



# Data Analytics and Visualization

**PAIRING BIG DATA ANALYTICS AND VISUALIZATION WITH DATA GOVERNANCE HELPS GENERATE MORE EFFECTIVE SOLUTIONS FOR USERS AND ENABLES DATA-DRIVEN PLANNING DECISIONS.**

## DRIVEN BY DATA

Our team specializes in predictive analytics using a variety of sources, including sensor data, online analytics data providers, and anonymized location-based services data from mobile devices to inform transportation and community development efforts on behalf of our municipal and land development clients.

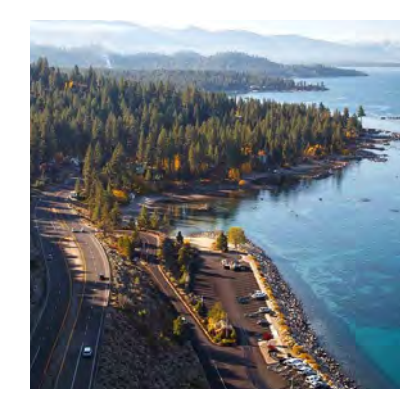
It's not all about solving transportation challenges. The usefulness of this data extends to downtown redevelopment strategies, addressing parking demands, medical and university campus planning, equity, and sustainability.

Understanding population behaviors, origins and destinations, trip length, and travel mode by time of day, day of week, trip purpose, and travel speeds allows us to

recommend solutions that improve equity in service, reduce congestion, and identify infrastructure improvements where and when they are most needed.

The key to understanding billions of data points for individual study areas is data management and visualization. Our team of machine learning engineers, data scientists, and data analysts are essential to transform a data lake into actionable insights.

Our teams have developed algorithms to graphically illustrate relationships in population movements throughout cities and between neighborhoods. Machine learning models are also used to forecast future travel patterns based on changes in network improvements, construction activity, new shared travel modes, and demographics.



## SUPPORTING CLIENT GOALS

We're helping clients across north America make **informed decisions** to improve their multimobility and transportation operations and services, winning national awards, and earning recognition in national publications.

Collecting meaningful data about how we use our mobility systems helps us guide our clients more efficiently with their limited resources and ultimately produce smarter communities. Whether it's cars, buses, rail, freight, or bicycles, a smart network of data leads to improved mobility, resulting in more productive, equitable, sustainable, and healthier communities.

### Goals

Through the application of data analytics and visualization, we aim to answer three key questions:

- 1 What are the best tools we have to solve this particular problem or do we need to create a custom solution?
- 2 What predictive tools do we have in place to provide better options for client consideration?
- 3 Presenting data is our specialty but are we using the best resources to obtain better insights?

### Benefits

The benefits of developing a structure and dashboards that handles enormous datasets from an extensive variety of sources while providing predictive analytics and visualizations are considerable.

Our skills and services enable our clients to visualize the data in order to prioritize improvements, to identify desirable destinations, to add micromobility services, revitalize public

open spaces and amenities, implement parking management strategies, and/or forecast congested locations that will require transportation solutions. It also aids in forecasting traffic accident locations or safety concerns, identifying social equity issues with available services, as well as identifying how projects benefit both individual users and the larger community.

This work allows us to provide real-time actionable insights, enabling our clients to perform more informed planning for all project types, along with improved operations, safety, and maintenance. Finally, it creates transparency on project impacts and benefits, which goes a long way in earning public trust and support.

### Evaluating Services from the Equity Lens

The availability of Location Based Services data coupled with census and planning context data integrated spatially, allows us to analyze the equity of all services within a community, not just access to transit and multimobility options. We look more deeply at the physical location of medical and dental services, access to fresh fruits and meats, schools, and employment opportunities to assess the variance in travel distances and times as well as available options for the various population groups within the community. We are clearly focused on understanding the relationships between proximity to all services from various neighborhoods and developing realistic solutions to broaden access and achieve greater equity throughout the community.

