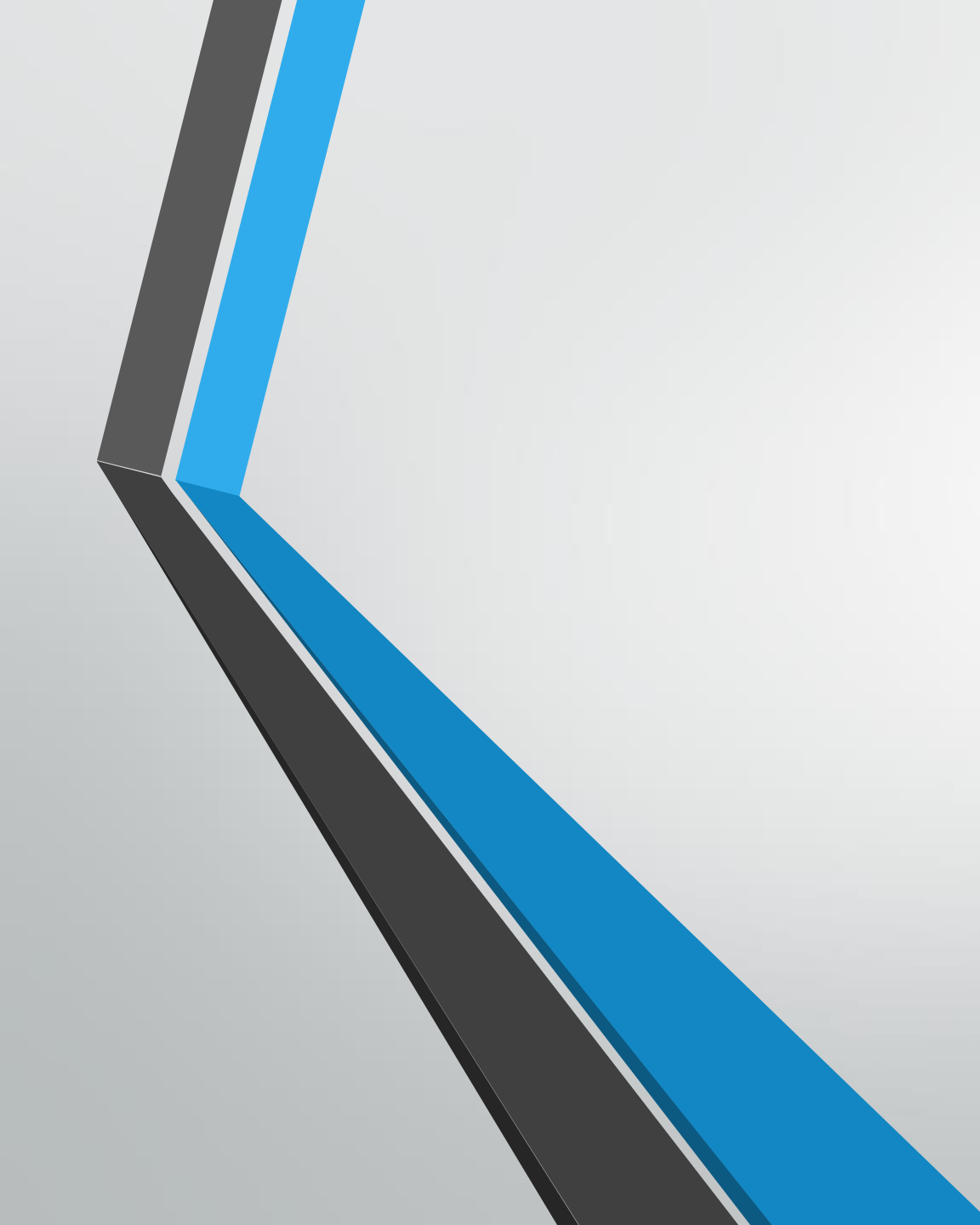




Emerging Trends

ACCB6019

Hackathon

TEAM KERBLESS

Team Members

Samuel Albrighton - 2404921

- Project Manager
- Computer Games Design

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- Developer
- Software Engineering

