

Mobile Ticketing Enhancements for General Population Incident Avoidance

Solution Proposal Presentation

March 12th, 2019

Team Roles

— — —



Pari
Project Manager



Catherine
Implementation Lead



Chris
Marketing Lead



Anny
Modeling Lead



Steven
External Coordinator



Yuki
Data Lead

Work Completed

— — —



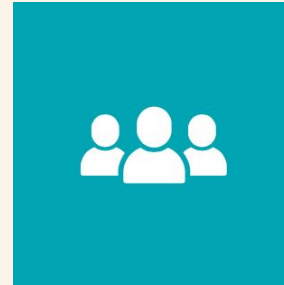
Mobile Ticketing Best Practices

2 weeks



Transit Incident Survey

3 weeks



Expert Interviews

3 weeks

Mobile Ticketing Best Practices Report

Lessons Learned

— — —

- Fare validation through an app should be foolproof
- Standardized guidelines for transit incident reporting
- Wide range of payment options should be available
- Successful marketing can balance style with substance

Mobile Ticketing Best Practices

**Mobile Ticketing Enhancements for General
Population Incident Avoidance**

Industry Capstone Team 5

University of Washington

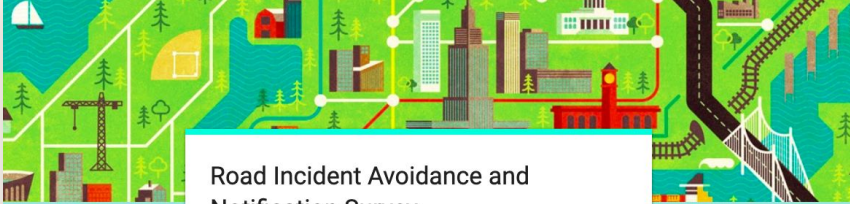
Winter 2019

Transit Incident Survey

Transit Incident Survey

— — —

- Our goal
 - Gain insight into the context of incident avoidance
 - Hear concerns from real humans
 - Validating early ideas for our solution



Road Incident Avoidance and Notification Survey

We are a group of student researchers at the University of Washington who, with the help of WSDOT, King County Metro, and Sound Transit, are looking into improving traffic incident reporting and notification service for travelers in the Puget Sound area.

Our goal is to design a service that can provide you with major incident information as soon as something happens, and with your completion of this survey, you will help get us closer to finding the solution. This survey will only take you 5 MINUTES and ALL INFORMATION AND ANSWERS YOU PROVIDE WILL BE UNIDENTIFIABLE.

If you have any questions, please contact the project manager, Pari Gabriel, with any questions or concerns you may have at parig@uw.edu.

*** Required**

What is your primary method of transportation for your daily commute to work/school? *

- ☐ Drive Alone
- ☐ Carpool
- ☐ Vanpool

Transit Incident Survey

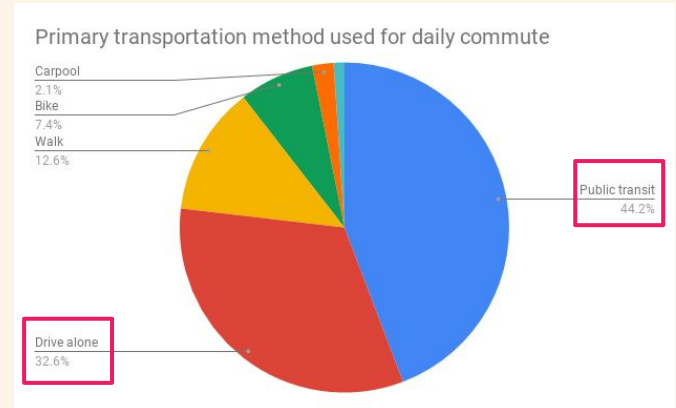
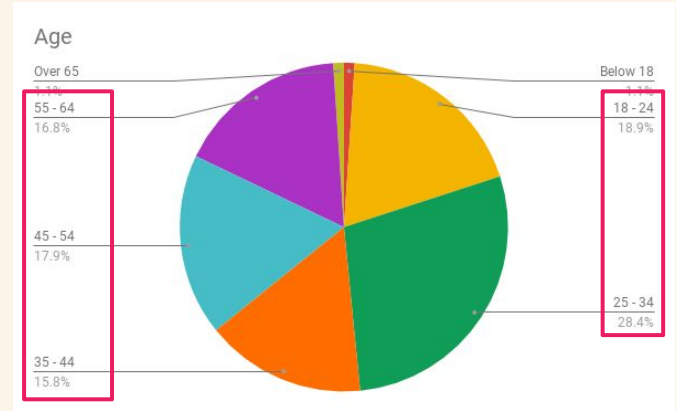
— — —

