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8 September 2017

Resource Consents
Wellington City Council
P O Box 2199
Wellington

Attention: Sophie Lord

Dear Sophie

SR 387233 - 59 KINGSFORD SMITH STREET

I refer to your request for further information and for the Applicant to obtain the written approval of Wellington International Airport Ltd (WIAL).

On behalf of the Applicant, I respond as follows.

Response to Further Information Request

Enclosed with this letter is:

- Further information prepared by Reve Architecture Ltd dated 4 September 2017, including supporting emails from Wellington Water and Morten Gjerde, the Council's urban design adviser.
- Copy of a draft Construction Management Plan dated July 2017 that includes traffic management as requested.
- Amended Geotechnical Assessment dated 12 July 2017 prepared by Coffey Ltd that includes assessment of the Evans Bay Fault as requested.
- Wastewater Assessment dated 28 August 2017 by Envelope Ltd as requested.
- Amended application plans by Reve Architecture Ltd in response to the matters raised in your request.
- Amended landscape plans by Wraight and Associates Ltd in response to the matters raised in your request.
- Sunlight access diagrams printed at A3.

I trust the above satisfactorily addresses your request for further information.

Response to Request to obtain the written approval of WIAL

The Applicant has sought the written approval of WIAL but this has not been given.

Clarification of the Proposal

The Applicant wishes to clarify and/or confirm that it is intended to use the proposed apartments either as serviced apartments (e.g. apartments that are offered for short term residential accommodation on a daily and/or weekly basis) and/or for permanent residential accommodation (e.g. as the permanent place of residence of the occupants).

Limited Notification

The Applicant requests that you proceed to limited notify the application. The additional application fee will be paid by the Applicant upon the issuing of an invoice.

Kind Regards

Peter Coop
Resource Management Consultant
URBAN PERSPECTIVES LTD

DDI (04) 474 4112
Email: peter@urbanp.co.nz

1109207

Wellington City Council

Resource Consents

rêve architecture LTD

4th SEPTEMBER 2017

RFI RESPONSE

ATTENTION: SOPHIE LORD
SENDER: MIKE STONYER
PROJECT: 59 KINGSFORD SMITH STREET
RESOURCE CONSENT: SR387233

Dear: Sir/ Madam

Re: 59 KINGSFORD SMITH STREET
Request for further information

We respond to the issues raised on the RFI dated on 4th JULY 2017 as follows:

Vehicle Access and Traffic

1. The applicant should number the carparks on the plan, so it will be possible to describe the short carparks.

Carparks are now numbered. Refer to Architectural Sheets A-1.01 and A-1.02.

2. The minimum height clearance available for vehicles in both carpark areas, and the location, should be advised.

2.2m height clearance is available to basement car park. Basement level to Ground floor level is 3.0m. This allows for 800mm max for slab and beam construction. Ground Floor Level interior will be 4.2m ± 100mm depending on resolved structure. Roller grille doors to both car parks to have 3m clearance. Dimensions are now shown in provided cross sections.

3. The height clearance for accessible carpark(s) should be advised.

4.2m.

4. The minimum height clearance for the servicing vehicles should be advised.

Entry doors are shown as 3.0m tall. The location of the servicing area for the rubbish has been moved further into the building as part of Council recommendations.

5. A longitudinal section of the driveway between the ground level and the basement should be provided – see the suggested changes below also.

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Added to Cross Section 4. Refer to Sheet A-3.02. Note that a 'glazed view slots' to the southern side of northern crossing has been replaced with a full width window now to allow viewing of pedestrians when exiting basement car park.

6. Advise whether the carparks on the ground floor are intended to be used by customers. If so, at least one of the car parks would need to be able to be used as an accessible carpark.

No. Car parks are for residents of the apartments. Car parks 47, 48 & 49 are large enough to be used for disabled parking regardless and would be advertised as disabled access car parks when allocating car parks.

7. The applicant should check the location of the vehicle crossings in relation to existing street sumps.

Position of existing street sump is now shown on Ground Floor Plan Sheet A-1.02. Existing sump is positioned in front of Apartment Lobby 1. Note that the servicing area which is to be painted on the ground has been moved further inwards as per Council recommendation.

8. It is recommended that a draft Construction Traffic Management Plan (CTMP) is provided for consideration at this stage to cover all matters related to the construction stages. The CTMP must include methods to avoid, remedy or mitigate adverse construction traffic effects during the development of the site. Note: the final CTMP must include, but not be limited to, the following matters:

- *Temporary Pedestrian Safety Measures, including directional signage (where applicable);*

- *Locations where construction vehicles will park and carry out loading and unloading of materials;*

- *Expected frequency of movements specific to the construction phase, with the hours and days of week. Movements should be reduced during peak traffic times (7-9am and 4-6pm weekdays).*

- *Methods for public to contact the site manager for complaints. There should be a $1m^2$ sign facing the public footpath with contact details.*

- *Details of the route to be used by the vehicles removing the earthworks material.*

Refer appended CTMP.

Encroachments

1. The Apartment Lobby 2 door entrance shown on A-2.01 Rev B would be declined by encroachments, this should be altered accordingly. Encroachments would also decline any encroachment into 61 Kingsford Smith Street Reserve property.

No encroachment is sort along the southern boundary of this proposed building. The Council owned recreation reserve property (61 Kingsford Smith Street) is remain as is. No overhanging of decks or roof projections are sort.

2. The balconies on Kingsford Smith Street appear to exceed our minimum height and setback requirements, please amend to meet the Encroachment requirement. The exception is the southwest corner balcony. The dimension between the proposed Level 1 corner balcony and kerb needs to be drawn and dimensioned. It must be a minimum of 450mm.

The dimension of this sout-west corner deck to the edge of the road below is 587mm as shown on sheet A-1.02.

Earthworks

1. A request for information with respect to the Evans Fault and what risk this fault poses to the development should be included in the geotechnical report by Coffey's Ltd.

Refer to response by Coffey as attached.

Urban Design

The Council team have consistently advocated for high quality internal environments to offset the need for outdoor private areas as prescribed by the design guide. Approaches such as lanai spaces, created as separate rooms with operable exterior walls, or conservatory spaces created as extensions to living areas were but two options tabled for discussion during the earlier meetings. The feedback stressed the need for supplementary space (supplementary to the living area) that could provide some of the qualities of private outdoor space or that the living areas themselves would be spatially generous, more so than would normally be expected in the type of accommodation being provided. Double height spatial arrangements were discussed, as these can generate some of the qualities that simulate external environments. As far as I'm aware, none of these have been included in the design put forward in the application.

The quality of individual terraces and decks must be checked with reference to the objective criteria that are described in the RDG. The information provided with the application will not enable these areas to be checked. In particular, the following information should be provided:

1. Sections should be provided through each wing of the building. Details of any privacy screening devices should be shown on the sections.

2. Large format shading analyses should be provided for the shortest day, 21 June. The three-dimensional shading diagrams provided at small scale are inadequate to enable each deck area to be checked.

3. Elevations of the internal walls of the development, toward the courtyard.

Once the levels of compliance with the objective criteria of the RDG have been determined, reference to shared open space and on-site recreational amenity will be taken into account. It is noted that the quality of the internal environment that had been described by the Council officers and discussed around the table during pre-application meetings has not eventuated in the design. The extent to which the current design can be advocated for in relation to environmental noise – given that it is expected that residents will be able to enjoy outdoor living any time the choose – is now unclear. The information that has been provided with the application in insufficient to enable full assessment of the project in relation to the RDG. The additional information required to allow this to be completed has been described above. While this information will enable further assessment, compliance with the RDG may not be sufficient to enable the Urban Designer to advocate for the design outcomes in this environment. Council advises the applicant to alter the design to take into consideration the suggestions outlined above.

The application should also include any signage proposed for the building.

Subsequent changes have been made to the design since the receipt of this RFI in order to gain support from the Council's Urban Designer. Refer to attached email from Morten Gjerde in regards to proposed design. Four new cross section drawings have been added to the drawing set to show the internal elevations. Refer to new Sheets A-3.01 & A-3.02. The sunshading diagrams provided are still applicable. Large format prints can be provided (or digital copies) if still required.

Stormwater

11092017 *The following information is provided by WWL hydraulic modeller with regards to flooding in the site:*

"We only have very draft results from Lyall Bay model. The results indicate that there is a risk of flooding around Kingsford Smith St and Mcgregor St. We would recommend to build 300mm above the kerb level at Kingsford Smith St."

The proposal is to have a ground floor (for retail stores, electrical room and rubbish room) with the floor level of about 4.85m RL. The proposed basement (for carparks and storage lockers) will have a floor level of 1.85mRL. The kerb levels are about 4.74m to 4.84m along Kingsford Street. Thus, the floor levels of the ground and basement of the building are below the floor levels recommended by the WWL Hydraulic Modeller.

While the information is only a "draft" form and is not yet being used to define flood hazard areas in the WCC District Plan, it may not have the teeth for enforcement in the Resource Consent. However, the information already provides indication of a potential flood risk that the applicant has to be aware of in their proposed development.

Please not however that Section 71(1)(a) of the Building Act 2004 that building work to be carried out on "likely" to be subject of natural hazard can be ground to refusal for granting building consent.

In this regard, additional information how the building would be built to resist entry of water, dampness or accumulation of external moisture in the building, to protect the building, life and other properties from the risk of the flooding.

Refer to attached email correspondence from Joey Narvasa from Wellington Water Ltd. Our proposed Ground Floor Level of RL4.85m provides freeboard of 350mm which Wellington Water has given approval for. They have requested resolving flood water from entering the basement. A strip channel drain has been added to the ramp down entrance with the grate level at RL4.75m. This is 250mm freeboard still. A stormwater pumping chamber will be required for this project due to the basement and this will be used to pump water out of the basement that makes it past the strip channel drain.

Wastewater

1. *The proposed development entails the development of 67 dwelling units and 4 retail units.*

Given the number of units to be created and in accordance with Section 3.2.1 (Requirement for Information) of the District Plan, the applicant should provide assessment if the existing wastewater network has the ability to provide level of service to the development and without adverse environmental and community impact.

The assessment should include what measures are proposed to mitigate adverse effects (if any) arising from the increase of wastewater flow from the development, which may include identifying downstream improvements required (if any) as a result of the proposed development.

Refer to attached report prepared by Envelope Engineering Ltd.

Parks, Reserve and Sport

The plans must be altered to remove the boardwalk at ground floor and must provide access to the retail services within the subject site; this is consistent with the information specified at the second pre-application meeting. The practicality of providing for door openings and outdoor space along the building façade as proposed is questionable. No permissions would be given to alter the natural dune in this area in order to alleviate the problem of sand blowing into the retail spaces.

1109217

The applicant would require land owner approval to carry out any development on land that they do not own. They would also require land owner approval to use the land for any sort of access to the building. They have not sought that approval and officers would not support an application for access or development of the land held as public reserve.

The coastal area along Lyall Bay has significant issues with erosion and shifting sand. A key part of the management of that, both now and as the Council looks at how sea level rise and storm effects change with climate change, is in supporting natural dune systems. The more space available for that, the better, and the proposal to use some of that potential space to support residential/ retail development of adjacent private land would not be supported. In Wellington, we estimate that over 99% of our natural dune systems have been lost through development. This gives every little area that remains an important value.

