

# 110 Jervois Quay

Civil Engineering Resource  
Consent Design Report

## MFC Development LP

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# Document control record

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# Executive Summary

The key conclusions from each section of this civil engineering report related to the resource consent are:

- There is capacity in existing 3-waters services to support the proposed building development;
- There is a projected risk of flooding from climate change which has been factored into the proposed building floor levels. Modelling also confirms the impact of the building on the surrounding area is negligible;
- There are existing gas and HV main adjacent the proposed development in Wakefield Street which be protected during the works;
- There is a large stormwater culvert that runs underneath the proposed building at the east of the site. Discussions have been progressed with Wellington Water regarding treatment of this culvert, which will involve protection or potential improvements to the culvert;
- There is a large wastewater buffer tank on the west of the site that is affected by the works. Discussions have been progressed with Wellington Water regarding treatment of this tank including completion of a detailed seismic assessment;

## 1 Introduction

### 1.1 Project Description

The applicant is developing a new Green Star rated office building at 110 Jervois Quay, on the site of the existing carpark. The building will consist of a ground floor, eight office levels and a rooftop plant room and plant deck. The development will also include external landscaping, enhancing the site and its connectivity to the waterfront.

The Figure below shows the proposed development layout.

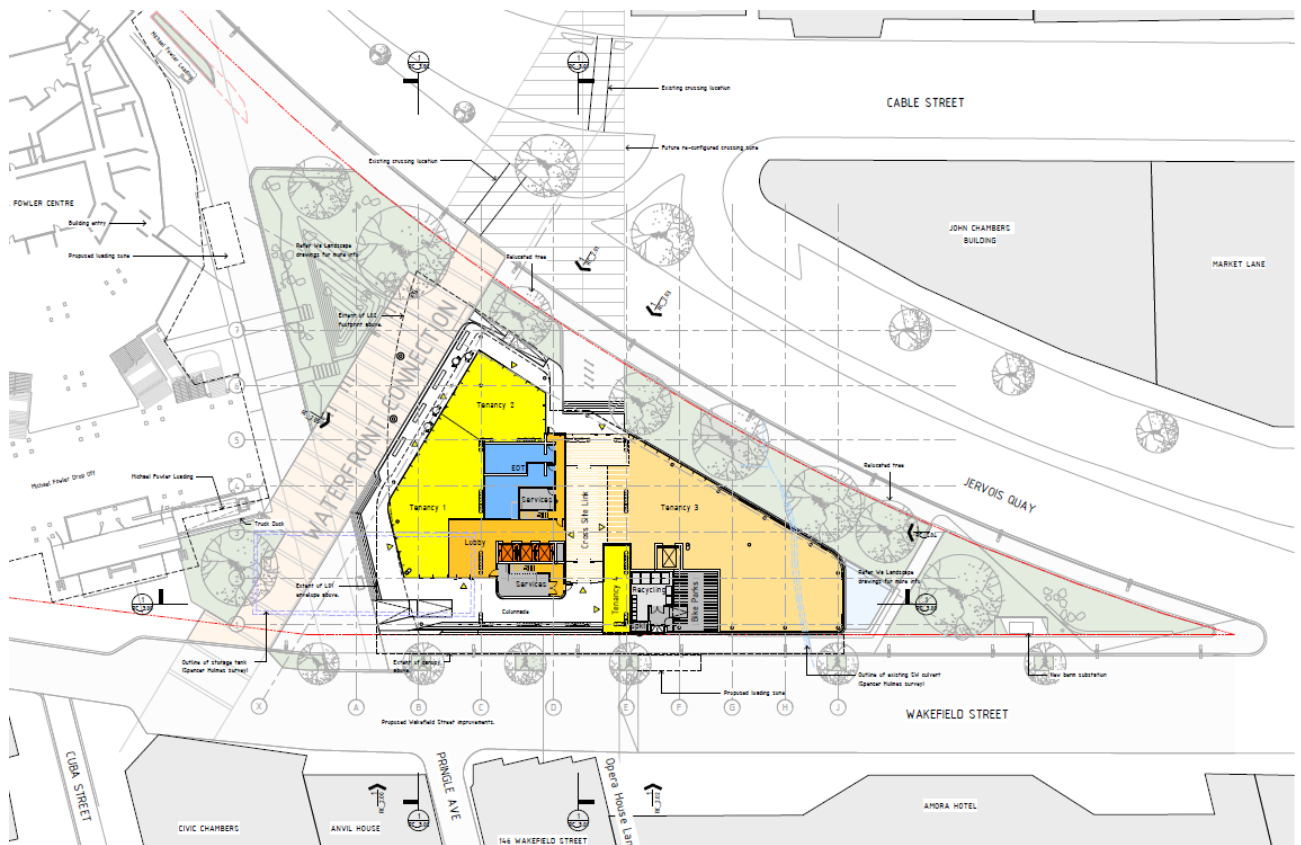


Figure 1: Proposed Site Plan

## 1.2 Site description

The site is located at 110 Jervois Quay and is bounded by the Michael Fowler Centre (MFC) building to the west, Wakefield Street to the south and south-west, and Jervois Quay to the north and east. The surrounding area generally comprises commercial and residential apartment buildings.

The site currently accommodates the temporary Royal New Zealand Ballet building, with a mixture of open pedestrian space and asphalt car parking on its western side. On its eastern side is a small park comprising grassed areas, planted garden beds, and trees. The site is generally level.

Vehicle access to the site is from Wakefield Street; there is also a significant pedestrian link across Wakefield St through the site from Cuba Street across Jervois Quay to the waterfront, with a traffic light operated pedestrian crossing controlling movements.

## 1.3 Design Standards

The design for all stages of the project will be undertaken in accordance with national and regional standards. These include but not limited to:

- NZ Building Code
- Wellington Water Regional Standards for Water Services (December 2021)
- Wellington Water Regional Specification for Water Services (December 2021)
- SNZ PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice
- Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region (Feb 2021)

## 1.4 Available Information

The underground services base plan has been produced utilising information available to Aurecon at the time of writing this report.

Features and service positions shown on the drawings are a combination of a historic Cardno topographic survey, and BeforeUDig plans received from utility operators.

Investigation works for key strategic services is to be undertaken during further design phases.

Due to the history of the site there is the possibility underground services are present that are live and not recorded by network utility operators (NUOs). After surface services mark outs, site stand over by NUOs will be required throughout the construction works to confirm whether exposed services are redundant or need to be protected.

Aurecon makes best endeavours to locate existing services as part of its design scope; however it cannot be held liable for the accuracy of existing services plotted by others.

## 1.5 Scope of Civil Works

The civil engineering scope associated with this report is primarily in relation to civil services, drainage and flooding. The details of the precinct finishes are included in the landscape architect design (by others).

Aurecon civil engineering concept drawings are provided in Appendix A.

## 1.6 Wellington Water correspondence

Please refer to Appendix B for records of Aurecon correspondence with Wellington Water. A summary of key outputs of engagement with Wellington Water is as below:

- Wellington Water indicate that there is >10 L/s spare capacity in the local 450mm diameter wastewater pipe, and ~29 L/s capacity in the local 250mm diameter wastewater network on Wakefield Street.
- The area (including the site) is prone to flooding, with >500mm depth of flood water predicted during a 1 in 100-year ARI storm event. The site sits within an overland flow path, and its construction may cause up to 30mm additional flood depth due to the displacement of flood water (refer to report Section *Flood Risk*)
- The existing water supply in Wakefield Street has been tested by a hydrant testing organisation for flow and residual pressure. The testing showed a residual pressure head of approximately 77 m head with an 80 L/s hydrant flow, which is sufficient for the design sprinkler flows.
- There is an existing large ovoid stormwater culvert that runs underneath the east of the site, and under the proposed building footprint that is required to be protected or diverted. (This work is being undertaken in conjunction with the structural engineer for the project). Extensive consultation has been undertaken with Wellington Water which are being finalised, but include options to protect or reline the culvert.
- There is an existing large wastewater buffer storage tank within the site that is located partially under the proposed building footprint that is required to be protected. (This work is being undertaken in conjunction with the structural engineer for the project). Extensive consultation has been undertaken with Wellington Water which are being finalised, but include options to carry out a detailed seismic assessment of the tank.

# 2 Existing Services

## 2.1 Network Utility Operator Services

Aurecon have received Before U Dig records of utilities from network utility operators (NUOs) near and within the site. A summary of the existing NUO services are provided in Appendix C.

## 2.2 Private Site Services

A number of private site services are present on the site, generally to service the existing RNZB building and the adjacent Michael Fowler Centre. These services are shown on Aurecon's Existing Services drawing and are sourced from RNZB design drawings and the historic Cardno survey.

## 2.3 Future Investigations

The following future existing services investigations are recommended:

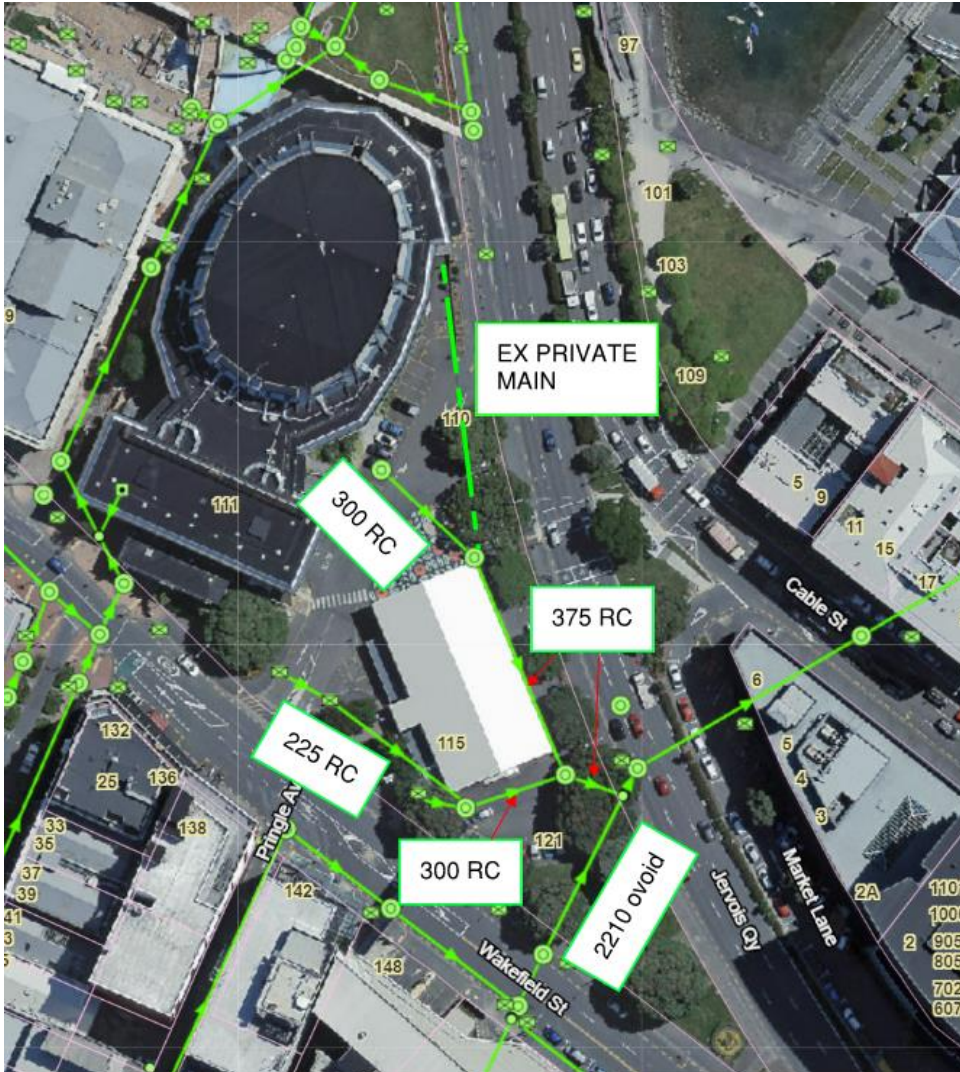
- CCTV survey RNZB 100mm dia sewer lateral to public drainage in Wakefield St, to enable potential replacement on same alignment
- Accurately locate existing ovoid stormwater culvert to the to enable piling design
- Accurately locate existing wastewater tank services to avoid clashes
- Accurately locate existing gas mains in Wakefield St footpath to avoid clashes with foundation excavations
- Accurately locate existing power cables in Wakefield St footpath to avoid clashes with foundation excavations
- Surveying invert levels in relevant manholes to enable drainage connection design

These investigation recommendations are captured on Aurecon's existing services drawing (refer Appendix A).

# 3 Stormwater Drainage

## 3.1 Existing Drainage Services

Wellington City Council records for stormwater assets are shown in the Figure below.



**Figure 2: Existing public stormwater infrastructure (Source: Wellington Water's Regional Water Stormwater Wastewater App)**

A large ovoid stormwater main runs beneath the eastern side of the site and across Jervois Quay to Wellington Harbour. Smaller mains, on the north east side of the RNZB building and the south side of the RNZB building, sized 375mm and 300mm diameter respectively, are located within the site. A private stormwater pipe of unknown size is located on the eastern side of the Michael Fowler Centre (MFC) building discharging into the 375mm main. Existing catchpits within the site provide inlets to the stormwater system and connect to the existing 300mm main.

The large ovoid stormwater main has been inspected using CCTV, in accordance with the New Zealand Gravity Pipe Inspection Manual 4<sup>th</sup> Ed. The main appeared to be in moderate condition, with isolated areas of wear or corrosion. The main appeared to be of concrete construction, whereas it is noted as brick construction in the Wellington Water GIS system. A small number of laterals directly discharging into the pipe will need to be properly sealed during the works. The factual inspection report associated with the CCTV survey is provided in Appendix E.

Extensive consultation has been undertaken with Wellington Water which are being finalised, but include options to protect or reline the culvert. Design mitigations for constructing the building over this stormwater main are addressed in the Dunning Thornton report *Structural Effects and Construction Methodology* (dated 27<sup>th</sup> January 2022)..

The 375mm concrete lateral entering the large stormwater main has been CCTV surveyed; the pipe is in moderate condition and enters the large stormwater main part-way up the height of the chamber WCC\_SW024290. Detailing for potential re-use of this connection will be developed in further design stages. The factual inspection report associated with the CCTV survey is provided in Appendix E.

The site is already predominantly surfaced with impervious materials, with the exception of the eastern park.



A low concrete nib wall on the boundary with Jervois Quay is likely to contain stormwater within the site, in the existing scenario. These mains will be constructed in accordance with Wellington Water requirements.

Changes to the impervious area has been checked by the landscape architects and is confirmed to be no greater than existing. On this basis the development is expected to be hydraulically neutral. The assessment of impervious areas is provided in Appendix D.

Private site drainage networks are required for the redeveloped public walkway which connects Cuba Street with Jervois Quay, as well as drainage in landscape areas. Provisional catchpits and subsoil drains have been allowed for this; however the levels and grades for the public walkway area are still to be developed which will determine the final drainage layout.

## 4 Flooding

### 4.1 Introduction

An initial flood risk assessment has been undertaken for the proposed building.

The flood risk assessment includes:

- Computing peak flood levels
- Identifying impacts of the proposed development on flood levels in the wider catchment
- Recommending minimum building floor level

This section summarises the methodology and results of the assessment.

### 4.2 Methodology

A copy of the hydraulic model of the Southern CBD Stormwater Catchment has been obtained from Wellington Water and has been used for the assessment.

- Model: Southern CBD Existing – ICM v10.5
- Network: SouthernCBD\_Existing
- Network Version: 2
- Network Scenario: Working Base Version

Simulations have been run for:

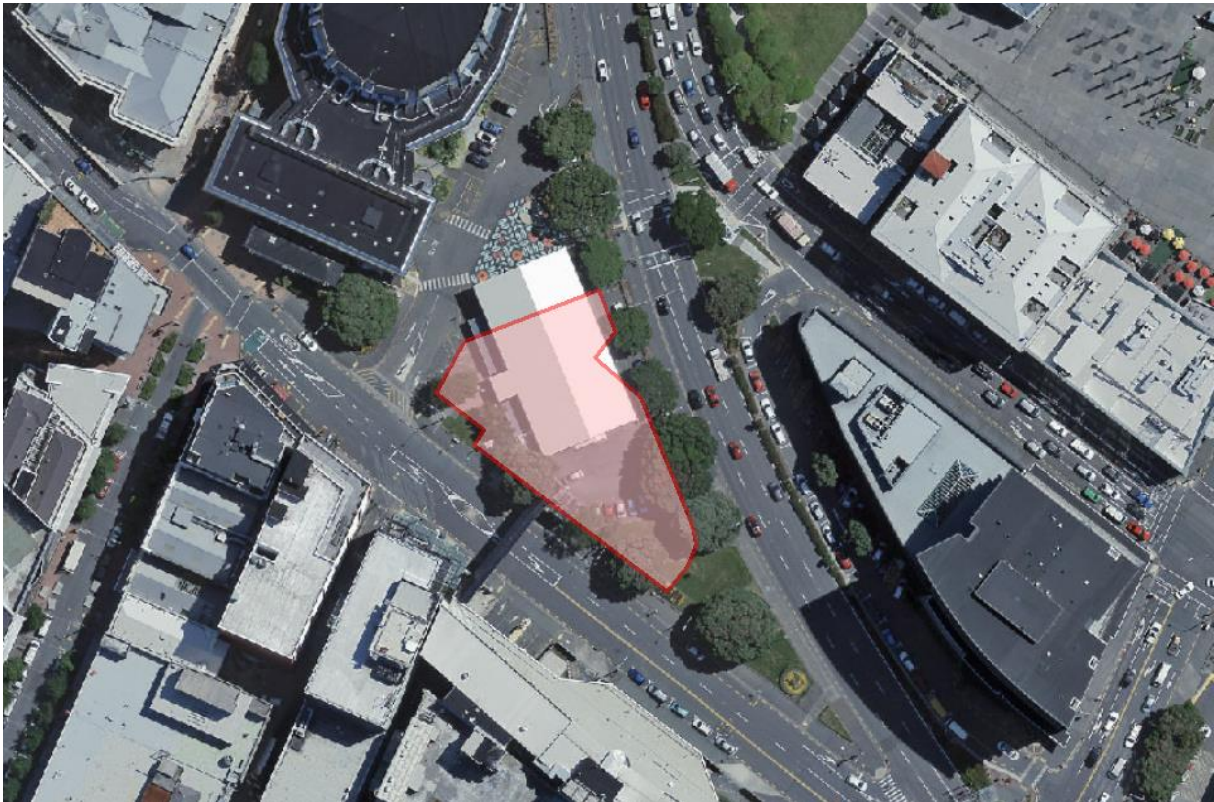
- 100yr ARI (Average Recurrence Interval) current climate,
- 100yr ARI including allowances for the impact of climate change (both rainfall intensity and sea level rise).

The simulations are based on the 12hr design storm event.

No changes have been made to the model representing the existing development of the Southern CBD in Wellington.

The impact of the proposed building has been assessed by blocking out the ground level building footprint as shown in Figure 3 below.

Figure 3 Extent of ground level footprint



All levels are presented in Wellington Vertical Datum 1953.

## 4.3 Assumptions

The modelling is based on the following assumptions:

- **Rainfall:**  
A 12hr rainfall profile was adopted representing a 10 year and 100yr ARI design storm event.
- **Tide data:**  
A dynamic tidal boundary was applied with a peak of 1.1mRL.
- **Climate Change (CC):**  
The model includes a climate change scenario which assuming 20% increase in rainfall and 1m sea level rise.
- **Ground profile:**  
The ground profile is represented by a 1m x 1m Digital Elevation Model (DEM) derived from LiDAR data collected in 2013. Large buildings have been blocked out.
- **RBNZ building:**  
The existing temporary Royal Ballet of New Zealand (RBNZ) building is not represented in the Southern CBD model (for both the Existing and the MFC Proposed development scenarios).

More detailed modelling assumptions are reported in Southern CBD Stormwater Catchment – Model Build Report<sup>1</sup>.

## 4.4 Model Run Results

The modelled design storm simulations are presented in Table 1 below.

<sup>1</sup> Southern CBD Stormwater Catchment – Model Build Report, Wellington Water, Rev 1, Jul 2019

**Table 1 Modelled Simulations and Results**

Design Event	Rainfall Depth	Peak Sea Level
10yr ARI	78mm	1.1m RL
10yr ARI + CC	93mm	2.1m RL
100yr ARI	122mm	1.1m RL
100yr ARI + CC	147mm	2.1m RL
Sensitivity Run: 100yr ARI + CC (rainfall only)	147mm	1.1m RL

The flood depth and extent for the 100yr ARI + CC design event is presented in Figure 4 below. The flood depth is up to 0.6m along the Wakefield Street side of the building.

