AGENDA
CONGESTION MANAGEMENT COMMITTEE

Wednesday, May 26, 2021 at 10:00 a.m.
Zoom Virtual Meeting

1. **COVID-19 – Continued Effects on Traffic Volumes**
   - **Mike Kaczorowski (RPCGB)**

2. **Weekly, Monthly and Annual Traffic Data Adjustment Factors**
   - **Mike Kaczorowski (RPCGB)**

3. **Alabama Transportation Institute (ATI) Program/Project Updates**
   - **Dr. Steven Jones and/or Other ATI official**

4. **RTOP Update**
   - **ALDOT**

5. **Other**

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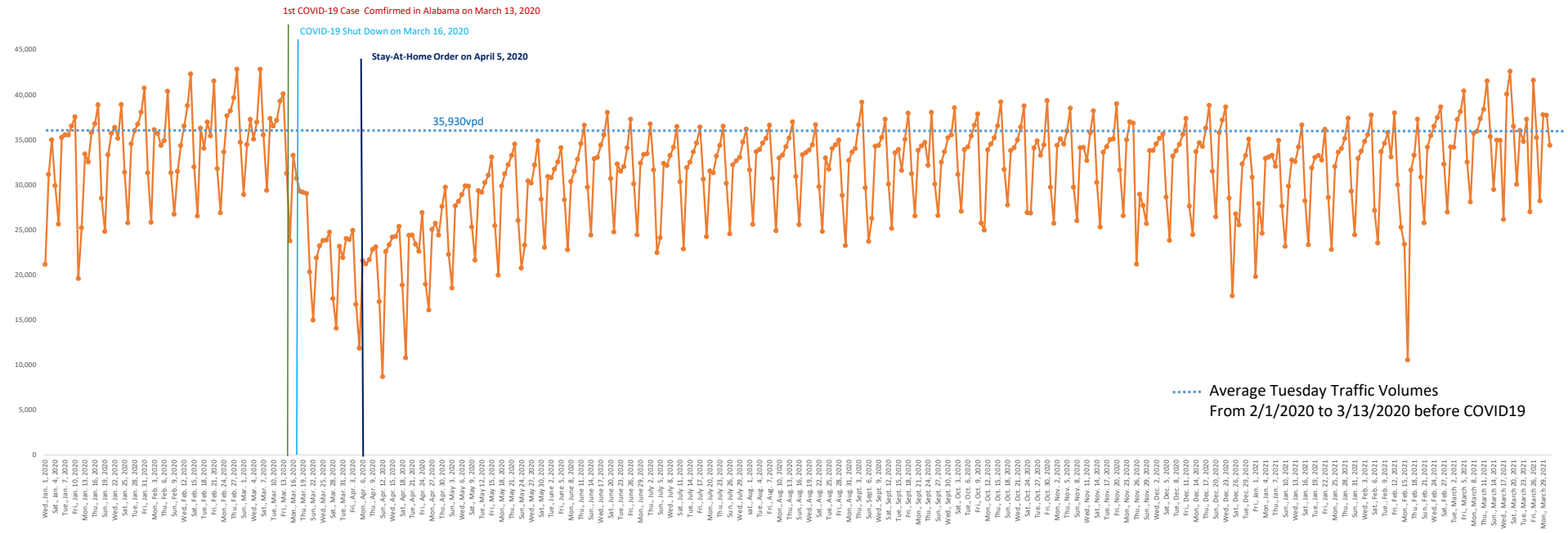
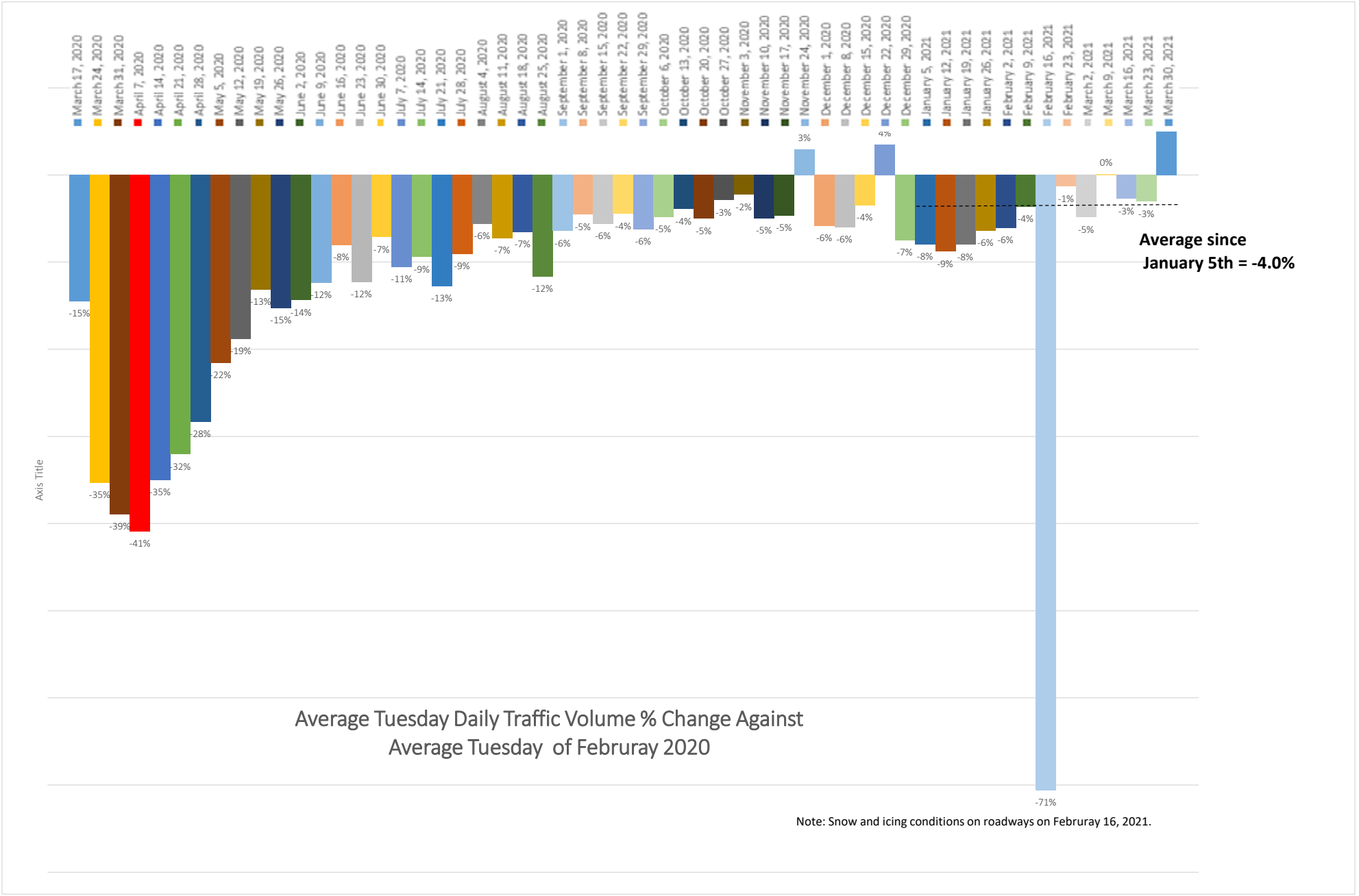
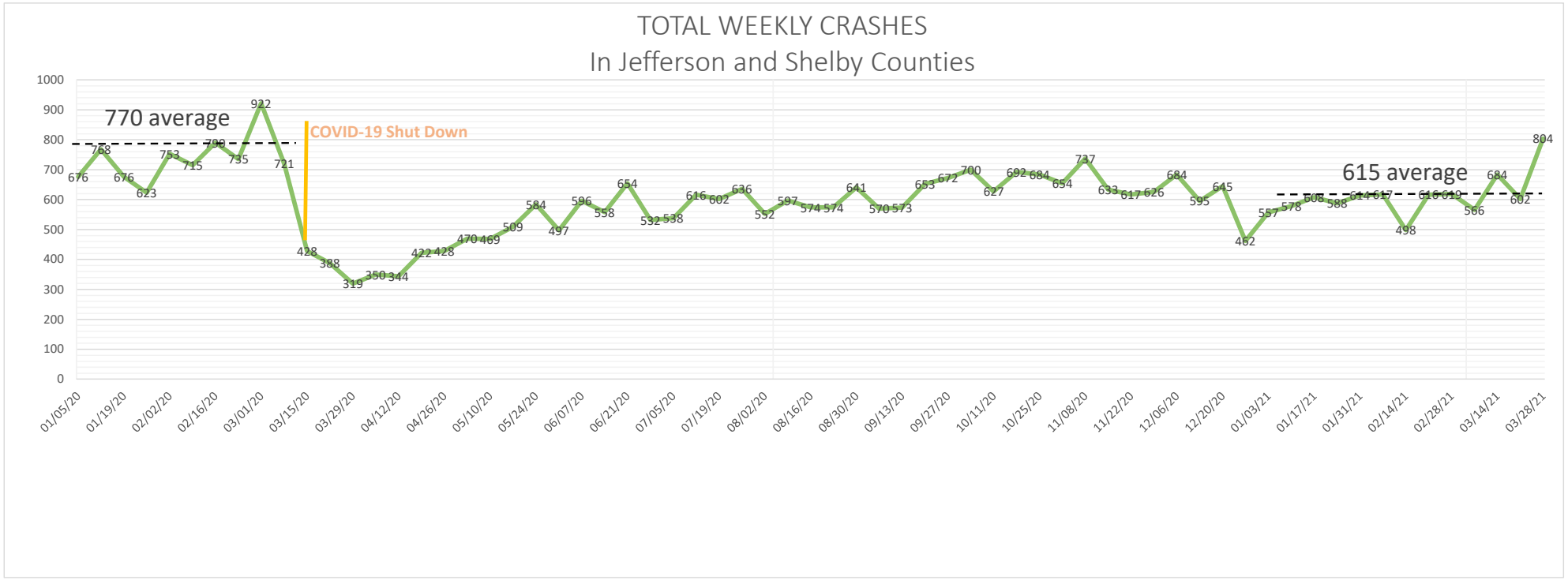
Average Daily Traffic Volumes on Continuous Count Stations From January 1, 2020 to March 31, 2021
in Jefferson And Shelby Counties



