



Transportation Education Series (TES) Event

# ESTIMATING TRAFFIC VOLUMES WHEN THERE'S NO TRAFFIC

Thursday, April 23, 2020

 **KITTELSON**  
& ASSOCIATES

**Presented by:**

Chris Brehmer, Brian Dunn, and Wayne Kittelson



Thank you for joining us!

# INTRODUCTION

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Today's presentation focuses on a key challenge facing our industry:

- **How can important transportation projects that rely on field-collected volume data continue to move forward?**

# AGENDA

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1

Highlights of White Paper

2

Case Studies

3

Perspective on Future Challenges

4

Questions & Discussion

# “SIGN IN” SHEET AND PDH CREDITS



Please post your name and email in the chat box.



Indicate if you'd like to receive a form for PDH credits.

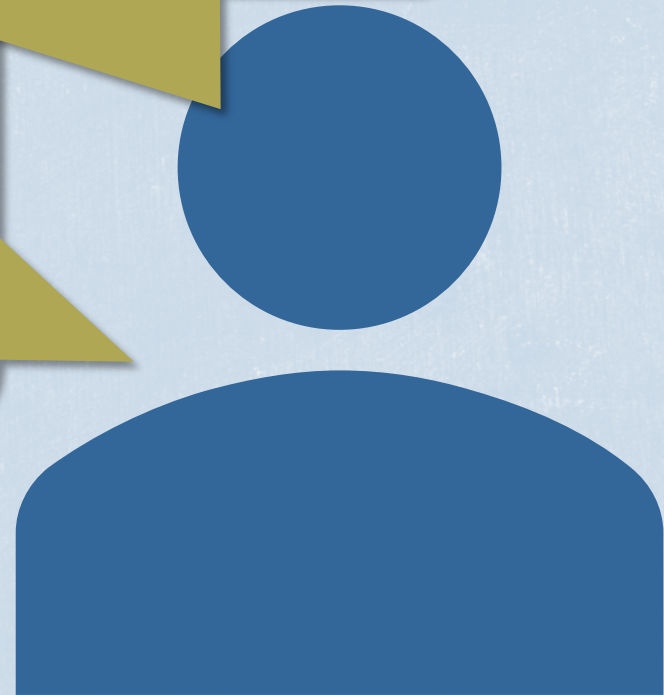


If you are unable to access the chat box but need a form, send Norma Jensen an email:  
[njensen@Kittelson.com](mailto:njensen@Kittelson.com)

# QUESTIONS & DISCUSSION

Use the chat box to post your questions throughout the presentation – we'll field them at the end.

Want to share verbally? Submit request in the chat box and we'll call on you to unmute.



# Finding the Chat Box

MB

AD

BG

WW

Click this icon



## Meeting chat

- Marc Butorac and 4 others joined the meeting.
- bgale@bendoregon.gov joined the meeting.
- Wende Wilber joined the meeting.
- Amy Donald 8:43 AM 4 +1  
Test 1
- 8:43 AM 4  
Test 2
- bgale@bendoreg... 8:44 AM 4  
test 3

# HIGHLIGHTS OF APRIL 2<sup>ND</sup> WHITE PAPER

## “Estimating Traffic Volumes Under COVID-19 Pandemic Conditions”

- Identifies 4-step process to developing proxy volume estimates

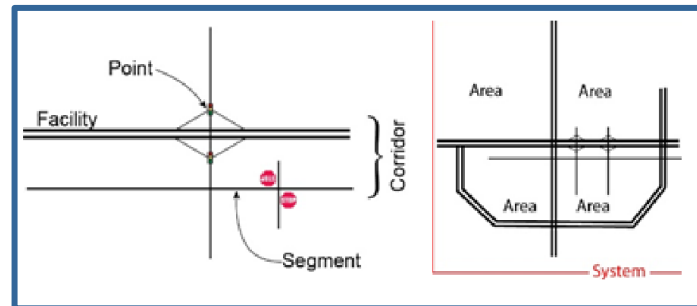
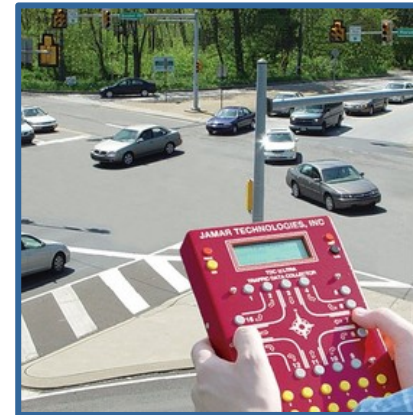


# HIGHLIGHTS OF APRIL 2<sup>ND</sup> WHITE PAPER

# STEP 1

## Establish project context and data needs

- What type of facility being analyzed?
- What are modal considerations?
- What type of data is needed?
- What are critical analysis periods?



Type of peak hour being reported: Intersection Peak Method for determining peak hour: Total Entering Volume

LOCATION: Boones Ferry Rd - Kruse Way PI QC JOB #: 11338801  
 CITY/STATE: Lake Oswego, OR DATE: Tue, Sep 24 2013