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- Cybersecurity
- Applied Computing

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- Creative Lead
- Animation and VFX

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- VR Modelling and Research
- Computer Games Design

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- Researcher
- 3D Artist
- Animation and VFX

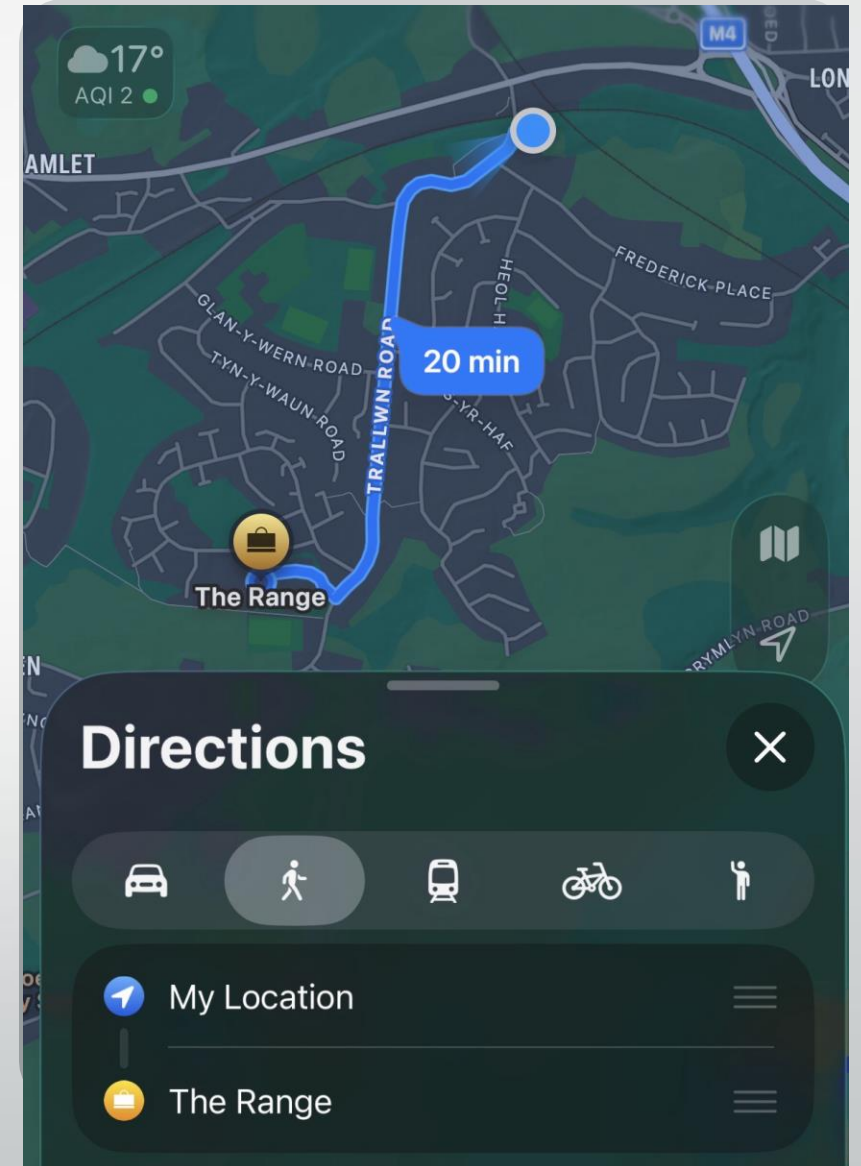
Issue and solution

Chosen Problem: Wheelchair accessibility

- Navigation apps don't always take into account whether the user is differently abled.
- A lot of buildings and areas around Swansea tend to be wheelchair inaccessible

Proposed solution: Smart navigation app

- An app specifically for wheelchair users
- Help them find the friendliest route to their destination



Apple Maps

Kerbless



Logo design made
by Arif Khamis

Wheelchair navigation app works in map mode or augmented reality mode

Will point the user towards the most wheelchair friendly route to get to their chosen destination

