

Report

2025-11-13

```
df = read.csv("./Datasets/MiWay_Bus_Stops_-4490514804018385747.csv")
head(df)

##   OBJECTID Stop_Number          Stop_Description Shelter
## 1         1      1 ERIN MILLS PKY north of LINCOLN GREEN WAY     0
## 2         2      2 ERIN MILLS PKY at PAULA CRT WALKWAY     0
## 3         3      4 EGLINTON AVE west of EAST MILL RD     0
## 4         4      9 THE COLLEGEWAY east of GLEN ERIN DR     1
## 5         5     10 EXPLORER DR at 5875 EXPLORER DR     0
## 6         6     11 MCLAUGHLIN RD at SOUTH CEREMONIAL DR     1
##   Boarding_Allowed Debarking_Allowed Express_Stop Accessible Routes_Service
## 1             1                 1           0           1          13
## 2             1                 1           0           1          13
## 3             1                 1           0           1          35
## 4             1                 1           0           1        29/36
## 5             1                 1           0           0          74
## 6             1                 1           0           1          66
##   District          Zone Latitude Longitude Effective_Date
## 1 SHERIDAN TRAFFIC ZONE 51 43.53525 -79.66364 2025/09/01
## 2 SHERIDAN TRAFFIC ZONE 50 43.53453 -79.66312 2025/09/01
## 3 EAST CREDIT TRAFFIC ZONE 88 43.57937 -79.68393 2025/09/01
## 4 ERIN MILLS TRAFFIC ZONE 213 43.53722 -79.68434 2025/09/01
## 5 AIRPORT CORPORATE TRAFFIC ZONE 5 43.65462 -79.61673 2025/09/01
## 6 HURONTARIO TRAFFIC ZONE 89 43.59985 -79.66698 2025/09/01
##   x       y
## 1 -79.66364 43.53525
## 2 -79.66312 43.53453
## 3 -79.68393 43.57937
## 4 -79.68434 43.53722
## 5 -79.61673 43.65462
## 6 -79.66698 43.59985

df$District[df$District == ""] <- "UNKNOWN"

library(dplyr)

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
## 
##   filter, lag
```

```

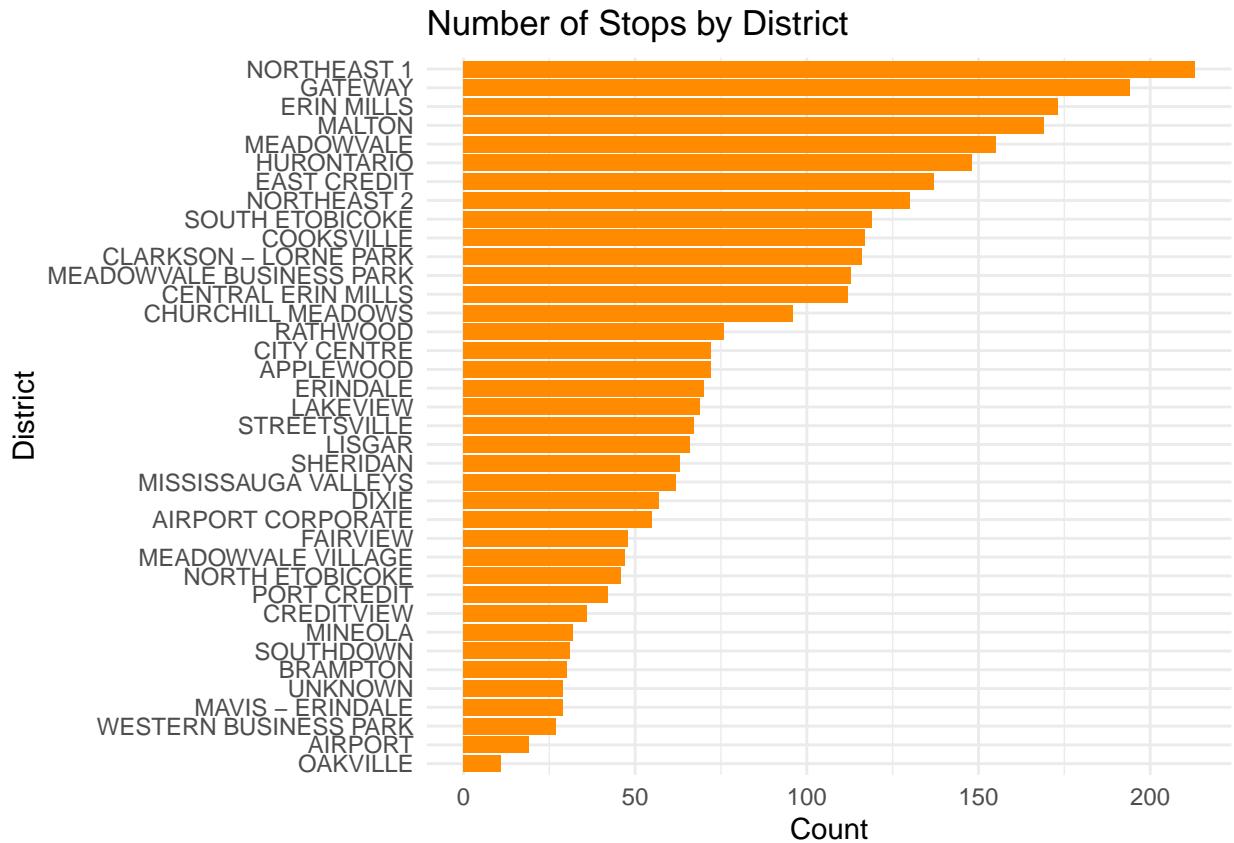
## The following objects are masked from 'package:base':
##       intersect, setdiff, setequal, union

library(ggplot2)
# install.packages("dplyr")
# install.packages("ggplot2")
counts <- df %>%
  group_by(District) %>%
  summarise(n = n()) %>%
  arrange(desc(n))
head(counts)

## # A tibble: 6 x 2
##   District      n
##   <chr>     <int>
## 1 NORTHEAST    213
## 2 GATEWAY      194
## 3 ERIN MILLS   173
## 4 MALTON       169
## 5 MEADOWVALE   155
## 6 HURONTARIO   148

ggplot(counts, aes(x = n, y = reorder(District, n))) +
  geom_col(fill = "darkorange") +
  labs(
    title = "Number of Stops by District",
    x = "Count",
    y = "District"
  ) +
  theme_minimal()

