WHILE YOU WAIT...

Visit www.menti.com and when prompted enter code 68 79 49 7 or scan the QR code below.

Take a quick 2 question survey about data.
USING DATA EFFECTIVELY IN PLANS AND PROJECTS
AGENDA

• Introductions
• Data overview
• Project examples
  • Long range planning
  • SRTS Five-Year Action Plan
  • School specific
• Facilitated discussion
INTRODUCTIONS

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Senior Transportation Planner
David Evans and Associates, Inc

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Project Manager
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Brenden Paradies
Project Manager
City and County of Denver

Yung Koprowski, PE, PTOE, RSP
Principal
Y2K Engineering

Drew Parker
Senior Planner
Toole Design Group

Kenna Davis
Transportation Planner
HDR

Landon Hilliard
Safe Routes Program Coordinator
Boulder Valley School District
DATA OVERLOAD
QUESTIONS TO ASK WHEN CONSIDERING DATA

• How will this data set inform decisions on the project? Will it change anything?
• How much does this data set cost?
• Is there a proxy for this data that I could access?
• Are absolute values necessary or can comparative information work?
• Is it something you would like to measure after the project is complete?
QUESTIONS TO CONSIDER DURING PRESENTATIONS

1. Type: Would you use the same data points?
2. Quantity: Was it enough/too much?
3. Use: Was there a clear link between the data and decision making?
4. Access: Were there barriers to accessing the data?
THEMES AMONG PROJECT EXAMPLES

• Data sources vary widely based on type of project

• Linking data directly to how you are going to use the data can help make decisions about what type of data to include

• Even if you don't have all the data, you can use what you have and think critically. Break the rules a little.
ONE LAST CHANCE FOR MENTI

Visit www.menti.com and when prompted enter code 68 79 49 7 or scan the QR code
LONG RANGE PLANNING

Boulder County Transportation Master Plan

SUMMARY VERSION
ADOPTED FEBRUARY 18, 2020

Strategy 1
Develop a Multimodal Transportation System

Strategy 2
Create the Complete Trip

Strategy 3
Invest in Key Transportation Corridors

Strategy 4
Increase Accessibility

Strategy 5
Enhance Mountain Area Connections
DATA UTILIZED

• DRCOG Regional Travel Demand Model
  • Housing and employment patterns

• Bicycle Level of Traffic Stress
  • Average Annual Daily Traffic (AADT) counts
  • Speed limit
  • Truck volume
  • Shoulder width

• StreetLight Data
  ▪ Average travel distances
  ▪ Top origins and destinations
  ▪ Top routes for specific destinations
DRCOG REGIONAL TRAVEL DEMAND MODEL

- Forecasted data to get trip information and travel patterns across the region
- Also includes current conditions
- Model utilized for the Boulder County TMP was the 2040 model (2050 model is now available)
### REGIONAL TRIPS - CHANGE FROM 2015 TO 2040

<table>
<thead>
<tr>
<th>County</th>
<th>2015</th>
<th>2040</th>
<th>Percent Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trips</td>
<td>Percent</td>
<td>Trips</td>
</tr>
<tr>
<td>Adams</td>
<td>73,000</td>
<td>20%</td>
<td>104,000</td>
</tr>
<tr>
<td>Arapahoe</td>
<td>16,000</td>
<td>4%</td>
<td>24,000</td>
</tr>
<tr>
<td>Broomfield</td>
<td>84,000</td>
<td>23%</td>
<td>146,000</td>
</tr>
<tr>
<td>Denver</td>
<td>48,000</td>
<td>13%</td>
<td>66,000</td>
</tr>
<tr>
<td>Gilpin</td>
<td>3,800</td>
<td>1%</td>
<td>5,100</td>
</tr>
<tr>
<td>Jefferson</td>
<td>53,000</td>
<td>15%</td>
<td>73,000</td>
</tr>
<tr>
<td>Larimer</td>
<td>31,000</td>
<td>8%</td>
<td>43,000</td>
</tr>
<tr>
<td>Weld</td>
<td>69,000</td>
<td>19%</td>
<td>143,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>365,100</strong></td>
<td><strong>100%</strong></td>
<td><strong>589,100</strong></td>
</tr>
</tbody>
</table>

