Spatial Analysis on the Bicycle Parking Locations at the University of Adelaide, North Terrace Campus

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Introduction

The University of Adelaide's Infrastructure Branch has been tasked with the development of an updated campus Sustainability Strategy to reduce the carbon footprint of the campus's operations. A part of this plan is to motivate more staff and students to cycle to the University's North Terrace campus. Consequently, a need for additional bicycle parking on campus has been identified.

This report will provide advice to the Infrastructure Branch on which three locations at the North Terrace campus would most benefit from additional bicycle parking.

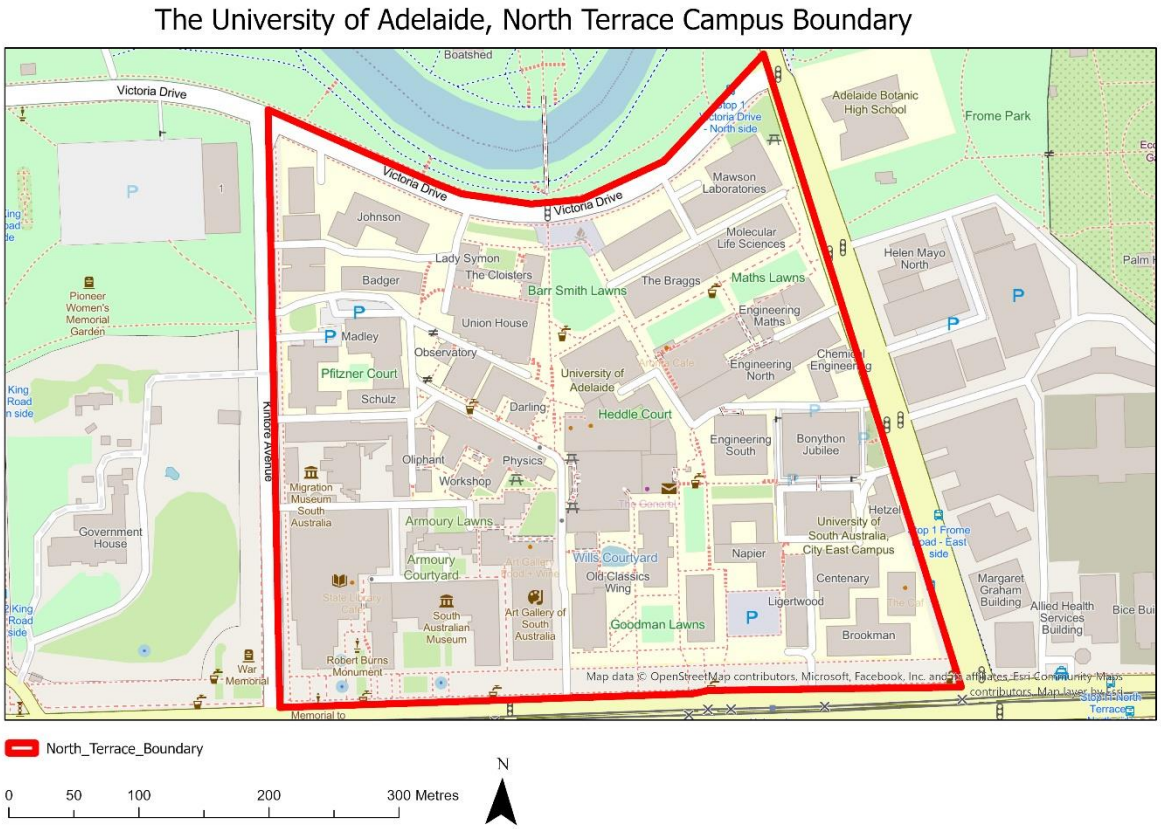

FIGURE 1: CAMPUS BOUNDARY SHOWING WHERE THE STUDY DATA HAS BEEN TAKEN

Existing Bicycle Locations

Using Survey123, electronic survey data has been collected on the existing campus bike racks. The date of data capture for the data used in this report was on Aug 3, 2022, at approximately 3:00pm.