```



```
unique(df$District)
```

```
## [1] "SHERIDAN"           "EAST CREDIT"
## [3] "ERIN MILLS"         "AIRPORT CORPORATE"
## [5] "HURONTARIO"         "NORTHEAST 1"
## [7] "MEADOWVALE"          "GATEWAY"
## [9] "LISGAR"              "STREETSVILLE"
## [11] "CENTRAL ERIN MILLS" "MISSISSAUGA VALLEYS"
## [13] "MEADOWVALE BUSINESS PARK" "FAIRVIEW"
## [15] "CITY CENTRE"         "COOKSVILLE"
## [17] "MEADOWVALE VILLAGE"  "UNKNOWN"
## [19] "CLARKSON - LORNE PARK" "OAKVILLE"
## [21] "SOUTHDOWN"           "PORT CREDIT"
## [23] "RATHWOOD"            "MINEOLA"
## [25] "NORTHEAST 2"          "SOUTH ETOBICOKE"
## [27] "AIRPORT"              "LAKEVIEW"
## [29] "NORTH ETOBICOKE"      "CHURCHILL MEADOWS"
## [31] "DIXIE"                "ERINDALE"
## [33] "MAVIS - ERINDALE"     "CREDITVIEW"
## [35] "APPLEWOOD"            "MALTON"
## [37] "WESTERN BUSINESS PARK" "BRAMPTON"
```

