

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

**AND**

**IN THE MATTER** of an application by Meridian  
Energy Limited for resource  
consents for the Mokihinui Hydro  
Project

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**STATEMENT OF EVIDENCE OF ANDREW MARK WHALEY ON BEHALF  
OF MERIDIAN ENERGY LIMITED**

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## 1. **QUALIFICATIONS AND EXPERIENCE**

1.1 My full name is Andrew Mark Whaley.

1.2 I have the following qualifications:

- a. Bachelor of Engineering (Civil) from the University of Canterbury (1994).
- b. Member of the Institution of Civil Engineers UK (MICE)
- c. Chartered Engineer (UK) (CEng)

1.3 I am a Principal Civil Engineer with URS New Zealand Ltd (URS), who assessed the traffic related construction activities and their associated effects for the Mokihinui Hydro Proposal (MHP).

1.4 I have experience in the assessment, design and construction of civil engineering and transportation projects since 1994. This includes 7 years contracting on Highways and Infrastructure works for Transit New Zealand, local authorities and the private sector. I followed this with 5 years in the provision of transportation research, design and assessment work for The Highways Agency (Transit NZ equivalent) in the United Kingdom. Most recently I have been involved in the assessment, design and construction supervision of civil engineering projects in the South Island.

1.5 I have been involved in assessing construction transportation effects for the following projects:

- a. Assessment of Construction Effects (Transportation) for the Central Plains Irrigation Scheme;
- b. Assessing and determination of required resourcing for multiple highways construction projects; and

- c. Assessing the effect of construction activities and traffic management on Highways improvements for the Highways Agency (UK).

1.6 I have read the Code of Conduct for Expert Witnesses (Rule 330A, High Court Rules and Environment Court Practice Note) and I agree to comply with it. I have complied with it in the preparation of this statement of evidence.

1.7 I have been involved in the following work in relation to Meridian Energy Limited's (Meridian's) MHP:

- a. Assessing the effects on the immediate highway network arising from the likely construction methodology for each activity associated with the project's construction and the identification of likely improvements to the highway network;
- b. Author of Section 7, Effects on Traffic and Roading of the report entitled Mokihinui Hydro Proposal, Construction Effects and Management Report, URS New Zealand Ltd (Oct 2007);

and I have prepared my statement of evidence in reliance on this work.

1.8 I have also reviewed:

- a. The reports and statements of evidence of other experts giving evidence on behalf of Meridian relevant to my area of expertise, including:
  - i. Cliff Tipler
  - ii. Stephen Chiles;
  - iii. Ron Fleming
- b. *Mokihinui Hydro Proposal Construction Effects and Management Report, URS New Zealand Ltd (28 November 2007) ("the Report")*.
- c. *Damwatch Services Ltd report, Mokihinui Hydro Proposal, Project Engineering Description, 7 August 2007*
- d. LineTech Constructability Report (September 2007)

- e. Relevant submissions of others, namely
  - i. G&J Stowell
  - ii. K&J Maltesen & S Barrowman
  - iii. AJ&DG Coleman
  - iv. Kirker & Dixon

## 2. SCOPE OF EVIDENCE

2.1 I have been asked by Meridian to prepare evidence in relation to the actual and potential effects on traffic and the existing roading infrastructure of the construction of the MHP within the Mokihinui Gorge. My assessment is based on the description of construction activities given in the evidence of Ron Fleming and Cliff Tipler. My assessment is a prediction of the likely traffic movements, however some specific details which are determined by the contractor may influence the ultimate number of traffic movements and specific vehicles used.

2.2 The matters that I will cover in my evidence are as follows:

- a. A description of the effect of construction traffic arising as part of the MHP including those associated with the construction of the various highways improvements identified. This is included under Section 5 below.
- b. A description of potential roading improvements to facilitate construction and minimise transport related construction effects. This is included under section 6 below.
- c. A description of the affect of construction traffic arising as part of the MHP transmission lines. This is included under Section 7 below.

### 3. EXECUTIVE SUMMARY

3.1 In addition to the concentrated activities on site, transport to and from the site will have an impact on the region, in particular Seddonville. Light and heavy vehicles will pass through Seddonville delivering plant, labour and materials needed for construction. This will necessitate upgrading the Mokihinui-Seddonville Road to accommodate the traffic flow and minimise aspects such as noise, dust and traffic congestion. While the traffic volume is not great in comparison to the capacity of the roading network, I note that the proportional change in volume through Seddonville will be large, albeit manageable. I will discuss the traffic effects in Sections 5 and 6.

3.2 An Environmental Construction Management Plan (including other Management Plans) will be developed for all key site specific activities in order to control these activities within acceptable bounds, and with the overall objective of achieving a world class engineering and environmental project. Further information on the Management Plans is presented by Cliff Tipler.

### 4. THE PROPOSAL

4.1 I confirm my evidence is based on the project proposal as described in the Assessment of Environmental Effects.

### 5. DESCRIPTION OF EFFECTS ON TRAFFIC

#### ***TRAFFIC EFFECTS***

5.1 In the following section of evidence I will present the anticipated traffic generation and potential effects on the roading network associated with the construction of the MHP. I will describe the traffic and roading effects under the following headings:

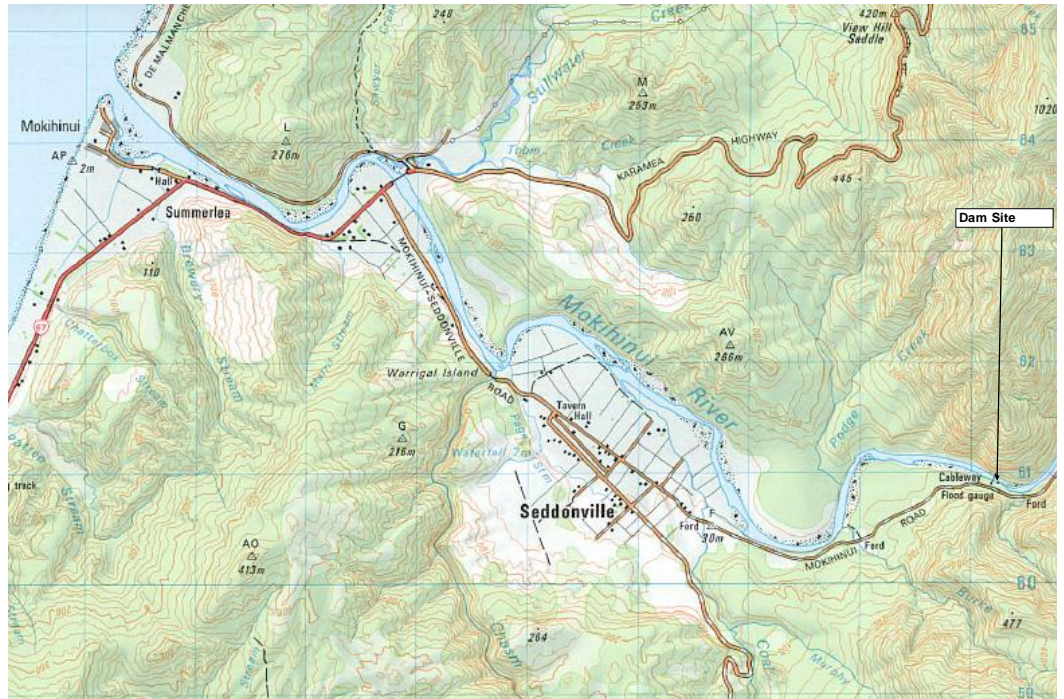
a. Site Location

- b. Existing Traffic
  - c. Construction Traffic Type
  - d. Trip Generation and Distribution
- 5.2 No assessment has been made as to the level of ancillary traffic that may be generated as a result of the project e.g. pie carts or similar activities servicing worker accommodation as this is anticipated to be minor in nature only and will be determined by the demand created by the contractors chosen workforce and accommodation preferences.
- 5.3 No assessment has been made of potential seasonality of the existing traffic. As discussed later in my evidence, as the existing traffic using the network is of such a low volume any seasonality would be easily accommodated within the existing spare capacity.

