Appendix 5a: Electricity Supply Confirmation

Aurora

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.

Aurora Energy Limited
10 Halsey Street • Dunedin • New Zealand
Email enquiries @auroraenergy.co.nz
Postal PO Box 1404
Phone 03-474-0322
Fax 03-477-5771

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.

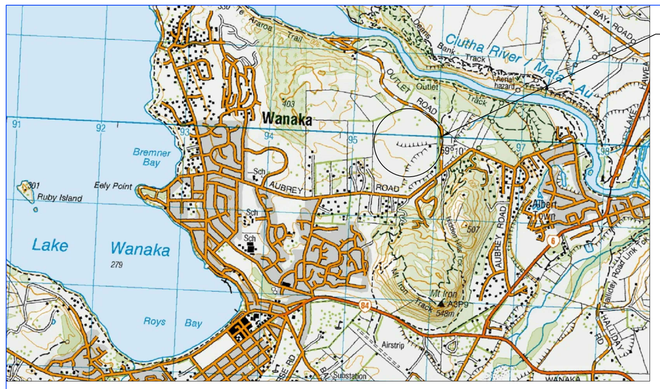
Yours sincerely

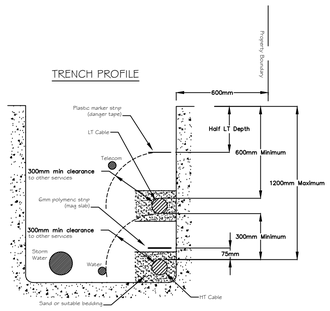
Alec Findlater
COMMERCIAL MANAGER (Delta)

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





Other services (e.g. Telecom, water, drainage) to have minum 300mm separation from power cables. (Refer to Telecom for their own requirements)

Cables installed across a roadway are to be installed in a 150mm duct at right angles to the kerb.

One spare duct must be laid for every two ducts installed with cables across carriageways.

Bedding material to have no greater than 10mm particle size and be laid at least 50mm above and 50mm below the cable.

300mm separation between HT and LT cables may be in a vertical or horizontal direction.

Sheet: 1 of 1	Amendments	Issued To: R Paterson 8/5/16; Dyson Gentler 8/5/16; Marc Bretherton 8/5/16	Drawn By: IDB	Prepared For: *Winton Partners*	**NORTHLAKE SUBDIVISON** **PowerNet Design** CONSTRUCTION LAYOUT To accompany tender documents for construction	peakpower services
Current Issue Date:			Date: 8 May 2016			PO Box 1207 Queenstown
			Scale (A1): 1:1333			(03) 450 9007
			Drawing File:	Job Number: 51071		contact@peakpowerservices.co.nz www.peakpowerservices.co.nz

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:

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.

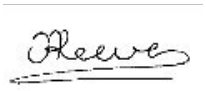
You are also required to pay the Developer Contribution (see above) at the same time as you return the signed version of the Subdivision Contract to us. Clause 2.2 of the Special Terms of the Subdivision Contract explains your payment obligations in more detail.

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

Sub Div Ref: WNK36794
Your Ref:

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

Appendix 7: Tonkin and Taylor Water Modelling Report Feb 2016

Tonkin+Taylor

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 engaged[1] 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:

[1] Email between Dominic Fletcher (T+T) and Rob Darby (QLDC) dated Wednesday 13 January 2016.

Tonkin & Taylor Ltd | 33 Parkhouse Rd, Wigram, Christchurch, 8042, New Zealand | PO Box 13-055, Christchurch 8141
P +64-3-363 2440 F +64-9-307 0265 E chc@tonkintaylor.co.nz

