

Initial Online Interviews with B/LV Individuals

The protocols, scripts, recruitment process, and other items for the interviews and surveys to be conducted throughout the project were developed and submitted to the Texas A&M University IRB via the Huron online portal. The protocol was approved, and researchers began recruiting and conducting online interviews with B/LV individuals to gain insight into a possible smartphone app alerting them of turning buses. The initial B/LV interview script is provided as a separate file.

TTI recruited B/LV individuals through contacts with Texas A&M University Transportation Services and the Department of Disability Services, Blinn College Disability Services, the Brazos Valley Council of Governments Aging and Disability Resource Center, the Brazos Transit District, and other agencies, private non-profit organizations, and businesses focusing on services to B/LV people. Participants were paid \$40 for participating in the online interviews via Venmo, PayPal, or Amazon gift card.

Four interviews were conducted in June 2024 with B/LV individuals, including two men and two women. All four participants had vision limitations that affected their daily lives, ranging from partial to full blindness. All four participants indicated that they do some walking as part of day-to-day transportation but do so generally over short distances, such as walking to a transit stop or a convenience store.

Travel-related apps used by participants included Google Maps, Waze, Oko, and Be My Eyes. Participants also used transit-related apps. One participant reported they had not used way-finding apps yet for pedestrian travel but had heard positive reviews about Blindsquare and Aira.

Participants described restrictions and concerns, including busy roadway traffic, lack of sidewalks, and driveways that intersect walking paths. Participants also noted that the lack of pedestrian signals at intersections is a problem, as well as pedestrian signals and markings that are not easy for a person with limited vision to perceive. Navigating without sidewalks and familiar landmarks was noted as difficult, including big open parking lots that can cause them to veer off course. Construction zones that block or reroute walking paths were also noted as a problem, particularly if the construction

zones are not marked with cones or a similar indicator that a person using a cane or guide dog can perceive.

Participants noted the following about signalized intersections:

- Pedestrians may not know how much time there is to cross on the pedestrian signal.
- Fast-moving traffic and parallel traffic are especially difficult for a blind pedestrian to hear.
- Not knowing the type of intersection is a problem. Is there four-way traffic? Does traffic stop in a given direction?
- Inconsistencies in intersection geometry, such as split pedestrian islands, can make it difficult for the pedestrian to tell if they are in a vehicle lane.
- Inconsistencies with signals, such as pedestrian buttons not located in the same place, may confuse the pedestrian.

Participants suggested the following potential improvements to signalized intersections:

- Chirping/audible pedestrian signals.
- Audible countdown times for crosswalks.
- An audible beacon at the far end of the intersection to confirm that the crossing pedestrian is traveling in a straight line and staying within the crosswalk.
- Increased time to cross.
- Consistency in crosswalk and intersection design, as well as uniformity in the pedestrian button location.
- Pedestrian signals that are bigger, brighter, and louder to be heard over traffic noise.
- Consistent maintenance of crosswalk markings to keep them bright and visible.
- Wider sidewalks and consistent curb cuts.
- More streetlights.

TTI researchers explained the design and graphics of the smarter intersections in the project. Three out of four participants indicated they would feel comfortable/feel safer at a smarter intersection. The responses are as follows:

- Yes—An audible reminder is good especially for new, quieter electric vehicles and for pedestrian distraction.
- Yes—Any additional notifications would be good and would help me feel safer.

- No—The intersection where I travel most often is very complex, so I do not think the notification would clarify which way the bus was turning. Depending on the complexity of an intersection, I might just wait for another person to cross with.
- Yes—I would know when to wait and let a vehicle turn. It would be helpful if this notification system could also provide feedback to the intersection, to potentially allow a few more seconds of crossing time for the pedestrian who is using the app.

Participants identified the following app information and features that would be most useful:

- Notice of whether the intersection is clear.
- How much time the pedestrian has to cross.
- Countdown times with auditory and vibrating pulses to indicate seconds.
- Information on oncoming or turning traffic that could help the pedestrian decide whether to start to cross or not.
- Simple design for a go/no-go decision.
- An advance planning option to help plan a route, with information included about intersections, traffic patterns, parking lots, and landmarks along the route.
- Accessibility testing. Ideally, the app should allow for connection to other artificial intelligence (AI)–based apps such as Be My Eyes.
- The ability to set a route and have the app notify the pedestrian if they get off course.

Participants indicated the following ways they would like the app to notify them of a bus turning:

- A distinctive, loud audible tone that does not sound like any other phone alert.
- A message after the tone with specific instructions or warnings.
- Both audible and haptic notifications; both need to be distinctive.

Participants were asked if they would use an app like this. Their responses were as follows:

- Yes, if it is simple to use and has no password or login.
- I would prefer that it does not keep a record of my information and movements. Users should be anonymous.
- I would use it if it had advance planning options. I would be less apt to use it en route for in-the-moment decisions.

- Absolutely!

Participants were provided the opportunity to ask questions about the app or provide additional comments. Two of the four participants were concerned about the privacy implications of the app and indicated they would be less likely to use it if their location information was being tracked and stored. The other two participants were in favor of their travel information being stored and were in favor of a feature that would help them to be located if they were lost. Other comments focused on the need for easy step-by-step instructions and the ability to tell if a given intersection is wired to interact with the app or if a bus is properly communicating with the intersection. Other comments focused on the potential capabilities of the app, such as reporting accidents. One participant asked if it will be available on both iOS and Android platforms, noting that the iOS platform and its apps tend to be more accessible. A question was also asked about whether the app would be able to connect to the Aggie Spirit transit app. Another suggestion was to add a possibility of a panic button that could provide a B/LV individual's location to someone if they get lost.