

# Sparkgeo



## **Accessibility Research Lab**

IDEAWORKS, Mohawk College

[a11yLAB@MohawkCollege.ca](mailto:a11yLAB@MohawkCollege.ca)

September 30, 2021



# Table of Contents

Project Summary.....	4
Persona Development .....	4
Scenario Development and Benchmarking .....	4
Public Health Ontario.....	5
Canada’s Federal Elections, 2000 - 2019 .....	6
Realtor.ca .....	7
Canada Territory Planning Map .....	8
Mapping Our Divisions.....	9
End-User Testers.....	10
Scenario Testing.....	11
Sharon .....	11
Martin .....	12
Jordan.....	12
Karen .....	12
Tricia.....	13
Highlight Reel .....	13
Summary of Findings.....	14
1. Interaction methods and modalities .....	14
2. Navigation and wayfinding .....	14
3. Structure and Semantics.....	15
4. Error Prevention and States.....	15
5. Contrast and Legibility .....	15
6. Language and Readability .....	16
7. Predictability and Consistency.....	16
8. Timing and Preservation .....	17
9. Movement and Flashing .....	17
10. Visual and Auditory Alternatives.....	17
Contact Information.....	17
Appendix A.....	18

Sarah .....	19
About.....	19
Devices and Technology .....	19
Goals & Wishes.....	19
Frustrations .....	20
Making things better for Sarah .....	20
More Reading.....	20
Low Vision in Canada.....	20
Roberta.....	21
About.....	21
Devices and Technology .....	21
Goals and Wishes .....	21
Frustrations .....	22
Making things better for Roberta.....	22
More Reading.....	22
Blindness in Canada.....	22
Appendix B .....	23
Photo and Video Consent .....	23
Statement of Confidentiality .....	23

# Project Summary

---

*Sparkgeo* a provider of geospatial expertise to tech companies, is researching how members of the blind and low vision community engage with geospatial data, represented visually through digital maps.

Mohawk College's Accessibility Research Lab will support *Sparkgeo* to conduct research in the following areas to understand how people who are blind or partially sighted interact with web content maps:

- Participating in a co-design workshop to develop custom accessibility personas
- Conduct functional and automatic testing for benchmarking
- Conduct virtual end-user testing

## Persona Development

---

The Persona Development workshop was an opportunity to practice co-design. Members of the *Sparkgeo* team were provided with a [2-hour Persona Development Workshop](#). The workshop explored the following:

- Introduction to personas
- Exploration of example persona for accessibility
- Accessibility approaches to persona development
- Research and statistics for blindness in Canada
- Demo of geospatial maps by a member of the disability community using JAWS screen reader and Microsoft Magnifier

Participants then engaged in persona development. Please see the [Persona Workshop Recordings](#) to access the full workshop.

The personas were then fully developed and edited and shared with the *Sparkgeo* team for feedback. No feedback was received. **See Appendix A.**

- Persona 1: [Roberta](#) (a user who is blind)
- Persona 2: [Sarah](#) (a user with low vision)

## Scenario Development and Benchmarking

---

*Sparkgeo* put together 5 testing scenarios using a variety of sites with geospatial maps. They were then tested for time/completion for a sighted user and a screen reader/screen magnifier user.

For benchmarking we tested the site using:

1. Benchmarking **[BM]** using no assistive technology
2. Benchmarking using assistive technology **[AT]**
  - a. Screen readers
    - VoiceOver (VO) for MacOS using Google Chrome and Safari browsers
    - NVDA on Windows using Google Chrome and Microsoft Edge browsers
    - Windows Magnifier using Google Chrome and Microsoft Edge browsers
  - b. Screen magnifiers
    - iOS zoom and VO for iOS on Safari (iPad and iPhone 12)
    - ZoomText on Windows using Google Chrome and Microsoft Edge browsers

#### Things we tested

1. General navigation of the map, including panning, zooming, and clicking features
2. Perceiving and understanding labels on the map such as place names, roads, borders
3. Perceiving and understanding any legends or additional information such as captions or labels
4. Navigation between interacting with the map and controls and filters outside of the map
5. Interaction with map features such as polygons and markers
  - a. Perceiving updated information after interaction with a map feature

## Public Health Ontario

Interactive leaflet map with legend and interactable features.

#### Site

[www.publichealthontario.ca/COVID-19 data](https://www.publichealthontario.ca/COVID-19-data)<sup>1</sup>

#### Persona

As a resident of Hamilton, you want to find out what the case-count is for COVID-19 in Hamilton and the surrounding areas, so that you can be better informed about the state of the pandemic in your area.

