APPENDIX ONE

Report

Victoria University of Wellington - Kelburn Campus - Development Contributions Self-Assessment - Discussion Document

Prepared for Victoria University of Wellington (Client)

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Revision History

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1 Executive Summary

Victoria University of Wellington (VUW) was established at the Kelburn campus in 1906, with the iconic Hunter building being a recognisable landmark on the Wellington skyline.

Since 1906 VUW has progressively developed the Kelburn campus, with a master plan in 1976 which has guided the development of the campus's current footprint. Since 1976, there has been development work onsite: Te Puni Village student accommodation, the Murphy building, the Alan MacDiarmid building, laboratory and research facilities, the Hub, along with the extension of the library to incorporate casual learning.

The purpose of this report is twofold. The first task is to assess the current carrying capacity within the existing services infrastructure that was put in place during the 1970's, and then understand the spare capacity that is available to VUW since these connections were put in place. The second task is to analyse the criteria for self-assessment of Development Contributions and how these relate to a university campus. Ideally, with this information VUW and Wellington City Council can agree on an appropriate self-assessment method for the university's on-going development contributions that will accurately reflect the impact the university building development work will have on the Wellington City Council's (WCC) services infrastructure.

Beca has been engaged by VUW to assist them in analysing the actual and historical services infrastructure usage and how Equivalent Household Units (EHU's) relate to student and staff numbers, building floor area, fire protection and transportation, and how this has impacted on the Wellington City Council's infrastructure over the years.

VUW considers that the Development Contributions should be reviewed on a campus wide basis rather than on an individual building basis, as a new building development does not necessarily mean there will be an increase in student and staff numbers and nor does it mean that there will be an increased demand on the WCC infrastructure services. Therefore, assessment of EHU's should take into consideration the whole campus.

Since the development works during the 1970's, there has not been any new infrastructure service connections into the WCC systems however, there have been new buildings added to the campus.

A detailed analysis of the historical usage has been undertaken for the following years:-

- 2005 when the Development contributions came into effect
- 2010 upon completion of the new AMB building was completed
- 2012 current usage
- 2015 projected usage

From this analysis, the water usage and the impact on the sewerage system bears no correlation to the total building area that has increased with the construction of AMB and the Hub.

Therefore, we consider development contributions associated with VUW's Kelburn campus compared to the WCC DC policy, should be reviewed and considered on the following points:-

- The actual water and sanitary sewer usage is 16% of the EHU assessed usage
- The actual number of sanitary fittings and fixtures are 27% of the EHU assessed numbers based on the worst case figure which are WC's
- The actual transportation figures are 6% of the EHU assessed usage
- The existing WCC infrastructure has more than sufficient carrying capacity to cater for the current and projected population figures.

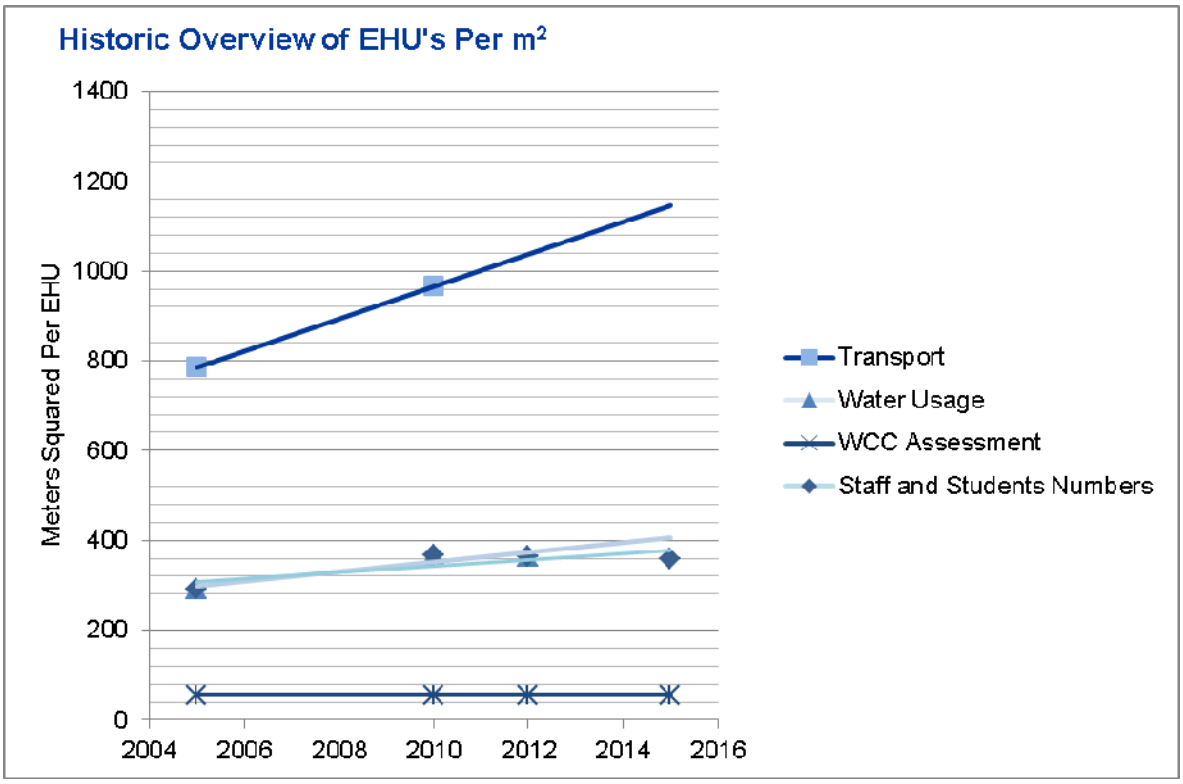
Subsequent developments, and the next phase of planned developments, will not exceed the existing carrying capacity due to the relatively flat forecast of student numbers to 2015 and beyond. Development Contributions should therefore not be paid until the University reach the carrying capacity of the systems that are currently in place.

- Once the carrying capacity has been reached, the University will then pay Development Contributions on a basis that fairly reflects its impact on WCC's services infrastructure. From the analysis undertaken Beca considers the self-assessment area of 420m^2 GFA for 1 EHU accurately reflects the university campus and not the 55m2 as highlighted in the Policy.

  Beca's conclusion is that converting the overall impact of VUW's usage on WCC's services infrastructure equates to an average of 420m2 per EHU, this is a weighted average taking into consideration the loading of water and wastewater services and transportation.

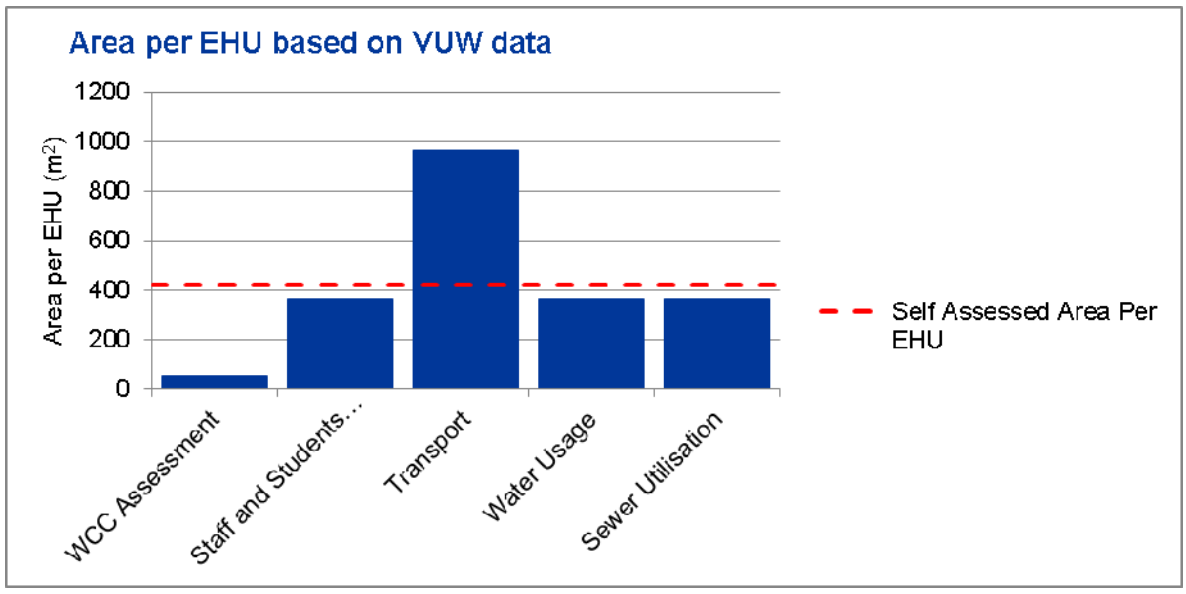
The following graph summarises the findings as detailed in Table 6 within the body of the report. It details how the actual impact of each service that is utilised by VUW correlates / measures against the prescribed 55m2 per EHU as set out in the WCC Delevelopment Contribution policy in terms of floor area per EHU.

Table 1 – Historical EHU conversion per m2



The following graph converts the actual impact of each service that is utilised by VUW to a self – assessed area per EHU.

Table 2 – Self assessed area per EHU



2 Introduction

Beca has been engaged by VUW to assist in collating and analysing infrastructure data to ascertain actual consumption by the university's Kelburn campus and also review the impact on WCC's infrastructure services. This report will review the current carrying capacity of the WCC services infrastructure that is currently in place and will enable VUW to gain a comprehensive understanding of their services infrastructure usage and ideally agree with WCC an appropriate measure for assessing development contributions.

The WCC Development Contributions Policy enables non-residential applicants to apply for a self – assessment of the number of EHU's payable for a particular development under Clause 2.5.1 of the policy.

Beca considers that the developments at the Kelburn campus should be viewed on a campus wide basis and as such, the assessment of EHU's should take into consideration a whole of campus approach.

As a long term building owner, VUW has the ability to track and monitor the growth and expansion of the Kelburn campus and VUW has significant records that show the campus's growth over the years. The growth, in terms of student numbers and increase in building stock, can readily be measured against the actual impact on WCC's infrastructure.

The historical data and ability to track actual usage allows the university to understand its actual impact on the WCC infrastructure that enables VUW to carry out a self-assessment and set a realistic EHU measure.

Beca have reviewed the campus development and associated demand on the WCC services infrastructure at the following milestone stages:-

- Initial focus on when the master plan and WCC services infrastructure was implemented in the 1970's
- The status of the campus in 2005 when the development contributions policy came into effect
- A review of the impact on WCC services infrastructure following the construction of the AMB building in 2010
- An assessment of the impact on WCC services infrastructure post construction of the Hub project due for completion late 2012
- An assessment on projected building development and student numbers to 2015.

3 Self-Assessment Methodology

3.1 Self-Assessment Criteria

Section 2.5.5.1 of the WCC development contributions policy, states:-

"the onus is on the applicant to prove (on the balance of probabilities) that the actual increased demand is different from that assessed by applying the non-residential unit of demand in para 2.21. Actual increased demand means the demand created by the most intensive non-residential uses likely to become established in the development within 10 years from the date of application."