- Distribution method
 - Social media outreach with help from CoMotion, WSDOT, KCM, Sound Transit, others (thank you mentors!)
 - Various transportation-related Facebook groups
 - PacTrans email list
- Gathered 95 responses



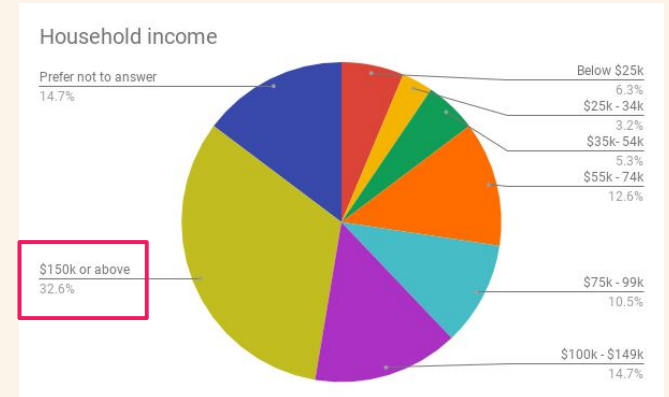
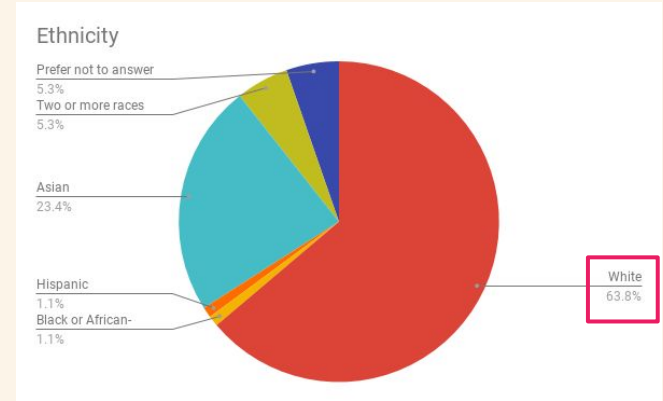
Transit Incident Survey

- **Diverse age range:** 18 ~ 65
- Mostly **public transit** users and those who **drive alone**



Transit Incident Survey

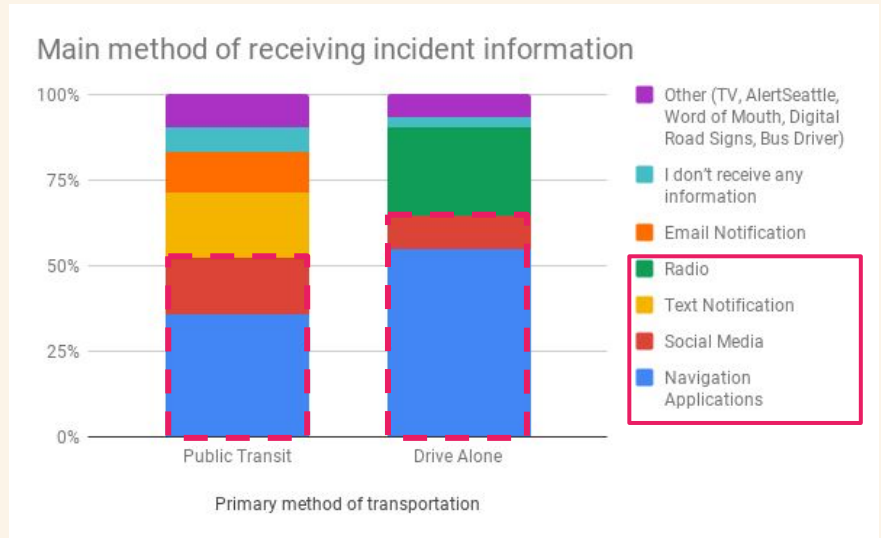
- Biased towards
 - **White** ethnicity
 - People with **income of over \$150k**



