APPENDIX I

Paterson Pitts Group Infrastructure Design Report

PENINSULA VILLAGE LTD & WANAKA BAY LTD

Peninsula Bay North End Rezoning
Infrastructure Design Report

PATERSONPITTSGROUP

Your Land Professionals
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1 September 2015

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1.0 EXECUTIVE SUMMARY

Paterson Pitts Group (PPG) has been engaged by Peninsula Village Ltd & Wanaka Bay Ltd to prepare an infrastructure and servicing report for the rezoning of land located at the northern end of the Peninsula Bay, Wanaka. This report will form part of the rezoning application for the proposed development. Additional detailed engineering design would be required at the time of actual subdivision to refine further the preliminary findings of this report.

This assessment demonstrates that existing infrastructure together with new infrastructure elements can cope with the potential demand for services resulting from the development. An additional possible 31 Lots have been identified by modelling as being able to connect to Council services however the proposed plan change is only seeking connection of an additional 26 lots.

Land Stability and Earthworks
The geological assessment completed in 2003 by Royden Thompson covered all of the Peninsula Bay site from its southern boundary through to the northern boundary. The findings of this report did not identify any issues of concern in the area now subject to the proposed rezoning.

Roading
The area subject to the proposed rezoning is intended to be accessed from the end of Infinity Drive and Bull Ridge.

Stormwater
Connection into the recently constructed stormwater system installed within Stages 1 to 5b of Peninsula Bay is possible.

Wastewater
Connection to the existing sewer lines installed within Peninsula Bay is proposed by way of extension of 150mm diameter sewer mains.

Water Supply
Connection to existing water lines installed within Peninsula Bay is proposed by extension of 100mm diameter water mains.

Power, Telecommunications
Power and telecommunications are available from existing supplies already installed within the site. New connections will be installed underground.

2.0 GEOLOGY AND EARTHWORKS

2.1 Geology

The geological assessment completed in 2003 by Royden Thompson, contained in Appendix A1, covered all of the Peninsula Bay site from its southern boundary through to the northern boundary. The findings of that report did not identify any issues of concern in the area now subject to the proposed rezoning. The key findings of the report in relation to the proposed rezoning of the northern end of Peninsula Bay land are

- The Peninsula Bay subdivision occupies an area of glacial moraine that has a varying surface morphology and generally westerly aspect. Along the northern boundary there is a steep drop to the shoreline of Lake Wanaka.

- Ablation till of significant but poorly determined thickness underlies the whole subdivision. Minor exposures on site and better exposures in the peripheral area, indicate the till will comprise heterogeneous gravel/sand/silt mixture without any associated water-laid deposits of consequence. Other lithologies, such as interglacial lake sediments and fluvioglacial alluvium, will underlie the subdivision at depth (below RL300) in the north east corner but their sub surface presence elsewhere is speculative.

- There are no known groundwater seepages and the water table is expected to be well below the ground surface.

- Road and service corridors should be entirely in till and there should be no excavation or slope integrity problems. Fills, using locally-derived till, should be similarly constructed but local practices should be utilized to suit the slightly variable characteristics the will be encountered.

2.2 Earthworks

Earthworks will be required to form and shape proposed roads and to shape and form suitable building areas within proposed lots. The final design of the earthworks will need to take into account overland flowpaths and convey these via roading corridors or out into the reserve land away from residential buildings.

Earthworks utilising material derived from onsite is possible as confirmed by previous work undertake in Stages 1 to 6 of Peninsula Bay and by the geological appraisal undertaken by Royden Thompson.

Enclosed in Appendix A2 are preliminary earthworks plans which identify the main areas of earthworks associated with forming the proposed roads and also proposed building platforms. The earthworks has been designed to minimize the removal of existing vegetation as much as is practical. Where earthwork batters require removal of existing vegetation, these will be replanted as per the proposed landscaping plan.

Preliminary earthworks volumes are 4500m^3 of cut and 1800m^3 of fill undertaken over an area 1.5ha. It is envisaged that any excess material would be utilised onsite to create additional landscape bunding and mounding with the final design and location of these subject to further detailed landscaping design during actual subdivision works.

2.3 Erosion & Sediment Controls

Management of stormwater runoff will be straightforward and can be fully contained within the confines of the site. The topography of the site means that stormwater generally flows in a southerly direction into the existing stormwater ponds installed under Stage 4 of Peninsula Bay.

The control of erosion and silt-laden water can easily be achieved through the use of silt fences and or hay bale barriers as appropriate to prevent any silt or sediment from leaving the site during development.

2.4 Dust control

Control of dust will be important due to the nature of underlying till material, which if left exposed will give rise to wind blown dust.

Appropriate controls measures such k-line irrigation, limiting exposed surfaces, use of water carts and prompt re-grassing/stabilisation of exposed areas will used as necessary to effectively control dust throughout the construction period.

2.5 Suitability of Site for Development

The geological assessment did not identify any areas of concern regarding site stability nor identify any special soils which will require further geotechnical assessment during development.

Based on the geological assessment the site is considered very suitable for residential development given its soil structure, gentle ground slope and stability.

3.0 ROAD DESIGN

3.1 Place & Context

The proposed rezoning is to enable low density residential development. Under Council's engineering standards this is characterised as live and play, suburban landuse.

3.2 Proposed Roading

The area subject to the proposed rezoning is intended to be accessed from the end of Infinity Drive and Bull Ridge. Infinity Drive has been recently been constructed partway through Stage 5b of Peninsula Bay and terminates near where the proposed eastern reserve carpark is intended to be constructed. A roading corridor up into the eastern end of the plan change land will likely follow a gully feature before terminating in a cul-de-sac head.

The western end of the plan change land will be accessed from Bull Ridge which is due to be constructed by mid-2015. This road will also be extended and likely split into two small cul-de-sacs or a loop road.

3.3 Road Dimensions

Under Councils amendments to NZS 4404:2004 the roads proposed within the north end of Peninsula Bay fall under the category of "Short Residential cul-de-sac" under Table 3.1 – Road Design Standards – Urban. This table specifies that a short residential cul-de-sac servicing up to 20du is to have a minimum road reserve width of 12m, with carparking allowed within one traffic lane. The minimum carriageway width required is 6m.

3.4 Pedestrian Network Connectivity

A high level of pedestrian network connectivity is proposed within the north end of Peninsula Bay for pedestrian and cyclists. The combination of smaller local cul-de-sacs merging into the existing shape of the land provide entry points for several walking and cycling pathways throughout the northern end of the Peninsula Bay site. These

walking and cycling trails link back into existing pathways recently constructed within the earlier stages of the Peninsula Bay development.

4.0 STORMWATER

4.1 Existing Infrastructure

There are existing stormwater water mains installed at the end of Infinity Drive and Minaret Ridge which are able to be extended to service the plan change area.

The development of the Peninsula Bay site required the installation of a new 900mm diameter trunk main extending from Lake Wanaka, near Roto Place, up Hunter Crescent and into the south western corner of the site. The earthworks, roading and lot layout of the Peninsula Bay site was designed to incorporate swales and retentions ponds to provide treatment and temporary retention of stormwater runoff onsite.

The large diameter trunk main was installed up the western side of the Peninsula Bay before extending into an area referred to as the central depression in the middle of the site. Located at this point are two large retention stormwater basins which temporarily store runoff and provide treatment of suspended sediment.

4.2 Proposed Stormwater Treatment and Management

The development of the north end of Peninsula Bay will be serviced by two extension of 300mm diameter stormwater drains. The eastern end will be serviced by extending the recently installed stormwater drainage located in Stage 5b of Peninsula Bay off the end of Infinity Drive. The western end will be serviced by extending the existing stormwater drainage in Minaret Ridge up through Stage 6b of Peninsula Bay which is due for completion in mid-2015. All new stormwater pipes will be 300mm diameter. The treatment of runoff will be attained via the existing swale and stormwater treatment ponds located in the central part of Peninsula Bay.

5.0 WASTE WATER

5.1 Existing Waste Water Reticulation

There are existing waste water mains installed at the end of Infinity Drive and Minaret Ridge which are located at sufficient depth to be extended to provide gravity drainage to the plan change area.

5.2 Proposed Disposal of Wastewater

The plan change area is divided into two distinct catchments split approximately in the middle of the plan change area. All new drains will be 150mm diameter.

The eastern catchment will be serviced from existing gravity waste water drains located at the end of Infinity Drive within the recently completed Stage 5b of Peninsula Bay. This drains down through the existing stages of Peninsula Bay to the south west corner of the site and into the Hunter Crescent wastewater network.

The western catchment will be serviced from existing gravity drainage in Minaret Ridge and at the end of the short section of Infinity Drive yet to be extended through from Stage 4 to Stage 5b. This drains down into the Penrith Park area.

Both catchments are conveyed via gravity drainage to the existing pump station located at Bremner Bay.

5.3 Rationale Ltd Wastewater Reticulation modelling

Rationale Ltd were commissioned to model the wastewater generated by the plan change area into the Council reticulated network. This report is contained in Appendix B.

The conclusion of this modelling is that the plan change area be allowed to connect to Council's existing reticulation. The report identifies that 31 possible additional lots can be connected to the existing network.

6.0 WATER SUPPLY

6.1 Existing Infrastructure

There are existing water mains installed at the end of Infinity Drive and Minaret Ridge which are able to be extended to service the plan change area.

6.2 Proposed Water Supply

The plan change area will be serviced by extension of two 100mm diameter watermains. The eastern end will be serviced by extending the recently installed water supply located in Stage 5b of Peninsula Bay off the end of Infinity Drive. The western end will be serviced by extending the water supply located in Minaret Ridge up through Stage 6b of Peninsula Bay which is due for completion in mid-2015. All new water supply pipes will be 100mm diameter.

6.3 Tonkin & Taylor Water Modelling

Tonkin & Taylor were commissioned to model the water supply required for the plan change area. This report is contained in Appendix C.

The conclusion of this modelling is that the plan change area be allowed to connect to Council's existing reticulation. The report identifies that 31 possible additional lots can be connected to the existing network.

7.0 POWER & TELECOMMUNICATIONS

Confirmation of supply of power and telecommunications has been obtained from the suppliers of these services. Written confirmations of supply availability are contained in Appendix D.

Power & Telecommunications will be supplied to the site from existing infrastructure installed within recently completed stages of Peninsula Bay. All cabling will be underground.

Paterson Pitts Group

Mike Botting
Registered Professional Surveyor

APPENDIX A1 – GEOLOGICAL ASSESSMENT REPORT

INFINITY INVESTMENT GROUP: DEVELOPMENT OF THE PENINSULA BAY SUBDIVISION

Geological Assessment of the Site and Surrounds in Relation to the Construction of Roads and Services.

Prepared by: R. Thomson
Geologist
Cromwell

For: Infinity Investment Group Holdings Ltd.
Wanaka

Date: July 2003

Contents

SUMMARY

The subdivision is wholly underlain by ablation till, with a characteristic morainic morphology and a predominantly westerly aspect. Drainage systems are variably west-trending or directed in part to closed basins.

Glacial tills will be heterogeneous, grey, compact silt/sand/gravel mixtures with some boulders expected towards the north. Total thicknesses are unknown. Excavations within the till should encounter dry and free-standing materials but there are potential problems with fills if the utilised tills are particularly fine-grained; follow existing roading practice in the area.

There is no need to undertake a test-pitting exercise to identify deletarious materials along roading and service corridors as there are no identified targets on the site. However, fine-grained infill materials may be present in the depression designated as a sports area, and some subsurface investigations would be desirable here during the early construction phase.

1. INTRODUCTION

Except for the northern fringe, the subdivision has a benign appearance and a paucity of geological exposure across the site. As such, there is some uncertainty about the lithologies which will be encountered along road corridors – particularly in relation to service installation – and it was considered prudent to assess the site geology to pre-empt possible problems with excavations.

This report is the result of a field mapping phase. A second phase of subsurface investigations (test pits) was planned but there are few prospective targets and none in perceived crucial areas. Minor works should be kept in mind, as mentioned below, but these could be more suitably implemented during development.

2. GEOLOGICAL SETTING

2.1 Physiography

Although surface textures are similar in general there are significant morphological difference across the site, such as:

a) Northern Segment. Characterised by:

- irregular, mounded terrain. Crestal elevations in excess of RL 330.
- poorly developed drainage systems, most channels of which lead into two closed depressions (Photos 1, 6, part 8).
- a precipitous boundary to the north.

b) Central Segment. Characterised by:

- closely spaced, NS-trending ridges that tend slightly arcuate. (Photos 1, 8).
- a progressive elevation drop to the west.
- poorly developed drainage systems.

c) Southern Segment. Characterised by:

- a stepped elevation drop to the west.

- moderately developed, incised, ephemeral drainage channels that trend west.

2.2 Glacial History and Lake Wanaka Evolution

The last two of a large number of glacial advances that have overridden the site left morainic deposits that can be subjectively differentiated by a variety of features and means. In the interest area, they are (Figure 1):

a) an assessed 23,000 year old event, termed the Mt. Iron Advance that, almost reached Albert Town and the Cardrona River (present location) around the flanks of Mt. Iron.

   The ablation moraine forms the higher terrain at and beyond the eastern subdivision boundary.

b) an assessed 18,000 year old event, termed the Hawea Advance, which abutted (locally) against the inside of the more proud fringe area of the older moraine. Characteristic landforms are fresh.

Between the advances there would have been a proto Lake Wanaka, similar to the present water body, that would have been infilled with lake sediment then river alluvium as the Hawea Glacier advanced. Deposits from such a genesis are exposed along the steep slopes at the north end of the subdivision and have been modelled as extending beneath it, as shown on the Figure 2b cross sections.

When the Hawea Glacier melted the present Lake Wanaka formed in the cavity. Its level was controlled by aggradational deposits at and downstream from the present outlet and the various beach remnants (Figure 1) suggest it had an initial surface elevation at about RL 300. As the Clutha River incised into the outwash alluvium along an extended reach of its channel the lake level progressively dropped to its present position (i.e. nominal RL 279 m).

2.3 Rock Types

Schist has not been located in the vicinity of the subdivision but it is extensively exposed at Mt. Iron to the south-east (Figure 1). The depth to schist bedrock at the site is unknown.

Glacial moraines formed by the youngest two advances are present in the area but only that deposited by the Hawea Advance has site pertinence. (Note the term "moraine" is used here as a landform while glacial "till" refers to the deposit.)

Interglacial lake sediment outcrops near the north-east corner of the subdivision and just west of the Penrith development area (Figure 2a). Slightly younger, but effectively associated river alluvium is exposed at the former location.

Loess is present as a cover bed within the subdivision but it is anomalously thin and is expected to have no significant influence on site construction.

2.4 Groundwater

There are no obvious seepages on or peripheral to the subdivision and it is interpreted that the water table will be low, perhaps controlled by lake level and extending back from the shoreline at a low gradient. No attempt has been made to model the groundwater regime on the cross sections.

3. SUBDIVISION GEOLOGY

3.1 Morainic Morphology and Surface Outcrops

Glacial landforms, produced during the wasting phase, wholly pervade the subdivision. As previously described, they have varying morphological styles, elevations and surface aspects.

Glacial till outcrops within the subdivision are small and widespread, as indicated on Figure 2. They are sufficient to suggest, however, that the till will be a heterogeneous mixture of gravely detritus in a grey, silt/sand matrix. While it is compact the till is not expected to be particularly hard as the moraines in this situation are ablation types i.e. accumulated near the surface as the ice progressively melted. There is insufficient exposure to determine gross till textures, such as banding or any suggestion deposition has been in a water body of significance, but road batters at the south end of Kirimoko Crescent (700 m south of Peninsula Bay) display features considered as typifying the tills in the subdivision. With reference to Photos 9 a/b and 10 a/b, relevant comment includes:

a) There is a dominance of gravel clasts in a sand/silt matrix.

b) Layering is common but beds are thin and relatively coarse grained. Strong deformation is evident as meltout of underlying ice caused collapse of the transient, surface deposits. On a large scale the till is heterogeneous.

c) No perceived groundwater or slope stability problems; steep batters remain intact.

d) An application to the moraine in the central and southern segments of Peninsula Bay. The ablation till in the northern segment may have some differing textural features (see below).

Along the steep face at the north end of the subdivision there are sporadic till outcrops at different heights. Features of note:

a) There is an upper unit that contains a varying proportion of boulders; evident both in situ and as surface lag detritus. Boulder piles within the northern segment of the subdivision (Photo 6) suggest this anomalously coarse till may extend, perhaps, 300 m south of the cliff face.

In the latter, finer till outcrops intersperse with coarse outcrops at the same level, suggesting bouldery concentrations are discontinuous.

b) At RL 310 approximately there is a persistent, thick (5-6 m?), coarse fluvial unit within the till sequence. It is subhorizontal and has a discontinuous exposure length of approximately 700 m (Fig. 2a).

The fluvial unit suggest multiple phases of glacial advances and retreats.

c) On the lower face below the north boundary mid point the base of the till clearly dips (apparently) to the west (Photo 2) and the till is very firm and compact (Photo 3). Here the till is interpreted as a lodgement deposit, having been overridden by the ice.

e) There are no till exposures attributed to the older Mt. Iron Advance adjacent to the northern boundary.

