

Mapping Accessible Parking and Accessible Entrances on UBC Campus

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Introduction and Project Overview

The purpose of this project was to create accessibility maps for the UBC campus. Although Wayfinding is useful for people looking to figure out how to get from building to building, it does not provide clear information on accessibility features at UBC. As a result of the challenges that Wayfinding has for those with disabilities, additional maps need to be made in order to provide a way of decision-making, to help people plan their routes in accordance to their specific challenges. This project was created in association with the UBC SEEDS program in which staff and students are paired together to work on improving different aspects of campus. UBC staff provided the primary data that was used for the maps. The maps were created in PDF format, with the first one showing designated Sparks parking stalls around campus, and the second showing accessible entrances into UBC buildings. Because of the amount of information that needed to be shown on the map, unique solutions to the visualization of information had to be devised.

Methodology

Consultation

The first part of the project consisted of consulting with Access and Diversity staff, SEEDS staff, and the course instructor in order to determine the purpose and scope of the project. During this phase of the project, it was determined that the mapping of accessibility features would only be extended to the main campus, which includes areas north of West 16th Ave., and west of Wesbrook Mall. In addition to this, the audience of the maps were identified during the consultation by giving a definition of

what the term 'disabled' entails. In general, when thinking of people with disabilities, wheelchair access is the first group that is thought of. This group of people, of course, is one of the primary audiences. However, even within the group of wheelchair users, there are different subgroups that include those who use motorized wheelchairs, and those who use manual wheelchairs. There are also people with disabilities in which wheelchairs are not used at all – for example, those who use crutches – who cannot walk long distances or go up flights of stairs. In 2016, it was estimated that the number of people 15 years and older suffering from a disability is 13.7% of the total population of Canada (Bizier, Fawcett, & Gilbert 2016). Having pinpointed the target audience, the purpose of the project therefore made clear. Maps that showed slope, stairs, nearest accessibility routes, distance, Spark accessible parking stalls, and accessible doors into buildings needed to be created so that these features could be noted by the map user to better inform them of accessibility features at the UBC main campus.

Data Collection & Verification

The next step of the project was to collect the necessary data to create the maps. A number of data layers were provided by UBC through github. This included data on UBC buildings – the location of the main entrances into buildings as well as the location of the buildings themselves, the coastline, roads around UBC, and landscape features such as fountains, parks, or fields. In addition to this data, staff of Access and Diversity also sent information on locations of Sparks parking stalls around UBC, as well as elevation data for the campus. Because of the recent changes to UBC campus due to the amount of construction occurring, the data needed to be verified. This was done by

exporting the GIS layer that contained information on parking stalls into Adobe Illustrator format (.ai), and walking around campus to confirm the availability to the parking stalls.

Map Creation

As explained by MacEachren, “the view of cartography as a communication process has been depicted graphically by many authors. While details of these depictions vary, all models share a basic structure with an information source tapped by a cartographer who determines what (and how) to depict, a map as the midpoint of the process, and a map user who ‘reads’ the map and develops some understanding of it by relation the map information to prior knowledge” (MacEachren 3). Because the cartographer plays an important role in creating accurate maps that can be used by people, it is vital to keep the audience in mind. Since this was to be a map that will be used by the general public, it was decided that the map should be easily recognized to be a map of UBC. Although the data for the locations of different buildings, roads, and features was available for use, once the data layers were opened in ArcGIS, it was not easily recognizable as UBC. Because of this, it was decided that the base map to be used would be a Wayfinding map.

Since the map that needed to be created required a number of different elements, such as accessibility of doors, location of accessible parking, as well as accessible routes, it was decided that the map would be split into two separate maps so that it would not be cluttered with information. The first map shows accessible parking around UBC campus, while the other shows accessible entrances into buildings across campus, as well as accessible routes to entrances that are accessible (in cases where

the main entrance is not accessible due to staircases or steep slopes). A rough draft of the maps were created in ArcGIS to show the locations of parking stalls and main entrances to buildings, but this map was only used for reference so that the points and symbols could be properly placed on the map in Adobe Illustrator.

Feedback

The maps were initially supposed to be presented to the community partners of the project (Access and Diversity staff). However, due to unforeseen circumstances, this did not happen. As a result, the final maps were handed to SEEDS staff, Access and Diversity staff, as well as the course instructor as is.