Transit Incident Survey

— — —

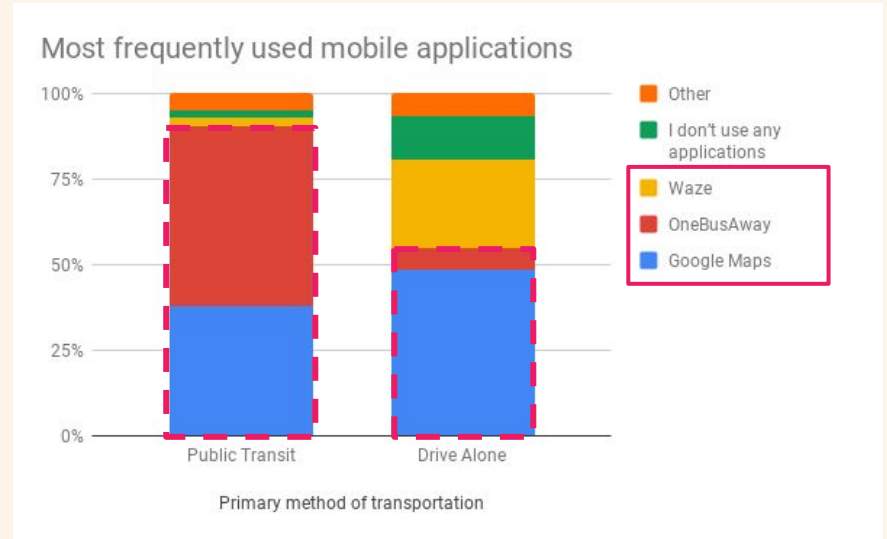
- **Navigation apps** and **social media** are the 2 main methods of receiving incident information
- **Text notifications** are used by 21% of public transit users
- **Radio** is used by a quarter of drivers



Transit Incident Survey

— — —

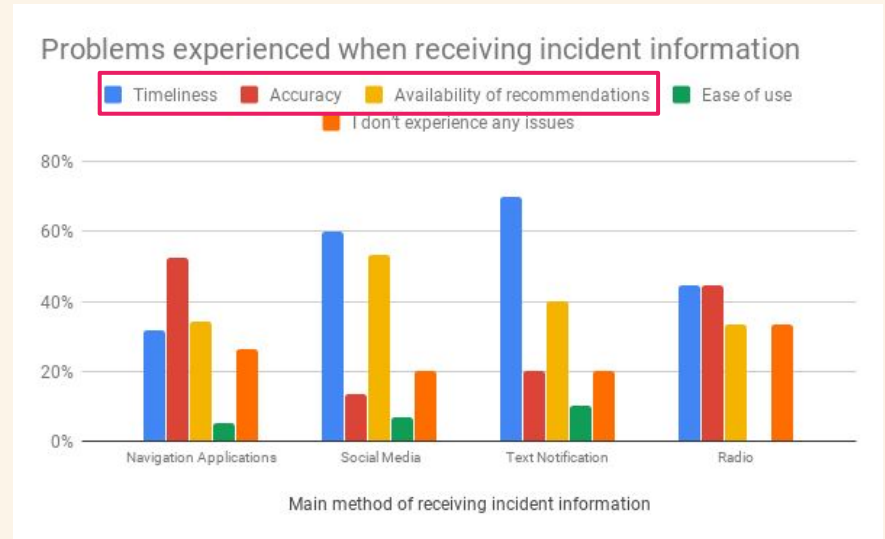
- **Google Maps** dominates as the most frequently used mobile app
- **OneBusAway** is used by over half of public transit users
- **Waze** is used by a quarter of drivers



Transit Incident Survey

— — —

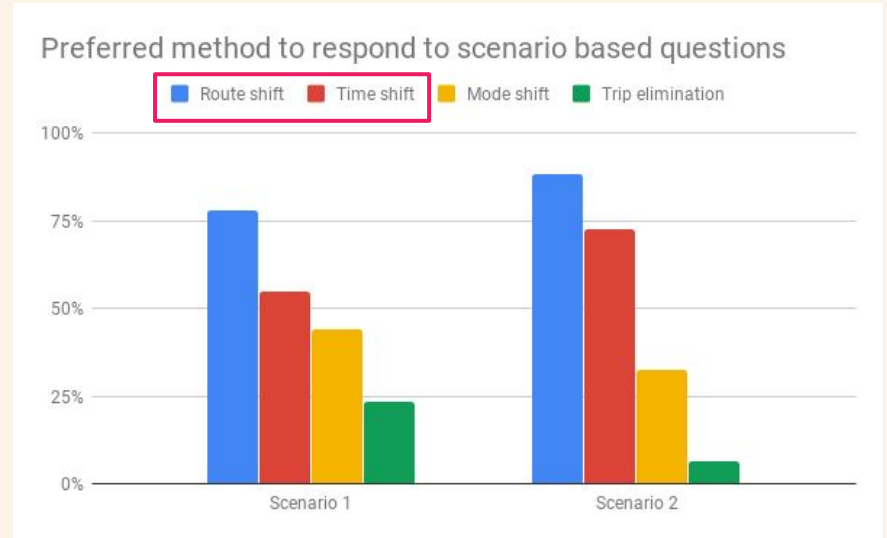
- **Timeliness** and **availability of recommendations** are problems experienced when receiving incident information
- Navigation apps lack **accuracy**



