Greening the Campus

GEOG309 Research for Resilient Environments and Communities
Group Report

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1. Executive summary

- Objective: Assess the potential for more native planting on the University of Canterbury's campus, prioritising underutilised green spaces.
- Ōtautahi,(Christchurch) originated as dense podocarp forests and wetlands, where native species once thrived.
- Purpose: Explore how native ecosystems could be implemented back into the area through campus planting to enhance cultural, social, and ecological health.
- Two sites on campus were chosen for analysis, and to show how native planting could potentially be incorporated.
- Mixed methods were used for data collection:
    - Quantitative: Soil Sampling
    - Qualitative: Survey and Interviews
- Engagement with mana whenua is essential for the sustainability of mātauranga Māori within science at UC.
- Engagement with Lucas Associates (community partner), and other relevant advisors.
- Developed species recommendations suitable for the environment of our sites.
- Developed conceptualisations of possible planting layouts.
- Limitations and recommendations were concluded regarding our survey sampling, as well as the time period in which our soil samples were taken and the scope of our soil analysis.
- Next steps for this project involve more extensive sampling and testing, as well as a further cost analysis.

2. Introduction

This report explores how underutilised green space at the University of Canterbury (UC) can feature more native vegetation. This research project investigates the potential for increased native planting at UC to enhance ecological, social and cultural values.

The central question guiding the research is:
"How can we better utilise green space at the University of Canterbury to include native vegetation?".

In addressing this question, we gathered multiple data types including soil samples, student and staff surveys, and interviews to produce a list of potential native species that would be viable in the selected sites.

2.1 Background

Historically, Ōtautahi Christchurch featured a rich mosaic of ecosystems and landforms (Davies, 1989). These included dense podocarp forests, tussock grassland and vast wetland and swamp systems (Meurk & Norton, 1988). The dominant native species included matai, kahikatea, totara and kanuka that created extensive forest systems where waterways ran through, forming routes of travel and mahinga kai sites for Māori settlements (Davies, 1989). Following Māori and European settlement, there has been a consistent trend of indigenous vegetation loss and a desire, among European settlers, for Christchurch to reflect its colonial roots (Meurk & Norton, 1988). The wetland ecosystems were drained, the forests were cleared, and the land was transformed to support increasing infrastructure and agriculture (Watts, 2011). By the year 2000 the native vegetation had declined to around 25% of its pre-settlement cover (Jang & Woo, 2022). Christchurch, once defined by wetlands and podocarp forests, now labelled as the garden city, is a landscape dominated by exotic species, sprawling lawns and impermeable surfaces (Stewart et al., 2004). This is reflected at UC. Hugh Baxter, the original landscape architect at the university, carried out his work around 50 years ago, pushing for native plants in Ilam, however there was a desire for English trees and the aim to establish an Antipodean Oxford at UC (Baxter, 2023). As a result, UC's green space continues to be dominated by lawns and introduced species, with some sparse areas of native planting and native riparian zones, but an overall lack of connectivity.

By increasing the density of native plants on campus we can strive towards a more ecologically, culturally and socially connected space. Ecologically, increased native species means increased native biodiversity (Meurk & Hall, 2006). Additionally, by incorporating 'plants of place' that are important to local iwi as Rodgers et al., (2023) suggests, the cultural identity of the place is more visible and tangible. Furthermore, restoration of native species is just as much about people as it is the environment, allowing for cultural education, community engagement and increased wellbeing, values which are a priority at UC (Norton et al., 2016; University of Canterbury, 2025).

By fully understanding the potential benefits of increased native planting on campus, this project provides a blueprint for UC to develop more ecologically relevant, culturally representative, and socially focussed green spaces. It is important that UC reflects Ōtautahi's rich ecological and cultural heritage in its landscape as we move into the future.

3. Literature Review

For this project, four research areas were investigated: the historic vegetation in Christchurch for context on the past plant species, the importance of campus greenspace and the benefits it can provide, the impact of student led changes on campus, and the cultural significance of native planting for more meaningful implementation.

3.1 Historic vegetation in Christchurch

In researching the historic native vegetation in Christchurch, the literature consistently circles back to the importance of using the past as a framework for future restoration (Morrison, 2015; Walters et al., 2024; Davies, 1989; Meurk & Norton, 1988; Stewart et al., 2004). Small remnants of native forest offer a window into Ōtautahi's ecological past showing the potential and providing a blueprint for planting initiatives (Morrison, 2015; Walters et al., 2024).

The literature provides a timeline of Christchurch's ecological past, as well as a call to action to remedy these ecosystem modifications through restoration. Walters et al., (2024) specifically describes that complete ecological restoration may not be viable, but restoring key native species and habitat diversity will be a crucial step in restoring urban environments.

In implementing these findings from the literature into this project, the design must be informed by the historic ecology of the sites in accordance with the current land use and spatial constrains.

3.2 Importance of Greenspace on Campus

The presence of biodiverse green spaces on university campuses fosters cultural, ecological, and psychological benefits that collectively enhance the sustainability and overall well-being of campus users. Ha and Kim (2021) state that multisensory biodiversity, encompassing both auditory and visual variety, enhances students' psychological recovery, demonstrating how sensory-rich and biodiverse campuses are important. Similar literature by Li, Ni, and Dewancker (2019) stress that the quality of accessible and visually appealing green spaces is essential for practicality and impact, linking ecological design with the daily experiences of students.

Kermath (2007) demonstrates how campus landscape architecture serves dual roles as a pedagogical and educational tool to promote sustainable literacy by direct interactions with native plantings. Similarly, Mata et al. (2021), state how the ecological hierarchy of indigenous vegetation supports urban biodiversity, especially native insect populations, from a variety of plantings.

Native versus non-native vegetation uses are summarised where the balance of climate adaptability, ecological benefits, and public preference is merged (Russo et al., 2025). A framework was established for context-sensitive planting strategies that reinforce the significance of implementing local species that ensure resilience for environmental changes.

