Appendix 5a: Electric	ty Supply Confirm	ation
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15 January 2016

Mr Mike Botting Paterson Pitts Group P O Box 283 WANAKA 9343

By email only: mike.botting@ppgroup.co.nz

Dear Mike

## RE: ELECTRICITY SUPPLY FOR NORTHLAKE STAGES 1 - 4

Thank you for your letter and accompanying plans dated 21 December 2015, outlining the above proposed development.

Aurora can make an electricity supply available for this development, subject to the following conditions:

- Supply confirmation is limited to a single phase 15kVA supply per lot.
- Easements in gross, in favour of Aurora, must be granted over the placement of all new and existing Aurora plant associated with this development, unless installed in road reserve.
- Where the development involves further subdivision of a land parcel containing an
  existing serviced installation, the mains cables (overhead or underground) intended to
  supply each lot must be completely contained within the lot that it serves. In some
  cases, this will require relocation of the cable serving the existing installation.
- All electrical installations must comply with Aurora's Network Connection Requirements and related standards and policies.
- The developer must comply with the Electricity Act, subordinate Regulations and associated Codes of Practice. Particular attention must be paid to the minimum distances between power lines and other structures defined in NZECP34:2011 "NZ Electrical Code of Practice for Electrical Safe Distances".
- No building shall be erected over any electricity easement without specific written authority from Delta's General Manager - Asset Management.
- The developer is responsible for all resource consents and local authority approvals.
- The developer will be required to make capital contributions toward the costs of providing the power supply, in accordance with Aurora's Capital Contributions policy prevailing at the time the development, or each stage of development, proceeds.
- This approval will lapse within 12 months of the date of this letter, unless the developer enters into a formal supply agreement with Aurora for this development.



Please note that this letter is to confirm that a power supply can be made available and does not imply that a power supply is available now, or that Aurora will make power available at its cost.

Aurora's Network Connection Requirements and Capital Contributions policy are available from http://www.auroraenergy.co.nz/. Should you require further information or clarification, please contact the undersigned.

Yours sincerely

Alec Findlater

COMMERCIAL MANAGER (Delta)

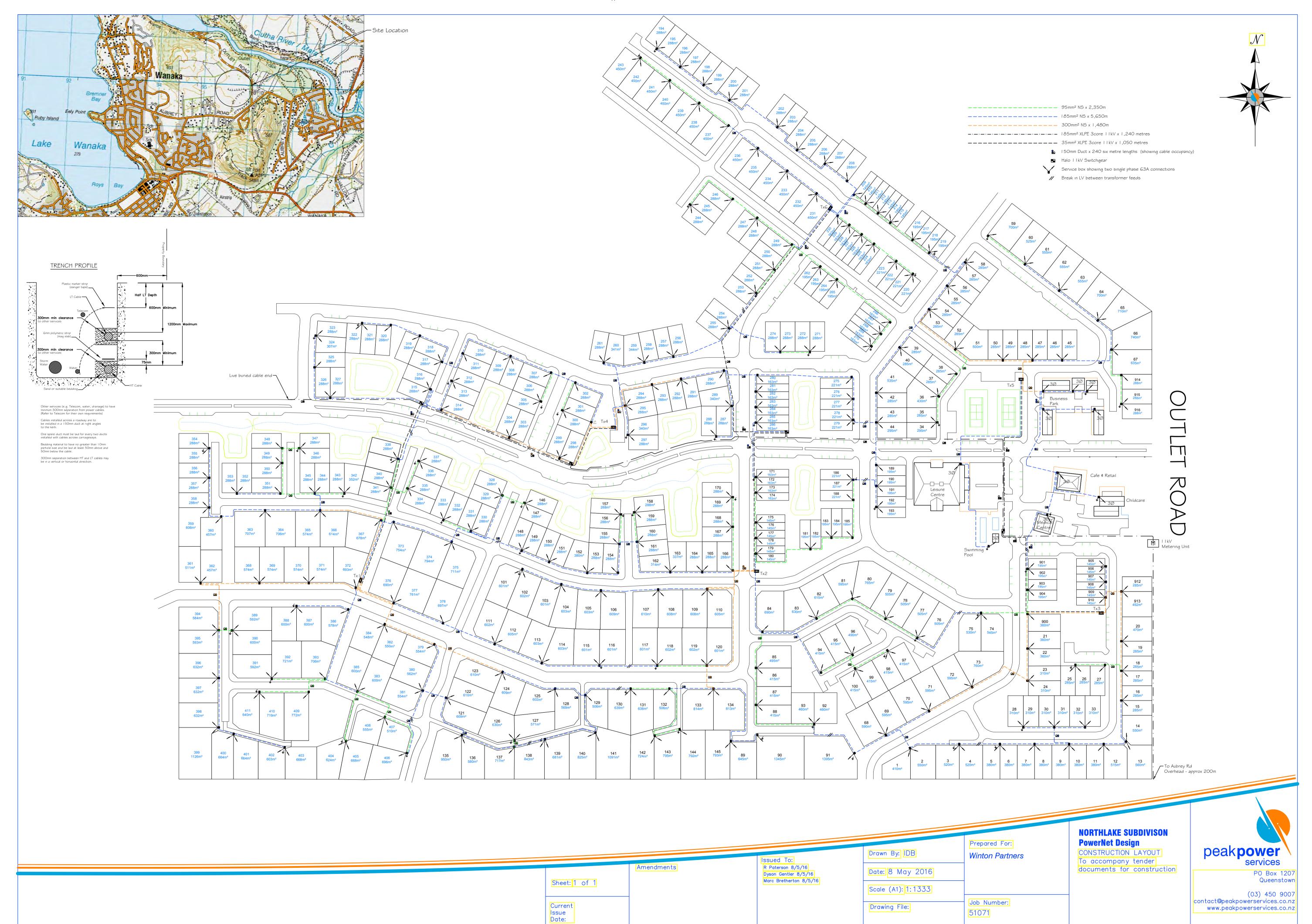
for Aurora Energy Limited

DDI Phone (03) 479 6695 Mobile 027 222 2169

Fax (03) 477 5771

Email alec.findlater@thinkdelta.co.nz

Appendix 5b: PowerNet Design for ODP Area	



51071

Appendix 6: Telecommunication Supply Confirmation				

#### **Chorus Network Services**

PO Box 9405 Waikato Mail Centre Hamilton 3200

Telephone: 0800 782 386 Email: tsg@chorus.co.nz

23 September 2016

Sub Div Ref: WNK36793 Your Ref:

horus

Northlake Investments Limited C/ PATERSONPITTSGROUP P.O. Box 283, Wanaka 9343, New Zealand

Attention: Alex Todd Dear Sir / Madam

**Fibre Reticulation Contract (ABF)** 

# SUBDIVISION RETICULATION - WNK: Aubrey Road, Wanaka - Northlake Stage 4 - 45 Lots (Lots 101-145) **Aubrey Road Wanaka**

Thank you for your enquiry regarding the above subdivision.

Chorus is pleased to advise that, as at the date of this letter, we will be able to provide telephone reticulation for this subdivision. In order to complete this reticulation, we require a contribution from you to Chorus' total costs of reticulating the subdivision. Chorus' costs include the cost of network design, supply of telecommunications specific materials and supervising installation. In this instance, the Developer Contribution (as defined in the Subdivision Contract) is \$82,800.00 (including GST).

A copy of the Contract for the Supply and Installation of Telecommunications Infrastructure for the subdivision ("Subdivision Contract") is attached to this letter. If you decide to accept Chorus' offer and to proceed with reticulation of this subdivision, you will need to sign the Subdivision Contract and return it to us at: Chorus Network Services, PO Box 9405, Waikato Mail Centre, Hamilton 3200. The Subdivision Contract will govern our relationship with you in relation to reticulation of this subdivision.

You are also required to pay the Developer Contribution (see above) at the same time as you return the signed version of the Subdivision Contract to us. Clause 2.2 of the Special Terms of the Subdivision Contract explains your payment obligations in more detail.

If you do not sign the Subdivision Contract and return it to us within 90 days from the date of this letter, the offer made by Chorus to you under the Subdivision Contract is no longer valid and is automatically withdrawn. If you wish to proceed with reticulation of this subdivision in the future, we will need to issue a new agreement for you to sign at that time. We note that, if this occurs, the amount of the contribution required from you and other terms of the Subdivision Contract may change.

We draw your attention to the additional documentation included with this letter. It is very important that you read and understand this information as it relates to your obligations regarding reticulation of the subdivision.

If you have any queries, please do not hesitate to contact us.

Yours faithfully

Tracy Reeves

Manager Chorus Network Services

Encl

(i) Contract for the Supply and Installation of Telecommunications Infrastructure,

(ii) Process for Connection of a Subdivision to the Chorus Network

(iii) Important Information for Developers,

(iv) Chorus' Standard Subdivision Lay Specifications,

(v) Standard Form Chorus Easement, and

(vi) Private Corporate Client Authority and Instruction for an Electronic Transaction

#### **Chorus Network Services**

PO Box 9405 Waikato Mail Centre Hamilton 3200

Telephone: 0800 782 386 Email: tsg@chorus.co.nz

22 September 2016

Northlake Investments Limited C/ PATERSONPITTSGROUP P.O. Box 283, Wanaka 9343, New Zealand

Attention: **Alex Todd**Dear Sir / Madam

**Fibre Reticulation Contract (ABF)** 



Sub Div Ref: WNK36794 Your Ref:

# SUBDIVISION RETICULATION - WNK: Aubrey Road, Wanaka - Northlake Stage 5,6 - 27 Lots (Lots 146-171 and Superlot 1017)

#### **Aubrey Road Wanaka**

Thank you for your enquiry regarding the above subdivision.

Chorus is pleased to advise that, as at the date of this letter, we will be able to provide telephone reticulation for this subdivision. In order to complete this reticulation, we require a contribution from you to Chorus' total costs of reticulating the subdivision. Chorus' costs include the cost of network design, supply of telecommunications specific materials and supervising installation. In this instance, the Developer Contribution (as defined in the Subdivision Contract) is \$49,680.00 (including GST).

A copy of the Contract for the Supply and Installation of Telecommunications Infrastructure for the subdivision ("Subdivision Contract") is attached to this letter. If you decide to accept Chorus' offer and to proceed with reticulation of this subdivision, you will need to sign the Subdivision Contract and return it to us at: Chorus Network Services, PO Box 9405, Waikato Mail Centre, Hamilton 3200. The Subdivision Contract will govern our relationship with you in relation to reticulation of this subdivision.

You are also required to pay the Developer Contribution (see above) at the same time as you return the signed version of the Subdivision Contract to us. Clause 2.2 of the Special Terms of the Subdivision Contract explains your payment obligations in more detail.

If you do not sign the Subdivision Contract and return it to us within 90 days from the date of this letter, the offer made by Chorus to you under the Subdivision Contract is no longer valid and is automatically withdrawn. If you wish to proceed with reticulation of this subdivision in the future, we will need to issue a new agreement for you to sign at that time. We note that, if this occurs, the amount of the contribution required from you and other terms of the Subdivision Contract may change.

We draw your attention to the additional documentation included with this letter. It is very important that you read and understand this information as it relates to your obligations regarding reticulation of the subdivision.

If you have any queries, please do not hesitate to contact us.

Yours faithfully

Matt Lock

Network Services Coordinator

Encl:

(i) Contract for the Supply and Installation of Telecommunications Infrastructure

(ii) Process for Connection of a Subdivision to the Chorus Network

(iii) Important Information for Developers

(iv) Chorus' Standard Subdivision Lay Specifications,

(v) Standard Form Chorus Easement, an

(vi) Private Corporate Client Authority and Instruction for an Electronic Transaction

Appendix 7	7: Tonkin and	d Taylor Wat	ter Modelli	ng Report I	Feb 2016	

Job No: 50553.324 10 February 2016

Queenstown Lakes District Council Private Bag 50072 Queenstown 9348

Attention: Rob Darby

Dear Rob

# **Northlake Developments Water Supply Modelling**

## 1 Introduction

Tonkin and Taylor Ltd (T+T) was engaged¹ by Queenstown Lakes District Council (QLDC) to undertake water supply modelling for the proposed Northlake subdivision in Wanaka. The scope of work completed by T+T includes modelling of interim and ultimate development scenarios to determine whether levels of service in the area can be met by the proposed water supply reticulation sizing and layout.

11 stages of development are proposed across four different landowners (Northlake Investments Limited, Urquhart, Allenby Farms Limited and Gilbertson). Initial modelling connected the first four stages (owned by Northlake Investments Ltd.) into the existing Northlake reticulation off Aubrey Road. The ultimate scenario expanded on this initial modelling to include all of Stages 1-11. These zones were all connected into the current network through connections to the Beacon Point outflow pipe and Aubrey Road. Refer to Appendix A for maps of the proposed layout and a contour plan of the area.

# 2 Network setting

Existing development in the Northlake area is confined to an approximately 30 hectare block north of Aubrey Road. This area, as well as areas surrounding Aubrey Road, is serviced by the Beacon Point inlet booster stations on the bank of Lake Wanaka, and corresponding reservoir, situated at an elevation of 382 m RL. The existing Northlake development water reticulation network connects into the current Wanaka network at three locations along the 375 mm Aubrey Road main – via two 150 mm mains which reticulate water throughout the development and one 100 mm lateral.

# 2.1 Criteria and assumptions

The purpose of the water supply modelling was to determine whether the proposed Northlake Development reticulation sizing and layout would allow QLDC levels of service and firefighting requirements to be met. The following demand scenarios were modelled to determine this:

<sup>&</sup>lt;sup>1</sup> Email between Dominic Fletcher (T+T) and Rob Darby (QLDC) dated Wednesday 13 January 2016.

- Peak day demand To determine whether available fire flows achieve the firefighting requirements as per NZS 4509:2008.
- Peak hour demand To determine whether minimum residual pressures at each connection are ≥ 300 kPa.

The firefighting water classification for the development is FW2 (12.5 l/s within a distance of 135 m from any point in the network with an additional 12.5 l/s available within a distance of 270 m).

# 2.2 Design demands

The average daily demands (ADF) for each of Stages 1-11, as well as the existing Northlake developed area off Aubrey Road, were calculated by assuming a water allocation of 700 l/person/day and 3 people per lot (refer Appendix B). Development demands during the peak day and peak hour demand scenarios were calculated as follows:

- Peak day flow (PDF) = 3.3 x ADF.
- Peak hour flow (PHF) = 6.6 x ADF.

Table 1 Calculated demands for the existing development and Scenarios One and Two (refer Appendix B for individual stage demands)

Area	ADF (I/s)	PDF (I/s)	PHF (I/s)
Existing Northlake development	1.31	4.33	8.66
Scenario One (Stages 1-4)	13.17	43.47	86.95
Scenario Two (Stages 1-11)	30.31	100.02	200.04

## 3 Modelled scenarios

Two scenarios were modelled, an initial scenario and ultimate scenario. Modelling assumed the current Wanaka peak day design network demands and reticulation and did not take into consideration future network upgrades or demand increases beyond those mentioned below for the Northlake Development.

# 3.1 Initial Scenario: Stages 1-4

The initial scenario extended the existing 150 mm rising mains servicing the current network development north of Aubrey Road into Stages 1-4. These 150 mm mains were then connected via a 300 mm main (refer Appendix C for network layout). Modelling of this scenario was undertaken to determine whether the proposed interim reticulation upgrades would meet levels of service for the areas and the effect, if any, on the existing network.

## 3.2 Ultimate development: Stages 1-11

The ultimate scenario consisted of all 11 proposed stages across the Northlake, Allenby, Gilbertson and Urquhart developments. The modelled network extended the 300 mm main in the initial scenario to connect both into the Beacon Point reservoir outlet pipe to the west of the development, as well as into the existing 375 mm Aubrey Road falling main to the east of the development. Three laterals of diameter size 100 mm and 150 mm extended off the 300 mm main to service Stages 6-8.

# 4 Modelling results

# 4.1 Scenario One: Stages 1-4

Modelling determined that the Beacon Point Reservoir (382 m RL) and corresponding network infrastructure has sufficient capacity to meet the additional 47.80 l/s demand of Stages 1-4 with little impact on pressure and demand to the surrounding current network. However, minimum residual pressures of 300 kPa were not met at areas of higher elevation (above 343 m RL). This is due to the reservoir elevation relative to the higher levels of the development and is not considered as a result of head losses in the network (refer Appendix C for results).

It is noted that minimum residual pressures in the current network off Aubrey Road were not all greater than 300 kPa prior to the addition of the Scenario 1 upgrades. This is considered due to the high elevation of certain areas of the network in comparison to the elevation of the Beacon Point reservoir.

Modelling of available firefighting flows took into consideration local head loss at each fire hydrant. Results determined that the required firefighting category FW2 (25 l/s) was available throughout the network for Stages 1-4.

Table 2 Residual pressures and fire flows at each junction throughout the existing development north of Aubrey Road and proposed Scenario One network

Area	Junction ID	Elevation	Minimum Residual	Available Fire flow (I/s)
		(m RL)	Pressure(kPa)	(Inc. hydrant losses)
	922	332	481 ≥ 300 OK	> 50 l/s OK
	912	348	265 < 300 NOT OK	46 ≥ 25 l/s OK
	919	352	206 < 300 NOT OK	41 ≥ 25 l/s OK
	918	356	147 < 300 NOT OK	34 ≥ 25 l/s OK
	917	348	196 < 300 NOT OK	40 ≥ 25 l/s OK
	916	348	216 < 300 NOT OK	42 ≥ 25 l/s OK
	911	348	216 < 300 NOT OK	43 ≥ 25 l/s OK
Existing Network	956	346	235 < 300 NOT OK	44 ≥ 25 l/s OK
	910	331	383 ≥ 300 OK	>50 l/s OK
	923	331	383 ≥ 300 OK	40 ≥ 25 l/s OK
	914	331	441 ≥ 300 OK	>50 l/s OK
	915	333	422 ≥ 300 OK	43 ≥ 25 l/s OK
	925	346	294 < 300 NOT OK	43 ≥ 25 l/s OK
	924	346	255 < 300 NOT OK	36 ≥ 25 l/s OK
	920	343	235 < 300 NOT OK	44 ≥ 25 l/s OK
Northlake	927	331	363 ≥ 300 OK	> 50 l/s OK
	928	343	284 < 300 NOT OK	> 50 l/s OK
Stage 1	926	347	137 < 300 NOT OK	38 ≥ 25 l/s OK
	930	329	324 ≥ 300 OK	> 50 l/s OK
Stage 2	933	351	206 < 300 NOT OK	47 ≥ 25 l/s OK
Stage 3	932	351	196 < 300 NOT OK	45 ≥ 25 l/s OK
Stage 5	929	352	196 < 300 NOT OK	40 ≥ 25 l/s OK
Stage 4	931	329	314 ≥ 300 OK	39 ≥ 25 l/s OK

# 4.2 Scenario Two: Ultimate development

Modelling indicated that with the additional demand for the ultimate development on top of current network operations, the Beacon Point reservoir would drain to empty towards the peak hour of the day without further network upgrades. This means levels of service are unable to be met throughout the ultimate development without upgrades to the current network.

The third pump at the Beacon Point inlet was included as a duty assist pump for modelling purposes, with the same duty head as the two existing operational pumps. Operation of all three pumps enabled network demands to be met, noting that specific assessment of the current intake ability to enable three pumps to operate concurrently has not been undertaken as part of this modelling work.

With the third operational pump at the intake, the required levels of service and firefighting flows in the area were not achieved for the higher areas in the development due to the elevation difference with the Beacon Point Reservoir (refer Appendix D). Table 3 below details the minimum residual pressures and fire flows achievable at each modelled junction in the development.

The results show that with three operating pumps, the required network demands and levels of service are achievable for the Gilbertson and Urquhart developments and Stages 1-4 of the Northlake Investments Limited development. However, due to the high elevation of the Allenby Farms Ltd development and Stages 6-8 of the Northlake Investments Ltd development, the same requirements cannot be met without localised pressure boosting or an additional upper reservoir. In general, this applies to all development and network connections at or above 355 m RL.

The proposed development pipe network is adequate to meet the additional development demands but only with localised boosting to higher areas of the network and upgrades to the current Beacon Point reservoir. An additional reservoir situated at the highest point in the network (414 m RL) could provide adequate levels of service to all areas below 384 m RL. However, the highest point in the proposed development is 393 m RL and therefore localised boosting would be required to meet areas of elevation higher than 384 m RL in the proposed development.

A small area in the existing network Northlake (around Junctions 918 and 919, refer Appendix B) does not meet levels of service for pressure due to its relative elevation to the Beacon Point Reservoir. Localised pressure boosting or connection to a higher pressure zone would be necessary to enable the 300 kPa minimum pressure requirement to be met in this location.

Table 3 Levels of service throughout the ultimate development with an additional pump at the Beacon Point intake

Area	Junction	Elevation	Minimum Residual	Available Fire Flow (I/s)
	ID	(m RL)	Pressure (kPa)	
Existing Network	922	332	491 ≥ 300 OK	> 50 l/s OK
	912	348	324 ≥ 300 OK	> 50 l/s OK
	919	352	284 < 300 NOT OK	50 ≥ 25 l/s OK
	918	355	245 < 300 NOT OK	44 ≥ 25 l/s OK
	917	348	304 ≥ 300 OK	50 ≥ 25 l/s OK
	916	348	324 ≥ 300 OK	> 50 l/s OK
	911	348	324 ≥ 300 OK	> 50 l/s OK
	956	346	334 ≥ 300 OK	> 50 l/s OK
	910	331	481 ≥ 300 OK	> 50 l/s OK
	923	331	481 ≥ 300 OK	45 ≥ 25 l/s OK

Area	Junction ID	Elevation (m RL)	Minimum Residual Pressure (kPa)	Available Fire Flow (I/s)
	914	331	481 ≥ 300 OK	> 50 l/s OK
	915	333	471 ≥ 300 OK	47 ≥ 25 l/s OK
	925	346	353 ≥ 300 OK	41 ≥ 25 l/s OK
	924	346	334 ≥ 300 OK	41 ≥ 25 l/s OK
	920	343	363 ≥ 300 OK	> 50 l/s OK
Stage 1(Northlake)	927	331	491 ≥ 300 OK	> 50 l/s OK
	928	343	461 ≥ 300 OK	> 50 l/s OK
	926	347	314 ≥ 300 OK	> 50 l/s OK
	930	329	500 ≥ 300 OK	> 50 I/s OK
Stage 2 (Northlake)	933	351	383 ≥ 300 OK	> 50 l/s OK
Stage 3 (Northlake)	932	351	383 ≥ 300 OK	> 50 l/s OK
	929	352	383 ≥ 300 OK	> 50 l/s OK
Stage 4 (Northlake)	931	329	491 ≥ 300 OK	48 ≥ 25 l/s OK
Stage 5	934	345	343 ≥ 300 OK	> 50 l/s OK
(Allenby Farms Ltd)	935	350	304 ≥ 300 OK	> 50 l/s OK
	936	355	255 < 300 NOT OK	48 ≥ 25 l/s OK
	937	362	196 < 300 NOT OK	40 ≥ 25 l/s OK
	938	366	167 < 300 NOT OK	34 ≥ 25 I/s OK
	939	359	245 < 300 NOT OK	45 ≥ 25 l/s OK
	945	370	118 < 300 NOT OK	23 < 25 l/s NOT OK
Stage 6 (Northlake	950	346	334 ≥ 300 OK	50 ≥ 25 I/s OK
Investments Ltd.)	946	372	98 < 300 NOT OK	16 ≤ 25 I/s NOT OK
Stage 7(Northlake	951	357	226 < 300 NOT OK	34 ≥ 25 I/s OK
Investments Ltd.)	952	359	206 < 300 NOT OK	30 ≥ 25 l/s OK
	953	361	186 < 300 NOT OK	27 ≥ 25 l/s OK
Stage 8 (Northlake	949	393	0 < 300 NOT OK	0 ≤ 25 l/s NOT OK
Investments Ltd.)	948	378	39 < 300 NOT OK	0 ≤ 25 l/s NOT OK
	947	374	78 < 300 NOT OK	8 ≤ 25 l/s NOT OK
Stage 9 (Urquhart)	954	329	481 ≥ 300 OK	32 ≥ 25 I/s OK
	955	329	402 ≥ 300 OK	23 ≤ 25 I/s NOT OK
Stage 10	943	328	510 ≥ 300 OK	> 50 l/s OK
(Gilbertson)	944	329	500 ≥ 300 OK	> 50 l/s OK
Stage 11 (Gilbertson)	942	326	530 ≥ 300 OK	> 50 l/s OK

# 5 Conclusion

There is sufficient capacity for the Beacon Point reservoir to meet both peak day demand and fire flow levels of service requirements of Stages 1-4 of the Northlake Development with the proposed network. However, due to the elevations in the development, not all areas are able to achieve minimum residual pressure. Localised pressure boosting for areas above 350 m RL elevation would be necessary to ensure a minimum residual pressure of at least 300 kPa is achieved throughout the network (for Stages 1 -4 reticulation only).

Three Beacon Point intake pumps are required to operate (duty-assist-assist type operation) to meet current design network demands with the additional design demand from the full development (Stages 1 - 11) on the design peak day.

Provided the increased network demand can be met by Beacon Point intake (i.e. an additional operational pump at the Beacon Point intake), levels of service can be met within the development for the proposed areas below 355 m RL (i.e. Stages 1 - 4 and 9 - 11). Localised boosting (i.e. pump stations and/or upper reservoir) to areas of higher elevation (i.e. Stages 5 - 8) in the proposed development and isolated areas in the existing Northlake development network is required to enable levels of service requirements to be met.

The proposed development pipe network capacity is adequate for the design demands modelled and when combined with pressure boosting measures (to overcome the elevation difference between the development area and the Beacon Point Reservoir). Specific pressure boosting measures (i.e. upper reservoir and/or pump station(s)) have not been modelled.

# 6 Applicability and closure

The model is a numerical representation of the physical reality, and subsequently bears some uncertainty. The demands and peaking factors used are based on assumptions regarding the patterns of water use in the township, and are an approximation of the physical reality. Hence, actual demands within the network may differ from those modelled.

The modelling results presented in this report show the levels of service for the proposed developments to the Wanaka network, based on adopted design demands and particular network upgrades, and are not a guarantee of available levels of service in the future. In addition, modelling has been undertaken using the current partially calibrated Mike Urban dynamic model for Wanaka. QLDC are in the process of developing a new water supply model and results may vary between the existing and new models.

This report has been prepared for the benefit of Queenstown Lakes District Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without out prior review and agreement.

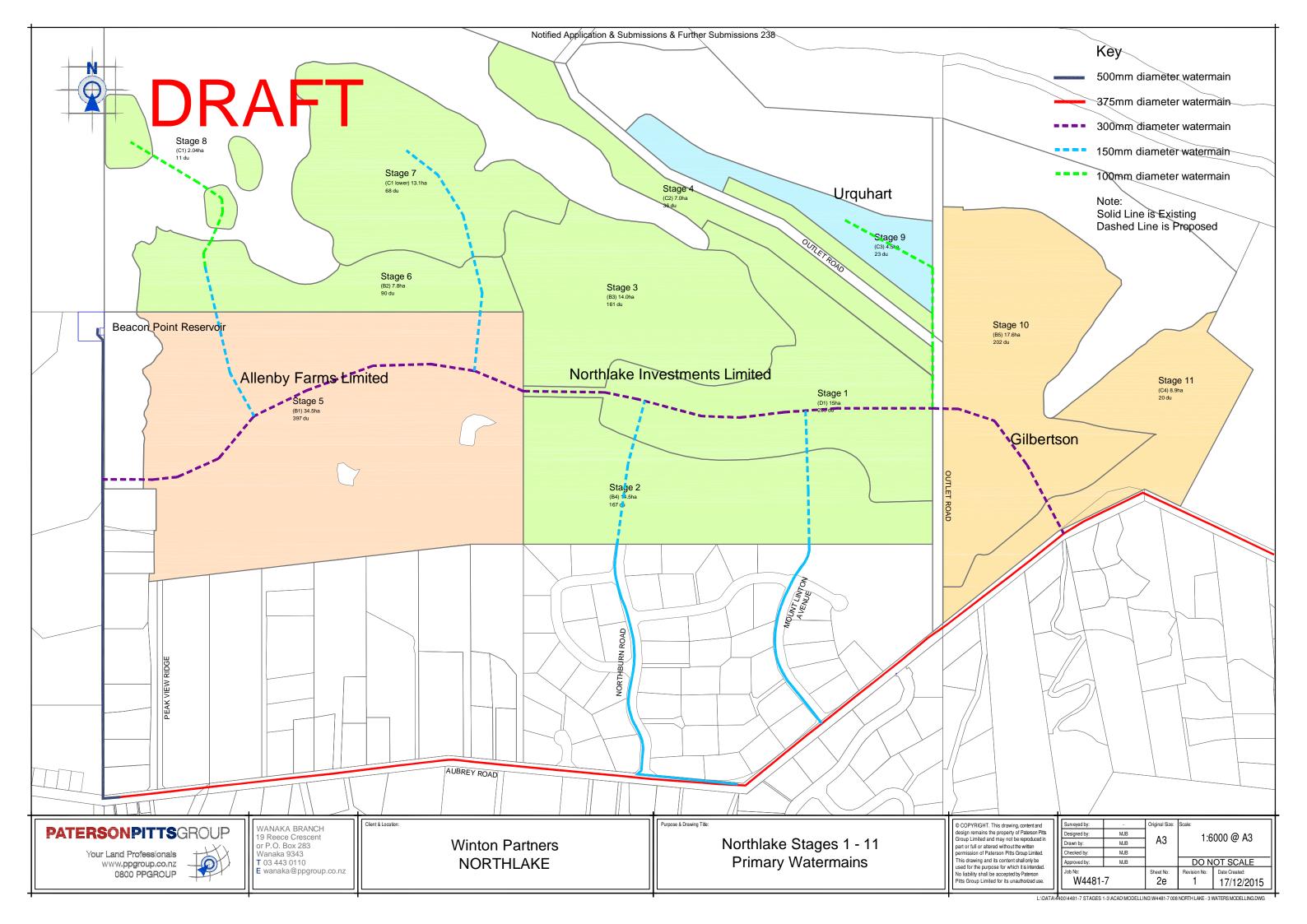
Tonkin & Taylor Ltd	
Environmental and Engineering Consultants	
Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
Michaela Aspell	Grant Lovell
Civil Engineer	Project Director

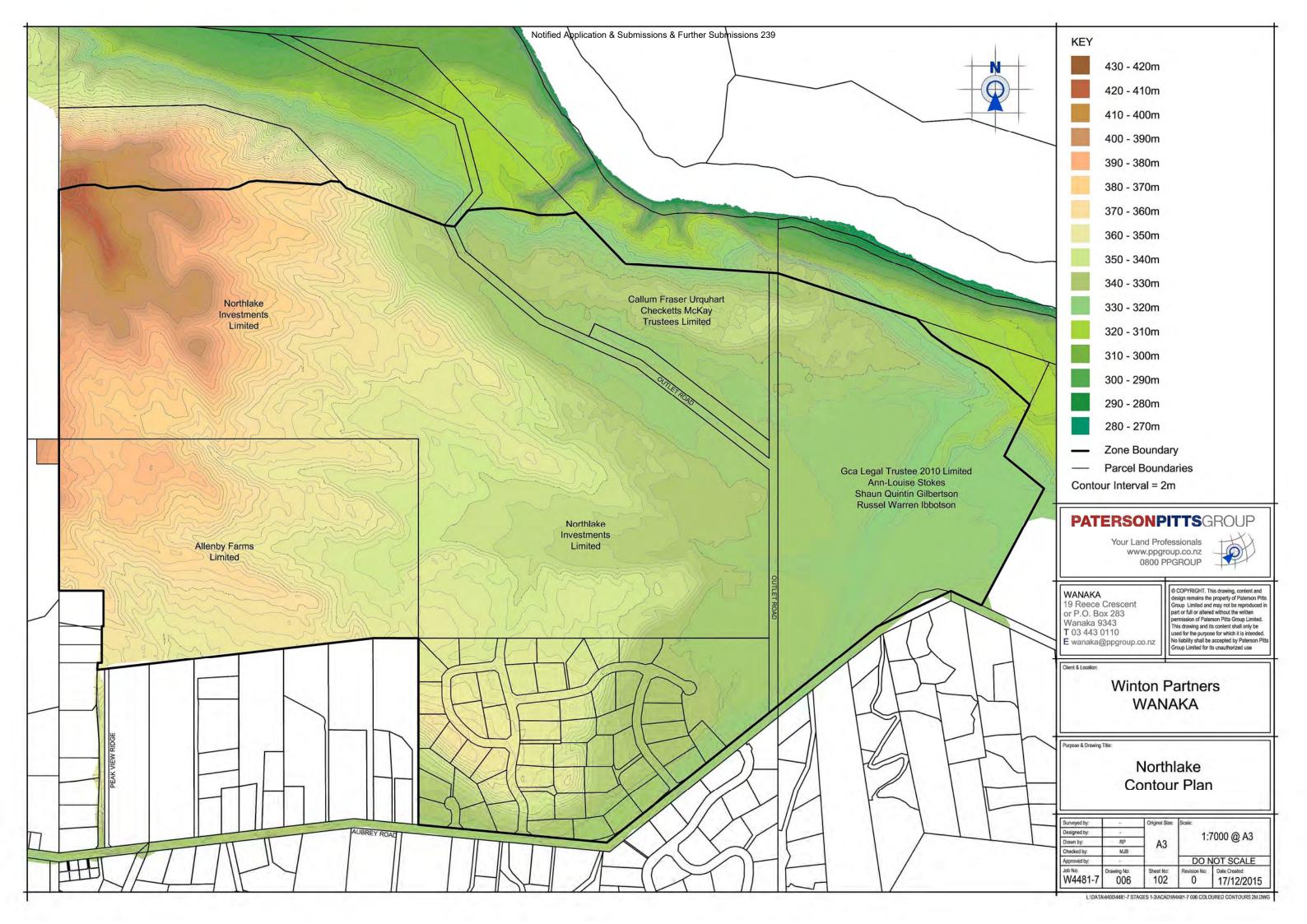
,

Technical review by: Dominic Fletcher (Water Resources Engineer)

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Appendix A: Draft Development Plans (Winton Partners)





# **Appendix B:** Modelling Design Demands



Job no. 50553.324

Description Northlake Developments Water Supply Modelling Demands

Computed 15/01/2015 mlaa

# NORTHLAKE SUBDIVSION

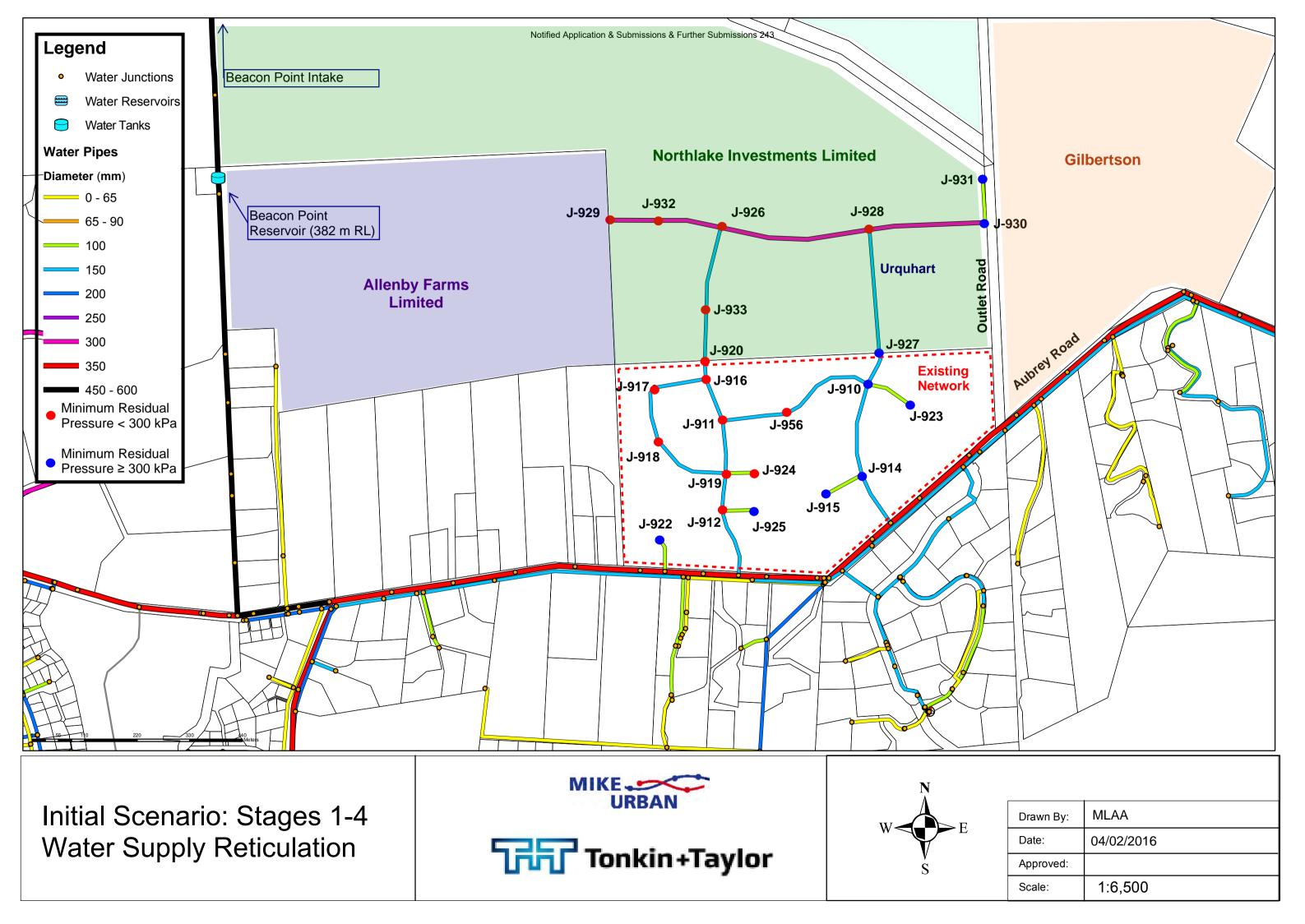
Density 3 people/lot Water allowance 700 l/person/day

Stage	No. of lots	ADF (I/s)	PDF (I/s)	PHF (I/s)
1	225	5.47	18.05	36.09
2	145	3.52	11.63	23.26
3	140	3.40	11.23	22.46
4	32	0.78	2.57	5.13
Scenario 1 (1-4)	542	13.17	43.47	86.95
5	345	8.39	27.67	55.34
6	78	1.90	6.26	12.51
7	59	1.43	4.73	9.46
8	9	0.22	0.72	1.44
9	20	0.49	1.60	3.21
10	176	4.28	14.12	28.23
11	18	0.44	1.44	2.89
Scenario 2 (1-11)	1247	30.31	100.02	200.04

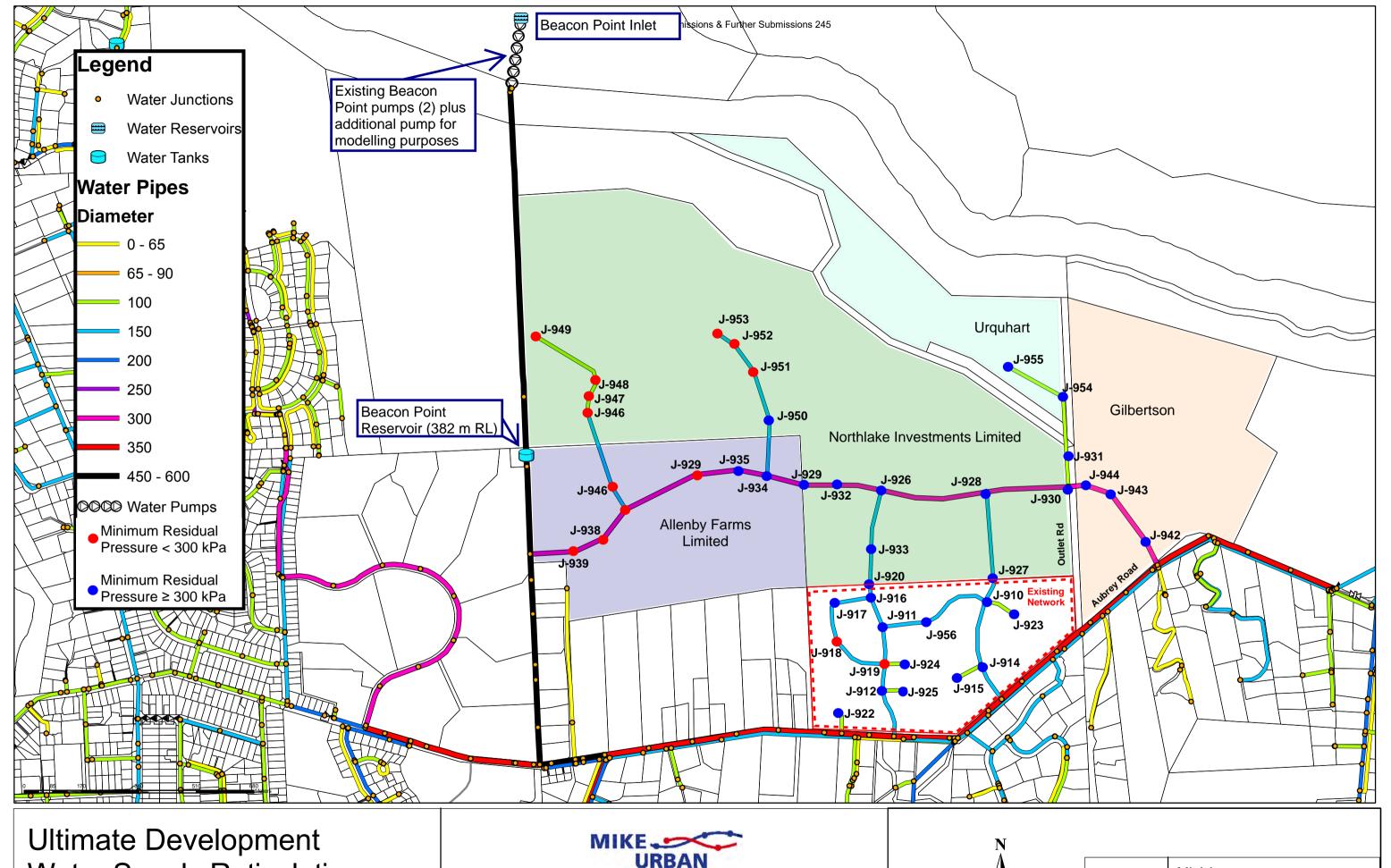
# **EXISTING NETWORK NORTH OF AUBREY ROAD**

Density (people/lot)	3
Water allowance (I/person/day)	700
Number of lots	54
ADF (I/s)	1.31
PDF (I/s)	4.33
PHF (I/s)	8.66

# **Appendix C:** Initial Scenario: Stages 1-4



# **Appendix D: Ultimate scenario (All Stages)**



Water Supply Reticulation - with additional inlet pump







Drawn By:	MLAA
Date:	04/02/2016
Approved:	
Scale:	1:10,000





# NORTHLAKE STAGES 8-9 SUBDIVISION INFRASTRUCTURE REPORT

PROJECT: Northlake Wanaka Stages 8 - 9

PRINCIPAL: Northlake Investments Limited

OUR REF: W4481-8

DATE: April 2017

**DUNEDIN:**P.O. Box 5933,
Dunedin 9058.
T 03 477 3245

CHRISTCHURCH: P.O. Box 160094, Christchurch 8441, T 03 928 1533 ALEXANDRA: P.O. Box 103, Alexandra 9340. T 03 448 8775 CROMWELL: P.O. Box 84, Cromwell 9342. T 03 445 1826 QUEENSTOWN:
P.O. Box 2645,
Queenstown 9349.
T 03 441 4715

WANAKA: P.O. Box 283, Wanaka 9305. T 03 443 0110

# **REVISION / APPROVAL PANEL**

Rev:	Date:	Prepared By:	Reviewed By:	Comments:
0	07/04/17	AGT	MJB	Original issue

# **CONTENTS**

1.	SCO	PE	3		
2.	PROPOSED INFRASTRUCTURE				
2.1 Earthworks			ks3		
2.2 Road Design Statement		ign Statement4			
	2.3	Roading (	Design Parameters		
	2.4	Stormwa	ter11		
	2.5	Wastewa	ter		
	2.6	Water Su	pply12		
	2.7	Network	Utility Services		
	2.8	Conclusio	on14		
APPENDIX 1 - PPG – Bulk earthworks plans stages 8-9 (as approved by RM161127)		PPG – Bulk earthworks plans stages 8-9 (as approved by RM161127)			
Α	PPEND	DIX 2 -	PPG – Road classifications table		
APPENDIX 3 -		OIX 3 -	PPG – Indicative road cross sections		
APPENDIX 4 -		OIX 4 -	PPG – Preliminary Water Supply Network Stages 4-9		
APPENDIX 5 -		DIX 5 -	PPG – Preliminary Wastewater Network Stages 4-9		
APPENDIX 6 -		OIX 6 -	Peak Power – Preliminary Electrical Design for ODP Area		
APPENDIX 7 -		DIX 7 -	Peak Power – Confirmation of Electrical Supply (Email)		
Α	PPEND	DIX 8 -	Chorus - Confirmation of Telecoms Supply (Email)		
APPENDIX 9 - Tonkin and Taylor Water Modelling Report Feb 2016		Tonkin and Taylor Water Modelling Report Feb 2016			
Α	PPEND	DIX 10 -	Watershed Water Modelling Northlake Stages 1-7 Summary Report Jun 2016		

# 1. SCOPE

This report covers the availability of the following infrastructure elements and is intended to accompany a resource consent application for Subdivision Consent for Stages 8-9 of Northlake Investments Limited's development of Northlake, Wanaka.