#### Scenarios

1. Find the recent cases and the recent rate per 100,000 for the City of Hamilton Public Health Services. **[BM]** = 1 min
2. Find the recent cases and the recent rate per 100,000 for an adjacent Public Health Unit. (such as Brant County or Niagara Region). **[BM]** = 1 min
3. Find a Public Health Unit that has a very high case count **[BM]** = 1 min

---

<sup>1</sup> <https://www.publichealthontario.ca/en/data-and-analysis/infectious-disease/covid-19-data-surveillance/covid-19-data-tool?tab=maps>

4. Find a Public Health Unit that has a very low case count **[BM]** = 1 min
5. When was this data updated? **[BM]** = 1 min

Possible <b>[AT]</b> Issue	Scenarios
No way to identify place names, roads, borders using screen reader. Users have to click map area with cursor to select health unit region. There is no way to scan through each health unit without clicking it on the map. Users may have to download table to read data.	1, 2, 3, 4
Screen reader reads the legend out every time you click on a new health unit, could be helpful to know the range of data and where your unit falls into that, but it adds time, and you can't easily compare that to other regions unless you can identify them on the map or use the data table.	1, 2, 3, 4
Screen magnification issues with map panning and pinch zoom, the pop-up instructions keep coming up to double touch the map, but the map won't zoom or pan. It zooms in on double tap but cannot zoom back out.	1, 2, 3, 4

## Canada's Federal Elections, 2000 - 2019

An Esri map showing the history of the Federal election from 2000 - 2019.

### Site

[esrica-tsg.maps.arcgis.com/Federal Election 2000-2019](https://esrica-tsg.maps.arcgis.com/Federal Election 2000-2019)<sup>2</sup>

### Persona

As a Canadian citizen, you want to be an informed and educated voter in the upcoming federal election

### Scenarios

1. Find who won in the Hamilton Center riding for the last federal election and how many ballots they won. **[BM]** = 1 min
2. Which party(ies) won in 2015 for the Hamilton Ridings of: **[BM]** = 6 min
  - a) Ancaster
  - b) Hamilton Center
  - c) Hamilton East
  - d) Hamilton Mountain
  - e) How are they different from the previous years? **[BM]** = 3 min

<sup>2</sup> <https://esrica-tsg.maps.arcgis.com/apps/MapSeries/index.html?appid=bd7ddfd489b749cf9beeb25b5786a8031>

Possible [AT] Issue	Scenarios
Users cannot just tab through ridings/election info on the map.	1, 2, 3
Sometimes the map works fine, other times it will not let the user select any riding unless you zoom in or out first (this happened a few times when the page was reloaded).	1, 2, 3
Screen reader reads this out every single time you engage with the map: "RIDING NAME, Province of Ontario, Esri Canada, Esri, HERE, Garmin, METI/NASA, USGS, EPA, NPS, USDA, NRCan, Parks Canada   RIDING NAME, Province of Ontario, Esri Canada, Esri, HERE, Garmin, METI/NASA, USGS, EPA, NPS, USDA, NRCan, Parks Canada" before the data is read. Users may skip this before getting to the data.	1, 2, 3
Pop up data box: Screen reader reads that the data box is an empty group box and suggests closing it before there is the option to read the information in the box. Users may assume nothing is there and close the box.  Sometimes the box will have a small arrow to cycle through nearby ridings, sometimes it doesn't. It isn't clear what determines this and may be confusing/add time onto finding information.	1, 2, 3
"Number of seats" pie graph may be confusing because of the toggle feature: you can choose not to see a certain party, but it only makes it disappear from the pie, not from the map itself. People may accidentally toggle these and then be misled about the number of seats each party holds in the pie chart.  Colour contrast issues – the legend/map for the independent parties is the same colour as the background, and also the same as the water on the map.	

## Realtor.ca

A Google map that allows users to filter, search, and view properties for sale that are listed on the MLS. (multiple listings service)

### Site

[Realtor.ca](https://realtor.ca/)<sup>3</sup>

### Persona

As someone with a growing family, you're going to need a bigger house.