#### ***SITE LOCATION***

- 5.4 The site, relative to the roading network is located at the eastern most extent of Mokihinui Road east of Seddonville as shown on Figure 1. Access to the site from the north is from the Karamea Highway or south from State Highway 67, turning east onto Mokihinui-Seddonville Road and then onto Mokihinui Road.

**Figure 1 Site Location**



## **EXISTING TRAFFIC**

### **State Highway 67**

5.5 State Highway 67 is the highway network that would potentially be affected by construction of the MHP. Information on the existing traffic on SH67 has been obtained from Transit New Zealand ("Transit") along the route from the site to Westport. This information has been used as a baseline traffic volume for SH67.

5.6 SH67 can be classified as a Group Three State Highway Cross-Section being a two-lane rural road with a 7m sealed width. It has a theoretical capacity of approximately 500 to 2,000 vehicles per day. It is noted that in areas approaching Mokihinui – Seddonville Road SH67 is, in places, less than 7m sealed width. This is not considered an issue as the 7m sealed width is a standard requirement for new or improved State Highways only. In my opinion it is not necessary to, widen SH67, other than the provision of a right turn bay at Mokihinui – Seddonville Road.

5.7 These locations are shown on attached Figure 2. Transit has provided traffic count information in the form of Annual Average Daily Traffic (AADT) for the years 2001 to 2006 measured at SH67 south of Waimarie

Junction approximately 2 km west of Mokihinui. Through all recorded years, traffic flows at this location have been low compared with the theoretical carrying capacity, despite an increase of approximately 22% in 2002, with only minor increases occurring in the subsequent years. The existing traffic includes 6.1% Heavy Commercial Vehicles (HCVs). I have estimated future growth rates by looking at the actual growth rates over all recorded years (2001 to 2006) and for recent years (2003 to 2006) as 4.3% and 0.8% respectively.

- 5.8 Forecast growth, based on current vehicle numbers, the two growth figures and assuming no MHP, for the current year and 2011 (which would be during anticipated construction) are as contained in Table 5-5 Forecast Traffic Growth for SH 67 below.

**Table 5-5 Forecast Traffic Growth for SH 67**

Year	Forecast High Growth AADT (4.3%)	Forecast Low Growth AADT (0.8%)
2008	386	350
2011	431	358

- 5.9 Without the traffic associated with the hydro development, the traffic volumes remain low in terms of the potential capacity of the existing highway.

#### ***Mokihinui-Seddonville Road***

- 5.10 When the analysis for the Report was undertaken, no information on existing traffic on Mokihinui-Seddonville Road or Mokihinui Road had been made available from the Buller District Council. It was assumed for the purposes of the Report that all traffic leaving or entering SH67 between the count site south of Waimarie Junction (approximately 2 km west of Mokihinui) and the count site north of the Mokihinui Bridge (approximately 160m north of Mokihinui-Seddonville Road) uses Mokihinui-Seddonville Road.

- 5.11 The assessed AADT on Mokihinui-Seddonville Road averages approximately 185 between 2003 and 2006. Through all years, assessed AADT on Mokihinui-Seddonville Road was low in terms of available capacity, despite an increase of approximately 31% in 2002. This 2002 increase is likely to be skewed as a result of interpolation of SH67 traffic flows which included this increase, with traffic flows fluctuating slightly in the subsequent years. The calculated existing traffic includes 4.2% Heavy Commercial Vehicles (HCVs). I have estimated future growth rates by looking at the actual growth rates over recorded years (2002 to 2006) and for recent years (2003 to 2006) as 5.1% and 0.3% respectively.
- 5.12 Forecast growth, based on the current vehicle numbers, the two growth figures and assuming no MHP, for the current year, and 2011 (during anticipated construction) are as contained in Table 5-11 Forecast Traffic Growth for Mokihinui-Seddonville Road below.

**Table 5-11 Forecast Traffic Growth for Mokihinui-Seddonville Road**

Year	Forecast High Growth AADT (5.1%)	Forecast Low Growth AADT (0.3%)
2008	216	189
2011	245	191

- 5.13 For these years, without the traffic associated with the hydro development, the traffic volumes remain low in terms of the potential capacity of the existing road.
- 5.14 The assumption that all traffic leaving or entering SH67 between south of Waimarie Junction and the count site north of the Mokihinui Bridge uses Mokihinui-Seddonville Road is a worst case scenario for assessing the impact on Mokihinui-Seddonville Road and Mokihinui Road. Data subsequently provided by the BDC indicated an AADT of 110 on Mokihinui-Seddonville Road. The predicted baseline traffic is therefore higher than is likely to be the reality, the result being a conservative assessment of spare capacity to accommodate construction traffic. No data exists for Mokihinui Road through Seddonville, however with the

assumed worst case scenario and only a small number of residential properties (approximately 12) generating local trips, the predictions used for Mokihinui-Seddonville Road are considered adequate for the purposes of describing potential effects on Mokihinui Road. Therefore I have not undertaken a traffic count on Mokihinui Road and I consider there would be little benefit from doing so.

### **CONSTRUCTION TRAFFIC TYPE**

- 5.15 Ron Fleming has provided a description of the probable construction methodology and the types of construction plant which are likely to be used on the MHP. However, it should be noted that subject to the constraints that will be imposed during detailed design and by the resource consent conditions, the contractor will be responsible for the final choice of methodology, plant and equipment and therefore there is potential for some variation in construction traffic to occur from that stated herein.
- 5.16 The construction activities on site will in my opinion be relatively intensive. As a result I would expect that construction related traffic will occur 24 hours per day, 7 days a week during key periods of construction, with the majority of heavy vehicle movements occurring during daytime hours extending, dependent on restrictions because of noise levels, into evenings.
- 5.17 I have assumed that the construction traffic is based on the construction methodology contained in the description of construction activities as in Ron Fleming's evidence and on the number of tonnes of Materials and Equipment supply and demobilisation information prepared by Dam Watch Services Ltd<sup>1</sup>. This information included predicted materials required on site on a month by month basis and can be summarised into the following traffic generating activities:

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<sup>1</sup> Mokihinui Hydro Proposal, Project Engineering Description, 7 August 2007, Dam Watch Services Ltd.

- a. Establishment
- b. Daily Operations
- c. Delivery of Bulk Materials

5.18 The number of tonnes to be transported and the number of vehicles required is set out on Figures 5.1 and 5.2. Below I explain how I arrived at these numbers.

