

**BEFORE THE HEARINGS PANEL FOR THE QUEENSTOWN LAKES  
PROPOSED DISTRICT PLAN**

**IN THE MATTER** of the Resource Management Act 1991

**AND**

**IN THE MATTER** of the Queenstown Lakes District Proposed District Plan,  
Hearing Stream 14 – Wakatipu Basin rezoning

**AND**

**IN THE MATTER** Submissions: 2449 – Morven Ferry Limited & 2509 –  
Barnhill Corporate Trustees Limited and DE, ME Bunn &  
LA Green.

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**STATEMENT OF EVIDENCE OF JASON BARTLETT FOR**

**Barnhill Corporate Trustee Limited and DE, ME Bunn & LA Green (2509)  
and  
Morven Ferry Limited (2449)**

**13<sup>th</sup> June 2018**

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## **INTRODUCTION**

### **Qualifications and experience**

- 1 My name is Jason Bartlett. I am an experienced traffic and transportation engineer. My academic and professional qualifications are:
  - (a) New Zealand Certificate in Engineering, Civil Option obtained in 1993;
  - (b) Bachelor of Engineering (BE) from the University of Canterbury awarded in 1996;
  - (c) Engineering New Zealand Member (MENG NZ), previously IPENZ and I have been a graduate member since 1995; and
  - (d) Chartered Engineer and Member of the Institution of Civil Engineers (CEng MICE), since 2007.
- 2 I have over twenty years experience in road design, network management, traffic and transportation engineering including nine years in the UK. During my time in the UK I became a Chartered Engineer and a Member of the Institution of Civil Engineers.
- 3 Since April 2008 I have been working as a traffic and transportation engineer in Queenstown. The first four of these years was for GHD Limited. I now operate my own traffic engineering consultancy, Bartlett Consulting, which I established in July 2012.

### **Expert witness code of conduct**

- 4 I have been provided with a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's Consolidated Practice Note dated 1 December 2014. While this matter is not before the Environment Court, I have read and agree to comply with that Code. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

### **Involvement in project**

- 5 In this matter I have been engaged by the land owners (Morven Ferry Limited & Barnhill Corporate Trustees Limited, D. E. & M. E Bunn &

L.A. Green "Barnhill"), to provide traffic engineering advice relating to the proposed zone change identified in their Submissions; 2449 & 2509.

- 6 I was originally involved in this project in September/October 2015 when I provided transport engineering advice regarding access to the proposed zone this resulted in the Transport Assessment dated October 2015 (refer Appendix A) which formed part of the Stage 1 submissions.
- 7 In preparing this evidence I have reviewed the following documents or reports relevant to my area of expertise:
- (a) The Traffic and Transport Evidence of Mr David Smith; and
  - (b) QLDC Section 42A Report and Planning Evidence of Mr Marcus Langman, Section 50.
- 8 I have prepared my evidence based on my:
- (a) Expertise as a traffic and transport engineer;
  - (b) Familiarity with the application site and surrounding area; and
  - (c) Familiarity with the above mentioned documents.

### **Scope of evidence**

- 9 My evidence addresses the following matters:
- (a) Overview of the traffic related elements of the Submissions; and
  - (b) Response to Traffic and Transport Evidence, QLDC s42A Report and Planning Evidence.

### **SUBMISSION**

- 10 The Submissions request the inclusion of Rural Residential or in the alternative Wakatipu Basin Lifestyle Precinct and Rural Visitor zoning within the proposed Wakatipu Basin Rural Amenity Zone. The plans identify 47.7ha Wakatipu Basin Lifestyle Precinct and 20.2ha of Rural Visitor zoning. These zones would be accessed via Morven Ferry Road.

## TRANSPORT ENVIRONMENT AND ASSESSMENT

- 11 This section is provided as a summary of the Transport Assessment dated October 2015.
- 12 The proposed rezoning would be accessed from Morven Ferry Road. Morven Ferry Road is a Local Road within the QLDC Road Network. Morven Ferry Road is a rural road with an intersection with SH6. It is noted that the Submissions' area can also be accessed, from SH6, via Arrow Junction Road which is a Local Road within the QLDC Road Network.
- 13 Both Morven Ferry Road and Arrow Junction Roads have evolved from a rural gravel road which now has an otta seal surfacing which is a dust suppressant. These roads do not meet the QLDC minimum standards for the extent of existing rural lifestyle type development served.
- 14 It is noted that the carriageway width of these roads, between the Submission area and SH6, generally provides two traffic lanes of minimum width. Although, this section of Morven Ferry Road is not up to the standard expected it will be capable of supporting the traffic flow resulting from the level of development anticipated by the Submissions. I note that the traffic generations that I have assumed, in the transport assessment, are a maximum based on the 85<sup>th</sup> percentile traffic generation rates for the proposed on-site activities.
- 15 The carriageway width of Morven Ferry Road reduces as it passes through a portion of the Submissions' area adjacent to the Barnhill land. It is anticipated that any development undertaken, as proposed by the Submissions, will require some upgrades to Morven Ferry Road and its intersection with Arrow Junction Road.
- 16 The recommendations from the transport assessment are:
  - (a) That accesses could be formed from Morven Ferry Road to both the Barnhill and Morven Ferry Limited land. It is noted that the access to the Morven Ferry Limited land would have a minimum legal width below the roading standards at the vehicle crossing from Morven Ferry Road.
  - (b) That roading improvements are required to widen the width of Morven Ferry Road adjacent to the land owned by Barnhill.

- (c) That the intersection of Morven Ferry Road and Arrow Junction Road is upgraded in a manner which encourages traffic to remain on Morven Ferry Road.

17 I considered that with local engineering works, as identified in the Transport assessment, any local transport effects from the proposed re-zoning (sought in Submissions) can be minimised and managed in a manner which is entirely appropriate.

#### **TRAFFIC AND TRANSPORT EVIDENCE – Mr David Smith**

18 I have reviewed the Traffic and Transport Evidence of Mr David Smith.

19 Mr Smith does not directly address the Morven Ferry Limited and Barnhill Submissions. However, his general comments and findings do relate to traffic that may be generated by the proposed zone changes sought.

20 Mr Smith considered the potential traffic generation, collectively, for development to the east of the Shotover River. He considers that these proposed developments would collectively have a cumulative traffic effect on the crossings over the Shotover River and in particular the SH6 Bridge at Lower Shotover. On this basis Mr Smith opposes all submissions that seek to increase residential density beyond that provided for in the notified Wakatipu Basin Chapter and plan maps<sup>1</sup>.

21 In arriving at this finding Mr Smith acknowledges that: *'Many of the submissions relate to relatively small increases in activity, [at the bridge] which in isolation would have no noticeable effect on the performance of the transport network. However, there is a risk of cumulative effects if a number of these submissions are approved together<sup>2</sup>*. Mr Smith's findings, relating to these Submissions, are therefore based on the potential of cumulative traffic effects at infrastructure (SH6 Shotover River Bridge) only which remote from the site.