3.2 Fluvial and Lake Sediment Outcrops

The only exposures of interglacial sediments in the subdivision vicinity are on the face adjoining the north boundary. These are illustrated by Photos 2, 4 and 5 and located on Figure 2a. Of particular note:

a) The fluvioglacial alluvium is fine-grained in outcrop (Photo 4) and has an uncertain relationship to the lake sediments. It is assumed, however, that the alluvium is the younger formation and that the host river incised into the lake sediments in an irregular manner as the glacier advanced.

b) Lake sediments can be seen in outcrop, or can be inferred from detritus, as forming the lower half of the steep face approximately east of the dominant gully. (Figure 2a). The better bedded units comprise sand and silty sand (Photos 5a and 5b) but there are indications of much thicker sand units as well.

Materials are soft and tend to have a low cohesion. As indicated on Figure 2a the formation crest may be as high as RL 300 beneath the north-east corner of the subdivision but contact positions here are a bit uncertain.

3.3 Expected Subsurface Lithologies

As illustrated by the Figure 2b cross sections there is likely to be a variety of geological formations beneath the subdivision, with an increasing level of uncertainty away from the outcrops by the northern boundary. Pertinent comments include:

a) The surface and near-surface lithology is obviously ablation till deposited during the retreat of the Hawea Glacier. At lower levels there should be remnant till deposited by the Mt. Iron Glacier, and sandwiched between the tills will be interglacial deposits of uncertain thickness and extents.

b) Lake sediments should underlie at least the north-east corner of the property (e.g. Cross Section AA') where the crestal elevation will be at about RL 300 and the base has an uncertain morphology. Expect the lake sediments to pinch out to the north-west (stripped by the advancing Hawea Glacier) and any remnants to be at lower elevations. To the south and south-west such remnants should be thin and the upper surface, at RL 300 approximately, will be well below the ground within the subdivision.

c) The fluvial sediment persistence is also speculative. If present beneath much of the subdivision (suggested on the sections) there will be a significant till mantle. In any case, the presence of alluvium at shallow depths should not be an adverse factor as it will be a competent and free-draining lithology.

3.4 Perceived Construction Issues

The geological assessment indicates that a thick deposit of ablation till, deposited by the last intruding glacier, mantles the complete subdivision. In regard to roading construction and service installations it is considered that:

a) The till will be readily excavated and cut batters should be stable. It is noted that most roads are to be aligned on relatively proud terrains so cuts will be low.

b) Fills are expected to be formed from locally derived till. There is no preponderance of silt in the matrix so liquefaction issues should not arise. Large amounts of roading have been formed in recent times in the vicinity of Peninsula Bay without apparent fill problems so site experience in till placement should be followed, with successful outcomes expected.

c) Service trenches should remain open for extended time periods.

d) Groundwater is not expected. Surface flows will occur during storm events but these should be minor.

e) There are two closed depressions that are likely to have some bedded infill of uncertain grading. However, the current layout plan shows the depression to the north as a recreational reserve while that to the south is to be a swimming and sporting complex site and a reserve in part.

While the former depression is essentially issue free, the latter may (potentially) generate foundation problems of a minor nature and must be prone to wetting during major storms.

f) An arterial road from Hunter Crescent is shown as trending to the east up an incised channel in an ephemeral stream. Disruption of the upper tributary channels would be prudent to ensure the lower road section is not within a future stormwater conduit.

4. CONCLUSIONS

a) The Peninsula Bay subdivision occupies an area of glacial moraine that has a varying surface morphology and a generally westerly aspect. Along the north boundary there is a steep drop to the shoreline of Lake Wanaka.

b) Ablation till, of significant but poorly determined thickness, underlies the whole subdivision. Minor exposures on site, and better exposures in peripheral areas, indicate the till will comprise a heterogeneous gravel/sand/silt mixture without any associated water-laid deposits of consequence.

Other lithologies, such as interglacial lake sediments and fluvioglacial alluvium, will underlie the subdivision at depth (below RL 300) in the north-east corner but their subsurface presence elsewhere is speculative.

c) There are no known groundwater seepages and the water table is expected to be well below the ground surface.

d) Road and service corridors should be entirely in till and there should be no excavation or slope integrity problems. Fills, using locally-derived till, should similarly be constructed satisfactorily but local practises should be utilised to suit the slightly variable characteristics that will be encountered.

e) Two closed depressions are present in the northern half of the subdivision. While neither are in key locations there could be fine-grained infill materials and prospective flooding issues during rainstorms.

f) Drainage systems grade in part to closed depressions (e) above) or to the west through the southern segment. Catchments for the latter are small.

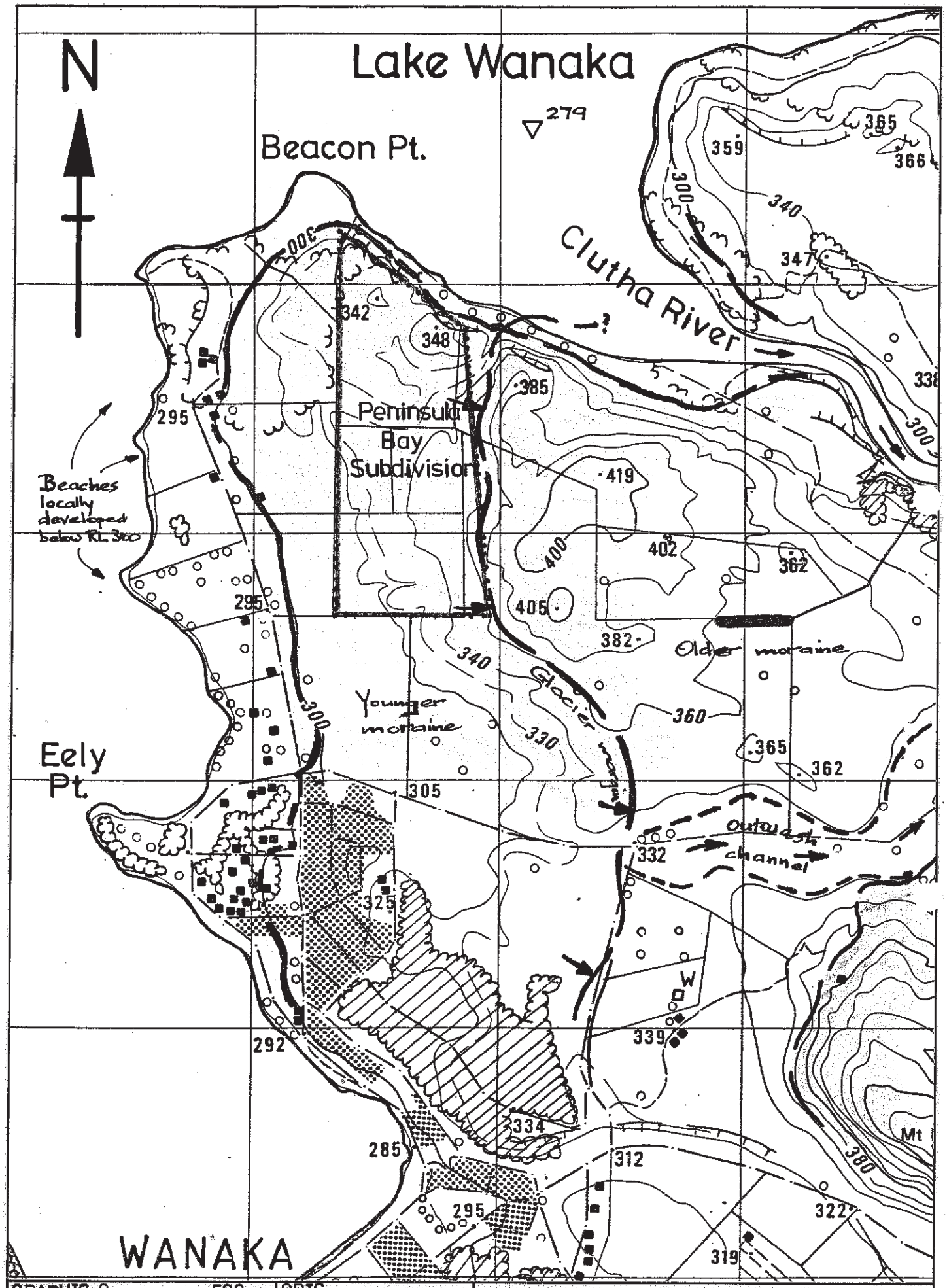
5. RECOMMENDATIONS

a) No test pitting is warranted to investigate potential deletarious materials along road and service corridors, in general.

b) Minor pitting should be undertaken in the more southerly of the two closed depressions to assess the nature of postglacial infill materials where a sports complex is proposed. Pitting to be done during the construction period.

c) A related issue is the mitigation of potential flooding in the depression. The possibility of bunding and rerouting flood channels from the east, and directing basin drainage to ground, should be investigated.

d) Review the alignment of the most southerly arterial road up an incised gully from a flooding perspective.


N
Lake Wanaka
279
Beacon Pt.
Clutha River
Peninsula Bay Subdivision
Beaches locally developed below RL. 300
Younger moraine
Older moraine
Glacier margin
Outwash channel
Eely Pt.
WANAKA
Mt
GRAPHIC SCALE: 0 500 m
EXPLANATION:
Initial lakeshore, L. Wanaka
18,000 yr. glacial advance moraine
23,000 yr (est) " " "
Schist
ORIG. SCALE : 1:20,000
DRAWN: R. Thomson
DATE : July '03
SHEET : 1 of 1
Infinity : Peninsula Bay
Fig.1 Location of Geolog! Features & Subdivisn

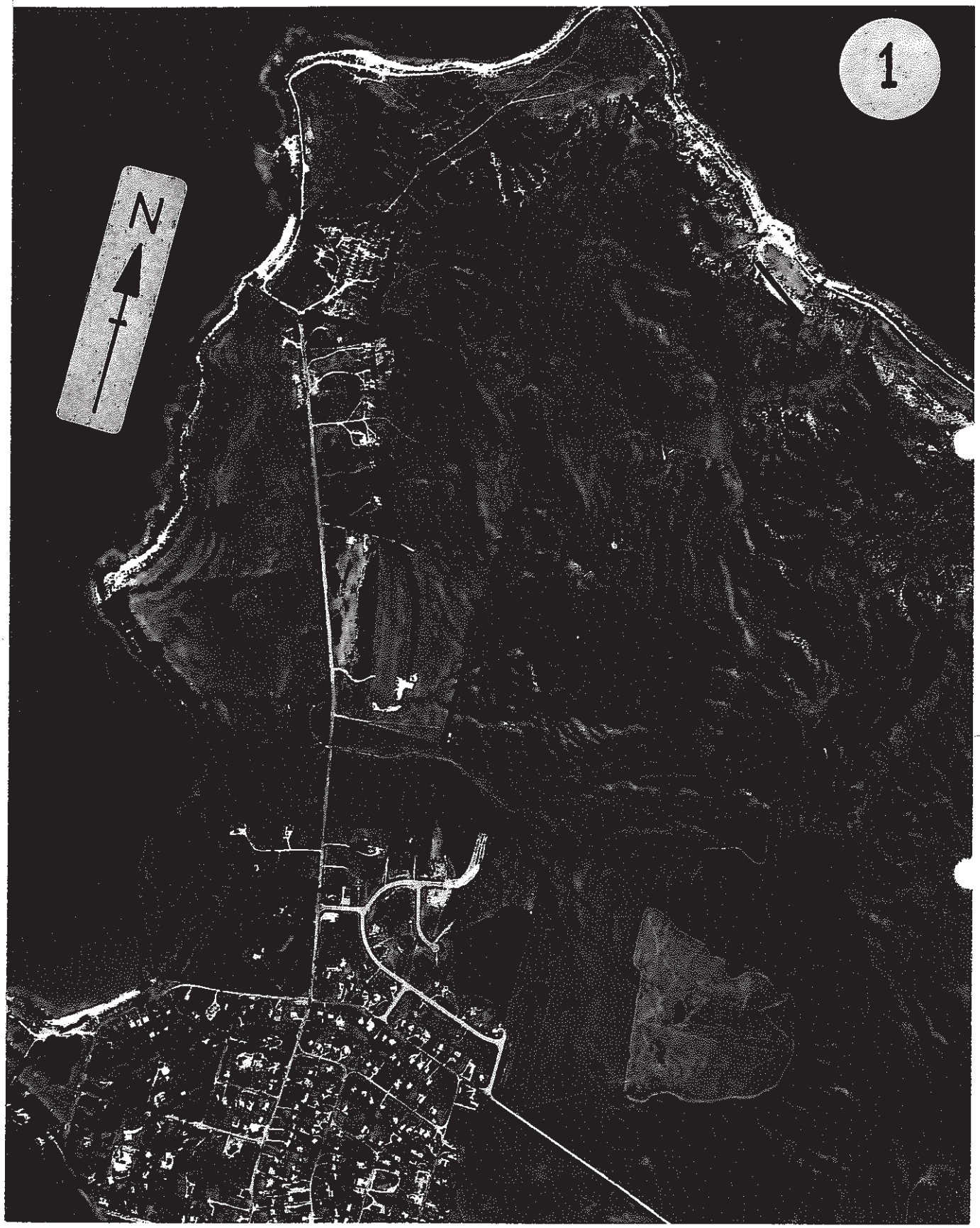
ATTACHMENT

Captions for photos taken on the 13 June 2003

Photo	Description
1	Section of vertical aerial photo taken in March 1974. The moraine with the subdivision (annotated) has amorphous, hummocky morphology in the northern segment but the central segment has a prominent, N-S alignment of morainic ridges reflecting late-stage glacier flow patterns. Note the high level lakeshore left of centre.
2	View of steep, eroded slope at the north end of the subdivision. At right glacial till overlies outwash alluvium; the last advance glacier sole forms the contact. To the left glacial till overlies bedded sand (lake) deposits.
3	Typical hard, compact glacial till at right of Photo 2. Disseminated schist clasts lie within a silt/sand matrix.
4	Fluvioglacial alluvium beneath the till. Here it is a uniform sandy gravel with rare, small boulders.
5a, b	Lake sediments just above HWL of the lake. Photo 5b at top right of Photo 5a. A horizontally bedded sequence of sand, silty sand, and sandy silt deposited in a lake assumed to have formed after the second last advance.
6	Looking south across Peninsula Bay subdivision. The morainic terrain is very pronounced. Of particular interest is a closed depression at bottom centre; it may have some fine sediments in the floor transported by small tributaries over time.
7	Profile of the southern segment of the subdivision. The hummocky terrain is less pronounced than that in Photo 6.
8	View to the north-west across central and northern segments of the subdivision. At left are the north-south-aligned morainic ridges obvious in Photo 1. Hummocks are more pronounced at centre and right where closed depressions remain.

9a, b, 10a, b General and close views of typical glacial till in road batters at southern end of Kirimoko Crescent, approximately 700 m south-east of the subdivision.
It is considered that the glacial till within the hummocks on the subdivision are similar in general to silt/sand/gravel mixtures displayed in the photos; i.e. compact, heterogeneous deposits that are not expected to be problematical in road corridors or service excavations.

