

Traffic Study

Why It Matters, What to Count and How to Measure

Todd Kempker, PE and Jason Sommerer, PE, PTOE

March 3, 2021

Bartlett & West


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Text **BARTLETTWEST995** to **22333** once to join, then **A, B, C, D, or E**

Visual settings 

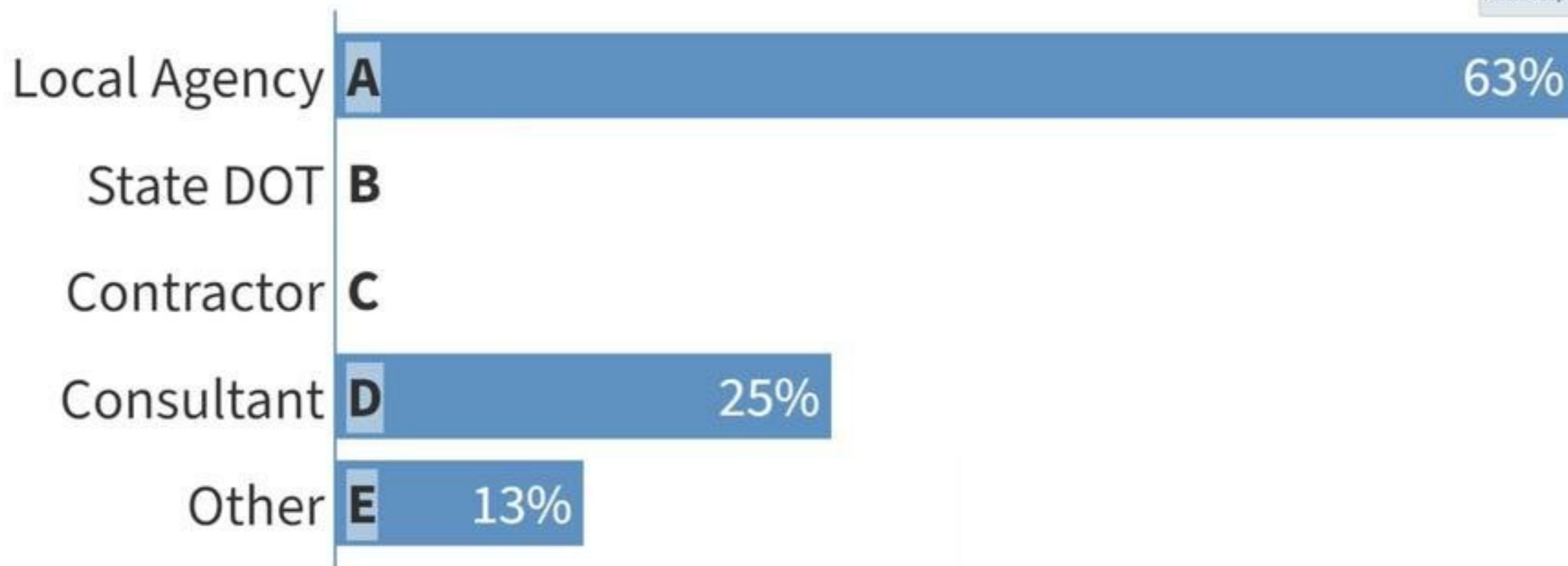
Activate 


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What best describes your affiliation?



 Answers to this poll are anonymous

➤ Why Does the Traffic Study Matter?



➤ How Traffic Affects ESALs

- 10,000 ADT
 - 5% Trucks
 - 155,125 ESALs/year
-
- 1,000 ADT
 - 50% Trucks
 - 155,125 ESALs/year

Traffic Calculation

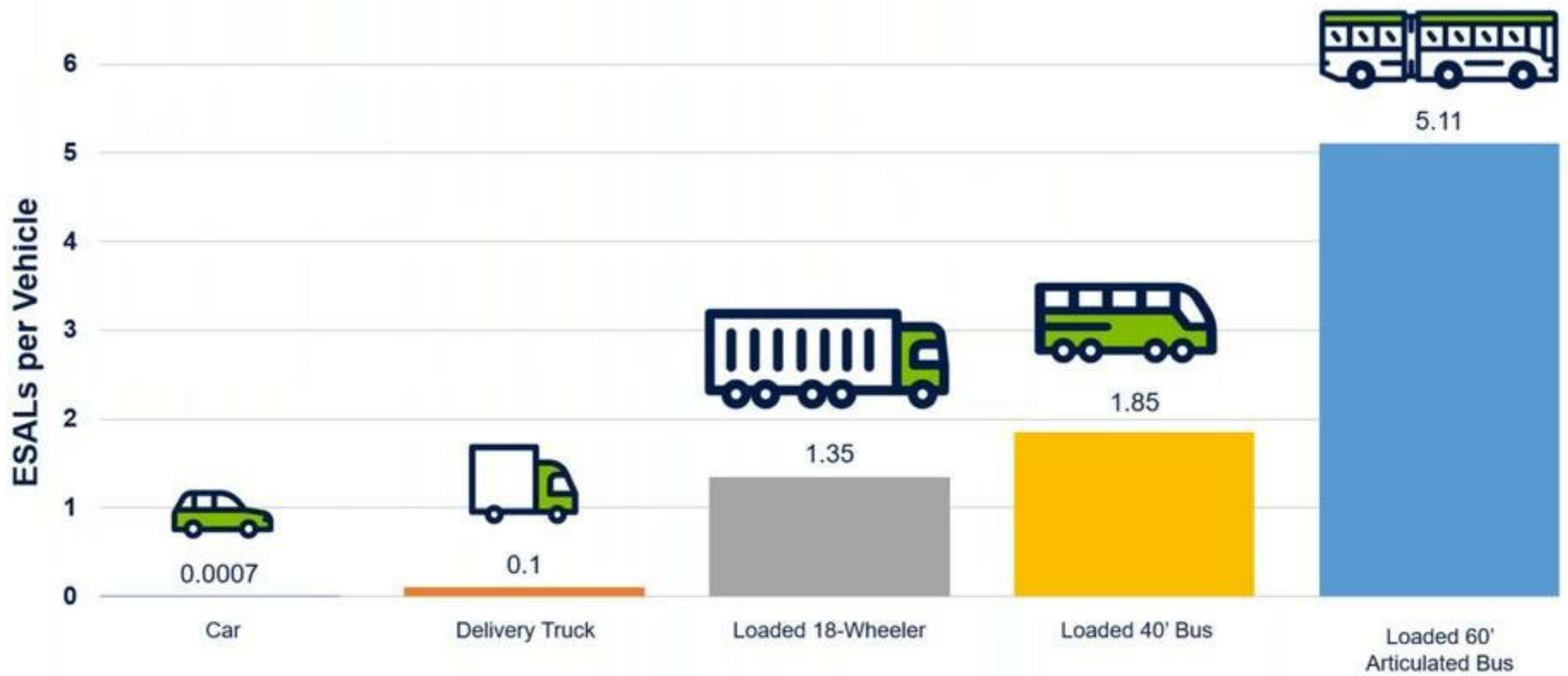
<input checked="" type="radio"/> No. of Years to Project Traffic (yrs):	<input type="text" value="1"/>	Help
<input type="radio"/> Determine Past and Future ESALs		
Two-Way Average Daily Traffic (ADT):	<input type="text" value="1,000"/>	Help
Directional Distribution Factor (%):	<input type="text" value="50%"/>	Help
Design Lane Distribution Factor (%):	<input type="text" value="100%"/>	Help
Growth Rate (%):	<input type="text" value="2%"/>	Help
Percent Trucks (%):	<input type="text" value="50%"/>	Help
Truck Factor (ESALs/Truck):	<input type="text" value="1.7"/>	Help

