City Service Requests 2018

Rafael A. Moreno Contreras
Introduction to Data Science and Python DA501
Catholic University of America

Introduction

Hundreds of thousands of requests to the city are made every year by visitors and residents of the District of Columbia trough the 311 number. The most important aspects of these requests are collected by D.C. Government as data sets available for public access, to be analyzed by whoever is interested.

In this particular case, the date set to be analyzed using python corresponds with the 2018 City Service Requests. The intention behind analyzing this data is to find useful insights which can be used to infer causes and correlation among the variables.

Problem Statement

The city faces different problems such as: parking meters out of order, potholes, pest infested zones, and many others. The aim is to identify and describe possible explanations of the causes of the most recurrent and relevant issues and with it pertinent recommendations.

Dataset

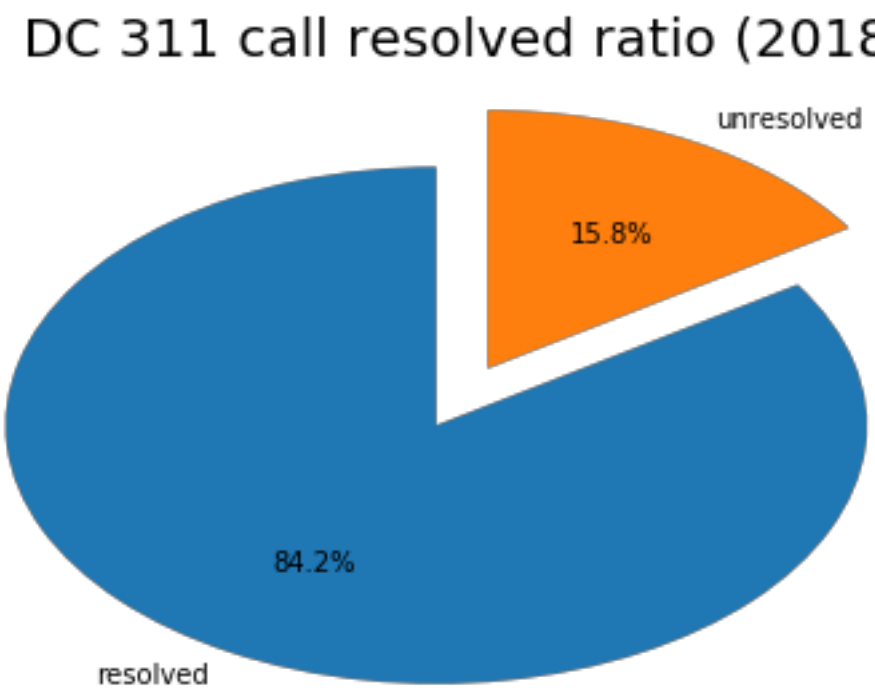
The dataset is filled up with daily observations, mainly categorical, for the entire year of requests. To obtain the desired results, it's important to arrange and clean the dataset in such a way that comparisons among variables are viable and plots can be deployed properly.

Unnecessary, redundant columns such as: `inspectionflag, inspectiondate, inspectorname` among others can be dropped to give priority to the more relevant ones. On the other hand, new columns can be created, such as `resolved,` to better represent the data where the status of the request can be expressed as binary values, and `turnover` where the delta time of `resolutiondate` and `adddate` can be sorted in hours.