The WCC Development Contributions assessment guidelines in Clause 2.5.5.3 of the policy sets out the criteria for assessment guidelines as follows:-

Table 3 – WCC Development Contributions Policy Assessment Guidelines

Infrastructure Type	Usage Measure per EHU
Water supply	780 litres per day excluding storage
Wastewater	390 litres per day
Stormwater	Runoff co-efficient not exceeding 0.7
Traffic and roading	10 private vehicle trips per day
Reserves	600m2 of allotment area

We propose to use these figures as the basis of comparison between the EHU measure and actual usage figures.

3.2 Kelburn Campus Development

VUW has been at the Kelburn campus since 1906, refer to aerial images in Appendix 6 that illustrates the progression of campus development over time. The key milestone dates for major development and refurbishment works at the Kelburn Campus are:-

- Hunter building opened 1906
- Old Kirk - 1938
- Easterfield – 1958
- Recreation Centre – 1961 & 1979
- Student Union Building – 1962, 1972 & 1993
- Rankine Brown - 1965
- MacLaurin - 1968
- New Kirk - 1972
- Von Zedlitz - 1977
- Cotton – 1978, 1986 &1992 (part of original 1970's masterplan)
- Laby – 1983 (part of original 1970's masterplan)

- Murphy – 1987
- Central Services Building1990
- Malaghan Institute - 2004
- Te Puni Village Student Accommodation - 2009
- Alan MacDiarmid building (AMB) - 2010
- Hub Central library project to be completed late 2012

3.3 Campus Infrastructure

The bulk of the services infrastructure was already in place either prior to or as part of the major campus development master plan works in the late 1970's.

There have not been any new major services infrastructure connections since the works in 1976-7.

The three major developments since 1976-7 master plan (excluding the student accommodation project) includes:-

Murphy Building (MY)

Designed in the mid 1980's and constructed in 1987, 11 level building. A full analysis on the impact on WCC services has not been undertaken as this is pre 2005 and there are minimal services within the building.

Alan MacDiarmid Building (AMB)

New laboratory and research building now known as AMB that consists of laboratories, write up space and ground floor teaching space.

The site where the new AMB sits was originally planned to cater for a building in the late 1970's that would have joined the Cotton and Laby buildings. The services infrastructure was installed however; the building was not constructed at that time.

AMB did not require any new infrastructure services connections into the WCC system and it was built over existing hard stand parking.

A review of the actual impact AMB has on the WCC services infrastructure is highlighted below:-

Table 4 – AMB - WCC EHU assessed impact on services infrastructure verus the actual usage.

Infrastructure type	WCC EHU Estimate of the Increase *Note 1*	Actual Usage *Note2*	Actual Increase On a Campus Wide Basis
Water Supply	64,272 litres/day	1,930 litres/day	Nil based on actual campus wide water consumption figures
Wastewater	32,136 litres/day	1,275 litres/day	Nil based on actual water consumption figures

Stormwater *Note3*	Runoff co-efficient not exceeding 0.7	Nil – most likely negative due to rainwater harvesting	Nil – most likely negative due to rainwater harvesting
Traffic and roading	824 private vehicle trips per day	Nil – population numbers have not changed as a result of development	Nil – population numbers have not changed as a result of development

Notes:-

1. New building area = 4,532 m2 which equates to 82.4 EHU's
2. Actual average recorded usage from the Building Management System (BMS) meters does not include the water captured by the rainwater harvesting tanks used for WC flushing and hence we have increased the ratio between incoming water supply and wastewater to ⅔rds.
3. The existing site was previously a hard paved carpark area with minor buildings, therefore the initial runoff coefficient when this area had its infrastructure put in place in 1976-7, would have been 0.9

HUB project

The site of the HUB project was the Quad which was primarily a glazed outdoor area.

The new Hub building did not require any new infrastructure services connections into the WCC system.

The actual impact the Hub building has on the WCC services infrastructure is minimal as there are only 5 No. new toilets and hand wash basins installed, the stormwater catchment area has not changed.

Table 5 – HUB - WCC EHU assessed impact on services infrastructure verus the actual usage.

Infrastructure type	WCC EHU Estimate of the Increase *Note 1*	Projected Usage *Note 2*	Projected Increase On a Campus Wide Basis
Water Supply	40,560 litres per day	4500 litres/day	Nil based on actual campus wide water consumption figures
Wastewater	20,280 litres per day	2250 litres/day	Nil based on actual water consumption figures
Stormwater *Note3*	Runoff co-efficient not exceeding 0.7	Nil – no change to catchment area	Nil – no change to catchment area
Traffic and roading	520 private vehicle trips per day	Nil – population numbers have not changed as a result of development	Nil – population numbers have not changed as a result of development

Notes:-

1. New building area = 2,850 m2 which equates to 52 EHU's
2. Projected usage based on 5 No. WHB's and WC's using AS/NZS 3500 and 10 minute usage interval over a 12 hour period
3. The existing site was previously a covered courtyard area; there would be no increase in stormwater catchment.

3.4 Self-Assessment Analysis

The following table carries out a direct comparison between the WCC assessed EHU impact on the services infrastructure based on building area versus the actual usage recorded at selected years

Table 6 – Campus wide WCC EHU assessed impact on services infrastructure verus the actual and projected usage.

Criteria	WCC Assessment criteria EHU	VUW 2005		VUW 2010 – AMB Bdg		VUW 2012 – Hub Bdg		Projected Future Growth 2015		Commentary
		WCC Assessed	Self Assessed	WCC Assessed	Self Assessed	WCC Assessed	Self Assessed	WCC Assessed	Self Assessed	
Building Area	55m^2 per EHU	119,716m^2		126,596m^2		129,446m^2		139,446m^2 (based on campus development plan)		Actual Kelburn Campus area calculation based on WCC DC policy methodology for assessing Gross Floor Area
Total EHU's based on Area		2,177	409 *Note1* (293m^2 per EHU)	2,302	345 *Note1* (367m^2 per EHU)	2,354	357 *Note1* (363m^2 per EHU)	2,535	387 *Note1* (360m^2 per EHU)	Self assessed value 16% of Development Contributions Policy Assessment based on the average actual usage of services.
People	2.6 people per EHU									The WCC DC policy calculates 2.6 people per EHU. The actual density of people on campus per EHU is higher. It should be noted that whilst the full Staff and Student numbers are taken into consideration, given the way the university operates its timetable this total number is not reached on the campus at any one time.
• **Students**		9,703		11,118						
• **Staff**		1,482		1,313						
Total people		11,185		12,431		12,232		12,232		

Criteria	WCC Assessment criteria EHU	VUW 2005		VUW 2010 – AMB Bdg		VUW 2012 – Hub Bdg		Projected Future Growth 2015		Commentary
		WCC Assessed	**Self Assessed**	**WCC Assessed**	**Self Assessed**	**WCC Assessed**	**Self Assessed**	**WCC Assessed**	**Self Assessed**	
Total EHU's based on People		5,130	409 *Note2* (equates to 27 people per EHU under the existing policy)	4,722	345 *Note2* (equates to 36 people per EHU under the existing policy)	4,623	357 *Note2* (equates to 34 people per EHU under the existing policy)	4,653	387 *Note2* (equates to 32 people per EHU under the existing policy)	Self assessed value 8% of Development Contributions Policy Assessment based on the average actual usage of services.
Sanitary Fixtures	1 kitchen sink, 1 toilet, 1 shower, 1 bath and 1 basin per EHU	2,177 kitchen sinks, 2,177 toilets 2,177 showers or baths 2,177 basins	216 kitchen sinks, 601 toilets, 54 showers, nil baths, 527 basins	2,302 kitchen sinks, 2,302 toilets 2,302 showers or baths 2,302 basins	224 kitchen sinks, 640 toilets, 56 showers, nil baths, 555 basins	2,354 kitchen sinks, 2,354 toilets 2,354 showers or baths 2,354 basins	224 kitchen sinks, 645 toilets, 56 showers, nil baths, 559 basins	2,535 kitchen sinks, 2,535 toilets 2,535 showers or baths 2,535 basins		The WCC DC policy sets out that each EHU will have a kitchen sink, toilet, bath or shower and wash hand basin. This row reviews the assessed amount of sanitary fixtures that would relate the equivalent EHU area to the actual installed sanitary fixtures on the campus
Water Usage	780 litres per day per EHU	1,698,060 litres per day	319,000 litres per day	1,795,560 litres per day	269,000 litres per day	1,836,120 litres per day	278,000 litres per day estimated	1,977,300 litres per day	300,000 litres per day (estimated)	The actual water meter readings are taken from the 4No. main water meters that serve the Kelburn Campus
Total EHU's based on Water Usage		2,177	409 (EHU calculated from metered water usage)	2,302	345 (EHU calculated from metered water usage)	2,354	357 (EHU calculated from metered water usage)	2,535	385(estimated)	Self assessed value 16% of Development Contributions Policy Assessment
Sanitary Sewer	390 litres per day per EHU	849,030 litres per day	159,500 litres per day	897,780 litres per day	134,500 litres per day	918,060 litres per day	139,000 litres per day	988,650 litres per day (estimated)	150,000 litres per day (estimated)	

Criteria	WCC Assessment criteria EHU	VUW 2005		VUW 2010 – AMB Bdg		VUW 2012 – Hub Bdg		Projected Future Growth 2015		Commentary
		WCC Assessed	**Self Assessed**	**WCC Assessed**	**Self Assessed**	**WCC Assessed**	**Self Assessed**	**WCC Assessed**	**Self Assessed**	
Total EHU's Based on Water Usage		2,177	409 (EHU calculated 50% of metered water usage)	2,302	345 (EHU calculated 50% of metered water usage)	2,354	357 (EHU calculated 50% of metered water usage)	2,535	385 (EHU calculated 50% of metered water usage)	Self assessed value 16% of Development Contributions Policy Assessment
Stormwater	0.7 run off co-efficient	No Change		No Change		No Change		No Change		
Transport	10 private vehicle trips per day per EHU									
• **Students**		-	719	-	671	-		-	-	
• **Staff**		-	804	-	641	-		-	-	
Total Trips		21,770	1,427	23,020	1,311	-		-	-	
Total EHU's Based on Transport Criteria		2,170	142	2,302	131			-	-	Self assessed value 6% of Development Contributions Policy Assessment

Notes:-

Note 1 - The self assessed area for the EHU is derived from the actual impact the Campus has on the WCC infrastructure services, taking into consideration water, sanitary sewer and transportation.

Note 2 – The self assessed population per EHU is derived from the actual impact the Campus has on the WCC infrastructure services, taking into consideration water, sanitary sewer and transportation.

The above table highlights the following:-

- The actual water and sanitary sewer usage is 16% of the EHU assessed usage
- The actual sanitary fittings and fixtures are 27% of the EHU assessed numbers based on the worst case figure which are WC's
- The actual transportation figures are 6% of the EHU assessed usage
- Using the average actual usage figures for 2010 and 2012 the overall impact of VUW's usage on WCC's services infrastructure equates to an area of 420m2 per EHU

3.5 WCC Infrastructure Kelburn Parade

The following table details the WCC services infrastructure that serves the VUW Kelburn campus and highlights the carrying capacity of each service

Table 7 –Carrying capacity of WCC services infrastructure.

