

# BIG DATA AADT EVALUATION

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Comparing Trucks and Active Transportation Counts with Observed Counts

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# Recap of Previous AADT Evaluation

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- Both StreetLight and Replica provided reasonable 2023 AADT estimates.
- The AADT data coverages of StreetLight and Replica AADT are both good,
- The Year-to-year AADT comparison from StreetLight is “tricky” for 2023.
- The Year-to-Year traffic comparison (2022 vs 2023) from Replica AADT is reasonable for lower Functional Classification(FC) but off for higher FC.
- The StreetLight Day of Week and Month of year traffic pattern is questionable.
- Replica doesn't have traffic data for each season of the year and each day of the week.

Source: Gao, Yu. “Big Data AADT Evaluation: Comparing with Collected 2023 AADT in District of Columbia.” Presented at the COG/TPB Travel Forecasting Subcommittee, held at the Metropolitan Washington Council of Governments, Washington, D.C., July 12, 2024. <https://www.mwcog.org/events/2024/07/12/travel-forecasting-subcommittee-travel-forecasts/>.



# Follow-up of Previous AADT Evaluation

- StreetLight 2022 vs 2023 AADT Comparison using Network Performance Module
  - Higher FC Group- 4%, Lower FC Group - 6%, still a little higher than observed data but more reasonable
- Shared the findings of the DOW and Month of year traffic pattern with StreetLight.
- StreetLight AADT Penetration Rate/Sample Size

Analysis Details	
Analysis ID:	1828020
Analysis Name:	295NBBridge 2023AADT_DDOT
Created by:	ygao@mwkog.org
Created on:	Oct 04, 2024
Organization:	MWCOG - Regional Modeling Data
Analysis Type:	Estimated 2023 AADT Values
Unit of Measurement:	Miles
Mode of Travel:	All Vehicles
Zone Kinds:	OSM Segment
Data Periods:	01/01/2023 - 12/31/2023
Output Type:	Estimated 2023 AADT
Country:	US
Sample Size:	Approximate Device Count: N/A Approximate Trip Count: 3122000
Metric Version:	R139-M133

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# Introduction – Truck AADT

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- Importance of Truck AADT.
- AADT from StreetLight - Light Duty, Medium Duty and Heavy Duty.
- Single Unit(SU) Truck AADT and Combination Unit(CU) Truck AADT is available from Replica (2019-2023).
- COG has access to all the continuous counting stations of District of Columbia.
- COG also hires contractor to collect short-term classification traffic data for District of Columbia.
- Latest 2023 Truck AADT from DC's continuous counting stations and short-term counts are ready to be used to compare with Truck AADT from Big Data.
- The comparison can inform us about the best use of the Big Data AADT products.



# Background – Replica Truck AADT

- Replica Truck AADT can be derived directly from Purchased Datasets by selecting the Geo Area and Year.
- The AADT is available from 2019 to 2023.
- AADT Explorer can be used to visualize Truck AADT along major roads across the country.

Geo Area: District of Columbia, DC  
Year: 2023

Showing first 100 of all 54740 rows

Bidirectional	Street Name	Highway	Length	Heading	Compass Direction	Aadt	Aadt Single Unit	Aadt Combination	Geometry
False	12th Street Expressway	motorway	95.69	360	N	19945	607	11	LINestring(-77.028067...
False	Whitehurst Freeway	motorway	29.03	105	SE	15884	461	21	LINestring(-77.069214...
False	3rd Street Tunnel, I 395	motorway	32.48	360	N	17287	513	49	LINestring(-77.014072...
False	Anacostia Freeway, I 295	motorway	134.59	3	N	42993	1925	262	LINestring(-77.016558...