**Figure 4 Computed Peak Flood Depth 100yr ARI + CC**

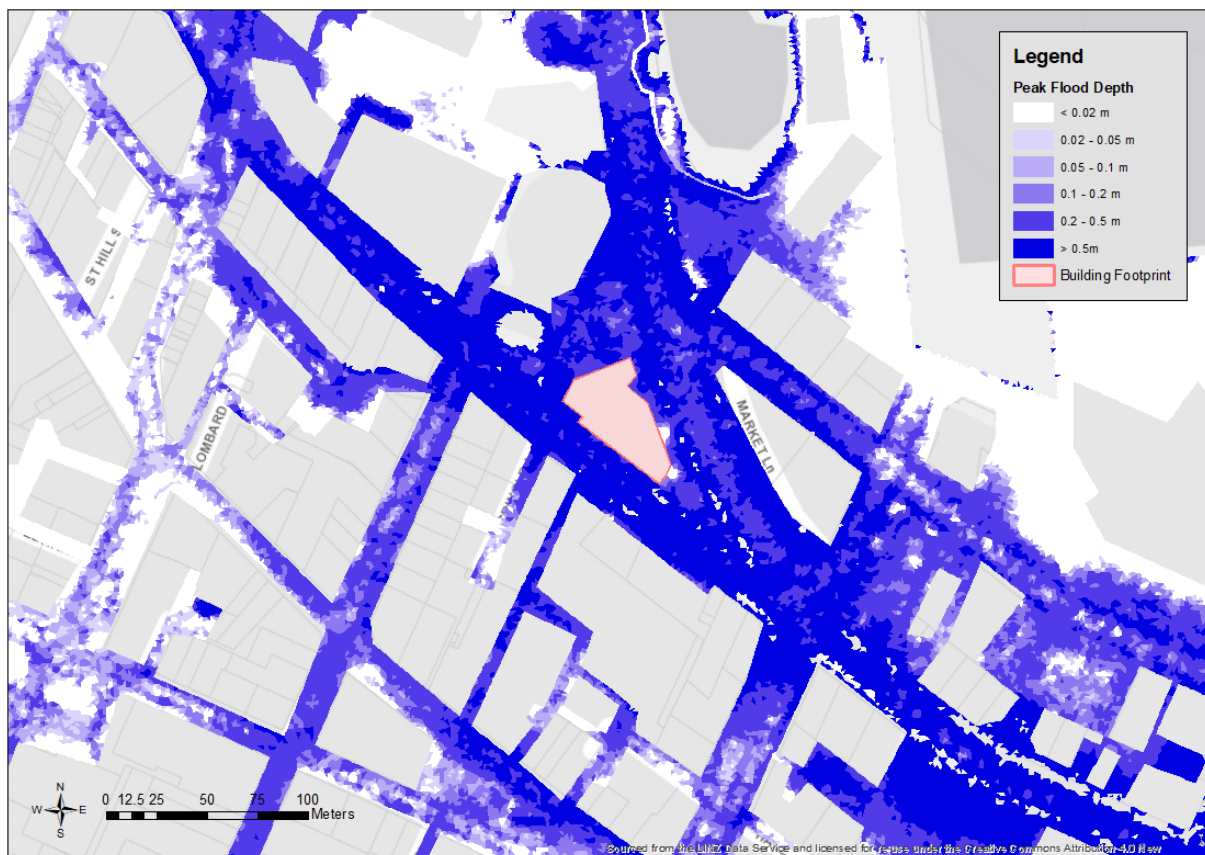


Table 2 below shows the modelled peak flood levels near the building for both the Existing Development and MFC Proposed Development. The results show that the impact of the building on the flood levels in the vicinity is an increase of 0.02m. It is noted that these levels do not include an allowance for freeboard.



**Table 2 Modelled Simulations and Results**

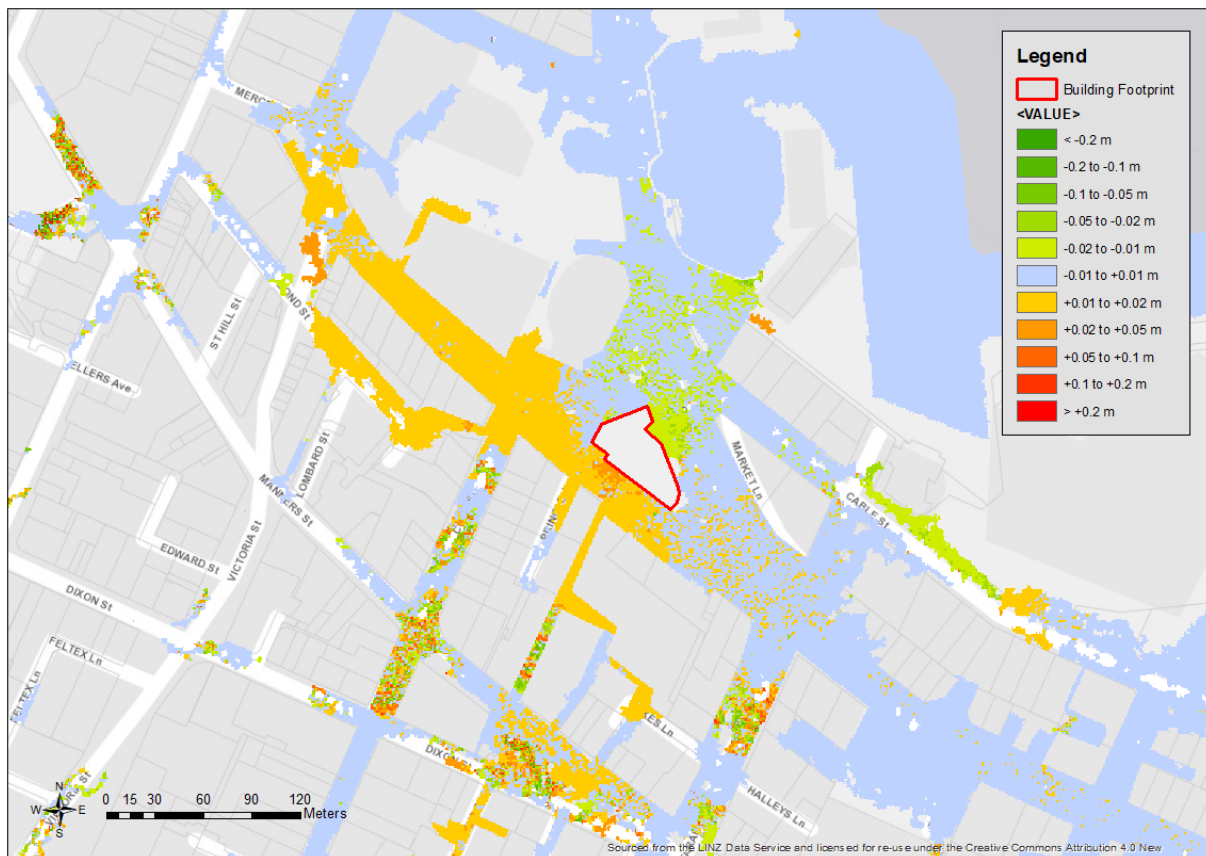
Design Event	Rainfall	Peak Tide Level (in m WVD-53)	Computed Peak Flood Levels (in m WVD-53)		Variance (in m)
			Existing Development	Proposed Development	
10yr Existing Climate	10yr ARI	1.1m WVD-53	2.39	2.40	+0.01
10yr Incl Climate Change	10yr ARI + 20%	2.1m WVD-53	2.58	2.60	+0.02
100yr Existing Climate	100yr ARI	1.1m WVD-53	2.61	2.63	+0.02
100yr Incl Climate Change	100yr ARI + 20%	2.1m WVD-53	2.80	2.83	+0.03
Sensitivity 100yr + 20% Rain	100yr ARI + 20%	1.1m WVD-53	2.66	N.A.	N.A.

Note: The above levels are the computed peak flood levels at Wakefield Street near the entrance to the carpark excluding freeboard.

## 4.5 Flood impact

The increase in modelled peak flood levels between the Proposed Development and Existing Development scenarios is shown in Figure 5 and Figure 6 for the 10yr+CC and 100yr+CC design events respectively.

Figure 5 Flood Level Difference Map 10yr ARI + CC

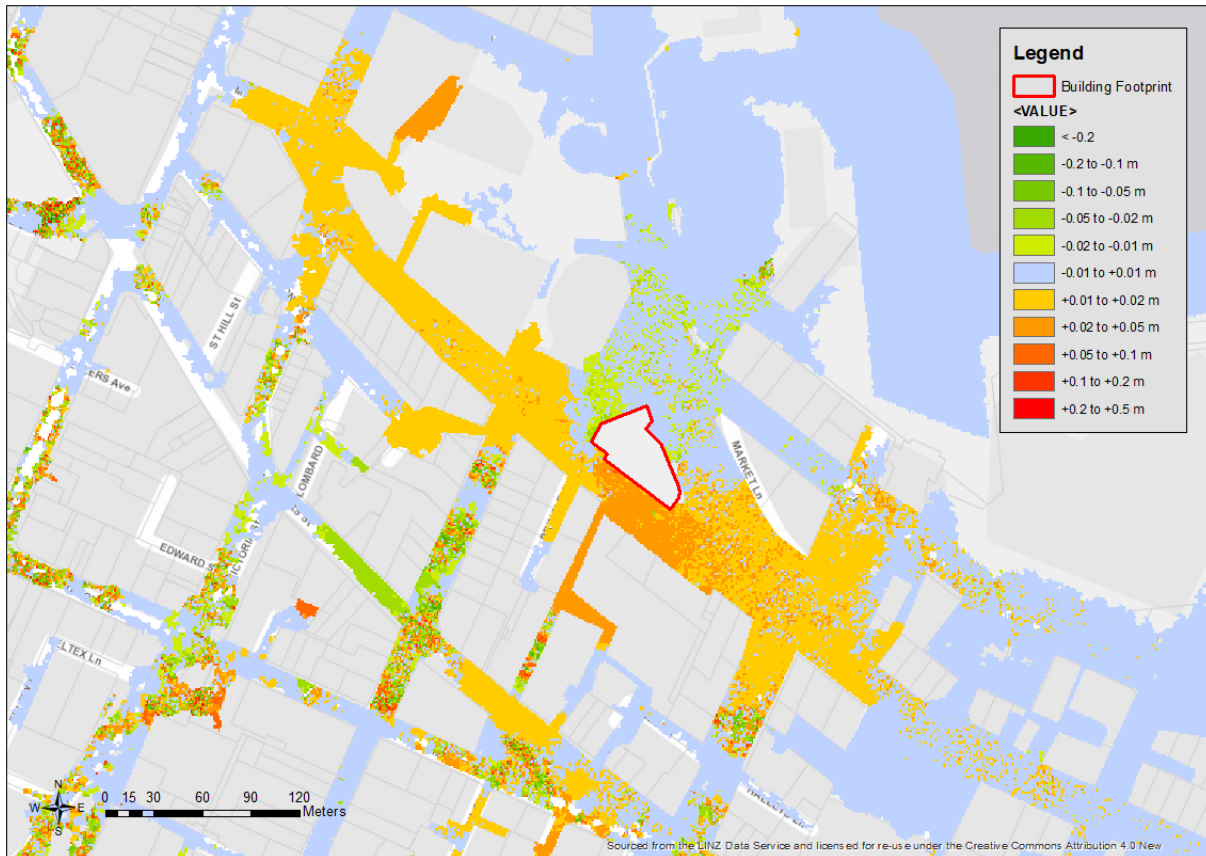


The maps show an increase up to 20mm for the 10yr ARI + CC event and up to 30mm for the 100yr ARI + CC event.

It is noted that there is “noise” in the results (i.e. areas showing a dense mixture of positive and negative values) due to the difference in mesh element sizes and shapes between the modelled scenarios and the small magnitude of variance presented (i.e. margin of error). This is a common modelling issue and these areas should be ignored as they do not show a consistent pattern.

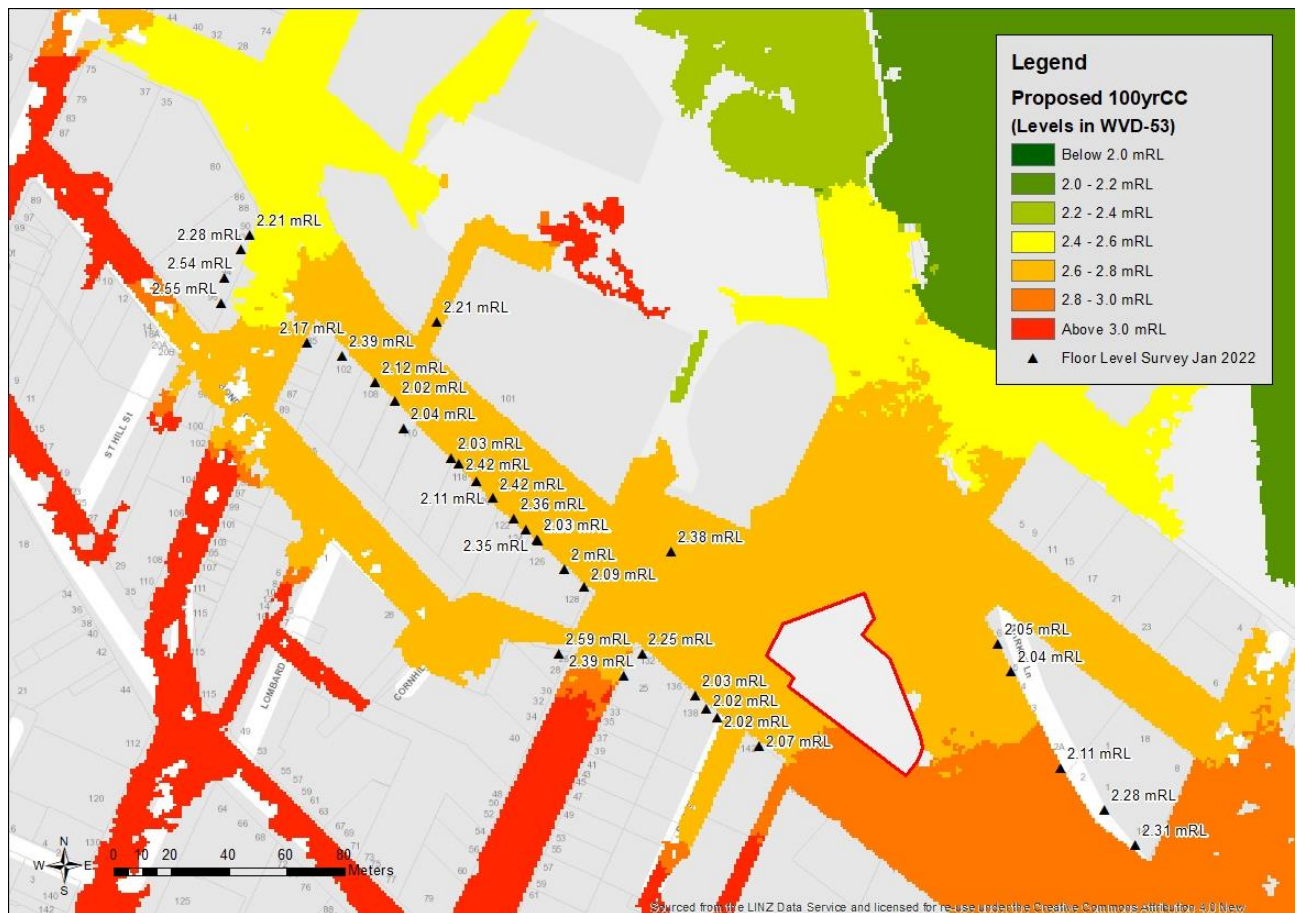
- In general terms the following can be concluded: Flood impact is mainly limited to Wakefield Street (from Taranaki Street to Victoria Street)
- The variances at Manners Street and Courtenay Place are considered to be outside the flood impact area and should therefore be ignored.
- The impact is up to 20mm during the 10yr+CC and 30mm during the 100yr+CC event.

Figure 6 Flood Level Difference Map 100yr ARI + CC



The existing floor levels of buildings within the affected area has been surveyed. The surveyed floor levels are shown in Figure 7 below. The figure shows that all buildings are already expected to flood during a 100-year ARI + CC design event up to around 0.7m. The increase in flood levels of 30mm is considered a minor impact on existing properties.

Figure 7 Surveyed Floor Levels and Proposed Development Flood Levels 100yr ARI + CC



## 4.6 Freeboard and Minimum Finished Floor Level

Following discussion with Wellington Water a freeboard of 0.2m is required to the top of foundation slab. This freeboard is to allow for:

- physical processes that may not have been allowed for in the model
- uncertainties in the precision of the hydraulic modelling
- and uncertainties in the prediction of physical processes.

Discussions with Wellington Water and Wellington City Council has confirmed that for a base isolated building the freeboard may be taken to the top of the foundation slab, being not subject to water damage.

The minimum Finished Floor Level (FFL) is therefore to be 3.03 m RL per WVD-53 or higher, being 200mm above the 100-year ARI + Climate Change flood level of 2.83 m RL.

## 5 Water Supply

### 5.1 Existing infrastructure

Wellington City Council records show a 200mm diameter Ductile Iron water main within Wakefield Street on the far side of the road to the development. A 250mm diameter Ductile Iron water main is also present in Cuba St which crosses Wakefield St and enters the western side of the Michael Fowler Centre site between the MFC and the town hall building, eventually connecting to mains in Jervois Quay and Civil Square. A 150mm water main is present in the southern side of Jervois Quay. Larger 450mm and 800mm transmission mains are present in Jervois Quay; however these would be unavailable for private connections. Several 20mm dia supplies to the site are shown on the GIS; furthermore a 40mm supply to the RNZB building is



known to be provided from Wakefield St (not shown on Figure). The existing water infrastructure records from Wellington Water are shown in the below Figure.

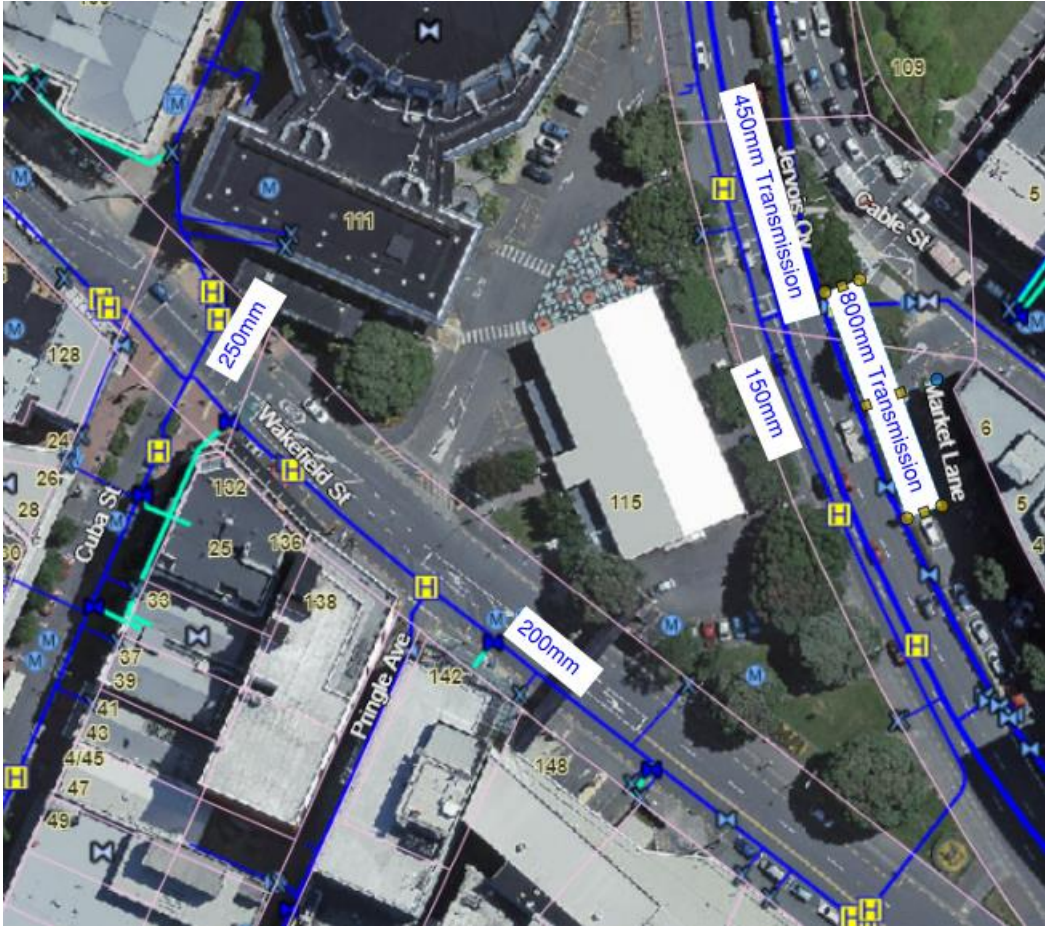


Figure 8: Council records of water infrastructure (Source: Wellington Water's Regional Water Stormwater Wastewater App)

Wellington Water modelling has shown a pressure head of 75-80m in the existing mains on Wakefield Street.

## 5.2 Proposed water supply infrastructure

Water supplies will be required for potable and sprinkler use in the new building.

Peak combined demand for the sprinkler system and hydrants is estimated to be 52.6 L/s as per NZS 4541. A 150mm diameter Ductile Iron Cement Lined pipe from the existing water main in Wakefield Street is proposed to service this demand as shown on the supplied proposed services plan.

Potable water demand is estimated to be in the order of 3.1 L/s as per the CIPHE Plumbing Engineering Services Design Guide. A DN90 HDPE is proposed to service the potable demand.

Wellington Water have made an initial assessment of the public supply in Wakefield St and have advised that there is a modelled 75-80m head in the line. This has been confirmed by hydrant testing which is provided in Appendix G, at a test flow of 80 L/s. This testing shows that the capacity of supply is likely to be sufficient for the design building demands.

Backflow prevention is to be provided by the building services trades, within the building footprint.

The 20mm site supplies are planned to be retained for irrigation of the planting areas.

Separation of potable and sprinkler supplies, to meet any security of supply requirements, are to be confirmed in further stages of design.



# 6 Wastewater Drainage

## 6.1 Existing System

Wellington City Council records show public wastewater drainage networks in the surrounding area as per the below Figures.