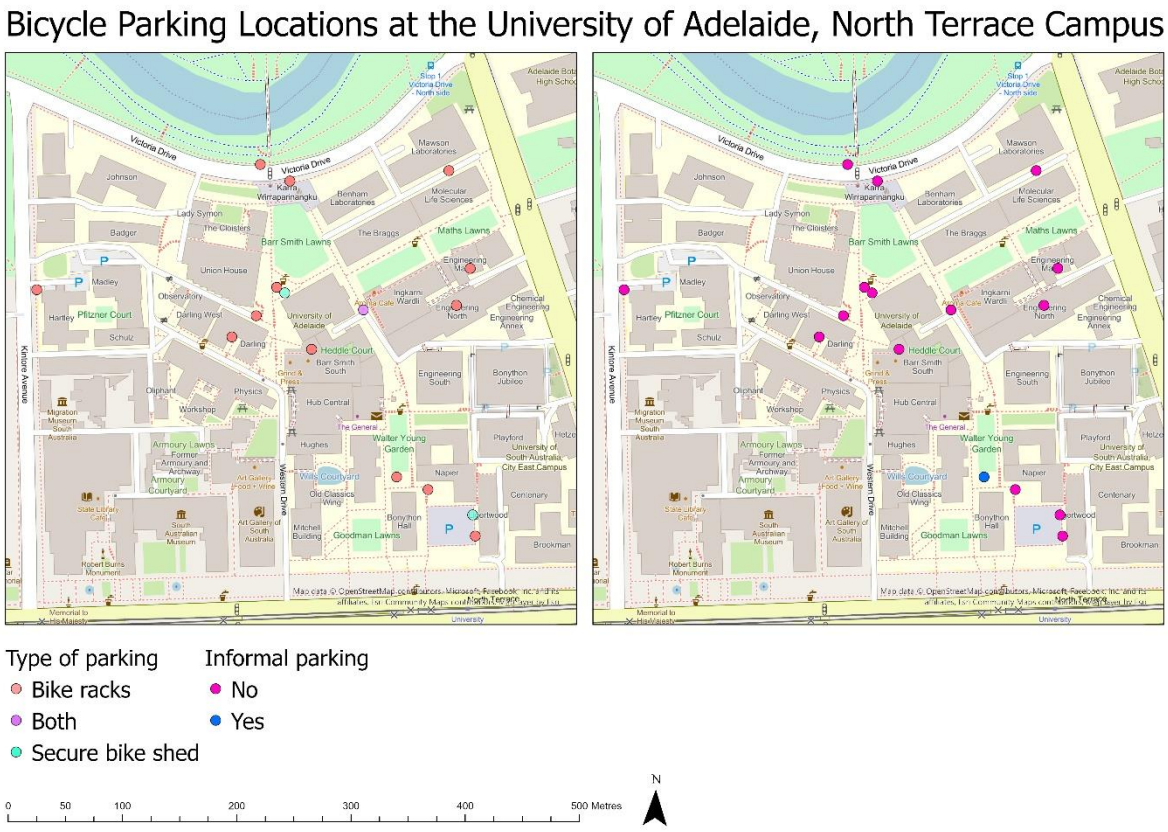

FIGURE 2: BICYCLE PARKING LOCATIONS, THEIR TYPE OF PARKING AND WHETHER THERE IS PRESENCE OF INFORMAL PARKING NEARBY

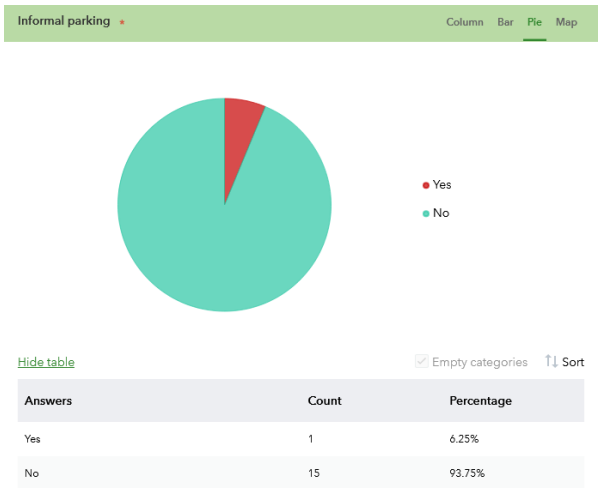

FIGURE 3: COUNT AND PERCENTAGE OF INFORMAL PARKING

There was only one bicycle parking location where there was any presence of informal parking. This is an indicator of strong parking demand within the area and not enough bike racks being provided.