No encroachments into Recreation Reserve land are sort.

Please feel free to contact me if you have any more queries.

Regards,

Mike Stonyer.
Reve Architecture Limited
04 381 3293

Michael Stonyer

11/09/2017

From: Joey Narvasa <Joey.Narvasa@wellingtonwater.co.nz>
Sent: Wednesday, 16 August 2017 9:40 a.m.
To: mike@revearchitecture.co.nz
Cc: Ryan Rose
Subject: FW: SR387233 - 59 Kingsford smith

Hi Mike

Thanks for the plans you provided. From the information below where the peak water level is 4.5m RL (without freeboard). Kerb levels at Kingsford Smith Street from the plans you provided indicated to be from 4.56m to 4.82m RL. I have consulted the Modelling Team manager if the 350mm freeboard you will provide is sufficient considering that the information below does not include climate change, and he said that your proposed 4.85mRL floor level for the Ground level containing the retail units, carparks and storage lockers, will be alright considering the nature of flooding at the site.

The issue of how flood water not entering the basement is something that needs to be resolved. You need to show a design of the ramp from the road to basement so that water from the road will not enter the ramp. You should also describe your proposal(s) how to make the basement watertight and dry.

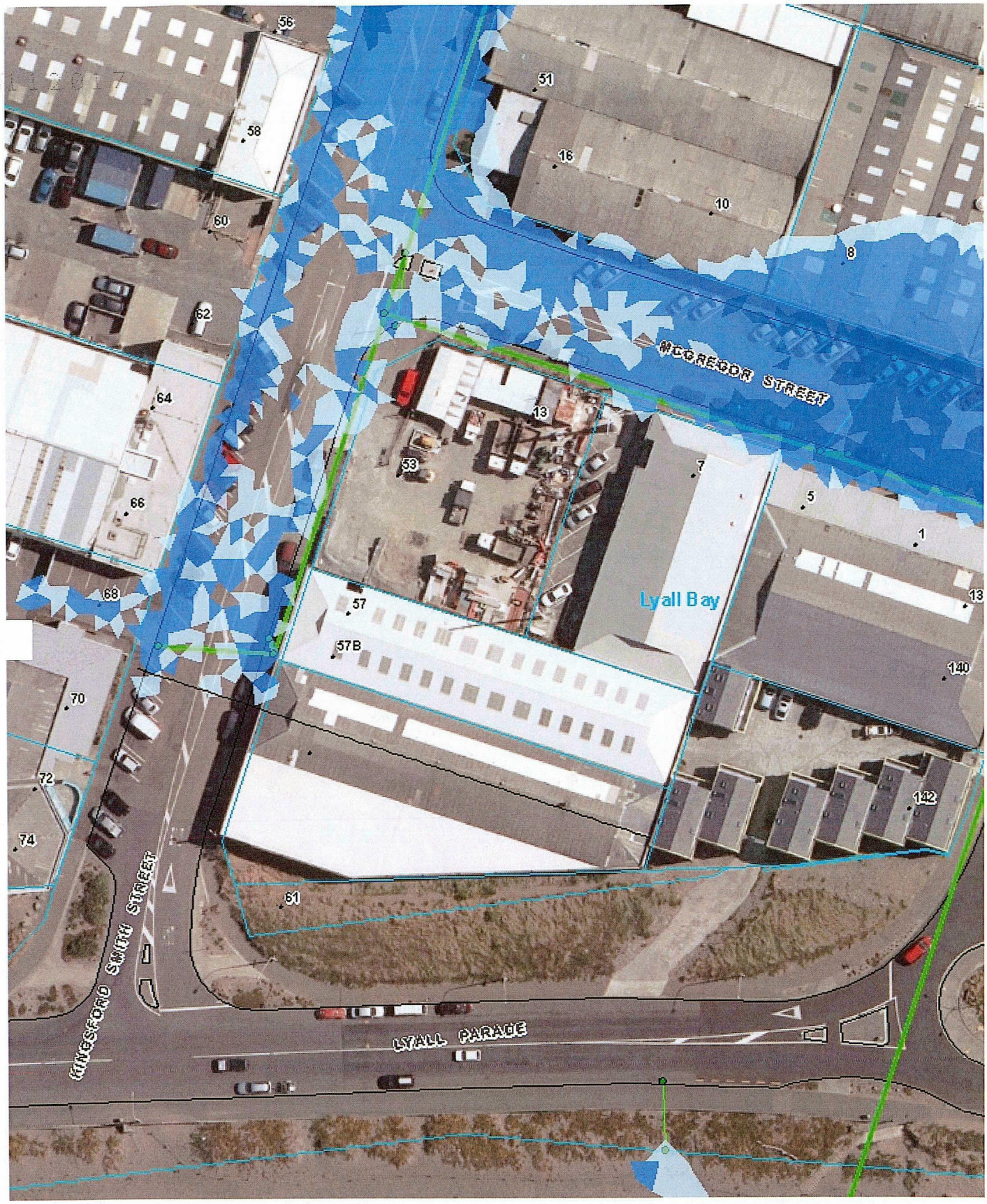
Regards

Joey

Hi Joey,

Please see below the draft results from our model. The results don't include freeboard. We only have available results for 100yr and 10yr events (no climate change).

100yr (no climate change) – flood depth [mm]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Lyall Bay
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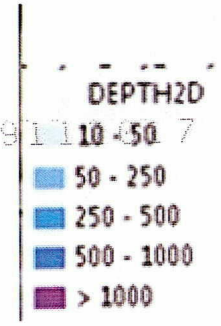
140
142
61
KINGSFORD SMITH STREET
LYALL PARADE



Peak water level (no freeboard) along Kingsford Smith St (in front of no.57) is about 4.5m. Peak water level (no freeboard) along McGregor St is about 3.9m (in front of no. 5)

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DRAFT CONSTRUCTION MANAGEMENT PLAN
57-59 KINGSFORD SMITH STREET
SR 387233

KSS PROPERTIES LIMITED

1 INTRODUCTION

Construction Management Plan Overview

This document forms a "Draft Construction Management Plan" (Draft CMP) for a new Business and Residential Building at 57-59 Kingsford Smith Street, Rongotai for KSS Properties Limited.

The Head Contractor responsible for the carrying out this development has not yet been commissioned. Therefore, this Draft CMP provides the framework within which the construction activities will be managed. However, at this point in time it is not possible to provide final details of the construction project or associated construction methodologies that will be implemented to avoid, remedy and mitigate all potential (short-term) construction effects.

The construction methodologies and mitigation details to be implemented by the appointed contractor (the "Head Contractor") will be submitted to Wellington City Council for its review and approval within a comprehensive "Final Construction Management Plan" (Final CMP) prior to any site works commencing.

It is anticipated (and acceptable to KSS Properties Limited) that the obligation to prepare and supply a Final CMP to Council for approval will be confirmed by an appropriate resource consent condition placed on the consent issued for the development.

The Site

The site has an area of some 2066m^2 and has legal and vehicle frontage to Kingsford Smith Street.

The site is presently occupied by a one-storey building that is used for business activities, most recently for car parking/storage.

To the south the site adjoins an area of Council owned land with an Open Space zoning. The other adjoining properties to the east and north are zoned Business 1 as is the site.

Access to the site during demolition, earthworks and construction will be by Kingsford Smith Street.

Statutory Requirements

All necessary statutory and bylaw requirements will be finalised from Wellington City Council upon application for Building Consent to implement the development.

2 THE PLAN

Responsibilities

KSS Properties Limited will appoint a Head Contractor for the contract.

The Head Contractor will be responsible for completion of the Final CMP, its supply to Wellington City Council for approval, and then overseeing its implementation.

Changes to the Construction Management Plan

No changes will be made to the approved Final CMP without firstly obtaining approval from Wellington City Council to any proposed or directed amendments.

3 HEALTH AND SAFETY

Responsibilities

The Head Contractor will prepare a Health and Safety Policy for this project.

This Policy will be specific for this project.

A visible hazard board naming current site specific hazards will be maintained and displayed at the entrance to the site.

Safety Induction Courses will be carried out on the site.

The Head Contractor's Site Manager will maintain the register to ensure all contractors have carried out the site training.

All people entering the site will be required to be site safe and hold a current site safe passport.

Content of the Policy

The Policy will cover the following:

SAFETY PLANNING FORMS	Task Analysis Worksheet
	Construction Hazards/Controls
	Hazard Register
	Induction / Visitor Register
	Workplace Induction Register
	Training Plan
	Record of Safety Meetings
	Site Safe Inspection Reports
	Incident and Accident Investigation Forms
	Incident and Accident Register
	Emergency Evacuation Plan
	Complaints Register

4 COMPLAINTS PROCEDURE

Complaint Action Process

All complaints are to be followed up by the Head Contractor's Site Manager.

It is that person's responsibility to ensure the complaints procedure is carried out as per the following:

1) Signage with Site Manager's 24 hour contact details.

2) Ensure Complaints Register is complete.

3) All employees of the Head Contractor and sub contractors will be trained to immediately report and feedback (be it complaints and or praise) from site visitors, neighbouring property owners or members of the public/pedestrians.

4) All feedback will be recorded in a Public Feedback Record, which will be maintained by the Site Manager.

5) This record will cover the following points:

COMPLAINTS PROCEDURE FORM	
Date of Complaint:	
Complainants Name:	
Recipients Name:	
Action Taken:	
Details of report back to Compliant:	
Conclusion:	

5 ENVIRONMENTAL EFFECTS

This project will create short-term effects to the environment during the demolition, earthworks and construction phases.

These potential environmental effects include:

- Noise
- Traffic
- Earthworks
- Construction

Noise

All noise generating activities during the period of site works for this project will be managed on site as far as is reasonably practicable to meet New Zealand Standard NZS 6803:1999 *Acoustics - Construction Noise* which was developed to appropriately mitigate and manage noise effects during demolition, earthworks and construction work.

In addition, all persons undertaking day to day management of construction activities on the site will wherever possible adopt the best practical option (BPO) at all times to ensure the emission of noise from the site does not exceed a reasonable level in accordance with Section 16 of the Resource Management Act 1991.

Traffic

The demolition, earthwork and construction contractor/s will each be required to provide traffic management details for the respective work phases which will be detailed as Traffic Management Plans associated or within the Final CMP.

These will detail:

- Site access for vehicles.
- Site access controls to provide for pedestrian and road safety.
- Route for the transport of earth off site to the consented landfill to be used.
- Measures for avoiding and minimizing the adverse effects of the transportation of surplus material e.g. wheel wash, covering loads etc.

The Head Contractor's Site Manager will carry out all necessary traffic management confirmed as necessary and appropriate by Council when it approves the Final CMP.

During site works, construction-related parking will be provided on the site if practicable or on nearby sites to avoid any potential conflict with traffic, parking and pedestrians in the vicinity of the site.

Maintenance of pedestrian safety on all street frontages will be paramount and covered in a Health and Safety document.

Earthworks

As part of site preparation and following demolition of the existing building, the site will be excavated as proposed.

If any debris is carried off the site onto the street network the Site Manager will ensure it is removed promptly and in a safe manner.

