

CEEn-2018CPST-015

UTA ON-DEMAND WHEELCHAIR ACCESSIBLE VEHICLE

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Introduction

- **To provide equal opportunity for all users in Salt Lake County, UTA will pilot the introduction of wheel chair accessible vehicles (WAVs) into an on-demand ride-hailing network.**
- **The goal of this pilot is to test a new solution to enhance wheelchair accessible transportation and to improve transit for people with disabilities.**
- **The WAV on-demand mobility pilot will run from March 1st to August 31st 2019.**
- **At the conclusion of the pilot program, UTA will evaluate the results and determine the future of WAVs in Salt Lake County and throughout other areas of Utah.**

Project Tasks and Deliverables

- **Site Selection:** Using data supplied by UTA we were able to analyze a number of different variables to come to a conclusion on where the most productive site would be for the pilot program to run.
- **Cost Analysis:** In order to determine the monthly cost of this program for UTA, our team broke out each individual variable and then combined them into an equation for analysis. By pinpointing the most dynamic variables, we were able to suggest to UTA the most efficient ways to reduce cost and maintain their target budget.

Project Tasks and Deliverables

- **Creating a Request for Proposal (RFP):** As a team we were able to write the RFP that was used by UTA and sent out to Uber and Lyft, the potential partners on the project. The project was eventually awarded to Lyft, who will now be helping UTA by allowing them to use their ride-share platform, along with independently contracted drivers, to make the pilot happen.

Project Tasks and Deliverables

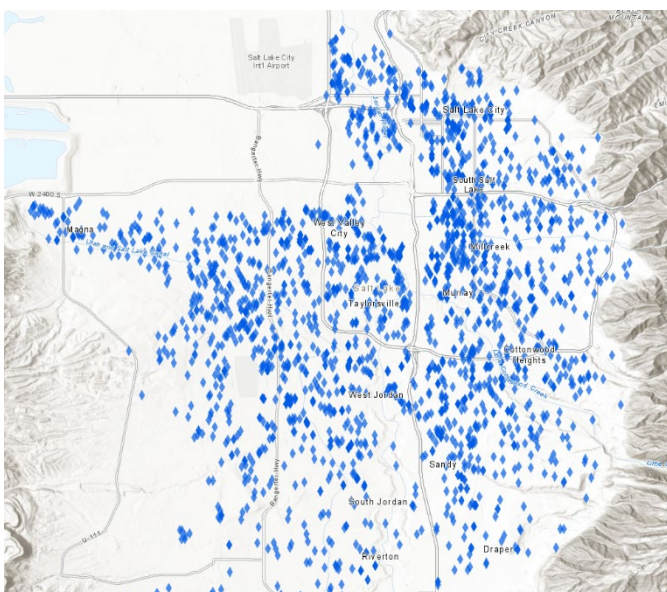


Figure 1 Addresses of qualified applicants for paratransit services (2,564 total). This data does not account for the unknown amount of wheelchair users that did not qualify for paratransit.

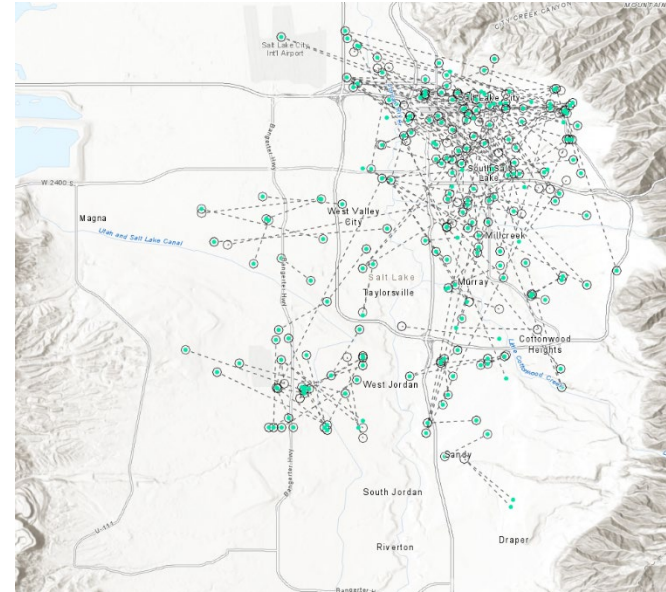


Figure 4 Connections between pick-up and drop-off ups from September 17-21, 2018. This data is highly correlated with routes that require more than one bus transfer.

