

311 Exploratory Analysis

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11/21/2019

Setup

Pathways

```
project_dir <- here::here()
data_city <- params$city
data_name <- paste0(data_city, "_data_census")
```

Parameters

```
write_my_files <- params$write # If you'd like to write out a .shp and .tsv file, use "yes", otherwise
```

Sourcing and Libraries

Checks

Potential duplicates. These are only addressed if it is believed they would present a significant issue in analysis.

```
# Check for apparent duplicates and address if there is a problem
data_calls %>%
  group_by(address, req_dt, updt_dt, topic) %>%
  count(sort = TRUE) %>%
  filter(n > 1) %>%
  knitr::kable()
```

```
## Warning: Factor `address` contains implicit NA, consider using
## `forcats::fct_explicit_na`
```

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```

```
## Warning: Factor `address` contains implicit NA, consider using
## `forcats::fct_explicit_na`
```

| address | req_dt | updt_dt | topic | n |
|---------------------|---------------------|---------------------|---------------------------------|---|
| 2647 W Potomac Ave | 2018-07-06 19:13:48 | 2019-04-02 12:55:49 | abandoned bike/vehicle | 3 |
| 4858 N Winthrop Ave | 2018-09-10 13:35:19 | 2019-04-02 12:41:46 | abandoned bike/vehicle | 3 |
| 5801 N Pulaski Rd | 2019-11-06 15:44:05 | 2019-11-06 15:44:24 | graffiti | 3 |
| 1129 N Hamlin Ave | 2019-10-31 08:55:47 | 2019-11-21 21:10:49 | building concern/code violation | 2 |
| 1236 N Paulina St | 2018-09-11 08:01:49 | 2019-04-02 12:38:45 | abandoned bike/vehicle | 2 |
| 1415 W Polk St | 2018-08-30 08:32:30 | 2019-04-02 14:29:08 | abandoned bike/vehicle | 2 |

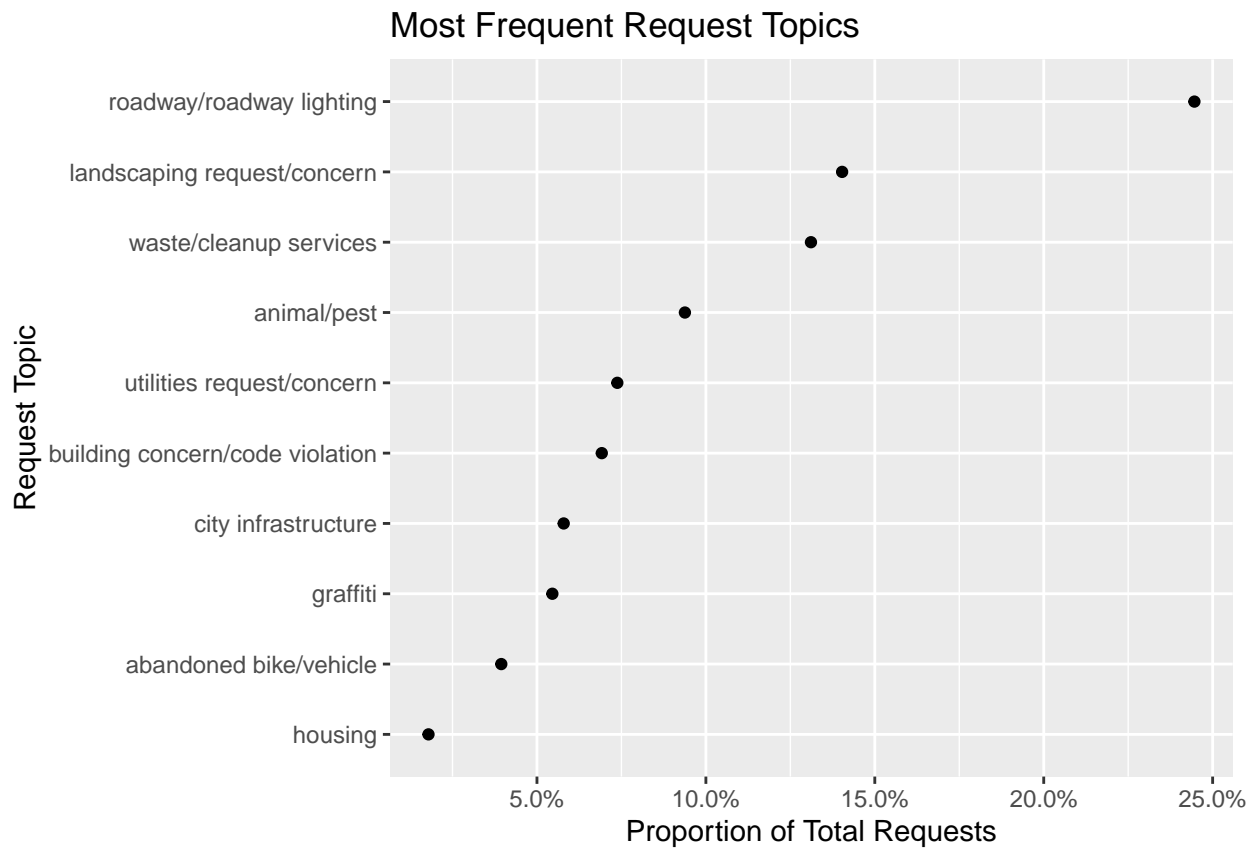
| address | req_dt | updt_dt | topic | n |
|------------------------|---------------------|---------------------|-----------------------------|---|
| 1420 S Kenneth Ave | 2018-09-11 07:59:31 | 2019-04-02 13:57:36 | abandoned bike/vehicle | 2 |
| 1508 W Chestnut St | 2018-07-20 11:55:52 | 2019-04-02 09:56:24 | abandoned bike/vehicle | 2 |
| 1526 N Wicker Park Ave | 2018-09-06 03:32:40 | 2019-04-02 12:52:20 | abandoned bike/vehicle | 2 |
| 1632 N Leavitt St | 2018-08-07 09:11:05 | 2019-04-02 12:52:26 | abandoned bike/vehicle | 2 |
| 1634 W Roscoe St | 2019-11-06 15:44:05 | 2019-11-06 15:44:24 | graffiti | 2 |
| 1869 N Halsted St | 2019-11-12 10:55:08 | 2019-11-12 10:55:25 | graffiti | 2 |
| 2002 S Wentworth Ave | 2019-09-25 12:03:06 | 2019-09-25 12:03:51 | graffiti | 2 |
| 2358 N Lincoln Park W | 2019-03-11 14:23:54 | 2019-04-19 14:32:27 | roadway/roadway lighting | 2 |
| 2399 W 49 Th St | 2018-07-06 10:05:23 | 2019-04-10 21:07:39 | graffiti | 2 |
| 2410 E 72 Nd St | 2018-08-28 10:48:41 | 2019-04-02 09:56:22 | abandoned bike/vehicle | 2 |
| 2539 N California Ave | 2018-09-11 08:05:16 | 2019-04-02 13:56:43 | roadway/roadway lighting | 2 |
| 2544 W Superior St | 2018-10-02 12:26:03 | 2019-04-02 13:59:10 | abandoned bike/vehicle | 2 |
| 2642 N Washtenaw Ave | 2018-09-25 10:48:09 | 2019-04-02 12:04:00 | abandoned bike/vehicle | 2 |
| 2652 N Clark St | 2019-07-11 11:30:44 | 2019-07-11 11:31:17 | graffiti | 2 |
| 2655 W 72 Nd St | 2018-07-04 18:11:31 | 2019-04-19 13:56:22 | abandoned bike/vehicle | 2 |
| 2659 N Clark St | 2019-07-11 11:30:44 | 2019-07-11 11:31:17 | graffiti | 2 |
| 2665 N Clark St | 2019-07-11 11:30:44 | 2019-07-11 11:31:17 | graffiti | 2 |
| 3036 W 19 Th St | 2018-10-02 10:49:12 | 2019-04-02 13:59:10 | abandoned bike/vehicle | 2 |
| 320 W Ohio St | 2018-07-20 08:01:59 | 2019-04-02 14:18:49 | abandoned bike/vehicle | 2 |
| 3200 N Kedzie Ave | 2019-06-12 09:39:48 | 2019-06-12 15:59:16 | graffiti | 2 |
| 335 W Wellington Ave | 2018-08-28 11:06:27 | 2019-04-17 13:12:22 | abandoned bike/vehicle | 2 |
| 3408 N Marshfield Ave | 2019-11-06 15:44:05 | 2019-11-06 15:44:24 | graffiti | 2 |
| 3442 S Prairie Ave | 2019-09-25 17:07:56 | 2019-11-12 09:22:22 | roadway/roadway lighting | 2 |
| 3442 S Prairie Ave | 2019-09-25 17:10:13 | 2019-11-12 09:22:22 | roadway/roadway lighting | 2 |
| 3557 N Karlov Ave | 2018-09-19 08:49:59 | 2019-04-10 21:33:05 | abandoned bike/vehicle | 2 |
| 3614 W 26 Th St | 2019-06-13 11:05:24 | 2019-06-13 12:36:21 | graffiti | 2 |
| 4552 S Evans Ave | 2019-07-17 07:29:26 | 2019-07-17 07:29:45 | landscaping request/concern | 2 |
| 4807 S Archer Ave | 2018-09-05 11:34:42 | 2019-04-19 13:50:11 | abandoned bike/vehicle | 2 |
| 4855 S Lawler Ave | 2018-08-27 06:30:02 | 2019-04-02 11:58:14 | information request | 2 |
| 4901 W Ohio St | 2019-09-03 13:40:20 | 2019-09-03 13:40:28 | landscaping request/concern | 2 |
| 4940 W Ferdinand St | 2019-09-03 13:40:20 | 2019-09-03 13:40:28 | landscaping request/concern | 2 |
| 5020 N Northwest Hwy | 2018-10-02 10:34:21 | 2019-04-02 14:22:28 | abandoned bike/vehicle | 2 |
| 5353 N Lincoln Ave | 2018-09-11 12:44:05 | 2019-04-02 13:55:00 | graffiti | 2 |
| 5359 S Central Ave | 2018-09-26 13:57:48 | 2019-04-02 13:16:30 | roadway/roadway lighting | 2 |
| 550 W Roscoe St | 2018-07-17 13:06:02 | 2019-04-02 09:56:27 | abandoned bike/vehicle | 2 |
| 558 W Taylor St | 2018-09-04 10:55:28 | 2019-04-02 12:44:20 | abandoned bike/vehicle | 2 |
| 6211 N Greenview Ave | 2019-04-16 19:00:57 | 2019-06-05 07:47:53 | roadway/roadway lighting | 2 |
| 6802 S Clyde Ave | 2018-08-09 10:53:44 | 2019-04-02 12:52:36 | abandoned bike/vehicle | 2 |
| 6928 S Winchester Ave | 2019-06-20 08:33:48 | 2019-06-20 08:33:53 | landscaping request/concern | 2 |
| 7021 S Winchester Ave | 2019-06-20 08:33:48 | 2019-06-20 08:33:53 | landscaping request/concern | 2 |
| 7032 S Campbell Ave | 2018-08-28 20:51:50 | 2019-04-02 14:04:54 | roadway/roadway lighting | 2 |
| 7421 S Colfax Ave | 2018-09-20 09:17:53 | 2019-04-02 14:03:48 | abandoned bike/vehicle | 2 |
| 7941 S Aberdeen St | 2019-11-11 04:00:10 | 2019-11-11 04:00:19 | landscaping request/concern | 2 |
| 811 W Montrose Ave | 2018-10-09 11:28:35 | 2019-04-02 11:56:40 | abandoned bike/vehicle | 2 |
| 837 N Leavitt St | 2018-08-31 11:24:03 | 2019-04-02 12:34:35 | abandoned bike/vehicle | 2 |
| 8646 W Foster Ave | 2018-08-14 06:55:39 | 2019-04-02 12:18:55 | abandoned bike/vehicle | 2 |
| 998 N Michigan Ave | 2018-10-01 14:02:01 | 2019-04-10 21:24:13 | abandoned bike/vehicle | 2 |