	Size	Pressure	Material	Peak Load Carrying Capacity	Installation Date	Comments
Water Main Kelburn Parade	200mm	600kPa	Asbestos Cement	-	Water main laid in Kelburn Parade 1964	
Water Primary Site Connections	2No. 150mm	250kPa	-	5,184,000 litres per day (30l/s @ 1.5m/s)	1970's	Peak water usage from primary connections 4.44l/s (recorded over 30 minute interval)
Sanitary Sewer Kelburn Parade	150mm	N/A	High Density Polyethelene	3,888,000 litres per day (45l/s)	Sewer installed in Kelburn Parade 1989	Peak sewer usage based on 50% of recorded water usage 2.22l/s
Stormwater Kelburn Parade	300mm	N/A	Cement Mortar	24,026,112 litres per day 0.27808m^3/sec	Stormwater installed in Kelburn Parade 1911	Stormwater catchment area and hardstanding not significantly changed

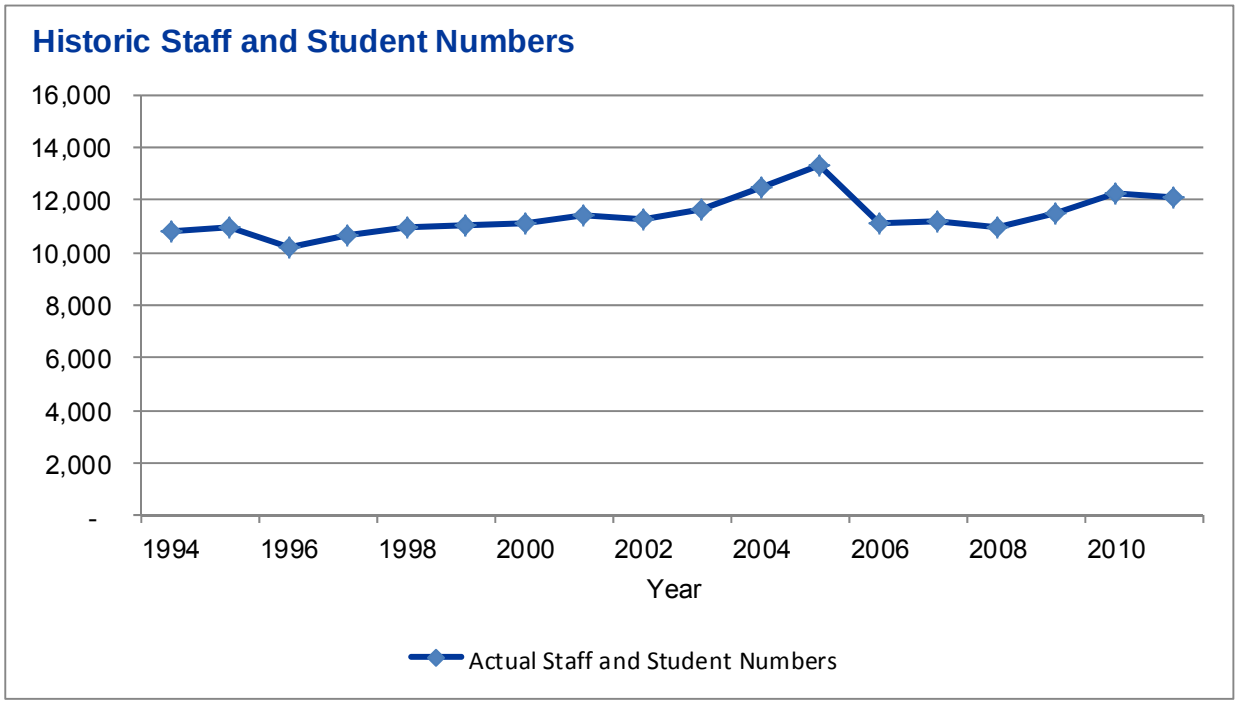
Tables 6 & 7 highlight the following:-

- The WCC services connections actual water carrying capacity is 5,184m3 per day and the VUW Kelburn campus actual usage is 278m3 per day, this represents the actual current usage is 5% of the daily carrying capacity
- The WCC services connections peak water capacity is 30l/s based on 2 No. 150mm connections at 600kPA at a velocity of 1.5m/s and the VUW Kelburn campus actual recorded peak was 4.4l/s, this represents the actual peak usage is 15% of the peak capacity
- The WCC services connections actual sanitary sewer carrying capacity is 3,888m3 per day and the VUW Kelburn campus actual usage is 139m3 per day, this represents the actual current usage is 4% of the daily carrying capacity
- The WCC services connections peak sanitary sewer capacity is 45l/s and the VUW Kelburn campus actual recorded peak was 2..22l/s, this represents the actual peak usage is 5% of the peak capacity

4 Student & Staff Numbers

Appendix 1 details the staff and student numbers at the Kelburn campus over the recent years. New Zealand Universities are funded according to aspirations and targets set out in an Investment Plan that has a three year life cycle. These targets reflect capped funding within articulated government policy of limiting student numbers.

Table 8 - Student and staff population at VUW Kelburn campus



Whilst the student and staff numbers do not correlate with the EHU value in terms of floor area, the actual daily and peak demand will be dramatically reduced when taking into consideration lecture and tutorial timetables throughout the day and across the year.

5 Water Supply & Sanitary Sewer

Student and staff numbers will remain relatively steady in the foreseeable future and as such, it is anticipated that there will not be any significant increased demand on the WCC infrastructure services, certainly no higher than that already experienced in previous years.

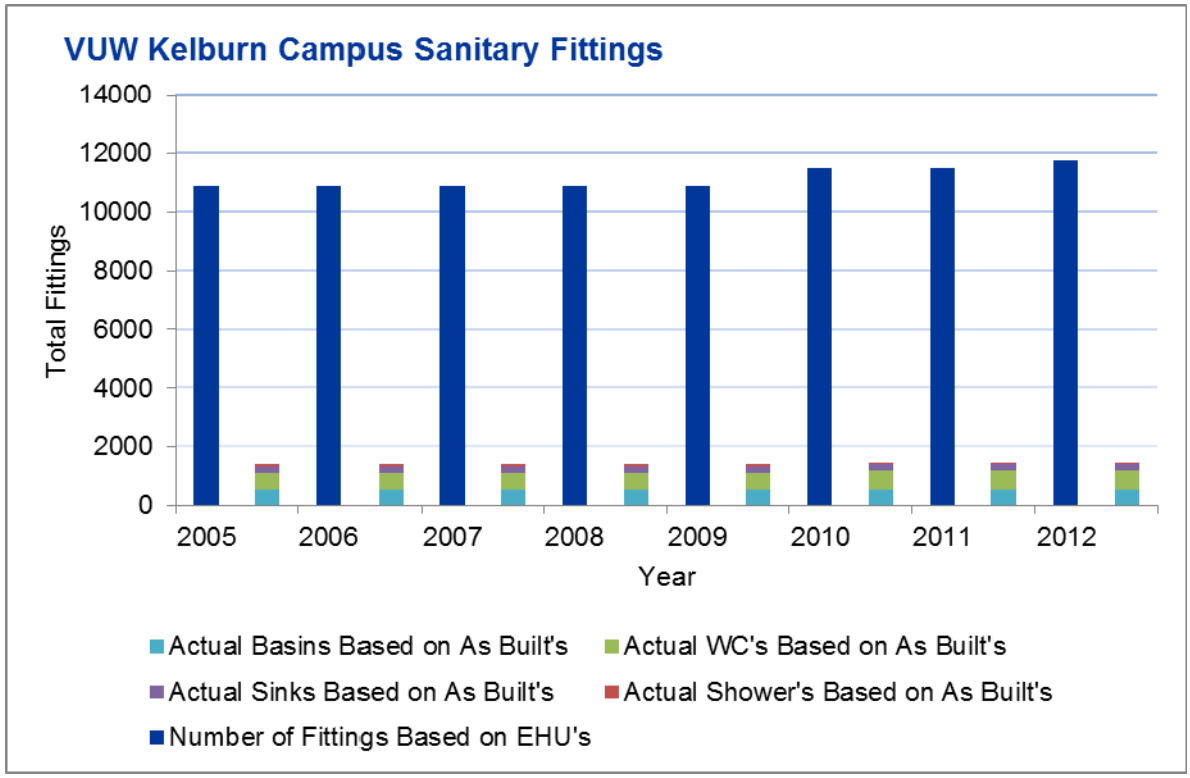
5.1 Water

WCC records indicate the water main in Kelburn Parade was installed in 1964. There are three major connections that serve the main campus, with several other smaller connections supplying the smaller facilities.

Whilst it is difficult to assess the upstream demand from the WCC water network, an assessment of the carrying capacity of the main and the capacity of the main connections, together with the recorded water consumption, indicates that there is sufficient capacity within the service connections to accommodate the VUW peak usage on the campus.

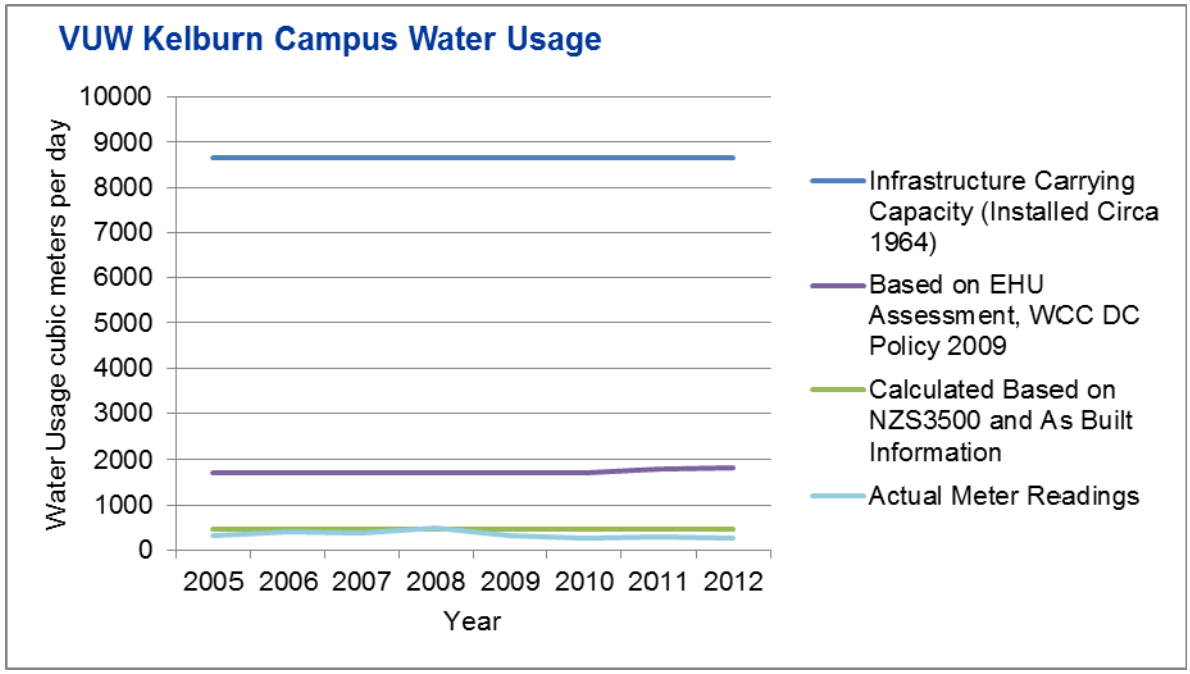
The following graph highlights the number of sanitary fittings and fixtures that could be installed on the campus based on the EHU calculation for the area of buildings versus the actual number of fittings installed on the campus.