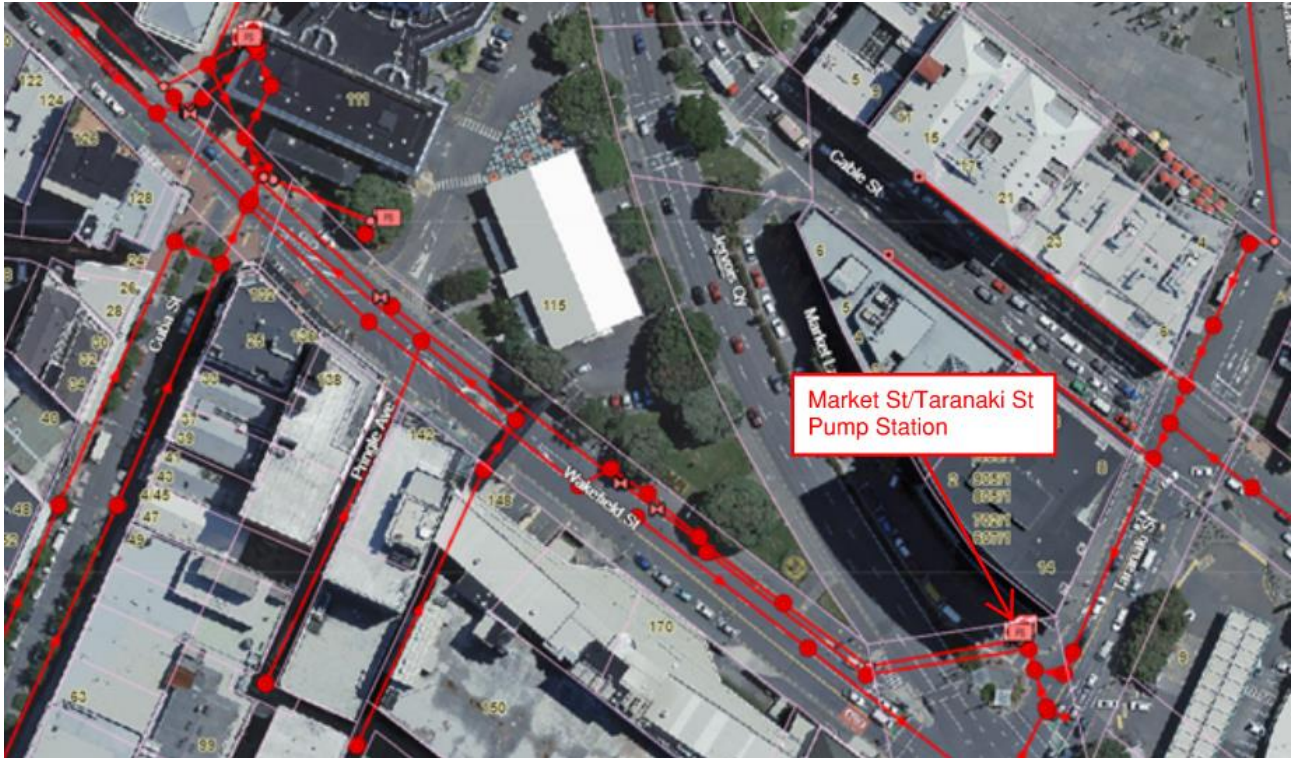


Figure 9: Council records of wastewater infrastructure (wide area view) (Source: Wellington Water's Regional Water Stormwater Wastewater App)

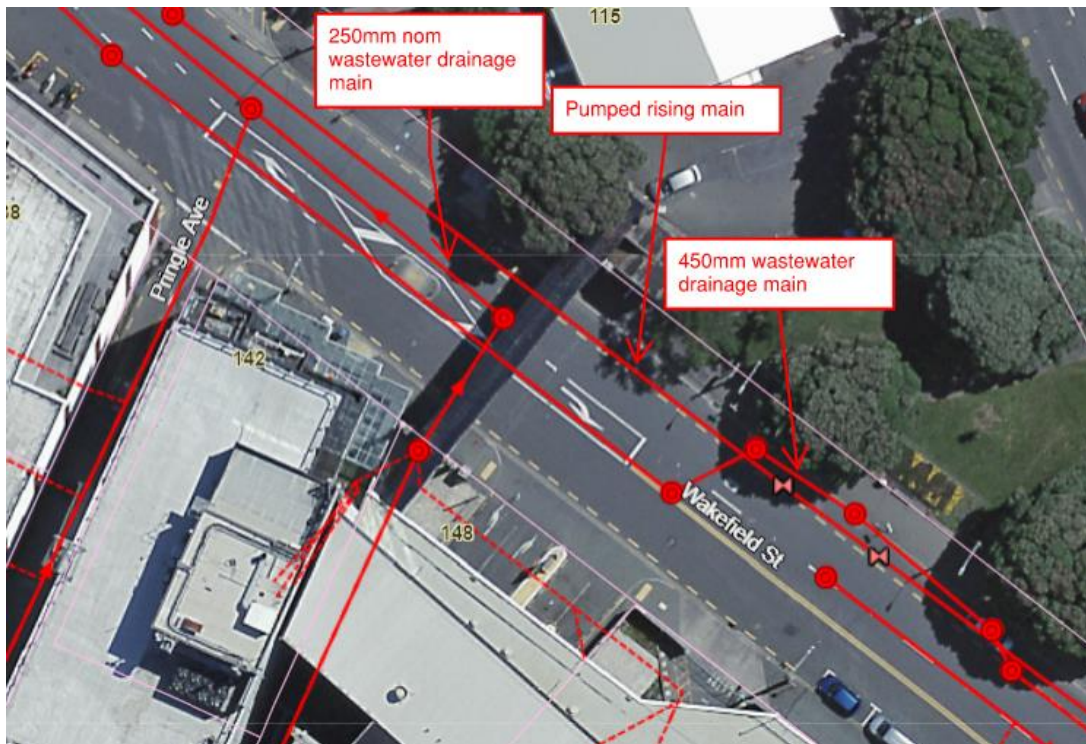


Figure 10: Council records of wastewater infrastructure in Wakefield St (Source: Wellington Water's Regional Water Stormwater Wastewater App)

A 450mm diameter concrete drainage pipe services Wakefield St and its upstream catchment, draining into the Pump Station shown at the intersection of Taranaki St, Market Lane, and Jervois Quay. A second, smaller public network (typically 250mm dia) collects wastewater from some buildings in the Wakefield Street and Cuba Streets area, discharging into a pump station in the south-west corner of the Michael Fowler Centre site. A pressurised rising main from the pump station is also present in Wakefield Street.

## 6.2 Wastewater Storage Chamber

A buried wastewater storage chamber is present below ground within the site, and it is proposed to construct the building footprint partially over the footprint of the chamber.

The chamber condition was inspected on 2 December 2021, comprising:

- Visual condition assessment of structure
- Hammer test to detect any areas of poor concrete quality.

The chamber appears to be in good condition, with no areas of deterioration detected.

Design, construction, and operational mitigations for constructing over this chamber are addressed in the Dunning Thornton report *Structural Effects and Construction Methodology* (dated 27<sup>th</sup> January 2022).

No changes to the hydraulic operation of the chamber are proposed.

Extensive consultation has been undertaken with Wellington Water which are being finalised, but include options to carry out a detailed seismic assessment of the tank.

## 6.3 Proposed Drainage Works

A single 150mm diameter lateral connection to the existing public 250mm network is proposed as shown on the supplied proposed services plan. Wellington Water has confirmed this network has capacity for the expected peak wet weather discharge of 9 L/s. This would likely be on the same alignment as the existing RNZB sewer lateral (i.e. replacing the lateral with a larger pipe).

# 7 Other Services

High voltage power is expected to be drawn from existing HV lines beneath Wakefield St, to a substation within the ground floor of the proposed building or located externally on the berm beside the building. Design development discussions with Wellington Electricity are ongoing.

Fibre-optic connections are to be from the Chorus network located in Wakefield Street. Design development regarding connection locations is ongoing.

Existing gas mains of up to 100mm diameter are present in the footpath of Wakefield Street, immediately adjacent to the proposed building. Design of the building foundations and construction methodologies will need to account for the presence of this gas main. Positive identification and accurate survey of the gas main will be required as an input to the design and is to be undertaken during further design stages.

Public streetlights are to be relocated to the road edges of the footpaths in Wakefield Street and Jervois Quay, in consultation with Wellington City Council.

Lighting within the site shall be designed in accordance with NZS1158.3.1:2020. Preliminary lighting levels have been selected in accordance with this standard and are shown on the Landscape Architect's drawings.

## 8 Sustainability

The external works design comprises features which are intended to contribute to a highly sustainable building, to be demonstrated through a 5-star NZ Green Star rating. The specific NZ Green Star credits being targeted in the civil design are:

- 25.1 Stormwater Peak Discharge:  
1 point is available where the post-development peak Average Recurrence Interval (ARI) event discharge from the site does not exceed the pre-development peak ARI event discharge.
- 25.2 Stormwater Pollution Targets:  
1 additional point is available, where the first point has been achieved and all stormwater discharged from site meets specified pollution reduction targets.

'Stormwater Peak Discharge' is likely to be met as the impervious area on the site is proposed to be reduced compared with the pre-development impervious area by introducing a net increase in soft landscaped areas, including areas at the north west of the site as part of a wider precinct improvement plan.

'Stormwater Pollution Targets' is likely to be met as:

- The paved area which will be frequently trafficked by vehicles will be reduced, thereby reducing contaminant load from vehicles tyres, brakes and the like
- The number of vehicle movements on the site will be reduced, by deletion of car parking. Traffic will typically be service vehicles to the adjacent Michael Fowler Centre, and minor light vehicle access.
- Green landscape areas will help to capture runoff from trafficked paved areas.
- A stormwater filtration device(s) may be provided, should trafficked paved areas not be able to be treated by other means. This is also subject to ownership agreements of drainage assets with Wellington City Council.

The design is at an early stage with some elements to be confirmed; however we are confident that the requirements for these credits can be met as the project advances.

## 9 Safe Design

Aurecon is committed to safe delivery of the proposed building. The key goal is to provide safer design for construction, operation, maintenance, and demolition phases throughout the project's lifecycle. Aurecon adopts a risk-based approach to eliminate or mitigate hazards not fully treated by the reference regulations, standards, codes, and guidelines.

The safe design process used on this project is based on a risk management approach. The safe design process:

- Maximises the likelihood of project safety objectives being achieved; and
- Documents the safe design work undertaken; and
- Records associated outcomes.

This section provides information on health and safety aspects of the design undertaken by Aurecon in the delivery of our services. At an appropriate point we recommend these risks are considered as part of a wider Safe Design workshop with the Client, Designers, and stakeholders.

Safe Design issues will continue to be assessed and mitigated throughout the design development. These include safety implications that impact that installation, construction, operations and maintenance of the proposed design. Key safety in design items that relate to the concept civil engineering works design thus far are:



- **High risk underground services.** The works will require excavation adjacent to strategic consumer gas assets for forming of foundations, crawl spaces, and the like. These works will require accurate location of the services and choosing structural design solutions which minimise risk to the existing services.

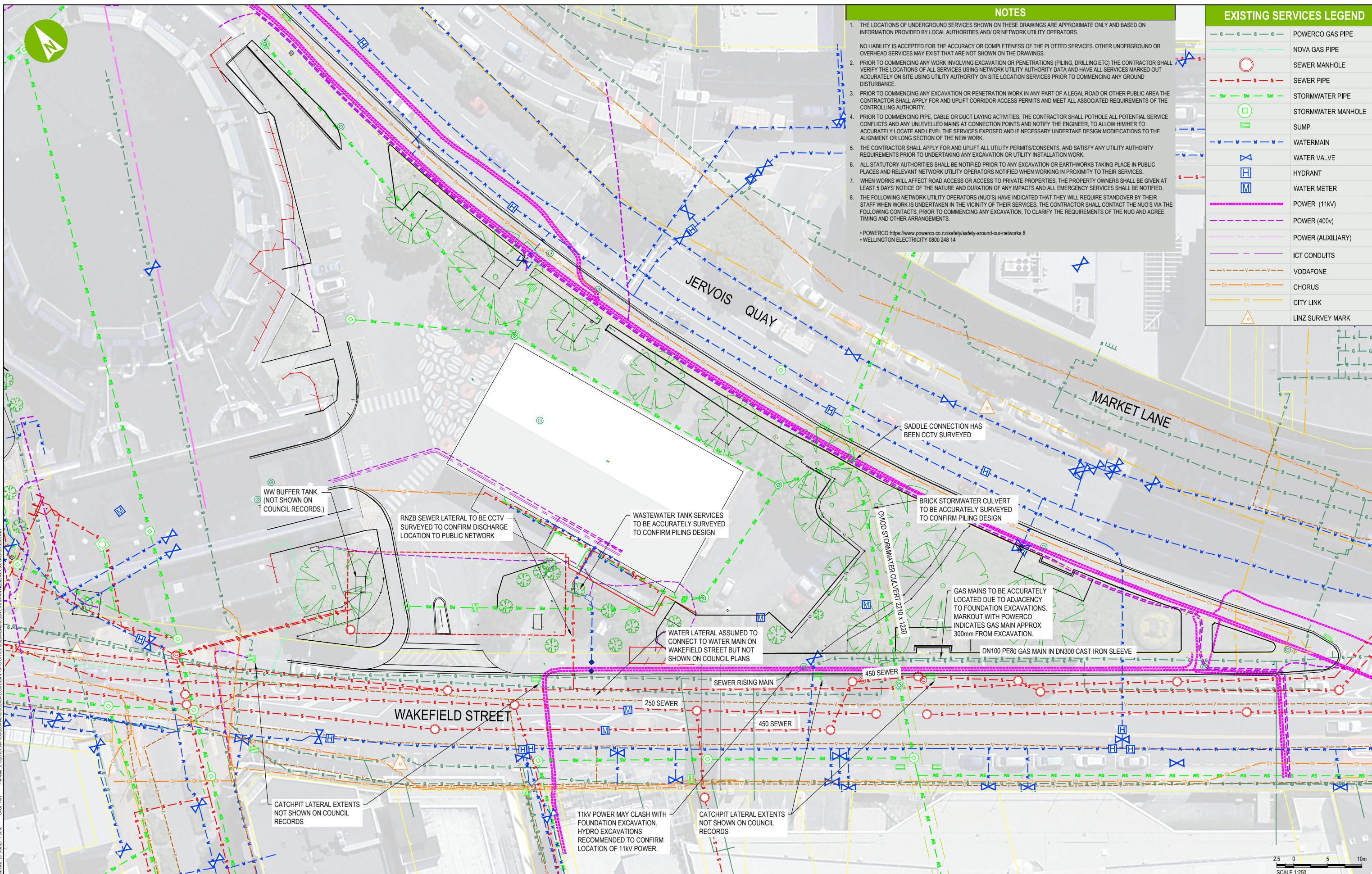
Further, the risk will always remain as there may be other unknown services within the site, so great care must be taken during construction.

- **Pedestrian traffic.** Significant pedestrian traffic moves through the site currently between Cuba Street and the Waterfront. This will need to be managed with appropriate staging of works.
- **Excavations.** Common coordinated service trenches are proposed to minimise excavations to dedicated routes through the site and minimise disruption in the public realm, where possible.
- **Flood Risk.** Site specific flood modelling has been undertaken using WWLs existing catchment model to assess the effects of the building on the overland flow path, flow velocities, depths, the proposed finished floor level, and impacts on surrounding buildings. The maximum increase in flood levels is relatively modest and will be assessed against existing building threshold levels to determine appropriate mitigation, if any is required.
- **Existing 3 waters infrastructure.** Significant work to determine the condition of existing buried wastewater and stormwater assets on the site is being undertaken to ensure that the design of the building is adapted to protect these existing structures to ensure no detrimental operational or structural effects from the development. (Please refer to the structural engineers report for further information on the protection measures proposed).

# Appendix A

## Drawings





- ### NOTES
- THE LOCATIONS OF UNDERGROUND SERVICES SHOWN ON THESE DRAWINGS ARE APPROXIMATE ONLY AND BASED ON INFORMATION PROVIDED BY LOCAL AUTHORITIES AND/OR NETWORK UTILITY OPERATORS.
  - NO LIABILITY IS ACCEPTED FOR THE ACCURACY OR COMPLETENESS OF THE PLOTTED SERVICES. OTHER UNDERGROUND OR OVERHEAD SERVICES MAY EXIST THAT ARE NOT SHOWN ON THE DRAWINGS.
  - PRIOR TO COMMENCING ANY WORK INVOLVING EXCAVATION OR PENETRATIONS (PILING, DRILLING ETC) THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL SERVICES USING NETWORK UTILITY AUTHORITY DATA AND HAVE ALL SERVICES MARKED OUT ACCURATELY ON SITE USING UTILITY AUTHORITY ON SITE LOCATION SERVICES PRIOR TO COMMENCING ANY GROUND DISTURBANCE.
  - PRIOR TO COMMENCING ANY EXCAVATION OR PENETRATION WORK IN ANY PART OF A LEGAL ROAD OR OTHER PUBLIC AREA THE CONTRACTOR SHALL APPLY FOR AND UPLIFT CORRIDOR ACCESS PERMITS AND MEET ALL ASSOCIATED REQUIREMENTS OF THE CONTROLLING AUTHORITY.
  - PRIOR TO COMMENCING PIPE, CABLE OR DUCT LAYING ACTIVITIES, THE CONTRACTOR SHALL POTHOLE ALL POTENTIAL SERVICE CONFLICTS AND ANY UNLEVELLED MAINS AT CONNECTION POINTS AND NOTIFY THE ENGINEER, TO ALLOW HIM/HER TO ACCURATELY LOCATE AND LEVEL THE SERVICES EXPOSED AND IF NECESSARY UNDERTAKE DESIGN MODIFICATIONS TO THE ALIGNMENT OR LONG SECTION OF THE NEW WORK.
  - THE CONTRACTOR SHALL APPLY FOR AND UPLIFT ALL UTILITY PERMITS/CONSENTS, AND SATISFY ANY UTILITY AUTHORITY REQUIREMENTS PRIOR TO UNDERTAKING ANY EXCAVATION OR UTILITY INSTALLATION WORK.
  - ALL STATUTORY AUTHORITIES SHALL BE NOTIFIED PRIOR TO ANY EXCAVATION OR EARTHWORKS TAKING PLACE IN PUBLIC PLACES AND RELEVANT NETWORK UTILITY OPERATORS NOTIFIED WHEN WORKING IN PROXIMITY TO THEIR SERVICES.
  - WHEN WORKS WILL AFFECT ROAD ACCESS OR ACCESS TO PRIVATE PROPERTIES, THE PROPERTY OWNERS SHALL BE GIVEN AT LEAST 5 DAYS' NOTICE OF THE NATURE AND DURATION OF ANY IMPACTS AND ALL EMERGENCY SERVICES SHALL BE NOTIFIED.
  - THE FOLLOWING NETWORK UTILITY OPERATORS (NUO'S) HAVE INDICATED THAT THEY WILL REQUIRE STANDOVER BY THEIR STAFF WHEN WORK IS UNDERTAKEN IN THE VICINITY OF THEIR SERVICES. THE CONTRACTOR SHALL CONTACT THE NUO'S VIA THE FOLLOWING CONTACTS, PRIOR TO COMMENCING ANY EXCAVATION, TO CLARIFY THE REQUIREMENTS OF THE NUO AND AGREE TIMING AND OTHER ARRANGEMENTS.
    - POWERCO <https://www.powerco.co.nz/safety/safety-around-our-networks>
    - WELLINGTON ELECTRICITY 0800 248 14

### EXISTING SERVICES LEGEND

	POWERCO GAS PIPE
	NOVA GAS PIPE
	SEWER MANHOLE
	SEWER PIPE
	STORMWATER PIPE
	STORMWATER MANHOLE
	SUMP
	WATERMAIN
	WATER VALVE
	HYDRANT
	WATER METER
	POWER (11kV)
	POWER (400v)
	POWER (AUXILIARY)
	ICT CONDUITS
	VODAFONE
	CHORUS
	CITY LINK
	LINZ SURVEY MARK

File Name: C:\Users\A14055\OneDrive\Documents\Projects\2018\2018\_02\_28\_17:02:00 - MFC OFFICE BUILDING\AURECON CIVIL DRAWINGS\2018\_02\_28\_17:02:00.DWG  
 Plot Date: 2018/02/28 17:02:00  
 Client Path:



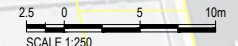
CLIENT

REV	DATE	REVISION DETAILS	APPROVED
A	25/02/22	ISSUE FOR INFORMATION	

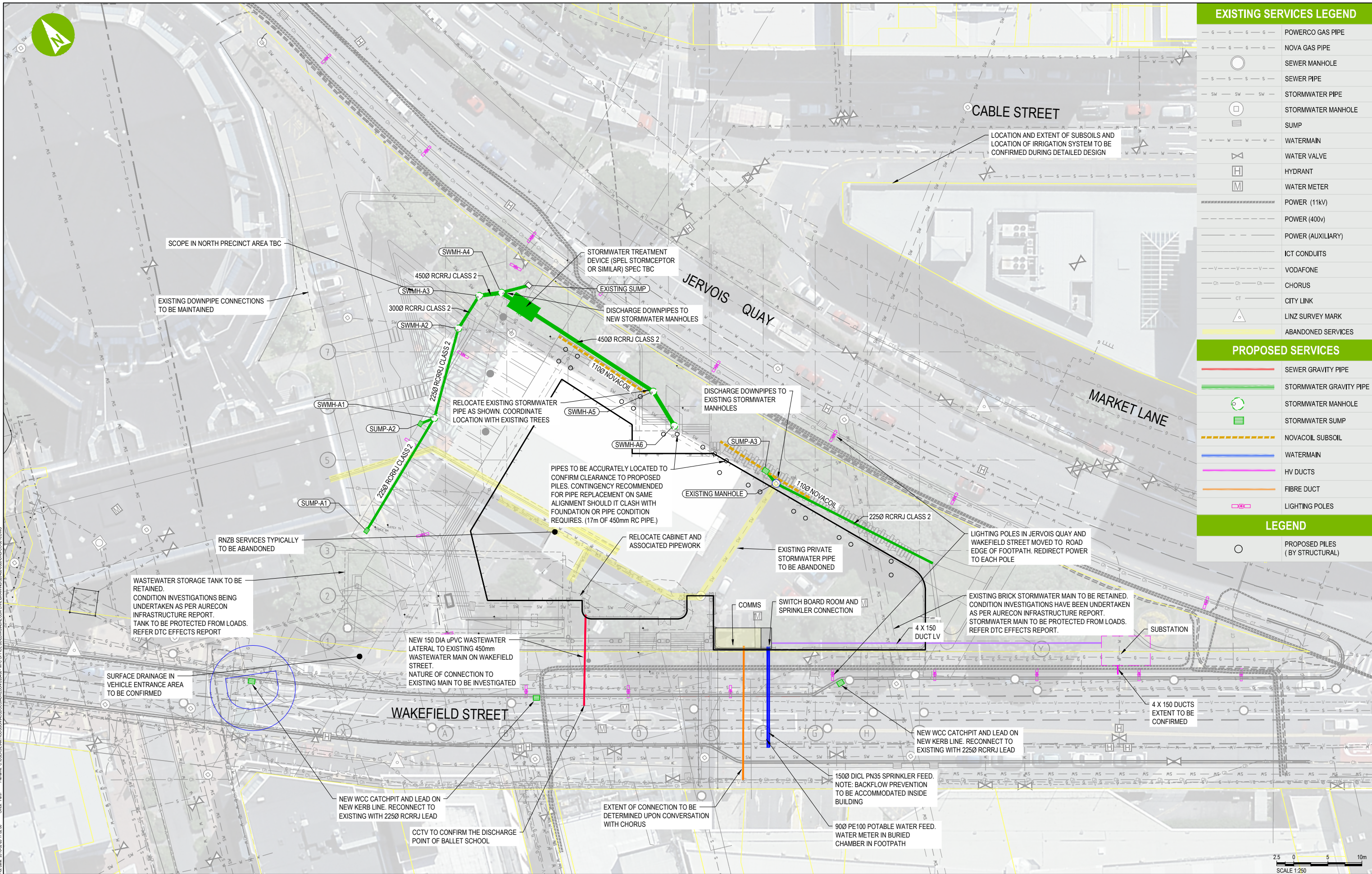
SCALE	1:250
SIZE	A1
DRAWN	I.HOLMES
DESIGNED	B.GOODISON
CHECKED	A.McLAREN

PRELIMINARY	NOT FOR CONSTRUCTION
APPROVED	DATE: 25/02/22

PROJECT	MFC OFFICE BUILDING MFC CARPARK				
TITLE	EXISTING SERVICES				
DRAWING No.	PROJECT No.	WBS	TYPE	DISC-NUMBER	REV
520408	520408	0000	DRG	CC-0005	A







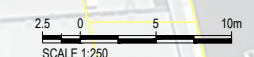
EXISTING SERVICES LEGEND	
— G — G — G — G —	POWERCO GAS PIPE
— G — G — G — G —	NOVA GAS PIPE
○	SEWER MANHOLE
— S — S — S — S —	SEWER PIPE
— SW — SW — SW —	STORMWATER PIPE
○	STORMWATER MANHOLE
□	SUMP
— W — W — W — W —	WATERMAIN
⊗	WATER VALVE
⊕	HYDRANT
⊙	WATER METER
— P — P — P — P —	POWER (11kV)
— P — P — P — P —	POWER (400v)
— P — P — P — P —	POWER (AUXILIARY)
— V — V — V — V —	ICT CONDUITS
— V — V — V — V —	VODAFONE
— Ch — Ch — Ch —	CHORUS
— CT — CT — CT —	CITY LINK
△	LINZ SURVEY MARK
—	ABANDONED SERVICES

PROPOSED SERVICES	
—	SEWER GRAVITY PIPE
—	STORMWATER GRAVITY PIPE
○	STORMWATER MANHOLE
□	STORMWATER SUMP
—	NOVAcoil SUBSOIL
—	WATERMAIN
—	HV DUCTS
—	FIBRE DUCT
□	LIGHTING POLES

LEGEND	
○	PROPOSED PILES (BY STRUCTURAL)



CLIENT

REV	DATE	REVISION DETAILS	APPROVED
A	25/02/22	ISSUE FOR INFORMATION	

SCALE	SIZE
1:250	A1
DRAWN	I.HOLMES
DESIGNED	B.GOODISON
CHECKED	A.McLAREN

PRELIMINARY	PROJECT
NOT FOR CONSTRUCTION	MFC OFFICE BUILDING
APPROVED	PROPOSED SERVICES
DATE	TITLE
25/02/22	

DRAWING No.	PROJECT No.	WBS	TYPE	DISC-NUMBER	REV
520408	520408	0000	DRG	CC-0010	A



# Appendix B

## Wellington Water Correspondence

## Alice Hoskins

---

**Subject:** Wastewater Capacity on Wakefield St  
**Location:** Microsoft Teams Meeting

**Start:** Wed 23/02/2022 12:30 PM  
**End:** Wed 23/02/2022 1:00 PM

**Recurrence:** (none)

**Meeting Status:** Meeting organizer

**Organizer:** Alice Hoskins  
**Required Attendees:** Mohammed.Hassan@wellingtonwater.co.nz

---

## Microsoft Teams meeting

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**Join with a video conferencing device**

945682022@t.plcm.vc

Video Conference ID: 131 699 694 9

[Alternate VTC instructions](#)

**Or call in (audio only)**

[+61 2 7208 4607,840016216#](#) Australia, Sydney

Phone Conference ID: 840 016 216#

[Find a local number](#) | [Reset PIN](#)

[Learn More](#) | [Meeting options](#)

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## Brock Goodison

---

**Subject:** RE: Building over drains/storage tank - Car Park Flood Sources and Levels-wwl -18 Sep 2021(address:111 Wakefield Street, Te Aro)

---

**From:** Samir Hermiz <[Samir.Hermiz@wellingtonwater.co.nz](mailto:Samir.Hermiz@wellingtonwater.co.nz)>

**Sent:** Tuesday, 22 February 2022 9:26 am

**To:** Graham Nash <[Graham.Nash@aurecongroup.com](mailto:Graham.Nash@aurecongroup.com)>

**Cc:** Olena Chan <[Olena.Chan@wellingtonwater.co.nz](mailto:Olena.Chan@wellingtonwater.co.nz)>; Mohammed Hassan <[Mohammed.Hassan@wellingtonwater.co.nz](mailto:Mohammed.Hassan@wellingtonwater.co.nz)>; Steve Hutchison <[Steve.Hutchison@wellingtonwater.co.nz](mailto:Steve.Hutchison@wellingtonwater.co.nz)>; Tim Strang <[Tim.Strang@wellingtonwater.co.nz](mailto:Tim.Strang@wellingtonwater.co.nz)>; Sam Lister <[Sam.Lister@wellingtonwater.co.nz](mailto:Sam.Lister@wellingtonwater.co.nz)>; Sean de Roo <[Sean.deRoo@wellingtonwater.co.nz](mailto:Sean.deRoo@wellingtonwater.co.nz)>; Sheena O'Brien <[Sheena.O'Brien@wellingtonwater.co.nz](mailto:Sheena.O'Brien@wellingtonwater.co.nz)>; Zac Jordan <[Zac.Jordan@wcc.govt.nz](mailto:Zac.Jordan@wcc.govt.nz)>; Charles Puha <[Charles.Puha@wellingtonwater.co.nz](mailto:Charles.Puha@wellingtonwater.co.nz)>; Samir Hermiz <[Samir.Hermiz@wcc.govt.nz](mailto:Samir.Hermiz@wcc.govt.nz)>

**Subject:** RE: Building over drains/storage tank - Car Park Flood Sources and Levels-wwl -18 Sep 2021(address:111 Wakefield Street, Te Aro)

**Importance:** High

Hi Graham

Thank you for your email after the discussion and meeting with different department in Wellington Water Ltd, please see the below comments and requirements;

1. The proposed building must comply with the Regional Standard for Water Services – December 2021 (rev.3) and the Regional Specification for Water Services – December 2021 (rev.3).
2. Building over the existing underground wastewater tank is not accepted in this case because the following reason:
  - A. WWL needs 24/7 access for heavy vehicles and this must be kept open.
  - B. As a minimum, an easement should be granted in favour of Wellington Water Ltd to ensure that the access hatches and reasonable surrounding area is accessible 24/7 and that no significant landscaping or similar work is done on or around those critical access points that hinders that access.
  - C. The building vehicle and pedestrian entrance arrangements need to be carefully reviewed and should be moved away from this utility access area.
  - D. The building tenants will need to recognise that this is a key operating infrastructure facility which is prone to noisy and smelly maintenance from time to time and to manage their own activities accordingly.
  - E. With longer term considerations, our ability to repair / refurbish / renew this asset would be severely compromised by this proposal. For example, seismic strengthening or earthquake repairs would normally be undertaken by opening the top of the structure. Having to access from one end creates a more hazardous confined space for workers, limits the use of heavy equipment and will inevitably increase the cost of such work. For example, in the unfortunate event that the structure was damaged in a severe earthquake it would be extremely difficult to repair with a large building over half the footprint.

Therefore the proposed building should be relocated away from this asset.

3. Building over the existing public stormwater culvert :

- A. According to GIS records, the culvert is over 100 years old and there is evidence of spalling and erosion damage. It's highly likely the culvert will need replacement or rehabilitation within the life of the building.
- B. The dimension of the culvert would make person-entry and insitu repairs difficult and limited in scope.
- C. Replacement of the culvert with a circular pipe is unlikely to perform hydraulically and may create unacceptable maintenance issues over the longer term.
- D. Diversion of the culvert around the building in the future does not look to be feasible given the dimensions of the culvert and downstream constraints.
- E. If a section of the culvert fails, then options for rehabilitation may be limited without severely compromising hydraulic performance.
- F. This culvert provides the primary stormwater conveyance from Aro Valley and the adjacent CBD areas. During heavy rainfall it will be flowing completely full and pressurised to above ground level. Any reduction in capacity will directly increase upstream and adjacent flooding issues.
- G. Replacement with a rectangular culvert may be feasible – but connections between the culverts and appropriate transitioning would need to be worked through.
- H. Given these circumstances, the culvert will need to be replaced prior to the construction of the building going ahead. Any alterations or additions to existing Public Drains will require Construction Plans to be submitted to the Land Development Team, Wellington Water, for approval. The work must be carried out by a Registered Drainlayer who is employed by a contractor who has an approved Health and Safety Plan and Public Liability Insurance. All work is to be carried out in accordance with the approved plans, the Wellington City Council Code of Practice for Land Development, Regional Standard for Water Services December, 2021, and a Public Drainage Permit (As distinct from a Building Consent ) to be issued by the Public Drainage Team and fees paid.

Please revise the proposed plans to comply with the above requirements.

Please feel free to contact me if you need more information.

Regards, ,

**Samir Hermiz** Drainage Engineer - Land Development



Tel +64 4 912 4466 DDI Mob 021 879 133

Private Bag 39804, Wellington Mail Centre 5045  
Level 4, IBM House, 25 Victoria Street, Petone, Lower Hutt

[www.wellingtonwater.co.nz](http://www.wellingtonwater.co.nz)

---

**From:** Graham Nash <[Graham.Nash@arecongroup.com](mailto:Graham.Nash@arecongroup.com)>

**Sent:** Wednesday, 16 February 2022 11:40 am

**To:** Samir Hermiz <[Samir.Hermiz@wellingtonwater.co.nz](mailto:Samir.Hermiz@wellingtonwater.co.nz)>; Mohammed Hassan <[Mohammed.Hassan@wellingtonwater.co.nz](mailto:Mohammed.Hassan@wellingtonwater.co.nz)>; Paul Winstanley <[Paul.Winstanley@wellingtonwater.co.nz](mailto:Paul.Winstanley@wellingtonwater.co.nz)>; Sean de Roo <[Sean.deRoo@wellingtonwater.co.nz](mailto:Sean.deRoo@wellingtonwater.co.nz)>; Sheena O'Brien <[Sheena.O'Brien@wellingtonwater.co.nz](mailto:Sheena.O'Brien@wellingtonwater.co.nz)>

**Cc:** Brock Goodison <[Brock.Goodison@arecongroup.com](mailto:Brock.Goodison@arecongroup.com)>; Kerrin Manuel <[KerrinM@mcguinness.co.nz](mailto:KerrinM@mcguinness.co.nz)>; Adam Thornton <[adam.thornton@dunningthornton.co.nz](mailto:adam.thornton@dunningthornton.co.nz)>; Jamie Reeve <[Jamie@willisbond.co.nz](mailto:Jamie@willisbond.co.nz)>; Rosalind Luxford <[Rosalind@willisbond.co.nz](mailto:Rosalind@willisbond.co.nz)>

**Subject:** RE: Building over drains/storage tank - Car Park Flood Sources and Levels-wwl -18 Sep 2021(address:111



Wakefield Street, Te Aro)

**Importance:** High

Hi Samir,

Further to our teams meeting and the below, and subsequent sharing of the basement draft model, can you confirm what comments WWL has please, or if you are satisfied with the information provided at this stage?

Thank you

**Graham Nash** BSc(Dist) IEng MICE  
Associate, Land Infrastructure, Aurecon  
T +64 4 4718768 M +64 27 2516079

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---

**From:** Graham Nash

**Sent:** Tuesday, 1 February 2022 4:27 pm

**To:** 'Samir Hermiz' <[Samir.Hermiz@wellingtonwater.co.nz](mailto:Samir.Hermiz@wellingtonwater.co.nz)>; 'Mohammed Hassan' <[Mohammed.Hassan@wellingtonwater.co.nz](mailto:Mohammed.Hassan@wellingtonwater.co.nz)>; 'Paul Winstanley' <[Paul.Winstanley@wellingtonwater.co.nz](mailto:Paul.Winstanley@wellingtonwater.co.nz)>; 'Sean de Roo' <[Sean.deRoo@wellingtonwater.co.nz](mailto:Sean.deRoo@wellingtonwater.co.nz)>; 'Sheena O'Brien' <[Sheena.O'Brien@wellingtonwater.co.nz](mailto:Sheena.O'Brien@wellingtonwater.co.nz)>  
**Cc:** Brock Goodison <[Brock.Goodison@arecongroup.com](mailto:Brock.Goodison@arecongroup.com)>; 'Kerrin Manuel' <[KerrinM@mcguinness.co.nz](mailto:KerrinM@mcguinness.co.nz)>; Adam Thornton <[adam.thornton@dunningthornton.co.nz](mailto:adam.thornton@dunningthornton.co.nz)>; 'Jamie Reeve' <[Jamie@willisbond.co.nz](mailto:Jamie@willisbond.co.nz)>; 'Rosalind Luxford' <[Rosalind@willisbond.co.nz](mailto:Rosalind@willisbond.co.nz)> <[rosalind@willisbond.co.nz](mailto:rosalind@willisbond.co.nz)>

**Subject:** RE: Building over drains/storage tank - Car Park Flood Sources and Levels-wwl -18 Sep 2021(address:111 Wakefield Street, Te Aro)

Hi Samir and wider WWL team,

Thanks for your time this morning – much appreciated. Please see attached my notes and actions from today's meeting.

Note: Adam is going to forward on some additional drawing perspectives as requested over the next few days

If I have omitted anything critical please advise – we look forward to WWLs comments, and are happy to catch up prior to the 15<sup>th</sup> Feb if you wish to discuss any design aspects.

Regards

**Graham Nash** BSc(Dist) IEng MICE  
Associate, Land Infrastructure, Aurecon  
T +64 4 4718768 M +64 27 2516079

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**From:** Graham Nash

**Sent:** Tuesday, 1 February 2022 10:48 am

**To:** Samir Hermiz <[Samir.Hermiz@wellingtonwater.co.nz](mailto:Samir.Hermiz@wellingtonwater.co.nz)>; Rosalind Luxford (<[Rosalind@willisbond.co.nz](mailto:Rosalind@willisbond.co.nz)> <[rosalind@willisbond.co.nz](mailto:rosalind@willisbond.co.nz)>); Jamie Reeve <[Jamie@willisbond.co.nz](mailto:Jamie@willisbond.co.nz)>; Adam Thornton <[adam.thornton@dunningthornton.co.nz](mailto:adam.thornton@dunningthornton.co.nz)>; Mohammed Hassan <[Mohammed.Hassan@wellingtonwater.co.nz](mailto:Mohammed.Hassan@wellingtonwater.co.nz)>; Paul Winstanley <[Paul.Winstanley@wellingtonwater.co.nz](mailto:Paul.Winstanley@wellingtonwater.co.nz)>; Sean de Roo <[Sean.deRoo@wellingtonwater.co.nz](mailto:Sean.deRoo@wellingtonwater.co.nz)>; Sheena O'Brien <[Sheena.O'Brien@wellingtonwater.co.nz](mailto:Sheena.O'Brien@wellingtonwater.co.nz)>

**Subject:** RE: Building over drains/storage tank - Car Park Flood Sources and Levels-wwl -18 Sep 2021(address:111 Wakefield Street, Te Aro)

FYI folks

Cheers

**Graham Nash** BSc(Dist) IEng MICE  
Associate, Land Infrastructure, Aurecon  
T +64 4 4718768 M +64 27 2516079

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-----Original Appointment-----

**From:** Samir Hermiz <[Samir.Hermiz@wellingtonwater.co.nz](mailto:Samir.Hermiz@wellingtonwater.co.nz)>

**Sent:** Thursday, 27 January 2022 11:51 am

**To:** Samir Hermiz; Rosalind Luxford ([Rosalind@willisbond.co.nz](mailto:Rosalind@willisbond.co.nz)); Jamie Reeve; Graham Nash; Adam Thornton; Mohammed Hassan; Paul Winstanley; Sean de Roo; Sheena O'Brien

**Subject:** FW: Building over drains/storage tank - Car Park Flood Sources and Levels-wwl -18 Sep 2021(address:111 Wakefield Street, Te Aro)

**When:** Tuesday, 1 February 2022 10:00 am-11:00 am (UTC+12:00) Auckland, Wellington.

**Where:** Microsoft Teams Meeting

-----Original Appointment-----

**From:** Samir Hermiz

**Sent:** Thursday, 27 January 2022 11:47 am

**To:** Adam Thornton; Mohammed Hassan; Paul Winstanley; Sean de Roo; Sheena O'Brien

**Subject:** Building over drains/storage tank - Car Park Flood Sources and Levels-wwl -18 Sep 2021(address:111 Wakefield Street, Te Aro)

**When:** Tuesday, 1 February 2022 10:00 am-11:00 am (UTC+12:00) Auckland, Wellington.

**Where:** Microsoft Teams Meeting

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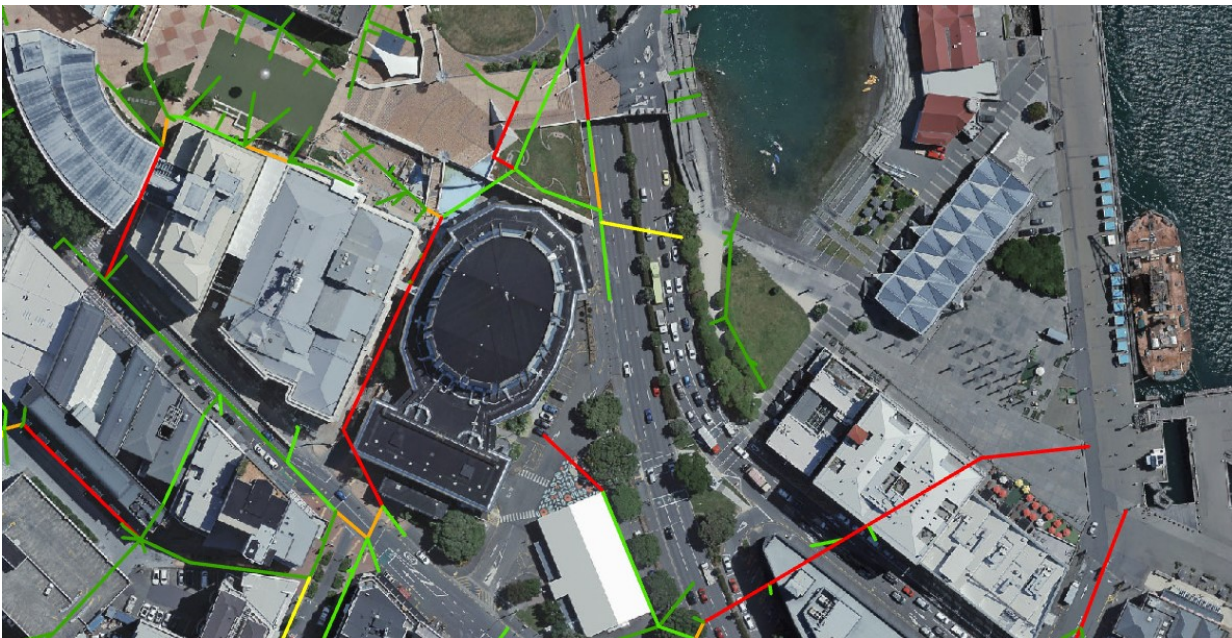
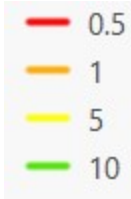
## Alice Hoskins

---

**From:** Land Development <Land.Development@wellingtonwater.co.nz>  
**Sent:** Thursday, 17 February 2022 9:58 AM  
**To:** Alice Hoskins  
**Cc:** Brock Goodison; Land Development  
**Subject:** FW: Michael Fowler Centre - Pipe capacities and unknown utilities locations (SW)

Hi Alice

The estimated/modelled for the Level of Service (return period) of stormwater pipes in the area is colour coded.