Dust mitigation measures will be utilised on-site to avoid dust being being generated and carried beyond the site.

Potential sediment runoff within stormwater will be controlled by appropriate management techniques to ensure that sediment does not migrate beyond the site.

Demolition and Construction

Demolition and construction activities will be carried out with all necessary care to prevent damage or risk for adjacent properties, adjacent buildings, and their occupiers.

Signage and safety barriers will be installed as required to warn pedestrians that construction activities are occurring.

Access to the site will be managed at all times, including maintenance of secure fencing around its perimeter when construction workers are not present on the site.

6 CONSTRUCTION PROCEDURES

Site Office

A temporary site office will be installed on the site. All approved documentation will be kept at the site office including the originals of the approved building consents and all working drawings.

Construction Program

An expected commencement and completion date for the project has not yet been determined.

Advice to Neighbouring Properties

Adjoining property owners will be supplied with an intended construction timetable along with 24 hour contact details for the Site Manager should issues arise at any point, including when construction personnel are not present on the site.

7 PLANT AND EQUIPMENT

The Head Contractor's Site Manager will ensure the sub-contractors plant and equipment carries the necessary certificates and inspection notifications as required under the current Health and Safety requirements.

All contractors will be responsible for the maintenance of their own plant and equipment to ensure smooth operation.

9 SEWAGE AND WASTE DISPOSAL

Portable chemical toilets will be provided for workers until such time as permanent toilets become re-available on-site.

Waste management skip bins will be used for regular refuse disposal.

10 INSPECTIONS, REPORTING AND RECORDS

The site office will be the point of reference for all management requirements.

All relevant records will be housed in the site office.

The site office will be used for induction of sub-contractors for Health and Safety procedures.

Reporting Schedule

Inspections ***Daily*** by Site Manager	Site Safe
	Activity
	Waste Management
	Parking
	Noise Control
Inspections ***Weekly*** by Site Manager	Progress Reports
	Construction Reports
Monthly Report by Site Manager	Project Overview

11 SUMMARY

In implementing all aspects of the proposed demolition, earthworks and construction activity, the aim will be to ensure that as little disruption to the surrounding environment as possible and to complete these activities as practically and efficiency as possible.

Any adverse effects will be limited to the demolition, earthworks and construction period and can reasonably be anticipated given the Business 1 provisions that provide for sites to be more efficiently developed with new multi storey buildings such as is proposed.

KSS PROPERTIES LTD
JULY 2017

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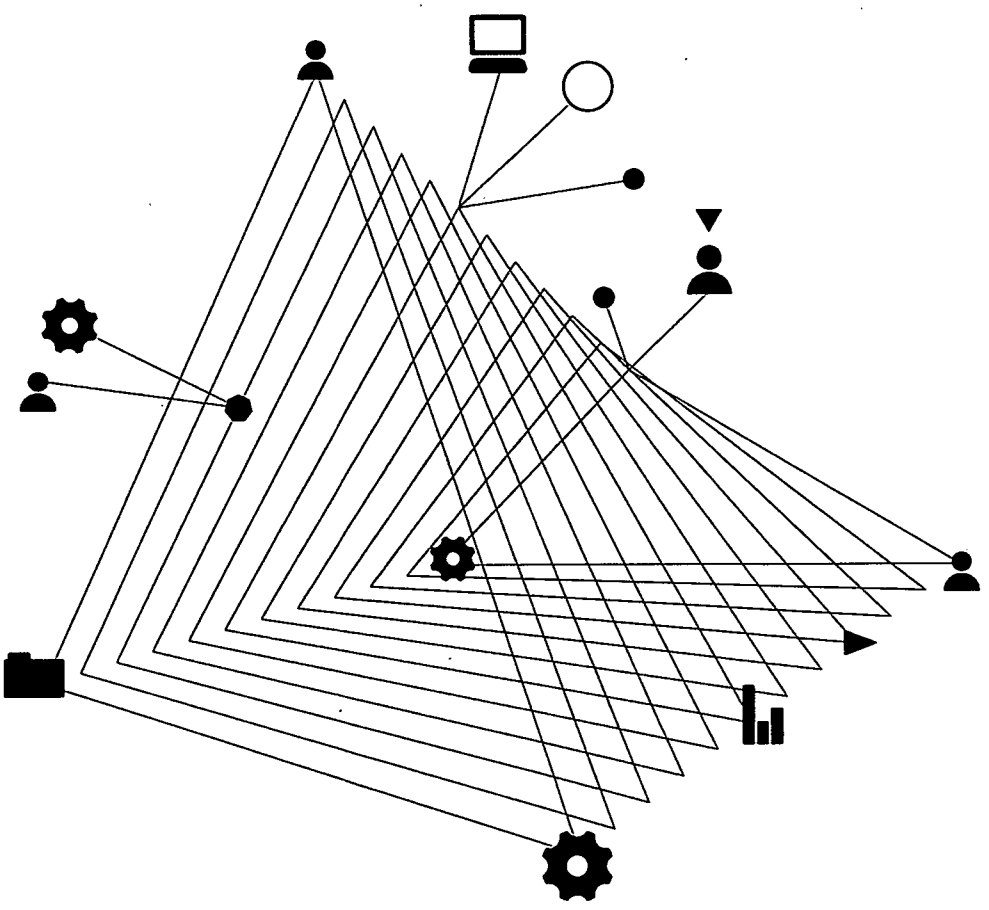
coffey
A TETRA TECH COMPANY

KSS Properties Ltd

57-59 Kingsford Smith Street

Preliminary Geotechnical Assessment



Experience comes to life when it is powered by expertise

11/09/2017

57-59 Kingsford Smith Street

Prepared for
KSS Properties Ltd
8 Reese Jones Grove
Maungaraki, Lower Hutt

Prepared by
Coffey Services (NZ) Limited
Level 5, 150 Willis Street
Wellington 6011 New Zealand
t: 04 385 9885
NZBN: 9429033691923

12 July 2017

Document authorisation

Our ref: 773-WLGGE203610AA

For and on behalf of Coffey

Nathan Schumacher
Senior Geotechnical Engineer

Quality information

Revision history

Revision	Description	Date	Author	Reviewer	Signatory
AA	Final	16 May 2017	A Hutchinson	KW Ho	N Schumacher
AB	Final_Rev1	12 July 2017	A Hutchinson	KW Ho	N Schumacher

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Final	1	.pdf	Michael Cornell (KSS Properties Ltd) Mike Stonyer (Reve Architecture Ltd)	16 May 2017
Final_Rev1	1	.pdf	Michael Cornell (KSS Properties Ltd) Mike Stonyer (Reve Architecture Ltd)	12 July 2017

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Tables

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Appendices

1. Introduction

KSS Properties Ltd commissioned Coffey Services (NZ) Ltd (Coffey) to undertake a geotechnical assessment of 57-59 Kingsford Smith Street, Lyall Bay. The proposed development consists of a five level mixed commercial and residential development with a basement car park.

Coffey has been provided with the concept architectural drawings by Reve Architecture Ltd dated May 2017.

This report presents the findings of a preliminary ground investigation and can be used as one of the supporting documents for resource consent submission.

For the detailed design stage and building consent, further ground investigations will be required, the scope of which can be advised once the concept layout and design is completed.

1.1. Scope of Work

Coffey's scope of work included the following:

1. Development of a preliminary ground model across the site.
2. Depth to groundwater and its effects on design and construction, particularly the basement.
3. Comments on seismic soil classification to NZS1170.5:2004.
4. Preliminary ultimate bearing capacities of the existing ground, and for shallow foundation design, such as ground beams.
5. Preliminary geotechnical design parameters for piles.
6. Preliminary liquefaction analysis and potential for liquefaction induced settlements.
7. Comments on geotechnical issues related to the construction of the basement.

2. Site Setting

The site is relatively flat and lies at an elevation of between RL4.73 – 5.22m according to the topographical survey by Adamson Shaw (2 May 2017). Lyall Parade runs south of the site with the beach sloping at around 5° to the sea beyond. The site is currently occupied by commercial and industrial premises.

A site location plan is provided in Appendix A Figure 1.

2.1. Published Geology

The geology is mapped as Holocene marginal marine sediments including sand according to GNS QMAP digital mapping. Photography from the early 1900s, prior to development, shows much of the Lyall Bay to Evans Bay isthmus to be covered by dune sands. Research by Lewis & Carter (1976) and Ota et al. (1981) suggests that the depth to rock may be around 60m beneath the site based on mapping of buried valleys cut into Greywacke basement rock.

The Evans Bay Fault intersects Tirangi Road around 50m east of the site; however the nature of the fault is not well understood. According to the GNS active faults database the reoccurrence interval and single event displacement are not known. The position of the fault was originally mapped by Lewis and Carter (1976) and Lewis and Mildenhall (1985). The fault was inferred to be a splinter of

the Wellington Fault and had been active during recent time. The fault was found to be a dextral fault and downthrown to the east which, as is typical with these types of faults, would create larger ground movements on the upthrown side – i.e. towards the site.

2.2. Published Natural Hazards

According to Greater Wellington Regional Council hazard maps the hazard risks are:

1. Liquefaction potential – Low.
2. Slope failure hazard – Low.
3. Tsunami Zone - Class 2, orange, CDEM Evacuation Zone, up to 5.0m distant or regional source tsunami, up to 5.0m wave height.
4. Combined hazard – High.

2.3. Existing Geotechnical Information

A search of Wellington City Council (WCC) archives files found the following existing geotechnical information from neighbouring properties:

1. 7 McGregor Street – one hand auger to 3.3m and one Dynamic Cone Penetrometer (DCP) to 2.9m for design of a monopole tower at rear of property. Report by Beca (2005).
2. 70 Kingsford Smith Street – two DCPs to 3.3m and 3.4m at the front of the property for an extension to the building. Report by Spencer Holmes (2003).

The hand auger found granular hardfill to 0.3m followed by fine brown dune sand below with trace gravels from 2.8m. The DCPs indicate the sand is medium dense to 2.6-3.0m depth with DCP blows/100mm between 3 and10 with an average 5. Below 2.6-3.0m depth the material is dense with DCP blows/100mm between 8 and 20 with an average 12.

The New Zealand Geotechnical Database contains the records of a CPT penetrated to 9.9m depth approximately 120m southeast of the site. The geology is inferred to be predominantly sand and silty sand. The marine deposits are medium dense to 4.5m depth and dense below. Further discussion on the results of the CPT are provided in Section 5.5.2.

The locations of the existing investigations are shown in Figure 1 in Appendix A.

3. Site Investigation

The site investigation was undertaken between 28 April 2017 and 1 May 2017 and comprised of one machine drilled borehole to 20m depth. Standard Penetrometer Tests (SPT) were carried out at 1.0m intervals in the top 15m then at 1.5m intervals to 20m. A piezometer was installed to 10m depth within the borehole.

The material from the borehole was logged on-site by a Coffey Engineering Geologist in accordance with the Coffey Geotechnical Field Manual (March 2013).

The borehole log and piezometer installation specification are provided in Appendix B.

4. Ground Conditions

4.1. Summary of Ground Conditions

Results of the investigation and desktop study show that the site is underlain by sandy marine deposits which become relatively competent below 3.5m. The marine deposits are underlain by medium dense to very dense alluvial gravels below 15.0m depth.