1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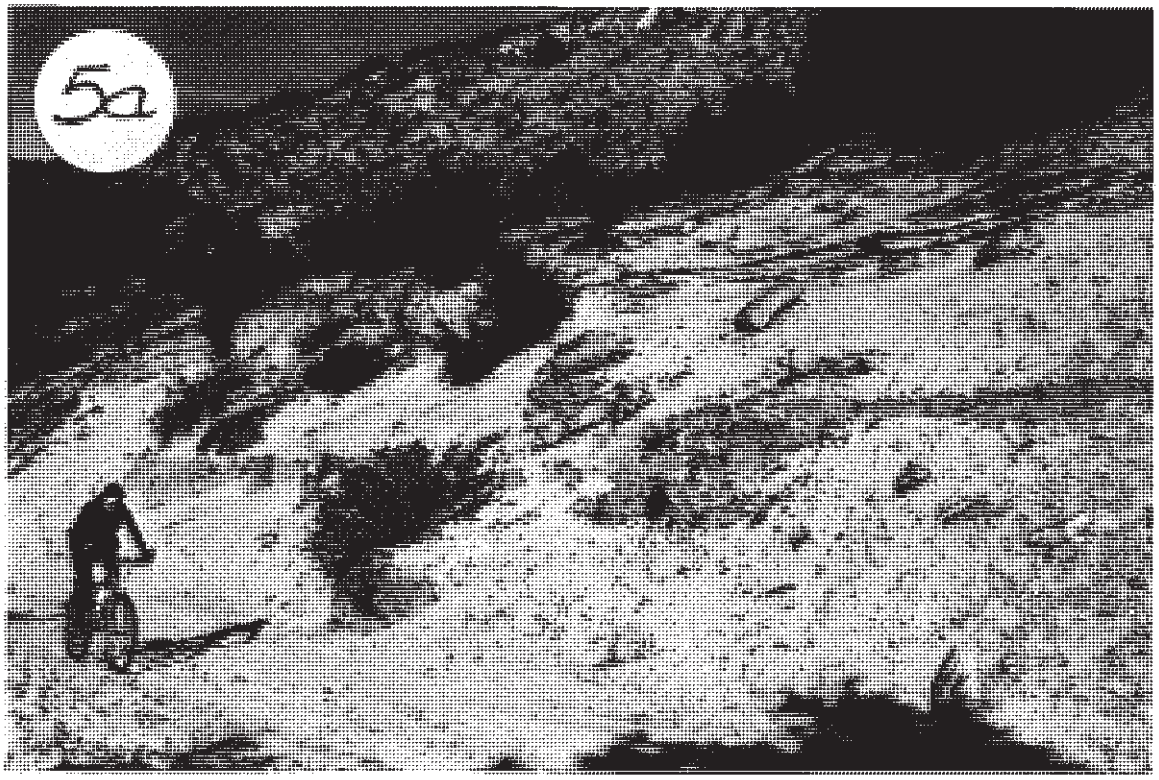
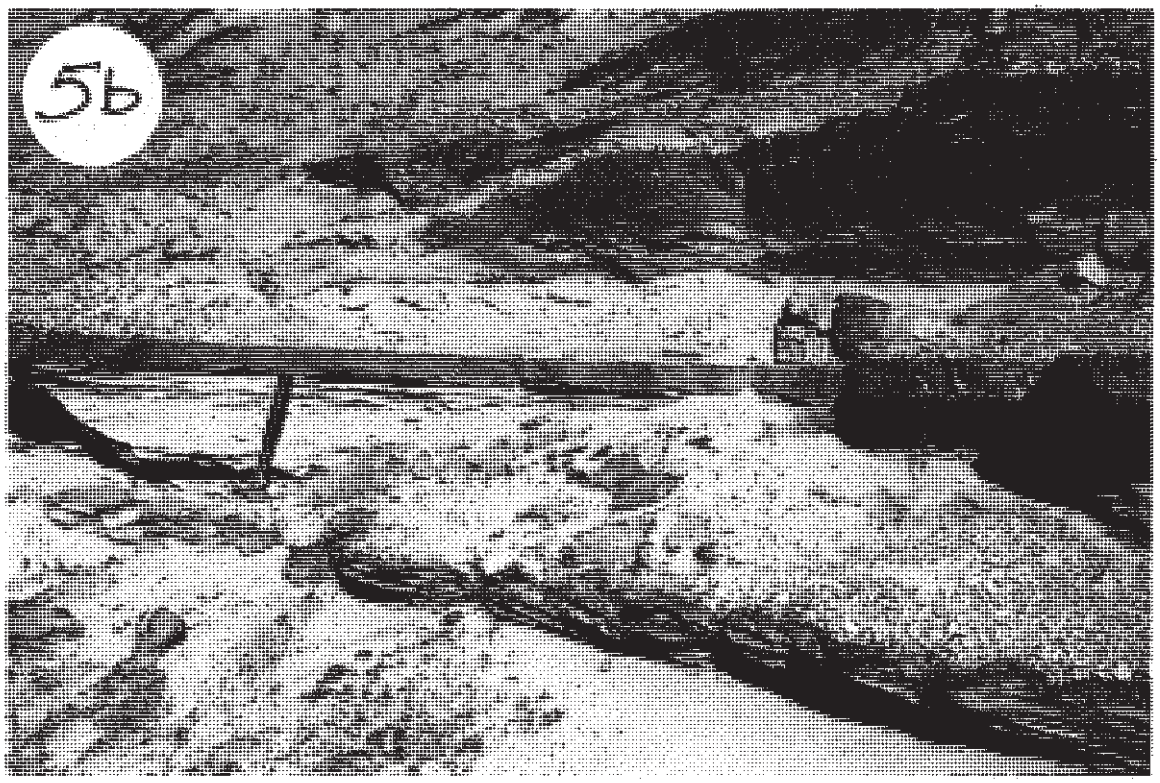

5a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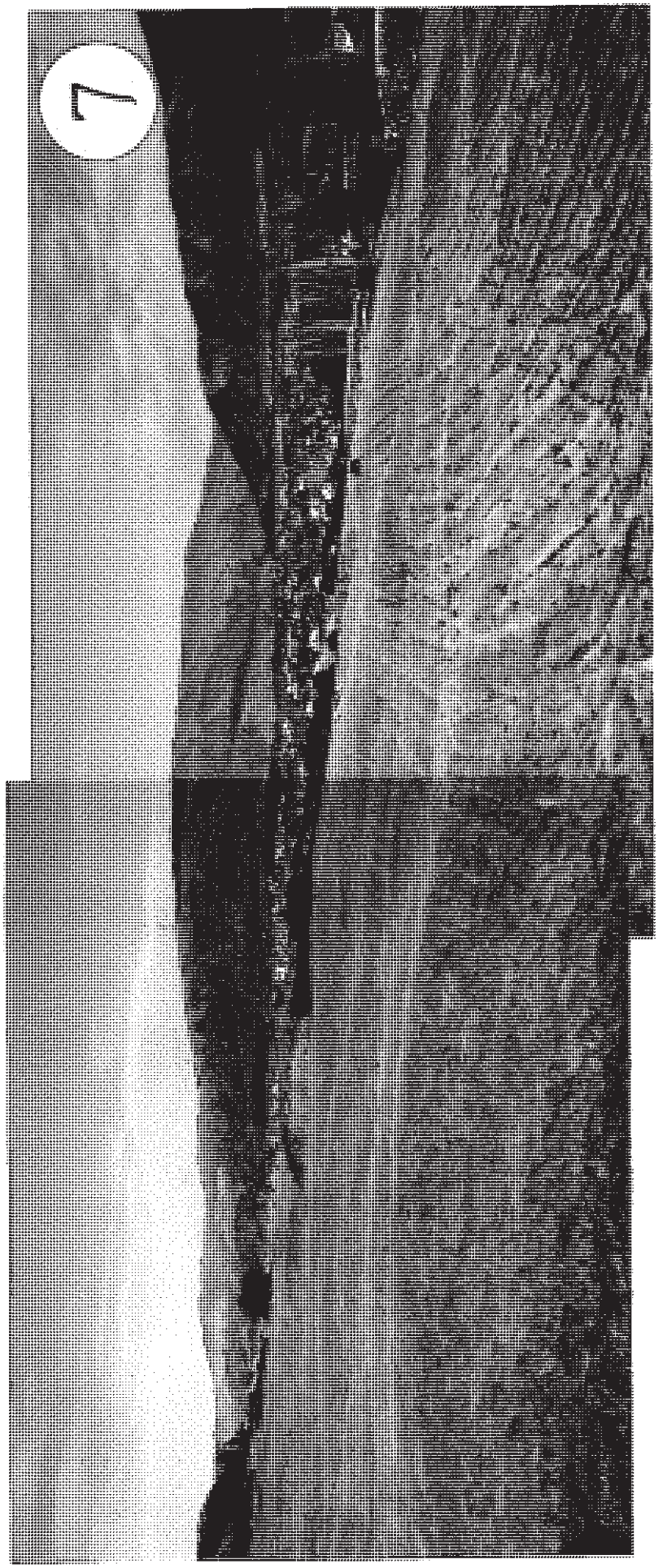

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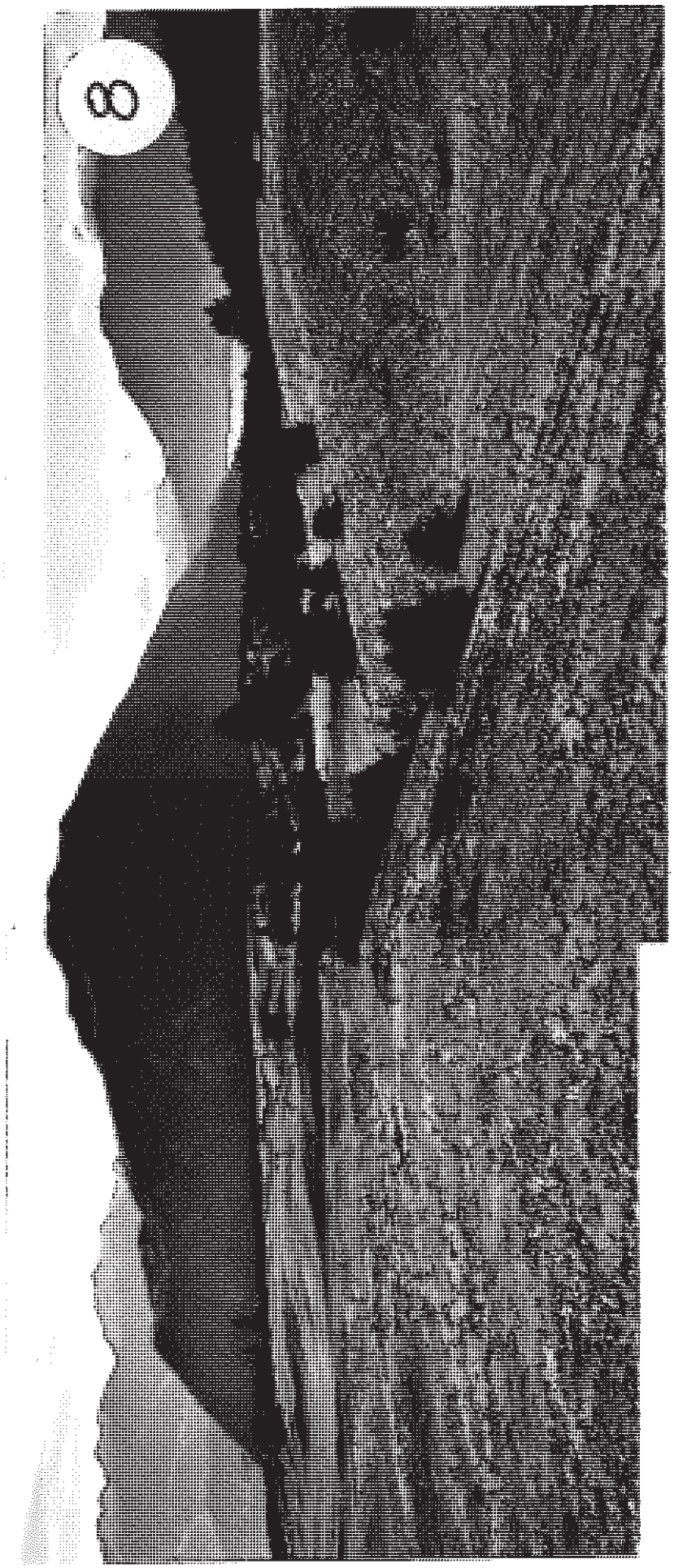

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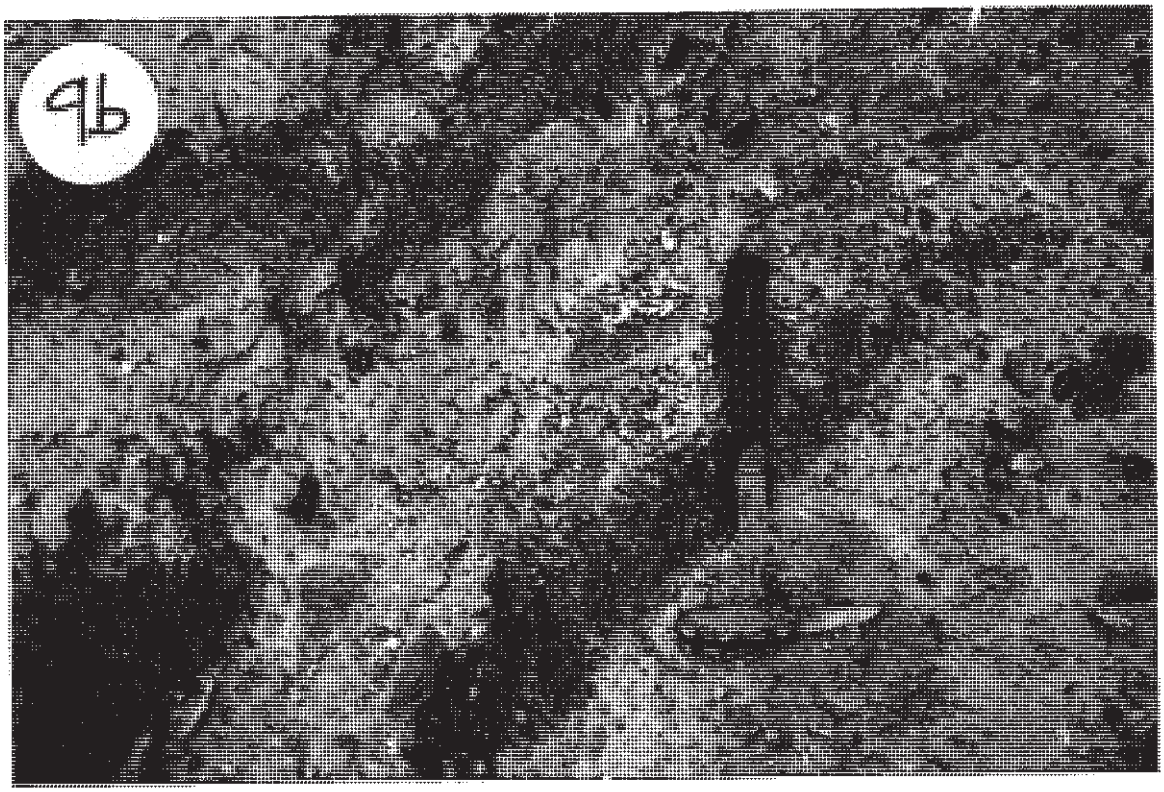
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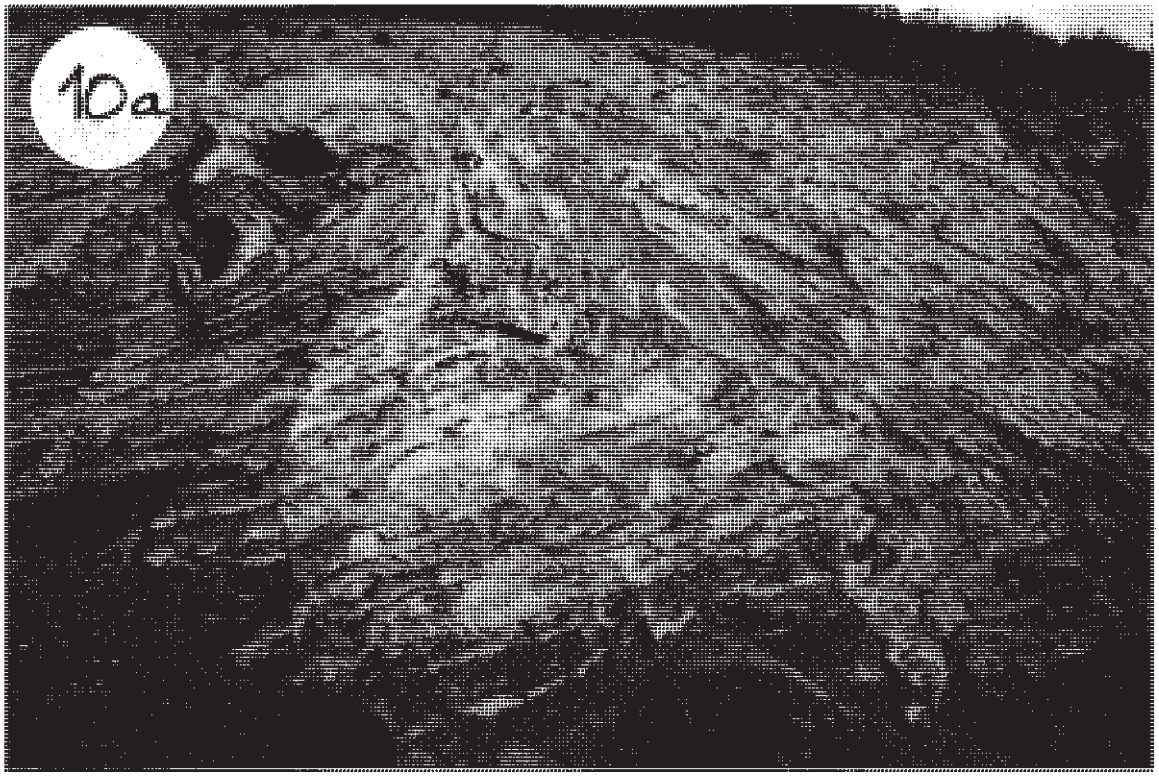
10a


10b

APPENDIX A2 – PRLIMINARY EARTHWORKS PLAN

NOTES

1. The contractor shall be responsible for locating all existing services prior to commencement of works. The contractor shall make good at their own expense any damage to existing services

2. Levels are in terms of Dunedin Vertical Datum 1958

3. All works are to be installed as per NZS 4404:2004 and QLDC amendments to those standards. Standard drawings are available from the Engineer

4. Contours at 1.0m Interval

LEGEND

CUT
- 3.0m +
- 2.5m to 3.0m
- 2.0m to 2.5m
- 1.5m to 2.0m
- 1.0m to 1.5m
- 0.5m to 1.0m
- 0.2m to 0.5m
- 0.0m to 0.2m

FILL
- 0.0m to 0.2m
- 0.2m to 0.5m
- 0.5m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.0m
- 2.0m to 2.5m
- 2.5m to 3.0m
- 3.0m +

Depth Contours (at 0.5m Intervals)

AA Section Views

Lot Boundaries

PATERSONPITTSGROUP
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0800 PPGROUP

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

Client & Location:

Infinity Investments
Peninsula Bay
North

Purpose & Drawing Title:

Engineering Drawings
Earthworks Cut Fill
Plan

Surveyed by:	-	Original Size:	Scale:
Designed by:	PGS	A1	1:800 @ A3
Drawn by:	PGS		DO NOT SCALE
Checked by:	MJB		
Approved by:	MJB		
Job No: W4332		Sheet No: 201	Revision No: A
			Date Created: 19/07/2015

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APPENDIX B – WASTE WATER MODELLING REPORT

12 January 2015

Queenstown Lakes District Council

Private Bag 50072

Queenstown 9348

ATTENTION: Myles Lind

Dear Myles

Re: Peninsula Bay Development, Wanaka

As outlined in your e-mail dated 8 December 2014 our wastewater modelling report has been prepared for the proposed additional units for the Peninsula Bay development in Wanaka. This report is based on the Wanaka dynamic wastewater model (2011), calibrated to flow data from December 2010 and January 2011. The approximate location of the development is outlined in orange in the map below.