I will send you wastewater information once I receive from our modeller.

regards

**Mohammed Hassan** Team Leader Land Development Consenting



Tel 04 912 4400 DDI 049124591 Mob 021913809

Private Bag 39804, Wellington Mail Centre 5045

Level 4, IBM House, 25 Victoria Street, Petone, Lower Hutt

[www.wellingtonwater.co.nz](http://www.wellingtonwater.co.nz)

---

**From:** Alice Hoskins <[Alice.Hoskins@aurecongroup.com](mailto:Alice.Hoskins@aurecongroup.com)>  
**Sent:** Tuesday, 15 February 2022 4:26 pm  
**To:** Land Development <[Land.Development@wellingtonwater.co.nz](mailto:Land.Development@wellingtonwater.co.nz)>  
**Cc:** Brock Goodison <[Brock.Goodison@aurecongroup.com](mailto:Brock.Goodison@aurecongroup.com)>  
**Subject:** Michael Fowler Centre - Pipe capacities and unknown utilities locations

Hi WW,

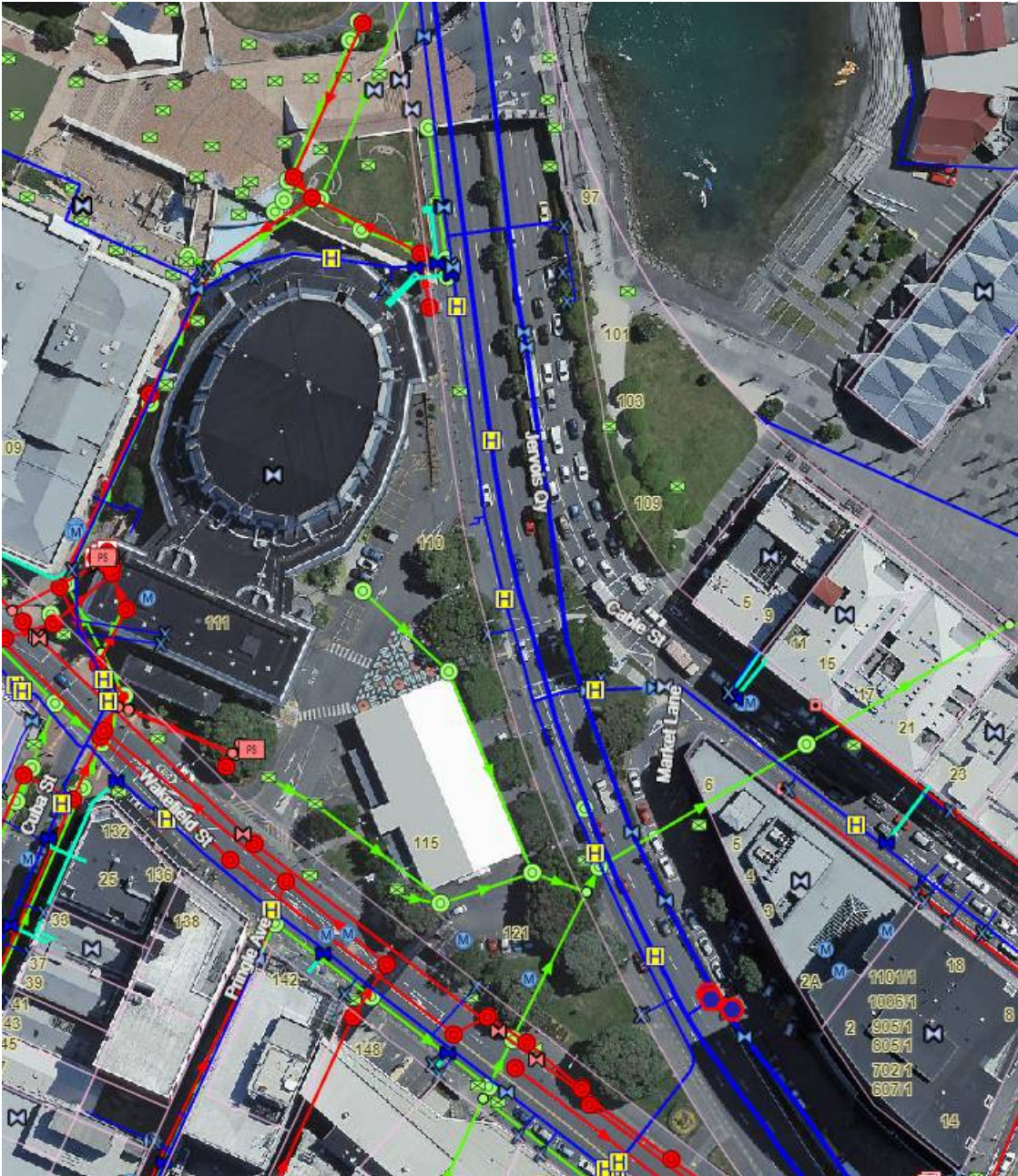
We are designing a large scale building on the existing ground of the Michael Fowler Carpark. We are needing to know the capacities of the surrounds WW and SW. Below is an image from your GIS system of the building we are looking out (115 Wakefield Street).

We have two main queries;

1. The capacities of the WW and SW networks in the area
2. Are there any additional info that does not appear in this GIS view?

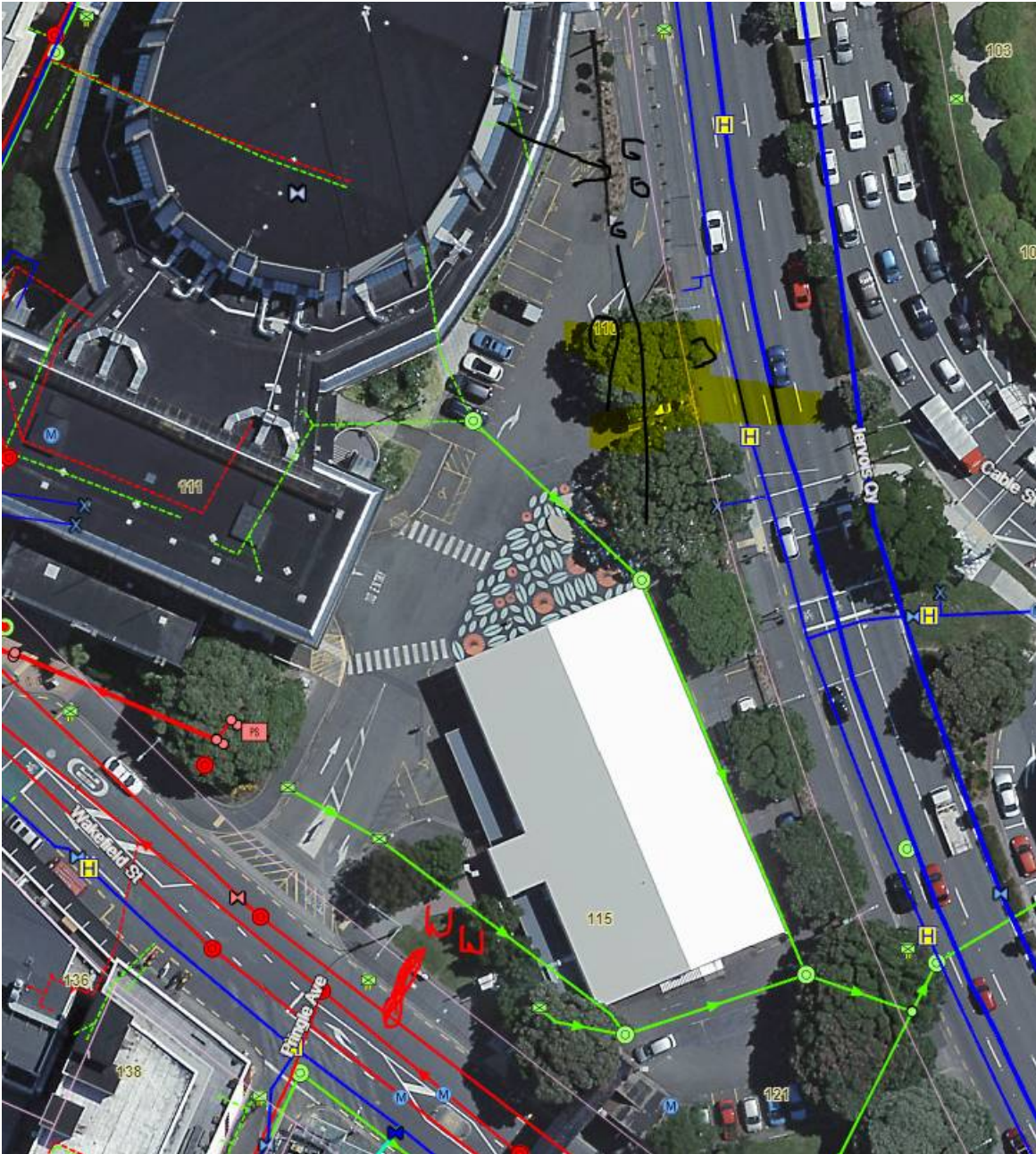
We ask the second due to a previous investigation in which we believe there might be a WW storage tank near the right PS near the entrance to the carpark. If this is the case, it might affect construction traffic etc. Also if you look at the zoomed in figure, there are several SW pipes that appear to not be connected to anything. Would you know if this is private infrastructure we need to follow up on?





Finally, we went out to site and found infrastructure on site that did not appear in the GIS. Such as several (what looked like SW or WW manholes) up at the top right (in black circles) and a marked out WW line including clear previous construction trench lines (in the red colour down the bottom of the page). We want to confirm that this is in your data base? Are they new connections? Are the SW ones up the top decommissioned?





We are just wanting to gain better understanding of the underground services in the area so we do not incur any surprises or instances.

Kind regards,

**Alice Hoskins**  
Civil Engineer, Aurecon

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Level 2, Iwikau Building  
93 Cambridge Terrace Christchurch New Zealand 8013  
[aurecongroup.com](http://aurecongroup.com)

**MEMO**

TO Land development

COPIED TO

FROM Ahmed Hassan

DATE 13 September 2021

SUBJECT Wastewater development impact assessment of MFC car park, Te Aro

**FOR YOUR INFORMATION**
**Asset impact assessment**

DETAILS	
Address	MFC car park, Te Aro, WELLINGTON
Source	Email dated 09 September 2021
Type	Development enquiry
Reference	
Asset	Wastewater

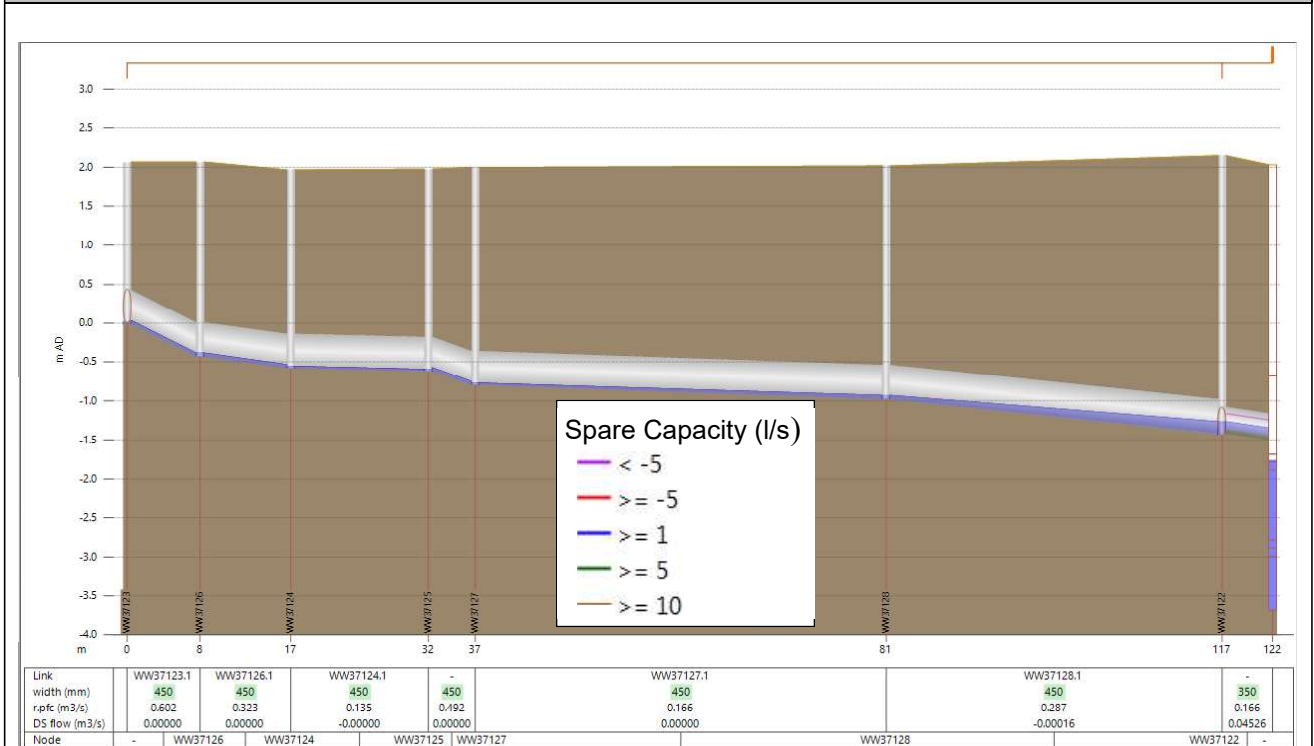
  




MODEL			
Software	InfoWorks ICM	Version	10.5
Model Name	WCC Moa Point WwTP	Version	5
Base Year	2015 (current)		
Design Event	1-year LTS (Moa Point 1Y > Kelburn with evap)		

LOCAL NETWORK	
Current Capacity	N/A

**TRUNK NETWORK (pipes 300mm dia and above)**



**Current Capacity** The property could be directly connected to the trunk network at or just upstream manhole WW37123 that discharges to pump station PS005 at the Taranaki St-Jerovis Qy intersection and has at least 10 litres/sec of spare design capacity during a 1-year LTS design event. From PS005 the trunk network ultimately flows to the Moa Point WWTP and that portion contains sections that are already at, or over their design capacity. There is an engineered overflow at manhole WW38599 that discharges via the Taranaki St stormwater system into Wellington Harbour. It is unclear from the model results how frequently it operates

**SUMMARY**

The trunk network to PS005 has at least 10 litres/sec of spare design capacity during the same event. There is an engineered overflow that discharges via the Taranaki St stormwater system into Wellington Harbour. It is unclear from the model results how frequently it operates

**DISCLAIMER**

This assessment is based on the results from WWL hydraulic models as defined in this memorandum. It does not take into account the impact on the spare design capacity of other developments that have occurred since then, are currently underway, or possible future developments. Non-hydraulic parameters like pipe age, conditions and likelihood of their failure have not been assessed. Flow monitoring may be required to verify these results. This development may impact on the spare design capacity available for possible future developments along the downstream network.

## Brock Goodison

**From:** Modelling Team <Modelling.Team@wellingtonwater.co.nz>  
**Sent:** Monday, 13 September 2021 10:26 AM  
**To:** Graham Nash; Land Development  
**Subject:** RE: MFC - Car Park Flood Sources and Levels-wwl - 7 Sep 2021

Hi Graham,

Please find the below WW assessment for this site

### Asset impact assessment

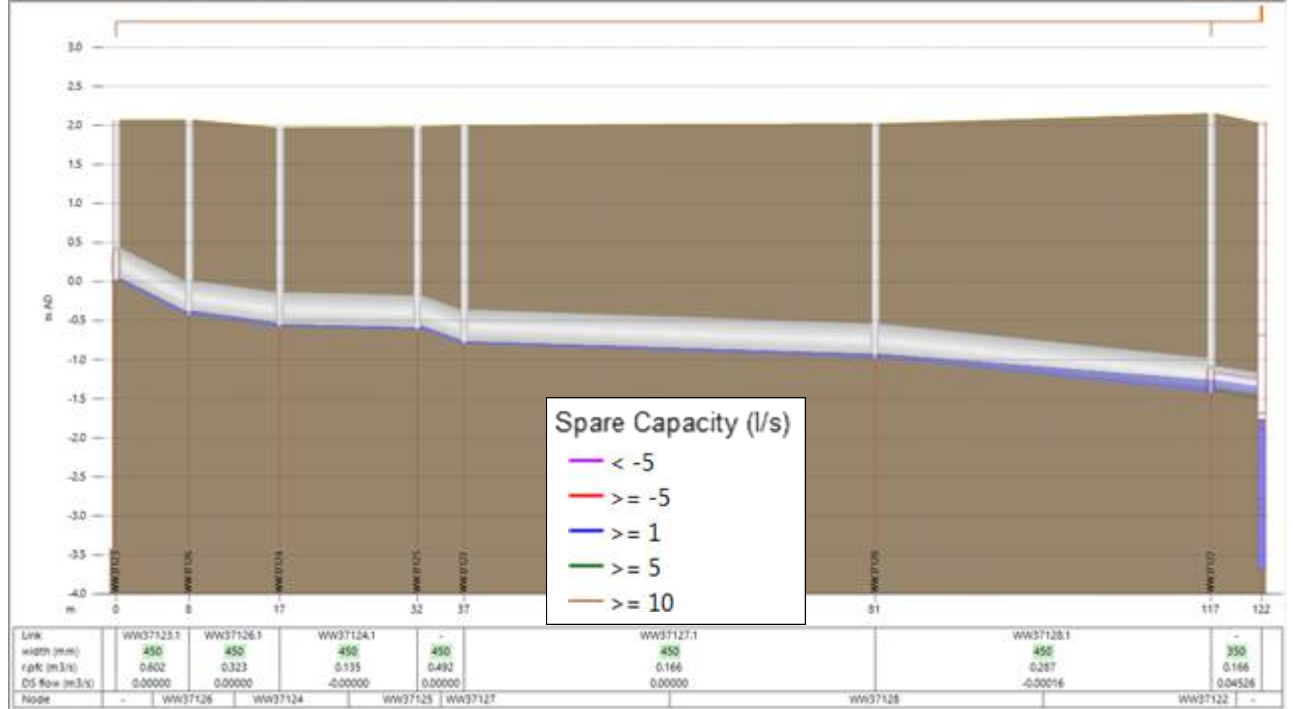
DETAILS	
Address	MFC car park, Te Aro, WELLINGTON
Source	Email dated 09 September 2021
Type	Development enquiry
Reference	
Asset	Wastewater



MODEL			
Software	InfoWorks ICM	Version	10.5
Model Name	WCC Moa Point WwTP	Version	5
Base Year	2015 (current)		
Design Event	1-year LTS (Moa Point 1Y > Kelburn with evap)		

LOCAL NETWORK	
Current Capacity	N/A

**TRUNK NETWORK (pipes 300mm dia and above)**



**Current Capacity**

The property could be directly connected to the trunk network at or just upstream manhole WW37123 that discharges to pump station PS005 at the Taranaki St-Jervois Qy intersection and has at least 10 litres/sec of spare design capacity during a 1-year LTS design event. From PS005 the trunk network ultimately flows to the Moa Point WWTP and that portion contains sections that are already at, or over their design capacity. There is an engineered overflow at manhole WW38599 that discharges via the Taranaki St stormwater system into Wellington Harbour. It is unclear from the model results how frequently it operates

**SUMMARY**

The trunk network to PS005 has at least 10 litres/sec of spare design capacity during the same event. There is an engineered overflow that discharges via the Taranaki St stormwater system into Wellington Harbour. It is unclear from the model results how frequently it operates

**DISCLAIMER**

This assessment is based on the results from WWL hydraulic models as defined in this memorandum. It does not take into account the impact on the spare design capacity of other developments that have occurred since then, are currently underway, or possible future developments. Non-hydraulic parameters like pipe age, conditions and likelihood of their failure have not been assessed. Flow monitoring may be required to verify these results. This development may impact on the spare design capacity available for possible future developments along the downstream network.

Ngā mihi  
Ahmed

Ahmed Hassan Senior Hydraulic Modelling – Land Development



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**From:** Graham Nash <Graham.Nash@aurecongroup.com>  
**Sent:** Thursday, 9 September 2021 5:45 pm  
**To:** Sarah Zhou <Sarah.Zhou@wellingtonwater.co.nz>  
**Cc:** Modelling Team <Modelling.Team@wellingtonwater.co.nz>; Ahmed Hassan <Ahmed.Hassan@wellingtonwater.co.nz>  
**Subject:** RE: MFC - Car Park Flood Sources and Levels-wwl - 7 Sep 2021

Hi Sarah,

Further the below can I add two other points/queries please in the interim if you can advise:

1. Flood levels with respect to FFLs. The regional standard below indicates freeboard is measure to from the underside of joists or concrete slab. Can I confirm that the underside reference was only for timber joist supported floors, and does not apply to a concrete slab on grade. I.e. that freeboard is measured to the top of the concrete slab. Thanks

**4.2.9 Freeboard**

Unless Wellington Water has undertaken a formal assessment of an appropriate freeboard allowance based on sensitivity testing in a validated hydraulic model, habitable building floors shall have a freeboard of 500 mm above the surface water of the secondary level of protection event. Commercial and industrial buildings shall have a freeboard of 300mm and all other building freeboards shall be 200 mm.

The minimum freeboard shall be measured from the top of the peak water level resulting from the design storm event, to the building platform level or underside of the floor joists or structural concrete slab of the building.

For open channels and streams, a minimum freeboard of 500 mm shall be adopted for the primary level of protection flow.

Vehicle bridges must have a freeboard of 600 mm to the underside of the bridge structure, or 1200 mm where there is a possibility of large trees in the waterway.