22 Mr Smith acknowledges that based on current levels of development the SH6 Shotover River Bridge will reach capacity at or about the year 2035<sup>3</sup>. Mr Smith further considers the potential of the Special Housing

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<sup>1</sup> Evidence of Mr Smith, Paragraph 3.6.

<sup>2</sup> Evidence of Mr Smith, Paragraph 3.5.

<sup>3</sup> Evidence of Mr Smith, Paragraph 7.11.

Areas (SHA) along Ladies Mile Highway<sup>4</sup> suggesting that if these were to develop then the SH6 Shotover River Bridge would reach capacity earlier; in 2023 (with 1000 dwellings) or even 2021 (with 2000 dwellings)<sup>5</sup>.

- 23 It seems that the SH6 Shotover River Bridge is likely to reach capacity in the near future and this appears to be inevitable regardless of any zoning that increases density within the Wakatipu Basin. If this is the case then, I believe, NZTA should be developing a business case to improve this river crossing. I note Mr Smith also makes a similar comment<sup>6</sup>.
- 24 A central element of a business case is the extent to which transport improvements will enable or support development and growth. Mr Smith's evidence opposes all development due to the potential cumulative impact at the bridge. This may lead to a situation where no funding can be made available for this crossing as it does not enable any future development. I believe that proposed rezoning, as requested, would provide clear development aspirations and provide certainty of future traffic growth which would strengthen any NZTA business case for funding an improved river crossing.
- 25 However, allowing for development to the east of the Shotover River through zoning provides a clear indication of the future planning environment. This in turn guides the development of future transportation infrastructure. Knowing where development is likely to occur allows for better prediction of future transport demand. This demand can be used to justify the business case for spending on improved transportation infrastructure, such as an improved crossing over the Shotover River.
- 26 Council approach this in a different manner by collecting development contributions. These are used to fund works to mitigate the cumulative effects of developments across the District.

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<sup>4</sup> Evidence of Mr Smith, Paragraphs 7.19 to 7.22.

<sup>5</sup> Evidence of Mr Smith, Paragraph 7.21

<sup>6</sup> Evidence of Mr Smith, Paragraph 7.21

- 27 I consider that opposing zone changes on the grounds of cumulative transport effects is allowing the constraints of existing infrastructure to prevent development.

#### **SECTION 42A REPORT and PLANNING EVIDENCE – Mr Marcus Langman**

- 28 I have reviewed the portion of Mr Marcus Langmans' Evidence that relates to the Submissions. Mr Langman acknowledges that the Submissions would be opposed on Traffic and Transport grounds. However, I note that Mr Langmans' Evidence suggests that, at this stage, the Traffic and Transport Evidence has not been fully addressed in his assessment. Mr Langman suggests that this elements may be addressed in rebuttal evidence<sup>7</sup>.

#### **CONCLUSION**

- 29 The Morven Ferry Limited and Barnhill Submissions seek to rezone an area of land proposed under Stage 2 as Wakatipu Basin Rural Amenity Zone. The Submissions seek to establish 47.7ha of Rural Residential (or Wakatipu Basin Lifestyle Precinct) and 20.2ha of Rural Visitor zoning.
- 30 The Submission areas will be accessed from Morven Ferry Road. I have identified that a number of traffic engineering works which would be required to upgrade the local road network and to develop appropriate accesses to these areas. I believe that with these works undertaken the predicted traffic generation can be appropriately accommodated within the local road network.
- 31 I am advised that the relevance of cumulative transport effects on infrastructure remote from the site will be addressed in legal submissions, however in my opinion it is not an appropriate ground for opposing re-zoning of the type sought by these Submissions.

**Jason Bartlett**

**13<sup>th</sup> June 2017**

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<sup>7</sup> Evidence of Mr Langman, Paragraph 50.1.

## **Appendix A – Transport Assessment**

Bartlett Consulting, Transport Assessment, dated October 2015.





Barnhill Corporation Trustee Limited, Morven  
Ferry Limited and DE & ME Bunn and LE Green  
Morven Ferry Road Proposed Zone Change

## **Transport Assessment**

October 2015

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## **1 Introduction**

### **1.1 Background**

Barnhill Corporation Trustee Limited, Morven Ferry Limited and DE & ME Bunn and LE Green proposes to seek a change to the zoning of land adjacent to Morven Ferry Road in the Wakatipu Basin. This proposed zone change would create areas for Rural Residential (47.7ha) and Rural Visitor (20.2ha) activity.

### **1.2 Purpose**

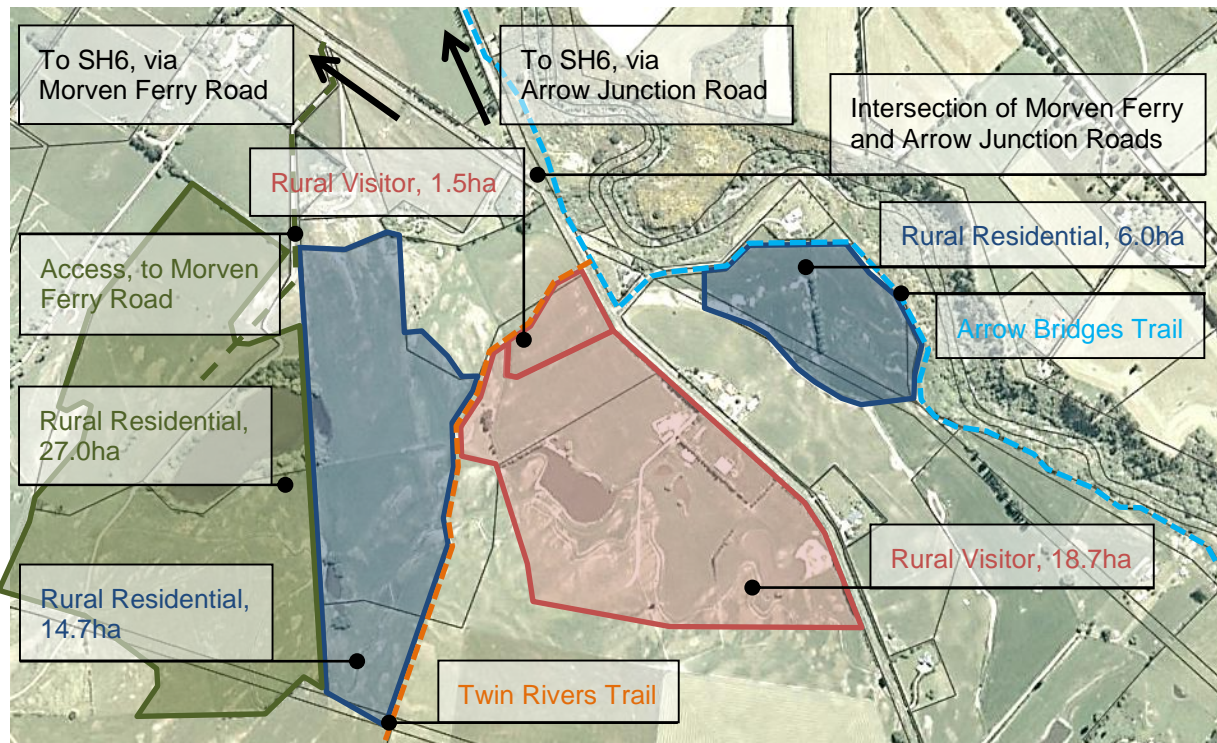
The purpose of this report is to assess the transport options for accessing the proposed zones from Morven Ferry Road. This assessment will review the adjacent local transport network and assess how traffic would access the site from the nearby Lake Hayes-Arrow Junction Highway (SH6). This assessment is based on transport infrastructure standards and will identify any potential transportation effects on the surrounding transport networks.