Peak-Hour: 4:45 PM - 5:45 PM  
 Peak 15-Min: 5:00 PM - 5:15 PM

5-Min Count Period	Boones Ferry Rd (Northbound)			Boones Ferry Rd (Southbound)			Kruse Way PI (Eastbound)			Kruse Way PI (Westbound)			Total	Hourly Totals		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right				
Beginning At	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:00 PM	1	120	0	0	1	113	4	0	0	0	0	0	248			
4:05 PM	2	1	0	2	103	4	0	3	1	7	0	2	0	262		
4:10 PM	3	132	3	0	3	78	7	0	5	0	4	0	1	0	238	
4:15 PM	0	137	1	0	1	93	4	0	8	1	2	0	0	0	247	
4:20 PM	2	124	1	0	0	92	11	0	7	0	3	0	4	0	244	
4:25 PM	1	129	1	1	1	128	2	0	10	0	2	0	1	0	277	
4:30 PM	0	117	1	0	0	92	4	0	0	0	1	0	0	0	225	
4:35 PM	3	115	1	0	1	103	6	0	9	0	2	0	1	0	242	
4:40 PM	0	123	0	0	0	114	5	0	5	0	4	0	0	0	258	
4:45 PM	3	158	3	0	1	86	7	0	8	0	4	0	2	1	273	
4:50 PM	2	138	1	0	0	109	3	0	7	0	1	0	1	0	264	
4:55 PM	1	120	1	0	0	87	7	0	15	0	3	0	0	0	235	
5:00 PM	2	140	2	0	0	92	3	0	9	1	8	0	7	1	0	265
5:05 PM	0	147	0	0	0	145	11	0	18	0	5	0	1	0	1	328
5:10 PM	1	139	1	0	1	108	8	0	8	0	2	0	0	0	270	
5:15 PM	0	130	0	0	1	102	3	0	4	0	6	0	1	0	0	247
5:20 PM	0	168	1	0	0	109	5	0	13	0	2	0	0	0	299	
5:25 PM	0	145	0	0	1	106	7	0	6	0	0	0	2	0	0	267
5:30 PM	0	127	1	0	1	91	7	0	6	0	5	0	1	0	0	239
5:35 PM	2	111	4	0	2	92	7	0	9	0	3	0	3	0	233	
5:40 PM	1	155	1	0	0	111	5	0	8	0	3	0	2	0	1	287
5:45 PM	0	143	3	0	0	100	4	0	11	0	1	0	1	0	265	
5:50 PM	1	129	0	0	1	83	4	0	11	0	0	0	3	0	235	
5:55 PM	0	159	1	0	0	87	7	0	4	0	1	0	0	0	242	
Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total			
All Vehicles	12	1704	12	0	4	1360	88	0	140	4	60	0	40	4	4	3452
Heavy Trucks	0	16	0	0	0	44	0	0	0	0	0	0	0	0	0	60
Pedestrians	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	8
Bicycles	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Stopped Buses																

Comments:  
 Report generated on 9/25/2013 9:24 PM SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212



# HIGHLIGHTS OF APRIL 2<sup>ND</sup> WHITE PAPER

# STEP 2

## Coordinate with appropriate agencies

- Develop scope-of-work
  - Recent success with ODOT, Hillsboro, other agencies
- Identify example case studies/validation efforts
  - Finding early success using historical data 2-5 years old
- Explore available agency data
  - Agency data not always centralized
- Data collection policy changes due to COVID-19



CLARK COUNTY WASHINGTON

**PUBLICWORKS**  
TRANSPORTATION

[www.clark.wa.gov](http://www.clark.wa.gov)

1300 Franklin Street  
Vancouver, WA 98666-9810  
564-397-2446

### MANAGEMENT DECISION

**DATE:** March 20, 2020  
**FROM:** Ahmad Qayoumi, PE, Public Works Director, County Engineer  
**Via:** David Jardin, Concurrency Engineer  
**CC:** File  
**RE:** Guidance – Required Traffic Count Data, Collection and Processing

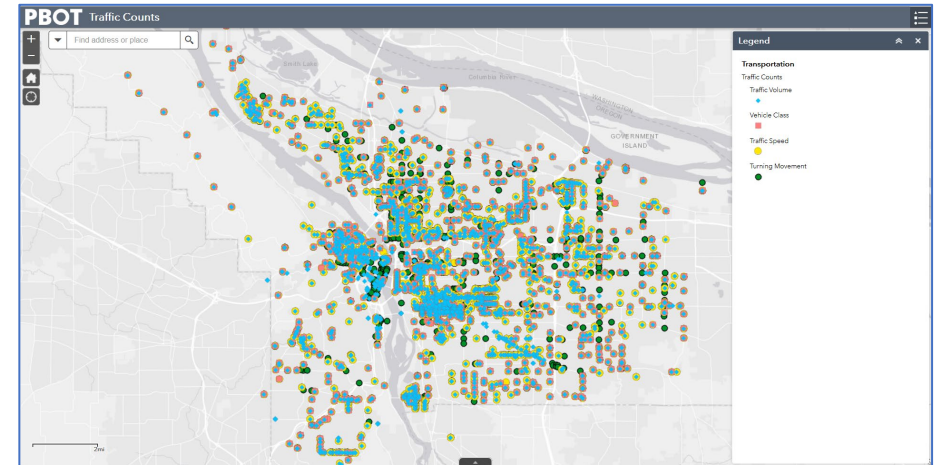
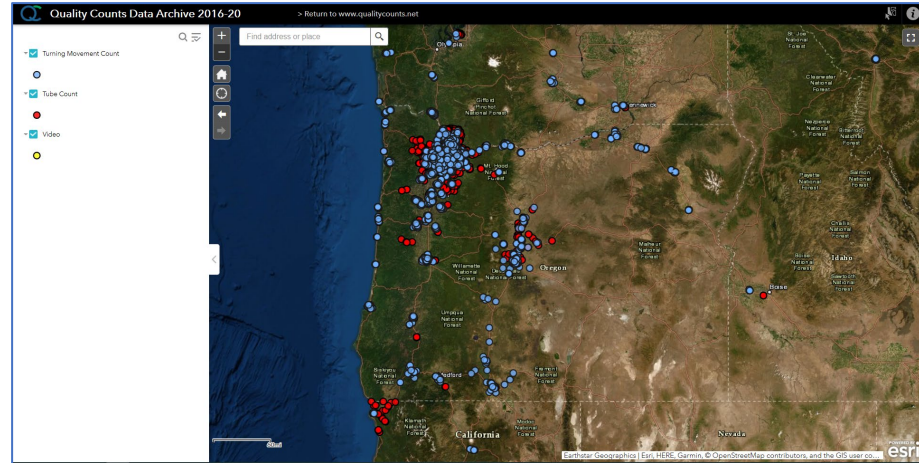
# HIGHLIGHTS OF APRIL 2<sup>ND</sup> WHITE PAPER

# STEP 3

## Identify available data resources

### Externally-observed data (i.e. counts)

- Traffic data collection companies
- Public agency count programs
- Opportunity for more data within agency-based programs? (e.g. ODOT, Washington County, Clark County)