Submit

ESAL Calculation

Total ESALs: 155,125

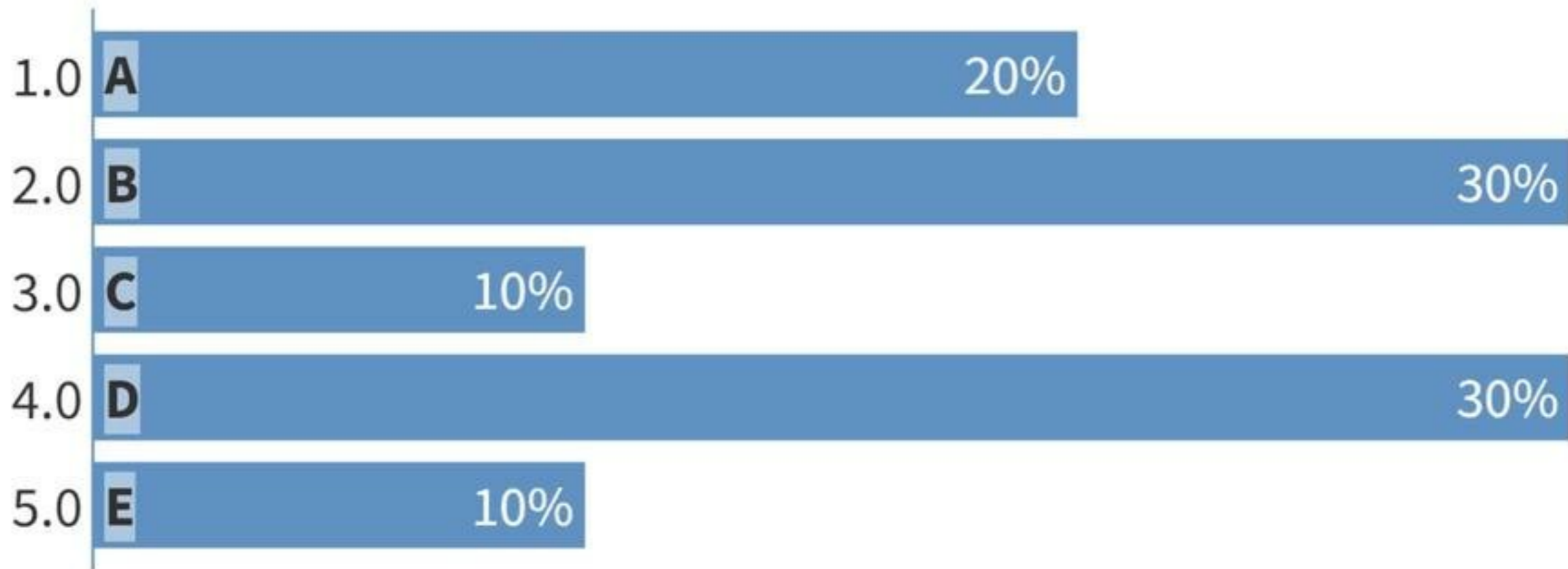
➤ ESALs per Vehicle



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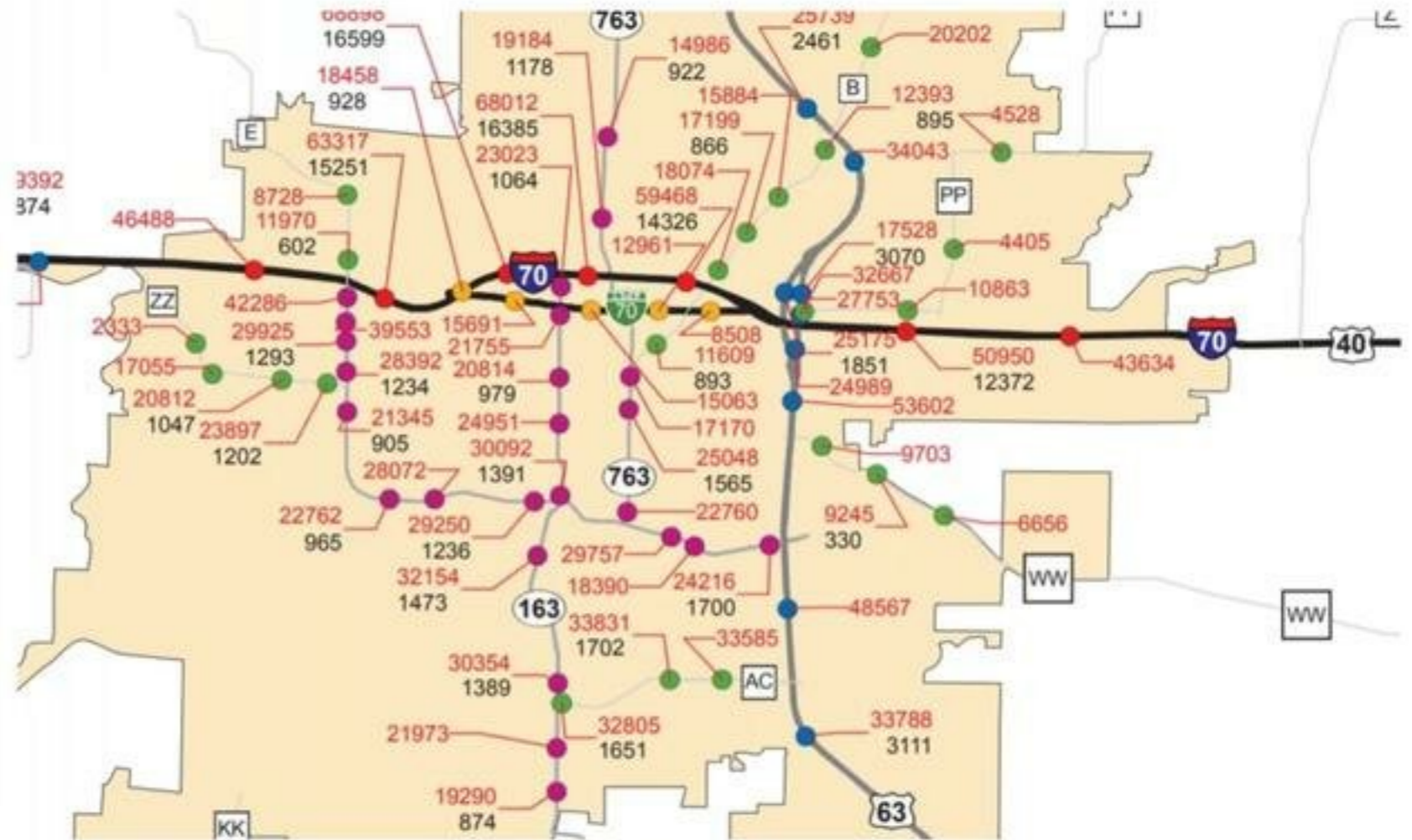
How many ESALs do you think results from a garbage truck?