2. I also wish to note that we may be building over the current large ovoid stormwater main as shown below. Can you confirm in principle that we can do so, pending agreements on how to protect the main? Thanks



Regards

**Graham Nash** BSc(Dist) IEng MICE  
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[Graham.Nash@aurecongroup.com](mailto:Graham.Nash@aurecongroup.com)

**DISCLAIMER**

**From:** Graham Nash  
**Sent:** Tuesday, 7 September 2021 5:08 pm  
**To:** Sarah Zhou <[Sarah.Zhou@wellingtonwater.co.nz](mailto:Sarah.Zhou@wellingtonwater.co.nz)>  
**Cc:** Modelling Team <[Modelling.Team@wellingtonwater.co.nz](mailto:Modelling.Team@wellingtonwater.co.nz)>; Ahmed Hassan <[Ahmed.Hassan@wellingtonwater.co.nz](mailto:Ahmed.Hassan@wellingtonwater.co.nz)>  
**Subject:** RE: MFC - Car Park Flood Sources and Levels-wwl - 7 Sep 2021

Hi Sarah,

Our connection point for wastewater would be in Wakefield St around Opera House Lane or east of (depending upon if we can make a direct connection or have to buffer storage on site prior to release). Same for our water supply, rather than a connection from Jervois

Thanks



**Graham Nash** BSc(Dist) IEng MICE  
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DISCLAIMER

---

**From:** Sarah Zhou <[Sarah.Zhou@wellingtonwater.co.nz](mailto:Sarah.Zhou@wellingtonwater.co.nz)>  
**Sent:** Tuesday, 7 September 2021 4:57 pm  
**To:** Graham Nash <[Graham.Nash@aurecongroup.com](mailto:Graham.Nash@aurecongroup.com)>  
**Cc:** Modelling Team <[Modelling.Team@wellingtonwater.co.nz](mailto:Modelling.Team@wellingtonwater.co.nz)>; Ahmed Hassan <[Ahmed.Hassan@wellingtonwater.co.nz](mailto:Ahmed.Hassan@wellingtonwater.co.nz)>  
**Subject:** RE: MFC - Car Park Flood Sources and Levels-wwl - 7 Sep 2021

Hi Graham

Ahmed in our modelling team is currently assessing the wastewater capacity. I understand you don't have a scheme plan at the moment.

Is it possible for you to identify the likely wastewater connection point? This will make wastewater assessment easier and faster.

Please find the **water supply** info below:

- The model shows that minimum pressure at the point of supply (assuming to be on the Wakefield Street) on the existing 200mm public main is expected to be about 75-80m, which meets the level of service criteria for pressure. The model also indicates that available fire flow capacity from the existing hydrants is expected to be compliant with their requirement of FW2. **This assumption (FW2) needs to be confirmed by a fire engineer by assessing the actual fire risk for the proposed building.**
- The proposed connection is likely to be OK if it is made to the 250mm pipe (the pipe crossed Wakefield Street) or to the 200mm on the other side of the road. Please provide design report, including all calculation and assumptions to ensure connection pipe is sized appropriately.

This modelling assessment only represents the existing network based on WWL hydraulic model developed in 2018. The analysis takes no account of developments that have occurred since then,

currently underway, or future developments. Non-hydraulic parameters like pipe age, conditions and likelihood of their failure have not been assessed. Please also note the above are just the result of WWL hydraulic model which could be impacted by day-to-day operational changes within the network and may need to be verified in the field through pressure logging and hydrant flow tests.



Thanks  
Sarah

Sarah Zhou Senior Engineer - Land Development



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---

**From:** Modelling Team <[Modelling.Team@wellingtonwater.co.nz](mailto:Modelling.Team@wellingtonwater.co.nz)>

**Sent:** Tuesday, September 7, 2021 10:32 AM

**To:** Sarah Zhou <[Sarah.Zhou@wellingtonwater.co.nz](mailto:Sarah.Zhou@wellingtonwater.co.nz)>

**Subject:** RE: MFC - Car Park Flood Sources and Levels-wwl - Urgent

Hi Sarah,

There are at least three different connections to the local network over this area, can you point roughly to the location of the proposed building? Or I will have to assess every possible connection which will take a while.

Ngā mihi  
Ahmed

**Ahmed Hassan** Senior Hydraulic Modelling – Land Development



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---

**From:** Sarah Zhou <[Sarah.Zhou@wellingtonwater.co.nz](mailto:Sarah.Zhou@wellingtonwater.co.nz)>

**Sent:** Friday, 3 September 2021 9:25 am

**To:** Iman Aghamohammadi <[Iman.Aghamohammadi@wellingtonwater.co.nz](mailto:Iman.Aghamohammadi@wellingtonwater.co.nz)>; Ahmed Hassan <[Ahmed.Hassan@wellingtonwater.co.nz](mailto:Ahmed.Hassan@wellingtonwater.co.nz)>; Modelling Team <[Modelling.Team@wellingtonwater.co.nz](mailto:Modelling.Team@wellingtonwater.co.nz)>

**Subject:** FW: MFC - Car Park Flood Sources and Levels-wwl - Urgent

**Importance:** High

(Water & wastewater)

Hi Guys

Can you provide modelling info for Michael Fowler Centre car park site? Further development is proposed at this area. (specific location is not confirmed)

**Please note the following:**

**Sewer:**

The proposed building I am advised is 14,300sq.m over 7 levels. At 400pp/ha this is a PWWF of around 9l/s.

**Water supply:**

Site demand of around 32l/s for 2/3 potable supply and fire flows assuming FW2 classification.





Thanks  
Sarah

Sarah Zhou Senior Engineer - Land Development



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---

**From:** Graham Nash <[Graham.Nash@arecongroup.com](mailto:Graham.Nash@arecongroup.com)>  
**Sent:** Thursday, September 2, 2021 5:57 PM  
**To:** Sarah Zhou <[Sarah.Zhou@wellingtonwater.co.nz](mailto:Sarah.Zhou@wellingtonwater.co.nz)>  
**Cc:** Joey Narvasa <[Joey.Narvasa@wellingtonwater.co.nz](mailto:Joey.Narvasa@wellingtonwater.co.nz)>  
**Subject:** RE: MFC - Car Park Flood Sources and Levels-wwl - 20 Aug 2021

Hi folks

Just following this one up please

Thanks

**Graham Nash** BSc(Dist) IEng MICE  
Associate, Land Infrastructure, Aurecon

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[Graham.Nash@aurecongroup.com](mailto:Graham.Nash@aurecongroup.com)

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---

**From:** Graham Nash  
**Sent:** Thursday, 26 August 2021 12:43 pm  
**To:** 'Sarah Zhou' <[Sarah.Zhou@wellingtonwater.co.nz](mailto:Sarah.Zhou@wellingtonwater.co.nz)>  
**Cc:** 'Joey Narvasa' <[Joey.Narvasa@wellingtonwater.co.nz](mailto:Joey.Narvasa@wellingtonwater.co.nz)>  
**Subject:** RE: MFC - Car Park Flood Sources and Levels-wwl - 20 Aug 2021

Hi Sarah/Joey,

Separate to the below this could I also ask/get some information on the network constraints in the vicinity of the Michael Fowler centre with respect to stormwater, wastewater and potable water supply please? I anticipate that a sewer connection will be the most challenging

**Sewer:**

The proposed building I am advised is 14,300sq.m over 7 levels. At 400pp/ha this is a PWWF of around 9l/s.

**Water supply:**

Site demand of around 32l/s for 2/3 potable supply and fire flows assuming FW2 classification.

**Stormwater:**

The site is essentially fully impervious with downstream connection to large main to outfall – I do not expect significant issues here.

Many thanks  
Graham

**Graham Nash** BSc(Dist) IEng MICE  
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[Graham.Nash@aurecongroup.com](mailto:Graham.Nash@aurecongroup.com)

DISCLAIMER

---

**From:** Graham Nash  
**Sent:** Thursday, 26 August 2021 12:13 pm  
**To:** 'Sarah Zhou' <[Sarah.Zhou@wellingtonwater.co.nz](mailto:Sarah.Zhou@wellingtonwater.co.nz)>  
**Cc:** 'Joey Narvasa' <[Joey.Narvasa@wellingtonwater.co.nz](mailto:Joey.Narvasa@wellingtonwater.co.nz)>  
**Subject:** RE: MFC - Car Park Flood Sources and Levels-wwl - 20 Aug 2021

Hi folks,

Any update on this please? Even some loose indication would be good thanks. Thanks

**Graham Nash** BSc(Dist) IEng MICE  
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[Graham.Nash@aurecongroup.com](mailto:Graham.Nash@aurecongroup.com)

DISCLAIMER

---

**From:** Graham Nash  
**Sent:** Sunday, 22 August 2021 7:14 pm  
**To:** Sarah Zhou <[Sarah.Zhou@wellingtonwater.co.nz](mailto:Sarah.Zhou@wellingtonwater.co.nz)>  
**Cc:** Joey Narvasa <[Joey.Narvasa@wellingtonwater.co.nz](mailto:Joey.Narvasa@wellingtonwater.co.nz)>  
**Subject:** RE: MFC - Car Park Flood Sources and Levels-wwl - 20 Aug 2021

Hi Sarah,

At this point it's not clear – best to assume coverage of existing thanks

Cheers

**Graham Nash** BSc(Dist) IEng MICE  
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[Graham.Nash@aurecongroup.com](mailto:Graham.Nash@aurecongroup.com)

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---

**From:** Sarah Zhou <[Sarah.Zhou@wellingtonwater.co.nz](mailto:Sarah.Zhou@wellingtonwater.co.nz)>  
**Sent:** Friday, 20 August 2021 9:11 am  
**To:** Graham Nash <[Graham.Nash@aurecongroup.com](mailto:Graham.Nash@aurecongroup.com)>  
**Cc:** Joey Narvasa <[Joey.Narvasa@wellingtonwater.co.nz](mailto:Joey.Narvasa@wellingtonwater.co.nz)>  
**Subject:** RE: MFC - Car Park Flood Sources and Levels-wwl - 20 Aug 2021

Hi Graham

Do you have a rough location of interest? Or the whole car park area? Would you be able to roughly mark up the extent you are interested?

Thanks  
Sarah

**Sarah Zhou Senior Engineer - Land Development**



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---

**From:** Graham Nash <[Graham.Nash@aurecongroup.com](mailto:Graham.Nash@aurecongroup.com)>  
**Sent:** Thursday, August 19, 2021 5:28 PM  
**To:** Joey Narvasa <[Joey.Narvasa@wellingtonwater.co.nz](mailto:Joey.Narvasa@wellingtonwater.co.nz)>; Sarah Zhou <[Sarah.Zhou@wellingtonwater.co.nz](mailto:Sarah.Zhou@wellingtonwater.co.nz)>  
**Subject:** MFC - Car Park Flood Sources and Levels

Hi Joey/Sarah,

We're looking at a site in the Michael Fowler Centre car park for development.

I see that the site as existing is subject to flooding of between 0.5-1m in 1:200+CC.

Can we have more detail on the flooding source please and FFLs – I assume the shapefile includes sea level rise/surge/increased rainfall intensity?

Our client will no doubt have to raise FFLs to above the flood levels + freeboard (0.3m or 0.5m per 4.2.9 of Regional Standard?).

What is not clear is if we'll need to provide compensation for infill if surface water related, or if the flooding is mainly sea level rise driven in which case compensatory storage is presumably not required, or to a lesser degree





Thanks, and happy to discuss

**Graham Nash** BSc(Dist) IEng MICE

Associate, Land Infrastructure, Aurecon

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## Brock Goodison

---

**From:** René van Lierop  
**Sent:** Wednesday, 29 September 2021 2:14 PM  
**To:** Nadia Nitsche (nadia.nitsche@wellingtonwater.co.nz); Alistair Osborne; Sarah Zhou; Graham Nash  
**Cc:** Marcus Welby  
**Subject:** RE: MFC Office Building - Meeting Wlg Water - 28 Sep 2021

Hi All

As discussed in our meeting, we have run the 10yr and 10yr+CC design events and the results are presented in the summary table below.

Please note:

- Peak Water Levels for the 100yr and 100yr+CC events have gone up slightly as the peak flood elevation occurs at the eastern end of the building (close to Taranaki St intersection) instead of the western end (near the MFC).
- The increase in peak flood levels in that area is nearly 30mm  
The increase for the 10yr events are 10mm.

We haven't been able to plot the difference maps yet.

Design Event	Rainfall	Peak Tide Level (in m WVD-53)	Computed Peak Flood Levels (in m WVD-53)		Variance (in m)
			Existing Development	Proposed Development	
100yr Existing Climate	100yr ARI	1.1m WVD-53	2.61	2.63	+0.02
100yr Incl Climate Change	100yr ARI + 20%	2.1m WVD-53	2.80	2.83	+0.03
10yr Existing Climate	10yr ARI	1.1m WVD-53	2.39	2.40	+0.01
10yr Incl Climate Change	10yr ARI + 20%	2.1m WVD-53	2.58	2.59	+0.01

Regards

René

**René van Lierop**  
Associate, Water, Aurecon  
M +64 021 740930  
[Rene.vanLierop@aurecongroup.com](mailto:Rene.vanLierop@aurecongroup.com)

---

### DISCLAIMER

**From:** René van Lierop  
**Sent:** Tuesday, 28 September 2021 2:57 pm  
**To:** Nadia Nitsche <nadia.nitsche@wellingtonwater.co.nz>; Alistair Osborne <Alistair.Osborne@wellingtonwater.co.nz>; Sarah Zhou <Sarah.Zhou@wellingtonwater.co.nz>; Graham Nash

<Graham.Nash@aurecongroup.com>

**Subject:** MFC Office Building - Meeting Wlg Water - 28 Sep 2021

Hi Team

Flood modelling results to date are shown below:

Design Event	Rainfall	Peak Tide Level (in m WVD-53)	Computed Peak Flood Levels (in m WVD-53)	
			Existing Development	Proposed Development
100yr Existing Climate	100yr ARI	1.1m WVD-53	2.57	2.59
100yr Incl Climate Change	100yr ARI + 20%	2.1m WVD-53	2.74	2.76

Current proposed Finished Floor Level (FFL) is 2.9m WVD-53.  
This would provide for 140mm freeboard.

Impact on flood levels is an increase of up to 20mm.  
Acceptance of this increase depends on current flood risk of buildings and usage (i.e. residential or commercial).

Actions from the meeting are:

- Aurecon to model ARI 10yr & 10yr+CC events
- Aurecon to provide flood difference maps to show the extent of the 20mm increase in peak flood levels.
- Aurecon to report results
- Wlg Water to check and provide FFL's of buildings in the area
- Wlg Water to confirm requirements regarding freeboard
- Wlg Water to confirm acceptance of difference in flood levels following Aurecon report on additional model runs

Regards

René

**René van Lierop**

Associate, Water, Aurecon

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*Whakahainga whakaaro  
Kia maia, kia kaha, mahi tahi*



# Appendix C

## Existing Services Summary



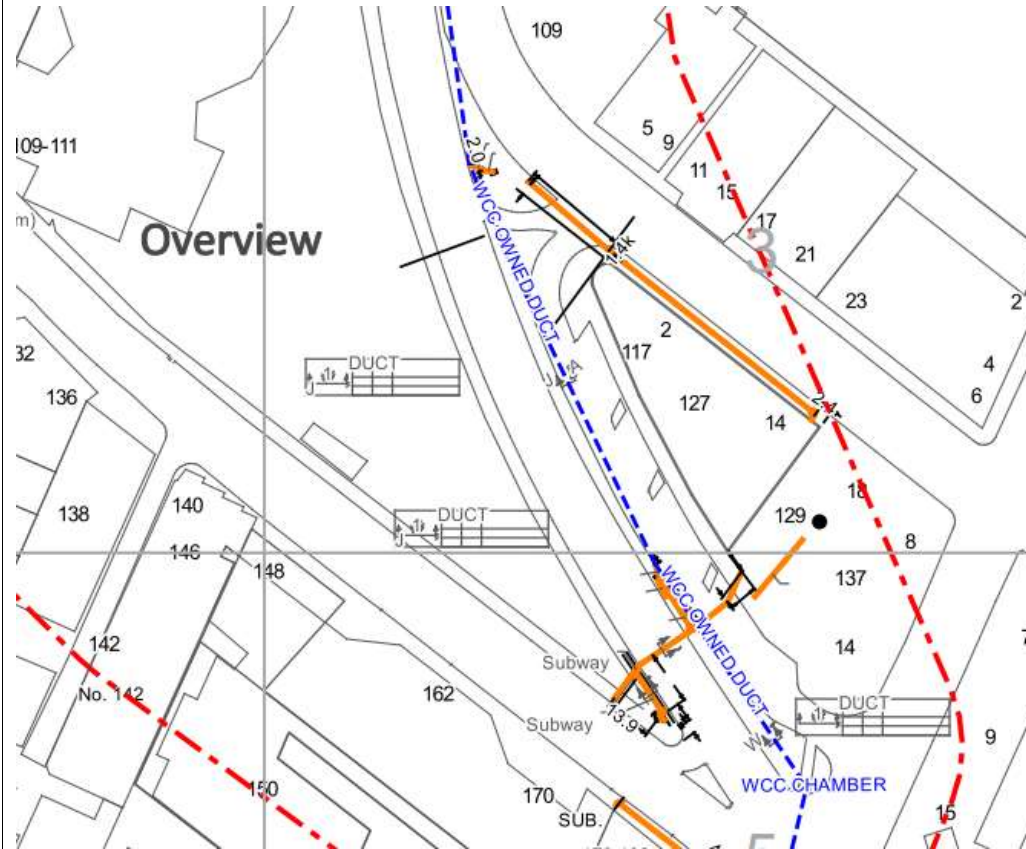
Existing Services on Wakefield St (north side)

NUO	Asset	Location
Chorus	None	<p>NO cables on the north side, only cabling southside and 2 x 50mm ducts crossing Wakefield St to service existing MFC building.</p>

Citylink (in conjunction with Vital Communications)

1 x 100mm duct route

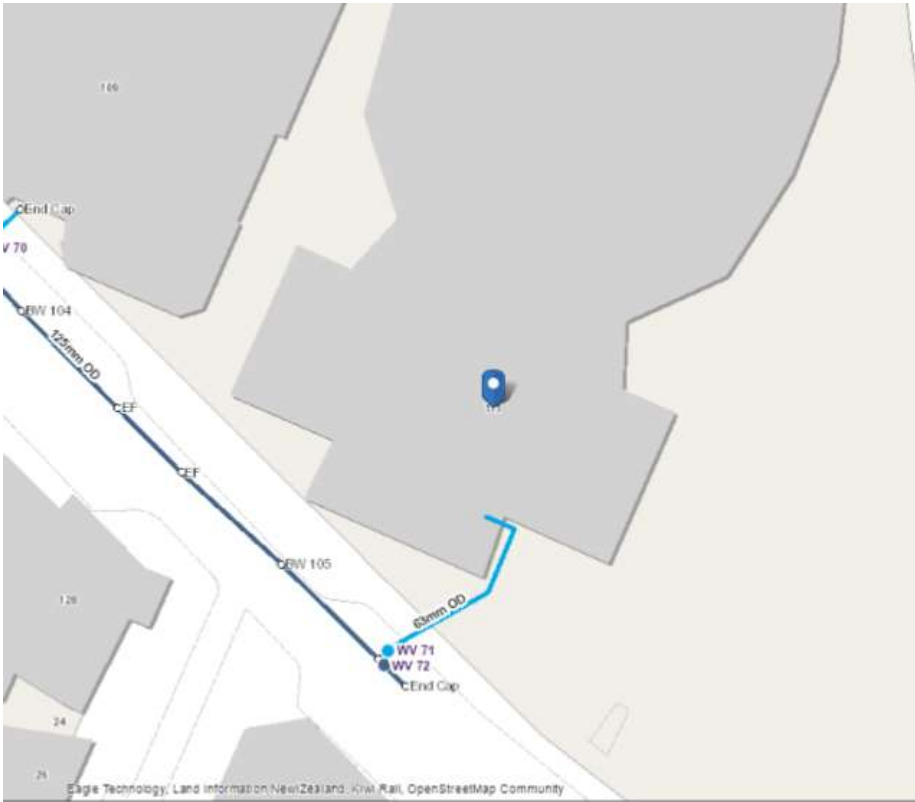
Within footpath only at intersection of Wakefield St and Jervis Quay intersection.



Nova Energy


Live 125mm OD  
gas distribution  
main

Wakefield St (approx. 7m offset from boundary; in carriageway) terminating with end cap just before projected edge of current MFC main building.



Live 63mm OD  
gas service line

Entering southeast corner of existing MFC building from Wakefield St.