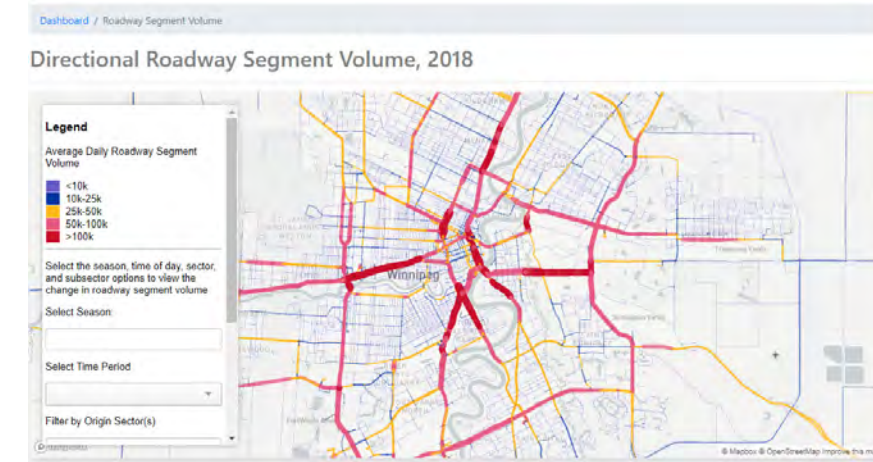
**Stantec, FDOT, and seven local governments leveraged expertise in multi-modal planning, traffic engineering, data analytics, and sport/resort planning to develop a plan to improve the traveler experience to the Sarasota-Manatee Barrier Islands.**



## APPLICATIONS/TOOLS

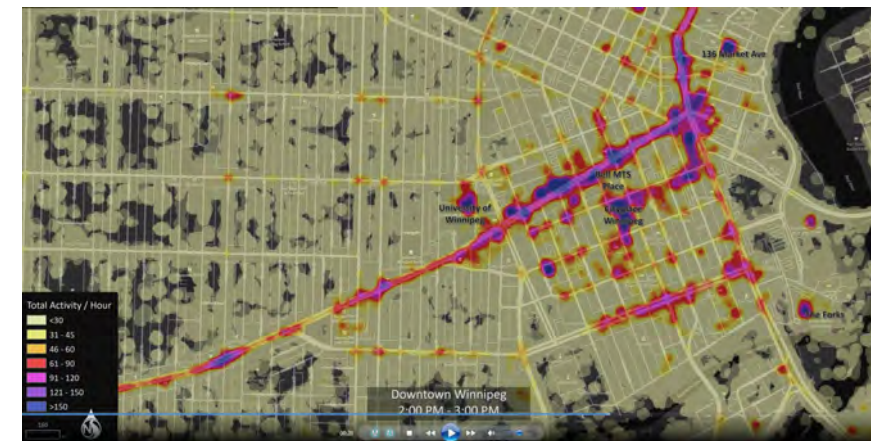
### LOCATION BASED SERVICES DATA

Directional roadway segment volumes computed from LBS data and compared to AADTs with regression analysis.



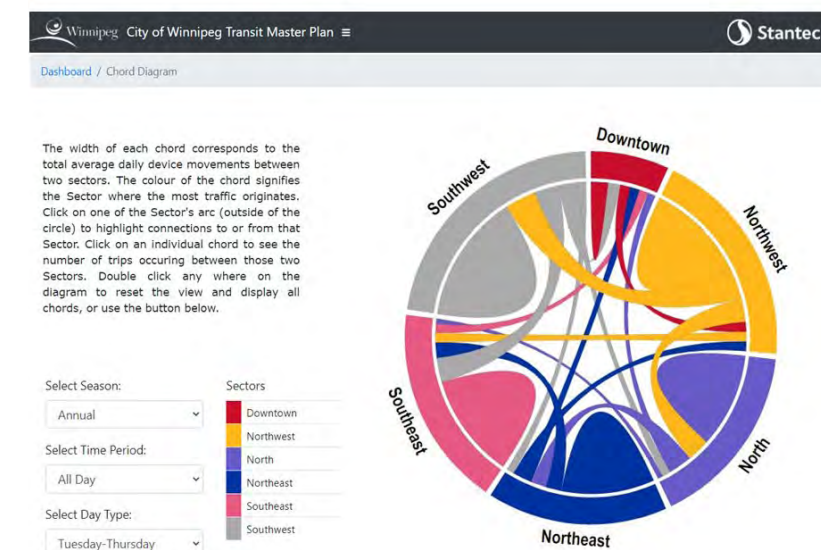
### POPULATION MOVEMENT SIMULATION

Simulations created from hourly interval data at 10 meter accuracy.