Table 9 – VUW actual number of sanitary fittings versus EHU assessed number of sanitary fittings



The water usage graph highlights the difference between the WCC services infrastructure carrying capacity, the EHU predicted water usage, the design water usage based on AS/NZS 3500 and the actual usage.

Table 10 –Historical actual daily water usage compared to EHU assessed and WCC services infrastructure carrying capacity



VUW has also invested in engineering solutions to a range of water usage problems, such as leak detection and rainwater harvesting (note: that the new AMB building incorporates 20,000 litres of rainwater storage for toilet flushing), low flow taps and fitting as well as dual flush toilets.

5.2 Water Supply for Fire Protection

Holmes Fire and Safety (HFS) have carried out a review of the impact on the current water supply demand and taking into consideration future developments (refer Appendix 7 for HFS report). HFS's findings are that the current capacity within the existing WCC main connections will cater for sprinkler protected buildings on the campus including the new proposed developments.

5.3 Sanitary Sewer

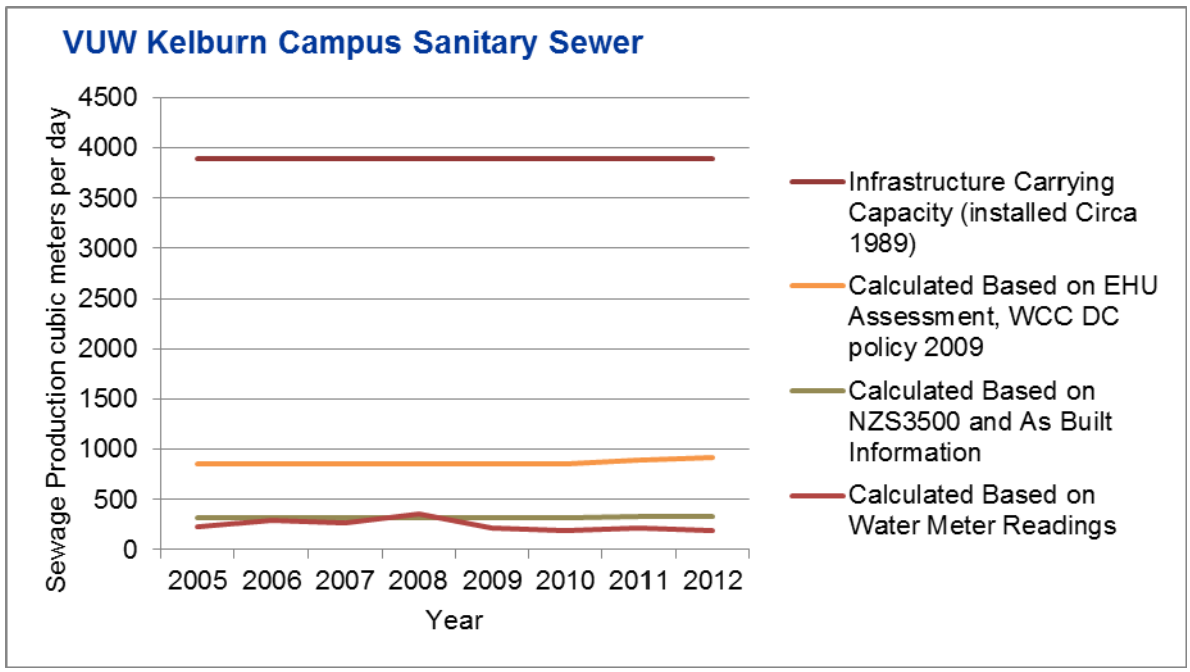
WCC records indicate the sanitary sewer within Kelburn Parade and Salamanca Road was upgraded in 1989. There are three major sanitary sewer connections that serve the main campus, with several other connections supplying the smaller facilities.

Whilst it is difficult to assess the upstream demand from the WCC sanitary sewer network, an assessment of the main carrying capacity and the capacity of the main connections, together with the recorded water consumption, this indicates that there is sufficient capacity within the service connections to accommodate the VUW peak usage on the campus.

As noted above, VUW has invested significant costs in developing and implementing a sustainable design guide. This includes any new or upgraded facility having low flow taps and fittings as well as dual flush toilets.

The following sanitary sewer highlights the difference between the WCC services infrastructure carrying capacity, the EHU predicted sanitary sewer usage, the design sanitary sewer usage based on AS/NZS 3500 and the actual usage (note: that the sewer demand has been based on the same ratio as the EHU ratio between water in and sewerage out).

Table 11 –Historical actual daily sanitarysewer usage compared to EHU assessed and WCC services infrastructure carrying capacity



6 Stormwater

Stormwater runoff can be assessed by comparing the run-off co-efficient of the site before development to that after development.

The aerial photographs in Appendix 6 highlight the campus's development over the years, since the introduction of development contributions in 2005, there is no difference as the site is fully covered with an impermeable surface before and after development.

Therefore there is no increase in demand on Council's stormwater systems and the contribution should be assessed as **nil**.

7 Transport Contributions

Transport related development contributions are based on Equivalent Household Units (EHUs). The Wellington City Council Development Contribution Policy Summary Guideline (July 2009) does not specifically include a university land use criteria, therefore the "non-residential development" criteria of 1 EHU per 55m^2 gross floor area (GFA) is the default rate that will be applied. The following sections provide a self-assessment of transport contributions to:

- Determine what is a fair and reasonable number of trips per day generated by the Kelburn Campus
- Identify an appropriate ratio of GFA per EHU for the assessment of transport contributions

7.1 Kelburn Campus Daily Traffic Generation & EHUs

The daily traffic generation and resultant EHUs of the Kelburn Campus has been determined using the following process:

- Identification of the number of staff and students at the campus
- Identification of the travel mode of staff and students
- Calculation of daily traffic based on the above
- Calculation of EHUs based on WCC policy

The calculation of daily traffic generation has been based on data from a two year period to provide a comparison and to identify whether travel patterns have significantly altered in recent years. The first year for assessment is 2005, which represents the date at which development contributions were first sought in Wellington. The second date is 2010, which is the most recent year for which there is a full data set for the staff and student numbers.

7.1.1 Daily Traffic Generation

Calculations of the daily traffic generation are contained in **Appendix 5** and summarised in this section. The daily traffic generation of the Kelburn Campus has been determined using the 2005 and 2010 staff and student numbers, as provided by VUW. Information collected in the 2007 and 2012 travel plans (that included the percentage of staff and students coming to the campus as car drivers) has been used to convert these into daily traffic generation.

The following assumptions have been made in the calculations:

- Each car driver represents two vehicle trips (i.e. an arrival plus a departure)
- Students spend an average of 116 days per year on campus (based on 24 weeks of term with 80% attendance and 20 additional days for exams / study)
- Staff spend an average of 200 days per year on campus (based on 47 weeks of work per year at 85% attendance)
- There are 260 weekdays per year (based on 52 weeks with five working days)
- No reduction has been made to account for reduced usage of the university at weekends

The calculated number of average daily traffic movements associated with the university is summarised as 1,427 and 1,311 vehicle trips per day in the 2005 and 2010 respectively.

7.1.2 Factors Affecting Daily Traffic Generation

As identified above, the key effect on the average daily traffic generation is the staff and student numbers at the Campus.

The other key factor that will reduce the average daily traffic generation is the mode share of travel to/from the Campus, specifically the percentage of car drivers. VUW has undertaken measures to reduce the car driver mode share at the Kelburn Campus, including introduction of a travel plan. However, perhaps the main step taken has been the construction of Te Puni Village, which accommodates approximately 400 students within the Campus grounds. Te Puni Village enables students to walk to/from the University and removes the need to drive. Nonetheless, development contributions relating to traffic have already been paid for the Te Puni Village.

7.1.3 EHU Calculation

The WCC Development Contribution Policy identifies that one EHU is equivalent to ten private vehicle trips per day. On this basis, the 2010 traffic generation is equal to 131 EHUs.

7.2 EHU to GFA Calculation for Transportation

Based on the above calculation, a ratio of GFA to EHU has been calculated for the Kelburn Campus. The existing GFA at the Campus is 126,596m^2 and the above calculated an average daily traffic generation of 131 EHUs. Therefore, the Kelburn Campus has a ratio of 905m^2 per EHU

8 Conclusions

In order to fully understand the actual impact a University has on the Council's services infrastructure, historical data has to be reviewed. As a long term building owner VUW is in the position to analyse this data and make an informed self-assessment. Table 6 analyses each component that makes up an EHU and has selected four key milestone years being:-

- 2005 when the Development Contributions policy came into effect
- 2010 when the Alan MacDiarmid building was completed – this reviews the impact a new building has on the services infrastructure
- 2012 current status and as assessment of what impact the new Hub project will have on the services infrastructure.
- 2015 future projected growth assessment.

Note that VUW has data for every year from 2005.

The following clarifies and summarises the findings as detailed in Table 6:-

- The actual water and sanitary sewer usage is 16% of the EHU assessed usage, this is an important driver for impact on WCC services infrastructure which correlates to population figures.
- The actual sanitary fittings and fixtures are 27% of the EHU assessed numbers based on the worst case figure which are WC's
- The actual transportation figures are 6% of the EHU assessed usage
- The self assessed area for the EHU is derived from the actual impact the Campus has on the WCC infrastructure services, taking into consideration water, sanitary sewer and transportation.
- The self assessed population per EHU is derived from the actual impact the Campus has on the WCC infrastructure services, taking into consideration water, sanitary sewer and transportation

From the data analysed, floor area does not have an impact on the services infrastructure at the Kelburn Campus.

Student and staff numbers dictate the demand on the services infrastructure, but not at the level of intensity as set out in the DC policy. This is primarily due to the lecture timetables and amount of time students are at the university at any one given time.

From Table 7, the existing services infrastructure has considerable carrying capacity to cater for future development growth.

It is difficult to set, agree and implement the threshold level of population that will trigger development contributions, we consider that water consumption is the most appropriate trigger.

Taking into consideration the overall impact of VUW's usage on WCC's services infrastructure, the equivalent area of 420m2 per EHU equates to the demand as set out in the WCC DC Policy.