Analysis

Base Benchmark Analysis (Non-Geographic)

What is the distribution of call by topic?

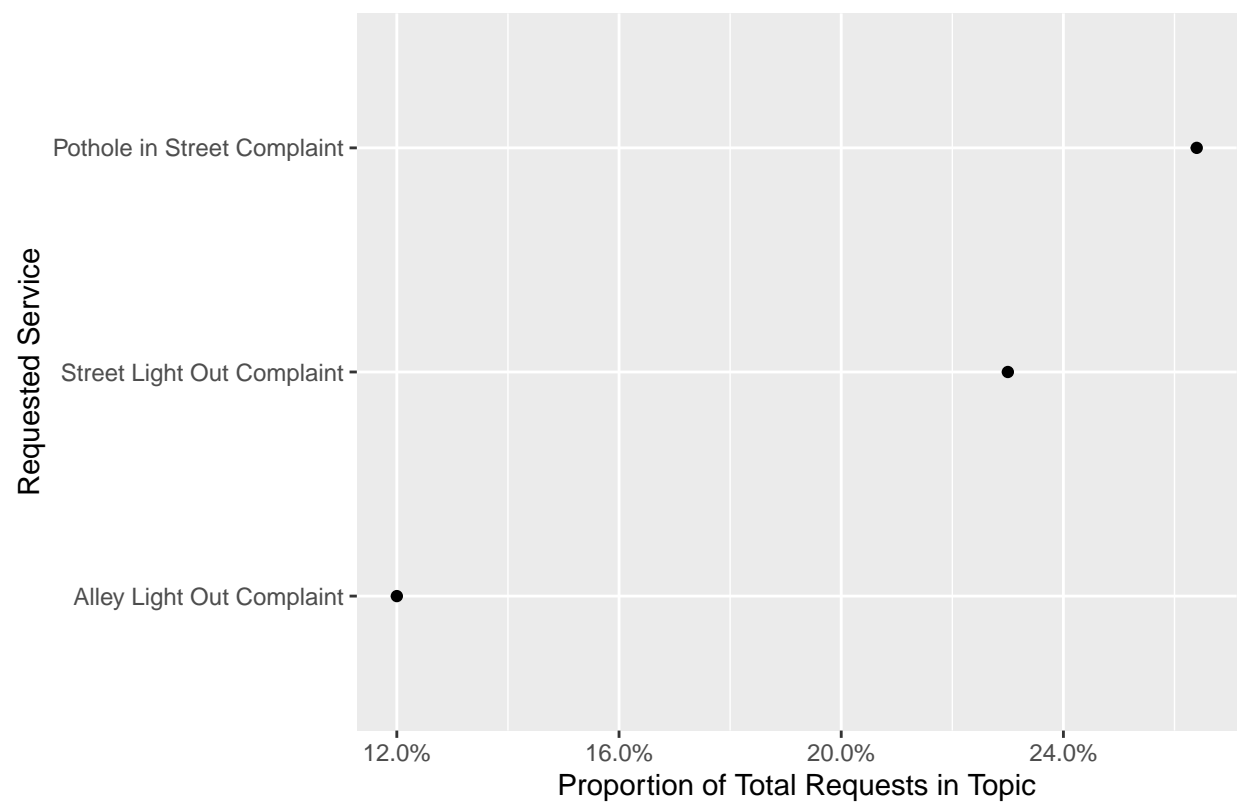
| topic | n | prop_total |
|---------------------------------|--------|------------|
| roadway/roadway lighting | 173942 | 0.245 |
| landscaping request/concern | 99785 | 0.140 |
| waste/cleanup services | 93232 | 0.131 |
| animal/pest | 66695 | 0.094 |
| utilities request/concern | 52470 | 0.074 |
| building concern/code violation | 49198 | 0.069 |
| city infrastructure | 41180 | 0.058 |
| graffiti | 38794 | 0.055 |
| abandoned bike/vehicle | 28044 | 0.039 |
| housing | 12720 | 0.018 |
| information request | 10023 | 0.014 |
| business | 8527 | 0.012 |
| blocked passage | 8345 | 0.012 |
| construction | 7545 | 0.011 |
| abandoned building | 6190 | 0.009 |
| taxi/ride-sharing | 6070 | 0.009 |
| health concern/public safety | 5122 | 0.007 |
| other/miscellaneous | 1916 | 0.003 |
| noise | 958 | 0.001 |
| city feedback | 354 | 0.000 |



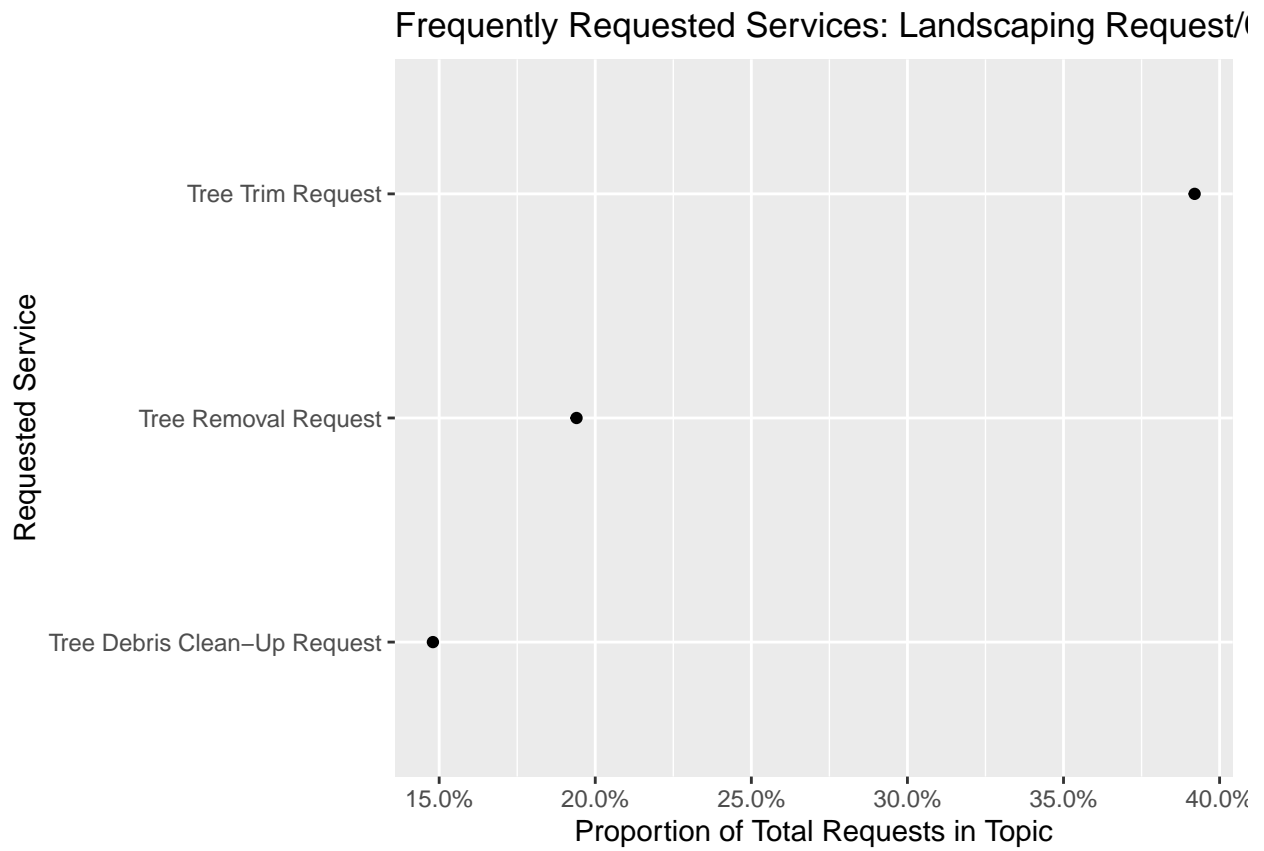
Within each topic, what are the most frequent services requested?

```
## [[1]]
```