These studies illustrate how biodiversity integration through campus planning strengthens ecological functions, enriches study experiences, and enhances human well-being. Therefore, universities hold a unique position as living laboratories for sustainable design, where campus environments intersect cultural, ecological, and social values as a space for visible expression and lived experience.

3.3 Student-led changes on campus

Student-led initiatives are an important part of every tertiary institution. Students play an active role all over the world with curriculum influence in Queenstown Australia (Dianati 2022), Student activism in Fresno California USA (Acosta et al. (2022), Social justice in the USA and India (Pradhan, Shea & Jurow 2024), Residency and cross border relations in US-Mexico border (Falcón Orta & Monk 2021) and even in New Zealand with Rainbow student support and equity (Smith et al. 2025).

These student led initiatives prove that student voices and actions can help influence change, directly relating to this research project as stakeholders' voices are acknowledged and heard through qualitative data. Student led changes on campuses have been consistent driving factors for positive change in various fields, such as curriculum reform, sustainability and social justice. In relation to greening the campus, this project allows for potential student influence on the ecological future of UC.

3.4 Cultural Significance of Native Planting

Wider literature suggests that native planting can move beyond being purely aesthetic or ecological and become culturally significant when it has an additional focus on restoring relationships between people and ecosystems. This becomes especially important in urban environments where indigenous people often experience disconnection between identity and place due to colonisation. Raerino et al. (2021) reveals a clear conclusion from their research, where authentic partnerships should be prioritised to avoid 'tokenistic' inclusion of Māori culture, it is argued that any community enhancement strategies should have the capabilities to re-indigenise spaces. Walker et al. (2025) supports this by highlighting how spaces can be created that honor Te Tiriti o Waitangi and reassert indigenous presence in landscapes historically shaped by colonial design. Wehi & Lord (2017) emphasize integration of active cultural practices into planting plans to foster kaitiakitanga, renew intergenerational practices and increase accessibility to heritage. Rogers et al. (2023) focuses on how using 'plants of place' can tell accurate historic narratives of an area and revitalise idenity for spaces that have been over-urbanised. Several barriers were also identified by these authors, mainly at the early stages of implementation where people do not yet feel connected to place. This is highlighted by Walker et al. (2024) who emphasizes how this rings true for many Māori who feel disconnect between their ancestral lands and urban environments. Overall, this makes it even more crucial to include mana whenua in all aspects of project design.

4. Methods

4.1 Research Approach

The research approach combined quantitative and qualitative research to investigate how native plants can be further incorporated on the UC campus. Mixed method approaches have been recognized as a powerful method to produce a comprehensive picture (Lindsay, 2013; Molina-Azorín & López-Gamero, 2016) Data was gathered through soil and analysis, by an online survey, and through in person interviews.

4.2 Data Collection

To collect the soil data, five samples were taken from the two selected sites on campus. Site one is located north of the Meremere building on UC campus and Site two is located on the east of the Clyde Road car park, between the car park and Clyde Road (refer to Appendix A). At site one, these samples were taken in a cross pattern with samples being approximately 10 meters away from the center hole. This sampling method was done due to obstacles such as footpaths, trees/roots and underground utilities. At site two the samples were taken using a linear pattern along a grassy mound every approximately 10 meters. These different sampling configurations were chosen to suit the different site shapes and underground obstructions including pipe and irrigation networks. The samples were gathered by using a hand auger, a T-Shaped hand drilling tool, to extract approximately the top 10-15cm of soil at each sample site, these were then analyzed to gain information on soil characteristics for native planting. The hand auger was used due to its ease of operation, its portability and its minimal environmental disturbance.

The survey aimed to gather opinions from UC staff and students about current and future native planting on campus. The survey was conducted online through Qualtrics, UC's primary survey application. All participants were kept anonymous and were made aware of the usage of the survey as a primary data source. The survey was distributed via social media platforms such as Instagram and Facebook and was shared to pages such as the University of Canterbury Student Association (UCSA) Facebook page, Girls Outdoors, and Enviro Soc.

Interviews were conducted with the UC Grounds Team, Emily Cormack from UC Māori, and Dr. Colin Meurk. Interviews are a keyway to gather primary information from experts in a quick and efficient method (Alshenqeeti, 2014). These were recorded either via audio recording or written transcription

4.3 Data Analysis

To understand the soil compatibility for native planting, we looked at organic matter content, particle size, contaminants and soil composition.

For organic matter, a loss on ignition test was used, by comparing the wet weight with the dry weight after the samples had been in a 100 °C oven overnight. To understand the soil particle size, weighed samples were mixed with Sodium hexametaphosphate then administered to the Master Sizer 3000, which uses laser diffraction to measure particle size and proportions of sand, silt, and clay. To look at contaminants, the samples were dried at 40°C for approximately three days, then ground up, and finally an X-ray fluorescence (XRF) analyzer was used to identify the presence of major oxides and trace metals in the soil.

For the qualitative data, Qualtrics automatically analyses the survey data and provides statistics. This data was then downloaded and entered in to excel to produce visualizations of the data. Quotes were taken directly from Qualtrics.

5. Results

5.1 Soil Results

Soil organic matter was consistently higher at Site 2 compared to Site 1, suggesting greater carbon storage potential in those soils.