Appendix 1

Staff and Student Numbers

APPENDIX ONE

Victoria University of Wellington
Provisional history of EFTS and Staff FTEs

Refer also to Vics staff data 240812.xlsx

Prepared by: Wareham Cameron + Co
24-Aug-12

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Whole of University EFTS	10,359	11,060	11,236	11,816	11,875	12,233	11,676	12,273	13,017	14,260	15,125	16,031	16,726	17,332	16,882	17,657	17,962	17,486
Source: Billing data																		
Total Staff FTE	1,274	1,338	1,374	1,385	1,403	1,359	1,288	1,234	1,350	1,405	1,901	2,138	1,781	1,820	1,817	1,782	1,786	1,843
Source: Annual Report																		
Kelburn EFTS																		
Continuing Ed	-	-	-	-	-	-	-	4	27	32	103	163	202	203	142	172	125	96
Architecture	213	3	-	-	-	3			1	62	72	143	4			209	316	305
Commerce	1,997	2,068	2,290	2,597	3,094	3,293	3,480	3,670	3,692	3,768	2,000	2,000	1,826	1,727	1,611	1,628	1,690	1,422
Education	2	2	4	4	2	-	-	-	-	52	56	374	370	319	311	297	331	298
Engineering														249	246	277	340	385
Humanities EFTS	4,257	4,390	4,290	4,433	4,451	4,322	4,267	4,357	3,905	4,072	4,259	4,225	4,666	4,703	4,661	4,963	5,323	5,378
Law	1,073	1,101	252	167	144	130	86	112	222	228	229	245	189	209	195	213	194	212
Science	2,026	2,111	1,984	2,100	2,124	2,169	2,136	2,240	2,380	2,355	2,425	2,447	2,695	2,624	2,637	2,649	2,796	2,765
Foundation Studies											2	63	8	2	-	2	2	-
Music													-		-	-	1	
Undesignated	12	80	121	60	18	31	10	12	8	25	65	43	4					
Old FoE	27	48	119	168	2	-	-	-	-	-	-	-	-	-	-	-	-	-
EFTS	9,607	9,803	9,060	9,529	9,835	9,948	9,979	10,395	10,235	10,594	9,211	9,703	9,964	10,036	9,803	10,410	11,118	10,861
Source: Billing data																		
Proportion Kelburn EFTS	93%	89%	81%	81%	83%													
Kelburn Staff FTEs	1,182	1,186	1,108	1,117	1,162	1,056	1,239	1,239	1,314	1,477	1,427	1,482	1,219	1,232	1,272	1,290	1,313	1,371
Total at Kelburn	10,789	10,989	10,168	10,646	10,997	11,004	11,218	11,634	11,549	12,071	10,638	11,185	11,183	11,268	11,075	11,700	12,431	12,232
Significant events		A & D to Te Aro	Law to Piptea				Pt Commerce to Rutherford				Pt Commerce to Railway / allow for NZSM	Merge with College of Education 1/1/2005						

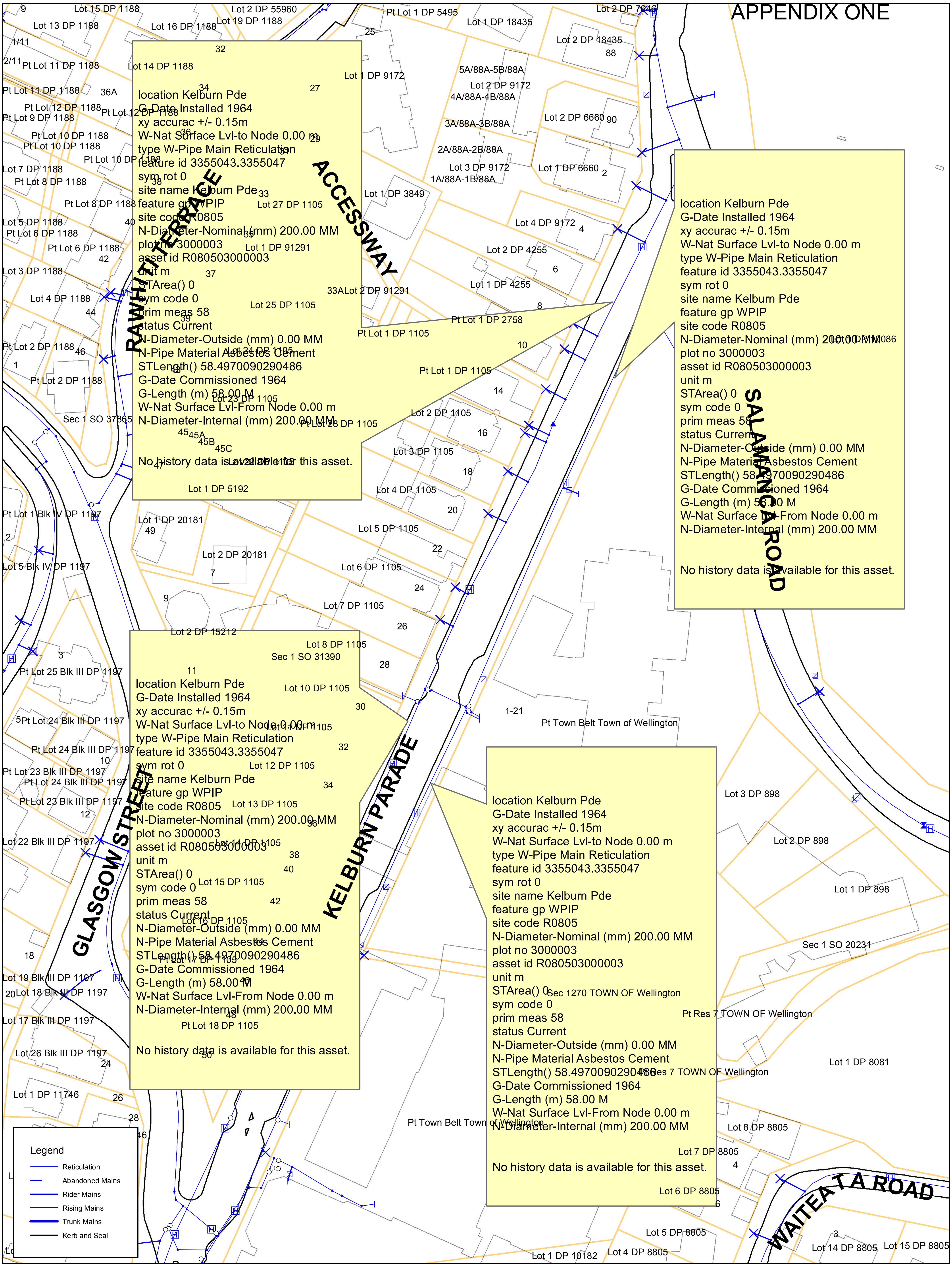
Note

Up to 2004Assumed that "Kelburn Staff FTE" = Total University Staff * proportion of total EFTS at Kelburn
From 2001 to 2004, to calc FTEs permamenent (full time and part time) and casual staff records were extracted from the payroll system and based on a snapshot at the year end. Full time staff were counted as one FTE and casual staff as hours worked divided by stand
Since 2005, the figures have been calculated on an average of the payroll data at start and end of year and the mid-points in Trimesters 1 and 2, reflecting the peak in staffing levels during the two main trimesters

Appendix 2

Water Consumption

APPENDIX ONE



DATA STATEMENT

Property boundaries
Land Information NZ
Licence WN0853547/2
Crown Copyright reserved
Accuracy in urban areas: +/-1m
Accuracy in rural areas: +/-30m

Other data has been compiled from a variety of sources and its accuracy may vary

Topographic data:
Wellington City Council
WCC copyright reserved
Accuracy: +/- 30cm

Any contours displayed are only approximate and not be used for detailed engineering design

Colour Orthophotography 1:500 flown Feb 2002 owned by Terralink International Ltd and used under licence by WCC

Kelburn Parade (1) Water
1:1,000

0 2.5 5 10 15 20 25
Metres

N

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APPENDIX ONE

location Kelburn Pde
G-Date Installed 1964
xy accurac +/- 0.15m
W-Nat Surface Lvl-to Node 0.00 m
type W-Pipe Main Reticulation
feature id 3355043.3355047
sym rot 0
site name Kelburn Pde
feature gp WPIP
site code R0805
N-Diameter-Nominal (mm) 200.00 MM
plot no 3000003
asset id R080503000003
unit m
STArea() 0
sym code 0
prim meas 58
status Current
N-Diameter-Outside (mm) 0.00 MM
N-Pipe Material Asbestos Cement
STLength() 58.4970090290486
G-Date Commissioned 1964
G-Length (m) 58.00 M
W-Nat Surface Lvl-From Node 0.00 m
N-Diameter-Internal (mm) 200.00 MM

No history data is available for this asset.

location Kelburn Pde
G-Date Installed 1964
xy accurac +/- 0.15m
W-Nat Surface Lvl-to Node 0.00 m
type W-Pipe Main Reticulation
feature id 3355043.3355047
sym rot 0
site name Kelburn Pde
feature gp WPIP
site code R0805
N-Diameter-Nominal (mm) 200.00 MM
plot no 3000003
asset id R080503000003
unit m
STArea() 0
sym code 0
prim meas 58
status Current
N-Diameter-Outside (mm) 0.00 MM
N-Pipe Material Asbestos Cement
STLength() 58.4970090290486
G-Date Commissioned 1964
G-Length (m) 58.00 M
W-Nat Surface Lvl-From Node 0.00 m
N-Diameter-Internal (mm) 200.00 MM

No history data is available for this asset.

Legend
- Reticulation
- Abandoned Mains
- Rider Mains
- Rising Mains
- Trunk Mains
- Kerb and Seal

DATA STATEMENT

Property boundaries
Land Information NZ
Licence WN08535477/2
Crown Copyright reserved
Accuracy in urban areas: +/-1m
Accuracy in rural areas: +/-30m

Other data has been compiled from a variety of sources and its accuracy may vary

Topographic data:
Wellington City Council
WCC copyright reserved
Accuracy: +/- 30cm

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Kelburn Parade (2) Water
1:1,000

