Bobcat Wildfire Consultants



Project Manager: Dawson Speer Members: AJ Carter & Hank Hall Clients: Braniff Davis & Christian Rowe We are working with *The City of Austin Fire Department – Wildfire Division* to develop evacuation routes for communities in the greater Austin area.



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Outline

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Objective

- Create evacuation routes for Travis County communities with limited ingress/egress.
- Address bottlenecking & <u>congestion</u> by building traffic network models to TAP locations.
- Address new community developments at risk.

Definitions

Limited Ingress/Egress

Areas with limited entrance or exit points.

• <u>TAP Locations</u>?: <u>Temporary Assembly Point</u>.

Relocation zones for evacuees where emergency responders can address their safety & direct them to a proper shelter.

Wildland Urban Interface (WUI): transition zone between unoccupied land and human development.

Bottlenecking

Traffic jam caused by narrow access to an entrance or exit.





Scope

- Parts of Williamson, Bastrop, Blanco, Burnet, and Hays Counties
- Vehicular transportation only.
- Communities within Travis County (Steiner Ranch & West Lake Hills)
- New Additional TAPs & Community locations from updated satellite imagery.



Methodology

▶<u>Data</u>

Limited In/Egress Communities, Temporary Assembly Points (TAP) In/Egress locations, Fire stations, Roadways, County Boundaries, and County Addresses.



Use network analyses to create models that demonstrates the most cost-effective routes for evacuating residents using factors like time & distance.



Methodology

- Network Analysis

We used the Closest Facility Network Analysis geoprocessing tool. We will be using both Drive Distance and Drive Time as our determining factors.

- Process for Analysis

Each team member was assigned a specific region within the study area. We created new features for new developments. Once all the features were completed, we ran a Closest Facility Network Analysis. After a few different attempts, we verified that it ran correctly.

Data Table

Data (shapefile <u>)</u>	Description	Spatial Object	Status	Source	Unit	Year
Limited In/Egress Communities	At Risk Communities	Polygon	available	Braniff Davis, Sr. Geospatial Analyst, Austin Fire Dept. Wildfire Division	US Foot	2022
Temporary Assembly Point (TAP) Locations	Gathering points post fire	Point	available	Braniff Davis, Sr. Geospatial Analyst, Austin Fire Dept. Wildfire Division	US Foot	2022
In/egress Points	Points where bottlenecking is likely to occur	Point	available	Braniff Davis, Sr. Geospatial Analyst, Austin Fire Dept. Wildfire Division	US Foot	2022
County Boundaries	Regional Boundaries for separation	Polygon	available	TxDOT Open Data Portal (Travis, Williamson, Bastrop, Blanco, Burnet, and Hays)	US Foot	2025
Addresses	Address points for at risk communities	Point	available	TxDOT Open Data Portal	US Foot	2025
New Limited In/egress Communities	Newly added at risk communities	Polygon	available	Bobcat Wildfire Consultants, Texas State University	US Foot	2025
New Temporary Assembly Point (TAP) Locations	Newly added gathering points	Points	available	Bobcat Wildfire Consultants, Texas State University	US Foot	2025
New In/egress Points	Newly added points where bottlenecking is likely to occur	Point	available	Bobcat Wildfire Consultants, Texas State University	US Foot	2025
Boundary Shapefiles	County borders & study area boundaries	Polygon	available	Bobcat Wildfire Consultants, Texas State University	US Foot	2025
Closest Facility Network Analysis	Escape routes (four routes total for each community)	Line	available	Bobcat Wildfire Consultants, Texas State University	US Foot	2025

Timetable

- January 27th-February 24th:Data Collection/Proposal Writing
- February 25th-March 21st:Pre-Processing Data/Network-Route Analysis
- March 24th-April 11th: Data Analysis/Final Report
- April 11th-April 28th: Data Interpretation/ Final Presentation



Results

- A fully comprehensive route analysis of the greater Austin metro area (Travis County)
- Many new community polygons, in/egress points, & TAPs to accommodate for new city developments.
- A network using time & distance as travel costs, with each community receiving 4 routes (2 based on distance, 2 based on time) to TAPs.
- Symbolizing the route data proved challenging due to their overlap & large volume.

West Lake Hills Route Breakdown



Primary Route



Secondary Route



Alternate Route #1



Alternate Route #2

Results Cont.

- Small-scale mapping made it difficult to see individual routes clearly.
- By narrowing down our scope and creating large-scale maps of high-risk neighborhoods, route differences became clearer.
- Final deliverables include:
- Two detailed community maps (Steiner Ranch and West Lake Hills) containing community boundary, all routes and additional info.
- A full geodatabase containing in/egress routes for all high-risk communities in the Travis County study area.
- A poster describing results





Conclusion

- Overall, the project successfully created evacuation routes for high-risk communities across Travis County.
- We produced detailed large-scale maps for high-risk neighborhoods and built a full geodatabase containing in/egress routes for every at-risk community.
- Our work supports both residents and first responders by improving access into (ingress) and out of (egress) fire-prone areas during an emergency.
- We also integrated key fire station locations to assist with future evacuation planning and public safety efforts.
- New proposed TAP locations were added to strengthen evacuation options for communities currently underserved.
- Major challenges included managing ArcGIS credit/token limits and coordinating regional assignments, both of which temporarily delayed progress but were successfully overcome.
- Despite these hurdles, the team adapted quickly, delivered strong final products, and contributed meaningful resources to help protect communities at risk.

We have been:



Project Manager: Dawson Speer Members: AJ Carter & Hank Hall

Brought to you by:



Clients: Braniff Davis & Christian Rowe