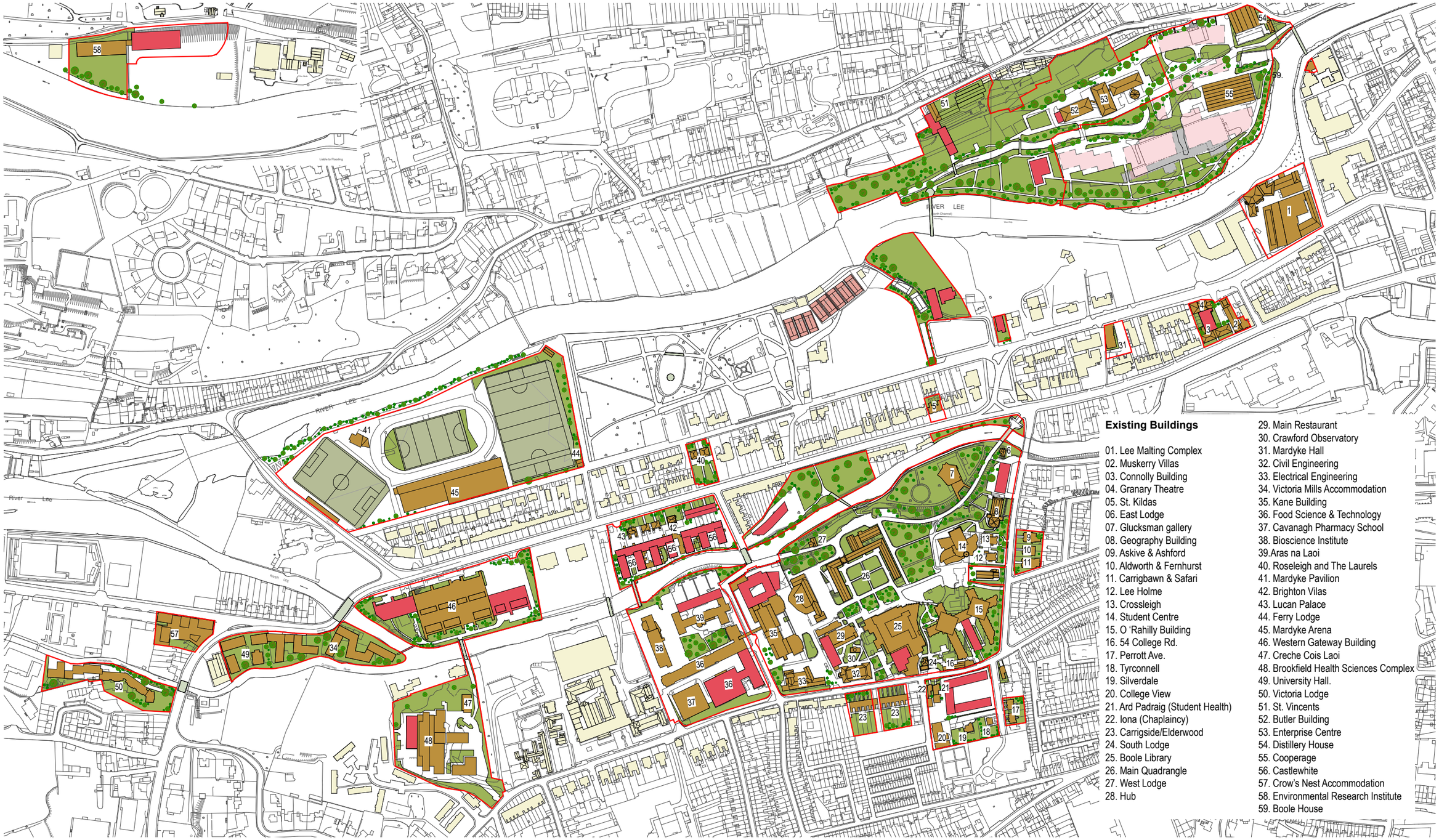
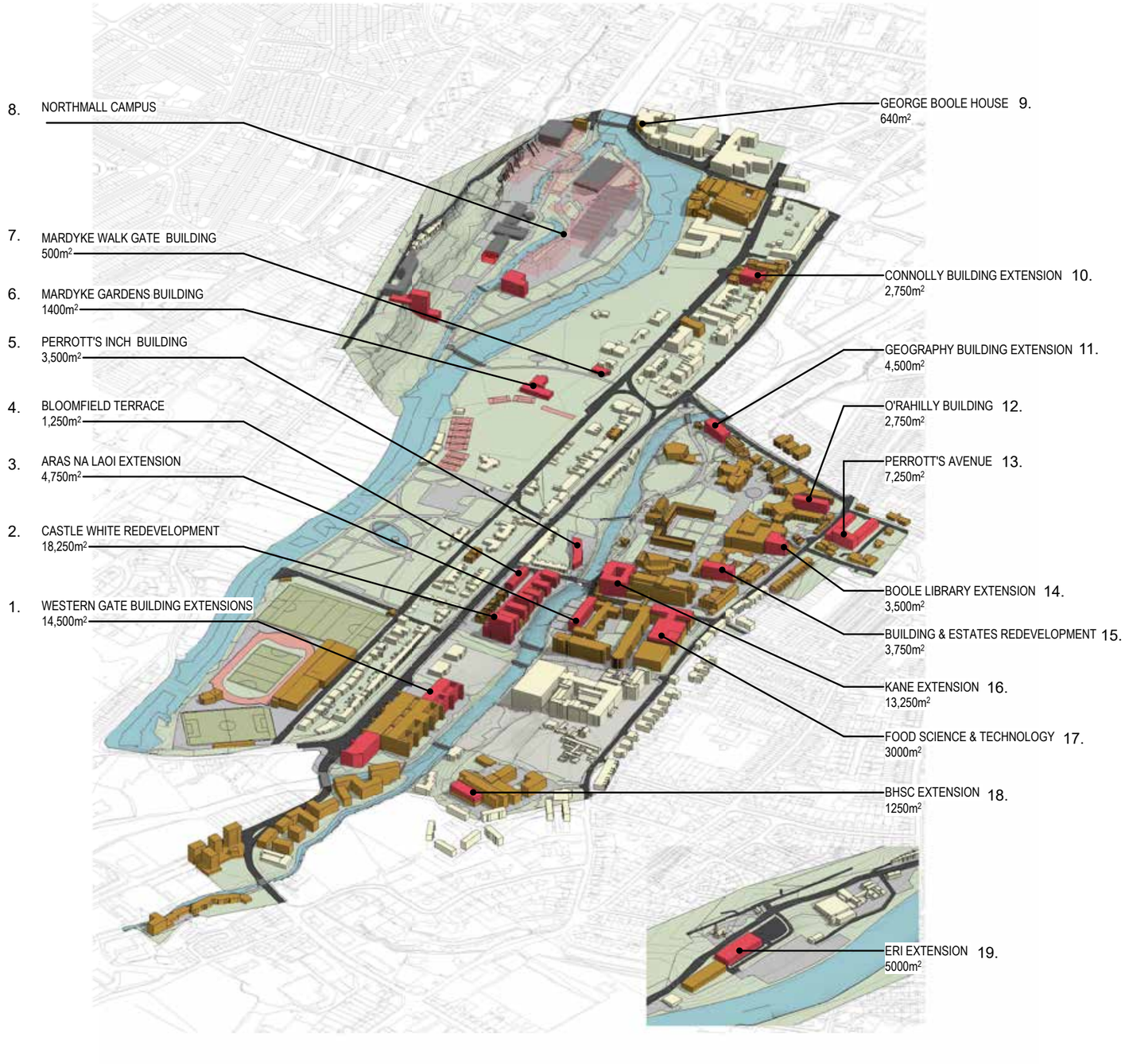
The Hub



Existing Buildings

01. Lee Malting Complex
02. Muskerry Villas
03. Connolly Building
04. Granary Theatre
05. St. Kildas
06. East Lodge
07. Glucksman gallery
08. Geography Building
09. Askive & Ashford
10. Aldworth & Fernhurst
11. Carrigbawn & Safari
12. Lee Holme
13. Crossleigh
14. Student Centre
15. O 'Rahilly Building
16. 54 College Rd.
17. Perrott Ave.
18. Tyrconnell
19. Silverdale
20. College View
21. Ard Padraig (Student Health)
22. Iona (Chaplaincy)
23. Carrigside/Elderwood
24. South Lodge
25. Boole Library
26. Main Quadrangle
27. West Lodge
28. Hub
29. Main Restaurant
30. Crawford Observatory
31. Mardyke Hall
32. Civil Engineering
33. Electrical Engineering
34. Victoria Mills Accommodation
35. Kane Building
36. Food Science & Technology
37. Cavanagh Pharmacy School
38. Bioscience Institute
39.Aras na Laoi
40. Roseleigh and The Laurels
41. Mardyke Pavilion
42. Brighton Vilas
43. Lucan Palace
44. Ferry Lodge
45. Mardyke Arena
46. Western Gateway Building
47. Creche Cois Laoi
48. Brookfield Health Sciences Complex
49. University Hall.
50. Victoria Lodge
51. St. Vincents
52. Butler Building
53. Enterprise Centre
54. Distillery House
55. Cooperage
56. Castlewhite
57. Crow's Nest Accommodation
58. Environmental Research Institute
59. Boole House

UCC Masterplan area with potential future development



Masterplan Capacity Study	m²
1 Western Gateway Building Extensions	14,500
2 Castlewhite Redevelopment	18,250
3 Aras na Laoi Extension	4,750
4 Bloomfield Terrace Building	1,250
5 Perrott's Inch Building	3,500
6 Mardyke Gardens Building	1,400
7 Mardyke Walk Building	500
8 North Mall Campus Buildings	41,325
9 George Boole House	640
10 Connolly Building Extension	2,750
11 Geography Building Extension	4,500
12 O'Rahilly Building Extension	2,750
13 Perrott's Avenue Building	7,250
14 Boole Library Extension	3,500
15 Building and Estates Redevelopment	3,750
16 Kane Building Extension	13,250
17 Food Science & Technology Building Extension	3,000
18 Brookfield Health Sciences Complex Extension	1,250
19 Energy Research Institute Extension	5,000
Total	133,115
City Centre Campus	25,720
CSAIP (33% of 107,350)	35,425
Total	**194,260**

UCC Accommodation Requirements and Proposals

The Masterplan review 2011 supported that where further land is required, that it should be acquired in the Greater Campus area. This recommendation aligns with regional, local and University policies. It represents a traditional sustainable approach to planning for future campus expansion.

In recent years however, innovation in campus planning have continued to involve a deep rethinking of the relationship between the built form of the university and the built form of its host city. The principle of the University as an enabler in the city, playing an important economic and social role, helping to co-ordinate economic and social developments at local and regional level implies that the traditional campus boundary is limitless.

UCC's physical expansion into distinct locations in the city has been gradual over the last decade, and this increase in its profile outside of the traditional campus perimeter offers opportunity to further develop UCC's relationship with the city socially and economically. This masterplan review strongly recommends that the University continues to acquire lands to enable its policy of strengthening the identity of the University in the city and its function as an activator and enabler of growth in the region.

Existing Space Provision

In the context of this masterplan review, a study has been undertaken to assess current space provision on campus against a number of established norms. In addition to an assessment of the existing situation, this exercise supports a projection of the future space requirements for UCC.

It should be noted that space norms can vary widely, depending on a number of factors e.g. programme area, teaching hour per week, staff student ratios etc. Studies suggest that undergraduate space allocation varies greatly both between faculties and between universities. It has also been noted that norms have reduced in recent years possibly due to more effective management by institutions of space allocation and usage.

.

Table 2 provides a comparison of current student numbers with the recognised FTE norms for higher education (HEA and AUDE) which are a sound basis for benchmarking spatial requirements.

1. HEA norms which propose an allowance of 10m² (gross floor area) per undergraduate and 20m² (gross floor area) per postgraduate student

2. The Association of University Directors of Estates (AUDE) which propose a 18m² per FTE for research intensive universities

The space provisions for the existing student numbers in UCC when subjected to both the HEA and AUDE norms indicate that there is a shortfall of accommodation currently to meet demands. The university has an ambitious capital development programme (see table 13) which aims to address the current space requirements. Further developments/opportunities will emerge during the masterplan period.

It is noted that a projection of anticipated growth and expansion requirements further highlights the Univerities immediate and long term challenges. A comparison of future demand versus future expansion illustrates there is an ongoing need to acquire lands to facilitate modest expansion requirements for the University.

UCC FTE Trends - Summary of FTE Numbers					
	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Undergraduate	13,549	13,840	14,206	14,412	14,637
Total Postgraduate	4,717	4,698	4,980	5,221	5,454
Total	**18,266**	**18,537**	**19,185**	**19,633**	**20,091**

Table 1 UCC Summary of FTE

Existing Academic Space Provision for Students	
Actual Existing Academic Space Provision (excluding student residences)	231,000 m²
20,091 (2021 Total) Actual Space Provision **73% (UG) : 27% (PG).**	(11.5m²/FTE)
UG@10 m² + PG@20 m² Space Required (HEA Norms)	146,370 + 109,080 = 255,450 m²
AUDE EMR Student Building Requirements (Association of University Directors of Estates)@18m²	361,638 m²
Current Shortfall	24,450 - 130,638 m²

Table 2 Existing Space Provisions

UCC Future Space Requirements

Projected UCC spatial expansion requirements are tested based on two scenarios - uplifting student numbers from 21,091 to 23,000 students and again to 25,000 students for a likely area demand to meet nominal expansion in the short to medium term.

The floor area requirements to accommodate projected capacities are indicated in tables 3-6 and suggest a significant shortfall in the existing UCC building stock and current available space.

UCC Future Space Provision

Allowing for issues of site diversity, proximity issues and similar, it is clear that the existing landbank can accommodate the short term building requirements of the university, assuming that the student/floor area ratio of 12.9m²/student is applied.

However, an increase to 18m²/student, allowing for site diversity and proximity issues would require an increase in landbank and spatial requirements.

Given that this is based on indicative norms for area allocation per student and with regard to UCC's significant quantum of existing building stock requiring refurbishment/ repair, it is clear that significant further lands are required which would allow the achievement of a floor area/student allocation of 18m²/student in the medium-to-long term.

Projected Space Requirements for 23,000 Students	
Academic space requirements for 23,000 students based on current HEA norms	
16,100 Undergraduates @10m²/student*	160,100 m²
6,900 Postgraduate@20 m²/student*	138,000 m²
Academic Space requirement for 23,000 students	298,100 m²

Table 3 Projected Space Requirements

Projected shortfall 23,000 Students		
HEA Norms	298,100 m²	67,100 m²
AUDE EMR	414,000 m²	183,000 m²

Table 4 Projected Gross Shortfall

Projected Space Requirements for 25,000 Students	
Academic space requirements for 25,000 students based on current HEA norms	
17,500 Undergraduates @10 m²/student*	175,000 m²
7,500 Postgraduate@20 m²/student*	150,000 m²
Academic Space requirement for 25,000 students	325,000 m²

Table 5 Projected Space Requirements

Projected shortfall 25,000 Students		
HEA Norms	325,000 m²	94,100 m²
AUDE EMR	450,000 m²	219,000 m²

Table 6 Projected Gross Shortfall

UCC Masterplan Development Areas

The table opposite indicates the current UCC pipeline of projects and development as submitted to the Higher Eduation Authority for 2021 National Development Projects review.

Current Pipeline Buildings	
1. Cork University Business School - New Facility	17,000 m²
2. Cork University Dental School & Hospital - Relocation	9,480 m²
3. New Facility / Expansion of Tyndall National Institute	16,437 m²
4. Innovation Hub Building	3,750 m²
5. Cork University Clinical Medical School	2,400 m²
6. Crow's Nest Student Residential & Health Centre	8,660 m²
Total Current Pipeline Buildings	**57,727 m²**
Future Pipeline Buildings	
7. Interdisciplinary Science Centre – Kane Extension	10,000 m²
8. Creative Hub (Phase 1 (URDF Proposal) & Phase 2	10,000 m²
9. PRTLI 6 Biosciences	6,000 m²
10. Specialist Germ Free Biological Facility	1,650 m²
11. Clinical Sites University Hospital Waterford, South Tipperary General Hospital & University Hospital Kerry	2,700 m²
12. New Clinical Research & Education Facility on site of Vacated Dental Hospital at CUH	20,000 m²
13. New Engineering Building	10,000 m²
14. Life Sciences building	4,500 m²
15. Outreach and Access Centre	1,300 m²
16. Public Health Building	5,000 m²
17. George Boole House/Tyndall Innovation	640 m²
18. APC Innovation Centre	4,000 m²
Total Future Pipeline Buildings	**75,790m2**
Total Pipeline	**133,517m2**

Table 7 Total UCC Pipeline Projects

11. THE DIGITAL CONTEXT

Introduction

The Pandemic challenged all places of learning in many new and unexpected ways. As UCC took measures and made efforts to minimise physical attendances, the challenge of the day to day business of learning and teaching focused a bright light on the robustness of UCC's infrastructure for remote learning and teaching.

Like all places of learning during the pandemic, UCC was not the hub of activity it normally was, but this did not mean that UCC was closed and learning and teaching were very active online. In UCC digitalisation has already broken down the physical barrier and distance learning students have been attending classes from home for some time before Zoom and Microsoft Teams became commonly known mediums

This crisis has increased the reliance on Information Technology and the concept of a true Digital Campus.

The digital environment in UCC had already been redefined in the last decade and the pace of this change is now accelerating. The modern UCC student brings expectations in terms of how UCC interacts with and supports them in their learning journey. Students are already well placed to engage online when applying for courses and programmes, a process which naturally follows through to course selection, registration, induction, assessment, graduation and post-graduation on-going engagement.

UCC already possesses the capability to develop and deliver an entire degree programme online which is a natural extension of its academic reach.

