TxDOT Digital Roadway Data

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Cooperative and Automated Transportation Program
Strategic Planning Division
TxDOT

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About the CAT Program

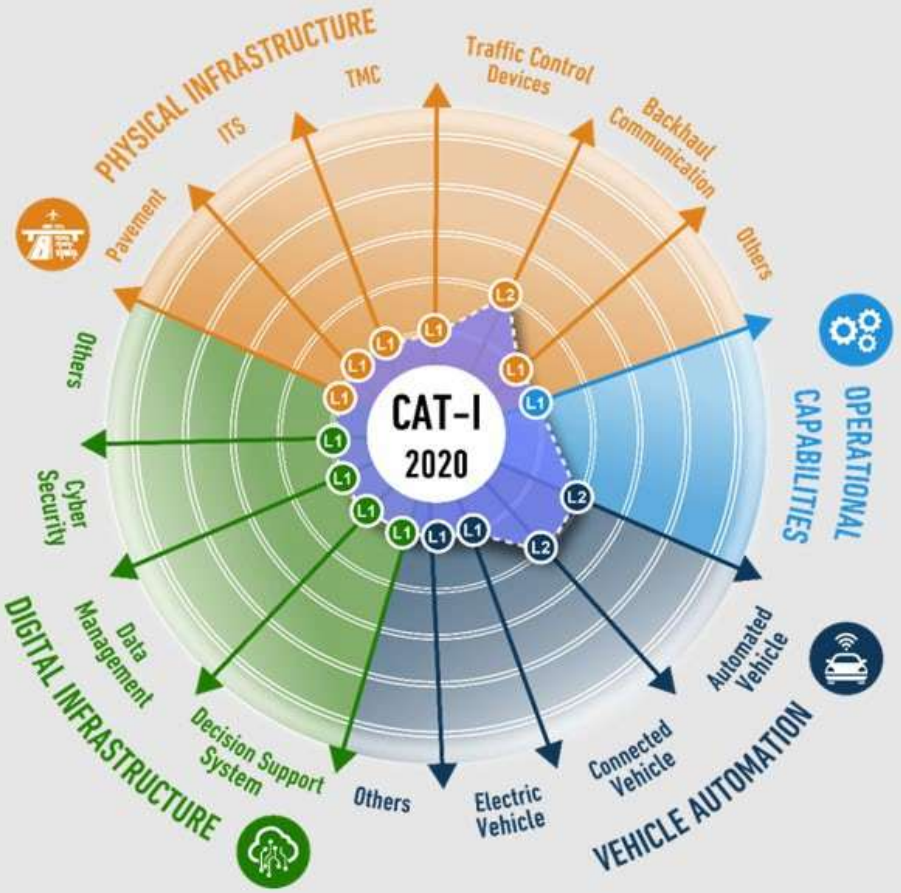
A dedicated team to initiate, accelerate and assist with Cooperative and Automated Transportation activities across TxDOT in alignment with planned strategies.

https://www.txdot.gov/about/programs/innovative-transportation/cooperative-automated-transportation-cat-program.html

Cooperative and Automated (CAT) Program

CAT:

- CAT is a cooperative ecosystem of physical & digital infrastructure
- Connected & Automated Vehicle (CAV) technologies, and their operational cap-abilities to enable the safe, reliable, and efficient movement of people and goods in a multi-modal transportation network.



What is Digital Roadway Data?

Digital Roadway Data is data that describes a roadway. It can be from Vehicles (V2X), Infrastructure (I2X), Crash data, Pavement data, Bridge data, traffic counts, geospatial data, geometric data, and more.

TxDOT's Statewide Data Contract

Has the world's most extensive real-time traffic and dynamic parking information networks.

Terri Johnson
Director
Public Sector Services
terri.Johnson@inrix.com

Available Now

Largest provider of connected vehicle data globally, working directly with passenger vehicle manufacturers to share movement and event data.

Carl Novelli
Assistance Vice President
Public Sector Sales
carl.novelli@wejo.com

Not Yet Available
Email txdotcatdata@txdot.gov to be put on waiting list

Data platform that represents people, mobility, economic activity and land use. This data provides deep insights into the patterns of activity in our communities.