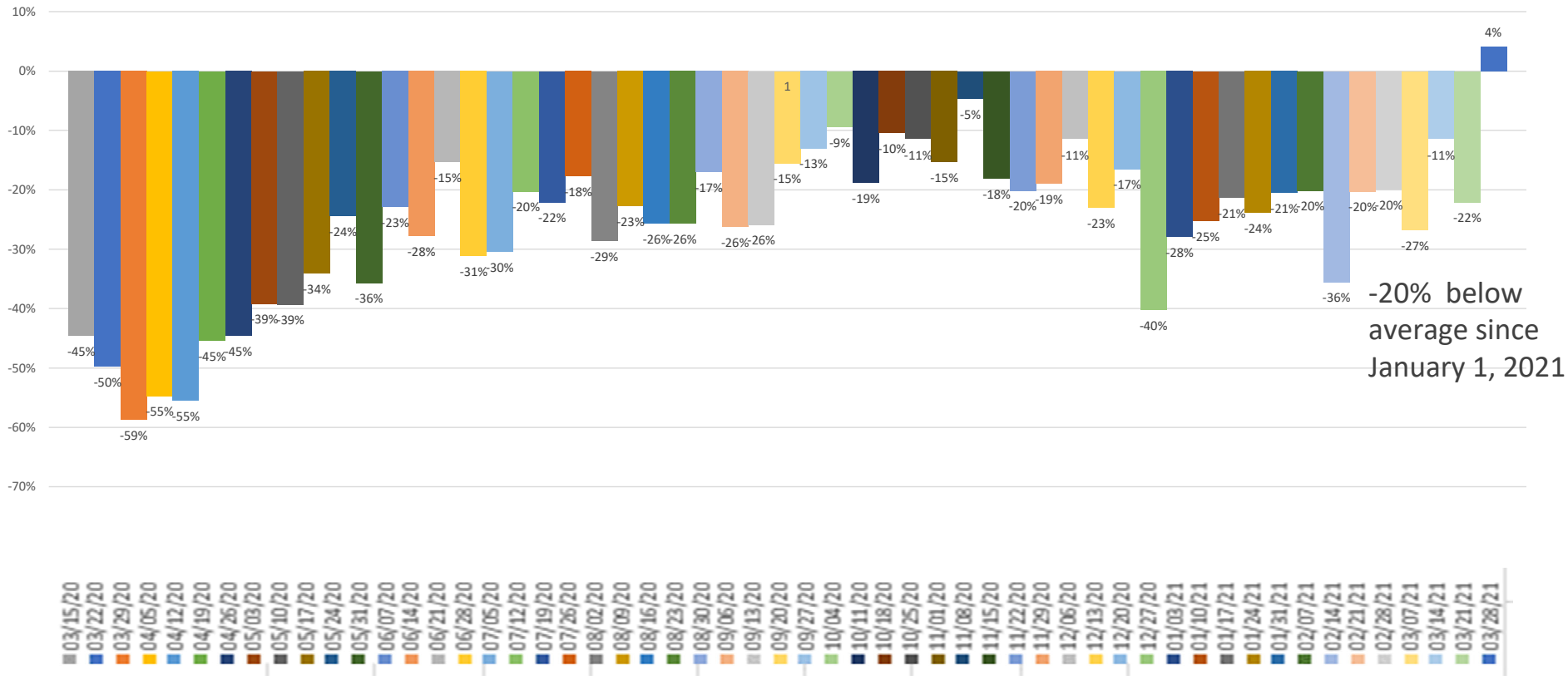
Comparison of Daily Traffic Volumes to Pre-Covid-19 Levels - Birmingham MPO Area