- Earthworks
- Roading Design Statement
- Roading Design Parameters
- Stormwater
- Wastewater
- Water Supply
- Network Utility Services (electricity and telecommunications)

Traffic, Landscaping and geotechnical are covered by separate consultant reports.

#### 2. PROPOSED INFRASTRUCTURE

All infrastructure for the Northlake development has been designed in accordance with Councils Land Development and Subdivision Code of Practice (LDSCOP)

The following information is contained in the Appendices;

- Appendix 1: Bulk earthworks plans stages 8-9 (as approved by RM161127)
- Appendix 2: Road classifications table
- Appendix 3: Indicative road cross sections
- Appendix 4: Preliminary water supply network Stages 4-9
- Appendix 5: Preliminary wastewater network Stages 8-9
- Appendix 6: Preliminary electrical design for ODP area
- Appendix 7: Confirmation of electrical supply email
- Appendix 8: Confirmation of telecoms supply email
- Appendix 9: Tonkin & Taylor water modelling report (Feb 2016)
- Appendix 10: Watershed water modelling report (Jun 2016)

# 2.1 Earthworks

RM161127 granted consent for bulk earthworks across Stages 8-9 of the Northlake development. This consent approved a total earthworks quantum of  $57,600m^3$  over an area of 6.1ha. The approved bulk earthworks includes the formation of roads to subgrade, the levelling and re-contouring of residential allotments, and the topsoiling of road berms and reserve areas. The altering of the existing ground levels will require the adjustment of the post-subdivision ground level (in accordance with the QLDC District Plan definition of ground level)

Other additional works will include trenching for services and required civil works.

The potential for environmental effects i.e. dust, sedimentation and erosion, resulting from the proposed earthworks will be managed in accordance with the site management plan approved under RM161127.

# 2.2 Road Design Statement

# 2.2.1 Scope of Roading Design Statement

The intention of this roading design statement is to outline to Council details of the proposed roading network for the Northlake Development as a whole and in doing so give context to the Stages 8-9 application for subdivision consent.

This roading design statement covers all aspects of the proposed roading design as required by Section 3.2.6 of the QLDC LDSCOP. This includes:

- (a) Road dimensions and layout
- (b) Place and link functions
- (c) Connectivity
- (d) How target operating speeds have been achieved
- (e) How LID principles have been considered for stormwater run-off from the roads

# 2.2.2 Roading Dimensions & Layout

The road layout for Stages 1-9 of the Northlake development is shown on the plans contained in **Attachment B** of the AEE. The roading layout has been governed primarily by the location of existing road connections i.e. Outlet Road, Northburn Road and Mount Linton Avenue and the requirements of the Northlake structure plan.

Road dimensions have been based initially on the minimum requirements outlined in Table 3.2 QLDC LDSCOP and then modified to suit the functional and aesthetic goals of the proposed development. Refer **Appendix 2** for our modified table 3.2.

The proposed roads have movement lane widths of either 2 x 4.2m, 5.7m or 3.0m. The reasons for these width options is as follows;

#### Road Type AA (Northlake Drive)

Road Type AA on the roading hierarchy plan corresponds to an E13 type road in table 3.2 of QLDC LDSCOP. This is classed as a collector road.

This road type features movement lanes of 2 x 4.2m width, recessed parallel car parking with individual parking bay dimensions of dimensions and footpaths on both sides each with a width of 2m.

Additional features within Road type AA are the central boulevard/planting island and a large landscaped swale providing the primary stormwater conveyance down the middle of the development. The stormwater swale will be contained within a separate parcel and vested as 'Local Purpose Reserve'. The Local Purpose Reserve will typically be 10m wide.

Road type AA is contained within a 20m legal width to provide sufficient room to accommodate the central boulevard/planting Island, the 2m wide footpaths, recessed parking, the movement lane, landscaping and services.

# Road Type B – 15m Width

Road Type B-15m width on the roading hierarchy plan corresponds to an E12 type road in table 3.2 of QLDC LDSCOP. This is classed as a local road.

This road type features a movement lane width of 5.7m, car parking is shared in movement lane or will be recessed where there is sufficient lot frontage length to provide recessed carparks whilst maintaining access options for the future lot owner. Footpaths will be constructed on both sides with a minimum width of 1.5m.

Road Type B - 15m Width is contained within a minimum 15m legal width to provide sufficient room to accommodate the 1.5m wide footpaths, recessed parking, the movement lane, landscaping and services.

A 5.7m movement lane width provides for the ability to park on one side of the road and one through lane or alternatively two through lanes. Neither option will be delineated but rather this will be left for road users to decide.

#### Road Type C

Road Type C on the roading hierarchy plan corresponds to an E11 type road in table 3.2 of QLDC LDSCOP. This is classed as a lane.

This road type features a movement lane width of 5.7m, car parking is shared in the movement lane, a footpath will be constructed on one side of the road with a minimum width of 1.5m.

Road Type C is contained within a minimum 12m legal width to provide sufficient room to accommodate the 1.5m wide footpath, the movement lane, landscaping and services.

# Road Type D

Road Type D on the roading hierarchy plan corresponds to an E11 type road in table 3.2 of QLDC LDSCOP. This is classed as a lane.

This road type features a movement lane width of 5.7m, car parking is shared in the movement lane, and pedestrian access is shared within the movement lane.

Road Type D is contained within a 10m legal width to provide sufficient room to accommodate the movement lane, landscaping and services.

## Road Type F - Access

Road Type F Access corresponds to an E9 or E10 road in table 3.2 of QLDC LDSCOP. This is classed as a lane.

This road type features a movement lane width of 3.0m, allows for passing every 50m, and pedestrian access is shared within the movement lane.

The accesses proposed for Stages 8-9 have legal widths of between 10 and 17m, which provides sufficient room to accommodate the movement lane, landscaping, services and a QLDC LDSCOP approved turning head.

#### 2.2.3 Place and Link Functions

Section 3.2.4 QLDC LDSCOP states that "the two fundamental roles of a road are to provide a space for interaction between people for a range of purposes and access to land so that movement between places can occur".

The following two sections discuss the proposed design in terms of both 'place context' and 'link context'

#### Place Context

Place context is defined for both the specific land use served and the broader area type in which it is located. The land use characteristic is defined according to the description of predominant activities in individual areas. QLDC LDSCOP uses the descriptions "live, play, shop, work and learn, in addition to activities associated with growing, manufacturing and transporting of goods and products".

Using Table 3.1 from QLDC LDSCOP, we have categorised the development area as:

(a) Land use: live and play

# (b) Area type: suburban

The live and play land use is defined as "homes, home based businesses, and mixed use developments with residential uses, as well as parks and low impact recreation". The proposed use of the development is for residential homes, local purpose and/or recreation reserves, walkway linkages and stormwater reserves and is consistent with the live and play land use.

The suburban area type is defined as "low and moderate density housing up to 15 units per hectare in an area where housing is the exclusive or dominant use". Residential housing will be the predominant land use allowing for the fact that there will likely be a few home based businesses established.

The 'urban' area type anticipates much a higher residential density (50 units per hectare) plus the inclusion of other land uses and is therefore not an appropriate category for the subject site. Similarly, the 'rural' area type is not appropriate because this is intended for a residential population outside of the urban limits.

Table 3.1 explains the transport context for the suburban area type as private vehicles being the predominant form of transport with public transport providing for peak flow on arterial and connector/collector roads. It further explains that non-motorised trips are primarily recreational and occur on local roads. Whilst the public transport component of this explanation is not currently applicable in the Wanaka context and private vehicles will be the predominant form of transport for the next few years, it is anticipated that public transport will be in place at some time in the future. With this in mind it would appear logical that bus stops could be situated on the Type A and Type B roads by converting some of the recessed parking into a suitable bus stop or by constructing a suitable bus stop at the appropriate time in the future by removal of street landscaping as required.

# **Link Context**

Link context is classified by the extent of access and the degree of through movement intended to be served. This standard includes three levels of link context;

- (a) Lane: a road that provides very high local access and very limited through movement connectivity. Very low vehicle speeds with shared pedestrian and vehicle access predominate;
- (b) Local road: A road that provides access and connectivity for a local area. Low vehicle speeds, pedestrian and local amenity values predominate;
- (c) Connector/collector road: A road that provides circulation in local areas and links to arterial roads, while balancing this with pedestrian and local amenity values. Higher vehicle and access for all modes of transport including public transport predominate.

The proposed road classification table contained in **Appendix 2** contains columns that detail which of the above classification options has been assigned to each of the proposed roads.

# 2.2.4 Connectivity

Section 3.2.5 of QLDC LDSCOP states that well connected networks (roads and other links) are achieved with smaller block sizes and regular connections. Network connectivity shall be designed to achieve:

- (a) Shorter travel distances;
- (b) An increased number of alternative routes for all types of users;
- (c) Increased opportunity for interaction;
- (d) Improved access to public transport, cycling and walking networks, and access to destinations.

The proposed roading layout provides considerable options for route choice by utilising all connection points to existing roads.

The proposed roading layout linkage points and connectivity is consistent with the routes shown in RM 160152 being the approved ODP for Northlake.

Access to public transport has been mentioned earlier in this report.

# 2.2.5 Target Operating Speeds

Section 3.3.5 of QLDC LDSCOP states that traffic management shall be included in the road design to ensure that the target operating speeds are achieved. Target operating speed can be managed by physical and psychological devices such as narrowed movement lanes, reduced forward visibility, slow points, build outs, lengths, chicanes, planting and landscaping and street furniture and art works. The two key geometric factors that contribute to achieving the target operating speed are carriageway width and forward visibility.

The proposed carriageway widths are consistent with the requirements of QLDC LDSCOP in order to provide a suitable number of through lanes as well as making provision for car-parking and passing manoeuvres.

# 2.2.6 LID Principles for Stormwater Runoff from Roads

It is proposed to direct all stormwater runoff from roads to the roadside kerb and channel which will in turn discharge into mudtanks and an underground piped network. Ultimately all stormwater runoff from the roads will be piped to various stormwater reserves located across the site where the runoff will be detained so as to balance pre and post flows.

The design of the stormwater reserves is discussed in a separate report prepared by Riley Consultants. In summary the design is considered to be 'low impact' since all stormwater will be attenuated to predevelopment flows.

Other LID options such as road side swales have been discounted due to the density of housing and the resulting number of vehicle crossings which would limit the effectiveness of any roadside swales. Additional factors include maintenance requirements of these options and degradation of visual appeal if maintenance is not undertaken.

# 2.3 Roading Design Parameters

Typical cross sections for all proposed roads are contained in **Appendix 3**.

The road design parameters proposed are as follows: (refer also the proposed road classification Table 3.2 contained in **Appendix 2**)

# 2.3.1 Extension of Road 1 (Northlake Drive)

Feature	Design Features	Reason for Departure if any
Road No	1	
Cross Section Ref	E13	
Our Road Type	Туре АА	
Area	Suburban	
Local attributes	Primary access to housing	
Locality served	Up to 800du	
Target operating speed	50km/h	
Legal road width	20m	
Pedestrians	A footpath will be constructed on both sides of the road 2.0m wide	
Passing, parking, loading and shoulder	Recessed parking	
Cyclists	Shared in movement lane	
Movement lane width	2 x 4.2	
Classification	Connector Road (~8000 vpd)	
Turning Head	Not Required	
Road to be vested in QLDC (YES/NO)	YES	

# 2.3.2 Road 15

Feature	Design Features	Reason for Departure if any
Road No	15	
Cross Section Ref	E12	
Our Road Type	Type B – 15m	
Area	Suburban	
Local attributes	Primary access to housing	
Locality served	1 - 200 lots	
Target operating speed	40km/h	
Legal road width	15m	
Pedestrians	1.5m each side	
Passing, parking, loading and shoulder	Recessed parking where space permits, otherwise parking is shared in the movement lane	
Cyclists	Shared in movement lane	
Movement lane width	5.7m	
Classification	Local road (~2000 vpd)	
Turning Head	Not Required	
Road to be vested in QLDC (YES/NO)	YES	

# 2.3.3 Road 11

Feature	Design Features	Reason for Departure if any
Road No	11	
Cross Section Ref	E12	
Our Road Type	Type B – 15m	
Area	Suburban	
Local attributes	Primary access to housing	
Locality served	1 to 200 du	
Target operating speed	40km/h	
Legal road width	15m	
Pedestrians	1.5m each side	
Passing, parking, loading and shoulder	Recessed parking where space permits, otherwise parking is shared in the movement lane	
Cyclists	Shared in movement lane	
Movement lane width	5.7m	
Classification	Local road (~2000 vpd)	
Turning Head	Not Required	
Road to be vested in QLDC (YES/NO)	YES	

# 2.3.4 Road 14

Feature	Design Features	Reason for Departure if any
Road No	14	
Cross Section Ref	E11	
Our Road Type	Type C – 12m	
Area	Suburban	
Local attributes	Primary access to housing	
Locality served	1 to 20 du	
Target operating speed	20km/h	
Legal road width	12m	Wider than minimum of 9m to allow room for carriageway, services and landscaping
Pedestrians	1.5m on one side only	
Passing, parking, loading and shoulder	No recessed parking	
Cyclists	Shared in movement lane	
Movement lane width	5.7m	
Classification	Lane (~200 vpd)	
Turning Head	Not Required	
Road to be vested in QLDC (YES/NO)	YES	

# 2.3.5 Road 16

Feature	Design Features	Reason for Departure if any
Road No	16	
Cross Section Ref	E11	
Our Road Type	Type C – 12m / Type D – 10m	
Area	Suburban	
Local attributes	Primary access to housing	
Locality served	1 to 20 du	
Target operating speed	20km/h	
Legal road width	In part 12m and in part 10m – refer to subdivision scheme plan	Wider than required to allow room for carriageway, services and landscaping
Pedestrians	Shared in movement lane	
Passing, parking, loading and shoulder	Shared in movement lane	
Cyclists	Shared in movement lane	
Movement lane width	5.7m	
Classification	Lane	
Turning Head	Not Required	
Road to be vested in QLDC (YES/NO)	YES	

# 2.3.6 Access 10

Feature	Design Features	Reason for Departure if any
Access No	10	
Cross Section Ref	E9	
Our Road Type	Type F – 10m	
Area	Suburban	
Local attributes	Primary access to housing	
Locality served	1 to 6 du	
Target operating speed	10km/h	
Legal road width	10m – 17m	Wider than required to allow room for carriageway, services, landscaping and turning head / courtyard area
Pedestrians	Shared in movement lane	
Passing, parking, loading and shoulder	Shared in movement lane	
Cyclists	Shared in movement lane	
Movement lane width	3.0m	
Classification	Lane	
Turning Head	T shaped – complies with LDSCOP	



Road to be vested in QLDC	YES	
(YES/NO)		

#### 2.3.7 Access 11

Feature	Design Features	Reason for Departure if any
Access No	11	
Cross Section Ref	E9	
Our Road Type	Type F – 10m	
Area	Suburban	
Local attributes	Primary access to housing	
Locality served	1 to 6 du	
Target operating speed	10km/h	
Legal road width	10m – 17m	Wider than required to allow room for carriageway, services and turning head / courtyard area
Pedestrians	Shared in movement lane	
Passing, parking, loading and shoulder	Shared in movement lane	
Cyclists	Shared in movement lane	
Movement lane width	3.0m	
Classification	Lane	
Turning Head	T shaped – complies with LDSCOP	
Road to be vested in QLDC (YES/NO)	YES	

Note: The design of the turning heads in accesses 10 and 11 will be refined during the detailed design phase of the project. This may involve changing the configuration to a 'L' or similar complying configuration. Final design detail will be submitted to QLDC for Engineering Acceptance.

# 2.4 Stormwater

Refer separate report by Riley Consultants which provides an outline of the overall stormwater disposal concept for the ODP area – this report is contained in **Attachment F** to the application.

In summary, all impervious areas within the proposed lots will be connected to the reticulated drainage network via a stormwater lateral provided at the time of subdivision. All impervious areas within the road reserve will drain to the kerb and channel and then into the reticulated drainage network via standard mudtanks. The reticulated drainage network will discharge to the central swale along Road 1 (Northlake Drive) before flowing into the drainage network (Northlake Drive swale, piped reticulation and attention ponds) constructed during stages 1-6 of this this development.

# 2.4.1 Management of upstream flows

The development of Stages 8-9, being the subject of this subdivision consent application, has considered the management of upstream catchment stormwater flows until such time as the remainder of the catchment is developed.

The earlier stages of this development will result in the progressive construction of variation attenuation basins, piped drainage network and the eastern portion of the Northlake swale.

To manage the upstream catchment flows, a number of clean water cut off drains will be constructed upstream of Stages 8-9 both on the Allenby Farms Limited land (Lot 3 DP 300408) and on the balance of the NIL land north of Northlake Drive. These cut off drains will direct clean water into the existing stormwater system. A small sedimentation pond may be required immediately upstream of the Northlake Drive swale.

It is anticipated that specific detail of this management system can be provided prior to the commencement of these construction works and that a condition of consent requiring this will be appropriate.

#### 2.5 Wastewater

The proposal for Stages 8-9 is to provide each lot with a  $\emptyset100$ mm lateral that is connected to the reticulated mains within the road corridors. Lots designated as being subdividable will either be provided with a single  $\emptyset150$ mm lateral or two  $\emptyset100$ mm laterals if the proposed boundary is known. All wastewater from these stages will gravity flow towards Road 1 (Northlake Dr) and then south along Outlet Road in the drainage network that is being constructed in Stage 1-6.

Refer to **Appendix 5** for a plan showing the indicative layout of the Stages 4-9 wastewater reticulation.

#### 2.6 Water Supply

Council's Project Manager (infrastructure) has been consulted during the investigation of the proposed development's potable water requirements. Tonkin and Taylor Ltd and Watershed were engaged by Council to assess whether there is sufficient capacity in the existing network to accommodate the connection of the Northlake development and to determine whether there is an opportunity to optimise the network by identifying and assessing a range of technical options for the servicing of this development. The findings of these modelling reports are summarised below.

Consultation with Mark Baker of Council in April 2016 has confirmed that Council is happy with the proposed connection of Northlake to its infrastructure but requires further modelling to be carried out by Council using a calibrated model before offsite upgrades, if any are required, can be confirmed.

#### 2.6.1 Internal Reticulation

The proposal for Stages 8-9 is as follows:

- Refer to Appendix 4 for a plan showing the indicative layout of the Stages 4-9 water supply layout
- Extend the Ø250mm principal main west along the south side of Road 1 (Northlake Drive) constructed in Stages 1-3 and 4-6. This will then form a future connection into Allenby Farms Limited land (Lot 3 DP 300408).
- The existing Ø150mm water main along Northburn Drive and Road 12 that will have been constructed under Stages 4-6 will feed the watermains that run west along Roads 11, 15 and 14.
  - o Road 11 will have Ø100 water mains running along both sides of the road until connecting into the Ø250 principal main running along Road 1 (Northlake Drive). Ø50mm rider mains will run up both Access 10 and Access 11.
  - $\circ$  Road 15 will have a Ø150mm water main running along the northern side of the road, which will have a future connection into Allenby Farms.

The remaining reticulation will be Ø100mm water mains or Ø50mm rider mains

#### 2.6.2 Modelling Considerations

The Tonkin and Taylor report (refer to **Appendix 9**) indicates the results of modelling the water supply demand under *Section 4.1 Scenario One: Stages 1-4*. For clarification, Stages 8-9 to which this report refers to, falls within the Stages 1-4 area referred to in the Tonkin and Taylor report. The report states, *'Beacon Point Reservoir (RL 382m)* and the corresponding network infrastructure has sufficient capacity to meet the additional 47.80l/s demand of Stages 1-4 with little impact on pressure and demand to the surrounding network. However, minimum residual pressures of 300kPa were not met at areas of higher elevation (above RL 343m). This is due to the reservoir elevation relative to the higher levels of the development and is not considered a result of head losses in the network'.

With regard to the current application, Lots 196-225 and Lots 230-234 are at or above RL 343m with Lots 203-205 being at the highest elevation of RL 349m. We note that the Tonkin and Taylor report contained in **Appendix 9** is dated Feb 2016 and we understand that since this date Council has undertaken further modelling and calibration of its water supply network. We therefore request that Council review the T&T report and advise accordingly.

Section 4.1 of the T&T report further notes that firefighting flows will be available

In addition to the above report, the hydraulic modelling review completed by Watershed (refer to **Appendix 10**) looked at the proposed water layout concerning Stages 1-7. The pressures within the stages were modelled as exceeding 300kPa, with a minimum service pressure specified as 200-300kPa. Firefighting requirements were also easily achieved. The only concern noted was for properties at higher elevation, notably along Genaray Crescent which has a high point of RL ~360m. However the modelling indicated that these would still maintain a pressure of 250kPa. While this report does refer only to the demand from Stages 1-7, it does give an indication as to whether there will be any likely concerns ahead of the Stages 8-9 development.

The modelling from both of the reports don't foresee any potential capacity or pressure issues likely to arise from the additional Stages 8-9 demand, except for the possibility of reduced pressure for those lots above RL 343m. This will require further investigation by Council to ensure the lots are provided with sufficient serviceability and we request that Council undertake this investigation upon receiving the Stage 8-9 subdivision application.

#### 2.7 Network Utility Services

#### 2.7.1 Electricity

The electrical reticulation that will be installed for Stages 1-7 of Northlake can be extended to supply Stages 8-9. Peak Power have been consulted during the preliminary planning of the previous stages and they have confirmed that supply can be made available to this site. This supply is currently limited to single phase 15kVA per lot. An email from Peak Power confirming this is attached **Appendix 7** and an indicative electrical supply layout is included in **Appendix 6**.

#### 2.7.2 Telecommunications

Chorus has confirmed that telecommunications can be made available to the site. This will require extension of the reticulation installed for Stages 1-7. The final design is subject to confirmation with Chorus. An email from Chorus confirming this is attached in **Appendix 8**.

#### 2.8 Conclusion

All of the network operators for water, wastewater, power and telecom have confirmed connection to their system by Northlake is possible.

While some system upgrades are known to be necessary, further modelling by Council using its new calibrated water supply model is required to confirm the exact timing. At this stage the subdivision of Stage 8-9 covers only a small part of the Northlake zone. It is anticipated that detailed modelling by Council will confirm what subdivision stages can connect before triggering offsite upgrades.

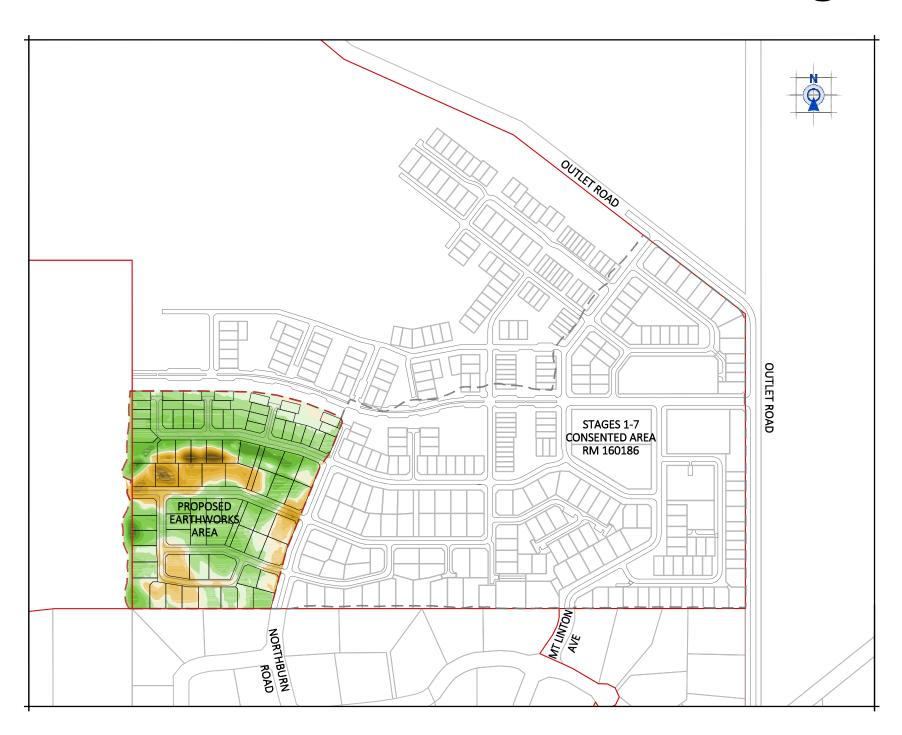
Development contributions payable for this development (less the credit for upgrading the system) will mitigate any effect this development will have on Council's existing infrastructure.

Alex Todd

Paterson Pitts Group Limited (Wanaka)

Appendix 1: PPG - Bulk earthworks plans stages 8-9 (as approved by RM 161127)							

# Northlake: Bulk Earthworks Stages 8-9



## **PLAN INDEX**

SHEET	CONTENTS	REV	DATE
100	Plan Index	2	24/01/2017
101	Existing Contours	1	07/12/2016
102	Proposed Final Contours	2	24/01/2017
103	Cut / Fill Contours	2	07/12/2016
104	Cross Sections - Detail 1	2	24/01/2017
105	Cross Sections - Detail 2	2	24/01/2017
106	Cross Sections - Detail 3	2	24/01/2017
107	Site Management Detail	1	07/12/2016

# FOR RESOURCE CONSENT



WANAKA BRANCH 19 Reece Crescent or P.O. Box 283 Wanaka 9343 T 03 443 0110 E wanaka@ppgroup.co.nz

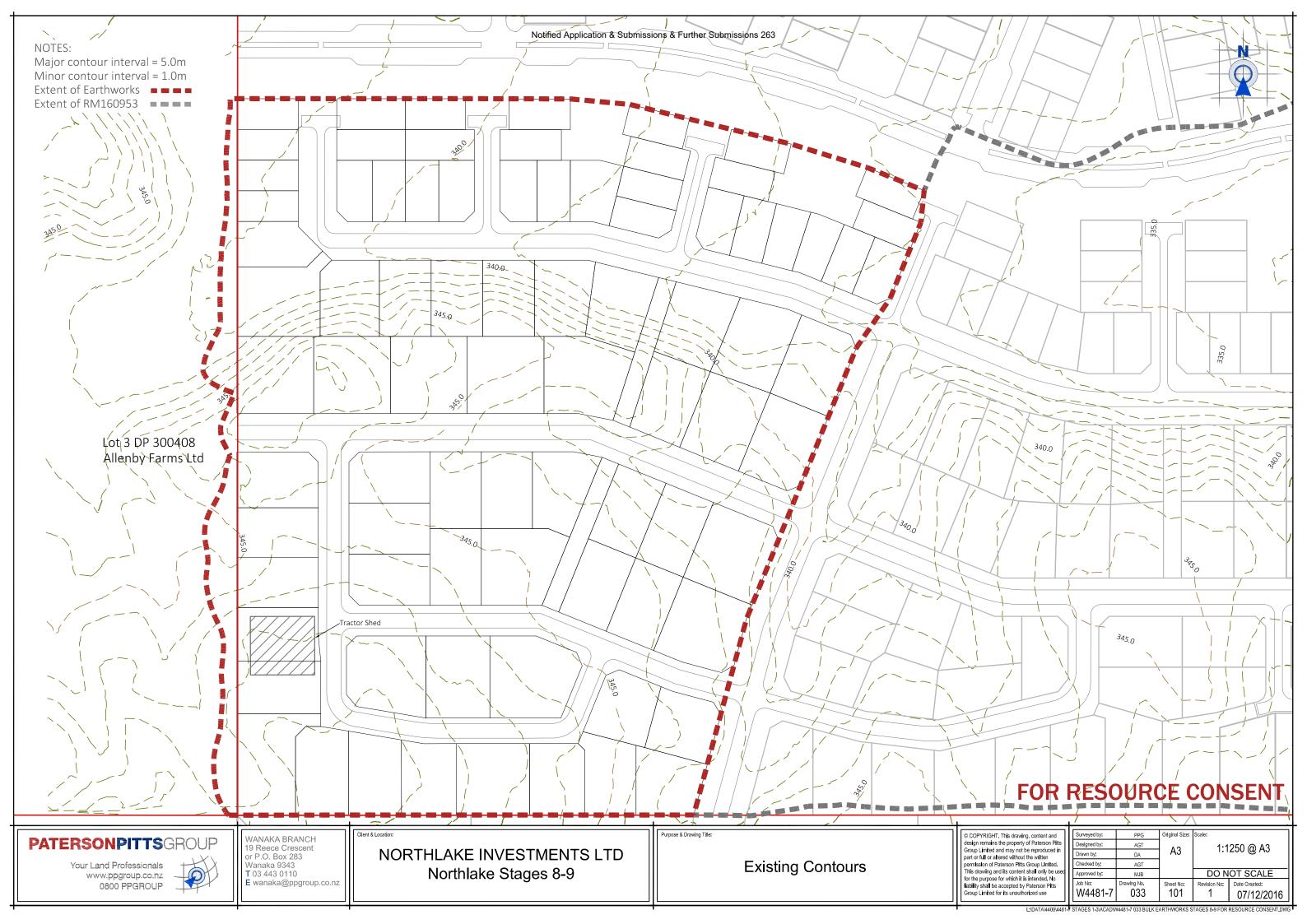
NORTHLAKE INVESTMENTS LTD
Northlake Stages 8-9

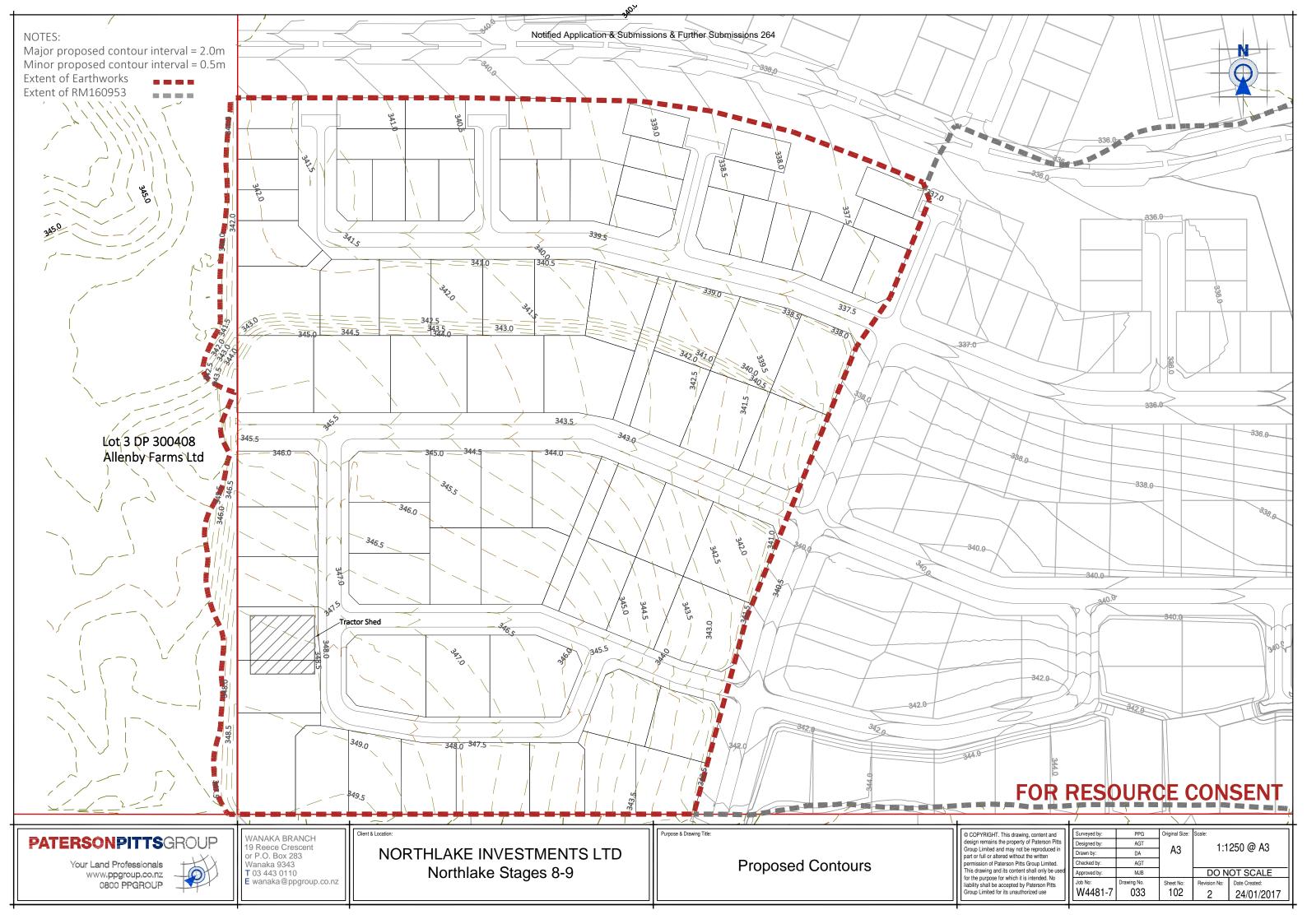
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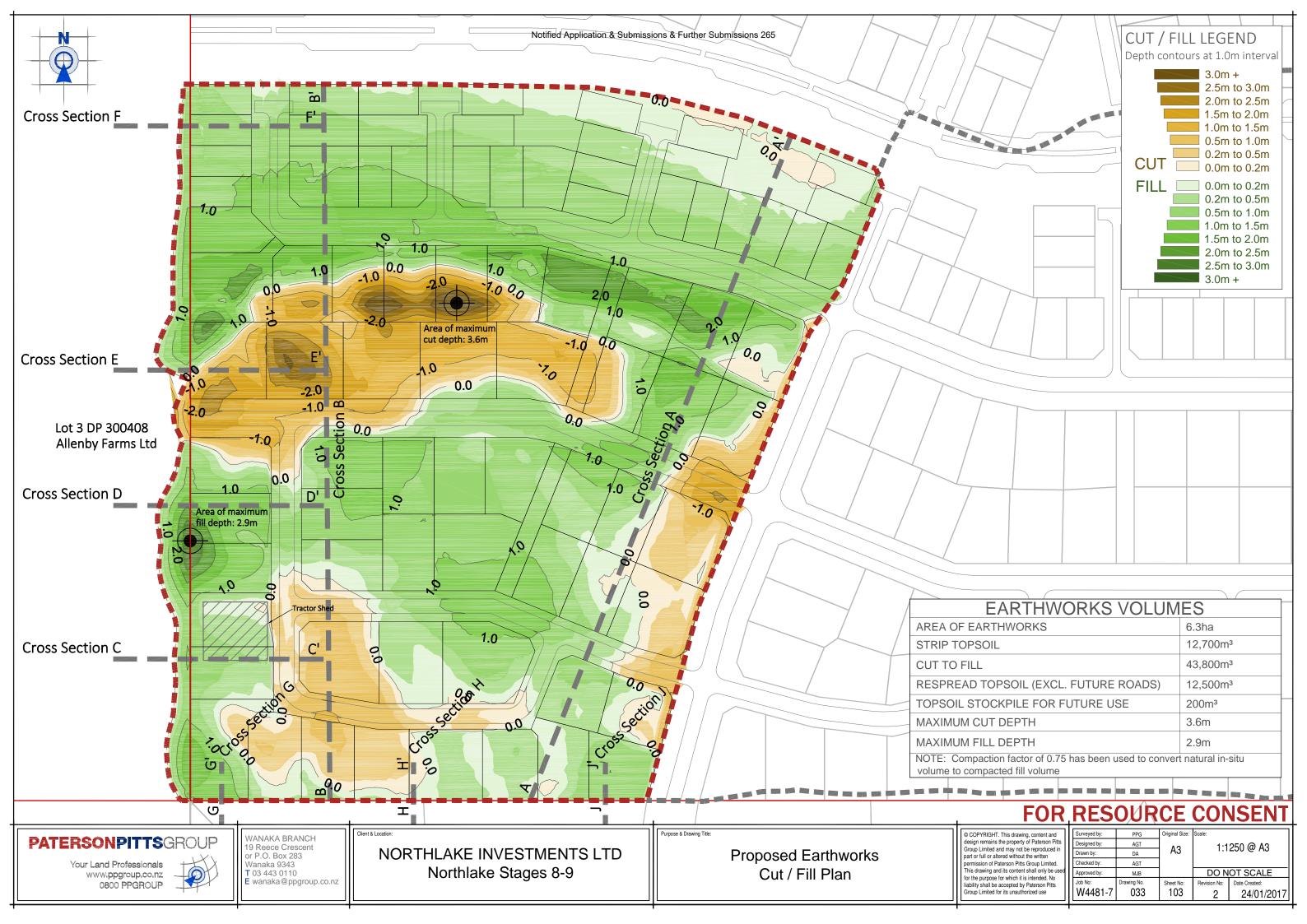
Plan Index

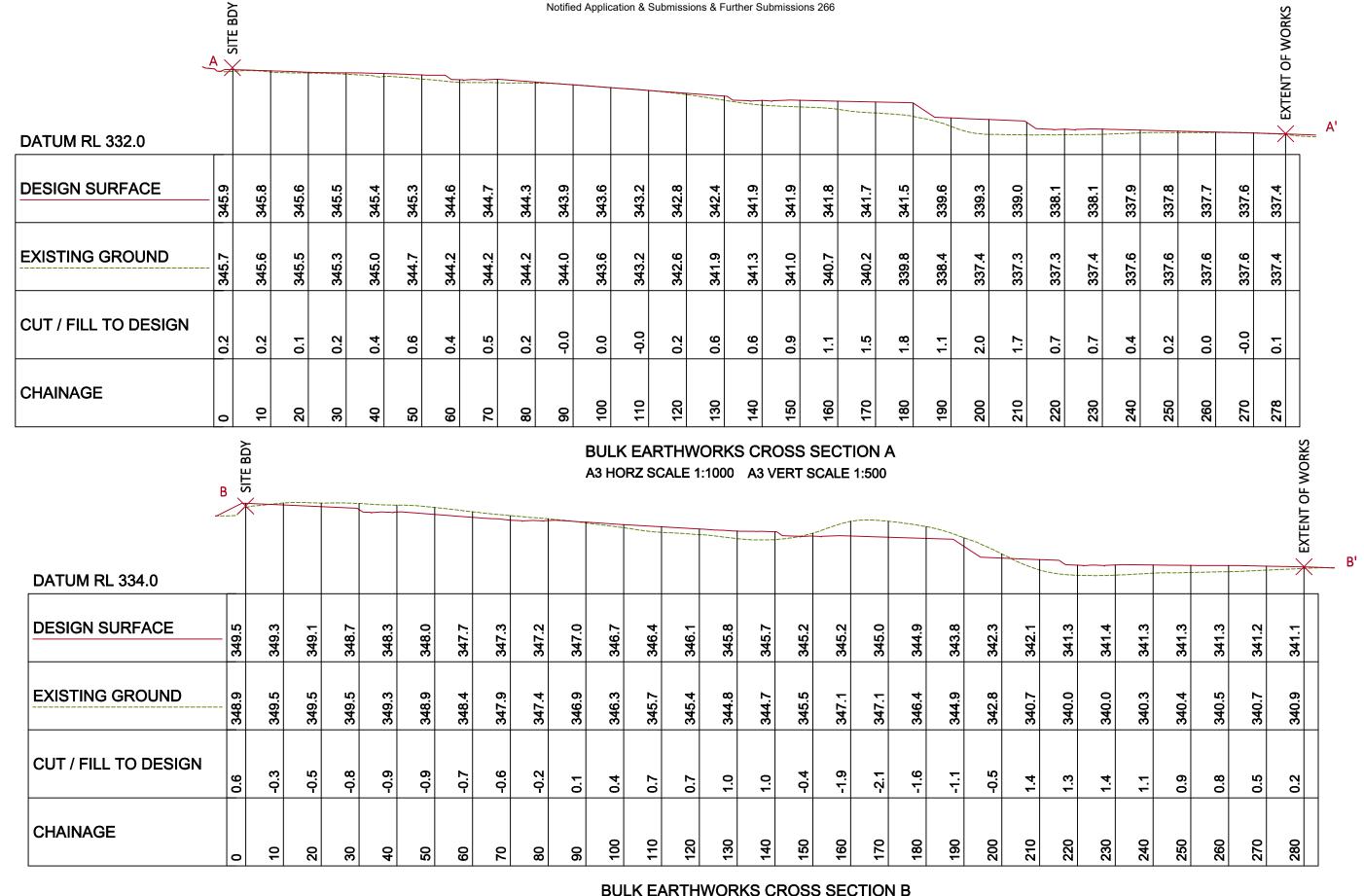
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BULK EARTHWORKS CROSS SECTION B
A3 HORZ SCALE 1:1000 A3 VERT SCALE 1:500

## FOR RESOURCE CONSENT



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NORTHLAKE INVESTMENTS LTD Northlake Stages 8-9

Cross Section - Detail 1

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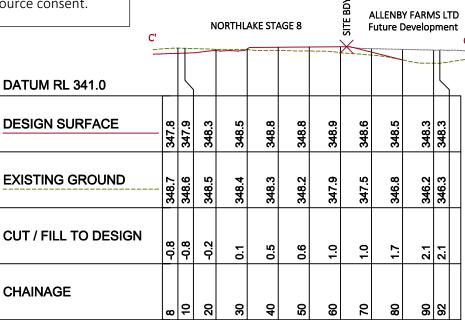
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Note: Design levels shown on Allenby Farms Ltd Land are indicative only and subject to future resource consent.