The objective of this work is to determine if the wastewater network has sufficient capacity with the addition of this development.

It is noted that we previously completed a report for this development on 18 September 2006 assuming a completed development of 340 residential properties. We have completed this investigation based on the completed development potentially containing the following loads:

Load Type	Units	Total Units	Load / Unit / Day (l/d)	PDWF (l/d)	Approx Peaking Factor	Rainfall Catchment Area (Ha)
Residential	Units	365	660	240,900	2.1	N/A

5 Arrow Lane | PO Box 226 | Arrowtown | New Zealand
+64 3 442 1156 | info@rationale.co.nz | www.rationale.co.nz

All loads have been modelled as per the standard load from the calibrated model. No additional rainfall catchment area has been added to the model as this area was previously included in the model.

The topography of the developments defines that loads generated will drain into two existing mains:

1. 26 connections (including 15 possible additional lots) to the north of the development will flow by gravity to connect to SM16026 in Minaret Ridge.

2. 339 connections (including 16 possible additional lots) will flow by gravity through the development and drain via the existing trunk main in Hunter Crescent.

Modelling Standard

The model has been run to the following standard, as is currently agreed with Council:

- 2012 peak day population sanitary loadings and diurnal patterns.
    - Residential load, 660 l/d/dwelling, approximate peaking factor of 2.1
    - Accommodation load, 370 l/d/unit, approximate peaking factor of 1.7
    - Commercial load, 150 l/d/connection, approximate peaking factor of 1.2
- 20 year return, 12 Hr duration storm.

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

- No overflows allowed at any network element.
- No pump station overflows based on the duty pump capacity.

Lakeside Pump Station 1 has recently undergone a pump upgrade as it was approaching capacity. This upgrade is assumed to be completed for this exercise. The performance curve for the upgraded pump has been used in the model for this scenario achieves a pump flow of 73.7 l/s.

Results – SM16026 to Waimana Place Pump Station

- There are no related network elements overflowing.
- The Waimana Place Pump Station inflow does exceed outflow but does not result in an overflow. This is based on a single duty pump capacity of 11 l/s and a total storage volume of 31.1 m^3, including the inline emergency storage volume. It is noted that the pump operating points for this pump station results in a small part of the inline emergency storage being utilised for each pump run. This effect can be seen in the inflow plot as the inflow increases during a pump run as the volume stored enters the wet well.

Results – Waimana Place and Hunter Crescent to Lakeside Pump Station 1

- Waimana Place to Lakeside Pump Station 1, there are no related network elements overflowing.
- Hunter Crescent to Lakeside Pump Station 1, there are no related network elements overflowing.
- The Lakeside Pump Station inflow does not exceed outflow at any time. This is based on a single duty pump capacity of 73.7 l/s and a total storage volume of 48.5 m^3. The large flow achieved by the upgraded pump and the relatively small operating volume have also resulted in short pump runs.

Results – Lakeside Pump Station 1 to Dungarvon Pump Station 1

- There are no related network elements overflowing. However it is noted that in a significant number of pipe sections the flow is indicated to be in excess of the pipe full running capacity. Currently surcharging of the

manholes is creating the extra head required for the flow to pass without an overflow occurring. See Figure 7 for surcharging locations.

- Dungarvon Pump Station 1 inflow does not exceed outflow at any time. This is based on a single duty pump capacity of 150l/s and a total storage volume of 101.2m^3.

Results – Dungarvon Pump Station 1 to Riverbank Road Pump Station

- There are no related network elements overflowing.

- Riverbank Road Pump Station inflow does not exceed outflow. This is based on a single duty pump capacity of 250l/s and a total storage volume of 141.8m^3.

Results – Riverbank Road Pump Station to Albert Town – Hawea Road Pump Station 2

- Albert Town – Hawea Road Pump Station 2 inflow does exceed outflow. However this does not result in an overflow. This is based on a single duty pump capacity of 215l/s and a total storage volume of 114.8m^3.

It should be noted that the reticulation between Riverbank Road Pump Station and Albert Town – Hawea Road Pump Station 2 is a pressure main construction and therefore is not subject to overflow.

Discussion

Modelling of the network from the proposed development through to Dungarvon Pump Station 1 and the downstream network indicates that the existing network has sufficient downstream capacity to handle the addition of this development, based on the above assumptions.

The recent pump upgrade undertaken at Lakeside Pump Station 1 has reduced the short term risk of overflow due to the pump capacity. However, due to the small operating volume available at the pump station, this has resulted in pump runs of less than 2 minute duration. The model also indicates that a high number of pump starts are likely to occur, with the model indicating that up to 15 pump runs per hour would be required during this scenario.

This upgrade increases the flow to the downstream network and Dungarvon Pump Station 1. The model indicates that there is significant surcharging in the downstream network with a lessening effect as the short pumped volume attenuates to a steady flow. The effect at Dungarvon Pump Station 1 is also minimised by the attenuation that occurs and following the diversion of the Anderson Road catchment away from the Dungarvon Pump Station 1 catchment there is currently sufficient capacity to service this catchment.

Further growth in the Lakeside Pump Station 1 catchment will extend the pump runs and will have the effect of lessening the attenuation which will increase the risk of overflow in the downstream network.

Recommendation

It is our recommendation that the development is allowed to connect. However a long term solution for Lakeside Pump Station 1 should be investigated in the near future in order to manage the risk of overflow in the network downstream from Lakeside Pump Station 1 and to optimise the operation of the network.

Due to the rapid growth occurring in this area, the validity of this letter should be checked any time it is used as supporting evidence in a consent application.