- 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 (l/s)	PDF (l/s)	PHF (l/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 (m RL)	Minimum Residual Pressure(kPa)	Available Fire flow (l/s) (Inc. hydrant losses)
Existing Network	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
	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
Stage 1	928	343	284 < 300 NOT OK	> 50 l/s OK
	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
	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 (m RL)	Minimum Residual Pressure (kPa)	Available Fire Flow (l/s)
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 (l/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 l/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 (Allenby Farms Ltd)	934	345	343 ≥ 300 OK	> 50 l/s OK
	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 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 Investments Ltd.)	950	346	334 ≥ 300 OK	50 ≥ 25 l/s OK
	946	372	98 < 300 NOT OK	16 ≤ 25 l/s NOT OK
Stage 7(Northlake Investments Ltd.)	951	357	226 < 300 NOT OK	34 ≥ 25 l/s OK
	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 Investments Ltd.)	949	393	0 < 300 NOT OK	0 ≤ 25 l/s NOT OK
	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 l/s OK
	955	329	402 ≥ 300 OK	23 ≤ 25 l/s NOT OK
Stage 10 (Gilbertson)	943	328	510 ≥ 300 OK	> 50 l/s OK
	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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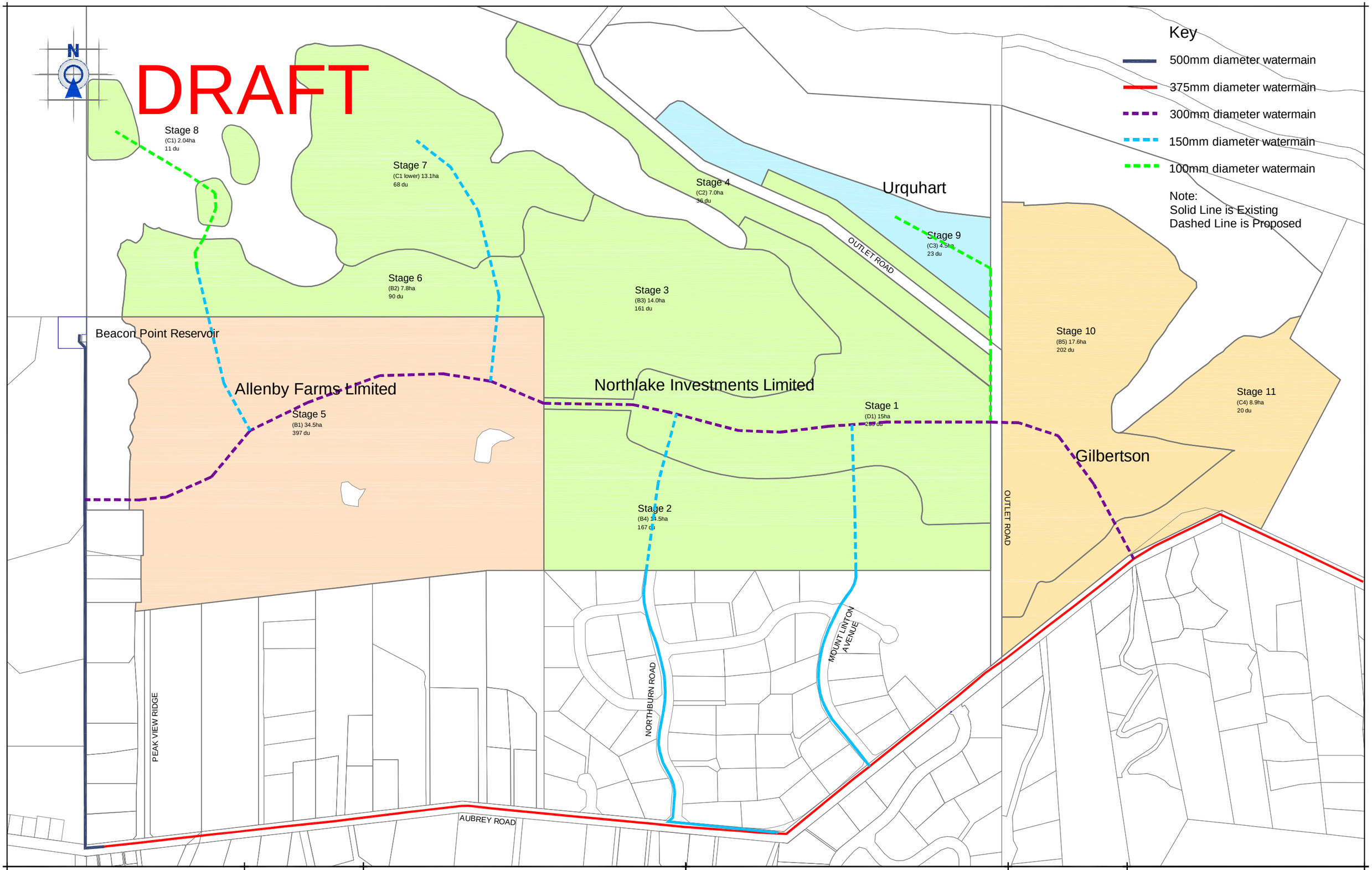
Appendix A: Draft Development Plans (Winton Partners)