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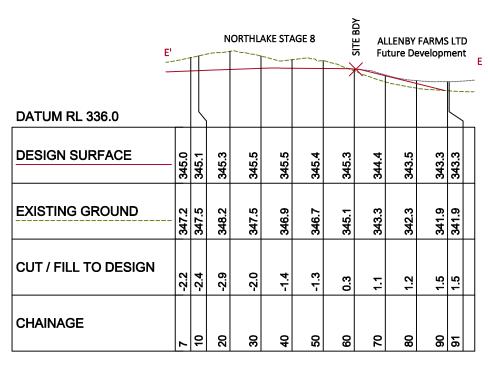
Existing Natural Surface =

Future Development (Allenby Farms Ltd) =



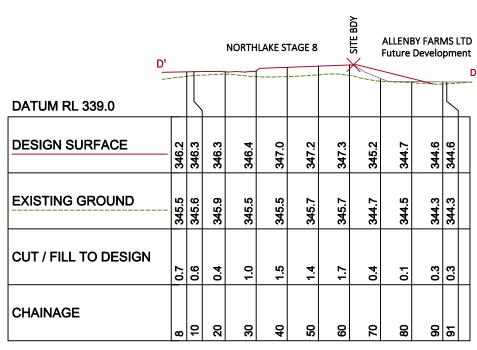
**BULK EARTHWORKS CROSS SECTION C** 

A3 HORZ SCALE 1:1250 A3 VERT SCALE 1:625



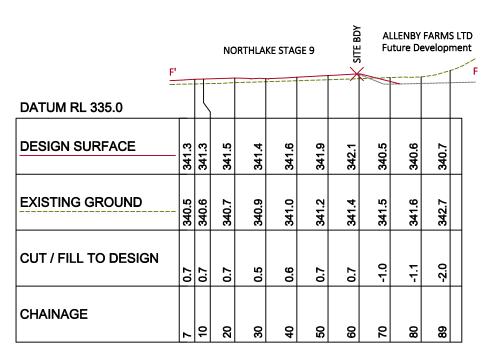
#### **BULK EARTHWORKS CROSS SECTION E**

A3 HORZ SCALE 1:1250 A3 VERT SCALE 1:625



#### **BULK EARTHWORKS CROSS SECTION D**

A3 HORZ SCALE 1:1250 A3 VERT SCALE 1:625



#### **BULK EARTHWORKS CROSS SECTION F**

A3 HORZ SCALE 1:1250 A3 VERT SCALE 1:625

### FOR RESOURCE CONSENT

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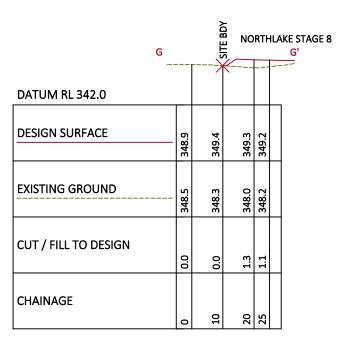
NORTHLAKE INVESTMENTS LTD Northlake Stages 8-9

Purpose & Drawing Title:

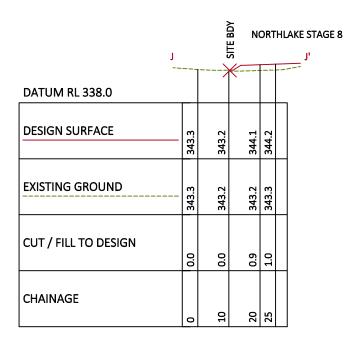
Cross Section - Detail 2

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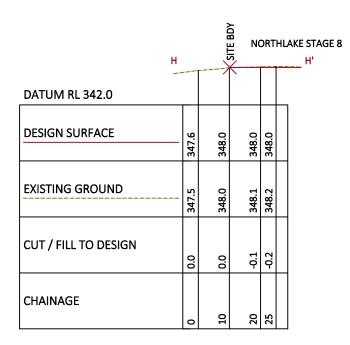


**BULK EARTHWORKS CROSS SECTION G** A3 HORZ SCALE 1:1250 A3 VERT SCALE 1:625



**BULK EARTHWORKS CROSS SECTION J** 

A3 HORZ SCALE 1:1250 A3 VERT SCALE 1:625



**BULK EARTHWORKS CROSS SECTION H** A3 HORZ SCALE 1:1250 A3 VERT SCALE 1:625

# FOR RESOURCE CONSENT



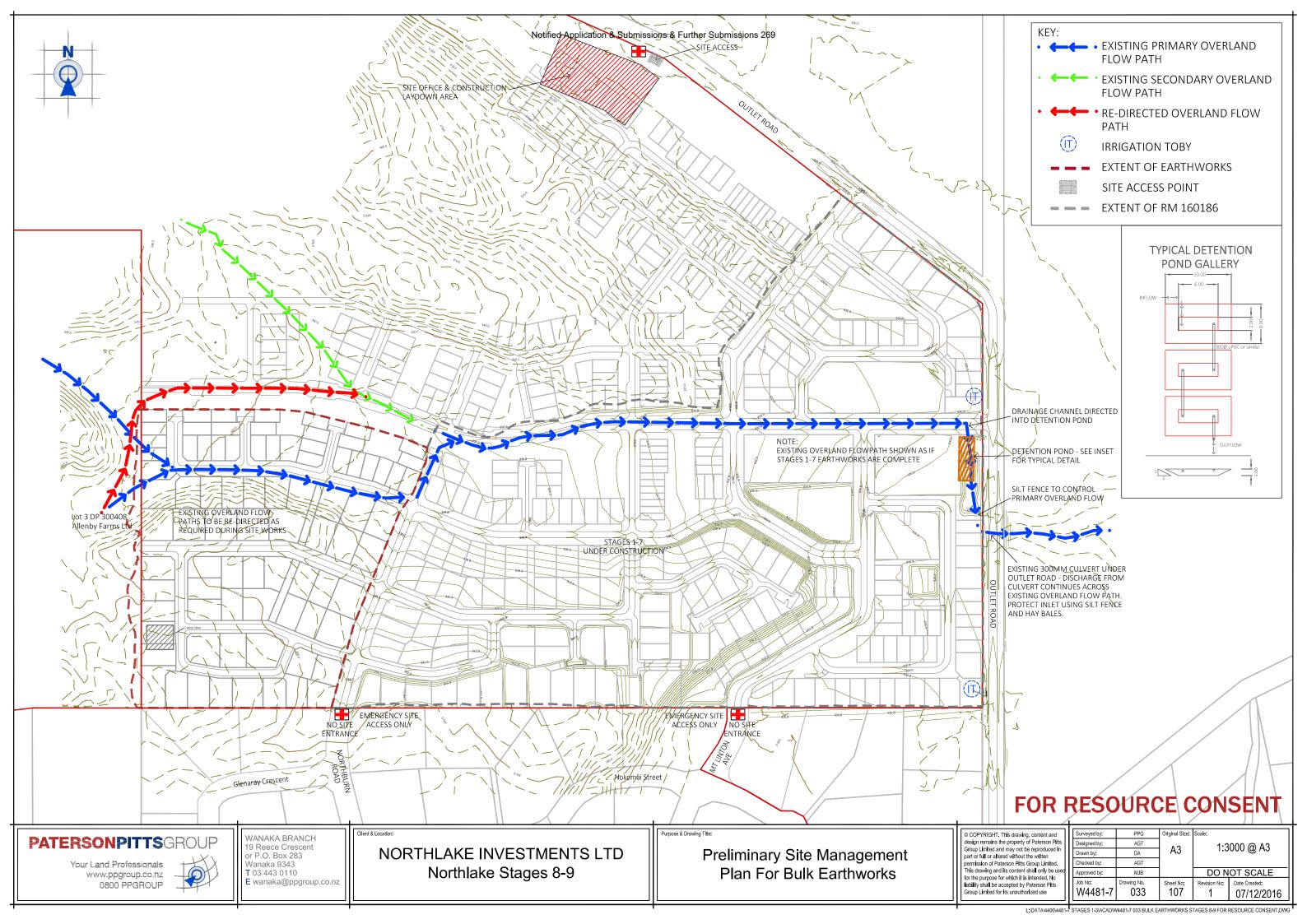
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NORTHLAKE INVESTMENTS LTD Northlake Stages 8-9

Cross Section - Detail 3

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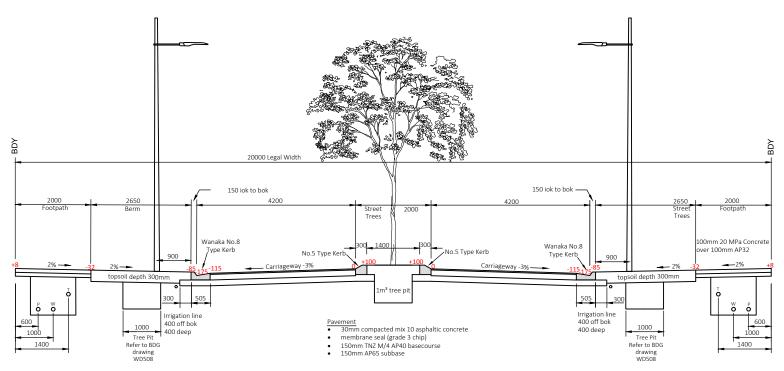


Appendix 2: PPG – Road classifications table							

				Place Cont	ext		Desi	gn Environi	nent					L	ink Context				
Road Number	LDS COP Cross Section Ref	Design Decision: Road Type	Area	Land Use	Local Attributes	Locality Served	Target Operating Speed (km/h)	Min. Road Width (m)	Design Decision: Road Width (m)	Max. Grade	Provision of Footpath for Pedestrians	Design Decision: Provision of Footpath for Pedestrians	Passing, parking, loading and shoulder	Design Decision: Provision of Recessed Carparking	Cyclists	Min. Movement Lane (excl. shoulder) (m)	Design Decision: Movement Lane (excl. shoulder) (m)	Design Decision: Turning Head Type	Classification
Road 1 / Northlake Dr (extension)	E13	Type AA	Suburban	Live and Play	Primary access to housing	Up to 800 du	50	20	20	10.00%	2.0m each side	2.0m each side	Parking is separate and recessed. See 3.3.6 Public transport is likely (see clause 3.3.1.4, 3.3.1.5)	Recessed parking	Separate provision where local authoirity defined cycle route	2 x 4.2	2 x 4.2m	NA	Connector / collector (= 8000vpd)
Road 15	E12	Туре В - 15т	Suburban	Live and Play	Primary access to housing	1 to 200 du	40	15	15	12.50%	1.5m one side or 1.5m each side where more than 20 du or more than 100m in length	1.5m each side	Shared parking in the movement lane up to 100 du, separate parking required over 100 du	No recessed parking	Shared (In movement lane)	5.5 - 5.7	5.7	NA	Local Road (= 2000vpd)
Road 11	E12	Туре В - 15т	Suburban	Live and Play	Primary access to housing	1 to 200 du	40	15	15	12.50%	1.5m one side or 1.5m each side where more than 20 du or more than 100m in length	1.5m each side	Shared parking in the movement lane up to 100 du, separate parking required over 100 du	No recessed parking	Shared (In movement lane)	5.5 - 5.7	5.7	NA	Local Road (= 2000vpd)
Road 14	E11	Type C - 12m	Suburban	Live and Play	Access to houses/ townhouses	1 to 20 du	20	9	12	16.00%	Shared (In movement lane)	1.5m one side only	Shared (In movement lane)	No recessed parking	Shared (In movement lane)	5.5 - 5.7	5.7	NA	Lane (= 200vpd)
Part Road 16	E11	Type C - 12m	Suburban	Live and Play	Access to houses/ townhouses	1 to 20 du	20	9	10	16.00%	Shared (In movement lane)	1.5m one side only	Shared (In movement lane)	No recessed parking	Shared (In movement lane)	5.5 - 5.7	5.7	NA	Lane (= 200vpd)
Part Road 16	E11	Type D - 10m	Suburban	Live and Play	Access to houses/ townhouses	1 to 20 du	20	9	10	16.00%	Shared (In movement lane)	1.5m one side only	Shared (In movement lane)	No recessed parking	Shared (In movement lane)	5.5 - 5.7	5.7	NA	Lane (≈ 200vpd)
Access 10	E9	Type F - 10m	Suburban	Live and Play	Access to houses/ townhouses	1 to 3 du or 1 to 6 du	10	3.6m for up to 3 du or 4.5m for up to 6 du	17 - 10	20.00%	Shared (In movement lane)	Shared (In movement lane)	Allow for passing up to every 50m	No recessed parking. Passing to be provided in courtyard / turning area	Shared (In movement lane)	2.75 - 3.0	3.0	T Shape	Lane (this would normally be a private road or private way)
Access 11	E9	Type F - 10m	Suburban	Live and Play	Access to houses/ townhouses	1 to 3 du or 1 to 6 du	10	3.6m for up to 3 du or 4.5m for up to 6 du	17 - 10	20.00%	Shared (In movement lane)	Shared (In movement lane)	Allow for passing up to every 50m	No recessed parking. Passing to be provided in courtyard / turning area	Shared (In movement lane)	2.75 - 3.0	3.0	T Shape	Lane (this would normally be a private road or private way)

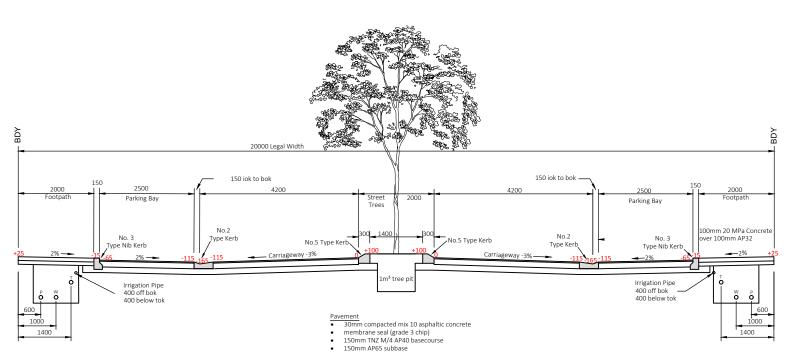






Road Type AA (Northlake Drive)

2 x 4.2m carriageway / 2m median strip / 20m legal width / 2.0m footpath both sides



#### Road Type AA (Northlake Drive) - With Parking

 $2 \times 4.2 \text{m}$  carriageway / 2 m median strip / 2.5 m parking / 20 m legal width / 2.0 m footpath both sides



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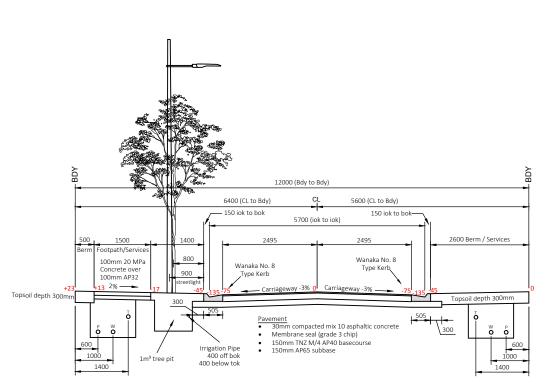


Stages 8-9
Typical Road Cross Sections

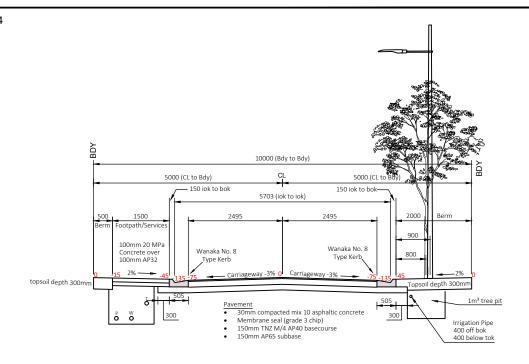
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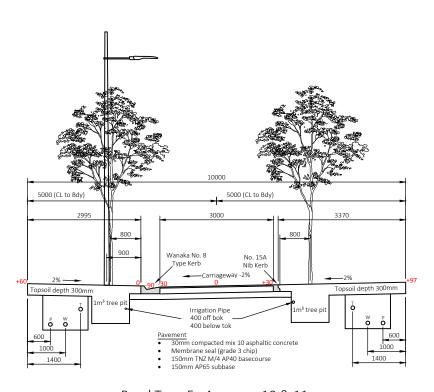
Road Type B Without Parking - Roads 11 & 15 5.7m carriageway / 15m legal width / 1.5m footpath both sides



Road Type C - Roads 14 & 16 (part of) 5.7m carriageway / 12m legal width / 1.5m footpath one side



Road Type D - Road 16 (part of) 5.7m carriageway / 10m legal width / 1.5m footpath on one side



Road Type F - Accesses 10 & 11 3.0m carriageway / 10m legal width / no footpath Note: legal width increases to 17m at northern end



0800 PPGROUP

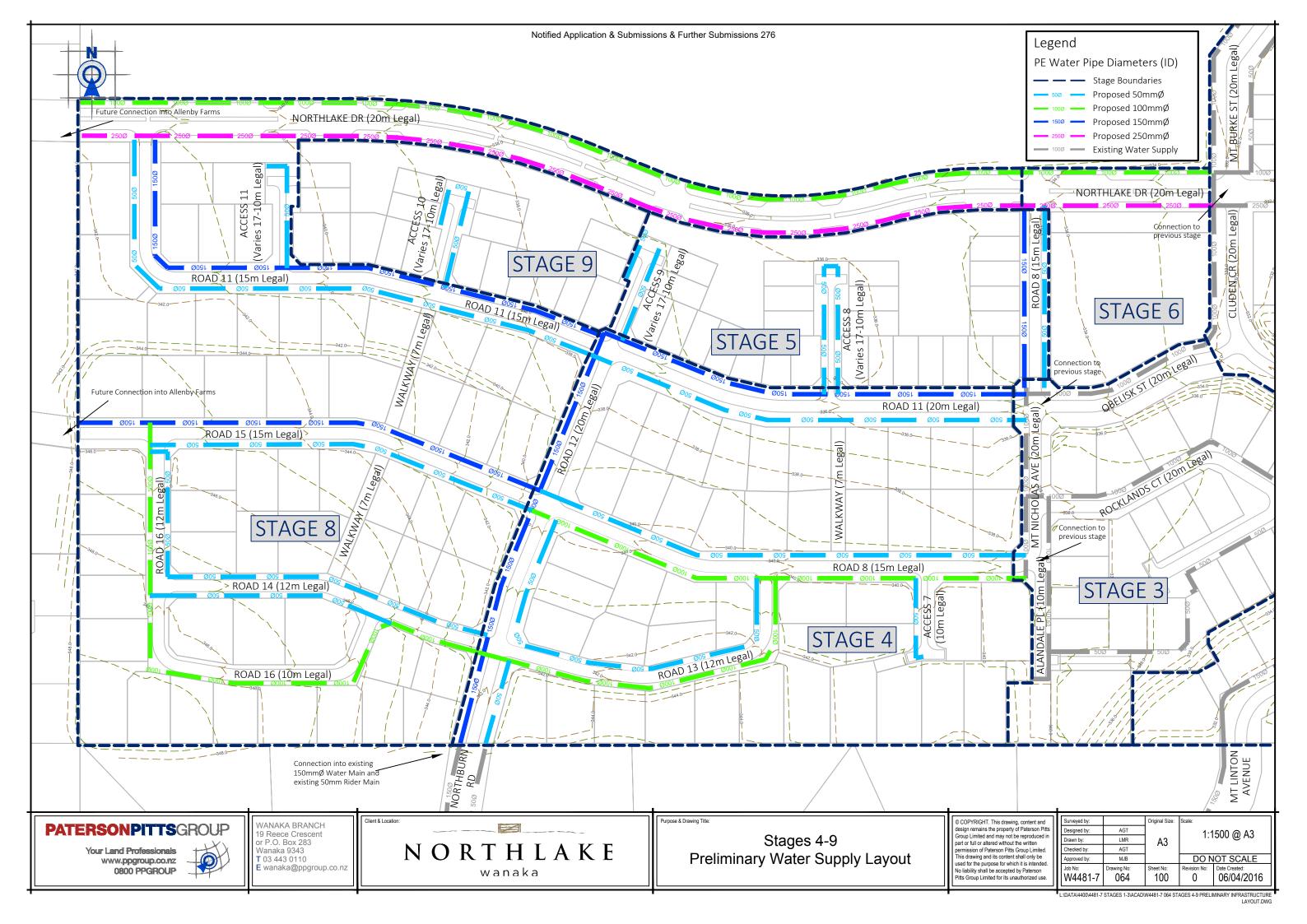
WANAKA BRANCH 19 Reece Crescent or P.O. Box 283 Wanaka 9343 E wanaka@ppgroup.co.nz



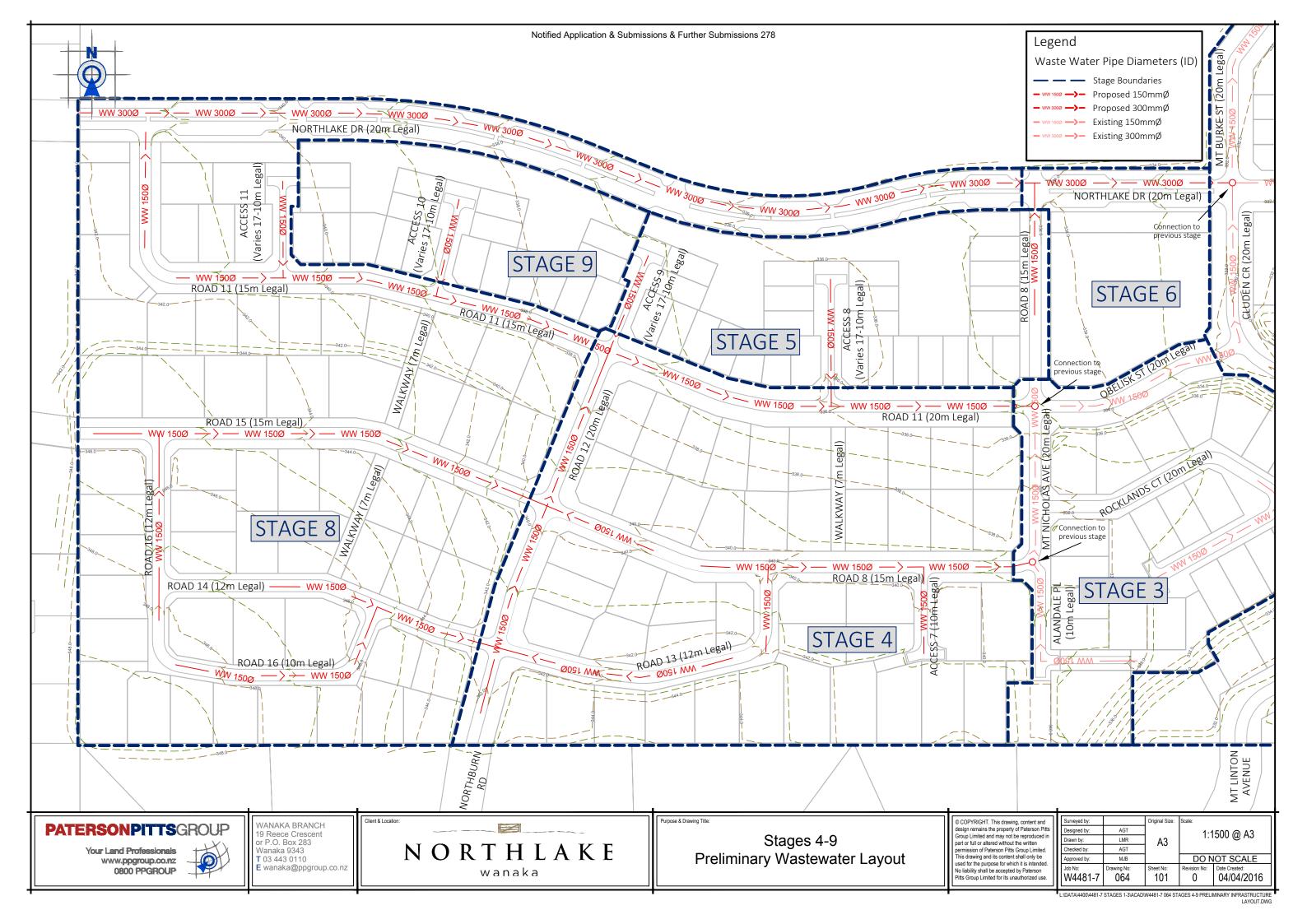
Stages 8-9 Typical Road Cross Sections © COPYRIGHT. This drawing, content and design remains the property of Paterson Pitts Group Limited and may not be reproduced in part or full or altered without the written permission of Paterson Pitts Group Limited. This drawing and its content shall only be used for the purpose for which it is intended. No liability shall be accepted by Paterson Pitts Group Limited for its unauthorized use.

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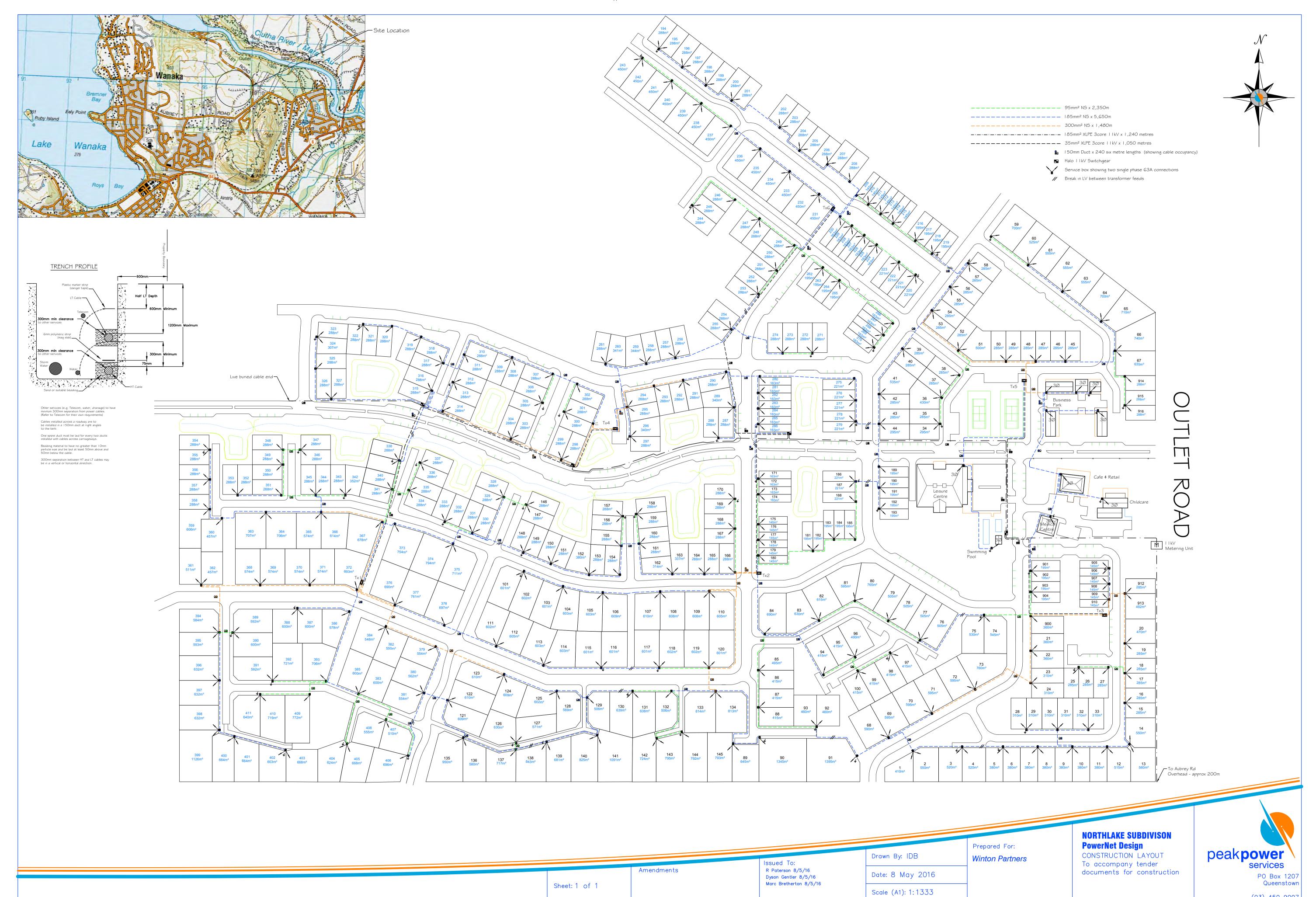








Appendix 6: Peak Power – Preliminary electrical design for ODP area						



Current Issue Date: (03) 450 9007 contact@peakpowerservices.co.nz www.peakpowerservices.co.nz

Job Number:

51071

Drawing File:

Appendix 7: Peak Power – Confirmation of electrical supply (email)							

#### **Alex Todd**

From: Ian Boud <ianb@peakpower.co.nz>
Sent: Wednesday, 5 April 2017 12:06 p.m.

**To:** Alex Todd

**Subject:** Northlake Electrical Supply Stages 8 & 9

#### Hi Alex.

I can confirm that Peak Power Services Ltd, working as an agent for Powernet Ltd, have been contracted to provide electrical supply to Stage 8 and Stage 9 of the Northlake development on Outlet Rd, Wanaka.

Power supply will be provided to the boundary of each lot in accordance with PowerNet and QLDC requirements.

Regards

#### **Peak Power Services Ltd**

Ian Boud
Project Manager
P O Box 1207
QUEENSTOWN

Mob 027-201 0812



www.peakpower.co.nz

Appendix 8: Chorus – Confirmation of telecom supply (email)			

#### **Alex Todd**

**To:** George Condon

**Subject:** RE: W4481-7: Northlake Stages 8 & 9

From: George Condon [mailto:George.Condon@chorus.co.nz]

**Sent:** Monday, 10 April 2017 11:17 a.m. **To:** Alex Todd <Alex.Todd@ppgroup.co.nz>

Cc: Marc Bretherton < marc.bretherton@wintonpartners.co.nz>

Subject: RE: W4481-7: Northlake Stages 8 & 9

#### Hi Alex

Stages 8 & 9 will be an extension of the work we will be doing in Stages 4 & 5. The design for any of the earlier stages are planned to take into account the subsequent or the possibility of further stages within the subdivision. I see no problem providing communications to Stages 8 & 9 as long as Stages 4 & 5 progress.

#### Regards

#### George Condon | Delivery Specialist

Chorus | T: +64 3 940 3060 | M:+64 21 504 138 Level 1, 12 Moorhouse Ave

From: Alex Todd [mailto:Alex.Todd@ppgroup.co.nz]

**Sent:** Monday, 3 April 2017 2:36 p.m.

**To:** George Condon < George.Condon@chorus.co.nz >

**Cc:** Marc Bretherton < <u>marc.bretherton@wintonpartners.co.nz</u>>

Subject: W4481-7: Northlake Stages 8 & 9

#### Hi George,

We are about to lodge a subdivision consent application for stages 8 & 9 at Northlake (see attached scheme plan) and I am hoping you can provide me an email confirming that telecom supply will be available for these lots. Ordinarily I would have sent this request to TSG but I don't actually want a contact just a confirmation of supply for Council when processing the application.

Are you able to help here? Happy to discuss

#### Kind regards

#### **Alex Todd**

Senior Surveyor

M 021 082 52333

E alex.todd@ppgroup.co.nz

#### **PATERSONPITTS**GROUP

Surveying • Planning • Engineering Your Land Professionals 19 Reece Crescent, Wanaka 9305 or P.O. Box 283, Wanaka 9343, New Zealand T 03 443 0110

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#### Notified Application & Submissions & Further Submissions 285

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Appendix 9: Tonkin & Taylor- Water modelling report Feb 2016			

Job No: 50553.324 10 February 2016

Queenstown Lakes District Council Private Bag 50072 Queenstown 9348

Attention: Rob Darby

Dear Rob

#### **Northlake Developments Water Supply Modelling**

#### 1 Introduction

Tonkin and Taylor Ltd (T+T) was engaged¹ by Queenstown Lakes District Council (QLDC) to undertake water supply modelling for the proposed Northlake subdivision in Wanaka. The scope of work completed by T+T includes modelling of interim and ultimate development scenarios to determine whether levels of service in the area can be met by the proposed water supply reticulation sizing and layout.

11 stages of development are proposed across four different landowners (Northlake Investments Limited, Urquhart, Allenby Farms Limited and Gilbertson). Initial modelling connected the first four stages (owned by Northlake Investments Ltd.) into the existing Northlake reticulation off Aubrey Road. The ultimate scenario expanded on this initial modelling to include all of Stages 1-11. These zones were all connected into the current network through connections to the Beacon Point outflow pipe and Aubrey Road. Refer to Appendix A for maps of the proposed layout and a contour plan of the area.

#### 2 Network setting

Existing development in the Northlake area is confined to an approximately 30 hectare block north of Aubrey Road. This area, as well as areas surrounding Aubrey Road, is serviced by the Beacon Point inlet booster stations on the bank of Lake Wanaka, and corresponding reservoir, situated at an elevation of 382 m RL. The existing Northlake development water reticulation network connects into the current Wanaka network at three locations along the 375 mm Aubrey Road main – via two 150 mm mains which reticulate water throughout the development and one 100 mm lateral.

#### 2.1 Criteria and assumptions

The purpose of the water supply modelling was to determine whether the proposed Northlake Development reticulation sizing and layout would allow QLDC levels of service and firefighting requirements to be met. The following demand scenarios were modelled to determine this:

<sup>&</sup>lt;sup>1</sup> Email between Dominic Fletcher (T+T) and Rob Darby (QLDC) dated Wednesday 13 January 2016.

- Peak day demand To determine whether available fire flows achieve the firefighting requirements as per NZS 4509:2008.
- Peak hour demand To determine whether minimum residual pressures at each connection are ≥ 300 kPa.

The firefighting water classification for the development is FW2 (12.5 l/s within a distance of 135 m from any point in the network with an additional 12.5 l/s available within a distance of 270 m).

#### 2.2 Design demands

The average daily demands (ADF) for each of Stages 1-11, as well as the existing Northlake developed area off Aubrey Road, were calculated by assuming a water allocation of 700 l/person/day and 3 people per lot (refer Appendix B). Development demands during the peak day and peak hour demand scenarios were calculated as follows:

- Peak day flow (PDF) = 3.3 x ADF.
- Peak hour flow (PHF) = 6.6 x ADF.

Table 1 Calculated demands for the existing development and Scenarios One and Two (refer Appendix B for individual stage demands)

Area	ADF (I/s)	PDF (I/s)	PHF (I/s)
Existing Northlake development	1.31	4.33	8.66
Scenario One (Stages 1-4)	13.17	43.47	86.95
Scenario Two (Stages 1-11)	30.31	100.02	200.04

#### 3 Modelled scenarios

Two scenarios were modelled, an initial scenario and ultimate scenario. Modelling assumed the current Wanaka peak day design network demands and reticulation and did not take into consideration future network upgrades or demand increases beyond those mentioned below for the Northlake Development.

#### 3.1 Initial Scenario: Stages 1-4

The initial scenario extended the existing 150 mm rising mains servicing the current network development north of Aubrey Road into Stages 1-4. These 150 mm mains were then connected via a 300 mm main (refer Appendix C for network layout). Modelling of this scenario was undertaken to determine whether the proposed interim reticulation upgrades would meet levels of service for the areas and the effect, if any, on the existing network.

#### 3.2 Ultimate development: Stages 1-11

The ultimate scenario consisted of all 11 proposed stages across the Northlake, Allenby, Gilbertson and Urquhart developments. The modelled network extended the 300 mm main in the initial scenario to connect both into the Beacon Point reservoir outlet pipe to the west of the development, as well as into the existing 375 mm Aubrey Road falling main to the east of the development. Three laterals of diameter size 100 mm and 150 mm extended off the 300 mm main to service Stages 6-8.

#### 4 Modelling results

#### 4.1 Scenario One: Stages 1-4

Modelling determined that the Beacon Point Reservoir (382 m RL) and corresponding network infrastructure has sufficient capacity to meet the additional 47.80 l/s demand of Stages 1-4 with little impact on pressure and demand to the surrounding current network. However, minimum residual pressures of 300 kPa were not met at areas of higher elevation (above 343 m RL). This is due to the reservoir elevation relative to the higher levels of the development and is not considered as a result of head losses in the network (refer Appendix C for results).

It is noted that minimum residual pressures in the current network off Aubrey Road were not all greater than 300 kPa prior to the addition of the Scenario 1 upgrades. This is considered due to the high elevation of certain areas of the network in comparison to the elevation of the Beacon Point reservoir.

Modelling of available firefighting flows took into consideration local head loss at each fire hydrant. Results determined that the required firefighting category FW2 (25 l/s) was available throughout the network for Stages 1-4.

Table 2 Residual pressures and fire flows at each junction throughout the existing development north of Aubrey Road and proposed Scenario One network

Area	Junction ID	Elevation	Minimum Residual	Available Fire flow (I/s)
		(m RL)	Pressure(kPa)	(Inc. hydrant losses)
	922	332	481 ≥ 300 OK	> 50 l/s OK
	912	348	265 < 300 NOT OK	46 ≥ 25 l/s OK
	919	352	206 < 300 NOT OK	41 ≥ 25 l/s OK
	918	356	147 < 300 NOT OK	34 ≥ 25 l/s OK
	917	348	196 < 300 NOT OK	40 ≥ 25 l/s OK
	916	348	216 < 300 NOT OK	42 ≥ 25 l/s OK
	911	348	216 < 300 NOT OK	43 ≥ 25 l/s OK
<b>Existing Network</b>	956	346	235 < 300 NOT OK	44 ≥ 25 l/s OK
	910	331	383 ≥ 300 OK	>50 l/s OK
	923	331	383 ≥ 300 OK	40 ≥ 25 l/s OK
	914	331	441 ≥ 300 OK	>50 l/s OK
	915	333	422 ≥ 300 OK	43 ≥ 25 l/s OK
	925	346	294 < 300 NOT OK	43 ≥ 25 l/s OK
	924	346	255 < 300 NOT OK	36 ≥ 25 l/s OK
	920	343	235 < 300 NOT OK	44 ≥ 25 l/s OK
Northlake	927	331	363 ≥ 300 OK	> 50 l/s OK
	928	343	284 < 300 NOT OK	> 50 l/s OK
Stage 1	926	347	137 < 300 NOT OK	38 ≥ 25 l/s OK
	930	329	324 ≥ 300 OK	> 50 l/s OK
Stage 2	933	351	206 < 300 NOT OK	47 ≥ 25 l/s OK
Stage 2	932	351	196 < 300 NOT OK	45 ≥ 25 l/s OK
Stage 3	929	352	196 < 300 NOT OK	40 ≥ 25 l/s OK
Stage 4	931	329	314 ≥ 300 OK	39 ≥ 25 l/s OK

#### 4.2 Scenario Two: Ultimate development

Modelling indicated that with the additional demand for the ultimate development on top of current network operations, the Beacon Point reservoir would drain to empty towards the peak hour of the day without further network upgrades. This means levels of service are unable to be met throughout the ultimate development without upgrades to the current network.

The third pump at the Beacon Point inlet was included as a duty assist pump for modelling purposes, with the same duty head as the two existing operational pumps. Operation of all three pumps enabled network demands to be met, noting that specific assessment of the current intake ability to enable three pumps to operate concurrently has not been undertaken as part of this modelling work.

With the third operational pump at the intake, the required levels of service and firefighting flows in the area were not achieved for the higher areas in the development due to the elevation difference with the Beacon Point Reservoir (refer Appendix D). Table 3 below details the minimum residual pressures and fire flows achievable at each modelled junction in the development.

The results show that with three operating pumps, the required network demands and levels of service are achievable for the Gilbertson and Urquhart developments and Stages 1-4 of the Northlake Investments Limited development. However, due to the high elevation of the Allenby Farms Ltd development and Stages 6-8 of the Northlake Investments Ltd development, the same requirements cannot be met without localised pressure boosting or an additional upper reservoir. In general, this applies to all development and network connections at or above 355 m RL.

The proposed development pipe network is adequate to meet the additional development demands but only with localised boosting to higher areas of the network and upgrades to the current Beacon Point reservoir. An additional reservoir situated at the highest point in the network (414 m RL) could provide adequate levels of service to all areas below 384 m RL. However, the highest point in the proposed development is 393 m RL and therefore localised boosting would be required to meet areas of elevation higher than 384 m RL in the proposed development.

A small area in the existing network Northlake (around Junctions 918 and 919, refer Appendix B) does not meet levels of service for pressure due to its relative elevation to the Beacon Point Reservoir. Localised pressure boosting or connection to a higher pressure zone would be necessary to enable the 300 kPa minimum pressure requirement to be met in this location.