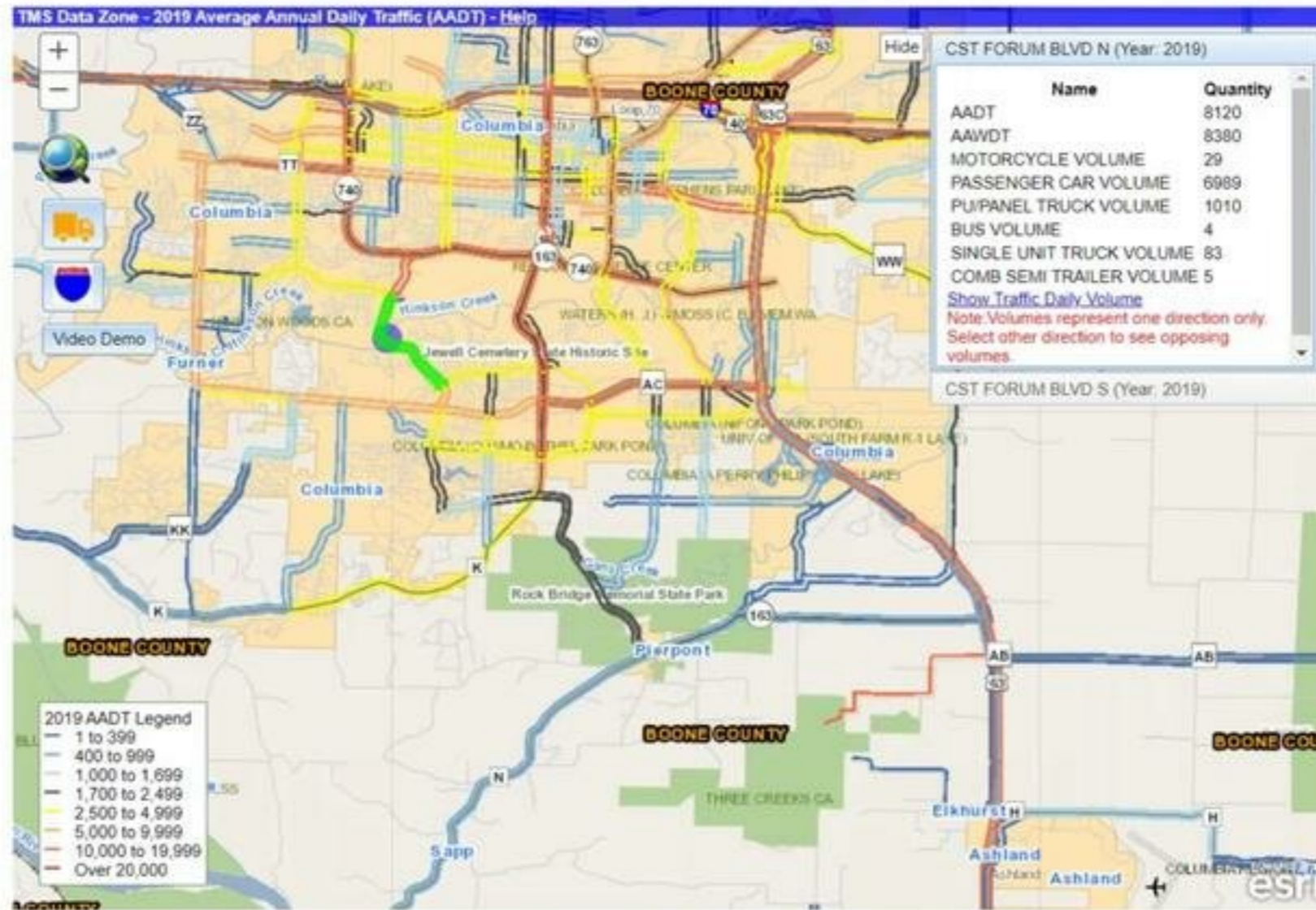
Answers to this poll are anonymous

➤ Methods for Obtaining Volumes

- Historical Counts



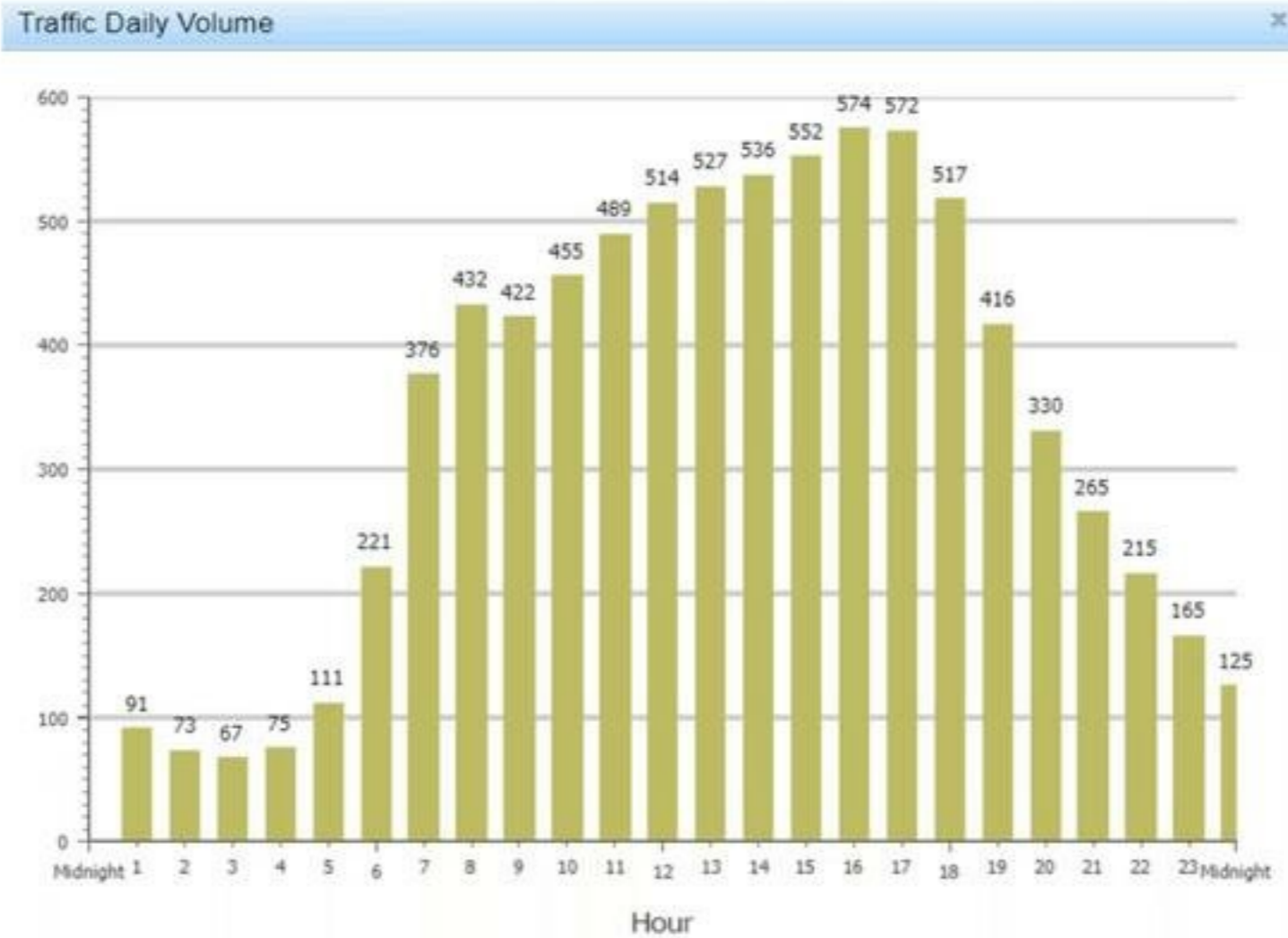
➤ Methods for Obtaining Volumes



Methods for Obtaining Volumes

- Historical Counts
- In-house Counter
- Consulting Firms

➤ Methods for Obtaining Volumes



➤ Types of Traffic Studies

- Intersection analysis
- Traffic impact study
- Corridor lane usage
- City-wide study
- Traffic projections



