **54** days shorter than the 2021 season.

#### Daily Rental Period

- Shared e-scooters were available to rent from 6 am to 11 pm in both the 2022 and 2021 seasons.

#### Fleet Size

- 2022 season permitted fleet size of **900** e-scooters with a maximum of **450** to Neuron, and **450** to Bird Canada.
- This was three quarters of the number of scooters that were available during the 2021 e-scooter pilot (**1,200**) where a maximum of **410** e-scooters were assigned to Bird Canada, **320** to Lime and **470** to Neuron.

- In the 2022 season, neither Bird Canada nor Neuron reached their fleet cap: each provider reaching a mean maximum daily number of e-scooters of **200** and **160** respectively.

## Deployment Area

- Both service providers Neuron and Bird Canada initiated the 2022 season with a smaller deployment zone than the permitted operating zone. In comparison, for the 2021 season, the e-scooter deployment spanned the total permitted operating zone designated by the city.
- The Phase 1 deployment zone for both service providers centered around the Centretown, By-Ward Market and Glebe areas.
- Expansions into the Phase 2 deployment areas for Bird Canada and Neuron were initiated on August 31 and September 10, respectively.
- In Phase 2, both Bird Canada and Neuron expanded further to include Lowertown, Old Ottawa East, Old Ottawa South, and Carleton University. Neither service provider expanded West to Westboro, further South or East of the Rideau River, therefore deployment into the full operating zone was not accomplished.
- The figure below provides a map of the permitted deployment area and the final operating zones for Bird Canada (Phase 2 - August 31) and Neuron (Phase 2 - September 10).

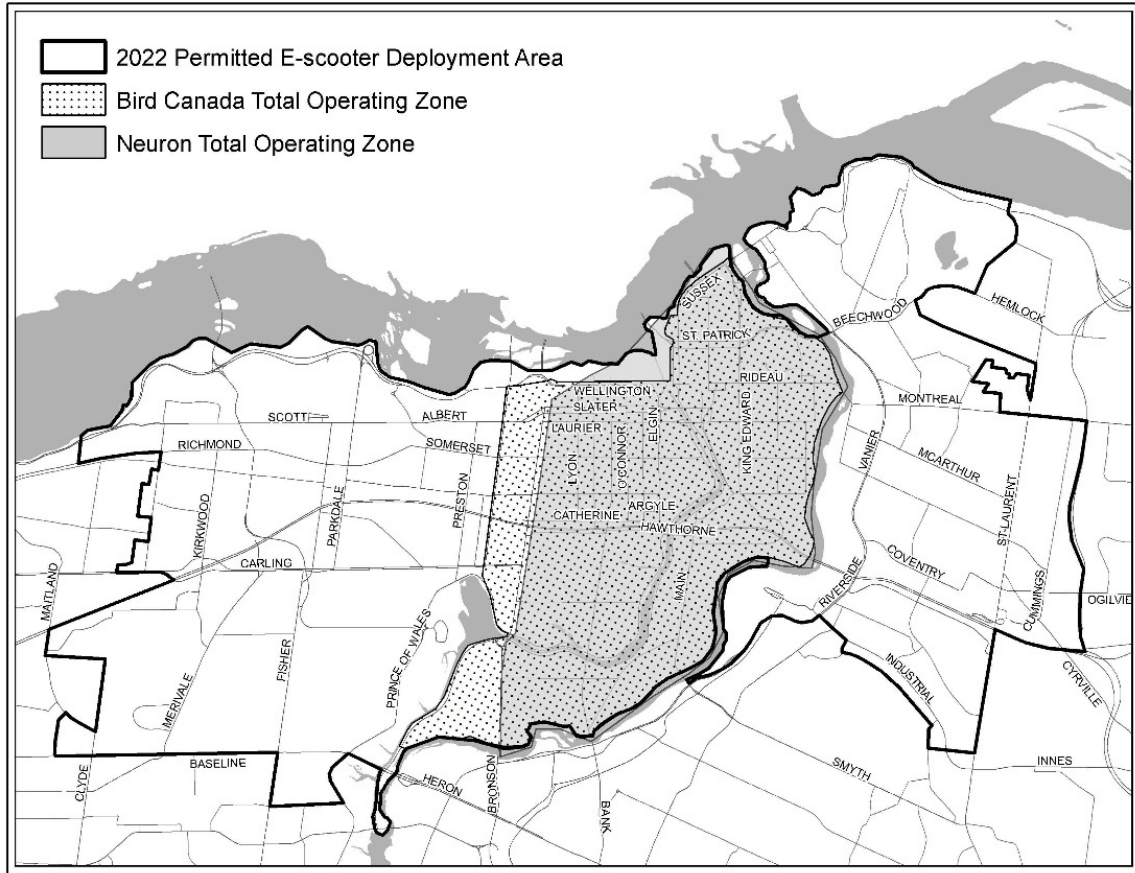


Figure 1: Final Operation Zone

## Unique Riders

- Approx. **33,000** unique riders during the 2022 season: **60%** with Bird Canada, and **40%** with Neuron.
- This is a decrease of approx. **94,000** unique riders compared to the 2021 e-scooter season which started earlier and ended later and saw approx. **127,000** unique riders.
- Note that these numbers could double count riders that took a ride with both service providers.

## Total Trips

- Approx. **80,000** e-scooter trips were completed during the 2022 season: **65%** with Bird Canada, and **35%** with Neuron.
- This is a decrease of approx. **410,000** trips compared to the 2021 e-scooter season. Overall, the 2022 season was **29%** shorter than the 2021 season and had an **84%** decrease in trips.
- An average of approx. **600** trips per day were completed from July 6 to November 15, 2022.
- During the busy season in August 2022, daily e-scooter trips averaged approx. **800** on weekdays and **1,100** on weekends, with some weekends as high as **1,700** daily trips.
- This compares with an average of **3,200** weekday and **4,400** weekend daily trips in July and August 2021, representing a decrease of approx. **81%** and **77%**, respectively.
- During the 2022 season, the busiest day for e-scooter trips was October 1 with **1,722** trips.

- Table 1 includes a breakdown of the 2022 monthly trip averages.

Table 1: 2022 Monthly Trip Data

Month	Avg E-Scooter Trips per Day	Avg E-Scooter Weekday Trips per Day	Avg E-Scooter Weekend Trips per Day
July 2022	596	475	869
August 2022	854	756	1,133
September 2022	807	695	1,116
October 2022	391	298	586
November 2022	139	124	178
All Season Average	604	514	829

- Figure 2 provides an overview of the number of trips per week during the 2022 e-scooter season.

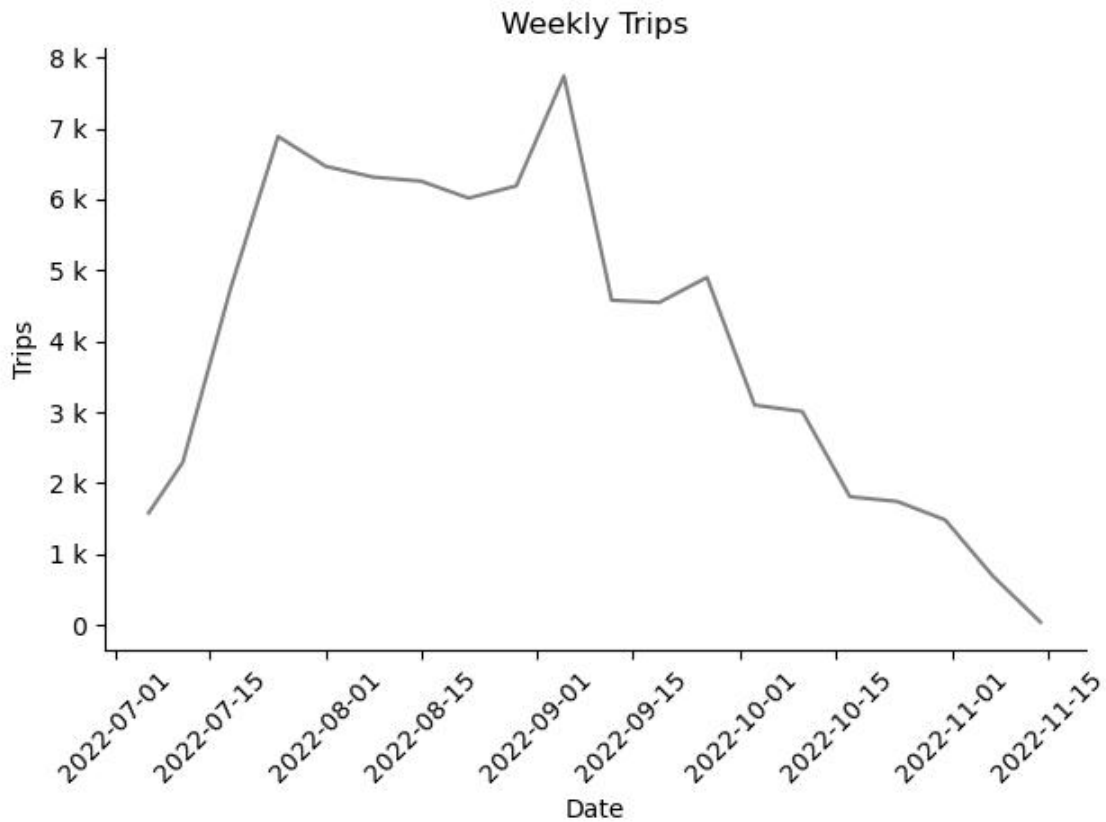


Figure 2: 2022 Weekly Trip Numbers

- Figure 3 provides an overview of the number of vehicles available per day during the 2022 season.