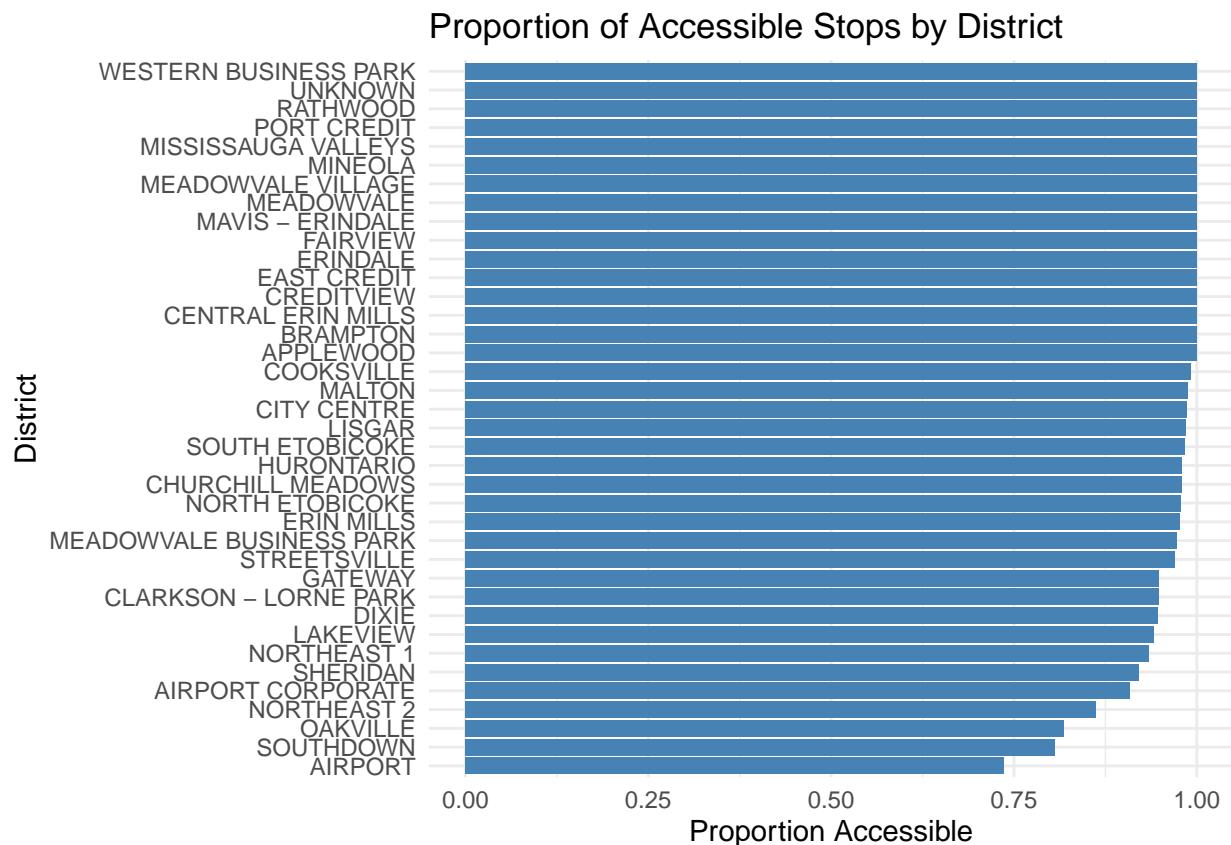
```
access_summary <- df %>%
  group_by(District) %>%
  summarise(
```

```

accessible = sum(Accessible),
total = n(),
proportion = accessible / total
) %>%
arrange(desc(proportion))

ggplot(access_summary, aes(x = proportion, y = reorder(District, proportion))) +
  geom_col(fill = "steelblue") +
  labs(
    title = "Proportion of Accessible Stops by District",
    x = "Proportion Accessible",
    y = "District"
  ) +
  theme_minimal()