## 2 Site

### 2.1 Location

The site covered by the proposed zone change is located to the north of the Kawarau River on Morven Ferry Road, just south of the intersection with Arrow Junction Road. Figure 1 below shows the location and the proposed Rural Residential (RR) and Rural Visitor (RV) zones.

**Figure 1 – Proposed Site, image from QLDC webmaps**



### 2.2 Existing Use and Zoning

The site is currently zoned as Rural General in the QLDC District Plan. Part of the site is subject to an approved Resource Consent RM100395 which allows for the establishment of five residential sites and building platforms. The property and neighbouring properties are used as farmland with some rural dwellings.

### 2.3 Adjacent Road Network

#### 2.3.1 Road Hierarchy

Morven Ferry Road is not listed in the QLDC District Plan road hierarchy and is therefore classed as a Local Road<sup>1</sup>. Originally a gravel road, Morven Ferry Road has been treated with otta seal, a dust suppressant, which effectively creates a sealed road surface. Morven Ferry Road and Arrow Junction Road both link to SH6. Arrow Junction Road and Morven Ferry Road both have an 80km/hr posted speed limit which is based on the number of vehicle accesses from this road. Though the road is in the Rural General Zone the roadside

<sup>1</sup> Refer QLDC District Plan, Appendix 6 – Road Hierarchy.

development is more rural lifestyle in nature. Arrow Junction Road also forms part of the Arrow River Trail, a pedestrian and cycle trail linking Arrowtown and the Gibbston Valley.

SH6 is a regional state highway managed by NZTA. SH6 provides an arterial transport route within the Wakatipu, linking Gibbston Valley, Lake Hayes and Queenstown. Regionally, SH6 provides a transport link between Southland, Central Otago and other regions to the North. SH6 has a posted 100km/hr speed limit at the intersection with Morven Ferry Road. This reduces to 80km/hr as the road passes through the intersection with Arrow Junction Road.

### 2.3.2 Traffic Flows

#### Morven Ferry Road

QLDC collates traffic count information for Morven Ferry Road, the most recent traffic flow data available is from 2008 showing between 144 vehicles per day (vpd) in July and 256vpd in January. This is the Average Daily Traffic (ADT) based on a seven day vehicle count and recorded between the SH6 intersection and the intersection with Arrow Junction Road. The highest recorded traffic flow is 360vpd recorded in February 2005, this count was located at chainage 1806 which is near to the proposed site. To update this data a further traffic count has been undertaken between 31 July 2015 and 6 August 2015 (7 days inclusive) at chainage 1600 which is just north of the intersection with Arrow Junction Road. This traffic count recorded an average daily traffic of 65vpd and an operating speed of 72km/hr. It is likely that the amount of traffic on Morven Ferry Road would increase in the summer as a result of trail users on the nearby trail networks operated by Queenstown Trails Trust.

It is estimated that the typical 2015 traffic flow on Morven Ferry Road, at the site, could be in the region of 100vpd. It is noted that the Queenstown Trails Network would have a significant effect on the summertime traffic flows of Morven Ferry Road and Arrow Junction Road.

#### Arrow Junction Road

Additionally, a traffic count has been undertaken on Arrow Junction Road between 22 July 2015 and 28 July 2015 (7 days inclusive). This traffic count was undertaken at chainage 1400 between the intersection with Morven Ferry Road and the Arrow River Trail car park. This traffic count showed an average daily traffic of 62vpd and an operating speed of 85km/hr. The speed data when investigated further showed a 60km/hr for northbound traffic and 94km/hr for southbound traffic, the variance in traffic speeds possibly as a result of the intersection of Morven Ferry/Arrow Junction Roads.

#### Lake Hayes-Arrow Junction Highway (SH6)

Traffic flow data for SH6 is collated by NZTA, Table 1 below provides a summary of the latest traffic count data in the vicinity of the site.

**Table 1 – SH6 Traffic Count Data, source NZTA State Highway Traffic Data Booklet 2014**

Site	2010	2011	2012	2013	2014
Between Crown Range Road and Whitechapel Road RP 983/0.61 (ID:00600984)	5704	5775	5608	6130	6645
East of Strains Road RP 983/4.66 (ID:00600988)	8345	8058	8492	8747	9102

This traffic count data is provided as Average Annual Daily Traffic (AADT). This data shows a five year annual growth rate of nearly 9% at the Crown Range Road site and only 4% at the

Strains Road site. This suggests that the current (2015) AADT on SH6 near to the Morven Ferry Road intersection is approximately 7500vpd (vehicles per day).

### **2.3.3 Queenstown Trails**

The Queenstown Trails network passes the site providing off-road walking and cycling routes throughout the Wakatipu. To the west is the Twin Rivers Trail linking from the site to Lake Hayes Estate, and Frankton. To the north and south is the Arrow Bridges Trail linking the site to Arrowtown in the north and Gibbston Valley to the southeast.

Information obtained from the Queenstown Trails Trust shows that the Arrow River Trail at the Edgar Bridge to south of the site has an annual average of approximately 123 trail users per day. This is highly seasonal and weather dependent and a peak summertime usage is near to 410<sup>2</sup> users per day. These trail users will all pass the site and include pedestrians and cyclists.

A number of trail users will use the Arrow Junction Road car park. It is possible that up to one third of users could park at the Arrow Junction Road car park, this could mean that on average 40 trail users or approximately 20 cars<sup>3</sup> could use this car park during an average day. During the peak periods this could significantly increase as up to 136 trail users or 68 cars<sup>4</sup> could use this car park. During the peak summertime period this could attract 136 additional vehicle movements per day<sup>5</sup> associated with the Trails.

### **2.3.4 Existing Carriageway Widths**

Morven Ferry Road between SH6 and Arrow Junction Road has a formed (sealed with otta seal) carriageway width of 5.5m to 5.7m. Beyond the intersection with Arrow Junction Road (past the site) the carriageway width is reduced to between 3.7 and 4.0m which is essentially one way, where oncoming vehicles will need to slow and pull off the sealed carriageway to pass.

Arrow Junction Road has a sealed (otta seal) carriageway width of 5.5m to 5.7m.

### **2.3.5 Required Road Standards**

The current QLDC road standards<sup>6</sup> are based on NZS4404:2004 (which has now been superseded). This document does not provide any standards for unsealed roads anticipating that roads would have formed pavements and sealed surfacing. The appropriate road standard for a rural road (public local) with an expected traffic flow less than 250vpd would include a 6.25m sealed carriageway. This road formation would also include 0.5m grassed shoulders on each side. Where the road forms part of a pedestrian or cycling route (Arrow Junction Road) it would be appropriate to replace the grassed shoulder with a 1.5m sealed shoulder which could be used by pedestrians or cyclists, alternatively an off road path would be provided to cater for these users.