Table 3	Levels of service throughout the ultimate development with an additional pump at
	the Beacon Point intake

Area	Junction ID	Elevation	Minimum Residual Pressure (kPa)	Available Fire Flow (I/s)
	10	(m RL)	Tressure (Kra)	
Existing Network	922	332	491 ≥ 300 OK	> 50 I/s OK
	912	348	324 ≥ 300 OK	> 50 l/s OK
	919	352	284 < 300 NOT OK	50 ≥ 25 l/s OK
	918	355	245 < 300 NOT OK	44 ≥ 25 l/s OK
	917	348	304 ≥ 300 OK	50 ≥ 25 l/s OK
	916	348	324 ≥ 300 OK	> 50 l/s OK
	911	348	324 ≥ 300 OK	> 50 l/s OK
	956	346	334 ≥ 300 OK	> 50 l/s OK
	910	331	481 ≥ 300 OK	> 50 l/s OK
	923	331	481 ≥ 300 OK	45 ≥ 25 l/s OK

Area	Junction ID	Elevation (m RL)	Minimum Residual Pressure (kPa)	Available Fire Flow (I/s)
	914	331	481 ≥ 300 OK	> 50 l/s OK
	915	333	471 ≥ 300 OK	47 ≥ 25 l/s OK
	925	346	353 ≥ 300 OK	41 ≥ 25 l/s OK
	924	346	334 ≥ 300 OK	41 ≥ 25 l/s OK
	920	343	363 ≥ 300 OK	> 50 l/s OK
Stage 1(Northlake)	927	331	491 ≥ 300 OK	> 50 l/s OK
	928	343	461 ≥ 300 OK	> 50 l/s OK
	926	347	314 ≥ 300 OK	> 50 I/s OK
	930	329	500 ≥ 300 OK	> 50 l/s OK
Stage 2 (Northlake)	933	351	383 ≥ 300 OK	> 50 l/s OK
Stage 3 (Northlake)	932	351	383 ≥ 300 OK	> 50 I/s OK
	929	352	383 ≥ 300 OK	> 50 I/s OK
Stage 4 (Northlake)	931	329	491 ≥ 300 OK	48 ≥ 25 l/s OK
Stage 5	934	345	343 ≥ 300 OK	> 50 l/s OK
(Allenby Farms Ltd)	935	350	304 ≥ 300 OK	> 50 I/s OK
	936	355	255 < 300 NOT OK	48 ≥ 25 l/s OK
	937	362	196 < 300 NOT OK	40 ≥ 25 l/s OK
	938	366	167 < 300 NOT OK	34 ≥ 25 l/s OK
	939	359	245 < 300 NOT OK	45 ≥ 25 l/s OK
	945	370	118 < 300 NOT OK	23 < 25 l/s NOT OK
Stage 6 (Northlake	950	346	334 ≥ 300 OK	50 ≥ 25 l/s OK
Investments Ltd.)	946	372	98 < 300 NOT OK	16 ≤ 25 l/s NOT OK
Stage 7(Northlake	951	357	226 < 300 NOT OK	34 ≥ 25 l/s OK
Investments Ltd.)	952	359	206 < 300 NOT OK	30 ≥ 25 l/s OK
	953	361	186 < 300 NOT OK	27 ≥ 25 l/s OK
Stage 8 (Northlake	949	393	0 < 300 NOT OK	0 ≤ 25 I/s NOT OK
Investments Ltd.)	948	378	39 < 300 NOT OK	0 ≤ 25 I/s NOT OK
	947	374	78 < 300 NOT OK	8 ≤ 25 l/s NOT OK
Stage 9 (Urquhart)	954	329	481 ≥ 300 OK	32 ≥ 25 l/s OK
	955	329	402 ≥ 300 OK	23 ≤ 25 I/s NOT OK
Stage 10	943	328	510 ≥ 300 OK	> 50 I/s OK
(Gilbertson)	944	329	500 ≥ 300 OK	> 50 l/s OK
Stage 11 (Gilbertson)	942	326	530 ≥ 300 OK	> 50 l/s OK

#### 5 Conclusion

There is sufficient capacity for the Beacon Point reservoir to meet both peak day demand and fire flow levels of service requirements of Stages 1-4 of the Northlake Development with the proposed network. However, due to the elevations in the development, not all areas are able to achieve minimum residual pressure. Localised pressure boosting for areas above 350 m RL elevation would be necessary to ensure a minimum residual pressure of at least 300 kPa is achieved throughout the network (for Stages 1 -4 reticulation only).

Three Beacon Point intake pumps are required to operate (duty-assist-assist type operation) to meet current design network demands with the additional design demand from the full development (Stages 1 - 11) on the design peak day.

Provided the increased network demand can be met by Beacon Point intake (i.e. an additional operational pump at the Beacon Point intake), levels of service can be met within the development for the proposed areas below 355 m RL (i.e. Stages 1 - 4 and 9 - 11). Localised boosting (i.e. pump stations and/or upper reservoir) to areas of higher elevation (i.e. Stages 5 - 8) in the proposed development and isolated areas in the existing Northlake development network is required to enable levels of service requirements to be met.

The proposed development pipe network capacity is adequate for the design demands modelled and when combined with pressure boosting measures (to overcome the elevation difference between the development area and the Beacon Point Reservoir). Specific pressure boosting measures (i.e. upper reservoir and/or pump station(s)) have not been modelled.

#### 6 Applicability and closure

The model is a numerical representation of the physical reality, and subsequently bears some uncertainty. The demands and peaking factors used are based on assumptions regarding the patterns of water use in the township, and are an approximation of the physical reality. Hence, actual demands within the network may differ from those modelled.

The modelling results presented in this report show the levels of service for the proposed developments to the Wanaka network, based on adopted design demands and particular network upgrades, and are not a guarantee of available levels of service in the future. In addition, modelling has been undertaken using the current partially calibrated Mike Urban dynamic model for Wanaka. QLDC are in the process of developing a new water supply model and results may vary between the existing and new models.

This report has been prepared for the benefit of Queenstown Lakes District Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without out prior review and agreement.

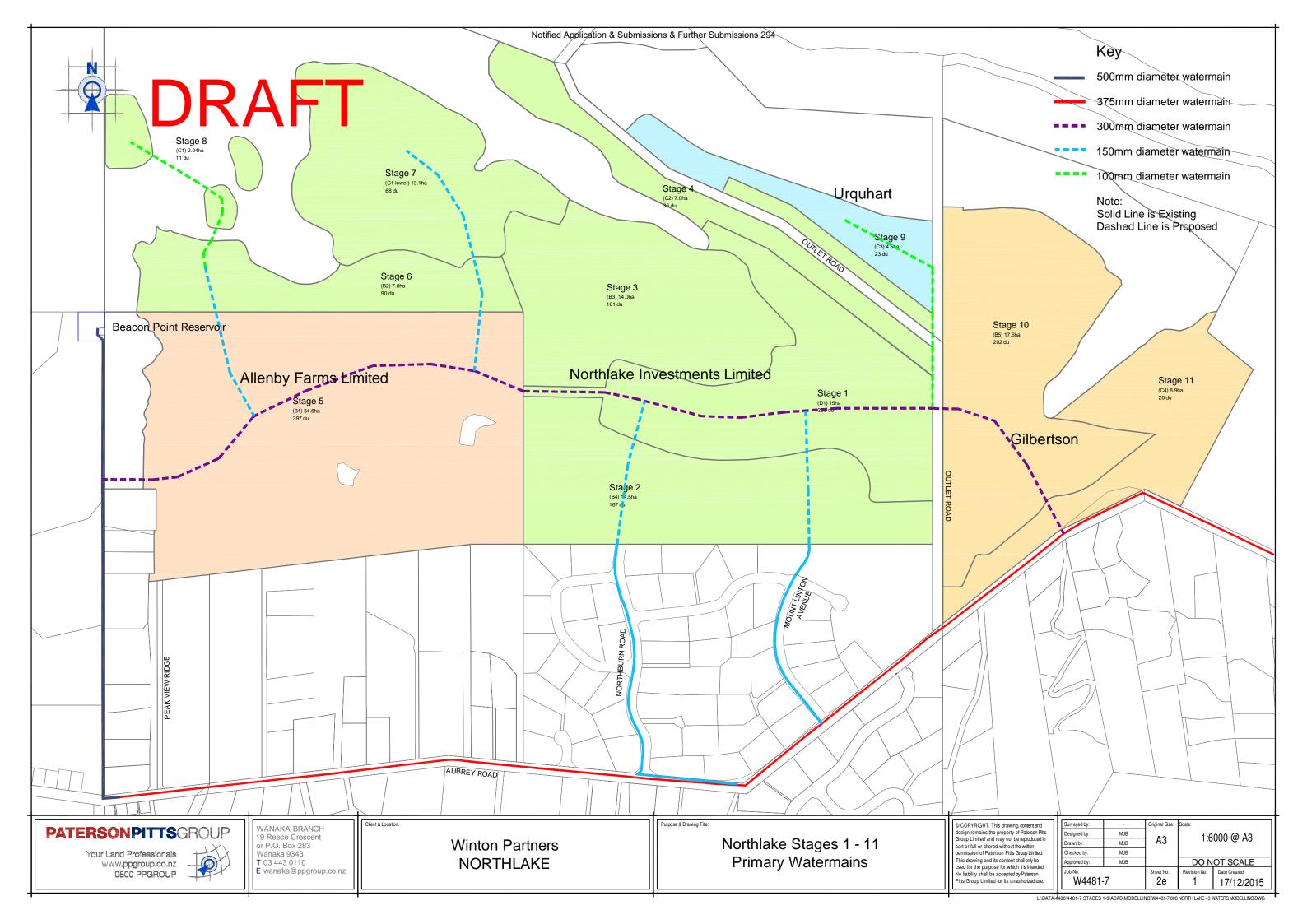
Tonkin & Taylor Ltd	
Environmental and Engineering Consultants	
Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
Michaela Aspell	Grant Lovell
Civil Engineer	Project Director

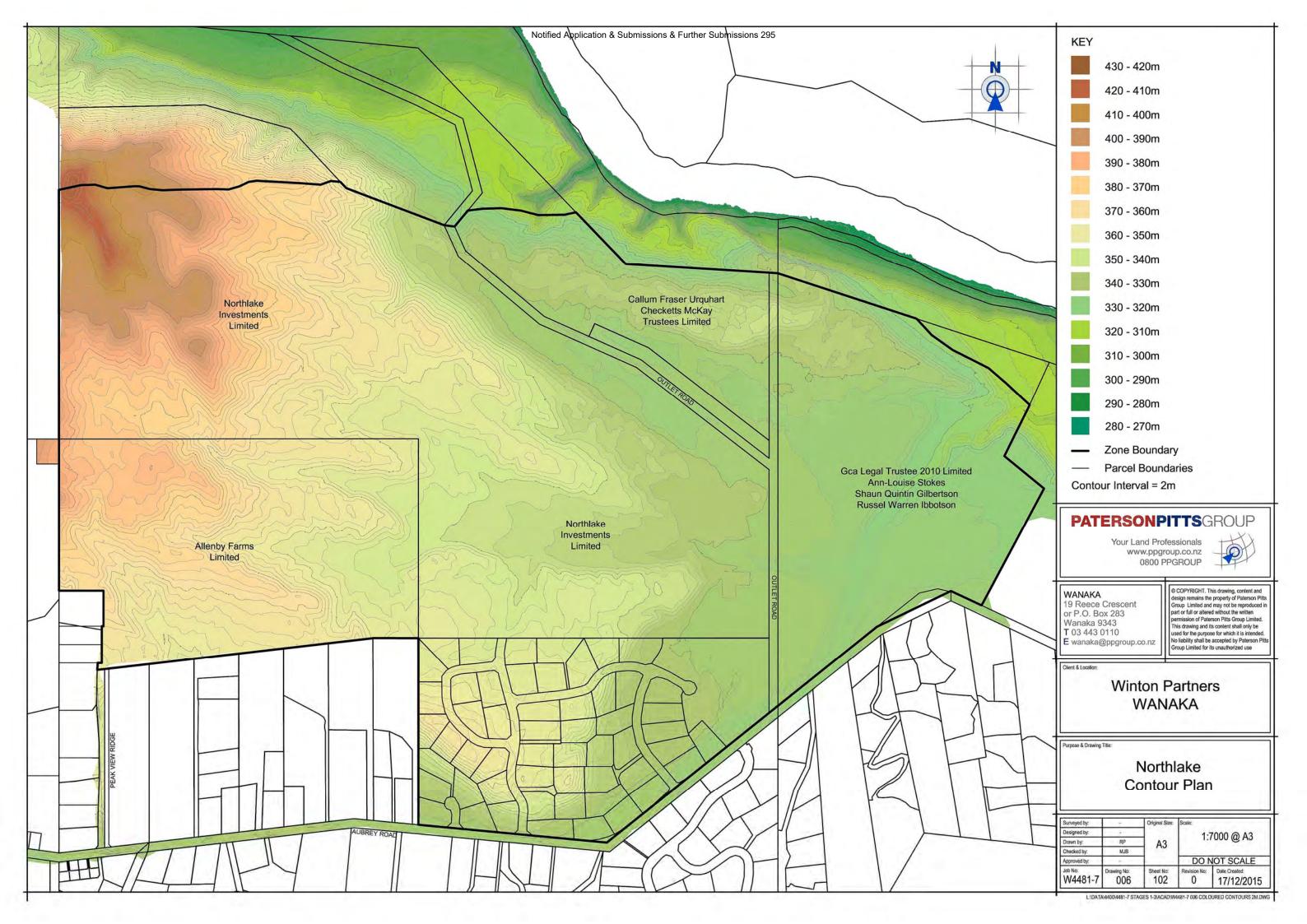
Technical review by: Dominic Fletcher (Water Resources Engineer)

MLAA

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Appendix A: Draft Development Plans (Winton Partners)





# **Appendix B:** Modelling Design Demands



Job no. 50553.324

Description Northlake Developments Water Supply Modelling Demands

Computed 15/01/2015 mlaa

# NORTHLAKE SUBDIVSION

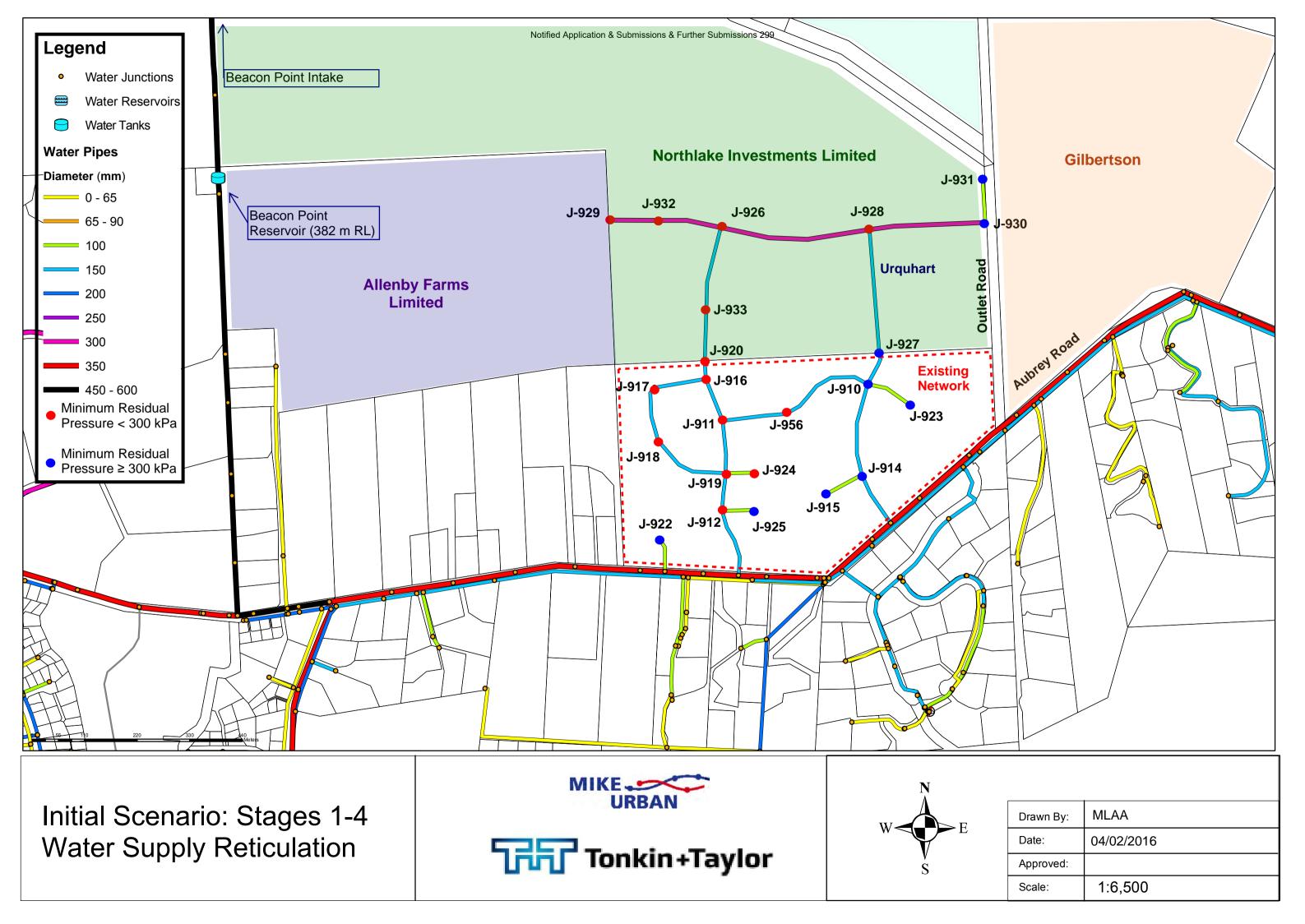
Density 3 people/lot Water allowance 700 l/person/day

Stage	No. of lots	ADF (I/s)	PDF (I/s)	PHF (I/s)
1	225	5.47	18.05	36.09
2	145	3.52	11.63	23.26
3	140	3.40	11.23	22.46
4	32	0.78	2.57	5.13
Scenario 1 (1-4)	542	13.17	43.47	86.95
5	345	8.39	27.67	55.34
6	78	1.90	6.26	12.51
7	59	1.43	4.73	9.46
8	9	0.22	0.72	1.44
9	20	0.49	1.60	3.21
10	176	4.28	14.12	28.23
11	18	0.44	1.44	2.89
Scenario 2 (1-11)	1247	30.31	100.02	200.04

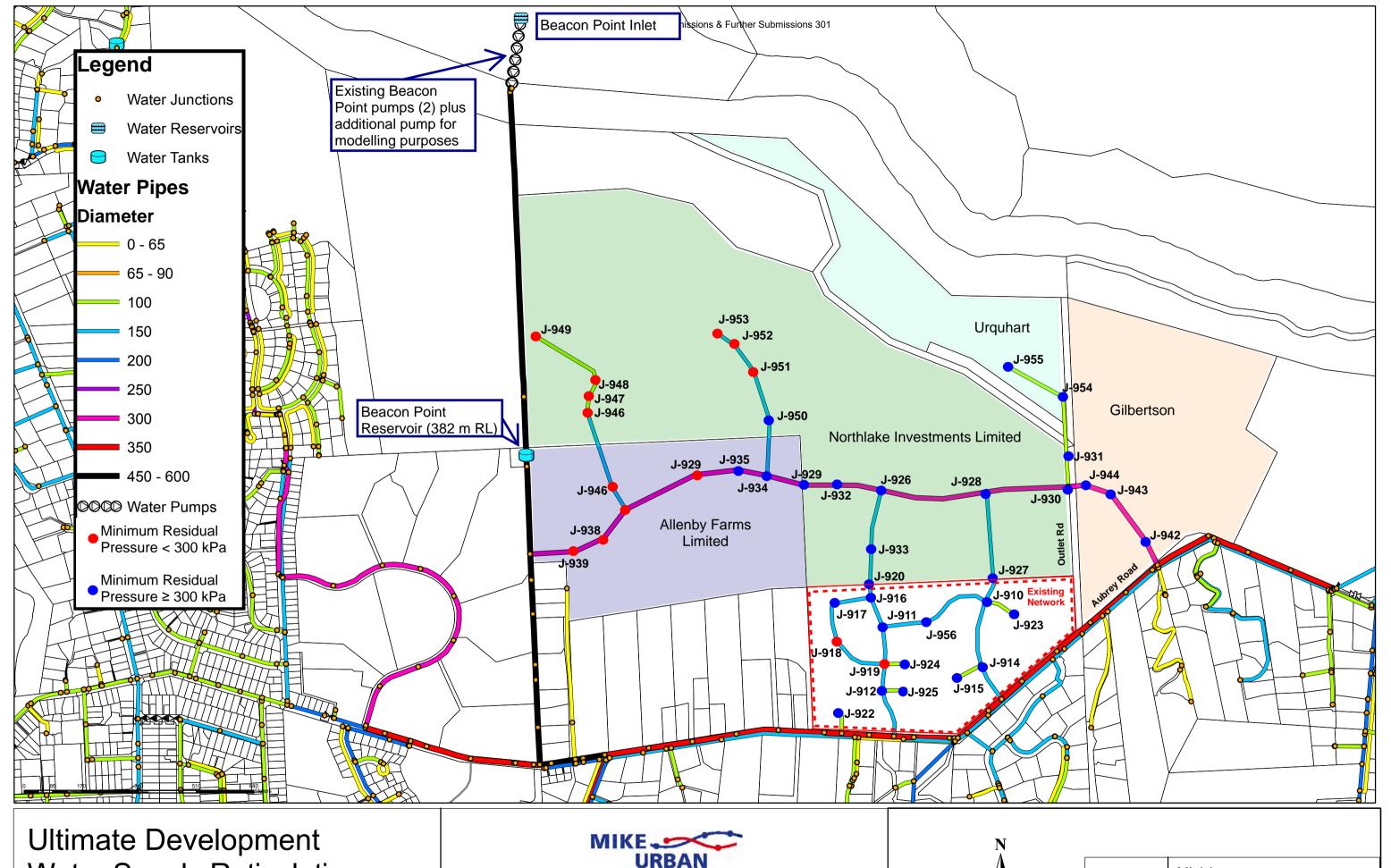
# **EXISTING NETWORK NORTH OF AUBREY ROAD**

Density (people/lot)	3
Water allowance (I/person/day)	700
Number of lots	54
ADF (I/s)	1.31
PDF (I/s)	4.33
PHF (I/s)	8.66

# **Appendix C:** Initial Scenario: Stages 1-4



# **Appendix D: Ultimate scenario (All Stages)**



Water Supply Reticulation - with additional inlet pump







Drawn By:	MLAA
Date:	04/02/2016
Approved:	
Scale:	1:10,000

Appendix 10: Watershed – Water modelling Northlake Stages 1-7 June 2016			



3 June 2016

Queenstown Lakes District Council 10 Gorge Road Queenstown

Dear Mark Baker,

## **NORTHLAKE DEVELOPMENT STAGES 1-7**

As per your request, we have undertaken hydraulic modelling to review the proposed water supply layout provided by Patterson Pitts Group, with respect to achieving the levels of service required by Queenstown Lakes District Council.

## **DEMAND ASSESSMENT**

The demand has been assessed based on the Northlake Stages 1-7 Proposed Water Supply Layout drawing W4481-7 011 Rev3 and the Queenstown Lakes District Council Land Development and Subdivision Code of Practice (2015).

The key design parameters outlined in Code of Practice are as follows:

- Daily consumption of 700 L/p/day
- Number of people per dwelling = 3
- Peak Day Demand (over a 12-month period) = Average Day Demand x PF:
  - (a) PF = 1.5 for populations over 10,000;
  - (b) PF = 2 for populations below 2,000.
- Peak Hourly Demand = Average Hourly Demand (on peak day) x PF (over a 24-hour period):
  - (a) PF = 2 for populations over 10,000;
  - (b) PF = 5 for populations below 2,000.
- Firefighting demands as specified in SNZ PAS 4509

Table 1: Average and Peak Day Demand Calculations

Development Stage	No. of Residential Lots	Population	Average Demand (I/s)	Peak Daily Demand (L/s)
Stage 1	36	108	0.875	1.750
Stage 1 A	10	30	0.243	0.486
Stage 2	37	111	0.899	1.799
Stage 3	33	99	0.802	1.604
Stage 4	45	135	1.094	2.188
Stage 5	25	75	0.608	1.215
Stage 6	20	60	0.486	0.972
Stage 7 <sup>1</sup>	30	90	0.729	1.458
Total	236	708	5.736	11.472

<sup>&</sup>lt;sup>1</sup> Stage 7 is the Village Centre and the information provided by the developer assesses the demand as equivalent to 30 Residential Lots.



Based on the recent calibration of the hydraulic model during peak demand, the per capita demand for the Beacon Point area was determined as 0.048 L/property/day. This equates to a peak day demand of 1382L/p/day or using the average to peak day factor of 2, 692 L/p/day. This agrees well with the code of practice assumption of 700L/p/day.

The firefighting classification for the village center is assumed to be FW3 50L/s.

#### Peak Hour Demand

The peak hour factor for the Beacon Point area based on the calibrated hydraulic model is 1.437, the domestic equivalent peak hour factor is 2.3. The suggested design peak hour factor is 5 for population less than 2000. Given the demand assessed in the model matches well with the design assumption, it is reasonable to assume that a similar peak hour factor would apply. For the purposes of assessing the Northlake subdivision, the domestic equivalent profile has been used applying a peak hour factor of 2.3.

#### **LEVELS OF SERVICE**

The levels of service agreed upon with QLDC for the current system performance assessment as part of the model development and calibration project are outlined below:

- The minimum service pressure is 200-300kpa
- The maximum service pressures is 700-800kpa

These levels of service along with the requirements of the Fire Fighting Water Supplies Code of Practice form the basis for the system performance analysis.

Queenstown Lakes District Council does not prescribe any level of service criteria relating to pipe head loss, generally speaking pipe head loss per unit length for new pipes should ideally be < 2 m/km, or 2-5 m/km for normal operation.

### **MODEL RESULTS**

For current peak day demand, pressures within the new sub-division are above 300kPa. The firefighting classification of 50L/s is easily achieved. The proposed pipes have head loss per unit length under 2 m/km or only slightly over.

The only area of concern are existing properties at higher elevation on Glenaray Crescent. These properties have been identified in the current system performance assessment as receiving minimum pressure between 200 – 300 kPa. Pressure to these customers could be reduced by a further 150kPa, however the model results indicate they do remain above 250kPa. The lower pressures are a factor of elevation (~357m) with respect to the Beacon Point Reservoir (TWL HGL 388.1m), where the maximum static pressure would be 31m. There are no significant high head loss pipes contributing to the lower pressures, however the proposed future 250mm connection will ensure minimal head loss.



#### **SUMMARY**

The hydraulic model is a representation of the physical water supply system and as noted in the model development and calibration report it has limitation to its accuracy. The demands and peaking factors used to assess the development are based on assumptions and the actual finally water demands may vary.

The modelling results indicate the proposed new development can be supplied through the proposed reticulation layout and meet the desired levels of service indicted by Queenstown Lakes District Council. Provided Queenstown Lakes District Councils are comfortable with the level of service provide to the properties on Glenaray Road, the proposed water supply design should be accepted.

We trust this report meet your requirements. Please contact Charlotte Broadbent on 021766475 <a href="mailto:charlotte.broadbent@wse.co.nz">charlotte.broadbent@wse.co.nz</a> if you wish to discuss any aspects of this report further.

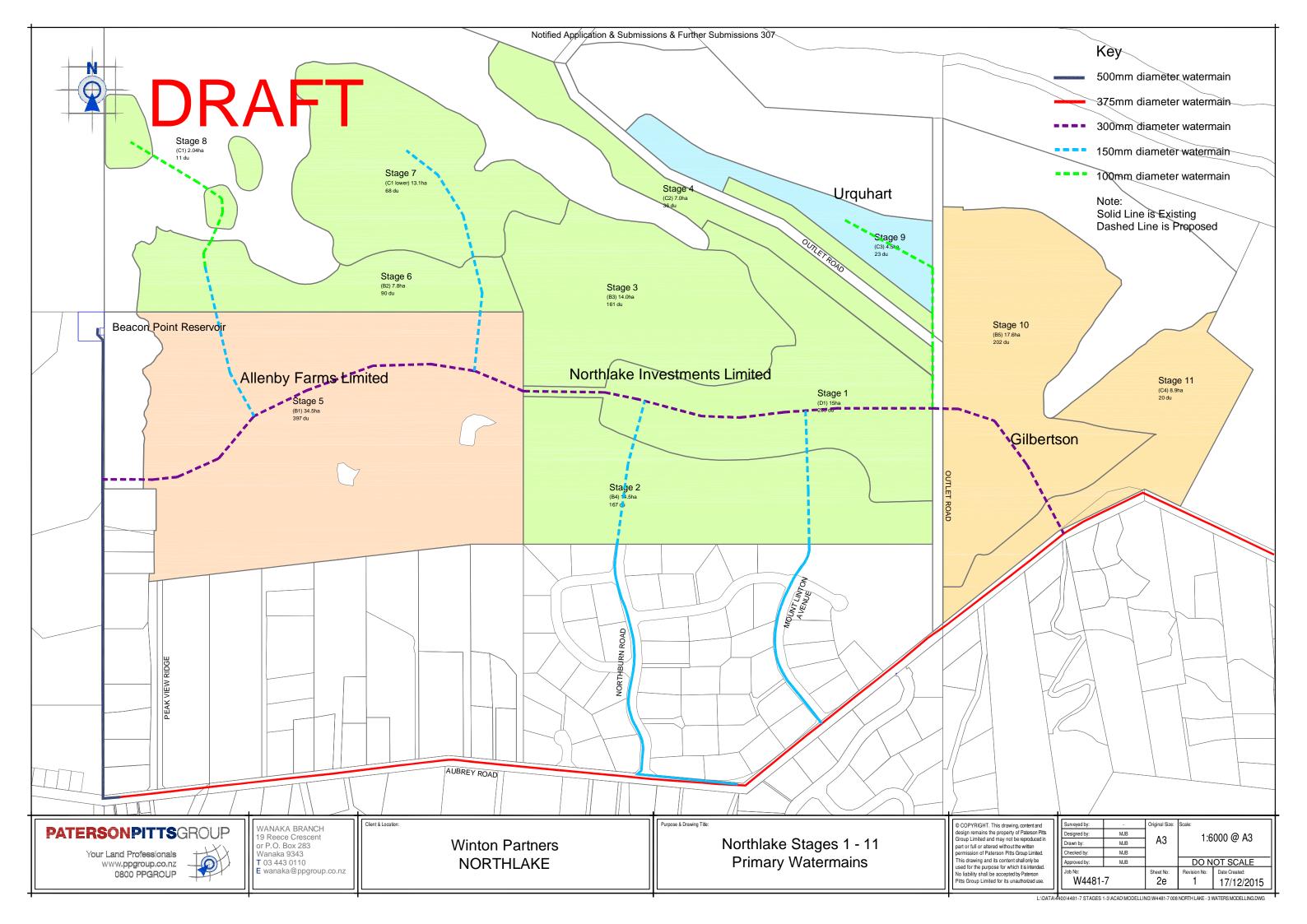
Regards,

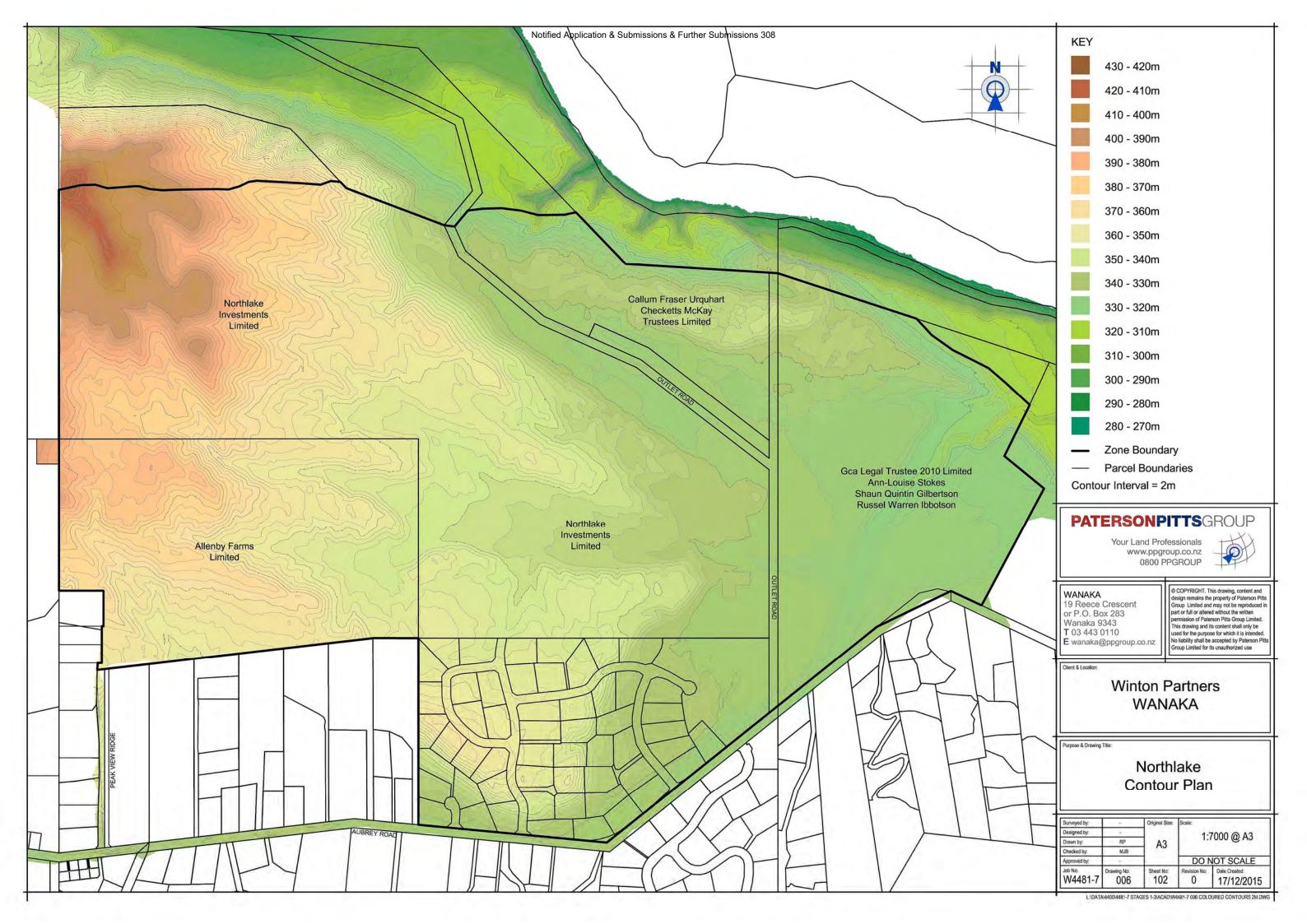
CRBroadbent

Charlotte Broadbent

Director / Senior Civil Engineer

Appendix A: Draft Development Plans (Winton Partners)





# **Appendix B:** Modelling Design Demands



Job no. 50553.324

Description Northlake Developments Water Supply Modelling Demands

Computed 15/01/2015 mlaa

# NORTHLAKE SUBDIVSION

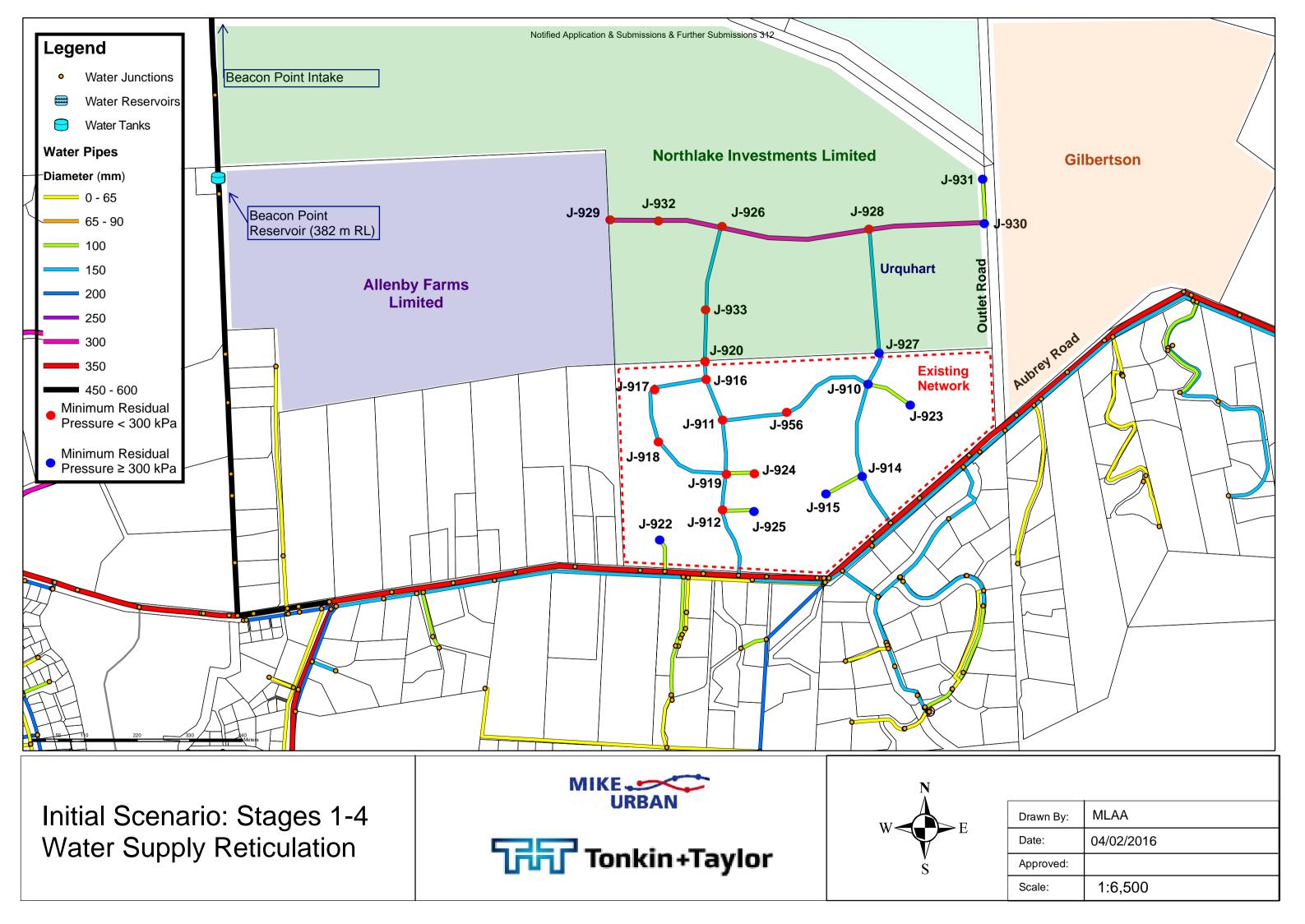
Density 3 people/lot Water allowance 700 l/person/day

Stage	No. of lots	ADF (I/s)	PDF (I/s)	PHF (I/s)
1	225	5.47	18.05	36.09
2	145	3.52	11.63	23.26
3	140	3.40	11.23	22.46
4	32	0.78	2.57	5.13
Scenario 1 (1-4)	542	13.17	43.47	86.95
5	345	8.39	27.67	55.34
6	78	1.90	6.26	12.51
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8	9	0.22	0.72	1.44
9	20	0.49	1.60	3.21
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11	18	0.44	1.44	2.89
Scenario 2 (1-11)	1247	30.31	100.02	200.04

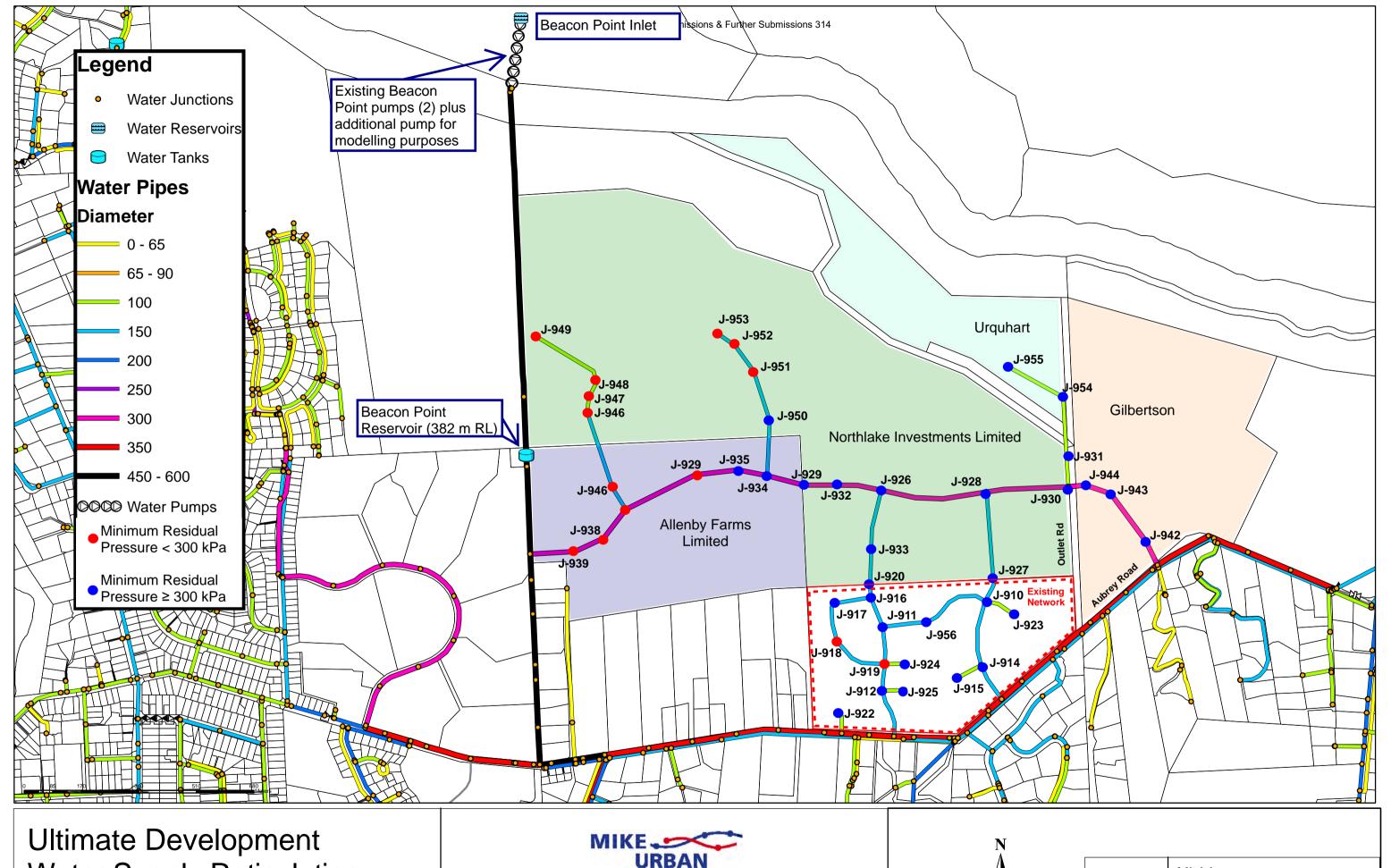
# **EXISTING NETWORK NORTH OF AUBREY ROAD**

Density (people/lot)	3
Water allowance (I/person/day)	700
Number of lots	54
ADF (I/s)	1.31
PDF (I/s)	4.33
PHF (I/s)	8.66

# **Appendix C:** Initial Scenario: Stages 1-4



# **Appendix D: Ultimate scenario (All Stages)**



Water Supply Reticulation - with additional inlet pump







Drawn By:	MLAA
Date:	04/02/2016
Approved:	
Scale:	1:10,000



3 June 2016

Queenstown Lakes District Council 10 Gorge Road Queenstown

Dear Mark Baker,

## **NORTHLAKE DEVELOPMENT STAGES 1-7**

As per your request, we have undertaken hydraulic modelling to review the proposed water supply layout provided by Patterson Pitts Group, with respect to achieving the levels of service required by Queenstown Lakes District Council.