```

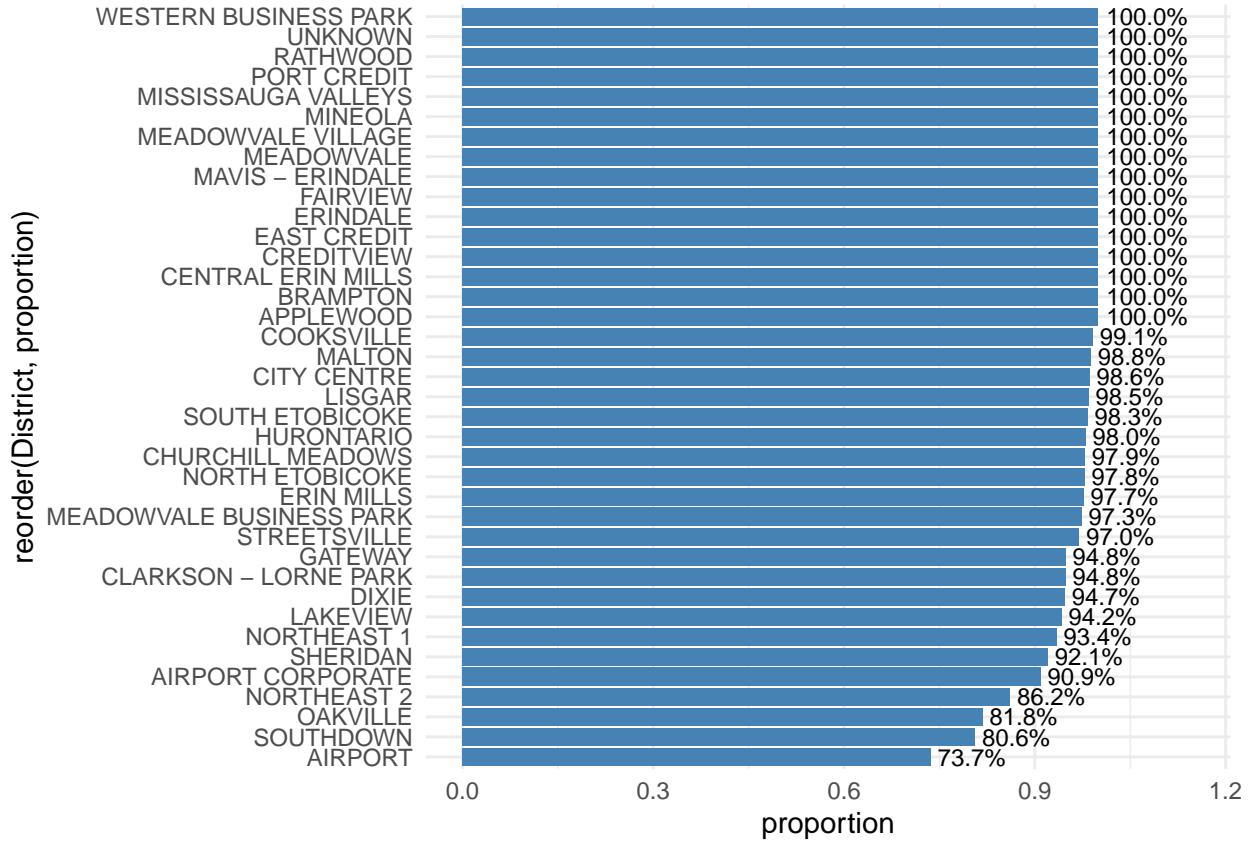


AODA (Accessibility for Ontarians with Disabilities Act) Requirements

```

ggplot(access_summary, aes(x = proportion, y = reorder(District, proportion))) +
  geom_col(fill = "steelblue") +
  geom_text(aes(label = sprintf("%.1f%%", proportion * 100)),
            hjust = -0.1, size = 3) +
  xlim(0, 1.15) +
  theme_minimal()

```



Shelter

```
shelter_summary <- df %>%
  group_by(District) %>%
  summarise(
    shelters = sum(Shelter),
    total = n(),
    proportion_sheltered = shelters / total
  ) %>%
  arrange(desc(proportion_sheltered))
head(shelter_summary)
```

```
## # A tibble: 6 x 4
##   District      shelters total proportion_sheltered
##   <chr>        <int>   <int>          <dbl>
## 1 APPLEWOOD      59     72          0.819
## 2 DIXIE          45     57          0.789
## 3 MISSISSAUGA VALLEYS 47     62          0.758
## 4 RATHWOOD       53     76          0.697
## 5 MEADOWVALE VILLAGE 32     47          0.681
## 6 CITY CENTRE     47     72          0.653
```

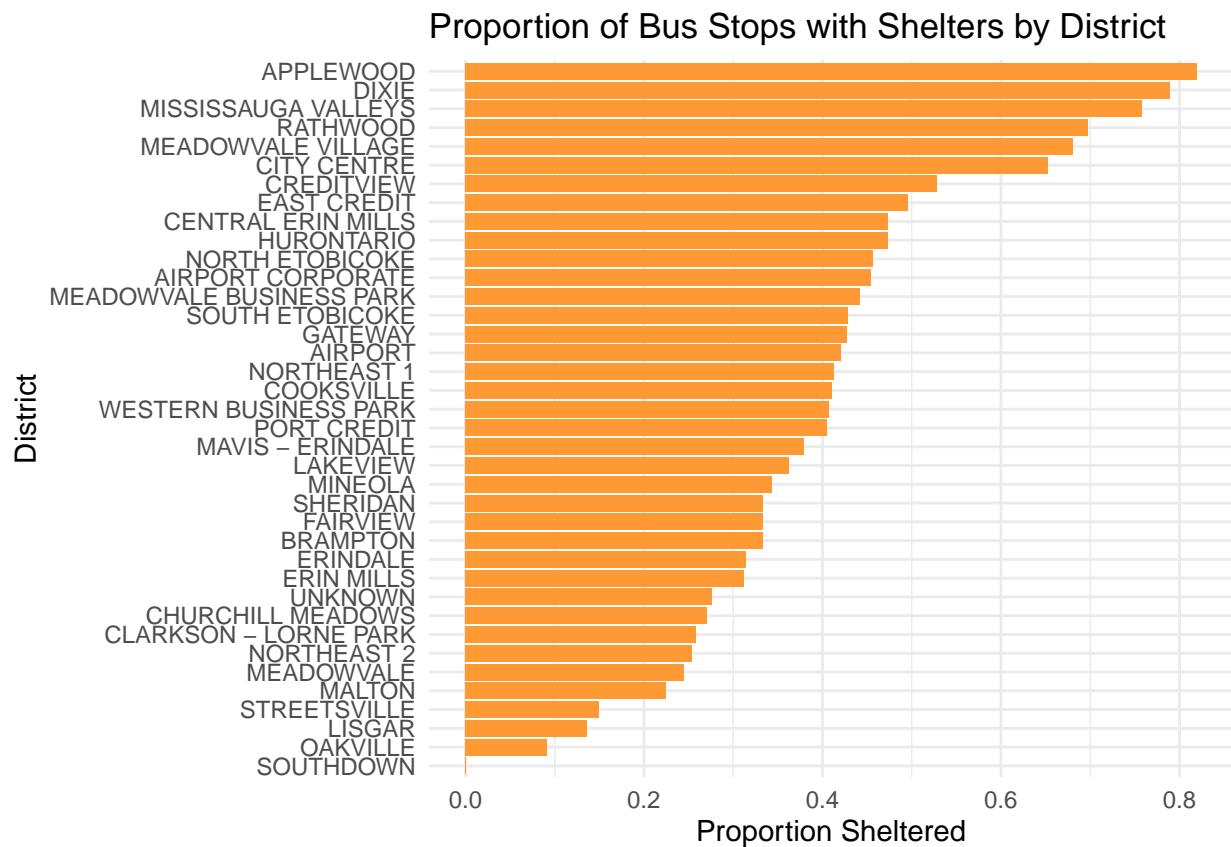
```
library(ggplot2)

ggplot(shelter_summary, aes(x = proportion_sheltered,
```

```

y = reorder(District, proportion_sheltered))) +
geom_col(fill = "#FF9933") +
labs(
  title = "Proportion of Bus Stops with Shelters by District",
  x = "Proportion Sheltered",
  y = "District"
) +
theme_minimal()