# Background – Truck AADT in District of Columbia

- Truck AADT is available in all HPMS sample sections and NHS roads.
- Continuous counting stations collect FHWA 13 vehicle classification data.
- 7-day Short-term classification counts are conducted in 3-year or 6-year cycles for full coverage.
- Latest 2023 Truck AADT is available.
- 43 locations - 2023 classification data

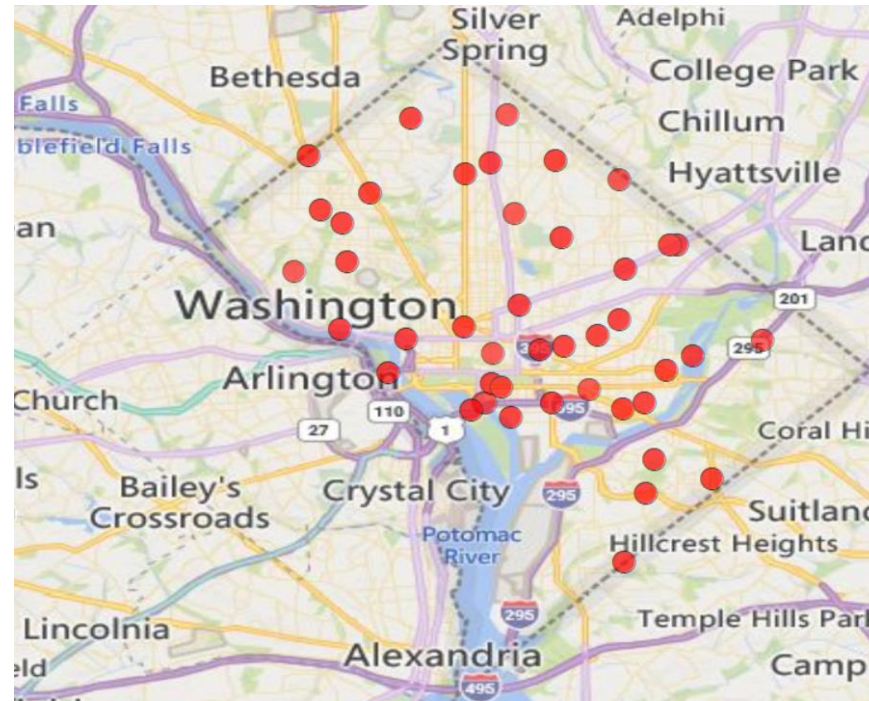


Figure 1. Locations with 2023 Classification Data



# 2023 Replica Truck AADT vs Collected Truck AADT

- Replica Truck AADT is available in 30 out of 43 locations.
- All the FC1, FC2, and FC3 locations Replica Truck AADT data is available.
- A few FC4 locations have Truck AADT data in Replica.
- Replica does not have any FC5 Truck AADT in the locations where DC has classification counts.
- Overall Truck AADT estimated from Replica is reasonable for all the group of locations.

		Observed SU_AADT	Replica SU_AADT	SU Diff%	Observed CU_AADT	Replica CU_AADT	CU Diff%
FC1/FC2	3 Locations	1,835	3,372		84	116	
FC3/FC4	27 Locations	18,881	15,235		1,256	1,711	
	<b>Summary</b>	<b>20,716</b>	<b>18,607</b>	<b>10%</b>	<b>1,340</b>	<b>1,827</b>	<b>36%</b>

Table 1. Comparison of Truck AADT between collected data and Replica Data by Functional Classification

# 2023 Replica Truck AADT VS Collected Truck AADT

- Truck AADT is generally reasonable but could be off for some locations, see examples below:

HPMSID	ROUTENAME	Observed_SU_AADT	Replica SU_AADT	Observed_CU_AADT	Replica CU_AADT	FC
1202	INTERSTATE 66 BN	735	1234	25	91	1
2105A	12TH EXPY SW	326	607	18	11	2
2209	SUITLAND PKWY SE	774	1531	41	14	2
2104	H ST NE	1179	604	20	24	3
2204C	SOUTH CAPITOL ST BN	152	274	7	2	3
2212	NORTH CAPITOL ST BN	879	1076	106	147	3
3601	RHODE ISLAND AVE NE	747	583	35	10	3
3707	WISCONSIN AVE NW	818	384	72	375	3
3804	16TH ST NW	635	922	180	29	3
3901	CANAL RD NW	658	935	21	118	3
3904A	BENNING RD NE	1124	1307	67	65	3
4704	GEORGIA AVE NW	582	523	20	65	3
7010	16TH ST NW	613	136	15	2	3
7012	MASSACHUSETTS AVE NW	446	305	15	18	3
7016	NEBRASKA AVE NW	509	352	24	42	3
7026	BRANCH AVE SE	357	448	114	18	3
7032	NEW HAMPSHIRE AVE NE	433	535	83	68	3
7034	SOUTH DAKOTA AVE NE	873	880	44	48	3
7055	K ST NW	1099	869	42	66	3
7067	RHODE ISLAND AVE NE	1250	838	77	28	3
7068	RHODE ISLAND AVE NW	665	836	33	19	3
7071	WISCONSIN AVE NW	874	472	55	213	3
7072	WISCONSIN AVE NW	678	323	42	112	3
7076A	14TH ST SW	755	366	35	82	3
7087	CONNECTICUT AVE NW	823	491	40	31	3
7094	INDEPENDENCE AVE SW	1020	491	23	46	3
7103	PENNSYLVANIA AVE SE	575	392	20	43	3
2205	C ST NE	166	224	14	2	4
4585016	MAINE AVE SW	275	214	37	17	4
4715	MAINE AVE SW	696	455	15	21	4