Erin Johnston
Senior Customer Success Manager
erin@replicahq.com

Available Now, if needed contact txdotcatdata@txdot.gov for assistance

For questions: please reach out to txdotcatdata@txdot.gov

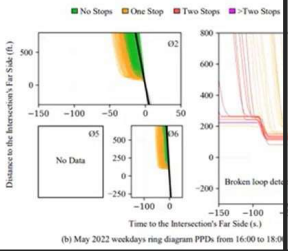
Wejo *

Purdue University – Signal Timing

Result

Three intersections were identified as having opportunities for tactical operational improvement by making minor adjustments to the timing plan (split and/or gap extension times). A post retiming review of the traffic signal performance measures showed up **to 30% reductions** in split failures, **53 sec/vehicle reductions** in control delay, and a **21% increase** in arrivals on green.

The presented technique can be applied to any system where CV data is available without the need for vehicle detection or communication technology, providing agencies with a scalable tool to identify locations where signal timing improvements could be implemented.



(b) May 2022 weekdays ring diagram PPDs from 16:00 to 18:0

wejo

Evacuation Use Case & Visuals

Hurricane Ian: September 30, 2022

- As you can see, during the evacuation, various people evacuated to nearby shopping centres for safety, as you can see lots of completely parked vehicles. Interesting to see the places people fled to for cover from the storm.
- High speeds on the inner lanes of the interstate, and congestion clearly building up on the routes out of Tampa.
- You can visually see the difference in journeys & road activity between the same snapshot over the three days 28/29/30th September.

Vehicle Journeys: 13,329

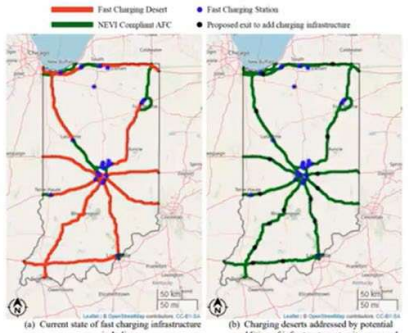
Identifying Charging Station Opportunities

Making informed EV Charging site selection decisions with CVD

PURDUE UNIVERSITY

Result

Using CVD, Purdue identified **15 exits** ("proposed exit to add charging infrastructure" in image) along the analyzed routes, which if instrumented with additional fast charging capacity, would alleviate the fast-charging desert problem and ensure Indiana's AFCs are compliant with federal requirements.



(a) Current state of fast charging infrastructure in Indiana

(b) Charging deserts addressed by potential addition of infrastructure at exits proposed in Table 2

Source: https://www.mdpi.com/2032-6653/13/9/157

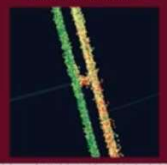
Turning Movements

Texas A&M Transportation Institute

Wejo Attributes
- Location
- Time
- Speed
- Heading
- Ignition on/off

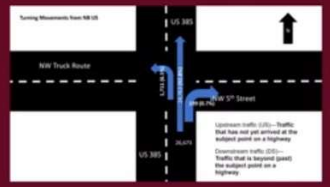
Algorithm
- Heading change
  - Left & right turn: ~ 90 degree
  - U-turn: ~ 180 degree
- Takes a few second
- Same location

Raw vehicle movements



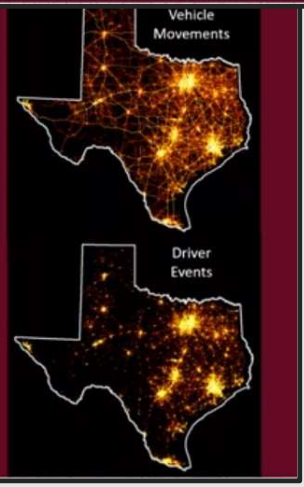
2.4% U-turns

Median crossover realignment opportunities where there are high U-turn percentages



Wejo: Executive summary

- Raw ingredients
  - Statewide coverage / Nov. 2021 – May 2023
  - Vehicle movements (+1 trillion points)
    - Every 3-seconds: location, speed, heading, etc.
  - Driver events (28 billion points)
    - When an event occurs: hard braking, seatbelt latch, etc.
- Data engineering skills required
  - Cloud storage & compute options
  - Low/no code options
- Dig into the details & test assumptions
- Data → Information → Intelligence
  - Speeds for custom segments
  - Turning movements
  - Passing events
  - Predictive crash modeling