### ***Establishment***

- 5.19 This will involve deliveries of site facilities, construction equipment, prefabricated components and mechanical and electrical equipment. These trips will typically be one off deliveries and associated removal for each item and be focused during the mobilisation and demobilisation of the construction. I anticipate the majority of this activity will occur during the first three to six months of the construction period when construction equipment, batching plants, aggregate production equipment and associated site infrastructure is being established.
- 5.20 Upgrading of existing road infrastructure and on site infrastructure will commence immediately prior to and during the establishment of the staging area.

### ***Daily Operations***

- 5.21 There will be traffic associated with the arrival and departure at the site of the construction workforce at each shift change. This will typically be in the morning and evening, with staff travelling in light vehicles, vans or crew buses as appropriate. This will be a relatively short duration activity each day.
- 5.22 Additionally there will be deliveries of routine consumable items such as fuel, waste removal, construction consumables and maintenance requirements. This is predicted to average approximately 240 tonnes per month during periods of high activity on the project. The precise number of vehicles will be dependent on the construction contractors

chosen methodology, however it can be assumed that it will be made up of a low number of HCV's, e.g. bulk fuel deliveries in articulated truck and trailer units, and a higher number of light commercial vehicles (LCV) e.g. Light trucks delivering small goods and maintenance vehicles. I anticipate that this will be in the order of 10 to 15 vehicles per day being approximately 30% HCV and 70% LCV.

### ***Delivery of Bulk Materials***

- 5.23 Throughout the construction period, bulk materials will be delivered in HCVs. Deliveries will occur throughout each shift for the construction period. The majority of bulk materials required comprise bulk cement deliveries, concrete batched off site (prior to establishment of on-site batching facilities), pozzolanic material, imported aggregates, and daily consumables.
- 5.24 It is likely that the primary HCV vehicle used during construction will be conventional truck and trailer units or B-trains. The B-train (a tractor unit towing two semi-trailers) has an overall length of 20 metres, the maximum length of any vehicle without a special permit. In most situations this vehicle will be used to transport general goods or bulk liquids.
- 5.25 Vehicles of this type are already in use along the affected routes and share them with all users. As such it is not anticipated that additional improvements to the rural roading network are required specifically for other users.
- 5.26 Within Seddonville, where shape correction is proposed to address noise issues associated with the current rough road surface, it is proposed to incorporate a wider pavement than the existing sealed road, with widening being typically to the northern side so as to minimise any impact on property frontages to the south as in many cases part of these gardens appear to occupy the existing legal road corridor.

- 5.27 It is not anticipated there will be a need to provide additional carriageway width to accommodate cyclists, pedestrians or similar as an alternate route for these users is available via Queen Street in Seddonville if required.
- 5.28 It is my expectation that the road between the SH67 junction and the construction staging area would need upgrading to have the ability for 2 HCV's to bypass one another while staying within their respective lanes, although in places it may be a more appropriate use of resources to use, for example, traffic signals or other positive traffic control at locations such as at Chasm Creek.
- 5.29 The activities which will require significant volumes delivered to site are as follows:
- a. River Diversion. Early in the construction period (approximately month three) material for construction of the structures associated with the river diversion will be imported to site. I anticipate that this will be approximately 13,000 tonnes comprising mainly concrete batched off site and cement and aggregate for the conventional concrete (CC) diversion culvert. The duration of these deliveries will depend on the commissioning of on-site batching activities.
  - b. Sheet Pile Deliveries. Within the first six to nine months of the construction period, a sheet pile cut off wall may be constructed in the coffer dams (unless another method such as grouting is used). Approximately 350 tonnes of sheet pile will be required. Traffic generation for the sheet pile option has been used. Other options considered for the coffer dams will generate less traffic.
  - c. Roller Compacted Concrete (RCC) Dam Construction. During months 8 - 19, as outlined in Mr Peter Amos's evidence, the RCC dam will be constructed. Material deliveries from off site will include bulk cement and fly ash material for on site concrete batching (90,000 tonnes).
  - d. Spillway Construction. During months 19-23, the spillway will be constructed. Material deliveries from off site will include bulk cement and fly ash material for on site concrete batching plus the

importation of concrete aggregate if it is not available on site. It is also possible that a high portion of concrete for the spillways may be batched off site. It is anticipated that 1,400 tonnes may be required to be imported.

- e. Powerhouse and other structures. During months 15-24, the powerhouse and other structures will be constructed and fitted out. Material deliveries from off site will include prefabricated structural components, concrete, construction material, mechanical and electrical equipment and other associated requirements. This is expected to be approximately 2,300 tonnes.

### ***TRIP GENERATION AND DISTRIBUTION***

#### ***Heavy Commercial Vehicles***

- 5.30 The trip generation has been calculated based on the monthly demand (tonnes) required on site as described above. There is a peak in month three of the construction period associated with the river diversion structures, with the demand increasing progressively from month 8 to 19 as the RCC Dam construction progresses. The monthly demand figures are contained in Appendix 1.
- 5.31 The number of HCVs per month has been calculated assuming an average load being delivered of 15 tonnes, with the HCV departing via the same route empty. It is anticipated that most loads will be delivered in truck and trailer units and bulk fuel or cement tankers as appropriate all of which can carry an average of 15 tonnes. The number of HCV loads is shown in Appendix 1.
- 5.32 It is estimated that in the busiest month (month 15) there will be 1,950 vehicles trips (ie 975 to the site and 975 from the site). The average number of HCV's per day is predicted to be 65 (rounded up to the nearest 5). However as is evident from Figure 5.2 most of the monthly totals will be a lot less than this. Assuming an average of 15 tonne per load it is anticipated that there will be a total of 15,600 HCV trips, over the construction period. This figure includes abnormal loads which will be

only a small portion of the total, being delivery of construction plant and some pre-fabricated components. Table 5-29 HCV Distribution on Local Roothing Network below shows the additional number of HCV's at various location back to Westport.

**Table 5-29 HCV Distribution on Local Roothing Network**

<b>Location</b>	<b>HCVs (Daily)</b>	<b>Assumed Distribution</b>
Mokihinui-Seddonville Road	65	All HCVs entering/leaving site via SH67
North of Mokihinui River Bridge	0	No HCVs head north.
South of Waimarie Junction	65	All HCVs head south as far as Granity South
Granity Township	65	
Granity South Little Ditch Stream	65	
South Waimangaroa Township	60	60 of 185 HCVs head south as far as Westport
Nth of Orowaiti River	60	

### ***Light Vehicles***

5.33 The majority of light vehicles accessing the construction site will be associated with transporting the workforce during shift changes. A forecast site staff of up to 310 (excluding transmission lines workforce) has been assumed, however this will be largely dependent on the construction methodology and programme of the contractor. For the purposes of these calculations it has been assumed that the majority of the work-force will be accommodated in a camp near Westport.

5.34 Some 36,000 light vehicle trips are anticipated over the construction period. During peak periods, light vehicle generation distributed on the network are expected to be as shown in Table 5-32 Light Vehicle Distribution on Local Roding Network following:

**Table 5-32 Light Vehicle Distribution on Local Roding Network**

<b>Location</b>	<b>Light Vehicles (Daily)</b>	<b>Assumed Distribution</b>
Mokihinui-Seddonville Road	60	All light vehicles entering/leaving site via SH67
North of Mokihinui River Bridge	10	10 of 60 vehicles head north to accommodation or other.
South of Waimarie Junction	50	50 of 60 vehicles head south as far as Granity South
Granity Township	50	
Granity South Little Ditch Stream	50	
South Waimangaroa Township	40	40 of 60 vehicles head south as far as Westport
Nth of Orowaiti River	40	

### ***Abnormal Loads***

5.35 Abnormal loads (over weight, over dimension or both) will be delivered to the site on HCVs on an as required basis, although it is anticipated the frequency will be relatively low (in the order of 30 loads over the project duration). Abnormal loads will comprise of prefabricated structural and mechanical and electrical components and the establishment of large construction equipment. These are included in the tonnage calculations above for predicted HCV's. They will be delivered in a controlled manner

with the appropriate authorisations and measures. This will include escorting/piloted deliveries and specific traffic control measures as required.