<p>PowerCo</p>	<p>HLP DN100 PE80 gas distribution main inserted in DN300 cast iron</p>	<p>Running along Wakefield St footpath and carriageway, with kink in alignment. Offset ranges between approximately 4m to &gt;1m from site boundary.</p> 
	<p>LMP gas distribution main (unknown size)</p>	<p>Running along Wakefield St footpath and carriageway, with kink in alignment. Offset ranges between approximately 4m to &gt;1m from site boundary.</p>

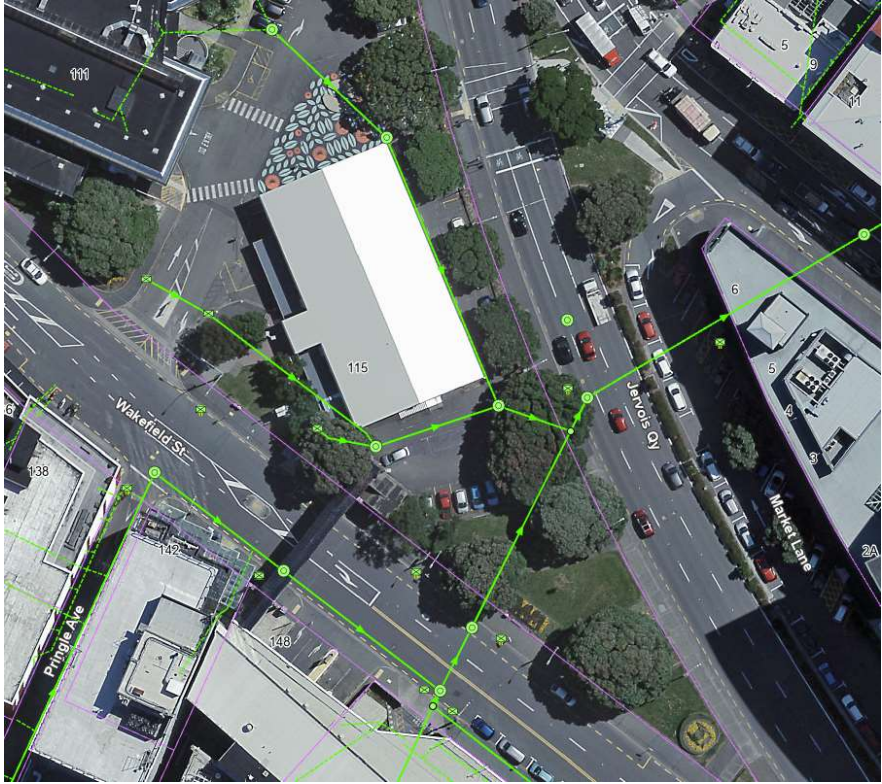


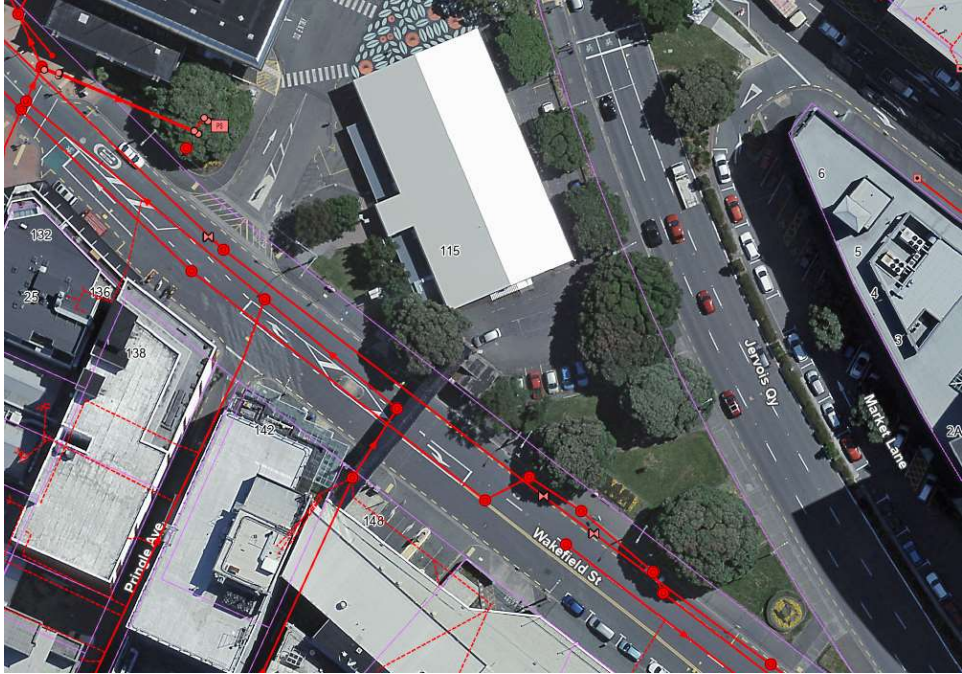
Vodafone

4 x 110mm  
ducts

Running along the entirety of Wakefield St, offset approximately 4m from the kerb.



WCC Stormwater	DN375 concrete main	<p>Runs along northeast side of existing temporary building within the site.</p> 
	DN225, transitioning to a DN300 concrete main	Runs along the southeast side of the existing temporary building.
	Ovoid 2210mm by 1220mm main	Runs through site to the west of the temporary building

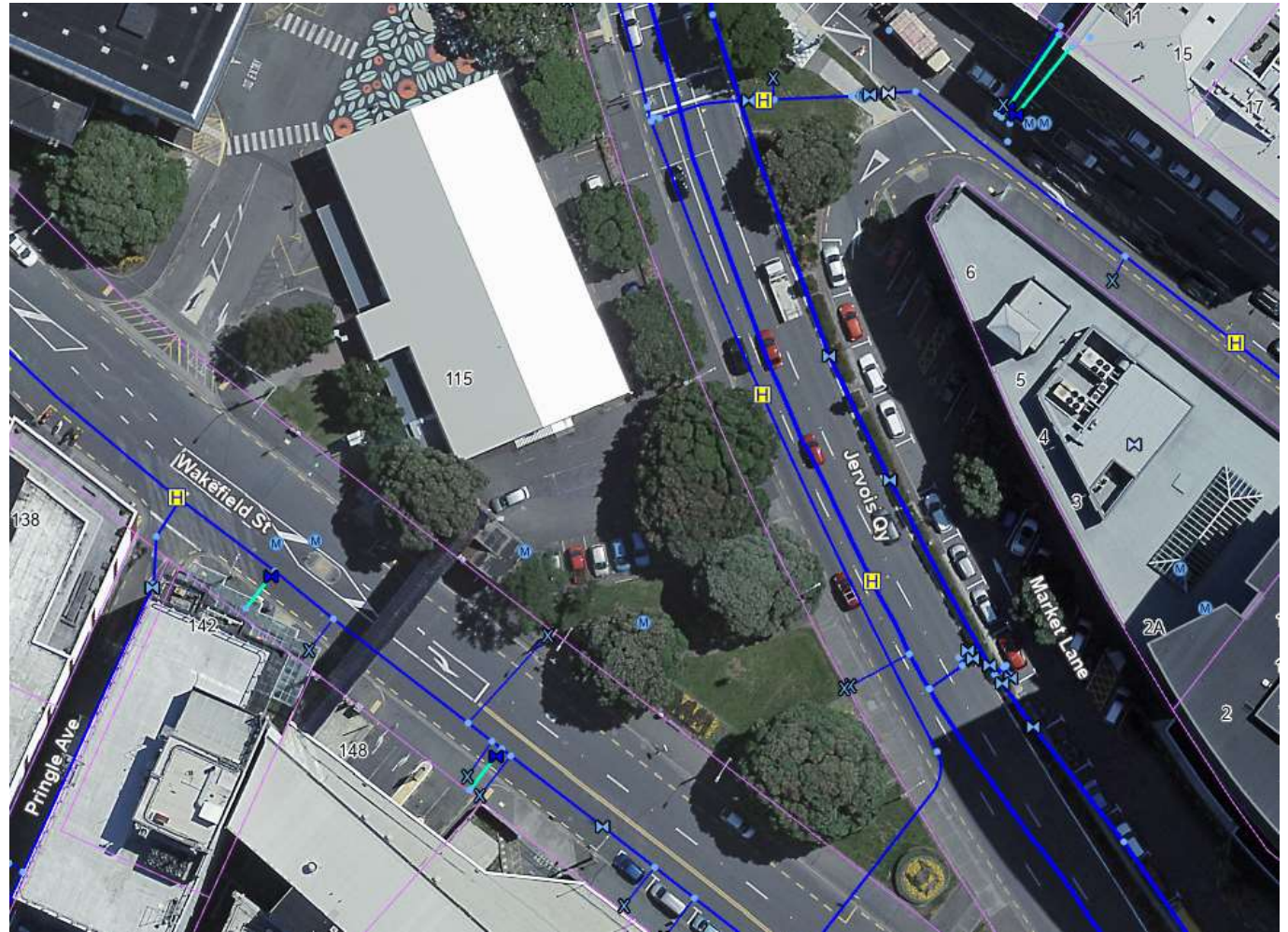
WCC Wastewater	DN350 CI pressure main	Running along Wakefield St carriageway, approximately 5m offset from the site boundary.
	DN250 PE100 main	Running along Wakefield St carriageway, approximately 7m offset from the site boundary
	DN450 concrete discharge pipe	Running along Wakefield ST carriageway and footpath with kink in alignment, with offset varying from approximately 2m to 11m from site boundary
	DN150 PE100 main	Running along Wakefield St carriageway, approximately 9m offset from the site boundary
	Pumpstation, with DN315 PE100 connecting main	<p>East corner of site near MFC building.</p> 



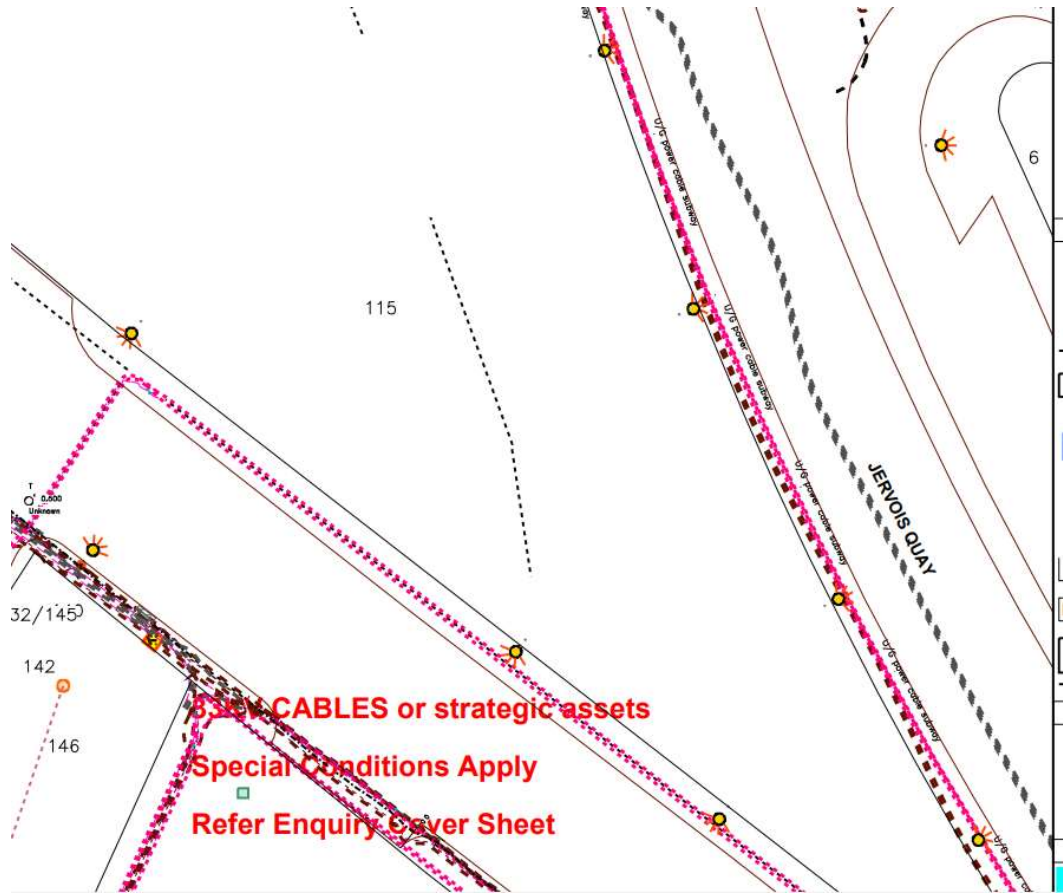
WCC Water  
Supply

DN20 copper  
supply

Running across from DN200 DI main on far side of Wakefield St to service valve within footpath.



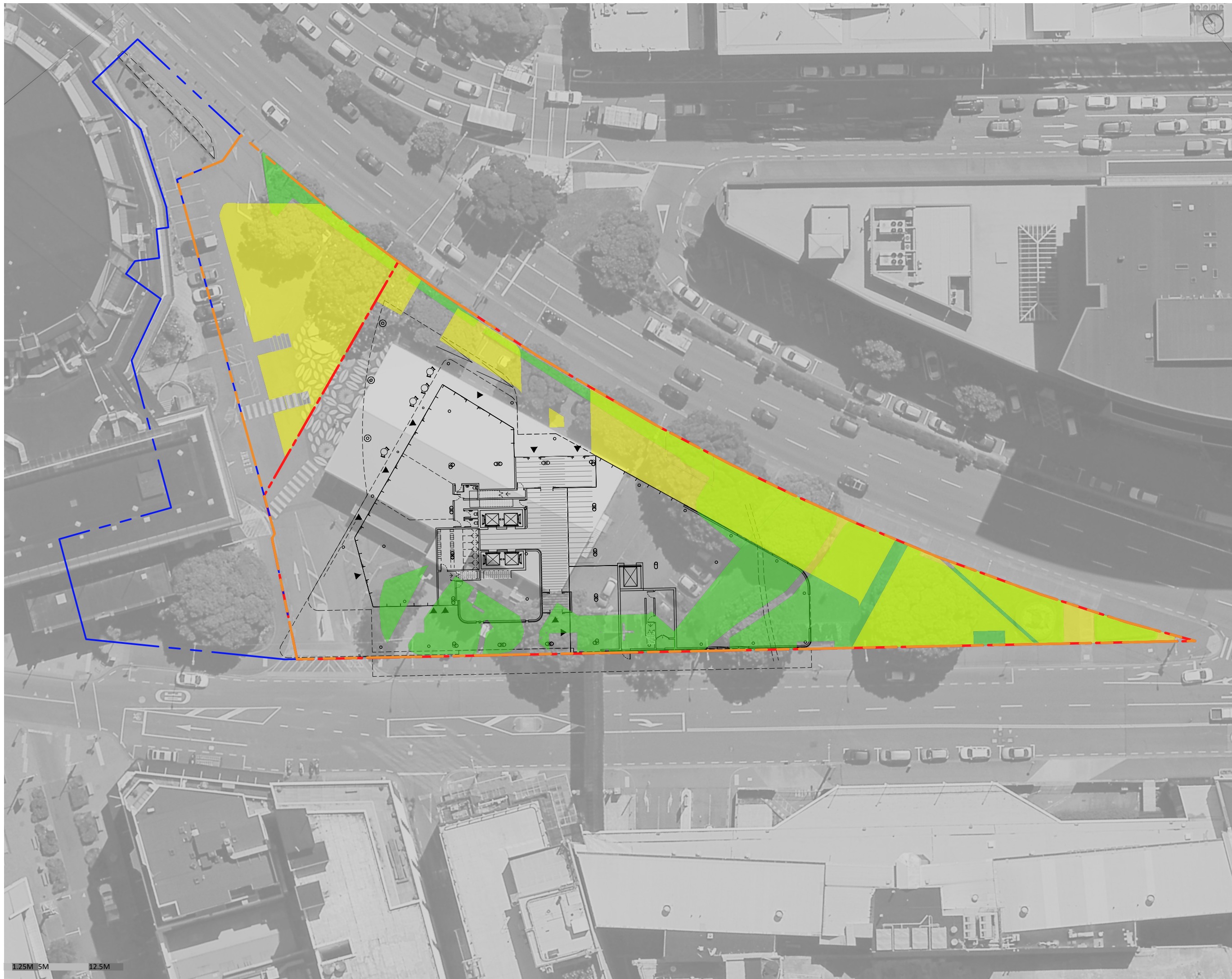


Wellington Electricity	Live 11 kV cables (x 2)	<p>Running within footpath along Wakefield St, starting from eastern MFC vehicle accessway. Approximately 2-3m offset from site boundary</p> 
	Abandoned 33 kV cables	Within proposed site and along Wakefield St footpath

# Appendix D

## Impervious Area Assessment





- - - INNER BOUNDARY  
=3642m<sup>2</sup>
- EXISTING PERMEABLE AREA:  
1193m<sup>2</sup> (33%)
- PROPOSED PERMEABLE AREA  
860m<sup>2</sup> (24%)
- - - MIDDLE BOUNDARY  
=4466m<sup>2</sup>
- EXISTING PERMEABLE AREA  
1261m<sup>2</sup> (28%)
- PROPOSED PERMEABLE AREA  
1365m<sup>2</sup> (30%)

**DRAFT**

NOT FOR CONSTRUCTION

issue:                      amendment:                      date:

DO NOT SCALE DRAWING.

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drawing title:  
**PERMEABILITY  
COMPARISON**

scale:  
1:250 @ A1, 1:500 @ A3

date:  
16.02.2022

drawing no.  
-

project name  
**MFC Car Park  
Development**

project phase.                      project no.  
**PRELIMINARY                      2114**  
**DESIGN**

client:  
**WILLIS BOND**

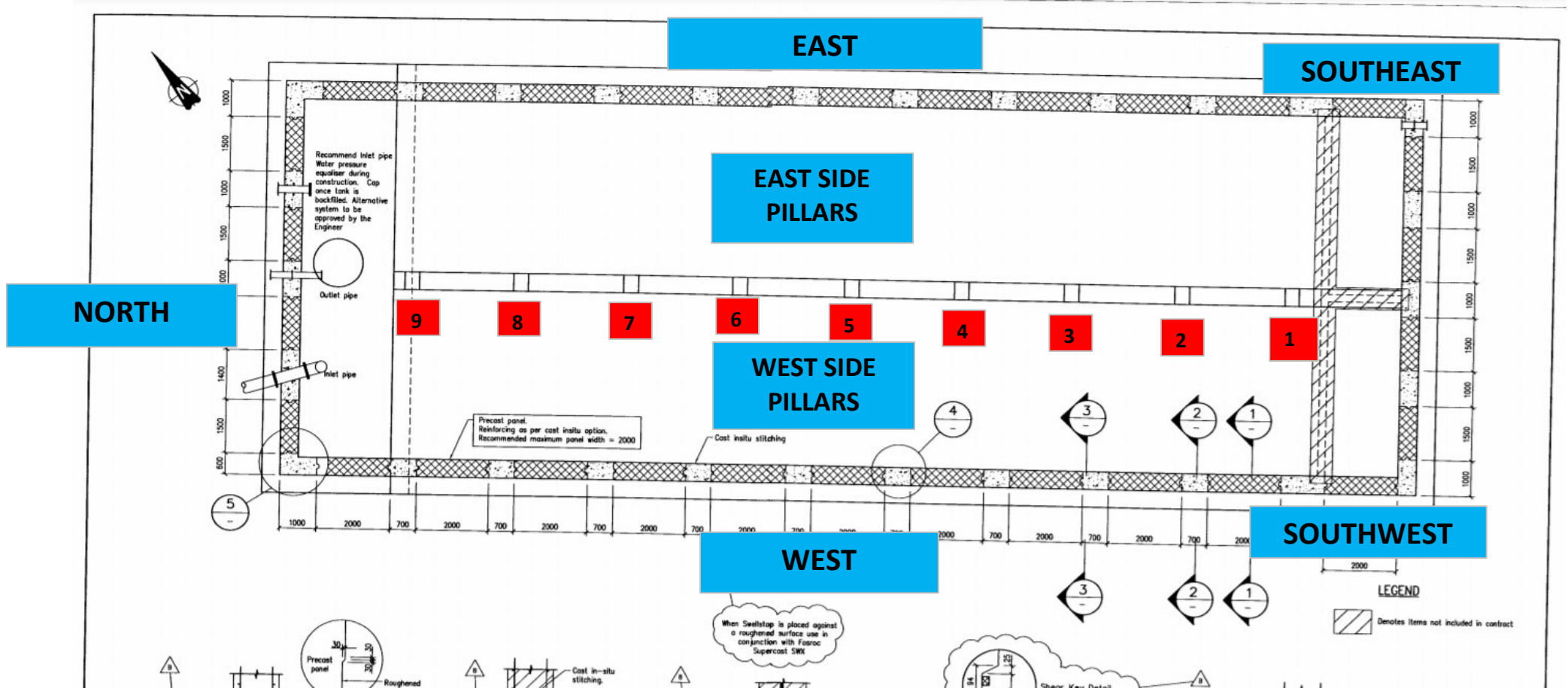
1:25M 5M 12.5M

# Appendix E

## CCTV Investigation Reports



## EMERGENCY WASTE CHAMBER INSPECTION



GENERAL - HIGH PRESSURE WATER JETTING CONDUCTED TO CREATE ACCESS TO PERIMETERS (FLOOR TO WALL AND WALL TO CEILING) AND BOTH SIDES OF CENTRAL COLUMNS, HIGH AND LOW LEVEL. ALL WALLS WERE GIVEN A CLEAN TO ENSURE GOOD VIDEO FOOTAGE. LOCALISED HAMMER TESTING CONDUCTED TO AREAS OF QUESTION. NONE OF THESE AREAS PRESENTED OBVIOUS DEFECTS OR DRUMMINESS. OVERALL CONDITION OF CHAMBER APPEARED SOUND.