** Wejo Limited has gone into Administration (UK Bankruptcy). Impact to TxDOT Contract is yet to be determined.*

Replica data

CAPABILITIES

Use Cases

Select Link Analysis

TxDOT Houston District

- I-10 Corridor link-to-link ODs

Active T

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- Zone
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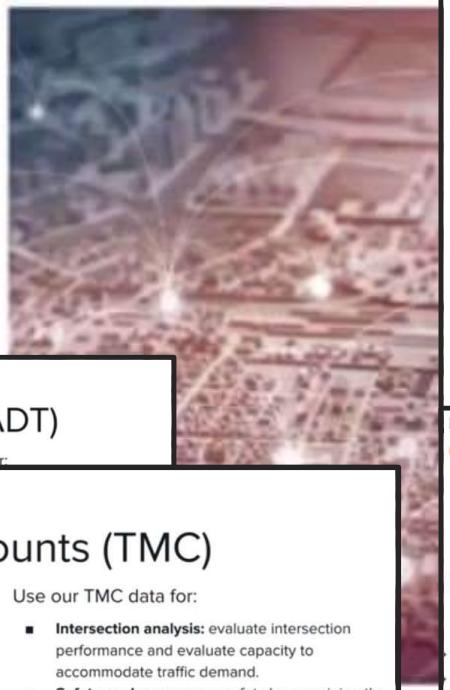


TRAFFIC DATA

Annual Average Daily Traffic (AADT)

Replica's AADT data includes:

- Hourly vo
  annually
- Volumes
  including
  trucks, or
- Nationwid
  rural area
  roads, an
- Data for 2
- Available
  GeoJSON
  Downloa

Use our AADT data for:

TRAFFIC DATA

Turning Movement Counts (TMC)

Replica's TMC data includes:

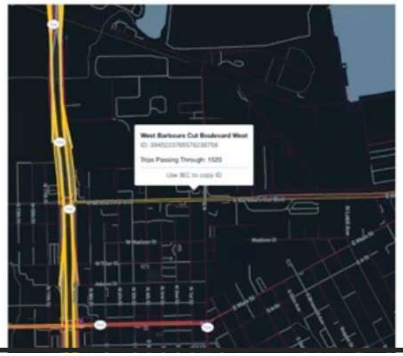
- Motor vehicle trip counts at most signalized intersections nationwide for each day of the week, bucketed into 1-hour intervals
- Data for Spring 2022 and Fall 2022
- Available for download in CSV format via the Replica Platform (Data Downloads)

Use our TMC data for:

- **Intersection analysis:** evaluate intersection performance and evaluate capacity to accommodate traffic demand.
- **Safety analyses:** assess safety by examining the number of vehicles and their turning movements at complicated intersections with known or observed crash incidents.
- **Traffic signal optimization:** understand the volume and timing of turning movements to improve overall traffic flow at intersections

MODELED DATA: REPLICA PLACES

Network Link Volumes



Use this data for:

- Corridor studies
- Zone-to-zone ODs
- Multimodal planning
- Freight planning
- Inter-district analysis

Access at studio.replicahq.com or here

MODELED DATA: REPLICA PLACES

Link-to-Link ODs

trips	street_1	link_1	street_2	link_2
20724	Ferry Road	3199770900198123175	TX 146	16341769493601133829
19460	TX 146	18368423667712241915	Ferry Road	13305062499803756 74
4902	South Loop West	10789179634824846376	South Loop East	17420520629103010188
4626	South Loop East	21445378601663099 88	South Loop West	94507575904964144 21
2314	Ferry Road	13305062499803756 74	South Loop East	21445378601663099 88
2209	South Loop East	17420520629103010188	Ferry Road	3199770900198123175
1578	South Loop East	17420520629103010188	TX 146	16341769493601133829
1572	TX 146	18368423667712241915	South Loop East	21445378601663099 88
1014	South Loop East	21445378601663099 88	South Loop East	17420520629103010188
303	South Loop West	10789179634824846376	Ferry Road	3199770900198123175
251	South Loop West	10789179634824846376	TX 146	16341769493601133829
238	Ferry Road	13305062499803756 74	South Loop West	94507575904964144 21

