

26 June 2008

Our Ref: 081720

Queenstown Lakes District Council
Private Bag 50072
QUEENSTOWN

Attn: Mr Daniel Wells

Dear Daniel,

**THREE PARKS DEVELOPMENT – WANAKA
INFRASTRUCTURE AND SERVICING ASSESSMENT REPORT – REVIEW**

As requested, we have reviewed the report "Infrastructure and Servicing Assessment Report, Three Parks Development, Wanaka, Prepared for Willowridge Developments Ltd". We report as follows.

1. Introduction

Hadley Consultants Ltd (HCL) has been engaged by Queenstown Lakes District Council (QLDC) to review the report titled "Infrastructure and Servicing Assessment Report, Three Parks Development, Wanaka, Prepared for Willowridge Developments Ltd". This review is to focus on the methodology used in the report with a view to the report being updated to take account of the revised zone layout and activity areas.

The report was prepared in April 2007 by Duffill Watts & King Ltd (DWK). It addresses the proposed servicing for the Three Parks land near Wanaka. This land is subject to a proposed zone change from the existing zone of Rural General to a range of zones comprising Low and High Density Residential, Visitor Accommodation, Commercial and Industrial usages.

This land has been identified in the Wanaka Structure Plan as suitable for development and consequently a zone change is being considered to allow that development to occur. As part of the zone change process, QLDC needs to satisfy itself that the area can be adequately serviced with the necessary development infrastructure. The report prepared for Willowridge Developments Ltd (WDL) is to inform the developer and QLDC of the infrastructure demands and solutions for this area.

The report by DWK addresses the following infrastructural aspects:

- Water Supply
- Wastewater
- Stormwater
- Telecommunications
- Power Supply
- Gas Supply

Each of these is discussed in more detail below.

2. Water Supply

2.1 DWK Methodology and Summary

DWK have assessed likely water usage for the area using two different methodologies.

The first methodology involves using NZS4404:2004 and the QLDC amendments. This methodology was repeated using “light commercial/industrial” figures and “medium commercial/industrial” figures.

The second involves using the actual measured water usages for similar commercial and medium density residential zones in the Dunedin area. These figures were augmented to take account of increased irrigation needs.

DWK have also amended the peaking factor used from the 6.6 in the QLDC amendments to NZS4404:2004 to 5.

The assessment has produced a range of values for the average daily usage of the subject area. These assessed values are 1,724 m³/day, 2,321 m³/day and 3,345 m³/day. DWK then recommend adopting a figure of 2,500 m³/day and a peak flow rate of 145 l/s. This adopted figure is approximately the average of the 3 calculated values.

The predicted flows were then passed to Tonkin + Taylor for modelling using the water supply model for the Wanaka network. Modelling was carried out on the basis of providing 300kPa residual pressure during peak hour demand and providing W3/W4 fire fighting flows.

Modelling demonstrated that only 24% of the development could be built using the existing water infrastructure provided all the existing spare capacity was dedicated to the Three Parks Development. The construction of the proposed Hawthenden reservoir and associated reticulation was required in order for the

subject area to be fully serviced for water supply. Modelling indicated pipe sizes of 250mm will be required from Cardrona Valley Road to the site.

2.2 Issues Raised

The issues we have identified as requiring further work and/or justification are as follows:

- In the Alternative Assessment Method, the use of medium density residential figures from Dunedin for Activity Area 5 appears anomalous. Activity Area 5 is noted as “High Density Residential/Visitor Accommodation” on the drawing included with the DWK report. We do not believe that there will be a good correlation between the assumed flows and the actual water demand for this activity area. We would prefer to see this activity area assessment based on the NZS4404 and QLDC Amendments demand figures used in Methodology 1. Doing this would raise the total Average Daily Flow Rate on Table 3 to 1,852 m³/day.
- Additional justification for the lowering of the peaking factor from 6.6 (as recommended in QLDC standards) to 5 is needed. The peaking factor value of 6.6 has been determined using metering of actual flows in the network. With the more extensive flow metering work about to be carried out in Wanaka, QLDC will be in a better position to understand that actual peak demands on the water supply infrastructure in Wanaka. Until this work is completed, the peaking factor of 6.6 should be retained.
- Based on the two points above, the assessed Average Daily Flow for the site should be raised to 2,600 m³/day and the Peak Hourly Flow rate to 199 l/sec.
- The modelled pipe sizes take no account of the other areas of land in the vicinity of the Three Parks site that will also be serviced from the new Hawthenden Reservoir. There are significant areas adjacent and nearby to the subject land that have been identified in the Wanaka Structure Plan as being appropriate for development in the future and the proposed trunk reticulation should take account of this.
- The assumption that 24% of the Three Parks site can be serviced from the Beacon Point Reservoir provided all existing spare capacity is allotted to Three Parks needs further explanation. Does this take into account the significant other developments currently happening in and around Wanaka? Developments such as Peninsula Bay, Riverside Park, and development of the Kirimoko Block are all likely to occur in the near future and they will be partially occupied in advance of the Three Parks area. Is the spare capacity over and above the known demands from other developments currently well advanced? We do not know of any method to keep this allotted capacity reserved for the Three Parks development. Furthermore we do not believe that it can practically be done as it would require preventing other developments occurring in