Frequently Requested Services: Roadway/Roadway Lighti

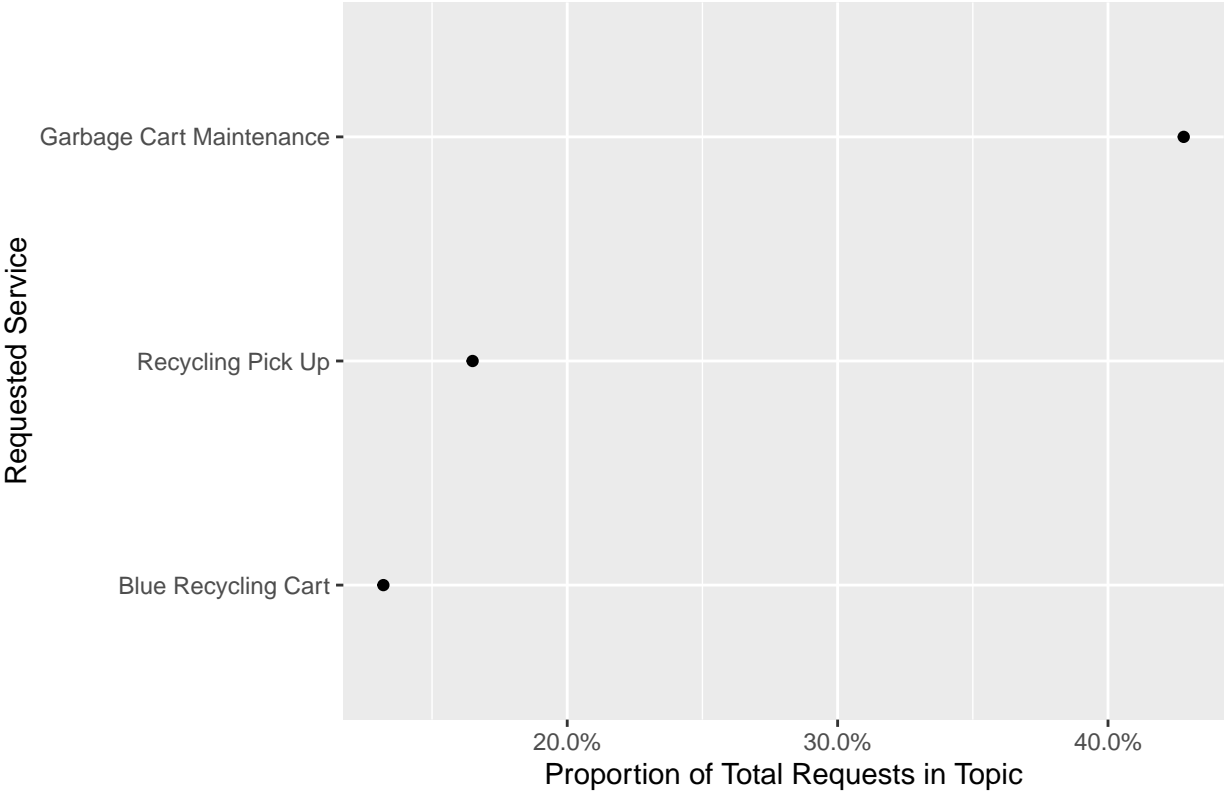


[[2]]



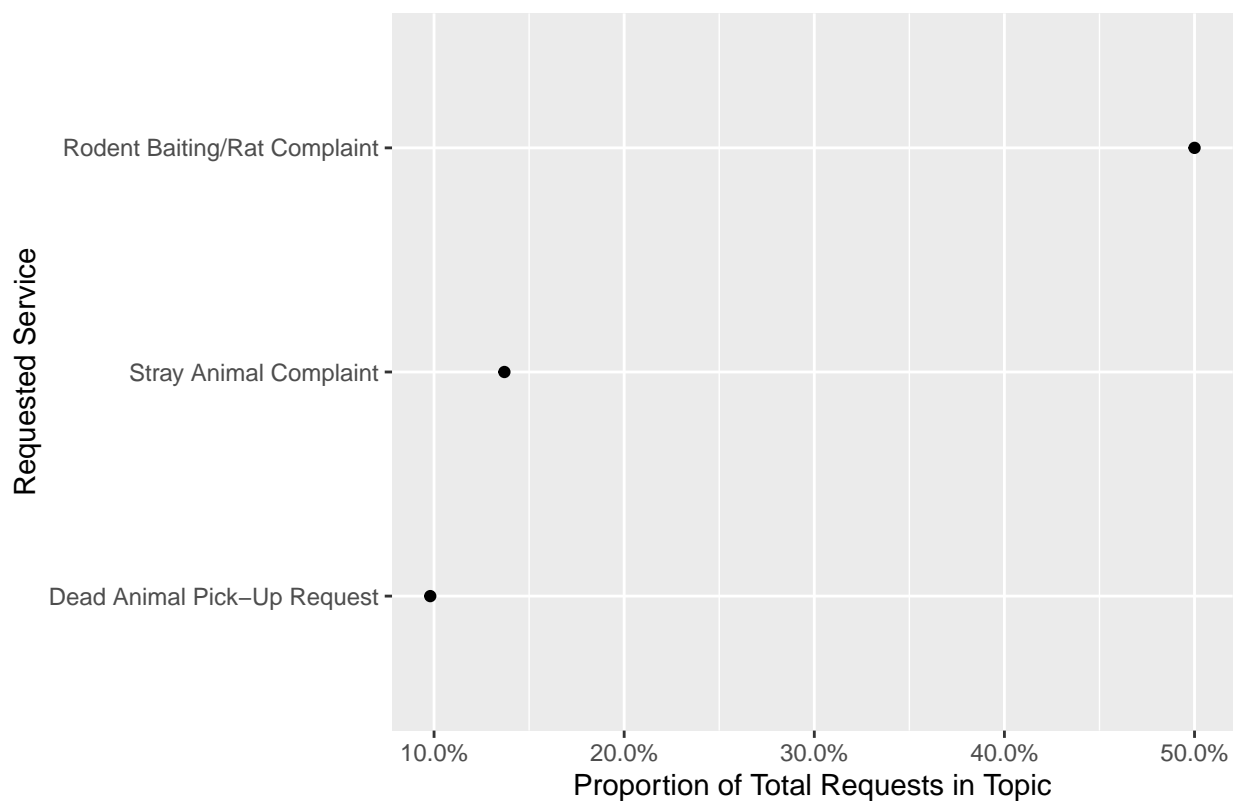
[[3]]

Frequently Requested Services: Waste/Cleanup Services



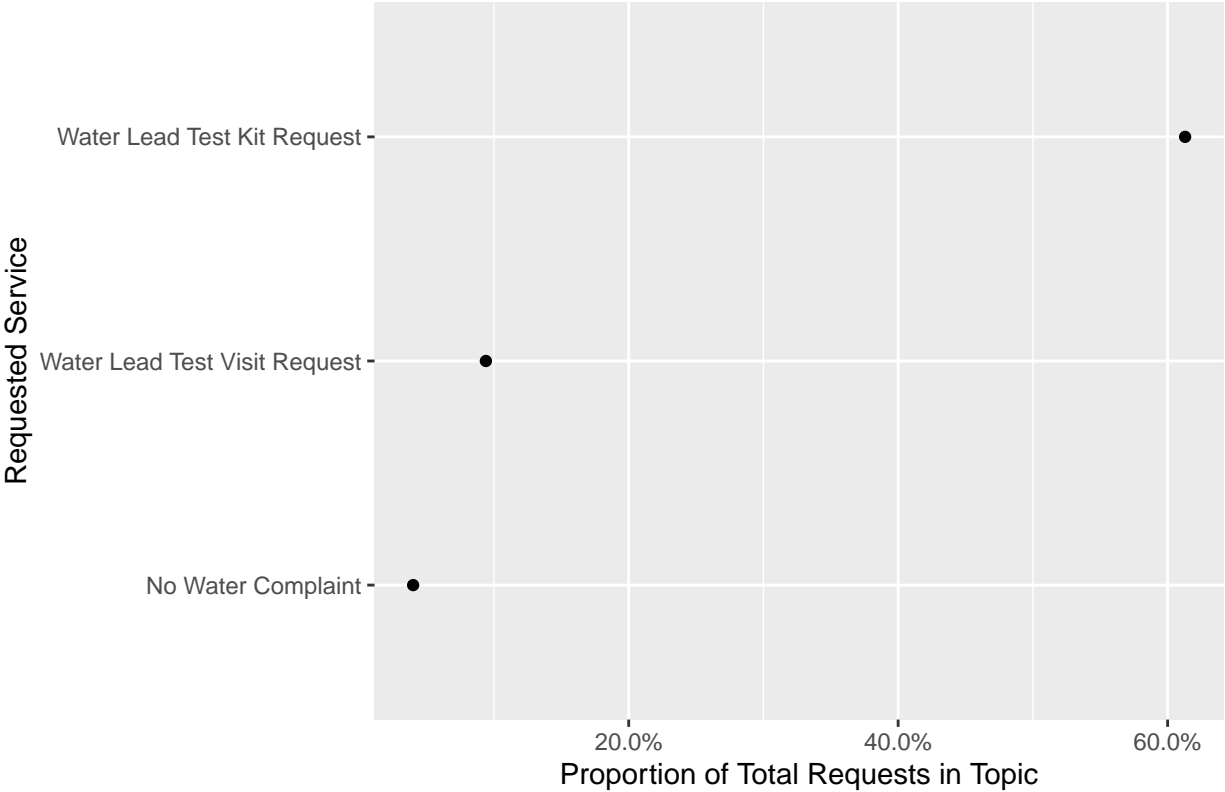
[[4]]