---

<sup>3</sup> <https://realtor.ca/>

## Scenarios

1. Find some properties on Hamilton Mountain that are within your budget of \$750,000 and have at least 3 bedrooms. **[BM]** = 1 min
2. After you've found a home, find out how some other homes in the area relate to that one. **[BM]** = 2 min
3. Find out how close day-care facilities and schools are to this home. **[BM]** = 3 min

Possible <b>[AT]</b> Issue	Scenarios
User cannot use keyboard to select dropdown location options (it works for cost/# of bedrooms/bathrooms)	1, 2, 3
Cannot select the listing's menu items by tabbing or using VO rotor (highlights/neighbourhood/stats/calc.) Someone using a screen reader/tabbing may not be able to access the neighbourhood info where the daycare and school distance map is kept.	1, 2, 3
Hard to navigate the map when the page is also zoomed in, sometimes it moves the whole screen and sometimes just the map.	1, 2, 3
There is no way to search for "Hamilton Mountain" on the real estate site – if you aren't familiar with Hamilton how do you know?	1, 2, 3
Number of real estate options changes depending on how close or far you zoom in, it lumps them together & isn't always clear why, this may be an issue for people using ZoomText, iOS zoom, and Windows Magnifier, etc.	1, 2, 3

## Canada Territory Planning Map

A Mango Map that allows you to query schools in a user-defined area. (This map is for demonstration purposes only, data may not be accurate)

### Site

[mangomap.com/CanadaTerritoryPlanningMap](http://mangomap.com/CanadaTerritoryPlanningMap)<sup>4</sup>

### Persona

As a City Planner for the city of Hamilton, you want to ensure that there's safe and accessible streets for all residents.

### Scenarios

---

<sup>4</sup> <https://mangomap.com/franchise/maps/109695/canada-territory-planning-map>



1. Find all the schools in a 5 km radius of a new subdivision that is being built in Dundas Ontario, so that you can better plan crosswalks and safer streets. **[BM]** = 10 min
  - a. Get this information in a format that you can send to your colleague.
2. Find the aggregate data of the census tracts in that same area **[BM]** = 5 min
  - a. What is the total population?
  - b. What is the median income?

Possible <b>[AT]</b> Issue	Scenarios
Screen reader users, people who are Blind or have mobility/dexterity related disabilities will not be able to draw the borders for the queries.	1, 2
Not many heading levels; levels are in the wrong order (3 before 1) or mislabeled, may be confusing.	1, 2
A table pops up when you try to access data. The interactive table is not accessible and the VO rotor and tabbing both act like it doesn't exist (it is still reading and highlighting the headings and links on the main map page underneath it). You have to download an excel file.	1, 2
The census tract data lists each of the regions just as "Hamilton" with different median incomes and populations on the table.	2

## Mapping Our Divisions

Story map with complex data visualizations and dependent on labels.

### Site

[thelocal.to/Mapping our Divisions](https://thelocal.to/Mapping-our-Divisions)<sup>5</sup>

### Persona

As a resident of Toronto, you want to learn more about how geography affects other residents, so you can be better informed about the types of people who live in Toronto and to better understand your own neighbourhood.

### Scenarios

1. Find which neighbourhoods have the lowest and highest income in Toronto. **[BM]** = 2 min

---

<sup>5</sup> <https://thelocal.to/mapping-our-divisions/>

2. What are some other neighbourhoods that have low and high incomes that aren't mentioned? **[BM]** = 3 min
3. West Hill neighbourhood is identified as a health care desert. Where in Toronto are there many primary care facilities? **[BM]** = 3 min

Possible <b>[AT]</b> Issue	Scenarios
When using keyboard tabbing & selection, sometimes the next and back buttons on the map open a new window to a feedback form.	1, 2, 3
Screen readers – The next and back buttons work with control + option + space, but you have to tab through to access the information and then travel back down to get to the next button again. Example: It reads the text box and then to get to the next one you have to go through the zoom buttons, copyright info, and map frame, then click next, then do the same thing in reverse to read the next text box.	1, 2, 3
Maps should maybe have neighbourhoods clearly outlined - some are listed on the map and others aren't. What does a neighbourhood mean? High Park, The Beaches, etc. are neighbourhoods, the entire region of East York is a district made up of many neighbourhoods, but none appear on the maps. May cause confusion.	1, 2, 3

## End-User Testers

---

[W3C](#) identifies the importance of end-user accessibility testing.

*“User testing is crucial because users are the real experts in their own abilities and their own assistive technology. User testing can also reveal usability gaps between more and less technical users, and between people who are familiar with the web site in question (such as the expert testers themselves) and people who aren't (new users).”*

For the *Sparkgeo* project, a total of 5 testers from the blind (screen reader user) and low vision (screen magnification user) community were recruited. *Sparkgeo* requested that the testers be technically proficient. Each tester identified their level of technical abilities based on the following scale:

On a scale of 1 to 5 with:

1. **Not Technical** (for example if you needed to find something you won't seek it out online, you'd rather pick up the phone and call or find someone who can help you.)
2. **[In between Not Technical and Somewhat Technical]**

3. **Somewhat Technical** (for example you may look on the computer and try to find what you're looking for, but if it takes longer than expected or you reach barriers, you'll seek help elsewhere.)
4. **[In between Somewhat Technical and Very Technical]**
5. **Very Technical** (for example you usually find what you're looking for online, you have learned how to circumvent inaccessible sites and are persistent when barriers present themselves, calling or asking for help is a last resort.)