Based on data from ALDOT's Contiuous Count Stations in the Birmingham Metro Area (approximatley 60 stations)


TOTAL WEEKLY CRASHES
In Jefferson and Shelby Counties
770 average
COVID-19 Shut Down
615 average
1000
900
800
700
600
500
400
300
200
100
0
676 768 676 623 753 715 780 735 922 721 428 388 319 350 344 422 428 470 469 509 584 497 596 558 654 532 538 616 602 636 552 597 574 574 641 570 573 653 672 700 627 692 684 694 737 633 617 626 684 595 645 462 557 578 608 588 614 617 498 616 619 586 684 602 804
01/05/20 01/19/20 02/02/20 02/16/20 03/01/20 03/15/20 03/29/20 04/12/20 04/26/20 05/10/20 05/24/20 06/07/20 06/21/20 07/05/20 07/19/20 08/02/20 08/16/20 08/30/20 09/13/20 09/27/20 10/11/20 10/25/20 11/08/20 11/22/20 12/06/20 12/20/20 01/03/21 01/17/21 01/31/21 02/14/21 02/28/21 03/14/21 03/28/21

Weekly % Changes of Crashes in Jefferson and Shelby Counties
Weekly Since March 15, 2020 vs. Average Weekly from February 2, 2020 through March 14, 2020



-20% below average since January 1, 2021

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METHODOLOGY OF TRAFFIC DATA AND TRAFFIC FACTORS

Regional Planning Commission of Greater Birmingham

Table of Contents

Traffic Data Products:

Monthly Summaries:

Monthly traffic volume of all counts should be produced by two processes. First, average all counts (each month and each day of the week) to get seven Monthly Average Day of the Week (MADWs). Then, produce Monthly Average Daily Traffic (MADT) through sum of MADWs divided by seven.

Monthly Average Day-of-Week (MADWs):

The estimate of traffic volume mean statistic for each day of the week, over the period of one month. It is calculated from edited-accepted permanent data as the sum of all traffic for each day of the week (Sunday, Monday, and so forth through the week) during a month, divided by the occurrences of that day during the month.

$$MADWs_{ij} = \frac{Total\ Vol\ for\ day\ i\ of\ the\ week}{m}$$

- i: Day of Week (Monday or Tuesday or ….. or Sunday)
- j: Station
- m: the occurrences of that day during the month

Monthly Average Daily Traffic (MADT[1]):

The estimate of mean traffic volume for a month, calculated by the sum of Monthly Average Days of the Week (MADWs) divided by seven. For MADT, most of the calendar month of data should be included with a minimum of at least one Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday.

$$MADT = \frac{\sum MADWs_{ij}}{7}$$

- i: Day of Week (Monday or Tuesday or ….. or Sunday)
- j: Station

Monthly Average Weekday Daily Traffic (MAWDT):

The MADT for Monday through Friday are summed and then divided by five.

$$MAWDT = \frac{\sum MADT(Weekdays)}{5}$$

[1] For a counter site that operates all days in the month without failure, the MADT can be computed by adding the daily volumes during any given month and dividing by the number of days in the month.