Frequently Requested Services: Animal/Pest

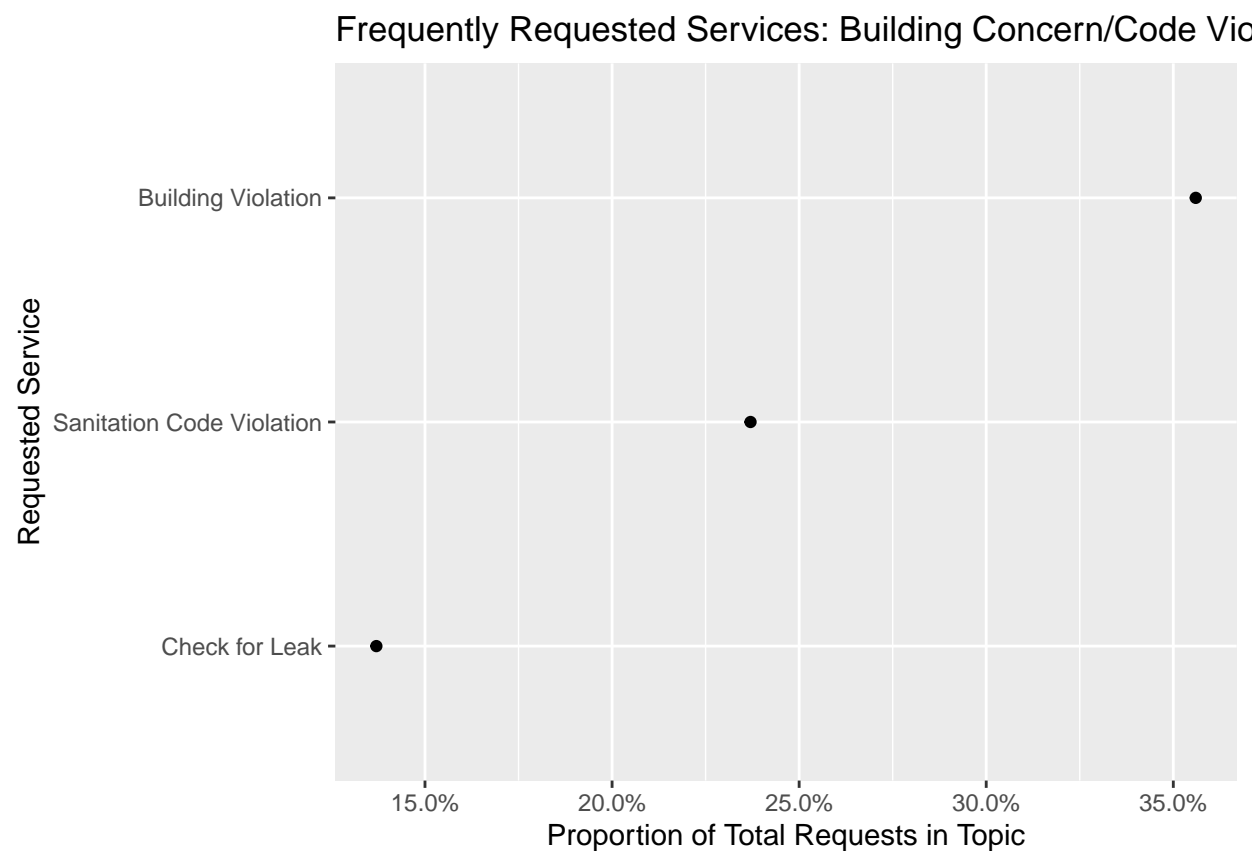


[[5]]

Frequently Requested Services: Utilities Request/Conce

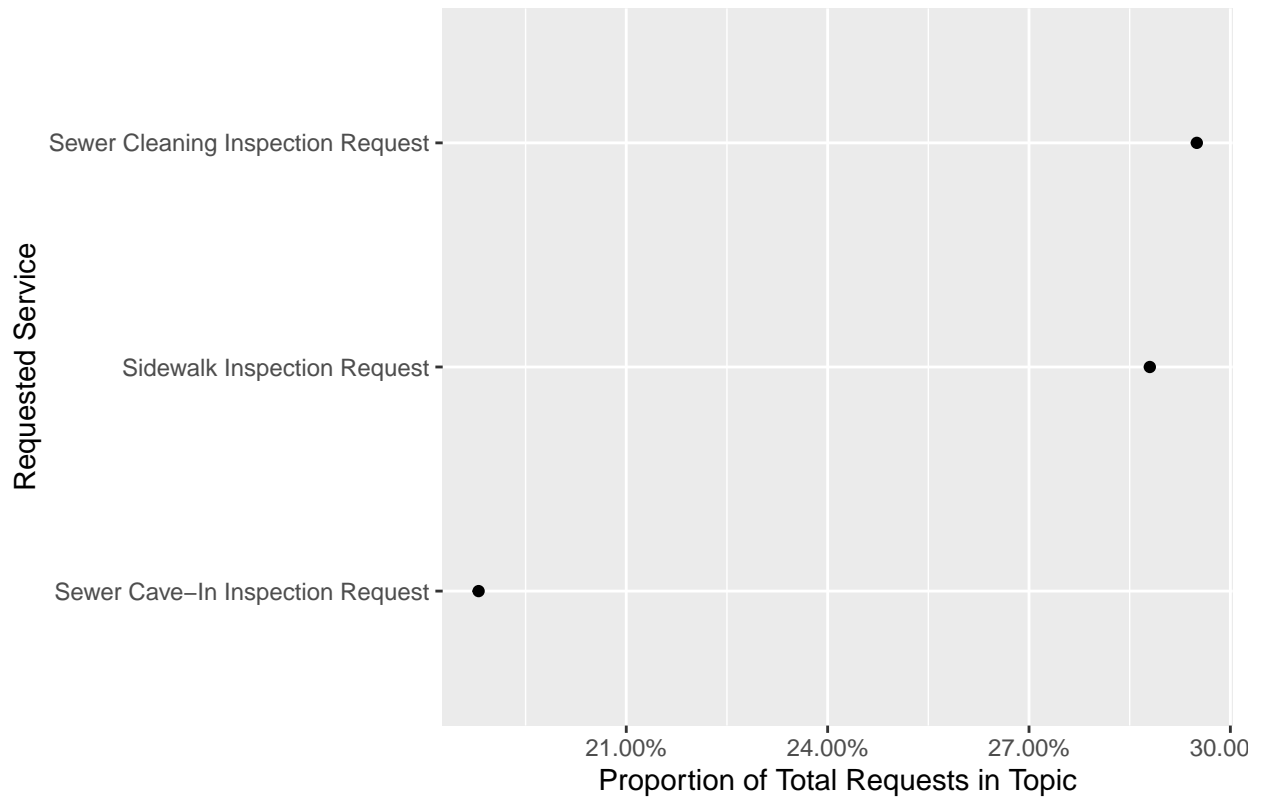


[[6]]



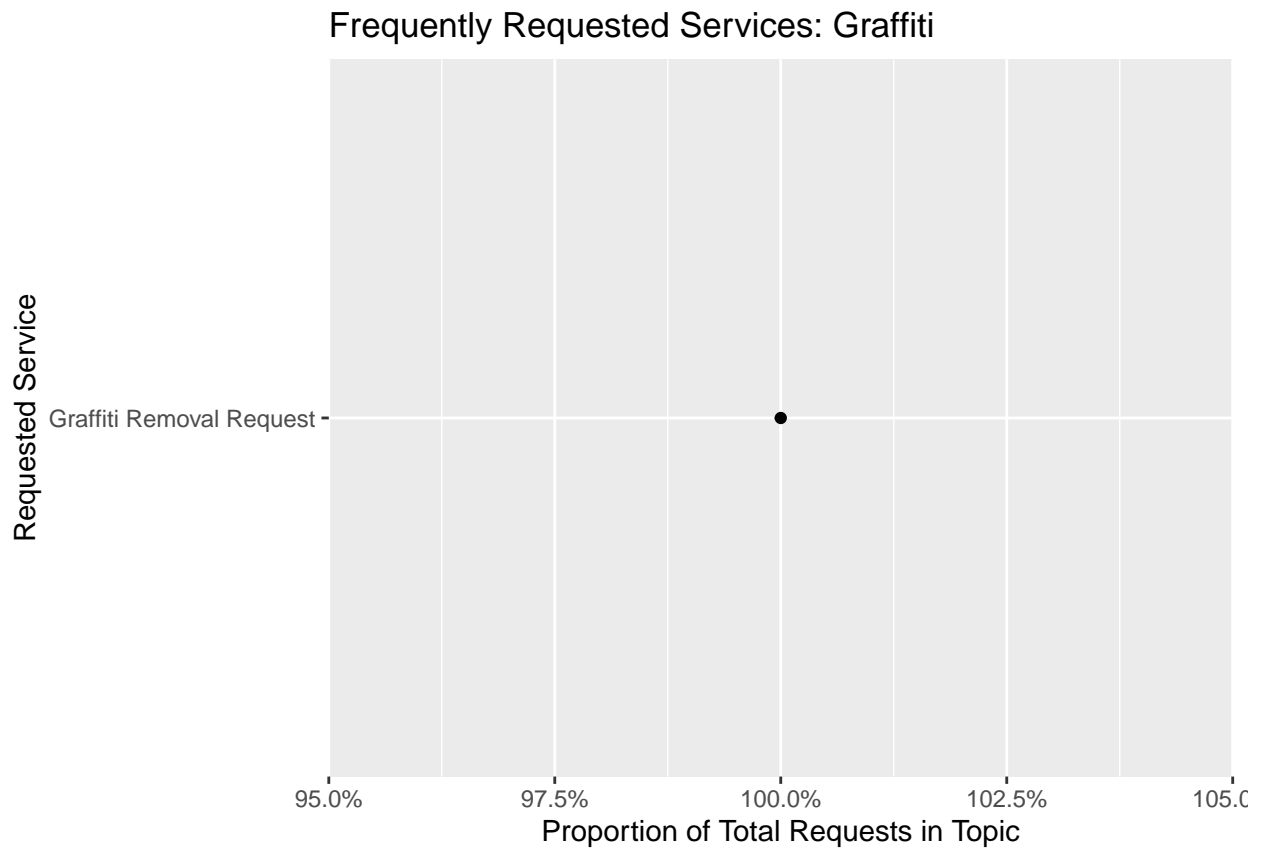
[[7]]