```

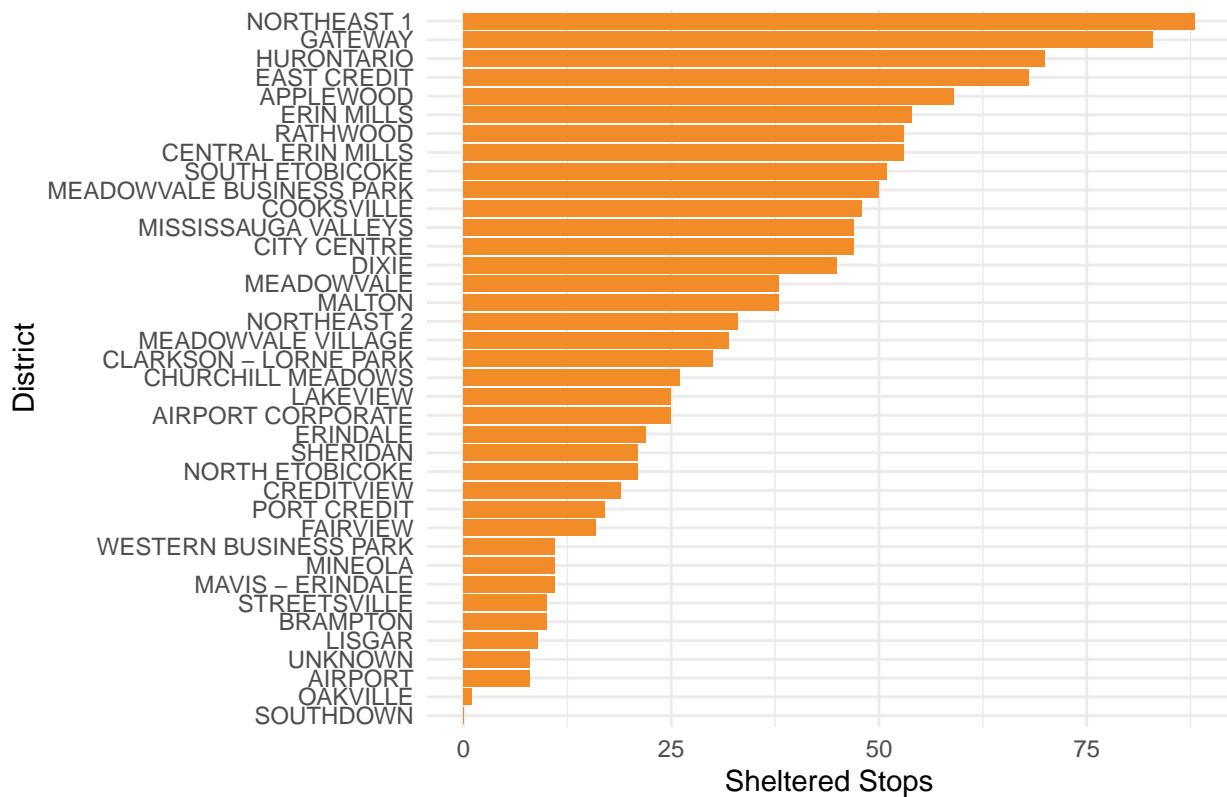


```

ggplot(shelter_summary, aes(x = shelters, y = reorder(District, shelters))) +
geom_col(fill = "#F28C28") +
labs(
  title = "Number of Sheltered Stops by District",
  x = "Sheltered Stops",
  y = "District"
) +
theme_minimal()