The app will take into account

- Stairs
- Kerbs
- Path width
- Extenuating circumstance

Aims and objectives

- Provide easy navigation for wheelchair users
- Accessible and easy to use for all skill levels
- AI-powered navigation that avoids inaccessible obstacles

Security

- Modern software must consider privacy and security.
 - There are many reasons for this; e.g. GDPR, compliance regulations, hackers, etc.
- To prevent spam in route review sections, a user account will be required. Two-factor authentication is recommended.
 - User accounts are not mandatory to use the app, only for submitting route reviews and/or using cross-device saving
- The AI used for calculating routes will run natively on the device.
 - While this increases system requirements, it also enables greater control over what the service can do on both the user and developers' end (whereas renting a cloud service would put the program at the behest of the cloud provider) and allow the software to run even when it cannot communicate with the servers
- Automated data collection (telemetry, etc.) should be completely optional, be anonymised and be encrypted to prevent leakage of user data
 - While this may have disadvantages from a commercial standpoint, it is preferable to receiving fines and lawsuits for inappropriate data security measures

Research : Feedback

- *"Wheel friendly Google maps? Could be interesting. Can you build in reporting for pavement parking? Path width is also a thing, mostly impacted by pavement parking, overgrown hedges and abandoned wheelie bins. Boris bike/scooter parking can also be a pain. Then there's the game of find the dropped curb when one corner /crossing point has it and the other doesn't. If you want to get really technical, the height of some dropped curbs is difficult to get up. Getting down is easier. Would you be able to input what mobility aid your using so AI can get the specs and tailor your route accordingly? My big scooter can take much rougher terrain than my chair." - Gemma*
- *"I think this would be very helpful. I'm not sure about the AR glasses due to most people wearing glasses anyway, maybe headphones/ear buds would be more suitable. The ramps or stairs are a great idea as would disabled toilets or rails for walking into building using sticks as most people leave mobility scooter outside at the door. Street lighting and pot holes or cobbles are something else that can effect the scooter as are the steepness of braes etc. And as thee aren't any at the moment, a phone holder that fits on the top of the tiller to hold your phone up in front of you making it easier to see where you are going." – Sheena*

- Reporting system

- Pavement Parking
- Path Width
- Overgrown Hedges
- Wheelie Bins
- Street Lighting
- Cobble Streets

- Mobility Scooter/Wheelchair Types

- Size
- clearance

- Audio directions

- Via headphones



Industry Sources

We gathered these sources to research wheelchair dimensions and identify the most common accessibility barriers faced by wheelchair users.

<https://www.daysmobility.co.uk/?srsltid=AU7gw4WDY0dfSbCWGr7FcnfDmd3yg6rnitGRzmByYYb43rIpONX6TQxJ> [1]

<https://www.swansea.gov.uk/article/5672/Disability-aids-and-equipment> [2]

<https://bushhealthcare.co.uk/our-stores/swansea/> [3]

<https://www.motabilityfoundation.org.uk/research-and-innovation/innovation> [4]

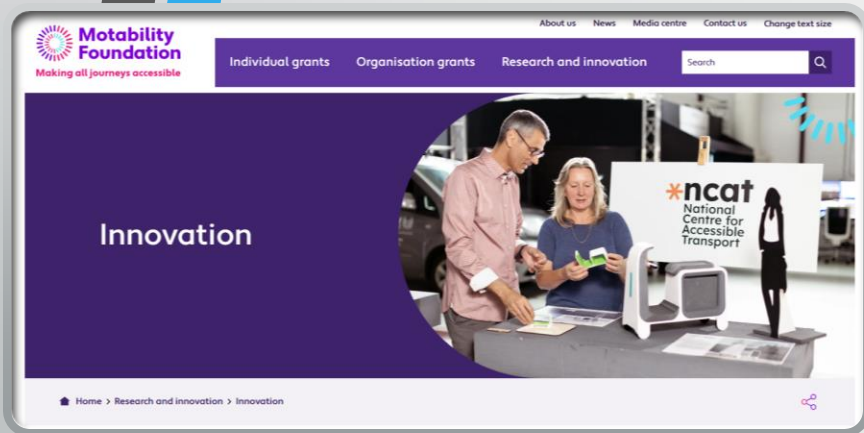
Motability foundation this organization supports and funds research into accessible transport help us to look into existing research