Frequently Requested Services: City Infrastructure

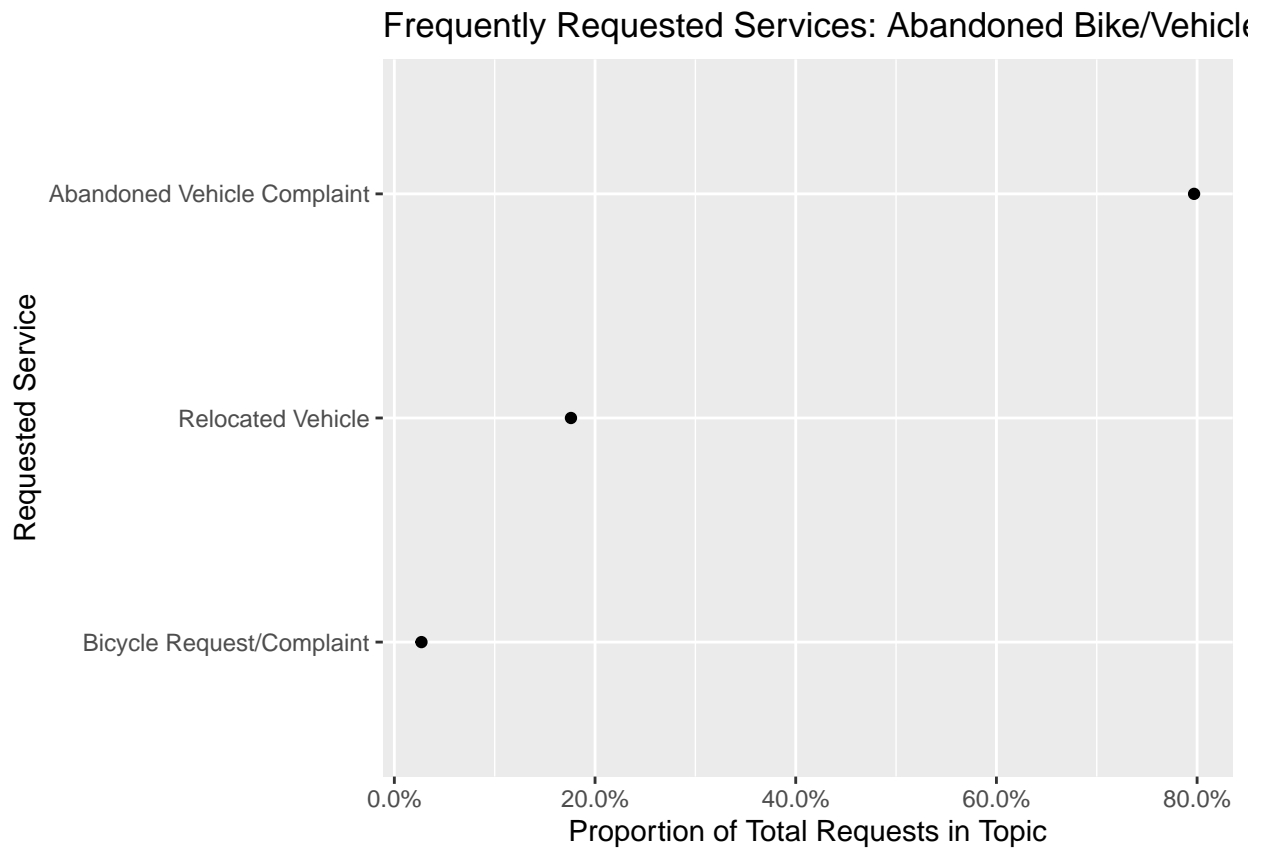


##

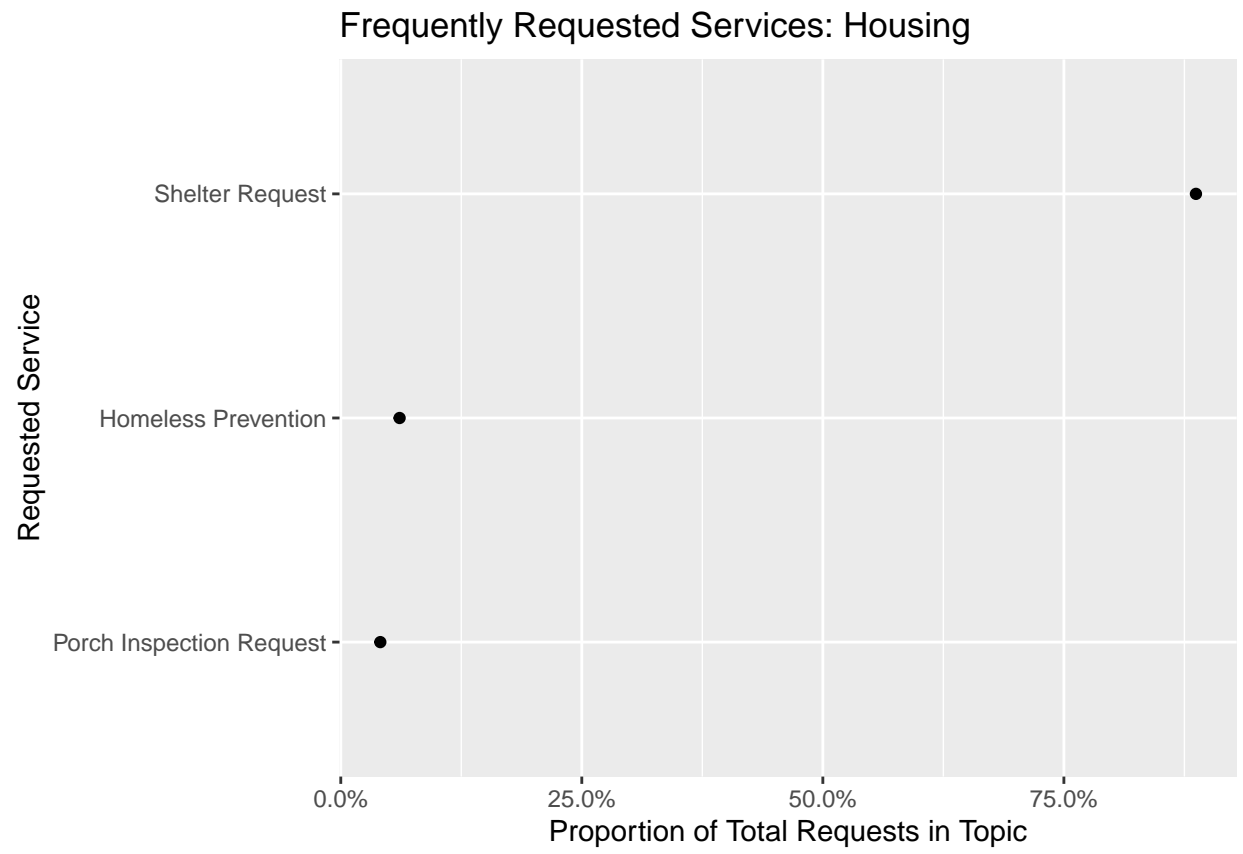
[[8]]



[[9]]

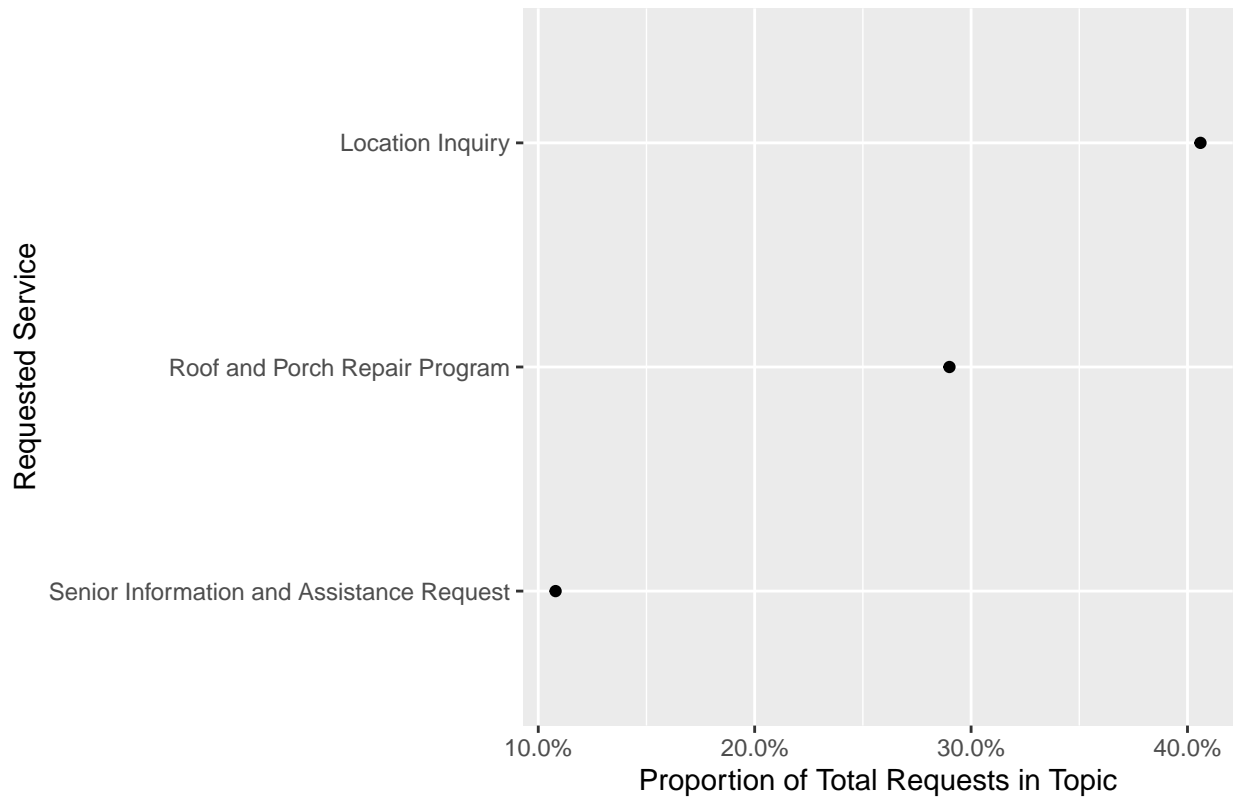


```
##  
## [[10]]
```



```
##  
## [[11]]
```