the area until additional water capacity was constructed even though they may be subject to a Controlled Activity consent process and can therefore not be refused.

- The modelling assumed fire flows for up to a W4 Fire Risk Classification. We note that “big box retail” and other industrial usages may have Fire Risk Classifications that are greater than this and these will need to be either sprinklered or use some other fire fighting water supply. This should be noted in the zone rules and is not a matter that requires review within the DWK report.

2.3 Summary

On review, we broadly agree with the approach taken in modelling the actual Average Daily Flow water supply demands likely to be generated by the development of the subject land. Until development actually occurs and buildings are occupied it is difficult to predict the actual water supply demand. This is particularly relevant to the industrial, commercial and any visitor accommodation zones. With the modifications outlined above, the different scenarios offered by DWK are a good indication of the range of likely demands from the subject land.

As noted above, the capacity for the Beacon Point reservoir to supply the initial stages of the development needs further explanation and justification. The extent of development that can occur using the Beacon Point reservoir only will vary greatly depending upon the timing of the actual development of the Three Parks area and other developments in the area. There is a clear need for the proposed Hawthenden reservoir to be constructed to supply the majority of the Three Parks development. This needs to be reflected in the timing of the zone change and the timing of the Hawthenden reservoir construction. There may be a need to defer significant areas of the proposed zone change until the Hawthenden reservoir is operational and the necessary trunk reticulation is in place.

Zone rules should be considered to allow the control of high water usage developments. Rules for the area should be put in place that ensures Council has discretionary control over the development of intensive water using businesses. This should include industrial, commercial and visitor accommodation developments that are anticipated to use greater water flows than expected at the time of the zone change and that have a higher Fire Risk Classification than W4.

3. Wastewater

3.1 DWK Methodology and Summary

DWK have used three methodologies to model likely wastewater flows. These are similar to the methodologies used for calculating the water supply flows.

We note that with all of these methodologies, a peaking factor of 4.5 has been used. The actual peaking factor that should be used is 5 (as contained in the QLDC amendments to NZS4404:2004). No justification has been given for the lower peaking factor and it appears to be an error.

The expected flows from the site have been compared to the flows allowed for the subject land at the time of the Project Pure design. The Peak Population Daily Flow Rate is near the high end of the range of flows calculated. The Peak Wet Weather Flow rate is at the low end of the range of flows calculated.

The reticulation across the site will either connect into the existing foul sewer gravity main across the site (running alongside the Cardrona Bypass storm water pipe) or will be reticulated directly to the Project Pure pump station on Riverbank Road. The flow rates from the subject land are capable of being reticulated by the new Project Pure pump station and reticulation.

3.2 Issues Raised

The issues we have identified as requiring further work and/or justification are as follows:

- The analysis of flows from the residential areas has been calculated using the same methodology in each of the three flow methodologies. This is not reflected in table 4 with Case 3 showing different Peak Wet Weather Flows for activity areas 5 and 6.
- The use of 4.5 as the peaking factor is incorrect and this should be 5 based on the QLDC amendments to NZS4404:2004.
- Based on the two points raised above, Peak Wet Weather Flows would be in the range of 53 to 72 l/sec. These are all higher than the allowances in the Project pure design for this area. However, we further note that these flows appear to be within the capacity of the Project Pure system.
- Additional justification for using the peaking factor of 3.5 from the Project Pure design work is required. This compares to the peaking factor from 5 as recommended in QLDC standards. The peaking factor value of 5 has been determined using metering of actual flows in the network. Whilst we accept that across the whole of Wanaka, the peaking factor may be lower than this, the Three Parks catchment will not have the same characteristics as the whole of Wanaka. There are a number of pump stations and an extensive network over a far greater

area that will act to attenuate the whole of Wanaka flows. These features will not exist in the Three Parks catchment.