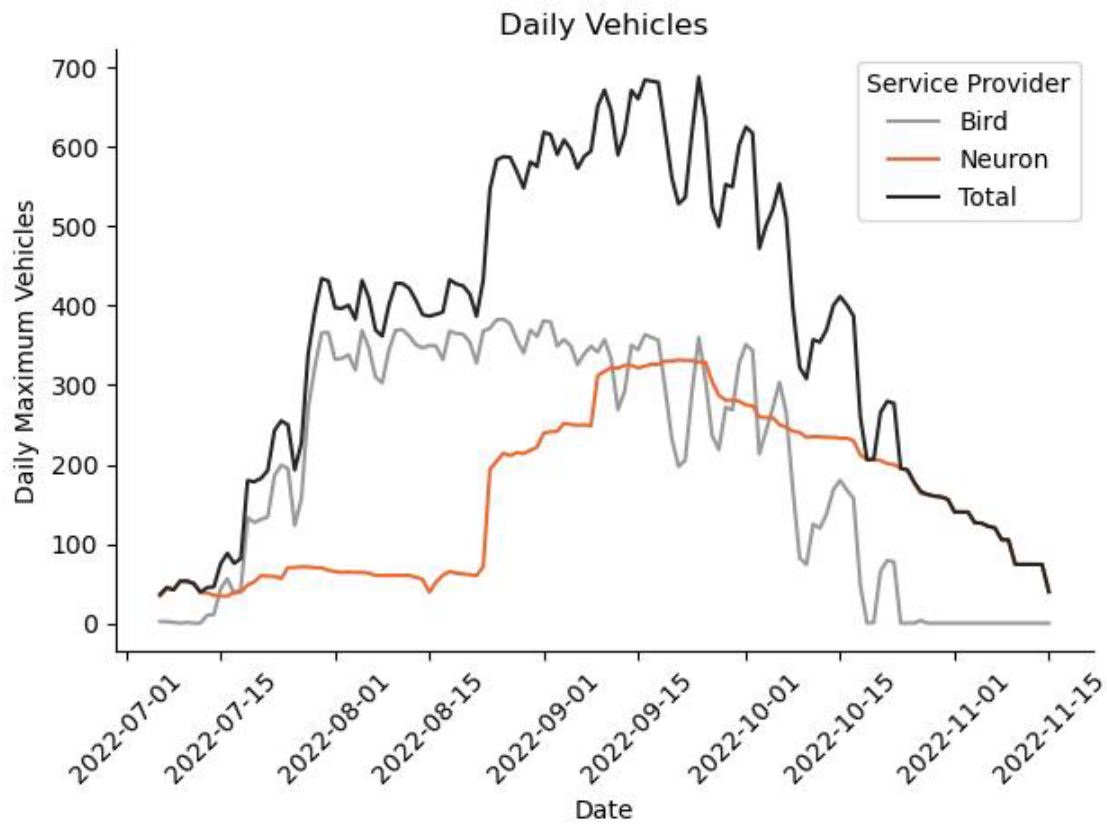


Figure 3: 2022 Daily Vehicle Numbers

### Key Origins and Destinations

- The heat map below (Figure 4) illustrates the most popular origins and destinations for the pilot, with a concentration of trips starting and ending in the ByWard Market and along commercial streets such as Elgin, Bank, and Wellington.

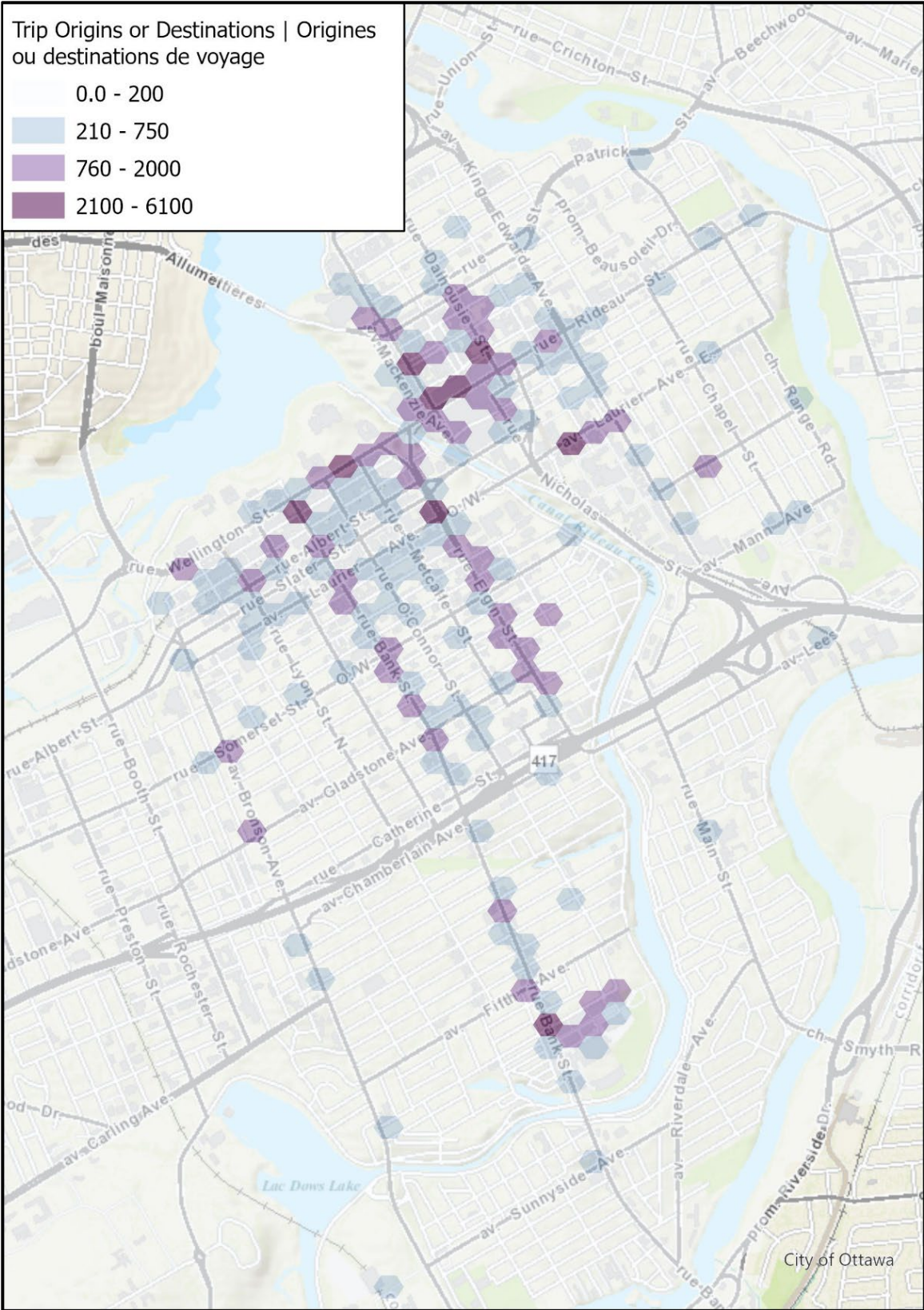


Figure 4: 2022 Origins and Destinations Heat Map

## Trip Distance, Duration and Speed

- The total distance travelled has decreased from approx. 985,000 km in 2021 to 166,000 km in 2022 (decrease of approx. 819,000 km or 83%).
- The average trip duration in 2022 was 19.42 min. and the average trip distance was 2.12 km.
- There were approx. 900 trips with a recorded distance of over 10 km. The maximum recorded trip distance was approx. 36 km. The potential for data management issues should be considered when considering the maximum recorded trip distance.
- These metrics will vary slightly depending on the treatment of outliers. Table 2 and Figures 5, 6, and 7 below do not include trips with speeds greater than the 99.9% speed percentile.

Table 2: 2022 Trip Duration, Distance and Speed

Value	Trip Duration (mins)	Trip Distance (km)	Trip Speed (km/h)
Average	19.42	2.12	7.04
25% Percentile	7.97	0.89	4.62
50% Percentile (Median)	13.62	1.56	7.02
75% Percentile	23.98	2.65	9.46

\* Excludes outlier trips with a trip speed greater than the 99.9% percentile.