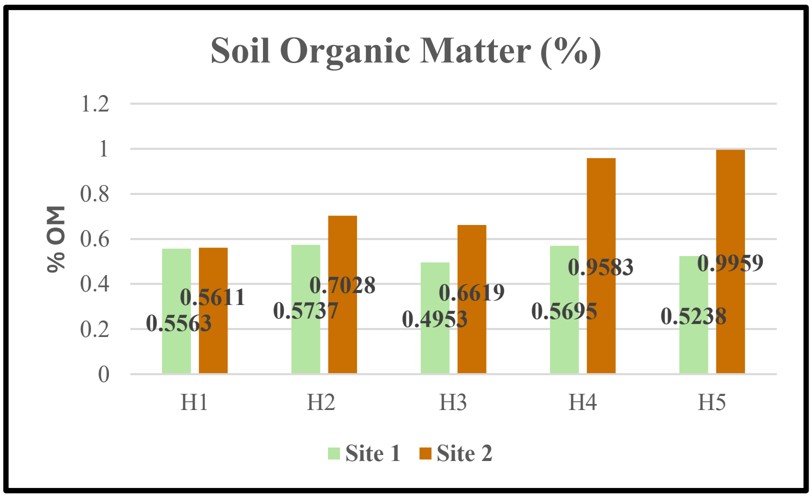

Figure 1. Soil Organic Matter Content

XRF Results

Table 1. Summary of Major Oxides (%)

Parameter	Site 1 (avg)	Site 2 (avg)	Key Observation
SiO_2	9.1	9.3	Similar silica content, showing silicate-rich parent soils.
Fe_2O_3	3.3	3.3	Consistent across both sites.
K_2O	2.5	2.6	Very similar soil fertility present.
Al_2O_3	0.75	0.82	Slightly higher in Site 1, more clay content present.

Table 2. Summary of Trace Metals (mg/kg)

Parameter	Site 1 (avg)	Site 2 (avg)	Key Observation
Zn	108	111	Slightly elevated at Site 2, but within safe levels.
Cu	31	31	Consistent across both sites.
Pb	29	43	More variability and slightly elevated in Site 2.
As	14	11	Generally low and within guideline values.

The average concentrations of major oxides and trace metals are summarised in Tables 1 and 2 respectively. The full datasets for each sample are provided in Appendix B. The XRF results show that both soil sites have a similar soil chemistry, which is primarily made up of iron oxides and silicates, with silica being the most abundant. This reflects the soils' silicate-rich parent material. Calcium oxide is consistently low across both sites. This tells us the soils aren't strongly calcareous, meaning they have limited ability to neutralise acidity. Only minor exceedances are seen for arsenic and lead in two samples, with other trace metals generally low. Soils are broadly safe and suitable for native vegetation, with no major contamination concerns.

Master Sizer Data

Table 3. Averages Soil Texture per Site (%)

Site	Clay %	Silt %	Sand %	Soil Type
Site 1	2.1	63.48	34.42	Silty Loam
Site 2	1.72	60.19	37.59	Mostly Silty Loam

The average soil texture for both sites was silty loam. Site 2 (Table 3). Site 2, however, was more variable, a clear sandy loam (S2 H4), and a strong loam (S2 H3), as shown in the full datasets in Appendix B.

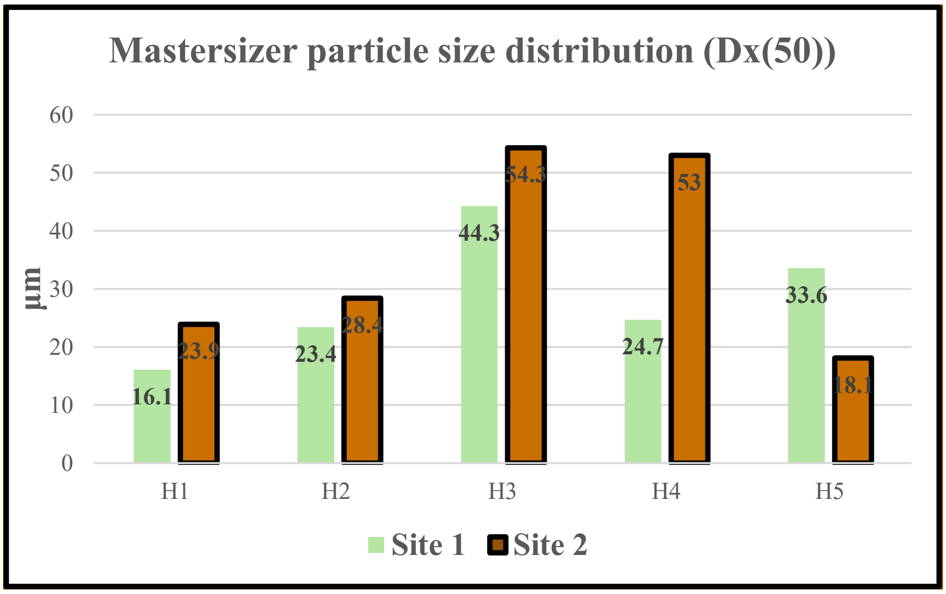

Figure 2: MasterSizer particle size distribution across site 1 and 2.

Dx(50) is the median particle size (Figure 2). Site 1 is dominated by silt to fine sand, ranging from 16 to 44 microns with an overall narrower distribution, mostly silt-dominated. Site 2 shows more variability, with an overall greater heterogeneity, as some soils have much coarser fractions.

5.2 Survey Results

The survey results below show strong support in favour of the project aims.