Transit Incident Survey

— — —

- When there's an incident on the road, **route shift** and **time shift** are the most popular response method

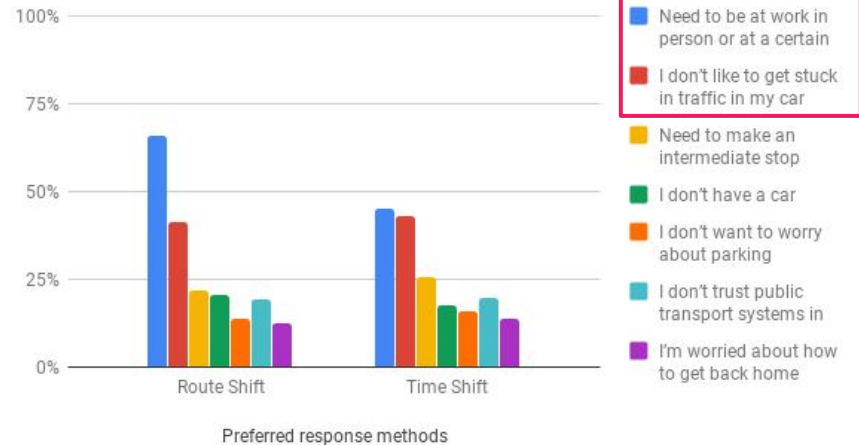


Transit Incident Survey

— — —

- When going from **home to work or school**, people preferred to route shift or time shift because:
 - Need to be at work or school in person or at a certain time
 - Don't like to get stuck in traffic in a car

[Scenario 1] Reasons for choosing route shift and time shift

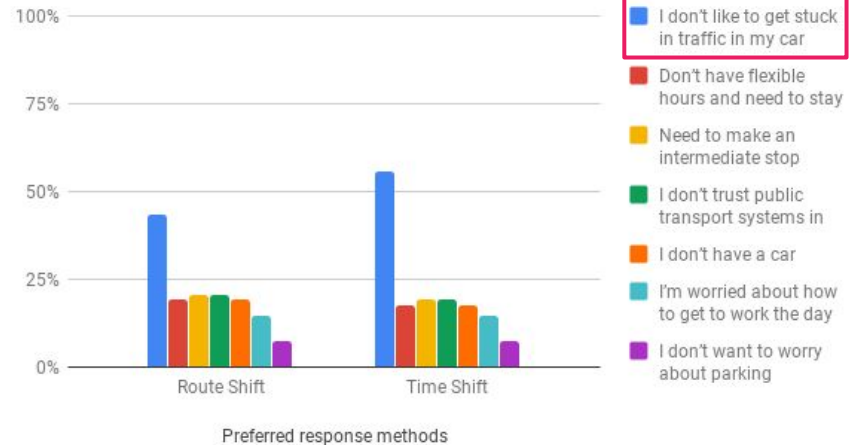


Transit Incident Survey

— — —

- When going from **work or school to home**, people preferred to route shift or time shift because:
 - Don't like to get stuck in traffic in a car

[Scenario 2] Reasons for choosing route shift and time shift



Expert Interviews

Experts Interviewed

— — —

What information can we gain from outside perspectives?

- **Marketing** - Dave Resnick and Jennifer Dice
- **Public Communications** - Don Champion, Lisa Van Cise, Mark Freitag, Tim McCall
- **User Experience** - Lauren Celenza
- **Mobile Ticketing** - Justin Deno
- **Technical Implementation** - Alan Borning



Key Takeaways - Jennifer Dice, Dave Resnick

— — —

- Aim for **strategic partnerships**
- Advertise in places of **high traffic**
- **Geolocate** marketing initiatives
- **Keep people updated** on what you're doing, tell stories



Key Takeaways - Don Champion

— — —

- **Accuracy** of information is always prioritized over **speed**
- **Social media** plays a key part in relaying incident information
- **Dataminr** - monitors tweets about trending incidents (mass casualties, disasters) in real time