## **DEMAND ASSESSMENT**

The demand has been assessed based on the Northlake Stages 1-7 Proposed Water Supply Layout drawing W4481-7 011 Rev3 and the Queenstown Lakes District Council Land Development and Subdivision Code of Practice (2015).

The key design parameters outlined in Code of Practice are as follows:

- Daily consumption of 700 L/p/day
- Number of people per dwelling = 3
- Peak Day Demand (over a 12-month period) = Average Day Demand x PF:
  - (a) PF = 1.5 for populations over 10,000;
  - (b) PF = 2 for populations below 2,000.
- Peak Hourly Demand = Average Hourly Demand (on peak day) x PF (over a 24-hour period):
  - (a) PF = 2 for populations over 10,000;
  - (b) PF = 5 for populations below 2,000.
- Firefighting demands as specified in SNZ PAS 4509

Table 1: Average and Peak Day Demand Calculations

Development Stage	No. of Residential Lots	Population	Average Demand (I/s)	Peak Daily Demand (L/s)
Stage 1	36	108	0.875	1.750
Stage 1 A	10	30	0.243	0.486
Stage 2	37	111	0.899	1.799
Stage 3	33	99	0.802	1.604
Stage 4	45	135	1.094	2.188
Stage 5	25	75	0.608	1.215
Stage 6	20	60	0.486	0.972
Stage 7 <sup>1</sup>	30	90	0.729	1.458
Total	236	708	5.736	11.472

<sup>&</sup>lt;sup>1</sup> Stage 7 is the Village Centre and the information provided by the developer assesses the demand as equivalent to 30 Residential Lots.



Based on the recent calibration of the hydraulic model during peak demand, the per capita demand for the Beacon Point area was determined as 0.048 L/property/day. This equates to a peak day demand of 1382L/p/day or using the average to peak day factor of 2, 692 L/p/day. This agrees well with the code of practice assumption of 700L/p/day.

The firefighting classification for the village center is assumed to be FW3 50L/s.

#### Peak Hour Demand

The peak hour factor for the Beacon Point area based on the calibrated hydraulic model is 1.437, the domestic equivalent peak hour factor is 2.3. The suggested design peak hour factor is 5 for population less than 2000. Given the demand assessed in the model matches well with the design assumption, it is reasonable to assume that a similar peak hour factor would apply. For the purposes of assessing the Northlake subdivision, the domestic equivalent profile has been used applying a peak hour factor of 2.3.

#### **LEVELS OF SERVICE**

The levels of service agreed upon with QLDC for the current system performance assessment as part of the model development and calibration project are outlined below:

- The minimum service pressure is 200-300kpa
- The maximum service pressures is 700-800kpa

These levels of service along with the requirements of the Fire Fighting Water Supplies Code of Practice form the basis for the system performance analysis.

Queenstown Lakes District Council does not prescribe any level of service criteria relating to pipe head loss, generally speaking pipe head loss per unit length for new pipes should ideally be < 2 m/km, or 2-5 m/km for normal operation.

### **MODEL RESULTS**

For current peak day demand, pressures within the new sub-division are above 300kPa. The firefighting classification of 50L/s is easily achieved. The proposed pipes have head loss per unit length under 2 m/km or only slightly over.

The only area of concern are existing properties at higher elevation on Glenaray Crescent. These properties have been identified in the current system performance assessment as receiving minimum pressure between 200 – 300 kPa. Pressure to these customers could be reduced by a further 150kPa, however the model results indicate they do remain above 250kPa. The lower pressures are a factor of elevation (~357m) with respect to the Beacon Point Reservoir (TWL HGL 388.1m), where the maximum static pressure would be 31m. There are no significant high head loss pipes contributing to the lower pressures, however the proposed future 250mm connection will ensure minimal head loss.



#### **SUMMARY**

The hydraulic model is a representation of the physical water supply system and as noted in the model development and calibration report it has limitation to its accuracy. The demands and peaking factors used to assess the development are based on assumptions and the actual finally water demands may vary.

The modelling results indicate the proposed new development can be supplied through the proposed reticulation layout and meet the desired levels of service indicted by Queenstown Lakes District Council. Provided Queenstown Lakes District Councils are comfortable with the level of service provide to the properties on Glenaray Road, the proposed water supply design should be accepted.

We trust this report meet your requirements. Please contact Charlotte Broadbent on 021766475 <a href="mailto:charlotte.broadbent@wse.co.nz">charlotte.broadbent@wse.co.nz</a> if you wish to discuss any aspects of this report further.

Regards,

CRBroadbent

Charlotte Broadbent

Director / Senior Civil Engineer



31 August 2017

Queenstown Lakes District Council 10 Gorge Road Queenstown

Dear Mark Baker,

# **NORTHLAKE DEVELOPMENT STAGES 1-14**

As per your request, we have undertaken hydraulic modelling to review the proposed water supply layout provided by Patterson Pitts Group, with respect to achieving the levels of service required by Queenstown Lakes District Council.

This analysis also included an assessment as to whether Stages 1 to 14 of the development could be supplied without the proposed 250mm connection through to the Beacon Point Reservoir outlet main.

## **DEMAND ASSESSMENT**

The demand has been assessed based on the Northlake Stages 1-14 Proposed Water Supply Layout drawing W4481-7 076 Sheet No. 600 Revision No. 3 and the Queenstown Lakes District Council Land Development and Subdivision Code of Practice (2015).

The key design parameters outlined in Code of Practice are as follows:

- Daily consumption of 700 L/p/day
- Number of people per dwelling = 3
- Peak Day Demand (over a 12-month period) = Average Day Demand x PF:
  - (a) PF = 1.5 for populations over 10,000;
  - (b) PF = 2 for populations below 2,000.
- Peak Hourly Demand = Average Hourly Demand (on peak day) x PF (over a 24-hour period):
  - (a) PF = 2 for populations over 10,000;
  - (b) PF = 5 for populations below 2,000.
- Firefighting demands as specified in SNZ PAS 4509

The firefighting classification for the village center is assumed to be FW3 50L/s. The remaining development is residential lots and will be assessed as FW2 25L/s.

Table 1 overleaf shows the demand calculation for each of the Stages 1 to 14 of the development.



Table 1: Average and Peak Day Demand Calculations

Development	No. of Residential	Population	Average Demand	Peak Daily
Stage	Lots		(I/s)	Demand (L/s)
Stage 1	36	108	0.875	1.750
Stage 1 A	10	30	0.243	0.486
Stage 2	37	111	0.899	1.799
Stage 3	33	99	0.802	1.604
Stage 4	45	135	1.094	2.188
Stage 5	25	75	0.608	1.215
Stage 6	20	60	0.486	0.972
Village Centre <sup>1</sup>	30	90	0.729	1.458
Stage 7	5	15	0.122	0.243
Stage 8	75	225	1.823	3.646
Stage 9	19	57	0.462	0.924
Stage 10	24	72	0.583	1.167
Stage 11	5	15	0.122	0.243
Stage 12	42	126	1.021	2.042
Stage 13	237	711	5.760	11.521
Stage 14	39	117	0.948	1.896
Total	682	2046	16.58	33.15

<sup>&</sup>lt;sup>1</sup> The Village Centre and the information provided by the developer assesses the demand as equivalent to 30 Residential Lots.

### Peak Hour Demand

The peak hour factor for the Beacon Point area based on the calibrated hydraulic model is 1.437, the domestic equivalent peak hour factor is 2.3. The suggested design peak hour factor is 5 for population less than 2000, or 2 for populations greater than 10,000 resulting in a prorated factor just under 5. Given the demand assessed in the model matches well with the design assumption, it is reasonable to assume that a similar peak hour factor would apply. For the purposes of assessing the Northlake subdivision, the domestic equivalent profile has been used applying a peak hour factor of 2.3.

#### **LEVELS OF SERVICE**

The levels of service agreed upon with QLDC for the current system performance assessment as part of the model development and calibration project are outlined below:

- The minimum service pressure is 200-300kpa
- The maximum service pressures is 700-800kpa

These levels of service along with the requirements of the Fire Fighting Water Supplies Code of Practice form the basis for the system performance analysis.

Queenstown Lakes District Council does not prescribe any level of service criteria relating to pipe head loss, generally speaking pipe head loss per unit length for new pipes should ideally be < 2 m/km, or 2- 5 m/km for normal operation.



#### MODEL RESULTS WITHOUT 250MM CONNECTION

For current peak day demand, pressures within Stage 1 to 14 new sub-division are generally above 300kPa, with the exception of the Node 23 in Stage 8 which falls slightly below, at 295kPa. This would be within the margins of error of the hydraulic model.

Without the 250mm connection from Beacon Point the subdivision is supplied from the proposed new main on Outlook Road and connections through Northburn Road and Mount Linton Avenue. Under this scenario, the maximum head loss per unit length for the mains on these streets ranges from 3.5m/km on Outlook Road to 4.2 m/km on Mount Linton Avenue and to 5.4 m/km on Northburn Road.

The firefighting classifications of 25L/s and 50L/s for the village center is easily achieved.

As noted in the previous assessment of stage 1-7 undertaken in 2016, the area of concern are existing properties at higher elevation on Glenaray Crescent and into Northburn Road. Properties on Glenarary Crescent have been identified in the current system performance assessment as receiving minimum pressure between 200 – 300 kPa. Under this scenario pressure to these customers could be reduced further, with the lowest pressure approximately 225kPa. Generally, the low pressures in this area are a factor of elevation (~357m) with respect to the Beacon Point Reservoir (TWL HGL 388.1m), where the maximum static pressure would be 31m. However, with the additional demand of stages 8 through to 14 creating slightly more head loss the minimum pressures are degraded further (previously still above 250kPa with Stages 1-7).

#### MODEL RESULTS WITH 250MM CONNECTION

For current peak day demand, pressures within Stage 1 to 14 new sub-division are above 300kPa. The proposed pipes have head loss per unit length under 2 m/km or only slightly above.

The firefighting classifications of 25L/s and 50L/s for the village center is easily achieved.

The proposed pipes have head loss per unit length under 2 m/km or only slightly over with the exception of the first section of the 250mm feed from Beacon Point. This section may initially have higher head loss at 3.5m/km depending on when the Beacon Point Reservoir outlet main is duplicated, as it provides a feed through to Aubrey Road.

Pressures for the higher elevation properties on Glenarary Crescent remain similar to those assessed in the current peak day system performance and are above 250kPa.



#### **NETWORK OBSERVATIONS**

Some of the proposed network diameters have changed since the previous assessment of Stages 1-7 undertaken in 2016. Of note is the watermain on Outlook Road which is now a 250mm diameter (previously 150mm) which will ultimately link though the development to Beacon Point Reservoir outlet main. This upgrade is essential to supplying stages 1-14 without the 250mm connection through to Beacon Point Reservoir.

It is also noted that a small area of Stage 14 is above the 350m contour. Consideration should be given to any proposed earthworks and to the proposed zone boundary between the Upper and Lower pressure zones to ensure these sites have sufficient pressures.

In terms of the wider water supply scheme proposed on drawing W4481-7 076 Sheet No. 600 Revision No. 3, it is recommended the pump station is dedicated to supplying only the Upper Pressure Zone. Options for the supply to the Upper Pressure Zone are currently being considered by QLDC and may include a high level reservoir rather than pumping direct online.

The proposed 250mm watermain should remain a gravity watermain through the Upper Pressure Zone to the Lower Pressure Zone. This limits the size of the pump station and ongoing energy costs of pumping excess water only for it to be pressure reduced into the lower zone. It may also be difficult to control the flow through the proposed pressure reducing valve as the Lower Pressure Zone is just part of the much larger Beacon Point Zone, this would then have implications for the design of the pump station, particularly if pumping is direct online.

### **SUMMARY**

The hydraulic model is a representation of the physical water supply system and as noted in the model development and calibration report it has limitation to its accuracy. The demands and peaking factors used to assess the development are based on assumptions and the actual finally water demands may vary.

The modelling results indicate that stages 1-14 can be supplied through the proposed reticulation layout on drawing W4481-7 076 Sheet No. 600 and meet the desired levels of service indicted by Queenstown Lakes District Council. Provided Queenstown Lakes District Councils are comfortable with the level of service provided to the properties on Glenaray Road, and the small area within Stage 14 above the 350m contour is addressed, the proposed water supply design can be accepted.



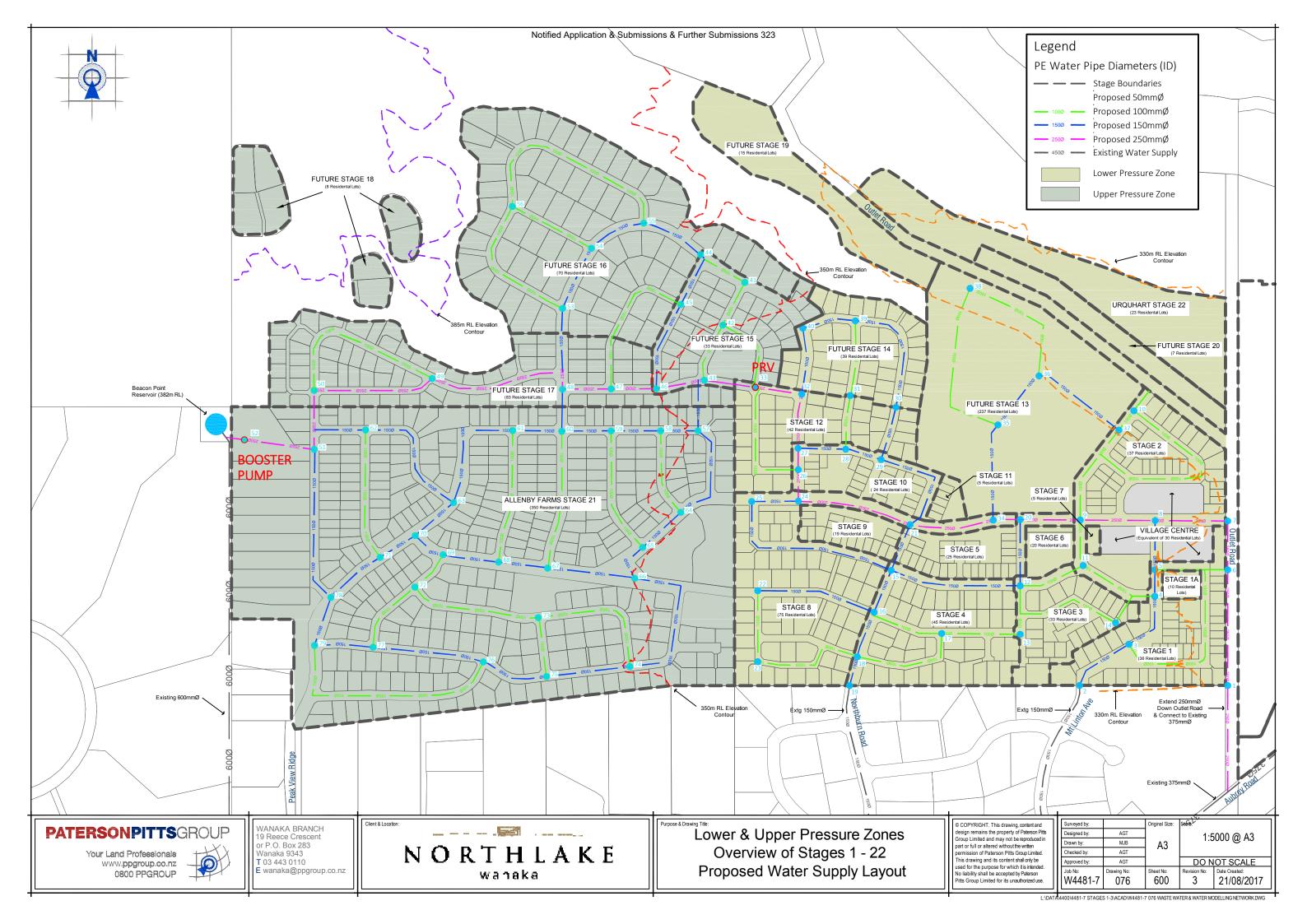
We trust this report meet your requirements. Please contact Charlotte Broadbent on 021766475 <a href="mailto:charlotte.broadbent@wse.co.nz">charlotte.broadbent@wse.co.nz</a> if you wish to discuss any aspects of this report further.

Regards,

CRBroadbent

**Charlotte Broadbent** 

Director / Senior Civil Engineer



14 January 2016

Rob Darby Queenstown Lakes District Council Private Bag 50072 Queenstown 9348

Dear Rob,

### Re: Proposed Development - North Lake, Wanaka

As per your email of 6 January 2016, we have assessed the impact of the proposed wastewater loads on the QLDC network. More specifically, the capacity of the existing 300 mm and 375 mm diameter trunk mains from Outlet Road along Aubrey Road with the additional discharge of wastewater from the proposed North Lake development and of maximum probable development within the catchment to Albert Town #2 Pump Station.

Two desktop assessments were completed using alternative load assumptions. The first using the load assumptions of the recently update subdivision code of practice (June 2015). The results of which indicated there was not sufficient capacity in the existing 300 mm or 375 mm diameter trunk mains. The second using the previously used load assumptions from the Land Development and Subdivision Infrastructure New Zealand Standard (2010) and lower unit occupancy rates which indicated there is sufficient capacity in the existing 300 mm diameter trunk main.

As a result of these findings, it has been agreed with QLDC to undertake hydraulic modelling to check the capacity of the mains with the North Lake load added to determine how these results compare to the completed desktop assessment.

This is outlined in the map below.



Figure 2- Wastewater schematic

## **Approach**

It was decided a desktop study would sufficient to assess the capacity in the Aubrey Rd trunk main. The desktop assessment has been completed using two alternatives with different load factors to calculate the capacity within the trunk main. These two alternatives significantly change the outcome.

Alternative	Description	Load Type	People per unit	Load/Person / Day (I/d)	Dry diurnal peak	Infiltration factor
A	From: QLDC Land Development and Subdivision Code of Practise, June 2015.	Residential	3	250	2.5	2
В	Based on: Land Development and Subdivision Infrastructure, NZS4404:2010	Residential	2.4	220	2.5	2

Alternative B includes 2.4 people per unit which is based on the 2015 Wanaka population projections, usual resident population/occupied houses (NZS4404:2010 states 2.5-3.5 p/d) and 220 l/person/day is from NZS4404:2010 (states 180-250 l/p/d).

Both of these inputs have been assessed because:

- The QLDC Land Development and Subdivision Code of Practise, June 2015 is specifically for subdivisions within the district but also is a good current basis for the assessment of existing infrastructure.
- 2. Alternative B inputs were used in previous assessments and the people per unit is based on local conditions. And:
- 3. This is a trunk main which produces a more smoothed flow compared to mains within a subdivision. The amount of smoothing hasn't been quantified but is assumed to be equivalent to a slightly reduced load per person.

We have conducted this investigation based on the completed development and surrounding catchment potentially containing the following loads:

Load at Outlet Road	Total Units	PWWF (I/s), QLDC amendment	PWWF (I/s), NZS4404
Potential North Lake development (Special Zone)	1,434	62.2	48.2
Outlet Rd Pump Station, measured flow		4.4	4.4
Existing dwellings upstream of Outlet Rd	167	7.2	5.0
Maximum probable development upstream of Outlet Rd	83	3.6	2.3
Total	1,684	77.5	55.9

Additional load at critical pipe 200969	Total Units	PWWF (I/s), QLDC amendment	PWWF (I/s), NZS4404
Existing dwellings upstream of pipe 200969	22	1.0	0.7
Maximum probable development upstream of Gunn Rd	22	1.0	0.7
Total	44	2.0	1.4

Additional load at Gunn Rd	Total Units	PWWF (I/s), QLDC amendment	PWWF (I/s), NZS4404
Maximum probable development upstream of Gunn Rd	16	0.7	0.5
Peak flow from possible future Rata/Aubrey PS rising main		39	39
Total	16	39.7	39.5

The following assumptions were used:

- The loads for North Lake are based on the special zone (potential lots + 15%) provided by the developer. This hasn't included any specific loads from the swimming pool, and commercial activities, including a business park, child care, café etc. as shown on the site plan. This should be included in the calculations if the loads are assessed to be greater than the underlying residential load. This is especially important for the swimming pool which has the potential to dump large flows into the network.
- The dry diurnal peak and infiltration factor have been added together to calculate the peak wet weather flow.

- The maximum probable development is based on the District Plan zone, rural residential which identify a minimum lot size of 4,000m<sup>2</sup> along Aubrey Road.
- Existing dwellings are a count of existing properties that are within the trunk main catchment, they may not be connected to the network currently but they have the potential as new mains have been constructed to service them.
- The design of the internal reticulation has not been assessed. The total load for the North Lake development has been placed on the existing 300 mm diameter main on corner of Aubrey Rd and Outlet Rd. Additional loads from the existing catchment have been added at this point, the critical main and at the corner of Aubrey and Gunn Road.

#### Results

Two different results were produced,

- Alternative A, QLDC Land Development and Subdivision Code of Practise, June 2015, results confirm there is <u>not</u> sufficient capacity in the downstream 300mm or 375 mm trunk main (approx. 2.7 km of main, and maximum 6 m cover).
- 2. Alternative B, using the historic inputs, results indicate that the connection of the proposed development and of the maximum probable development in the existing catchment will not cause any additional capacity constraints.

Detailed results are attached to this letter.

#### **Discussion**

As a result of these findings, it has been agreed with QLDC to undertake hydraulic modelling of the load assumptions to determine how these results compare to the completed desktop assessment.

The issue of which of the three results is acceptable to QLDC will need to be agreed.

### Summary

In summary, two methods of assessing the capacity were completed and these had significantly different results. One indicating there was sufficient capacity and the method based of the current QLDC Land Development and Subdivision Code of Practise showing there was not sufficient capacity in the 300 mm and 375 mm diameter trunk mains.

Due to the potential changes in demand occurring in this area, and the resulting capacity upgrades that may be necessary it is recommended that the validity of this letter should be checked any time in the future it is used.

Yours sincerely,

Nichola Greaves

Infrastructure Advisor Rationale Limited

Encl. Results - Aubrey Rd - Constructed Capacities, Alternative A.pdf

Results - Aubrey Rd - Constructed Capacities, Alternative B.pdf

1 February 2016

Rob Darby Queenstown Lakes District Council Private Bag 50072 Queenstown 9348

Dear Rob.

### Re: Proposed Development - North Lake, Wanaka

As per your email of 6 January 2016, we have assessed the impact of the proposed wastewater loads on the QLDC network. More specifically, the capacity of the existing 300 mm and 375 mm diameter trunk mains from Outlet Road along Aubrey Road to Hawea - Albert Town #2 Pump Station, with the additional load of wastewater from the proposed North Lake development and with maximum probable development within the catchment.

Two desktop assessments were completed using alternative load assumptions. The first using the load assumptions of the recently updated subdivision code of practice (June 2015). The results of which indicated there was not sufficient capacity in the existing 300 mm or 375 mm diameter trunk mains. The second using the previously used load assumptions from the Land Development and Subdivision Infrastructure New Zealand Standard (2010) and lower unit occupancy rates which indicated there is sufficient capacity in the existing trunk mains. As a result of these findings, it has been agreed with QLDC to undertake hydraulic modelling to determine the capacity available. The details of the desktop assessment can be found in the letter dated 14/1/16.

Based on the model results, the proposed wastewater loads exceed the capacity of the 300mm main at the two manholes directly downstream of Outlet Road. The results indicate that there is insufficient capacity in approximately 1.1 km of the 300 mm diameter trunk main but the wastewater only spills at the areas of low ground level once the main has backed up. The model can be refined further to assess whether improving the accuracy will create more capacity and at what stage of the development the capacity in the 300 mm trunk main is exceeded.

This modelling analysis is based on the Wanaka dynamic wastewater model (2011), calibrated to flow data from December 2010 and January 2011. This model is now considered to require an update and a flow survey is currently underway to enable a recalibration of the model. The flow survey, model update and recalibration will significantly improve confidence in the model.

Approximate proposed development site

Outlet Rd

Outlet Rd

Critical pipe
200969

Gun Rd

from North Lake

300 mm Dia Main

Aubrey Rd

375 mm Dia Main

The development site and wastewater network is outlined in the map below.

Figure 1- Wastewater schematic

## **Modelled Scenario**

We have conducted this investigation based on the completed development and surrounding catchment potentially containing the following loads. The tables below show the number of dwellings and additional rainfall catchment area that has been added to the model. Rainfall dependent inflow and infiltration parameters in line with the Wanaka average have been used.

Aubrey Rd (East)

To Hawea - Albert Town #2 WWPS

Load at Outlet Road	Total Units	Rainfall Catchment Area (Ha)
Potential North Lake development (Special Zone)	1,434	140
Existing dwellings upstream of Outlet Rd	167	95
Maximum probable development upstream of Outlet Rd	83	n/a
Total	1,684	135

In addition, Outlet Rd Pump Station, measured flow, 4.4 l/s.

Additional load at critical pipe 200969	Total Units
Existing dwellings upstream of Gunn Rd	22
Maximum probable development upstream of Gunn Rd	22
Total	44

Additional load at Gunn Road	Total Units
Maximum probable development downstream of Gunn Rd	16
Total	16

#### The following assumptions were used:

- The loads for North Lake are based on the special zone (potential lots + 15%) provided by the developer. This hasn't included any specific loads from the swimming pool, and commercial activities, including a business park, child care, café etc. as shown on the site plan. This should be included in the calculations if the loads are assessed to be greater than the underlying residential load. This is especially important for the swimming pool which has the potential to dump large flows into the network.
- The maximum probable development is based on the District Plan zone, rural residential which
  identify a minimum lot size of 4,000m<sup>2</sup> along Aubrey Road. No allowance has been made for
  the potential zone changes identified in the Wanaka Structure Plan.
- Existing dwellings are a count of existing properties that are within the trunk main catchment, they may not be connected to the network currently but they have the potential as new mains have been constructed to service them.
- The design of the internal reticulation has not been assessed. The total load for the North Lake development has been placed on the existing 300 mm diameter main on the corner of Aubrey Rd and Outlet Rd. Additional loads from the existing catchment have been added upstream of this point, the critical main and the corner of Aubrey and Gunn Road as shown on the Figure 1.
- The additional 39 l/s peak flow from the possible future Rata Street/Aubrey Road pump station
  has not been included in the model. This is a significant additional load but is not yet included
  in the modelled network.
- Hawea Albert Town #2 Pump Station has not been checked for capacity. Currently the start
  level is above the Aubrey Road trunk main invert level and wastewater backs up in the pipe
  before the pump runs. This may be acceptable currently, but adjustment is recommended in
  the future. It is understood there is provision for an additional pump at this pump station and
  currently the pumps are ramped back because the Project Pure screens can't accept additional
  flow. The pump station is modelled based on a single duty pump capacity of 215 l/s.
- The 375 mm trunk main is based on the as-built recently provided and has been added to the model.

#### The model has been run to the following standard:

- 2011 peak day population sanitary loadings and diurnal patterns.
- Residential load, 660 I/d/dwelling, approximate peaking factor of 2.7
- 20 year return, 12 Hr duration storm.

All relevant sections of the network have been checked for capacity using the following criteria:

- No overflows allowed at any network element.
- Theoretical capacity based on flow and pipe details.

#### Results

Modelling of the network from the proposed development through the downstream network to Albert Town - Hawea #2 Pump Station indicates that in areas the existing network does not have sufficient capacity to manage the addition of this development, based on the above assumptions.

The model results show:

- The two manholes on the 300 mm trunk main directly downstream of Outlet Road overflow.
- The wastewater backs up above the pipe soffit level in the manholes but does not overflow at ground level in 19 of the 34 manholes downstream of Outlet Road.
- Flow backs up but does not overflow from the 375 mm trunk main because of the operation of the Hawea – Albert Town #2 Pump Station.

The results indicate that there is insufficient capacity in the approximately 1.1 km of 300 mm diameter trunk main but the wastewater only spills at the areas of low ground level once the main has backed up.

The downstream portion of the 375 mm trunk main also has insufficient capacity because the existing pumps at Hawea - Albert Town #2 pump station can't keep up with the flow. There is capacity to add an additional pump to the pump station and increase the flow of the existing pumps.

Detailed results are attached to this letter.

#### Discussion

The total wastewater load from the development has been placed on the corner of Outlet Road and Aubrey Road because the development's internal reticulation has not been modelled. It is a possibility that if the internal reticulation was modelled there would be some smoothing of the flow within the development creating less of a peak load on the downstream network. It is unclear whether this would result in sufficient capacity in the downstream network.

The modelled operation of the Hawea – Albert Town #2 Pump Station creates a backup of flow in the 375 mm trunk main, affecting the capacity of the pipe. The pump station could be remodelled with additional pumps and optimised operation to investigate if this improves the 375 mm trunk main flow.

As detailed in the assumptions the additional 39 l/s peak flow from the possible future Rata Street / Aubrey Road pump station has not been included in the model. This is a significant additional load and could also be added to the model to ensure all potential future plans are included. As a basic check a peak flow of 39l/s was added with a diurnal pattern on the corner of Gunn Rd where this rising main is planned to discharge. The results indicate insufficient capacity with the majority of the manholes spilling.

As a comparison the model was also run with solely the network flow and no rainfall event. Results show sufficient capacity through the trunk main.

## **Summary**

Based on the model, the proposed wastewater loads exceed the capacity of the 300mm main at the two manholes directly downstream of Outlet Road. The model can be refined further to assess whether improving the accuracy will create more capacity and at what stage of the development the capacity in the 300 mm trunk main is exceeded.

Options to provide sufficient capacity have not been investigated.

It should be noted that the wastewater model is an attempt to simulate a physical system using hydraulic equations and various assumptions, hence they bear some uncertainty. QLDC's GIS data and localised asbuilt data was used to develop the models and we can offer no guarantee on the accuracy of this information. The diurnal patterns, sanitary loads, diurnal patterns and infiltration and inflow rates are an approximation of the patterns in the townships that have been agreed with QLDC.

Due to the potential changes in demand occurring in this area, the validity of this letter should be checked any time in the future it is used.

Yours sincerely,

GRADES

Nichola Greaves

Infrastructure Advisor Rationale Limited

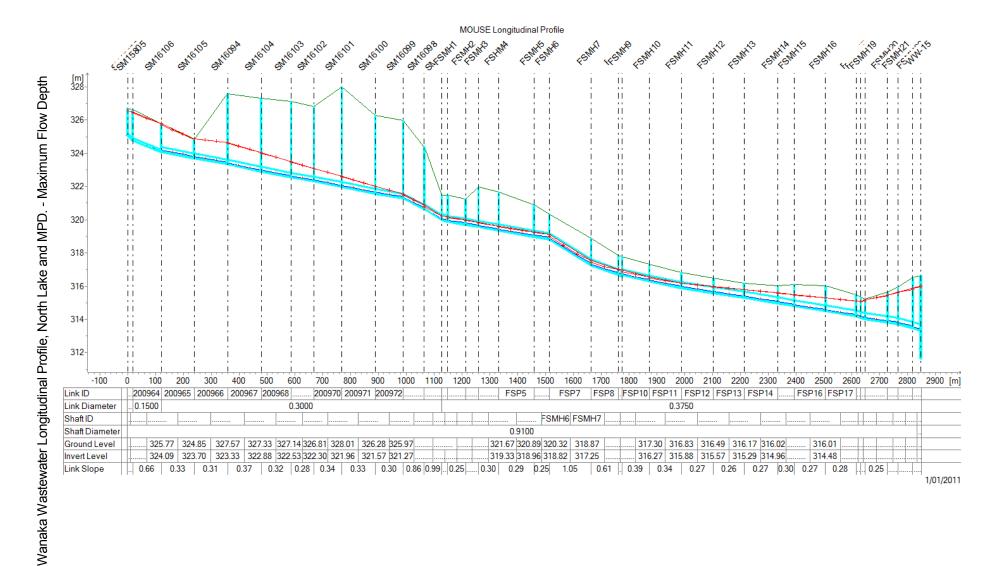
#### Encl.

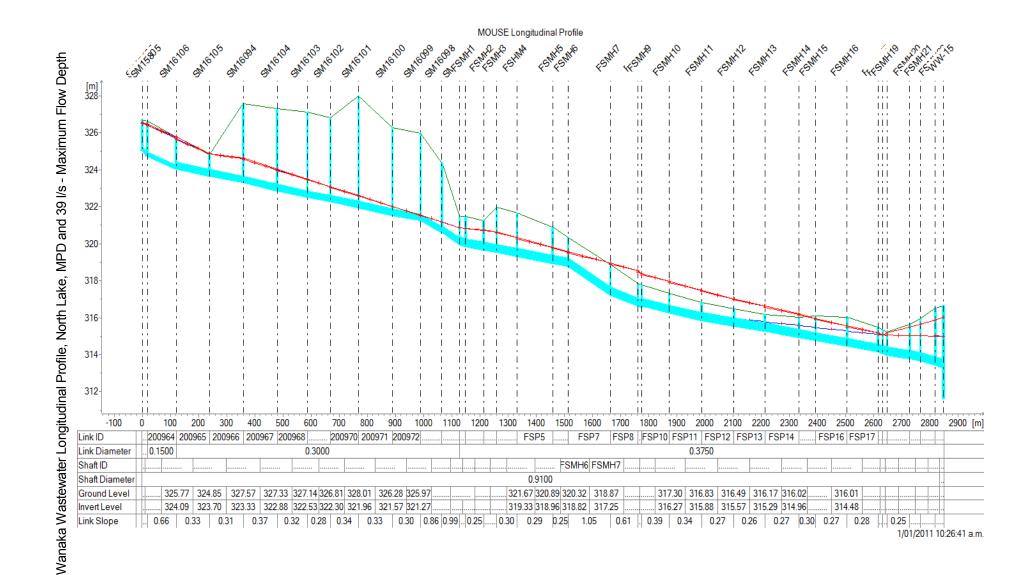
Results - Wanaka Wastewater Longitudinal Profile, North Lake and MPD. - Maximum Flow Depth

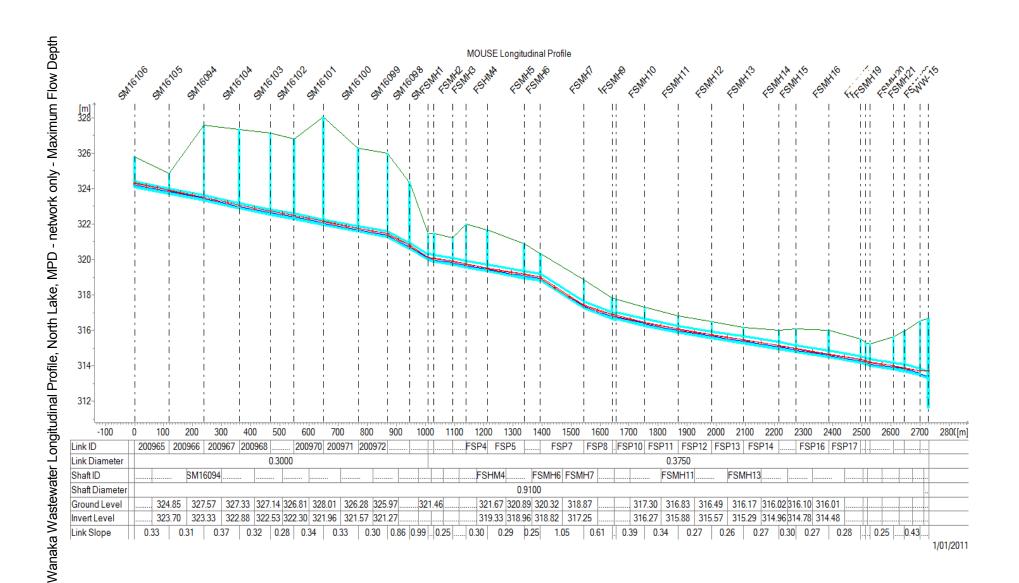
Results - Wanaka Wastewater Longitudinal Profile, North Lake, MPD and 39 l/s - Maximum Flow Depth

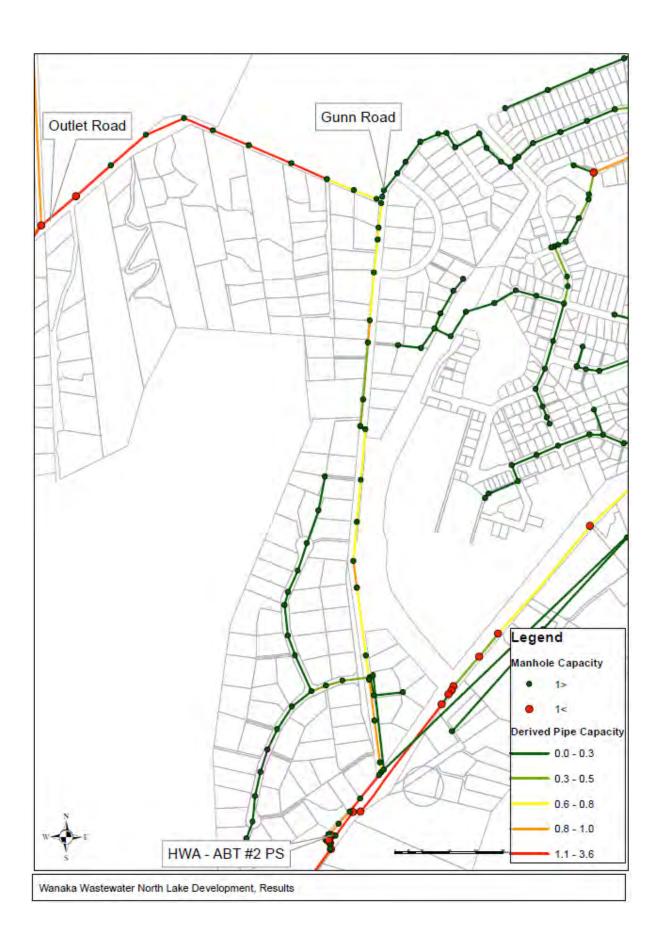
Results - Wanaka Wastewater Longitudinal Profile, North Lake, MPD - network only - Maximum Flow Depth

Results - Wanaka WW Capacity Results, Base.pdf









## **Alex Todd**

From: Mark Baker < Mark.Baker@qldc.govt.nz>
Sent: Wednesday, 13 September 2017 12:06 p.m.

**To:** Mike Botting; Charlotte Broadbent

**Cc:** Alex Todd; Ulrich Glasner; Nichola Greaves - External

**Subject:** RE: Northlake Sub-Division - Water Supply

#### Mike,

Yes, we are happy with using the slightly reduced peaking factors as it is based on measured data and is being used to define a trunk main, although I noted that if we were to use the 6.6 peaking factor then you would not be able to service those stages without the connection through to the reservoir – so there is a relatively small amount of headroom in the LOS until the trunk main is completed.

I have also caught up with Sarah Johnstone (covering for Nichola) and Charlotte in the last couple of days regarding your further request for modelling of 19, 20 & 22 and have a couple of comments:

- I do not see that the modelling of further stages adds much value for North Lake, the current modelling indicates we are already eroding the LOS to some of the existing North Lake residents and while we do have a little headroom compared to our draft LOS document (not the COP) I would think that a further modelling report will state that we simply erode into that LOS further.
- Given that the current modelling results indicate that 682 lots can be serviced without the 250 mm trunk main being linked back to the reservoir. I would assume that demand of 682 is potentially 5 years or more before it is fully realised, and I would think Northlake would require the trunk main to be completed through to the reservoir before that due to other (non-capacity) triggers, e.g. resilience or operational requirements. So we perhaps we could come to an agreement that up to 682 lots sited below the 350 m contour with approved internal reticulation, built to the Subdivision Code of Practice, can be serviced without further modelling?

I am happy to discuss this further if required.

Cheers, Mark

**From:** Mike Botting [mailto:Mike.Botting@ppgroup.co.nz]

Sent: Friday, 8 September 2017 9:47 AM

To: Charlotte Broadbent <charlotte.broadbent@wse.co.nz>

Cc: Mark Baker < Mark.Baker@qldc.govt.nz>; Alex Todd < Alex.Todd@ppgroup.co.nz>

Subject: RE: Northlake Sub-Division - Water Supply

I'm happy with your explanation. If Council accepts the factors used than that's fine. The code does say up to 6.6 so what you have used fits within the standard.

#### **Mike Botting**

Principal
Registered Professional Surveyor
M 027 505 0664
T 03 443 0110

## **PATERSONPITTS**GROUP

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From: Charlotte Broadbent [mailto:charlotte.broadbent@wse.co.nz]

Sent: Friday, 8 September 2017 9:00 a.m.

To: Mike Botting < Mike.Botting@ppgroup.co.nz > Cc: 'Mark Baker' < Mark.Baker@qldc.govt.nz > Subject: RE: Northlake Sub-Division - Water Supply

Hi Mike,

My focus is on clause 6.3.5.3 Peak flows. The peaking factors I have used is average to peak day of 2, peak hour 2.3... so actually 4.6.

The approach has been discussed with QDLC and is one agreed that I use when working for them to assess developments. The 2.3 is a based on a standard profile and is slightly greater than the peak hour factor we have seen from logging, so considers actual data. Technically yes they could hold you to using 6.6 from design perspective.

Mark do you want me to re-run using 6.6? It will be enough of a difference to draw pressure down at Glenaray Crescent requiring the 250mm through from Beacon Point.