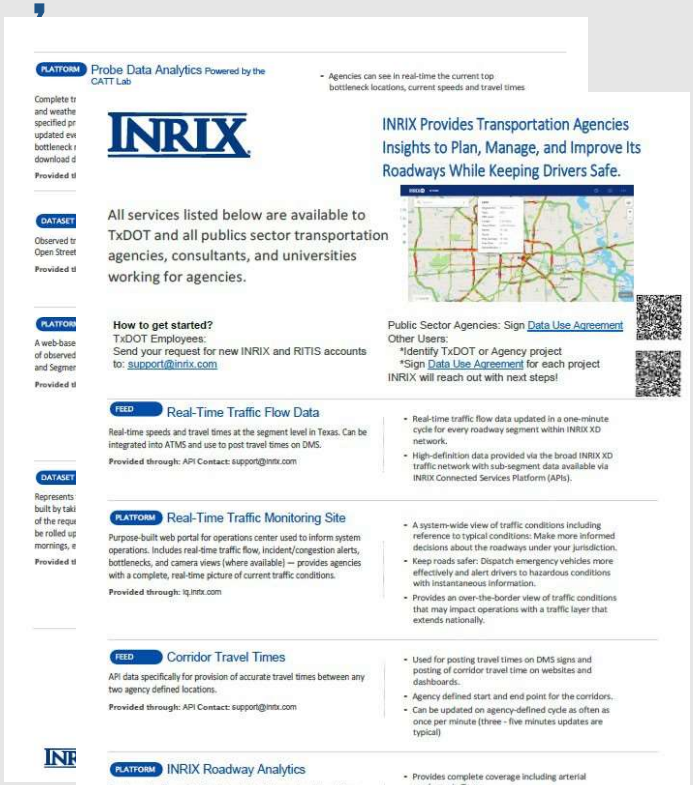
Use this data for:

- Traffic planning
- Roadway improvement projects

Get started here

INRIX and RITIS data

Resources for obtaining access: txdotcatdata@txdot.gov



PLATFORM Probe Data Analytics Powered by the CATT Lab

- Agencies can see in real-time the current top bottleneck locations, current speeds and travel times

INRIX

INRIX Provides Transportation Agencies Insights to Plan, Manage, and Improve Its Roadways While Keeping Drivers Safe.

All services listed below are available to TxDOT and all publics sector transportation agencies, consultants, and universities working for agencies.

How to get started?
TxDOT Employees:
Send your request for new INRIX and RITIS accounts to: support@inrix.com

Public Sector Agencies: Sign Data Use Agreement
Other Users:
*Identify TxDOT or Agency project
*Sign Data Use Agreement for each project
INRIX will reach out with next steps!

FEED Real-Time Traffic Flow Data

Real-time speeds and travel times at the segment level in Texas. Can be integrated into ATMS and use to post travel times on DMS.

Provided through: API **Contact:** support@inrix.com

- Real-time traffic flow data updated in a one-minute cycle for every roadway segment within INRIX XD network.
- High-definition data provided via the broad INRIX XD traffic network with sub-segment data available via INRIX Connected Services Platform (APIs).

PLATFORM Real-Time Traffic Monitoring Site

Purpose-built web portal for operations center used to inform system operations. Includes real-time traffic flow, incident/congestion alerts, bottlenecks, and camera views (where available) — provides agencies with a complete, real-time picture of current traffic conditions.

Provided through: iq.inrix.com

- A system-wide view of traffic conditions including reference to typical conditions: Make more informed decisions about the roadways under your jurisdiction.
- Keep roads safer: Dispatch emergency vehicles more effectively and alert drivers to hazardous conditions with instantaneous information.
- Provides an over-the-border view of traffic conditions that may impact operations with a traffic layer that extends nationally.

FEED Corridor Travel Times

API data specifically for provision of accurate travel times between any two agency defined locations.