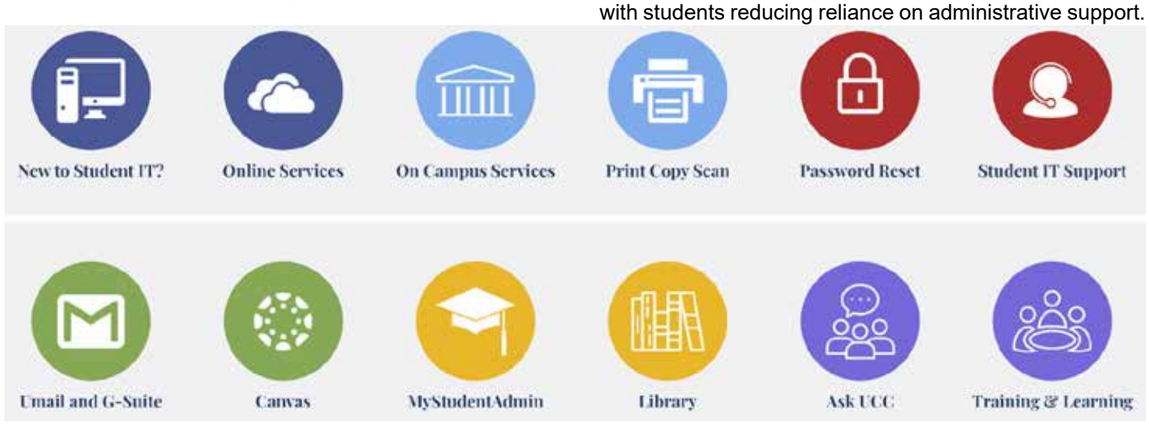
UCC can lever its infrastructure the opportunity to deliver an enhanced range of services taking advantage of new technologies and applications.

UCC's digital technologies can improve communication with, collaboration between, and socialisation of students.

Academics can be encouraged to explore and implement new teaching techniques through the use of digital collaboration tools.

Technology enables a more effective and co-ordinated approach to student welfare and the delivery of student services.

UCC is taking advantage of social media in communication with students reducing reliance on administrative support.



UCC IT Services

UCC can extend its ability to deliver lectures, tutorials, assessments and grading information to remote students however, learners of all types also need to be present on campus in an environment that challenges them and fosters new ways of thinking about the world.

After the Pandemic, what will remain is a new need to identify the redefined purposes of blended learning, virtual + physical presence and ensuring the right balance between them, for teaching and learning for the future.

IT Masterplan

The importance of the digital network, the power of IT as an enabler and the future reliance on same shall not be underestimated. A lot of future building and campus solutions will be reliant on the strength and reliability of stable digital networks.

An emerging theme for buildings is the concept of the 'Smart' building that in turn extends to the 'Smart City' or 'Smart Campus'. Technology now provides endless opportunities to deliver buildings that are more energy efficient, that can create value for the university, that

UCC IT Opportunities

can improve user experiences, and that can deliver key services to occupants when and where required. IOT/ Building sensors and ubiquitous Wi-Fi is becoming the norm while staff and students are demanding services and spaces that can enhance the learning experience and that can deliver services to them when and where they need it.

Any buildings 'Master Plan' must include a digital/ technology strand and IT Services must ensure buildings are future proofed to leverage technology. There are several pillars that need to be considered under this 'IT strand'.

Firstly, the networks and infrastructure (the foundations) must be solid and capable of meeting the IT demand of today and the future. Layered on the infrastructure is the technology and devices that can deliver services or gather information, such as digital displays and sensors. The data that is generated by devices and sensors can then be leveraged to improve performance of buildings, improve user experiences, and/or facilitate the deployment of new services. IT Security is a fundamental requirement. This is becoming more critical as buildings and devices become increasing connected and dependent on the data networks.

Future new builds and refurbishments of the campus estate must at least consider how technology can be deployed and used to deliver the following benefits or services.

1. Reduce energy consumption:

Technology must be considered as an enabler to reduce energy consumption, to reduce the university carbon footprint, and to deliver real cost savings to the university.

2. Improve Building Efficiency:

Technology must be leveraged to identify under/over used resources within a building. It needs to make sure that spaces are used optimally and that heating/lighting etc. are optimised.

3. Predictive maintenance/management:

Technology must be used to detect and monitor building performance, to predict potential failures and activate maintenance procedures before alerts are triggered. With better insight into how buildings are used and operated it is easier to plan preventative maintenance.

4. Increased productivity:

Technology can be used to enable 'Smart' buildings that are designed to deliver a more comfortable experience for occupants.

5. Better use of resources:

Data generated by smart buildings can provide insights that can be leveraged in planning and improving services for users. It can also be used to develop new services.

6. Personalisation:

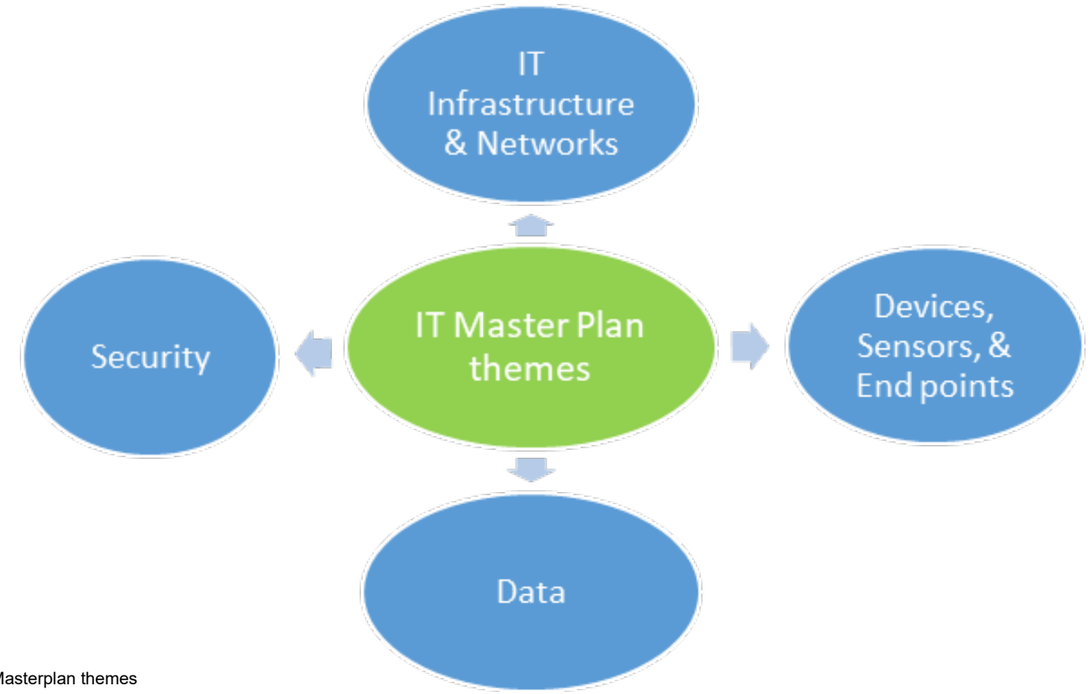
Data and connected buildings can help provide personalised experiences for staff and students. That can range from wayfinding, environmental settings in office spaces (lighting and heating), free desks in library or space in canteen etc.

7. Infrastructure resilience:

Critically Networks and technology underpin the smart building. In the past the building network or infrastructure was separate to the data or IT Network. This is no longer the case and the operations and management of smart modern buildings are dependent on a secure and resilient network that is connected to the rest of the campus and internet.

Commuter plans, parking availability, traffic flow, restaurantoccupancy, waiting times, room and desk occupancies, wayfinding are just some of the added services or value where technology can help in delivering buildings that are smarter. The key success however will be dependent on a resilient and fit for purpose IT network.

This chapter aims to highlight some of the future trends and solutions that need to be considered in all future developments.



IT Masterplan themes

IT/Network Infrastructure

The requirements for IT infrastructure are relatively simple and definable. The infrastructure is the IT backbone of any building that facilitates the digital services. Most services and users at this stage are reliant on the data networks.

- Wi-Fi is becoming the preferred mechanism for staff and students to consume services. Therefore, all new buildings must ensure that the Wi-Fi service is available in all areas where staff and students will be located. In practical terms, for example, this means detailed Wi-Fi surveys based on designs to optimally locate access points and post build surveys to validate that the service is appropriate. Furthermore, there must be a recognition that other devices/sensors within buildings may leverage Wi-Fi.

- The wired network is still critically important. It is envisaged that the LAN will be a key part of the building fabric. The LAN will run key buildings services including backhaul Wi-Fi, CCTV, BMS, Access Control, Digital signage, and realistically any fixed type devices. Staff and students may still have access to the LAN and as such office and desks may continue to be served by LAN connections. The other consideration is the development in PoE – the data network and equipment can now deliver power to many devices – for example lighting.

- Given that the buildings will be highly dependent on the data networks it is important that the various comms rooms and closets are classified as critical areas of the building. As a critical part of the building fabric the building design and construction must consider separate power isolation for data comms rooms supported by UPS and generator, appropriate cooling, as well as security measure such as internal CCTV and secure access leveraging access control.

- Finally, connectivity from buildings back to main UCC comms rooms and data centres is vital. All new major buildings or buildings that are deemed critical must have resilient fibre back to the main UCC network cores.

Sensors/Technology

The ‘Smart Building/Campus/City’ is very much based on connectivity and connected devices or sensors. These devices will be the mechanism to gather raw data that will be leveraged to generate insight/analytics and that can also be used to deliver services or value to the university, staff, students, and other stakeholders. These devices or endpoints may sit on the UCC data networks in most cases (there may be situations where the public 3G/4G networks will be used and the emergence of 5G technology must be considered).

There is a lot of technology available now to provide solutions to problems or to deliver new services. However there needs to be a clear business strategy or rationale before deploying. The IT network can be the enabler, but the business must have clear requirements. For example:

- Parking across campus is an issue particularly during peak times. There are opportunities to leverage the IT infrastructure and technology to alleviate this problem and/or better inform users to direct them to locations where parking may be available.

- Similarly, there is increasing demand for lecture and office space. Again, technology can be leveraged to measure occupancy levels in real-time or near real-time. This can in turn help the university maximise space utilisation and provide improved service.

- Sensors and technology can dramatically improve building performance and drive the green agenda. Sensors sitting on the network can measure temperature, lighting etc. and in turn reduce energy consumption.

IT Services needs to work closely with B&E and designers to identify how technology will be deployed in any new buildings.

Data

IT Services can help the university build data repositories and capabilities that will be key to the ‘Smart Campus’. The campus generates large amounts of data from BEMS, Wi-Fi, Access Control, etc. This should be considered when envisioning the utilisation and functionality of new buildings.

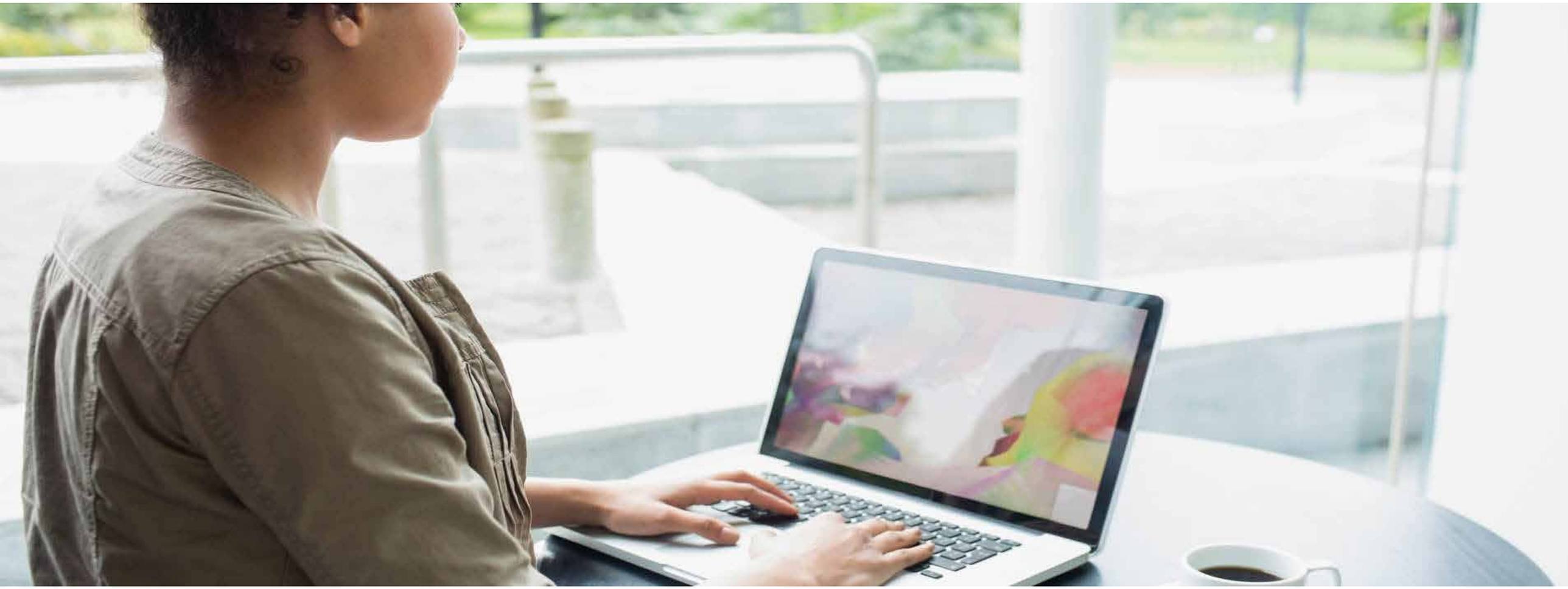
Security

Cyber security must be a basic principle for all IT deployments and new buildings. That means comms rooms must be appropriately secured. However, it also means that the network design must be capable of supporting the new types of sensors and IOTs – without endangering the main business systems, data, and services.

As we see more ‘nontraditional’ devices residing on the network supported by external third parties the vectors for cyber-attack increase. In most cases these are non-managed devices and pose a considerable risk to the digital estate of the university.

Funding

The budget allocation for the IT Infrastructure needs to reflect the criticality of this service. The IT requirements in this document will require careful consideration and investment from the start of each project.



Guidelines/Checks

- All new buildings should have resilient fibre links – using diverse routes to connect the building back to the main communication hubs on campus

- Network communications rooms and closets need to be designed to have resilient and segregated power.

- The network will run critical services and, there is a growing trend to power devices over the data network using PoE. Therefore, consideration must be given to universal power supply within the comms rooms, and backup generators that can power the comms rooms during periods of extended power outages.

- All cabling must meet IT Services requirements and standards. Designers will adhere to IT Services standards for cabling and comms room layouts when commencing a project.

- All comms rooms must be secured from unauthorised access and controlled by CCTV and Access Control swipe.

- Cooling shall be provided to all comms rooms but the main data centres shall require N+1 cooling strategy.

- Mobility within a building must be a key principle and as such appropriate Wi-Fi deployment is required. External Wi-Fi must be considered for all new buildings to deliver enhanced connectivity for all users. In addition mobile coverage over 4G (and 5G) in the future must be considered, all new building design shall ensure that mobile coverage is achieved throughout the building.

  Site survey for both Wi-Fi and mobile coverage must be part of all new building designs.

- The project team must arrange to meet with UCC IT at an early stage in the project design stage to discuss their proposals and ensure that all requirements are being met and in line with the smart buildings vision.

Spaces/User Groups

It is important to realise that different spaces have different requirements and also to consider that different user groups have different needs. It is important to engage each stakeholder early in the design to understand what technology will be required and how it will be used. Considerations must be given to how users will access services (Wi-Fi or LAN), digital signage, technology in the classroom, unique research requirements etc.

Examples of different spaces:

- Admin Areas
- Research Areas
- Campus Companies
- Teaching Spaces
- Collaboration Spaces

Examples of different user groups:

- Students
- Staff/Researchers
- Third Parties/Visitors/Other
- Students living on Campus

The purpose of the masterplan document is not to dictate the IT requirements for each but more over to ensure that the needs of the different spaces and different user groups are considered and agreed with UCC IT at an early stage in each project.

Smarter Buildings & Data

The advent of IOT will be a dramatic change in how buildings will operate in the future. How buildings will operate in the future will be enabled by data and geolocation. The following items are therefore very important to be considered in the early stages of a project.

- Room Tagging - room numbering to be consistent throughout

- Occupant Comfort – create opportunities for automatic personalisation of the room to user preferences. (example, light levels, temperature preferences)

- Energy Consumption – the thermal heating and cooling energy put into rooms to be activated by presence detectors and also room booking system/ software.

- Building Maintenance and preventative maintenance - The enormous mass of data generated by building automation systems can be constantly monitored and analyzed to find on-going operational problems (hot and cold problem areas, broken dampers or valves, equipment that doesn't turn off). How can the IOT system create preventative maintenance regimes rather than reactive maintenance.

- Centralised Campus control centre – consideration to be given to a centralised building controls centre – assuming all buildings will be controlled using software and IT hardware. (rather than BMS's)

- Software platforms – any technology system being installed should be open protocol. Any software that is not open protocol should be discussed with UCC IT department for approval.

- Cyber Security – is the building safe from cyber treats

- Data Standardization and Applications — can you standardize the data output of automation systems using an open source solution to label or "tag" building data so it can be ingested by a third party easily.

Other items for consideration for smart buildings:

- Room occupancy and trends
- Smart Lighting
- Energy usage/efficiency (sensors & automation)
- All car parks shall be connected to the LAN. This is required to centralise the data to feed future car parking and commuter information/commuter plans.
- Car charging – where are the unoccupied charging spaces? How is this communicated to the user?
- Library Seating – where are there free library seats
- Hot seating/desking
- Hot rooms

Personalisation

Consideration should be awarded to the use of technology for personalising the user experience in UCC.