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<sup>2</sup> Based on an average Saturday during January 2014.

<sup>3</sup> Based on an assessed two trail users per car. No survey has been undertaken.

<sup>4</sup> Based on an assessed two trail users per car during the peak January Saturday.

<sup>5</sup> Based on an entry and exit movement for each car.

<sup>6</sup> Refer QLDC Development and Subdivision Engineering Standards (2007), Table 3.2 Rural General, Rural Lifestyle and Rural Residential Zones – Geometric Roading Standards.



Current NZ Standard NZS4404:2010<sup>7</sup> allows for a slightly wider sealed carriageway (6.5m to 6.7m) with a further 0.5m shoulder either side. This standard also suggests that cycles would be accommodated in the sealed shoulder and 1.5m footpaths are provided either side for pedestrians.

These standards suggest that for the existing traffic Morven Ferry Road should have a sealed carriageway of between 6.25m and 6.7m with 0.5 shoulders either side, a total formation width of up to 7.7m. Arrow Junction Road forms part of a pedestrian and cycle trail. This road should have a sealed carriageway width of 8.5m to 9.25m allowing for 1.5m sealed shoulders on either side to cater for pedestrians and cyclists.

The current formation and sealed widths of both Morven Ferry Road and Arrow Junction Road are significantly below the required standard.

### **2.3.6 Intersections**

The local road network includes three key intersections where Morven Ferry Road, Arrow Junction Road and SH6 form a triangle. An obvious route from the site to SH6 is along Arrow Junction Road. However, the intersection between Arrow Junction Road and SH6 has poor visibility sight distances. It is noted that this intersection has appropriate road markings and a reduced speed limit to maintain safety at the intersection. Alternatively, the intersection between Morven Ferry Road and SH6 has good visibility sight distances. Both the Arrow Junction Road and Morven Ferry Road intersections with SH6 are formed with left turn widening and right turning lanes, both intersections will be able to accommodate a significant amount of turning traffic.

The intersection of Arrow Junction and Morven Ferry Roads is a traditional rural intersection. This intersection has a large central island and no priority controls. The alignment of this intersection does not encourage drivers to slow as they approach or clearly identify which traffic should give way. This intersection layout is poor and should be upgraded to an appropriate intersection standard to maintain road safety for the existing traffic.

## **2.4 Alternative Transport Options**

The site is remote from residential or commercial development within the Wakatipu and as a result there are no public bus services that pass near to the site.

The Arrow River Trail and the Twin Rivers Trail both pass through the site. These are off-road walking and cycle trails which are part of the Queenstown Trails Network and are discussed in Section 2.3.3. These trails provide off road trails linking the site to Arrowtown to the north, Gibbston to the south and Queenstown (Via Lake Hayes Estate and Frankton) to the west.

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<sup>7</sup> Refer NZS4404:2010 Land Development and Subdivision Infrastructure, Table 3.2 – Road Design Standards, Figure E6, Primary freight access to rural activity, 5.5m to 5.7m movement lane, 1m shoulders (0.5m sealed) with off-road cycle and pedestrians (1.5m each side where required).

### 3 Proposed Zone Change

The proposed Morven Ferry Road zone change seeks to rezone 42.5ha of Rural General to a combination of Rural Residential (RR, 21ha in two areas) and Rural Visitor (RV, 21.5ha in two areas) zoning under the QLDC District Plan. The intention is to allow for rural style housing on large lots, visitor accommodation and related or supporting commercial activity based around the adjacent walking and cycle trail activity.

#### 3.1 Traffic Generation

The proposed zone change would enable development of the land for a combination of rural residential properties and visitor accommodation, there will also be some commercial activity. This commercial activity is likely to be tourism related and could include café/restaurants or offices/storage for tourism related activities such as cycling or similar activities associated with the on-site visitor accommodation or the nearby walking and cycling trails. It is anticipated that the commercial activity would complement the adjacent Queenstown Trails.

##### 3.1.1 Published Traffic Generation Rates

The current New Zealand document that could be used to gain an understanding of likely traffic generation for this development is NZTA Research Report 453 (RR453), Trips and Parking Related to Land Use (2011).

This document provides design peak hour and daily traffic flows for individual activities. The rates are a quick, initial value based on activity. These rates are appropriate when considering specific activities and traffic generation for particular facilities and are used to gain an overall perspective of the likely traffic generation. This methodology does not consider the likely reduction in traffic as a result of multiple activities located at the same site or by the selection of alternative travel modes such as walking or cycling. Table 2 provides the traffic generation rates from RR453.

**Table 2 – Design Traffic Generation Rates from RR453**

Activity	Peak Hour	Daily
Rural Residential (rural dwelling)	1.4/unit	10.1/unit
Rural Visitor (Commercial, based on a mixture of visitor accommodation and related or supporting tourist activities)	2.5/100m <sup>2</sup> GFA	26.1/100m <sup>2</sup> GFA

These trip rates are based on the 85<sup>th</sup> percentile design trip generation rate for these activities. The use of the 85<sup>th</sup> percentile trip generation rate provides a good assessment of the maximum likely hourly or daily traffic flow for a development.

The traffic generation rate used for Rural Visitor has been based on the commercial rate, in reality this will be made up of a mixture of activity types including visitor accommodation (approximately 9vpd/100m<sup>2</sup> GFA), restaurants/café (approximately 80vpd/100m<sup>2</sup> GFA) offices and tourist businesses (approximately 26.1vpd/100m<sup>2</sup> GFA), the use of this rate is considered to be a robust assessment of the maximum likely overall trip rate for a high level traffic generation.



### 3.1.2 Combined Traffic Generation

The zoning will be made up of five distinct areas. The following Table 3 provides the traffic generation expected from each area based on the anticipated level of development.

**Table 3 – Combined Traffic Generation, based on RR453 design traffic generation rates**

Activity Area	Peak Hour	Daily
Rural Residential (Morven Ferry Limited), 27.0ha located to the west and accessed from Morven Ferry Road, between 25 and 45 residential dwellings (based on 45 maximum dwellings)	63vph	455vpd
Rural Residential (Barnhill), 14.7ha located to the west of the Twin Rivers Trail and Morven Ferry Road, max 25 residential dwellings	35vph	253vpd
Rural Visitor, 1.5ha northern portion located to the west of Morven Ferry Road, medium density development say 40% site coverage, 6,000m <sup>2</sup> GFA max	150vph	1,566vpd
Rural Visitor, 20ha southern portion located to the west of Morven Ferry Road, low density with 5% building coverage control, 10,000m <sup>2</sup> GFA max	250vph	2,610vpd
Rural Residential (Bunn), 6ha located to the east of Morven Ferry Road, adjacent to the Arrow Bridges Trail, max 10 residential dwellings	14vph	101vpd

This traffic generation is based on the design traffic generation rate (85<sup>th</sup> percentile) and allows for full development over the maximum site area, this is considered to be a maximum possible traffic generation. This is significantly greater than the current traffic flow on Morven Ferry Road.