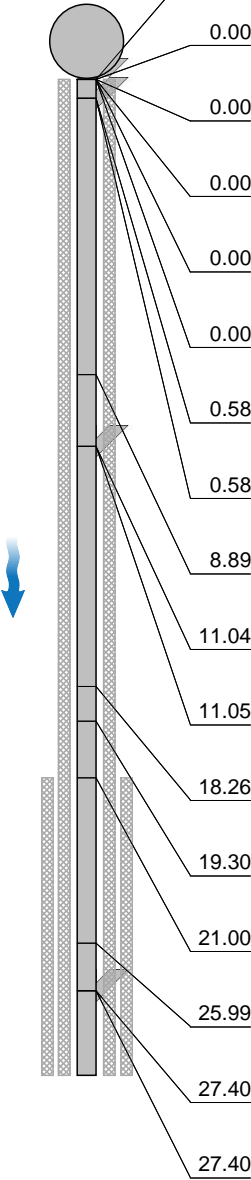


## Section Inspection - 2/12/2021 - WCC\_SWP025801

Section No. <b>1</b>	Asset No. <b>WCC_SWP025801</b>	Contract Number <b>CC8018</b>	Date <b>2/12/2021</b>	Time <b>9:10 am</b>	Weather
Town or Suburb <b>WELLINGTON</b>	Name of Coder <b>S Johns</b>	Operator <b>KF</b>	Video Reference <b>L.T McGuiness SW MFC 1</b>	Drawing No.	Client

Pipe Length <b>37.21 m</b>	Material <b>Cast In-Situ concrete or Mortar</b>	Use <b>Stormwater</b>
Setup <b>Upstream node</b>	Shape <b>Arch shaped</b>	Pipe Type <b>Gravity</b>
Surveyed Length <b>37.21 m</b>	Dia/Height <b>0 mm</b>	Currency <b>Current Inspection</b>
Joint Spacing <b>0.00 m</b>	Width <b>2,210 mm</b>	Inspection <b>Inspection complete</b>
U/S Node <b>WCC_SW024022</b>	D/S Node <b>WCC_SW024286</b>	
U/S Node Type <b>Stormwater Manhole</b>	D/S Node Type <b>Stormwater Manhole</b>	
U/S Pipe Depth	D/S Pipe Depth	
U/S Location <b>170 WAKEFIELD STREET</b>	D/S Location	

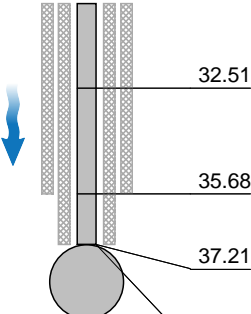
### General Comment

1:227	m +	OC	Observation	MPEG	Photo	Score
	0.00	IS	Inspection start, node reference: WCC_SW024022 / FROM US MH WCC_SW024022	00:00:00		
	0.00	OPS	Obstruction permanent, reduction of up to 10% of the pipe diameter from 11 o'clock to 1 o'clock / WOODEN BEAM?	00:00:38	WCC_SW P025801_f0027fa6-8	10 / 15
	0.00	LPS	Lateral protruding, into the pipe by 10% or less of the diameter of the pipe at 11 o'clock	00:00:45		10
	0.00	LFXS	Lateral sealing faulty, small gaps between the lateral and the main pipe which are not open at 11 o'clock / 225mm?	00:00:45	WCC_SW P025801_9e7f63d7-	1
	0.00	LFXS	Lateral sealing faulty, small gaps between the lateral and the main pipe which are not open at 11 o'clock / 225mm?	00:00:51	WCC_SW P025801_acd7d454-	1
	0.00	S01 DES	Debris silt, small, clear diameter reduced by less than 10%, start / STONES TO 37.21	00:01:07		
	0.58	LXR	Lateral problem, roots seen inside the lateral at 10 o'clock / JFXL, RI S	00:01:49	WCC_SW P025801_32fd10de-	
	0.58	LFXS	Lateral sealing faulty, small gaps between the lateral and the main pipe which are not open at 10 o'clock / 525mm?	00:01:49		1
	8.89	SRCS	Wall loss due to corrosion exposing reinforcement steel (which is corroded) at 11 o'clock	00:03:42	WCC_SW P025801_23c88c88-	20 / 15
	11.04	SAES	Concrete aggregate is visible, damage covering up to 10% of the pipe circumference from 11 o'clock to 12 o'clock	00:04:17		6 / 5
	11.05	LFXS	Lateral sealing faulty, small gaps between the lateral and the main pipe which are not open at 9 o'clock / 225mm?	00:04:18		1
	18.26	RIFS	Fine roots, roots restrict flow by 10% or less of full flow from 10 o'clock to 11 o'clock	00:05:15		5
	19.30	RIFS	Fine roots, roots restrict flow by 10% or less of full flow from 10 o'clock to 11 o'clock	00:05:17		5
	21.00	S02 RIFS	Fine roots, roots restrict flow by 10% or less of full flow from 10 o'clock to 2 o'clock / RI S TO 35.68	00:06:08		
	25.99	SAES	Concrete aggregate is visible, damage covering up to 10% of the pipe circumference from 12 o'clock to 1 o'clock	00:07:01		6 / 5
	27.40	LFXS	Lateral sealing faulty, small gaps between the lateral and the main pipe which are not open at 9 o'clock / 300mm?	00:07:26		1
	27.40	OPS	Obstruction permanent, reduction of up to 10% of the pipe diameter from 11 o'clock to 1 o'clock / REINFORCED CONCRET SLAB?	00:07:27	WCC_SW P025801_b67022bc-	10 / 15



## Section Inspection - 2/12/2021 - WCC\_SWP025801

Section No. <b>1</b>	Asset No. <b>WCC_SWP025801</b>	Contract Number <b>CC8018</b>	Date <b>2/12/2021</b>	Time <b>9:10 am</b>	Weather
Town or Suburb <b>WELLINGTON</b>	Name of Coder <b>S Johns</b>	Operator <b>KF</b>	Video Reference <b>L.T McGuiness SW MFC 1</b>	Drawing No.	Client

1:227	m +	OC	Observation	MPEG	Photo	Score
	32.51	IPL	Infiltration, gushing or jetting (pressure flow) from 5 o'clock to 7 o'clock / GUSHING FLOW	00:09:06	WCC_SW P025801_ 9f3da986-	30 / 30
	35.68	F02 RIFS	Fine roots, roots restrict flow by 10% or less of full flow from 10 o'clock to 2 o'clock / RI S TO 35.68	00:06:08		73
	37.21	F01 DES	Debris silt, small, clear diameter reduced by less than 10%, end / STONES TO 37.21	00:01:07		558
<b>WCC_SW024286</b>	37.21	IE	Inspection ends, node reference: WCC_SW024286 / AT DS MH WCC_SW024286	00:11:24		

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
11	30	2.34	87.00	4	11	50	19.79	736.55	5



## Section Pictures - 2/12/2021 - WCC\_SWP025801

Town or Suburb	Location	Date	Asset No.	Section No.
WELLINGTON		2/12/2021	WCC_SWP025801	1



WCC\_SWP025801\_f0027fa6-81b5-448b-bfd8-8a4cafeb513b\_20211203\_110113\_319.jpg, 00:00:38, 0.00m  
Obstruction permanent, reduction of up to 10% of the pipe diameter from 11 o'clock to 1 o'clock / WOODEN BEAM?



WCC\_SWP025801\_9e7f63d7-ed53-4318-8822-9b06ced52c98\_20211203\_110148\_592.jpg, 00:00:45, 0.00m  
Lateral sealing faulty, small gaps between the lateral and the main pipe which are not open at 11 o'clock / 225mm?



WCC\_SWP025801\_acd7d454-96b1-4f18-9d38-405470fc8cdd\_20211203\_110245\_257.jpg, 00:00:51, 0.00m  
Lateral sealing faulty, small gaps between the lateral and the main pipe which are not open at 11 o'clock / 225mm?



WCC\_SWP025801\_32fd10de-402a-41a3-a977-52e1d9ab8183\_20211203\_110617\_934.jpg, 00:01:49, 0.58m  
Lateral problem, roots seen inside the lateral at 10 o'clock / JFXL, RI S





## Section Pictures - 2/12/2021 - WCC\_SWP025801

Town or Suburb	Location	Date	Asset No.	Section No.
WELLINGTON		2/12/2021	WCC_SWP025801	1



WCC\_SWP025801\_23c88c88-ea71-4790-8a0f-c1ef42a8b44f\_20211203\_111619\_725.jpg, 00:03:42, 8.89m  
 Wall loss due to corrosion exposing reinforcement steel (which is corroded) at 11 o'clock



WCC\_SWP025801\_e20a2ae7-e334-402f-9010-ee3999ad05a\_a\_20211203\_111620\_055.jpg, 00:03:42, 8.89m  
 Wall loss due to corrosion exposing reinforcement steel (which is corroded) at 11 o'clock



WCC\_SWP025801\_b67022bc-c7a1-4f64-981d-72f80bee0da8\_20211203\_115723\_284.jpg, 00:07:27, 27.40m  
 Obstruction permanent, reduction of up to 10% of the pipe diameter from 11 o'clock to 1 o'clock / REINFORCED CONCRET SLAB?



WCC\_SWP025801\_4da97f73-fc7c-437a-8d5f-8b43f2c9b4ac\_20211203\_115802\_728.jpg, 00:07:27, 27.40m  
 Obstruction permanent, reduction of up to 10% of the pipe diameter from 11 o'clock to 1 o'clock / REINFORCED CONCRET SLAB?



## Section Pictures - 2/12/2021 - WCC\_SWP025801

Town or Suburb	Location	Date	Asset No.	Section No.
WELLINGTON		2/12/2021	WCC_SWP025801	1



WCC\_SWP025801\_9f3da986-010a-4a12-aeaa-08f05809520b\_20211203\_120615\_827.jpg, 00:09:06, 32.51m  
Infiltration, gushing or jetting (pressure flow) from 5 o'clock to 7 o'clock / GUSHING FLOW



## Section Inspection - 2/12/2021 - WCC\_SWP025804

Section No. <b>2</b>	Asset No. <b>WCC_SWP025804</b>	Contract Number <b>CC8018</b>	Date <b>2/12/2021</b>	Time <b>9:39 am</b>	Weather
Town or Suburb <b>WELLINGTON</b>	Name of Coder <b>S Johns</b>	Operator <b>KF</b>	Video Reference <b>L.T McGuiness SW MFC 2</b>	Drawing No.	Client

Pipe Length <b>9.24 m</b>	Material <b>Steel Reinforced Concrete</b>	Use <b>Stormwater</b>
Setup <b>Upstream node</b>	Shape <b>Circular</b>	Pipe Type <b>Gravity</b>
Surveyed Length <b>9.24 m</b>	Dia/Height <b>375 mm</b>	Currency <b>Current Inspection</b>
Joint Spacing <b>2.40 m</b>	Width <b>0 mm</b>	Inspection <b>Inspection complete</b>
U/S Node <b>WCC_SW024287</b>	D/S Node <b>WCC_SW024286</b>	
U/S Node Type <b>Stormwater Manhole</b>	D/S Node Type <b>Stormwater Manhole</b>	
U/S Pipe Depth	D/S Pipe Depth	
U/S Location <b>170 WAKEFIELD STREET</b>	D/S Location	

General Comment

1:70	m +	OC	Observation	MPEG	Photo	Score
<b>WCC_SW024287</b>						
	0.00	IS	Inspection start, node reference: WCC_SW024287 / FROM US MH WCC_SW024287	00:00:00		
	0.00	DES	Debris silt, small, clear diameter reduced by less than 10% / STONES/SILT	00:00:20		15
	1.43	JFDS	Joint faulty, minor cracking or spalling at 1 o'clock / DAMAGE TO JOINT	00:01:25		3
	3.93	JFXL	Joint faulty, major cracking or spalling, likely through the pipe wall from 11 o'clock to 1 o'clock / SEALING RING VISIBLE	00:02:19	WCC_SW P025804_135f07e1-	10
	5.92	WLC	Clear water / WATER LEVEL INCREASES DUE TO DEBRIS IN DS MH.	00:03:15		
	6.78	JFXL	Joint faulty, major cracking or spalling, likely through the pipe wall from 11 o'clock to 1 o'clock / SEALING RING VISIBLE	00:03:28		10
	6.85	S01 DES	Debris silt, small, clear diameter reduced by less than 10%, start / SILT/STONES TO 9.24	00:03:28	WCC_SW P025804_96b1aac9-	
	7.66	CCL	Crack circumferential, crack, large, open and there is evidence that it extends through to the outside wall from 9 o'clock to 3 o'clock / ED FROM CRACK	00:04:15	WCC_SW P025804_14e520b2-	12
	7.66	EDS	Encrustation deposits, clear diameter is reduced by less than 10% from 9 o'clock to 3 o'clock / FROM CRACK	00:04:15		10
	8.27	GC	General comment / EELS IN PIPELINE	00:04:43	WCC_SW P025804_6295fca4-	
	9.24	F01 DES	Debris silt, small, clear diameter reduced by less than 10%, end / SILT/STONES TO 9.24	00:03:28		36
	9.24	IE	Inspection ends, node reference: WCC_SW024286 / AT DS MH WCC_SW024286	00:06:54		

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
4	12	3.79	35.00	5	3	25	6.59	60.85	5



## Section Pictures - 2/12/2021 - WCC\_SWP025804

Town or Suburb	Location	Date	Asset No.	Section No.
WELLINGTON		2/12/2021	WCC_SWP025804	2



WCC\_SWP025804\_135f07e1-ae30-49f0-9126-406532f61802\_20211203\_133540\_002.jpg, 00:02:19, 3.93m  
 Joint faulty, major cracking or spalling, likely through the pipe wall from 11 o'clock to 1 o'clock / SEALING RING VISIBLE



WCC\_SWP025804\_96b1aac9-a355-4d8b-b2f9-7a4c358eabe5\_20211203\_134037\_980.jpg, 00:03:28, 6.85m  
 Debris silt, small, clear diameter reduced by less than 10%, start / SILT/STONES TO 9.24



WCC\_SWP025804\_14e520b2-e007-4add-bc6b-7ee710cc7776\_20211203\_134315\_289.jpg, 00:04:15, 7.66m  
 Crack circumferential, crack, large, open and there is evidence that it extends through to the outside wall from 9 o'clock to 3 o'clock / ED FROM CRACK



WCC\_SWP025804\_6295fca4-a9ba-413b-936a-9f7bf3569196\_20211203\_134529\_352.jpg, 00:04:43, 8.27m  
 General comment / EELS IN PIPELINE





## Section Pictures - 2/12/2021 - WCC\_SWP025804

Town or Suburb	Location	Date	Asset No.	Section No.
WELLINGTON		2/12/2021	WCC_SWP025804	2

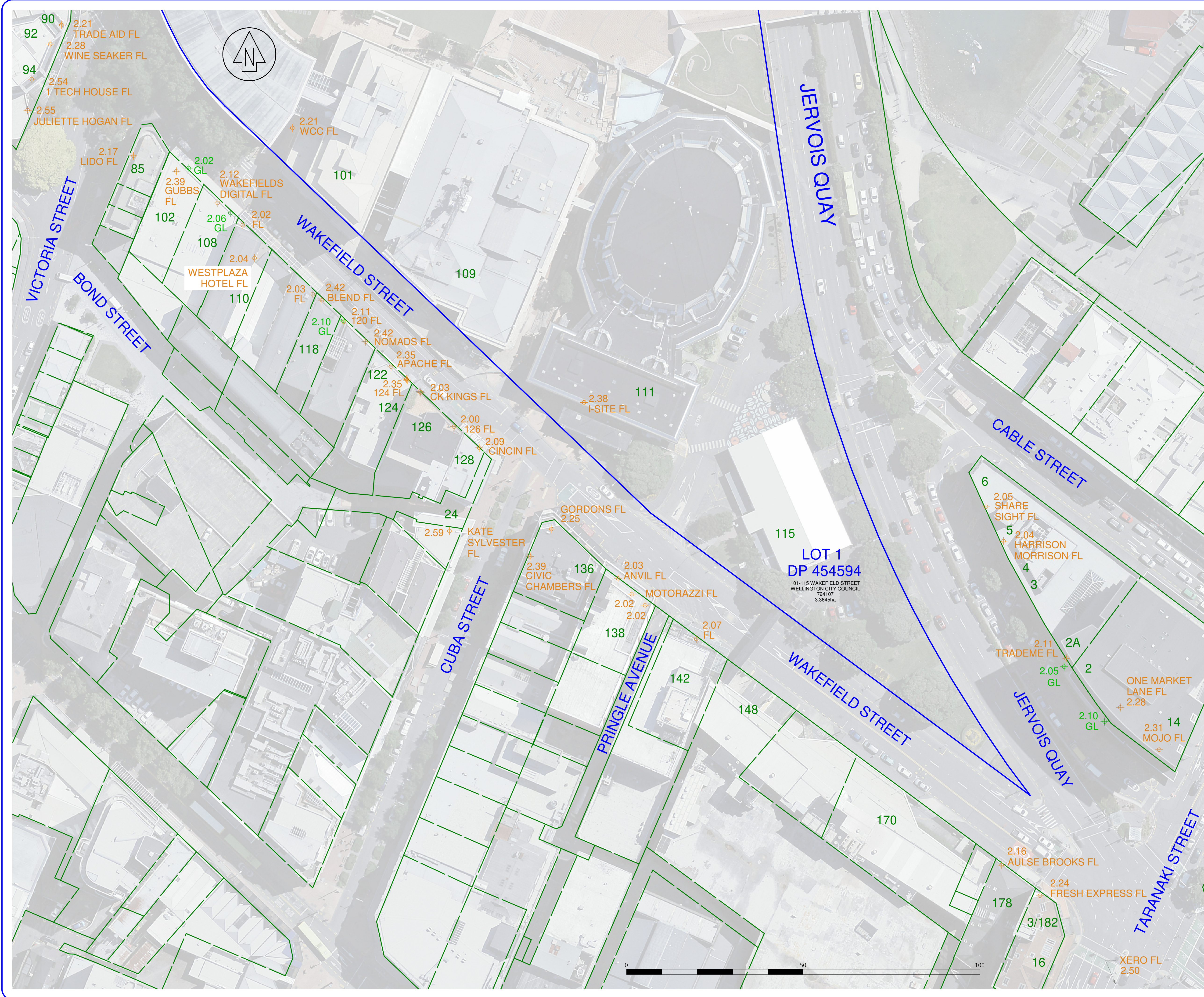


WCC\_SWP025804\_29ddb046-8a51-4c67-bcf9-0f6c76bcba06\_20211203\_134605\_062.jpg, 00:04:43, 8.27m  
General comment / EELS IN PIPELINE

# Appendix F

## Wakefield St Thresholds Survey (Spencer Holmes)





NO	REVISION	BY	DATE
A	FIRST ISSUE		

**Boundaries:**  
 Adjoining boundaries shown on this plan have been sourced from either Quickmap in electronic form. Their positional and dimensional accuracy remains subject to survey verification.

**Topographical Survey Work**  
 Contours have been interpolated from surveyed spot heights. Accuracy will vary depending on proximity to the spot heights used to derive the contour.

Retaining walls either on or very close to a boundary can affect the assessment of ground level at the boundary. Care must be taken when assessing ground level at the boundary for the determination of building recession planes.

Any interpolation of the surveyed data is made entirely at the risk of the person making that interpolation.

If the specific position or height of any wall, building or structure is critical to the design then its accuracy must be confirmed by SHL before it can be relied upon.

COORDINATE DATUM - WELLINGTON 2000

HEIGHT ARE IN TERMS OF  
 - WELLINGTON DATUM 1953

ORIGIN OF LEVELS  
 - MARK NAME OLP 1 DP 399319  
 - REDUCED LEVEL 1.92m  
 - SOURCE DP 399319



Level 10 - 57 Willis Street  
 PO Box 588 Wellington New Zealand  
 (04) 472-2261 www.spencerholmes.co.nz

CLIENT  
**WILLIS BOND**

PROJECT  
**MICHAEL FOWLER CENTRE**

DRAWING TITLE  
**THRESHOLD SURVEY**

DESIGN CONSULTANT

Copyright of this drawing is vested in Spencer Holmes Ltd. The Contractor shall verify all dimensions on site.

**CAUTION** - The information shown on this plan has been prepared under specific instruction from the client and is intended solely for the clients use. The information is valid as at the date of survey. Spencer Holmes Limited will accept no liability for any consequence arising out of the use of this plan, or the information thereon whether in hard copy or electronic form by any other party for any purpose whatsoever.

2022 01 19 Threshold survey - S21-0662-T15  
 DRAWN JHG  DATE 20/01/2022  
 CHECKED RMT

SCALE  
**1 : 500** AT

DRAWING NUMBER  
**S21-0662-T15** REV  
**A**

RESOURCE MANAGEMENT - LAND PLANNING - SURVEYING - STRUCTURAL - CIVIL - FIRE



# Appendix G

## Hydrant Testing Results



17 March 2022

Attention: Alice Hoskins  
Civil Engineer  
Aurecon  
Spark Central, Level 8, 42-52 Willis Street, Wellington New Zealand 6011  
PO Box 1591, Wellington 6140

Dear Alice

**Hydrant Testing for 115 Wakefield Street Wellington**

You asked me to do water main testing to assist with the building development project at this site for Willis Bond and their client. This work has been successfully completed without any incidents or issues.

I installed the pressure logger on the fire hydrant in the paving area by the traffic lights outside 128 Wakefield Street. I collected pressure data at 30-second intervals from 9 to 15 March 2022 inclusive. I used Meters Head as the pressure measurement unit. 10.215 Meters = 100 KPA. Static pressure is about 84 meters head in this area of the CBD.

We did the flow testing using 2 hydrants running at the same time, as planned. They were outside 138 and 170 Wakefield Street. We did not fully open them up because of the high pressure and flow rate expected from the 200mm pipe. We got to a combined steady flow of 80 liters per second. There was more capacity to take it further (if we used a 3<sup>rd</sup> hydrant).

There was only about a 5% drop in pressure between 8.11 and 8.21 AM on 12 March when we did the flow test. I have highlighted this in the pressure data spreadsheet provided with this report to make it easy to see it.

These test results are very good. They should give you everything you need. The small drop in pressure proves my view about there being much more flow capacity available in this big pipe.

Yours faithfully

Chris Parkinson  
Manager Leak Detection  
ADR  
Wellington  
04916 6211  
021 305 637

**Document prepared by**

**Aurecon New Zealand Limited**

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**W** [aurecongroup.com](http://aurecongroup.com)

The Aurecon logo consists of a small green square above the word "aurecon" in a bold, lowercase, sans-serif font.

*Bringing ideas  
to life*