Data Analysis

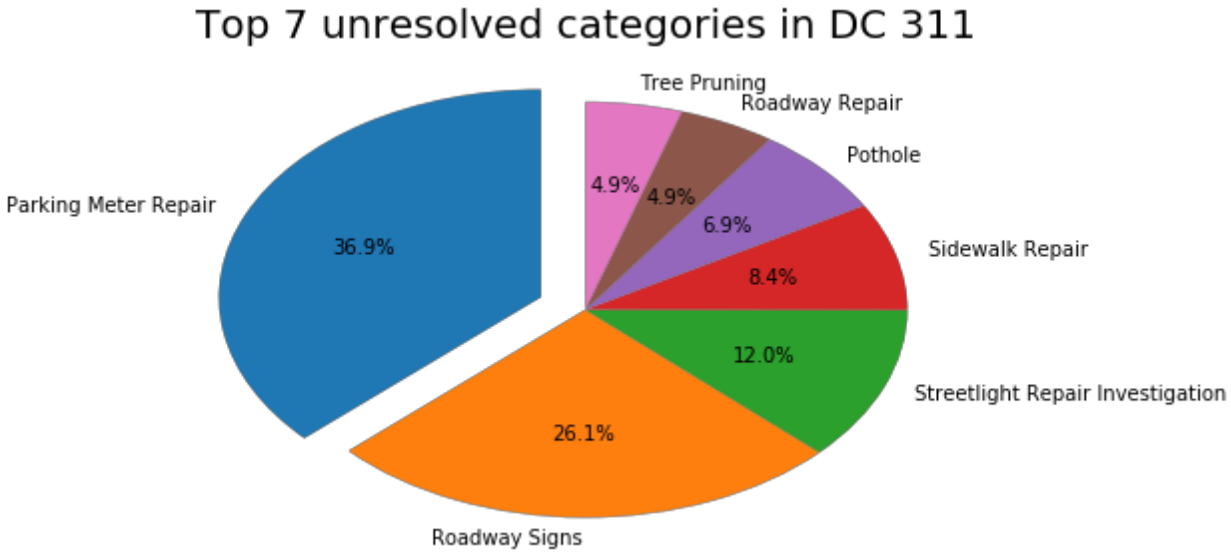
Resolved ratio

Out of the hundreds of thousands of recorded service requests in the past year, the city was capable of resolving 84.2% (280,474) of the requests, while only 15.8%(52,630) were left unresolved. At first sight, this ratio seems to be favorable for a city of this size, although to establish a real criteria, it could be compared to other cities of similar relevance and size, or contrasted with historical data.



Top 7 unresolved cases

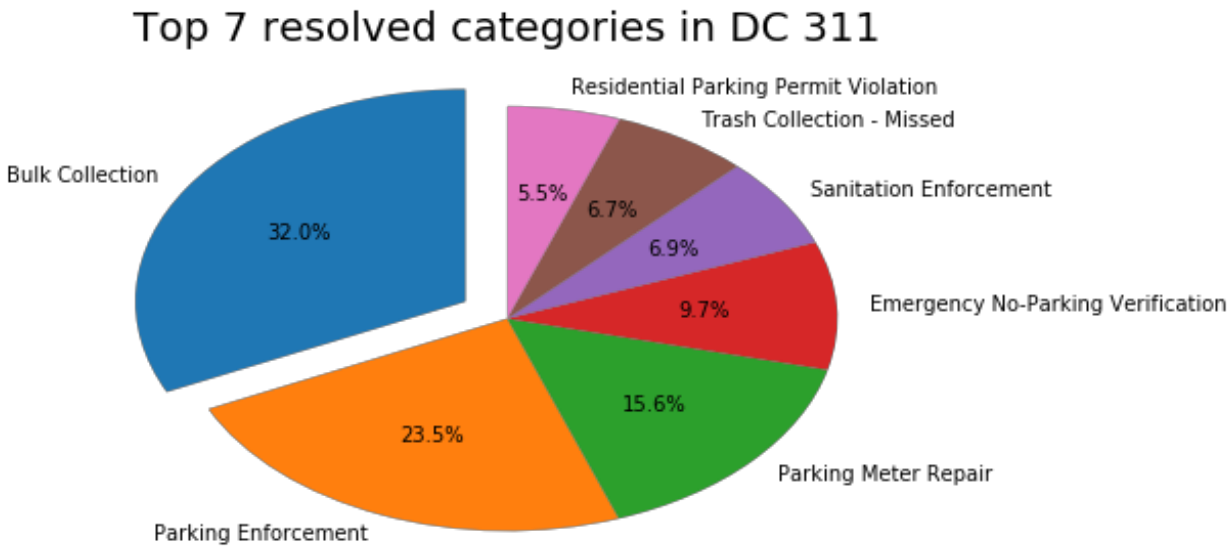
The top 7 unresolved categories are all infrastructure-wide requests with parking meter repair being the main one, followed by roadway signs, streetlight repair, sidewalk repair pothole, roadway repair, and tree pruning. This could be attributed to the nature of infrastructure issues, which are easy to spot and report, due to the inconveniences associated to the disrepair of them.