Key Takeaways - Mark Freitag

— — —

- Make sure our solution will work well with KCM's new system and WSDOT's **Virtual Command Center**
- Foster **collaboration** between different departments
- Give control center ability to update bus scheduling and routing



Key Takeaways - Lisa Van Cise

— — —

- TMC uses **social media, radio, website, road signs**, etc. to capture **as many people as possible** rather than relying on one outlet
- Cross agency communication is lacking
- **Sharing resources** to help one another during incidents is crucial
- Communicating incidents with Google Maps is difficult



**Washington State
Department of Transportation**

Key Takeaways - Tim McCall

- **AlertSeattle** currently used for alerting public of major incidents
- **Coordination** with WSDOT and other agencies limited to major events
- **Google Maps** does not currently use SDOT incidents and relies on **WAZE** to give information
- **Social media, electronic reader boards** and **news media** are best ways to reach commuters



Key Takeaways - Lauren Celenza

- Accessibility spans from **disability accommodations** to **safety** to **economics**
- **Participatory** frameworks in applications
 - **Contextual information** is important for transit riders
 - **Push notifications** should be sent sparingly and at times when they're actually needed
 - requires ops teams and monitoring to maintain a flow of factual information



Key takeaways - Justin Deno

— — —

- **WSDOT API** can not identify incidents
- **Specialized solution framework** for each type of incidents
- **HaCon** solution integrates push notification, rerouting backend, direct update of transit changes by agency, and mobile ticketing
- Better integration with current **ORCA** system could increase usership from **3% to 40%**



Bytemark



Key Takeaways - Alan Borning

— — —

- Stressed **communication** and **information sharing** between transit agencies and outside entities needs to be improved
- Recommended an **open-source data repository** that allows for contributions
- Updates from agencies should be formatted to be **machine readable**

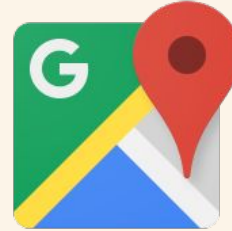
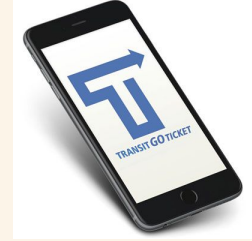


— — —

Current Solutions

Current Solutions

- TransitGO
- OneBusAway
- King County Trip Planner
- Google Maps
- WSDOT Application



Current Solutions

— — —

	Incident Notification	Trip Planning	Re-routing Recommendation	Mobile Ticketing	Transit Schedule
TransitGo		✓		✓	
OneBusAway				✓	✓
Google Maps		✓	✓		✓
Puget Sound Trip Planner		✓			✓
WSDOT Application	✓	✓			

Challenges



Re-routing

Recommendations

- Limited especially during incidents

Challenges



Re-routing Recommendations

- Limited especially during incidents



Route Planning

- Only available on OneBusAway Android and Google Maps

Challenges



Re-routing Recommendations

- Limited especially during incidents



Route Planning

- Only available on OneBusAway Android and Google Maps



TransitGO Problems

- Limited mobile ticketing options
- Inaccurate real-time schedule

Challenges



Re-routing Recommendations

- Limited especially during incidents



Route Planning

- Only available on OneBusAway Android and Google Maps



TransitGO Problems

- Limited mobile ticketing options
- Inaccurate real-time schedule



Lack of Updates

- Complicated trip planner
- Puget Sound Trip Planner updated last 2 years ago

Our Solution

Interagency Communication Solution

— — —

- A single source of truth for all incidents in Puget Sound
- A **platform** where agencies can share incident information
- A **data repository** which gathers all incident info from forum and translates into machine readable API that could be used by apps
- We hoped our solution would enhance current transportation applications and empower users to decide to either route, mode, or time shift their commute
 - Affected populations: car drivers and transit users

Setbacks

— — —

- We learned of two major technologies late in our process
 - Full extent of VCC
 - Next Gen ORCA
- Our research data is not as **effective** or **targeted** for moving forward into next quarter's work



Upcoming Improvements

- ORCA Next Gen
 - Mobile ticketing
 - Wide range of payment options (NFC, Apple Pay, card, etc)
 - Accounts based system
- Virtual Command Center
 - Consistent interagency communications
 - (Eventually) data availability to public and media