Methodology

Using the electronic data collected, to calculate the demand for the bike parking locations, the available space at the area should be considered alongside its total capacity. Using the following equation, the available space of the bike parking location can be displayed as a percentage for ease of visualisation and comparison.

$$\frac{Available\ space}{Total\ capacity} \times 100$$

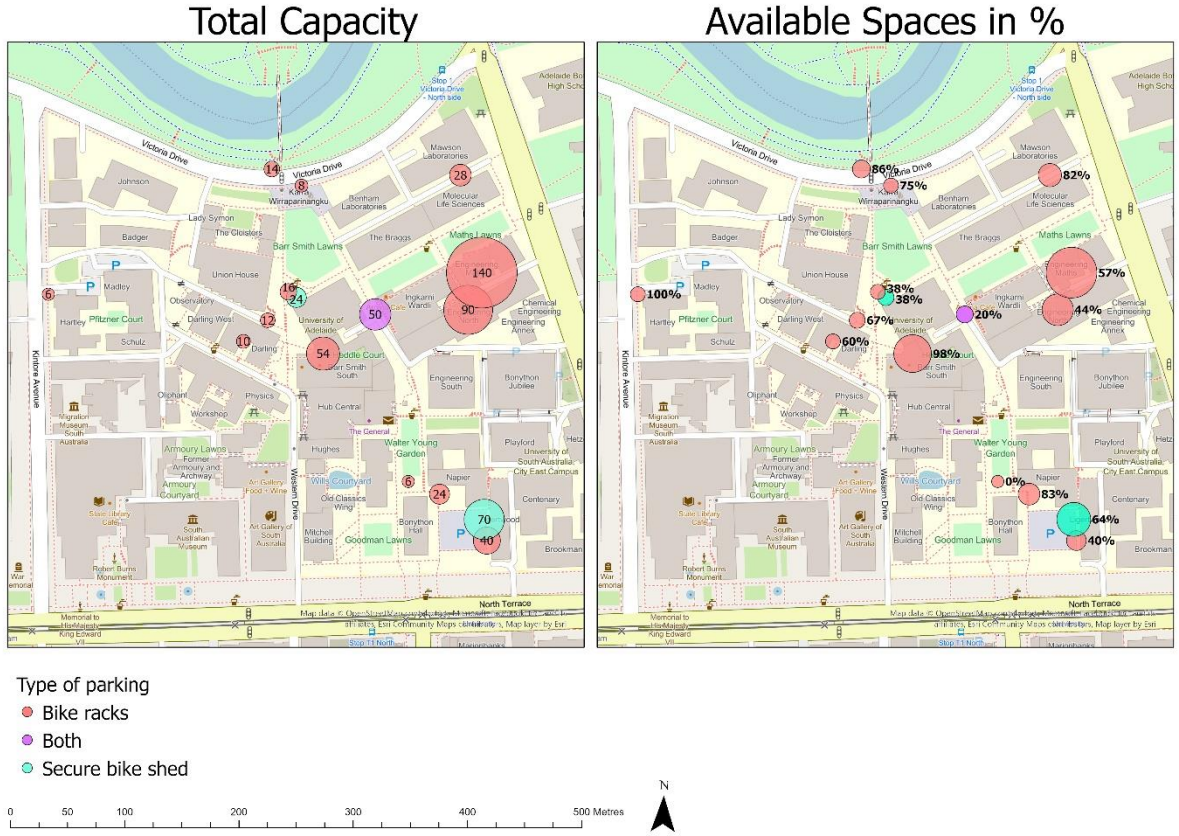

FIGURE 4: COMPARISON BETWEEN THE TOTAL CAPACITY AND AVAILABLE SPACES IN % OF THE BICYCLE PARKING LOCATIONS

With a quick obseration of the above map, it is evident that there is heavy demand for parking at the bike rack south of Walter Young Garden, being at 0% availability and from Figure 2, there was also presence of informal parking at that location.

There is substantial demand for bicycle parking just west of Ingkarni Wardli, being at a low 20% availability and just west of that location, south of the Barr Smith Lawns, theres also a secure bike shed and nearby bike racks which both suffered from 38% availability.

Despite having the highest total capacity, the bike racks between the Engineering Maths and Engineering North building show slight pressure for parking availability, being at 57% and 44% which is relatively low considering their total capacity.