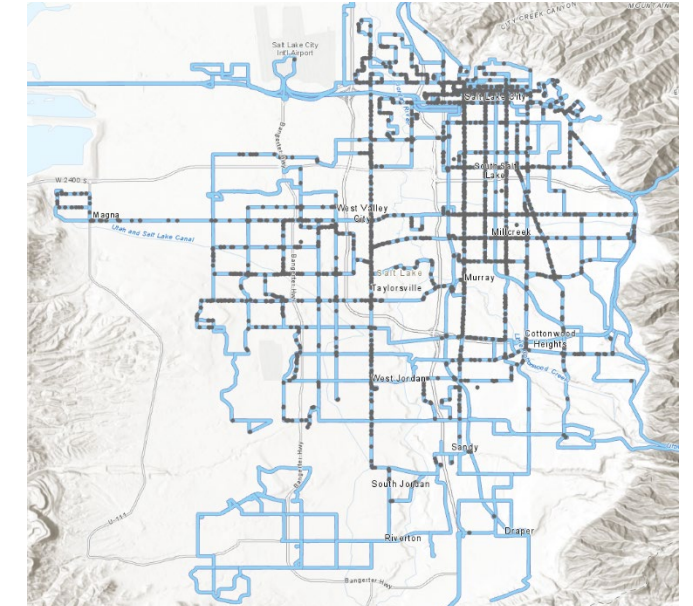


Figure 6 Bus routes and locations of ramp access activations from buses during the month of August 2018 (17,853 total). Note that every wheelchair user is to be properly strapped into the bus by the driver.

Project Tasks and Deliverables

$$MC = VMT * \$gas * \#days * \#vans MPG + \$insurance * \#vans + \$maintenancemile * VMT * \#days * \#vans + (wage * \#hoursday * \#days * \#vans) + (\$depreciation * \#vans)$$

Table 2 Comparison of Monthly Cost Based on VMT

Variable	Min Value	Max Value	
Number of Vans	4	4	
Wage (per driver per hour)	\$ -	\$ -	
Hours of Operation (per day)	10	10	
Days of Operation (per month)	31	31	
Insurance (per month)	\$ 1,200.00	\$ 1,200.00	
Maintenance (per mile)	\$ 0.09	\$ 0.09	
Vehicle Miles Traveled (VMT) (per van per day)	25	75	
MPG	15	15	
Gas Price	\$ 3.50	\$ 3.50	
Depreciation (per month)	\$ 855.00	\$ 855.00	
Cost of Operation	\$ 2.97	\$ 1.20	Per mile
	\$ 296.99	\$ 360.66	Per day
	\$ 2,301.71	\$ 2,795.13	Per week
	\$ 9,206.83	\$ 11,180.50	Per month
	\$ 2,301.71	\$ 2,795.13	Per van per month

Table 5 Calculated Values of Derivatives of Monthly Cost with Respect to Each Variable

Variable	Slope (dollar per change in variable unit)	
	Min	Max
Number of Vans	2309.67	2309.67
Maintenance	1600.00	3200.00
Hours of Operation	0.00	0.00
Wage (Driver Rate)	200.00	400.00
Days of Operation	25.47	50.93
Gas Price	106.67	213.33
VMT	12.73	25.47
Insurance	2.00	4.00
Depreciation	2.00	4.00
MPG (negative)	24.89	49.78