Table 2. Comparison of Truck AADT between collected data and Replica Data by location





# Summary of Big Data Truck AADT

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- Replica has detailed Truck AADT for major roads.
- StreetLight has AADT by 3 weight categories.
- The Single-Unit and Combination-Unit Truck AADT from Replica are generally reasonable for a group of roads.
- The Single-Unit and Combination-Unit Truck AADT from Replica can be off for individual road segments.



# Introduction – Active Transportation Counts

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- Importance of Active Transportation Counts.
- Both StreetLight and Replica have Active Transportation Analysis Module.
- StreetLight Active Transportation Analysis Module can show pedestrian/bike activities at Census tract level from 2019-2022.
- Replica Active Transportation Analysis Module can show a quick evaluation of the impact of a potential project on active transportation trips.
- StreetLight has limited bike/pedestrian AADT in Zone Activity Module.
- Replica has link level bike/pedestrian trips data in Network Link Volumes dataset
- COG hires contractor to collect short-term active transportation counts for VDOT.
- Latest 2023 Fall Active Transportation Counts from Loudoun County is available for comparison with Replica.



# Background – Replica Active Transportation Trips

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- Replica Network Link Volumes are available from 2019 fall to 2023 fall.
- Primary Mode of Bike and Pedestrian can be selected to filter active transportation trips.
- Active transportation trips are available for almost all major roads/footway and some trails (W&OD Trail, King St Trail, etc.) .
- The data is available in shape files.



# Background – Active Transportation Counts Collected in 2023

- Active transportation traffic counts were conducted at eight (8) locations in Loudoun County.
- Each location was counted on both a weekday and a weekend day