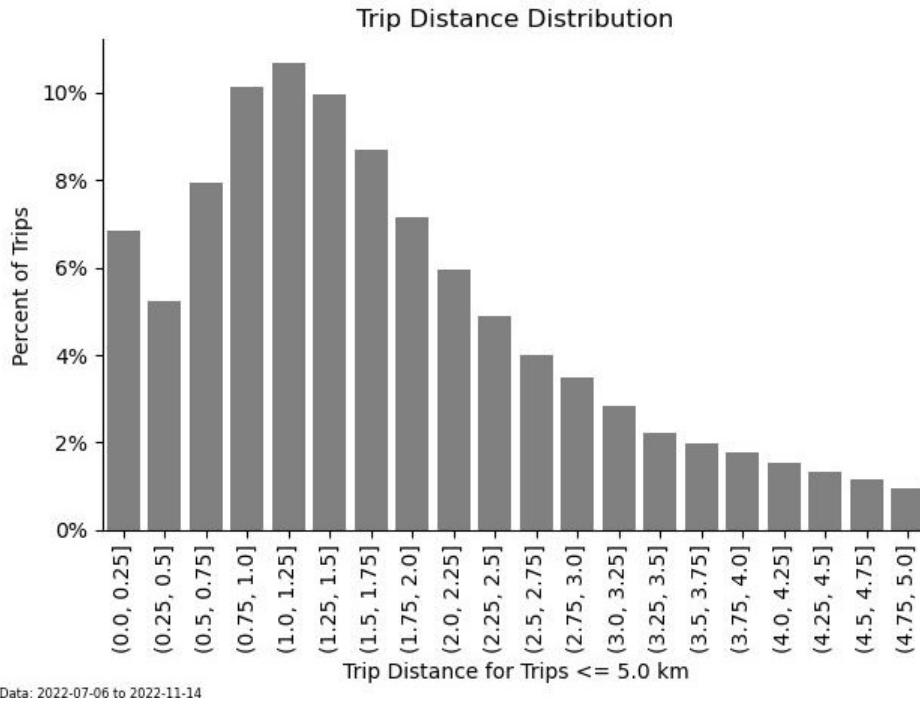


Figure 5: 2022 Trip Distance Distribution

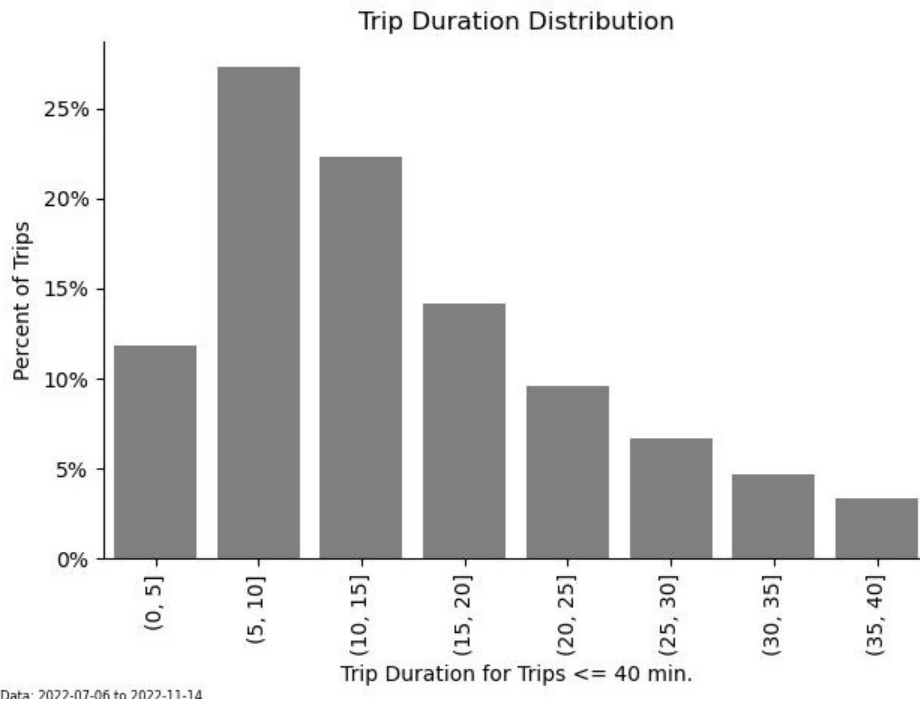


Figure 6: 2022 Trip Duration Distribution

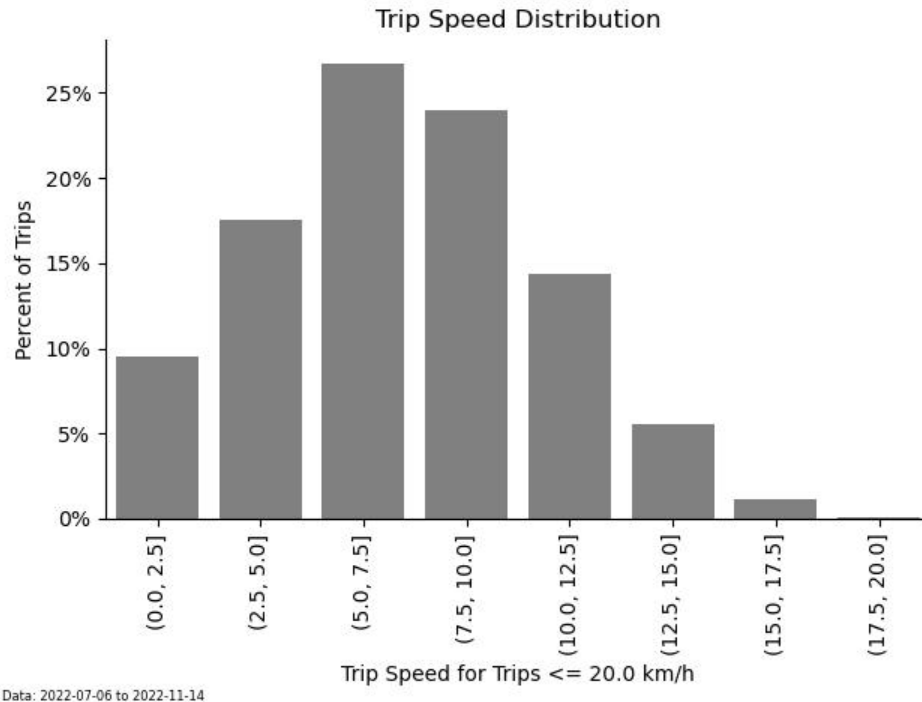


Figure 7: 2022 Trip Speed Distribution

## Trip Purpose

- As part of the evaluation of the 2022 pilot, staff conducted an online survey which provided insight on the benefits and issues associated with e-scooters. The City’s E-Scooter Survey ran from October 26 to November 15, 2022.
- A total of **1,389** respondents completed the survey. Respondents to the 2022 survey included both e-scooter users and non-users:
- E-Scooter Non-Users
- **40%** of respondents did not ride an e-scooter in the 2022 season.
- E-Scooter Users
- **60%** of respondents rode an e-scooter in the 2022 season.
- “Lost” E-Scooter Users: **59%** of respondents rode an e-scooter in 2020 or 2021 but did not ride one in 2022.
- “New” E-scooter Users: **23%** of respondents did not ride an e-scooter in 2020 or 2021 but did ride one in 2022.
- The survey collected data on trip purpose as outlined in Table 3.

Table 3: Trip Purpose

What were the most common reasons why you used a shared e-scooter?	2020	2021	2022	Change (2022 vs 2021)
Get to/from work	18%	34%	27%	-7%
Get to/from school	5%	12%	9%	-3%
Run errands/appointments	36%	48%	33%	-15%
Get to/from social activities	49%	63%	71%	8%
Get to/from dining	33%	49%	46%	-3%
Get to/from shopping/local business	34%	47%	38%	-9%
For fun/leisure	76%	57%	50%	-7%
To try out the service	51%	34%	33%	-1%
Other	1%	3%	4%	1%
Faster/more efficient than other modes of transportation	-	-	47%	-
To reduce vehicular emissions/pollution	-	-	32%	-
Sightseeing/tourism	-	-	32%	-
To get to/from another mode of transportation	-	-	27%	-

## Time of Day Usage

- The busiest period for e-scooter usage occurs in the evening. Figure 8 shows the distribution of e-scooter trips throughout the day.
- The distribution of trips between the 2021 and 2022 e-scooter seasons varies.
  - During the 2022 season most of the trips started during the 21:00 and 22:00 hour with approx. 7,900 and 8,300 trips respectively, slightly different to the 2021 season where most trips started during the 19:00 and 20:00 hour.