➤ Components of a Traffic Study

- Existing conditions – data collection
- Proposed project – reason for the traffic study
- Future conditions – design year
- Traffic analysis
- Recommendations

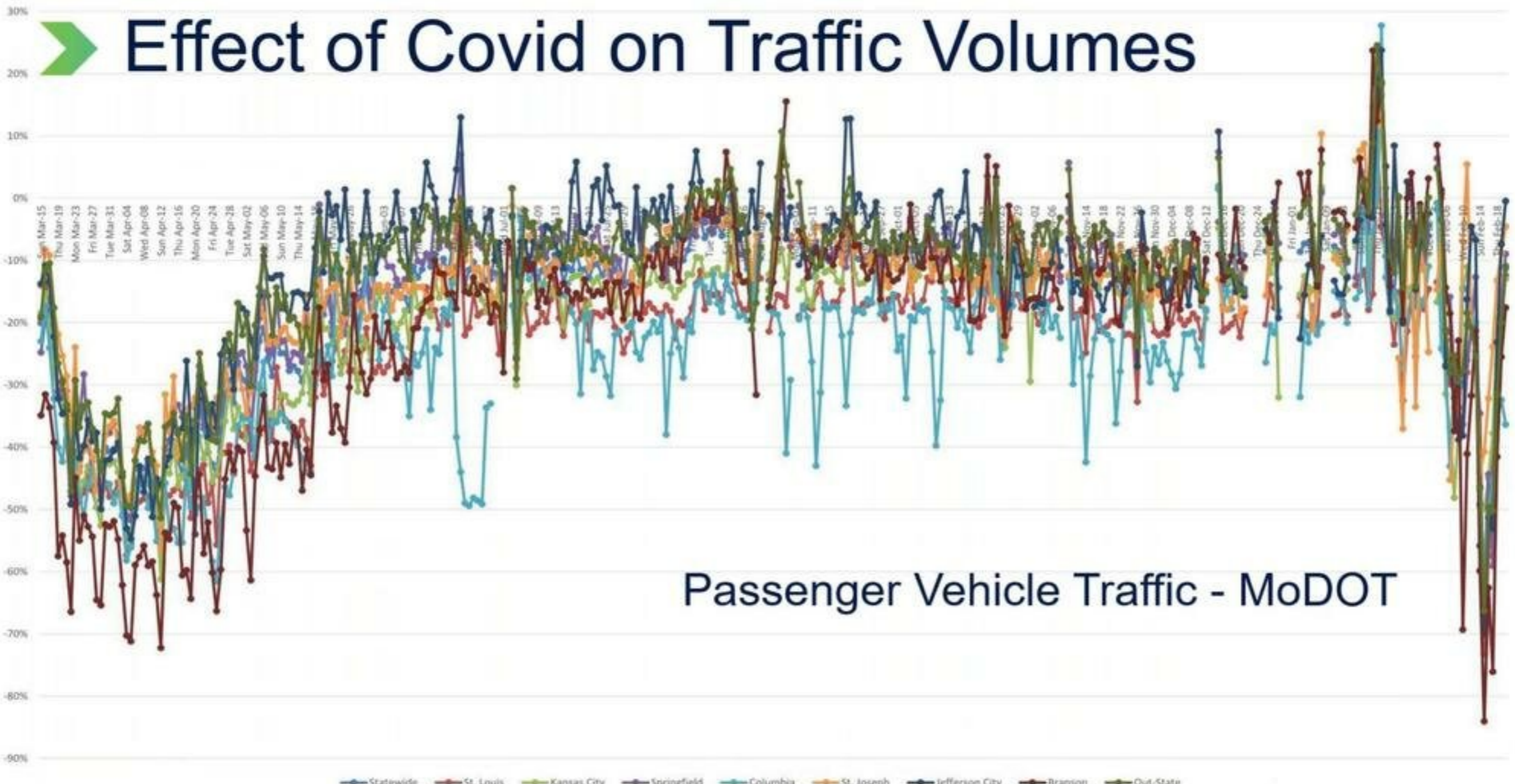
Data Collection

- Intersection/Roadway Layout
- Traffic Volumes
 - Number/Location of Traffic Counts
- Crash Data & Vehicle Speeds