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

Yours Sincerely,

Mark Baker
Infrastructure Analyst

Tom Lucas
Director / Infrastructure Analyst

Figure 1 – Long Section, SM16026 to Waimana Place Pump Station

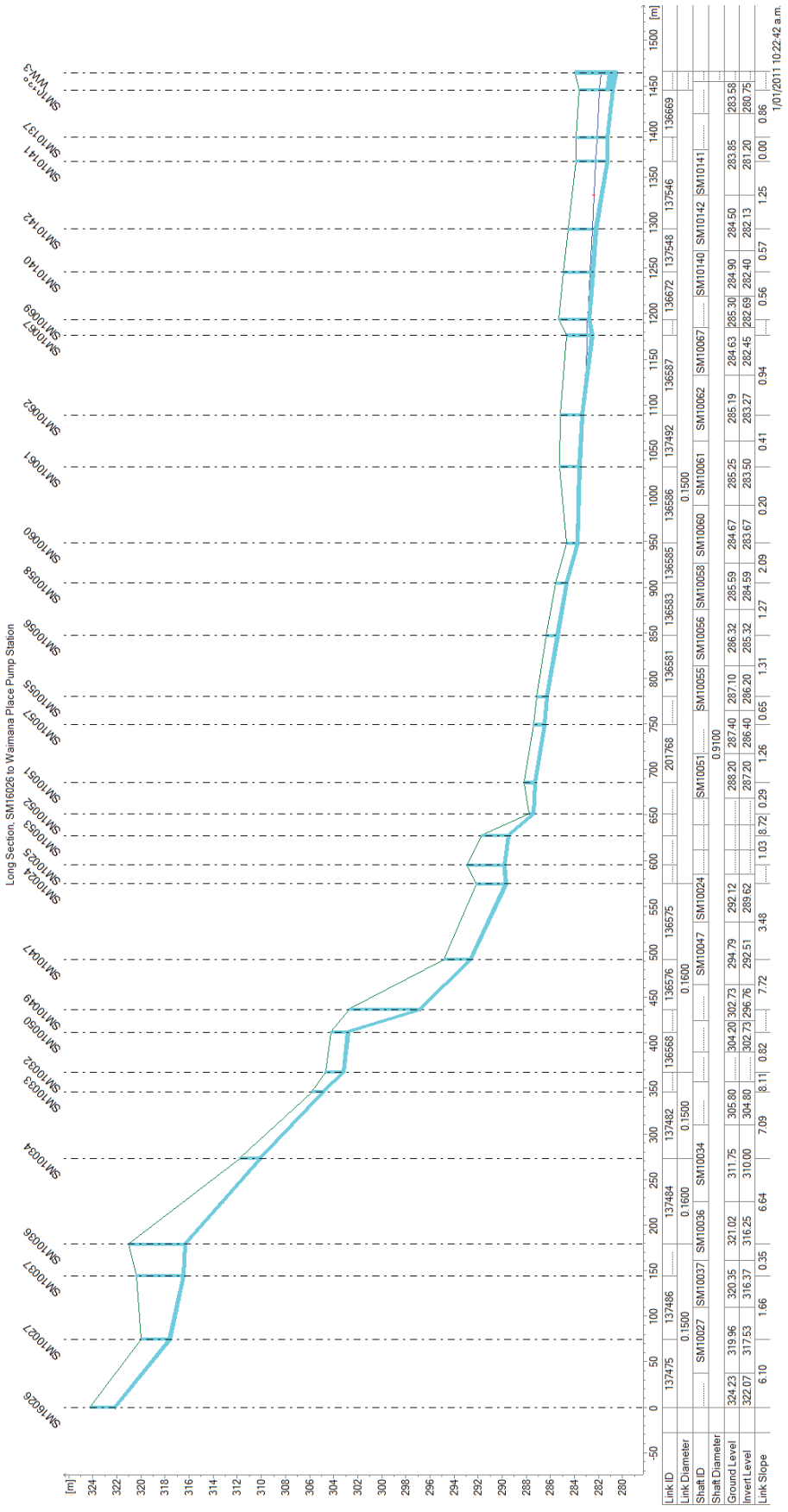


Figure 2 – Waimana Place Pump Station - Inflow / Outflow

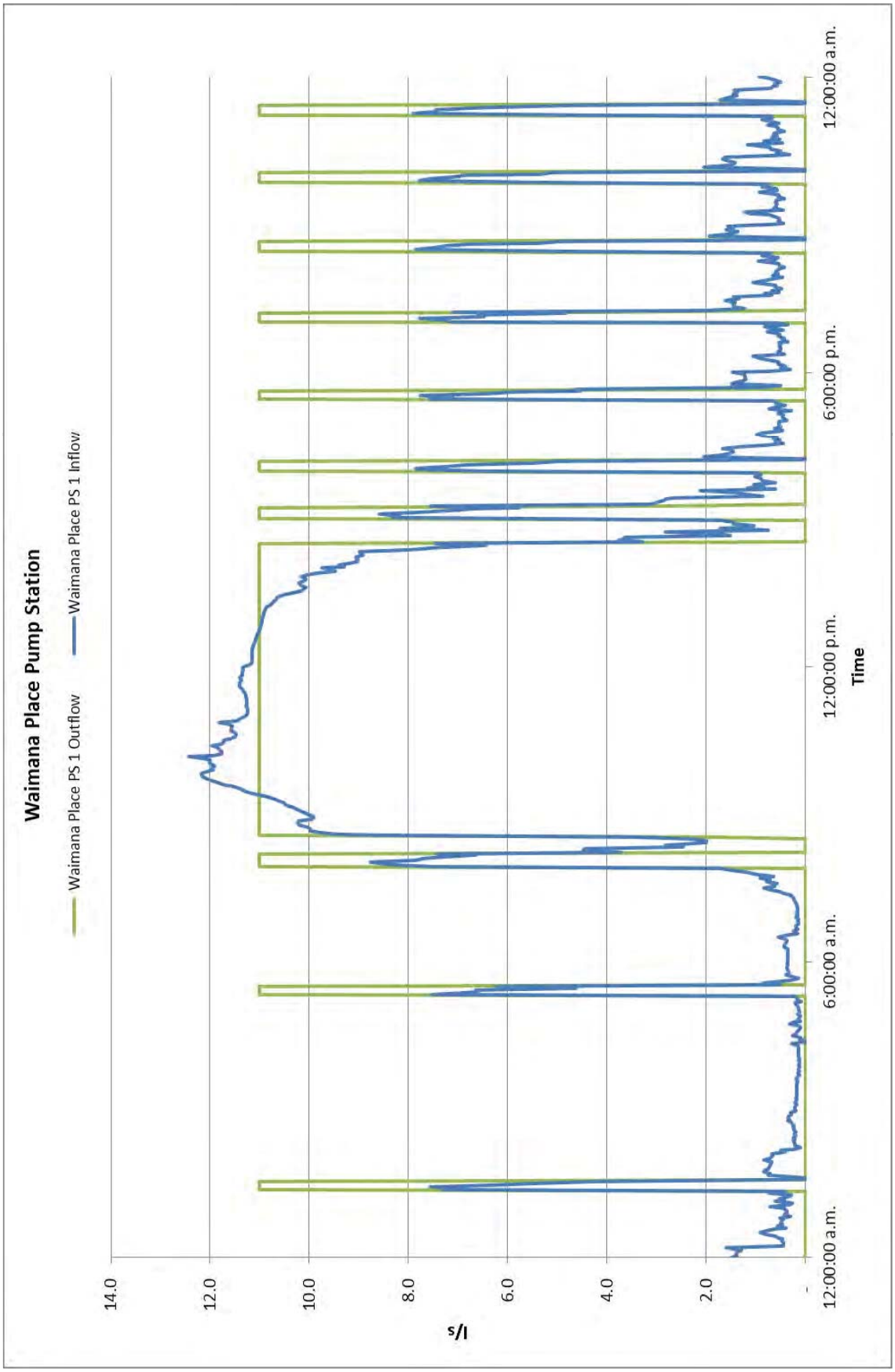


Figure 3 – Long Section, Waimana Place Pump Station to Lakeside Pump Station 1

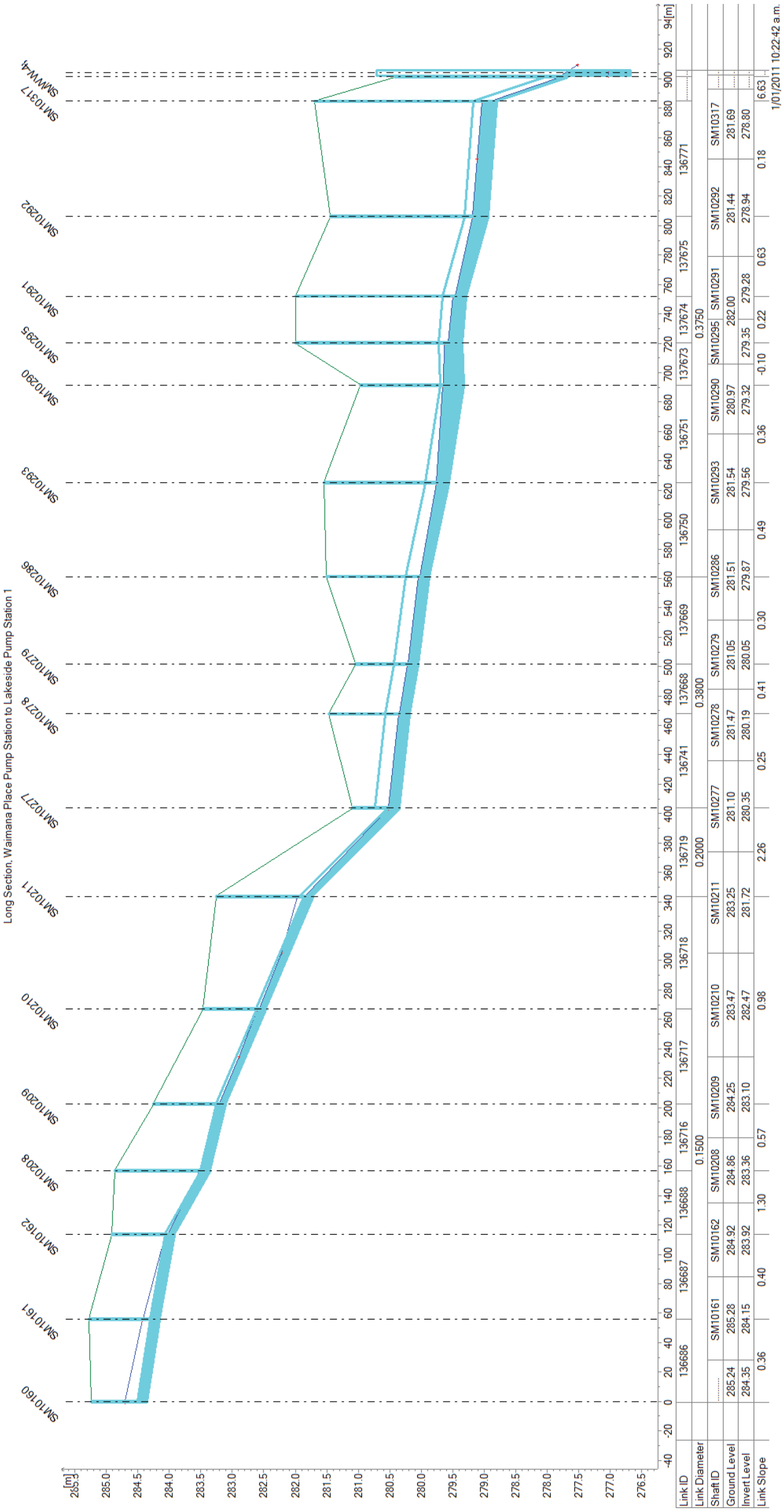


Figure 4 – Long Section, Hunter Crescent to Lakeside Pump Station 1

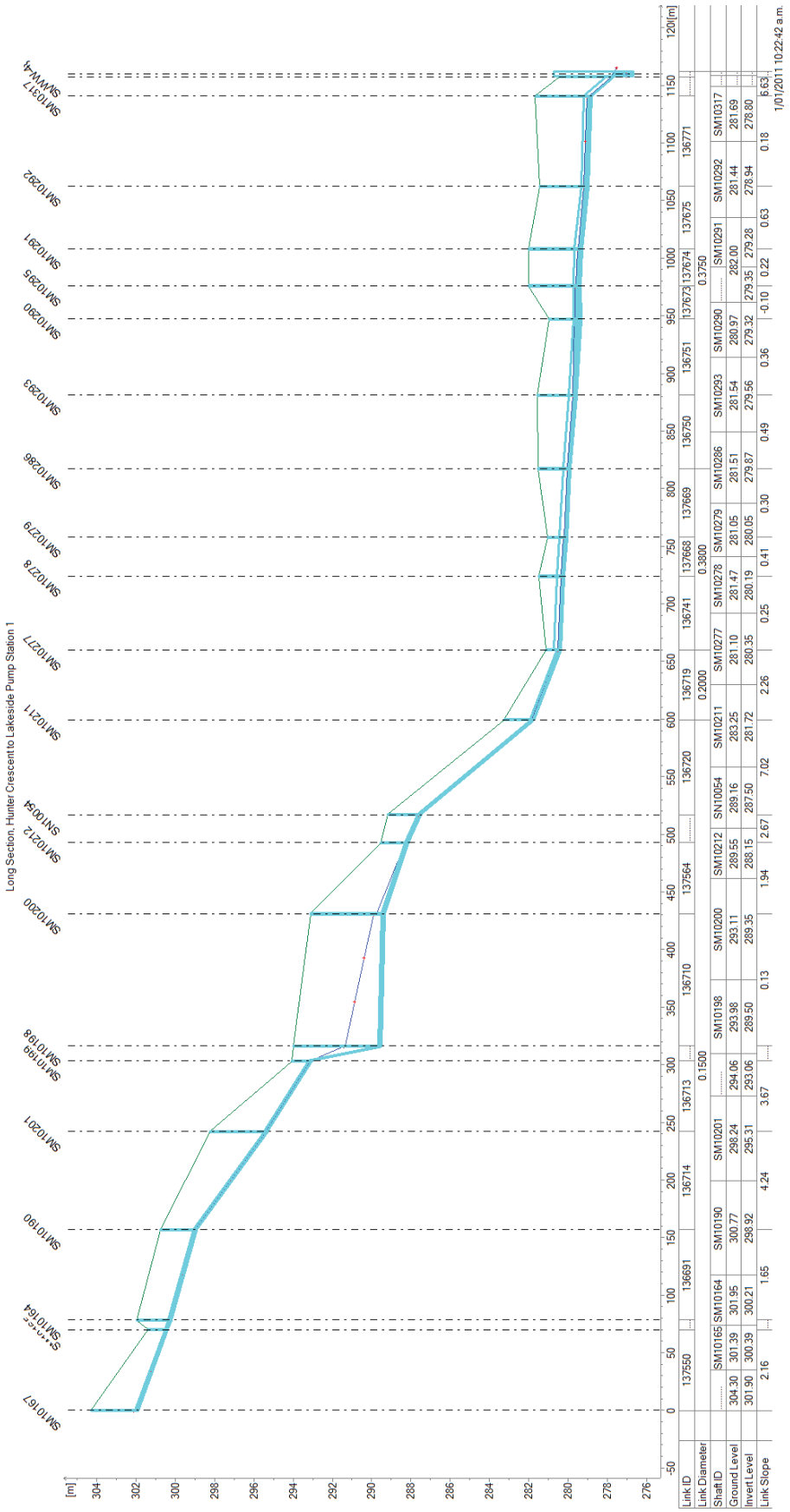


Figure 5 – Lakeside Pump Station 1 Inflow / Outflow

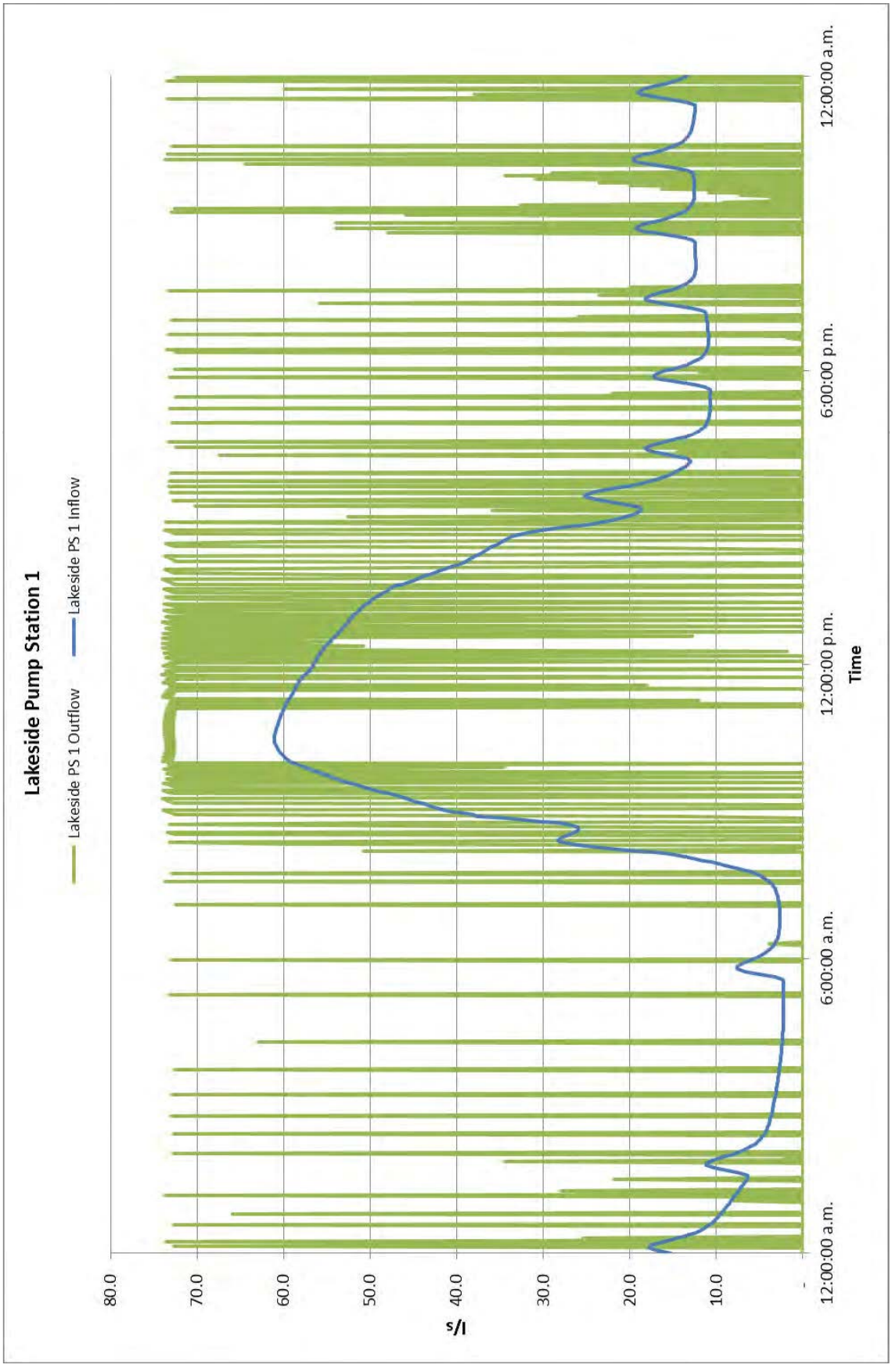


Figure 6 – Long Section, Lakeside Pump Station 1 to Dungarvon Pump Station 1

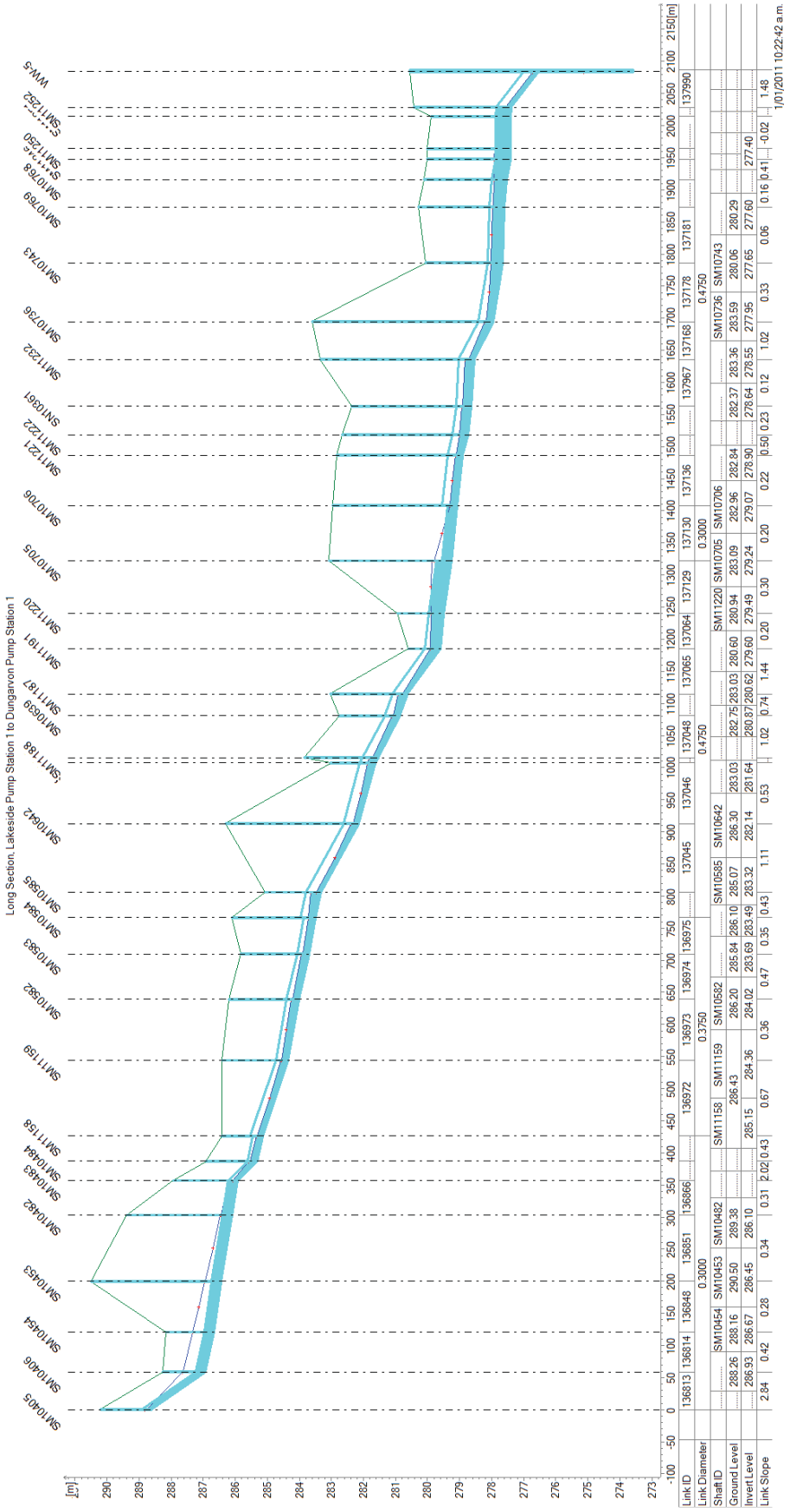


Figure 7 – Map, Lakeside Pump Station 1 to Dungarvon Pump Station 1 Flow / Capacity Ratio