For comparison the average, or typical, traffic generation for the Rural Visitor areas could be 25%<sup>8</sup> less than the maximum figures provided in Table 3 above. The actual traffic generation of the proposed zone change can be re-assessed as the area develops and the actual amount or scale of the on-site activities are known.

### 3.2 Access Options (Barnhill/Bunn)

This section provides information regarding the access opportunities to the portion of the proposed zone within which include the Rural Visitor activities and the Rural Residential (Barnhill and Bunn) portions only. These sections will all be accessed from Morven Ferry Road to the south of the intersection with Arrow Junction Road.

The alignment of Morven Ferry Road, horizontally and vertically will limit the number of access options available. For the purpose of this assessment the forms of access considered are:

- Shared access, or
- Public road access

<sup>8</sup> Based on NZTA Research Report 453 (RR453), Trips and Parking Related to Land Use (2011) Comparison of 50<sup>th</sup> percentile (average) daily traffic generation against 85<sup>th</sup> percentile daily traffic generation rate, refer Table C.1: New Zealand trip generation and parking demand.

The difference being based on the volume of traffic likely to be generated by the area served. The following Sections describe these different access forms and where they might be appropriate.

### **3.2.1 Access Form**

#### **Shared Access**

A shared access is a private driveway or road providing access to residential and/or commercial properties. This form of access is based on the NZTA document (then Land Transport Safety Authority) RTS 6, Guidelines for visibility at driveways (1993, reprinted 1998 & 2001). For a local road such as Morven Ferry Road this document bases the design criteria on the visibility sight distance and operating speed of the frontage road.

Morven Ferry Road has an 80km/hr speed limit, the operating speed of Morven Ferry Road would be considered to be 85km/hr based on the measured operating speed of Arrow Junction Road. It is noted that the current operating speed of Morven Ferry Road is likely to be below 80km/hr as a result of existing narrow carriageway width, between 3.7 and 4.0m.

For an 85km/hr operating speed a shared access would need minimum visibility sight distance of 120m<sup>9</sup> in each direction. It is recommended that this access type is used for the Rural Residential, or limited to a low volume access (less than 200vpd) when serving properties in the Rural Visitor zone.

#### **Public Road Approach**

This type of access would be formed as a road intersection. The approach road may be adopted, or vested, with Council. This type of access will meet the design criteria of the current Austroads guides. Based on the current guidance a public road access would require minimum visibility sight distance of 197m Safe Intersection Sight Distance<sup>10</sup> (SISD). Austroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections (2010) gives guidance with regard to intersection infrastructure and layout based on traffic flow. The maximum hourly traffic flows (Table 3) suggest that the zones could be served by basic turn treatments with rural intersections<sup>11</sup>.

### **3.2.2 Access Locations**

A number of potential access locations have been reviewed on-site. These are shown on Figure 2.

The visibility sight distances at each potential access have been measured on-site, Table 4 provides the measured visibility sight distances and provides an indication of the access form that would be appropriate.

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<sup>9</sup> Refer RTS 6, Guide for visibility at driveways (2001), Table 1: Sight Distances, visibility sight distance interpolated as 120m being between 105m @ 80km/hr and 130m @ 90km/hr.

<sup>10</sup> Refer Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2010), Table 3.2: Safe Intersection Sight Distance (SISD) and corresponding minimum crest vertical curve size for sealed roads. The value for 85km/hr has been calculated based on 2 second reaction time.

<sup>11</sup> Refer Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2010), Section 4 Types of intersection and their selection.

Figure 2 – Potential Access Locations, image from QLDC webmaps

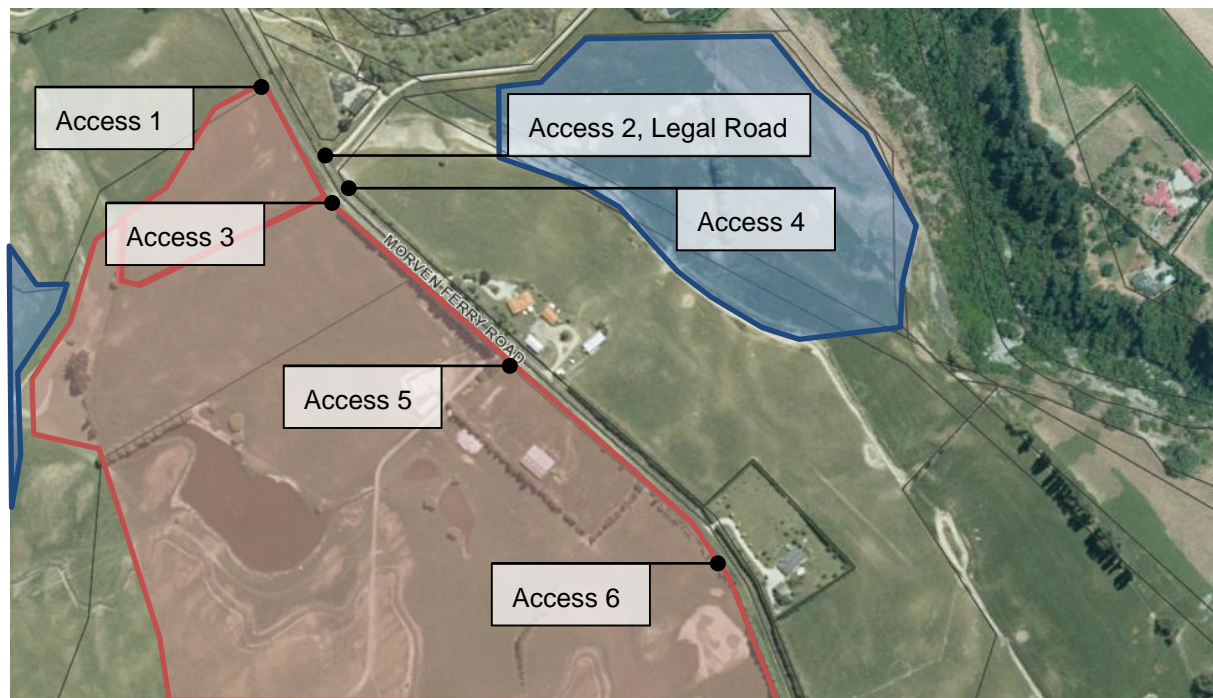


Table 4 – Access Visibility Sight Distance

Access	Sight Distance		Access Form
	North (towards Arrowtown)	South	
Access 1, at the existing access and trail crossing	180m to Arrow to Junction Road, limited by horizontal alignment.	160m, limited by horizontal and vertical alignment.	Shared access. This access could serve the Rural Residential zone to the west of Morven Ferry Road.
Access 2, legal road and existing access to the east.	240m to Arrow to Junction Road, limited by horizontal alignment.	40m, Limited by horizontal and vertical alignment	Access not recommended. This is a legal road access, Visibility sight distance to the south is poor and cannot easily be improved.
Access 3, located on the outside of a curve	285m to Arrow to Junction Road, limited by horizontal alignment.	130m, limited by vertical alignment. Visibility sight distance Could be improved through vertical alignment of Morven Ferry Road.	Shared access serving approximately 750m <sup>2</sup> GFA of Rural Visitor. This access will need priority intersection controls if Access 4 (opposite) is used. Improved vertical alignment of Morven Ferry Road is recommended to allow this access to be used a public road approach allowing access to the full Rural Visitor zone.