When and Where to Count Traffic

- Count during a "typical" week and weekday
- Changing "typical" due to Covid-19

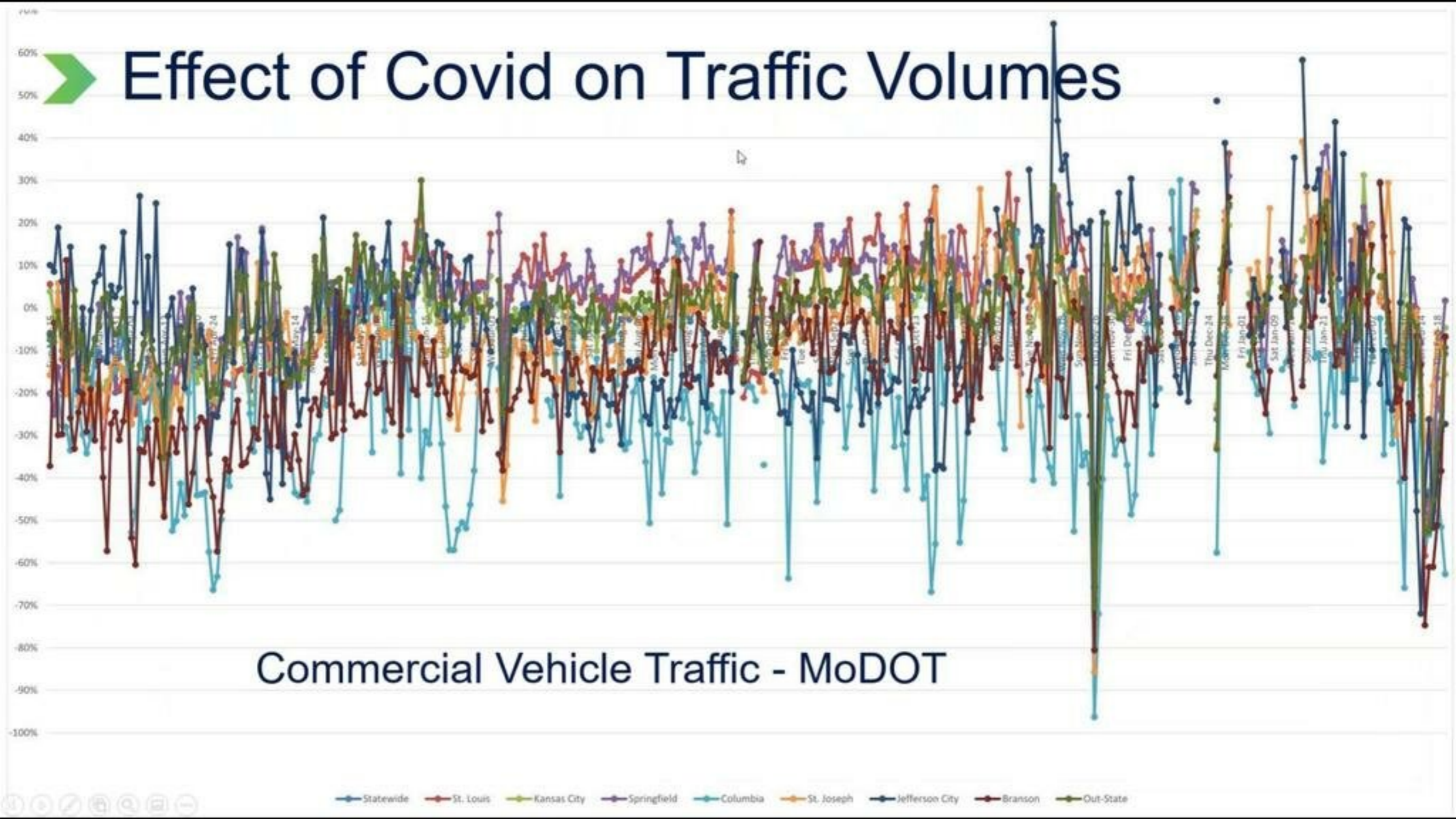
➤ Effect of Covid on Traffic Volumes



Passenger Vehicle Traffic - MoDOT

Statewide St. Louis Kansas City Springfield Columbia St. Joseph Jefferson City Branson Out-State

➤ Effect of Covid on Traffic Volumes



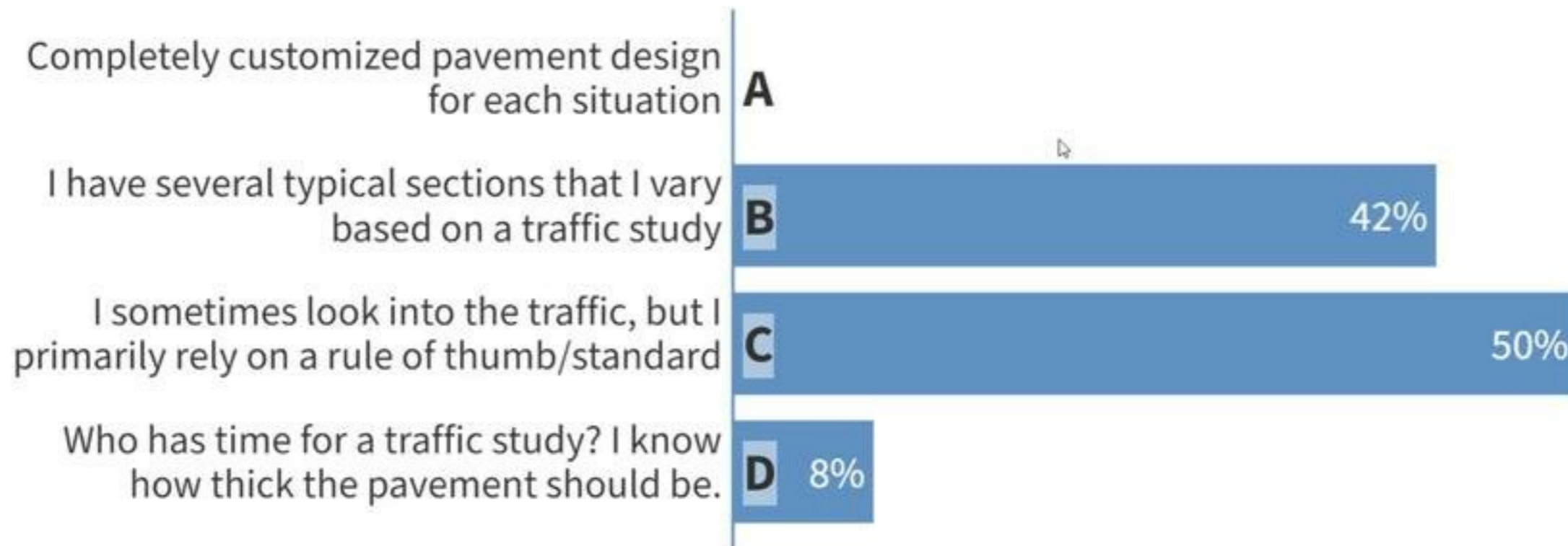
Commercial Vehicle Traffic - MoDOT

Statewide St. Louis Kansas City Springfield Columbia St. Joseph Jefferson City Branson Out-State

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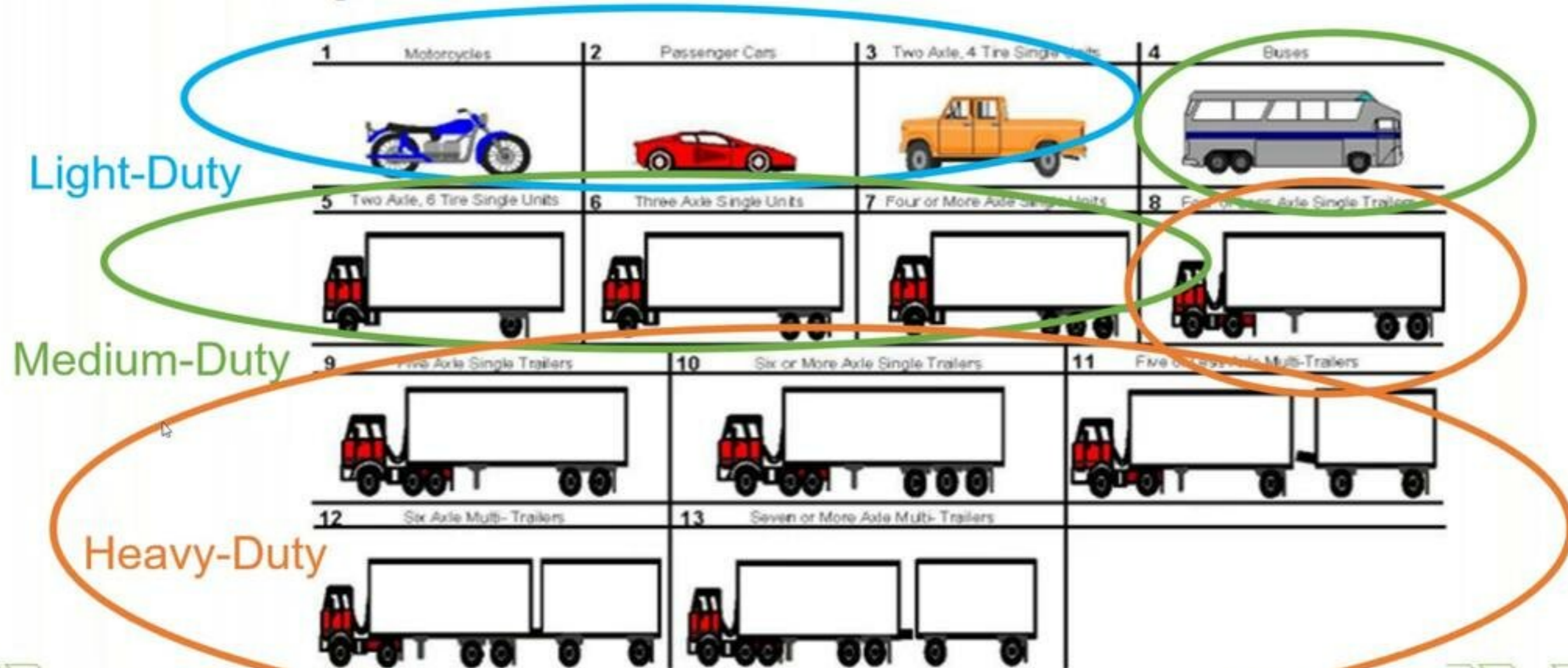
How much do you factor in traffic into your pavement choices?