For example:

- Inclusion – can we embrace technology to facilitate this, to cater/deliver services to users with disabilities

- Room preferences

EXISTING BUILDINGS

1. Lee Malting Complex
2. Muskerry Villas
3. Connolly Building
4. Granary Theatre
5. St. Kildas
6. East Lodge
7. Glucksman gallery
8.Geography/Geology
9. Askive & Ashford
10. Aldworth & Fernhurst
11. Carrigbawn & Safari
12. Lee holme
13. Crossleigh
14. Student Centre
15. O'Rahilly Building
16. 54 College Rd.
17. Perrott Ave.
18. Tyrconnell
19. Silverdale
20. College View
21. Ard Padraig (Student Health)
22. Iona (Chaplins)
23. Carrigside/Elderwood
24. Disability Support Services
25. Boole Library
26. Main Quadrangle
27. West Lodge
28. Windle Building/Student Hub
29. Main Resturant
30. Crawford Observatory
31. Boole Lecture Theatre
32. Civil Engineering
33. Electrical Engineering
34. Reception Centre
35. Kane Building
36. Food Science & Tecnology
37. Cavanagh Pharmacy School
38. Bioscience Institute
39.Aras na Laoi
40. Roseleigh
41. The Laurels
42. Brighton Vilas
43. Lucan Palace
44. Ferry Lodge
45. Mardyke Arena
46. Western Gateway Complex
47. Creche Cois Laoi
48. Brookfield Healthsciences Complex
49. University Hall.
50. Victoria Lodge
51. St. Vincents
52. Butler building
53. Enterprise Centre
54. Distillery House
55. Cooperage
56.Castle White

NORTH

DRAFT

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Rev	Date	Description	Chg / Apr

University College Cork

UCC MASTERPLAN

FIBRE OPTIC CABLING SITE PLAN

C19013-EDC-00-00-DR-E-2000

As indicated	TT	ROF

Mechanical & Electrical Consulting Engineers

12. APPENDICES

1. DRAINAGE AND FLOODING
2. MOBILITY INFRASTRUCTURE
3. LANDSCAPE AND TOPOGRAPHY
4. MAIN CAMPUS PROPOSED SEQUENCE OF MV NETWORKS UPGRADES

1. Drainage

Flood Zones

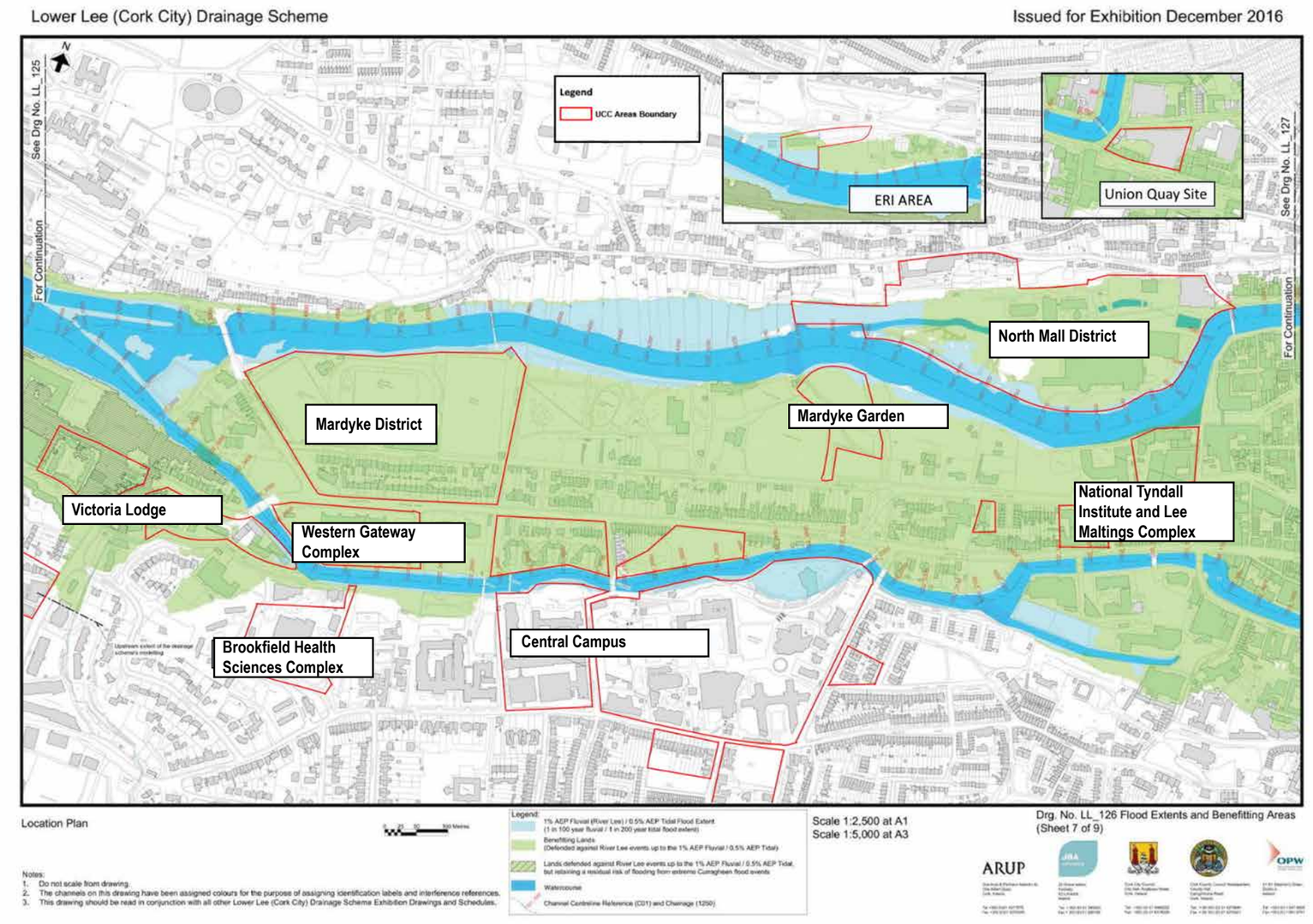
The office of Public Works (OPW) holds a record of Flood defences mapping along the River Lee downstream.

Flood zones are mapped geographical areas within which the likelihood of flooding is within a particular range. There are three main flood zones, defined as follows: Flood Zone A defined as areas with a 1% or greater likelihood of flooding in any given year, or a 1% Annual Exceedence Probability (AEP). Flood Zone B is areas with a 0.1% AEP in any given year. Flood Zone C is areas with less than a 1 in 1000 chances of flooding in any given year, which is effectively all areas outside of Flood Zone A or Flood Zone B.

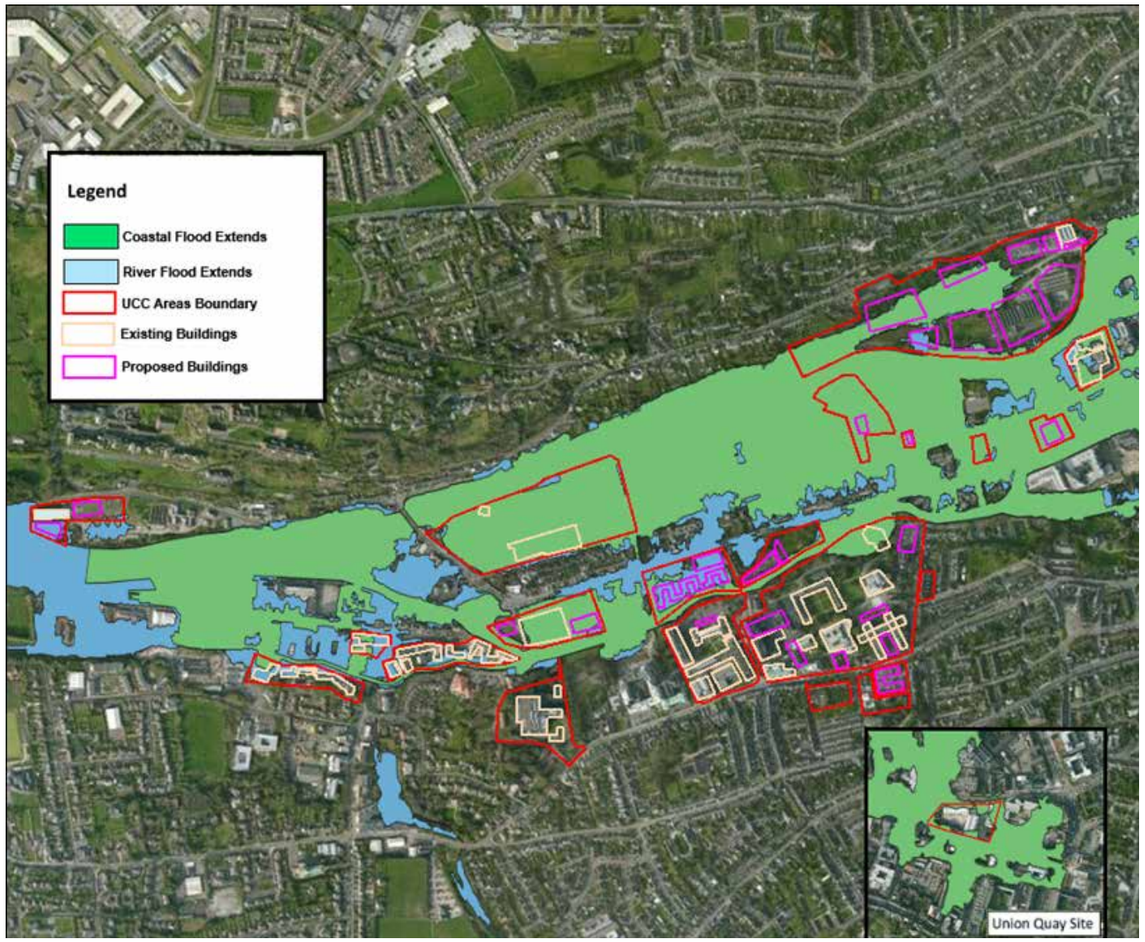
Flood extent mapping has been created and is available from the Office of Public Works (OPW) for reference. The maps show flood extents for 1% AEP and 0.1% AEP events. Many of the existing and some of the proposed development sites lie within the 0.1% and 1% AEP floodplains. On November 2009 River levels exceeded the ground floor levels in a number of UCC buildings and left 30 % of the city campus under water.

The Lower Lee Flood Relief Scheme (FRS), commissioned by the Office of Public Works (OPW), has identified a number of measures for implementation to reduce flood water levels there by reducing the risk of human and economic damage. The proposed Lower Lee FRS takes into account most of the UCC campus ground.

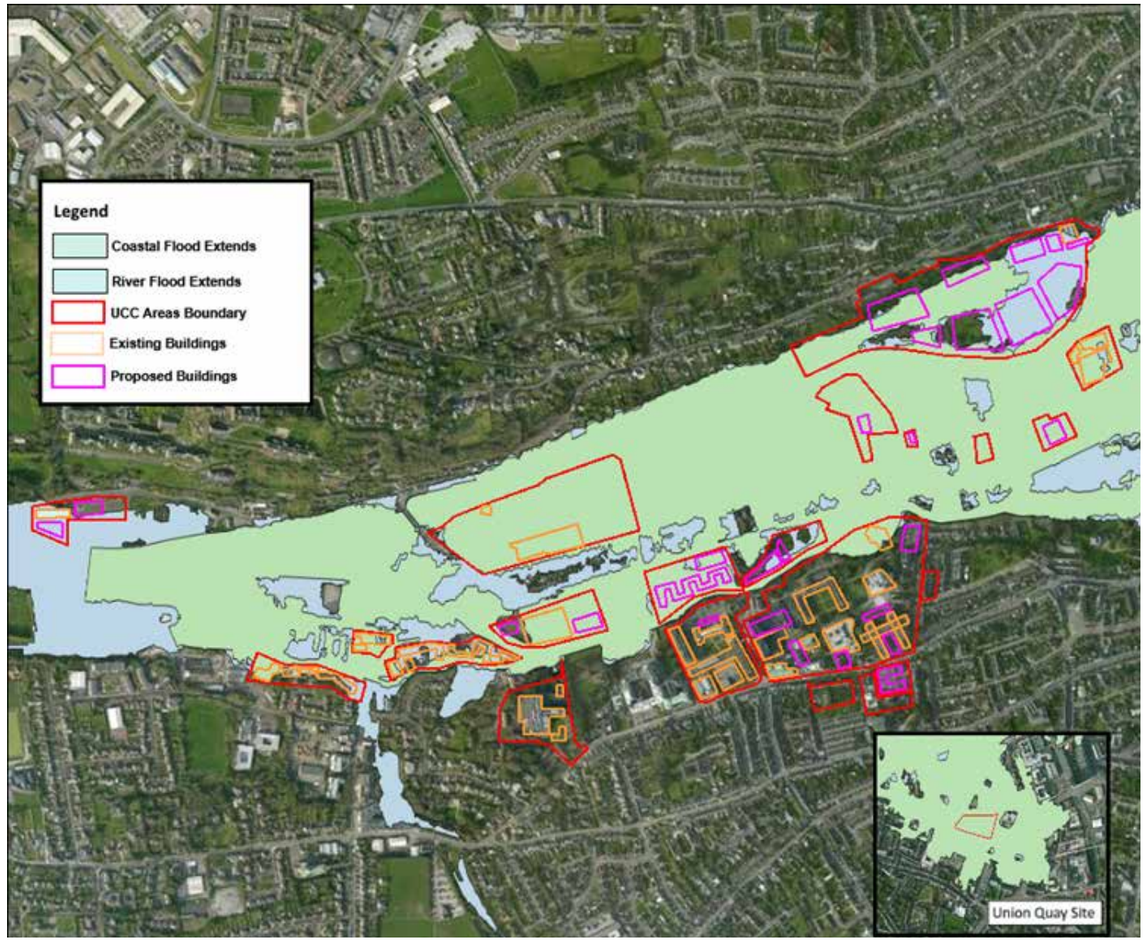
The Drainage Review describes each of the campuses in further detail in the context of the impact of the proposed Lower Lee FRS on existing and proposed future development.



Campus locations in relation to the Lower Lee FRS proposed defended areas



Currently Undefended 1 in 100 year flood extents with overlay of UCC buildings



Currently Undefended 1 in 1000 year flood extents with overlay of UCC buildings

Drainage Review

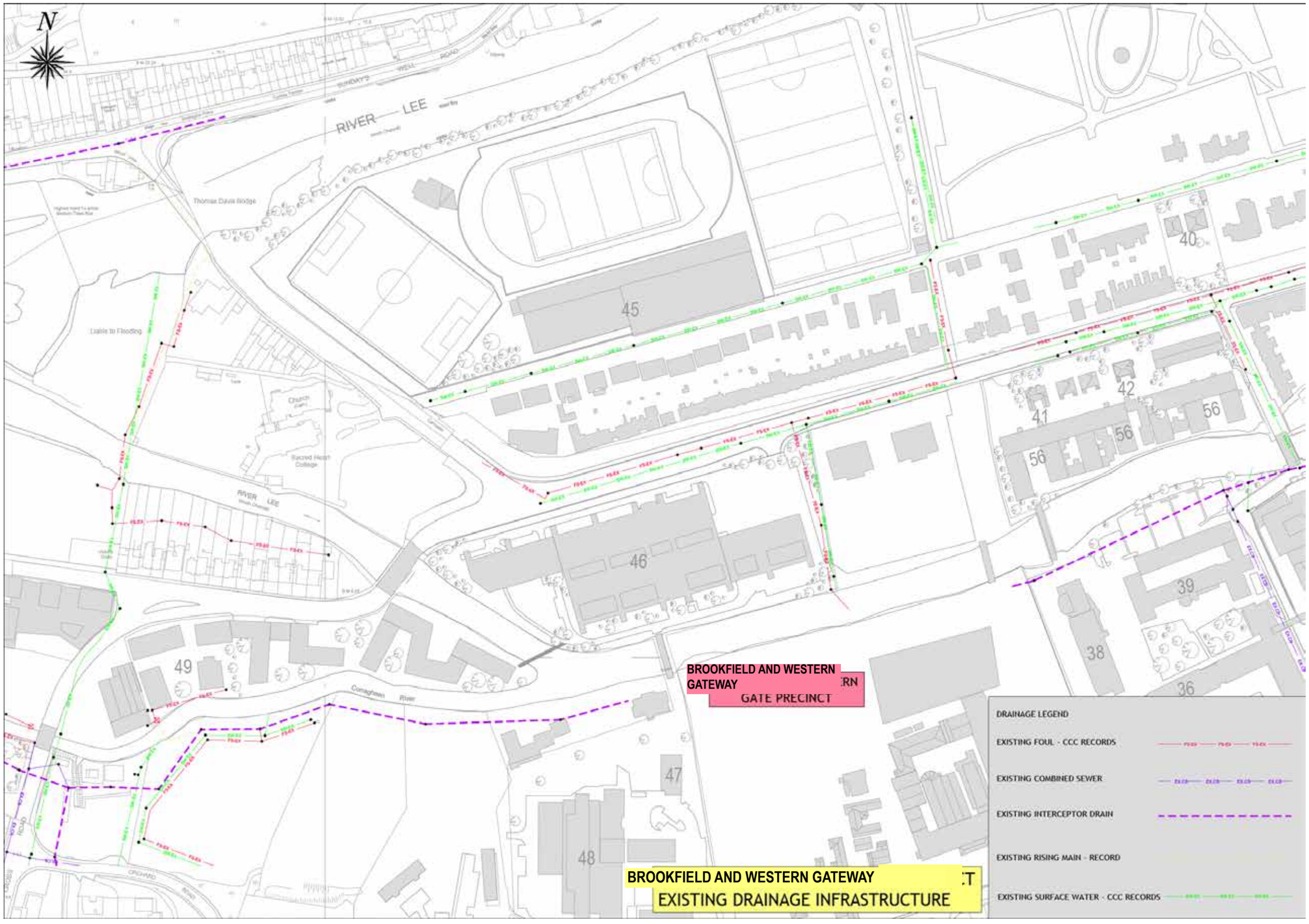
NORTH MALL DISTRICT	CENTRAL CAMPUS	ERI	UNION QUAY	CURRAHEEN (CSIP)
Foul An existing 750mm diameter interceptor sewer traverses the North Mall site, approximately following the existing access road along the northern side of the School of Applied Psychology and School of Earth Sciences, before entering the Mercy Hospital carpark and turning to run to the south of the Cooperage and exiting the site. Based on invert levels indicated on Irish Water/CCC record drawings, gravity connections for foul drainage can be achieved to service any proposed buildings on the site and pumping should not be necessary. Diversion of the interceptor sewer may be required to facilitate development of several of the opportunity sites to the north of this campus, depending on the final configuration of developments on these sites. Early engagement with Irish Water is advised with regard to all development at the North Mall site. **Storm** The existing hardstanding areas on the North Mall discharge directly to the River Lee close to the site. The Lee is tidal at this location and as such, attenuation/restriction of flows generated by the development will have no beneficial impact on flood risk downstream.	The Central Campus has three drainage systems serving foul water, storm water and chemical wastes. Earlier buildings (e.g. Main Quadrangle Building, Restaurant, Geography Building) have combined foul and storm water systems. Newer developments such as the Kane Building and Food Sciences complex have separate foul and storm water drains. Storm water systems generally discharge into the River Lee. The foul and chemical waste systems combine and feed into public foul sewers. Drain lines containing chemical waste run to designated manholes which are subject to an effluent licence issued and monitored by Cork City Council. A dedicated drainage system was installed for the Boole Library building consisting of both storm and foul gravity lines. These traverse the eastern side of the campus and discharge to the river and interceptor sewer at the Donovan's Road / Western Road intersection. This system provides drainage infrastructure to the entire eastern section of the campus, facilitating future development. The drainage systems generally fall to the north with the storm water systems discharging to the South Channel of the River Lee on the northern boundary of the Main Campus. A large municipal interceptor sewer runs contiguous with, and parallel to, the southern bank of the river at this point and the foul water and combined systems discharge to this.	**Foul** An existing 225mm diameter interceptor sewer which runs along the Lee Road services the ERI building. Invert levels for this sewer are not shown on Irish Water record drawings. Pumping of wastewater will be necessary to achieve connection to this interceptor sewer, which may require upgrade of the existing pump station on site, dependent on foul loadings.	Cork City Council record drawings indicate that there is an existing 300mm dia. combined sewer on South Terrace, an existing 1050mm dia. combined sewer on Copley Street and an existing 300mm dia. combined sewer on Stable Lane. **Storm** It is envisaged that surface water from the proposed development will discharged by gravity to the River Lee, via a rainwater harvesting tank which will help to limit the impact of the development on the receiving environment and reduce water demand for the Union Quay site. **Foul** Foul flows from the development can be discharged to the existing sewer network on the roads around the site. Dependent on finished floor levels and the provision of a basement in the proposed development, pumping of foul sewage may be required.	There is an existing wastewater pumping station located to the west of the proposed CSIP. This pumping station pumps towards the Curraheen Road, where it connects to the Cork City wastewater collection system. This pumping station currently serves the Greyhound Stadium however Irish Water have confirmed that this pumping station has sufficient capacity to serve Phase 1 developments on the UCC Precinct II lands. Foul flows from future developments at CSIP will be directed into proposed future 300mm diameter trunk main by Irish Water/CCC connecting the UCC lands to the Inchagaggin Sewer to the North, as described in the UCC Precinct II Masterplan documents. There is no existing piped surface water network in the vicinity of CSIP. The surface water is currently drained via natural greenfield run-off to the Curraheen and Twopot Rivers. The Curraheen river traverses the eastern boundary of the UCC Precinct II lands. The design intent of the long-term drainage solution for the site is for the CUDB site and future developments along the northern portion of Precinct 2 to be attenuated by means of a large swale which will provide direct infiltration to ground with an overflow connection to the Twopot river, as described in the UCC Precinct II Masterplan documents.