Provided through: API **Contact:** support@inrix.com

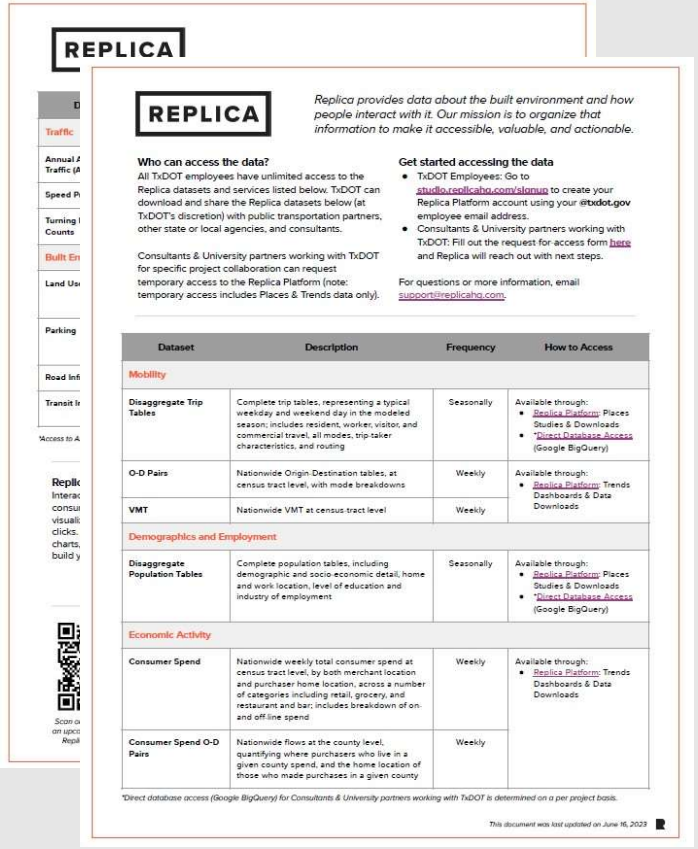
- Used for posting travel times on DMS signs and posting of corridor travel time on websites and dashboards.
- Agency defined start and end point for the corridors.
- Can be updated on agency-defined cycle as often as once per minute (three - five minutes updates are typical)

PLATFORM INRIX Roadway Analytics

Easy to use traffic monitoring tool of historical speed and travel times including data downloader, congestion scans, performance charts, bottleneck ranking.

Provided through: https://analytics.iq.inrix.com/roadway-analytics

- Provides complete coverage including arterial roadways in Texas.
- Tool is used to analyze, visualize, and disseminate roadways performance and conduct comparisons.
- Data granularity defined by users in 1-, 5-, 15-, or 60-minute increments.
- Data is available back to January 1, 2018



REPLICA

Replica provides data about the built environment and how people interact with it. Our mission is to organize that information to make it accessible, valuable, and actionable.

Who can access the data?
All TxDOT employees have unlimited access to the Replica datasets and services listed below. TxDOT can download and share the Replica datasets below (at TxDOT's discretion) with public transportation partners, other state or local agencies, and consultants.

Consultants & University partners working with TxDOT for specific project collaboration can request temporary access to the Replica Platform (note: temporary access includes Places & Trends data only).

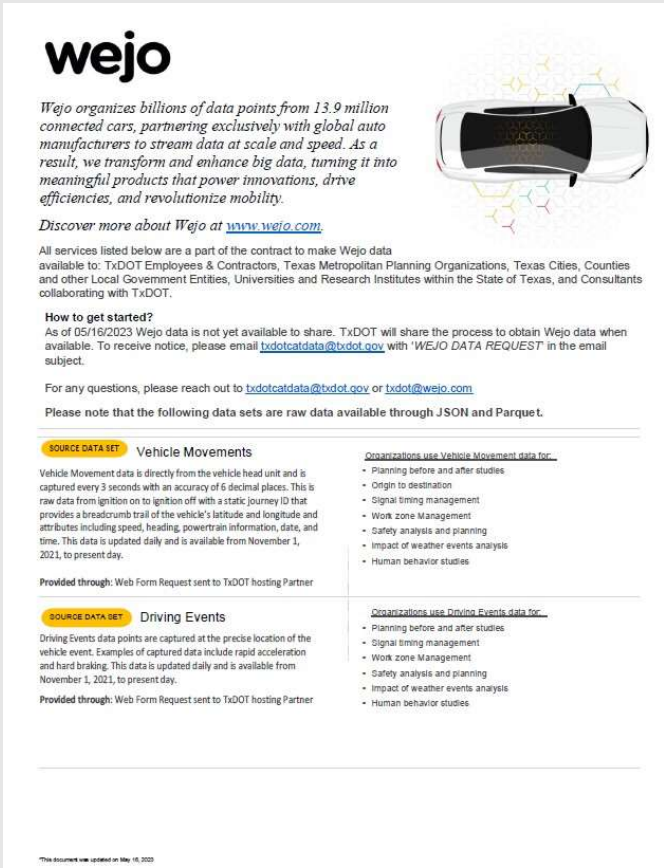
Get started accessing the data
- TxDOT Employees: Go to studio.replicahq.com/signup to create your Replica Platform account using your **@txdot.gov** employee email address.
- Consultants & University partners working with TxDOT: Fill out the request for access form here and Replica will reach out with next steps.