Answers to this poll are anonymous

➤ Vehicle Classifications

Figure A.1 FHWA Vehicle Classifications



Traffic Volume Collection

- What is a "traffic count"?
 - Intersection Turning Movements
 - Roadway Volumes

➤ Intersection Turning Movements



➤ Roadway Volume

- Tube counts 
- Other traffic recorders
- Traffic Volumes from "Big Data"



Photo Credit:
Tennessee DOT

➤ Roadway Volume – Portable Counters



➤ Other Collection Devices

Radar &
Bluetooth
Detection

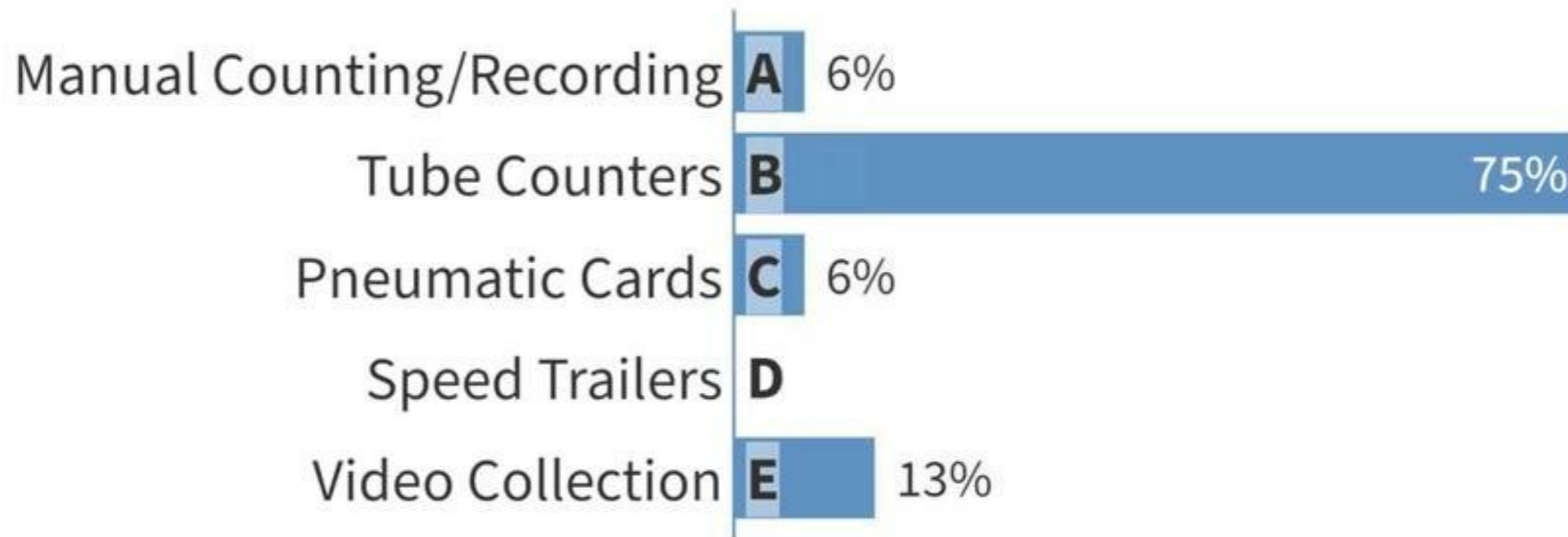


Photo Credit: Minnesota DOT

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What type of traffic counting equipment does your agency/company use the most?



Answers to this poll are anonymous

➤ Making Sense of the Data

Traffic Calculation

No. of Years to Project Traffic (yrs): [Help](#)

Determine Past and Future ESALs

Two-Way Average Daily Traffic (ADT): [Help](#)

Directional Distribution Factor (%): [Help](#)

Design Lane Distribution Factor (%): [Help](#)

Growth Rate (%): [Help](#)

Percent Trucks (%): [Help](#)

Truck Factor (ESALs/Truck): [Help](#)

- Traffic Volumes – ADT
- Directional distribution
- Design lane distribution
- Growth Rate
- Percent Trucks
- Truck Factor

ESAL Calculation

Total ESALs: 155,125

➤ Making Sense of the Data

Traffic Calculation

No. of Years to Project Traffic (yrs): [Help](#)

Determine Past and Future ESALs

Two-Way Average Daily Traffic (ADT): [Help](#)

Directional Distribution Factor (%): [Help](#)

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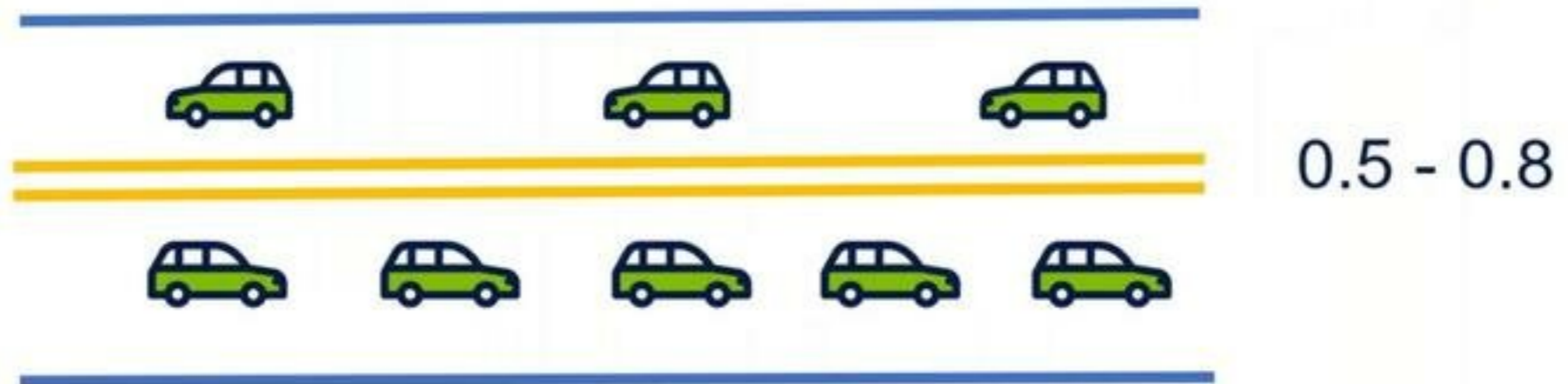
ESAL Calculation