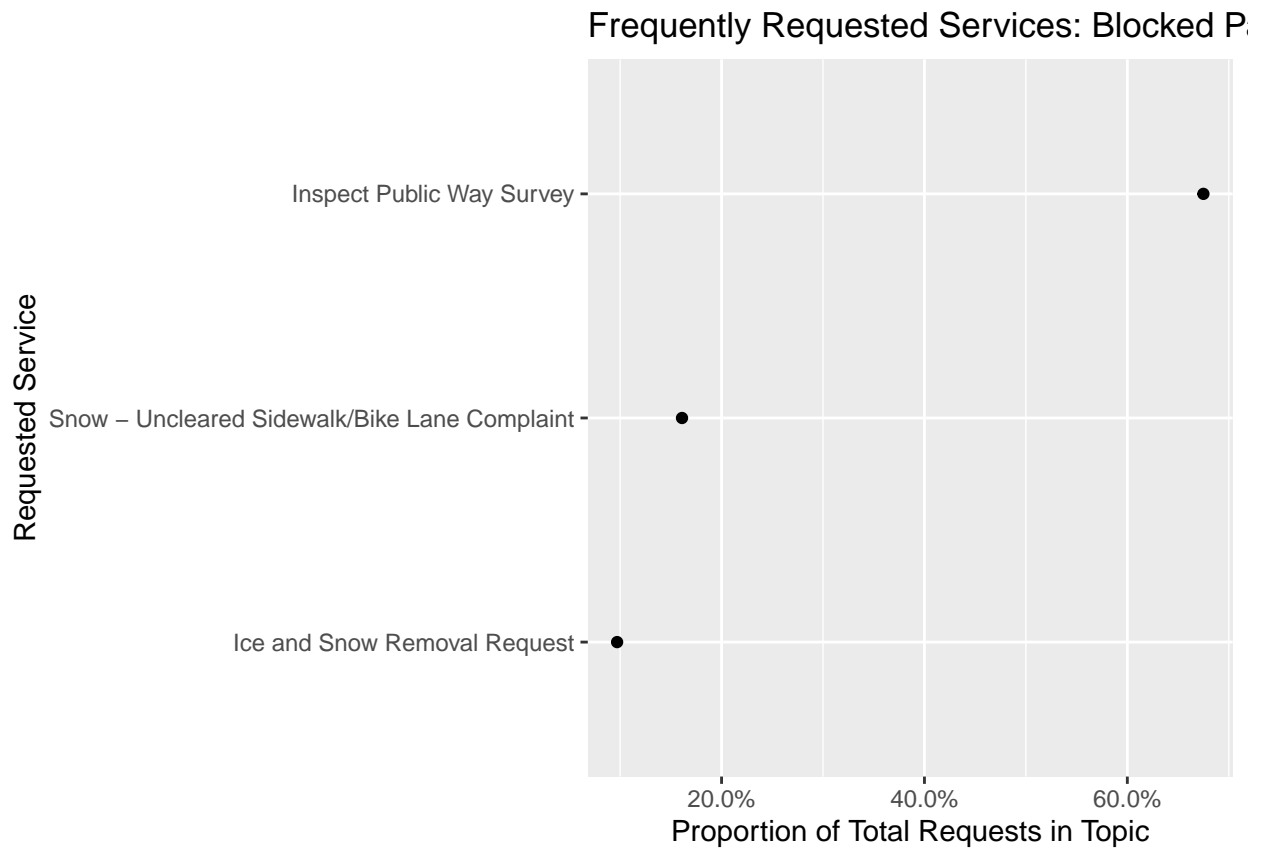
Frequently Requested Services: Information Re



[[12]]



[[13]]

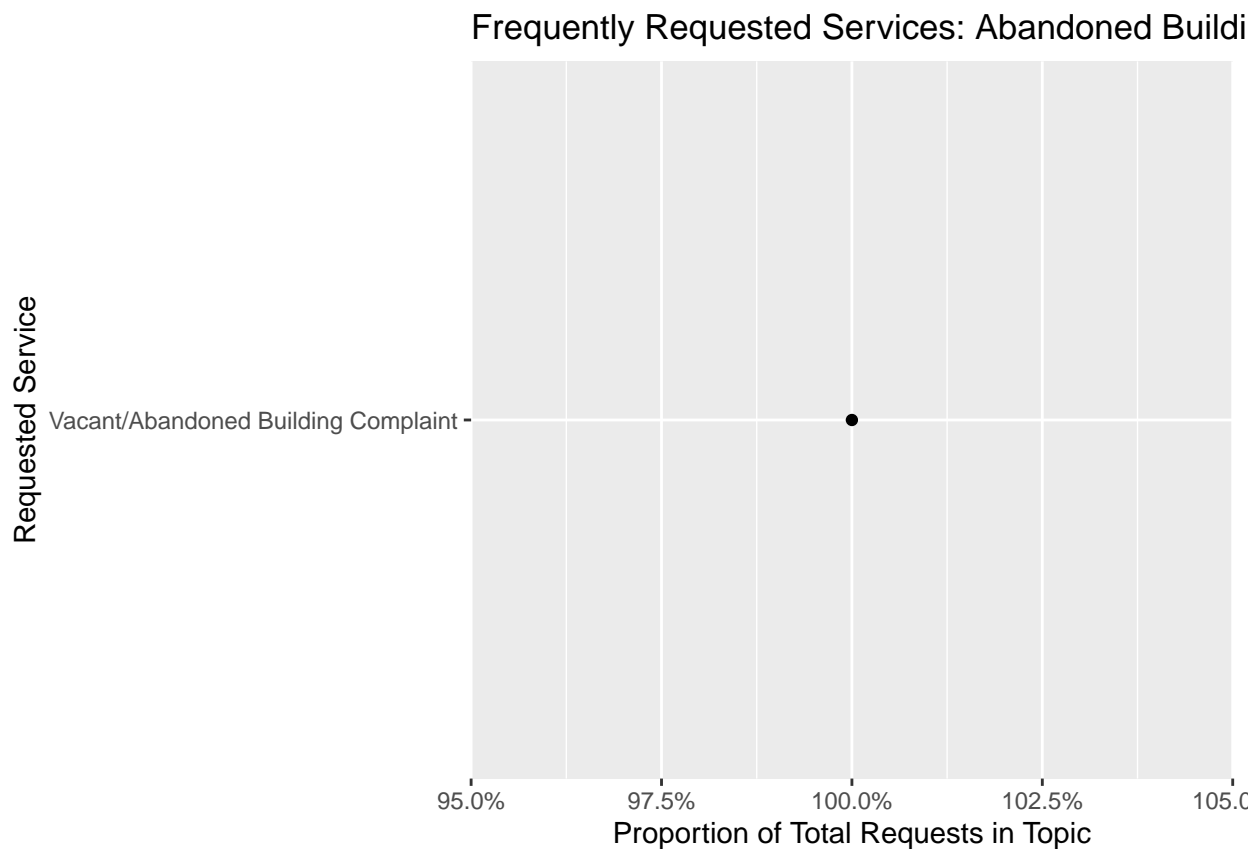


[[14]]