Design Decisions and Analysis

In order to make a map that would be useful as well as accurate, a number of design decisions were made to improve visualization. These decisions were made based on cartographic conventions such as those pointed out by Tufte in his book *Beautiful Evidence*, as well as determining what would visually look good based on Cairo's book *The Functional Art*. As outlined by Cairo, "when you open your eyes to the world, one of the first things your brain does is discriminate between background and foreground. That is, it identifies the boundaries of the objects and creatures in your vision field: where the lion ends and the grass begins, and where the grass ends and the sky begins" (Cairo 111). Because the first map that was downloaded from the UBC Camps Maps + Wayfinding was a general map for displaying locations of the bus loops, attractions around UBC, parking lots, as well building names, many changes had to

made to adapt the map for accessibility purposes. The second map that was downloaded also included a lot of information that was not needed, this prompted many design changes as well.

Sparks Accessible Parking Locations at UBC

This first map was downloaded for the creation of the accessible parking map. Taking this into consideration, the main information that would be needed were street names, parking lot location, as well as some building names for reference (in case the driver does not know the street name, but knows the building name). The first change that was made was to delete building information from the map that was not needed. This included a number of building names, transit exchange symbol, secure bike storage symbol, as well as names of roads that are not accessible by car. The next change that was done was to change the original outline of the borders of UBC campus. The original Wayfinding map had a border around the entire UBC campus to show the campus boundary. However, because the focus of the map was accessible parking within the main campus, the border was changed to include only areas North of West 16th, as well as west of Wesbrook Mall.

For this map, a vertical orientation was chosen due to the fact that the map-readers would primarily be driving towards the UBC campus using Southwest Marine Drive, 10th street, or 4th street. Because a vertical orientation for the map would allow the map-readers to adjust the map more easily to face the direction they are heading, this would ease the interpretation of the map as well. The next change that was done to the map was to change the colours so that parking stall locations would be more easily

noticeable as compared to other aspects of the map. The background green colour that was used to show fields and forests was changed to a lighter shade. Since attractions around UBC was not a primary concern, the darker blue colour used on these buildings was changed to a lighter shade of blue so they would not stand out as much.

In the original data file for Sparks accessible parking stalls around campus, each stall was individually marked by a dot symbol. If the locations of each stall were reported individually in the final map deliverable, it would have looks confusing. As explained by Cairo, “the detection of object boundaries is based on variations of light intensity and color, and on how well the edges of the things you see are defined” (112). Because the dots used to symbolize each individual parking stall made it difficult to interpret, a symbol that is easily recognized was used instead – the blue handicap sign that is located by every handicap stall. At first, in an attempt to retain some of the original elements of the data, a proportional handicap symbol was used to show areas with more or less parking stalls. However, this made the map confusing to read, not only because the symbols were quite small in areas with less parking stalls, but also because the interpretation of the sizes of the symbol could easily lead to confusion due to the fact that “the brain is much better at quickly detecting *shade variations* than *shape differences*” (113). As a result, a handicap symbol that was roughly the same size as other symbols on the map was used to show designated accessible parking locations around campus. In an earlier edition of the map as well, a different colour scheme for the usual blue and white handicap symbol was used (in this case it was a bright reddish colour) in attempts to make the signs be easily noticeable in the foreground. However,

this would also confuse the map-reader as the sign may not be as easily recognized as the original blue symbol.

Accessibility of UBC Building Entrances Map

In Tufte's book *Beautiful Evidence* he outlines six major principles, which he called the fundamental principles of analytical design. These six principles included: "Show comparisons, contrasts, differences" (Tufte 127); "show causality, mechanism, explanation, systematic structure" (128); "show multivariate data; that is, show more than 1 or 2 variables" (130); "completely integrate words, numbers, images, diagrams" (131); "thoroughly describe the evidence. Provide a detailed title, indicate the authors and sponsors, document the data sources, show the complete measurement scales, point out relevant issues" (133); and "analytical presentation ultimately stand or fall depending on the quality, relevance, and integrity of their content" (136). Due to the nature of the map that was produced, some of these principles were not applicable. However, the principles of showing comparisons, contrasts and differences, as well as showing multivariate data are quite important in the second map. This is due to the fact that this map is meant to show entrances into buildings that are accessible to those with disabilities. The importance of being able to show this data becomes much more important.