Table 1 below provides a summary of the ground profile.

Table 1: Summary of materials encountered on site.

Unit	Top depth (mbgl)	Bottom depth (mbgl)	Geological Unit	Soil Description	Density	SPT Field N Range (Ave)	SPT N_{60} Ave
A	0.00	0.55	Fill	**SAND & GRAVEL,** brown-orange; angular	-	-	
B	0.55	3.50	Marine Deposits A	**SAND,** grey-brown; trace fine medium, angular to sub-angular gravel	loose	5 – 6 (5.5)	6
C	3.50	15.0	Marine Deposits B	**Sand,** grey-brown; some shell fragments	medium dense	17 – 39 (26)	36
D	15.0	20.0	Alluvial	**Sandy GRAVEL,** grey; rounded to sub-rounded	medium dense – very dense	13 – 50+ (30)	42

Note: mbgl - metres below ground level.

4.2. Groundwater

Groundwater measurements are summarised in Table 2 below. Groundwater is likely to be tidal influenced at the site and requires further monitoring to assess the variation in level.

Table 2: Groundwater Level Measurements

Date and Time	Tide level	GWT (mbgl)	RL (m)	Comments
1/05/2017	1hr before high tide	4.38	0.62	During drilling at hole depth 11.0m. Taken Monday morning after Friday's drilling
11/05/2017	1.5hrs before high tide of 1.5m	4.14	0.86	11 days after drilling completion

Note: GWT Ground Water Table

5. Geotechnical Assessment

5.1. Site Subsoil Class

Information on the depth to rock below the site could not be found as it appears that no deep boreholes have been drilled here. It is likely that given the sites location near the centre of the Lyall Bay isthmus that rock could be at over 40-60m depth. The site has therefore been conservatively assessed as being Site Subsoil Class D according to the definitions in NZ1170.5:2004. This site class

should be adopted for the building's design although further investigations may be able to confirm whether the site is Class C.

5.2. Liquefaction Assessment

5.2.1. Seismic Loads

Peak Ground Accelerations (PGA) for use in the liquefaction assessment have been assessed as 0.35 and 0.09 under ULS and SLS design levels respectively.

The PGAs have been calculated according to the *NZTA Bridge Manual 2013 Third Edition* (May 2016) as recommended by NZGS, MBIE/NZGS *Geotechnical Guidance Module 1* (March 2016) and use of the following assumptions:

1. $C_{0,1000}$: 0.45 (Table 6A.1 Bridge Manual).
2. Importance Level (IL): 2 (AS/NZS1170.0).
3. Annual probability of exceedance: ULS 1/500, SLS 1/25 (Table 3.3 of NZS 1170.5).
4. Return Period Factor, R_u ULS = 1.0, R_u SLS = 0.25 (Table 3.5 of NZS 1170.5).
5. Effective earthquake magnitude, M_{eff}: ULS 7.1, SLS 6.2.
6. Site Subsoil Class Factor, f: 1.0 (for Site Subsoil Class D – Deep Soil Site).

$$PGA = C_{0,1000} \times \frac{Ru}{1.3} \times f$$

5.2.2. SPT Based Liquefaction Assessment Results

An SPT based liquefaction assessment has been completed using the results of the site investigation from BH1 completed during the site investigation works, has been carried out according to the method of Idriss and Boulanger (2014) and assuming a ground water level of 4.0mbgl.

Liquefaction is not predicted to occur under ULS or SLS seismic loading; however, strain softening is predicted at certain depths which is likely to cause minor amounts of settlement and lateral stretch toward the sea. The results of the assessment are presented in Table 3 below and graphical outputs are provided in Appendix C.

Table 3: Liquefaction Assessment Results

Depth (m)	Lateral Stretch (mm)	Free Field Settlement (mm)
06.50 – 07.50	10	20
12.50 – 13.50	<1	5
17.00 – 18.00	180	20
20.00 – 20.45	150	15
Cumulative	**341**	**60**

Note material at the base of the hole, where an anomalously low SPT was recorded (N=13), is not expected to be associated with any liquefaction given the lack of evidence in the literature for liquefaction occurring below 20.0m depth.

A liquefaction check was also carried out on the existing CPT located 120m southeast of the site assuming a water level of 4.0m consistent with water level at the site. The assessment was

undertaken in CLiq software (Geologismiki, v. 1.7.6.49) using the Idriss and Boulanger (2014) method. The results are provided in Appendix D.

Under ULS seismic loading ground is predicted to liquefy between 4.0-4.5m and also at around 5.0 and 9.0m although layers here may be too thin to liquefy at only 0.03 and 0.07m thick, respectively. Liquefaction induced free field settlement is predicted to be in the order of 15mm and lateral displacement 360mm. Using the SPT based site investigation data at the site, a similar order of magnitude in values to the above were predicted.

Overall the site appears to have a low liquefaction risk consistent with the GWRC mapping.

5.3. Geotechnical Parameters

The adopted geotechnical design parameters for the soil units presented in Table 4 have been interpreted from the site investigation data and Coffey's experience in working with similar materials.

Table 4: Summary of Soil Geotechnical Parameters

Unit	Bulk Unit Weight, γ_b (kN/m^3)	Effective Cohesion, c' (kPa)	Effective Friction Angle, φ' (°)	Young's Modulus vertical, E_v	Young's Modulus horizontal, E_h	Ultimate Bearing Capacity (kPa)
A - Fill	18	-	-	-	-	-
B - Marine A	17	0	30	6	4	300
C - Marine B	19	0	34	35	25	800
D - Alluvial	20	0	36	70	47	1,000

5.4. Foundation Design Parameters

5.4.1. Shallow Foundations

The existing fill which extends to 0.55m below the site is considered an unsuitable bearing strata and should be removed from the site. The natural marine sand below is medium dense and expected to have an ultimate bearing capacity of 300kPa.

We recommend a geotechnical strength reduction factor (Φ_g) value of 0.5 be used in the static design of foundations and a Φ_g of 0.6 be used in the seismic foundation design.

5.4.2. Deep Foundations

Table 5 presents assessed geotechnical strength parameters which can be used in the design of non-displacement end bearing piles (i.e. bored piles). The surficial fill material should be removed from site and so is ignored from offering any skin friction.

Table 5: Assessed Geotechnical Strength Parameters for Deep Foundation Design

Unit	Ultimate Skin Friction, f_s (kPa)	Ultimate Skin Friction in Tension, $f_{s,t}$ (kPa)	Ultimate End Bearing, f_b (kPa)
A - Fill	n/a	n/a	n/a
B - Marine A	16	11	1,000
C - Marine B	66	46	2,500
D - Alluvial	76	53	5,000

For piles, the ultimate geotechnical pile strength, $R_{d,ug}$ is defined as the total resistance developed by the (axially loaded) pile at which static equilibrium is lost or the supporting ground fails. Therefore the ultimate skin friction, f_s and ultimate end bearing, f_b, values should be multiplied by a geotechnical reduction factor, ϕ_{pc}, in the calculation of the design pile strength.

In line with New Zealand Building Code, B1/VM4 a ϕ_{pc} value of 0.5 has been assessed as being appropriate for a bored pile option.

5.5. Summary of Assessment

5.5.1. General

In summary the site lies on beach dune deposits which are loose in the top 3.5m but relatively competent below. Below 15m are medium dense to very dense gravelly alluvial deposits. Although liquefaction is not predicted in these sediments, lateral stretch of the ground around the site toward the ocean is likely with minor amounts of settlement predicted associated with strain softening during cyclic loading.

The foundation design should take into account the loose sand in the top 3.5m and can be optimised to take into account the uplift and compression load demands. Either a raft or piled raft is likely to be appropriate for the site (refer Section 6).

The excavation for the basement construction requires temporary shoring or otherwise the retaining can be incorporated into the permanent building design. Provision for pumping of water from the basement should be made in the event of flooding from storm surge or tsunami.

5.5.2. Natural Hazards

As per Section 71 of the Building Act and Section 106 of the Resource Management Act, an assessment of the land subjected to natural hazards is to be completed (for Resource Consent), to specifically address the effects of:

1. Erosion (including coastal erosion, bank erosion and sheet erosion).
2. Falling debris (including soil, rock, snow and ice).
3. Subsidence.
4. Inundation (including flooding, overland flow, storm surge, tidal effects and ponding).
5. Slippage.

Adequate provision is to be made to protect the land, building work, or other properties from the natural hazards outlined above.

The site lies over 3.0m above the Mean High Water Springs-10 (MHWS10) (refer Figure 2 Appendix A.) This is the mean high water spring tide exceeded 10 percent of the time. The level provides a reference point for infrastructure design works, and also for estimating extreme high (e.g. the 100-

year Average Recurrence Interval) storm tides. Although the site is above the MHWS10 the basement will still be subject to flooding from tsunamis and potentially from extreme storm events. Adequate provision should therefore be made for pumping of water from the basement should it flood.

In our opinion the site is not subject to falling debris, subsidence or slippage provided foundations are designed appropriately. Coastal erosion is not considered to be a risk due to the protection of the proposed building by the adjacent road and seawall. Subsidence will be managed through appropriate foundation design to limit settlements.

The risk of damage to the foundation and building through fault rupture along the Evans Bay Fault is difficult to ascertain at this stage due to the uncertainty in the exact trace of the fault in relation to the site although it is currently mapped 50m to the east. The likely displacement associated with events on the fault is also unknown. The Ministry for the Environment (2003) recommend a minimum avoidance zone of 20 metres either side around surface traces of mapped faults or the likely fault rupture zone, though this should be increased depending upon the complexity of the fault system, or uncertainty regarding the location or extent of the fault trace at the ground.

Nevertheless the proximity to the active fault presents a design consideration. An option for building resilience into the structure include use of a raft foundation which provides rigid platform connecting the foundation elements and sharing structural loads which can help to reduce differential settlements and displacements within the building. The raft foundation could be used in conjunction with some ground improvement (e.g. stone columns, jet grouting) to reduce the minor settlements and lateral stretch which may be associated with a ULS design level earthquake.

6. Foundation Options

Foundation options for the development include:

1. Raft – a reinforced concrete raft is able to spread building loads over a large area and even out differential settlement by holding the building together as one.

2. Combination of raft-pile – the combination shares the building load demands where shorter piles are needed with the raft assisting in the uplift resistance. This is often a cost effective way of constructing building foundations on soft/ loose ground subject to differential settlements and lateral movement such as sites like this.

Should building overturning/ uplift loads be large then deep piles may provide the uplift resistance. However deep piles may be more vulnerable to displacements from fault rupture particularly if the fault is closer than 50m to the site and may therefore not be appropriate for the building.

6.1. Basement Discussion

A single level basement is proposed for the development although the depth has not been decided at this stage. For a typical basement, a depth of approximately 3.0m can be assumed which would found the basement above the groundwater table based on water levels recorded during drilling.

The excavation for the basement will be through loose dune sand therefore the walls of the excavation will require shoring. The shoring can either be temporary for example, use of sheet piles or permanent by incorporating the retaining into the structure such as secant pile wall or precast concrete wall. The design requires appropriate assessment of local and global cut stability during the detailed design stage.