```

Number of Sheltered Stops by District



```
library(dplyr)
library(tidyr)

routes_long <- df %>%
  separate_rows(Routes_Service, sep = "/") %>%
  mutate(Routes_Service = trimws(Routes_Service)) %>%
  filter(Routes_Service != "")
```

```
routes_by_district <- routes_long %>%
  group_by(District) %>%
  summarise(n_routes = n_distinct(Routes_Service)) %>%
  arrange(desc(n_routes))
routes_by_district
```

```
## # A tibble: 38 x 2
##   District      n_routes
##   <chr>          <int>
## 1 CITY CENTRE    22
## 2 SOUTH ETOBICOKE 21
## 3 NORTHEAST 1     17
## 4 HURONTARIO     16
## 5 UNKNOWN         16
## 6 ERIN MILLS     14
## 7 EAST CREDIT     13
## 8 GATEWAY         13
```

```

##  9 MEADOWVALE          13
## 10 APPLEWOOD           12
## # i 28 more rows

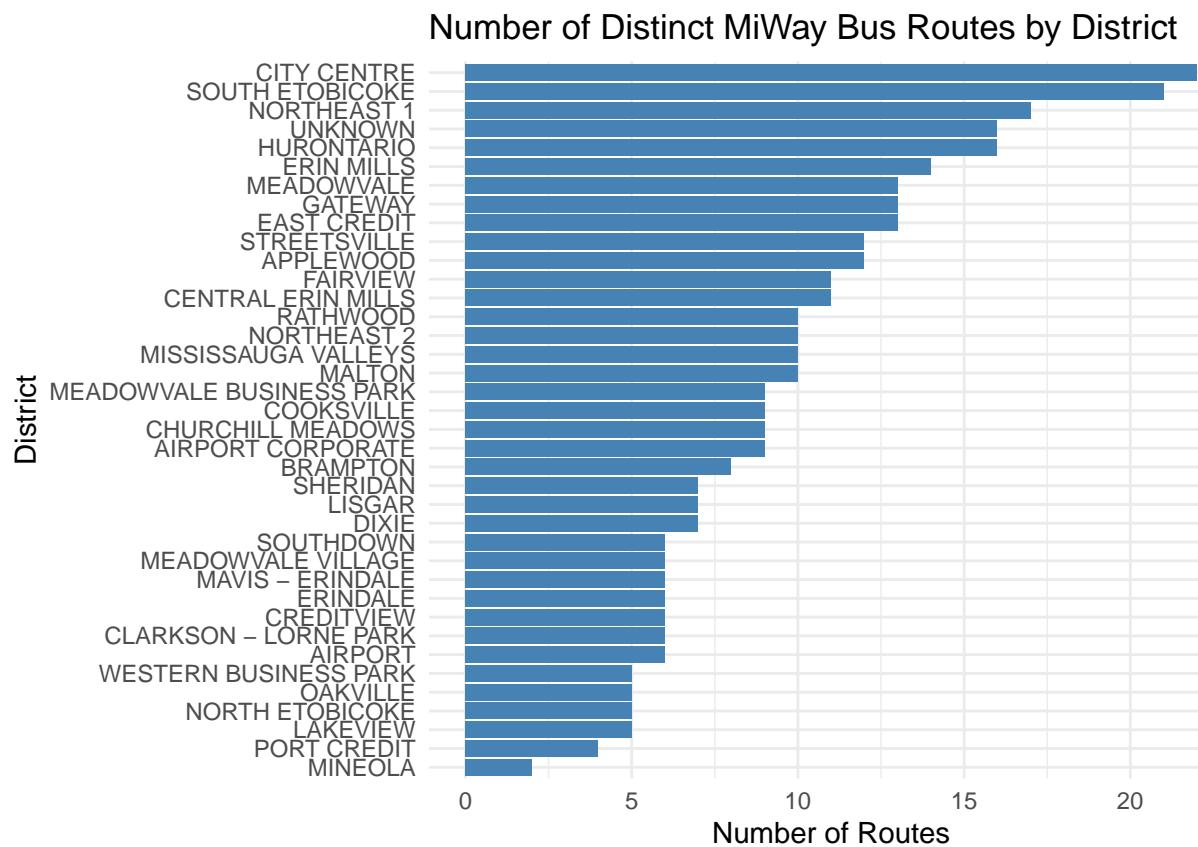
```

```

library(ggplot2)

ggplot(routes_by_district, aes(x = n_routes, y = reorder(District, n_routes))) +
  geom_col(fill = "steelblue") +
  labs(
    title = "Number of Distinct MiWay Bus Routes by District",
    x = "Number of Routes",
    y = "District"
  ) +
  theme_minimal()