Regards, Charlotte

From: Mike Botting [mailto:Mike.Botting@ppgroup.co.nz]

Sent: Thursday, September 7, 2017 5:23 PM

**To:** Charlotte Broadbent < <a href="mailto:charlotte.broadbent@wse.co.nz">charlotte.broadbent@wse.co.nz</a>>

Subject: RE: Northlake Sub-Division - Water Supply

#### Hi Charlotte

Just one more query, this time about the peaking factor of 2.3 that you have used. In Council's LDSCOP it specifies that a peaking factor of 6.6 (rest of District) should be used. Why the large difference? I take it Council has approved the lower peaking factor?

Would be good to confirm the above as we are finalising an infrastructure report tomorrow.

## Regards

## **Mike Botting**

Principal
Registered Professional Surveyor
M 027 505 0664
T 03 443 0110

#### **PATERSONPITTS**GROUP

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From: Mike Botting

Sent: Wednesday, 6 September 2017 10:12 a.m.

To: 'Charlotte Broadbent' < charlotte.broadbent@wse.co.nz>

Subject: RE: Northlake Sub-Division - Water Supply

## Hi Charlotte

I have discussed the report with Northlake. What we would like is to have the report amended to also include Stages 19, 20 and 22. Given that these sit within the lower pressure zone and are small stages adding only another 45 Lots (see attached plan) it makes sense to cover these off as well.

Therefore can you include the water nodes 58 and 59 please. Let me know what minor variation cost this involves.

#### Regards

## **Mike Botting**

Principal Registered Professional Surveyor M 027 505 0664 T 03 443 0110

## **PATERSONPITTS**GROUP

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From: Charlotte Broadbent [mailto:charlotte.broadbent@wse.co.nz]

Sent: Friday, 1 September 2017 9:38 a.m.

To: Mike Botting < <a href="mailto:Mike.Botting@ppgroup.co.nz">Mike.Botting@ppgroup.co.nz</a> Cc: 'Mark Baker' < <a href="mailto:Mark.Baker@qldc.govt.nz">Mark.Baker@qldc.govt.nz</a> Subject: RE: Northlake Sub-Division - Water Supply

Hi Mike,

Based on the contours I have there is a high point between nodes 39 and 40, rises back up here above 350m, (352m) it's not really a major but prudent for me to comment. (i.e. if the dwelling proposed is situated on the site at 352m and is 2-3 stories high).

Pressure results attached. The elevations I used in the model are extrapolated from the contours I have.

Regards, Charlotte

From: Mike Botting [mailto:Mike.Botting@ppgroup.co.nz]

Sent: Friday, September 1, 2017 8:59 AM

**To:** Charlotte Broadbent < <a href="mailto:charlotte.broadbent@wse.co.nz">charlotte.broadbent@wse.co.nz</a>>

Subject: RE: Northlake Sub-Division - Water Supply

#### Hi Charlotte

Thanks for the report. Just one minor thing to amend. Note that I changed the layout for Stage 14 so that it was made smaller and is now all below the 350 contour. Therefore could you remove paragraph 2 from the section on Network Observations on page 4. You could still include consideration about the final configuration of the zone boundary between the two zones.

Also would it be possible to get the pressures included in the report for each node?

#### Regards

#### **Mike Botting**

Principal
Registered Professional Surveyor
M 027 505 0664
T 03 443 0110

## **PATERSONPITTS**GROUP

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From: Charlotte Broadbent [mailto:charlotte.broadbent@wse.co.nz]

Sent: Thursday, 31 August 2017 2:51 p.m.

To: Mike Botting < Mike.Botting@ppgroup.co.nz > Cc: 'Mark Baker' < Mark.Baker@qldc.govt.nz > Subject: RE: Northlake Sub-Division - Water Supply

Hi Mike,

Report attached. I've addressed it to Mark Baker at this stage, let me know if you would like this changed, and feel free to call me tomorrow if you have any questions.

Regards, Charlotte

From: Mike Botting [mailto:Mike.Botting@ppgroup.co.nz]

Sent: Friday, August 25, 2017 9:11 AM

**To:** 'Charlotte Broadbent' < <a href="mailto:charlotte.broadbent@wse.co.nz">charlotte.broadbent@wse.co.nz</a>>

**Subject:** FW: Northlake Sub-Division - Water Supply

#### Hi Charlotte

Signed confirmation form attached, please proceed with the modelling.

I agree with you about the upper pressure zone that it needs further discussion with Council. At least we have a starting point for discussion and can then see what will be acceptable to Council and go from there. I trust the concept gives you a sufficient idea of what is proposed across the whole site.

Any questions give me a call or email.

#### Regards

#### Mike Bottinga

Principal
Registered Professional Surveyor
M 027 505 0664
T 03 443 0110

## **PATERSONPITTS**GROUP

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From: Marc Bretherton [mailto:marc.bretherton@wintonpartners.co.nz]

**Sent:** Friday, 25 August 2017 8:57 a.m.

**To:** Mike Botting < <u>Mike.Botting@ppgroup.co.nz</u>> **Subject:** RE: Northlake Sub-Division - Water Supply

Attached.

WINTON PARTNERS

**Marc Bretherton** 

#### New Zealand

Level 1, Brownston House, Wanaka 9305 PO Box 818, Wanaka 9305 telephone **0276 969 550** 

Level 2, 33 Shortland St Auckland 1010 PO Box 105526 Auckland 1143 facsimile +64 9 3777 011

#### Australia

Level 2, 95 Pitt St Sydney NSW 2000 Australia telephone +61 2 8229 0400 facsimile +61 2 8229 0422

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From: Mike Botting [mailto:Mike.Botting@ppgroup.co.nz]

**Sent:** Thursday, 24 August 2017 11:26 a.m.

To: Marc Bretherton <marc.bretherton@wintonpartners.co.nz>

Subject: FW: Northlake Sub-Division - Water Supply

#### Hi Marc

This is ridiculous, but Watershed need you to sign an instruction confirmation form. Sorry but I understood that everything was authorised by the email the other day.

Can you sign the attached and return it to me ASAP.

#### **Thanks**

#### Mike Botting

Principal
Registered Professional Surveyor
M 027 505 0664
T 03 443 0110

## **PATERSONPITTS**GROUP

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From: Charlotte Broadbent [mailto:charlotte.broadbent@wse.co.nz]

**Sent:** Thursday, 24 August 2017 11:22 a.m. **To:** Mike Botting < Mike.Botting@ppgroup.co.nz>

Cc: 'Rob Darby' <Rob.Darby@qldc.govt.nz>; 'Nichola Greaves' <Nichola.Greaves@qldc.govt.nz>; 'Mark Baker'

<<u>Mark.Baker@qldc.govt.nz</u>>

Subject: RE: Northlake Sub-Division - Water Supply

Hi Mike,

Please find attached a short form agreement to assess the proposed Northlake development Stages 1-14. While commissioned by Northlake Investments Limited, it should be noted that Watershed is undertaking this work on behalf of Queenstown Lake District Council (QLDC). Although this study is anticipated to result in a beneficial outcome for both parties, Watershed will highlight any potential conflict of interest that may arise during this project.

Please note I have only priced for items/scenarios 1 & 2 as discussed with you in our phone call. Item 3 falls into the wider planning of how this area will be supplied of which there are several options, and I will discuss this further with QDLC.

Regards,

From: Mike Botting [mailto:Mike.Botting@ppgroup.co.nz]

Sent: Tuesday, August 22, 2017 2:55 PM

To: 'Charlotte Broadbent' < charlotte.broadbent@wse.co.nz>

Cc: Rob Darby <Rob.Darby@qldc.govt.nz>; Nichola Greaves <Nichola.Greaves@qldc.govt.nz>

**Subject:** FW: Northlake Sub-Division - Water Supply

#### Hi Charlotte

Please proceed with the modelling. You can email me the invoice. For the billing name please use Northlake Investments Limited: Attention Marc Bretherton

Attached are some updated plans which show

- 1. The overall concept layout split into two pressure zones (Upper and Lower).
- 2. The lower pressure zone layout up to the end of Stage 14.

For the upper pressure zone we have hinged this off the central 250 diameter pipe with a booster near the reservoir at node 52 and a PRV at Node 33. We currently only have one connection between the two zones. We could add more PRVs at nodes 22 and 25 if required.

Also attached are two spreadsheets with updated water node heights and also a breakdown of the number of dwellings in each stage. Note that Stage 14 has been made smaller so as to be below 350 level and we have tweaked the other stages 15 to 22. Allenby was split into stages but we have now just shown this as one stage called Stage 21.

For Stage 18 which involves 8 larger semi-rural lots we could install individual tanks and boosters on these lots to save trying to boost the pressure up to supply to a height of 30m above 385m. Therefore just assume that these lots will have onsite firefighting tanks and their own individual boosters.

Also attached is a cad plan of the site so that you can see exactly what is proposed.

There are 3 scenarios that we need modelled.

- 1. Stages 1 14. Question we need answered is can these all be fed from the 3 connections from North Burn Road, Mt Linton Ave and Outlet Road
- 2. If Stages 1 14 need the 250 diameter line then model this without the booster or PRV. This could be an interim solution.
- 3. Overall network with the two pressure zones. Boosted supply for Stages 15 to 18 and Stage 21 (Allenby)

Any questions give me call on 027 505 0664 or email.

#### Regards

#### **Mike Botting**

Principal
Registered Professional Surveyor
M 027 505 0664
T 03 443 0110

## **PATERSONPITTS**GROUP

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From: Marc Bretherton [mailto:marc.bretherton@wintonpartners.co.nz]

**Sent:** Monday, 21 August 2017 4:22 p.m.

**To:** Mike Botting < <u>Mike.Botting@ppgroup.co.nz</u>> **Subject:** RE: Northlake Sub-Division - Water Supply

Yes, pls proceed.

WINTON PARTNERS

#### **Marc Bretherton**

#### New Zealand

Level 1, Brownston House, Wanaka 9305 PO Box 818, Wanaka 9305 telephone **0276 969 550** 

Level 2, 33 Shortland St Auckland 1010 PO Box 105526 Auckland 1143 facsimile +64 9 3777 011

#### **Australia**

Level 2, 95 Pitt St Sydney NSW 2000 Australia telephone +61 2 8229 0400 facsimile +61 2 8229 0422

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From: Mike Botting [mailto:Mike.Botting@ppgroup.co.nz]

**Sent:** Monday, 21 August 2017 3:55 p.m.

To: Marc Bretherton <marc.bretherton@wintonpartners.co.nz>

Subject: FW: Northlake Sub-Division - Water Supply

Quote below, need your approval please to proceed.

## **Mike Botting**

Principal
Registered Professional Surveyor
M 027 505 0664
T 03 443 0110

## **PATERSONPITTS**GROUP

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From: Charlotte Broadbent [mailto:charlotte.broadbent@wse.co.nz]

**Sent:** Monday, 21 August 2017 3:51 p.m.

**To:** Mike Botting < Mike.Botting@ppgroup.co.nz >; 'Nichola Greaves' < Nichola.Greaves@qldc.govt.nz >

Cc: 'Mark Baker' < Mark.Baker@qldc.govt.nz > Subject: RE: Northlake Sub-Division - Water Supply

Hi Mike / Nichola / Sarah,

Can a projected shapefile (or equivalent) of the proposed road layout be provided?

#### Northlake Stages 1-14 Development Query

Scenario 1 - without 250mm connection

- Create proposed network in model
- Demand calculations
- Assign demands

#### Notified Application & Submissions & Further Submissions 344

- Scenario set-up
- Assess hydraulics (pressures and pipe head loss)
- Assess fire flow

Scenario 2 - with 250mm connection

- Scenario set-up
- Assess hydraulics (pressures and pipe head loss)
- Assess fire flow

An initial look at the data indicates Stage 14 is at an elevation where it cannot be supplied directly from Beacon Point reservoir. This will be commented upon, but no options considered for servicing.

Scenario 1 \$990+GST Scenario 2 \$450+GST PM & Reporting \$990+GST

Total \$2430+GST

Regards, Charlotte

From: Mike Botting [mailto:Mike.Botting@ppgroup.co.nz]

Sent: Friday, August 18, 2017 9:30 AM

**To:** Nichola Greaves < Nichola.Greaves@qldc.govt.nz >; 'Charlotte Broadbent' < charlotte.broadbent@wse.co.nz >

Cc: Mark Baker < Mark.Baker@qldc.govt.nz >; Marc Bretherton < marc.bretherton@wintonpartners.co.nz >

**Subject:** RE: Northlake Sub-Division - Water Supply

#### Thanks Nichola

I talked with Charlotte and she is away sick but will come back to me next week with cost and will be able to get onto it straight away later next week.

#### Regards

## **Mike Botting**

Principal
Registered Professional Surveyor
M 027 505 0664
T 03 443 0110

#### **PATERSONPITTS**GROUP

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From: Nichola Greaves [mailto:Nichola.Greaves@qldc.govt.nz]

Sent: Wednesday, 16 August 2017 5:34 p.m.

**To:** 'Charlotte Broadbent' < <a href="mailto:charlotte.broadbent@wse.co.nz">charlotte.broadbent@wse.co.nz</a>>

**Cc:** Mike Botting < Mike.Botting@ppgroup.co.nz >; Mark Baker < Mark.Baker@qldc.govt.nz >

Subject: FW: Northlake Sub-Division - Water Supply

#### Hi Charlotte

Could you please provide a quote for carrying out the modelling discussed below. To avoid hold ups from our end please liaise directly with Mike Botting but keep us in the loop.

#### Cheers

Sarah Johnstone

**From:** Mike Botting [mailto:Mike.Botting@ppgroup.co.nz]

Sent: Tuesday, 8 August 2017 2:55 PM

**To:** Nichola Greaves

Cc: Ulrich Glasner; Mark Baker; Simon Leary; Marc Bretherton (marc.bretherton@wintonpartners.co.nz); Alistair

Snow; Rob Darby

Subject: RE: Northlake Sub-Division - Water Supply

#### Hi Nichola

Find attached plan showing proposed water reticulation up to Stage 14 at Northlake. This plan shows the majority of the lower site including the 250 diameter connection through to the water reservoir. Also attached is a summary of the heights at each water node.

Can you get two scenarios modelled please for the network shown.

**Scenario 1** – reticulation <u>without</u> the 250mm connection to the reservoir. Under this scenario Stages 1 – 14 are fed for water from Northburn Road, Mt Linton Drive, & Outlet Road via 150 diameter and 250 diameter connections as shown.

**Scenario 2** – reticulation with the 250mm connection to the reservoir. Connection as above but with the 250 diameter trunkmain connected through to the reservoir.

Can you confirm a timeframe for when the modelling report will be completed by.

Note that the position of the 250 trunkmain through the site connecting up to the reservoir is now proposed to be within Northlake land for the most of its route apart from where it needs to dog leg back into the upper part of Allenby and connect to the reservoir.

Give me a call on 027 505 0664 if you have any queries.

#### Regards

## **Mike Botting**

Registered Professional Surveyor M 027 505 0664 T 03 443 0110

## **PATERSONPITTS**GROUP

Surveying • Planning • Engineering Your Land Professionals

From: Mike Botting

**Sent:** Monday, 7 August 2017 8:49 p.m.

To: 'Rob Darby' <Rob.Darby@qldc.govt.nz>; Marc Bretherton (marc.bretherton@wintonpartners.co.nz)

<<u>marc.bretherton@wintonpartners.co.nz</u>>; Alistair Snow <<u>Alistair.Snow@qldc.govt.nz</u>>

**Cc:** Nichola Greaves < Nichola.Greaves@qldc.govt.nz >; Ulrich Glasner < Ulrich.Glasner@qldc.govt.nz >; Mark Baker

<<u>Mark.Baker@qldc.govt.nz</u>>; Simon Leary <<u>Simon.Leary@qldc.govt.nz</u>>

**Subject:** RE: Northlake Sub-Division - Water Supply

#### Hi Rob

No issue from me. Was good meeting and very comprehensive discussion. Your knowledge of our Wanaka infrastructure is great to call on.

Our next step will likely be to get some more modelling carried out to check about how far we can service the site from the 3 current connections. I will coordinate this modelling with Nichola this week.

#### Regards

**Mike Botting** 

Registered Professional Surveyor M 027 505 0664 T 03 443 0110

## **PATERSONPITTS**GROUP

Surveying • Planning • Engineering Your Land Professionals

From: Rob Darby [mailto:Rob.Darby@qldc.govt.nz]

Sent: Wednesday, 2 August 2017 5:19 p.m.

To: Marc Bretherton (marc.bretherton@wintonpartners.co.nz) < marc.bretherton@wintonpartners.co.nz>; Mike

Botting < Mike.Botting @ppgroup.co.nz>; Alistair Snow < Alistair.Snow@qldc.govt.nz>

Cc: Nichola Greaves < Nichola.Greaves@qldc.govt.nz >; Ulrich Glasner < Ulrich.Glasner@qldc.govt.nz >; Mark Baker

<<u>Mark.Baker@qldc.govt.nz</u>>; Simon Leary <<u>Simon.Leary@qldc.govt.nz</u>>

Subject: Northlake Sub-Division - Water Supply

Hi Marc and Mike,

Thank you for meeting earlier today.

As requested Alistair Snow's contact details below, and copied in.

#### Alistair.Snow@qldc.govt.nz

027 706 6903

Brief summary to todays meeting, please advise any corrections, additions, or contentious points that may require amendment:-

- 1. Northlake currently have engineering approval for water supply up to and including stage 9. However, they are progressing with future stages ASAP.
- 2. Northlake do not want to be held up in the delivery of their sub-division through all stages.
- 3. Northlake are waiting on modelling from Council for the wider Wanaka network and how this affects their development.
- 4. Northlake will likely require additional water supply connectivity / capacity for future stages below 350m RL.
- 5. Northlake will require water supply for the 350m RL to 370m RL by December 2018, staged or otherwise.
- 6. Infrastructure internal to the Northlake sub-division could potentially service the entire PC45 (including Allenby Farms land) area for water, being:
  - a. The 'Northlake Falling Main' from the existing Beacon Point Reservoir to currently approved Stages via Northlake or Allenby Farms land. Requires connection to existing falling main out of the Beacon Point reservoir, this connection point is the subject of a separate Council project. A budget of \$220K is likely to be approved by Council on 16<sup>th</sup> August for works to provide this connection point. Delivery of this connection point to be coordinated with Northlake/Allenby Farms.
  - b. Interim boosting from the Northlake Falling Main into stages above the 350m RL level. The interim booster could move with development, or become a lift pump to a permanent rising/falling main and associated tank farm/ reservoir if/when required.
  - Permanent lift pump, rising/falling main and associated tank farm/reservoir established drawing from treated water from existing Beacon Point reservoir.
- 7. Council is considering a second Beacon Point reservoir and new treatment facility. The most favoured location for these new facilities is between the high spot on the existing rising main (410m RL) and the existing Beacon Point reservoir (388m RL).
- 8. Council's time frame for delivering this infrastructure is 3-5 years, i.e. 2021-2023.

- 9. The budgets for these proposed Council projects are being formulated but have yet to be approved in the LTP.
- 10. Northlake is open to discussion on the siting of Council's proposed second Beacon Point reservoir and treatment facility within Northlake land, most likely at the highest point 410m RL, but could be close to the existing reservoir and within Northlake land.
- 11. Heavy vehicle access to the 410m RL site may require upgrades and extensions to the Northlake roading network.
- 12. The other most likely location option is beside the existing reservoir. Allenby Farms own the land to the east of the existing reservoir and John May the land to west. Council will pursue separate discussions with these land owners.
- 13. Should the reservoir and treatment plant option at 410m RL come to fruition, it should be able to service the entire PC45 area between 350m RL and 370m RL by gravity, i.e. same as the tank farm/reservoir contemplated in 2 (c) above. In this case presumably:
  - a. The existing reservoir would be filled via a LCV.
  - b. The 'Northlake Falling Main' could be re-connected to the upper reservoir immediately before the LCV and supply the PC45 area between 350m RL and 370m RL by gravity.
  - c. A PRV would be require on the 'Northlake Falling Main' at 350m RL, and at all other interconnecting pipe work between the two pressure zones.
  - d. Alternatively, the 'Northlake Falling Main' remains connected to the outlet of the existing reservoir and the upper pressure zone is serviced from above the LCV with separate pipe work.
- 14. Should the reservoir and treatment plant beside the existing reservoir come to fruition, the PC45 area will require a permanent lift pump, rising/falling main and associated tank farm/reservoir, as described in 2 (c) above.

Please advise any corrections, additions, or contentious points that may require amendment?

Regards,

Rob Darby | Project Manager | Infrastructure
Queenstown Lakes District Council
DD: +64 3 450 1725 | P: +64 3 443 0024 | M: +64 27 220 1185
E: rob.darby@gldc.govt.nz



# **NEW ZEALAND FIRE SERVICE-SOUTHERN REGION**

## **HYDRANT & MAINS TESTING DATA SHEET**

Flow Gauge Readings to be between 25 & 100 kPa Hydrants used for pressure readings included as 'Inspect and flush' STATION No

3785 Wanaka 4 July 2017

						4	July 20	1 /
Street No	Location of Hydrant	Date	S.P kPa	R.P kPa	Ring Size	Press	Flow	Main Capacity
	Northlake Subdivision							
	Lot 69 DP510104							
	Mt Linton Ave							
	Hydrant ID: WH89944		550	425	D4	50	23.9	88.56
	Hydrant ID: WH89944		330	425	D4	50	23.9	88.56
	Lat C DDF 10104							
	Lot 6 DP510104 Glendene Crescent		ראר	425	DE	Γ0	20.0	01.5
			525	425	D5	50	39.8	91.5
	Hydrant ID: No ID (update GIS)							
	L-+ 1000 DDF 10104							
	Lot 1000 DP510104		F 2 F	425	DE	F0	20.0	01.5
	Glendene Crescent		525	425	D5	50	39.8	91.5
	Hydrant ID: WH89942							
	1 1 1 7 5 5 5 1 0 1 0 1							
	Lot 17 DP510104		505	450	5.5		00.0	400 5
	Glendene Crescent		525	450	D5	50	39.8	103.5
	Hydrant ID: WH89945							
	Lot 74 DP510104							
	Mt Linton Ave		525	450	D5	50	39.8	103.5
	Hydrant ID: WH89943							
	15 Outlet Rd		500	500	D5	60	43.5	>300
	Hydrant ID: WH89947							
				<u> </u>	<u> </u>	<u> </u>	<u> </u>	

**Defects:** 

CCL Ref: 14204-121017-bretherton.docx

12 October 2017

Marc Bretherton
Northlake Investments Limited

By e-mail only: marc.bretherton@wintonpartners.co.nz



- A. PO Box 29623, Christchurch, 8540
- P. 03 377 7010
- e. office@carriageway.co.nz

#### Dear Marc

## Northlake Subdivision: Proposed Plan Change

Further to e-mails and discussions with yourself and also with John Edmonds, we have carried out an assessment of the likely transportation effects arising from the proposed plan change within the Northlake subdivision. Our comments are set out below.

#### Overview

From the information provided, we understand that a plan change is proposed within Northlake, which will have four main elements. Two (relating to commercial signage and community facilities) do not have a transportation-related component. However two elements of the plan change request will affect the traffic generation and other issues:

- It is proposed that 4.2ha of land is changed from B3, C2 and E1 to D1, to enable either additional medium density residential land or a retirement village to be established; and
- It is also proposed to amend a Zone Standard to allow the provision of a single retail activity of up to 1,250sqm GFA, with a total retail floor area within the zone of 2,500sqm GFA compared to an existing provision for 1,000sqm GFA. The purpose of this change is to enable a small supermarket to be established on Lot 1005.

This report addresses the transportation implications of both aspects of the plan change request.

#### Change of Land from B3, C2 and E1 to D1

## Background

The location of the area to be rezoned is towards the northeastern side of Northlake, immediately southwest of Outlet Road and towards the north of Northlake Drive:

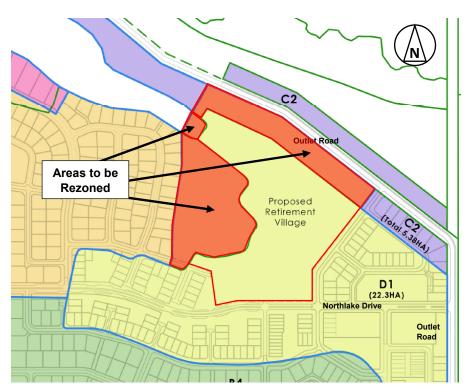


Figure 1: Location of Land Rezoning

#### With regard to the rezoning:

- 15,588sqm of land adjacent to Outlet Road (the northernmost area shown above) is to be rezoned from C2 to D1;
- 1,323sqm of land (the smallest area shown above) is to be rezoned from E1 to D1; and
- 24,512sqm of land (the larger, irregularly shaped area shown above) is to be rezoned from B3 to D1.

The primary transportation matter in regard to this rezoning is that D1 enables a density of 15 households per hectare, whereas B3 has a density of 10 residences per hectare and C2 has a density of 4.5 residences per hectare. Area E1 is within a Building Restriction Area where buildings are presently a non-complying activity. Based on the areas of the land, we consider that under the existing zonings, up to 36 residences could be constructed<sup>1</sup>.

For completeness, the balance of the area shown above which lies immediately east of the plan change area (noted on the plans as being 'proposed retirement village') is currently zoned as D1 and is in the order of 53,200sqm in size. Under the Outline Development Plan of RM160152, this area provides for 105 residences.

## Use for Medium Density Residential

If medium-density housing was to be constructed on the red-shaded areas identified above under a D1 zoning then up to 72 residences could be constructed. This is an increase of 36 residences over and above the existing zoning of this land.

Our earlier work regarding the traffic generation of the Northlake subdivision (though Plan Change 45) identified that each residential property would generate 0.9 vehicle movements (two-way) in

<sup>&</sup>lt;sup>1</sup> That is, 7 residences in Area C2 plus 24 residences in Area B3, plus an additional 15% for the target density margin



the peak hours. Thus the additional residences permitted under the proposed rezoning would generate an additional 32 vehicle movements in the peak hours, equivalent to an average of one vehicle movement every 1.9 minutes at the busiest times, which in our view will not be perceptible.

#### Use for a Retirement Village

Under a scenario where the rezoned land and also the existing D1 area marked on the plans are used for a retirement village, the total site area would be around 9.4ha.

Surveys of retirement villages show that they generally have low traffic generation rates. This is for a combination of reasons - some residents are less mobile or are simply no longer able to drive, and all no longer need to travel to work or for the 'school run' and so they travel at different times of day. Car ownership rates are also lower than for standard residential properties which also reduces the potential traffic generation.

The data shows that independent living facilities (villas and apartments) each generate 2 vehicle movements per day (allowing for both residents and guests), with carehome beds generating 1.5 vehicles movements a day (which allows for visitors, staff and service vehicles). Around 20% of traffic movements are generated in the peak hours.

In this case, because a plan change is sought there is no specific design that has been produced. Accordingly, we have reviewed recent applications for similar facilities:

- We have recently been involved with the Arrowtown Retirement Village. The
  Transportation Assessment which was submitted to the Council and agreed as being
  appropriate noted that the site is 12.1ha and provides for 295 retirement units (villas,
  apartments and beds). In the peak hours, these generate a total of 108 vehicle movements
  (two-way), and this equates to a traffic generation rate of 8.9 vehicle movements (two-way)
  per hectare.
- We are also aware that the Queenstown Country Club occupies a site area of 50ha and was calculated in the Special Housing Area submission to generate 241 to 271 vehicle movements (two-way) in the peak hours, equivalent to a traffic generation rate of 4.8 to 5.4 vehicle movements (two-way) per hectare.
- The Aspiring Lifestyle Retirement Village in Wanaka occupies a site of 12.2ha. The Transportation Assessment for the resource consent application set out that this generates 188 vehicle movements (two-way) in the peak hours. This equates to a rate of 15.4 vehicle movements (two-way) per hectare.
- The Diana Issac Retirement Village in Christchurch occupies a site of 11.2ha. The Transportation Assessment for the resource consent application set out that this has 379 villas, apartments and beds and generates 164 vehicle movements (two-way) in the peak hours. This equates to a rate of 14.6 vehicle movements (two-way) per hectare.

Overall then, rates of 4.8 to 15.4 vehicle movements (two-way) per hectare have been calculated at other, comparable retirement villages. In our view, the Wanaka and Arrowtown rates are likely to be the more relevant – the Christchurch site is very intensively developed and we presented evidence to the Queenstown Country Club regarding the very low rates promulgated by the applicant.

For this assessment, we have used a rate of 12.1 vehicle movements (two-way) per hectare as this is the mean value of the two sites. This would mean that a facility at Northlake could generate around 114 vehicle movements (two-way) in the peak hours.



By way of comparison, under the *existing* zoning of the land which would be used for the retirement village, up to 141 residences could be constructed as of right<sup>2</sup> and these would generate 127 vehicle movements (two-way) in the peak hours.

The traffic generation of the retirement village is therefore 13 vehicle movements *lower* in the peak hours than the existing zoning allows.

#### Connectivity by Other Modes

The areas subject to the proposed rezoning are located relatively centrally within Northlake, and are 200m to 450m from community facilities in the village centre. This is a short distance that will take three to six minute to walk (assuming an average pedestrian speed), meaning that walking is a viable mode of transport. Cycling is similarly viable.

Policy 18(a) of the Otago Regional Public Transport Plan (2014) sets out that in built-up urban areas, spacing between bus stops of 300m and 400m are desirable, with a maximum separation of 500m. This suggests that the maximum walking distance to a bus stop should be around 300m to 400m. All of the areas subject to the proposed rezoning are within 400m of Northlake Drive, which has been designed to be suitable for buses.

We therefore consider that the areas are located in a manner that does not require the use of a car to travel to community facilities or public transport, or to reach the wider roading network.

If the area is to be used for a retirement village, then the site is immediately adjacent to Northlake village centre, and is therefore within a viable travel distance even for those with reduced mobility. The site will also have frontage onto Northlake Drive, a potential public transport route, and there is scope within the road for bus stops to be provided immediately adjacent to the retirement village. This means that bus use will be a highly attractive mode of transport for those living in the retirement village.

More generally, any new roads within the area will be constructed to meet Council's Subdivision Code, which ensures a suitable level of provision for walking and cycling. The existing roads in the area all have footpaths, and Northlake Drive itself is the spine of an internal walking and cycling network, which provides a high-quality route throughout the subdivision and to Aubrey Road further south.

### Summary

Based on our analysis, if the rezoned land was to be used for medium density residential properties then:

- The area subject to the change of zoning can presently generate 32 vehicle movements (two-way) in the peak hours under the existing zoning.
- Under the proposed rezoning this would increase to 64 vehicle movements (two-way).
- This increase in traffic generation will be imperceptible and is not sufficient to create any material change to the efficiency or safety of any roads or intersections

If the rezoned land, plus the adjacent lot, was to be used for a retirement village then:

The area that would be occupied by the retirement village can presently generate 127 vehicle movements (two-way) in the peak hours under the existing zoning.

<sup>&</sup>lt;sup>2</sup> That is, up to 36 residences on the land subject to the rezoning, plus 105 residences on the balance of the land permitted through RM160152



- Under the potential retirement village this would reduce to 114 vehicle movements (twoway).
- In practice, the reduction in traffic generation will be imperceptible but will have small (beneficial) effects on the efficiency or safety of roads or intersections.

For clarity, although our assessment has focused on the whole area being used for either standard residential dwellings or a retirement village, if a subdivision was to be progressed as a hybrid of the two (that is, part retirement village and part standard residential dwellings), then the outcome of an imperceptible change in traffic flows would remain the same.

The areas to be rezoned and/or the retirement village are located within a viable walking and cycling distance of the community facilities in Northlake village centre, and to any potential bus route which may use Northlake Drive. Northlake Drive itself is the spine of an internal walking and cycling network, which provides a high-quality route throughout the subdivision and connections to the roading network further south.

## Provision of a Small Supermarket

#### Background

The location of the area where a small supermarket could be developed if the plan change was to be approved is immediately north of Northlake Drive and within the village centre, close to the already-consented healthcare centre, early childhood centre and restaurant:



Figure 2: Location of Supermarket Site

We understand that the supermarket will have a size of up to 1,250sqm GFA.

#### Traffic Generation and Distribution

The traffic generation characteristics of supermarkets are well-understood, and a facility of this size can be expected to have a rate of low traffic generation rate in the morning peak hour (as few people go shopping) and a rate of 15 vehicle movements (two-way) per 100sqm in the evening



peak hour. This equates to 188 vehicle movements (two-way), of which 50% will enter the site and 50% will exit.

It is known that vehicles travelling to supermarkets is not all newly-generated on the road network. Rather, it is a combination of:

- Primary trips: which are new on the network;
- Pass-by trips: which are those presently being made on Northlake Drive, where a driver can call in to the supermarket without having to change their route; and
- Diverted trips: which are those presently being made on the road network but where a driver has to change their route in order to visit the supermarket.

Surveys have shown that the total traffic at a supermarket comprises around 50% primary trips, 25% pass-by trips and 25% diverted trips at weekends, with this changing to a 33% / 33% / split during the weekday evening peak period<sup>3</sup> which is when the greatest cumulative effects of the supermarket will arise. In our view it is reasonable that similar proportions will be seen at supermarkets.

Consequently, we consider that the weekday evening peak traffic generation of the supermarket will be:

- 63 trips (two-way), which are newly generated;
- 63 trips (two-way), which are presently being made on Northlake Drive where a driver calls in to the supermarket; and
- 63 trips (two-way), where a driver is already on the road network but diverts to the supermarket.

To determine the diverted trips, from the plans provided we have reviewed the number of existing residences in Wanaka, plus lots that are zoned but undeveloped, that are closer to the proposed supermarket than to the New World supermarket in the town centre. This shows that there is a total of 3,395 residences for which this will be the closest supermarket:

- Peninsula Bay: 350 residences;
- 30% of Eely Point: 260 residences;
- Kirimoko: 300 residences;
- Aubrey Road: 215 residences;
- Albert Town<sup>4</sup>: 900 residences;
- Hikuwai: 200 residences;
- Allenby Farms: 350 residences;
- Northlake: 800 residences; and
- Urquhart land: 20 residences.

Taking into account that traffic associated with Northlake, Allenby Farms, Hikuwai and Urquhart land can use the internal roading network within the subdivisions, this then means that 60% of the diverted trips could be made from locations external to those subdivisions.

https://static1.squarespace.com/static/5591f57ee4b07952c1a4d8bd/t/56c18936ab48de9e3b0f252e/1455524152776/Steedman%2C+Harrison+-Paper+65+-+Pass-

<sup>&</sup>lt;sup>3</sup> See for example

by+and+diverted+trip+rates+of+supermarkets+in+Christchurch.pdf

<sup>&</sup>lt;sup>4</sup> There are some shops within Albert Town but these are small and will only typically provide for a small proportion of residents' grocery needs. Since the proposed supermarket will have a larger floor area, and will therefore have a wider range of goods, we consider that Albert Town residents will make use of the facility.



Overall then, this means that at the peak times, the supermarket could result in an additional 38 vehicle movements (two-way) being newly generated on Aubrey Road due to vehicles travelling to and from the supermarket, plus a further 38 vehicle movements (two-way) on Aubrey Road due to drivers that are diverting. Of these, we expect that 50% will be associated with the eastern part of Aubrey Road, since 50% of the total number of residences lie in this direction<sup>5</sup>.

Consequently, the additional traffic movements due to the supermarket that are external to the Northlake / Allenby Farms / Hikuwai subdivisions will be:

- 19 vehicles entering from Aubrey Road (east), plus 19 vehicles exiting onto Aubrey Road (east); and
- 19 vehicles entering from Aubrey Road (west), plus 19 vehicles exiting onto Aubrey Road (west)

#### Traffic Effects

The supermarket access will accommodate peak traffic flows of 94 vehicles entering and 94 vehicles exiting in the peak hours. On average, this equates to one vehicle movement every 19 seconds (that is, one entry every 38 seconds and one exit every 38 seconds) which is well within the capacity of a typical priority access or intersection.

Northlake Drive itself has ample capacity to accommodate these vehicle movements.

The Aubrey Road / Outlet Road intersection will accommodate traffic flows of 19 vehicles turning right from Aubrey Road (east) onto Outlet Road, plus 19 vehicles turning left from Outlet Road onto Aubrey Road (east). These volumes of traffic equate to an average of one vehicle movement every 1.6 minutes, and are likely to be imperceptible. We also note that this intersection already has an auxiliary right-turn lane providing additional capacity for the east-to-north movement.

Vehicles approaching from the west on Aubrey Road have a choice of routes, including Northburn Road, Mt Linton Avenue and Outlet Road. Our measurements show that each route is approximately equidistant, and so in terms of journey distance, no route is more favourable that the others. However it is likely that the route via Outlet Road will be the quicker, due to a higher design speed, fewer intersections to negotiate and a reduced potential for encountering cars maneouvring to or from private driveways.

If vehicles were to use Northburn Road, Mt Linton Avenue and Outlet Road equally then the increase in traffic would equate to peak hour volumes of 13 vehicle movements (two-way), or one vehicle movement every 5 minutes, on each road. Conversely, the use of only Outlet Road would result in an increase in traffic of 38 vehicle movements (two-way). In either case, the increase will not be perceptible, and the Aubrey Road / Northburn Road, Aubrey Road / Mt Linton Avenue and Aubrey Road / Outlet Road intersections have sufficient capacity to accommodate the increase without any material changes in queues and delays.

It should also be noted that the traffic attracted to the supermarket from external locations (Peninsula Bay, Eely Point, Kirimoko, Albert Town etc) would have otherwise purchased groceries elsewhere and would therefore have created effects on the roading network in other locations in Wanaka. The proposed supermarket therefore has a benefit in reducing transportation effects elsewhere in the town.

<sup>&</sup>lt;sup>5</sup> Peninsula Bay (350) plus Eely Point (260) plus Kirimoko (300) to the west, Albert Town (900) to the east



## Connectivity by Other Modes

The proposed location of the supermarket is well positioned with regard to the bulk of the Northlake area. It is typically accepted that the maximum viable walking distance to a destination is 1km, with a 3km distance being cyclable. All of the site lies within 3km and most is within 1km.

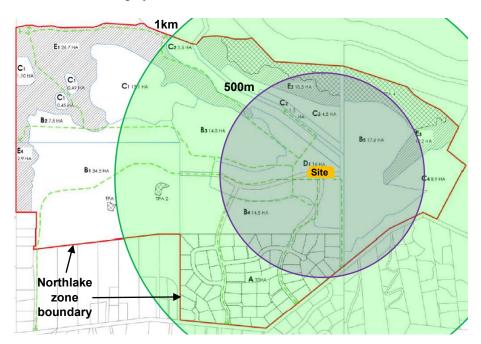


Figure 3: 500m and 1km Isodistances from the Supermarket Site

As such, walking and cycling to the supermarket are reasonable travel options. The site is also contiguous with the other (consented) facilities within the village centre which means that people can travel once and visit several destinations during the same trip, thereby minimising the need to travel.

The site is immediately adjacent to Northlake Drive, which has been designed to be suitable for buses, and which also forms the spine of a walking and cycling network within the subdivision. The existing roads in the area all have footpaths.

We therefore consider that the supermarket would be located such that it is accessible by a range of travel modes rather than being reliant on private car use, and that the need to travel is minimised through customers being able to visit multiple destinations as part of the same trip.

## Summary

Based on our analysis, the supermarket will generate up to 188 vehicle movements in the peak hours, but only 38 additional vehicle movements on Aubrey Road (east) and Aubrey Road (west) will occur as a result of the majority of traffic being on the internal Northlake and environs roading network.

The small changes in traffic flows can easily be accommodated on the road network, and the Anderson Road / Aubrey Road intersection continues to work satisfactorily.

The supermarket would be located within a viable walking and cycling distance of much of the residential development within Northlake and is immediately adjacent to any potential bus route which may use Northlake Drive. Northlake Drive itself is the spine of an internal walking and cycling network, which provides a high-quality route throughout the subdivision.



## Cumulative Effects of the Plan Change Request

Taking into account both the proposed rezoning and the supermarket, there could be a total increase of 108 vehicle movements (two-way) compared to the existing zoning provisions<sup>6</sup>. Of these, 67 vehicles (two-way) would use Aubrey Road (west) with 41 vehicles (two-way) using Aubrey Road (east)<sup>7</sup>.

The greatest of these increases occurs on Aubrey Road (west), but even then, it is equivalent to around one vehicle movement every minute during the busiest periods. In our view this will not be noticeable, and it is insufficient to create any efficiency or road safety effects.

## Other Plan Change Provisions

The types of activity that could occur if the plan change request was to be approved are relatively common, and do not have any unusual transportation-related characteristics. As such, we do not consider that there will be a need to vary any of the operative transportation-related Site Standards as part of this plan change request, and we understand no such variations are proposed. In the unlikely event that any of the operative Site Standards are not met, a resource consent application will be made and the effects of the non-compliance will be assessed at that time.

#### **Conclusions**

Overall, we consider that the traffic generated by the proposed plan change is relatively small. There is little difference in the traffic generation between the proposed rezoned land towards the north of Northlake and that which can already occur as of right, regardless of whether this area is used for medium density residences or a retirement village.

The small supermarket is likely to primarily attract customers from the Northlake, Hikuwai and Allenby Farms subdivisions, but there will be some additional traffic which will be generated from existing (external) subdivisions. However this can be accommodated on the road network without adverse outcomes in respect of safety or efficiency.

The cumulative changes in traffic flows are small, and even the greatest change (which occurs on Aubrey Road (west)) equates to only one additional vehicle movement every minute in the peak times. In our view, this will be unnoticeable.

All areas are well-located to support travel options, including walking and cycling, and the proximity of Northlake Drive means that the proposed activities are well-placed to support a public transport service through the site. In particular, a retirement village would be adjacent to the community facilities within the village centre meaning that these are within a viable travel distance even for those with reduced mobility. The supermarket would be similarly adjacent, which means that several facilities can be visited by customers during the same trip, thereby reducing the need to travel.

<sup>&</sup>lt;sup>6</sup> An additional 32 vehicles arising from the rezoned areas if used for medium density residential, plus 76 new and diverted trips associated with the supermarket.

<sup>&</sup>lt;sup>7</sup> Towards the west: 32 vehicle movements arising from the residential component x 90%, plus 50% of the 76 vehicle movements due to the supermarket. Towards the east: 32 vehicle movements arising from the residential component x 10%, plus 50% of the 76 vehicle movements due to the supermarket.



Given that the activities under the proposed plan change are not unusual, we do not consider that there is any requirement to include additional transportation-related provisions or to seek to depart from the Site Standards of the operative District Plan.

Consequently, we are able to support the plan change request from a transportation perspective.

I trust that this is of assistance, but please do not hesitate to contact me if you require anything further or clarification of any issues.