In this map, the closest accessible path to accessible entrances as well as main entrances that are accessible are shown. In earlier drafts of this map in ArcGIS, attempts at including elevation information was done so that areas with large slopes could be highlighted in the map for those with disabilities to avoid. However, this data

was provided as a contour layer for GIS, making it difficult to create a map that would show entrances as well as areas with large hills very difficult. In addition to this, the elevation changes within UBC main campus was not large enough to show up clearly once the contours were converted to a raster file. Based on previous knowledge on the slopes and distances of UBC, it was determined that elevation would not need to be displayed in this map as well due to the fact that many parts of UBC campus are quite flat and accessible. As a result, only information regarding accessible and inaccessible main entrances, as well as closest routes to accessible entrances was used in this map.

As with the accessible parking map, the base map was downloaded from Wayfinding UBC. However, since this is map designed for those who will be walking, a horizontal orientation was chosen as this may help in figuring out where the person is, assuming that a majority of them will be walking from the bus loop. As with the previous map, the original map contained a lot of information that was not needed for the final map. Many building names and symbols were deleted to unclutter the map. The original base map also had many vibrant colours, which was distracting. As a result, the unimportant elements of the campus – fields, water features, Pacific Spirit Park, as well as grass patches surrounding the walkways were toned to a lighter shade. Since in this map, the buildings would play a much more important role, the building outlines were changed from white to dark grey so that they would be more visible.

In the original data file that showed the main entrances of the buildings, the symbology was too large. Because the main campus contained so many main accessible main entrance, in the final map, the symbols were made smaller and simplistic. Dark purple dots were used to symbolize main entrances into buildings that

were accessible (entrances that had ramps, and power doors). Dark purple was used as it provided a large enough contrast to the light grey and green of the surrounding areas. Bright red dot symbols were used to show entrances that are inaccessible. Red was used because it is often associated with negative words such as stop (as in the stop sign, or no). This colour was contrasted with the dark purple, and allowed the map-reader to know that these doors are not accessible.

As with the parking accessibility map, a symbol that would be easily recognized was used to show alternate accessible doorways into buildings with inaccessible main entrances. These symbols were made large enough that map-readers can easily see which part of the building the entrance is located, but not large enough to cover the pathways leading to the entrance. Because some of the pathways were not clear enough, the closest accessible routes to the handicap symbols were shown by using thick dotted lines that lead to or from major roads to the entrance.

Limitations

Some limitations associated with the maps include the legibility of the maps for those with visual impairments. During the process of creating the maps, the focus was mainly based on those without visual impairments such as colorblindness. As a result, the map was created in colour so that different aspects of the map would be more clear. In addition to this, because the data was manually plotted rather than imported from the GIS data provided, some of the locations of the main entrances to buildings could have been misplaced. A final limitation to the map includes the fact that the type used for

words in the map is quite small. This could make reading street names or building names difficult for those with visual impairments.

Reflection on Working with a Community Partner

Being the first time I have worked with a community partner, this was quite a daunting task. However, it turned out to be quite educational. Of the many things I've learned, one of the most important aspects of working with a community partner was communication. Before meeting with the community partners, I was quite confused as to what exactly I needed to create a map for. However, once the consultation had occurred, the uses of the map were made much more clear. However, near the end of the project, because I had fallen ill, the communication between the community partner and I was broken down, which led to confusion on handing back the project deliverables, as well as my missed chance of obtaining feedback to improve the map. Overall the experience with the community partner has taught me how to use my cartographic skills in a practical, hands-on manner, which is a valuable experience that I will remember.

Conclusion

Although the maps created accurately show information that would be very useful for those with disabilities, there are still further actions that can be taken to improve the project in the future. However, due to constraints of trying to finish the project in time for class, the two maps created were all that was done. One idea for future improvements on the maps created is to map out bus stop locations around the campus that will make

it easier to access buildings farther away from the main core of the campus. In addition to this, due to the construction occurring around campus, the map should be updated to include new areas that are inaccessible due to road blockages. In the future, perhaps the data on the maps could also be converted to a KML format so that the information can be viewed in Google Earth. Although one of the deliverable that the community partner wanted was a GIS layer, due to my lack of required skills to make a map that would be able to display the information adequately enough, this was not done.

Although all the information data was compiled into the GIS layer and filtered to only show data for the main campus, it does not look visually pleasing at all. Future work for this project could look to creating a map that is both visually pleasing, and rich with information as a GIS layer.