<https://www.transportforall.org.uk/> [5]

Organization campaigning for accessible transport could help us find common issues wheelchair users face while traveling

<https://digitalaccessibilitycentre.org/contact.html> [6]

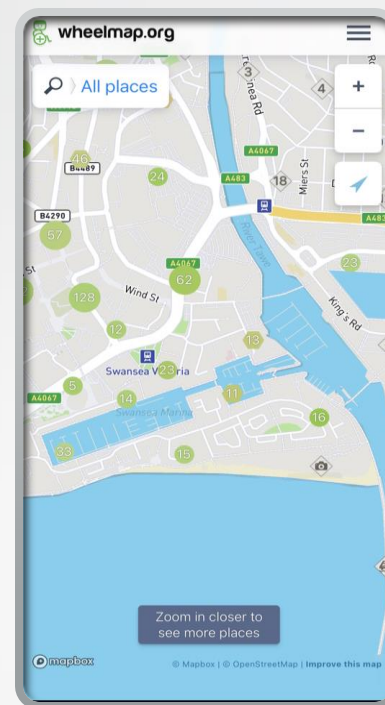
Specializes in digital accessibility testing and could help us to lay out the app in most user-friendly way



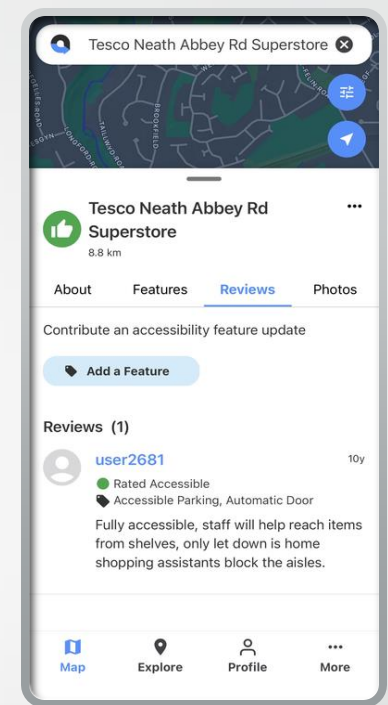
Examples

- **Wheelmap** – wheelchair accessible locations
- **Accessnow** – wheelchair accessible locations with user rating
- **Wheelaccess** – navigation app in French
- **Route4u** – navigation app not usable here

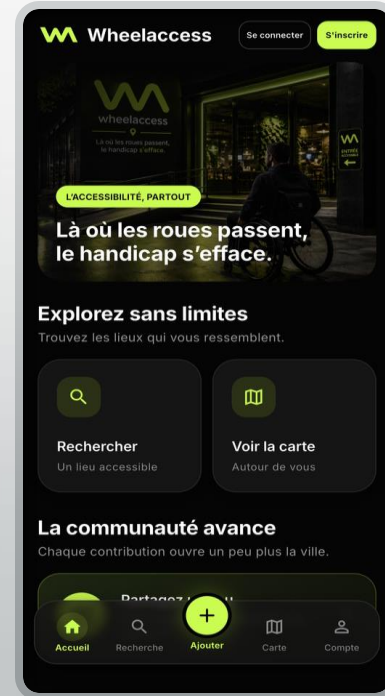
Wheelmap[7]



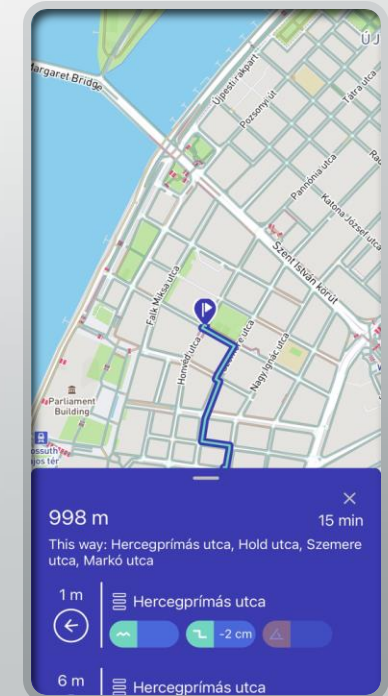
Accessnow[8]



Wheelaccess[9]



Route4U[10]



Mock-ups

Camera view shows when steps or ramps are nearby.