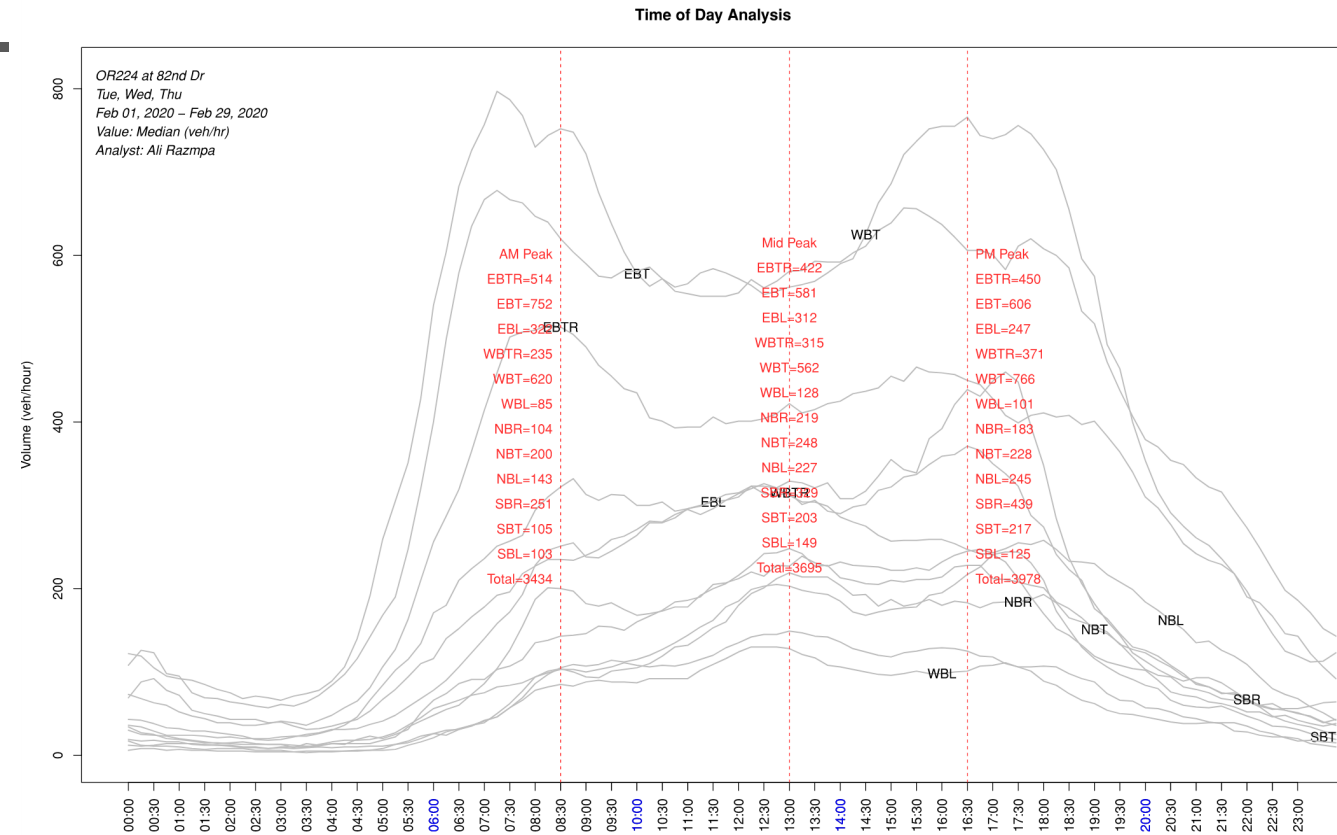
# HIGHLIGHTS OF APRIL 2<sup>ND</sup> WHITE PAPER

# STEP 3

## Identify available data resources

### Externally-observed data (contd.)

- Published studies
  - Long range system plans
  - Corridor plans
  - Capital improvement plans
  - Traffic impact studies
- Advanced Traffic Controllers (ATC's)
  - Some ODOT signals can provide vehicle detection data



# HIGHLIGHTS OF APRIL 2<sup>ND</sup> WHITE PAPER

# STEP 3

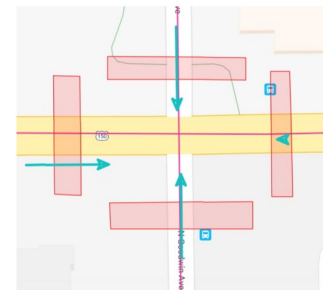
## Identify available data resources

### User-generated data (i.e. "Big Data")

- Emerging technologies using probe data
  - Location-based (GPS/freight navigation)
  - Communication-based (Cell phone/Bluetooth/Wi-Fi)
  - Connected vehicles
- Traffic Data Aggregators & Vendors
  - INRIX
  - Wejo
  - StreetLight
  - Moonshadow