Works Cited

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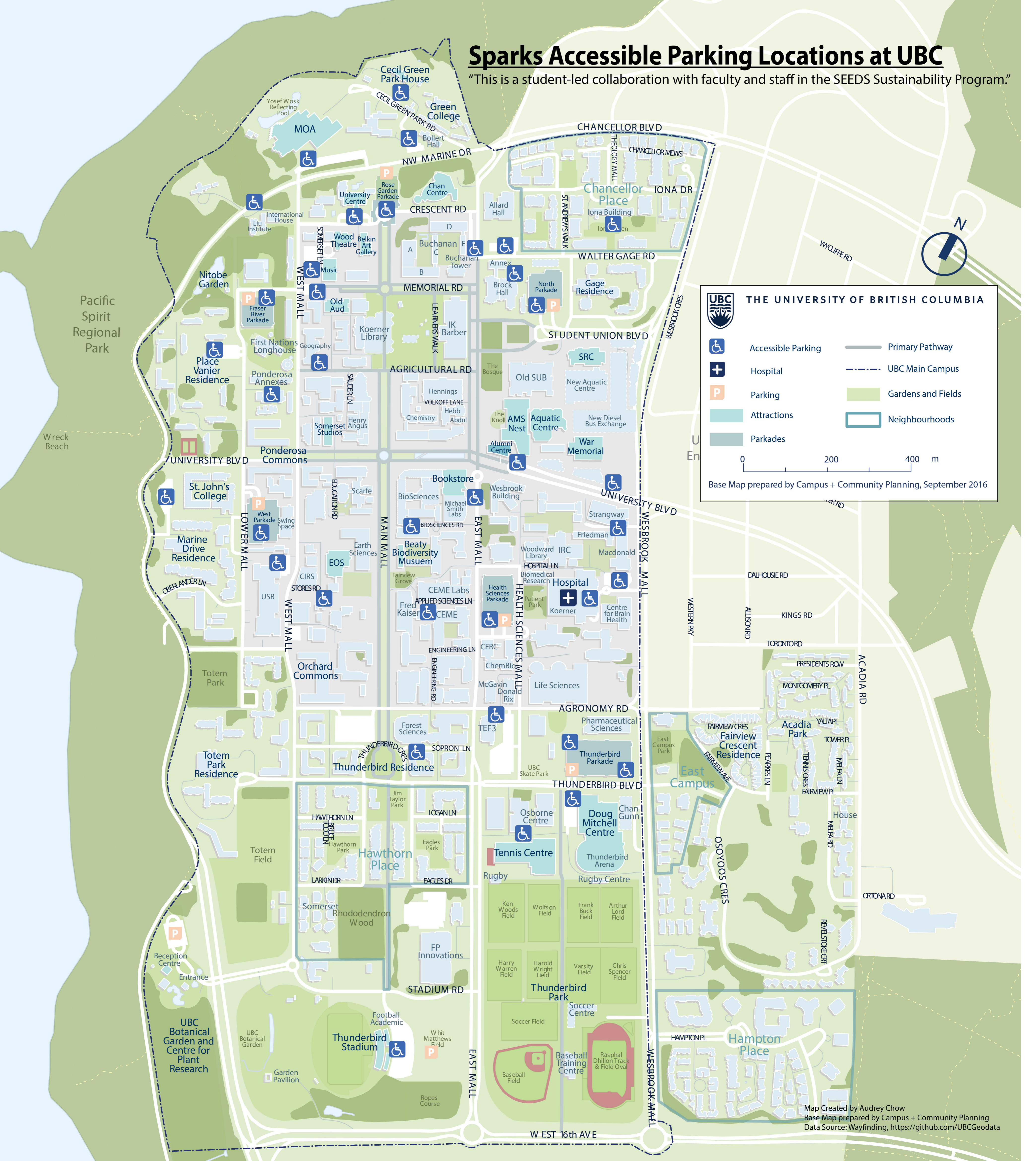
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Sparks Accessible Parking Locations at UBC

"This is a student-led collaboration with faculty and staff in the SEEDS Sustainability Program."



UBC THE UNIVERSITY OF BRITISH COLUMBIA

- Accessible Parking
- Hospital
- Parking
- Attractions
- Parkades
- Primary Pathway
- UBC Main Campus
- Gardens and Fields
- Neighbourhoods


0 200 400 m

Base Map prepared by Campus + Community Planning, September 2016









Map Created by Audrey Chow
 Base Map prepared by Campus + Community Planning
 Data Source: Wayfinding, <https://github.com/UBCGeodata>

Accessibility of UBC Building Entrances

"This is a student-led collaboration with faculty and staff in the SEEDS Sustainability Program."