### ***Trip Generation and Distribution Effect***

- 5.36 In Table 5-36 Traffic Distribution on Roothing Network following the effect of the trip generation and distribution at locations on SH67 and Mokihinui-Seddonville Road is summarised.
- 5.37 The level of traffic generated by the construction is not expected to exceed the capacity of the roading network with SH67 having a theoretical capacity of approximately 500 to 2,000 vehicles per day at it's northern end and a greater carrying capacity near Westport where it is constructed to a higher geometric standard (wider). The capacity of Mokihinui-Seddonville Road, given the recommended improvements are made would be in the order of 500-1,000 vehicles per day. The forecast AADT using Mokihinui-Seddonville Road is 437 vehicles (an increase of 127%), which while large in proportion to baseline flows, is well within the anticipated capacity, and the highest forecast AADT using SH67 is 461 near Mokihinui-Seddonville Road and 2,144 at Westport (an increase of 4.9%). The effect on the roading network will therefore be minor in terms of highway capacity and given construction traffic exists for a defined end date and that the increase traffic will be removed.
- 5.38 Additionally, as shown below the portion of HCV traffic using the roading network during peak activity significantly increases over current levels. The magnitude of this proportional increase is a function of the low levels of existing use. Given the low total traffic forecast on the network, this increase can easily be accommodated within the capacity of the existing roading network.

**Table 5-36 Traffic Distribution on Roding Network**

		AADT 2006		Additional Vehicles (Peak Activity) No.	Total Vehicles		
		No.	%		No.	%	% increase
Mokihinui-Seddonville Road	AADT	192		125	317		65.1%
	HCVs	8	4%	65	73	23%	812.5%
	CARs	184		60	244		32.6%
Nth of Orowaiti River	AADT	154		10	164		6.5%
	HCVs	13	8%	0	13	8%	0.0%
	CARs	141		10	151		7.1%
South Waimangarara Township	AADT	346		115	461		33.2%
	HCVs	21	6%	65	86	19%	309.5%
	CARs	325		50	375		15.4%
Granity Sth Little Ditch Stm	AADT	1079		115	1194		10.7%
	HCVs	82	8%	65	147	12%	79.3%
	CARs	997		50	1047		5.0%
Granity Township	AADT	964		115	1079		11.9%
	HCVs	131	14%	65	196	18%	49.6%
	CARs	833		50	883		6.0%
Sth of Waimarie Junction	AADT	1470		100	1570		6.8%
	HCVs	163	11%	60	223	14%	36.8%
	CARs	1307		40	1347		3.1%
Nth of Mokihinui River Br	AADT	2044		100	2144		4.9%
	HCVs	149	7%	60	209	10%	40.3%
	CARs	1895		40	1935		2.1%

## 6. ROADING IMPROVEMENTS

- 6.1 As part of the mobilisation of the site it is proposed to undertake some upgrading of local roading infrastructure. The suggested improvements are as shown in Appendix 2. The existing roads meander in and out of the existing road reserve.
- 6.2 In my opinion the Draft Traffic Management Plan (which forms part of the Draft Environmental Construction Management Plan attached to the evidence of Mr Tipler) will ensure that potential adverse effects are avoided, remedied or mitigated.
- 6.3 For the purpose of determining the extent of likely improvements and the design vehicle for which road improvements are modelled on I have selected a four-axle semi-trailer of length 17.5 m and width 2.5 m.

- 6.4 In the past, the B-train has generally been regarded as the design vehicle that should be used for the design of most roading projects. However, with the introduction of four-axle semi-trailers, the tracking curve of the semi-trailer is now the reference vehicle for such designs.
- 6.5 The effects due to traffic are described in more detail in the following sections.
- 6.6 Based on the above predicted traffic movements and vehicle type a scoping exercise has been completed to identify where improvements will be required. This has been completed in sufficient detail in order to demonstrate that improvements to accommodate the safe trafficking of two semi-trailers bypassing each other is feasible, without having a negative impact.
- 6.7 The scoping of improvements was developed using 2 metre contour data only. It is not a detailed design and as such alignments were sufficient only to demonstrate that the standard required to allow the design vehicle to negotiate the road unrestricted (i.e., two semi trailers can bypass each other comfortably) is viable. Further detailed design would be needed prior to commencing the road improvements.
- 6.8 The focus of the scoping exercise has been to determine a horizontal alignment, with a minimized physical footprint taking into account the following constraints which I have listed below and then described in more detail:
- a. Maximised cutting and embankment slopes.
  - b. Minimum sealed width of 6m.
  - c. Shoulder/Watertable width of 3m
  - d. Bridge Replacement.
  - e. Historic Rail Walkway and Tunnel.
  - f. Existing Alignment and Legal Boundaries
  - g. Design Vehicle – Swept Paths

h. Abnormal Loads

6.9 These improvements will be focused on minimisation of likely construction effects as follows:

- a. Safety – Improving safe stopping distance and sight lines
- b. Noise – Shape Correction of the carriageway through Seddonville to reduce the likelihood of trucks ‘banging’ when travelling on uneven carriageways
- c. Dust – Treatment of unsealed road adjacent to residential properties where dust is likely to cause a nuisance
- d. Widening – Improving capacity to allow free flow of two-way traffic movement.

6.10 Transit New Zealand (TNZ) was consulted as a part of the investigation on whether they had any concerns regarding possible construction effects and they advised that they did not. They did however have a desire to that if the scheme was to proceed, a right turn bay is provided at the SH67 – Mokihinui – Seddonville Road intersection. This is included in the suggested improvements within the Report. The design of improvements to this intersection will be to TNZ requirements and require their approval prior to construction.

6.11 When contacted the Buller District Council did not express any concerns regarding transport effects arising from construction of the MHP. It was however acknowledged that the Mokihinui – Seddonville Road would require upgrading in places to accommodate construction traffic.

6.12 Proposed improvement activities are likely to be as follows:

***SH 67 - Mokihinui-Seddonville Road Intersection***

6.13 The existing priority junction, being an uncontrolled t-intersection in this case, will require upgrading to accommodate queuing of right turning

traffic approaching from the south on SH 67. This will entail the widening of the State Highway to accommodate a right hand turn bay, with associated widening of the approach to the State Highway from Seddonville to facilitate the anticipated swept path of the heavy commercial vehicles (HCVs).

### ***Mokihinui-Seddonville Road at Chasm Creek***

- 6.14 This stretch of road has the tightest constraints for improvements out of all areas because of the proximity of the Chasm Creek Walkway. The need for improvements to the road, versus the provision of positive traffic control such as traffic lights will be assessed so as to best suit the project and stakeholder concerns. If improvements are assessed as being required, they would likely include the smoothing of the tight bends in Mokihinui-Seddonville Road over a 500 metre long section of road to the west of Seddonville. This will improve safe stopping distance and sight lines, including replacement of the existing single lane bridge with a 2-lane bridge. The improvements will entail straightening of the bends to improve the potential swept paths of HCV's and realignment adjacent to the Chasm Creek walkway to minimise any impact on the walkway or tunnel portals. The existing one-way bridge is inadequate for HCVs and in my opinion widening is the preferred option.