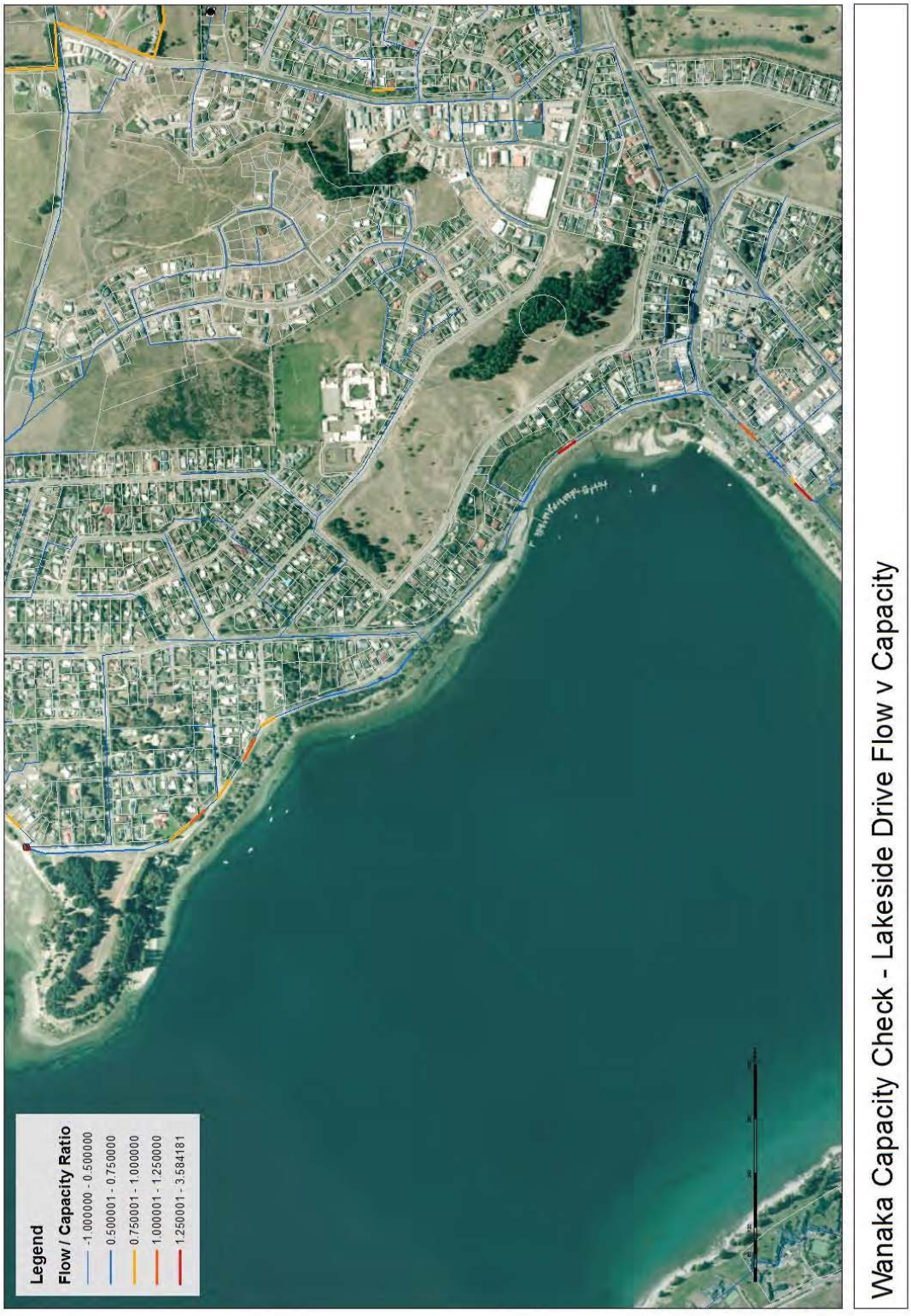


Figure 8 – Dungarvon Pump Station 1 Inflow / Outflow

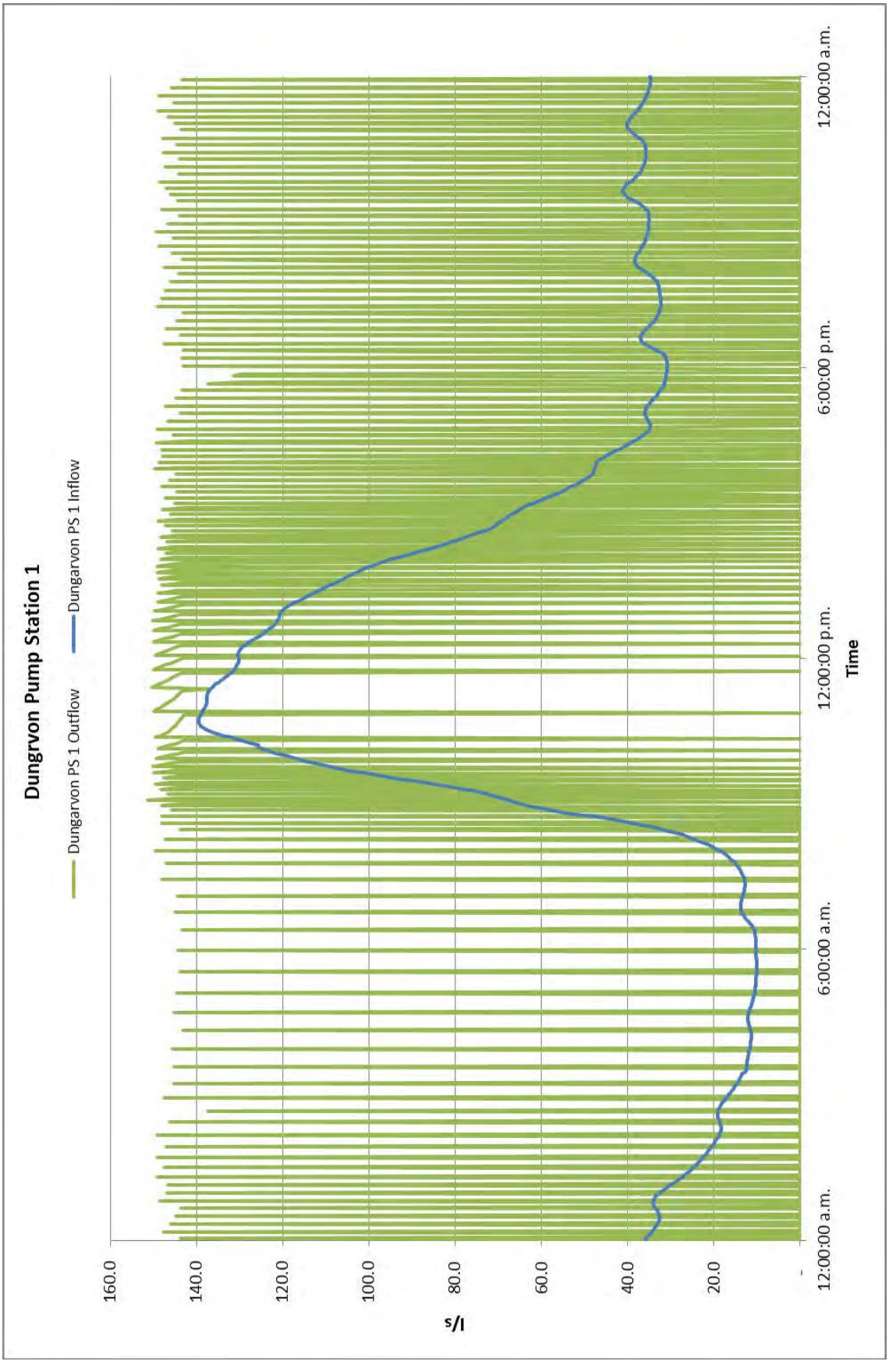


Figure 9 – Long Section, Dungarvon Pump Station 2 to Riverbank Road Pump Station

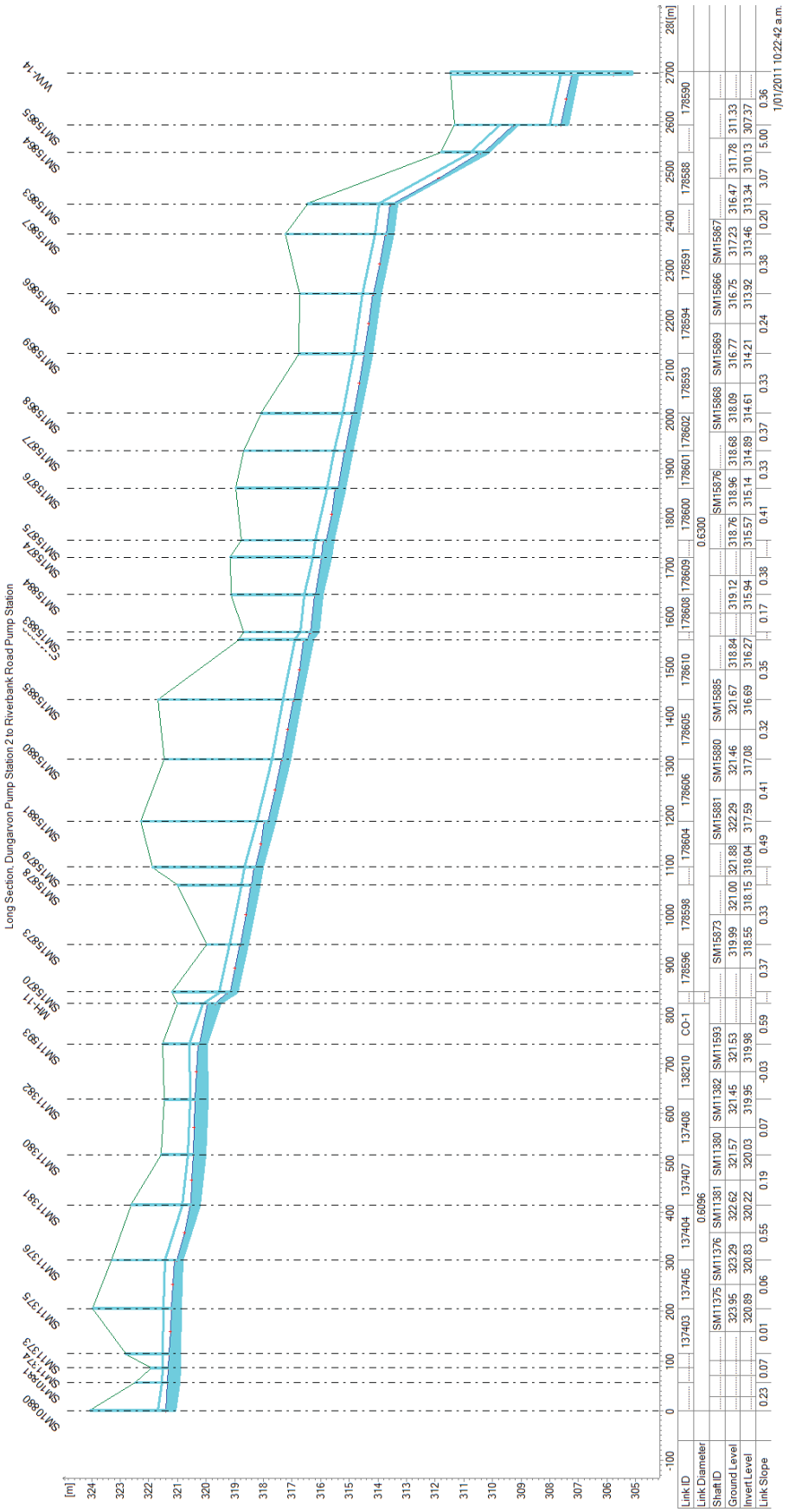


Figure 10 – Riverbank Road Pump Station Inflow / Outflow

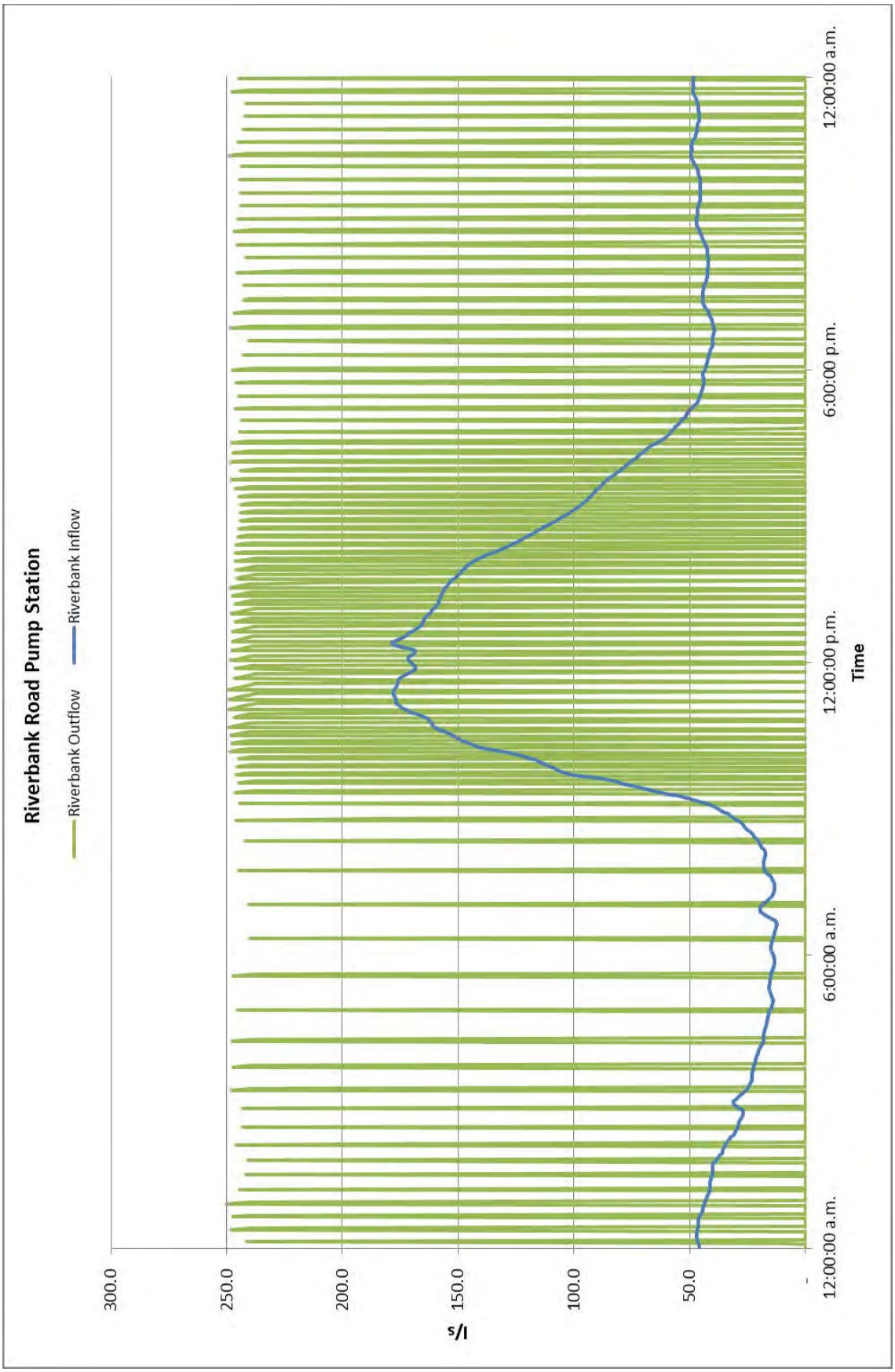
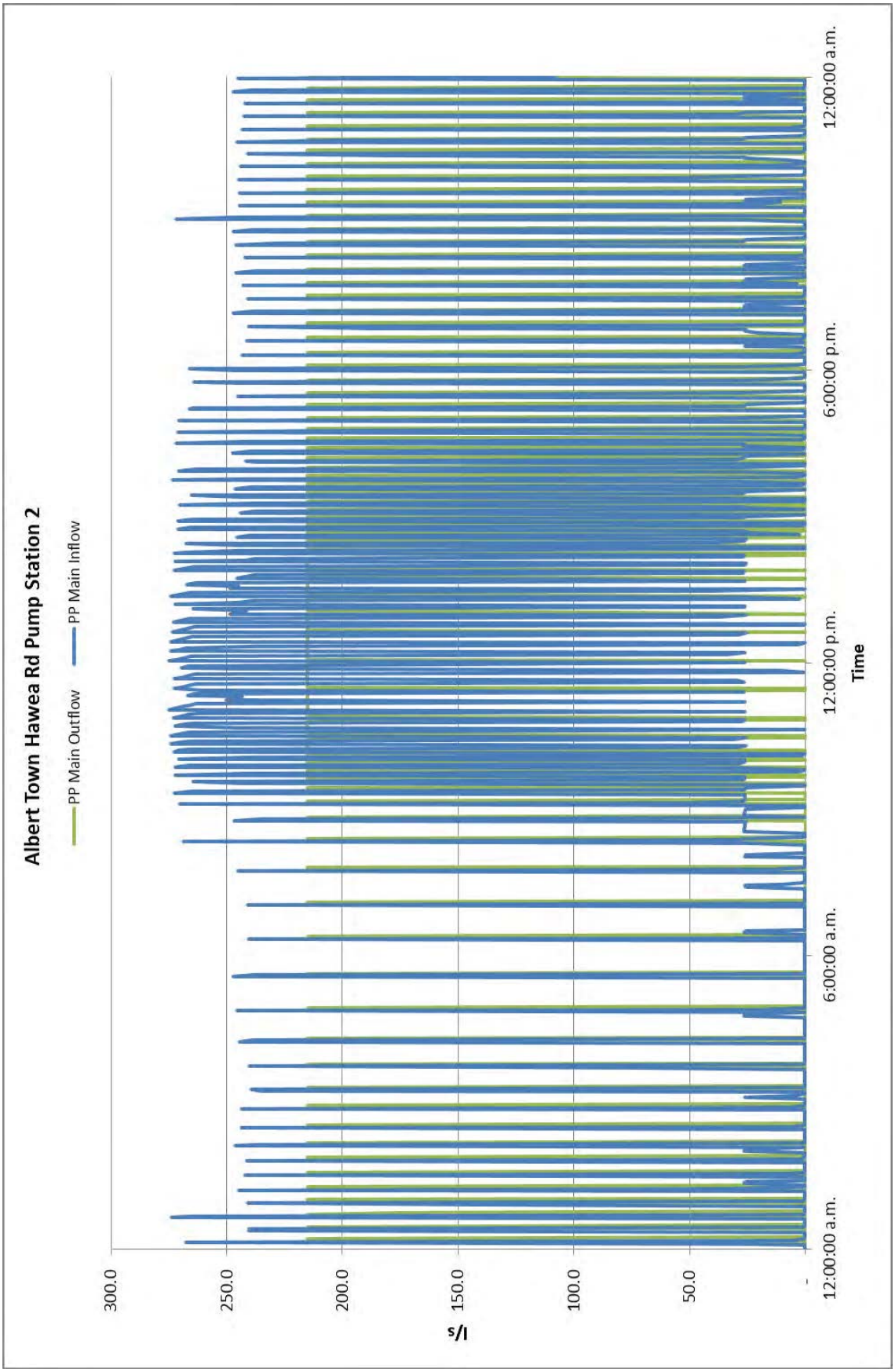


Figure 11 – Albert Town / Lake Hawea Road Pump Station 2 Inflow / Outflow



APPENDIX C – WATER MODELLING REPORT

Tonkin & Taylor

T&T Ref: 51556.027
05 February 2015

Queenstown Lakes District Council
Private Bag 50072
Queenstown 9348

Attention: Myles Lind

Dear Myles

Results of water modelling re-run for proposed additional 31 lots of Peninsula Bay development, Wanaka

Following your email received 11 December 2014**,** and in accordance with your request and our conditions of engagement, we have run our Wanaka water supply model to check the levels of service for the proposed development at Peninsula Bay, Wanaka. This work was undertaken for Queenstown Lakes District Council (QLDC) as our client.

The most recent water supply modelling for the Peninsula Bay development prior to this work was undertaken in 2011. The modelling presented in this report proceeded on the basis of an additional 31 lots to the north of the development, as detailed in the drawing provided by you (PPP Dwg W4332, titled "Plan of Water catchments", Dated 3/12/2014), modelling a total of 365 residential dwellings in the proposed development.

Modelling methodology

Modelling was undertaken using the current partially calibrated Wanaka water supply model and the design peak day demand scenario. The modelled demand scenarios used to determine levels of service for the development and the potential effects on the Wanaka water supply network were:

- Average flow on peak day demand - To determine whether available fire flows meet fire fighting requirements [1], and
- Peak hour demand on peak day - To determine whether minimum residual pressures at each connection are ≥ 300 kPa [2]

[1] Fire flow requirements are in accordance with SNZ PAS 4509:2008, "*New Zealand Fire Service Fire Fighting Water Supplies Code of Practice*".