0 2.5 10 15 20 25
Metres

N

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APPENDIX ONE

Water Usage Meter Readings												
	77 Fairlie Tce		14 Kelburn Pde		2 Waiteata Rd		21 Kelburn Pde		81 Kelburn Pde			
Account #:	1184883		1181517		1181550		1181627		1183347			
	m3	days	m3	days	m3	days	m3	days	m3	days		
May-05												
Jun-05	60	59	1217	81	43	81	21828	81	296	81	2005 total	81760
Jul-05											daily average	319
Aug-05	38	69	1791	52	53	52	16499	52	167	52		
Sep-05												
Oct-05	16	62	2068	58	39	58	18159	58	149	58		
Nov-05												
Dec-05	6	56	1725	65	34	65	17048	65	524	65		
Jan-06												
Feb-06	16	52	1616	53	18	53	16277	53	421	53	2006 total	150734
Mar-06											daily average	418
Apr-06	15	62	2631	70	40	70	22358	70	815	70		
May-06												
Jun-06	44	67	2999	66	30	66	23081	66	869	66		
Jul-06												
Aug-06	19	57	2151	53	46	53	19588	53	578	53		
Sep-06												
Oct-06	7	63	2223	62	43	62	18916	62	632	62		
Nov-06												
Dec-06	3	62	1827	57	41	57	14550	57	545	57		
Jan-07												
Feb-07	11	60	3992	58	39	58	18049	58	585	58	2007 total	145528
Mar-07											daily average	383
Apr-07	33	61	4803	75	57	75	26323	75	809	75		
May-07												
Jun-07	240	68	2968	48	30	48	16444	48	575	48		
Jul-07												
Aug-07	83	53	3595	72	61	72	24616	72	1036	72		
Sep-07												
Oct-07	0	60	2425	55	161	55	18331	55	518	55		
Nov-07												
Dec-07	26	66	1950	72	332	72	17299	72	137	72		
Jan-08												
Feb-08	36	63	1924	55	326	55	15130	55	83	55	2008 total	174911
Mar-08											daily average	507
Apr-08	39	54	1523	48	54	48	21193	48	135	48		
May-08												
Jun-08	36	61	2199	70	70	70	39614	70	123	70		
Jul-08												
Aug-08	37	71	3965	52	62	52	35783	52	220	52		
Sep-08												
Oct-08	167	58	2890	62	41	62	23539	62	233	62		
Nov-08												
Dec-08	29	62	2358	58	23	58	22972	58	107	58		
Jan-09												
Feb-09	3	61	2979	63	32	63	18095	63	157	63	2009 total	113126
Mar-09											daily average	311
Apr-09	63	52	2809	54	34	54	20368	54	154	54		
May-09												
Jun-09	138	63	2815	60	0	0	17156	61	183	60		
Jul-09												
Aug-09	168	68	2639	68	61	63	13865	67	229	68		
Sep-09												
Oct-09	241	57	973	57	10	58	9970	57	198	57		
Nov-09												
Dec-09	103	63	3155	62	11	62	16372	62	145	62		
Jan-10												
Feb-10	200	56	2126	57	10	57	16518	57	162	57	2010 total	97552
Mar-10											daily average	269
Apr-10	172	63	2331	63	21	63	16654	63	233	63		
May-10												
Jun-10	144	58	1587	60	19	60	13588	60	216	60		
Jul-10												
Aug-10	160	66	1745	64	21	64	11197	64	240	64		
Sep-10												
Oct-10	234	57	1794	58	23	58	14414	58	238	58		
Nov-10												
Dec-10	126	59	1249	60	8	60	11961	60	161	60		
Jan-11												
Feb-11	221	68	1740	66	11	66	17461	66	267	66	2011 total	112414
Mar-11											daily average	305
Apr-11	268	57	1500	55	9	55	14187	55	343	55		
May-11												
Jun-11	210	60	1702	63	13	63	18956	63	401	63		
Jul-11												
Aug-11	224	66	1848	65	11	65	16010	65	471	65		
Sep-11												
Oct-11	284	53	1582	48	7	48	16394	48	351	48		
Nov-11												
Dec-11	389	68	1015	71	8	71	16059	71	472	71		
Jan-12												
Feb-12	293	62	1525	61	8	60	14139	61	279	61	2012 total	16244
Mar-12											daily average	278
Apr-12	136	59	1637	55	9	56	14992	55	414	55		
	4738	2562	93591	2552	1969	2488	775953	2552	14871	2552		

Total water usage	891122	m3
Total number of days	2541	
Water consumption per day	351	m3 / day

Appendix 3

Sanitary Sewer

APPENDIX ONE

US_Node_ID□WW16869
DS_Node_ID□WW14288
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□WW Main
System_Type□WW
Pipe_Shape□Circular
Diameter□150
Height□0
Pipe_Material□High Density Polyethylene
Lining_Material□No code allocated
US_Invert_Level□99.1
DS_Invert_Level□95.26
Pipe_Length□47.636797
Gradient□0.08061
Capacity□0.04328
Date_Installed□1/01/1989
Asset_ID□WW16869.WW14288.1
Feature_ID_Historical□Q25-094.Q26-059
Asset_ID_Historical□R080501000041
Joint_Type□Fusion Weld
Pipe_Class□SDR17
Pipe_Bedding□<null>
Pipe_Standard□<null>
Plan_Reference□D3404
OBJECTID□17040
Link_Suffix□1
Shape□Polyline
Shape.STLength()□47.636797

US_Node_ID□WW29687
DS_Node_ID□WW17320
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□WW Main
System_Type□WW
Pipe_Shape□Circular
Diameter□150
Height□0
Pipe_Material□High Density Polyethylene
Lining_Material□No code allocated
US_Invert_Level□94.78
DS_Invert_Level□90.55
Pipe_Length□50.488277
Gradient□0.083782
Capacity□0.04412
Date_Installed□1/01/1989
Asset_ID□WW29687.WW17320.1
Feature_ID_Historical□Q26-009.R26-002
Asset_ID_Historical□R080501000042
Joint_Type□Fusion Weld
Pipe_Class□SDR17
Pipe_Bedding□<null>
Pipe_Standard□<null>
Plan_Reference□D3404
OBJECTID□29686
Link_Suffix□1
Shape□Polyline
Shape.STLength()□50.488277

US_Node_ID□WW16867
DS_Node_ID□WW16869
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□WW Main
System_Type□WW
Pipe_Shape□Circular
Diameter□150
Height□0
Pipe_Material□High Density Polyethylene
Lining_Material□No code allocated
US_Invert_Level□101.46
DS_Invert_Level□99.1
Pipe_Length□32.462948
Gradient□0.072698
Capacity□0.0411
Date_Installed□1/01/1988
Asset_ID□WW16867.WW16869.1
Feature_ID_Historical□Q25-094.Q25-118
Asset_ID_Historical□R080501000040
Joint_Type□Fusion Weld
Pipe_Class□SDR17
Pipe_Bedding□<null>
Pipe_Standard□<null>
Plan_Reference□D3404
OBJECTID□17038
Link_Suffix□1
Shape□Polyline
Shape.STLength()□32.462948

Legend

Wastewater Pipes

Type, Status

- Pipe, In Use
- Pipe, Abandoned
- Rising Main, In Use
- Rising Main Valve, In Use
- Rising Main, Abandoned

Stormwater Pipes

Status

- In Use
- Abandoned
- Removed
- Unknown
- Kerb and Seal

DATA STATEMENT

Property boundaries
Land Information NZ
Licence WN08535547/2
Crown Copyright reserved
Accuracy in urban areas: +/-1m
Accuracy in rural areas: +/-30m

Other data has been compiled from a variety of sources and its accuracy may vary

Topographic data:
Wellington City Council
WCC copyright reserved
Accuracy: +/- 30cm

Any contours displayed are only approximate and must not be used for detailed engineering design

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Kelburn Parade (2) Sewer
1:1,000

0 2.5 10 15 20 25
Metres

N

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APPENDIX ONE

US_Node_ID: WW06921
DS_Node_ID: WW29689
Owner: <null>
Status: In Use
Location: Kelburn Pde
Type: WW Main
System_Type: WW
Pipe_Shape: Circular
Diameter: 225
Height: 0
Pipe_Material: Earthenware
Lining_Material: No code allocated
US_Invert_Level: 84.36
DS_Invert_Level: 79.94
Pipe_Length: 54.754747
Gradient: 0.080724
Capacity: 0.12719
Date_Installed: 1/01/1989
Asset_ID: WW06921.WW29689.1
Feature_ID_Historical: R26-006.R26-012
Asset_ID_Historical: R080501000049
Joint_Type: Rubber Ring Joint
Pipe_Class: No Code Allocated
Pipe_Bedding: <null>
Pipe_Standard: <null>
Plan_Reference: D3404
OBJECTID: 6805
Link_Suffix: 1
Shape: Polyline
Shape.STLength(): 54.754747

US_Node_ID: WW29689
DS_Node_ID: WW13833
Owner: <null>
Status: In Use
Location: Kelburn Pde
Type: WW Main
System_Type: WW
Pipe_Shape: Circular
Diameter: 225
Height: 0
Pipe_Material: Earthenware
Lining_Material: No code allocated
US_Invert_Level: 79.94
DS_Invert_Level: 77.97
Pipe_Length: 59.896747
Gradient: 0.03289
Capacity: 0.08127
Date_Installed: 1/01/1989
Asset_ID: WW29689.WW13833.1
Feature_ID_Historical: R26-012.R26-093
Asset_ID_Historical: R080501000049
Joint_Type: Rubber Ring Joint
Pipe_Class: No Code Allocated
Pipe_Bedding: <null>
Pipe_Standard: <null>
Plan_Reference: D3404
OBJECTID: 29688
Link_Suffix: 1
Shape: Polyline
Shape.STLength(): 59.896747

US_Node_ID: WW06920
DS_Node_ID: WW17320
Owner: <null>
Status: In Use
Location: Kelburn Pde
Type: WW Main
System_Type: WW
Pipe_Shape: Circular
Diameter: 150
Height: 0
Pipe_Material: High Density Polyethylene
Lining_Material: No code allocated
US_Invert_Level: 90.55
DS_Invert_Level: 86.51
Pipe_Length: 47.617633
Gradient: 0.084843
Capacity: 0.0444
Date_Installed: 1/01/1989
Asset_ID: WW06920.WW17320.1
Feature_ID_Historical: R26-002.R26-005
Asset_ID_Historical: R080501000050
Joint_Type: Fusion Weld
Pipe_Class: SDR17
Pipe_Bedding: <null>
Pipe_Standard: <null>
Plan_Reference: D3404
OBJECTID: 6804
Link_Suffix: 1
Shape: Polyline
Shape.STLength(): 47.617633

US_Node_ID: WW06920
DS_Node_ID: WW06921
Owner: <null>
Status: In Use
Location: Kelburn Pde
Type: WW Main
System_Type: WW
Pipe_Shape: Circular
Diameter: 150
Height: 0
Pipe_Material: High Density Polyethylene
Lining_Material: No code allocated
US_Invert_Level: 86.51
DS_Invert_Level: 84.44
Pipe_Length: 23.580695
Gradient: 0.087784
Capacity: 0.04517
Date_Installed: 1/01/1989
Asset_ID: WW06920.WW06921.1
Feature_ID_Historical: R26-005.R26-006
Asset_ID_Historical: R080501000043
Joint_Type: Fusion Weld
Pipe_Class: SDR17
Pipe_Bedding: <null>
Pipe_Standard: <null>
Plan_Reference: D3404
OBJECTID: 6803
Link_Suffix: 1
Shape: Polyline
Shape.STLength(): 23.580695

Legend

Wastewater Pipes

Type, Status

- Pipe, In Use
- Pipe, Abandoned
- Rising Main, In Use
- Rising Main Valve, In Use
- Rising Main, Abandoned

Stormwater Pipes

Status

- In Use
- Abandoned
- Removed
- Unknown
- Kerb and Seal

RAWHITI TERRACE
ACCESSWAY
KELBURN PARADE
SALAMANCA ROAD

Kelburn Parade (1) Sewer
1:1,000

0 2.5 10 15 20 25
Metres

N

DATA STATEMENT

Property boundaries
Land Information NZ
Licence WN0853547/2
Crown Copyright reserved
Accuracy in urban areas: +/-1m
Accuracy in rural areas: +/-30m

Other data has been compiled from a variety of sources and its accuracy may vary

Topographic data:
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Accuracy: +/- 30cm

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Appendix 4

Stormwater

APPENDIX ONE

US_Node_ID□SW11662
DS_Node_ID□SW22364
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□Stormwater Pipe
System_Type□SW
Pipe_Shape□Circular
Diameter□375
Height□<null>
Pipe_Material□Reinforced Concrete
Lining_Material□No code allocated
US_Invert_Level□79.45
DS_Invert_Level□78.02
Pipe_Length□74.495255
Gradient□0.019196
Capacity□0.24116
Date_Installed□1/01/1933
Asset_ID□SW11662.SW22364.1
Feature_ID_Historical□R26-011.R26-015
Asset_ID_Historical□R080502000043
Joint_Type□Cement Mortar
Pipe_Class□No Code Allocated
Pipe_Bedding□<null>
Pipe_Standard□<null>
Plan_Reference□SW308
OBJECTID□12146
Link_Suffix□1
Shape□Polyline
Shape.STLength()□74.495255