It is recommended that the groundwater is monitored for the detailed design of the building to assess seasonal fluctuations in groundwater level and the tidal variability.

7. Further Investigation Requirements

It is recommended that further site investigations including drilling of additional boreholes are undertaken for the detailed design of the buildings. The investigation will allow cross sections of the ground profile to be developed and increase confidence in the ground model whilst reducing any conservatism. The scope of the further investigation can be confirmed once the preliminary design is complete.

8. Conclusions

The following conclusions are made:

1. The site is underlain by sandy marine deposits which are loose in the top 3.5m although an ultimate bearing capacity of 300kPa is thought to be achievable in this material. The sandy marine deposits are medium dense from 3.5m to 15.0m and below 15.0m a medium dense to very dense alluvial sandy GRAVEL material is present.
2. The site is likely to be Site Class D. Rock depth could not be confirmed during the investigation.
3. Liquefaction is not expected to occur under either ULS or SLS seismic loading; however lateral stretch to the sea and minor amounts of settlement may occur.
4. Soil parameters for shallow and deep foundation design are provided in Table 2 and Table 3.
5. The walls of the excavation for the basement will require temporary shoring or otherwise retained using a permanent retaining system (secant pile wall, precast concrete wall) incorporated into the building design.
6. From a geotechnical engineering perspective there are no issues which would prohibit the development from taking place.
7. Possible foundation options are discussed in Section 6.

The following recommendations are made:

1. Further investigation of the site will be required to confirm the preliminary ground model provided in this report.
2. The depth to groundwater and any seasonal and tidal influence requires confirmation for detailed design of the basement. Further groundwater level monitoring is therefore recommended although at this stage it appears unlikely that groundwater will be at the level of the basement if we consider a typical basement depth to be 3.0m and groundwater level appears to be at around 4.0-4.5m depth.

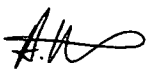
9. Limitations

This report has been prepared solely for the use of our client, KSS Properties Ltd, their professional advisers and the relevant Territorial Authorities in relation to the specific project described herein. No liability is accepted in respect of its use for any other purpose or by any other person or entity. All future owners of this property should seek professional geotechnical advice to satisfy themselves as to the on-going suitability for their intended use.

Please also refer to the enclosed *Important Information about Your Coffey Report.* If you have queries or you require any clarification on aspects of this report, please contact the author of this report.

11/09/2017

Prepared by



Andrew Hutchinson
Project Engineering Geologist

Reviewed/ Authorised By:

Kah-Weng Ho
Senior Principal Geotechnical Engineer

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Important information about your **Coffey** Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

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Appendix A - Figures

Figure 1 – Site Investigation Plan

Figure 2 – Coastal Elevation


Kingsford Smith St
McGregor St
Eans Bay Fault
Tirangi R
DCP1 (2005)
Site
BH01
Lyall Pde
CPT 72625
Eans Bay
Borehole
CPT
DCP

GWRC Web Map

May 9, 2017

Coastal Elevation in the Wellington Region - Coastal Elevation

- 25 cm relative to MHWS10
- 50 cm
- 100 cm
- 125 cm
- 150 cm
- 200 cm
- 250 cm
- 300 cm relative to MHWS10

1:1,128

0 0.0075 0.015 0.03 mi

0 0.015 0.03 0.06 km

GWRC/LINZ/Terralink International
GWRC, WAGGIS, LINZ, NZAM

GWRC Mapping Services

Appendix B - Borehole Log

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Soil Description Explanation Sheet (1 of 2)

DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are broadly described in accordance with the Unified Soil Classification System (UCS) as shown in the table on Sheet 2. However, there are some departures from this and reference should be made to the New Zealand Geotechnical Society 'Field Description of Soil and Rock' 2005 for clarification.

PARTICLE SIZE DESCRIPTIVE TERMS

NAME	SUBDIVISION	SIZE
Boulders		>200 mm
Cobbles		60 mm to 200 mm
Gravel	coarse	20 mm to 60 mm
	medium	6 mm to 20 mm
	fine	2 mm to 6 mm
Sand	coarse	600 μm to 2 mm
	medium	200 μm to 600 μm
	fine	60 μm to 200 μm

MOISTURE CONDITION

Dry	Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.
Moist	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
Wet	As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS

TERM	UNDRAINED STRENGTH s_u (kPa)	FIELD GUIDE
Very Soft	<12	Easily exudes between fingers when squeezed.
Soft	12 - 25	Easily indented by fingers.
Firm	25 - 50	Indented by strong finger pressure & can be indented by thumb pressure.
Stiff	50 - 100	Cannot be indented by thumb pressure.
Very Stiff	100 - 200	Can be indented by thumb nail.
Hard	200 - 500	Difficult to indent by thumb nail.

DENSITY OF GRANULAR SOILS

TERM	DENSITY INDEX (%)	SPT N-value (Blows / 300mm)
Very loose	Less than 15	Less than 4
Loose	15 - 35	4 - 10
Medium Dense	35 - 65	10 - 30
Dense	65 - 85	30 - 50
Very Dense	Greater than 85	Greater than 50

MINOR COMPONENTS

FRACTION	TERM	% OF SOIL MASS	EXAMPLE
Major	(...) [UPPER CASE]	≥ 50 [major constituent]	GRAVEL
Subordinate	(...)y [lower case]	20 - 50	Sandy
Minor	with some... with minor...	12 - 20 5 - 12	with some sand with minor sand
	with trace of (or slightly) ...	< 5	with trace of sand (slightly sandy)

SOIL STRUCTURE

ZONING		CEMENTING	
Layers	Continuous across exposure or sample.	Weakly cemented	Easily broken up by hand in air or water.
Lenses	Discontinuous layers of lenticular shape.	Moderately cemented	Effort is required to break up the soil by hand in air or water.
Pockets	Irregular inclusions of different material.		

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS	
Extremely weathered material	Structure and fabric of parent rock visible.
Residual soil	Structure and fabric of parent rock not visible.

TRANSPORTED SOILS	
Aeolian soil	Deposited by wind.
Alluvial soil	Deposited by streams and rivers.
Colluvial soil	Deposited on slopes (transported downslope by gravity).
Fill	Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.
Lacustrine soil	Deposited by lakes.
Marine soil	Deposited in ocean basins, bays, beaches and estuaries.

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Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)								USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of materials less than 60 mm is larger than 0.06 mm	(About the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.36 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.				GW	GRAVEL
				Predominantly one size or a range of sizes with more intermediate sizes missing.				GP	GRAVEL
			GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)				GM	SILTY GRAVEL
				Plastic fines (for identification procedures see CL below)				GC	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.36 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes				SW	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing.				SP	SAND
			SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).				SM	SILTY SAND
				Plastic fines (for identification procedures see CL below).				SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 60 mm is smaller than 0.05 mm	(A 0.06 mm particle is about the smallest particle visible to the naked eye)		IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.						
				DRY STRENGTH	**DILATANCY**	**TOUGHNESS**			
		SILTS & CLAYS Liquid limit less than 50		None to Low	Quick to slow	None		ML	SILT
				Medium to High	None	Medium		CL	CLAY
				Low to medium	Slow to very slow	Low		OL	ORGANIC SILT
		SILTS & CLAYS Liquid limit greater than 50		Low to medium	Slow to very slow	Low to medium		MH	SILT
				High	None	High		CH	CLAY
				Medium to High	None	Low to medium		OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS		Readily identified by colour, odour, spongy feel and frequently by fibrous texture.						Pt	PEAT

• Low plasticity – Liquid Limit w_L less than 35%. • Medium plasticity – w_L between 35% and 50%. • High plasticity – w_L greater than 50%.

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length.	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.	

TERM	DEFINITION	DIAGRAM
SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter.	
TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

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Engineering Log - Borehole

Borehole ID.	**BH01**
sheet:	1 of 2
project no.	**773-WLGGE203610**
date started:	**28 Apr 2017**
date completed:	**01 May 2018**
logged by:	**AH**
checked by:	**MH**

client: ***KSS Properties Ltd***

principal:

project: ***57-59 Kingsford Smith Street***

location: ***Lyall Bay, Wellington***

position: Not Specified | surface elevation: 5.00 m (NZVD2009) | angle from horizontal: 90°

drill model: Sonic | drilling fluid: | hole diameter : 123 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	vane shear ⊕ remoulded ⊙ peak (kPa) 50 100 150 200	structure and additional observations
NDD				5	0.0		SP	**FILL: SAND**: fine to coarse grained, brown-orange.	M			**FILL** Core Run (0.0-1.5 m): 0% recovery
							GP	**FILL: GRAVEL**: medium to coarse grained, angular, orange, some fine to coarse sand and silt.				
				4	1.0		SP	**SAND**: fine to coarse grained, grey.		L		**MARINE DESPOSITS A**
			SPT 1, 2, 3 N*=5	3	2.0		SP	**SAND**: fine grained, grey-brown, trace fine to medium, angular to subangular gravel.				Core Run (1.5-2.5 m): 100% recovery
			SPT 1, 3, 3 N*=6	2	3.0							Core Run (2.5-3.5 m): 100% recovery
			SPT 3, 7, 10 N*=17	1	4.0		SP	**SAND**: fine to coarse grained, grey, some fine to medium, sub-rounded to rounded gravel. some shell fragments <2mm.		MD		**MARINE DESPOSITS B** Core Run (3.5-4.5 m): 100% recovery
		01/05/17	SPT 6, 11, 13 N*=24	0	5.0		SP	**SAND**: fine to medium grained, grey-brown, trace fine to medium, rounded gravel. minor shell fragments <10mm.	W			Core Run (4.5-5.5 m): 100% recovery
SD			SPT 4, 8, 11 N*=19	-1	6.0							Core Run (5.5-6.5 m): 100% recovery
			SPT 5, 8, 10 N*=18	-2	7.0							Core Run (6.5-7.5 m): 100% recovery
			SPT 6, 11, 14 N*=25	-3	8.0		SP	**SAND**: fine grained, grey, trace shell fragments.				Core Run (7.5-8.5 m): 100% recovery
			SPT 6, 10, 13 N*=23	-4	9.0							Core Run (8.5-9.5 m): 100% recovery
			SPT 6, 15, 16 N*=31	-5	10.0					D		Core Run (9.5-10.5 m): 100% recovery

CDF_0_9_06_LIBRARY.GLB rev:AS Log COF BOREHOLE: NON CORED 57-59 KINGSFORD SMITH STR LOGS.GPJ <<DrawingFile>> 10/05/2017 09:53

method
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
NDD non destructive drilling
SD sonic drilling
* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
HP hand penetrometer (kPa)
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
VS vane shear; peak/remouded (kPa)
R refusal
HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
D dry
M moist
W wet
S saturated
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Engineering Log - Borehole