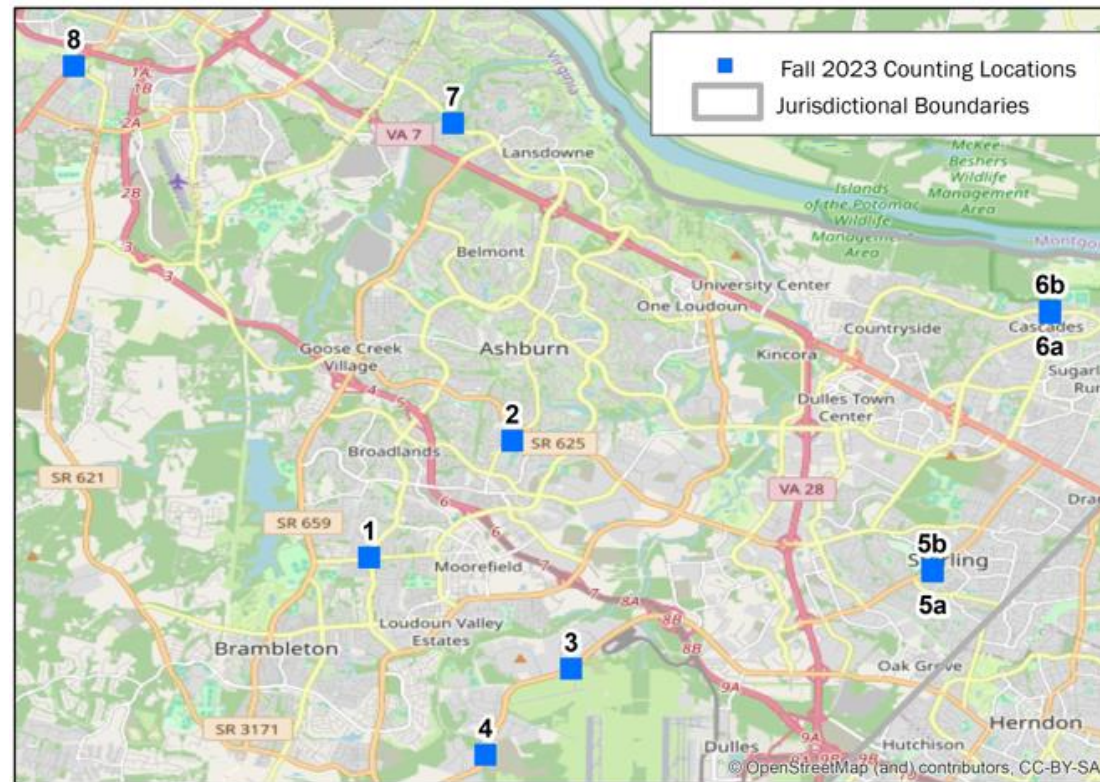


Figure 2. Active Transportation Counting Locations



# 2023 Active Transportation Counts: Replica VS Collected Data

- For the 8 counting locations with collected data, Replica trip data is available in all the locations.
- Weekday counts from collected data and Weekday Replica data are used for comparison.
- All Replica data comes from footway, not on road, except one location with no footway data available.

Location	Count Date	Day of Week	Collected	Replica
Claiborne Pkwy at/north of Croson Ln.	10/3/2023	Tuesday	237	98
Ashburn Rd. North of Broad Run HS	10/3/2023	Tuesday	163	9
Old Ox Rd. (VA 606) at/south of Mercure Cir	10/3/2023	Tuesday	22	246
Old Ox Rd. (VA 606) at Overland Dr.	10/3/2023	Tuesday	39	214
Sterling Blvd between Holly Ave and Maple Ave EB	10/3/2023	Tuesday	100	76
Sterling Blvd between Holly Ave and Maple Ave WB	10/3/2023	Tuesday	143	109
Algonkian Pkwy at/west of Cascades Pkwy EB	10/12/2023	Thursday	104	106
Algonkian Pkwy at/west of Cascades Pkwy WB	10/12/2023	Thursday	107	66
Riverside Pkwy over Goose Creek	10/12/2023	Thursday	151	206
King St at Governors Dr. SW	10/12/2023	Thursday	68	383
		<b>Total</b>	<b>1,134</b>	<b>1,513</b>

Table 3. Comparison of Active Transportation Counts between collected data and Replica Data

# Summary of Big Data Active Transportation Data

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- Both StreetLight and Replica have Active Transportation Analysis Module.
- StreetLight has limited link level active transportation AADT from Zone Activity module (through April 2022).
- Replica has link level active transportation trips with good coverage.
- The general magnitude of Replica active transportation trips is reasonable.
- Active transportation trips from Replica, at the link level, can be off.



# Example of Recent Big Data AADT Application

COG recently received a data request from a stakeholder about the estimated I-295 NB bridge mainline AADT in 2023. No count was conducted at this specific location previously.