### ***Mokihinui Road through Seddonville***

- 6.15 Mokihinui Road through Seddonville has a sealed width as little as 3-4 m in places. The proposed works are primarily associated with shape correction of the carriageway to rectify rough areas and undulations that would result in increased traffic noise associated with HCV's. However the geometry of the road will need to be improved to facilitate a minimum sealed width for the safe trafficking of 2 HCV's. It is noted that the flexibility for making improvements is compromised by the current occupancy of the legal road corridor by the frontages of some properties on the south side of the road. It is not the intent that proposed improvements affect these frontages. It is intended that the new road surface would be a chip sealed surface as would be typical for this class of road in this environment. Road design and geometric changes would be to Buller District Council requirements and approval.

***Mulholland's farm***

- 6.16 Meridian intends to construct an underpass at Mulholland's farm to allow cows to access the milking shed without crossing the road. If, for whatever reason, the underpass cannot be constructed, then Meridian and the Mulhollands will agree on times that the milking herd can be moved along or across Mokihinui Road.

***Mokihinui Road from Seddonville to the Construction Staging Area***

- 6.17 It is probable that the recently constructed bridge east of Mulholland's Farm will require replacement to accommodate anticipated 2-way HCV movements and likely overweight loads involved in plant deliveries. The approaches to this bridge would be realigned and straightened to improve the sight lines for vehicles approaching the bridge.
- 6.18 The existing metalled road from Seddonville to Burke Creek will require widening to a metalled width of 6m plus shoulders. This will include associated improvements to the existing drainage.
- 6.19 A new bridge will be required at Burke Creek Ford. This will include realignment and straightening of the approaches to the ford. It is possible that this bridge may be built on an alternative alignment to the existing ford to satisfy sight line requirements and 2 way HCV traffic movements. This would include abutment protection works to ensure Burke Creek remained within its channel under the bridge in design flood events.
- 6.20 The existing track from Burke Creek Ford to the dam site will require re-aligning to ease two sharp corners and widening to a metalled width of 6m plus shoulders. This will include associated improvements to the existing drainage with a particular focus being placed on minimising removal of the existing vegetation along the corridor. The improvements will include sediment retention systems built into the drainage design to minimise the impact on the adjacent bush areas.

## 7. TRANSMISSION LINE TRANSPORTATION EFFECTS

7.1 I will describe the anticipated traffic generation and probable affects on the roading network associated with the installation of 110 KV transmission lines connecting the proposed Mokihinui Dam to the existing Transpower Inangahua – Westport B transmission line. Also considered is the construction traffic effects of the associated substation that will be installed where these two lines connect, at or near pole No. 146. I will describe the traffic and roading effects in the following sections:

- a. Line Route and accessibility from adjacent road network
- b. Existing Traffic
- c. Construction Traffic Type
- d. Trip Generation and Distribution
- e. Roding Infrastructure Improvements
- f. Summary

### ***Line Route and Access***

7.2 The route of the transmission line is described in the evidence of Ray Brown. Generally it runs south west from the dam site through native bush, forestry, road easements, pasture land and both scrub covered and bare rock land. Sections of the route run close to existing roads and forest tracks or in open paddocks, while some sections run through less accessible terrain.

7.3 The LineTech Constructability Report (September 2007) shows the transmission line corridor. It is envisaged that four local roads will be used to access pole sites. These local roads are accessed from State Highway 67 which would be the main route used to transport construction materials and staff to the area. Burma Road, where it runs to the east of Stockton coal mine, will provide access to the southern most half of the line, while Charming Creek Road and the eastern most extent of Mokihinui Road east of Seddonville will provide access to the northern section of the proposed route.

- 7.4 Cedar Creek Road is a local road inland from Waimangaroa which runs close to the southern end of the proposed transmission route. Connecting tracks nearby may be suitable for use for deliveries and staff access during installation, subject to some upgrading. This road would be used in the installation of the substation
- 7.5 In addition to delivery and installation access by road, it is also expected that a significant number of poles will be installed by helicopter, with materials transferred by helicopter from drop-off points on the nearest accessible road.

#### ***SH 67 - Millerton Road Intersection (to Burma Road)***

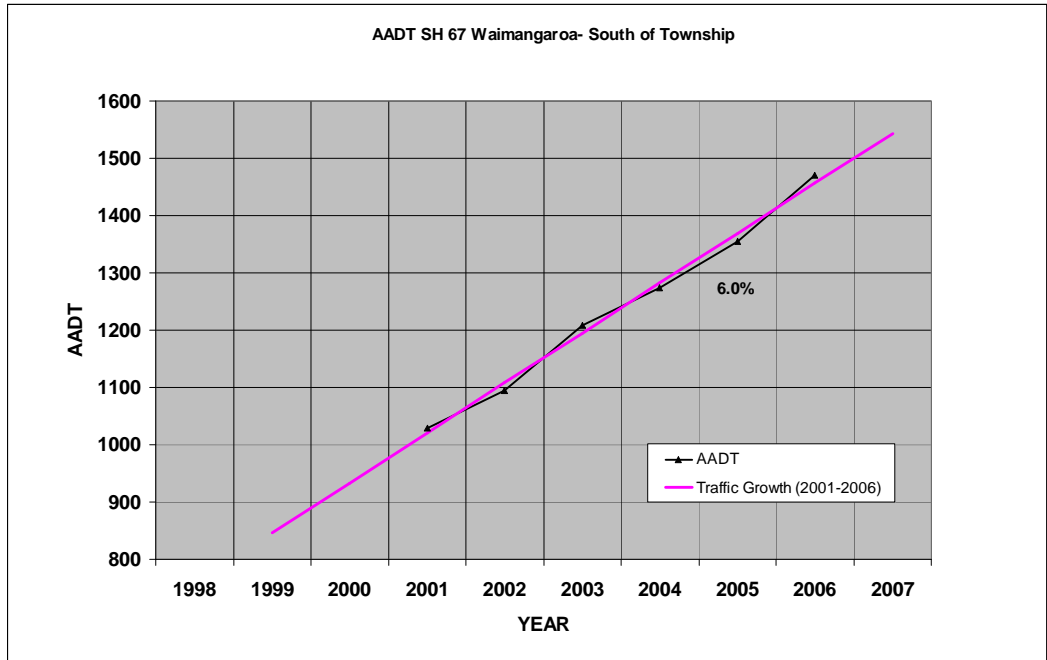
- 7.6 This intersection is in close proximity to the Seddonville branch railway line and provides access to Stockton coal mine. Although no right turn bay is provided here, there appears to be sufficient sealed width to allow for a vehicle to pass on the left while another waits to turn right. The space between the highway lane edge and the railway line is less than the desirable 20m and will be identified as a potential hazard in the traffic management plan.