**Source:** DRCOG 2015 and 2040 Regional Travel Demand Model and David Evans and Associates, Inc.

1. The majority of trips within Broomfield County are located in “South Broomfield”, TAZs located south of 144th Avenue.
2. All data comes from the DRCOG Regional Travel Demand Model and data did not come directly from the NFRMPO for Larimer County. Due to Boulder County’s location within the DRCOG jurisdiction, Larimer County is not included within their Regional Travel Demand Model. The numbers here are an assumption based on the previous planning effort completed in 2012.
## BOULDER COUNTY DAILY PERSON TRIPS

<table>
<thead>
<tr>
<th>Trip Type</th>
<th>2015</th>
<th>2040</th>
<th>2015–2040 Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-county</td>
<td>127,480</td>
<td>163,325</td>
<td>+ 28%</td>
</tr>
<tr>
<td>Regional</td>
<td>377,800</td>
<td>604,100</td>
<td>+ 60%</td>
</tr>
<tr>
<td>Total</td>
<td>505,280</td>
<td>767,425</td>
<td>+ 52%</td>
</tr>
</tbody>
</table>

Source: DRCOG 2015 and 2040 Regional Travel Demand Model and David Evans and Associates, Inc.
DATA ➡️ DECISIONS

KEY TAKEAWAYS

• Regional trips will account for a greater percentage of trip types in Boulder County

• Greatest increase- Weld, Adams, Broomfield

• Number of person trips in Boulder county is projected to increase by about 50%

TMP IMPLEMENTATION ACTIONS

• Develop partnerships with communities with anticipated increased travel to and from Boulder County

• Evaluate and pursue alternate transit service delivery options to provide increased transit service in areas outside of the RTD service area
BICYCLE LEVEL OF TRAFFIC STRESS

Types of Bicyclists

- 12% Somewhat Confident
- 4% Highly Confident
- 25% Non-bicyclist
- 59% Interested but Concerned

BICYCLE LEVEL OF TRAFFIC STRESS

**County roads; Truck Percentage ≥ 10%**

<table>
<thead>
<tr>
<th>Daily Volume</th>
<th>0 ft to &lt; 2 ft</th>
<th>2 ft to &lt; 4 ft</th>
<th>4 ft to &lt; 6 ft</th>
<th>≥ 6 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 400</td>
<td>LTS 2</td>
<td>LTS 2</td>
<td>LTS 2</td>
<td>LTS 2</td>
</tr>
<tr>
<td>400 to 1,500</td>
<td>LTS 3</td>
<td>LTS 2</td>
<td>LTS 2</td>
<td>LTS 2</td>
</tr>
<tr>
<td>1,500 to 7,000</td>
<td>LTS 4</td>
<td>LTS 3</td>
<td>LTS 3</td>
<td>LTS 3</td>
</tr>
<tr>
<td>&gt; 7,000</td>
<td>LTS 4</td>
<td>LTS 4</td>
<td>LTS 4</td>
<td>LTS 4</td>
</tr>
</tbody>
</table>

**Key Takeaways**

- Due to traffic volume and speeds, most county roads are BLTS of 3 or 4.
- TMP Implementation Actions Include:
  - Develop a network of bicycle facilities that connect regional destinations.
  - Prioritize roadway safety, signage, and shoulder improvements to address unsafe conditions on primary on-road cycling corridors that separate bikes from cars and lower bicycle level of stress.

Source: David Evans and Associates, Inc. based on methodologies from Colorado Department of Transportation (CDOT) and Oregon Department of Transportation (ODOT)
STREETLIGHT DATA

• Big Data: Every month StreetLight Data indexes ~40 billion anonymized location records from smart phones and navigation devices in connected cars and trucks

• Place a gate on any road and get comprehensive data for trips passing through each gate

• AADT traffic counts

• Average travel distances

• Top origins and destinations
The map shows the relative morning peak traffic volumes on routes entering the city of Boulder. The map only accounts for trips originating outside of Boulder and ending inside the city. The map does not provide information about routes taken once inside the city limits.
The map shows the relative morning peak traffic volumes on routes entering the city of Longmont. The map only accounts for trips originating outside of Longmont and ending inside the city. The map does not provide information about routes taken once inside the city limits.
KEY TAKEAWAYS