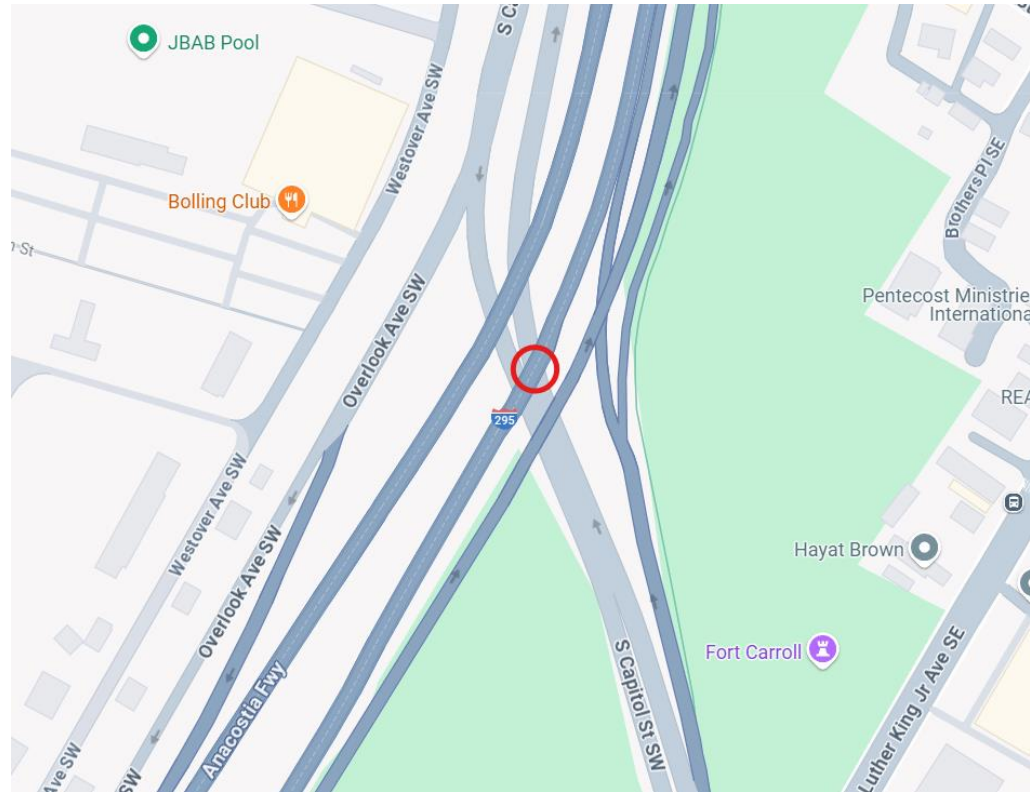


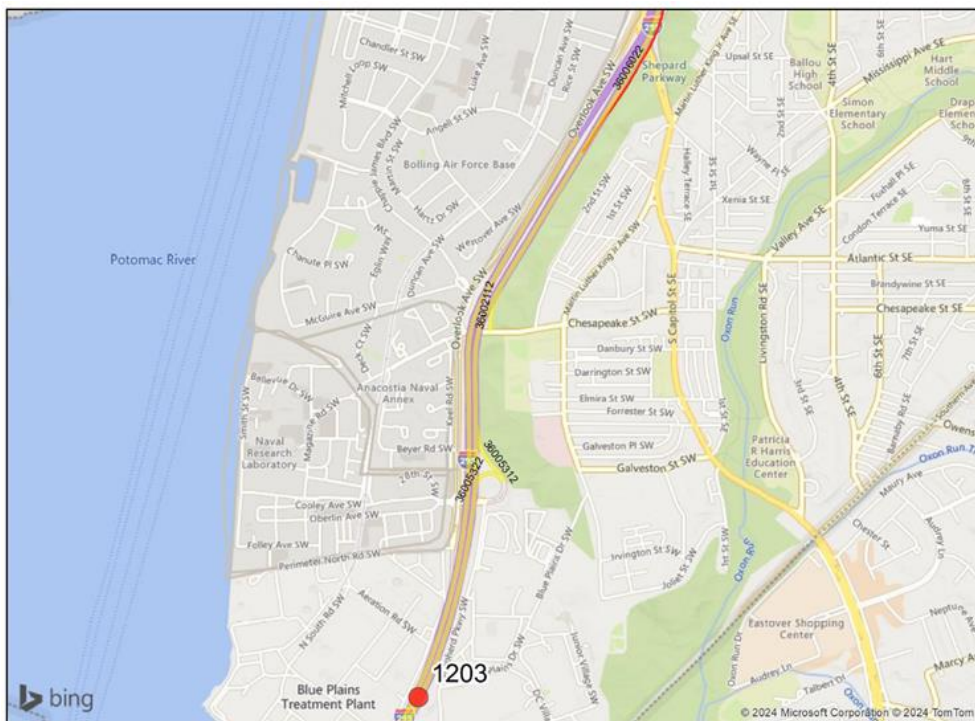
Figure 3. I-295 Northbound Bridge





# Example of Big Data AADT Application - Approach 1

- Approach 1: utilizes collected data from continuous counting stations (WIM) 1203 and short-term counts on multiple ramps, for new ramp without real count, use StreetLight AADT.