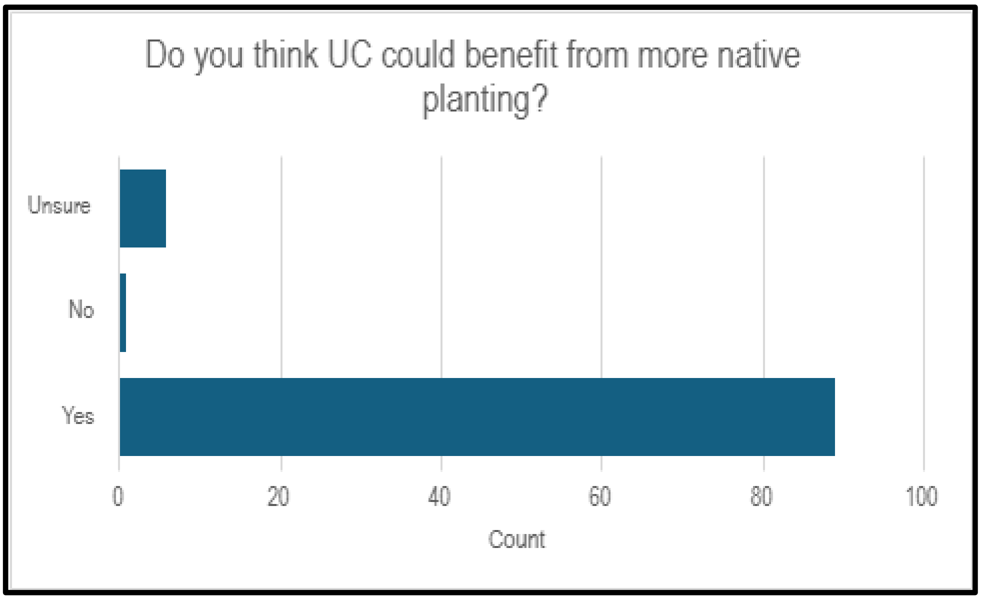

Figure 3. Bar graph showing participants survey answers if they though UC would benefit from more native planting, answer: yes, no, or unsure

Of the 96 survey participants, 89 answered yes that UC would benefit from more native planting (Figure 3).

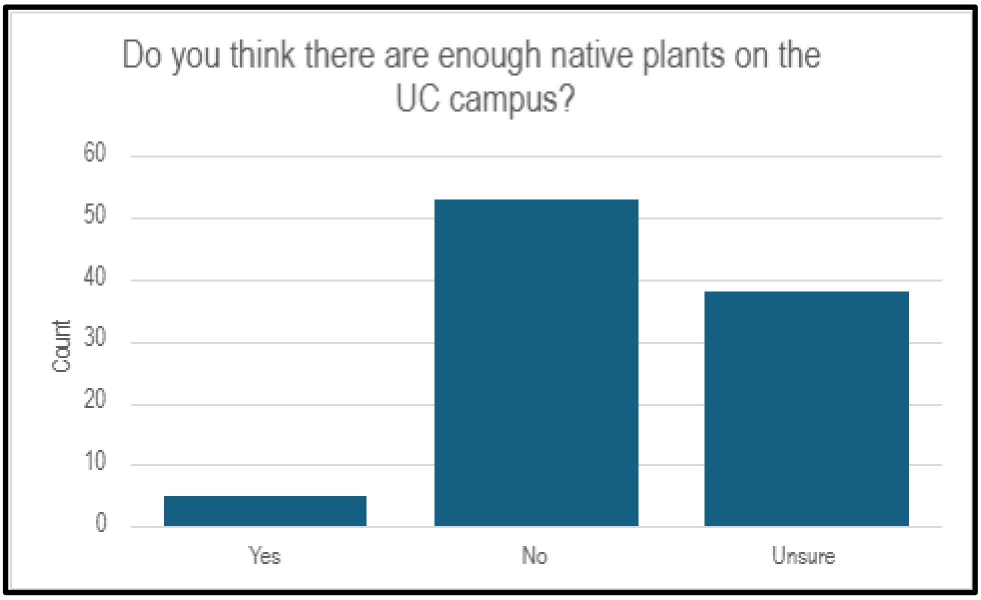

Figure 4. Bar graph showing survey participants answers if they think there are enough native plants on the UC Campus, answer: yes, no, or unsure

For this question, do you think there are enough native plants on the UC Campus, 53 participants thought there were not enough native plants on campus, 38 participants were unsure, and 5 thought there were enough existing native plants on campus (Figure 4).

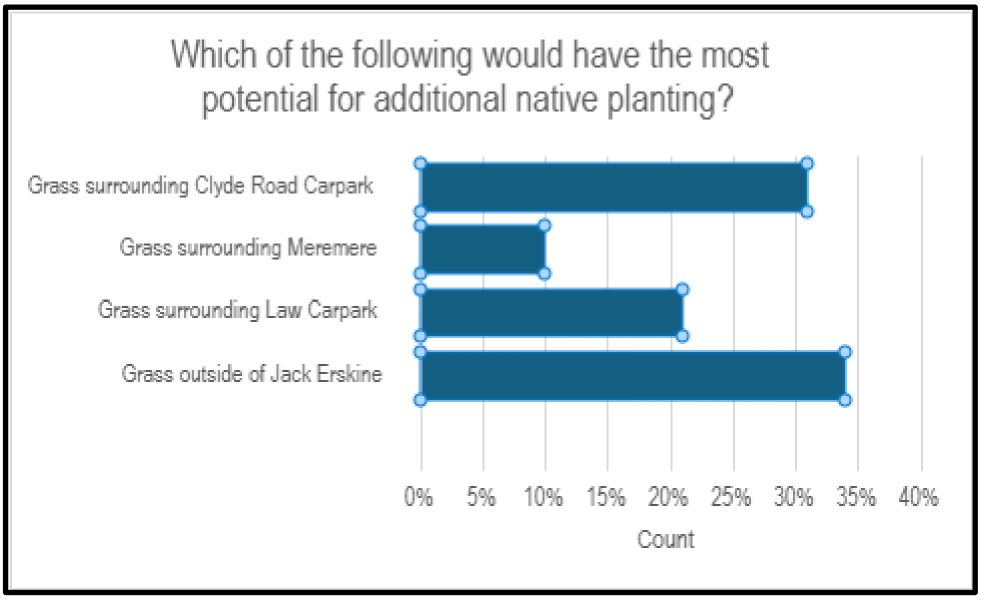

Figure 5. Bar graph showing survey participants answers for which areas would have the most potential for additional native planting.

31% of participants said site 2 would have the most potential for additional native planting, while 10% said site 1 would have the most potential for additional native planting. The other two sites included were more popular (Figure 5). These were options for us however the grass outside Jack Erskine is already under planning for more native planting.