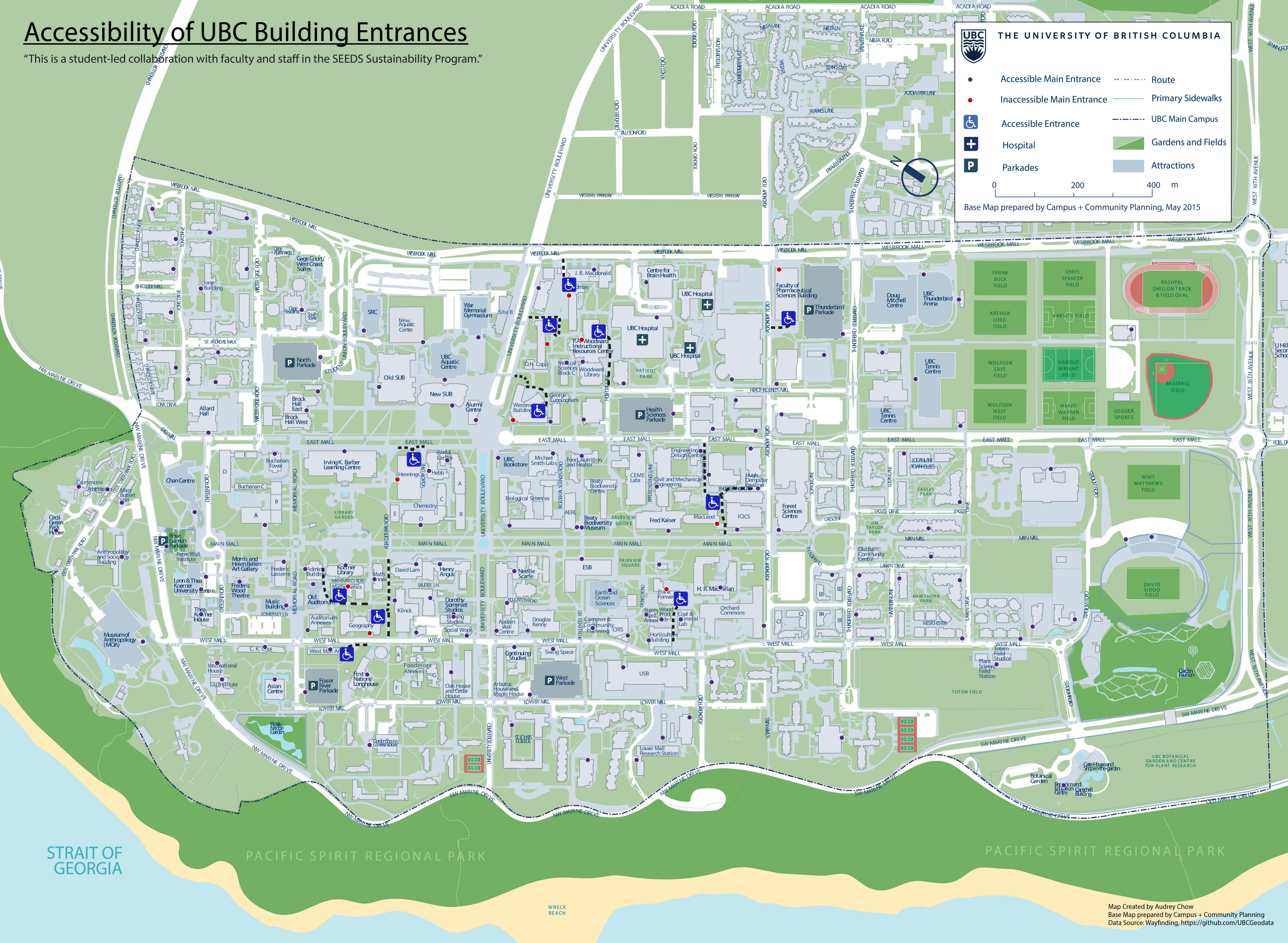


THE UNIVERSITY OF BRITISH COLUMBIA

- Accessible Main Entrance
- Inaccessible Main Entrance
-  Accessible Entrance
-  Hospital
-  Parkades
-  Route
-  Primary Sidewalks
-  UBC Main Campus
-  Gardens and Fields
-  Attractions

0 200 400 m

Base Map prepared by Campus + Community Planning, May 2015



STRAIT OF GEORGIA

PACIFIC SPIRIT REGIONAL PARK

PACIFIC SPIRIT REGIONAL PARK

WRECK BEACH