PATERSONPITTSGROUP
Your Land Professionals
www.ppgroup.co.nz
0800 PPGROUP

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

Client & Location:

Winton Partners
NORTHLAKE

Purpose & Drawing Title:

Northlake Stages 1 - 11
Primary Watermains

Surveyed by:	-	Original Size:	Scale:
Designed by:	MJB	A3	1:6000 @ A3
Drawn by:	MJB		DO NOT SCALE
Checked by:	MJB		
Approved by:	MJB		
Job No: W4481-7		Sheet No: 2e	Revision No: 1
			Date Created: 17/12/2015

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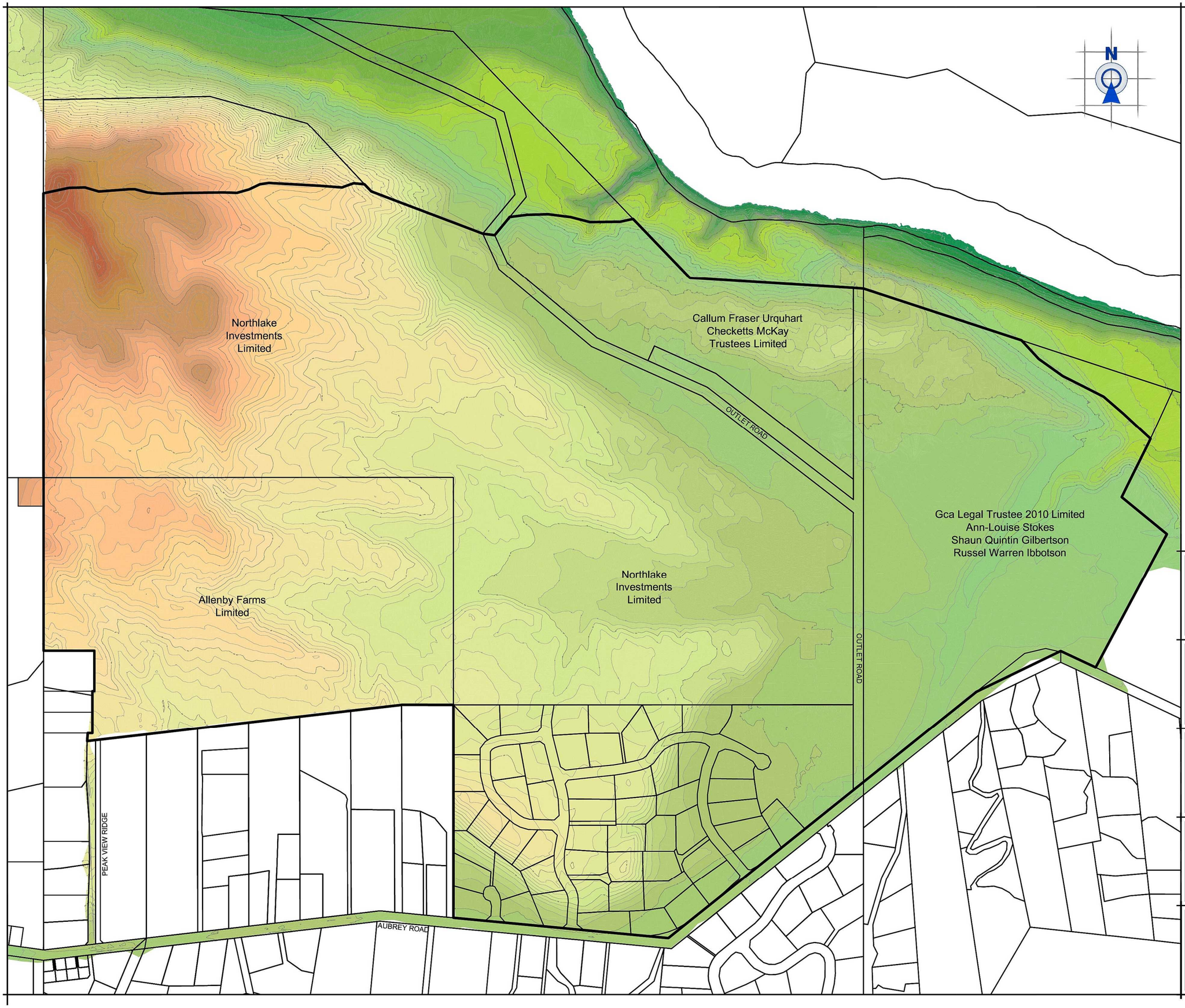