## Scenario Testing

---

Each end-user was scheduled to participate via a 1-hour, virtual meeting (using the Zoom platform). The meeting was recorded and *Sparkgeo* was invited to observe and was given the opportunity to ask questions at the end of each testing block.

Each participant completed a Photo and Video Consent & Statement of Confidentiality form, see Appendix B.

Each tester will be listed individually with the recording of their session. The overall results of the tested will be collated and provided below with a highlight reel.

### Sharon

**Disability:** Sharon is a middle-age woman who has a diagnosis of Retinopathy of Prematurity ([ROP](#)), as a result of Nephropathy. Sharon has no vision in her right eye, and limited vision in her left eye. She has no depth perception and has difficulty adjusting to changes in light. Sharon has difficulty with very bright environments and seeing colours with low colour contrast. Sharon uses a guide dog for assistance.

**Assistive Technology:** [ZoomText](#) 2021 is a screen magnifier with a built-in screen reader. Sharon uses a large print keyboard, large (27") monitor at 300+ magnification (3.5), or 600+ magnification on her 15" laptop. Sharon prefers to use the Google Chrome Browser. She will also use her iPad to take advantage of the iOS zoom controls.

**AT Support:** Level Access has an excellent demonstration of ZoomText screen magnification software and common accessibility challenges in their [Web Accessibility 101: ZoomText Demo](#).

**Technical Ability:** Sharon rates herself at a 4: In between Somewhat Technical and Very Technical.

**End-User Testing Recording:** [Sharon – Magnifier, September 3, 2021](#)

**Simulation:** [Sharon ZoomText Simulations](#)

## Martin

**Disability:** Martin is a middle-age man who has no vision or light perception. Martin uses a guide dog for assistance.

**Assistive Technology:** JAWS 2021 is a screen reader for Windows. It provides speech and braille output. Martin uses a braille display, Focus 40. His preferred browser is Microsoft Edge.

**AT Support:** AMI: Accessible Media Inc.'s Double Tap TV, discuss the latest advances in JAWS screen reader technology. [Introducing JAWS 2020](#) – although Martin uses version 2021, the features are relatively the same. [The Focus 40 Blue Refreshable Braille Display](#) by Freedom Scientific Training is another good resource to understand Martin's technical needs.

**Technical Ability:** Martin rates himself at a 5: Very Technical.

**End-User Testing Recording:** [Martin – JAWS with Microsoft Edge, September 3, 2021](#)

## Jordan

**Disability:** Jordan is in his mid-twenties and is a computer science student at Mohawk College. He is in his final semester before graduation and has just returned to Hamilton to complete the course in-person. Jordan has been fully blind since birth. He has no usable vision and no light perception.

**Assistive Technology:** Jordan is a proficient screen reader user of JAWS for Windows, VoiceOver on MacOS, and NVDA with Windows. But for this test he was using the screen reader Orca for Linux.

**AT Support:** Ubuntu Linux ships with an open source screen reader program called Orca that can help a blind person navigate the web. Orca doesn't require any setup. To start you select the Windows key + Alt + S. See this video by Jantcu to learn more about [Orca Screen Reader for Linux](#).

**Technical Ability:** Jordan rates himself at a 4 – 4.5: In between Somewhat Technical and Very Technical

**End-User Testing Recording:** [Jordan – Linux Orca, September 3, 2021](#)

## Karen

**Disability:** Karen, an older adult, has been legally blind since the age of 14 when she lost most of her vision for unknown reasons. Karen reports that she can see everything, but everything is slightly out of focus and she can't see any details. She finds using a screen reader easier and quicker to navigate the web, but when she gets really frustrated she will resort to using her magnifying glasses and a screen magnifier.

**Assistive Technology:** JAWS 2021 and Microsoft Edge. Additionally, Karen also uses (but not for this user testing) Windows Magnifier, and magnifying glasses.

**AT Support:** See Martin’s bio for information on JAWS 2021. Microsoft’s [Use Magnifier to make things of the screen easier to see](#), provides a blog and video for reference.

**Technical Ability:** Karen rates herself at a 5: Very Technical

**End-User Testing Recording:** [Karen – JAWS Edge, September 13, 2021](#)

## Tricia

**Disability:** Tricia is a middle-age woman who has been completely blind her whole life. She has no usable vision and no light perception.