Top 7 resolved cases

When it comes to what the city is most determined to resolve, the top 7 is concentrated on sanitation and parking enforcement / infrastructure. Bulk collection is the leading resolved request followed by parking enforcement, parking meter repair, emergency no-parking verification, sanitation enforcement, trash collection - missed, and residential parking permit violation.

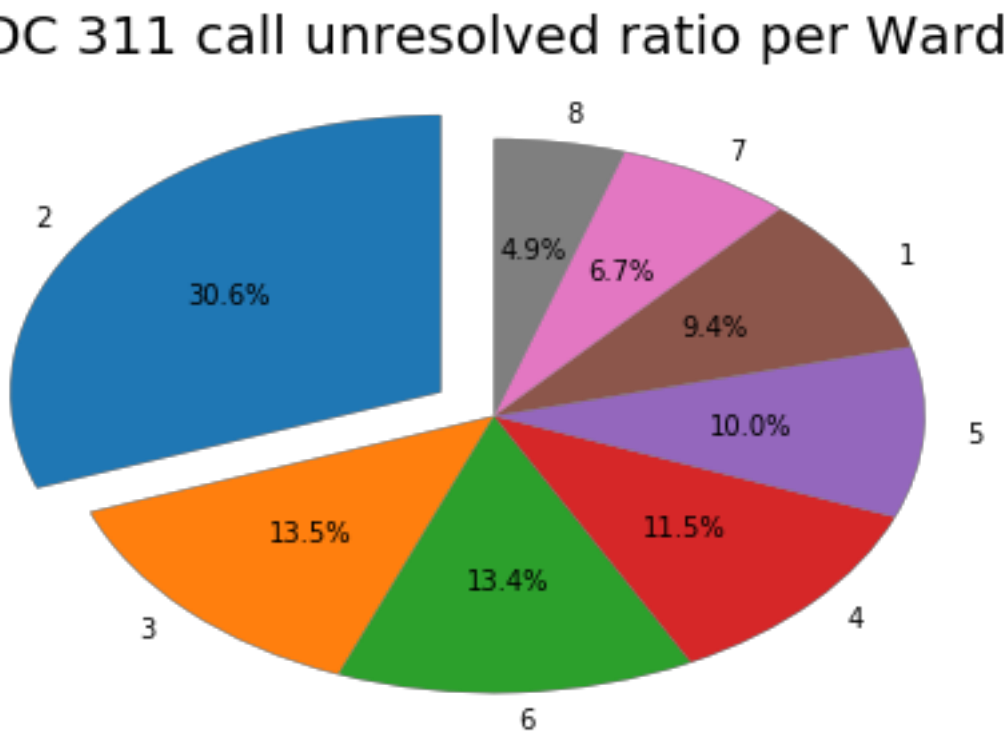
The focus on sanitation could be due to the recent improvement on top of the lessons learned from the mismanagement on this area in the past. While the focus on parking could be primarily motivated to the revenue generated by parking enforcement justifying the investment on infrastructure on this area.



Unresolved ratio by Ward

To better understand why categories like parking meter repair are among the top ones, it's useful to put it on geographical context. When comparing the unresolved ratio by categories and ward side by side, correlations start to emerge. For instance Ward 1, which includes Downtown D.C and The National Mall is the top ward with unresolved issues, This Ward has the highest density of parking meters, corresponding with the top unresolved category.

It is also noticeable how Ward 8 characterized by low income and high crime demographics represents the Ward with the least unresolved requests. This could lead to the idea of the city dedicating more resources to this Ward, but taking into account the conditions of that Ward, one can assume that many incidents there go unreported.