Total ESALs: 155,125

- Traffic Volumes – ADT
- Directional distribution
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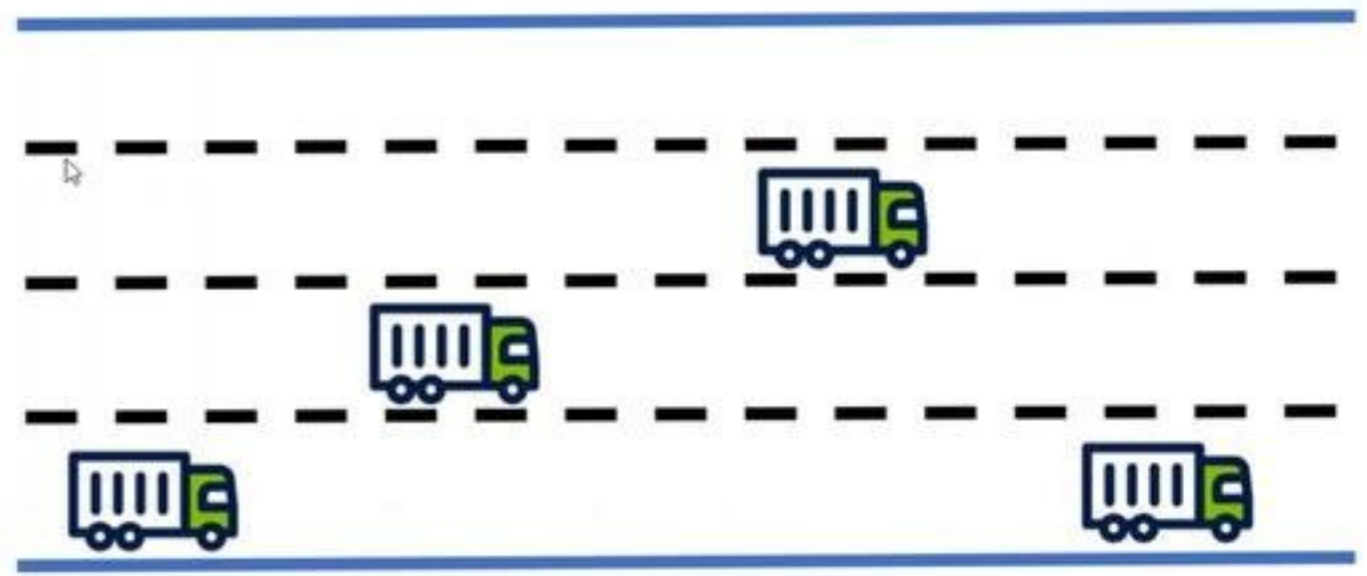
➤ Directional Distribution

- Not always 50-50



➤ Lane Distribution

0.5 - 0.6



0.9

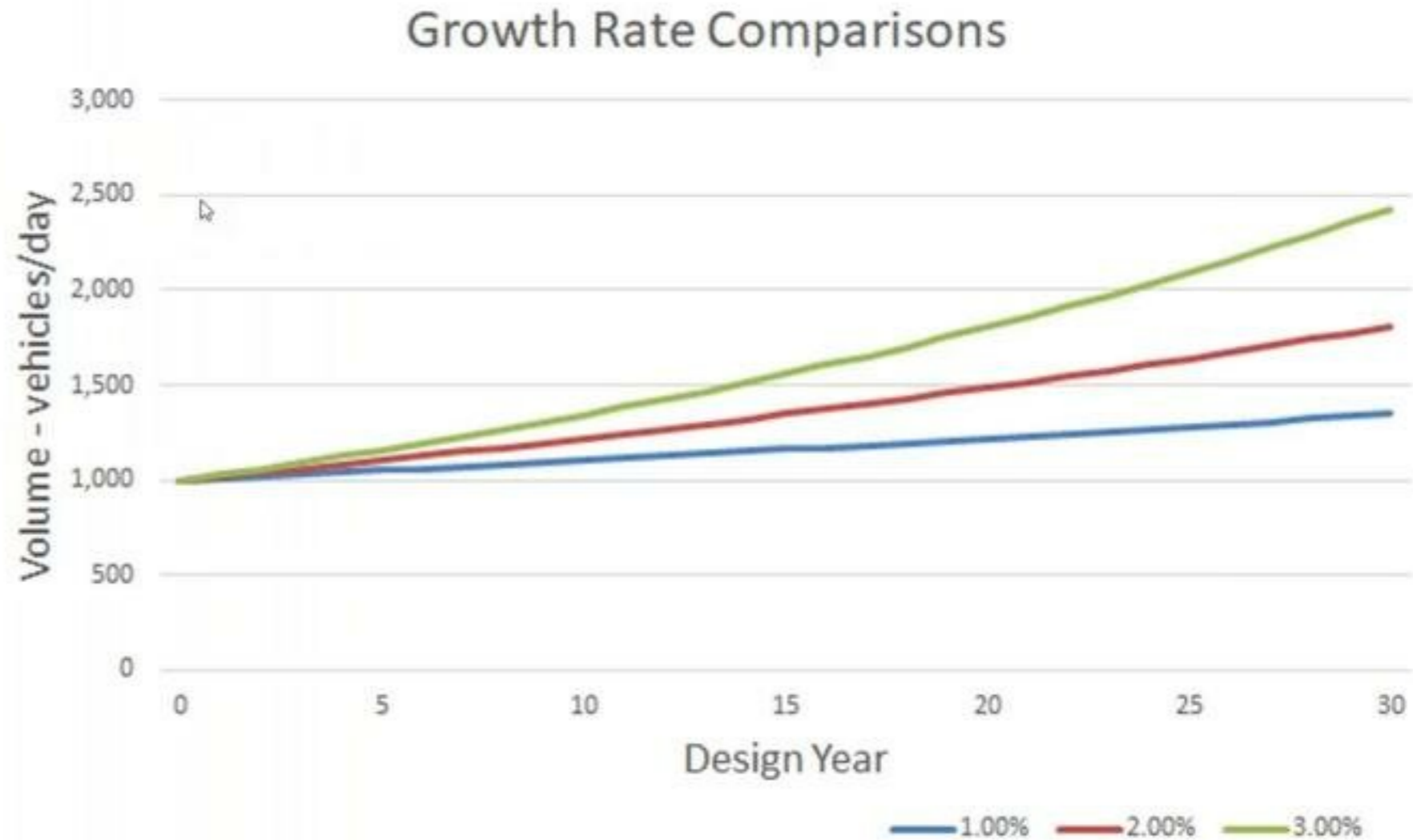


Future Volumes

- Accounting for increases in traffic
 - “Normal” growth
 - Annual, background/percentage growth
 - Site developments
 - New restaurants/shopping/etc. sites