Project Tasks and Deliverables

- **Vehicle Miles Traveled Analysis**

- $VMT = (\# \text{ of trips}) * (\text{avg. trip distance}) * (\text{usage factor})$

Site	Bus Ramp Activations	# of Trips	Avg. Trip Distance (miles)	Usage Factor	VMT (per month)	VMT (per day)
SLC Downtown	3820	1910	2.06	0.2	785.01	26.17
South Salt Lake	4883	2442	2.56	0.2	1250.05	41.67
West Jordan	450	225	2.36	0.2	106.09	3.54
Sandy	123	62	2.73	0.2	33.58	1.12
Salt Lake City	6669	3335	3.14	0.2	2095.73	69.86
Murray	4649	2325	2.56	0.2	1190.14	39.67



Project Tasks and Deliverables

- **Pilot Evaluation:**
- **The key will be to understand the demand.**
 - Fares
 - Wait time
 - Awareness (marketing)
- **Keep fares constant, that analysis can be done later.**
- **# WAV trips / # expected WAV trips**
 - On-demand rides / total population
 - On-demand VMT / total VMT
- **Supply and driver productivity will be dependent on demand.**

#	Goal	Target	Primary Data Source from WAVs
1	Provide WAVs on-demand	# of WAV trips per day per vehicle	Pick-ups, vehicle option, vehicle ID, time stamps,
2	Proper utilization of WAVs	% of WAV requests on WAVs	Pick-ups, vehicle option, vehicle ID, time stamps
3	Prioritize WAV trips	100% of all WAV requests are WAV rides	Requests, cancellations, pick-ups, vehicle option, time stamps
4	Equivalent service	Wait time < 10 min + conventional	Requests, pick-ups, vehicle option, time stamps (+ conventional vehicles too)
5	Understand WAV on-demand travel patterns	TBD; identify traffic generators, customer segments, etc.	Pick-ups, drop-offs, GPS locations, vehicle option, time stamps
6	Meet WAV demand by day and time of day	>98%	Requests, pick-ups, cancellations, time stamps
7	Productive driver time	100% of drivers comply with hours of operation	Driver online status, driver user ID, time stamps
8	Customer satisfaction	>4.8 rating	Customer feedback, driver user ID, time stamps
9	Affordable pricing	TBD; how does ride cost compare to other options?	Pick-ups, drop-offs, GPS locations, cost of ride, time stamps
10	Listen to customer feedback	TBD; use as leading indicators related to safety, ease of use, etc.	Customer feedback as appropriate

Discussion of Results

- **Site Selection:** After our data analysis, and UTA awarding the contract to Lyft, we suggested that expanding the ride service to the entire Salt Lake County area would be beneficial to help those who were farther away from the downtown area to have access to the new mode of transportation.
- **Cost Analysis:** Based on the budget analysis, the pilot program should be able to run for the full 4 months as planned.
- **Creating an RFP:** Using the RFP that we drafted, UTA was able to select Lyft as their partner for the pilot.
- **Pilot Evaluation:** Using our recommendations for evaluation, UTA will be able to adjust the pilot as needed to stay on budget and be as effective as possible through the duration of the project.

Conclusions

- **If successful, this pilot will potentially provide a service that would enable people with disabilities to have on-demand transportation; greatly expanding their mobility.**
- **This new mobility option will also be provided at a much lower cost than what is currently available to people with disabilities.**
- **Apart from the users of this new service, the economy will also benefit by providing more jobs for drivers.**
- **UTA will have the option in the future to offer on-demand transportation to the general public.**

Recommendations

- **Begin the legal process before anything else in the project as this is what seems to be number one on the critical path.**
- **Faster response times from UTA would allow capstone students to accomplish more in less time.**
- **Allow the capstone students to take over more of the project when they don't have other tasks pending.**
- **Allow the capstone students to attend meetings with the contract partners and presentations to UTA executives.**
- **Allow BYU Capstone students and UTA to work together again on future transportation projects.**

The End

Any Questions?