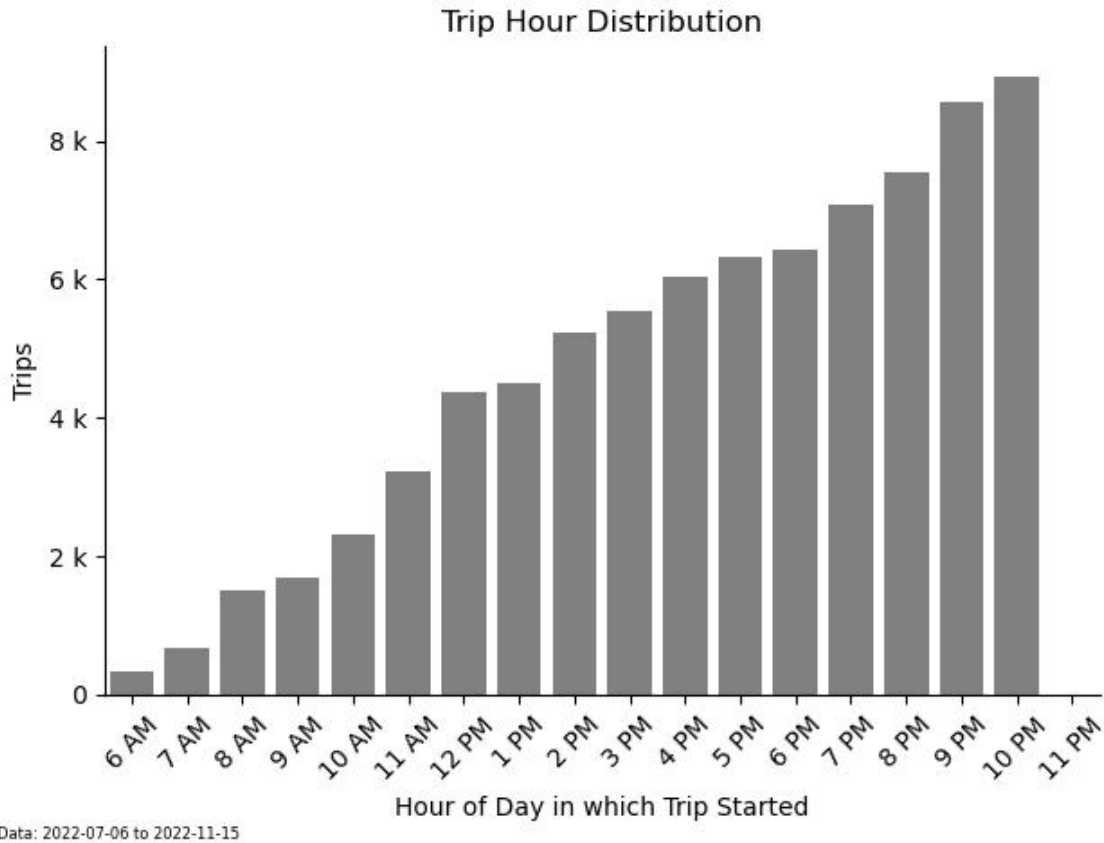


Figure 8: 2022 Trip Distribution by Time of Day

## Demand for E-Scooters

- The number of daily trips versus the average number of available e-scooters was analyzed to assess the average vehicle utilization. As shown in Figure 9, there was a decrease in the average vehicle utilization in the 2022 season compared to the 2021 season, with the average utilization decreasing from **2.64** to **2.32** trips per vehicle per day.
- It is thought that 3 to 4 daily trips per vehicle days is a good target for the size and population of the City of Ottawa.

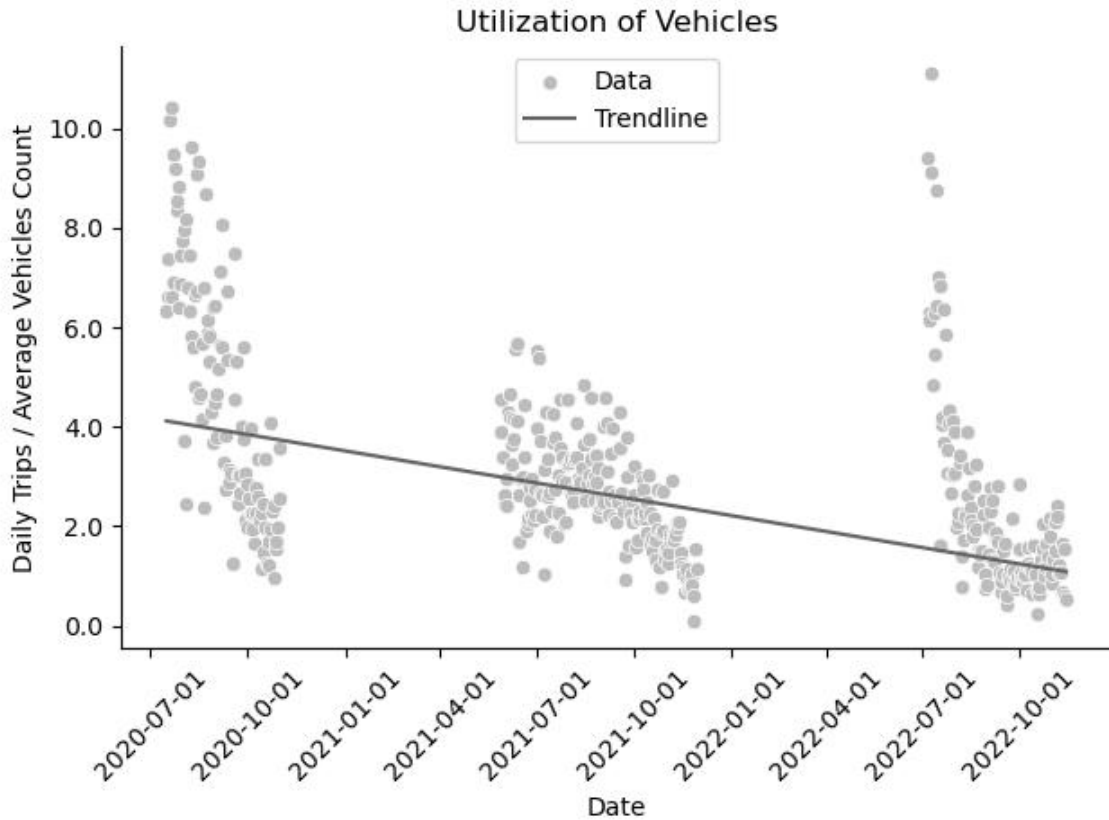


Figure 9: 2020, 2021 and 2022 E-scooter Vehicle Utilization

- Based on the results from the E-Scooter Survey, **58%** of respondents found it easy to find an e-scooter when they wanted to use one, a decrease from 2021.

Table 4: Difficulty Finding an E-Scooter

How easy was it to find a shared e-scooter when you wanted to use one?	2020	2021	2022	Difference (2021 to 2022)
Difficult	7%	4%	23%	19%
Easy	85%	84%	58%	-26%
Neutral	8%	11%	17%	6%

- The Survey also asked about how many e-scooter trips each respondent completed.
- As shown in Table 5, most respondents who used an e-scooter in 2022 did so more than once.
- The number of respondents reported having completed a single trip grew from **10%** to **27%** from the 2021 to the 2022 surveys.

- The number of respondents who completed several trips (10+) decreased significantly from **43%** to **12%** from the 2021 to the 2022 survey.

Table 5: Number of Trips per Rider

How many e-scooter trips have you taken this season?	2020	2021	2022	Difference (2021 to 2022)
One	13%	10%	27%	17%
2-5	42%	29%	47%	18%
6-10	22%	18%	14%	-4%
+10	23%	43%	12%	-31%

## Alignment with Mobility Objectives

- A detailed breakdown of the changes in travel behaviour reported by respondents is presented in Table 6 and Table 7. The survey question that explored the effects of e-scooters on travel plans varied from the 2021 to the 2022 survey.
- Overall, in the 2022 season, majority of riders responding to the survey noted a decrease in their use of transit and a decrease in their use of personal vehicles, whether as a driver or passenger, compared to last year’s survey results.
- In the 2022 season **62%** of respondents indicated a significant increase in the use of e-scooters in comparison to alternative modes of transportation.

Table 6: Changes in Travel Behaviour

How did the introduction of shared e-scooters change the way you travel?	2022		
	Increased	Decreased	No Change
Passenger in a vehicle (carpool/taxi/rideshare)	2%	44%	42%
Driving a vehicle	1%	39%	42%
Public transit	12%	21%	56%
Walking	15%	22%	58%
Cycling	6%	10%	64%
E-scooters	62%	4%	24%
Other, please specify	3%	1%	22%

- Table 7 shows the difference between the 2022 and 2021 survey responses to the question: “Why did you take a shared e-scooter instead of another mode of transportation?”
- With the 2021 survey, **39%** of respondents indicated that they took an e-scooter to avoid the cost and hassle of parking a car. For the 2022 survey, this has increased to **42%** of respondents.
- Across the 2021 and 2022 seasons the response to ‘trying out e-scooters’ was relatively constant.