```



```

utm_routes <- c("1", "44", "101", "110", "126")
unique(df$Routes_Service)

```

```

## [1] "13"
## [2] "35"
## [3] "29/36"
## [4] "74"
## [5] "66"
## [6] "7/74"
## [7] "7/39/43"

```

```
## [8] "10/313"
## [9] "43"
## [10] "39/43"
## [11] "107/109"
## [12] "39/43/73"
## [13] "25/43"
## [14] "39"
## [15] "10/39/43/306"
## [16] "9/48"
## [17] "9/13/48"
## [18] "3/53"
## [19] "108"
## [20] "25/70"
## [21] "3/8"
## [22] "28"
## [23] "3"
## [24] "26/110"
## [25] "61"
## [26] "39/90"
## [27] "38/39/43/90"
## [28] "17"
## [29] "17/103"
## [30] "110"
## [31] "13/29/45"
## [32] "13/14/45/110"
## [33] "13/14/45"
## [34] "13/14/29/45/110"
## [35] "29"
## [36] "29/45"
## [37] "23"
## [38] "1/38"
## [39] "53"
## [40] "39/53"
## [41] "14/29"
## [42] "14/23"
## [43] "14"
## [44] "51/302"
## [45] "7"
## [46] "48"
## [47] "2"
## [48] "15"
## [49] "5"
## [50] "26"
## [51] "2/8/14/23"
## [52] "13/46/49"
## [53] "45"
## [54] "7/35"
## [55] "2/8"
## [56] "18/42"
## [57] "8"
## [58] "10/45/313"
## [59] "13/29"
## [60] "6"
## [61] "11/30"
```

```
## [62] "46"
## [63] "4"
## [64] "23/31"
## [65] "31"
## [66] "4/5/31"
## [67] "4/5"
## [68] "5/23/31"
## [69] "5/23"
## [70] "4/31"
## [71] "61/312"
## [72] "68/314"
## [73] "2/3/7/10/17/20/26/68/315"
## [74] "2/3/10/26"
## [75] "45/71"
## [76] "44/126"
## [77] "68/315"
## [78] "1/29/101"
## [79] "13/71"
## [80] "1"
## [81] "13/110"
## [82] "36"
## [83] "1/101/110"
## [84] "1/101"
## [85] "29/71"
## [86] "13/29/110"
## [87] "73"
## [88] "24/107"
## [89] "6/8/26/312"
## [90] "6/8/26/126/312"
## [91] "8/26/126/302/312"
## [92] "8/26/312"
## [93] "26/302/312"
## [94] "10"
## [95] "8/9/10"
## [96] "35/48"
## [97] "1/38/101"
## [98] "70"
## [99] "6/38"
## [100] "38"
## [101] "9/35"
## [102] "2/103"
## [103] "2/4"
## [104] "2/4/103"
## [105] "4/28"
## [106] "7/20/315"
## [107] "2/53/103"
## [108] "45/109"
## [109] "45/49/109"
## [110] "24/43/57/74"
## [111] "13/48"
## [112] "44"
## [113] "10/39/43"
## [114] "315"
## [115] "51"
```

```
## [116] "1/3/26/307"
## [117] "3/26"
## [118] "314/315"
## [119] "1/11/20/35/70/101/108/109/126"
## [120] "5/31"
## [121] "9"
## [122] "9/61"
## [123] "42/90"
## [124] "49"
## [125] "38/306/314"
## [126] "16"
## [127] "43/46"
## [128] "24"
## [129] "1/36"
## [130] "26/126"
## [131] "20"
## [132] "13/26/29"
## [133] "1/13/36/48"
## [134] "13/101"
## [135] "1/45"
## [136] "1/36/48"
## [137] "7/39/107/109"
## [138] "2/53"
## [139] "6/26"
## [140] "57/61"
## [141] "68/306/314"
## [142] "68/306/315"
## [143] "6/26/126"
## [144] "1/6"
## [145] "2/302"
## [146] "2/103/302"
## [147] "304"
## [148] "8/53"
## [149] "8/53/304"
## [150] "8/304"
## [151] "39/43/314"
## [152] "3/302/304"
## [153] "302/304"
## [154] "26/126/312"
## [155] "26/312"
## [156] "90"
## [157] "1/3/307"
## [158] "3/307"
## [159] "51/307"
## [160] "20/26"
## [161] "51/302/307"
## [162] "3/302"
## [163] "42"
## [164] "20/26/126"
## [165] "2/17"
## [166] "68/107/109"
## [167] "107"
## [168] "26/109"
## [169] "9/38"
```