Monthly Average Weekend Daily Traffic (MAWET):

The MADT for Saturday and Sunday are summed and then divided by two.

$$MAWET = \frac{\sum MADT(Weekend\ days)}{2}$$

Average Daily Traffic (ADT):

Average Daily Traffic – The total volume during a given time period (24 hours), greater than one day and less than one year, divided by the number of days in that time period.

$$ADT_j = \frac{\sum_i 24\ Hours\ Vol}{n} = \frac{The\ total\ volume\ during\ a\ given\ time\ period}{n}$$

- i: Day
- j: Station
- n: Number of days during the month

Annually Summaries:

It is similar process with monthly summaries. Frist, for each day of the week, produce an Annual Average Day of The Week (AADWs) by average 12 monthly MADWs. Then, sum of seven AADW divided by seven to produce Average Annual Daily Traffic (AADT).

Annual Average Day of The Week (AADWs):

It is calculated from average MADW in this whole year.

$$AADWs_{ij} = \frac{\sum MADWs_{ij}}{12}$$

- i: Day of Week (Monday or Tuesday or ….. or Sunday)
- j: Station

Average Annual Daily Traffic (AADT[2]):

The AASHTO method for computing AADT is recommended. This is because it has highly precise estimates and error-tolerant, it allows factors to be computed accurately even when a considerable number of data is missing from a year at a site, and because it works accurately under a variety of data conditions (both with and without missing data).

$$AADT = \frac{1}{7}\sum_{i=1}^{7}[\frac{1}{12}\sum_{j=1}^{12}(\frac{1}{n}\sum_{k=1}^{n}VOL_{ijk})]$$

- VOL: Daily traffic for day k, of DOW i, and month j
- i: Day of the week
- j: Month of the year
- k: 1 when the day is the first occurrence of that day of the week in a month, 4 when it is the fourth day of the week
- n: the number of days of that day of the week during that month (usually between one and five, depending on the number of missing data)

Annual Average Weekday Daily Traffic (MAWDT):

The AADT for Monday through Friday are summed and then divided by five.

$$AAWDT = \frac{\sum AADT(Weekdays)}{5}$$

Annual Average Weekend Daily Traffic (MAWET):

The AADT for Saturday and Sunday are summed and then divided by two.

$$AAWET = \frac{\sum AADT(Weekend\ days)}{2}$$

[2] For a counter site that operates 365 days per year without failure, the AADT can be computed by adding all of the daily volumes and dividing by 365.

Hourly Distribution (HD):

$$HD = Avg_j(\frac{\sum_i One\ Hour\ Vol}{\sum_i 24\ Hours\ Vol})$$

- j: Station
- The average is taken over all continuous sites, j, in the group.

Traffic Factor Groupings:

All roadways are categorized into Traffic Factor Groupings based on their operational characteristics. Many counties have different road patterns such as rural, urban, and recreational area. Traffic data from permanent counters in each grouping are used to develop adjustment factors to be applied to the short-term counts in that same grouping.

Recommended Group	HPMS Functional Code
Interstate Rural	1
Other Rural	2, 3, 4, 5, 6, 7
Interstate Urban	1
Other Urban	2, 3, 4, 5, 6, 7
Recreational	Any

Source: FHWA. (2013). *Traffic Monitoring Guide.*

Traffic Adjustment Factors and Ratios:

One of the most important uses of data from continuous monitoring sites is in the development of factors and ratios for adjusting data from short-term counting sites for monthly and DOW variation and for growth.