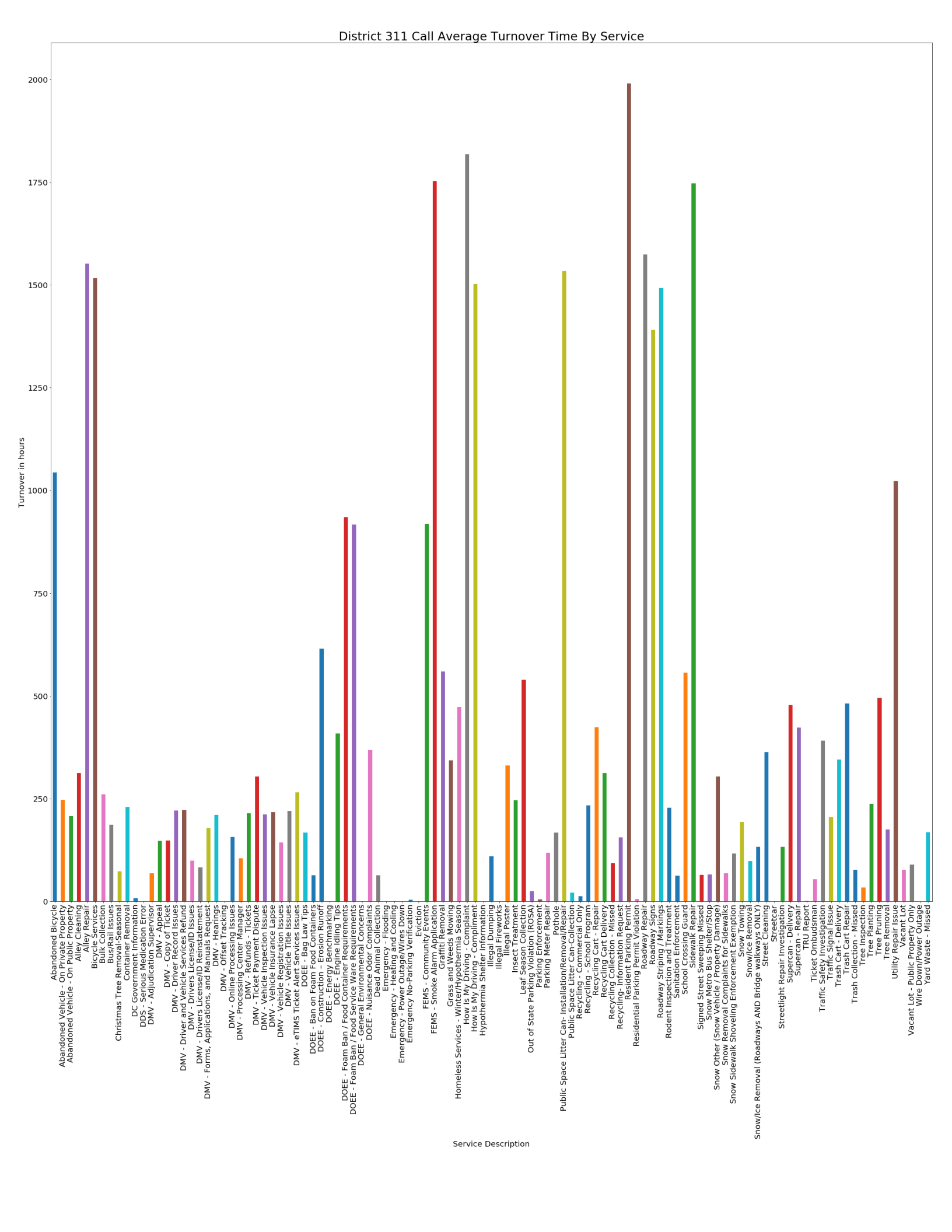


Average turnover in hours by service

To grasp the effectiveness of the District in dealing with these requests, it is worth examining all requests in terms of average time spent on achieving the resolution of the requests. The top service request with the longest average turnover is resident parking permits, which is aligned with the top unresolved topic so far: parking.

The second top issue with the longest average turnover time are “how is my driving” - complaints, which contrasts with the ninth top issue being how is “my driving” - compliments. Therefore, this request for either complaint or compliment takes, on average, an odd amouth of time to be resolved. Maybe the system in place to deal with either case is not very efficient.

The rest of the top ten is split among services and infrastructure related issues, in the following order: FEMS - smoke alarm application, sidewalk repair, alley repair, bicycle services, roadway repair, public space litter can - installation/removal/ repair, and lastly, roadway striping markings.