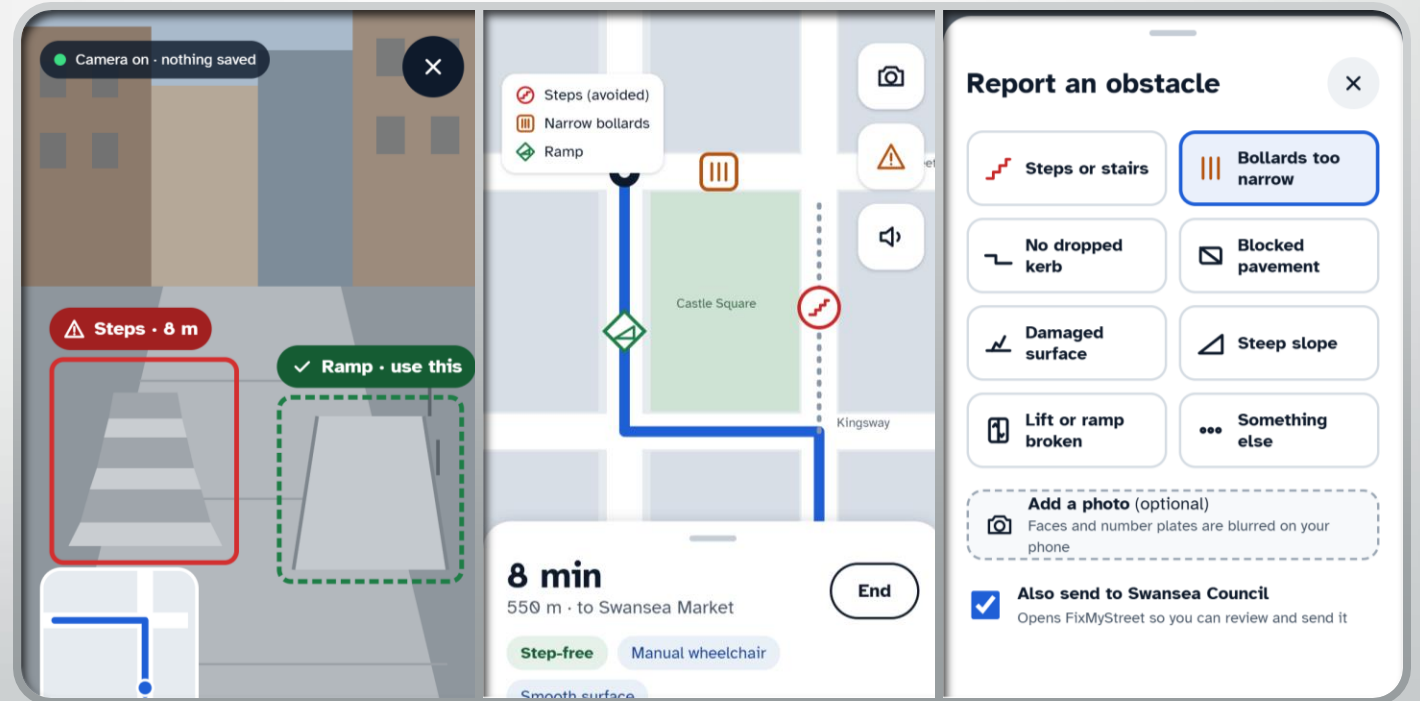
Map view has symbols to denote certain obstacles such as bollards, or to denote where there are ramps.

Ability to report an obstacle is also a part of the app.