KEY

- 430 - 420m
- 420 - 410m
- 410 - 400m
- 400 - 390m
- 390 - 380m
- 380 - 370m
- 370 - 360m
- 360 - 350m
- 350 - 340m
- 340 - 330m
- 330 - 320m
- 320 - 310m
- 310 - 300m
- 300 - 290m
- 290 - 280m
- 280 - 270m
- Zone Boundary
- Parcel Boundaries

Contour Interval = 2m

PATERSONPITTSGROUP
Your Land Professionals
www.ppgroup.co.nz
0800 PPGROUP

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

Client & Location:

Winton Partners
WANAKA

Purpose & Drawing Title:

Northlake
Contour Plan

Surveyed by:	-	Original Size:	Scale:		
Designed by:	-	A3	1:7000 @ A3		
Drawn by:	RP				
Checked by:	MJB				
Approved by:	-		DO NOT SCALE		
Job No:	Drawing No:	Sheet No:	Revision No:	Date Created:	
W4481-7	006	102	0	17/12/2015	

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Appendix B: Modelling Design Demands

Job no. 50553.324
Description Northlake Developments Water Supply Modelling Demands
Computed 15/01/2015 mlaa

NORTHLAKE SUBDIVSION

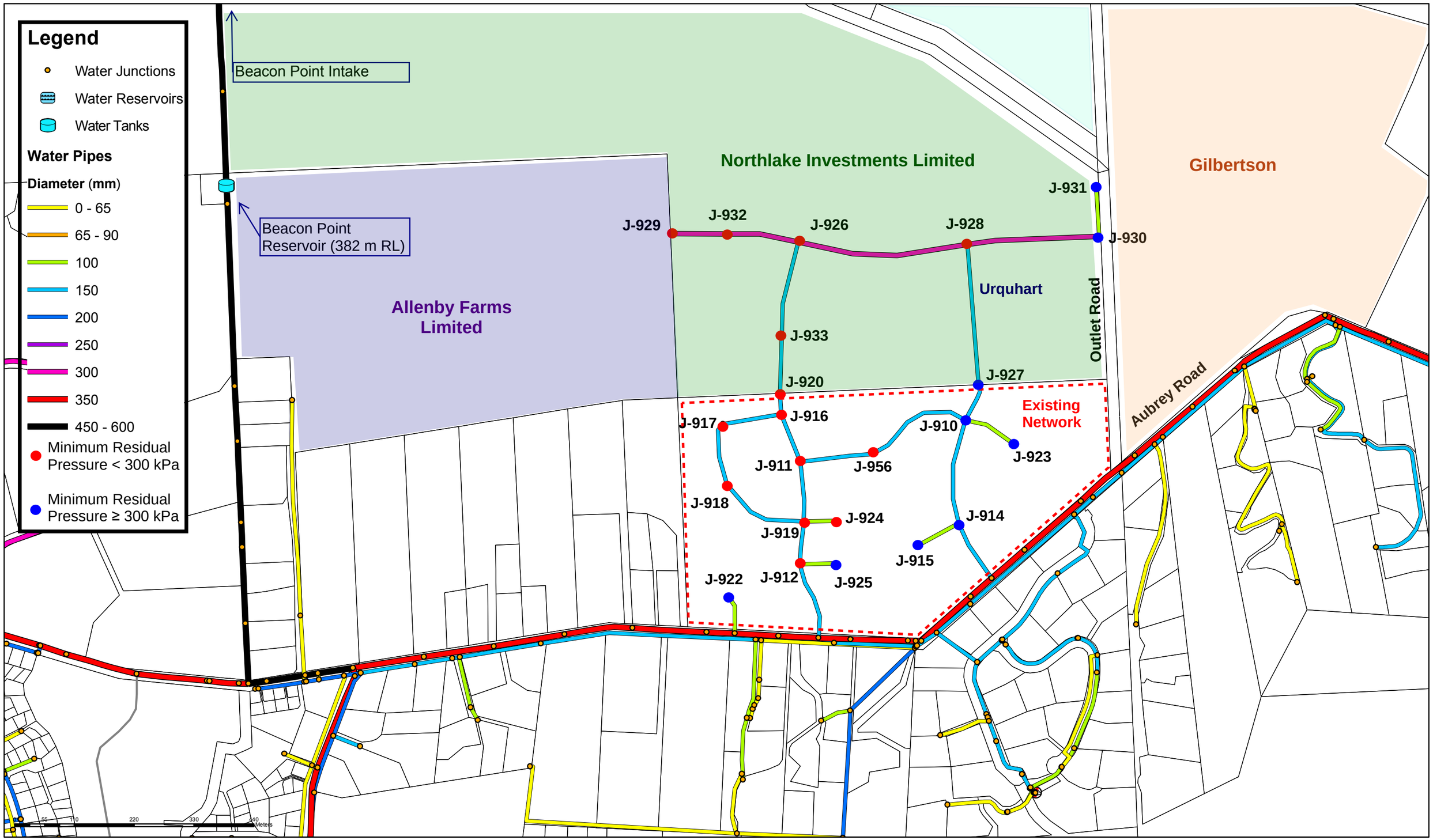
Density 3 people/lot
Water allowance 700 l/person/day

Stage	No. of lots	ADF (l/s)	PDF (l/s)	PHF (l/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 (l/person/day)	700
Number of lots	54
ADF (l/s)	1.31
PDF (l/s)	4.33
PHF (l/s)	8.66