Borehole ID.	**BH01**
sheet:	2 of 2
project no.	**773-WLGGE203610**
date started:	**28 Apr 2017**
date completed:	**01 May 2018**
logged by:	**AH**
checked by:	**MH**

client: **KSS Properties Ltd**

principal:

project: **57-59 Kingsford Smith Street**

location: **Lyall Bay, Wellington**

position: Not Specified | surface elevation: 5.00 m (NZVD2009) | angle from horizontal: 90°

drill model: Sonic | drilling fluid: | hole diameter : 123 mm

drilling information						material substance							
method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕ remoulded ⊙ peak (kPa) 50 100 150 200	structure and additional observations
SD			SPT 6, 14, 16 N*=30	-6	11.0		SP	**SAND**: fine grained, grey, trace shell fragments. *(continued)*	W	D		Core Run (10.5-11.5 m): 100% recovery
			SPT 8, 17, 16 N*=33	-7	12.0							Core Run (11.5-12.5 m): 100% recovery
			SPT 7, 10, 15 N*=25	-8	13.0					MD		Core Run (12.5-13.5 m): 100% recovery
			SPT 5, 11, 16 N*=27	-9	14.0							Core Run (13.5-14.5 m): 100% recovery
			SPT 10, 18, 21 N*=39	-10	15.0					D		Core Run (14.5-15.5 m): 100% recovery
							GW	**Sandy GRAVEL**: fine to medium grained, rounded to sub-rounded, grey.				**ALLUVIUM**
								15.25 m: grades to fine sand	M	St to VSt		HP 150 - 220 kPa; HP values are dial value times 100 for compressive strength
			SPT 13, 24, 26/120mm N*=R	-11	16.0		GP	**SILT**: low liquid limit, grey, trace fine sand.	W	VD		Core Run (15.5-17.0 m): 100% recovery
								GRAVEL: medium to coarse grained, rounded to sub-rounded, grey, some fine to coarse sand.				
			SPT 2, 7, 10 N*=17	-12	17.0					MD		Core Run (17.0-18.5 m): 100% recovery
				-13	18.0		GW	**Sandy GRAVEL**: fine to coarse grained, rounded to sub-rounded, grey.				
			SPT 6, 11, 30 N*=41	-14	19.0					D		Core Run (18.5-20.0 m): 100% recovery
			SPT 2, 4, 9 N*=13	-15	20.0					MD		
								Borehole BH01 terminated at 20.45 m Target depth				

CDF_0_9_06_LIBRARY.GLB rev:AS Log COF BOREHOLE: NON CORED 57-59 KINGSFORD SMITH STR LOGS.GPJ <<DrawingFile>> 10/05/2017 09:53

method
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
NDD non destructive drilling
SD sonic drilling

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
HP hand penetrometer (kPa)
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
VS vane shear; peak/remouded (kPa)
R refusal
HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
D dry
M moist
W wet
S saturated
Wp plastic limit
Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

09/12/2017

BH01 1.50 - 4.95 m - Core Box #1

BH01 4.95 - 8.95 m - Core Box #2

drawn	AH
approved	KWH
date	5/05/2017
scale	N.T.S.
original size	A4

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client:	KSS Properties Ltd		
project:	57-59 Kingsford Smith Street Lyall Bay, Wellington		
title:	**CORE PHOTOGRAPH** **BH01**		
project no: 773-WLGGE203610		fig no: **PLATE 1**	rev: A

09/12017

BH01 8.95 - 12.95 m - Core Box #3

BH01 12.95 - 16.40 m - Core Box #4

drawn	AH
approved	KWH
date	5/05/2017
scale	N.T.S.
original size	A4

coffey
A TETRA TECH COMPANY

client:	KSS Properties Ltd
project:	57-59 Kingsford Smith Street Lyall Bay, Wellington
title:	**CORE PHOTOGRAPH** **BH01**
project no: 773-WLGGE203610	fig no: **PLATE 2** rev: A

BH01 16.40 - 19.40 m - Core Box #5

BH01 19.40 - 20.45 m - Core Box #6

drawn	AH
approved	KWH
date	5/05/2017
scale	N.T.S.
original size	A4

coffey
A TETRA TECH COMPANY

client:	KSS Properties Ltd
project:	57-59 Kingsford Smith Street Lyall Bay, Wellington
title:	**CORE PHOTOGRAPH** **BH01**
project no: 773-WLGGE203610	fig no: **PLATE 3** rev: A

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Piezometer Installation Log

Hole ID.	**BH01**
sheet:	1 of 1
project no.	**773-WLGGE203610**
client:	**KSS Properties Ltd**
date started:	**28 Apr 2017**
principal:	
date completed:	**01 May 2018**
project:	**57-59 Kingsford Smith Street**
logged by:	**AH**
location:	**Lyall Bay, Wellington**
checked by:	**MH**

position: Not Specified | surface elevation: 5.00 m (NZVD2009) | angle from horizontal: 90°

equipment type: Sonic | drilling fluid: | hole diameter : 123 mm

drilling information | **material substance** | **piezometer construction details**

bore construction license:
drilling company: Griffiths
driller: Jack
driller's permit no.:

method & support	water	RL (m)	depth (m)	graphic log	material name
NDD		4			FILL
					MARINE DESPOSITS A
	01/05/17	0	4		MARINE DESPOSITS B
		-4	8		
SD		-8	12		
		-12	16		ALLUVIUM
		-16	20		

BH01

Grout
Gravel
Bentonite
1.00 m
1.00 m, 1.00 m NZVD2009
Gravel
10.00 m

CDF_0_9_06_LIBRARY.GLB rev:AS Log COF PIEZOMETER ONE PAGE SUMMARY 57-59 KINGSFORD SMITH STR LOGS.GPJ <<DrawingFile>> 10/05/2017 09:55

method & support
see engineering log for details

water
- 10-Oct-12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

ID	type	installation date	stickup (m)	tip depth (m)	water level (m)	Relative Levels (NZVD2009) stickup	tip	water level
BH01	standpipe	01/05/2017	0.00 m	10.00 m		5.00	-5.00	

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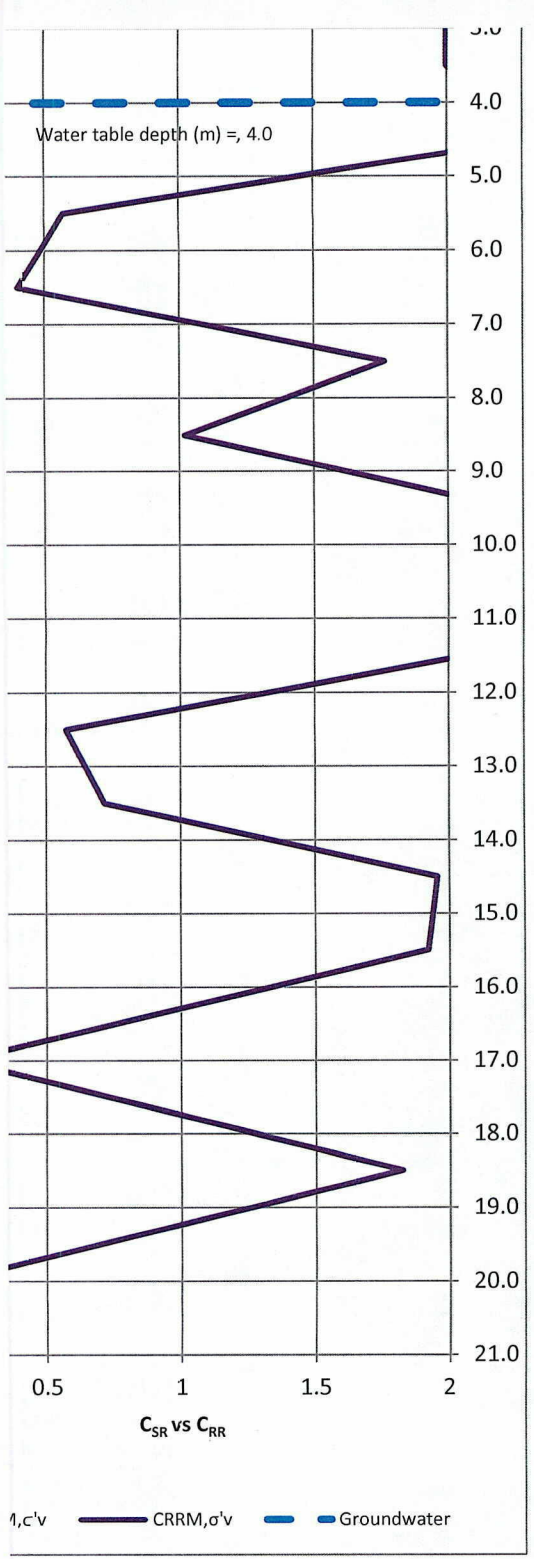
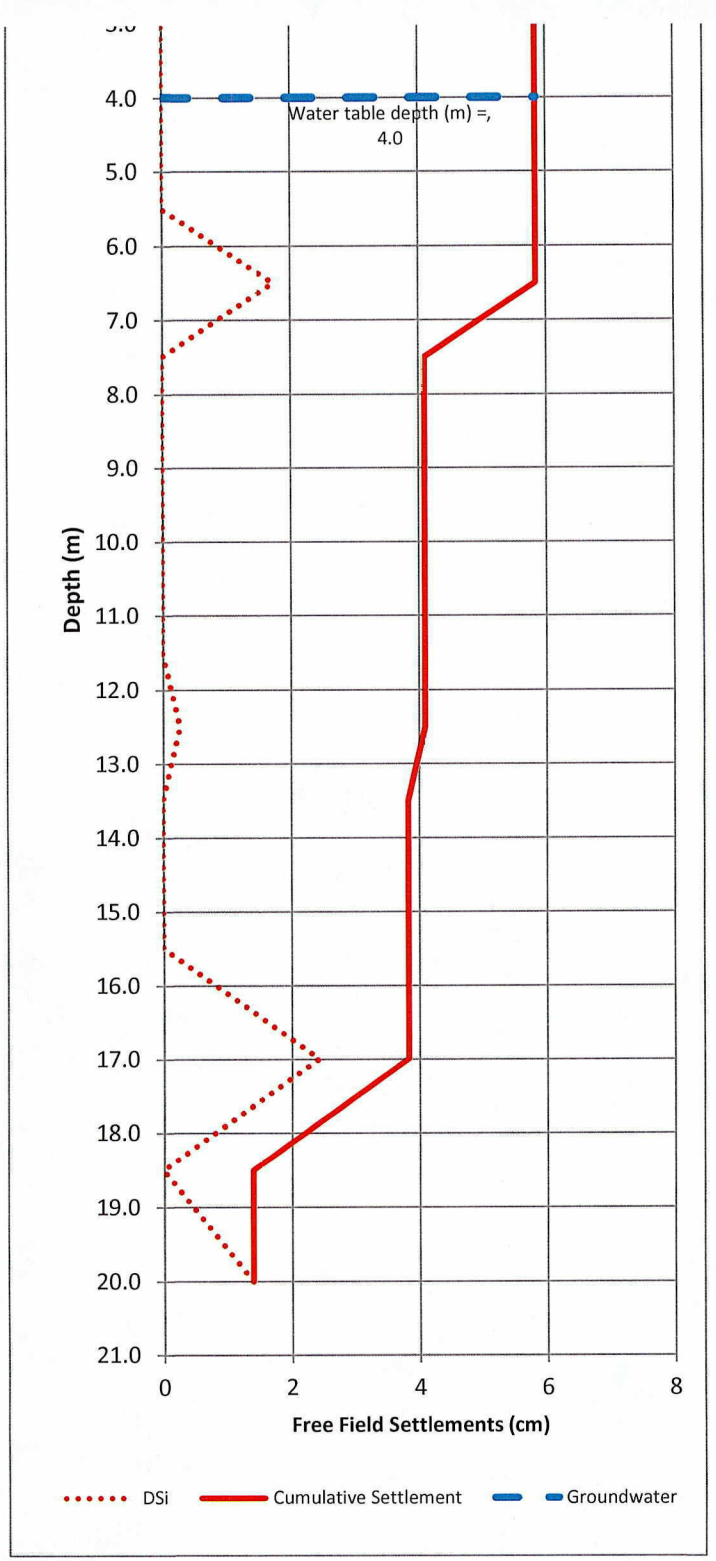
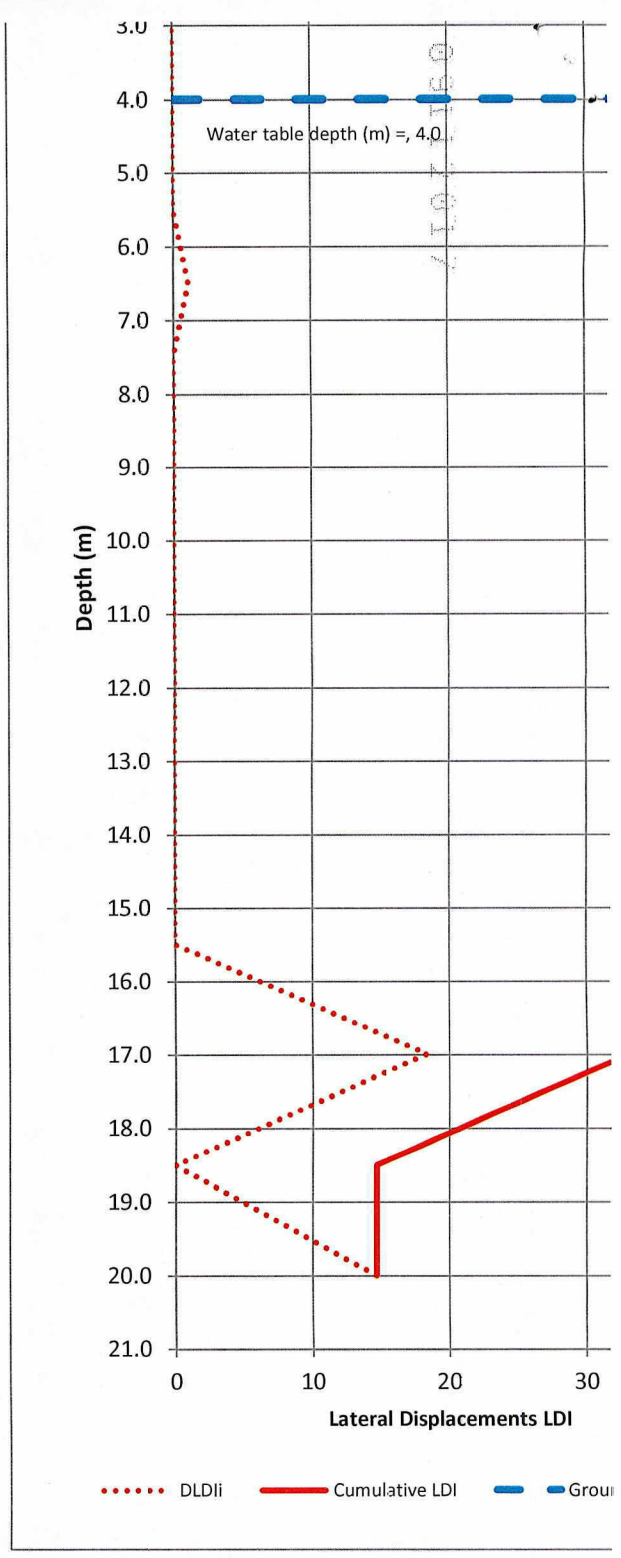
Appendix C - SPT Liquefaction Assessment Results