Table 7: Factors Influencing E-Scooter Use

Why did you take a shared e-scooter instead of another mode of transportation?	2020	2021	2022	Difference (2021 to 2022)
Easier	50%	63%	48%	-15%
Faster	54%	62%	59%	-3%
Convenient	65%	73%	70%	-3%
Affordable	35%	49%	31%	-18%
To reduce Greenhouse Gas emissions	27%	40%	31%	-9%
More fun	76%	66%	72%	6%
To try out e-scooters	57%	44%	42%	-2%
To be physically distant from others	21%	17%	10%	-7%
To avoid the cost/hassle of parking a car	33%	39%	42%	3%
Other	2%	4%	6%	2%

## Facilitating Transit and Multimodal Trips

- Based on the number of individual e-scooter trips starting or ending close to transit stations within the e-scooter operating area, it is roughly estimated that approximately **five** percent of all e-scooter trips were combined with transit trips in 2022. This is relatively constant compared to the 2021 season which saw approximately **4%** of all e-scooter trips combined with transit.
- First/last mile trips to/from transit stations averaged between 2.3 and 4.5 km, with longer distance trips tending to occur at Pimisi Station, outside the downtown core.

- Results from the survey provide additional insight on multimodal trips.
- **85%** of survey respondents reported taking a shared e-scooter to connect to or from another form of transportation (walking) at least once.
- **64%** of respondents who reported connecting to another mode indicated that they connected to transit (bus or train).
- Most survey respondents (**89%**) indicated that having access to shared e-scooters did make them more likely to use the mode to which they connected.

## Health and Mobility Considerations

- **15%** of survey respondents reported that they walked more with the introduction of shared e-scooter.
- E-scooters continue to provide greater mobility. Riders who would have walked without the e-scooters were able to travel farther to access additional shops and services, accomplish their daily tasks more efficiently and conveniently, reach destinations that may not be convenient by transit, include family members with limited mobility in their outings, and feel more comfortable with evening travel options.

## Support for Local Businesses

- **51%** of trips started in a Business Improvement Area (increase from 2021 at **45%**).
- **47%** of trips ended in a Business Improvement Area (increase from 2021 at **42%**).
- Of the survey respondents who used e-scooters to travel to or from dining and local businesses, **18%** indicated they spent \$20 or less on average (**36%** in 2021), **35%** spent \$21-50 (**17%** in 2021), **29%** spent \$51-100 (**19%** in 2021), and **17%** spent over \$100 (**26%** in 2021).



# Issues Management

## Sidewalk Riding

- Sidewalk riding was monitored using automated sidewalk counts at various locations throughout the city.
- Counts were completed between 15:00 and 21:00 on Friday or Saturday every two weeks during the e-scooter season using Miovision cameras.
- The monitoring of sidewalk riding was limited by the available budget. In addition, interference with the count equipment occurred in locations near the Byward Market, making it necessary to select alternative count sites to avoid damage to the equipment.
- Figure 10 provides an overview of the locations that were counted at least once over the course of the 2022 e-scooter season.

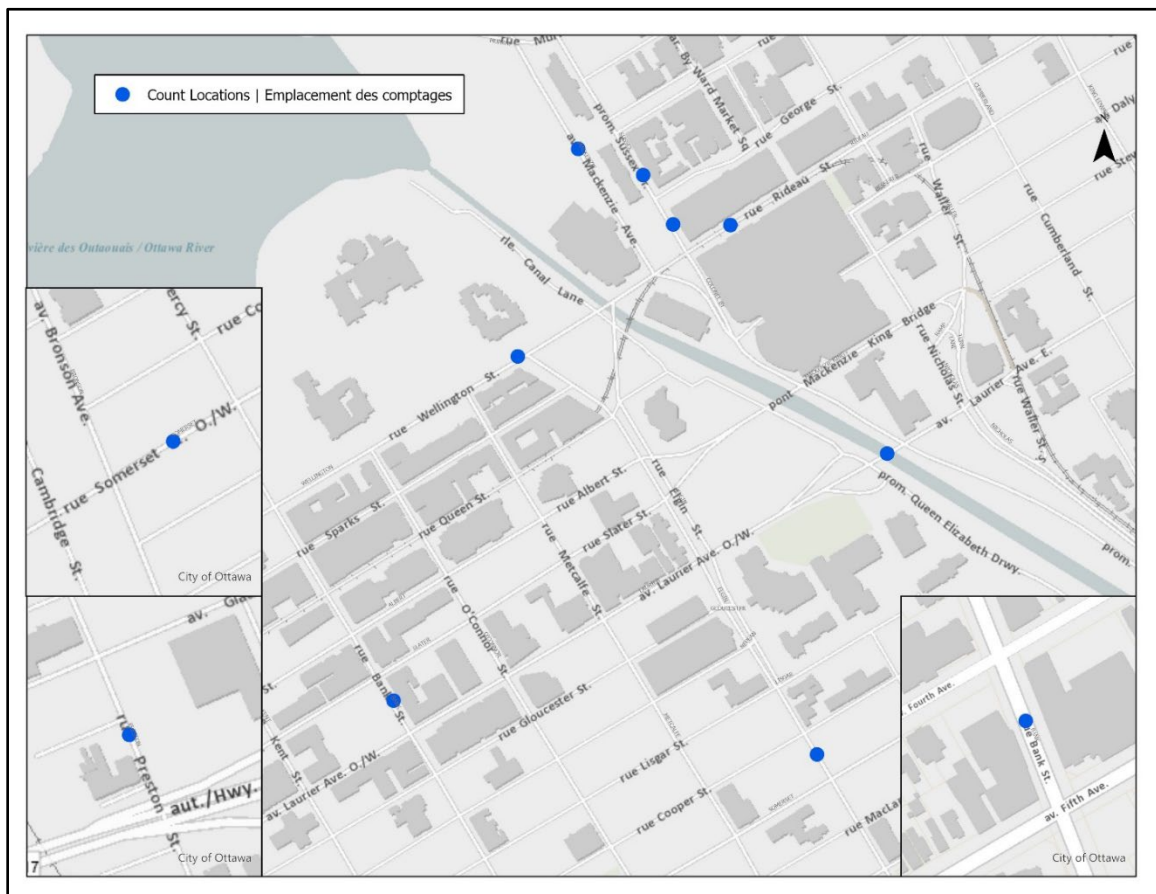


Figure 10: Miovision Count Sites

- Figure 11 provides a summary of the number of e-scooters operating on the sidewalk as measured by the count equipment. Caution should be taken in interpreting this figure, as there is a lot of variability in the data which is affected by the specific count location and the time of year.
- Counting technology does not distinguish between shared e-scooters from the service providers and privately-owned e-scooters, which may not support sidewalk detection technology.
- Since there were fewer e-scooter trips during the final months of the 2022 season, we would typically expect the amount of sidewalk riding to decline as well. To account for this effect, an attempt has been made to calibrate the number of sidewalk riders as a function of the number of e-scooter trips each day.
- Count locations with high pedestrian and e-scooter activity often suffered from equipment tampering at the beginning of the season and had to be abandoned. Therefore, over the course of the season, there is a higher proportion of lower activity count locations included in the dataset which may impact the observed trendline at the end of the season.

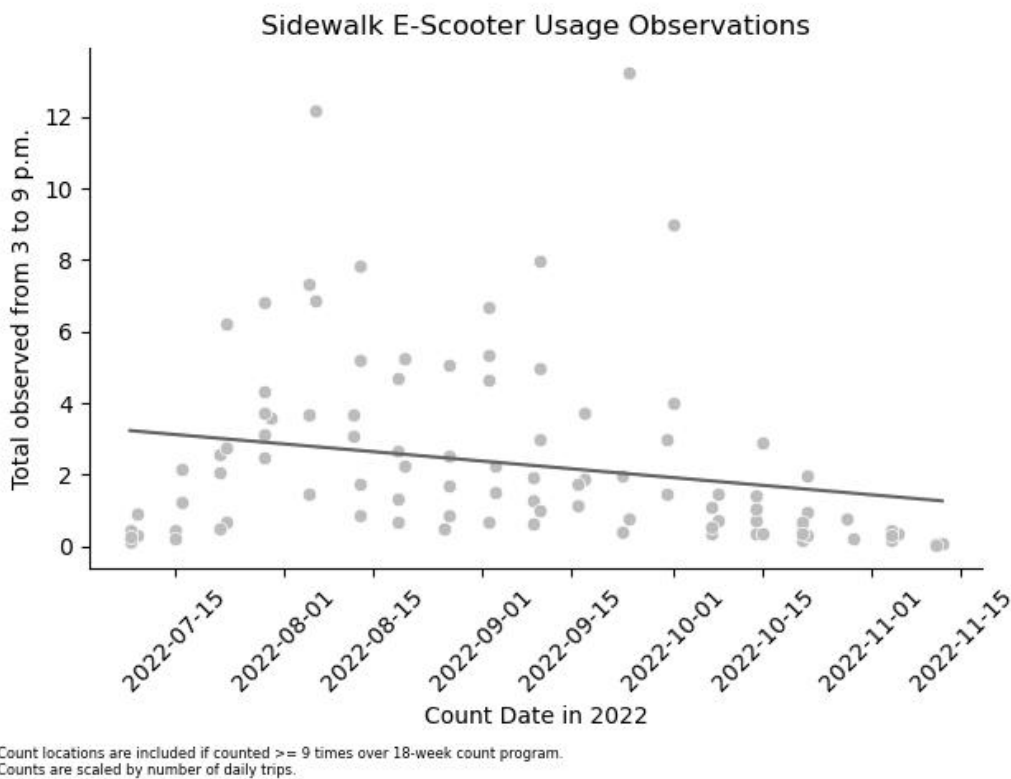


Figure 11: Sidewalk Riding Counts

- The end-of-season survey included questions about e-scooter sidewalk riding.
- **47%** of respondents indicated that they have encountered people riding e-scooters on the sidewalk. These respondents were asked a series of follow up questions:
  - In terms of frequency, **28%** of respondents encountered sidewalk riders once/rarely, **14%** experienced daily sidewalk riding, **33%** encountered sidewalk riders weekly, and **16%** reported monthly encounters.
  - Most respondents (**90%**) did not report it to the City of Ottawa, e-scooter service providers or the Ottawa Police Service.
  - Most respondents reported that they felt uncomfortable and unsafe when encountering an e-scooter being ridden on the sidewalk (**59%**). Further, **27%** of respondents indicated that it changed their walking route.
  - When asked whether e-scooter riding behaviour has improved since the 2020 and 2021 seasons, **50%** of respondents agreed that behaviour had improved, **29%** were neutral, and **21%** disagreed.