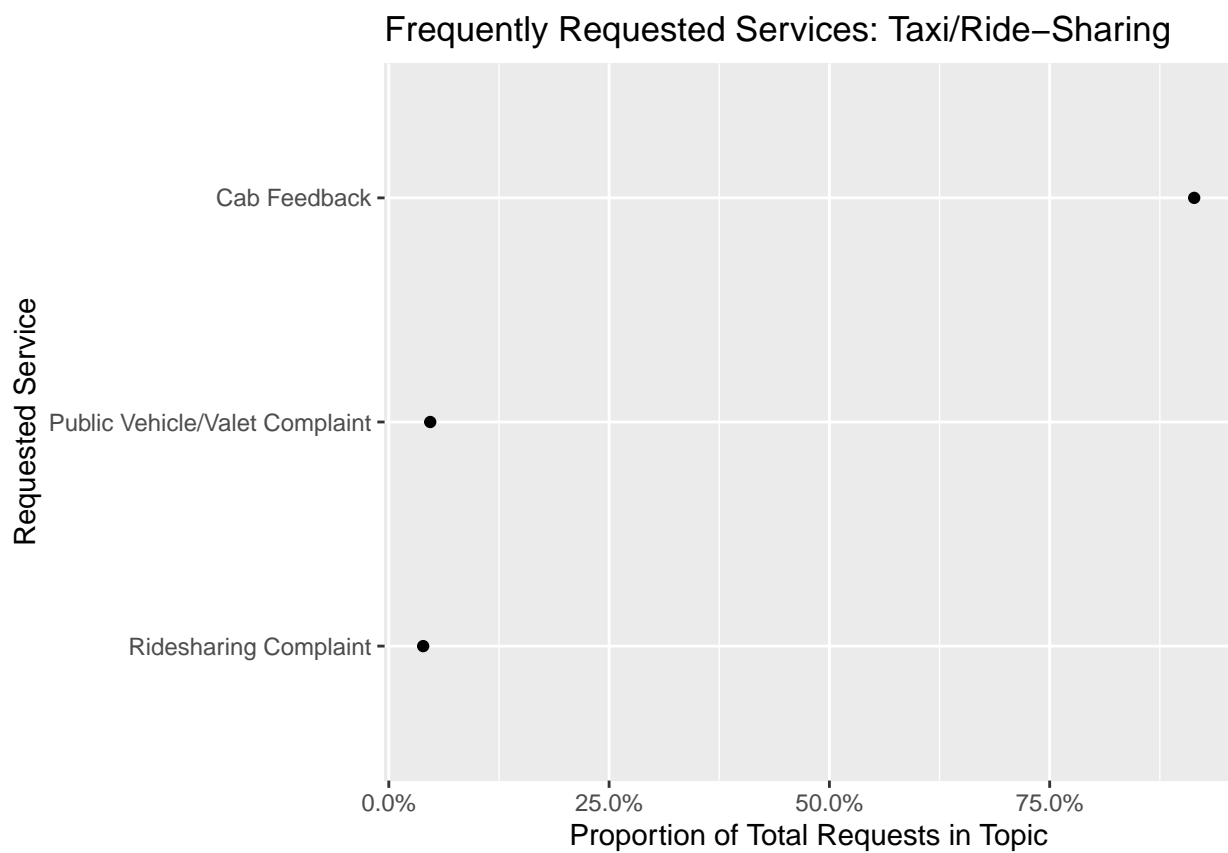
Frequently Requested Services: Construction



[[15]]

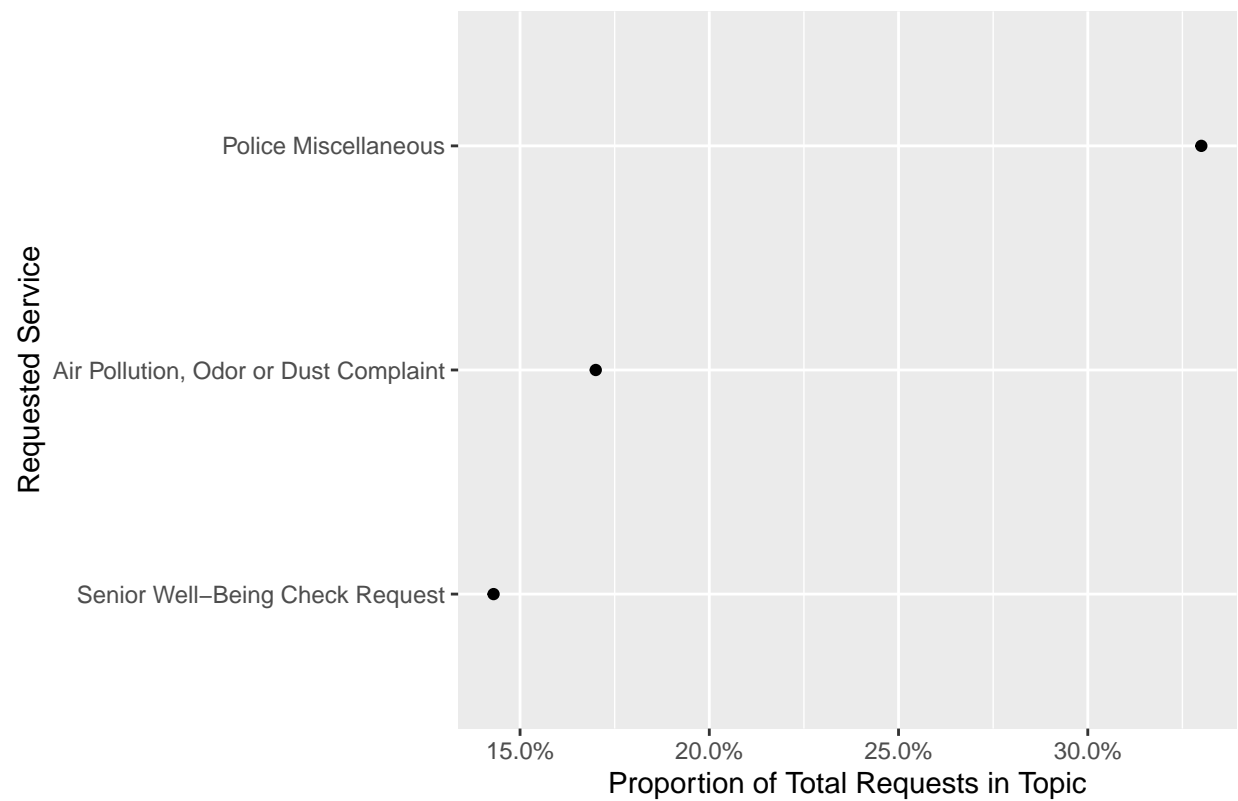


[[16]]



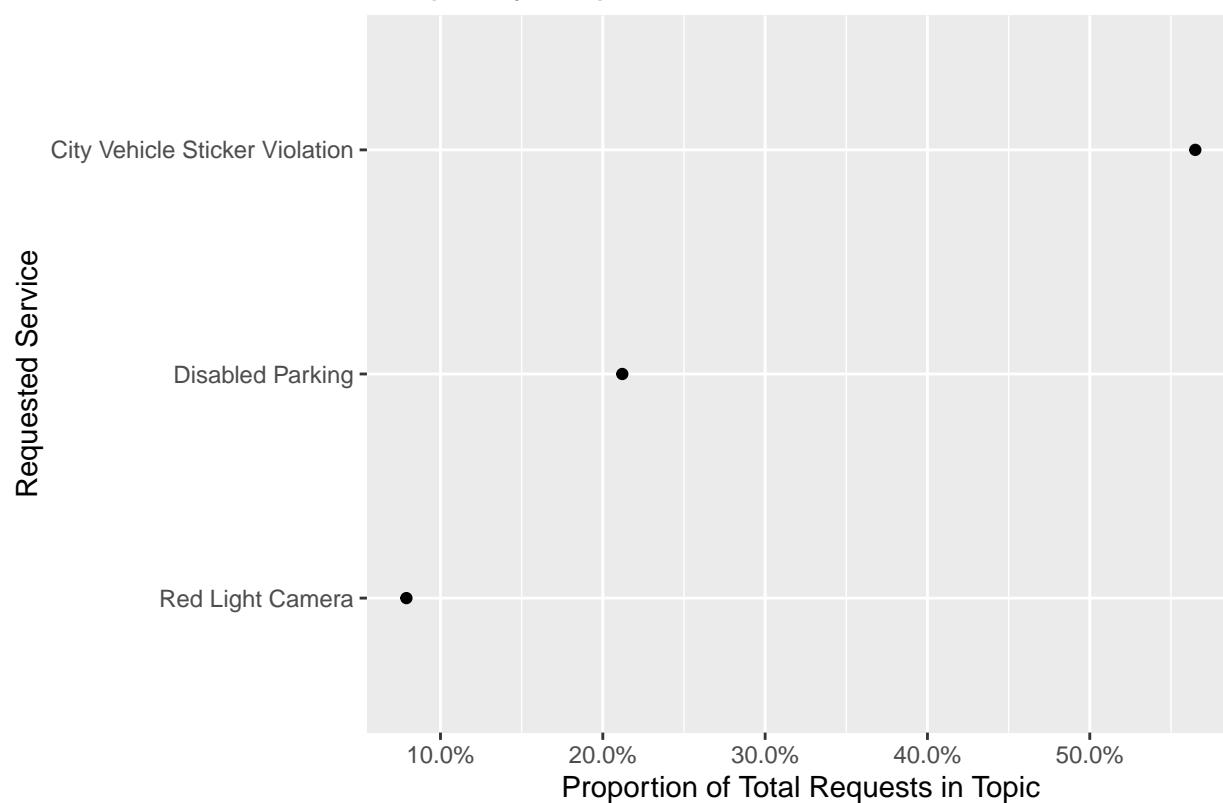
[[17]]

Frequently Requested Services: Health Concern/Pu



[[18]]