District 311 Call Average Turnover Time By Service
Turnover in hours
0
250
500
750
1000
1250
1500
1750
2000
Service Description
Abandoned Bicycle
Abandoned Vehicle - On Private Property
Abandoned Vehicle - On Public Property
Alley Cleaning
Alley Repair
Bicycle Services
Bulk Collection
Bus/Rail Issues
Christmas Tree Removal-Seasonal
Container Removal
DC Government Information
DDS - Serious Medication Error
DMV - Adjudication Supervisor
DMV - Appeal
DMV - Copy of Ticket
DMV - Driver Record Issues
DMV - Driver and Vehicle Services Refund
DMV - Drivers License/ID Issues
DMV - Drivers License/ID Reinstatement
DMV - Forms, Applications, and Manuals Request
DMV - Hearings
DMV - Offset Tracking
DMV - Online Processing Issues
DMV - Processing Center Manager
DMV - Refunds - Tickets
DMV - Ticket Payment Dispute
DMV - Vehicle Inspection Issues
DMV - Vehicle Insurance Lapse
DMV - Vehicle Registration Issues
DMV - eTIMS Ticket Alert Services Issues
DOEE - Bag Law Tips
DOEE - Ban on Foam Food Containers
DOEE - Construction – Erosion Runoff
DOEE - Energy Benchmarking
DOEE - Engine Idling Tips
DOEE - Foam Ban / Food Container Requirements
DOEE - Foam Ban / Food Service Ware Requirements
DOEE - General Environmental Concerns
DOEE - Nuisance Odor Complaints
Dead Animal Collection
Emergency - Flooding
Emergency - Heating and Cooling
Emergency - Power Outage/Wires Down
Emergency No-Parking Verification
Eviction
FEMS - Community Events
FEMS - Smoke Alarm Application
Graffiti Removal
Grass and Weeds Mowing
Homeless Services - Winter/Hypothermia Season
How Is My Driving - Compliment
How Is My Driving - Complaint
Hypothermia Shelter Information
Illegal Dumping
Illegal Fireworks
Illegal Poster
Insect Treatment
Leaf Season Collection
Out of State Parking Violation (ROSA)
Parking Enforcement
Parking Meter Repair
Pothole
Public Space Litter Can- Installation/Removal/Repair
Public Space Litter Can-Collection
Recycling - Commercial Only
Recycling - Cart - Repair
Recycling Cart - Delivery
Recycling Collection - Missed
Recycling- Information Request
Resident Parking Permit
Residential Parking Permit Violation
Roadway Repair
Roadway Signs
Roadway Striping / Markings
Rodent Inspection and Treatment
Sanitation Enforcement
School Crossing Guard
Sidewalk Repair
Signed Street Sweeping Missed
Snow Metro Bus Shelter/Stop
Snow Other (Snow Vehicle / Property Damage)
Snow Removal Complaints for Sidewalks
Snow Sidewalk Shoveling Enforcement Exemption
Snow Towing
Snow/Ice Removal
Snow/Ice Removal (Roadways AND Bridge walkways ONLY)
Street Cleaning
Streetcar
Streetlight Repair Investigation
Supercan - Delivery
Supercan - Repair
TRU Report
Ticket Ombudsman
Traffic Safety Investigation
Traffic Signal Issue
Trash Cart - Delivery
Trash Cart Repair
Trash Collection - Missed
Tree Inspection
Tree Planting
Tree Pruning
Tree Removal
Utility Repair Issue
Vacant Lot
Vacant Lot - Public Property Only
Wire Down/Power Outage
Yard Waste - Missed

Results

It is clear at this point that the District has some serious parking related issues to be resolved. When it comes to infrastructure, theres is a lot of room for improvement, but to some extent, it seems quite ordinary that these issues take time to be resolved in comparison to parking related issues, which seem to be a bit out of control.

Recommendations

The findings recommend a continued focus on the quick resolution of service requests to lower those average turnover times.

Deploy more resources to the agencies in charge of maintaining in place the parking infrastructure to solve the ongoing parking issues.

Preventive maintenance of alleys, sidewalks, and roadways, among other key infrastructures, could reduce the need for constant requests for repair among users.