### CHORD DIAGRAMS

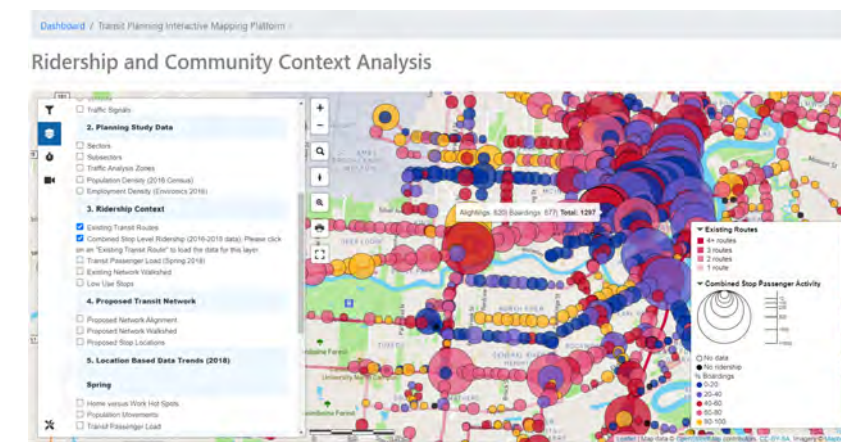
Dynamic Chord Diagrams are ideal to visualize population movement patterns between multiple origins and destinations.



Dynamic visual display of the population movements between city sectors

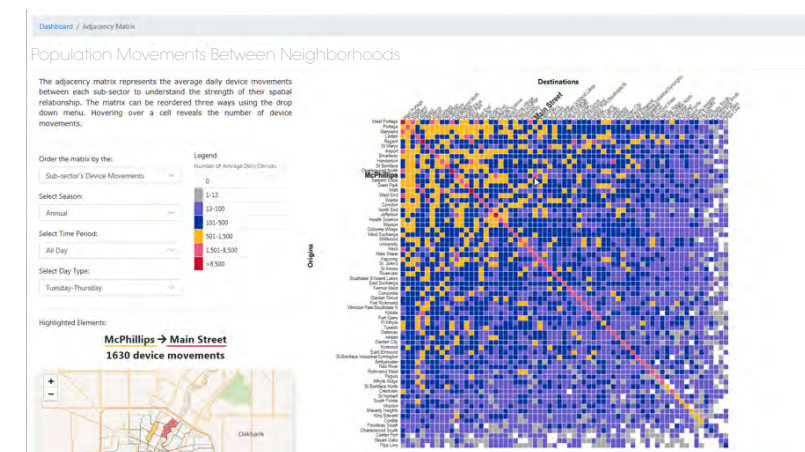
### TRANSIT PLANNING INTERACTIVE DASHBOARD

Transit planning using LBS data allows deeper insight into route logistics, scheduling, and service types.



### ADJACENCY MATRIX

Adjacency matrices identify strong relationships between two geographies, i.e. neighborhoods, neighborhoods and downtown, entry points and destinations, downtown and restaurants, neighborhoods and public parks, etc.