US_Node_ID□SW11662
DS_Node_ID□SW22365
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□Stormwater Pipe
System_Type□SW
Pipe_Shape□No Code Allocated
Diameter□0
Height□<null>
Pipe_Material□No code allocated
Lining_Material□No code allocated
US_Invert_Level□0
DS_Invert_Level□0
Pipe_Length□87.14005
Gradient□0
Capacity□0
Date_Installed□<null>
Asset_ID□SW11662.SW22365.1
Feature_ID_Historical□R26-011.R26-014
Asset_ID_Historical□R080502000057
Joint_Type□No Code Allocated
Pipe_Class□No Code Allocated
Pipe_Bedding□<null>
Pipe_Standard□<null>
Plan_Reference□<null>
OBJECTID□12147
Link_Suffix□1
Shape□Polyline
Shape.STLength()□87.14005

US_Node_ID□SW11658
DS_Node_ID□SW11662
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□Stormwater Pipe
System_Type□SW
Pipe_Shape□Circular
Diameter□375
Height□<null>
Pipe_Material□Reinforced Concrete
Lining_Material□No code allocated
US_Invert_Level□83.33
DS_Invert_Level□79.45
Pipe_Length□45.083775
Gradient□0.086062
Capacity□0.51466
Date_Installed□1/01/1911
Asset_ID□SW11658.SW11662.1
Feature_ID_Historical□R26-010.R26-011
Asset_ID_Historical□R080502000044
Joint_Type□Cement Mortar
Pipe_Class□No Code Allocated
Pipe_Bedding□<null>
Pipe_Standard□<null>
Plan_Reference□SW308
OBJECTID□12141
Link_Suffix□1
Shape□Polyline
Shape.STLength()□45.083775

US_Node_ID□SW11660
DS_Node_ID□SW17740
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□Stormwater Pipe
System_Type□SW
Pipe_Shape□Circular
Diameter□300

Legend

Wastewater Pipes

Type, Status

- Pipe, In Use
- Pipe, Abandoned
- Rising Main, In Use
- Rising Main Valve, In Use
- Rising Main, Abandoned

Stormwater Pipes

Status

- In Use
- Abandoned
- Removed
- Unknown
- Kerb and Seal

Kelburn Parade (1) Stormwater
1:1,000

0 2.5 10 15 20 25 Metres

N

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APPENDIX ONE

US_Node_ID□SW11659
DS_Node_ID□SW11658
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□Stormwater Pipe
System_Type□SW
Pipe_Shape□Circular
Diameter□375
Height□<null>
Pipe_Material□Reinforced Concrete
Lining_Material□No code allocated
US_Invert_Level□87.19
DS_Invert_Level□83.33
Pipe_Length□46.68084
Gradient□0.082689
Capacity□0.50499
Date_Installed□1/01/1911
Asset_ID□SW11659.SW11658.1
Feature_ID_Historical□R26-004.R26-010
Asset_ID_Historical□R080502000045
Joint_Type□Cement Mortar
Pipe_Class□No Code Allocated
Pipe_Bedding□<null>
Pipe_Standard□<null>
Plan_Reference□SW308
OBJECTID□12143
Link_Suffix□1
Shape□Polyline
Shape.STLength()□46.68084

US_Node_ID□SW11647
DS_Node_ID□SW11648
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□Stormwater Pipe
System_Type□SW
Pipe_Shape□Circular
Diameter□300
Height□<null>
Pipe_Material□Reinforced Concrete
Lining_Material□No code allocated
US_Invert_Level□101.46
DS_Invert_Level□99.59
Pipe_Length□22.394548
Gradient□0.083562
Capacity□0.27671
Date_Installed□1/01/1911
Asset_ID□SW11647.SW11648.1
Feature_ID_Historical□Q25-048.Q25-049
Asset_ID_Historical□R080502000033
Joint_Type□Rubber Ring Joint
Pipe_Class□No Code Allocated
Pipe_Bedding□<null>
Pipe_Standard□<null>
Plan_Reference□SW308
OBJECTID□12125
Link_Suffix□1
Shape□Polyline
Shape.STLength()□22.394548

US_Node_ID□SW11660
DS_Node_ID□SW17740
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□Stormwater Pipe
System_Type□SW
Pipe_Shape□Circular
Diameter□300
Height□<null>
Pipe_Material□Reinforced Concrete
Lining_Material□No code allocated
US_Invert_Level□94.57
DS_Invert_Level□89.15
Pipe_Length□65.478796
Gradient□0.082775
Capacity□0.27851
Date_Installed□1/01/1911
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Feature_ID_Historical□Q26-008.R26-003
Asset_ID_Historical□R080502000047
Joint_Type□Cement Mortar
Pipe_Class□No Code Allocated
Pipe_Bedding□<null>
Pipe_Standard□<null>
Plan_Reference□SW308
OBJECTID□12144
Link_Suffix□1
Shape□Polyline
Shape.STLength()□65.478796

US_Node_ID□SW11648
DS_Node_ID□SW11661
Owner□<null>
Status□In Use
Location□Kelburn Pde
Type□Stormwater Pipe
System_Type□SW
Pipe_Shape□Circular
Diameter□300
Height□<null>
Pipe_Material□Reinforced Concrete
Lining_Material□No code allocated
US_Invert_Level□99.59
DS_Invert_Level□95.1
Pipe_Length□54.400177
Gradient□0.082537
Capacity□0.27808
Date_Installed□1/01/1911
Asset_ID□SW11648.SW11661.1
Feature_ID_Historical□Q25-049.Q26-050
Asset_ID_Historical□R080502000032
Joint_Type□Rubber Ring Joint
Pipe_Class□No Code Allocated
Pipe_Bedding□<null>
Pipe_Standard□<null>
Plan_Reference□SW308
OBJECTID□12127
Link_Suffix□1
Shape□Polyline
Shape.STLength()□54.400177

CENTRAL TERRACE
GLASGOW STREET
KELBURN PARADE
SALAMANCA ROAD
WAITEATA ROAD

Legend
Wastewater Pipes
Type, Status
Pipe, In Use
Pipe, Abandoned
Rising Main, In Use
Rising Main Valve, In Use
Rising Main, Abandoned
Stormwater Pipes
Status
In Use
Abandoned
Removed
Unknown
Kerb and Seal

Kelburn Parade (2) Stormwater
1:1,000

0 2.5 10 15 20 25 Metres

N

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Appendix 5

Transportation

Victoria University, Kelburn Campus: Transport Contributions

Staff & Student Numbers

Base Data - Students

2005 Full Time Equivalent Students at Kelburn =	9,703
Average student attendance=	80%
Days per year (24 wks plus 20 days for exams/study) =	140
Weekdays per year (52wks) =	260

2010 Base Data

2010 Full Time Equivalent Students at Kelburn =	11,118

Base Data - Staff

2005 Full Time Equivalent Staff at Kelburn =	1,482
Average staff attendance =	85%
Days per year (47wks) =	235
Weekdays per year (52wks) =	260

2010 Full Time Equivalent Staff at Kelburn =	1,313

Travel Patterns - 2005

Students	%	2005 No.
Walk	36%	3,493
Bus	25%	2,426
Train / Ferry	20%	1,941
Drive	7%	679
Passenger	7%	679
Cycle	2%	194
M'cycle	2%	194
Other	1%	97
	100%	**9,703**

Staff	%	2005 No.
Walk	16%	237
Bus	16%	237
Train / Ferry	15%	222
Drive	37%	548
Passenger	10%	148
Cycle	4%	59
M'cycle	1%	15
Other	1%	15
	100%	**1,482**

Travel Patterns - 2010

Students	%	2010 No.
Walk	36%	4,002
Bus	24%	2,668
Train / Ferry	22%	2,446
Drive	7%	778
Passenger	7%	778
Other	4%	445
	100%	**11,118**

Staff	%	2010 No.
Walk	18%	236
Bus	20%	263
Train / Ferry	9%	118
Drive	36%	473
Passenger	6%	79
Work at Home	7%	92
Other	4%	53
	100%	**1,313**

Assessment Calculation

Staff Travel - 2005

Staff Vehicle No.s =	548
Staff Days per week & attendance =	200
Staff vehicle no.s per year (1-way) =	219,003
Staff average daily traffic generation =	842

Staff Travel - 2010

Staff Vehicle No.s =	473
Staff Days per week & attendance =	200
Staff vehicle no.s per year (1-way) =	188,836
Average daily traffic generation =	726

Student Travel - 2005

Student Vehicle No.s =	679
Student Days per week & attendance =	112
Student vehicle no.s per year (1-way) =	152,143
Student average daily traffic generation =	585

Student Travel - 2010

Student Vehicle No.s =	778
Student Days per week & attendance =	112
Student vehicle no.s per year (1-way) =	174,330
Student average daily traffic generation =	671

Vehicle No.s

2005 vehicle generation =	1,427
2010 vehicle generation =	1,397

Change in generation = - 31

Change in Equivalent Household Units (EHU)