## Mis-parked Shared E-scooters

- Mis-parked e-scooters were monitored during the 2022 pilot through on-site surveys. Staff surveyed retail and commercial corridors in the ByWard Market, Downtown, and the Glebe. Figure 12 demonstrates the path taken each week to observe parking behaviours.

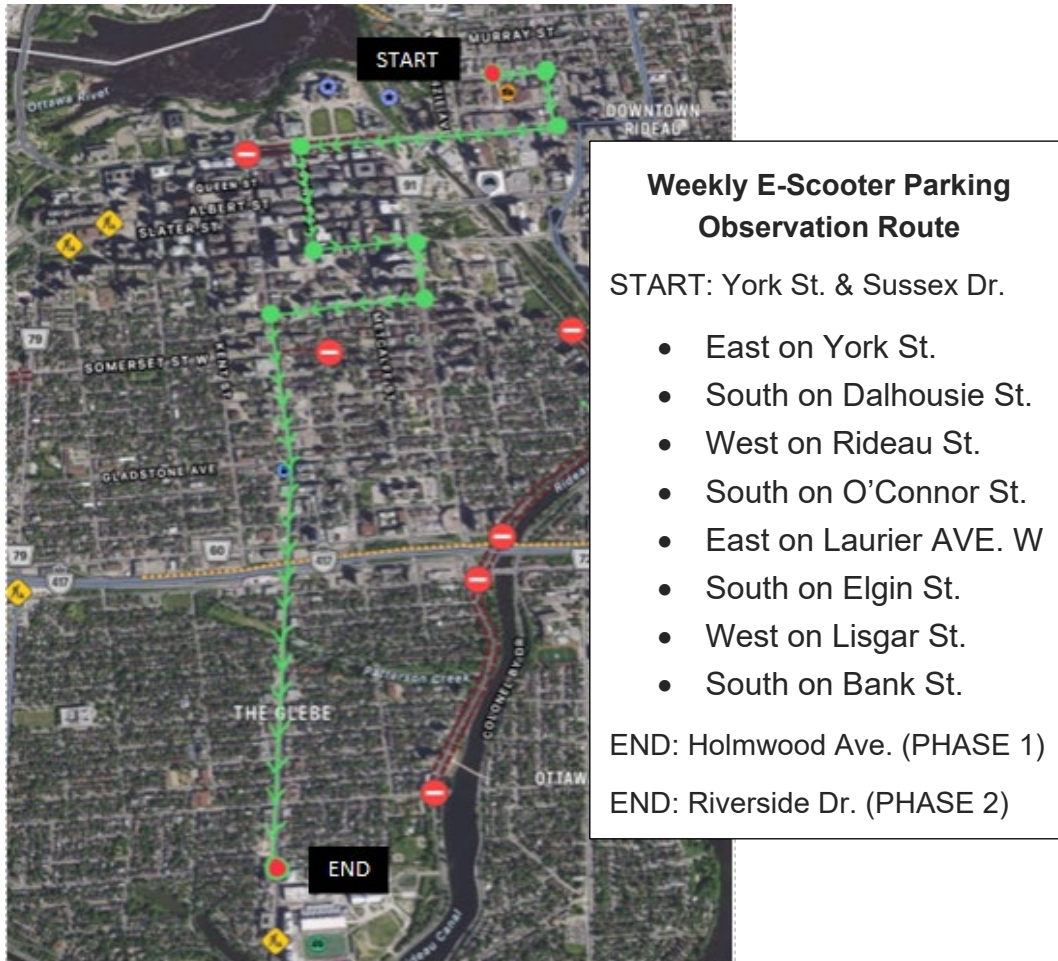


Figure 12: Weekday E-scooter Parking Observation Route (Monday to Friday)

- The scope of the monitoring was limited by budget and staff time. Resource limitations did not allow for monitoring of residential streets.
- The number of mis-parked e-scooters is tied to the level of e-scooter activity; with fewer e-scooter trips occurring in the Fall months impacting the number of observed mis-parked scooters.

- Figure 13 provides an overview of the mis-parked scooters that were surveyed over the course of the 2022 season as a percentage of the total number of parked scooters.
- ‘Slightly mis-parked’ refers to scooters that are parked incorrectly or outside of the designated parking spots but not blocking the area from pedestrian access. ‘Severely mis-parked’ refers to scooters that are parked incorrectly or outside of the designated parking spots and blocking the area from pedestrian access, requiring movement of the e-scooter.
- A total of **1,430** parked e-scooters were surveyed over the course of the season.
- For the 2022 season an average of **94%** of e-scooters surveyed were parked correctly, **with 6%** slightly mis-parked, and a negligible percentage severely mis-parked.

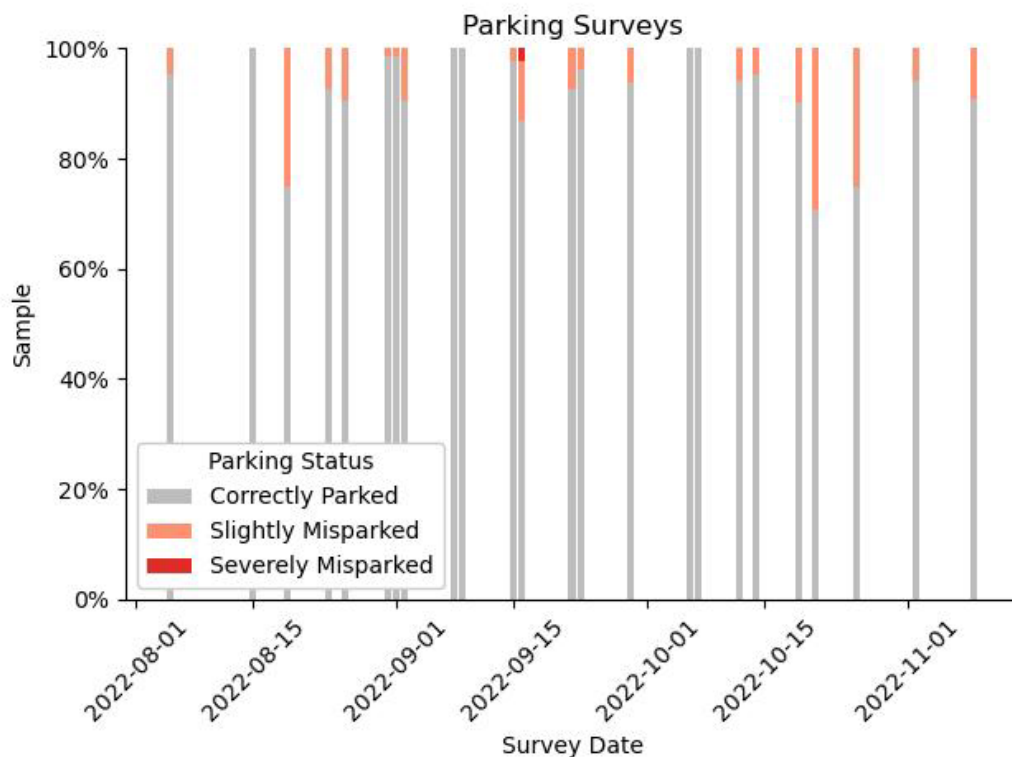


Figure 13: 2022 Mis-parked E-Scooters Survey Results

- For the 2022 season, the reporting process (for any inquiry or complaint about e-scooters) was changed from previous seasons. Residents were encouraged to submit their complaints regarding e-scooters through the City’s online e-scooter complaint e-form, in addition to the City’s 3-1-1 phone service. All complaints regarding issues such as mis-parked scooters were directed to by-law officers who would then forward the complaints to the appropriate e-scooter providers.

- Figure 14 provides a breakdown of number of complaints to 3-1-1 (by phone and/or new e-form) classified under the different subjects.
- **76%** of complaints were received by 3-1-1 through the new self-serve e-forms (desktop web or mobile web site), while **24%** of complaints were direct calls to 3-1-1 agents.