Tonkin & Taylor Ltd - Environmental and Engineering Consultants, 33 Parkhouse Rd, Wigram, Christchurch, New Zealand
PO Box 13-055, Christchurch, Ph: 64-3-363 2440, Fax: 64-3-363 2441, Email: chch@tonkin.co.nz, Website: www.tonkin.co.nz

Development setting

The proposed development is in Beacon Point pressure zone which is supplied from the Beacon Point reservoir via the 300 mm main along Rata Street. The Wanaka water supply network near the proposed development is shown in Figure 1, attached.

Due to the unknown layout of the reticulation for the proposed 31 lots, the water supply network adopted consisted of two additional 100 mm diameter mains connected to Infinity Dr (see Figure 2, attached). The length of pipe to the proposed 16 dwellings and proposed 15 dwellings from Infinity Drive have been modelled to ensure that firefighting hydrant location requirements can be met for all dwellings (2 hydrants providing 12.5 l/s at 135 m and 270 m from any dwelling for FW2). Fire flow availability for the two catchment areas was assessed based on a hydrant at the end of each main.

Due to contour information within Catchment A being unavailable, modelling proceeded on the basis of the highest dwelling platform at approximately 340 mRL. Contour data has been used when modelling the dwelling platform elevations in Catchment B.

Demands

The average daily flow (ADF) demand was calculated assuming an average population of 3 people per residential dwelling and an average daily water consumption of 700 litres per person per day, as per Queenstown Lakes District Council requirements. 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 Design demands for Peninsula Bay Development

Development	Number of dwellings	Average daily flow (ADF)		Peak day flow (PDF)		Peak hour flow (PHF)	
		m^3/day	*l/sec*	*m^3/day*	*l/sec*	*m^3/hour*	*l/sec*
Peninsula Bay	15	32	0.4	104	1.2	9	2.4
	16	34	0.4	111	1.3	9	2.6
	334	701	8.1	2315	28.6	191	53.6
Total	365	767	8.9	2531	29.3	211	58.6

We have added the demand of the proposed 334 consented lots, and 31 additional lots (total of 365 lots) into the current Mike Urban PDF EPS network analysis model for Wanaka. Demands were entered into the model at the 10 nodes outlined in Table 2 below. The node locations are as shown in Figure 2, attached.

[2] The minimum residual pressure requirement is as set out in Queenstown Lakes District Council Amendments and Modifications (2005) to NZS 4404:2004 , *"Land Development and Subdivision Engineering".*

Modelling results

Modelling results are presented in Table 2 below. Note that these results relate to the Peninsula Bay development alone, with current Wanaka water supply model peak day design demands, and do not include demands from other proposed developments recently modelled by Tonkin & Taylor.

Table 2 Minimum pressures and fire flow availability

Nodes assessed	Residual pressure (kPa) (1)	Fire flow available (l/sec) (2)
J1	430 ≥ 300 **OK**	50 ≥ 25 **OK**
J2	660 ≥ 300 **OK**	63 ≥ 25 **OK**
J3	490 ≥ 300 **OK**	51 ≥ 25 **OK**
J4	320 ≥ 300 **OK**	37 ≥ 25 **OK**
J5	490 ≥ 300 **OK**	56 ≥ 25 **OK**
J6	360 ≥ 300 **OK**	43 ≥ 25 **OK**
J7	340 ≥ 300 **OK**	28 ≥ 25 **OK**
J8	500 ≥ 300 **OK**	63 ≥ 25 **OK**
J9	470 ≥ 300 **OK**	37 ≥ 25 **OK**
J10	400 ≥ 300 **OK**	33 ≥ 25 **OK**
J11	380 ≥ 300 **OK**	25 ≥ 25 **OK**
J12	310≥ 300 **OK**	22 ≥ 12.5 **OK** (3)

(1) A minimum residual peak hour pressure of 300 kPa is required as per QLDC amendments to NZS 4404:2004.

(2) A total of 25 l/sec is required from within 270 m of each non-sprinklered, residential dwelling for Class FW2 fire fighting as per SNZ PAS 4509:2008.

(3) A minimum of 12.5 l/sec is required from each hydrant as per SNZ PAS 4509:2008.

Modelling shows that during the current design peak hour demand scenario, the residual pressures in the development will be at least 310 kPa. This is for all dwellings below 340 m RL. Hence, the Queenstown Lakes District Council (QLDC) requirement for minimum pressures being ≥ 300 kPa **is met** within the proposed development.

Modelling also shows that a minimum of **Class FW2 fire flow can be achieved** during the design peak day demand scenario, as required for residential dwellings. All hydrants can deliver at least 12.5 l/sec within 135 m of each lot, with the remaining 12.5 l/sec available from within 270 m (total of 25 l/sec as required for FW2 firefighting).

As previously reported[3], the addition of the Peninsula Bay development reduces pressures along Minaret Ridge by approximately 90 kPa to 540 - 660 kPa (upstream of the PRV). Modelling indicates that with connection of the additional 31 lots in the Peninsula Bay development, **the effects on the rest of the water supply network are minimal.**

[3] Infinity Investments group Limited, *'Water supply modelling – Peninsula Bay development – Revised Modelling Results'*, dated 02 June 2011, T&T Ref. 51556.016

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.

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 our prior review and agreement.

In addition, the modelling results presented in this report show the available levels of service for the Wanaka network, based on the current design peak day demands, and are not a guarantee of available levels of service in the future.

We trust this modelling report meets your requirements. Please contact Dominic Fletcher (dfletcher@tonkin.co.nz) on 03 363 2440 if you wish to discuss these results or any other aspect of this modelling report.

Yours sincerely,

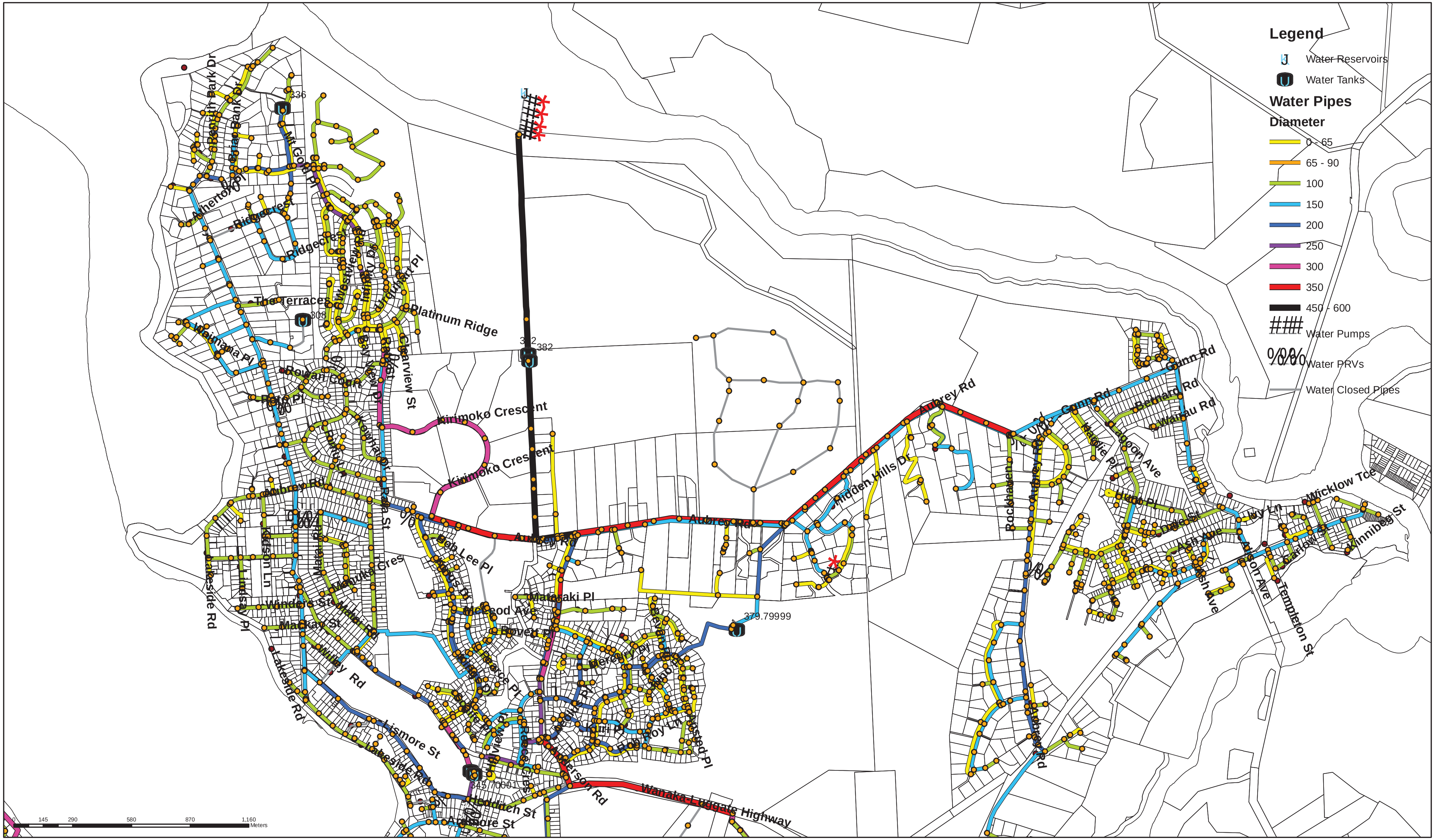
TONKIN & TAYLOR LTD

Grant Lovell
PROJECT DIRECTOR

Attachments:

- Figure 1 – Wanaka Network Layout
- Figure 2 – Peninsula Bay Additional Lots Water Supply Network Layout

5-Feb-15
p:\51556\51556.0270\workingmaterial\2015-02-02.mlaa.ltr.water modelling results.doc

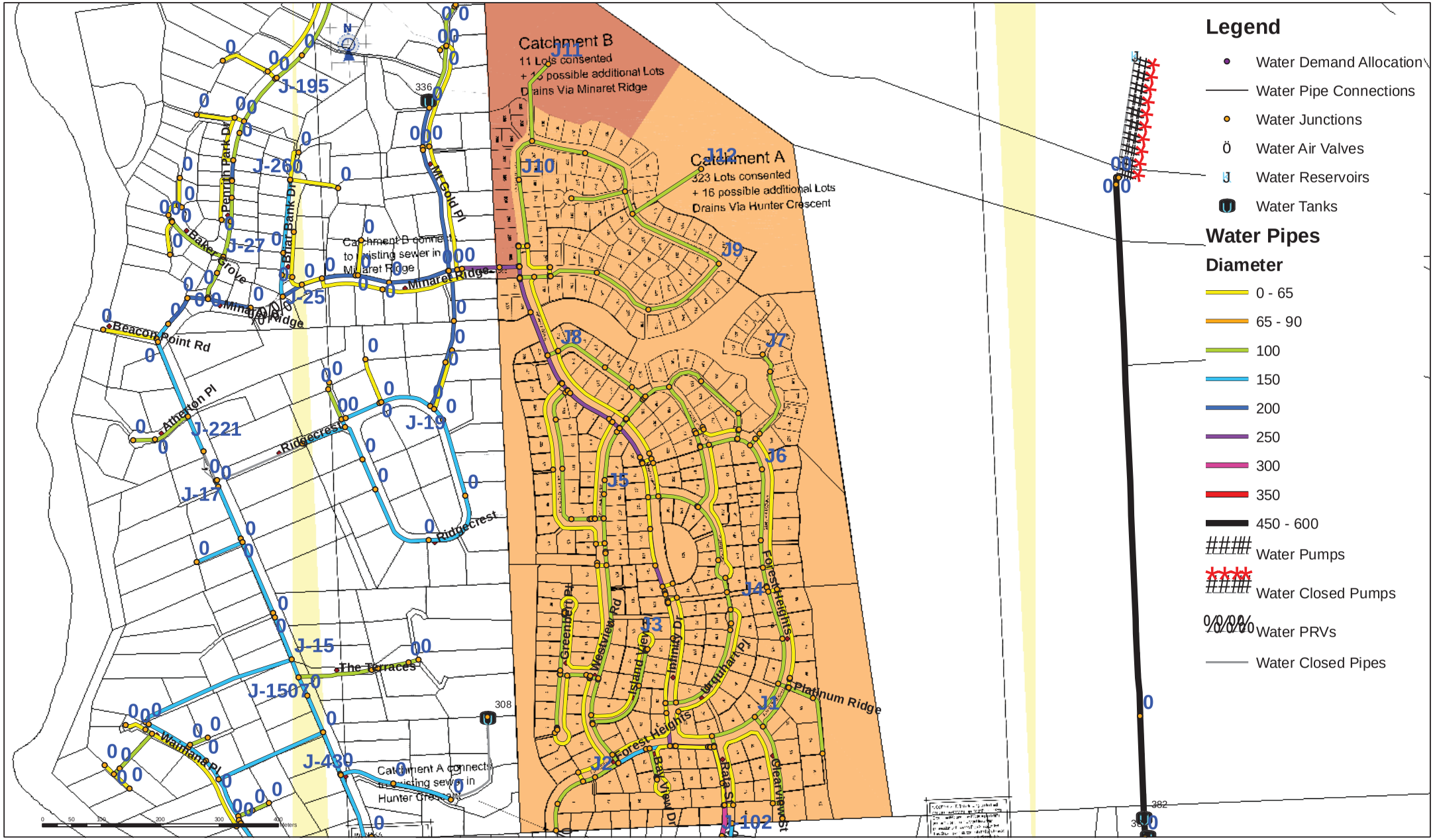


Wanaka network layout

Figure 1

MIKE URBAN

Drawn By:	JTC
Date:	04/02/2015
Approved:	
Scale:	1:17,500



Peninsula Bay Additional Lots
Water Supply Network Layout

Figure 2

MIKE URBAN

Drawn By:	MLAA
Date:	02/02/2015
Approved:	DAF
Scale:	1:6,000

APPENDIX D – CONFIRMATION OF UTILITY SERVICE AVAILABILITY

Aurora

27 January 2015

Mr Pete Smallfield
Paterson Pitts Group
P O Box 283
WANAKA 9343

By email only: pete.smallfield@ppgroup.co.nz

Dear Pete

RE: ELECTRICITY SUPPLY FOR PROPOSED 31-LOT SUBDIVISION INFINITY INVESTMENT GROUP - PENINSULA BAY - NORTHEND

Thank you for your letter and accompanying plans dated 23 January 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 co mply 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.

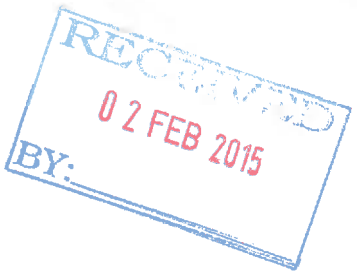
Aurora's Network Connection Requirements and Capital Contributions policy are available from http://www.auroraenergy.co.nz/. Should you require further information or clarification, please contact the undersigned.

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

The Subdivision Group
55 Shands Road, Hornby 8042
P O Box 1374, Christchurch 8140
Telephone: (03) 339 3402
Facsimile: (03) 338 0133
Email: tsg@chorus.co.nz



28 January 2015

Chorus Ref: WNK26881
Your Ref:

Infinity Investments Peninsula Bay
c/- Paerson Pitts Group
19 Reece Crescent
P O Box 283
Wanaka 9343

Attention: Pete Smallfield

Re: Proposed Subdivision: WNK: Infinity Drive, Peninsula Bay North End - 31 lots (lots 1-31)ABF

(Subdivision Location: Bull Ridge & Infinity Drive Wanaka)

Dear Sir / Madam

Thank you for letter and scheme plan for the above subdivision.

Chorus requires infrastructure and architecture design work to be completed prior to quoting the price for the provision of their services. At this time, due to other works in the area, the situation regarding spare capacity is unclear and requires further investigation.

Please allow up to six weeks for the Network design work to be completed, (some can occasionally take longer), before we can get back to you with confirmation of the cost to extend Chorus Network in Subdivision Location: Bull Ridge & Infinity Drive Wanaka.

Please do not hesitate to contact me should you have any queries.

Yours faithfully

Nuncy Maposa

Sub Division Specialist

Aurora

27 January 2015

Mr Pete Smallfield
Paterson Pitts Group
P O Box 283
WANAKA 9343

By email only: pete.smallfield@ppgroup.co.nz

Dear Pete

RE: ELECTRICITY SUPPLY FOR PROPOSED 31-LOT SUBDIVISION INFINITY INVESTMENT GROUP - PENINSULA BAY - NORTHEND

Thank you for your letter and accompanying plans dated 23 January 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.
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- The developer must co mply 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

The Subdivision Group
55 Shands Road, Hornby 8042
P O Box 1374, Christchurch 8140
Telephone: (03) 339 3402
Facsimile: (03) 338 0133
Email: tsg@chorus.co.nz

Chorus

Chorus Ref: WNK26881
Your Ref:

17 April 2015

Infinity Investments Peninsula Bay
c/- Paerson Pitts Group
19 Reece Crescent
P O Box 283
Wanaka 9343

Attention: **Pete Smallfield**

Fibre Reticulation Offer Letter

RE: Subdivision: WNK: Infinity Drive, Peninsula Bay North End - 31 lots (lots 1-31)ABF

(Subdivision Location: Bull Ridge & Infinity Drive Wanaka)

Dear Sir / Madam

Thank you for your enquiry and scheme plan for the above subdivision. This letter is to confirm that Chorus will install Fibre to the Premises (FTTP) reticulation for the subdivision.