#### ***SH 67 – McGill St Intersection***

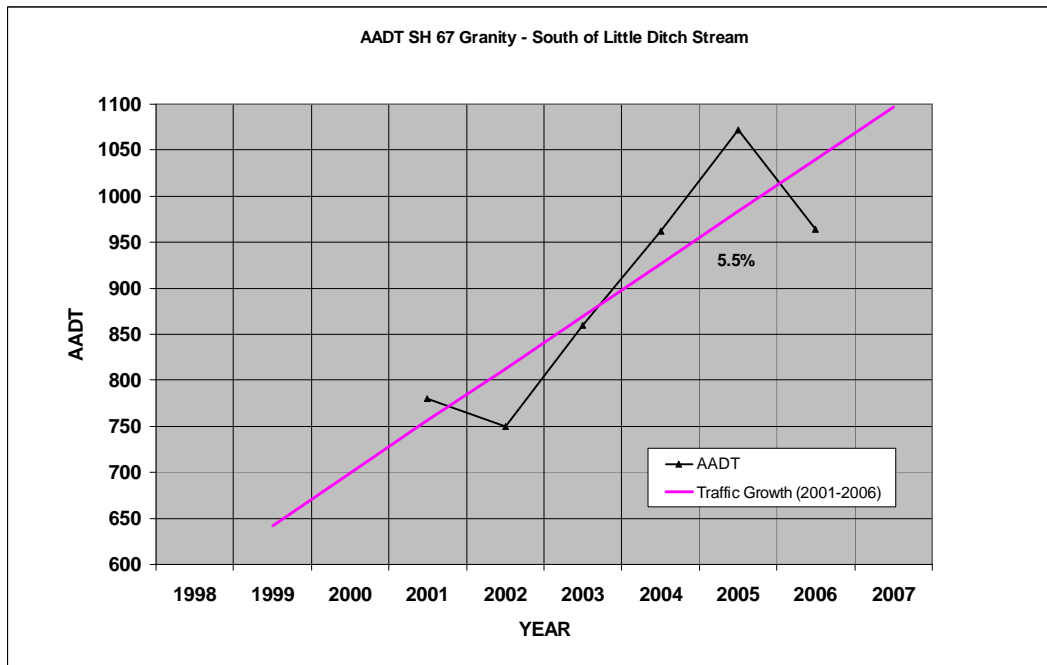
- 7.7 This intersection has no right turning bay, however it is not expected that it will see a significant proportion of traffic associated with the line installation. Consequently it is not anticipated that an upgrade is required.

#### ***Existing Traffic***

- 7.8 Existing traffic count information has been obtained from Transit New Zealand for SH 67 and from the Buller District Council for Mokihinui-Seddonville Road at the locations listed in paragraph 5.3 of my evidence.
- 7.9 The existing traffic on SH 67 south of Waimangaroa and at Granity is as follows:



**Figure 7-8 SH 67 Existing Traffic**



**Figure 7.9 SH 67 Existing Traffic**

7.10 Based on 2001-2006 traffic counts, I have estimated traffic growth at Waimangaroa (South of Township) and Granity (South of Little Ditch Stream) to be 6.0% and 5.5% respectively. However traffic over the last 3 years remains relatively static. Table 7-10 Existing Traffic on Local Roads shows local roads in the area near to the line route all have low traffic volumes. Traffic on Burma Road is estimated to be fairly low and

associated mainly with staff and contractors accessing the Stockton Coal Mine, likewise with both Charming Creek Road and Mokihinui Road where traffic is expected to be mainly recreational, forestry and agriculture related.

**Table 7-10 Existing Traffic on Local Roads**

<b>Road</b>	<b>AADT</b>	<b>Year</b>
Mokihinui-Seddonville Road	110	2005
Millerton Track (leads to Burma Road)	151	2002
Deniston Road (leads to Cedar Creek Road)	128	2005

### ***Construction Traffic Type***

- 7.11 There are 3 primary activities that will generate traffic or have an impact on the local roading network as follows:
- a. Establishment
  - b. Daily Transportation of Staff to site
  - c. Delivery of Bulk Materials.

### ***Establishment***

- 7.12 This will involve deliveries of construction equipment, including excavators, and smaller plant associated with route clearing and foundation construction as well as the poles and foundation materials. These trips will typically be one off deliveries for each item, and associated removal (if applicable) and be focused during the mobilisation and demobilisation of the construction. Because of the large size of some poles to be delivered (up to 20m in length) it will be necessary for these vehicles to be accompanied by pilot vehicles.

***Daily Establishment***

- 7.13 There will be traffic associated with the arrival and departure of the construction workforce at the sites. This will typically be in the morning and evening, with staff travelling in light vehicles or vans as appropriate. This will be a relatively short duration activity each day.

***Delivery of Bulk Materials***

- 7.14 Throughout the construction period, bulk materials will be delivered in Heavy Commercial Vehicles (HCVs). Deliveries for items such as fuel for the construction equipment will occur regularly. The majority of bulk materials required comprise bulk cement deliveries, concrete batched at the dam site, and daily consumables. There is also potential for some deliveries of stone to site for improvements to existing roads.

***Trip Generation and Distribution***

- 7.15 It has been anticipated that traffic generated from the line construction is based on likely activities undertaken during the construction period. At this stage, it is still to be determined whether construction will be in linear sequence or whether there will be a number of teams working concurrently at different points on the route, however to provide a more robust and conservative traffic assessment it has been assumed the later. The trip generation associated with the transmission line construction is detailed in Table 7-19 Trip Generation for Transmission Line Traffic.

***Distribution***

- 7.16 It is envisaged that materials and components will be delivered to storage areas, yet to be determined, and taken as needed to locations on the route. Although helicopters will be used for access to some sections it is expected that materials will be delivered to the closest point on nearby roads to minimise helicopter usage.

7.17 The following are the estimates for the traffic levels on the roads as described above, based on the number of nearby pole locations.

- a. State Highway 67 – As the only road into the area, all of the traffic set out in Table 7-19 Trip Generation for Transmission Line Traffic will use part of this road during the line installation. North of the new Stockton access, traffic associated with the installation will reduce, to around 40-50% of the total traffic set out in table 7-10.
- b. Burma Road – It is expected that up to 60% of the overall traffic will use this road, however this may reduce depending on to what extent Cedar Creek Road is used.
- c. Charming Creek Road - It is expected that up to 15% of the transmission route will be readily accessible from this road, and there is also potential that it may see additional traffic, should the dam construction site be used as a main store for materials used on the transmission line.
- d. Cedar Creek Road – Given that this road provides the most direct access from the south to the southern end of the transmission route, even if not used by excavators to directly access pole sites, it is likely that poles and materials will be delivered to a point on this road for transfer by helicopter for installation. It is estimated that up to 15% of total construction traffic may use this road.
- e. Mokihinui Road – Around 15% of the total traffic is expected to use this section of road given the line routes close proximity to the road. In addition, should the dam construction site be used as a main store for materials used on the transmission line further traffic associated with the delivery of materials may use this road.

7.18 Given the figures set out in Table 7-19 Trip Generation for Transmission Line Traffic and an assumed installation period of 6 months, the average daily traffic volume for the installation would be around 8 vehicles per day at any one time on any road. Were this to be concentrated on the lowest volume road proposed for use, it would equate to approximately 6% of the existing 2007 traffic.

### Cedar Creek Substation

7.19 Based on information received construction is likely to involve the delivery and installation of a number of prefabricated components in addition to construction of concrete foundations. The duration of this is expected to be less than 1 month and peak construction traffic flows of around 12 vehicles per day. This traffic would be mainly associated with staff access to the site, and it is anticipated that less than 50% of this traffic will be heavy. The distribution would be solely on Cedar Creek Road, accessing the state highway at Waimangaroa.