Traffic Factors Versus Traffic Ratios:

There are two basic ways of converting a short count to an estimate of average volume over an extended period of time (such as a month or a year). One is to multiply the count by an appropriately derived traffic factor (i.e., to "factor" the count); and the other is to divide the count by an appropriately derived traffic ratio. Both quantities are derived, using similar procedures, from counts collected at one or more continuous count sites; and, except for the difference between multiplication and division, both quantities are used in the same way. Furthermore, they produce very similar results. However, when traffic factors and ratios are derived using data from two or more continuous count sites, the results almost always differ slightly (frequently by a very small amount), and it appears that the estimates produced by traffic ratios are slightly more reliable than those produced by traffic factors. For this reason, there is a slight preference for using traffic ratios, and the presentation of this section is in terms of traffic ratios. However, the advantage of using ratios generally is quite small and does not warrant a change in procedures by any state that currently uses traffic factors.

Month of Year Factors (MOY):

The individual monthly factors for each continuous count station are the ratio of the AADT to MADT. Alternatively, the State can combine the DOW adjustment and monthly adjustment into a single factor, for example the ratio of annual average daily traffic to monthly average weekday traffic (AADT / MAWDT).

$$MOY = Avg_j(\frac{AADT_j}{MADT_j})$$

- j: Station
- The average is taken over all continuous sites, j, in the group.

Day-of-Week Adjustment Factors (DOW):

$$DOW_i = Avg_j(\frac{AADT_j}{AADWs_{ij}})$$

- i: Day (Monday or Tuesday or ….. or Sunday)
- j: Station
- The average is taken over all continuous sites, j, in the group.

Same DOW adjustments for every month of the year.

Traffic Factors Matrix (TF_md):

For each seasonal factor group, Data from continuous monitoring sites is used to compute a set of 84 traffic factors, corresponding to the 12 months (m) and the seven days of the week (d). The result is a 7*12 matrix.

$$TF_{md} = \underset{i}{Avg}\left[\frac{AADT_i}{MADW_{mdi}}\right]$$

- The average is taken over all continuous sites, i, in the group

This alternative uses different DOW adjustments for each month of the year.

Example:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average month
January	1.11	1.09	1.03	0.93	0.89	1.25	1.54	1.12
February	0.96	0.9	0.93	0.88	0.84	1.2	1.53	1.03
March	0.99	0.94	0.89	0.88	0.82	1.05	1.3	0.98
April	0.91	0.88	0.88	0.86	0.81	1.09	1.33	0.97
May	1.02	0.92	0.9	0.87	0.83	1.08	1.29	0.99
June	0.96	0.94	0.93	0.91	0.85	1.07	1.33	1.00
July	0.98	0.93	1.02	0.94	0.9	1.09	1.37	1.03
August	0.95	0.93	0.91	0.89	0.84	1.11	1.36	1.00
September	1.11	0.94	0.93	0.91	0.85	1.17	1.4	1.04
October	0.96	0.92	0.9	0.91	0.86	1.16	1.34	1.01
November	1.09	0.99	1	1.07	0.97	1.3	1.43	1.12
December	1.08	1.06	0.97	0.98	0.92	1.24	1.44	1.10
Average Day	1.01	0.95	0.94	0.92	0.87	1.15	1.39	

Estimation of AADT:

To convert short-term volume count (at least 24 hours duration) to estimate of AADT, AASHTO method is recommended, please following this procedure:

1. Summarize the count as a set of hourly counts;
2. Multiply by the appropriate seasonal traffic factors;
3. For each hour of the day, average the results of Step 2, and produce 24 hourly averages;
4. Sum the 24 hourly average data to produce estimate of AADT.

Weekday Adjustment Factors (WDF):

$$WDF_i = Avg_j(\frac{AADT_j}{MAWDT_j})$$

- i: Month
- j: Station
- The average is taken over all continuous sites, j, in the group.

Different WDF adjustments for each month of year.

OR

$$WDF = Avg_j(\frac{AADT_j}{AAWDT_j})$$

Same WDF adjustments for every month of the year.

Weekend Adjustment Factors (WEF):

$$WEF_i = Avg_j(\frac{AADT_j}{MAWET_j})$$

- i: Month
- j: Station
- The average is taken over all continuous sites, j, in the group.