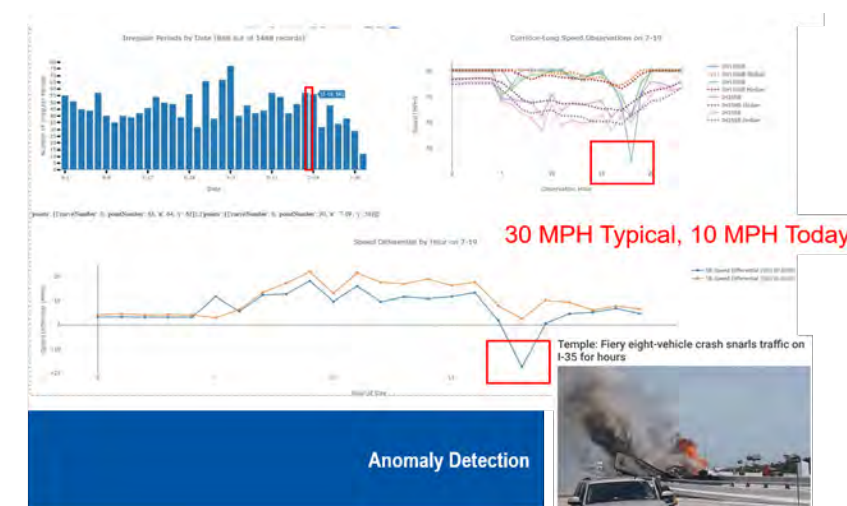
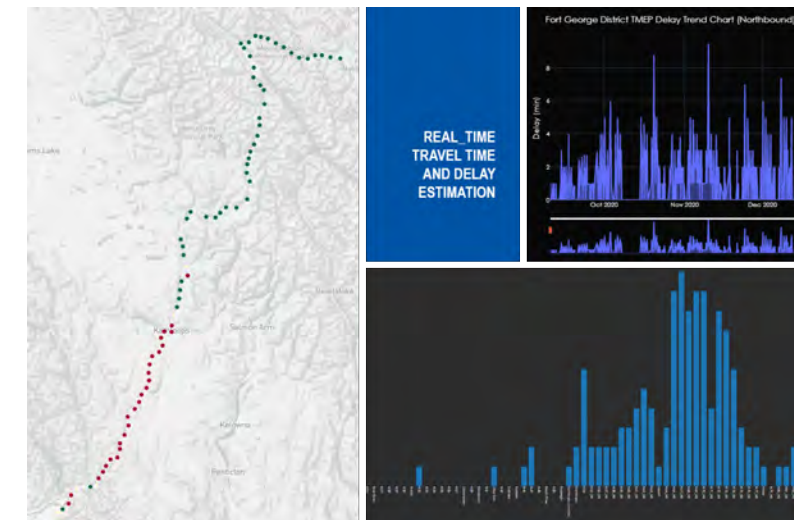
### COMPUTER VISION APPLICATIONS

Video data is rich with insights, including mobility patterns, safety analyses.



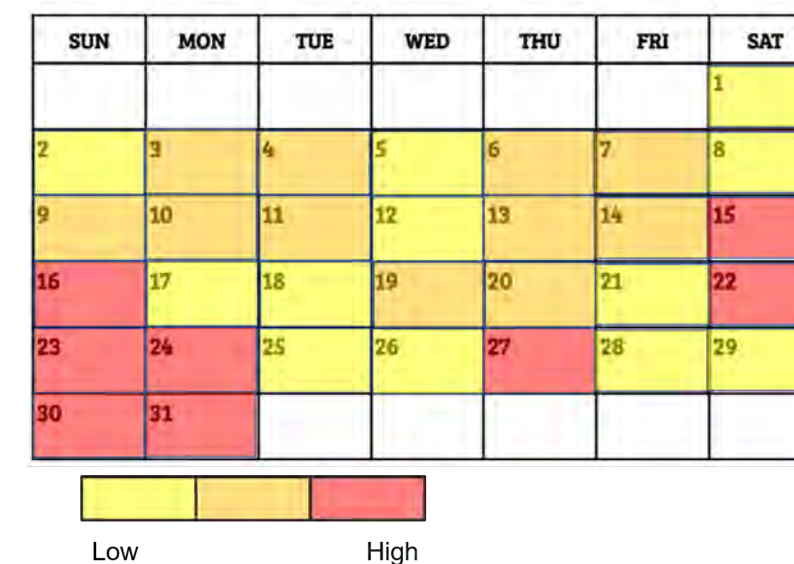
### REAL-TIME TRAFFIC MONITORING

Real-time traffic monitoring can help identify incidents and construction-related delays, helping agencies better identify and respond to these types of events.