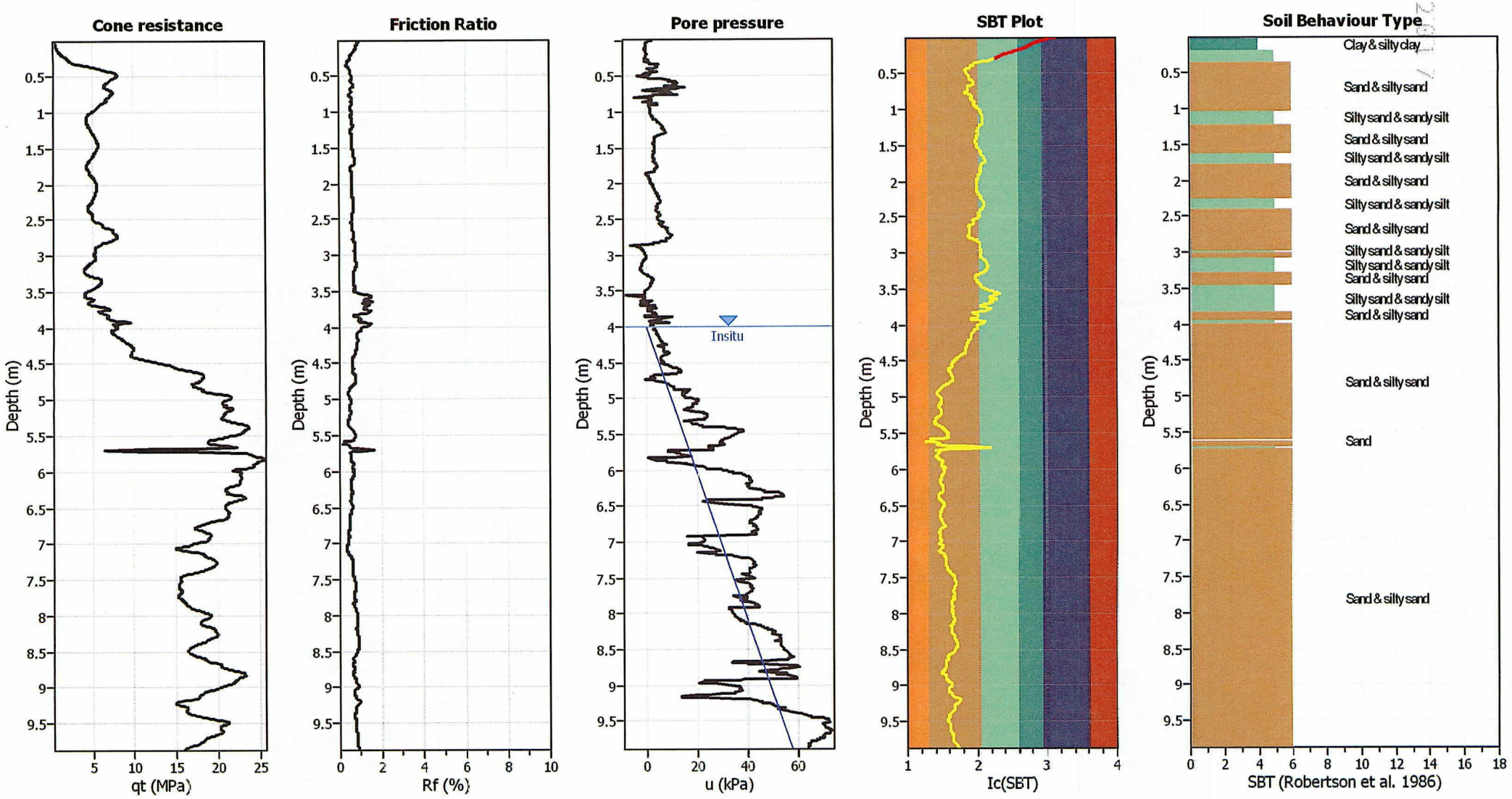

Water table depth (m) =, 4.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0
21.0
0.5
1
1.5
2
CSR vs CRR
CRRM,σ'v
Groundwater


Water table depth (m) =, 4.0
Depth (m)
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0
21.0
0
2
4
6
8
Free Field Settlements (cm)
DSi
Cumulative Settlement
Groundwater


Water table depth (m) =, 4.0
Depth (m)
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0
21.0
0
10
20
30
Lateral Displacements LDI
DLDIi
Cumulative LDI

Appendix D - Neighbouring CPT Liquefaction Assessment Results

CPT basic interpretation plots



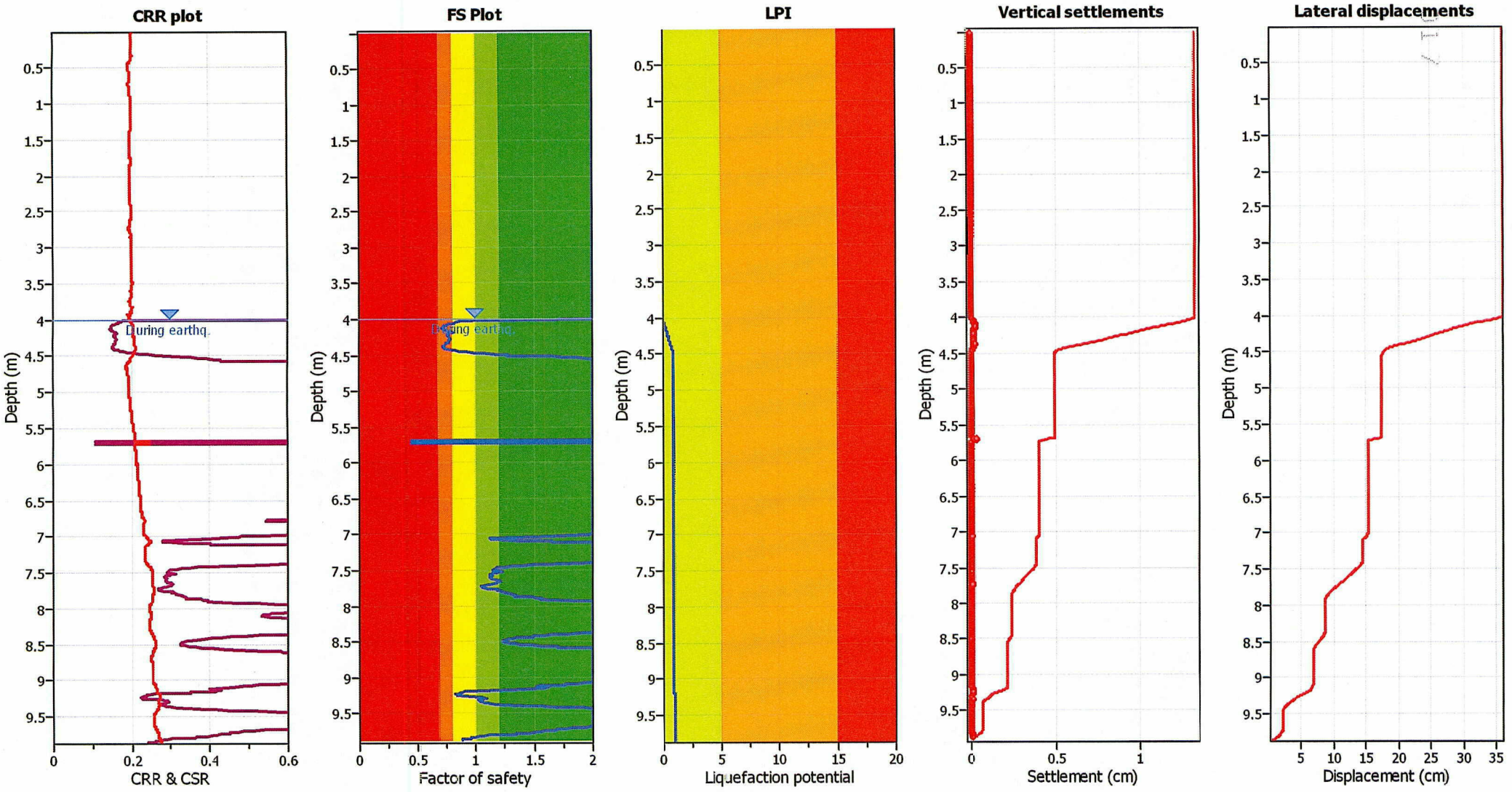
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	4.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.10	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	4.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	4.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.10	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	4.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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ENVELOPE

LAND
STRUCTURE
MANAGE

M001V1-1168-BM
WASTEWATER CAPACITY

TO	WCC	DATE	28/08/2017
PROJECT NAME	57-59 Kingsford Smith Street	ENVELOPE REF	1168
ATTENTION	Wellington City Council	SIGNED	B Miller
EMAIL ADDRESS			

This memo is in response to queries on the downstream wastewater capacity raised in a request for further information. We have liaised with Wellington Water prior to compiling this response.