**Assistive Technology:** JAWS 2020 for Windows 10 using Google Chrome.

**AT Support:** See Martin’s bio for information on JAWS 2020.

**Technical Ability:** Tricia rates herself at a 5: Very Technical

**End-User Testing Recording:** [Tricia – JAWS Chrome, September 13, 2021](#)

## Highlight Reel

---

Please see the *Sparkgeo* [highlight reel](#)<sup>6</sup> for a curated selection of video clips, demonstrating the more common errors identified by our end-users.

The highlight reel is organized using the [Web Content Accessibility Guidelines](#) (WCAG) **POUR Principles**:

- Perceivable
- Operable
- Understandable
- Robust

The highlight reel demonstrates the specific frustrations experienced by the end-users, while the summary of findings offers a more general overview of the challenges.

---

<sup>6</sup> [https://mohawkcollege365-my.sharepoint.com/:v/g/personal/000258991\\_mohawkcollege\\_ca/ETgTk1doHCNKmnCV9zxE23wBmCV-0kJCT5CM4h52WqISMg?e=bRGkqv](https://mohawkcollege365-my.sharepoint.com/:v/g/personal/000258991_mohawkcollege_ca/ETgTk1doHCNKmnCV9zxE23wBmCV-0kJCT5CM4h52WqISMg?e=bRGkqv)

# Summary of Findings

---

The testing resulted in several areas of the 5 maps being identified as inaccessible and/or not usable. Here is a summary of the overall findings from the automatic/functional testing and the end-user testing.

The errors will be grouped using the [10 Accessibility Heuristics](#) (Boudreau, 2019)<sup>7</sup> framework.

## 1. Interaction methods and modalities

All of the maps reviewed required the users to be mouse users. The maps were not keyboard navigable. Several of the maps broke when magnified. The users were not able to efficiently interact with the system using the input method of their choosing (i.e. mouse, keyboard, touch etc.).

**Next Steps:** Adding keyboard focus allows HTML elements to be identified, so that users can move focus by pressing the TAB key (to go forward) and the SHIFT + TAB keys (to go backwards). [Keyboard Accessibility by WebAIM](#)<sup>8</sup> provides a nice overview to ensure that all content can be accessed with the keyboard alone.

As we focused on screen reader and screen magnifier users we did not check the functionality using touch screens or voice commands. This would be important areas to also consider.

## 2. Navigation and wayfinding

There were not clear, visible indicators set on all of the active elements as they received focus. Users could not easily navigate, find content, and determine where they are at all times within the system.

The maps (and their pages) did not have meaningful title text with page-specific information going first. Meaningful headings were not used for each major section.

The links' purpose could not be determined from text alone. Although a "skip link" was sometimes provided at the top of the page, it wasn't always revealed on focus.

The organization of navigational elements did not facilitate wayfinding. This was evident each time a screen reader user tried to locate the maps' content.

---

<sup>7</sup> <https://www.deque.com/blog/supporting-the-design-phase-with-accessibility-heuristics-evaluations/#:~:text=What%20Are%20Accessibility%20Heuristics%3F,designers%20create%20better%20user%20interfaces.>

<sup>8</sup> <https://webaim.org/techniques/keyboard/>

**Next Steps:** W3.org Web Accessibility Initiative (WAI) offers some good web accessibility tutorials to facilitate proper navigation and wayfinding. A good place to start is [Page Structure Concepts](https://www.w3.org/WAI/tutorials/page-structure/)<sup>9</sup>.

### 3. Structure and Semantics

This was one of the most obvious challenges. The screen reader users and the screen magnifier user struggled to make sense of the structure of the content on each page and understand how to operate within the system.

**Next Steps:** It is recommended that when putting together a data map that there is a clear heading structure that follows a proper hierarchy. All information conveyed through sensory characteristics (i.e. images) are also supported in text. It is also recommended that all navigation mechanisms are structured using lists.

An alternative to displaying information in a map form, would be to provide the same information in an accompanying data table. The table would need to have clear header columns and rows.

### 4. Error Prevention and States

The interactive controls in the map scenarios did not have persistent, meaningful instructions to help prevent mistakes. The users often found themselves lost, not knowing where they should be and how to find the information that was asked of them.

**Next Steps:** All labels and instructions should be worded in text, to provide users with adequate support. It is recommended that labels and instructions be displayed in close visual proximity to their controls, so that when a screen is magnified they are able to pair the instructions with the controls.

### 5. Contrast and Legibility

The maps varied on colour contrast and font legibility. It is important that text and other meaningful information be easily distinguished and read by the users.