When participants were asked if they would gain personal benefits from more native planting on campus, these were some of the key quotes:

- "More birds, less UHI urban heat island effect, visually pleasant. More food for birds and insects, more soil carbon and organic matter, cleaner water."
- "I would get enjoyment from increased biodiversity and birdsong."
- "Aesthetics as well as positive mental health correlations to green space. Native plants will only add to this as they are important in the New Zealand landscape".
- "Just being in green spaces makes me feel better!"
- "Increased understanding and connection of culture"

- "I would have a heightened sense of wellbeing amongst native plants."
- "Greater initiative to study and more likely to recommend UC to a friend."

These quotes reinforce the importance of the project and emphasise the various benefits additional native planting would provide to staff and students.

5.3 Interview Results

Interview with the Grounds team

Darryl Cone from the UC grounds team helped with valuable insights into the current management practices and challenges around native vegetation. Although future developments involve native plantings where possible, “space is limited, and plantings must balance practicality, safety, and aesthetics” (D. Cone, personal communication, September 29, 2025). D. Cone (personal communication, September 29, 2025) stated that a “mix of natives and exotics is preferred to combine biodiversity with visual vibrancy”, as exotics offer seasonal contrasts in colour, enhancing the campus visually.

Underground infrastructure was noted as a key restriction, with sewer, heating and water systems guiding where deep-rooted trees can be planted. Additional notes include maintaining open lawn spaces for recreation and vermin management.

Signage was discussed as a way of approaching mātauranga Māori engagement for the native plantings, where newly implemented innovative tools were mentioned: “low-impact options like QR codes can support learning about native plants.” (D. Cone, personal communication, September 29, 2025).

Interview with UC Māori

Our interview with Emily Cormack (E. Cormack, personal communication, September 23, 2025) from UC Māori highlighted ways to incorporate co design into our project and the inclusion of cultural narratives and values. Emily affirmed that we were on the right track with our project, highlighting the importance of looking to the past to understand what to plant for the future. We gathered insights on how to go about incorporating the social narratives of the space into our sites by overlaying stories and prioritising te ao māori values. She emphasised the importance of eco sourcing and using seeds and saplings that are local to the area as well as incorporating interactive species to prioritise human-environment interactions. If this project did go ahead, Emily has given us pathways for collaboration and co design with mana whenua.

Interview with Colin Meurk

Dr. Colin Meurk (C. Meurk, personal communication October 2nd, 2025) helped us to better understand the importance of increasing native plantings, the ecological context of our sites, and the specific species that could be established. He stressed the critical role that visibility plays for preservation of natives. As he put it "If you don't know something exists, then it is no longer part of your consciousness. It's not part of your identity; it's not part of what you believe is important to you and what you want to protect." (C. Meurk, personal communication October 2nd, 2025) One species he focussed on was the addition of matai, a slow growing podocarp that once dominated the areas of interest. He pointed out how matai could eventually outlast the large exotic trees in our sites and eventually exceed their stature.

We left the interview thinking on one of Colin's statements, "Extinction of experience leads to extinction of species" (C. Meurk, personal communication October 2nd, 2025) which we felt underpinned our project and the aims of native restoration in general.

6. Discussion

The rationale behind gathering quantitative data in the form of soil testing was to solidify that the soils were healthy for native vegetation, ensuring there were no underlying issues of concern. From here, we can assess the soil's compatibility and what these results mean.

Figure 1 shows that the soil organic content was higher in site 2 compared to site 1. Greater carbon storage potential is therefore exhibited, meaning higher fertility and nutrient retention (Gerke, 2022).

As the XRF results shown in Tables 1 and 2 exhibit generally low levels of trace metals, from an environmental perspective, this ensures the soils are broadly safe and therefore suitable for native vegetation. There were also no major contamination concerns that posed a risk for native plant growth, which can be sensitive to soil toxins, showing how native plants particularly thrive in low-nutrient conditions (Ministry for the Environment, 2011). Although phosphorus was not strongly detected, it may exist in forms not captured by the test, and overall nutrient availability appears sufficient to support native species.

As shown by the results in Graph 2 above, the soils slightly differ in organic carbon storage and soil texture. Site 1 has finer soil and is richer in clay and silt, which is described as having a greater ability to retain moisture and stabilisation of carbon. Site 2 soil results showed more variability and were slightly sandier, offering greater drainage but lower fertility; however, this may favour native species, such as those adaptive to less nutrient-rich and drier soils (Gerke, 2022).

These quantitative results and findings show that the combination of safe chemical profiles, moisture retention in finer soils, and drainage variability across the sites has provided the opportunity to support a diverse range of native species. This also reiterates the importance of this step as a requirement within our research to gather a variety of data but also proves the soils within our sites are healthy and exhibit no concerns.

The rationale for surveying UC staff and students about current and future native planting was to understand public opinion on this topic. Our survey data revealed strong support for increasing native vegetation on campus. Many participants wrote that native plating would have positive benefits for themselves and in a biological sense.

The interviews provided expert insight and highlighted the diverse views of those with interested in this area, while centring our project in practical reality.

Based on the soil analysis, survey results, and interviews, a potential plant list was developed. Dr. Colin Meurk provided expert advice for this species list and was extremely helpful in indicating the ecological compatibility of different native plant species in our selected areas. Another primary reference for plant selection was the Lucas Associates Ecosystem Map, which identified our sites in the wet plains: Tōtara ecosystem (Lucas Associates, 2023). This list is informed by the species that will be ecologically supported here, cultural narratives that help shape the space, educational and cultural uses, and wellbeing benefits. Both sites have a range of different environments, for this reason the plant list has been separated by moisture level. Any plant can be used on either site.