Different WEF adjustments for each month of year.

OR

$$WEF = Avg_j(\frac{AADT_j}{AAWET_j})$$

Same WEF adjustments for every month of the year.

References

AASHTO Guidelines for Traffic Data Programs (2nd Edition). (2009).

FHWA. (2013). *Traffic Monitoring Guide.*

6 Categories of Seasonal Adjustment Factors

- Freeway - Urban
- Non-Freeway - Urban
- Ramp - Urban
- Freeway - Rural
- Non-Freeway - Rural
- Ramp - Rural

2018 - Urban Non-Freeway - Seasonal Adjustment Factors

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	**Average**
January	1.11	1.09	1.03	0.93	0.89	1.25	1.54	1.12
February	0.96	0.9	0.93	0.88	0.84	1.2	1.53	1.03
March	0.99	0.94	0.89	0.88	0.82	1.05	1.3	0.98
April	0.91	0.88	0.88	0.86	0.81	1.1	1.33	0.97
May	1.02	0.92	0.9	0.87	0.83	1.08	1.29	0.99
June	0.96	0.94	0.93	0.91	0.85	1.07	1.33	1.00
July	0.98	0.93	1.02	0.94	0.9	1.09	1.37	1.03
August	0.95	0.93	0.91	0.9	0.84	1.11	1.36	1.00
September	1.11	0.94	0.93	0.91	0.85	1.17	1.4	1.04
October	0.96	0.92	0.9	0.91	0.86	1.16	1.34	1.01
November	1.09	0.99	1	1.07	0.97	1.3	1.44	1.12
December	1.04	1.06	0.97	0.98	0.92	1.24	1.44	1.09
Average	1.01	0.95	0.94	0.92	0.87	1.15	1.39	

Comparison of Monthly Adjustment Factors 2018, 2019 & 2020 - Urban Freeway

	2018	2019	2020
January	1.10	1.10	0.97
February	1.02	1.05	0.91
March	0.97	0.98	1.07
April	0.99	0.99	1.57
May	1.02	1.00	1.13
June	1.00	0.99	1.00
July	1.02	1.01	1.01
August	1.04	1.01	0.97
September	1.04	1.03	0.97
October	0.98	1.00	0.95
November	1.03	1.03	0.97
December	1.06	1.03	1.00

Comparison of Weekday Adjustment Factors 2018, 2019 & 2020 - Urban Freeway

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2018	1.01	0.95	0.94	0.92	0.87	1.15	1.39
2019	0.99	0.98	0.96	0.94	0.88	1.11	1.28
2020	1.00	0.97	0.96	0.94	0.89	1.14	1.39