2 Options for Spring Quarter

#1 Prototype Public Facing Side of VCC

— — —

- Learn more about the project from the inside
 - Work with Mark Haselkorn
- Ideate a **public information system** that stems from VCC
- Access to VCC work plan, goals, etc.
- End Product: a prototype of the system
 - No live data

#1 Prototype Public Facing Side of VCC

— — —

- Notification System -- suggested by Borning
 - Client side:
 - Receive a push notification on their **starred** routes
 - Agency side:
 - Enter a notification message and broadcasts to **needed** users
 - Redirects user to our **recommendations** if requested

*“Push notifications should be sent sparingly and **at times when they’re actually needed** - during rides, just before, or just after.”* -- Lauren Celenza

#2 Provide Mode Shift Solutions

— — —

- Research how we can **motivate mode shifting** behaviors for **single occupancy vehicles**
- Requires 4 weeks of **interviews and surveys**
- Builds on VCC information to empower users to make decisions
- End Product: **marketing plan** and **implementation strategy**

#2 Provide Mode Shift Solutions

— — —

- Recommendation system
 - Ask user for their current state
 - During commute/ pre-commute/ after commute
 - Suggests **three feasible options**
 - **Accurate time estimation algorithm**
 - Always updated in tandem with VCC information

Our Data Repository

— — —

- Fetch accurate info from **VCC** in a timely manner
- Make the real-time incident info to a **machine readable API**
- Use **GitHub** for our repository

*“It would be helpful to use **Open-source Platform** that allows for contributions”* -- Borning

Thank you for listening!

What We Want To Know From You

— — —

- Direction on where we fit into the transportation system
- Preferred option going forward
- Resources/additional data available to us
- Questions you have

What We Need

Our other solutions

	Public Transit Users		Drive Alone	
	Pre-commute	During commute	Pre-commute	During commute
Real-time Digital Road Signs				✓
Radio	✓	✓	✓	✓
Social Media	✓	✓	✓	
Website	✓	✓	✓	

*“TMC uses **social media, radio, website, road signs**, etc. to capture as many people as possible rather than relying on one outlet” -- Lisa Van Cise (WSDOT)*

Our Focus

— — —

- Mode shift
 - *“When there’s an incident on the road, mode shift is the **2nd least** desirable response method after trip elimination”* -- Survey
 - Contributes to a healthier environment with better air quality and less oil consumption
 - Reduces traffic and potential for gridlock throughout Seattle
- Google Maps already provides easy-to-use routeshift and timeshift utilities
 - *“Google Maps dominates as the most frequently used mobile app and >90% say it is easy to use.”* -- Survey

Our Target User Group

— — —

- Solo drivers
- Transit users

*“There are **over 44%** people say their primary method for daily commute is **public transit** and over 32% people **drive alone** out of 95 people we surveyed. Most of them **experienced problems with receiving incident information**” --*
Survey

Incident scenario

Four car collision happened on the highway. Both bounds of 520 are affected. The police estimated the traffic waiting time will be 3 hours. The collision has caused paralyzing traffic throughout the entire transportation system.



Picture source: wall-street

How can we help?

— — —

User is planning their commute

1. Google Maps accurately suggests that mode shifting is faster by an hour
2. If the user wants to use the bus, Google Maps transfers the users to our app to buy a mobile ticket
3. The app helps the user buy a ticket

Frustrations

— — —

- Why weren't we told about the VCC earlier?
- We need more details on ORCA Next Gen to inform mobile ticketing
- WSDOT wants this capstone to convince SOVs to mode shift to public transit
- Who do we report to?

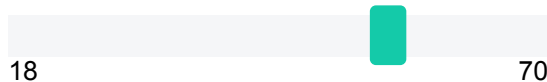


Bill

Location: Downtown - Shoreline

Transportation: Drive alone during rush hour

Age: 50



Before:

- Hit the traffic and stuck there
- Call his wife not to wait for him for dinner

After:

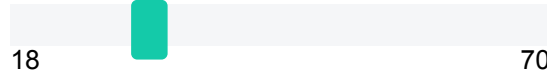
- Get traffic information from radio channel
- Able to reroute and able to get dinner on time

Kate



Transportation: Drive alone during rush hour

Age: 28



Before:

- Hit the traffic and stuck there

After:

- Get notification from Spotify or push notification
- Reroute or get on public transportation

Limitations

— — —

- Demographics of our survey:
- Biased towards
 - Age group from **18 to 65**
 - **White** ethnicity
 - People with **income of over \$150k**
- We build our solution on VCC
 - assumed VCC is accurate and updated