**Next Steps:** The following suggestions will help to improve the contrast and legibility:

- Information should be conveyed by means other than just colour alone
- The foreground and background contrast ratio of normal text should be at least 4.5:1 (WCAG 2.1 Level AA) or 7:1 (WCAG 2.1 Level AAA). Large text and graphics and user

---

<sup>9</sup> <https://www.w3.org/WAI/tutorials/page-structure/>

interface components (such as form input borders) require a contrast ratio of at least 3:1 (WCAG 2.1)<sup>10</sup>

- It is important to not embed text inside an image
- Line spacing should be set to at least 1.5 in paragraphs, and twice as much between them
- Select typefaces that are easy to read and that can be rendered properly on a mobile device. For more information on this topic refer to the research being conducted by [The Readability Group](#)<sup>11</sup>

## 6. Language and Readability

This was not flagged as a problem during our testing. However, it is important to note that the testers were not able to advance far enough into the map's data to comment on the information being shared.

**Next Steps:** To be mindful that language should be presented at a reading level of the target audience. With content being presented in short blocks of text or lists with adequate padding and leading for easy consumption. Following the [principles of plain language](#)<sup>12</sup> is highly recommended.

## 7. Predictability and Consistency

One of the challenges the testers noted was that going between and within the 5 map scenarios, there was no consistency or predictability. They couldn't learn from one map, and apply their learning to the next or within a map itself. It would have been helpful if it was clear (and meaningful) how each element related to the system as a whole. This would have helped to avoid confusion and frustration.

**Next Steps:** It is recommended that sites are designed with navigation patterns that can be repeated throughout the interface. It is important that the design is intuitive and that functionalities are easily discoverable.

Participants reflected on the number of steps that were required to complete a task. It is important to design the interface with a minimal number of steps required to complete an action.

---

<sup>10</sup>

<https://webaim.org/resources/contrastchecker/#:~:text=WCAG%202.1%20requires%20a%20contrast,4.5%3A1%20for%20large%20text>.

<sup>11</sup> <https://garethfordwilliams.medium.com/>

<sup>12</sup> <https://www2.gov.bc.ca/gov/content/governments/services-for-government/service-experience-digital-delivery/web-content-development-guides/web-style-guide/plain-language-course>



## 8. Timing and Preservation

This was not noted as a problem with the mapping scenarios. Users were given enough time to complete their tasks. However, it is important to note that due to the inaccessibility of the sites the users did become frustrated to the point that they abandoned their tasks and information was lost.

## 9. Movement and Flashing

This was not noted as a problem with the mapping scenarios. There were no elements on the page that moved, flashed, or were animated in other ways. There were no elements that distracted the users or caused them harm.

## 10. Visual and Auditory Alternatives

This was one of the biggest challenges for our users. Information on the mapping sites were presented in purely visual content that did not have a text-based alternative.

**Next Steps:** Providing a meaningful text-based alternative to visual and auditory content is required. If an image is complex then it should be provided with an alternative text (alt-text) and an extended full text description.

For video and audio content, synchronized captions and audio description tracks should be provided.

## Contact Information

---

If there are any questions or feedback on this report. Please contact:

**Jennifer Curry Jahnke, M.Ed., IAAP (CPACC) (She/Her)**

Faculty & Coordinator, [Accessible Media Production](#) – Graduate Certificate

The McKeil School of Business, School of Communications, Creative Industries & Liberal Studies

Mohawk College

135 Fennell Avenue West | Hamilton, ON L9C 0E9

905-575-2044 | Office: F172G

[www.mohawkcollege.ca](http://www.mohawkcollege.ca)

# Appendix A

---

Personas to follow on separate pages.

- Persona 1: [Roberta](#) (a user who is blind)
- Persona 2: [Sarah](#) (a user with low vision)



Figure 1 Sarah, Geospatial Developer

## Sarah

**Age:** 23

**Disability:** Low vision (retinitis pigmentosa)

**Assistive Technology:** Screen magnification ZoomText, Android Magnifier

“I like visiting sites that are intuitive and predictable. I don’t like having to take the extra time to figure out how a site works.”

### About

Sarah is a Geospatial Developer, they work with a team of web developers and geospatial analysts to work on Geographic Information Systems (GIS) software applications. As a B.Sc. student Sarah completed an Introduction to GIS course and was drawn to the GIS field. They saw their skills as a gamer and experience with assistive technology as an asset with demonstrated transferrable technical skills.

Sarah utilizes a screen magnifier to access online content. They were diagnosed with retinitis pigmentosa (RP), a hereditary

disease that causes night vision and loss of peripheral vision, during young adulthood.