1.0 BACKGROUND

The development includes the following:

- 15 no x 1 bedroom/studio Apartments estimated at 1.5 people per dwelling = 22.5
- 22 no x 2 bedroom apartments estimated at 2.5 per apartment = 55
- 29 no x 3 bedrooms apartments estimated at 4 per apartment = 116
- 808m2 retail space – estimate 5 staff per unit for 4 units = 20

Therefore, total proposed estimate population 213.5

1.1 WASTEWATER

1.1.1 EXISTING WASTEWATER SUPPLY

Currently the existing building is serviced by a DN150 wastewater connection in Kingsford Smith Street adjacent to the development.

Refer to Appendix 1 for the existing Drainage Plan attached.

1.1.2 PROPOSED WASTEWATER SUPPLY

Our Infrastructure Plans 1168-01-415 in Appendix 2 attached shows the proposed new private drainage line connecting to the existing public wastewater manhole noted A3 in Kingsford Smith Street.

The new private wastewater line is to be sized as 150mm dia this information will be detailed at the building consent stage of works.

Note that all current design is based on WCC GIS levels and pipe gradients, depths, sizes etc will be confirmed at Detailed Design/Engineering Approval stage once a full site survey has been undertaken.

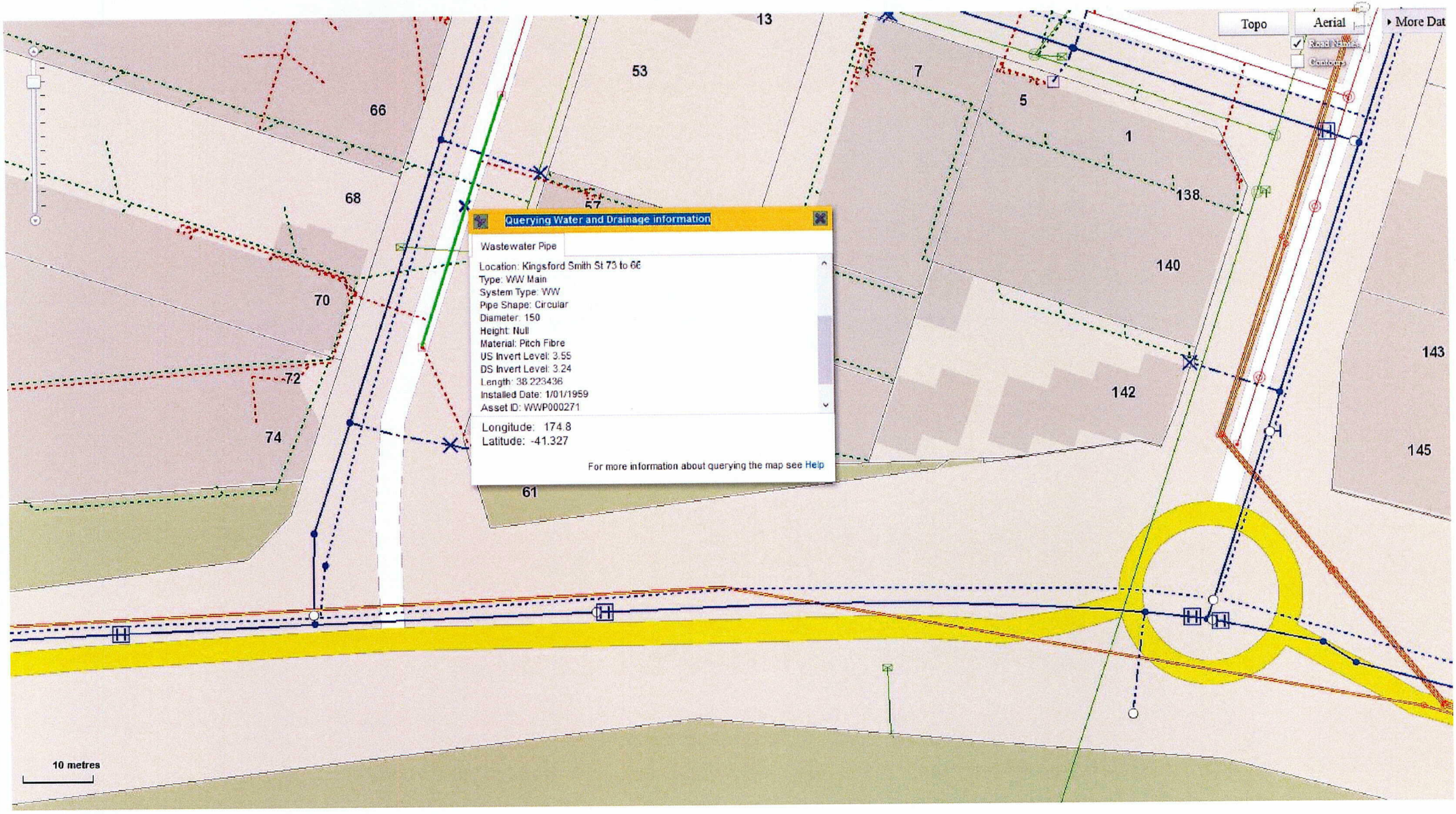
Our Wastewater Calculations are included in Appendix 3. We have calculated the capacity of the line immediately downstream from the proposed connection as well as the capacity of the next 2 downstream pipes to ensure there is adequate capacity in the existing wastewater lines. Our Wastewater Catchment Plan 1168-01-415 (within Appendix 2) shows the catchment areas used for these calculations.

ENVELOPE ENGINEERING
24 EGMONT STREET, TE ARO
WELLINGTON 6011

1.1.3 CONCLUSION

Based on this assessment it can be seen than SSMH-A3 to SSMH-A2 has ample capacity and that the following downstream line SSMH-A2 to SSMH-A1 has marginal capacity. This assessment calculation attached is very conservative and we would deem this marginal result as demonstrating sufficient capacity for the proposal.

APPENDIX 1
EXISTING WW NETWORK


Topo
Aerial
More Dat
Road Names
Contours
13
53
7
5
1
66
68
70
72
74
57
138
140
142
143
145
61
Querying Water and Drainage information
Wastewater Pipe
Location: Kingsford Smith St 73 to 66
Type: WW Main
System Type: WW
Pipe Shape: Circular
Diameter: 150
Height: Null
Material: Pitch Fibre
US Invert Level: 3.55
DS Invert Level: 3.24
Length: 38.223436
Installed Date: 1/01/1959
Asset ID: WWP000271
Longitude: 174.8
Latitude: -41.327
For more information about querying the map see Help
10 metres

APPENDIX 2
WW CATCHMENT PLAN

REVISIONS:

REV	NOTES	BY	DATE

PROJECT:

TITLE:
WASTE WATER DRAINAGE
CATCHMENT PLAN

ENVELOPE
LAND
STRUCTURE
MANAGE
L3, 125 VINCENT STREET
AUCKLAND CITY 1010
PO BOX 68946 NEWTON 1141
ENVELOPE ENGINEERING

DESIGNED: AB
DRAWN: PJ
CHECKED:
DATE: 7-Sep-2017
SCALE A1: 1:500
SCALE A3: 1:1000
STATUS: FOR INFORMATION

PROJECT No.	DRAWING No.	REVISION
1168-01	415	P1

APPENDIX 3
WASTEWATER CALCULATIONS

WASTEWATER CALCULATIONS

ENVELOPE	Project Name: 57-59 Kingsford Smith St	Project No: 1168-01
Wastewater Design Chart - Mannings Formula	Location: Kingsford Smith St, WELLINGTO	Date: 2/07/2017

57-59 Kingsford Smith Street Polulation

15 x 1 Bedroom/ Studio Apartments at 1.5 people per house = 22.5
22 x 2 bedroom Apartments at 2.5 per apartment = 55
29 x 3 bedroom Apartments at 4 per apartment = 116
808m2 Retail Unit Space - Allow for an equivalent of 5 staff/ people per unit for 4 units = 20
Therefore Total 57-59 Kingsford Smith St Population = 213.5

For sites where building information/ use/ population is not available, use 1200 people per hectare.

Population Figures used for WW Lines A3 to A1 are 400 people per hectare plus the additional 214 people for 57-59 Kingsford Smith St

WW LINE A3 to A2

FLOW	Catchments	TOTAL AREA (Ha)	Population/Ha	Population	L/s/person	ADWF
ADWF	66-74 Kingsford Smith St	0.9200	400	464	0.0023	1.56
	The site			214		
	ADWF		PF			PDWF
PDWF	1.56		6.600			10.29
	PDWF	PGWF	PWRF			PWWF
PWWF	10.29	0.0405	0.405			10.74

PF	6.600	(RSFWS-Appendix 11)				
PGWF	0.040	(AREA x 0.044)				
PRWF	0.405	(AREA x 0.440)				

Capacity Check						
Material	n factor	Size	Grade	Velocity	Capacity	Spare Capacity
EW	0.013	**150**	1.00	1.30	**15.2**	**4.5**

WW LINE A2-A1

FLOW	Catchments	TOTAL AREA (Ha)	Population/Ha	Population	L/s/person	ADWF
ADWF	As above + Line B and 8-16 McGregor and 1-13 McGregor	1.7000	400	776	0.0023	2.28
	The Site			214		
	ADWF		PF			PDWF
PDWF	2.28		6.600			15.03
	PDWF	PGWF	PWRF			PWWF
PWWF	15.03	0.0748	0.748			15.85

PF	6.600	(RSFWS-Append x 11)				
PGWF	0.075	(AREA x 0.044)				
PRWF	0.748	(AREA x 0.440)				

Capacity Check						
Material	n factor	Size	Grade	Velocity	Capacity	Spare Capacity
EW	0.013	**150**	1.00	1.30	**15.2**	**-0.6**