Source: Moonshadow



Source: StreetLight

# HIGHLIGHTS OF APRIL 2<sup>ND</sup> WHITE PAPER

## STEP 4

### Develop proxy volume estimates

Method 1: Adjustments to externally-observed data

Method 2: Adjustments to user-generated data



# CASE STUDY

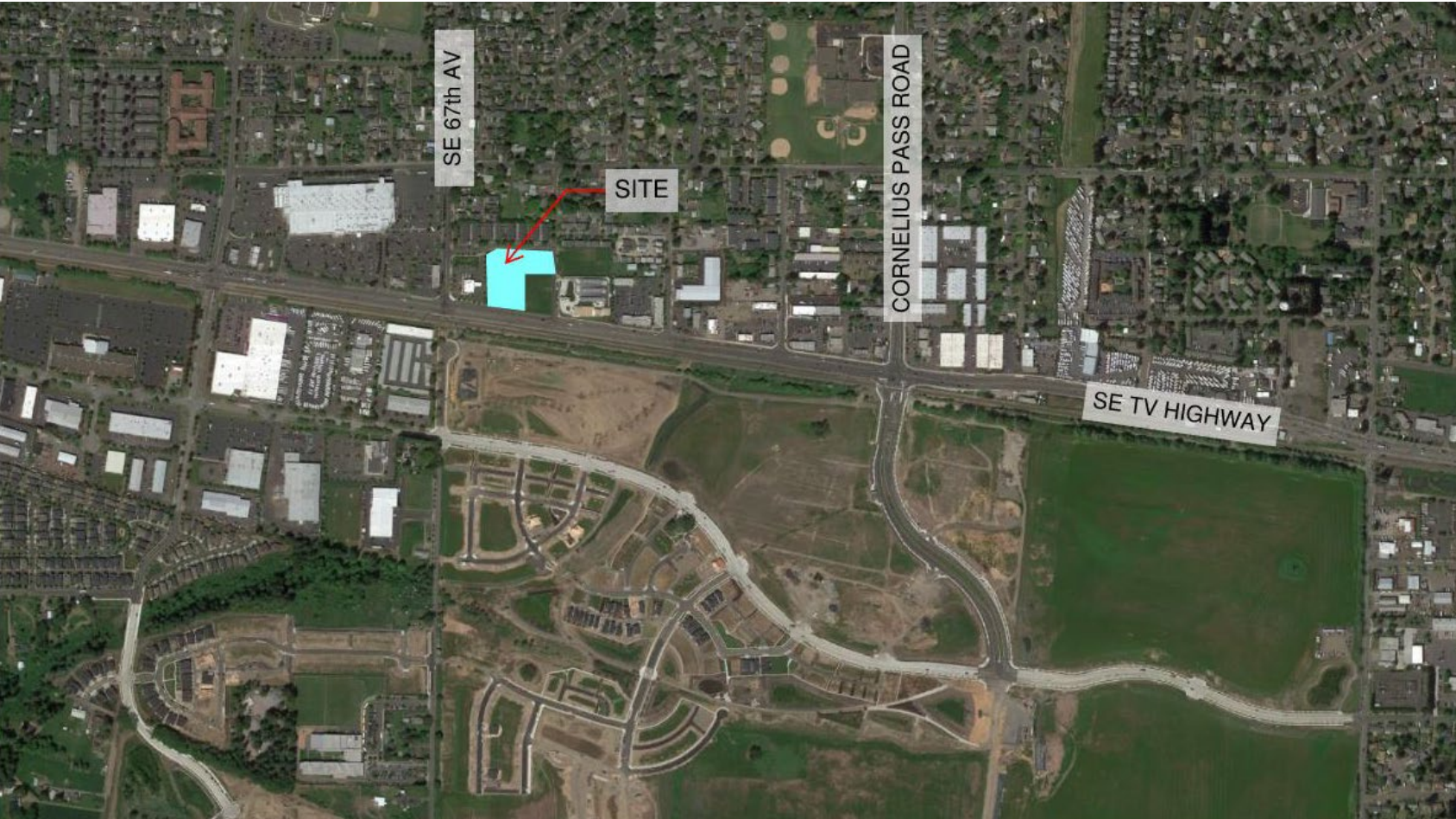
# #1

**PRIVATE DEVELOPMENT TRAFFIC IMPACT ANALYSIS  
HILLSBORO, OR**

Method 1: Adjustments to externally-observed data



# INFILL DEVELOPMENT



**STEP 1:**  
Establish project  
context & data  
needs





# DATA AVAILABLE



4/23/2020

## STEP 3:

Identify available data resources

Image source: Google Earth  
2019 Aerial Photography

# DATA AVAILABLE: 2013 VS. 2018



**STEP 3:**  
Identify available  
data resources

## Changes:

- SE 229<sup>th</sup> Avenue closed south of TV Highway in 2018
- New north-south and east-west roads in 2018
- New carwash opens October 2016

Image sources: Google Earth 2013 and 2019 Aerial Photography

# DEVELOPING PROXY VOLUMES



## 1. Develop 2020 estimate of 67<sup>th</sup>/TV Highway (traffic signal controlled)

- Start with June 2018 count
  - (no October 2018 count available)
- Account for new network re-routing using nearby June and October 2018 counts (4-legged vs. 3-legged)
- Account for growth 2018-2020
- *Evaluate early February 2020 (pre-COVID 19) ODOT detector data to assess 2020 traffic counts and compare*

Image source: Google Earth  
2013 Aerial Photography

## STEP 4: Develop proxy volume estimates

Method 1: ←  
Adjust externally-observed data

# DEVELOPING PROXY VOLUMES



## 2. Develop 2020 estimate of 70<sup>th</sup>/TV Highway (stop controlled)

- Begin with 2013 turn movement count
- Further grow north-south from 2013 count assuming 7 years of local growth rate
- Add carwash count estimate using ITE *Trip Generation Manual* data
- Finesse as appropriate and balance 2020 estimated east-west TV Highway through from 67<sup>th</sup> Avenue