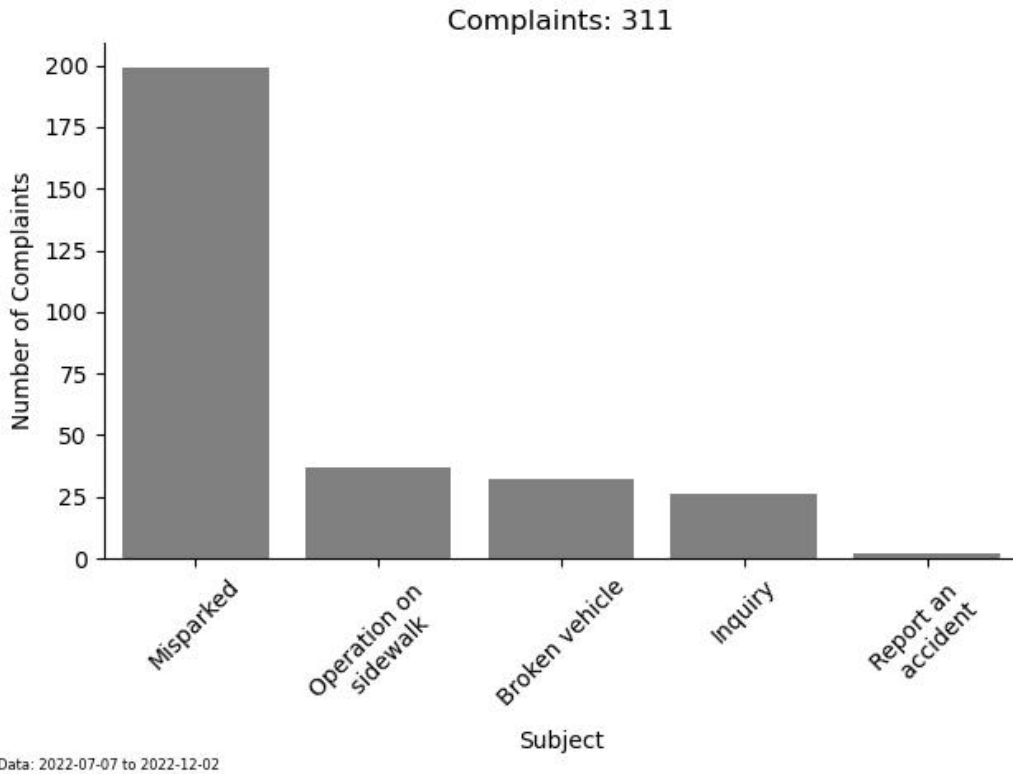


Figure 14: 2022 3-1-1 Complaints by Subject

- Table 9 provides the breakdown of service requests received from 3-1-1 each month. Majority of complaints were regarding mis-parked scooters.

Table 9: 3-1-1 Monthly Service Requests Received by 311

Month	Number of Service Requests
July	142
August	71
September	55
October	20
November	7

- Table 10 provides the summary of service requests recorded by Bylaw each week. These include those received by 311 and other generated by internal observations; therefore, the table below and above would not match exactly.

Table 10: Monthly Service Requests Recorded by Bylaw

Date	Number of Service Requests			Sidewalk Riding
	Total	Bird	Neuron	
Jul 7 - Jul 26	86	43	43	7
Jul 27 - Aug 3	54	39	15	16
Aug 4 - Aug 10	47	38	9	3
Aug 11 - Aug 17	38	31	7	3
Aug 18 - Aug 24	55	31	25	1
Aug 25 - Aug 30	38	17	21	2
Aug 31 - Sep 7	21	10	10	2
Sep 15 - Sep 21	23	10	13	2
Sept 22 - Oct 11	30	7	23	2
Oct 12 - Oct 23	12	4	8	0
Oct 24 - Oct 30	23	0	23	0
Oct 31 - Nov 13	16	0	16	0

- Residents were encouraged to direct all comments directly through City communication lines. Nonetheless, some complaints did were directed directly to the service providers.

- Figure 15 illustrates the number of weekly complaints to 3-1-1 and each service provider.

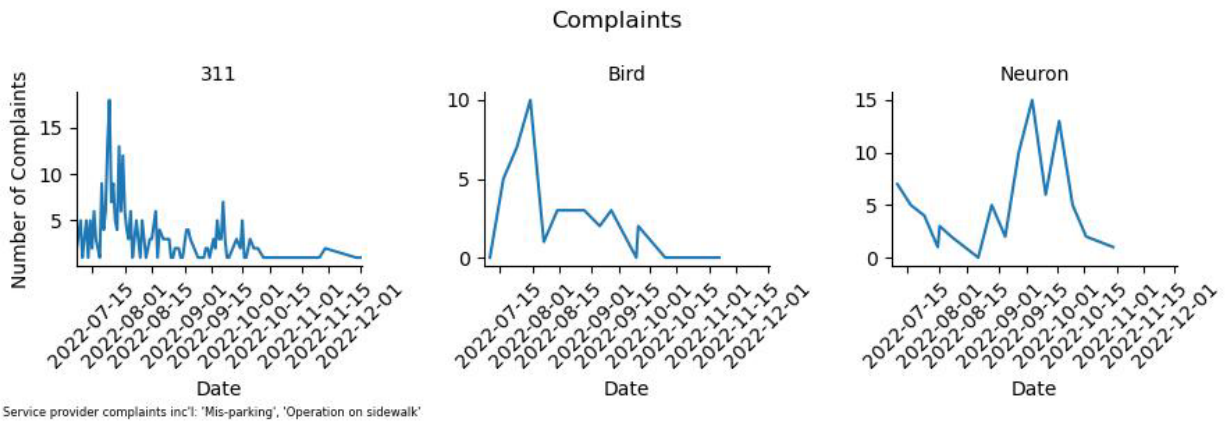


Figure 15: 2022 3-1-1 and Service Providers Complaints

- Several city designated parking zones (identified with signage and pavement markings) were implemented in the 2022 season. The below map illustrates the location of these zones and the geospatial density e-scooter parking events for the season.
- The busiest zones were in the ByWard Market and along commercial streets in the Centretown region such as Elgin, Bank, and Wellington.
- Planning for a potential 2023 e-scooter season will allow the designation of additional zones, and the relocation of underutilized zones.