1 Household = 10 vehicle trips per day (based on Wellignton Citry Council Development Contributions Policy 2.5.5.3

University EHU is - 3 based on change in staff and pupils from 2005 to 2010

Overall EHUs

Total traffic in 2010 =	1,397
Overall 2010 Traffic EHU =	140

For non-residential development, 1 EHU = 55 m^2 of GFA

EHU based on WCC policy = 2,299

Resultant EHU = 7,682 m^2 of GFA

Suggested University m^2 per EHU

Current GFA of Kelburm Campus = 126,446 m^2 GFA

1 EHU for Kelburn Campus = 905 m^2 GFA

Appendix 6

Aerial Images

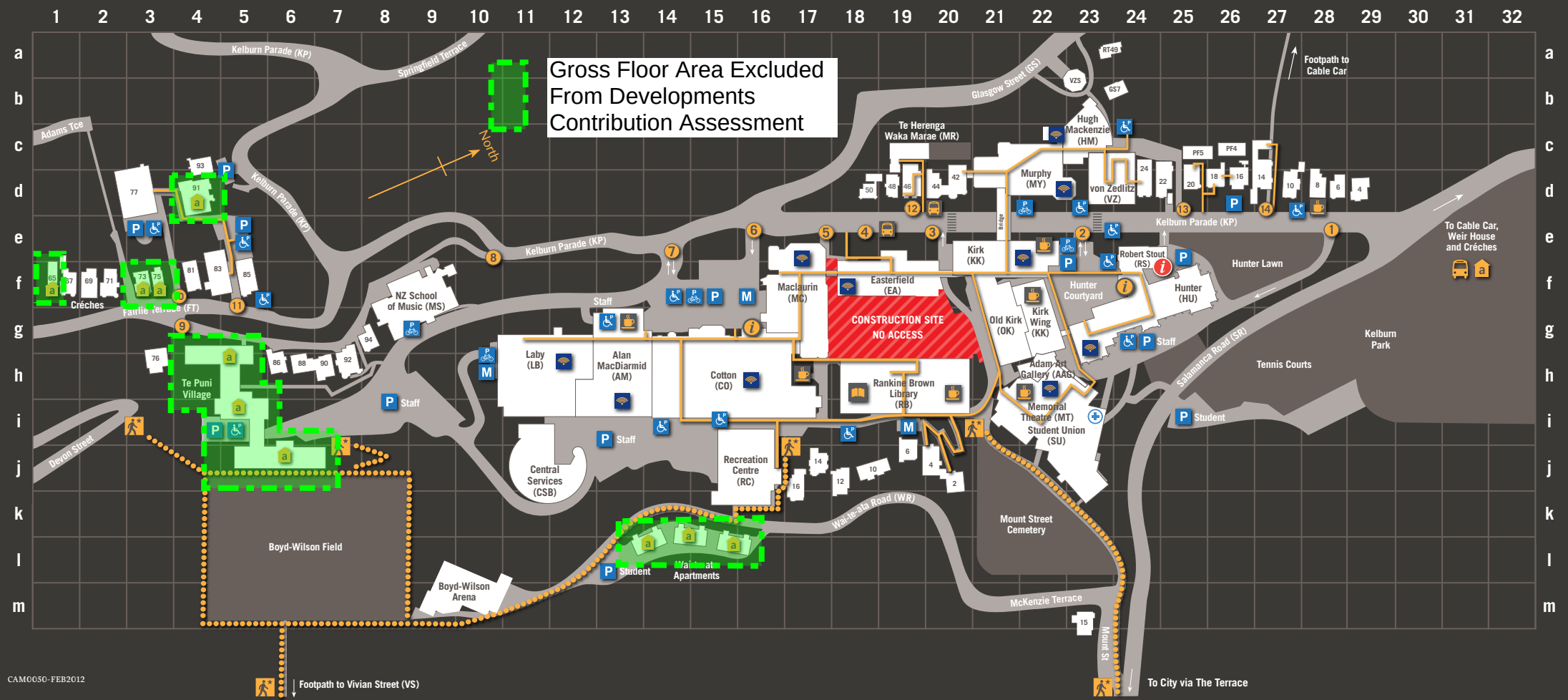
Kelburn Campus Map

This map identifies the location of buildings and facilities and the accessible routes that link them for people with disabilities. It is intended for use by anyone visiting or working on, Victoria University's Kelburn Campus.

APPENDIX ONE

- Main buildings
- Student Halls of Residence
- Safe pathways
- Accessible routes
- Gates
- (MS) Building code
- Cafés
- Library
- Public transport stops
- Information centres
- Lecture theatres
- Parking
- Motorcycle parking
- Mobility parking
- Bike racks
- Disability Services
- Health Services

Victoria Campus Care	04-463 5398
Victoria University Main Telephone	04-472 1000



CAM0050-FEB2012

APPENDIX ONE

APPENDIX ONE

VUW Kelburn Campus 2000

APPENDIX ONE

VUW Kelburn Campus 2009

Appendix 7

Holmes Fire and Safety Fire Protection Report

APPENDIX ONE

FIRE SAFETY REVIEW REPORT

VUW - SITE FIRE WATER SUPPLIES

KELBURN PARADE
WELLINGTON

For

VICTORIA UNIVERSITY OF WELLINGTON

31 July 2012

Version A

104933.02R01A.DOC

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REPORT ISSUE AUTHORISATION

Project: VUW – Site Fire Water Supplies

Project No. 104933.02

Version	Date	Status	Written	Reviewed
A	31 July 2012	For Information	AMW	KDI

Version	Extent of revision

Written By:

Antony Walker
BE(Hons), MEFireE, MSFPE, MIPENZ, CPEng

Reviewed by:

Kevin Irwin
BE(Hons), MEFireE, MIPENZ, CPEng

This report caters specifically for the requirements for this project and this client. No warranty is intended or implied for use by any third party and no responsibility is undertaken to any third party for any material contained herein.

The building owner must be aware that the fire safety solutions described in this report address the requirements of the Building Code. Consideration of protection of the building owner's property is not included unless this has been specifically requested.

1 EXECUTIVE SUMMARY

The purpose of this report is to consider the requirements for the site wide fire fighting water supplies that are required at Victoria University of Wellington, Kelburn, and to review and summarise the high level requirements for infrastructure that provide services associated with fire safety within the campus.

The basis of the assessment has been undertaken by utilising the Code of Practice for Fire Fighting Water Supplies (CoP), including several versions that have been in force over a period of several years of interest.

Finally a summary of the current and anticipated future demands (for development sites as noted by way of example) are provided, that demonstrates that the future demands will fall within the currently available capacity.

2 DESIGN PHILOSOPHY

The Code of Practice for Fire Fighting Water Supplies (CoP) has been used to determine the extent of the demands driven by the various buildings on site. The biennial surveys have been reviewed to determine the highest demands required from the sprinkler systems.

We have considered the Kirk buildings and Maclaurin as reference buildings, being unsprinklered and of large floor plate. The highest sprinkler demand that we are aware of on site is present within the Cotton, Laby, Central Services, and the Student Union buildings.

The sprinkler demand within these buildings is 1,350 l/min at up to 410 kPa.

3 FIRE FIGHTING WATER SUPPLY REQUIREMENTS

The following demands have been determined from the CoP. This code has been revised during recent history and the requirements for the Kelburn campus are noted as below in relation to the particular version of the code of practice in force at the time.

Year	Sprinklered [l/min]	Unsprinklered [l/min]	Notes
1992	2,400	2,400	1992 CoP did not require an additional allowance for un-sprinklered buildings.
2003	2,850	6,000 + 6,000	The unsprinklered demands are to be provided as 6,000 l/min within 135, and an additional 6,000 l/min within 270 m.
2008	2,850	6,000 + 6,000	

As from the 2003 version of the CoP, the philosophy for calculating the demands for Fire Fighting Water Supplies changed, such that the following approach was stipulated:

1. The hydrant demand for sprinklered buildings was set at 1,500 l/min, this is required to be additional to the sprinkler demand (the sprinkler standard also requires the water supplies to be able to deliver the 1,500 l/min above the demand of the sprinkler system).

2. The hydrant demand for unsprinklered buildings is based on the firecell floor area, fuel load, and ventilation characteristics of the particular building. Prior to these versions the CoP did not differentiate between sprinklered and unsprinklered buildings.

4 SUMMARY OF CURRENT REQUIREMENTS

Therefore as of 2003, the water supplies were required to be able to deliver the following:

1. At least 6,000 l/min (within 135 m of the building) at a residual pressure of 100 kPa,

2. An additional 6,000 l/min within 270 m of the building.

We note that from our review of previous flow test information available from sprinkler system biennial surveys, we believe that it is unlikely that the towns main will be able to deliver 6,000 l/min within 135 m.

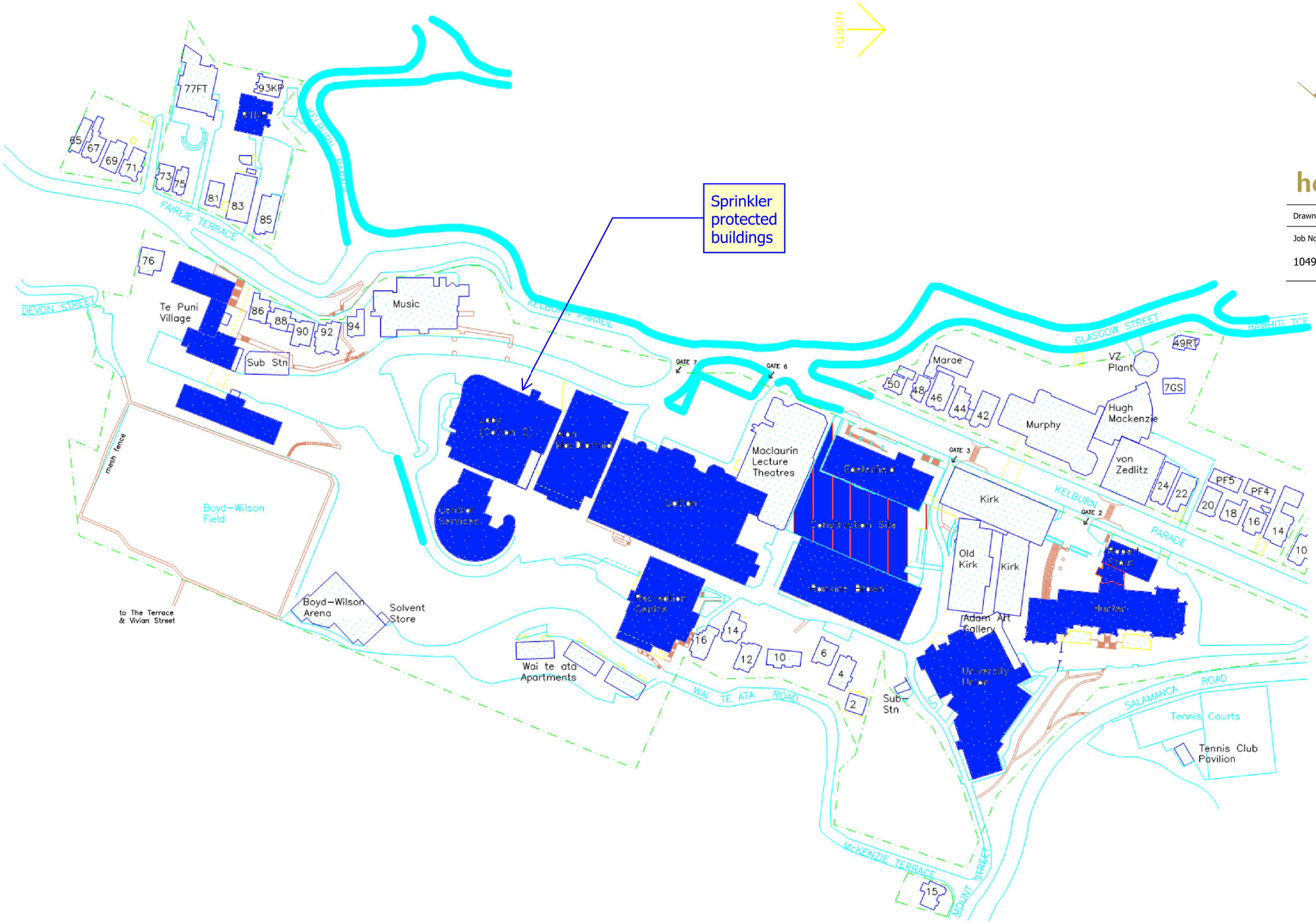
Further to the above, the extent of buildings on site that are sprinkler protected are indicated on the attached sketch.

5 EXPECTED FUTURE DEMANDS

Future demands are likely to be limited to 1,350 l/min for the sprinkler system and 1,500 l/min for the hydrant demand, being a total of 2,850 l/min. It is to be noted that this is irrespective of the size of the sprinklered building.

Therefore based on the intention to sprinkler protect any new significant building (say of over 1,000 m^2), that any new building would not result in an increase to the fire fighting water supplies required on the site.

APPENDIX ONE



holmesfire

Drawn: AMW	Date: 31/07/12	
Job No	Sheet No	Rev
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