## 3. Repeat steps for other intersections

Image source: Google Earth  
2013 Aerial Photography

## STEP 4: Develop proxy volume estimates

Method 1: ←  
Adjust externally-observed data



# CASE STUDY

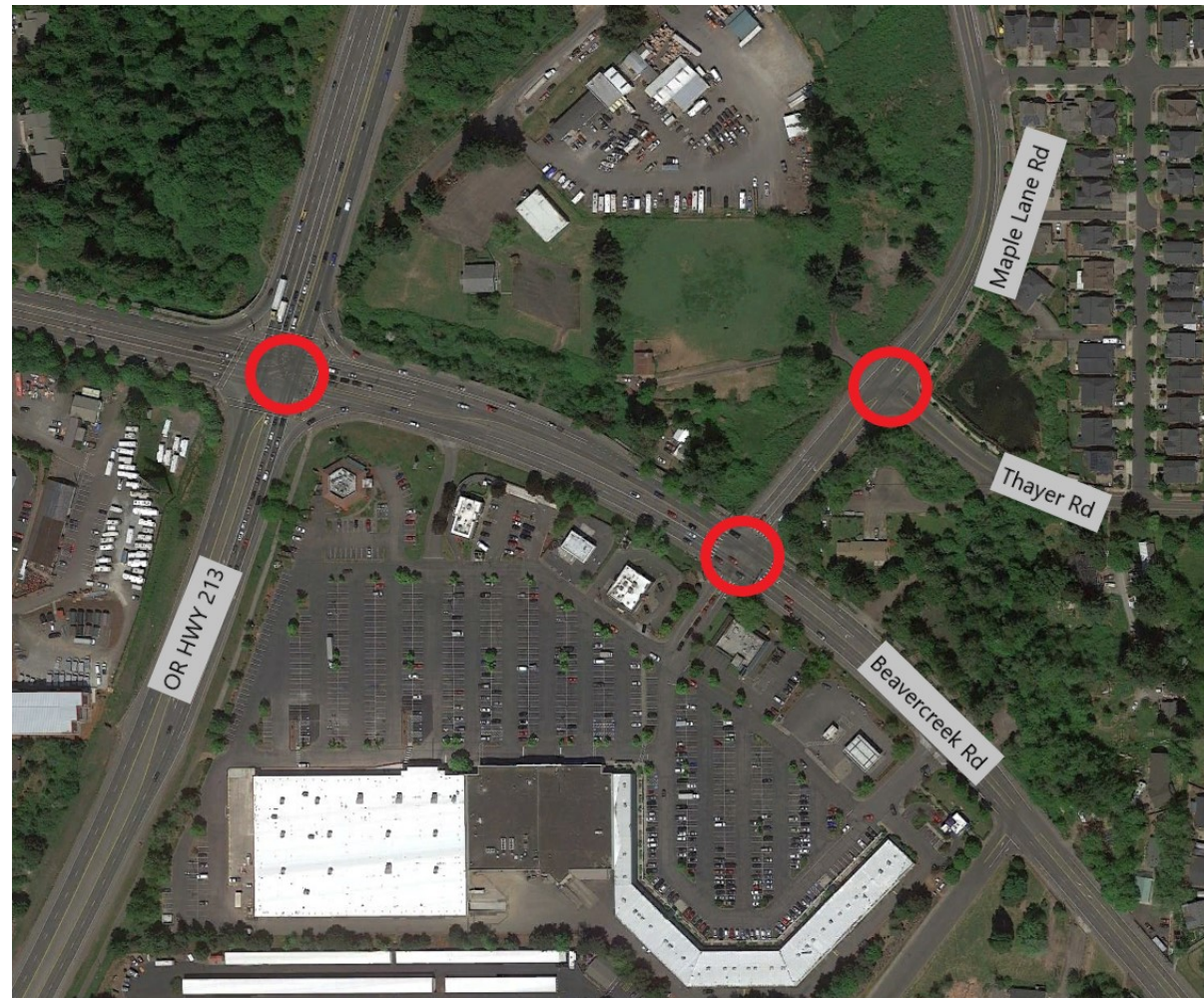
# #2

INDEPENDENT RESEARCH PROJECT  
OREGON CITY, OR

Method 2: Adjustments to user-generated data



# STUDY INTERSECTIONS



## Selected Intersections

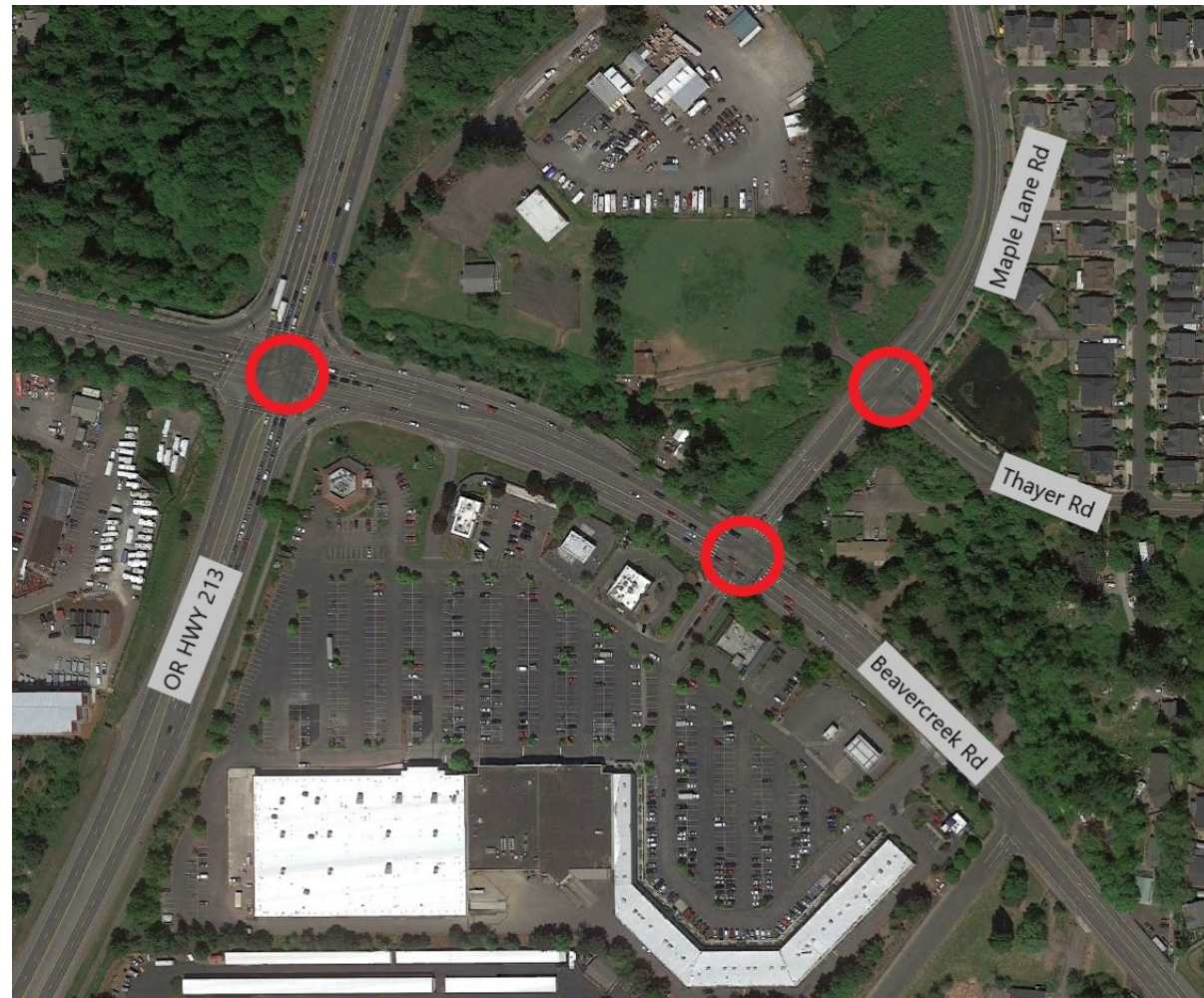
- In series
- Non-contiguous

## Diverse Conditions

- Unique roadway functional classifications
- Different land uses feeding into each intersection
- Highway is commuter corridor
- Commercial driveway