• Confirmed key regional corridors
• Better understanding of the inter- and intra-regional travel
LESSONS LEARNED

• **Multiple layers of data**: Combination of looking at the DRCOG model forecast and detailed StreetLight Data as well as local data

• **What’s good enough?**: Determine ahead of time how the data will be used

• **Data is an investment**: Think about potential for multiple uses

• **Follow up is needed**: Come back to data as we move forward
SAFE ROUTES TO SCHOOL ACTION PLAN.

September 2021

denvergov.org/srts
EXISTING CONDITIONS

DATA ANALYZED INCLUDED:

- Level and Types of Schools
- DOTI Equity Areas of Need
- Safety - Number of Crashes
- High Injury Network (HIN)
- Denver Public Schools Walk to School Model

- Active Infrastructure:
  - Existing and planned bicycle facilities
  - Sidewalks
  - Crosswalks
  - Signalized Intersections
  - Midblock Signalized Crossings
SCHOOLS ANALYZED

299 schools analyzed
SCHOOLS ANALYZED

87 schools within DOTI Equity Index Area of Need
DPS WALK TO SCHOOL MODEL
CRASHES AND THE HIGH INJURY NETWORK

6% Schools not within 1/2 mile of the HIN
68% Schools within 1/2 mile of the HIN
23% Schools within 750 feet of the HIN

Legend
Age Group
- 0-11
- 12-14
- 15-18
High Injury Network
CURRENT AND PLANNED ACTIVE INFRASTRUCTURE

Schools were divided into equal tiers based on their active infrastructure:

- Tier I - poor
- Tier II - moderate
- Tier III - good
CURRENT AND PLANNED ACTIVE INFRASTRUCTURE

<table>
<thead>
<tr>
<th>RANK</th>
<th>Name</th>
<th>Bicycle Facilities Score</th>
<th>Sidewalk Facilities Score</th>
<th>Crossings Score</th>
<th>CW</th>
<th>TS</th>
<th>INT</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Denver Language School A</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>Denver Language School B</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>3</td>
<td>Denver Language School C</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>Denver Language School D</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>5</td>
<td>Denver Language School E</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

For the full table, please refer to the attached document.
SCHOOL TYPOLOGIES & OVERLAYS

TYPOLOGIES

• Type of School Trip
  o DPS SchoolChoice Participation Rates
  o DPS/DOTI Potential Walking Routes Model
  o DPS Enrollment Zone
  o Private School

• Traffic Safety Concerns
  o Youth-Involved Bicycle and Pedestrian Crashes
  o Proximity to the HIN

• Multimodal Infrastructure Need
  o Youth-Involved Bicycle and Pedestrian Crashes
  o Proximity to the HIN
<table>
<thead>
<tr>
<th>Category</th>
<th>Variable Level</th>
<th>Variable</th>
<th>Value Range</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of School Trip</td>
<td>Primary</td>
<td>DPS School Choice Participation Rate</td>
<td>&lt;25% of students choice-in</td>
<td>Neighborhood School</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25-75% of students choice-in</td>
<td>Community School</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt;75% of students choice-in</td>
<td>Regional School</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>DPS/DOTI Potential Walking Routes Model</td>
<td>45th percentile of citywide results</td>
<td>Neighborhood School</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20.5-45th percentile of citywide results</td>
<td>Community School</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20.5th percentile of citywide results</td>
<td>Regional School</td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>DPS Enrollment Zone</td>
<td>Yes</td>
<td>Community School</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>Private School</td>
<td>Yes</td>
<td>Regional School</td>
</tr>
<tr>
<td>Traffic Safety Concerns</td>
<td>Primary</td>
<td>Crashes involving pedestrians or bicyclists under 18 from 2016-2018 (Total Crashes)+(Total Serious Injuries)*2+(Total Fatalities)*3 =Total Crash Score</td>
<td>&gt;2, 1, 0</td>
<td>High, Medium, Low</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>Vision Zero High Injury Network</td>
<td>HIN street(s) are within a 750 ft. buffer of the school</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The mileage of HIN streets within a half mile of the school is greater than 0 and the school is not within 750 ft. of the HIN.</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>There is no mileage of HIN streets within a half-mile of the school, and the school is not within 750 ft. of the HIN.</td>
<td>Low</td>
</tr>
<tr>
<td>Multimodal Infrastructure Need</td>
<td>Primary</td>
<td>Current and Planned Active Infrastructure Evaluation Model Score, including bicycle facility, sidewalk, and crossing infrastructure score*</td>
<td>0-3.85, 3.86-4.89, 4.90-6.97</td>
<td>High, Medium, Low</td>
</tr>
</tbody>
</table>