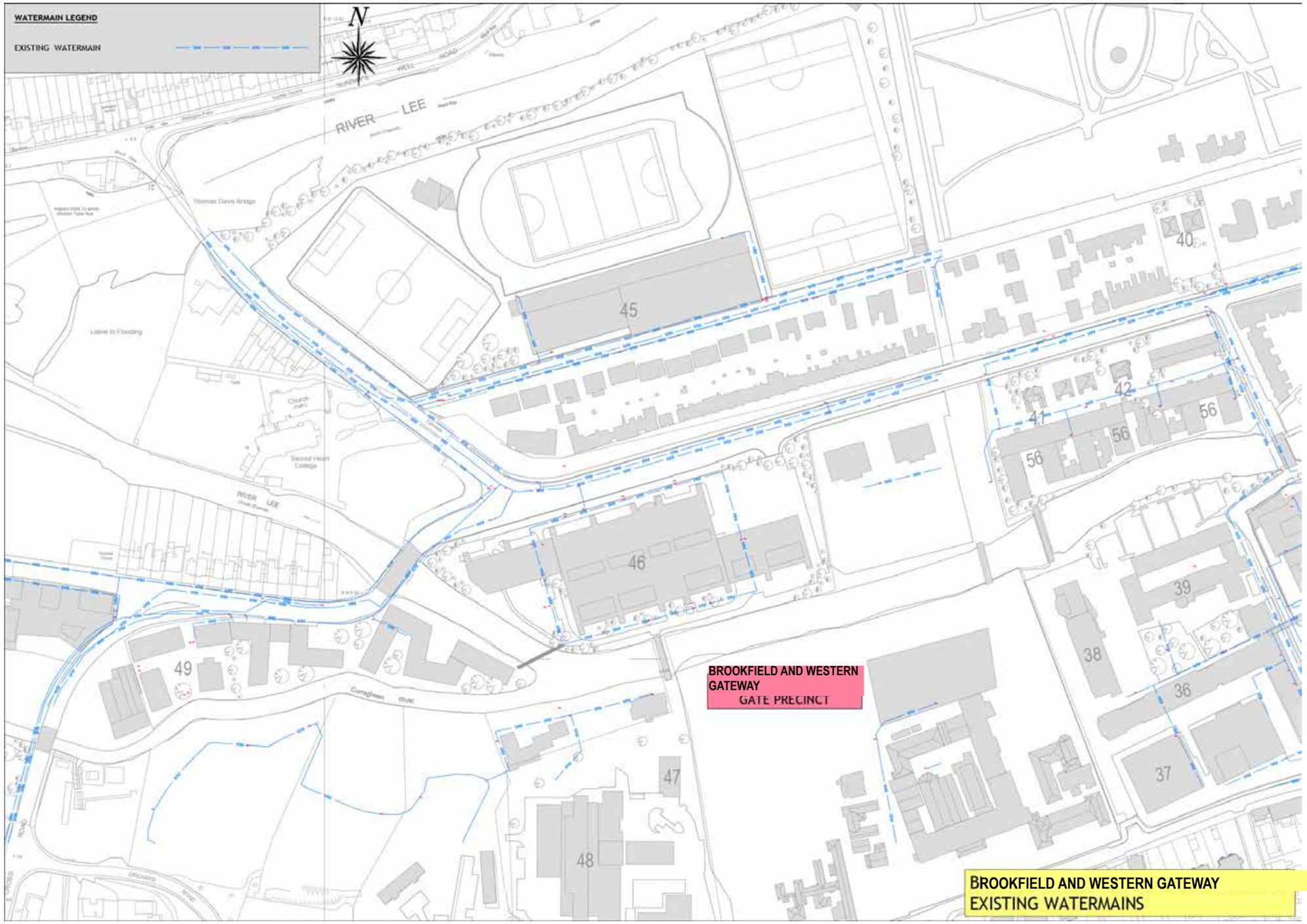
Drainage Review Continued

Water Cork City Council/Irish Water records indicate that the primary water supply to the North Mall District is via a 200mm ductile iron watermain from which cast iron and ductile iron feeds supply various parts of the site. The 200mm ductile iron main is fed from a 450mm diameter cast iron trunk main with the connection at the junction of Sundays Well road and North Mall.	**Water** The main campus is serviced by a series of cast iron and ductile iron watermains which traverse the site. The main campus intake is from a 300mm diameter trunk watermain which runs along western road, with connections to UCC also provided from Donovan's Road and College Road watermains. This main is fed from the Shanakiel Reservoir.	**Water** The ERI is serviced by an existing 100mm ductile iron watermain	**Water** Cork City Council record drawings indicate that there is an existing 150mm and 300mm dia. watermain on South Terrace, an existing 75mm and 250mm dia. watermain on Union Quay, an existing 75mm dia. watermain on Copley Street and an existing 75mm dia. watermain on Stable Lane. A new metered connection from one of these mains will need to be constructed to service the proposed development at Union Quay	**Water** There is an existing 150mm watermain along the western boundary of the proposed site. Previous consultation with Cork County Council and Irish Water has confirmed that this main has sufficient capacity to supply Phase 1 developments within UCC Precinct II. Upgrades of the watermain infrastructure are proposed by Cork City Council which will service future needs of the fully developed CSIP, as described in the UCC Precinct II Masterplan documents.

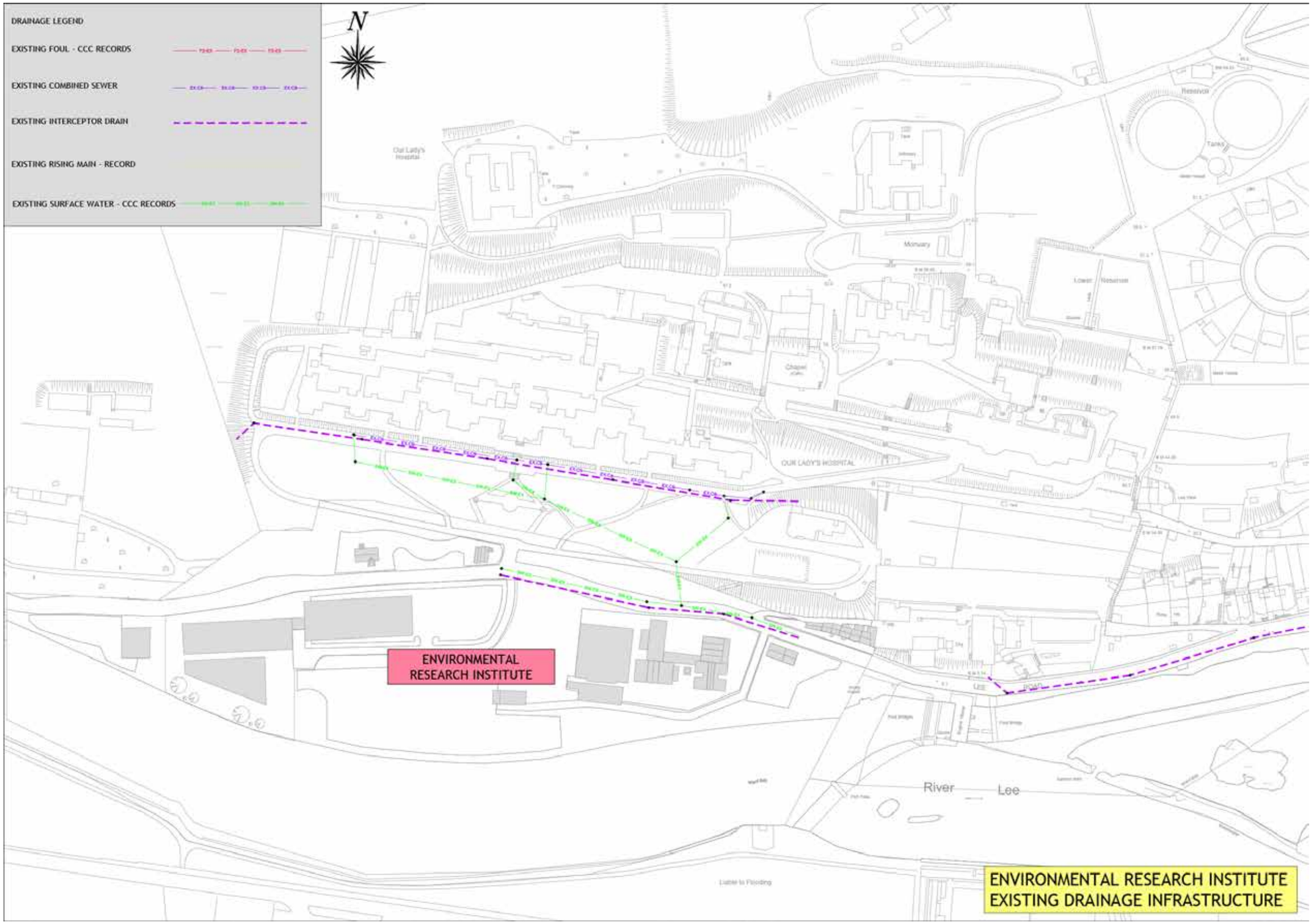
General (Statement on SUDS)

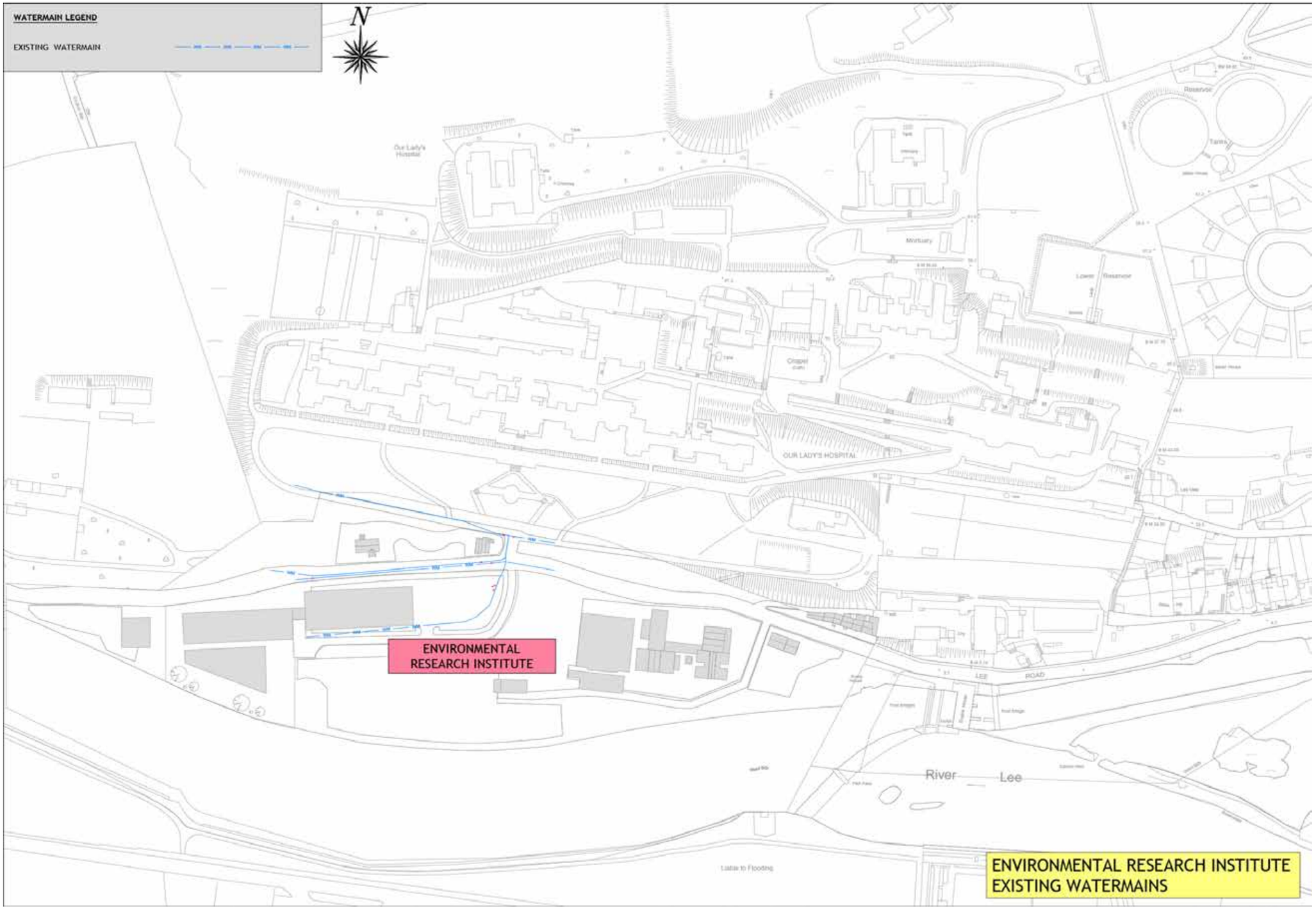
Provision of SUDS measures for conveyance, treatment and discharge of additional runoff generated by future construction is key to any development at opportunity sites as identified in this masterplan. SuDS elements have the capacity to retain and filter pollutants and assist with suspended solids removal prior to discharge to the receiving environment and in some cases can remove the requirement for Petrol Interceptors which may otherwise need to be installed on site. Installation of SuDS where practicable and achievable can reduce the loading on municipal drainage services and assist with groundwater recharge

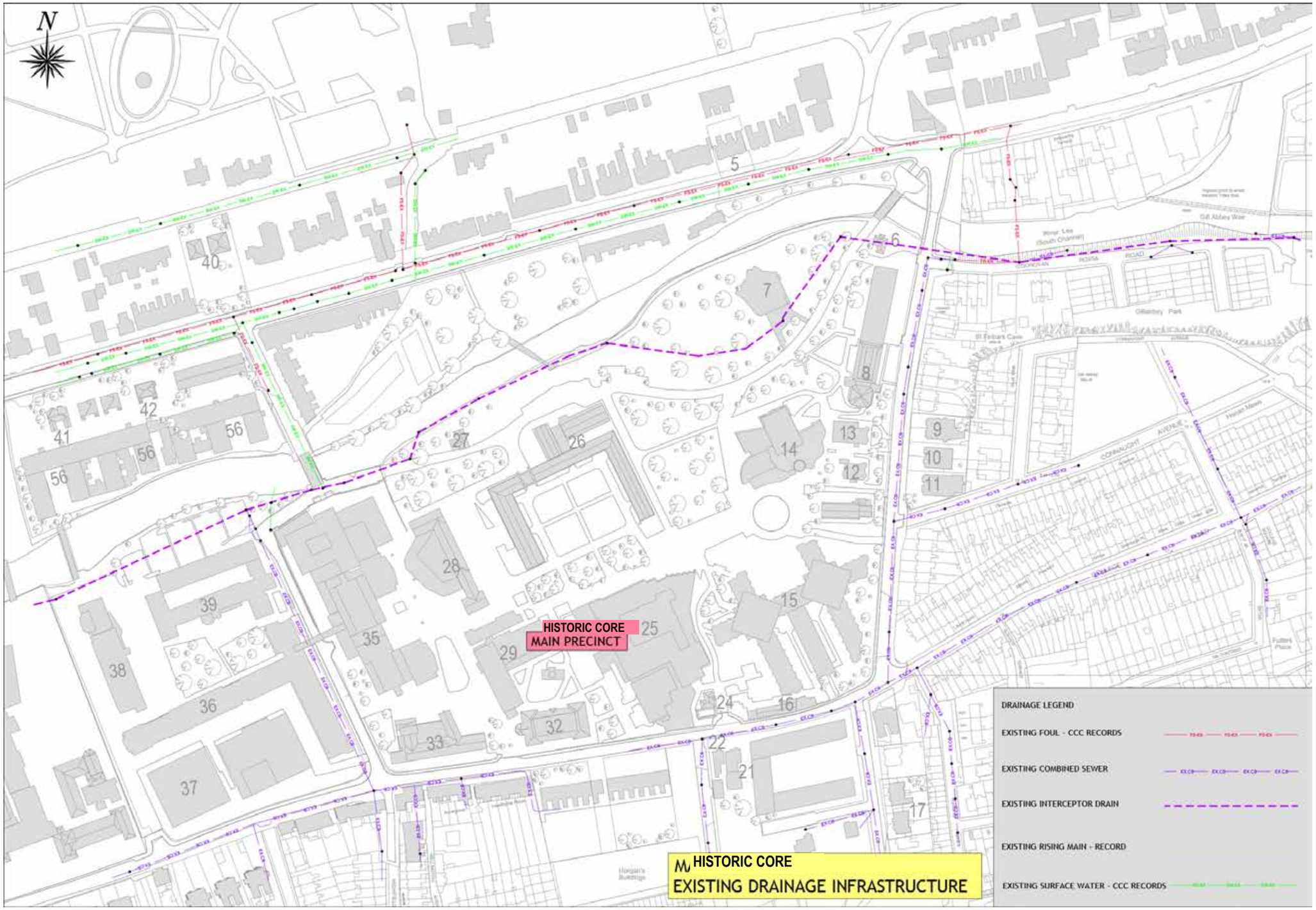

N
RIVER LEE
Thomas Davis Bridge
Liable to Flooding
Church
Sacred Heart College
RIVER LEE
Coneghan River
45
46
47
48
49
40
41
42
56
56
56
39
38
36
BROOKFIELD AND WESTERN GATEWAY
GATE PRECINCT
BROOKFIELD AND WESTERN GATEWAY
EXISTING DRAINAGE INFRASTRUCTURE
DRAINAGE LEGEND
EXISTING FOUL - CCC RECORDS
EXISTING COMBINED SEWER
EXISTING INTERCEPTOR DRAIN
EXISTING RISING MAIN - RECORD
EXISTING SURFACE WATER - CCC RECORDS