Access	Sight Distance		Access Form
	North (towards Arrowtown)	South	
Access 4, located on the inside of a curve	285m to Arrow to Junction Road, limited by horizontal alignment.	130m, limited by vertical alignment. Visibility sight distance Could be improved through vertical alignment of Morven Ferry Road.	Shared access. This access could serve the Rural Residential zone to the east of Morven Ferry Road. This access will need priority intersection controls if Access 3 (opposite) is used.
Access 5, located opposite an existing residential access	250m limited by vertical alignment.	220m limited by horizontal and vertical alignment.	Public Road approach This access could serve the full Rural Visitor zone.
Access 6, located on the inside of a curve	100m limited by roadside vegetation. Could be increased to 200m limited by vertical alignment.	100m limited by roadside vegetation. Could be increased to 200m limited by vertical alignment.	Not recommended without vegetation removal. Removal of roadside vegetation from within the site will allow this access to be used a public road approach allowing access to the full Rural Visitor zone.

The section of Morven Ferry Road between proposed accesses 3 and 6 has an undulating vertical alignment which limits visibility sight distances. If this vertical alignment was improved the visibility sight distance to the south of Access 3 and 4 could be improved. These accesses could then be considered as intersections for public road approaches. This may be appropriate to allow Access 3 to serve a greater area of the proposed Rural Visitor zone to the west.

Additionally, Access 6 may be utilised if roadside vegetation is removed from within the site. Vegetation removal will allow this access to be developed as an intersection with a public road approach which could serve the Rural Visitor zone.

### 3.3 Access Options (Morven Ferry Limited)

The rural residential (Morven Ferry Limited) land to the east could be developed to between 25 and 45 residential sections. Based on the worst case scenario, 45 sections would be developed which would be accessed from Morven Ferry Road along a portion of Morven Ferry Limited's land.

This land has a minimum width of 12m and a narrowing at the access (frontage length) to 6.0m at Morven Ferry Road. The road frontage is located adjacent to two other property accesses. This width will allow for the construction of a minimum movement lane which is compliant with NZS4404:2010. However with a traffic flow of up to 455vpd the required minimum legal road reserve width would be 15m<sup>12</sup>. It is noted that this width would allow for services and any works which are likely to be accommodated within the 12m available road

<sup>12</sup> Refer NZS4404:2010 Land Development and Subdivision Infrastructure, Table 3.2 – Road Design Standards, Figure E3, Rural Live and Play access to housing, 15m min road width for a local road with approximately 1000vpd.

width. It is also noted that if a road/intersection was created at this location it would breach minimum separation distances requirements of the Operative QLDC District Plan<sup>13</sup>. Regardless, the proposed access would be able to be formed within this width although whether the final access would be vested with Council can be decided at development stage.

Given the likely traffic flow at this access, up to 455vpd, the access intersection should be formed as a road intersection. This type of access will meet the design criteria of the current Austroads guides. Based on the current guidance a public road access would require minimum visibility sight distance of 197m Safe Intersection Sight Distance<sup>14</sup> (SISD). Austroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections (2010) gives guidance with regard to intersection infrastructure and layout based on traffic flow. The maximum hourly traffic flows (Table 3) suggest that the zones could be served by basic turn treatments with rural intersections<sup>15</sup>.

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<sup>13</sup> Refer Operative QLDC District Plan, Section 14.2.4.2 Access, vi Distances of vehicle crossings from Intersections, Table 5 – Minimum Distance of Vehicle Crossings from Intersections requires a minimum of 25m separation between an intersection and a vehicle crossing.

<sup>14</sup> Refer Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2010), Table 3.2: Safe Intersection Sight Distance (SISD) and corresponding minimum crest vertical curve size for sealed roads. The value for 85km/hr has been calculated based on 2 second reaction time.

<sup>15</sup> Refer Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2010), Section 4 Types of intersection and their selection.



## 4 Transport Effects

### 4.1 On-site Transport Effects

The on-site transport effects can be managed through the design and planning process. The QLDC District Plan identifies a number of transportation objectives which should be considered during planning and engineering of the on-site development. It is expected that any on-site traffic effects would be managed through planning approvals for development within the proposed zones. At this stage it is anticipated that the internal road network can be established on the current QLDC code of practice and NZS4404:2010 Land Development and Subdivision Infrastructure.

It is noted that the access to the largest Rural Residential area within Morven Ferry Limited's land to the east has a proposed access which would utilise a corridor with a minimum width of 12m and a frontage length of 6.0m at Morven Ferry Road. This will lead to a number of potential non-compliances regarding legal road width if the access road is to be vested with Council. These non-compliances can be managed through design and are unlikely to result in an effects on the operation of safety of the roads within the site.

The nearby Queenstown Trails network is used by a significant number of walkers and cyclists, with an average of 123 trail users per day and a peak of 410 trail users during a January Saturday. It is anticipated that development within the proposed zones would be complementary and beneficial to this trails network. Development adjacent to the trails network and establishment of appropriate connections can be managed through the planning approvals process.

### 4.2 Off-site Transport Effects

The off-site transport effects are likely to be a result of additional traffic within the roading network from the proposed zone change. The effects that are likely to be noticeable are:

- Traffic at the accesses to the proposed zone change area from Morven Ferry Road,
- Traffic on Morven Ferry Road, Arrow Junction Road and the intersection of these roads,
- Traffic at the SH6 intersections with Morven Ferry Road and Arrow Junction Road.

An assessment of these effects, and conditions to minimise any adverse impacts are provided below:

#### 4.2.1 Access and Intersection Traffic

There is likely to be a number of accesses to the proposed zones. These accesses will be from Morven Ferry Road. It is likely that there will be a mixture of shared accesses serving the Rural Residential zone and formed intersections with public road approaches to the Rural Visitor zone. It is possible to establish appropriate accesses and/or intersections for the anticipated on-site development. It is noted that the use of the current legal road to the east (identified as Access 2 in Figure 2 and Table 4) is not recommended.

The development of these accesses would be based on current guidance, the establishment of which can managed through planning approvals for development within the proposed zones. Accesses, or intersections, which are designed in accordance with current guidance (Austroads or similar) and/or meet the requirements of the QLDC District Plan will minimise any transport effects on the operation and safety of Morven Ferry Road.

#### 4.2.2 Morven Ferry Road and Arrow Junction Road

The proposed zones will have a significant traffic generation compared to the existing traffic flows on Morven Ferry Road. It is likely that a significant portion of this traffic will travel between the proposed zones and SH6.