For questions or more information, email support@replicahq.com.

Dataset	Description	Frequency	How to Access
Mobility			
Disaggregate Trip Tables	Complete trip tables, representing a typical weekday and weekend day in the modeled season; includes resident, worker, visitor, and commercial travel, all modes, trip-taker characteristics, and routing	Seasonally	Available through: • Replica Platform: Places Studies & Downloads • *Direct Database Access (Google BigQuery)
O-D Pairs	Nationwide Origin-Destination tables, at census tract level, with mode breakdowns	Weekly	Available through: • Replica Platform: Trends Dashboards & Data Downloads
VMT	Nationwide VMT at census tract level	Weekly	
Demographics and Employment			
Disaggregate Population Tables	Complete population tables, including demographic and socio-economic detail, home and work location, level of education and industry of employment	Seasonally	Available through: • Replica Platform: Places Studies & Downloads • *Direct Database Access (Google BigQuery)
Economic Activity			
Consumer Spend	Nationwide weekly total consumer spend at census tract level, by both merchant location and purchaser home location, across a number of categories including retail, grocery, and restaurant and bar; includes breakdown of on- and off-line spend	Weekly	Available through: • Replica Platform: Trends Dashboards & Data Downloads
Consumer Spend O-D Pairs	Nationwide flows at the county level, quantifying where purchasers who live in a given county spend, and the home location of those who made purchases in a given county	Weekly	

*Direct database access (Google BigQuery) for Consultants & University partners working with TxDOT is determined on a per project basis.

This document was last updated on June 16, 2023



wejo

Wejo organizes billions of data points from 13.9 million connected cars, partnering exclusively with global auto manufacturers to stream data at scale and speed. As a result, we transform and enhance big data, turning it into meaningful products that power innovations, drive efficiencies, and revolutionize mobility.

Discover more about Wejo at www.wejo.com.

All services listed below are a part of the contract to make Wejo data available to: TxDOT Employees & Contractors, Texas Metropolitan Planning Organizations, Texas Cities, Counties and other Local Government Entities, Universities and Research Institutes within the State of Texas, and Consultants collaborating with TxDOT.

How to get started?
As of 05/16/2023 Wejo data is not yet available to share. TxDOT will share the process to obtain Wejo data when available. To receive notice, please email txdotcatdata@txdot.gov with '*WEJO DATA REQUEST*' in the email subject.

For any questions, please reach out to txdotcatdata@txdot.gov or txdot@wejo.com

Please note that the following data sets are raw data available through JSON and Parquet.

SOURCE DATA SET Vehicle Movements

Vehicle Movement data is directly from the vehicle head unit and is captured every 3 seconds with an accuracy of 6 decimal places. This is raw data from ignition on to ignition off with a static journey ID that provides a breadcrumb trail of the vehicle's latitude and longitude and attributes including speed, heading, powertrain information, date, and time. This data is updated daily and is available from November 1, 2021, to present day.

Provided through: Web Form Request sent to TxDOT hosting Partner

Organizations use Vehicle Movement data for:
- Planning before and after studies
- Origin to destination
- Signal timing management
- Work zone Management
- Safety analysis and planning
- Impact of weather events analysis
- Human behavior studies

SOURCE DATA SET Driving Events

Driving Events data points are captured at the precise location of the vehicle event. Examples of captured data include rapid acceleration and hard braking. This data is updated daily and is available from November 1, 2021, to present day.

Provided through: Web Form Request sent to TxDOT hosting Partner

Organizations use Driving Events data for:
- Planning before and after studies
- Signal timing management
- Work zone Management
- Safety analysis and planning
- Impact of weather events analysis
- Human behavior studies

*This document was updated on May 16, 2023

TxDOTCATData@txdot.gov