Kind regards

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# Northlake Special Zone Assessment of Retail Economic Effects

October 2017

#### **DISCLAIMER**

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# **Contents**

1.	Execu	tive Summary 4				
	1.1	Introduction	4			
	1.2	Population and Housing	5			
	1.3	Tourism in Wanaka	6			
	1.4	Retail Facilities in Wanaka	6			
	1.5	The RCG Retail Sales Model	7			
	1.6	Retail Demand in Wanaka	7			
	1.7	Assessment of Economic Effects	8			
	1.8	Conclusions	8			
2.	Introd	Introduction 10				
	2.1	Northlake	10			
	2.2	The Current Proposals for Northlake	11			
	2.3	Review of Previous Analyses	12			
	2.4	Abbreviations	13			
3.	Population and Housing 14					
	3.1	Drivers of Population and Household Growth	14			
	3.2	Stats NZ Projections	14			
	3.3	QLDC Projections	16			
	3.4	Housing Demand and Supply	17			
	3.5	Holiday Homes	19			
	3.6	House Prices and Affordability	20			
4.	Tourism in Wanaka 22					
	4.1	Tourism Context	22			
	4.2	Commercial Accommodation "Guest Nights"	22			
	4.3	Airbnb in the Queenstown-Lakes District	24			
	4.4	Regional Tourism Estimates	25			
5.	Retail Facilities in Wanaka 28					
	5.1	The "Existing Environment" for Retail	28			
	5.2	Other Potential Retail Areas	29			
6.	The RCG Retail Sales Model 30					
	6.1	Model Overview	30			
	6.2	Income Adjustments	31			
	6.3	Real Spending Multiplier	32			
	6.4	Retail Demand from Visitors	32			
	6.5	Forecasting Tourism Spending	32			

	6.6	"Wanaka" Catchment Definition	33			
	6.7	"Northern Wanaka" Catchment Definition	34			
7.	Retail Demand in Wanaka 36					
	7.1	Tourism Spending in Wanaka	36			
	7.2	Household and Business Spending in Wanaka	38			
	7.3	Total Demand from Visitors, Households and Businesses	40			
	7.4	LFR Food Retailing Demand	41			
	7.5	Retail Demand in "Northern Wanaka"	42			
8.	Assessment of Economic Effects 44					
	8.1	Clarifying the Extent of the Proposed Changes	44			
	8.2	Modelling Results: Demand and Supply	44			
	8.3	Effects on the Wanaka CBD and Three Parks	45			
	8.4	Comments on John Long's 2014 Evidence	47			
9.	Conclu	sions 50				

# Executive Summary

This report provides an "assessment of economic effects" for proposed changes to the Northlake Special Zone. Our report is structured as follows:

- Section 2 explains the Plan Change 45 process which led to Northlake being zoned, the further changes which are now proposed, and summarises RCG's previous work in Wanaka.
- Sections 3 to 5 outline various data for Wanaka and the Queenstown-Lakes District: their population, tourism, and retail offering.
- Section 6 introduces RCG's Retail Sales Model, which we use to look at retail sales and spending power in Wanaka, now and into the future.
- Section 7 presents results from the Retail Sales Model, including "floor space demand" projections.
- Based on the work above, we make an assessment of retail economic effects in section 8 and provide our final conclusions in section 9.

## 1.1 Introduction

- The Northlake Special Zone was created as a result of Plan Change 45 (PC45). It was made operative in December 2015.
- The zone allows for up to 1,520 homes and 1,000 m<sup>2</sup> of retail space in the 'AA-D1' area. Individual shops are limited in size to 200 m<sup>2</sup>.
- Community and commercial (non-retail) activities are also allowed in the AA-D1 area, without any floor space restrictions.
- Less than two years after PC45 became operative, hundreds of sections have been sold in Northlake, with earthworks and infrastructure installation well underway. The first sections have already been titled and settled with their buyers.
- Northlake Investments Ltd has received land use consents for a "health centre", "restaurant" and "early childcare centre". We understand that leasing for these is well advanced, and construction will start in the next few months.
- Given this, and the high popularity of section sales, Northlake clearly has real momentum.

Northlake Investments Ltd is now seeking another plan change to the Operative District Plan (ODP), to allow for a slightly different mix of activities. RCG has been engaged to provide an expert opinion on the retail aspect of these proposed changes. The changes include provision for a total of  $2,500 \, \text{m}^2$  of retail space, including one

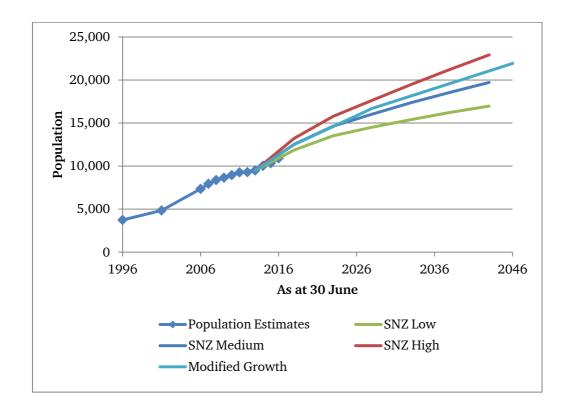
tenancy of up to 1,250 m<sup>2</sup> (likely to be a food retailer, i.e. a small supermarket or large grocery store), with other tenancies limited to 200 m<sup>2</sup> as they are currently.

RCG has also carried out economic analyses for several other Wanaka developments:

- Reports and evidence for Three Parks over 2007-2009, which was made operative in January 2011;
- Evidence for the initial Northlake PC45 hearings in 2014-2015;
- Evidence for the Gordon Family Trust in 2016-2017. The provisions for this
  proposed Local Shopping Centre Zone, on Cardrona Valley Rd, remain
  subject to the Proposed District Plan (PDP) hearings process.

## 1.2 Population and Housing

The graph below shows 'estimated' and 'projected' population growth for Wanaka:



- Wanaka's estimated population was 10,910 as at 30 June 2016.
- Stats NZ released new population projections for Wanaka in mid-2017.
   These show a much higher rate of growth than previous Stats NZ projections.
- Stats NZ have released low, medium and high projections.

- Rationale Ltd has also made projections for Wanaka, on behalf of the council. These include a "modified growth" projection which they see as the most appropriate for [the council's] long term planning".
- We agree with this assessment and use the "modified growth" projection as our 'preferred' projection for our retail modelling work.
- Under this projection, Wanaka's population will reach 16,700 by 2028, a 53% increase.
- Building consents in Wanaka are running at near-record levels, of around 350-400 homes a year.
- Wanaka is one of the most expensive housing markets in New Zealand, with average house prices of almost \$800,000 in the year to June 2017.
- The Queenstown-Lakes Housing Accord targets "an increase in land and housing supply" and improved affordability. It will require further growth in consenting activity from their current record levels.

## 1.3 Tourism in Wanaka

- Although Northlake is a more 'suburban' part of Wanaka, focusing more on local households than visitors, tourism context is still essential.
- Tourism is a major factor in Wanaka retailing, and in the economic life of the town. Even in suburban areas, the presence of holiday homes, Airbnb etc means that tourists are still an influence.
- Tourism has been very strong across New Zealand, particularly in the Queenstown-Lakes District.
- "Guest nights" in Wanaka commercial accommodation are currently at record levels. There were 840,000 guest nights for the year to June 2017.
- Airbnb is a growing influence but remains relatively small compared to the commercial accommodation sector.
- Tourism spending in Wanaka is at record levels, with \$313 million a year from international visitors (up 71% from two years ago), and \$189 million a year from domestic ones.

#### 1.4 Retail Facilities in Wanaka

- We estimate that there is around 20,000 m<sup>2</sup> of built retail space in Wanaka.
- The "existing environment" also includes retail areas which are approved but not yet built, such as the permitted retail at Three Parks or Northlake.
- The Wanaka CBD has at least 15,700 m<sup>2</sup> of retail space. It has a single small supermarket (New World) and other food retailers (Four Square, Mediterranean Market).
- Three Parks can include 10,000 m<sup>2</sup> of retail initially, with the early focus likely to be on large format retail (LFR).

- Northlake can currently include 1,000 m<sup>2</sup> of 'small format' retail space. Resource consents include a childcare centre, health centre and restaurant.
- Retail has been indicated for a site on Cardrona Valley Rd as part of the Proposed District Plan process. For 'economic effects' purposes, we assume that this site is approved in full.

### 1.5 The RCG Retail Sales Model

- RCG's Retail Sales Model lets us assess demand for retail floor space, now and into the future.
- The model is based on actual retail sales data at the national level, and allocated to catchments based on household, business and tourism data.
- Key assumptions include the level of population/ household/ tourism growth, and the 'sales per square metre' achieved by retailers.
- Our modelling is generally based on the Wanaka catchment, equivalent to the Wanaka Ward. We also look at 'Northern Wanaka" the parts of the town which are closer to Northlake than to the existing New World.
- Eventually, there could be up to 3,395 households in Northern Wanaka.

#### **T.6 Retail Demand in Wanaka**

- Using our 'preferred' projections, demand for retail floor space in Wanaka will increase from 55,900 m<sup>2</sup> in 2018 (next year) to 77,100 m<sup>2</sup> by 2028.
- These results show huge demand growth. They also show that Wanaka is already seriously undersupplied with retail space.
- As such, Wanaka will be able to support substantial increases in its retail offering indeed, it could accommodate substantial increases already.
- Looking just at demand for "large format retail" space in the food retailing category, demand will increase from 5,258 m² in 2018 to 7,326 m² by 2028.
- Again, this is significant growth over the next 10 years. These results also show that Wanaka is undersupplied with food retail space.
- The existing New World seems to trade very strongly indeed. Tourist spending alone is more than sufficient to support a supermarket of this size.
- Looking just at the 'Northern Wanaka' area close to Northlake, our brief analysis of the potential 3,395 homes here suggests that they could support 10,484 m<sup>2</sup> of retail space in 2028, if the area is completely developed for housing by this time.
- This gives us further confidence that the proposed Northlake changes can be supported by the local market.

#### 1.7 Assessment of Economic Effects

- The ODP currently allows for 1,000 m<sup>2</sup> of retail space in Northlake. The proposed changes will increase this to 2,500 m<sup>2</sup>.
- The changes allow for a single large tenancy of up to 1,250 m<sup>2</sup>, with other shops limited to 200 m<sup>2</sup> as presently.
- Essentially, the main change is allowing for a large tenancy of 1,250 m<sup>2</sup>. The area of 'small' shops is only changing from 1,000 m<sup>2</sup> to 1,250 m<sup>2</sup>.
- Wanaka's retail market is undersupplied, and demand growth is rapid. This
  gives a clear rationale for providing for extra retail space, and means that
  any effects of new shops or centres on existing ones will be minor and shortlived.
- The CBD is very healthy and commercially successful at present, with unique amenity and accessibility for tourists.
- As Wanaka becomes a busier tourism destination, the CBD will strengthen its 'tourist' focus, with other centres providing for 'local' shoppers. This transition is already underway in Queenstown.
- This process will not "undermine" centres, and instead it will enable Wanaka residents and businesses to make the most of the retail opportunity – providing for their wellbeing.
- If retail growth is not facilitated, the risks are that the amenity of the CBD is reduced or that Wanaka retailers are not able to make the most of the opportunity to sell to tourists.
- As such, we see retail at Northlake as "supplementing" the Wanaka town centre, helping it to fulfil its function and providing something of a 'pressure release valve'.
- Even in conjunction with other planned or potential developments,
   Northlake will not undermine the Wanaka CBD's role as a "primary focus for the District's economic activity".
- Three Parks also has potential, as the main prospect for Wanaka retail growth in the future. It will serve the wider Wanaka catchment, and have a much larger and broader retail offering than Northlake.
- Three Parks is still largely undeveloped, with no retail built there since the zone became operative in 2011. However, it has potential for LFR, 'national' retail chains, a shopping centre etc.
- The main area of potential competition between Three Parks and Northlake is likely to be in food retailing, and our view is that this will not 'undermine' the role of Three Parks given the significant difference in scale, and the major growth in demand across Wanaka.

#### 1.8 Conclusions

• The proposed increase in Northlake's retail offering will promote sustainable and efficient outcomes, and not "undermine" higher order centres.

- The retail offering will help to support higher housing densities in Northlake (and vice versa). It provides amenity for local residents, and opportunities for local shopping and recreation.
- Other 'Northern Wanaka' residents will also be able to satisfy some everyday needs locally, without needing to drive across town to the CBD or Three Parks.
- This will assist the Wanaka CBD in maintaining an attractive, pedestrianfocused environment while promoting visitor spending growth.

## 2. Introduction

#### 2.1 Northlake

The Northlake Special Zone was originally proposed as Plan Change 45 to the Queenstown-Lakes Operative District Plan. This plan change was notified in August 2013, and made operative in December 2015.

Plan Change 45 created the Northlake Special Zone, with activities governed by a Structure Plan. The zone aims to provide for up to 1,520 homes, as well as "small scale neighbourhood retail activities".

More specifically, the Northlake Special Zone currently has the ability to provide up to  $1,000~\text{m}^2$  of retail space within Activity Area D1 (AA-D1), with individual shops limited in size to  $200~\text{m}^2$ . There is no constraint on the extent of commercial (non-retail) or community floor space in the AA-D1 area.

Figure 2.1 below shows the Northlake Structure Plan approved as part of PC45, with the Northlake Special Zone outlined in red:

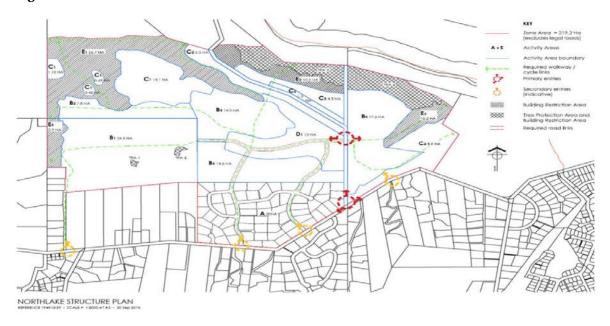


Figure 2.1: Northlake Structure Plan

Source: Queenstown-Lakes Operative District Plan

Although PC45 has been operative for less than two years, development has been very rapid. Northlake Investments Ltd is the largest landowner and developer within the Northlake Special Zone. The company has sold hundreds of sections in its

subdivision (also called Northlake), with earthworks and infrastructure installation well underway. 'Stage one' sections in the Northlake subdivision have recently settled, with many more to come in the next few months. Other landowners in the Northlake Special Zone are also progressing their own subdivisions.

In 2017, three land use consents have been granted for a "health centre", "restaurant" and "early childcare centre" on Northlake Investments Ltd's land. We understand that these facilities have been supported by strong tenant demand, and that many of the future tenants are existing Wanaka businesses which want to open a second location to cater for growth.

### 2.2 The Current Proposals for Northlake

Northlake Investments Ltd, is now seeking a plan change to the Operative District Plan (ODP) to allow for a slightly different mix of activities. RCG has been engaged to provide an expert opinion on the retail aspect of these proposed changes. The changes include provision for a total of 2,500 m $^2$  of retail space, including one tenancy of up to 1,250 m $^2$  (likely to be a small supermarket or a large grocery store), with other tenancies limited to 200 m $^2$  as they are currently.

As noted above, RCG has been engaged by Northlake Investments Ltd to assess the economic effects of the proposed planning changes for Northlake.

Our report is structured as follows:

- A review of population and household growth in Wanaka;
- A review of tourism growth in Wanaka;
- Modelling retail demand in Wanaka, based on the household and tourism data above;
- Comments on retail 'supply' in Wanaka (including Northlake and other proposed facilities) and Queenstown;
- Our assessment of retail economic effects from the proposed changes at Northlake, and our conclusions on these.

### 2.3 Review of Previous Analyses

RCG has carried out a number of studies on the Wanaka retail market in the past. RCG staff have also provided expert evidence to QLDC and the Environment Court on these matters.

#### **Three Parks**

RCG had considerable involvement in the Three Parks rezoning (PC 16). This included the preparation of research reports and evidence on behalf of the applicant over 2007-2009, for QLDC and Environment Court hearings.

As befitted a project of Three Parks' scale, there were a number of economic experts called on to give opinions on the Wanaka retail market, and to carry out modelling work. Several different consultants prepared modelling exercises for the Wanaka retail market, which included an assessment of the market as it existed in 2009 and projections/ forecasts of retail demand into the future. To our knowledge, no other substantial modelling was undertaken again for Wanaka until RCG's 2016 work (described below).

Plan Change 16 was made operative on 19 January 2011.<sup>1</sup>

#### **Northlake**

The Northlake Special Zone (PC45) was supported by RCG evidence. John Long provided evidence for Northlake Investments Ltd on the plan change, initially with a Statement dated 5 February 2014 prepared for the QLDC hearing. The plan change was subsequently appealed to the Environment Court, and John Long provided a Statement dated 31 October 2014 and a Rebuttal dated 13 February 2015 for this hearing.

John Long's evidence was in support of the Northlake zone, where it included a small village cluster of shops. As proposed in PC45, and carried through in the evidence, there was to be an overall cap on retail activity of  $1,000~\text{m}^2$ , and a size limit or 'tenancy cap' on individual shops of  $200~\text{m}^2$ . In his evidence, John Long noted that he "[supported] the inclusion of a small retail cluster at Northlake for local lifestyle and amenity reasons in the expectation that this will have no significant offsite retail effects". We discuss John Long's evidence further in section 8.4~of this report.

<sup>&</sup>lt;sup>1</sup> http://www.qldc.govt.nz/planning/district-plan/district-plan-changes/plan-change-16-three-parks/

### Cardrona Valley Rd

John Polkinghorne provided evidence for the Trustees of the Gordon Family Trust, with Statements of Evidence dated 18 November 2016 and 4 April 2017. These statements were prepared for the hearings on the Proposed District Plan.

The provisions for the Gordon Family Trust's site on Cardrona Valley Rd are yet to be confirmed. The PDP as notified showed the land being rezoned as a Local Shopping Centre Zone (LSCZ) of 2.7 hectares. Through submissions and hearings, various parties have expressed their views on this – with some arguing for a smaller size, and for a cap on office and retail activities, potentially of just 3,000 m<sup>2</sup> GFA.

John Polkinghorne's evidence argues in favour of the 2.7 hectare size, and for office and retail activities to be uncapped (although with some restrictions on tenancy types).

#### Other RCG Work

Other RCG work in the Queenstown Lakes District has included consulting work for Kawarau Falls and Queenstown Airport, and evidence on PC19 (Frankton Flats B).

#### 2.4 Abbreviations

Our report uses the following abbreviations:

AA-D1 – Activity Area D1 within the Northlake Special Zone

LFR - Large Format Retail

LSCZ – Local Shopping Centre Zone

NPS-UDC – National Policy Statement on Urban Development Capacity 2016

PDP - Proposed District Plan (as notified)

QLDC - Queenstown-Lakes District Council

RTO - Regional Tourism Organisation

Stats NZ - Statistics New Zealand

Wanaka CBD - Wanaka town centre

# Population and Housing

This chapter looks at housing supply and demand in Wanaka and the wider Queenstown-Lakes District.

## 3.1 Drivers of Population and Household Growth

At the local level, population growth results from:

- Natural increase (births minus deaths);
- 'Net' international migration (immigration minus emigration);
- 'Net' internal/ domestic migration.

Household growth comes from the factors above, as well as declining 'household sizes', or the average number of people per household. This has been a long-term, internationally recognised trend, arising in part due to people having fewer children, but more due to people living longer (as 'empty nesters'). As a result, household growth tends to be faster than population growth.

Nationally, international migration has been at record levels for the last three years. This has dramatically boosted population growth. In the year to June 2017, New Zealand experienced record growth of 100,400 people, with 72,300 of that growth coming from net international migration.

Past experience shows that migration flows can turn around very quickly. However, it seems likely that on average, immigration in the future will be higher than it has been historically. For example, recent projections from Stats NZ assume higher levels of migration than had been used in the past.

## 3.2 Stats NZ Projections

Stats NZ produces a wide range of projections – for both population and households, and at the national, subnational and area unit level. These projections are scenarios for how an area's population could grow and change in the future.

Stats NZ projections are regularly updated, typically every 2-3 years. They use the latest census as the "base year", and are then updated again in between the 5-yearly censuses.

Stats NZ construct their projections on a 'top down' basis, beginning at the national level, and then allocating growth at the subnational level and finally to individual area units. National population projections were last updated in October 2016,

followed by subnational projections in February 2017, and area unit projections released gradually through the rest of 2017. The updated area unit projections for the Queenstown-Lakes District (including the Wanaka catchment) were released circa mid-2017, and our report is based on these.

These updated projections are substantially higher than the ones they replaced, and which had been used in John Polkinghorne's 2016 work. Looking at the 'medium' projection for example, the previous projections showed Wanaka's population reaching 10,910 in 2018 and 17,490 in 2043. The updated projections show a population of 12,540 and 19,720 respectively. The level of growth compared with the 'base year' population of 9,500 in 2013 is much faster. The 'low' and 'high projections show a similar lift.

Figure 3.1 below shows the three SNZ projections for Wanaka, along with population estimates for 1996-2016. It also shows a fourth "Modified Growth" projection from Rationale Ltd, as explained in section 3.3 below:

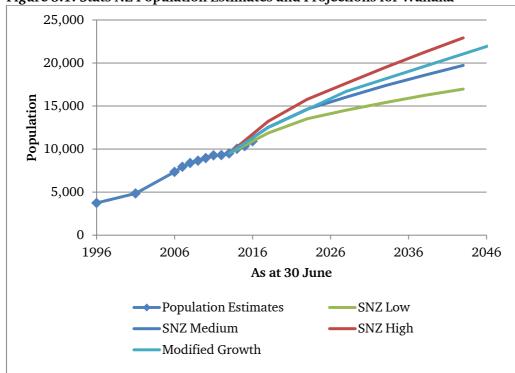


Figure 3.1: Stats NZ Population Estimates and Projections for Wanaka

Source: RCG, Stats NZ

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<sup>&</sup>lt;sup>2</sup> They are also higher than the 'preferred' projections used in RCG's 2009-2010 work for Three Parks.

Based on the 'medium' projection from Stats NZ, Wanaka will have a residential population of 19,700 people by 2043. Under the 'high' projection, the figure would be 22,920, and under the 'low' projection it would be 16,970.

By comparison, Wanaka's estimated population was 10,910 as at 30 June 2016. As such, the town's population will more than double under Stats NZ's 'high' projection, and almost double under the 'medium' projection.

Wanaka is projected to grow somewhat faster than Queenstown on a percentage basis, accounting for 37%-38% of growth under the medium and high projections versus its current 32% share of the population.

Stats NZ's subnational household projections are now out of date – they were released in December 2015, and are based on an earlier set of population projections than the ones above. They will be revised in December 2017, and the 'medium' projection is likely to be revised upwards. Stats NZ do not provide household projections at the area unit level.

However, the existing household projections are still useful for providing another perspective on housing demand. These projections show the number of households in the Queenstown-Lakes District growing from 11,500 in 2013 to:

- 16,000 households in 2038 under the low projection, or average growth of 180 a year;
- 18,800 households in 2038 under the medium projection, or average growth of 292 a year;
- 21,500 households in 2038 under the high projection, or average growth of 400 a year.

Even the high projection seems unrealistically conservative in 2017, and we have not considered these household projections further. Instead, we focus on the population projections from SNZ, which are much more current, and the projections prepared for QLDC by Rationale Ltd.

#### 3.3 QLDC Projections

The QLDC has commissioned various reports and projections from Rationale Ltd in recent years. The most recent report is titled "QLDC Growth Projections to 2058", and was released in May 2017.3

<sup>&</sup>lt;sup>3</sup> "QLDC Growth Projections to 2058", Rationale Ltd, May 2017

This report uses SNZ projections as a 'base', but extrapolates them over a longer timeframe (to 2058 rather than 2043), and also introduces a fourth projection known as the "modified growth" projection. This falls in between SNZ's medium and high projections.

Rationale Ltd note that "the modified growth scenario is considered the most appropriate for the purpose of QLDC's long term planning". We agree that this projection is in an appropriate range for planning, and we use it as our 'preferred' projection for our retail modelling work.4

Rationale Ltd's "modified growth" projection show Wanaka's population growing to 16,700 people by 2028 and 22,500 by 2048.

In addition to projecting the population across the district, Rationale Ltd also include projections for visitor numbers (on 'average' and 'peak' days), and the total number of dwellings (occupied and unoccupied). Based on the 'modified growth' scenario as described on page 9 of their report, 5 Rationale Ltd assume growth in 'average' visitor numbers to be 2.4% per annum in the next 10 years, with growth in 'peak' numbers at 2.3% per annum.

## 3.4 Housing Demand and Supply

Councils across New Zealand use a range of approaches for looking at housing demand and supply. However, building consents are a very common measure of housing supply, as they are nationally consistent and long-term data is available.

Figure 3.2 below shows the number of homes consented in the Queenstown-Lakes District, on a 'moving annual total' basis:

<sup>&</sup>lt;sup>4</sup> Historically, Stats NZ projections have often under-projected the level of growth in Wanaka and the wider district. While more recent projections have improved the level of accuracy, we believe it is prudent for councils to allow for a higher level of growth to avoid underprovision of land and services. Our view is that the Rationale "modified growth" scenario strikes the right balance, falling between the 'medium' and 'high scenarios.

<sup>&</sup>lt;sup>5</sup> "QLDC Growth Projections to 2058", Rationale Ltd, May 2017

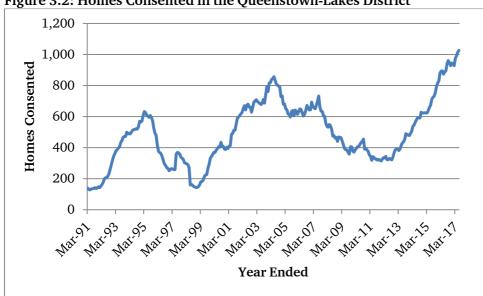
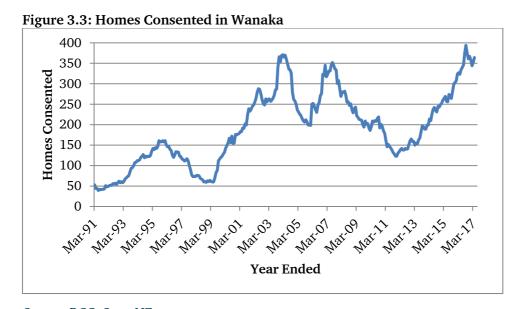


Figure 3.2: Homes Consented in the Queenstown-Lakes District

Source: RCG, Stats NZ

Building consents in the Queenstown-Lakes District are currently running at record levels. The long-term average since 1990 has been 500 homes consented a year, and consents are now running at more than 1,000 homes a year.

Figure 3.3 below shows the number of homes consented in Wanaka, on a 'moving annual total' basis:



Source: RCG, Stats NZ

Based on customised data from SNZ which covers the period to April 2017, consenting activity in Wanaka is also running at near-record levels, of around 350-400 homes a year.

By comparison, Rationale Ltd's "Modified Growth" projection assumes that the number of dwellings in Wanaka rises from 6,000 in 2013 to 7,600 in 2018 and 9,400 in 2028. This implies average growth of 320 dwellings a year in 2013-2018, and 180 dwellings a year in 2018-2028. The rate of growth is projected to fall further beyond 2028, to an average of 95 dwellings a year in 2028-2048 and 90 a year in 2048-2058.

Over the 27 years for which we have data, 5,165 dwellings have been consented in Wanaka, or an average of 191 a year. However, the average for the last 15 years is higher at 250 a year.

### 3.5 Holiday Homes

Holiday homes are an important consideration for the Queenstown-Lakes District: a substantial proportion of homes are not occupied by permanent residents, and are instead used as holiday homes or rented out as short-term accommodation. As such, building consent data may overstate the number of homes available for new households.

In Wanaka, 64% of dwellings were occupied on census night 2013, and in Queenstown 77% of dwellings were occupied. Both figures have been trending upwards compared to the 2001 and 2006 censuses.

The occupied dwelling counts include those 'holiday homes' which were occupied on census night, so another comparison is to look at the number of households versus the total number of dwellings. On that basis, in Wanaka 59% of dwellings were occupied by a household who lived there, and in Queenstown the figure is 72%. Again, these figures have generally been trending upwards.

As such, household growth in Wanaka will come from two sources:

- New homes being consented built, of which the majority will be for 'permanent households' but some will be for holiday homes;
- An increasing proportion of homes being used as full-time residences rather than holiday homes/short-term accommodation.

## 3.6 House Prices and Affordability

Wanaka average house prices fluctuated around the \$500,000 mark over 2007-2014, and have since risen rapidly – to almost \$800,000 in the year to June 2017.

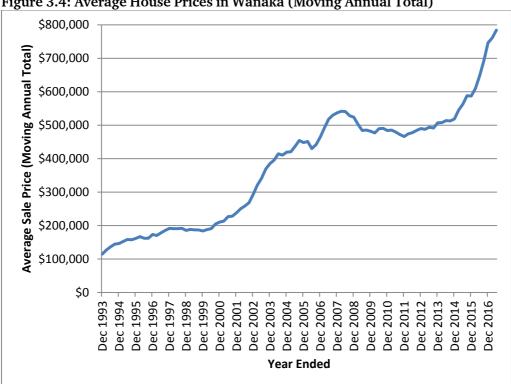


Figure 3.4: Average House Prices in Wanaka (Moving Annual Total)

Source: MBIE Urban Development Capacity Dashboard

This makes Wanaka one of the most expensive housing markets in New Zealand – only Queenstown and Auckland have more expensive housing.

Although many of the factors driving this house price growth are national (low interest rates, record migration, rising construction costs etc), we believe that Wanaka's attractive lifestyle, popular with both domestic and international migrants, is an important local factor.

Affordability is a growing issue, especially for Wanaka locals, workers and aspirational residents who have seen house prices increase dramatically in the last few years, with incomes not rising to match. Queenstown's 'median multiple' – the ratio of median house prices to median household incomes – was the highest in the country in February 2017, at 10.71.6

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<sup>&</sup>lt;sup>6</sup> http://www.mbie.govt.nz/info-services/housing-property/housing-affordability/documentimage-library/signed-housing-accords/queenstown-lakes-district-housing-accord.pdf

As a result of these issues, the government and QLDC signed the Queenstown-Lakes Housing Accord in July 2017, aimed at "an increase in land and housing supply" and improving affordability in the district. This replaced an earlier three-year Housing Accord from 2014, which had focused on the Wakatipu Basin only.

The Housing Accord aims to deliver 1,100-1,200 sections and dwellings consented across the Queenstown-Lakes District in 2017, with 1,200-1,300 in 2018, and 1,300-1,400 in 2019. This will require further growth in consenting activity from their current record levels.

Growth in household numbers (and holiday home numbers) will of course also create demand for additional commercial space, infrastructure and other amenities. These will all need to be provided to adequately service the strong residential growth.

## 4. Tourism in Wanaka

This section gives an overview of tourism trends in Wanaka and the Queenstown-Lakes District. We use two main data sources: the Commercial Accommodation Monitor and Regional Tourism Estimates, both of which are produced by MBIE.

Although Northlake is a more 'suburban' part of Wanaka, focusing more on local households than tourists, we believe it is still essential to provide some tourism context. Tourism is a major factor in Wanaka retailing, and in the economic life of the town. Even in suburban areas, the presence of holiday homes, Airbnb etc means that tourists are still an influence.

As such, we provide a lot of detail on tourism spending and growth, and then model tourism retail demand (including demand for floor space) for Wanaka into the future.

#### 4.1 Tourism Context

At a New Zealand-wide level, the tourism sector has been very positive in recent years, and this is expected to continue. Tourism businesses are investing in new hotels and facilities, capacity is being added to airports, and airlines have also been adding seat capacity on major routes. One of the main emerging issues is a shortage of accommodation in Auckland, Queenstown and other tourism hotspots.

More locally, tourism has been particularly strong in the Queenstown-Lakes District. This has been helped along by investments in Queenstown Airport – one of the fastest growing airports in the world, and with many more domestic and international connections than it had only a few years ago. Total passenger numbers have grown by 81% in the last five years, with growth even faster in the international segment. The recent introduction of 'night flights', and future planned investments, should help to continue this strong growth.

The Queenstown-Lakes District is divided into two Regional Tourism Organisations (RTOs): Lake Wanaka and Queenstown. Our report focuses on the Lake Wanaka RTO.

## 4.2 Commercial Accommodation "Guest Nights"

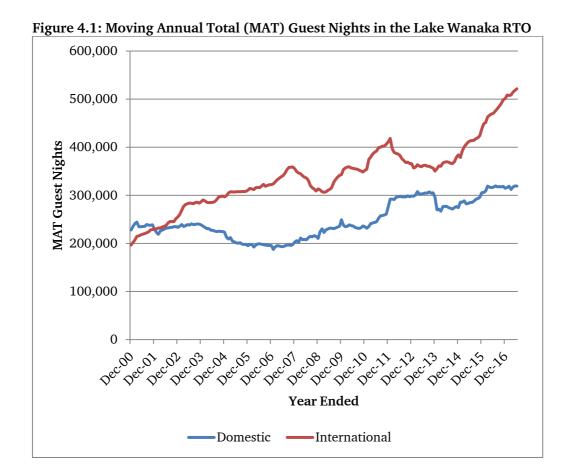
"Guest nights" are the number of nights stayed in commercial accommodation by visitors. For example, a couple staying in a hotel for two nights accounts for four guest nights.

The Commercial Accommodation Monitor covers guest nights stayed in hotels, motels, holiday parks and backpackers. As such, it excludes small-scale private accommodation providers, e.g. Airbnb hosts.

The Commercial Accommodation Monitor is a reliable source of information on guest nights in its four defined accommodation types. It is a good indicator of tourism activity, although it is less useful for areas where most visitors do not stay overnight, or where they tend to stay with friends or relatives rather than in commercial accommodation.

The Commercial Accommodation Monitor shows that guest nights in Wanaka (and Queenstown) have grown strongly in recent years, and are currently at record levels. Wanaka guest nights reached 840,000 for the year to June 2017, while Queenstown guest nights reached 3.55 million.

Figure 4.1 below shows the number of guest nights stayed by domestic and international guests in the Lake Wanaka RTO:



Source: Commercial Accommodation Monitor

Most guest nights in the Lake Wanaka RTO are from international guests: the figure has risen rapidly over the last few years, to 521,000 in the year to June 2017. Domestic guest nights have risen less dramatically, and have currently plateaued at around 319,000. Accommodation prices have increased significantly in the last couple of years, both in Wanaka and in other parts of New Zealand. This reflects high international demand and a lack of capacity growth. These higher prices are likely to be a factor behind the lower rate of growth in domestic guest nights.

There are a range of price and quality offerings within the commercial accommodation sector, ranging from 'holiday parks' through to 'hotels'. These also tend to have different occupancy rates and make differing levels of economic contribution to the district.

In the Lake Wanaka RTO, guest nights are split fairly evenly between the four accommodation types defined in the Commercial Accommodation Monitor. The relevant numbers are shown in Figure 4.2 below:

Figure 4.2: Lake Wanaka RTO Accommodation for the Year Ended June 2017

Accommodation Type	Establishments	Guest nights	Occupancy (%)	Average Stay (days)
	Latabilatilitetta		( /0)	Stay (uays)
Hotels	9	206,818	61.3%	2.2
Motels	21	212,693	69.4%	2.2
Backpackers	9	155,139	70.1%	2.0
Holiday Parks	6	266,099	23.8%	2.1
Total	45	840,749	44.0%	2.1

Source: Commercial Accommodation Monitor

In contrast to Queenstown – where hotels are now nudging above 80% average occupancy, indicative of strained capacity – Wanaka has not yet felt the same degree of pressure. This could change in the future, as Queenstown becomes more and more constrained and as Wanaka's tourism offering grows.

#### 4.3 Airbnb in the Queenstown-Lakes District

Airbnb is a "marketplace for people to list, discover, and book unique accommodation around the world", 7 with users able to book individual rooms within private dwellings, or to book entire homes for the period of their stay. Airbnb, Bookabach, and similar sites continue a long-running tradition of property owners making their properties available to short term guests. These arrangements can be known as homestays, bed & breakfasts, baches etc.

<sup>&</sup>lt;sup>7</sup> https://www.airbnb.co.nz/about/about-us

Airbnb is growing rapidly in New Zealand, and is especially popular in the Queenstown-Lakes District. According to Stuff.co.nz, 8 there are 2,000 hosts in the district, earning an average of \$8,600 in the year to March 2017 over 43 nights.

Economic consultancy Infometrics have also analysed the Airbnb data. 9 They noted that "some dwellings may have multiple Airbnb listings, but even so, Airbnb's claim of 2,000 listings translates to about 10% of Queenstown-Lakes' dwelling stock". They estimated that Airbnb accounted for around 180,000 guest nights, or around 4.2% of the total measured by the Commercial Accommodation Monitor.

Infometrics also noted that "Airbnb hosts have different expectations", e.g. "filling up spare rooms at peak times, or renting out their house periodically when they are out of town" – as such, they have much lower occupancy rates than commercial providers. For the Queenstown-Lakes District, they estimated Airbnb occupancy at 13.7% and commercial accommodation occupancy at 62.6%.

As such, while Airbnb is a growing influence and helping to provide more capacity for Queenstown and Wanaka visitors, it remains relatively small compared to the commercial accommodation sector.

## 4.4 Regional Tourism Estimates

Monthly Regional Tourism Estimates use EFTPOS data to estimate tourism spending at the RTO level, for both domestic and international visitors and across a range of spending categories. These estimates exclude GST and are in 'nominal' dollars.

The RCG Retail Sales Model uses the Regional Tourism Estimates data for three of the spending categories - "food and beverage serving services", "retail sales alcohol, food, and beverages", and "retail sales - other", as inputs for the model's 2016 base year. The first two of these categories match up with two of the store types in the Retail Sales Model, whereas "retail sales - other" is apportioned across several other store types.

The Regional Tourism Estimates for the Lake Wanaka RTO are shown in the two graphs below:

<sup>8</sup> http://www.stuff.co.nz/business/property/91179730/airbnb-boom-20000-properties-andcounting-in-new-zealand

<sup>9</sup> http://www.infometrics.co.nz/390000-airbnb-guest-nights-auckland-180000-queenstown/

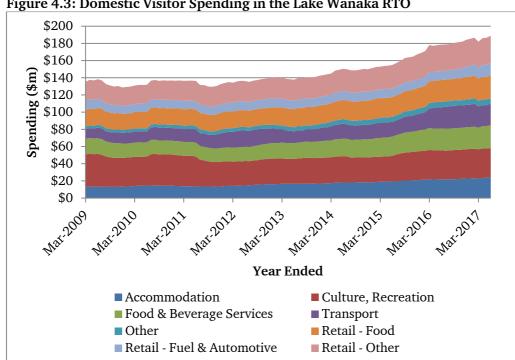


Figure 4.3: Domestic Visitor Spending in the Lake Wanaka RTO

Source: MBIE, RCG

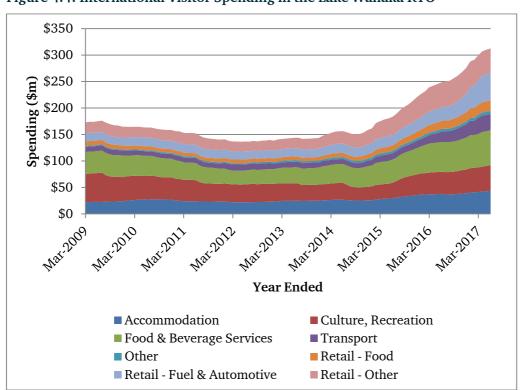


Figure 4.4: International Visitor Spending in the Lake Wanaka RTO

Source: MBIE, RCG

Figure 4.5: Visitor Spending in the Lake Wanaka RTO (\$m, Year Ended June 2017)

Spending Category	Domestic	International	Total
Accommodation	\$24.0	\$43.6	\$67.6
Culture, Recreation	\$34.2	\$48.5	\$82.7
Food & Beverage Services	\$26.3	\$66.2	\$92.4
Transport	\$25.4	\$30.4	\$55.8
Other	\$6.4	\$5.9	\$12.3
Retail - Food	\$26.6	\$19.8	\$46.4
Retail - Fuel & Automotive	\$14.8	\$52.4	\$67.1
Retail - Other	\$31.4	\$46.0	\$77.4
Total	\$189.0	\$312.7	\$501.7

Source: MBIE, RCG

Most tourism spending in the Lake Wanaka RTO is by international visitors, and this has now reached \$313 million a year. Domestic visitors are an important but slower-growing market, with spending of \$189 million a year.

International and domestic visitors both make a significant contribution to retail spending in Wanaka. The figures above, derived from EFTPOS spending data on what tourists currently spend in each part of New Zealand, suggests that tourists spend \$92 million on food & beverage services in the Wanaka area, along with \$46 million on retail food, \$67 million on fuel and automotive products, and \$77 million on other retail products.

## Retail Facilities in Wanaka

This section summarises the existing, approved and potential retail areas in Wanaka.

### 5.1 The "Existing Environment" for Retail

Wanaka has a compact and vibrant town centre. For brevity, we refer to the town centre as the "Wanaka CBD" in the remainder of this report.

The Wanaka CBD is currently home to most of the retailers in the area. A 2007 RCG report estimated that there was 15,707m² of "retail" space in the CBD. There has been very little space added since then, with the exception of 93 Ardmore St (home to the Wanaka Speight's Ale House). In addition, the CBD contains a mix of non-retail uses, including offices and visitor accommodation.

Wanaka's CBD is home to the only three substantial grocery stores/ supermarkets in the town: New World, Four Square and the Mediterranean Market. New World and Four Square are both Foodstuffs brands, whereas the Mediterranean Market is owned by wholesale company Bidvest. We estimate that these three food retailers total around 2,900  $\rm m^2$  of retail space between them – approximately 2,100  $\rm m^2$  for New World, 260  $\rm m^2$  for Four Square and 540  $\rm m^2$  for Mediterranean Market.

A small number of larger shops are located in Anderson Heights, which is generally more of a light industrial/ commercial area. RCG's 2007 report estimated that there was 2,459  $\rm m^2$  of trading space, and noted that some of these shops could be expected to relocate to Three Parks. Anderson Heights includes The Butcher's Block & Smokehouse, a butcher of approximately 350  $\rm m^2$ .

Cardrona Valley Road, the southern gateway to Wanaka, now includes various retail and commercial activities. It is already home to the Basecamp Wanaka climbing centre, Ruby's Cinema and the former Lone Star restaurant and bar. Other non-residential uses include Aspiring Lifestyle Retirement Village, Aspiring Enliven Care Centre, Mercure Oakridge Resort Lake Wanaka and West Meadows Motel. However, the former Lone Star is the only activity which would typically be included in retail demand models.

