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Wellington City District Plan Proposed Plan Change 83 Kiwipoint Quarry Traffic Assessment

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for: **Wellington City Council (Infrastructure)**

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1 Background & Scope

1.1 Background

Wellington City Council (**WCC**), as the owner of the Kiwipoint Quarry, is seeking a plan change (**PC83**) to enable its continued operation after the current workforce is exhausted.

PC83 was notified in April 2018 and submissions closed in May 2018. A hearing is scheduled for September 2018.

Assessments in support of the PC83 application did not include any consideration of potential traffic effects, on the basis that the continued operation of the quarry would result in no change to the associated levels of traffic activity.

A submission from the NZ Transport Agency (**NZTA**) has raised concerns that there may be existing / historical operational problems associated with the use by quarry trucks of the adjacent State Highway 1 (**SH1**) Ngauranga gorge (Centennial Highway). If such problems exist, they would continue with on-going quarrying activity (and possibly intensify as background levels of traffic activity increase over time on this part of the state highway network).

1.2 Scope & Methodology

This document describes a review of the available information regarding the effects of quarry-related vehicle movements upon the operation of the Ngauranga gorge.

A number of specific issues are addressed:

- the availability of any evidence of recent problems (safety or efficiency) being experienced on Ngauranga gorge as a result of its use by quarry-related truck movements;
- whether on-going growth in background traffic activity on the Ngauranga gorge would be likely to result in quarry-related truck movements having a greater effect in the future; and
- whether the granting of the plan change would be likely to lead to any change in the level of effects associated with quarry-related truck movements.

This review is intentionally confined to the potential effects of quarry-related truck movements only. The number of light vehicle movements is not high and their effects are negligible. 'Quarry-related' includes truck movements associated with the Allied Concrete and Downer operations, since these are dependent on the quarry.

The geographic extent of possible effects has focussed upon the northbound direction of travel on the Ngauranga gorge, as this is where the greatest potential for effects arises as a result of slow-moving loaded trucks on the uphill section between Kiwipoint and the Newlands interchange. Nonetheless, it is recognised that a proportion of the loaded trucks also travel downhill from the Newlands interchange, as well as unloaded trucks approaching Kiwipoint from the south, and these areas are addressed as appropriate. Potential effects beyond the Ngauranga gorge area have not been considered as the

dispersal of truck movements to the various routes available means any effects are necessarily diluted.

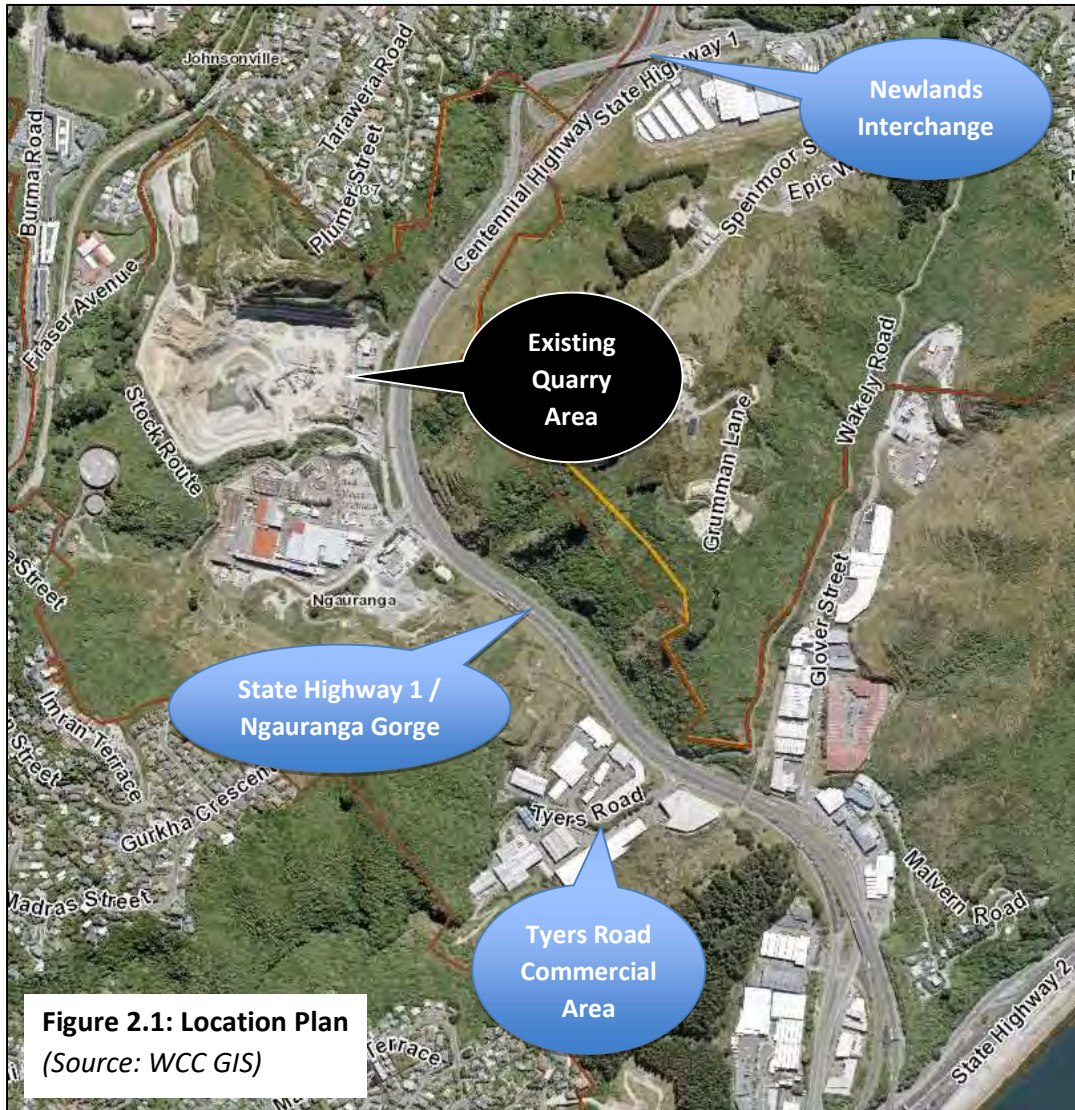
This review has involved:

- a site visit to view conditions directly;
- a review of detailed crash records for the relevant part of the Ngauranga gorge;
- a review of traffic volumetric information for Ngauranga gorge;
- liaison with WCC, Holcim, Allied Concrete and Downer regarding the nature of activities undertaken, truck movements and any issues encountered by drivers; and
- liaison with the Traffic Operations Centre (**TOC**) in relation to the general operation of the gorge area and specifically the movement of quarry-related trucks.

2 Existing Quarry Operation

2.1 Location

The general location of the existing quarry site is shown by **Figure 2.1**.



Vehicular access to the Kiwipoint area is from a point on Ngauranga gorge 1.4kms above the State Highway 2 (SH2) interchange, and 850m below the Newlands Road overbridge.

2.2 Kiwipoint Area

A number of activities are located within the Kiwipoint area and share the access to/from Ngauranga gorge at this point:

- Kiwipoint Quarry (described in further detail below);
- Taylor-Preston (meat processing);
- Allied Concrete (production of concrete materials); and

- Downer (production of asphalt materials).

2.3 Quarry Operation

General Description

The quarry is owned by WCC but operated by Holcim (NZ) Limited. Principal activities are the blasting of the rock-face, rock-crushing and processing. Materials produced are aggregates, including builder's mix, roading/drainage metals, base course, river sand and decorative rock.

Total annual output is 315 – 325,000 tonnes, or around 1,100 tonnes/day.

Hours of Operation

The quarry operates from 7am on six days/week, closing at 5pm Monday-Thursday, 4pm on Friday and 3pm on Saturday. The site is closed on Sundays and public holidays.

Truck Activity

Figure 2.2 summarises truck activity associated with the quarry over the most recent 12-month period. The quarry generates 1,700 – 2,300 return truck movements a month (or 65 – 88 per day), but of these 51% make 'internal' deliveries to the Allied Concrete or Downer plants within the Kiwipoint area. The number of 'external' vehicle movements averages around 1,000 return truck movements a month (or 40 per day).