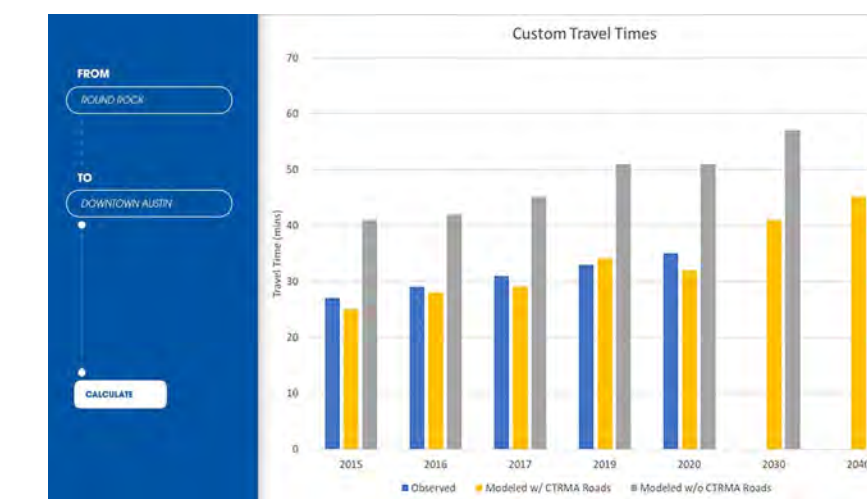
### PREDICTIVE ANALYTICS

If you know when and where there will be high demand, you can take pre-emptive actions to manage that demand.



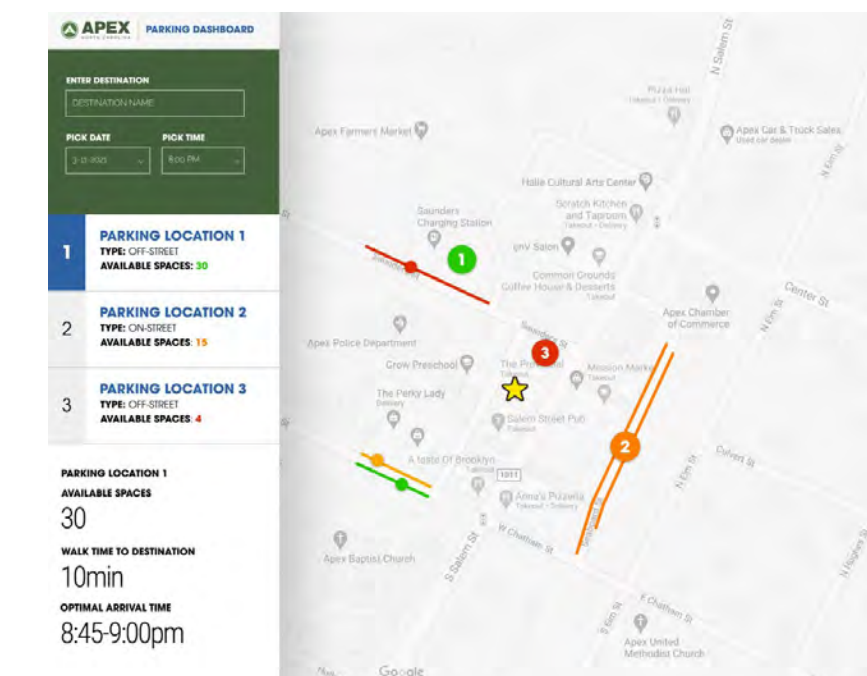
### PERSONALIZED PROJECT BENEFITS

Most cost-benefit analyses focus on the benefits to a region. We can let users identify how these projects would benefit their specific trip patterns.



### PARKING OCCUPANCY

Limited parking leads to congestion in urban areas, and sports and resort communities, as drivers look for limited parking spaces. A dashboard showing where available spaces are can overcome this challenge.



## RELATED ITEMS

Our team provides a variety of data analytics and visualization services, including:

- Data Visualization and Interaction through Custom Dashboards
- Location-Based Services Data
- Real-Time Data for Numerous Applications
- Predictive Congestion
- Individualized Project Outcomes
- Traffic Camera Intelligence
- Traffic Data Inventory and Monitoring

## CONTACT US

Cynthia Albright, FAICP CUD, GISP  
Senior Principal, Planning & Urban Design

Sumeet Kishnani, PE, PTOE  
Principal, Transportation

## CONNECT WITH US



STANTEC.COM