**STEP 1:**  
Establish project  
context & data  
needs

# STUDY INTERSECTIONS

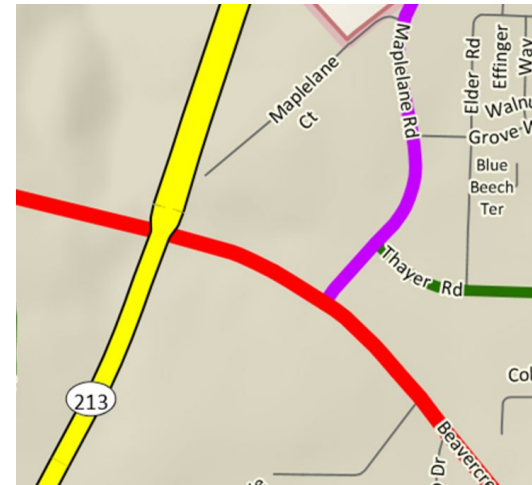


## ODOT

- OR Hwy 213 (Expressway)

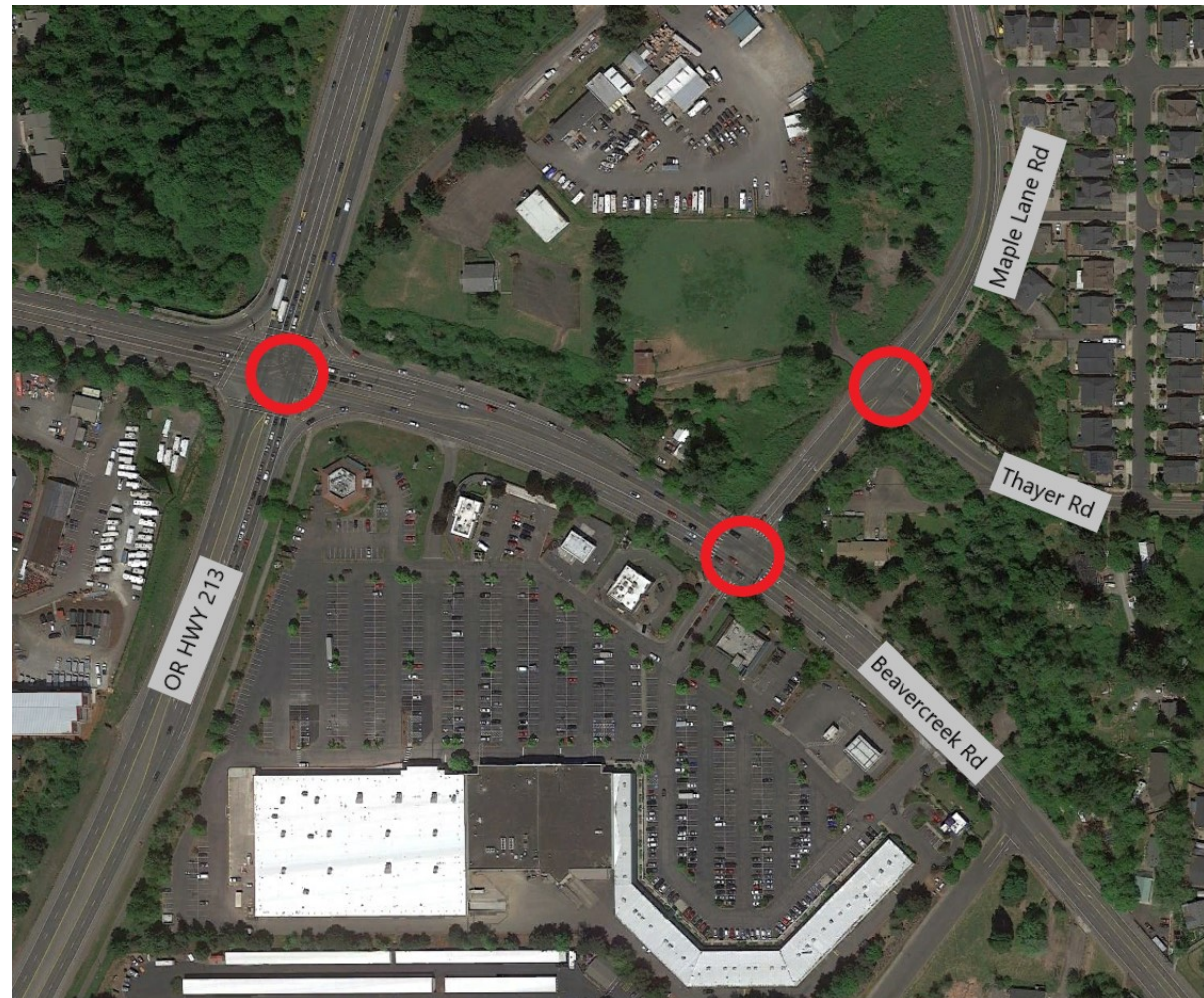
## Oregon City

- Beaver Creek Rd (Major Art.)
- Maple Lane Rd (Minor Art.)
- Thayer Rd (Collector)



**STEP 1:**  
Establish project  
context & data  
needs

# JURIS. MOBILITY STANDARDS



## ODOT

- Alternative mobility target (3 highest hours)