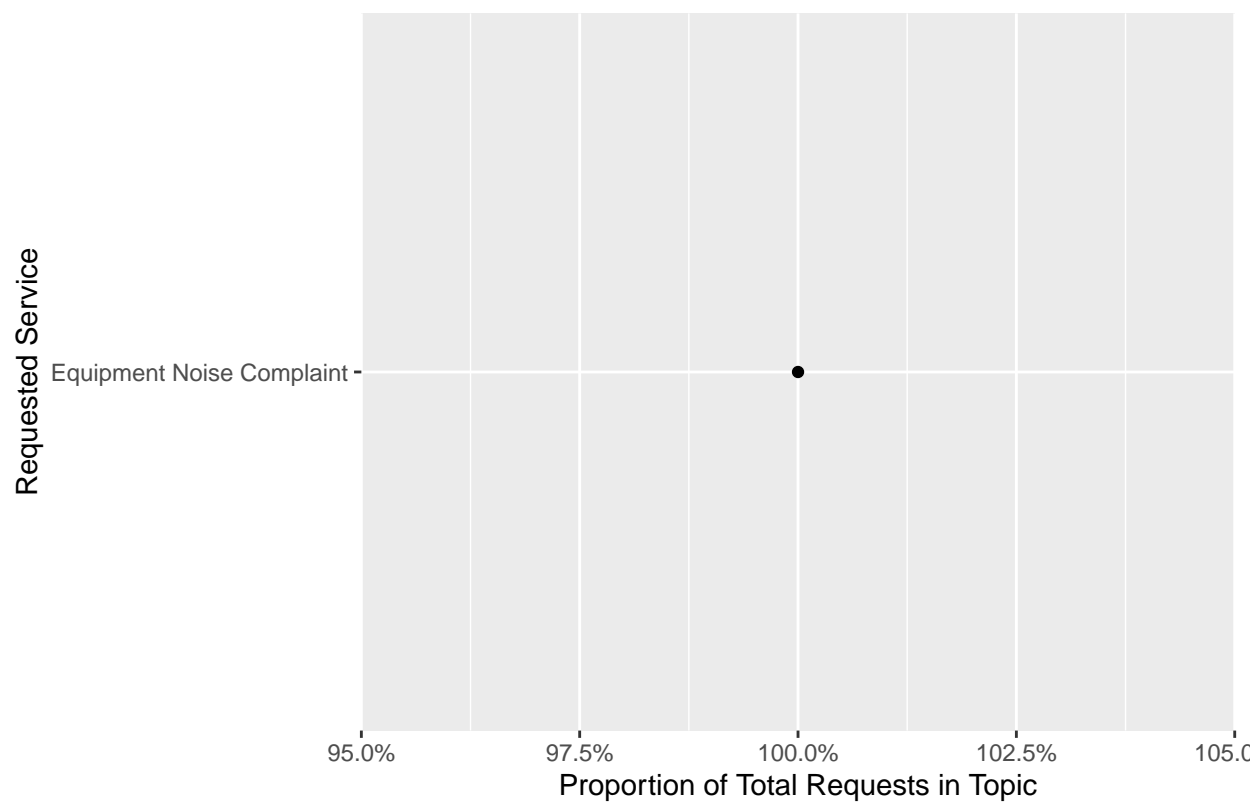
Frequently Requested Services: Other/Miscellaneous



##

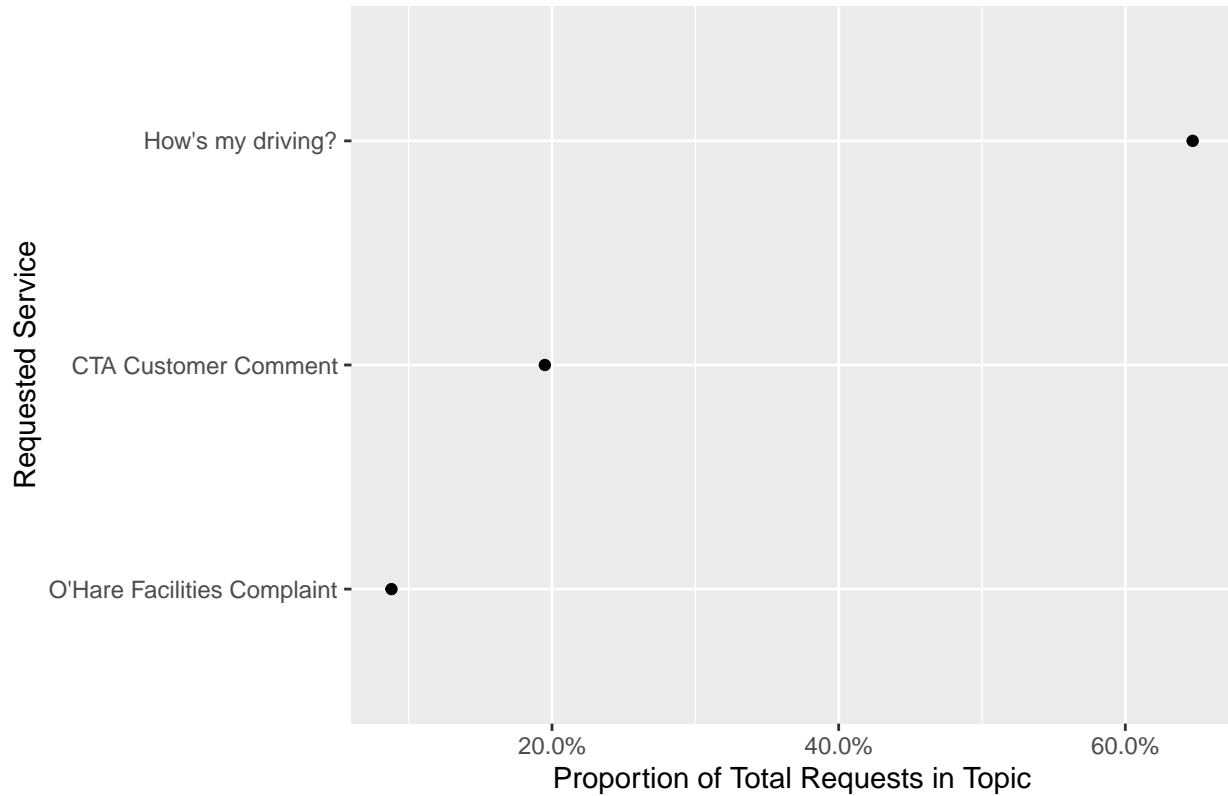
[[19]]

Frequently Requested Services: Noise



[[20]]

Frequently Requested Services: City Feedback



What is the proportion of requests that may be adversarial by topic?

| topic | tot_adversarial | tot_not_adversarial | prop_adversarial | prop_not_adversarial |
|---------------------------------|-----------------|---------------------|------------------|----------------------|
| abandoned bike/vehicle | 28044 | 0 | 1.0000000 | 0.0000000 |
| abandoned building | 6190 | 0 | 1.0000000 | 0.0000000 |
| construction | 7545 | 0 | 1.0000000 | 0.0000000 |
| graffiti | 38794 | 0 | 1.0000000 | 0.0000000 |
| noise | 958 | 0 | 1.0000000 | 0.0000000 |
| taxi/ride-sharing | 6070 | 0 | 1.0000000 | 0.0000000 |
| business | 7724 | 181 | 0.9771031 | 0.0228969 |
| city feedback | 329 | 25 | 0.9293785 | 0.0706215 |
| health concern/public safety | 2052 | 2844 | 0.4191176 | 0.5808824 |
| building concern/code violation | 12496 | 18923 | 0.3977211 | 0.6022789 |
| utilities request/concern | 7973 | 42649 | 0.1575007 | 0.8424993 |
| animal/pest | 7047 | 48801 | 0.1261818 | 0.8738182 |
| housing | 1424 | 11289 | 0.1120113 | 0.8879887 |
| waste/cleanup services | 7514 | 76812 | 0.0891066 | 0.9108934 |
| blocked passage | 332 | 8013 | 0.0397843 | 0.9602157 |
| city infrastructure | 248 | 38637 | 0.0063778 | 0.9936222 |
| other/miscellaneous | 2 | 1914 | 0.0010438 | 0.9989562 |
| information request | 0 | 9911 | 0.0000000 | 1.0000000 |
| landscaping request/concern | 0 | 99785 | 0.0000000 | 1.0000000 |
| roadway/roadway lighting | 0 | 173925 | 0.0000000 | 1.0000000 |

What is the proportion of requests that may involve illegal activity by topic?

| topic | tot_illegal | tot_not_illegal | prop_illegal | prop_not_illegal |
|---------------------------------|-------------|-----------------|--------------|------------------|
| construction | 4400 | 0 | 1.0000000 | 0.0000000 |
| graffiti | 38794 | 0 | 1.0000000 | 0.0000000 |
| noise | 958 | 0 | 1.0000000 | 0.0000000 |
| abandoned bike/vehicle | 22356 | 748 | 0.9676247 | 0.0323753 |
| business | 3267 | 618 | 0.8409266 | 0.1590734 |
| building concern/code violation | 38201 | 10736 | 0.7806159 | 0.2193841 |
| other/miscellaneous | 1082 | 567 | 0.6561552 | 0.3438448 |
| health concern/public safety | 2021 | 2399 | 0.4572398 | 0.5427602 |
| waste/cleanup services | 7514 | 85718 | 0.0805946 | 0.9194054 |
| blocked passage | 332 | 8013 | 0.0397843 | 0.9602157 |
| animal/pest | 20 | 66084 | 0.0003026 | 0.9996974 |
| city feedback | 0 | 354 | 0.0000000 | 1.0000000 |
| city infrastructure | 0 | 41014 | 0.0000000 | 1.0000000 |
| housing | 0 | 11886 | 0.0000000 | 1.0000000 |
| information request | 0 | 10019 | 0.0000000 | 1.0000000 |
| landscaping request/concern | 0 | 99785 | 0.0000000 | 1.0000000 |
| roadway/roadway lighting | 0 | 173897 | 0.0000000 | 1.0000000 |
| utilities request/concern | 0 | 51206 | 0.0000000 | 1.0000000 |
| abandoned building | 0 | 0 | NaN | NaN |
| taxi/ride-sharing | 0 | 0 | NaN | NaN |

What is the average time needed to close a request pertaining to something potentially illegal?

This needs more thinking through, as there is bound to be extraneous data here.

```
# data_calls %>%
#   summary()
#
# data_calls %>%
#   mutate()

data_calls %>%
  filter(status == "closed", fix_min < 300000) %>%
  group_by(illegal) %>%
  summarise(
    avg_minutes_to_close = mean(fix_min, na.rm = TRUE),
    avg_hours_to_close = avg_minutes_to_close / 60,
    avg_days_to_close = avg_hours_to_close / 24
  )
```

```
## # A tibble: 3 x 4
##   illegal avg_minutes_to_close avg_hours_to_close avg_days_to_close
##   <chr>          <dbl>          <dbl>          <dbl>
## 1 maybe          110045.          1834.           76.4
## 2 no              85089.          1418.           59.1
## 3 yes            79764.          1329.           55.4
```

What is the average time needed to close a request by topic?

Geographic Analysis