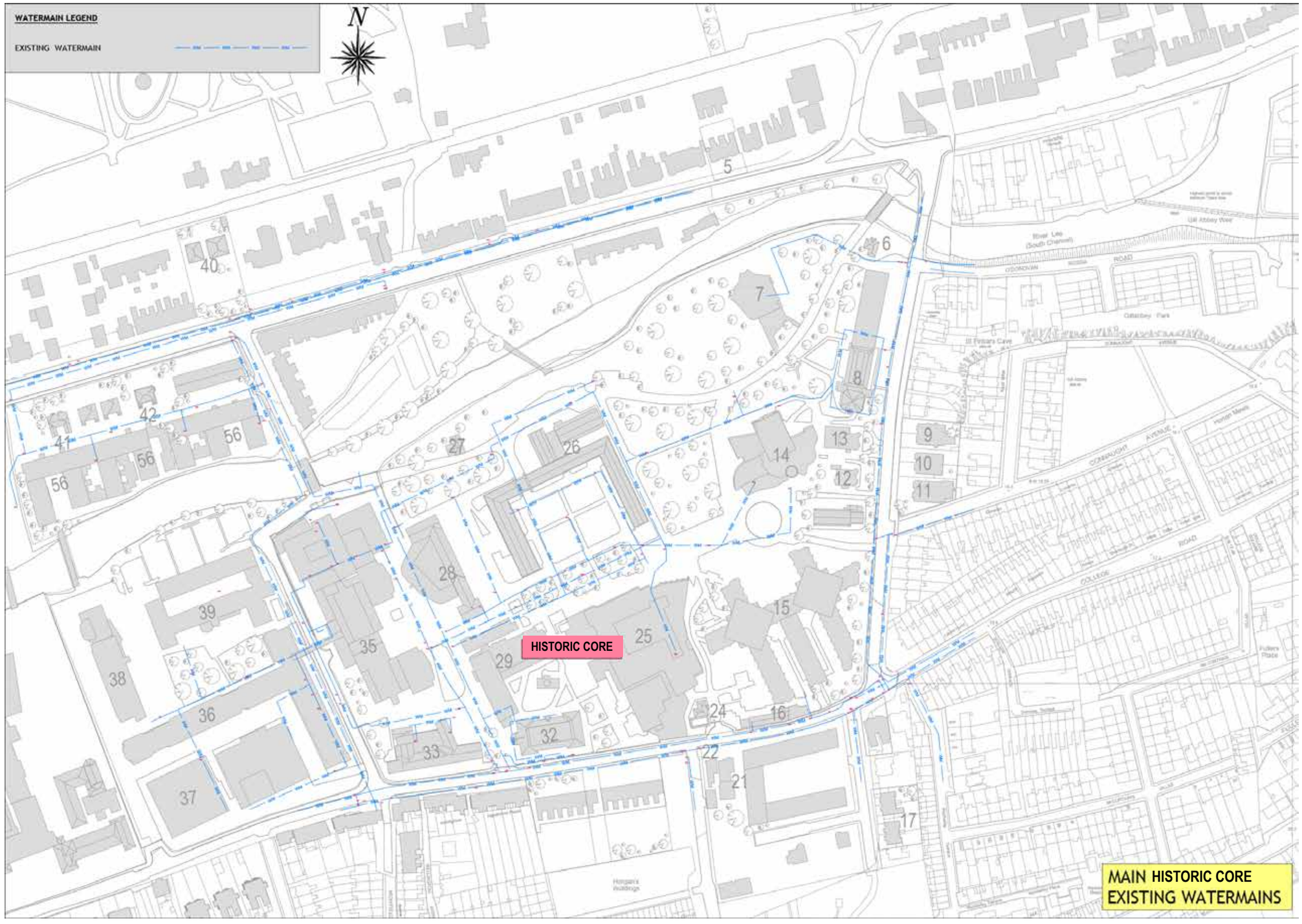


Bus Infrastructure


DRAINAGE LEGEND
EXISTING FOUL - CCC RECORDS
EXISTING COMBINED SEWER
EXISTING INTERCEPTOR DRAIN
EXISTING RISING MAIN - RECORD
EXISTING SURFACE WATER - CCC RECORDS
N
Our Lady's Hospital
Mortuary
Reservoir
Tanks
Lower Reservoir
OUR LADY'S HOSPITAL
ENVIRONMENTAL RESEARCH INSTITUTE
River Lee
Liable to Flooding
ENVIRONMENTAL RESEARCH INSTITUTE
EXISTING DRAINAGE INFRASTRUCTURE


WATERMAIN LEGEND
EXISTING WATERMAIN
N
Our Lady's Hospital
Mortuary
Reservoir
Tanks
Lawn Reservoir
OUR LADY'S HOSPITAL
ENVIRONMENTAL RESEARCH INSTITUTE
LEE ROAD
River Lee
Liable to Flooding
ENVIRONMENTAL RESEARCH INSTITUTE
EXISTING WATERMAINS


N
HISTORIC CORE
MAIN PRECINCT
DRAINAGE LEGEND
EXISTING FOUL - CCC RECORDS
EXISTING COMBINED SEWER
EXISTING INTERCEPTOR DRAIN
EXISTING RISING MAIN - RECORD
EXISTING SURFACE WATER - CCC RECORDS
HISTORIC CORE
EXISTING DRAINAGE INFRASTRUCTURE


WATERMAIN LEGEND
EXISTING WATERMAIN
N
HISTORIC CORE
MAIN HISTORIC CORE
EXISTING WATERMAINS

2. Mobility Infrastructure

While the gradual expansion of public transport and sustainable infrastructure is not within the remit of UCC the university is committed to supporting sustainable transport measures for their students and staff as much as possible. Comfortable and attainable commutes are vital to attract both students and staff to UCC.

Most public transport systems are not financially sound as a single entity and have to be subsidised, just as a cycle and walking path does not directly generate profit. However, an infrastructure network is an important component in society. It is a fundamental system necessary for the economy to function and without high quality infrastructure civilization becomes challenged. Critical infrastructure networks are the backbone of modern societies as they provide them with the services that are essential for their continuous functioning.

Choice of transport is not only linked to availability, but also to: location, social status, income, cycle networks, footpath quality, quality of public transit and parking availability.

Sustainable transport in Cork faces similar challenges to many other cities - lack of investment in public transport. Quality public transport is the backbone of our society and for the second largest city in Ireland mobility is a vital component to make the urban centre function fully.

Lack of public transport means long, difficult and time-consuming commutes which hinders a good work/life balance.

Average commuting times in Ireland according to the 2016 census is 30 minutes, however as housing prices has risen in recent years people are increasingly forced to move further away from the large cities which means that commutes to work or study of more than one hours is becoming increasingly standard in 2019.

There is a direct link between commuter times and well-being.

People with the longest commutes have the lowest overall satisfaction with life and as car ownership is increasingly on the rise and dominate our lives our cities are becoming very congested.

Driving is the most stressful way to commute, while public transport, walking and cycling are more comfortable and often beneficial to our health. Surprisingly the ideal commute is not necessarily no commute. It can be beneficial to have some separation between work/study and home, allowing time to think and an opportunity to get exercise through walking (running) or cycling. Using public transport often also includes some means of walking and cycling to and from train stations and bus stops.

Commuting quality is closely linked to physical health. Cycling or walking to work ensures daily exercise while using the car is closely linked with degenerating health and lifestyle health problems.

Attractiveness of Commuter Modes

Commuter Modes		Health Benefits	Stress Levels	Reliability During Peak Commuter Times
1	**Working / Studying from home**	No	None - No commute	Yes
2	**Walking**	yes	Low - Walking will relieve general stress	Yes
3	**Cycling**	yes	Low - Cycling will relieve general stress, though there might be safety concerns, cycling in the public realm	Yes - but could increase stress over safety cycling in dense traffic
4	**Train**	some - movement to and from train is likely to be walking or cycling	Some - depends on dependability on the service and availability of seating spaces	Some - depends on the service, so can vary
5	**Bus**	some - movement to and from bus is likely to be walking or cycling	Some - depends on dependability on the service and availability of seating spaces	Some - depends on the service, so can vary, can be less reliable than the train due to road congestion
6	**Car**	No	High - it is stressful sitting in non moving traffic	No - the closer to peak commuters times of the day the more likely to be of unpredictable length of time

Table: Attractiveness of commuter modes

Mobility and Health

Changing the mode share of commuters towards sustainable options is a key requirement to ensure quality of life for all Corkonians including the students and staff of UCC.

The continued delivery of an efficient, integrated and coherent transport network is a critical component of Corks public infrastructure and linking this new infrastructure closely to UCC will be vital.

Cork is going through significant growth and in 2050 it is likely that 500.000 people will live in and around Cork.

Students are a group particularly sensitive to lack of public transport as they often do not have cars, but still have long commutes and as rents are steadily increasing, they are commuting from further and further away.

New Modes of transport

Electric bikes and scooters are becoming increasingly popular. E-scooters are great for short commutes and city crossings as they can be folded and brought onto a train and a bus and Electric bikes can substantially contribute to widening the commuting radius for cycling and will likely significantly aid in reducing congestion and become popular modes of transport for the student population in the future.

Integration of Modes of Transport

Integrated mobility solutions are very desirable. Measures include integrated ticketing systems, park and ride options, the possibility of bringing bikes and E-scooters onto public transport. It is imperative that walking and cycling networks should be closely linked to public transport hubs and bus stops.

Mobility around Cork

Availability of both public transport infrastructure and cycle networks is limited in Cork City, this challenges general movements around Cork and not only the commuting options

Infrastructure Network Movement types:

- Pendulum movements - commutes

- Professional movements – going to meetings, presentations
- Individual movements – various, including shopping, social visits
- Touristic movements – movement to landmarks in and around the city
- Distribution movements – freight and postal deliveries

Taking a pro-active approach to influencing travel behaviour and management thereof is closely linked to national transport initiatives, however UCC is invested in supporting any public transport initiatives and actively encourage walking, cycling as well as park and ride solutions for the Metropolitan Campus.

Parking

Parking is increasingly a 'hot topic', both the lack of parking around UCC and how to resolve this issue. It is widely recognised that adding more parking is not the best solution, since this encourages increased car use and more congestion.

The Cork Metropolitan Area Transport Strategy proposes a set of public transport initiatives which will over time alleviate the need for parking in and around the city and UCC is committed to plan for this as a reduced number of parking spaces on the campus will accommodate new buildings an updated public realm.

Cycling

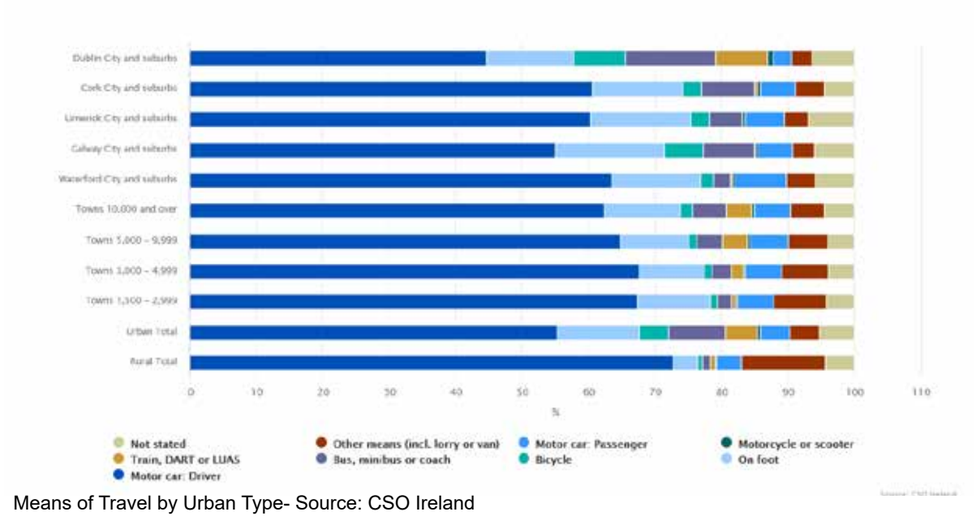
The Cork Cycle Network Plan documented the increased need for good cycling infrastructure and the main cycling arteries currently are:

- Bishopstown Road
- Western Road
- Model Farm Road
- N20
- Middle Glanmire Road
- Blackrock Road Ballinlough Road
- Douglas Road
- S Douglas Road

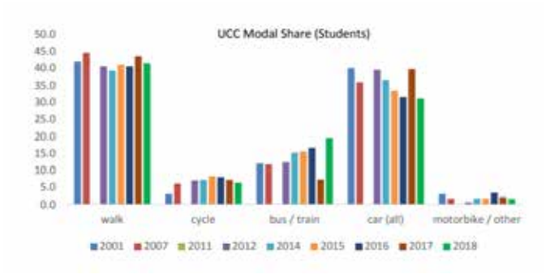
Pedestrian and cycle facilities can only be successful where they form a coherent network and at present, just 1.7% of all trips to work and education are taken by bike. A higher use of 4.5% is recorded among third level students. Overall, a large majority (67.8%) travel by car.

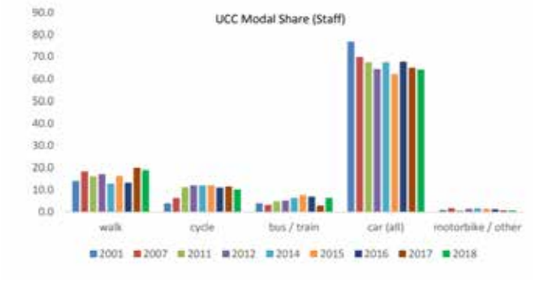
On the UCC Campuses:

- Cyclists are permitted to enter all Campus areas.
- Pedestrians, however, have absolute priority so, cyclists are asked to cycle carefully and at slow speed.