```
## [170] "6/8/26/302/312"
## [171] "38/108"
## [172] "6/8/9/26/28/61/66/302/312"
## [173] "10/38/39/43/45/46/90/313"
## [174] "38/43"
## [175] "10/53"
## [176] "28/38"
## [177] "71"
## [178] "9/46/48"
## [179] "39/46"
## [180] "48/110"
## [181] "68"
## [182] "48/313"
## [183] "10/45/109/313"
## [184] "46/48"
## [185] "25/43/70"
## [186] "25"
## [187] "2/10"
## [188] "17/70"
## [189] "9/28/61/66"
## [190] "10/306"
## [191] "10/39"
## [192] "103"
## [193] "17/70/103"
## [194] "35/68"
## [195] "5/73"
## [196] "5/73/74"
## [197] "7/35/74"
## [198] "7/43/74"
## [199] "57"
## [200] "38/313"
## [201] "38/314"
## [202] "17/53"
## [203] "44/90"
## [204] "44/48/90"
## [205] "10/109"
## [206] "3/8/302"
## [207] "38/44/108"
## [208] "38/43/44/108"
## [209] "7/30"
## [210] "38/68"
## [211] "14/45"
## [212] "38/43/108"
## [213] "44/306"
## [214] "43/44"
## [215] "49/313"
## [216] "313"
## [217] "5/15"
## [218] "42/108"
## [219] "15/18/42"
## [220] "15/51"
## [221] "25/39/53"
## [222] "38/39/43/46/90"
## [223] "4/28/103"
```

```

## [224] "39/57"
## [225] "23/29"
## [226] "15/30"
## [227] "22"
## [228] "24/30"
## [229] "11/18/42"
## [230] "18/30/42"
## [231] "30"
## [232] "7/15/30"
## [233] "11/18/24/42"
## [234] "11/18/42/107"
## [235] "11"
## [236] "15/24"
## [237] "16/22"
## [238] "39/43/68/314"
## [239] "7/24/107"
## [240] "7/24"
## [241] "39/43/306"
## [242] "39/70"
## [243] "66/70"
## [244] "4/28/38"
## [245] "9/61/66"
## [246] "49/321"
## [247] "73/74/107/109"
## [248] "306/313"
## [249] "7/39/43/74"
## [250] "18/42/107"
## [251] "43/68/314"
## [252] "321"
## [253] "46/49"
## [254] "9/13/46/49"
## [255] "109/110"
## [256] "45/49"
## [257] "35/321"
## [258] "14/29/45"
## [259] "9/321"
## [260] "101"
## [261] "36/45"
## [262] "109"
## [263] "9/49"
## [264] "49/306"
## [265] "46/321"
## [266] "3/6/7/8/9/20/28/66/68/107/302/312/315"
## [267] "10/13/38/39/42/43/44/45/46/48/90/109/313"
## [268] "18/66"
## [269] "61/66"
## [270] "18/57"
## [271] "18"
## [272] "1/11/20/35/70"
## [273] "1/3/26/71/307"
## [274] "26/71"
## [275] "70/71/108/307"
## [276] "126"

```

```

library(dplyr)
library(tidyr)

routes_long <- df %>%
  separate_rows(Routes_Service, sep = "/") %>%
  mutate(Routes_Service = trimws(Routes_Service))

utm_long <- routes_long %>%
  filter(Routes_Service %in% utm_routes)

district_utm <- utm_long %>%
  group_by(District) %>%
  summarise(
    utm_stops      = n_distinct(Stop_Number),      # stops with a direct UTM bus
    utm_bus_occurrences = n(),                      # total appearances of UTM routes
    utm_distinct_routes = n_distinct(Routes_Service) # how many of the 5 show up here
  ) %>%
  arrange(desc(utm_stops))

library(ggplot2)

ggplot(district_utm, aes(x = utm_stops, y = reorder(District, utm_stops))) +
  geom_col(fill = "#2C7BB6") +
  labs(
    title = "Direct UTM Bus Access by District",
    x = "Stops with a Direct UTM Bus",
    y = "District"
  ) +
  theme_minimal()

```

Direct UTM Bus Access by District