7.20 During installation of the substation it is expected the total construction traffic generated will be approximately 20 vehicles per day when combined with the line installation traffic.

**Table 7-19 Trip Generation for Transmission Line Traffic**

<b>Item to be Delivered</b>	<b>No of Vehicle Movements (return trips)</b>	<b>Vehicle Type</b>
160 No poles (35 steel / 114 concrete)	160  (assumes only one pole per truck and allowance for double pole structures)	Large HCV
4 No excavators	4	Large HCV
Smaller equipment – chainsaws, drills, mixers etc	2	Large HCV
Supplies – fuel for plant and helicopters	1 per week during installation period	Small HCV
28 No transmission cable drums	7	Large HCV
Staff daily travel	6 per day during installation	Van / 4x4

Item to be Delivered	No of Vehicle Movements (return trips)	Vehicle Type
	period	
Foundation material  -Reinforcement steel, cement stabilizers, concrete	5	Large HCV

***Roading infrastructure improvements for transmission line and sub-station construction***

- 7.21 For the transmission line installation there is potential for some minor roading improvements to the local roads and forestry tracks. Improvements are likely to be minor, such as the laying of additional material on longer tracks where access would be provided to multiple excavated foundation sites, and where tracks are more economical than using a helicopter. Short access tracks from the road to the line route will generally involve no more than vegetation clearance for tracked vehicle access. Installation and existing volumes of traffic are such that any widening required to accommodate two-way traffic is not anticipated.
- 7.22 Other recent road upgrading of Millerton Tack as a Buller District Council subsidised works programme has improved access to Millerton so no works should be necessary on this road.
- 7.23 No road improvements are necessary for the construction of the Cedar Creek substation.

***Traffic Effect Summary (Transmission Lines)***

- 7.24 The effect on the local transport network, while noticeable in terms of increased traffic due to the current low traffic levels, will remain well within the capacity of the existing highway network, as such effects are no more than minor.

- 7.25 There will be some roading improvements undertaken as part of the mobilisation works to minimise the construction traffic effects on adjacent landowners and residents associated with safety, noise, dust and traffic flow. The distribution of the transmission line construction traffic over different roads will go some way in mitigating the effect on individual roads.

## 8. **ISSUES RAISED BY SUBMISSIONS**

- 8.1 The following summarises issues raised in submissions associated with construction traffic.
- a. General concerns with people in Seddonville and adjacent to Mokihinui-Seddonville Road regarding noise, vibration from trucks and traffic volumes.
- 8.2 The proposed improvements to the Mokihinui-Seddonville Road, Mokihinui Road and the intersection with SH 67 will address most issues associated with noise and vibration. The current condition of these roads is such that most noise and vibration will be generated from trucks 'banging' over rough areas. The shape correction element of the proposed improvements will serve to mitigate against this.
- 8.3 There will be additional traffic using the highway network during the construction period. The proposed improvements will enable this additional traffic to be accommodated safely, as well as any improvements undertaken benefiting residents and users of Mokihinui-Seddonville Road after construction has concluded.

## 9. **SECTION 42A REPORT AND COMMENTS ON CONDITIONS**

- 9.1 In Appendix 3 of the section 42A Report comments have been made on Meridian's proposed conditions and I respond as follows.

**Traffic Management**

- 9.2 Comment 71: “*Seal in front of houses that are within 100m of Road*”. An arbitrary 100m sealing requirement is overly onerous given the potential negative impacts of construction traffic will be minimised via the proposed restricted working hours for HCVs and dust control measures.
- 9.3 Comment 71: “*The consent holder to provide commuter bus for workers, including pickups and drop offs through Seddonville and Mokihinui*”. The transportation requirements for works will be largely determined by the contractor and vary throughout the construction period dependent on the level of activity. The contract will be best placed to manage worker transport efficiently without arbitrary requirements being enforced.
- 9.4 Comment 17: “*The consent holder shall seal road widths through the Seddonville Village 50km/h zone to a minimum of 8 metres plus 1 metre unsealed shoulders either side to ensure all road users levels of service are safe and efficient, along with eventual restoration back to 6.5 metres*”. The sealed width and shoulder provision needs to be consistent with BDC design standards for the class of road. This is already addressed in the design submission and approval process. It should be noted that if the widening is substantial this will negatively impact on the frontages of adjacent properties. A requirement for eventual restoration to 6.5 metres represents a considerable improvement on the existing infrastructure and should not be imposed on the applicant.
- 9.5 Comment 17: “*Should include any requirements for upgrade along the Dennison, Burnetts Face and Mackley Roads to the Substation at Cedar Creek*”. It is not anticipated that upgrades at these roads will be required.
- 9.6 Comment 17: “*The detailed design plans should include sealing of bridge approaches at Coal Creek and Burkes Creek*”. The sealed approaches will be supplied if required under the BDC design standards. This is addressed in the requirement for plan submission and approval. It should not be the responsibility of the applicant in this case to provide for

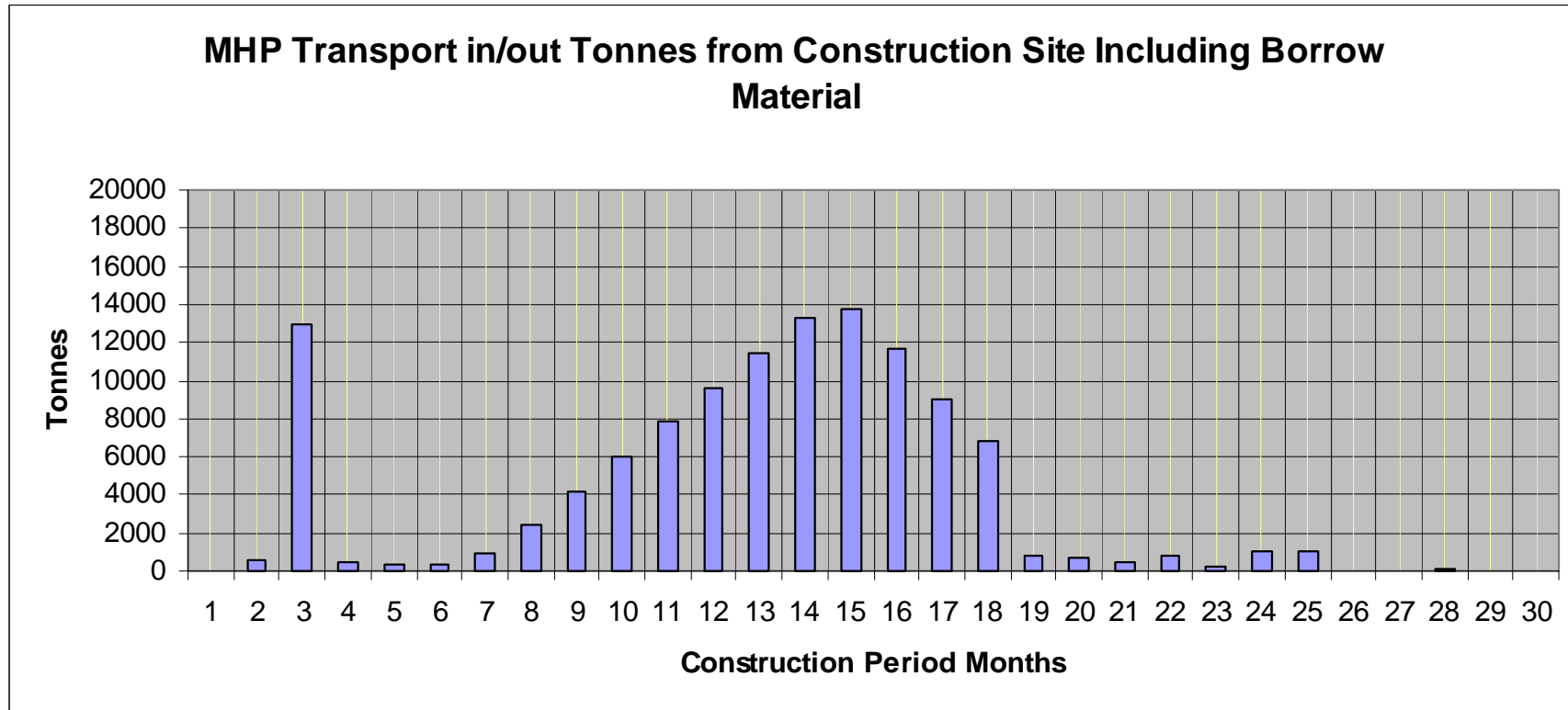
a higher standard of infrastructure to reduce the BDC's future maintenance costs.