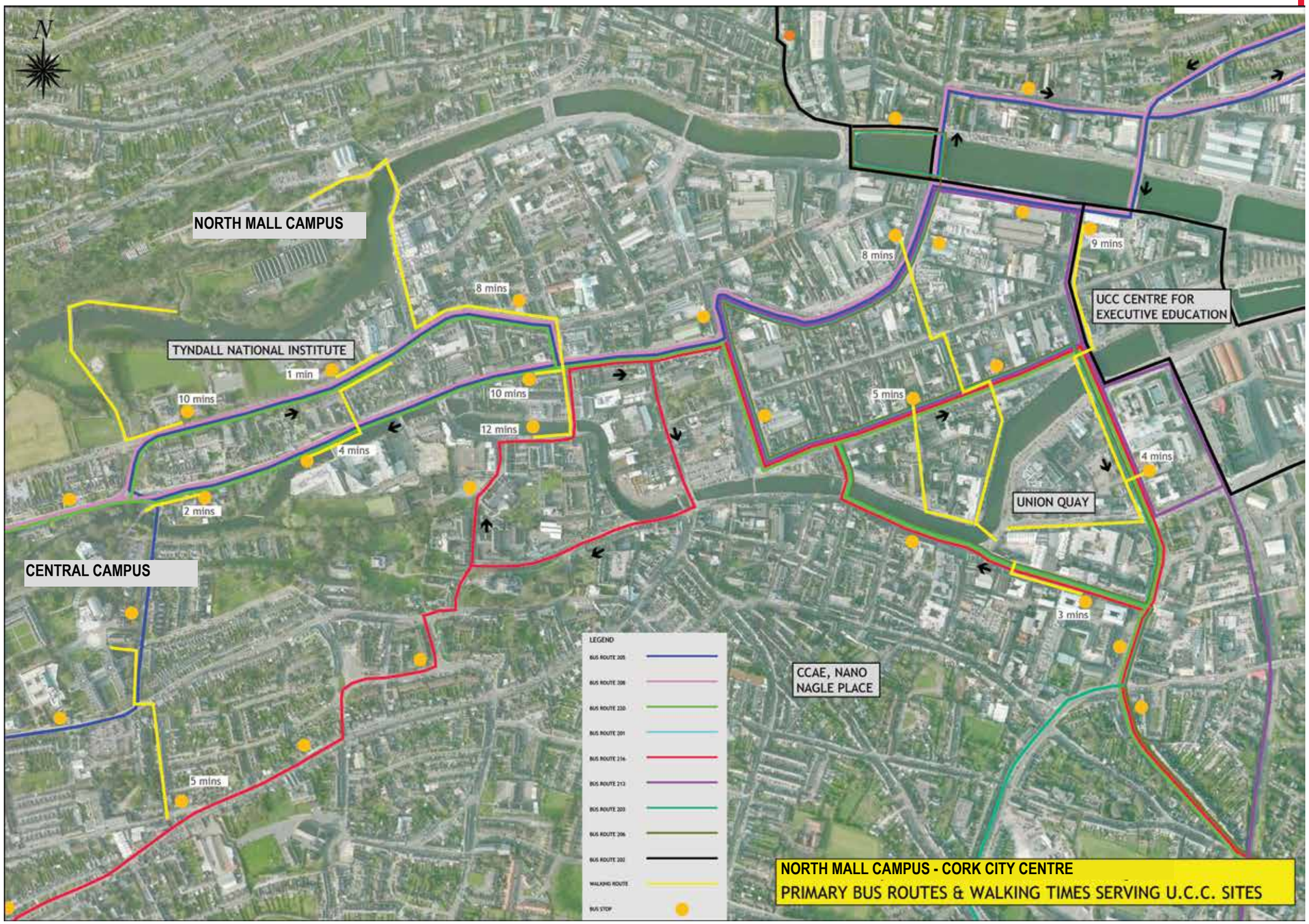
Means of Travel by Urban Type- Source: CSO Ireland

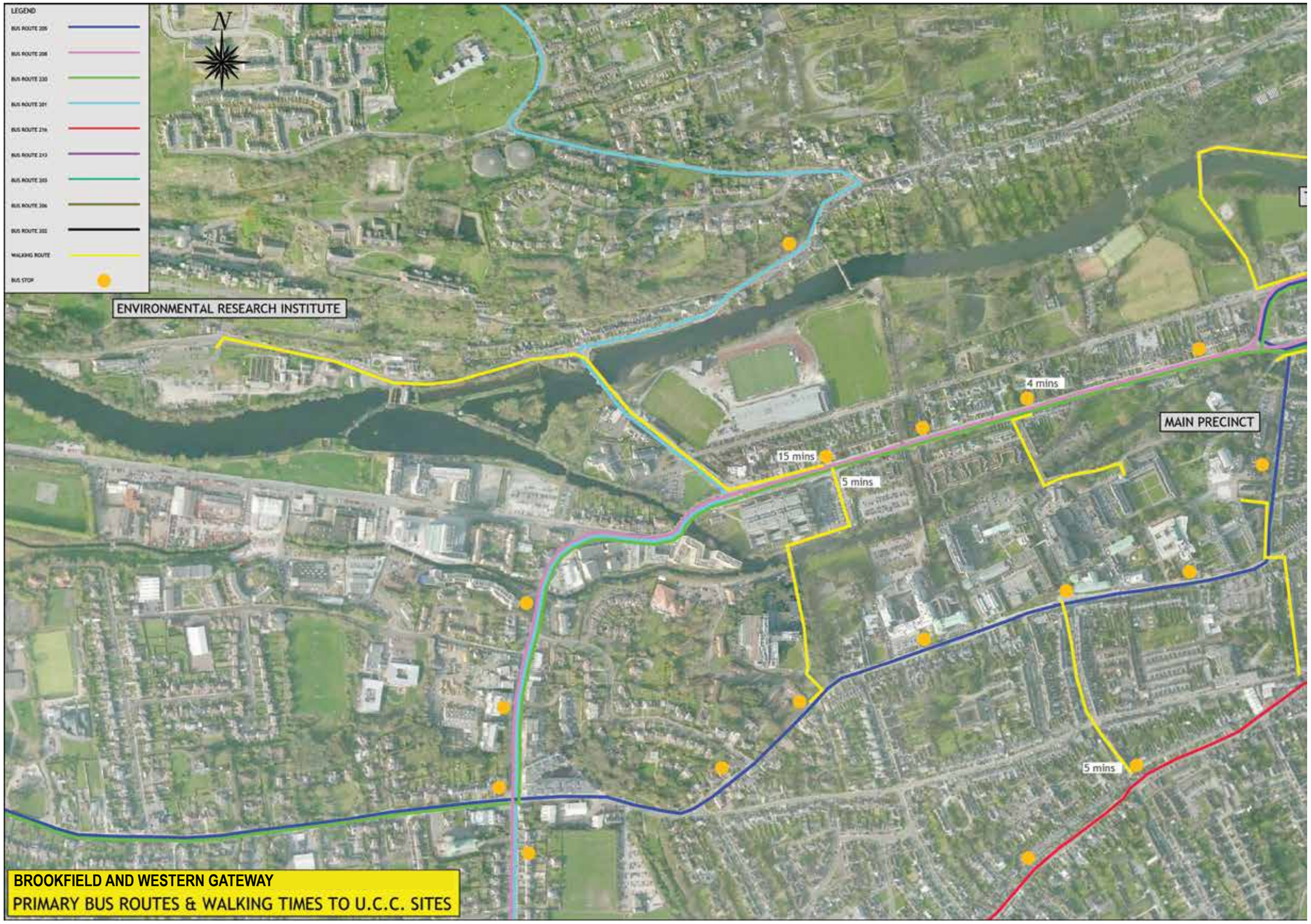


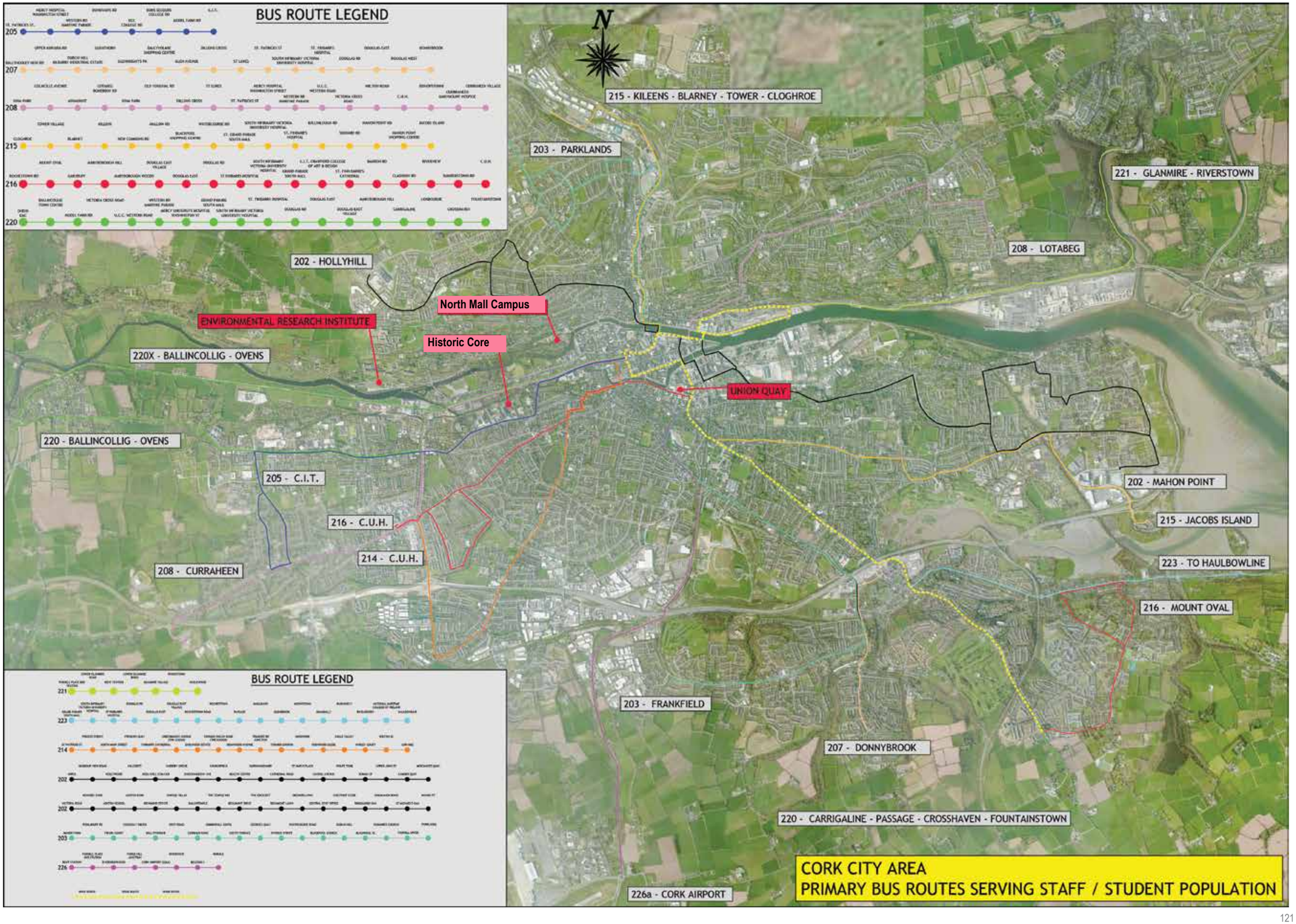


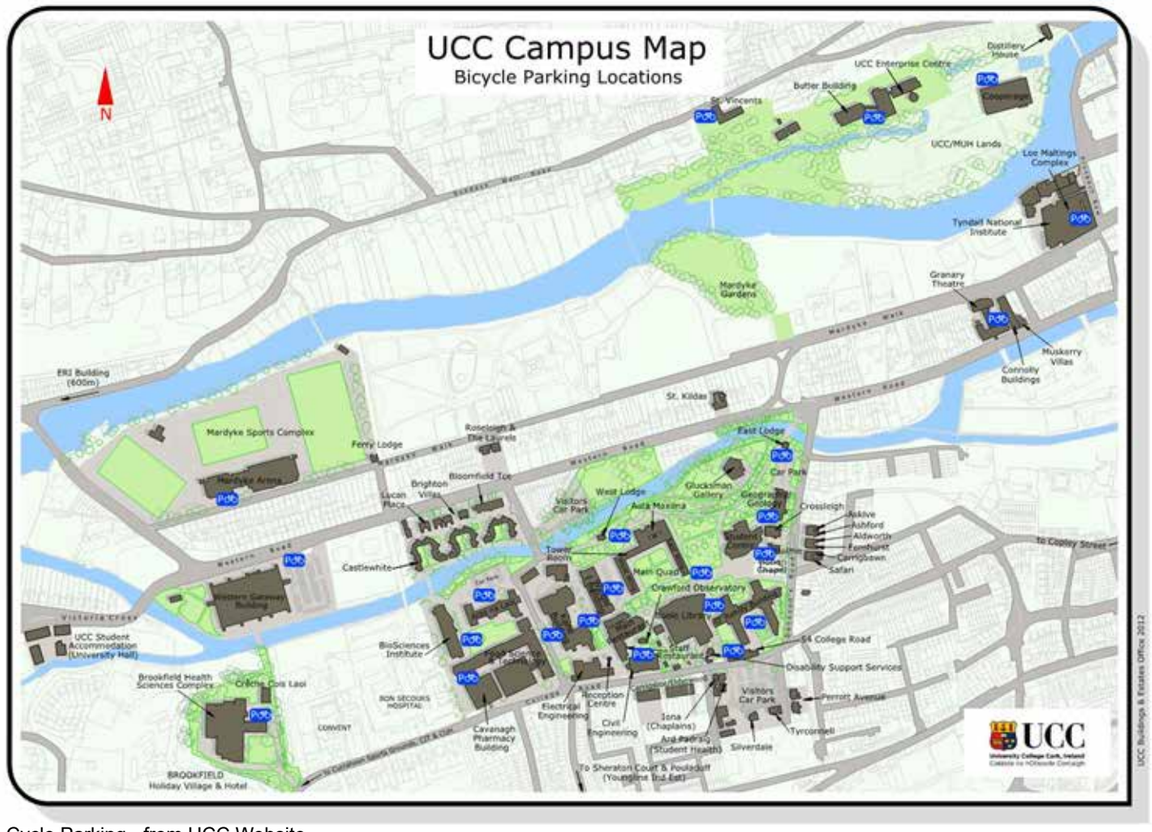

LEGEND
FULLY SEGREGATED CYCLE PATH
BUSY ROAD SHARED WITH VEHICLES
QUIET ROAD SHARED WITH VEHICLES
PART SEGREGATED/ PART SHARED ROAD
GREENWAY
COCA COLA ZERO BIKE STATION
QUALITY OF LIGHTING IN PLACES ALONG GREENWAY IS POOR DUE TO VEGETATION. CCTV PROVISION IS SPARSE. CYCLISTS MAY PERCEIVE IT AS UNSAFE TO USE THIS ROUTE AT QUIETER TIMES.
NORTH MALL PRECINCT
CYCLISTS CROSSING IN WESTERLY DIRECTION FROM MARDYKE WALK TO ACCESS GREENWAY OR ERI CYCLE ON FOOTPATH DUE TO DISCOMFORT OF CROSSING ROAD HERE
TYNDALL NATIONAL INSTITUTE
UCC CENTRE FOR EXECUTIVE EDUCATION
ENVIROMENTAL RESEARCH INSTITUTE
UNION QUAY
MAIN PRECINCT
GAP IN CONSISTENCY OF CYCLE ROUTE PROVISION TO AND FROM BUSINESS SCHOOL FROM MAIN CAMPUS. ROUTE IS SAFER TRAVELLING AWAY FROM UNION QUAY .
CCAE, MANO NAGLE PLACE
BUS
LOW SAFETY QUOTIENT ON PRIMARY ROUTE FROM MAIN STUDENT RESIDENCES (VICTORIA CROSS AREA) TO MAIN CAMPUS, NORTH MALL AND UNION QUAY
NO CYCLIST PRIORITY ESTABLISHED ON THIS ROUTE
LACK OF COMFORTABLE, SAFE CYCLE ROUTE FROM MAIN CAMPUS TO CUH
INTERSITE CYCLING - PRIORITY ROUTES FOR UCC USE


LEGEND
FULLY SEGREGATED CYCLE PATH
BUSY ROAD SHARED WITH VEHICLES
QUIET ROAD SHARED WITH VEHICLES
PART SEGREGATED/ PART SHARED ROAD
GREENWAY
BIKE SHARING STATION
U.C.C. BICYCLE PARKING
N
NORTH MALL CAMPUS
ENVIRONMENTAL RESEARCH INSTITUTE
CENTRAL CAMPUS
UNION QUAY
CUH
C.U.D.S.H.
DOUGHCLOYNE
POULADUFF
U.C.C. - CORK CITY CENTRE
PRIMARY CYCLE ROUTES FOR ACCESS TO U.C.C. SITES

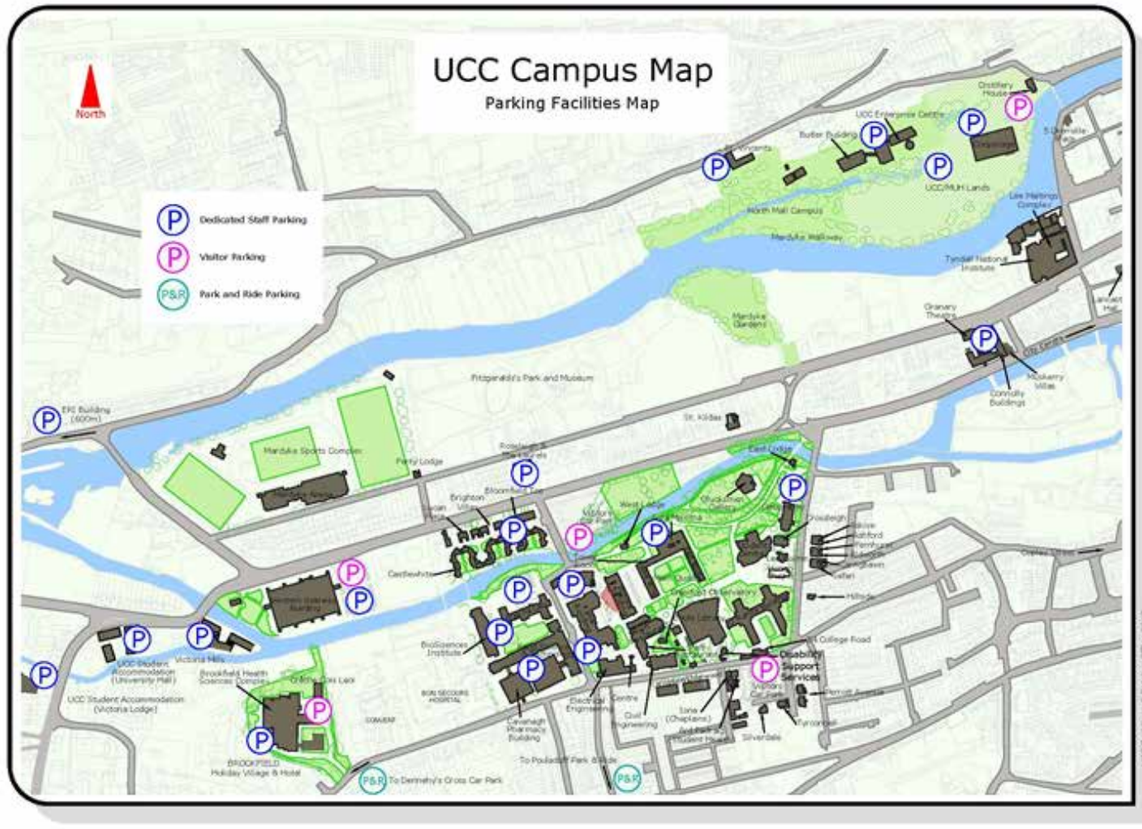

N
NORTH MALL CAMPUS
TYNDALL NATIONAL INSTITUTE
CENTRAL CAMPUS
UCC CENTRE FOR EXECUTIVE EDUCATION
UNION QUAY
CCAE, NANO NAGLE PLACE
1 min
2 mins
3 mins
4 mins
5 mins
8 mins
9 mins
10 mins
12 mins
LEGEND
BUS ROUTE 205
BUS ROUTE 208
BUS ROUTE 220
BUS ROUTE 201
BUS ROUTE 216
BUS ROUTE 213
BUS ROUTE 203
BUS ROUTE 206
BUS ROUTE 202
WALKING ROUTE
BUS STOP
NORTH MALL CAMPUS - CORK CITY CENTRE
PRIMARY BUS ROUTES & WALKING TIMES SERVING U.C.C. SITES