*Full model equation is shown below:
Total Score = 10/3 ((Bike Score-Min Bike Score)/(Max Bike Score-Min Bike Score)) + 10/3 ((Sidewalk Score-Min Sidewalk Score)/(Max Sidewalk Score-Min Sidewalk Score)) + 10/3 ((Crossing Score-Min Crossing Score)/(Max Crossing Score-Min Crossing Score))
Bicycle Score = (Existing Bicycle Facilities)/(Existing Bicycle Facilities+Planned Bicycle Facilities)
Sidewalk Score = (Sidewalks>5+(0.5*Sidewalks<5))/(Sidewalks>5+Sidewalks<5+Missing Sidewalk)
Crossing Score = ((# of Crosswalks)/4+# of Signalized Intersections+2*# of RRFB & HAWK Crossings)/(# of Intersections)
SCHOOL TYPOLOGIES & OVERLAYS

OVERLAYS

• Equity
  o DOTI Equity Index
  o DPS School Free and Reduced-Price Lunch Levels
• Existing Land Use

• Languages Spoken
  o Limited-English Speaking Households
  o DPS English-Language Learners Levels
• RTD DPS Pass Program
• Crossing Guard Program
<table>
<thead>
<tr>
<th>Overlays</th>
<th>Variable</th>
<th>Value Range</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>DOTI Equity Index</td>
<td>≥80</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>DPS School Free and Reduced-Price Lunch Levels</td>
<td>≥40% of Students</td>
<td>Yes</td>
</tr>
<tr>
<td>Languages Spoken</td>
<td>Limited-English Speaking Households by Census Block within 1/2 mile of school, ACS 2014-2018 Estimates</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;33% of households</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17-33% of households</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;17% of households</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>DPS English-Language Learners Levels</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;33% of students</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17-33% of students</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;17% of students</td>
<td>Low</td>
</tr>
<tr>
<td>Existing Land Use</td>
<td>Denver parcel data</td>
<td>Varies</td>
<td>Varies</td>
</tr>
<tr>
<td>RTD DPS Pass Program</td>
<td>DPS RTD Pass (High Schools only)</td>
<td>School Participates</td>
<td>Yes</td>
</tr>
<tr>
<td>Crossing Guard Program</td>
<td>Crossing Guard Program</td>
<td>School Participates</td>
<td>Yes</td>
</tr>
</tbody>
</table>
DASHBOARD

• Dashboard: https://arcg.is/10jmL5

Photo Credit: Colorado Census Report
HOW ARE WE GOING TO DO THIS?

PRIORITY SCHOOLS

• **Student Safety**, focusing specifically on schools near the Vision Zero High Injury Network.

• **Neighborhood School Trips**, where there is the greatest opportunity for students and caregivers to feasibly walk, bike, or roll to school and,

• **Equity**, or more specifically, ensuring the plan is set up to produce equitable outcomes.