There is a retail development at Albert Town, just off the main highway. John Long's 2014 evidence for Northlake (for the PC45 hearings) estimated these shops at 1,000 m². However, the Albert Town site, which is zoned LSCZ under the PDP, covers 1.2 hectares and is therefore very underdeveloped. A future redevelopment of the site could potentially increase the area of retail space.

Three Parks has been identified as a major growth node for retail in the future, especially for LFR. It can include 10,000 m<sup>2</sup> of retail as a permitted activity (subject

to provisions which restrict the number of tenancies and their sizes). Further retail can be developed subject to a "Wanaka Town Centre Health Check". So far, Three Parks is undeveloped as to retail. Given the demand shown by our modelling work, it is surprising that retail development at Three Parks has not eventuated more quickly.

As noted earlier, no retail has been developed at Northlake to date, but the operative PC45 enables 1,000 m<sup>2</sup> of retail space, with shops of up to 200 m<sup>2</sup>. Resource consents for Northlake also form part of the "existing environment", although they are mainly non-retail: these include a childcare centre, health centre and restaurant.

Overall, we estimate that there is currently around 20,000 m<sup>2</sup> of retail space in Wanaka, excluding trade-oriented businesses such as PlaceMakers. <sup>10</sup> In addition, there is undeveloped retail capacity at Three Parks and Northlake which is already provided for under the Operative District Plan. This additional capacity is therefore part of the "existing environment" for planning and economic impact purposes.

#### 5.2 Other Potential Retail Areas

As noted in section 0, the provisions for the Gordon Family Trust's site on Cardrona Valley Rd are yet to be confirmed. John Polkinghorne's evidence argues in favour of the 2.7 hectare size, with no cap on retail and office activities. Some parties are arguing for a reduced size of 1 hectare, with these activities capped at 3,000 m<sup>2</sup>.

For the purposes of our 'economic effects assessment', we assume that the Cardrona Valley Rd site is indeed rezoned as a LSCZ of 2.7 hectares with no cap on retail and office activities.

<sup>&</sup>lt;sup>10</sup> We note that these businesses are now included in the Retail Trade Survey, although they were excluded at the time of our 2007 surveys and 2009 work for Three Parks

## 6. The RCG Retail Sales Model

RCG's Retail Sales Model can be used to estimate the "retail spending power" for a given area, and then translate it into demand for retail floor space.

As noted earlier, John Polkinghorne of RCG carried out a modelling exercise for the Wanaka catchment in 2016. This report uses the same model, but we have updated the model inputs to reflect the more recent projections which are now available.

#### 6.1 Model Overview

- "Retail spending power" is an estimate of how much money the households and businesses based in a catchment, and visitors to that catchment, are likely to spend on retail.
- Retail spending power is based on actual retail sales data at the national level (from the Retail Trade Survey), and allocated to catchments based on households and household incomes, employee numbers, and tourism spending.
- At the national level, RCG's model covers the entire "core" retail sector as defined by Statistics New Zealand (SNZ), with the exception of the "non-store and commission-based retailing" and "accommodation" store types.
- This equates to \$51.4 billion in nationwide retail sales in 2013, the "base" year of the model. Of this figure, around 53% is allocated to households, 32% to businesses and 15% to tourism.
- Beginning with the base year, 2013, we make projections of retail spending power in the future, based on our assumptions on household and business growth, income growth, and tourism spending growth.
- All dollar values in the modelling are "real", i.e. they are adjusted for inflation and presented in 2013 dollars. They exclude GST.
- Retail spending power leads to "floor space demand" that is, because people want to spend money in retail stores, there is a demand for retail floor space.
- The model calculates this by dividing the retail spending power figures by typical retailer performance factors, i.e. a benchmark "sales per square metre of leasable area" ratio for each store type.
- Retailers can be divided into large format retail (LFR) and "other" retail, i.e. smaller shops. LFR retailers are typically over 500 m2 in size, and include supermarkets, Rebel Sport, furniture stores, etc. The split between LFR and other retail is another important assumption of the model.

The table below shows the modelled assumptions as to the LFR/ other retail sales split, and sales per square metre, for each store type:

Figure 6.1: Assumed LFR/ Other Retail Sales Split, and Sales per Square Metre

Store Type	Assumed	Sales Split	Assumed Sales per Square Metre		
	LFR	Other	LFR	Other	
Food Retailing	80%	20%	\$14,000	\$7,000	
Department stores	100%	0%	\$3,200	n/a	
Furniture, floor coverings, houseware and					
textiles	75%	25%	\$2,500	\$5,500	
Hardware, building and garden supplies	75%	25%	\$2,200	\$3,500	
Recreational goods	40%	60%	\$3,000	\$5,500	
Clothing, footwear and personal accessories	15%	85%	\$2,400	\$5,500	
Electrical and electronic goods	70%	30%	\$7,000	\$8,000	
Pharmaceutical and other stores	0%	100%	n/a	\$5,500	
Food and beverage services	0%	100%	n/a	\$8,000	

Source: RCG

For example, the model defines all Food & Beverage Services space as small format, and assumes that these stores trade at \$8,000/m<sup>2</sup>.

The model assumes that 80% of Food Retailing sales are made in LFR stores (i.e. supermarkets and large grocery stores), and that these stores typically trade at  $$14,000/m^2$ . For the purposes of our report, we consider Four Square and the Mediterranean Market to be small format stores – they are significantly smaller than the major supermarket banners in NZ, or grocery stores such as Farro or Raeward Fresh.

The model only covers "core retail" businesses which focus on selling physical goods. It excludes service businesses and other users of retail space – such as banks, travel agents, real estate agents, or hairdressers and beauty services.

However, these users are significant, especially in Wanaka, which has an array of tourism service businesses in addition to the everyday ones. These are likely to add at least another 10% to the demand for retail floor space.

## 6.2 Income Adjustments

The Retail Sales Model assumes that catchments with median household incomes above the national median spend more on retail, and vice versa. It uses a linear adjustment, so households in a catchment with incomes 20% higher than the national median are assumed to spend 20% more than average.

The Wanaka median household income is almost identical to the national median (\$63,596 vs \$63,800) so in this case the adjustment is very small. However, this may understate the affluence and spending power of Wanaka households.

To use another measure, the NZDep2013 Index of Deprivation, produced by the University of Otago ranks areas across New Zealand from 1 (least deprived) to 10 (most deprived), based on a range of social and economic factors. Wanaka and Hawea are both scored 2 and Matukituki is scored 1, indicating low levels of deprivation.

Furthermore, EFTPOS spending data from one of the major trading banks suggests that, in the year to August 2015, the average spending for households living in Wanaka was around 13% higher than the national average.

This data is based on a 'sample' of households and covers one particular year, so we do not see it as being definitive, but again it tends to illustrate that our modelling may be conservative in estimating the spending power of Wanaka households.

## 6.3 Real Spending Multiplier

The Retail Sales Model assumes that retail spending per household (or per employee) grows by 1% per annum. This is conservative compared with historical rates of growth, averaging 2.2% over the last 12 years.

We view this 1% annual growth assumption, which we call a "real spending multiplier", as conservative throughout the modelling timeframe.

#### 6.4 Retail Demand from Visitors

Regional Tourism Estimates are in 'nominal' dollars, not 'real' dollars. Since the Retail Sales Model is based on real 2013 dollars, it is necessary to remove an assumed inflation figure from the Regional Tourism Estimates for consistency.

We do this using deflators from the Retail Trade Survey, based on price differences for the year to June 2013 compared with the year to June 2016 (the year used for the Regional Tourism Estimates model input).

Based on this, we have adjusted the Regional Tourism Estimates figures down by 5.2% for "food and beverage serving services", and by 2.6% for "retail sales - alcohol, food, and beverages". No adjustment is applied for "retail sales – other" as prices in most other retail categories have been roughly flat.

#### 6.5 Forecasting Tourism Spending

In the past, the Ministry of Tourism produced forecasts at the Wanaka level, but now forecasts are only made at the New Zealand level. The latest MBIE forecasts (updated in May 2017) assume that international tourism spending will grow by

5.9% in the year to March 2017, and at an annual rate of 5.3%-6.8% in the following five years, which is as far out as the forecasts go.

The MBIE forecasts will be on a nominal basis, so include an inflation component. We expect this is 2%, although this is not made explicit in the current forecasts.

The forecasted growth rates would have been seen as overly optimistic a few years ago – the 2013 tourism forecasts showed growth in the 2-3% range, barely more than the 2% assumed inflation. Those forecasts completely failed to predict the huge upturn in the last three years.

Over the long term, these upturns and downturns should cancel out to some extent, so that a smoother rate of growth can be assumed – but there is still uncertainty over what that rate should be, and it is appropriate to apply sensitivities.

For international tourism spending, we look at (real) growth of 1% to 4% per annum. Even the high end of this range is comparable to MBIE's forecasts for the next six years. However, our modelling covers a multi-decade period and it would be highly speculative to apply high rates over such a long time. Our 'preferred' growth rate for international tourism spending, used in our summary modelling tables, is 3%.

For domestic tourism spending we look at (real) growth of 1% to 3% per annum. As noted earlier, the domestic market tends to be steadier. The logic used in our 2009 research for Three Parks remains quite relevant: if household numbers around New Zealand are increasing by around 1% annually, and 'real spending growth' per household rises by 1% annually, then 2% is a reasonable guess of how domestic tourism spending could grow.

We note a typo in the text of John Polkinghorne's 2016 evidence – his 'preferred' growth rate for domestic tourism spending was 2% as shown in the tables, not 3% as mentioned in paragraph 57 of the text. We retain the 2% 'preferred' assumption for domestic tourism spending growth in this report.

Lastly, as outlined in section 3.3, Rationale Ltd's projections show average visitor numbers rising by 2.4% per annum, in a similar range to our 'preferred' projections – especially given the potential for spending to rise somewhat faster than visitor numbers.

#### 6.6 "Wanaka" Catchment Definition

Except where otherwise noted, our modelling is based on the commonly accepted Wanaka catchment. This comprises the Wanaka, Hawea and Matukituki area units, equivalent to the Lake Wanaka RTO and the Wanaka Ward. The map below shows

the Wanaka catchment in yellow (along with the catchment often defined for Queenstown in orange, taking in the remainder of the Queenstown-Lakes District).

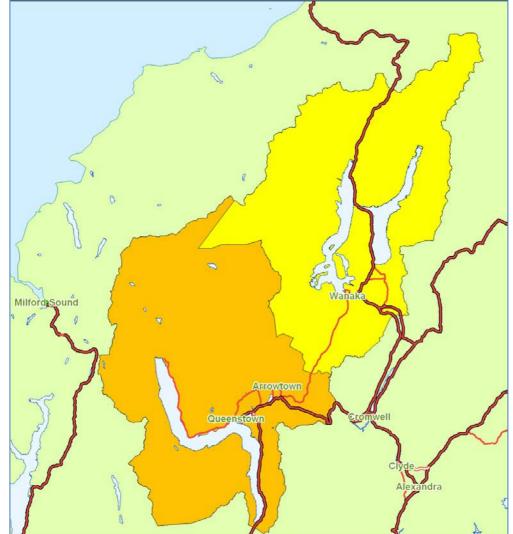


Figure 6.2: The Wanaka and Queenstown Catchments

Source: RCG

## 6.7 "Northern Wanaka" Catchment Definition

We also show a more limited modelling exercise, looking at 'Northern Wanaka". This is essentially the northern parts of the town that, as noted by Carriageway Consulting, "are closer to the proposed [Northlake] grocery store than to the New World supermarket in the town centre". 11

 $<sup>^{11}</sup>$  Letter from Andy Carr of Carriageway Consulting to Marc Bretherton of Northlake Investments Limited, dated 11 September 2017

Carriageway Consulting estimate that there will be 3,395 lots/ homes which will have Northlake as their closest supermarket/ major grocery store:

• Peninsula Bay: 350 residences;

• 30% of Eely Point: 260 residences;

Kirimoko: 300 residences;

• Aubrey Road: 215 residences;

• Albert Town: 900 residences;

• Hikuwai: 200 residences;

Allenby Farms: 350 residences;

• Northlake: 800 residences; and

• Urquhart land: 20 residences.

These subdivisions, along with some other areas which are closer to the New World, are shown below:

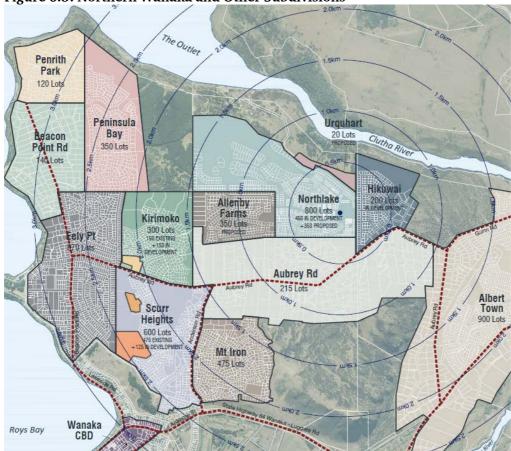


Figure 6.3: Northern Wanaka and Other Subdivisions

Source: Paterson Pitts Group

## 7. Retail Demand in Wanaka

As noted in section 2.3, RCG carried out a retail modelling analysis for the Wanaka market in 2016. For this report, we have updated our analysis, using the same model but based on the more recently released population projections.

## 7.1 Tourism Spending in Wanaka

Our modelling results for tourism spending in Wanaka are unchanged from our 2016 work. We take a simple modelling approach: current tourism spending is split into domestic and international spending, and across a range of store types, and then projected forward at constant rates of growth.

According to *MBIE's* Regional Tourism Estimates, visitors spent the following amounts on retail in Wanaka in the year to June 2016:

- Food and beverage serving services: \$23 million domestic, \$57 million international;
- Retail sales alcohol, food, and beverages: \$21 million domestic, \$14 million international;
- Retail sales other: \$28 million domestic, \$48 million international.

Our modelling converts these sales figures to 'floor space demand' for the year to June 2016. Note that the sales are 'deflated' back to 2013 prices, as noted earlier. We estimate the following floor space demand for tourists in Wanaka in 2016:

Figure 7.1: 2016 Floor Space Demand in Wanaka from Tourists (m<sup>2</sup>)

Store Type	LFR	Other Retail	Total
Food Retailing	1,954	977	2,931
Department stores	8,289	0	8,289
Furniture, floor coverings, houseware and textiles	0	0	0
Hardware, building and garden supplies	0	0	0
Recreational goods	1,439	1,178	2,617
Clothing, footwear and personal accessories	702	1,735	2,437
Electrical and electronic goods	0	0	0
Pharmaceutical and other stores	0	3,623	3,623
Food and beverage services	0	9,482	9,482
Total	12,384	16,995	29,379

Source: RCG

 $<sup>^{12}</sup>$  Although our modelling is based on the year to June 2016, we note that spending has risen further in the year to June 2017.

This demand is entirely based on spending which already occurs in Wanaka. The model translates this spending into demand for different store types based on national-level patterns, some of which may initially seem odd in the Wanaka context – for example, Wanaka does not have a full-range department store, so in practise this demand is likely to be satisfied by other stores at present.

The retail floor space demand from visitors will grow over time. As noted earlier, forecasting tourism growth patterns is difficult. we adopt a sensitivity range of 1% to 4% real annual growth for international visitors (all of which are lower than current MBIE forecast growth rates at the New Zealand level), and 1% to 3% for domestic visitors.

The table below shows the modelled floor space demand for Wanaka, as a result of tourism retail spending in the area.

2028 Floor Space Demand in Wanaka from Tourists (m<sup>2</sup>)

	ar ar apulo	Domestic Spending Growth Rate							
		1.0%	1.5%	2.0%	2.5%	3.0%			
late	1.0%	33,105	33,759	34,449	35,178	35,947			
wth F	1.5%	34,472	35,126	35,816	36,545	37,314			
ng Gro	2.0%	35,915	36,569	37,260	37,988	38,757			
oendir	2.5%	37,439	38,092	38,783	39,511	40,280			
nal S	3.0%	39,046	39,700	40,390	41,119	41,887			
International Spending Growth Rate	3.5%	40,741	41,395	42,085	42,814	43,583			
Inte	4.0%	42,529	43,183	43,873	44,602	45,371			

Source: RCG

This table illustrates that, using the 'preferred' growth assumptions, visitors to the Wanaka RTO will create demand for  $40,390 \text{ m}^2$  of retail floor space as at 2028. Sensitivities around the growth assumptions show some of the other potential outcomes, from  $33,105 \text{ m}^2$  to  $45,371 \text{ m}^2$  in 2028.

This compares with the 'current' 2016 demand of 29,379 m². Of course, even this figure is much higher than it would have been in 2012 or 2013, given the large spending increases in that time.

We have selected 2028, 12 years out from 2016, as an example to show the results of using different sensitivities. Growth would be expected to continue beyond this point.

### 7.2 Household and Business Spending in Wanaka

The table below shows the modelled floor space demand from households and businesses based in Wanaka in 2028:

Figure 7.2: 2028 Floor Space Demand in Wanaka from Households and Businesses (m<sup>2</sup>)

Projection					
Low	Medium	High	QLDC		
31,980	35,306	38,852	36,672		

Source: RCG

This table illustrates that, using the 'preferred' QLDC projection (i.e. the "modified growth" projection from Rationale Ltd), households and businesses based in Wanaka will create demand for  $36,672~\text{m}^2$  of retail floor space as at 2028. Different projections show some of the other potential outcomes, from  $31,980~\text{m}^2$  to  $38,852~\text{m}^2$  in 2028. Growth is of course expected to continue beyond 2028.

Comparing the above results for 2028 to the results shown in John Polkinghorne's 2016 work, it is noteworthy that most of these projections have lifted by around  $5,000~\text{m}^2$ . This is entirely due to the lift in expected household numbers. Indeed, a large part of the lift is due to higher growth in the 2013-2018 period, which is to say that there has already been a large lift in Wanaka's ability to support retail – due to its recent and ongoing building boom.

Demand was  $18,023 \text{ m}^2$  in the model's base year of 2013, and based on the QLDC projection it reached 22,077 m<sup>2</sup> in 2016.

The table below shows the modelled floor space demand from households and businesses based in Wanaka over the 2013-2038 period. It uses our 'preferred' assumptions, i.e. the QLDC/ Rationale Ltd "modified growth" household projections:

Figure 7.3: 2013-2038 Floor Space Demand in Wanaka from Households and Businesses (m<sup>2</sup>)

Businesses (m <sup>2</sup> )	0010	0010	0000	0000	0000	0000
Store Type	2013	2018	2023	2028	2033	2038
Large Format Retail (LFR)		0.5			<b>_</b>	
Food Retailing	2,322	3,209	3,934	4,725	5,427	6,187
Department stores	2,268	3,135	3,843	4,615	5,300	6,043
Furniture, floors, houseware,				2 = 26		
textiles	1,330	1,838	2,253	2,706	3,107	3,543
Hardware, building and garden	2.000	F F1.4	6.760	0.110	0.004	10 (01
supplies	3,990	5,514	6,760	8,119	9,324	10,631
Recreational goods	391	541	663	796	914	1,042
Clothing, footwear and accessories	409	566	694	833	957	1,091
Electrical and electronic goods	581	803	985	1,183	1,358	1,549
Pharmaceutical and other stores	0	0	0	0	0	0
Food and beverage services	0	0	0	0	0	0
Total	11,293	15,605	19,132	22,978	26,388	30,086
Other Retail (Specialty)						
Food Retailing	1,161	1,605	1,967	2,363	2,713	3,094
Department stores	0	0	0	0	0	0
Furniture, floors, houseware,		J		, ,		, ,
textiles	201	278	341	410	471	537
Hardware, building and garden						
supplies	836	1,155	1,416	1,701	1,954	2,227
Recreational goods	320	442	542	651	748	853
Clothing, footwear and accessories	1,012	1,399	1,715	2,060	2,365	2,697
Electrical and electronic goods	218	301	369	444	509	581
Pharmaceutical and other stores	1,663	2,298	2,817	3,383	3,886	4,430
Food and beverage services	1,318	1,822	2,233	2,682	3,080	3,512
Total	6,730	9,300	11,402	13,694	15,726	17,930
Total, All Retail						
Food Retailing	3,483	4,814	5,902	7,088	8,140	9,281
Department stores	2,268	3,135	3,843	4,615	5,300	6,043
Furniture, floors, houseware,	2,200	3,133	3,043	4,013	3,300	0,043
textiles	1,531	2,116	2,594	3,116	3,578	4,080
Hardware, building and garden	1,001	2,110	2,071	0,110	0,070	1,000
supplies	4,826	6,670	8,177	9,821	11,278	12,859
Recreational goods	711	983	1,205	1,447	1,662	1,895
Clothing, footwear and accessories	1,422	1,965	2,409	2,893	3,322	3,788
Electrical and electronic goods	799	1,105	1,354	1,626	1,868	2,129
Pharmaceutical and other stores	1,663	2,298	2,817	3,383	3,886	4,430
Food and beverage services	1,318	1,822	2,233	2,682	3,080	3,512
Total	18,023					48,016
IVIAI	10,023	24,906	30,534	36,672	42,114	40,010

Source: RCG

This table illustrates that households and businesses in Wanaka created demand for  $18,023~\text{m}^2$  of retail floor space as at 2013. This will grow over time, to  $36,672~\text{m}^2$  by 2028 and  $48,016~\text{m}^2$  by 2038.

## 7.3 Total Demand from Visitors, Households and Businesses

The table below shows the total retail floor space demand from households, businesses and visitors in Wanaka, based on our various 'preferred' assumptions as outlined above.

Figure 7.4: 2013-2038 Floor Space Demand from Visitors, Households and

<b>Businesses</b> (Pr	eferred Assum	ptions.	$m^2$
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<b>Businesses (Preferred Assumptions,</b>						
Store Type	2013	2018	2023	2028	2033	2038
Large Format Retail (LFR)						
Food Retailing	3,769	5,258	6,242	7,326	8,360	9,497
Department stores	6,466	11,894	13,901	16,168	18,575	21,302
Furniture, floors, houseware, textiles	1,330	1,838	2,253	2,706	3,107	3,543
Hardware, building and garden						
supplies	3,990	5,514	6,760	8,119	9,324	10,631
Recreational goods	1,438	2,046	2,346	2,679	3,021	3,402
Clothing, footwear and accessories	772	1,307	1,543	1,808	2,076	2,376
Electrical and electronic goods	581	803	985	1,183	1,358	1,549
Pharmaceutical and other stores	0	0	0	0	0	0
Food and beverage services	0	0	0	0	0	0
Total	18,347	28,660	34,030	39,989	45,822	52,299
Other Retail (Specialty)						
Food Retailing	1,885	2,629	3,121	3,663	4,180	4,749
Department stores	0	0	0	0	0	0
Furniture, floors, houseware, textiles	201	278	341	410	471	537
Hardware, building and garden	201	2/0	311	110	1/ 1	337
supplies	836	1,155	1,416	1,701	1,954	2,227
Recreational goods	1,177	1,674	1,919	2,192	2,472	2,783
Clothing, footwear and accessories	1,909	3,231	3,817	4,471	5,133	5,874
Electrical and electronic goods	218	301	369	444	509	581
Pharmaceutical and other stores	3,516	6,126	7,210	8,426	9,677	11,083
Food and beverage services	7,235	11,824	13,671	15,766	18,055	20,658
Total	16,976	27,219	31,864	37,072	42,450	48,492
Total, All Retail						
Food Retailing	5,654	7 007	9,364	10.000	12 540	14 246
	-	7,887		10,990	12,540	14,246
Department stores	6,466	11,894	13,901	16,168	18,575	21,302
Furniture, floors, houseware, textiles Hardware, building and garden	1,531	2,116	2,594	3,116	3,578	4,080
supplies	4,826	6,670	8,177	9,821	11,278	12,859
Recreational goods	2,615	3,719	4,265	4,870	5,493	6,185
Clothing, footwear and accessories	2,680	4,538	5,360	6,279	7,209	8,250
Electrical and electronic goods	799	1,105	1,354	1,626	1,868	2,129
Pharmaceutical and other stores						11,083
Food and beverage services	3,516 7,235	6,126 11,824	7,210	8,426 15,766	9,677 18,055	20,658
Total			13,671			
I Otal	35,323	55,879	65,895	77,062	88,272	100,791

Source: RCG

This table illustrates that households, businesses and tourists in Wanaka created demand for  $35,323 \text{ m}^2$  of retail floor space as at 2013. This will grow over time, to  $77,062 \text{ m}^2$  by 2028 (i.e. more than double the 2013 demand) and  $100,791 \text{ m}^2$  by 2038 (almost triple the 2013 demand).

These results show very significant growth in demand over the next 20+ years. Indeed, there has been significant growth even since 2013. Furthermore, Wanaka is currently undersupplied with retail space – with perhaps  $20,000 \text{ m}^2$  of existing shops, as outlined in section 5.

As such, Wanaka will be able to support substantial increases in its retail offering – indeed, it could accommodate substantial increases already.

## 7.4 Food Retailing Demand

Figure 7.4 above estimates total food retail demand at  $5,654 \text{ m}^2$  in 2013, and projects it to be  $7,887 \text{ m}^2$  in 2018. This will grow over time, to  $10,989 \text{ m}^2$  by 2028 and  $14,246 \text{ m}^2$  by 2038.

Looking at LFR food retailing in particular – i.e. supermarkets and other large grocery stores – demand was estimated at  $3,769 \text{ m}^2$  in 2013, and is projected to be  $5,258 \text{ m}^2$  in 2018. This will continue to grow over time, to  $7,326 \text{ m}^2$  by 2028 and  $9,497 \text{ m}^2$  by 2038.

As stated in section 5.1 above, Wanaka currently has around  $3,250 \, \mathrm{m}^2$  of food retailing space from New World, Four Square, the Mediterranean Market and The Butcher's Block & Smokehouse. There are also at least two dairies/ convenience stores. Overall, Wanaka is clearly undersupplied with food retailing stores at present.

Our view is that a supermarket is likely to be developed at Three Parks within the next few years, as part of a larger 'first stage' of retail development. This would most likely be a full-size supermarket offering, of say  $3,000 \, \text{m}^2 - 4,000 \, \text{m}^2$ . This would take Wanaka's food retailing "supply" to  $6,500\text{-}7,500 \, \text{m}^2$ . Even at the upper end of this range, this would still be short of the 2018 "demand", projected to be  $7,887 \, \text{m}^2$ , and the undersupply would steadily increase over time.

## 7.5 Retail Demand in "Northern Wanaka"

In this section, we run our RCG Retail Sales Model for the "Northern Wanaka" area described in section 6.6. Essentially, it is the 3,395 residential lots/ homes/ proposed future homes which are closer to the Northlake shops than to the New World supermarket.

Figure 7.5: Retail Demand in "Northern Wanaka

Store Type	2013	2018	2023	2028	2033	2038
Large Format Retail (LFR)	- 2013		_ 2023		2033	
Food Retailing	1,762	1,852	1,947	2,046	2,151	2,260
Department stores	1,571	1,651	1,736	1,824	1,917	2,015
Furniture, floor coverings, houseware and	1,5/1	1,031	1,730	1,027	1,717	2,013
textiles	564	593	623	655	688	723
Hardware, building and garden supplies	884	929	976	1,026	1,079	1,134
Recreational goods	287	302	317	333	350	368
Clothing, footwear and personal	207	302	317	333	330	300
accessories	200	210	221	232	244	257
Electrical and electronic goods	216	227	239	251	264	277
Pharmaceutical and other stores	0	0	0	0	0	0
Food and beverage services	0	0	0	0	0	0
Total	5,485	5,765	6,059	6,368	6,692	7,034
Total	3,703	3,703	0,039	0,300	0,092	7,034
Other Retail (Specialty)						
Food Retailing	881	926	973	1,023	1,075	1,130
Department stores	0	0	0	0	0	0
Furniture, floor coverings, houseware and						
textiles	85	90	94	99	104	110
Hardware, building and garden supplies	185	195	205	215	226	238
Recreational goods	235	247	259	273	286	301
Clothing, footwear and personal						
accessories	495	520	547	575	604	635
Electrical and electronic goods	81	85	90	94	99	104
Pharmaceutical and other stores	504	529	556	585	614	646
Food and beverage services	1,080	1,135	1,192	1,253	1,317	1,384
Total	3,546	3,727	3,917	4,117	4,327	4,547
Total, All Retail						
Food Retailing	2,644	2,779	2,920	3,069	3,226	3,390
-	-			-		-
Department stores	1,571	1,651	1,736	1,824	1,917	2,015
Furniture, floor coverings, houseware and	6.40	600	717	754	702	022
textiles	649	682	717	754	792	833
Hardware, building and garden supplies	1,069	1,124	1,181	1,241	1,305	1,371
Recreational goods	522	548	576	606	637	669
Clothing, footwear and personal	60F	791	760	907	0.40	002
accessories	695	731	768	807	849	892
Electrical and electronic goods	297	312	328	345	363	381
Pharmaceutical and other stores	504	529	556	585	614	646
Food and beverage services	1,080	1,135	1,192	1,253	1,317	1,384
Total	9,031	9,491	9,976	10,484	11,019	11,581

This analysis assumes that each of the 3,395 potential properties is home to one household, and ignores all tourism and business spending. From the model's 'base year' of 2013, we then increase the level of spending by 1% per annum in line with our "real spending multiplier" (see section 6.3).

Our analysis here is simplistic – of course, it will be some years before the 3,395 potential properties are all developed for housing. Some homes will be used as holiday homes, although of course tourists (and businesses/ employees) will also contribute to spending.

Even so, this analysis shows the spending power of a catchment of 3,395 households (with Northlake, of course, making up almost half of that). If fully developed for housing and occupied by permanent households, these Northern Wanaka areas could support 9,491 m<sup>2</sup> of retail space in 2018, growing to 10,484 m<sup>2</sup> in 2028.

This retail demand is split across various store types and formats, but there are significant contributions from food retailing (both LFR and small format) and food & beverage, store types which are often found in smaller neighbourhood/ convenience retail areas.

If fully developed in 2028, Northern Wanaka could support 2,046 m<sup>2</sup> of LFR food retailing space and another 1,023 m<sup>2</sup> of small format space, for a total of 3,069 m<sup>2</sup> food retail.

Our model assumes that all LFR food retailers trade at  $$14,000/m^2$  and all small format retailers trade at  $$7,000/m^2$ . In reality, performance varies widely. Full-size supermarkets tend to trade more strongly as households use them for their "main" shopping rather than just "top-up" shopping. Retailers in better locations, with access to a larger customer base, will also trade more strongly than those in weaker locations. Furthermore, food retailers can still be viable if their sales are lower than the levels assumed in our model.

Given the above, food retailers in this catchment (e.g. at Northlake) may well trade at lower levels than our model assumes. As such, they may account for a smaller share of the Northern Wanaka demand (and the total Wanaka demand) than would otherwise be indicated.

Our brief analysis in this section gives us further confidence that the proposed changes to enable a larger Northlake retail offering can be supported by the local market.

## 8. Assessment of Economic Effects

## 8.1 Clarifying the Extent of the Proposed Changes

The ODP allows for 1,000 m<sup>2</sup> of retail GFA in Northlake, with individual tenancies of up to 200 m<sup>2</sup>. These rules constitute part of the "existing environment" for retail in Wanaka.

"Neighbourhood" retailing in Northlake is further supported by a higher density of residential in the surrounding area, and by other non-residential uses also being encouraged in the AA-D1 area.

As noted earlier, the proposed plan change will increase the amount of retail space permitted in Northlake from  $1,000~\text{m}^2$  to  $2,500~\text{m}^2$  GFA. This includes a single large tenancy of up to  $1,250~\text{m}^2$  GFA.

Essentially, the area of small shops will be  $1,250 \text{ m}^2$  rather than the current  $1,000 \text{ m}^2$ , and there will be an additional larger tenancy of up to  $1,250 \text{ m}^2$  – not currently provided for in the zone. Our assessment of economic effects considers these proposed changes, compared with what is currently provided for. We focus on the single larger tenancy of up to  $1,250 \text{ m}^2$ , as this is the most important change.

## 8.2 Modelling Results: Demand and Supply

Our modelling results in section 7 show that Wanaka had "demand" for 35,323 m² of retail floor space in 2013. This predates the tourism boom (2014 onwards). Factoring in more recent information on tourism spending and population growth, demand is likely to reach 55,879 m² next year (2018).

In the period to 2028 – roughly, a 10-year planning horizon – we project demand reaching 77,062 m<sup>2</sup> (i.e. more than double the 2013 demand). The level of demand will continue to grow strongly thereafter.

By comparison, Wanaka currently has approximately 20,000 m<sup>2</sup> of existing shops, as estimated in section 5. This is a substantial undersupply and it continues to grow.

Looking just at LFR food retailing, demand will increase from  $5,258 \text{ m}^2$  in 2018 to  $7,326 \text{ m}^2$  by 2028. Current 'supply' consists of a single small New World. Wanaka is also undersupplied with small format food stores, with the Mediterranean Market, Four Square and The Butcher's Block the only notable retailers.

#### 8.3 Effects on the Wanaka CBD and Three Parks

Our assessment considers whether there is potential for Northlake to have adverse effects or 'impacts' on other centres. Trade competition effects are excluded from consideration under the Resource Management Act, as competition is generally considered to be healthy and help markets to function. This is a part of providing for economic wellbeing.

Instead, our assessment focuses on the potential for "significant" amenity effects, or for other centres to be "undermined". These effects are relevant under the Resource Management Act.

The key centres to consider are the Wanaka CBD and Three Parks: they are significant centres with a mix of activities (potentially, in the case of Three Parks), and have important functions in terms of enabling community wellbeing and providing amenity.

Anderson Heights is a mixed commercial area with a retail component, but it does not have a significant centre function or provide significant amenity. The Albert Town shops are small in scale, with no significant centre function.

"Cumulative" impacts are relevant for economic assessments. That is, even if one development by itself will not have an impact, it is prudent to consider the potential impacts if several developments go ahead at once. As such, in considering the potential for economic impacts on the Wanaka town centre and Three Parks, we assume that the Gordon Family Trust's site is rezoned as a LSCZ of 2.7 hectares with no restrictions on floor space.

As noted in section 8.2, Wanaka already has an undersupply of retail space, and demand will continue to grow strongly in the future. This creates a clear rationale for providing for extra retail space.

As Wanaka becomes a busier tourism destination, we anticipate the Wanaka CBD shifting to more of a tourism focus, with other retail environments providing for local shoppers. This transition is already underway in Queenstown.

Growth in retail floor space demand will maintain the amenity of the Wanaka CBD, and allow some local-oriented retail to move to Three Parks and other suburban centres (including Northlake) without having an impact on the town centre.

If retail activities are not allowed to expand outside of the Wanaka CBD, the CBD will have to shoulder the shopping needs of both locals and tourists. However, the CBD is constrained in its area, and both of the main customer groups are expected to grow strongly. The risk here is that the amenity of the CBD is reduced (e.g. through

congestion, pressure on infrastructure etc) or that Wanaka retailers are not able to make the most of the opportunity to sell to tourists – with some even potentially priced out of the leasing market.

Given the above, retail at Northlake will provide something of a 'pressure release valve' for the Wanaka CBD – allowing it to make the most of the tourism opportunity, and continue to provide an attractive and commercially vibrant offering for the town. We see this as a positive economic effect. However, we do consider the potential for negative effects on the Wanaka CBD and Three Parks below.

#### The Wanaka CBD

The Wanaka CBD trades very strongly. This is evidenced by the substantial tourism spending which is recorded in the Wanaka area, the very significant population growth in the area, and the relative lack of new space which has been provided in recent years, despite what our modelling shows as very high demand.

This is also reflected in retail rents for Wanaka, which are much higher than for most New Zealand towns. A recent research report by Colliers shows Wanaka CBD rents ranging from \$575-\$730/m² net, with "low" supply and "high" demand. 13

The CBD performs well and offers excellent amenity. However, it is constrained in its ability to grow and respond to the very strong demand growth expected in Wanaka, even allowing for 'transitional' CBD areas. This situation was recognised a decade ago, which ultimately led to Three Parks being approved – although, as noted elsewhere, Three Parks remains largely undeveloped to date.

Notwithstanding the constraints on the Wanaka CBD, it provides a very attractive retail core, centrally located for the town and for the many visitors. It has unique amenity next to the lake, a number of non-retail uses which support the CBD and provide a point of difference, and will remain by far the top retail destination in the Wanaka catchment.

Northlake will provide a much smaller and more limited retail offer, focused on local residents' convenience needs. Even in conjunction with planned or potential developments at Three Parks, Cardrona Valley Rd and elsewhere, our view is that there is no potential for significant impacts on the Wanaka CBD's role or function.

13

http://www.colliers.co.nz/~/media/New%20Zealand%20Website/Files/Research/Specialty%2 0Reports/Queenstown%20Dunedin%20%20Wanaka%20%20Market%20Review%20And%20O utlook%202017.ashx

#### **Three Parks**

Three Parks has a number of advantages for attracting retailers:

- It has potential for 10,000 m<sup>2</sup> of LFR-focused retail initially, and could theoretically accommodate more subject to 'health checks' etc;
- It is the only zoned site in Wanaka able to accommodate full-size supermarkets, department stores or hardware stores;
- With these potential 'anchors', it should also be an attractive location for a shopping centre, including national brands and fashion offerings;
- It is already home to the Wanaka Recreation Centre, will be home to a primary school from 2019, and has potential for a range of other uses;
- It is centrally located, with access from SH6 and Ballantyne Rd.

Three Parks is likely to accommodate the majority of Wanaka's retail growth in the next 20-30 years. Its main competitors will be the retail centres in Frankton, Queenstown. Northlake will have a much smaller retail offering than Three Parks, along with a narrower range of other non-residential uses. It will also be mainly attractive to shoppers living in Northlake or in 'Northern Wanaka' generally, whereas Three Parks will be able to serve the entire Wanaka catchment.

Furthermore, Northlake's offering will mainly consist of small convenience-oriented shops and service providers, whereas Three Parks is planned to initially consist mainly of LFR. The main area of competition between the two centres will be in food retailing. Our clear view is that this is 'trade competition' only, with Northlake not having the potential to undermine the larger centre at Three Parks – given the significant difference in scale, and the major growth in demand.

The level of retail demand growth means that any effects on existing centres are likely to be minor and short-lived. Development could occur simultaneously in Three Parks, Cardrona Valley Rd and Northlake without any centres being impacted.

#### 8.4 Comments on John Long's 2014 Evidence

We outline some of the relevant points from John Long's 2014 evidence below. Paragraph references are to his Statement of Evidence dated 31 October 2014 before the Environment Court:

- "Given the location of the shops in the centre of Northlake, away from the main highway and other passing traffic, the main customer catchment will be people living or staying [in Northlake]" (paragraph 2.12).
- Northlake shops would be "independent retailers... of a subsistence nature", with low rents and potentially difficulties for the landlord in "attracting tenants... and keeping them trading". The shops would be provided more as

- an amenity for local residents, rather than as a commercial opportunity for the developer (paragraphs 2.18-2.20 and elsewhere).
- Given the above, and Three Parks' assumed attractiveness for national or regional chains on a commercial basis, "the possibility of Northlake preventing (or even affecting) tenant uptake at Three Parks is at least 'less than minor', and probably non-existent' (paragraph 2.12).
- John Long supported "the inclusion of a small retail cluster at Northlake for local lifestyle and amenity reasons in the expectation that this will have no significant offsite retail effects" (paragraph 10.1).

The economic environment in Wanaka has changed significantly since 2014. Wanaka (and New Zealand) has had a prolonged tourism boom beginning in 2014, as well as a housing boom which also began in 2014-2015. Retail demand in Wanaka has grown much faster than would have been anticipated, with tourism the main driver. Conversely, Three Parks has been slower to develop than might have been expected in 2014: its planning rules were made operative in January 2011 but no retail has eventuated to date.

While housing development and tourism have both accelerated significantly, there has been little accompanying infrastructure to support this growth. Supply of non-residential land and commercial space has not kept pace with demand. Wanaka now has a clear undersupply of retail space across most store types, in particular large format food retailing.

The strong demand has meant that housing uptake at Northlake has been much faster than would have been anticipated. It has also boosted demand for new commercial activities and services. As noted earlier, Northlake will soon get underway with its first stage of commercial development – including existing Wanaka businesses that plan to open a second location. This initial stage will include a health centre, childcare centre and restaurant.

The broader mix of activities now planned at Northlake will make it more of a destination than if it had simply had 1,000 m² of small shops, and allow it to draw people from a wider catchment. As such, we now anticipate Northlake retailers will not be limited to "people living or staying [in Northlake]" as in John Long's evidence above. They will be able to access a larger catchment which we have defined as Northern Wanaka.

Similarly, a small supermarket of  $1,250~\text{m}^2$ , as is now being proposed, will act as an 'anchor' for retail activity and help Northlake to draw from this wider Northern Wanaka catchment. However, the shops are still away from the highway and passing traffic. This will act to limit their scale and focus, such that their main customer base will be people living or staying in fairly close proximity, i.e. in Northern Wanaka.

John Long's main conclusion – that Northlake retail will support "local lifestyle and amenity" and "have no significant offsite retail effects" – remains valid even with the larger retail offering now proposed.

## 9. Conclusions

Under current planning rules, Northlake can include  $1,000 \text{ m}^2$  of small shops. Under the proposed rules, it will be able to include  $2,500 \text{ m}^2$  of retail, comprising  $1,250 \text{ m}^2$  of small shops and a larger tenancy of  $1,250 \text{ m}^2$ , likely to be a small supermarket or large grocery store.

Based on our economic assessment, we conclude that the proposed increase in Northlake's retail offering will promote sustainable and efficient outcomes.

Northlake households – likely to include a mix of families, 'empty nesters' and potentially retirees in a proposed retirement village – will have local amenity and convenient access, often within walking distance. The retail offering will also help to support higher housing densities in AA-D1 (and vice versa).

Residents (and visitors) in the northern parts of Wanaka will be able to satisfy some of their everyday needs locally, without needing to drive to a more distant centre such as the CBD or Three Parks. This will supplement the Wanaka CBD, and assist it in maintaining an attractive, pedestrian-focused environment while promoting visitor spending growth.

Our retail demand analysis shows that there is a significant undersupply of retail in Wanaka, especially in food retailing. There is also major demand growth forecast – and growth to date has exceeded expectations, for both population and tourism growth. Within the next few years, Wanaka could accommodate several more major food retailers, potentially including a full-size supermarket at Three Parks and a smaller store at Northlake.

Overall, we conclude that the retail and other non-residential offering at Northlake will help to better provide for the wellbeing of Wanaka residents. The probability of significant effects on the Wanaka CBD or Three Parks is negligible.