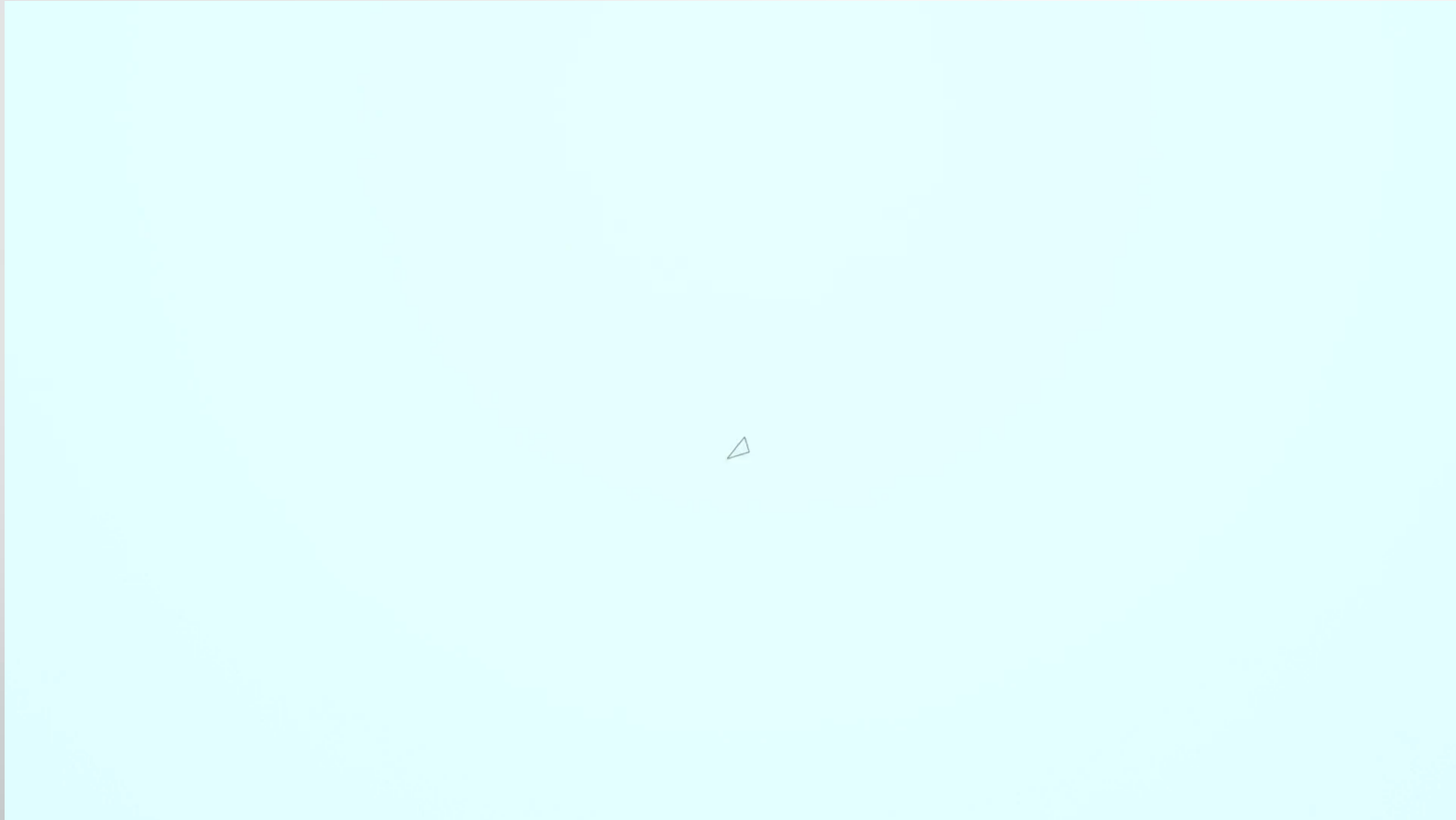
Symbol “key” example



- Recently reported obstruction on this street



App Launch Sequence



Dotted line represents the kerb

Triangle and sliding circle representing wheel-friendly slope in green to show that it's the easier way for wheeled mobility aids



Thanks for listening!