LEGEND
BUS ROUTE 205
BUS ROUTE 208
BUS ROUTE 220
BUS ROUTE 201
BUS ROUTE 216
BUS ROUTE 213
BUS ROUTE 203
BUS ROUTE 206
BUS ROUTE 202
WALKING ROUTE
BUS STOP
N
ENVIRONMENTAL RESEARCH INSTITUTE
4 mins
MAIN PRECINCT
15 mins
5 mins
5 mins
BROOKFIELD AND WESTERN GATEWAY
PRIMARY BUS ROUTES & WALKING TIMES TO U.C.C. SITES


BUS ROUTE LEGEND
205
207
208
215
216
220
N
215 - KILEENS - BLARNEY - TOWER - CLOGHROE
203 - PARKLANDS
221 - GLANMIRE - RIVERSTOWN
208 - LOTABEG
202 - HOLLYHILL
North Mall Campus
ENVIRONMENTAL RESEARCH INSTITUTE
Historic Core
220X - BALLINCOLLIG - OVENS
UNION QUAY
220 - BALLINCOLLIG - OVENS
205 - C.I.T.
202 - MAHON POINT
215 - JACOBS ISLAND
216 - C.U.H.
214 - C.U.H.
223 - TO HAULBOWLINE
208 - CURRAHEEN
216 - MOUNT OVAL
BUS ROUTE LEGEND
221
223
214
202
202
203
226
203 - FRANKFIELD
207 - DONNYBROOK
220 - CARRIGALINE - PASSAGE - CROSSHAVEN - FOUNTAINSTOWN
226a - CORK AIRPORT
CORK CITY AREA
PRIMARY BUS ROUTES SERVING STAFF / STUDENT POPULATION

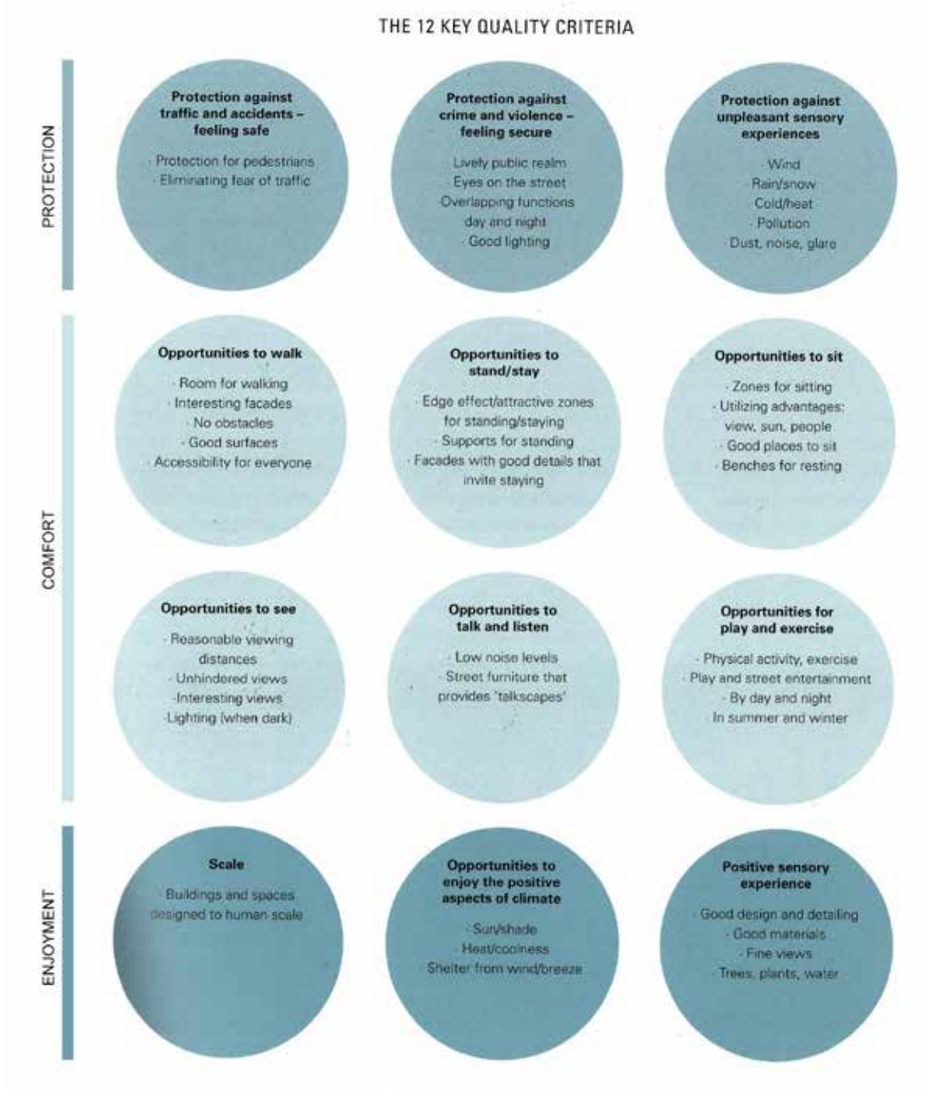


Cycle Parking - from UCC Website



Parking - from UCC Website

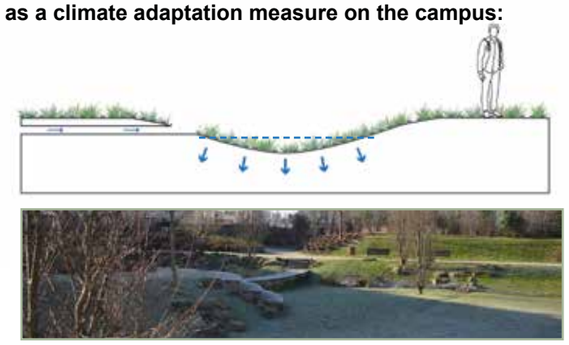
Landscape Maps



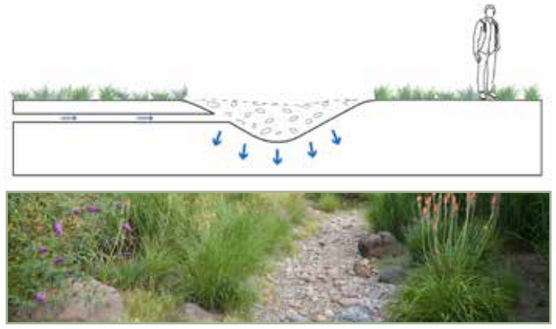
Spatial Health Check - Source: New City Life, Gehl, Gemzoe, Kirknaes, Sondergaard

Sustainable Urban Drainage types which should be used as a climate adaptation measure on the campus:

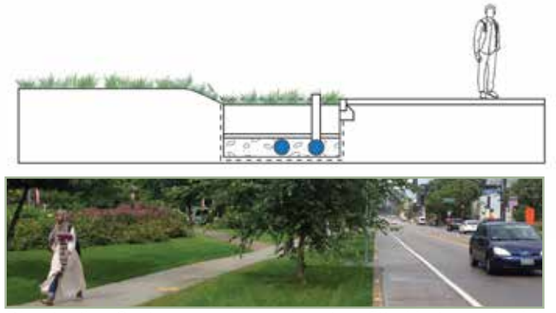
Infiltration Swale - a shallow vegetated channel, designed to store and convey and infiltrate runoff.



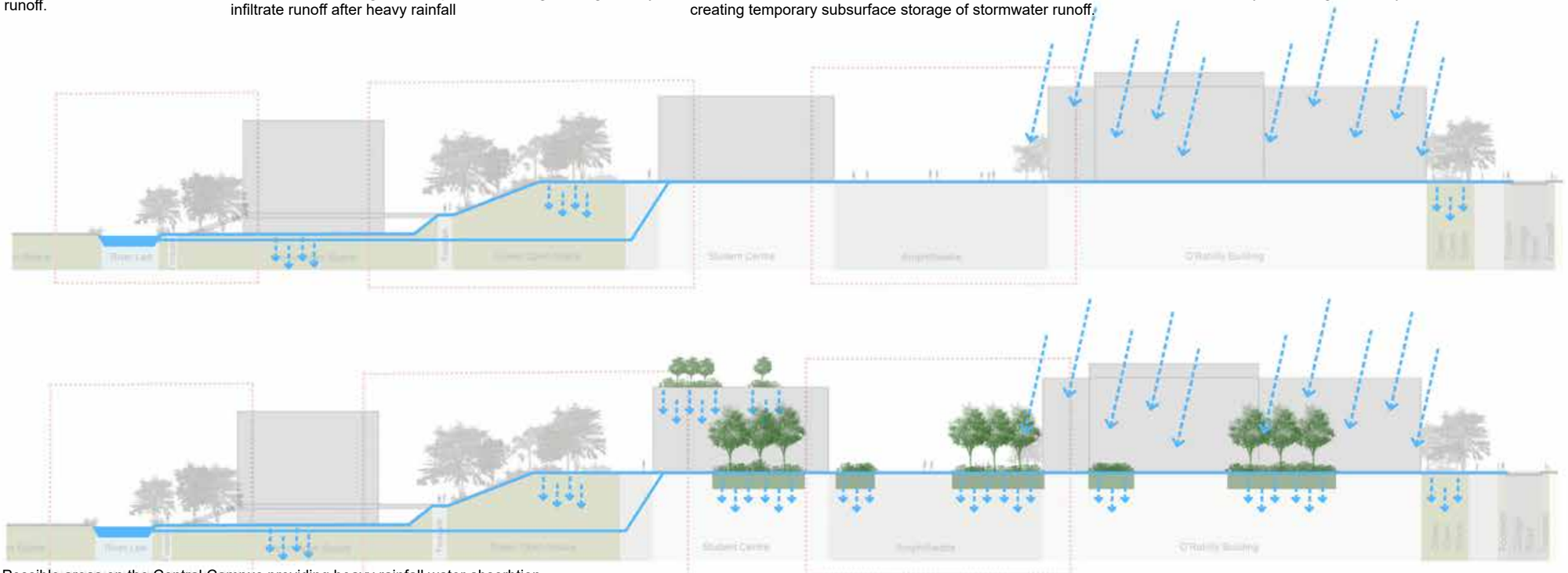
Infiltration Basin - vegetated depressions designed to gradually infiltrate runoff after heavy rainfall



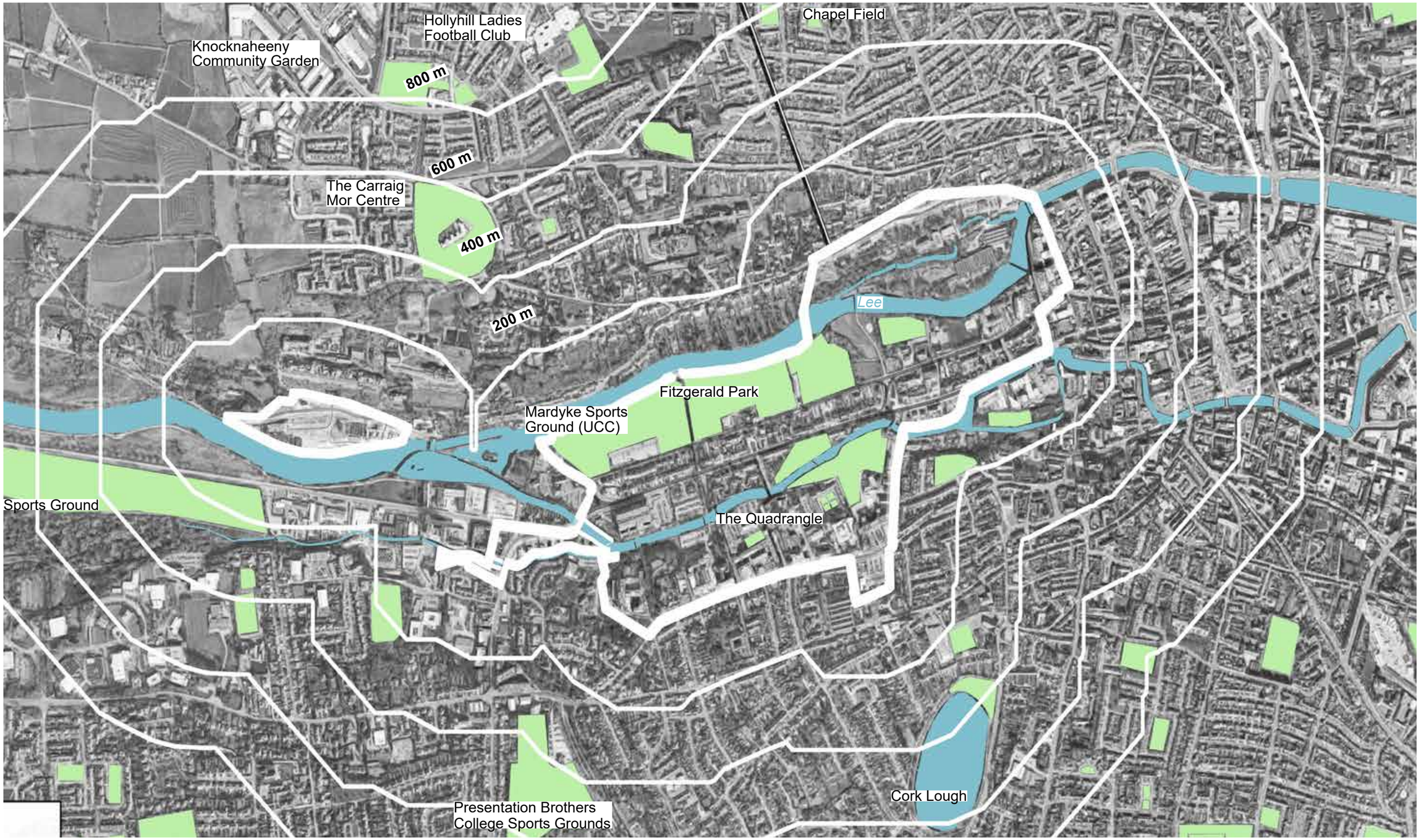
Infiltration Trench - shallow excavation with rubble or stone creating temporary subsurface storage of stormwater runoff.



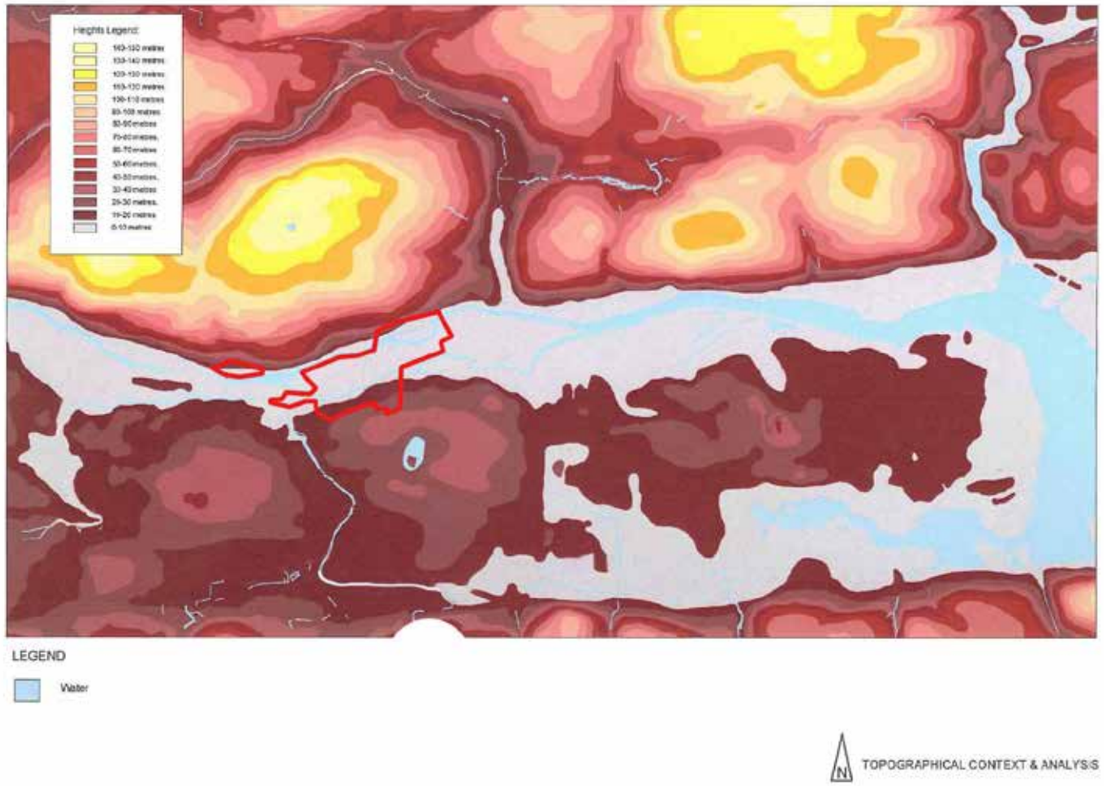
Bioretention System - engineered system fitted between kerbs



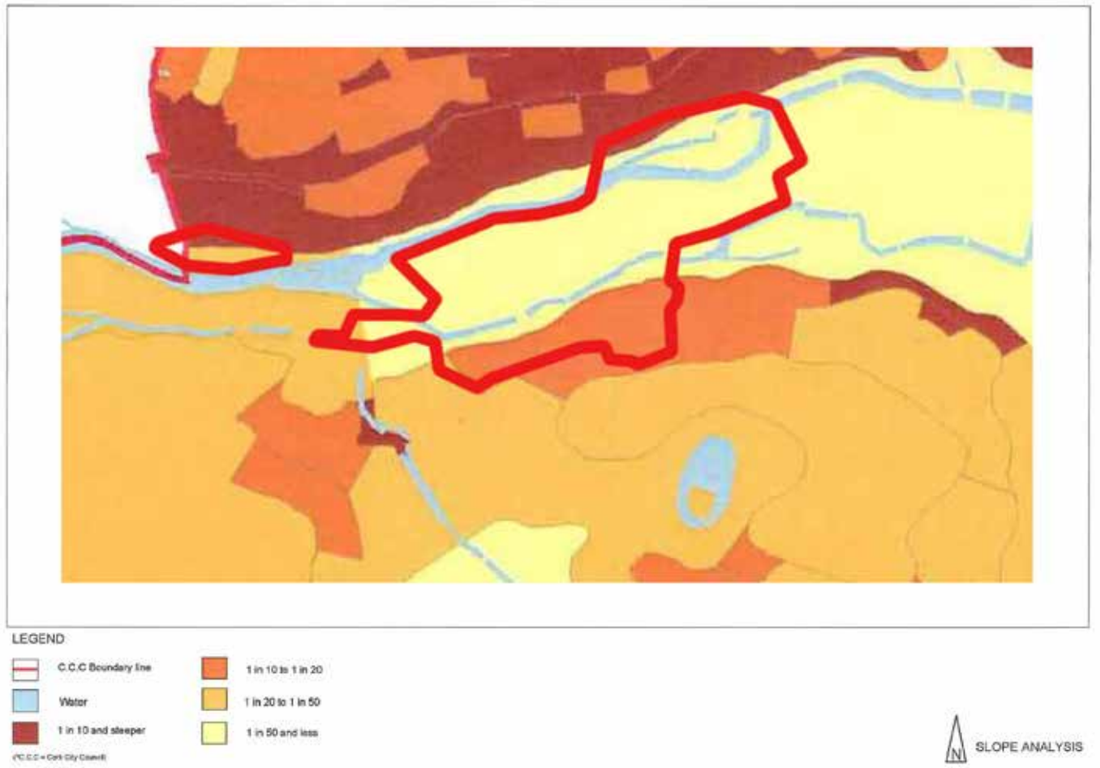
Possible areas on the Central Campus providing heavy rainfall water absorbtion.