- 9.7 Comment 20: *"The traffic management plan should include a restriction in heavy vehicle movement to the site. Heavy vehicles are only to access the site from 7am to 10pm. The exception of which is oversized heavy vehicles which may be transported slightly earlier between 6am and 7am to avoid other road users. The plan shall include methods to advise residents in advance of these movements"*. Given the uncongested nature of the highway network, lack of traffic impact, and the 24 hour construction requirement, restrictions on traffic movements should be avoided (also discussed further in the evidence of Mr Tippler),. It is likely that oversized heavy vehicle movements will be more appropriate overnight, and any restriction, given their low numbers would be inappropriate and possibly counter productive.
- 9.8 Comment 20: *"The consent-holder shall require all contractors to, as far as practicable, ensure that traffic is concentrated between the hours of 8:30am and 3:30am"*. As per 9.8 above, given the lack of congestion on the network, this is inappropriate and too restrictive for a 24 hour a day construction programme.
- 9.9 Comment 20: *"The traffic management plan should include provision that contractors ensure vehicles associated with the construction only travel at 50km/hr through Seddonville and past houses that are closer than 100m from the road"*. This comment is inappropriate. Vehicles should only be required to comply with the posted speed limit, albeit permanent or temporary. Temporary speed restrictions would only be envisaged where required to comply with noise restrictions or safety considerations.
- 9.10 Comment: *"During the construction period maintenance of the Mokihinui-Seddonville Road from SH67 intersection through to the new dam site shall be the responsibility of the consent holder. Annual inspections will be undertaken by the roading authorities to ensure maintenance of the road"*. This is inappropriate as the majority of

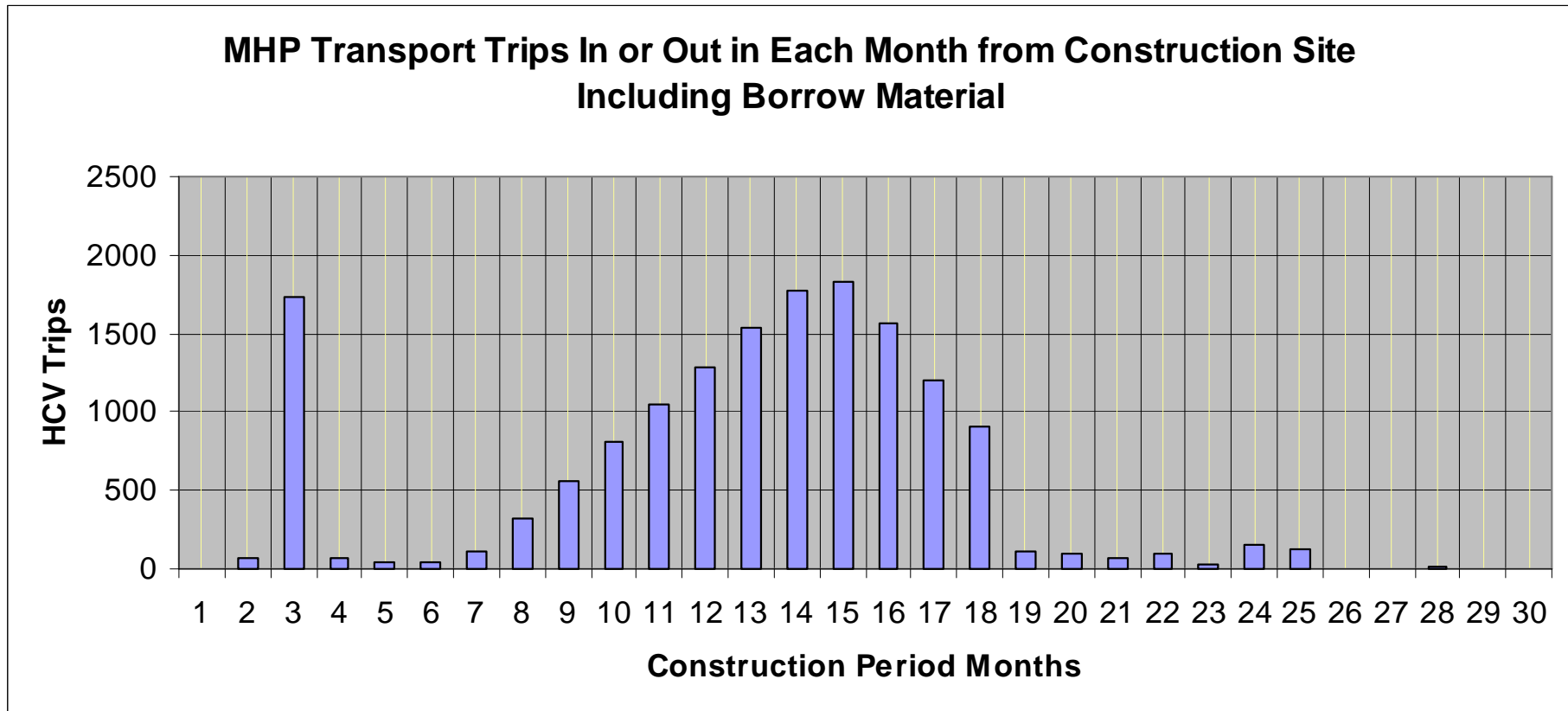
required routine maintenance is not associated with the impact of construction traffic. For example vegetation control and drainage maintenance. Suggest a clause such as 'Prior to construction commencing, the consent holder and the BDC shall undertake a condition assessment of the road, and any defects arising as a result of construction activities shall be made good by the consent holder.'

## 10. **CONCLUSION**

- 10.1 The affects on the transport network arising from the scheme, given the suggested improvements on Mokihinui-Seddonville Road occur, will be minor in the short term as the highway network has sufficient capacity to accommodate the anticipated construction traffic. In the long term affects on transportation will be no more than minor.



**Figure 5-1 MHP Tonnes to be Transported**



**Figure 5-2 Heavy Commercial Vehicle in/out Trips**