For moist environments:

Ribbonwood

Hinau

Lacebark (Houhere)

Simplicia

Kawakawa

Rengarenga

Silver Fern

Alpine Water Fern

Plume Grass

Karetu

Weak Poa

Leafless Bush Lawyer

Native Verbena

Ground Spleenwort

Kowaowao

Pigeonwood

NZ Broadleaf

Mountain Wine Berry

Whiplash Hebe

For dry environments:

Kānuka

Kōwhai

Lancewood (Horoeka)

Totara

Kaimako

Korokia

NZ Clematis

Fragrant Daisy Tree

Pig Fern

NZ Wind Grass

Corpora Intertexta

Shrubby Tororaro

Cabbage Tree

Lacebark (Houhere)

Matai

Coprosma Obconica

Shrub Pohuehue (Muehlenbeckia astonii)

Table 4. Categories of value and uses regarding NZ native species (Lucas Associates, 2021)

Wildlife value	Use
F = fruit S = seed N = nectar B = bud/foliage I = insects L = fruit for lizards	R = rongoā K = kai H = hedging

Table 5. Specific plant species in our site list with wildlife value and use indicated by Table 4. (Lucas Associates, 2021)

Plant Species	Wildlife Value	Use
Nz Broadleaf	F, N, I	R, K, H
Lacebark (Houhere)	I	R
Kānuka	N, I	R, K
Kōwhai	N, I	R
Shrub Pohuehue	F, L, I	K, H
Ribbonwood	I	H
Cabbage Tree	F, N, I	R, K
Tree Daisy	S, I	H
Kawakawa	I	R, K

6.1 Conceptualisations

Conceptualisations have been drawn to share with the wider community allowing for better communication surrounding what implementation of this project could look like.

There are different environments between and within each site, shade, topography and drainage all influence these locations. This will mean different plants are suited to different areas. For example, on either side of the mound on the Clyde carpark site (see Figure 1). The north facing side of the mound (left) has been identified as a dry well-drained, environment whilst the leeward south facing side (right) has been identified as a moist environment that may be susceptible to moisture retention and pooling. Different plants from each environment type (listed above) can be planted in each area respectively (whilst this report would've liked to design a comprehensive planting plan, including in-site specific locations, it was out of the scope of the project set by Lucas Associates).

It was important to the UC grounds team to maintain most of the open park like elements used in the original designs of the campus. For this reason, this report recommends the use of small dense pockets of native bush being planted instead of whole areas. This can be seen in Figure 1 which maintains the open, park-like aesthetic whilst still paying tribute to the historical planting that would've been present pre-colonisation. This also supports the creation of biodiversity corridors which are highly beneficial for the longevity of restoration projects

(Velázquez, 2022). Aesthetic requirements such as texture, colour and layering can easily be met by using a range of different plants from the lists above.

Integrating more native planting has the potential to benefit UC's public image. As people drive along Clyde Road, it would be beneficial to create spaces that align with New Zealand's green identity to revitalise mana whenua connections to the land and connect people to the wild spaces New Zealand is known for which they may be therefore, more inclined to protect.

Figure 6: Clyde Road Carpark Conceptualization

UC Entrance
gure 4 Clyde Road
UC Entrance Conceptualisation

Figure 7: Clyde Road UC Entrance Conceptualization

Figure 8: Meremere Conceptualization

6.2 Limitations and Future Research

Firstly, the survey sample used to represent student and staff at UC is small and may not represent the full diversity of views at UC. Using convenience sampling, the survey was distributed to clubs, including Enviro Soc and Girls Outdoors, both outdoor focused and sustainably minded clubs. In addition, it was shared among friends, many of whom also study environmental science, geography or other environmentally focused disciplines. To reach a wider audience at UC, the survey link was posted to the UCSA noticeboard and distributed among the business school staff members, given a connection to this faculty. The survey results likely overrepresent those interested in native planting restoration or who share general environmental concerns. As well, the survey relied on voluntary participation, meaning self-selection bias may have occurred, with individuals who support native planting on campus being more willing to respond.

When undertaking soil sampling, only one day of collection was conducted. Although we were constrained by time and could not gather more samples to analyse, this limited the ability to see any differences in soil characteristics over a temporal period, such as seasonal variation. Furthermore, in future the sampling conducted should be more systematic and structured. We did not create a map with the sites beforehand and loosely measured on the day meaning our methods are not standardised or easily repeatable.

In addition, the scope of the soil analysis was somewhat limited. Key variables were analysed, such as particle size, organic matter, soil characteristics, and contaminants. These tests were necessarily simple given the time constraints of the project. The analysis did provide reasonable indications of the soil characteristics in the samples, but it would be interesting to use more intensive tests to get more data. For example, the tests did not pick up Phosphorus, an important nutrient for plant growth in soil, which could have provided a more comprehensive understanding of the soil fertility and potential for plant growth.

7. Conclusion

The central research question **“How can we better utilise green space at the University of Canterbury to include native vegetation?”** has been addressed through a combination of soil analysis, survey and interview data to produce a list of plant species. The soil analysis confirmed the suitability of native plants in the selected sites, while the survey results show strong support among staff and students for native planting. The interviews reinforced the importance of balancing practicality with cultural and ecological aims in increased native planting on campus.

Collectively, these findings indicate that increased native planting on campus is not just possible but will be beneficial for UC as a future focussed university.

Future research would benefit from more extensive sampling, including a broader sample, multiple collection days, a higher density of samples in the sites, deeper soil cores and more extensive testing, additionally cost analysis could be incorporated.

The findings of this research project show that not only would planting be beneficial and viable on the campus but that it would enhance social, ecological and cultural values throughout UC.

8. Acknowledgements

In completing this report, we would like to thank our community partner, Di Lucas and her team for their instruction, as well as our supervisor Georgie Douglas, and course coordinators Simon Kingham and Sophie Horton for their helpful guidance. In addition, we acknowledge Darryl Cone, Emily Cormack and Colin Meurk for their helpful insights when interviewed. Furthermore, we would like to thank Chris Grimshaw and Brett Robinson their help in the laboratory.