● Anacostia Freeway\_from WIM station(1203) to S Capitol St SE

Location	2023 AADT
NB WIM Station(1203)	40,535
NB off-ramp (36005322)	7,795
NB on-ramp (36005312)	1,991
NB on-ramp (36002112)	3,893
NB off-ramp (36006022)	5,213 (StreetLight)

I-295 NB bridge mainline AADT =  
 $40,535 - 7,795 + 1,991 + 3,893 - 5,213 = \mathbf{33,411}$ .





# Example of Big Data AADT Application - Approach 2

- Approach 2: directly use the AADT from StreetLight for the I-295 NB bridge mainline. The AADT estimate from StreetLight is **37,524**, which aligns closely with the result from the first approach.

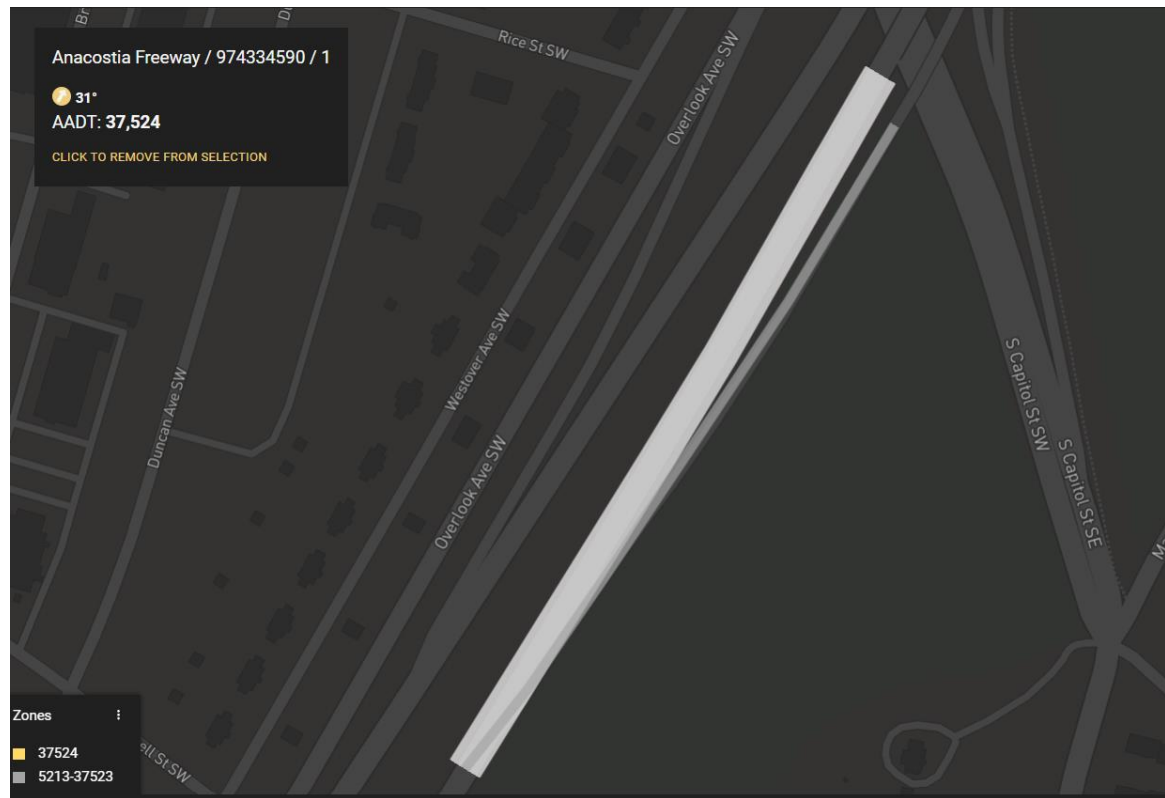


Figure 4. StreetLight AADT Visualization



# Conclusion

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- StreetLight has AADT by 3 weight categories.
- Single Unit Truck and Combination Unit Truck AADT is available from Replica(2019-2023).
- Replica Truck AADT data is generally reasonable for a group of roads but can be off for individual road.
- Both StreetLight and Replica have Active Transportation module for planning purposes.
- StreetLight has limited bike/pedestrian AADT in Zone Activity Module.
- Replica has link level active transportation trip data, and the coverage is good.
- Replica active transportation trips for a group of locations is reasonable, however, individual links' active transportation trips from Replica can be off.
- Big data AADT can be utilized to fill the gap where there are no actual counts, or to be used for validation purpose.



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