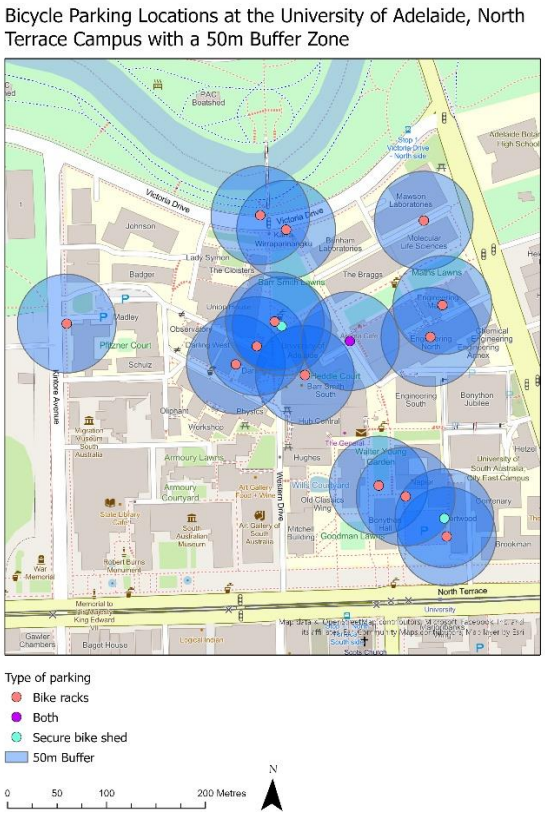

FIGURE 5: BICYCLE PARKING LOCATIONS AT THE NORTH TERRACE WITH A 50M BUFFER ZONE

Buffer zones are a commonly used tool within proximity analysis. The buffer zones around the bicycle parking locations can assist in visualising where there is a heavy abundance and overlap of bike parking locations in certain areas. This can be interpreted as these zones not requiring additional bike racks as they are plentiful, however, as seen in Figure 4, there is low space availablity in these heavily intersecting zones. This shows strong demand and providing more bike racks in these areas will be beneficial.

Results

The first proposed location for additional bicycle parking is the location just south of Walter Young Garden. With a total capacity of just 6 bikes, these racks are easily completely occupied, and this promotes the presence of informal parking.

FIGURE 6: PROPOSED LOCATION FOR ADDITIONAL BICYCLE PARKING, SOUTH OF WALTER YOUNG GARDEN

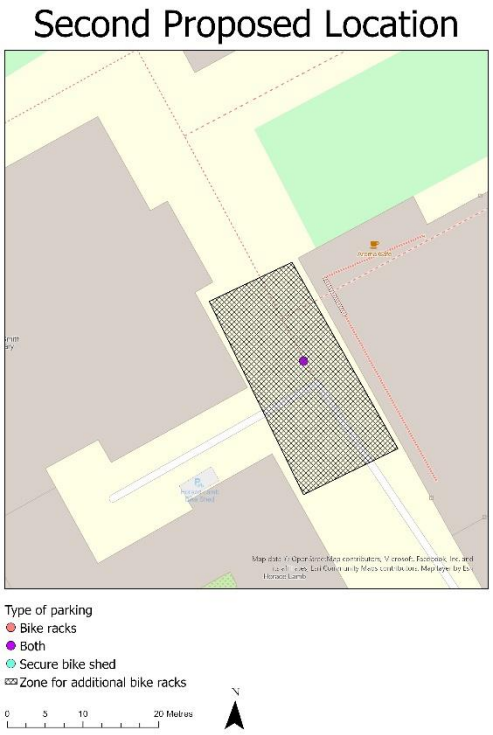

FIGURE 7: PROPOSED LOCATION FOR ADDITIONAL BICYCLE PARKING, BETWEEN INGKARNI WARDLI AND BARR SMITH LIBRARY

The second location that should consider obtaining additional bicycle parking is the area between the Barr Smith Library and Ingkarni Wardli. This location provides both bike racks and a secure bike shed and has a total capacity of 50. At the off-peak campus time of 3pm that the data was collected, this location still had a mere 20% of its space available. This shows heavy demand for parking in this area and would greatly benefit from supplementary bike racks.

The third location that would benefit from having additional bicycle parking implemented is the area south of the Barr Smith Lawns. Both bike racks and a secure bike shed exist in this location and both had 38% of their space available at the time the data was collected.