Appendix C: Initial Scenario: Stages 1-4



Initial Scenario: Stages 1-4
Water Supply Reticulation

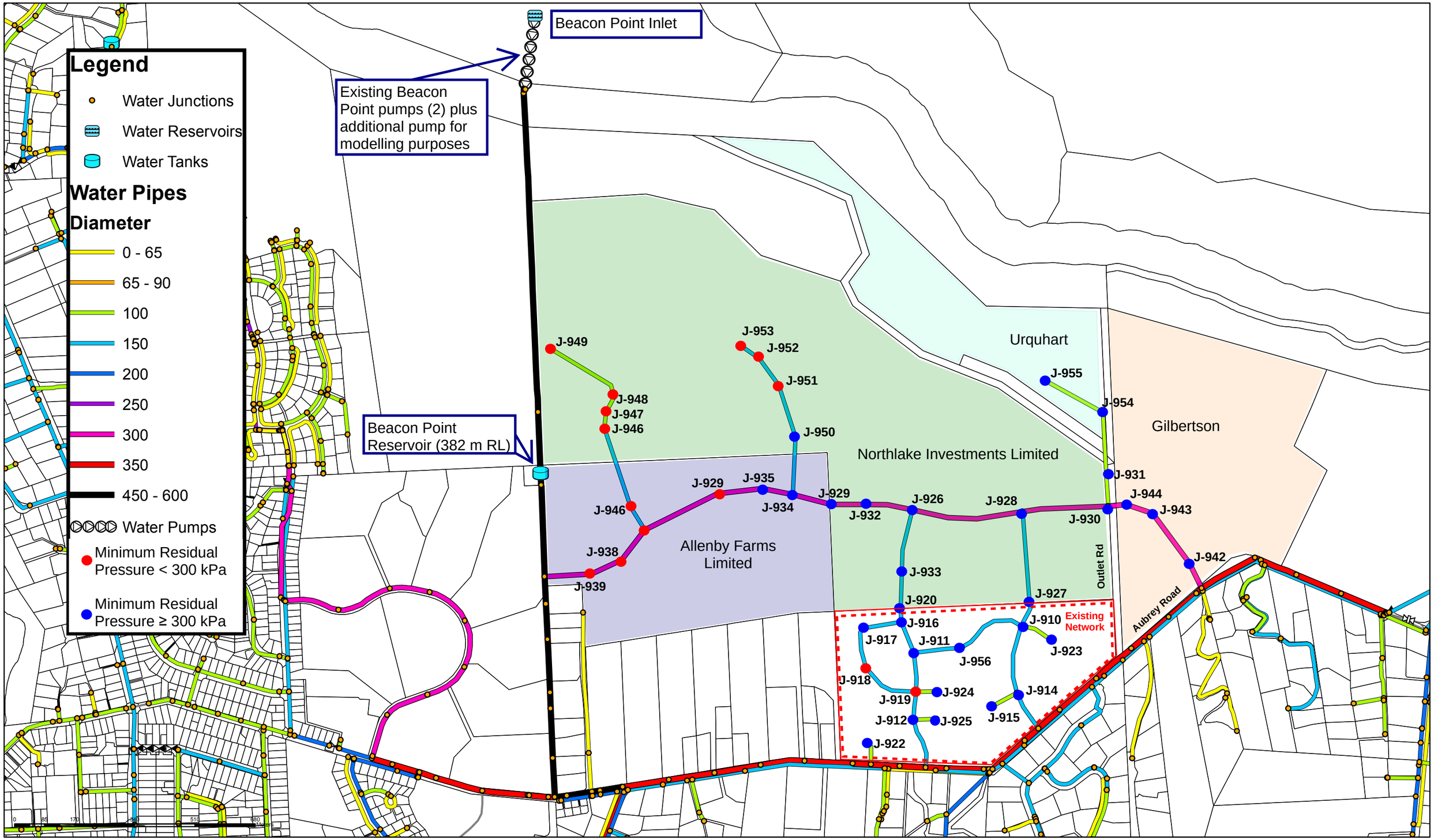
MIKE URBAN

Tonkin+Taylor

N
W E
S

Drawn By:	MLAA
Date:	04/02/2016
Approved:	
Scale:	1:6,500

Appendix D: Ultimate scenario (All Stages)



Ultimate Development
Water Supply Reticulation
- with additional inlet pump

MIKE URBAN

Tonkin+Taylor

N
W E
S

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

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NORTHLAKE STAGES 8-9
SUBDIVISION INFRASTRUCTURE REPORT

PROJECT:	Northlake Wanaka Stages 8 - 9
PRINCIPAL:	Northlake Investments Limited
OUR REF:	W4481-8
DATE:	April 2017

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REVISION / APPROVAL PANEL

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

CONTENTS

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 57,600m³ 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 pre-development 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	Type AA	
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/NO)	YES	

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 mud-tanks. 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 Ø100mm lateral that is connected to the reticulated mains within the road corridors. Lots designated as being subdividable will either be provided with a single Ø150mm lateral or two Ø100mm 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.
    - 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.
    - 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)