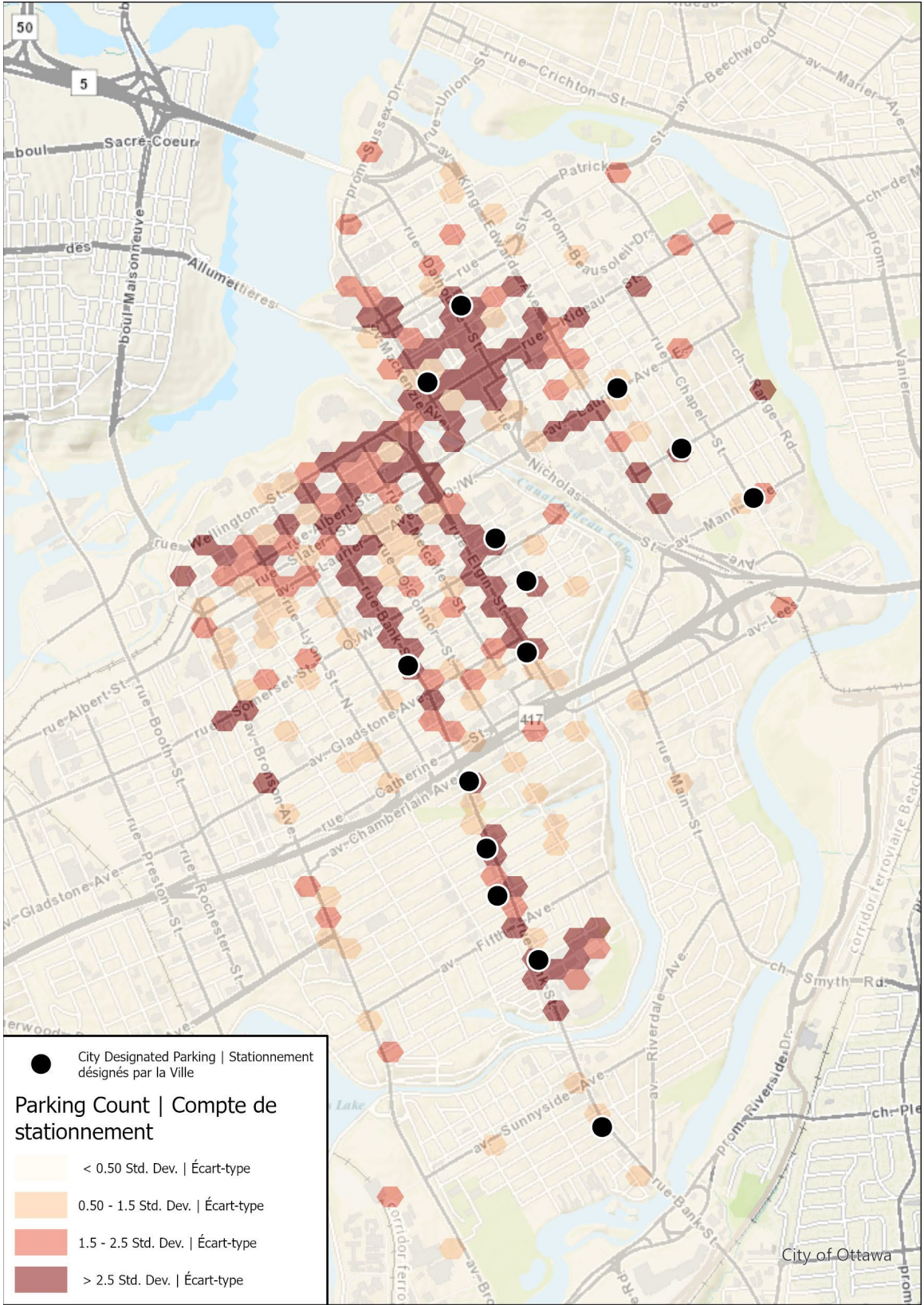


Figure 16: Designated E-scooter Parking Areas – Utilization Data

- The end-of-season survey also included questions about e-scooter parking.
  - Most respondents indicated that they are aware of how to correctly park e-scooters with only **12%** indicating that they are not aware. This is significant decrease to the rate from the 2021 survey which indicated **26%** of respondents were not aware to the correct parking regulations for e-scooters.
  - Few respondents (**40%**) indicated that they had encountered a mis-parked e-scooter. This is a decrease compared to the rate from the 2021 survey (**83%**). Of those respondents, **29%** indicated that they encountered a mis-parked scooter once or rarely, **13%** encountered a mis-parked scooter monthly, **14%** reported daily encounters, and **32%** reported encountering a mis-parked scooter on a weekly basis.
- The heat map below illustrates the most popular parking locations for the 2022 e-scooter pilot program, with comparison to designated digital parking spots provided by the service providers.
- A concentration of trips ended in the areas near the parking spots in the ByWard Market and along commercial streets in the Centretown region such as Elgin, Bank, and Wellington:

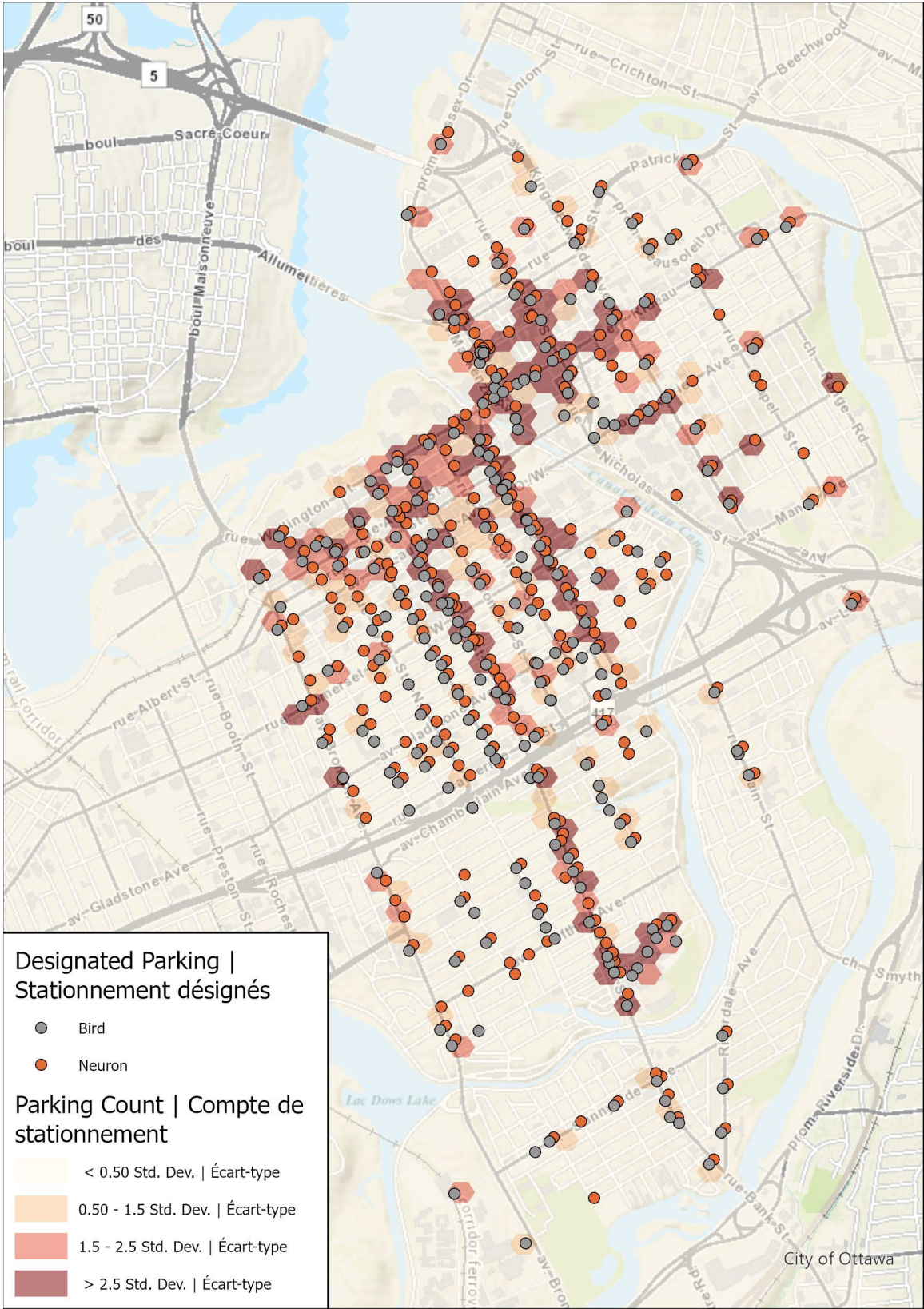


Figure 17: Total Parking Events and Service Provider Parking

## Effective Injury Prevention

- The E-Scooter Service Providers provided the number of injuries reported to them during the 2022 season: Bird (**0**), and Neuron (**15**, **10** unverified; of the **5** verified<sup>1</sup>, **3** required medical attention).
- The end-of-season survey included questions about e-scooter collisions:
  - Only **12** respondents indicated they were involved in a collision with an e-scooter and only **1** respondent required medical attention.
- As of April 1<sup>st</sup>, 2021, e-scooter related injuries were to be coded in hospital data systems using the International Statistical Classification of Diseases and Related Health Problem (ICD) code of *W02.08* “fall involving other specified sports equipment”<sup>2</sup>. This code includes all falls from a scooter, including electric, motorized, and non-motorized vehicles used for sports, leisure, or locomotion.
- More detailed coding was added in the 2022 ICD coding for *W02.08* to discriminate between electric e-scooters (*W02.080*), other motorized conveyances like hoverboards and Segways (*W02.087*) and non-motorized scooters (*W02.088*).
  - Emergency Department visits with the *W02.08* code totalled **38** for April to June 2022, the most recent month with available data.
- The table below provides the number of collisions identified in the City’s collision records that involved e-scooters.
  - The total number of accidents is separated based on the classification of the accident.
    - This data does not distinguish between shared e-scooters from the service providers and privately-owned e-scooters. Certain accidents occurred before the start end of the 2022 shared e-scooter season.

---

<sup>1</sup> A verified incident is when the rider provides details on the incident when the provider follows up directly with them, whereas an unverified incident is when the rider does not respond or provide additional details when the provider follows up.

<sup>2</sup> Canadian Institute for Health Information. Updated ICD-10-CA coding direction: Homelessness, and falls from an electric scooter (e-scooter), mobility scooter, Segway® or hoverboard. Available from: <https://www.cihi.ca/en/bulletin/updated-icd-10-ca-coding-direction-homelessness-and-falls-from-an-electric-scooter>

Table 11: City Collision Data Involving E-Scooters

Category	Number of Collisions	
	2020	2021
Property Damage Only	1	3
Non-Fatal Injury	3	3
Total	4	6

### By-Law and Ottawa Police Services Support

- For the 2022 season, all e-scooter incidents reported to 311 via the e-form or call were transferred to a designated team at By-Law and Regulatory Services who would forward issues to the appropriate e-scooter service provider.
- By-Law reported no tickets issued for the 2022, however **one** Neuron e-scooter was impounded during the season.
- The service response time for both service providers was stated to be under the required 15-minute service time.
- Ottawa Police Services reported the following number of tickets and warnings under the City’s e-scooter bylaw (Ottawa Bylaw 2020-174) for each season. A summary is provided in Table 12.

Table 12: Number of Tickets and Warnings given by Ottawa Police Services

Year	2020	2021	2022	Difference (2021 to 2022)
Ticket	9	14	0	-14
Warning	5	10	0	-10
Total	14	24	0	-24