In addition to being an avid gamer, Sarah also enjoys outdoor activities such as Geocaching (GPS treasure hunting), hiking and travelling.

### Devices and Technology

Although Sarah is at the early stage of their vision loss, they still need to magnify their computer screen to 250%, and it is anticipated that this will continue to increase as Sarah’s RP evolves.

They use ZoomText on their PC laptop, a software program that provides screen magnification and the extra contrast and brightness to help with reading and other tasks.

On their Android mobile (Samsung Galaxy) they use the built in Magnifier. Sarah is also very adept at using their keyboard and hot keys for quick navigation.

### Goals & Wishes

At work Sarah would like to be able to independently interact with the web apps and geospatial data.

In their free time, Sarah aspires to build an accessible geocaching app. Their goal is to be able to travel the world to seek out more challenging and interesting caches as well as to pursue advanced education.

Sarah is a continuous learner and looks forward to advancing their STEM education. Their hope is that education institutions will have timely access to accessible education materials, making learning easier for someone with vision loss.

## Frustrations

Sarah finds it frustrating to explain to colleagues and friends how screen magnification works and why digital accessibility is important. It is irritating that sites fail to comply to the WCAG requirements for desktop and mobile applications. Sarah wishes that content developers would build in spatial patterns by colour and symbol size and shape, giving options for identification.

As an amateur app developer, Sarah would like to have the ability to use industry standard integrated development environment (IDE) software for building her accessible geocaching app. This would include offline support for the app data and the ability to customize the look, feel and function of the app while still being fully accessible.

## Making things better for Sarah

WHAT TO DO	FURTHER READING
<b>Common magnification errors</b>	See the most common screen magnification errors as presented by Level Access <a href="#">Web Accessibility 101: ZoomText Demo</a> .
<b>Keyboard access</b>	Visit WebAIM for more information on <a href="#">Keyboard Accessibility</a> .
<b>Content layout</b>	Predictable structure makes web content more readable and comprehensible to everyone. Use <a href="#">descriptive headings</a> as it helps to orient the reader.
<b>Alt text for images</b>	Pictures don't always magnify well, so alt text should be provided. See the W3C for <a href="#">resources on alternative text for images</a> .
<b>Colour contrast</b>	<a href="#">Colour contrast checking tools</a> can compare two colours and report on the contrast ratio between them. A ratio of 4.5:1 is recommended.
<b>Font clarity</b>	Some fonts can become pixelated when magnified. WebAIM offers a tutorial on <a href="#">typefaces and fonts</a> .

## More Reading

- Jones, L. (n.d.). Screen Magnification. Perkins. Retrieved from [Screen Magnification](#).
- RNIB. (2013, January 22). [Screen readers and screen magnification](#) [YouTube].
- Google.com. (n.d.). [Android Accessibility Help: Magnification](#).
- [Funkify – Disability Simulator](#): Peripheral Pierre.

## Low Vision in Canada

“Canadians with vision loss are at greater risk for social isolation and reduced community participation” (Packer, T., Dalhousie University’s School of Occupational Therapy, 2021).



Figure 2: Roberta, Real Estate Agent

## Roberta

**Age:** 32

**Disability:** Blindness (trachoma)

**Assistive Technology:** Screen Reader (JAWS) and Refreshable Braille Display, VoiceOver on iPhone & iPad  
“Quote – pull from end-user testing”

### About

Roberta is a Real Estate Agent in a major Ontario city. A social person, Roberta enjoys meeting with clients, learning about them and their needs, and finding ways to match them up with their perfect home. As a blind realtor, Roberta works with a contracted home inspector to identify the weak points of a home before showing it to her clients, and has had to advocate for accessible contract forms and listings.

Roberta’s blindness is the result of trachoma, a bacterial infection she contracted as a young child in Malaysia. Roberta and her family

immigrated to Canada when she was five to seek advanced medical support. She has some light perception.

After finishing her English degree, Roberta completed the Real Estate Salesperson Program at Humber College and is now registered with the Real Estate Council of Ontario (RECO).

### Devices and Technology

Roberta uses JAWS, a screen reader that allows her to read and navigate web content and documents.

In addition to listening to the audio content provided by JAWS, Roberta also uses a refreshable braille display. The braille display provides access by raising and lowering different combinations of pins in braille cells that she can read with her fingers. This works with both her PC computer and her iPhone.

For her mobile Roberta is also proficient with Apple’s VoiceOver, a built-in screen reader for her i-devices. The combination of JAWS, VoiceOver on her iPhone and her braille display allows Roberta to access her email, browse different websites, utilize Excel spreadsheets and search the Multiple Listing Services (MLS) database for her clients.