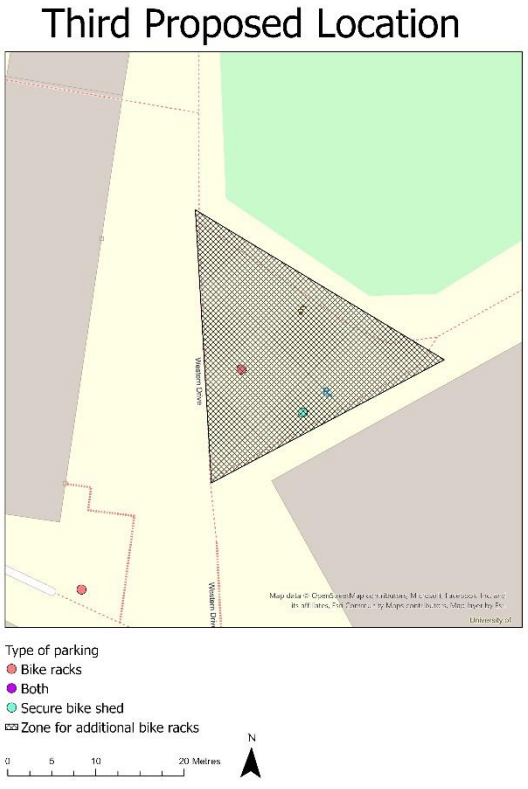

FIGURE 8: PROPOSED LOCATION FOR ADDITIONAL BICYCLE PARKING, SOUTH OF THE BARR SMITH LAWNS

Discussion

The proposed locations identified for additional bicycle parking have been strongly influenced by the number of available spaces. There are several limitations behind the decisions behind these results as the time of data capture, weather, location, any nearby physical obstructions, and connectivity to main roads and/or public bike paths have not been strongly considered.

Conclusion

In conclusion, by using Survey123 to electronically collect data and the use of spatial analysis tools available on ArcGIS Pro 2.9.0, locations at the North Terrace campus of the University of Adelaide were able to be identified to receive additional bike racks. Although these proposed locations may benefit from these additions, they may not be the *most* beneficial locations as several variables have not been factored into the result process.

Module 5 Web Map:
https://uofadel.maps.arcgis.com/apps/instant/interactivelegend/index.html?appid=a318298114d547659c79178af9876414

Survey Results:
https://arcg.is/10Cmz10

Survey Data:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	ObjectID	GlobalID	CreationD	Creator	EditDate	Editor	Date of da	Participant Name	Type of pa	Informal p	Total capa	Available	x	y
2	1	aee32fd5-8e73-45d7-9178-bed3f62e6288	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	28	23	138.6057	-34.9178
3	2	d5a6ae12-2509-4116-9dbd-21f64dd3600c	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	90	40	138.6058	-34.9188
4	3	5079908f-f7d3-4999-a14e-a44fdfd5142c	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	8	6	138.6042	-34.9179
5	4	f1182c7d-48b5-4ae7-9c60-b3b632a7f766	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	14	12	138.6039	-34.9178
6	5	c5c88a18-bfc7-4825-a040-845aa78c2fa8	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	6	6	138.6018	-34.9188
7	6	726bb83b-cda1-4630-ae1b-5423c9b7b332	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	10	6	138.6037	-34.9191
8	7	6229525b-b5bc-4f88-8cd3-43f3af18289f	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	54	53	138.6044	-34.9192
9	8	323df5d9-abba-4508-8fdc-b6bd0441efbf	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	12	8	138.6039	-34.919
10	9	81e26cac-65c9-45fb-9f5c-b603b3468ded	########	a1765618	########	a1765618	########	Sop Troeung	Secure bik	No	24	9	138.6042	-34.9188
11	10	64e037ea-817c-4c9e-8d71-5194924c5372	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	16	6	138.6041	-34.9187
12	11	52b50ffd-8a7e-4957-b39c-94ebd188b86f	########	a1765618	########	a1765618	########	Sop Troeung	Both	No	50	10	138.6049	-34.9189
13	12	de1e83a9-b7bb-47e5-a699-f19f1d9e9503	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	140	80	138.6059	-34.9185
14	13	0e52009f-9d0a-4b6d-9b9a-cc08b76c8742	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	Yes	6	0	138.6053	-34.9202
15	14	7fe1a3d6-f163-4ea1-aab1-68f5f4ce6a78	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	40	16	138.6061	-34.9207
16	15	f08ff656-49a2-44f8-8191-e326fca72188	########	a1765618	########	a1765618	########	Sop Troeung	Secure bik	No	70	45	138.606	-34.9205
17	16	c62ba086-352c-4ebf-a555-e8a985c2bdd7	########	a1765618	########	a1765618	########	Sop Troeung	Bike racks	No	24	20	138.6056	-34.9203
18														