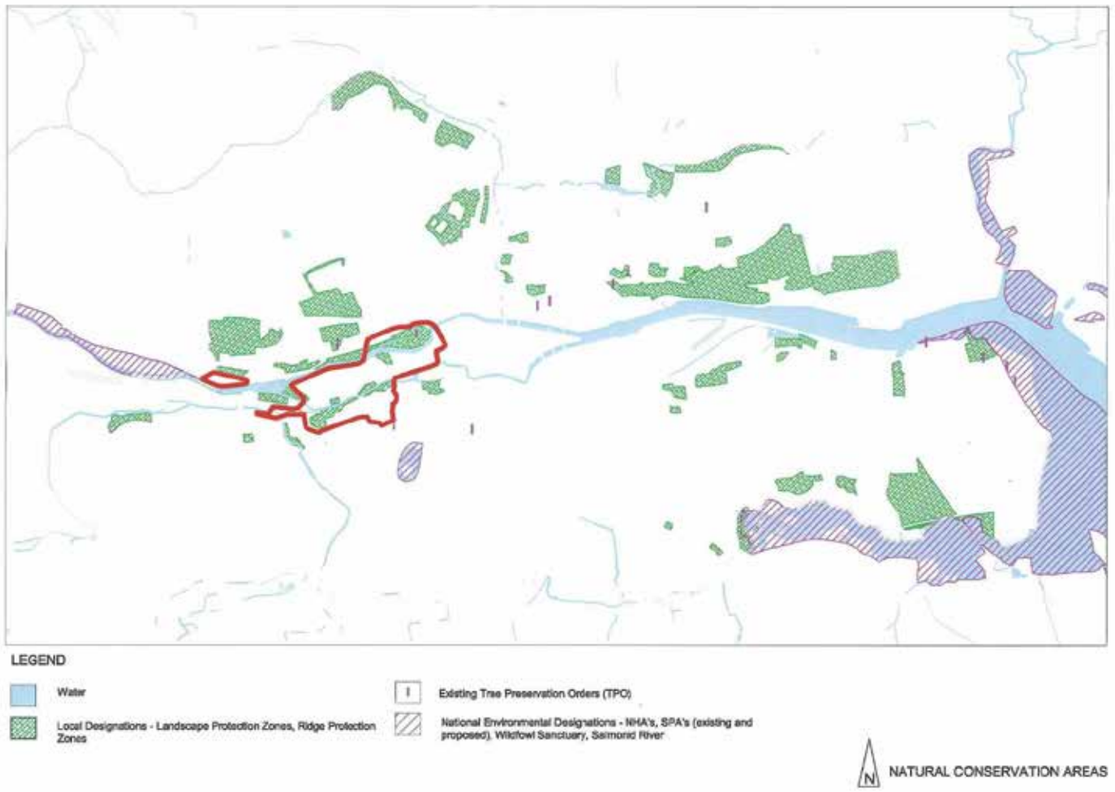
Public space access



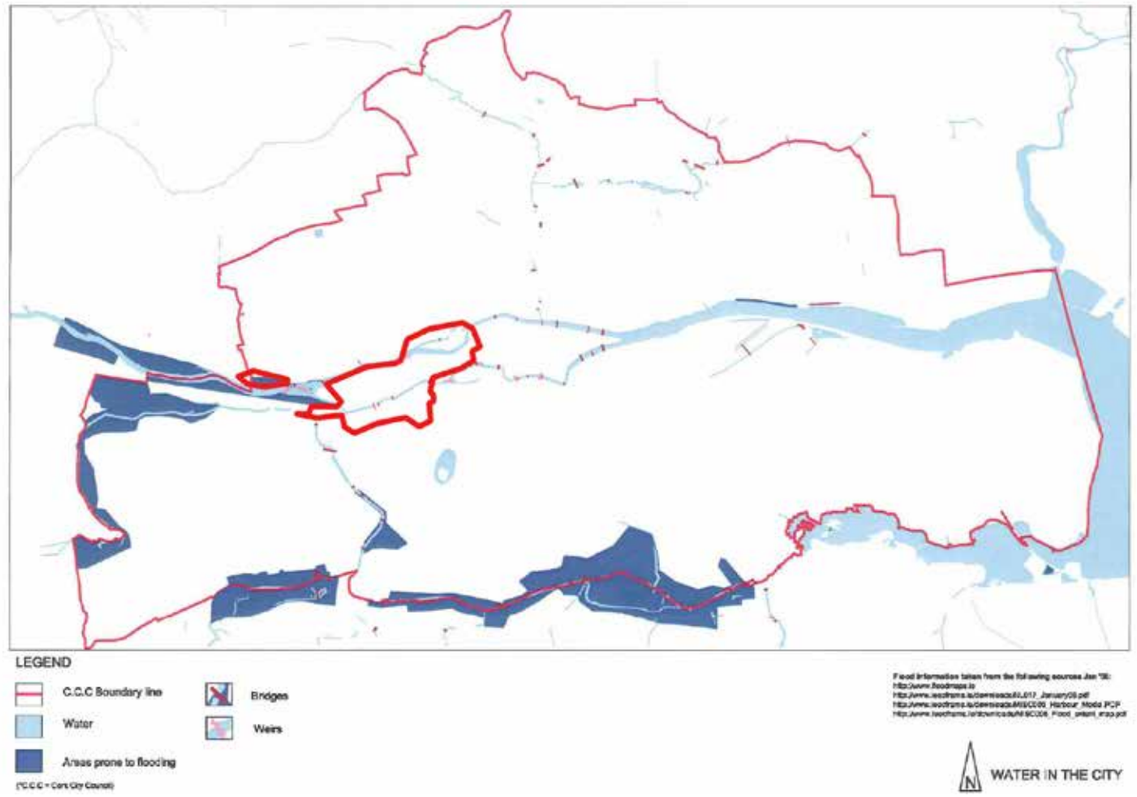
Topography



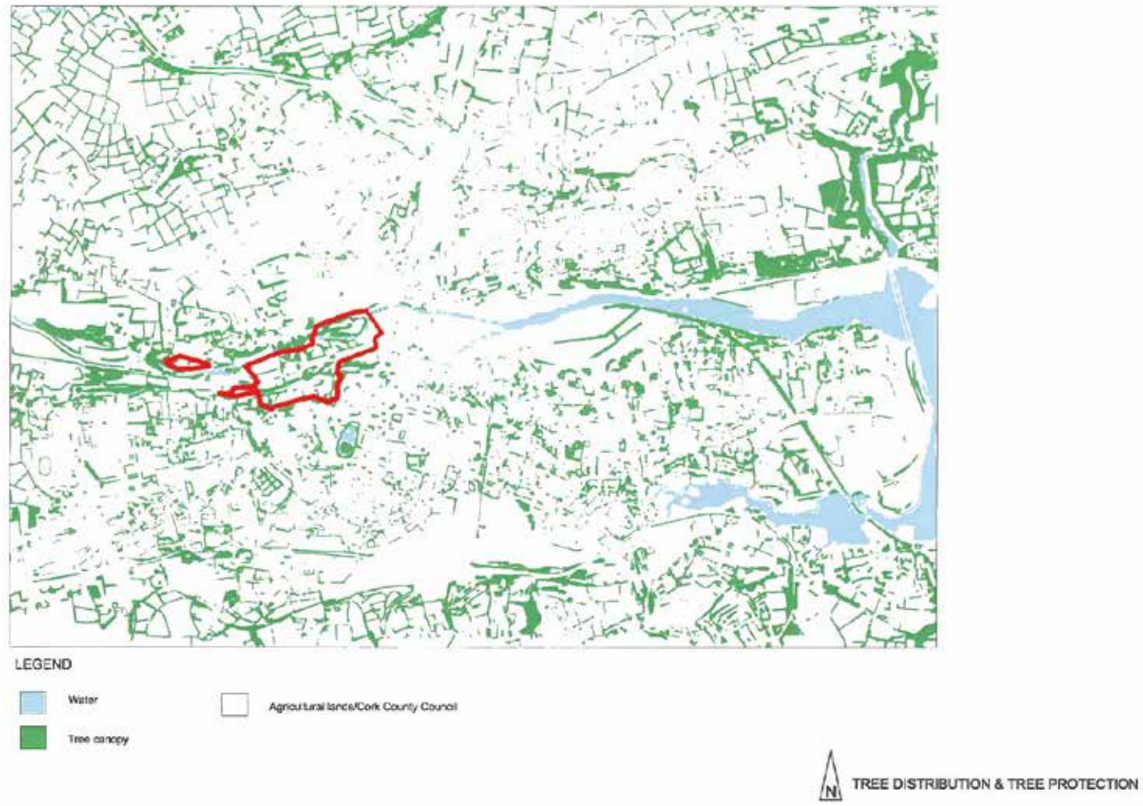
Slope Analysis



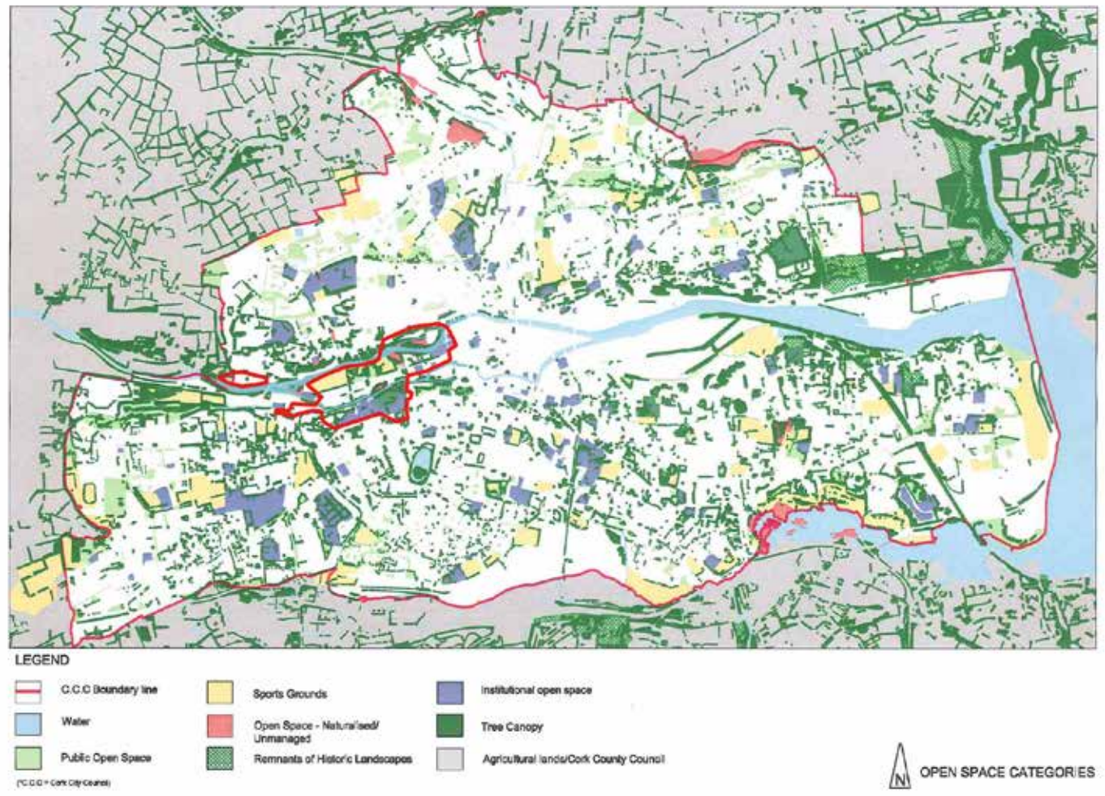
Natural conservation areas



Water in the city

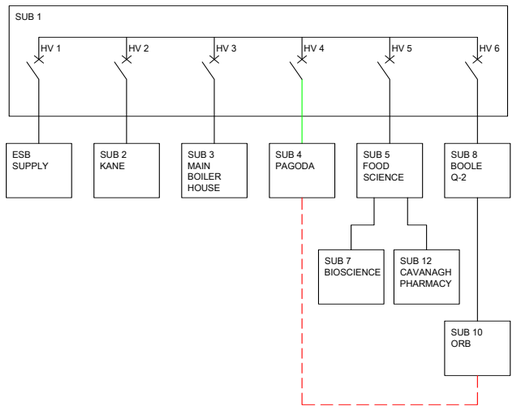


Tree distribution and Protection

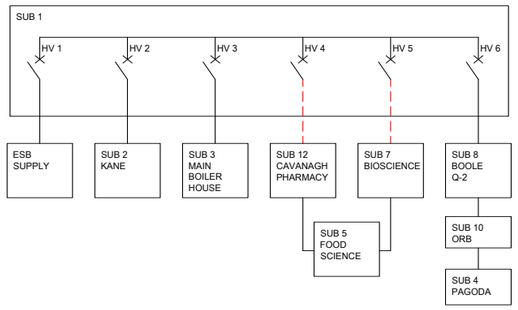


Open Space Categories

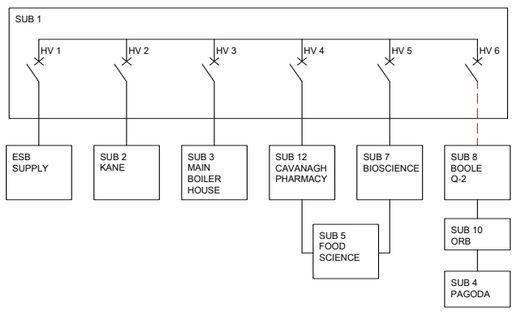
4. MV MAIN CAMPUS



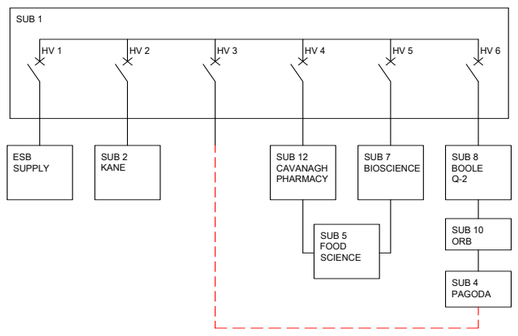
PHASE 1 (COMPLETE) : NEW XLPE CABLE INSTALLED FROM SUB 4 TO SUB 10 / PILC CABLE FROM HV4 TO SUB 4 DECOMMISSIONED



PHASE 2 : NEW XLPE CABLE INSTALLED FROM HV4 TO SUB 12 & FROM HV5 TO SUB 7 CREATING AN MV RING FOR THE WESTERN CAMPUS. PILC CABLE FROM HV5 TO SUB 5 DECOMMISSIONED



PHASE 3 : NEW XLPE CABLE INSTALLED FROM HV6 TO SUB 8. PILC CABLE FROM HV6 TO SUB 8 DECOMMISSIONED



PHASE 4 : NEW XLPE CABLE INSTALLED FROM HV3 TO SUB 4. SUB 3 & PILC CABLE FROM HV3 TO SUB 3 DECOMMISSIONED

NOTES

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NOTES : ELECTRICAL

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE FRONT END STUDY DOCUMENT C2016010-265-RP-001.

LEGEND

- MV CIRCUIT BREAKER
- EXISTING PILC CABLE DECOMMISSIONED
- PROPOSED XLPE INSULATED CABLE

rev	description	date	by	chk.	app.
B	Updated For Font End Study	05/04/19	JOR	GK	DF
A	Issued For Font End Study	18/10/18	RB	GK	DF

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Coláiste na hOllscoile Corcaigh

Project: UCC MV STUDY

Title: MV MAIN CAMPUS - PROPOSED SEQUENCING OF MV NETWORK UPGRADE

Drawing Status	Discipline	Size	Scale
FES	Electrical	A1	1:NTS

Drawing Number: C2016010-ED-006 Rev: B

Date	Drawn By	Des. By	Chk. By	App. By
18/10/18	RB	IS	GK	DF

MV MAIN CAMPUS - PROPOSED SEQUENCING OF MV NETWORK UPGRADE

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Sources:

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Cork Metropolitan Area Cycle Network Plan 2017

Cork Metropolitan Area Transport Strategy

UCC Annual Sustainability Report 17018

UCC Biodiversity Action Plan 2018 - 2023

UCC Green Campus Newsletter Spring 2019

UCC Campus Traffic Management Plan 2017

UCC Commuter Plan 2005 & 2019 (currently in draft format)
UCC Campus Traffic Management Plan 2014 & 2017
UCC Sustainability Strategy 2016
UCC CSAIP Precinct II Masterplan
Site specific Mobility Management Plans for various planned developments.

Project Team:

Lead Consultant: Reddy Architecture + Urbanism
Landscape Architecture consultant: Mitchell + Associates
Flooding and Mobility consultant: Punch Engineers
IT Infrastructure consultant: EDC Engineering

Áras na Laoi

An Chearnóg Láir
Main Quadrangle

Áiléar Lewis Glucksman

Réadlann Crawford
The Crawford Observatory