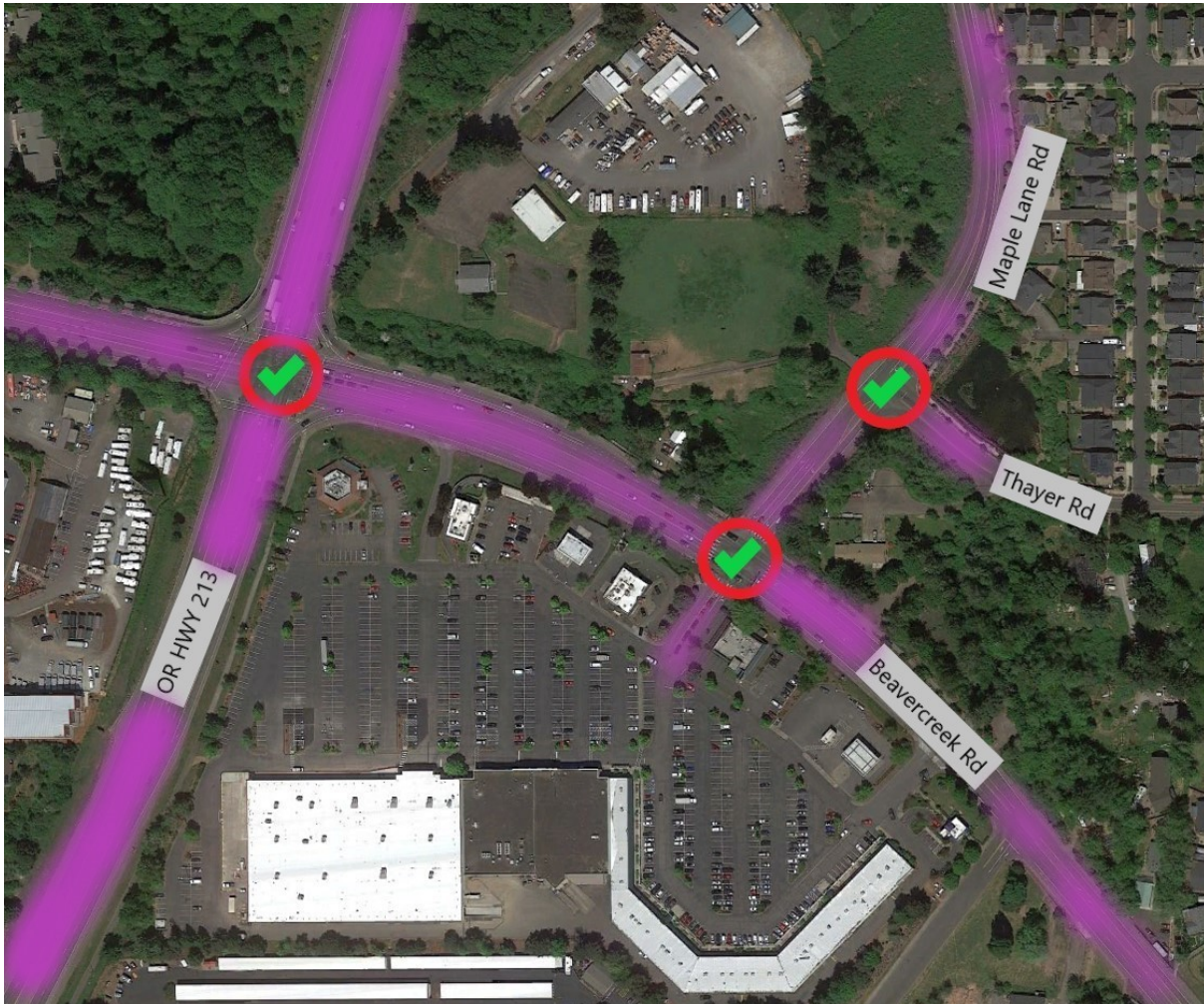
## Oregon City

- Peak hour standard (Weekday AM & PM/  
Saturday midday)