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RTOP

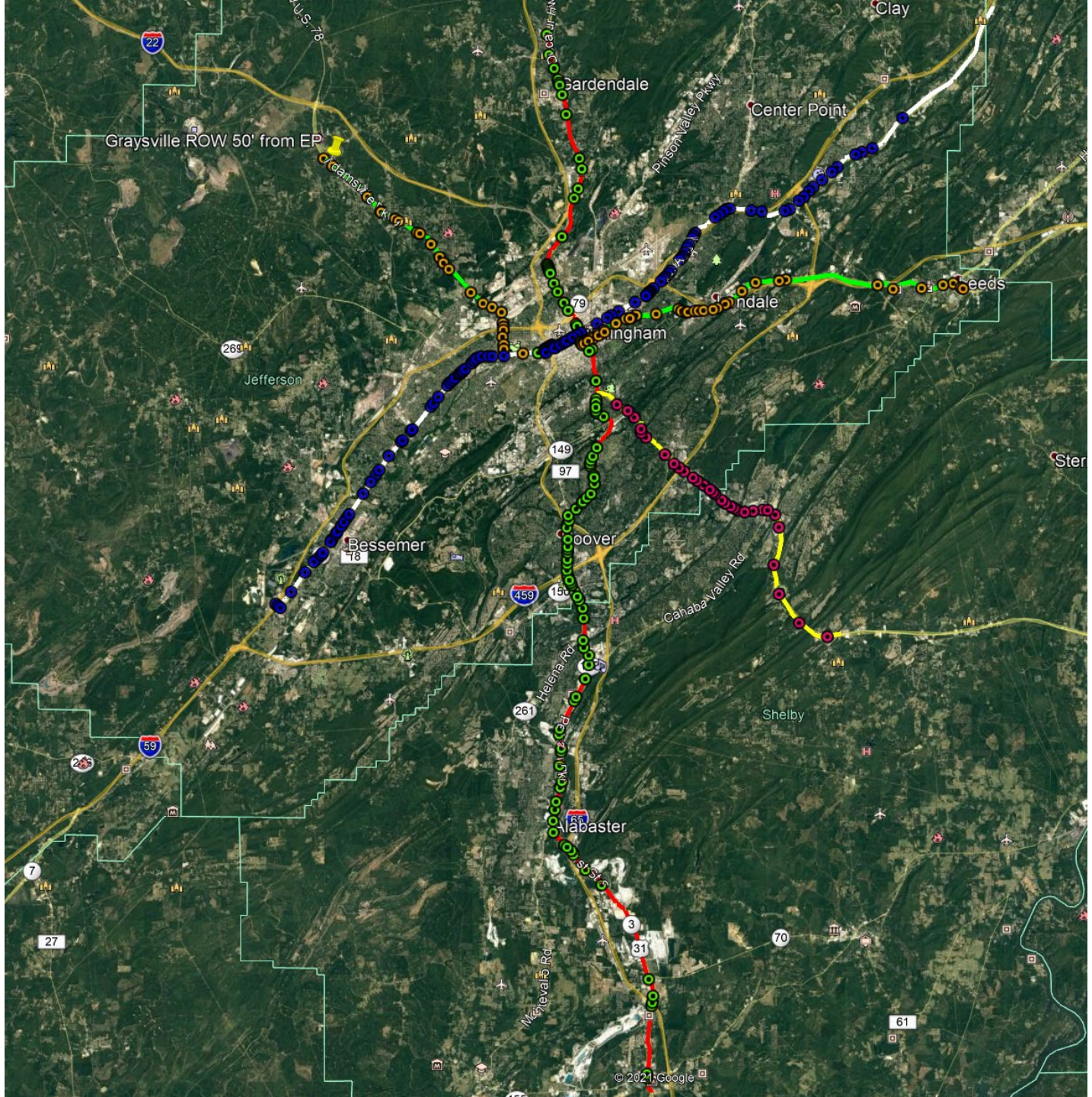
East Central Region, Birmingham Area

RTOP

- Definition – Region Traffic Operations Program
- Intent – Place the signals on selected routes under one operator to maximize corridor efficiency
- Timeframe – Beginning in October, 2021

RTOP Functions

- Develop and maintain an inventory of existing signals and ITS devices
- Conduct traffic counts
- Develop and implement multiple timing plans
- Continuous monitoring and adjustment of system operation performance measures
- Manage Preventative Maintenance of the system


Graysville ROW 50' from EP
Gardendale
Center Point
Clay
Jefferson
Bessemer
Hoover
Shelby
Alabaster
Cahaba Valley Rd
Helena Rd
Prison Valley Pkwy
© 2021 Google

City	Route	Begin Mile Post	End Mile Post	# of Signals from TSI	New Description
Bham/Chelsea	US-280	0	15	31	US-31 to CR-47/Chelsea Rd
Calera/Bham	US-31	242.5	272	71	AL-25 in Calera to Red Mtn Expressway
Bham/Gardendale	US-31	272	286.5	27	Red Mtn Expressway to Mt. Olive Blvd.
Graysville/Bham	US-78	AL-5 144.5	101.7	41	10th Ave SW to 5th Ave S
Bham/Leeds	US-78	101.7	115.3	23	56th St S to AL-25/9th St SE
Bessemer/Bham	US-11	119.3	136.3	69	I-20/59 in Bessemer to US-31/Red Mtn. Expressway
Bham/Trussville	US-11	136.3	152.2	45	34th St N to Deerfoot Parkway

RTOP

- Consultants

  Gresham Smith and Partners – assigned US-31 from Calera to the Red Mountain Expressway and US-78 from Graysville to US-11 in Birmingham

  Arcadis – assigned the rest of the routes in the program