- There is an area adjacent to the proposed Three Parks development that has been identified in the Wanaka Structure Plan as being appropriate for further development. This is upstream of the Three Parks area in terms of the wastewater catchment and it is appropriate that the reticulation through the subject land takes this into account during design and construction.

3.3 Summary

On review, we broadly agree with the approach taken in modelling the wastewater flows from the site, as with the water supply, actual demands generated by the development of the subject land will vary. There are some inaccuracies in the DWK assessment but these do not change the overall ability of the Project Pure scheme to adequately manage the flows.

Constructed reticulation within the development should allow for drainage from upstream catchments.

4. Stormwater

4.1 DWK Assessment and Methodology

DWK have assessed the future flows from the subject land and flows from the surrounding catchments. As no runoff coefficients are given for the various catchment areas, it is difficult to know how much future development of surrounding catchments has been allowed for. Upstream Catchment Area C has been identified in the Wanaka Structure Plan as being suitable for future development and due to topography it makes sense that storm water flows from this area are reticulated through the Three Parks area. The future development of this area needs to be allowed for in the reticulation and drainage features of the Three Parks development.

The primary storm water drainage path identified for the site is to reticulate to the Cardrona Bypass storm water pipeline that runs through the site. Calculations show that this pipe has sufficient capacity for the primary storm water runoff from the site.

Secondary flows are proposed to be controlled on site with “appropriately designed flow paths, controlled flood plains, detention ponds and soak pits”.

4.2 Issues Raised

The issues we have identified as requiring further work and/or justification are as follows:

- Runoff coefficients should be clearly stated in the report. The assumed development status of the various catchment areas should be clearly stated.
- The flows, reticulation and other drainage features through the Three Parks area should allow for fully developed upstream catchment areas.
- Secondary flows may be managed by drainage features constructed on reserve areas. If this is the case, QLDC should be aware of this and agree to the future use of reserve areas in this manner.
- Connell Wagner is currently preparing Catchment Management Plans for Wanaka on behalf of QLDC. Whilst this work is not yet complete, Connell Wagner should be consulted as a check on the capacity of the Council infrastructure.

4.3 Summary

Primary storm water flows from the site will be reticulated to the Cardrona Bypass pipe running through the site. Calculations have demonstrated that this has capacity. These calculations should be checked to ensure that they have allowed for fully developed upstream catchments.

Secondary flows from the site will be subject to specific design as part of the development. This will include specifically designed and constructed flow paths, flood plains and detentions ponds. QLDC should consider if they approve of these facilities being on land that may become Council reserve in the future.

5. Telecommunications, Power and Gas Services

DWK have contacted the relevant service authorities for Telecommunications, Power Supply and Gas. All have confirmed the ability to reticulate the proposed development area.

6. Summary

With the corrections and the suitable addressing of the clarifications requested above, the report will form a good basis for the assessment of the relevant infrastructure in association with the Three Parks development.

The key concerns from the report relate to the availability of water supply to the development and ensuring that the development adequately drains upstream storm water and wastewater catchments.

Two issues have been identified that QLDC need to consider when evaluating the zone change. The first of these is the inclusion of zone rules relating to water restrictions to prevent large water use businesses establishing on the subject land and consuming large amounts of water to the detriment of the Council reticulation. This should also ensure that buildings with fire risk classifications that are higher than the W4 classification allowed for are required to be appropriately sprinklered or provide alternative fire fighting supplies. The second relates to the construction and maintenance of secondary storm water facilities on land that may become QLDC reserve in the future.

We note that roading has not been addressed by the DWK report. We recommend that a full evaluation of the effects of this development on the existing network and integration of the new roading layout into the strategic work currently being carried out is undertaken.

Should you have any questions please contact the undersigned in the first instance.

Yours faithfully

Hadley Consultants Ltd



John McCartney

CIVIL DIRECTOR

Copy to:

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