Fibre reticulation will enable the delivery of high bandwidth internet connections for new multi-media services, internet-based applications and phone services. This is why Chorus is currently laying thousands of kilometres of fibre optic cable to bring ultra-fast broadband to more than 800,000 homes and businesses across New Zealand.

Important information about premises wiring
It is important for you to know that the wiring requirements for premises in a subdivision connected by fibre are different from the requirements for connecting to the traditional copper network. Premises wiring is the responsibility of the homeowner. Any new homes built in the subdivision should be installed with telecommunications cabling that complies with the Telecommunications Carriers' Forum's Premises Wiring Code. Information about this code and wiring requirements is available on our website at **www.chorus.co.nz/wiring**

Failing to install telecommunications wiring that meets the standard in the Code may mean services will not function as expected within the home. It is therefore important that information about wiring requirements and service delivery is passed on to your electricians, builders and potential property owners for this subdivision.

If the developer wishes to reticulate the subdivision and install connection points on the boundaries prior to selling sections, they'll need to commit to a Chorus Subdivision Reticulation Agreement and pay the required subdivision fees. The charge for Chorus to provide reticulation for this subdivision of 31 lots/units is $37,145.00 (G.S.T inclusive). This quote is valid for 90 days from the date of this letter.

The charge is a contribution to Chorus' total costs to extend its network and infrastructure to the lots in the supplied plan. Chorus' costs include network design, supply of telecommunications specific materials and supervising installation.

The quote above also assumes that the Developer, or their nominated contractor, will supply and reinstate trenches, and install Chorus plant within the subdivided area.

Easements
In any areas where Chorus Network is not installed in public road reserve vested to the Local Council, the subdivider is to ensure that a legal easement is registered over the route and Network in favour of Chorus New Zealand Limited. The easement should provide for an "easement in gross for Telecommunications purposes". Chorus has standard forms for easements transfer where an easement is being granted to Chorus as part of the requirements associated with the depositing of a subdivisional plan

Please Note: this includes service lead-in pipes and cable extending from the main network cabling into Right of

Ways.

Information relating to Street Names and Addresses
Please note that there are now multiple service providers who can potentially connect into communications networks in new subdivision areas. In order for connection requests to proceed without delays, accurate street address and numbering that aligns with Council plans needs to be recorded in the network providers data base.

This is particularly important for multiple dwelling units, campus developments or retirement villages that use both street addresses and unit numbering

Most subdivision developments at design stage start without Council registered road names and contain allotment numbers through the early build phase of the project. At build completion, the road names and the street address information is often available to developers before the final survey plans are sent for registration

It's vital that this information gets recorded in the Chorus network data base to ensure that connection requests to the network are completed successfully. The information can be provided back into the Chorus system via our Service Company staff who have provided the network designs for the subdivision area

I hope that this information assists with your enquiry and look forward to hearing from you in due course if a Reticulation Agreement is required.

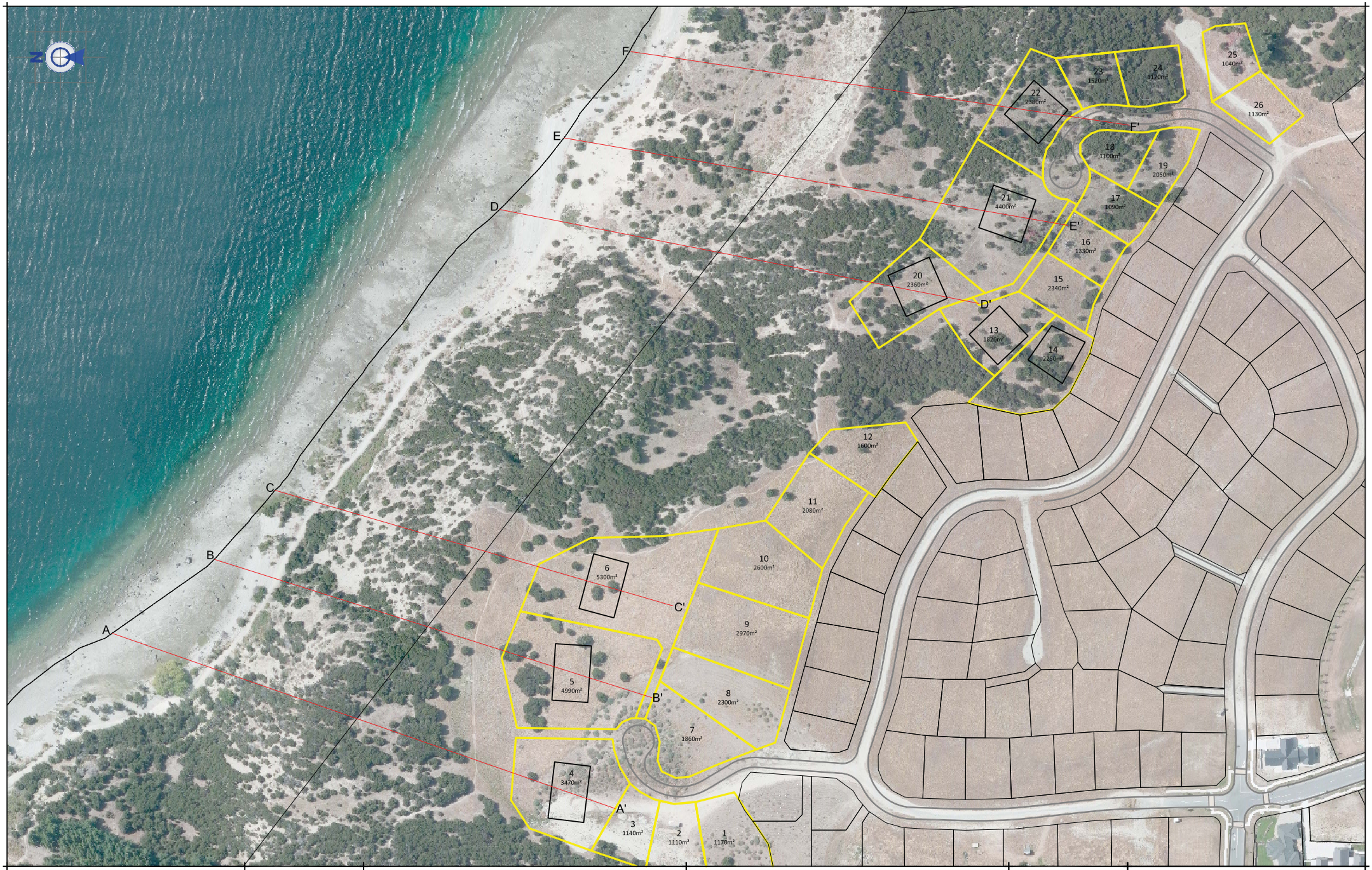
Yours faithfully

Nuncy Maposa

Sub Division Specialist

ANNEXURE C

Additional Pages to Appendix I of Section 32 Report
(Infrastructure Report)
Cross Sections



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

Client & Location:
Infinity Investments
Peninsula Bay

Purpose & Drawing Title:
Building Platform
Cross section
Plan

Surveyed by:		Original Size: A3	Scale: 1:2000 @ A3
Designed by:			
Drawn by:	PGS		DO NOT SCALE
Checked by:	MJB		
Approved by:	MJB		
Job No: W4332		Sheet No: 1	Revision No: A
			Date Created: 9/11/2015

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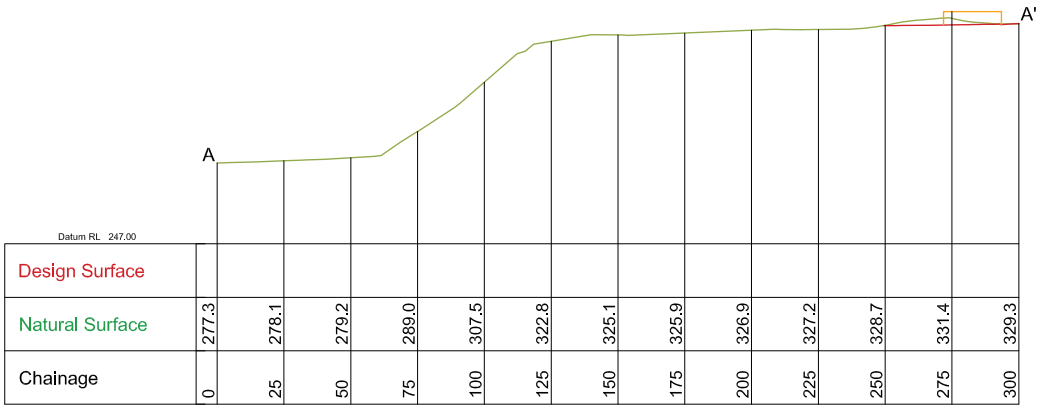
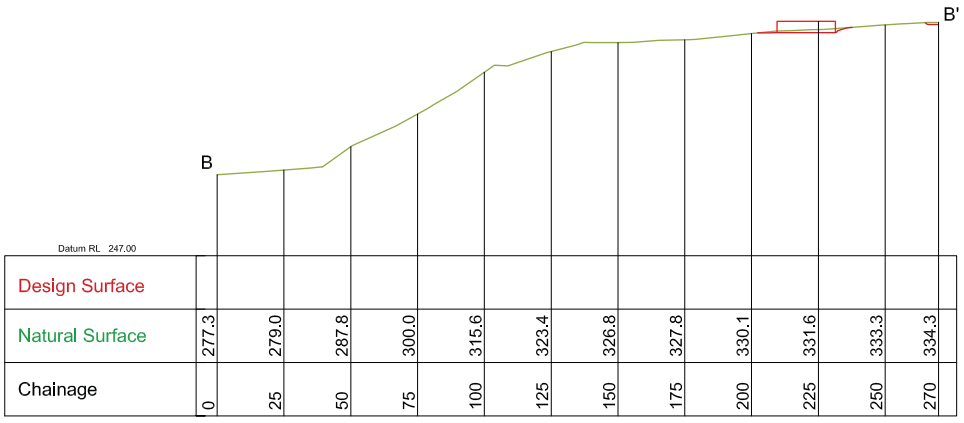


Lot 4



Lot 5

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E wanaka@ppgroup.co.nz

Client & Location:
Infinity Investments
Peninsula Bay

Purpose & Drawing Title:
Building Platform
Cross section
Lot 4 & 5

Surveyed by:		Original Size: A3	Scale: 1:2000 @ A3
Designed by:			
Drawn by:	PGS		
Checked by:	MJB		DO NOT SCALE
Approved by:	MJB		
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			Date Created: 9/11/2015

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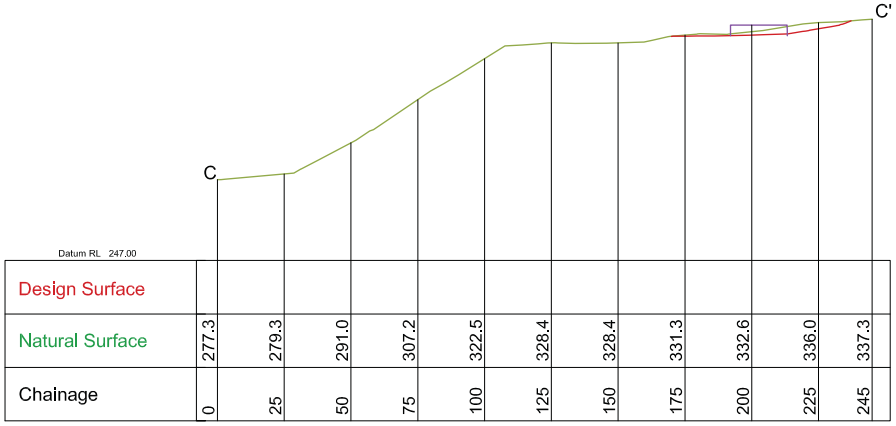

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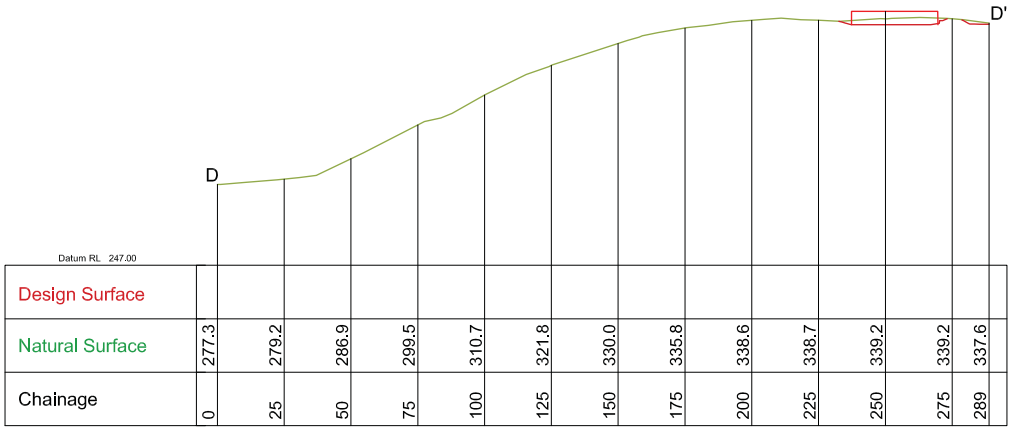

Lot 20

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Client & Location:
Infinity Investments
Peninsula Bay

Purpose & Drawing Title:
Building Platform
Cross section
Lot 6 & 20

Surveyed by:		Original Size: A3	Scale: 1:2000 @ A3
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Drawn by:	PGS		
Checked by:	MJB		DO NOT SCALE
Approved by:	MJB		
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			Date Created: 9/11/2015

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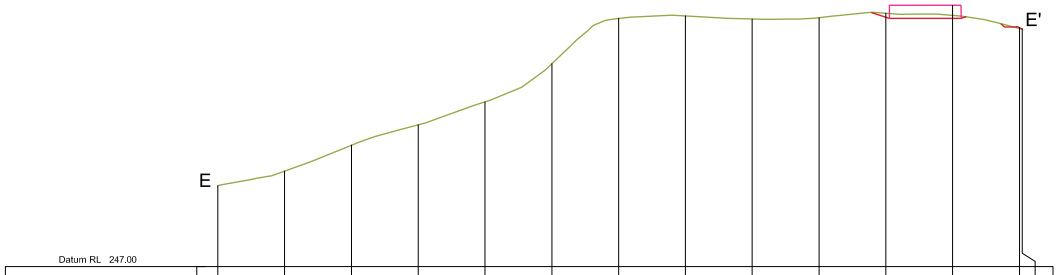

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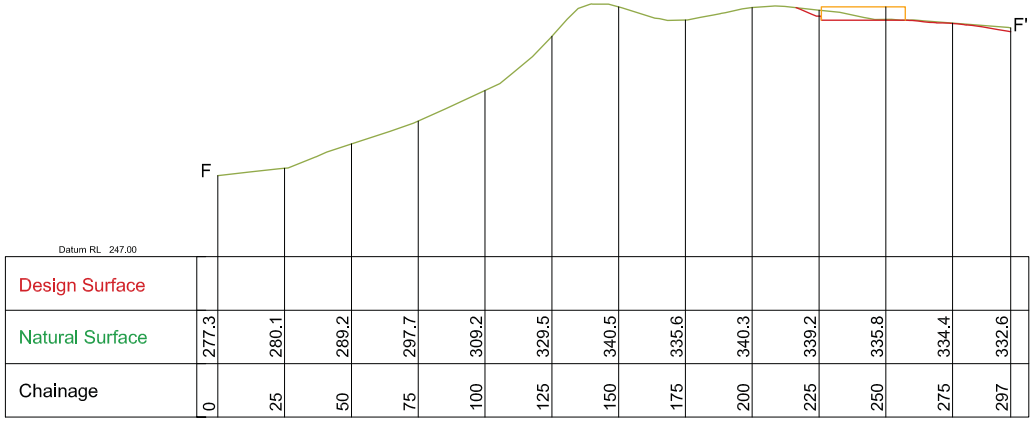

Lot 22

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Client & Location:
Infinity Investments
Peninsula Bay

Purpose & Drawing Title:
Building Platform
Cross section
Lot 21 & 22

Surveyed by:		Original Size: A3	Scale: 1:3000 @ A3
Designed by:			
Drawn by:	PGS		
Checked by:	MJB		DO NOT SCALE
Approved by:	MJB		
Job No: W4332		Sheet No: 4	Revision No: A
			Date Created: 9/11/2015

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