MOST RANKED PRIORITIES BY ONLINE PUBLIC EVENT ATTENDEES OVERALL

- **Student Safety**: 94%
- **Equity**: 48%
- **Neighborhood School Trips**: 45%
- **Health**: 32%
- **Funding**: 31%
- **Community Collaboration**: 23%
- **Policy**: 17%
- **Long Distance School Trips**: 11%
## PRIORITY SCHOOLS

<table>
<thead>
<tr>
<th>Priority Tier</th>
<th>Traffic Safety Concern</th>
<th>Total Number of Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1 Neighborhood School</td>
<td>High</td>
<td>15</td>
</tr>
<tr>
<td>Tier 2 Community School</td>
<td>High</td>
<td>24</td>
</tr>
<tr>
<td>Tier 3 Neighborhood School</td>
<td>Medium</td>
<td>30</td>
</tr>
<tr>
<td>Tier 4 Community School</td>
<td>Medium</td>
<td>39</td>
</tr>
<tr>
<td>Total Number of Schools</td>
<td></td>
<td>108</td>
</tr>
</tbody>
</table>

**Legend**
- **Equity Index Areas >80**
- **Priority of Schools**
  - First Priority
  - Second Priority
  - Third Priority
  - Fourth Priority
  - Other Schools
LESSONS LEARNED

• Data did not replace traditional outreach methods (i.e. stakeholder interviews, public meetings)

• Don’t be so prescriptive – use the data but don’t limit ourselves

• Internal outreach was valuable – build upon previous work and make sure project products fit into existing processes – don’t reinvent the wheel

• Simplify data to make more digestible

• Tracking progress – able to update data easily quarterly/annually
BOULDER COMMUNITY SCHOOL OF INTEGRATED STUDIES (BCSIS) AND HIGH PEAKS SCHOOL PROJECT
EXISTING CONDITIONS
## LINKING DATA TO POTENTIAL TREATMENTS (1)

<table>
<thead>
<tr>
<th>Data point</th>
<th>Detail</th>
<th>Potential treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queuing</td>
<td>Queuing across driveways, surface parking lot, through lanes</td>
<td>- Do not block markings across surface parking lot access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Remove parking in loop area to allow queuing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Using the parking lot for circulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Remove on-street parking to allow additional queuing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Staggering bell times</td>
</tr>
</tbody>
</table>
## LINKING DATA TO POTENTIAL TREATMENTS (2)

<table>
<thead>
<tr>
<th>Data point</th>
<th>Detail</th>
<th>Potential treatments</th>
</tr>
</thead>
</table>
| Congestion | • Congestion occurring at both drop-off and pick-up times  
• Safety concerns associated with kids darting through traffic | • Relocating pick-up/drop-off areas  
• Move bus stops  
• Hug-and-go area  
• Signal timing adjustments and detection  
• Staggering bell times |
## LINKING DATA TO POTENTIAL TREATMENTS (3)

<table>
<thead>
<tr>
<th>Data point</th>
<th>Detail</th>
<th>Potential treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsafe crossings</td>
<td>• Limited visibility associated with vehicles parking across crosswalks</td>
<td>• Marked crosswalks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Curb extension with plastic delineators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Crosswalk removal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fencing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Staggering bell times</td>
</tr>
</tbody>
</table>

Recommendations
## LINKING DATA TO POTENTIAL TREATMENTS (4)

<table>
<thead>
<tr>
<th>Data point</th>
<th>Detail</th>
<th>Potential treatments</th>
</tr>
</thead>
</table>
| Limited parking  | • High numbers of students traveling from outside the community leads to higher numbers of vehicles  
|                  | • Two elementary schools on one campus                                 | • Hug-and-go area                          |
|                  |                                                                        | • Organizing surface parking lot           |
|                  |                                                                        | • Staggering bell times                    |
HOW IS IT WORKING TODAY?

The "three rules"

- No U-Turns Anywhere
  Don't make U-turns, they're dangerous.

- Slow Down
  Drive 20 mph in the school zone, it's the law.

- Use Crosswalks
  Stay with your child and use crosswalks.
LESSONS LEARNED

• Qualitative data works
• Institutional knowledge is essential
• Benefits of low-cost, quick-build facility design solutions
OVERALL SUMMARY

• Data sources vary widely based on type of project
• Linking data directly to how you are going to use the data can help make decisions about what type of data to include
• Even if you don’t have all the data, you can use what you have and think critically. Break the rules a little.
MENTI RESULTS
FACILITATED DISCUSSION / Q & A

1. Type: Would you use the same data points?
2. Quantity: Was it enough/too much?
3. Use: Was there a clear link between the data and decision making?
4. Access: Were there barriers to accessing the data?