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Appendix A: Site mapping and Underground Utilities

Map A1 - Site 1 – Outside Meremere

Map A2 - Site 2 – Clyde road car park

Map A3 - Site 1 underground utilities

Map A4 - Site 2 underground utilities

Appendix B: Full Results (Survey, XRF and Soil Types)

Table B1: Site 1 Major Oxides (%)

Sample	SiO_2	Fe_2O_3	K_2O	Al_2O_3	CaO
S1 H1	11.3	3.4	2.8	1.16	0.79
S1 H2	9.5	3.2	2.6	0.89	0.70
S1 H3	8.5	3.4	2.5	0.60	0.70
S1 H4	7.7	3.4	2.2	0.40	0.60
S1 H5	8.5	3.2	2.5	0.70	0.70

Table B2: Site 2 Major Oxides (%)

Sample	SiO_2	Fe_2O_3	K_2O	Al_2O_3	CaO
S2 H1	11.6	3.3	2.9	1.10	0.70
S2 H2	7.5	3.5	2.3	0.50	0.70
S2 H3	10.0	3.3	2.7	0.70	0.70
S2 H4	9.4	3.3	2.6	0.90	0.60
S2 H5	7.9	3.3	2.3	0.90	0.60

Table B3: Site 1 Trace Metals (mg/kg)

Sample	Zn	Cu	Pb	As
S1 H1	99	33	20	10
S1 H2	119	27	34	21
S1 H3	94	25	19	11
S1 H4	112	32	38	17
S1 H5	114	40	32	12

Table B4: Site 2 Trace Metals (mg/kg)

Sample	Zn	Cu	Pb	As
S2 H1	96	27	46	<10

S2 H2	143	26	66	11
S2 H3	98	31	42	13
S2 H4	85	26	26	<10
S2 H5	131	43	37	13

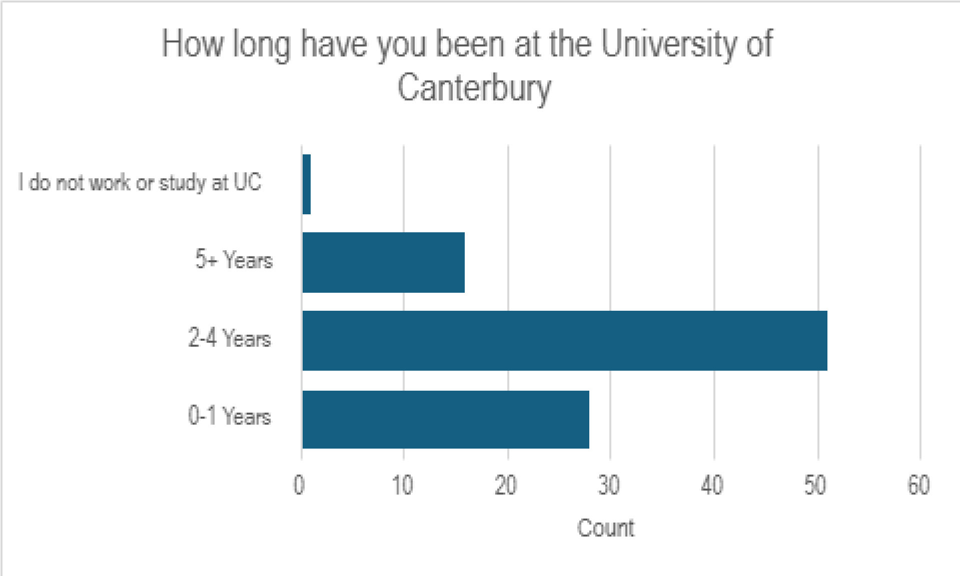
Table B5: Site 1 Soil Types (%)

Sample	**Clay %**	**Silt %**	**Sand %**
S1 H1	3.06	74.74	22.20
S1 H2	2.22	66.94	30.84
S1 H3	1.99	50.29	47.72
S1 H4	2.01	66.65	31.34
S1 H5	1.23	58.80	39.98

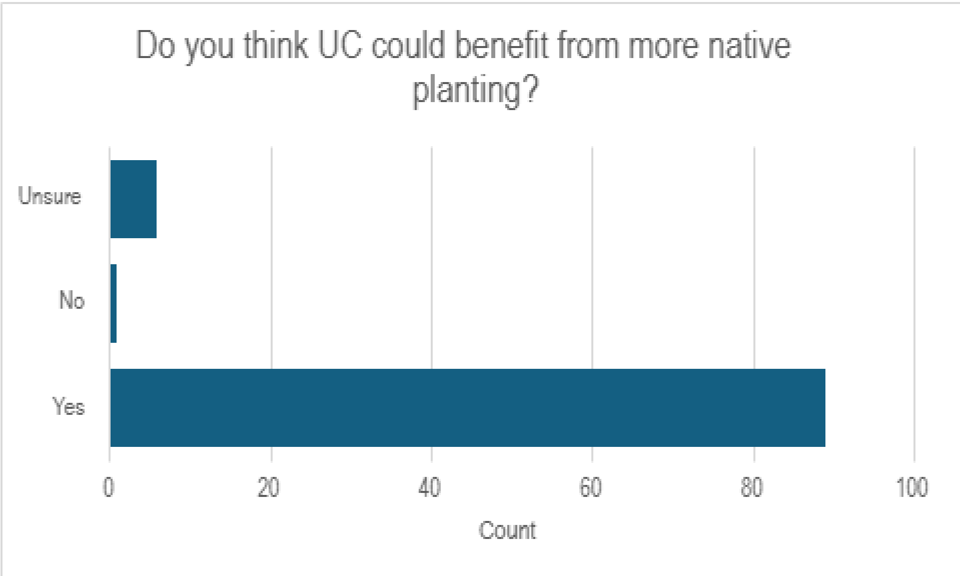
Table B6: Site 2 Soil Types (%)

Sample	**Clay %**	**Silt %**	**Sand %**
S2 H1	1.55	68.36	30.09
S2 H2	1.43	63.44	35.13
S2 H3	0.78	47.42	49.25
S2 H4	1.29	46.64	52.07
S2 H5	3.54	75.07	21.39