➤ Annual Traffic Volume Growth

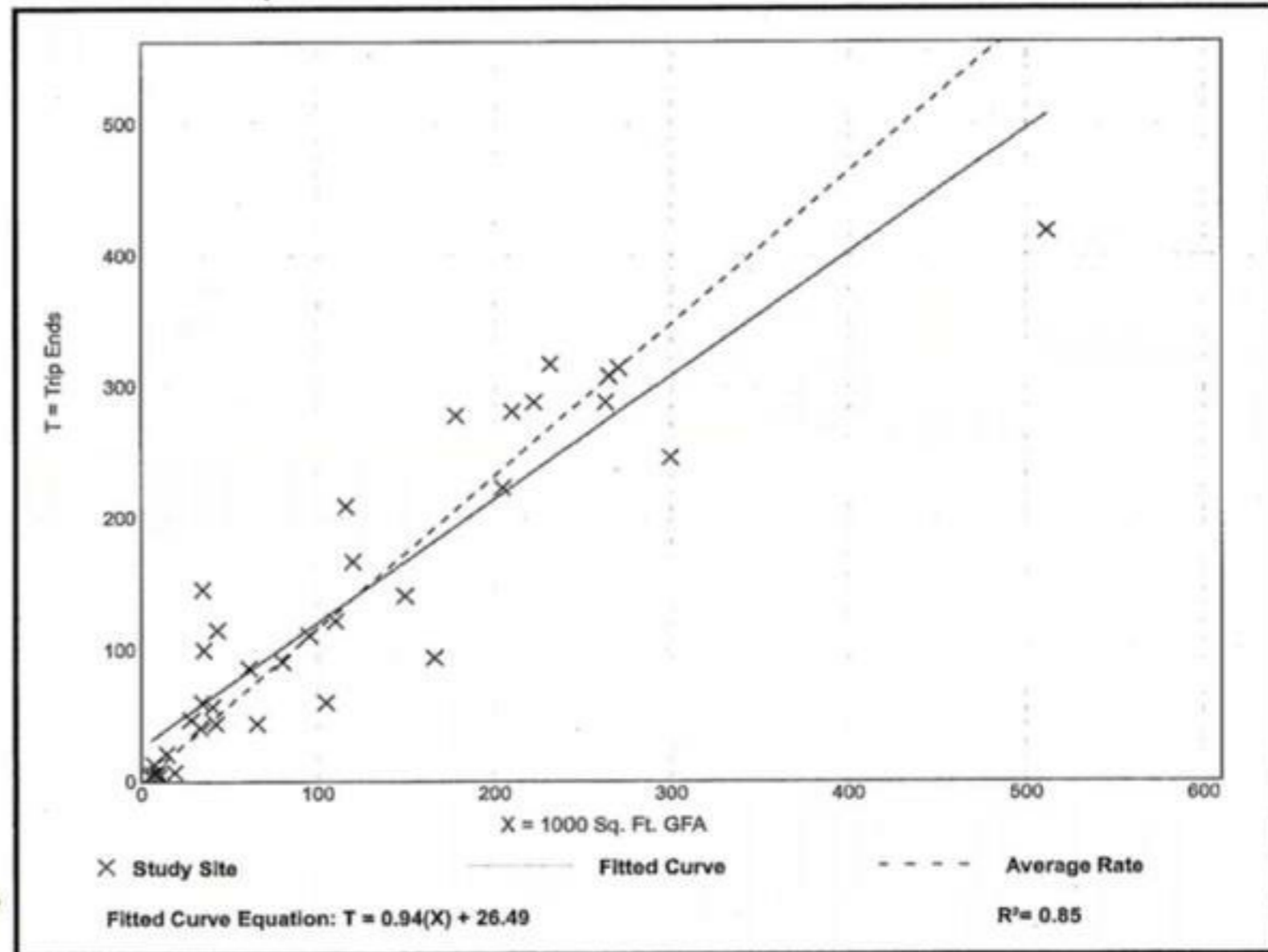
- Starting with 1,000 vehicles/day
- 1% growth
- 2% growth
- 3% growth



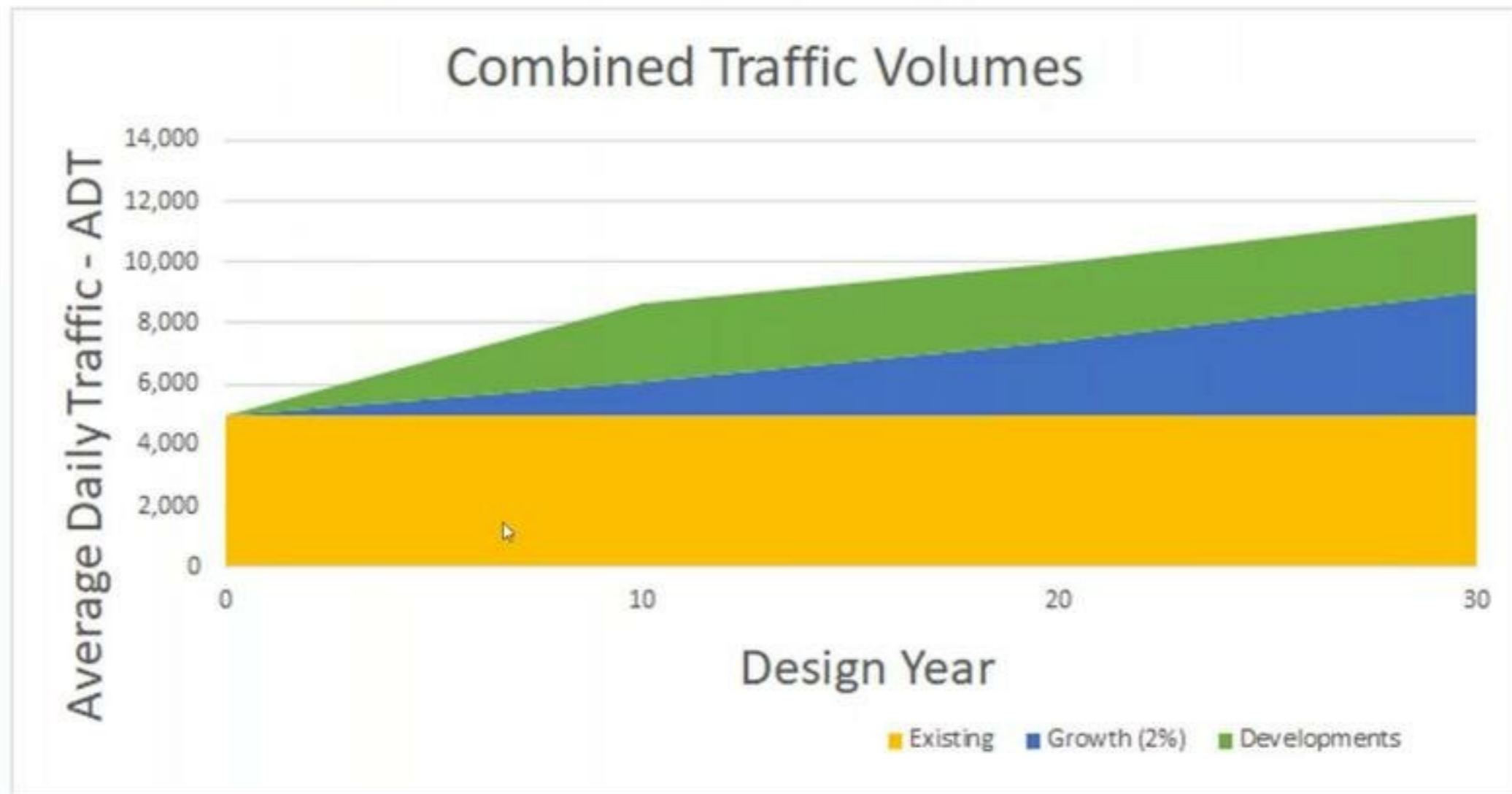
➤ Traffic Volumes for Site Development

- General Office Building
- Weekday
- Morning Peak Hour

Data Plot and Equation



➤ Combined Growth & Developments



➤ Reviewing a Traffic Study

- LOS
 - A – Free Flow
 - B – Reasonably Free Flow
 - C – Stable Flow
 - D – Approaching Unstable Flow
 - E – Unstable Flow
 - F – Forced/Breakdown Flow



➤ What is Needed for Pavement Design

- Projected Traffic Volume
- Truck Percentages
- Distributions

Traffic Calculation

No. of Years to Project Traffic (yrs): [Help](#)

Determine Past and Future ESALs

Two-Way Average Daily Traffic (ADT): [Help](#)

Directional Distribution Factor (%): [Help](#)

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ESAL Calculation

Total ESALs: 155,125

Questions?

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