Morven Ferry Road has a formed carriageway and sealed (otta seal) width of 5.5 to 5.7m between SH6 and Arrow Junction Road. This road is not formed to the required standard outlined in the current QLDC Development and Subdivision Engineering Standards. To meet this standard for the existing traffic the road should include full pavement construction with a sealed width of between 6.25m and 0.5 shoulders either side, a total formation width of 7.25m. The current NZS4404:2010 recommends that to support existing traffic this road should be formed with a sealed width of 6.7m formation width of 7.7m. If Morven Ferry Road was formed to this standard it would be able to accommodate the additional traffic generated by the zone change. The existing Morven Ferry Road (Arrow Junction Road to SH6) will accommodate the additional traffic flow though efficiency is likely to be significantly reduced which is likely to result in additional annual maintenance costs to maintain the existing roads otta seal surfacing.

The section of Morven Ferry Road adjacent to the proposed zone change site, beyond the intersection with Arrow Junction Road, has a sealed (otta seal) width of between 3.7 and 4.0m. This carriageway width is essentially one way, where oncoming vehicles will need to slow and pull off the sealed carriageway to pass. This section of Morven Ferry Road is not formed to the appropriate standard as per current guidance, if it was formed to this standard it would be able to accommodate the additional traffic generated by the zone change. However the existing road will not accommodate the additional traffic and should be formed with a sealed carriageway width of 6.5m to 6.7m with 0.5m shoulders each side giving a total formed carriageway width of 7.7m. This suggested road formation would comply with the minimum requirements of NZS4404:2010<sup>16</sup>.

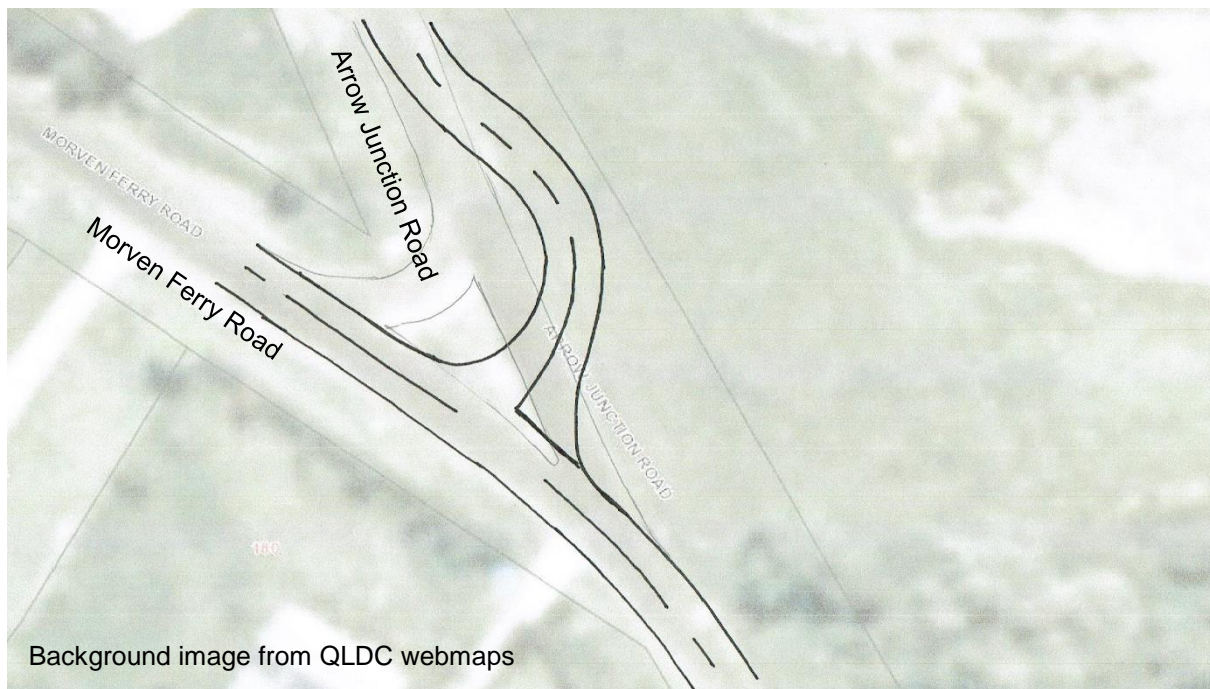
Arrow Junction Road is part of the Arrow Bridges Trail, this is a defined pedestrian and cycle trail linking Arrowtown and Gibbston. This road has a formed carriageway width of approximately 5.5m to 5.7m with an otta seal surface. Based on the QLDC standards this road is not wide enough to accommodate the existing vehicular traffic and the pedestrian and cycle trail. The use of Arrow Junction Road by development traffic should be avoided where possible. This is possible to an extent through intersection improvements at the intersection of Morven Ferry and Arrow Junction Roads.

The intersection of Morven Ferry and Arrow Junction Roads is a traditional rural intersection. The existing intersection includes a large central island and no priority controls. This intersection type is not considered appropriate given the existing road usage. The current layout would not be appropriate given the anticipated traffic generation as a result of the proposed zone change. It is recommended that this intersection is upgraded to a priority T-Intersection to accommodate existing and predicted zone change traffic. The proposed improvements would define Morven Ferry Road as the major road and through route. Arrow Junction Road would be formed as a minor road approach. Figure 3 below shows a possible intersection layout.

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<sup>16</sup> Refer Refer NZS4404:2010 Land Development and Subdivision Infrastructure, Table 3.2 – Road Design Standards, Figure E6, Primary freight access to rural activity, 5.5m to 5.7m movement lane, 1m shoulders (0.5m sealed) with off-road cycle and pedestrians (1.5m each side where required).

**Figure 3 – Morven Ferry/Arrow Junction Roads, Possible Intersection Improvements**



This suggested intersection layout will encourage traffic to use Morven Ferry Road which is capable of accommodating the predicted traffic from the proposed zone change. This intersection layout will also reduce the likelihood of drivers choosing to use Arrow Junction Road and hence reduce any traffic effects on the current pedestrian and cycle trail which utilises this road. Additionally, the proposed intersection improvements will have a positive impact on the safety of this intersection and the safety of the local road network. If this intersection is improved it will create a safe intersection layout which will accommodate traffic generated from the proposed Rural Residential and Rural Visitor zones.

#### **4.2.3 SH6 Intersections**

The proposed zone change will have an effect at the nearby SH6 intersections as a result of additional turning traffic. The SH6 intersections, with Arrow Junction Road and Morven Ferry Road, both include left turn widening and right turn bays. These facilities will cater for the likely turning traffic as a result of the zone change.

The intersection of Morven Ferry Road and SH6 has adequate visibility sight distance in each direction. The additional turning manoeuvres are unlikely to affect the operation or safety of this intersection.