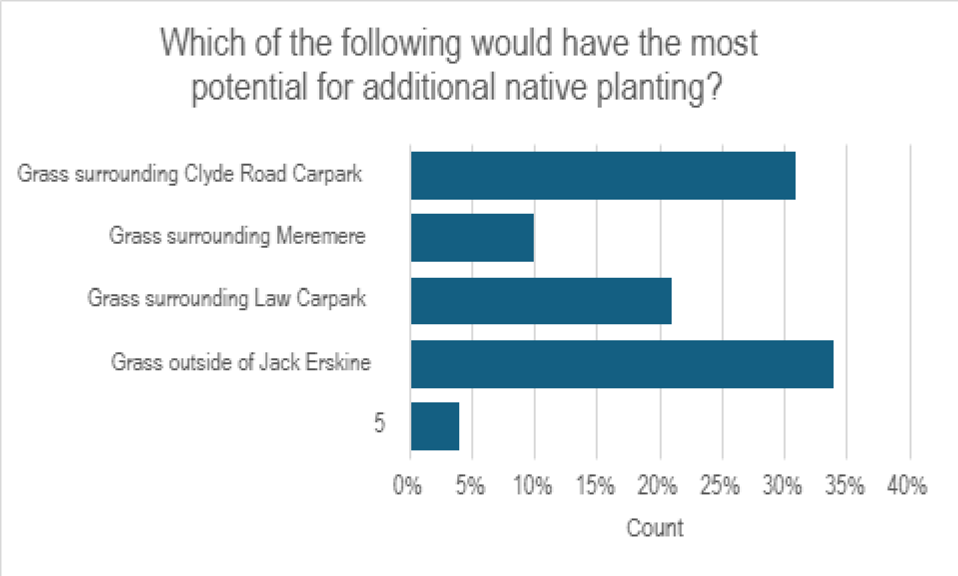
Graph B7: Respondants duration at UC



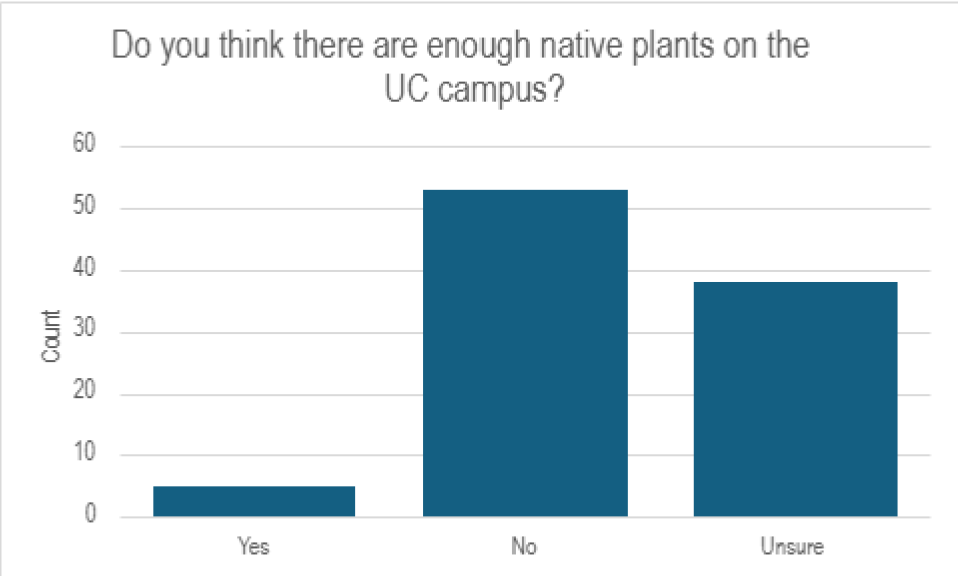
Graph B8: Respondents opinion on wanting more planting at UC



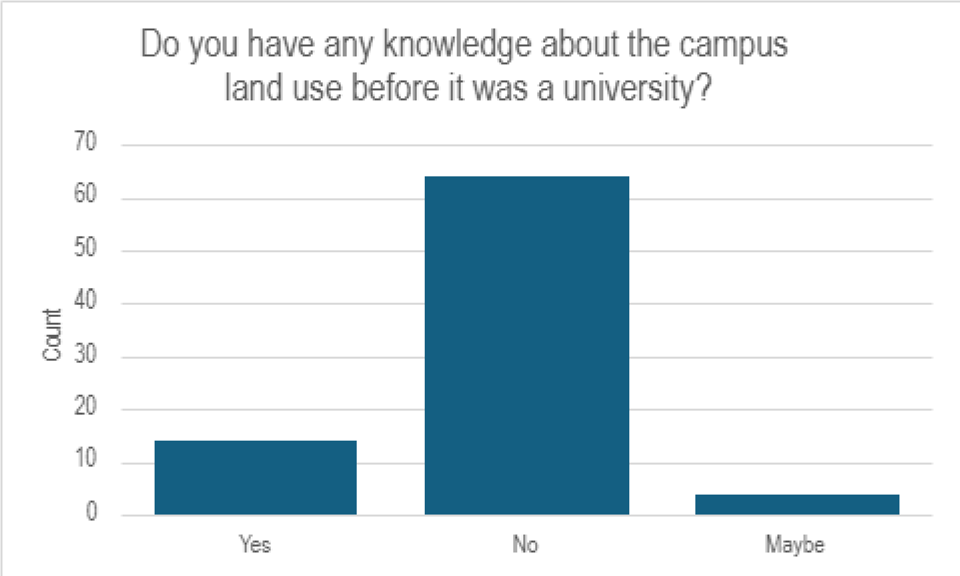
Graph B9: Respondents opinion on where they would like more planting done



Graph B10: respondants opinion on current state of native vegetation



Graph B11: Respondents knowledge on history of land use


Do you have any knowledge about the campus land use before it was a university?
Count
70
60
50
40
30
20
10
0
Yes
No
Maybe