**STEP 2:**  
Coordinate with  
appropriate  
agencies



# DATA AVAILABLE



## Turn Movement Counts

- Mid-February 2020
- Weekday 3:30-6:30 PM

## “Big Data”

- Probe data for entire month of February 2020

## STEP 3:

Identify available data resources

# DEVELOPING PROXY VOLUMES

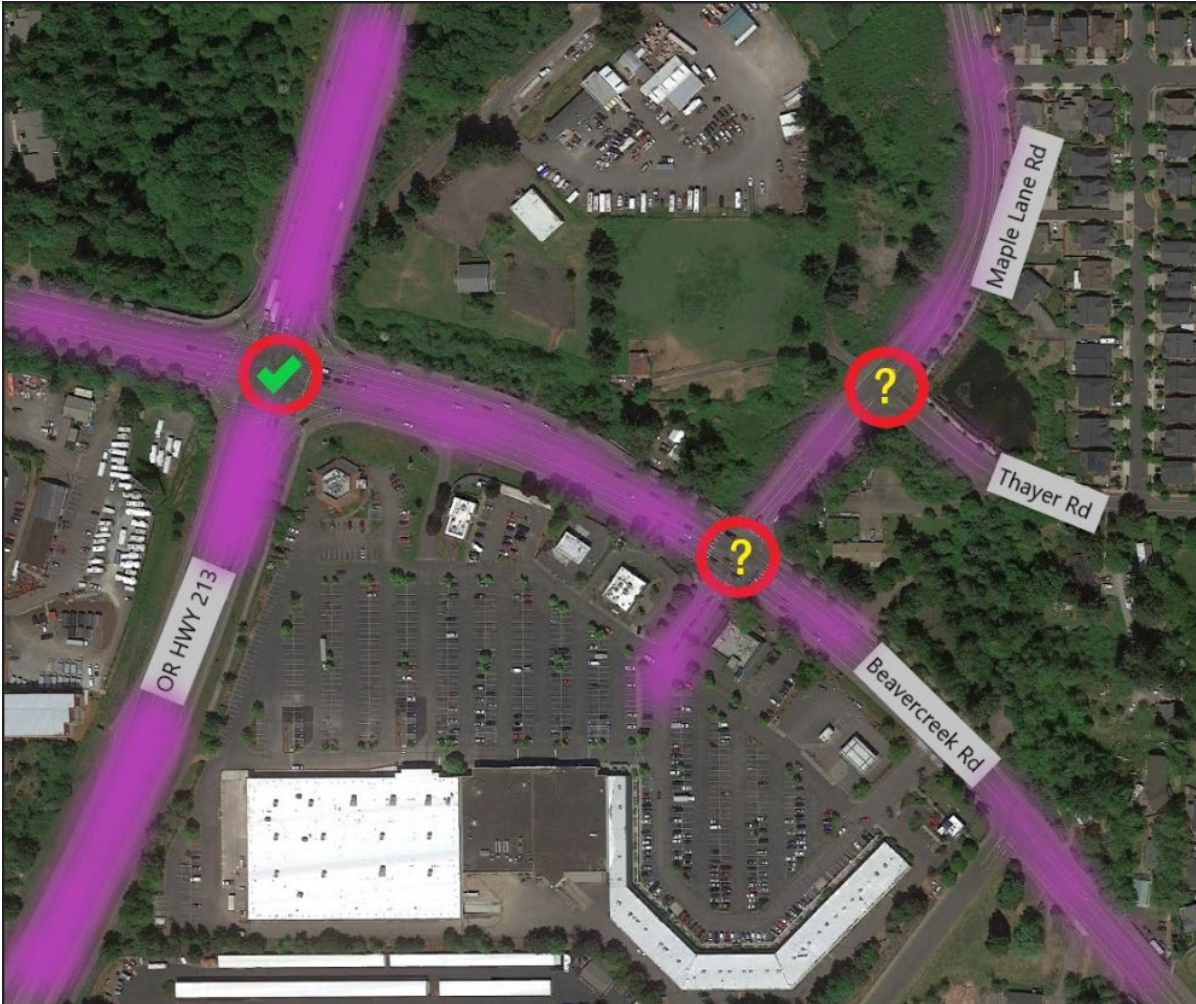


Image source: Google Earth Aerial Photography

## Test #1 - Spatial

- Use system probe data and known count at 1 location
- Develop proxy volumes for other 2 locations
- Validate process using known counts at other 2 locations

## STEP 4: Develop proxy volume estimates

Method 2: ←  
Adjust user-generated data

# DEVELOPING PROXY VOLUMES

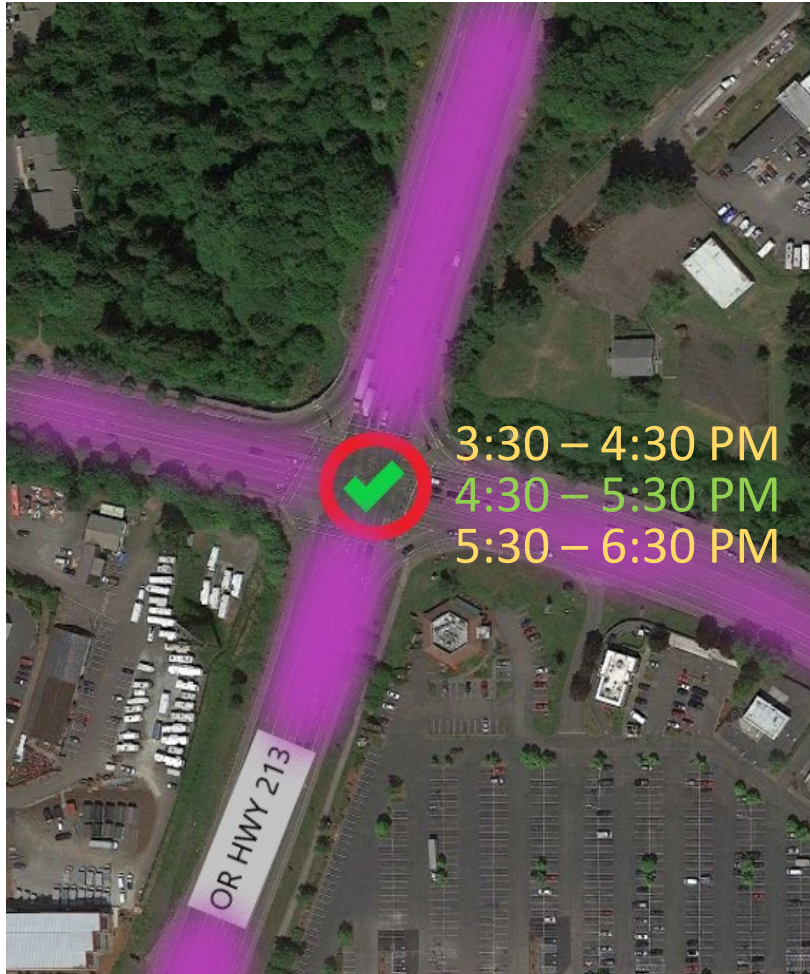


Image source: Google Earth Aerial Photography

## Test #2 - Temporal

- Use system probe data and known 1-hour count
- Develop proxy volumes for adjacent 2 hours
- Validate process using 3-hour known count at location

## STEP 4: Develop proxy volume estimates

Method 2: ←  
Adjust user-generated data

# FUTURE CHALLENGES IN PREDICTING TRAVEL DEMAND

## Near-Term Projections (1-5 years)

- Future background conditions <> pre-COVID conditions
  - Fundamental trip making characteristics that may change permanently:
    - Trip generation
    - Trip distribution
    - Mode split
- Possible approach:
  - Rely on available tools and fundamental trip-making variables that will remain the same
    - Population and employment will remain the same in scale and distribution
    - Existing travel demand models may be the best available predictive tool
    - Apply a scenario-based planning approach (“reasonable worst case”, “most likely case”, and “reasonable best case”)

# FUTURE CHALLENGES IN PREDICTING TRAVEL DEMAND

## Mid-Term Projections (5-15 years)

- Expected Status of Key Trip-Making Characteristics:
  - Some behavioral changes will have dissipated and others will remain
  - Recession effects will have been incorporated into ambient demand levels
  - Technology-driven changes will have been accelerated
- Possible approach:
  - Apply travel demand models to an updated “most likely” scenario
  - Ignore current near-term economic forecasts
  - Apply current 20-year forecasts of technology-driven trip-making changes

# FUTURE CHALLENGES IN PREDICTING TRAVEL DEMAND

## Long-Term Projections (15-25 years)

- Expected Status of Key Trip-Making Characteristics:
  - Currently unknown factors and future events are likely to affect these projections as much or more than the permanent behavioral, locational, and trip making effects of the COVID crisis.
- Possible approach:
  - Extrapolate mid-term assumptions cited earlier regarding technology-driven changes

# QUESTIONS & DISCUSSION



**Ideas?**  
**Current Challenges?**  
**Alternative Solutions?**



# THANK YOU FOR PARTICIPATING!



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