The intersection of SH6 with Arrow Junction Road has reduced visibility sight distances in each direction, the speed limit at this intersection is also reduced to maintain safety. Increased turning traffic at this intersection may increase the exposure to a potential conflict and lead to a reduction in the safety of this intersection. Traffic from the proposed zone change should be dissuaded from using this intersection. This can be undertaken in two ways as follows:

- That the intersection of Morven Ferry Road and Arrow Junction Road is upgraded in a manner that encourages drivers to remain on Morven Ferry Road, and
- That any signage or directions to proposed development identify the preferred access route via Morven Ferry Road.



## 5 Summary

Barnhill Corporation Trustee Limited, Morven Ferry Limited and DE & ME Bunn and LE Green proposes to seek a change to the zoning of land adjacent to Morven Ferry Road. This proposed zone change would create areas for Rural Residential and Rural Visitor activity. The intention is to rezone 42.5ha of Rural General land under the QLDC District Plan to a combination of Rural Residential (RR, 21ha in two areas) and Rural Visitor (RV, 21.5ha in two areas) zoning. This will allow for rural style housing on large lots, visitor accommodation and related or supporting commercial activity based around the adjacent walking and cycle trail activity.

Morven Ferry Road is a local road within the QLDC roading hierarchy, it is formed as a gravel road with an otta seal surfacing. The sealed carriageway width of Morven Ferry Road varies. Between the intersections with Arrow Junction Road and Lake Hayes-Arrow Junction Highway (SH6) the sealed carriageway width is 5.5 to 5.7m, this narrows to between 3.7m to 4.0m sealed carriageway width beyond Arrow Junction Road and adjacent to the site.

Adjacent to the site is the Queenstown Trails network providing off road walking and cycling routes throughout the Wakatipu. To the west is the Twin Rivers Trail and to the north and south is the Arrow Bridges Trail. These trails provide off road links between Frankton and Lake Hayes Estate to the east Arrowtown to the north and Gibbston Valley to the southeast. Information provided by the Queenstown Trails Trust suggests that the Arrow Bridges Trail has an average of 123 trail users per day and a peak of 410 users on a January Saturday.

Morven Ferry Road and Arrow Junction Road both have a likely traffic flow of less than 250vpd which includes an allowance for measured traffic flow (July/August) and traffic associated with the nearby pedestrian and walking trails. These roads do not meet the minimum carriageway formation and seal width of the current QLDC standards for their current use.

There are a number of access options to the proposed Rural Residential and Rural Visitor zones. The proposed intersections/accesses would be from Morven Ferry Road, there are a number of acceptable intersection/access locations along the site boundary which can be utilised which includes an intersection on Morven Ferry Road serving the Rural Residential area with the Morven Ferry Limited land.

Morven Ferry Road and Arrow Junction Road are low traffic volume roads. Additional traffic from the proposed zone change will significantly increase the traffic flows on these roads, though it is noted that even with the zone change traffic these roads would still have a relative low traffic flow compared to other roads within the District.

If Morven Ferry Road and Arrow Junction Road were formed to the minimum carriageway formation and seal width of the current QLDC standards for their use they would be able to accommodate the increased traffic as a result of the zone change. However, based on the existing condition of these roads the increased traffic flow as a result of the zone change will have an impact on roads and intersections away from the site. In particular the following effects have been identified:

- That the adjacent Queenstown Trails may be affected by works and development within the proposed zones, any adverse effects can be managed within the planning approvals process as development occurs.
- Traffic at the intersection of Morven Ferry Road and Arrow Junction Road. These effects can be mitigated by improvements to this intersection's alignment and method of control,
- Traffic on Morven Ferry Road either at the proposed access(es), and within the narrow section adjacent to the proposed zone change area. The narrow section adjacent to the

zone change site should be widened to a sealed carriageway width of 6.5m to 6.7m with 0.5m shoulders each side giving a total formed carriageway width of 7.7m. This suggested road formation would comply with the minimum requirements of NZS4404:2010 and accommodate two directional traffic flow. Additionally, access and intersections should be provided in accordance current guidance depending on the type of final development served.

- Traffic on Morven Ferry Road between the intersections with Arrow Junction Road and SH6. If this road was constructed to the required QLDC standard additional traffic generated by the zone change could be accommodated. However, this road is a 5.5m to 5.7m unsealed road with an otta seal surfacing. This road will accommodate the additional traffic, however, the efficiency of the road is likely to be reduced and is likely to result in increased annual maintenance costs to maintain the existing otta seal surfacing.
- Traffic on Arrow Junction Road. This road is part of the Arrow Bridges Trail and is used by a significant number of pedestrians and cyclists. Based on current guidance the width of this road is insufficient to support two directional vehicular traffic flow with an allowance for pedestrians and cyclists. To minimise any effects on the safety of this road the use of it should be discouraged where possible,
- Traffic at the SH6 intersection with Morven Ferry Road. This intersection is formed with sufficient visibility sight distance and includes left turn widening and a right turn bay. It is expected that this intersection will be able to support addition traffic from the proposed zone change, and
- Traffic at the SH6 intersection with Arrow Junction Road. The visibility sight distances at this intersection are poor, the intersection includes a reduced speed limit, left turn widening and a right turn bay to maintain the safety of this intersection. Where possible this intersection should be avoided to reduce any possible effects.

To accommodate the likely traffic from the proposed Rural Residential and Rural Visitor zones it is recommended that the following roading improvements are undertaken:

- That Morven Ferry Road from Arrow Junction Road along the proposed site frontage is widened. The widened carriageway is to meet the minimum requirements based on NZS4404:2010. The carriageway construction should, as a minimum, match the current road formation being a typical unsealed road pavement with an otta seal surfacing, and
- That the intersection of Morven Ferry Road and Arrow Junction Road is to be upgraded to a priority T-intersection intersection. The design of this intersection should be in accordance with Austroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections.

With these improvements undertaken the transport effects of the proposed zone change are considered to be less than minor. This consideration is based on other existing and proposed transport infrastructure meeting minimum standards for the proposed use.

## **Appendix A    Concept Plan**

Aurum Survey drawing, Zone Concept Overview, 3015-52A-1B, dated 18 Sept 2015





**SOUTHERN PLANNING GROUP**  
 RESOURCE MANAGEMENT CONSULTANTS

**vivian+espie**  
 resource management and landscape planning

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**Legend**

- RV Zone\* Rural Visitor: 8m height limit
- RV Zone (Restricted) Rural Visitor: 10m height limit agricultural/viticultural buildings 8m height limit any other building, 5% max building coverage
- RR Zone Rural Residential Barnhill / Bunn
- RR Zone Rural Residential Morven Ferry
- RV Zone (Restricted) Setback 35m setback from Morven Ferry Rd
- Queensdown Trail
- Outstanding Natural Feature boundary (from District Plan review)

<p><b>ZONE CONCEPT OVERVIEW</b>  <b>MORVEN FERRY ROAD</b>  <b>WAKATIPU BASIN</b></p>	<p>DATE: 18 Sept 2015    Scale 1:7500    DRAWING &amp; ISSUE No. 3015-52A-1B</p> <p>BY: Bruce McLeod    Original Plan A3</p>
	<p>PO Box 2493        Wakatipu 9349        Ph 03 442 3466        Fax 03 442 3469        Email admin@ascl.co.nz</p>