### Goals and Wishes

Roberta wants to be able to independently search, understand and parse data on MLS and other realtor sites using her assistive technology. Her goal is to be able to access the MLS map features to acquire neighbourhood demographics and other relevant data for her clients.

As a realtor, Roberta needs to not only market homes, but also herself. She wants to be able to self-promote and improve communications with clients while building her brand.

Roberta is an active advocate for web accessibility. She strives to educate web developers to follow WCAG, including the use of ARIA tags.

## Frustrations

*As a realtor, Roberta depends on shared drives and standardized documents. She is frustrated with the lack of organization and poor naming conventions in the documents and shared drives. She wishes her coworkers would follow standard document structures for accessibility.*

*Roberta tries to be patient with her colleagues, but is irritated by the lack of general accessibility knowledge for creating accessible information and communication. She continually requests alternative formats, support for digital tools (i.e. DocuSign), and support with research.*

*Her biggest frustration is the shared MLS ([realtor.ca](http://realtor.ca)) and other realtor sites ([Zolo.ca](http://Zolo.ca), [Zoocasa.com](http://Zoocasa.com), [Properly.ca](http://Properly.ca), etc.). The inaccessibility of the sites, the use of pop-ups in the mapping areas, and the poor keyboard navigation create an inaccessible experience. She feels this puts her at a disadvantage in this very competitive field.*

## Making things better for Roberta

WHAT TO DO	FURTHER READING
<b>KEYBOARD ACCESS</b>	Visit WebAIM for more information on <a href="#">Keyboard Accessibility</a> .
<b>CONTENT LAYOUT</b>	Predictable structure makes web content more readable and comprehensible to everyone. Use <a href="#">descriptive headings</a> as it helps to orient the reader.
<b>ALT TEXT FOR IMAGES</b>	<a href="#">Alt text</a> should be provided for images so that screen reader users can understand the message being conveyed by the image.
<b>ARIA ROLES AND LANDMARKS (WHEN NECESSARY)</b>	Always use native HTML elements when they are available. Otherwise adding accessible rich internet applications (ARIA) is a powerful technical specification for adding accessibility information. Visit W3.org for adding <a href="#">ARIA in HTML</a> .

## More Reading

You may find the following resources useful:

- Foley, E. (2019). [Understanding Assistive Technology: How does a blind person use the internet?](#) Level Access Blog.
- American Foundation for the Blind. (n.d.). [Refreshable Braille Display](#).
- American Printing House for the Blind. (2020, July 14). [Introducing Chameleon 20: A 20-Cell Refreshable Braille Display](#) [YouTube].

## Blindness in Canada

*“Today, an estimated 1.5 million Canadians identify themselves as having a sight loss. An estimated 5.59 million more have an eye disease that could cause sight loss” (CNIB).*



# Appendix B

---

## Photo and Video Consent

I, the undersigned, agree to take part in this usability study conducted by Mohawk College's Accessibility Research Lab on behalf of *Sparkgeo*.

The Accessibility Research Lab is part of IDEAWORKS, Mohawk's active hub of applied research and innovation.

I understand that participation in this usability study is voluntary. I will receive a \$25 gift card per hour as an honorarium. I agree to immediately raise any concerns or discomfort during the session by speaking with the students, faculty, or staff present during the interview.

I give my consent for the interview to be recorded and/or photographed, and for the video and photos to be used by the Accessibility Research Lab and *Sparkgeo* for the purpose of sharing insights learned from the study participants. This may include the creation of a highlight reel, sharing photos and video at conferences, publishing findings, sharing photos and video with advisory boards, vendors of products being tested, and for education and training purposes.

Please sign below to show that you have read and you understand the *Photo and Video Consent* on this form.

### **Photo and Video Consent:**

Please continue to review the Statement of Confidentiality.

## Statement of Confidentiality

I, the undersigned, agree that by taking part in the usability study, I will be given access to information that is confidential. I understand that confidential information cannot be shared outside of the study environment. I agree to keep all information private and will not share it with others.

I understand that if I share this information I may not be invited back to participate in any further usability study activities hosted by the Accessibility Research Lab.

Please sign below to show that you have read and you understand the *Statement of Confidentiality* on this form.

### **Statement of Confidentiality Consent:**

Thank you! If you have any feedback, questions, concerns, or want more information, please contact, Jennifer Curry Jahnke at [jennifer.jahnke@mohawkcollege.ca](mailto:jennifer.jahnke@mohawkcollege.ca).