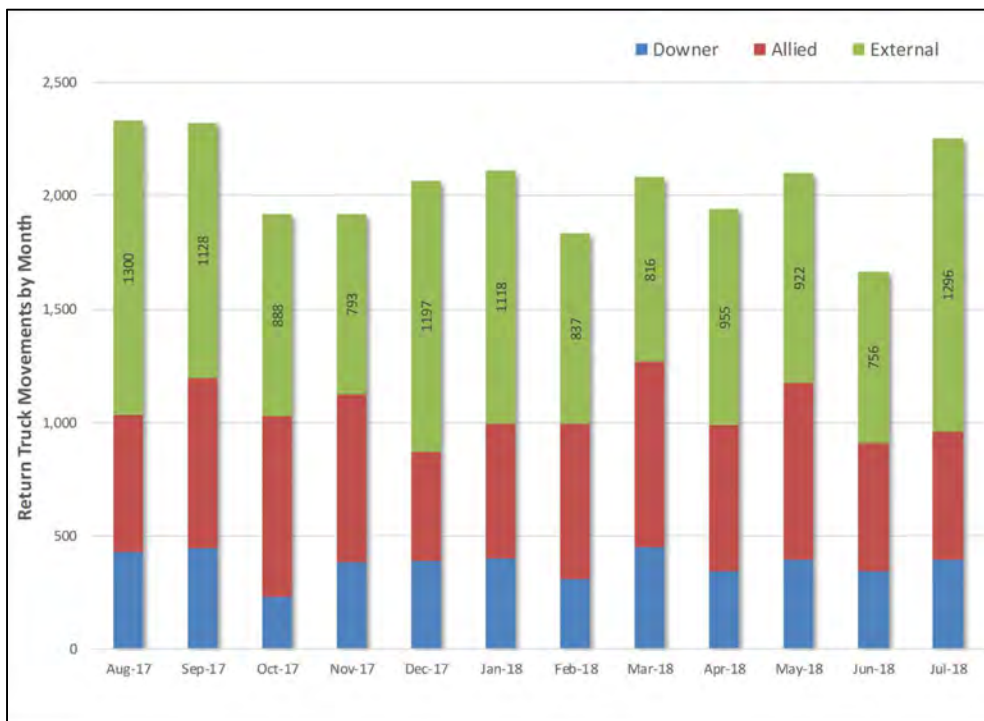


Figure 2.2: Kiwipoint Quarry: Typical Truck Activity by Month

(Source: Holcim NZ Ltd)

Other Activities

Allied Concrete receives deliveries from the quarry for the manufacture of concrete products. Typically, 40 loads a day leave the Allied Concrete plant, the majority of which take place in the morning period. Slightly over half of these go to destinations from Johnsonville northwards with the remainder being in the Wellington city or Hutt Valley areas.

Downer similarly receives deliveries from the quarry and manufactures asphalt products. Records maintained by Downer indicate that the number of return truck movements associated with its plant is typically 40 a day, of which 15 are to/from the quarry with the remaining 25 being external. Around 60% of the external movements occur prior to mid-day.

These movements are summarised by **Table 2.1**. On a 'typical' day, around 294 truck movements take place (one-way), of which 84 are internal to Kiwipoint and the remaining 210 are split equally between external arrivals and departures.

The Taylor-Preston meat processing plant is also responsible for an unknown number of truck movements each day to and from the Kiwipoint area.

	To:				
From:	Quarry	Allied	Downer	External	Total
Quarry		27	15	40	82
Allied	27		0	40	67
Downer	15	0		25	40
External	40	40	25		105
TOTAL	82	67	40	105	294

TABLE 2.1: Movement of Kiwipoint Quarry-Related Truck Movements

Figures are average truck movements/day

The Allied Concrete and Downer operations are considered to be part of the wider quarry operation, since these activities would be unlikely to continue at this location if the quarry was to cease operation.

3 Road Environment

3.1 Description

Access to the Kiwipoint area is by means of a left-in / left-out intersection with Ngauranga gorge. For arriving vehicles, a separate left-turn lane is developed over a length of 150m from the three northbound through lanes.

Signage and road markings require arriving vehicles to give-way to outbound vehicles or those from the quarry making internal movements.

Vehicles exiting to Ngauranga gorge are required to turn left and join the northbound traffic stream. The on-ramp from the Kiwipoint area is maintained as a fourth northbound lane and becomes the off-ramp for the Newlands exit 400m further to the north. Vehicles from the Kiwipoint area using the Newlands off-ramp (either to go to Newlands or to return to the Ngauranga gorge southbound) stay in the left lane while those with a destination further to the north are required to move across one lane.

The internal access road to the Kiwipoint quarry runs parallel to the state highway. Trucks exiting from the quarry directly to the Ngauranga gorge are required to negotiate a downhill gradient followed by a tight radius (10m) turn which together limits their speed.

While the speed limit for northbound vehicle movements using the gorge is displayed on electronic signs and can be varied, it is understood that the 80 km/hr limit is only lowered in response to specific incidents (and not, for example, in response to higher traffic volumes).

The uphill gradient of the Ngauranga gorge is 7-8%. This part of SH1 has the status of a 'Limited Access Road' (**LAR**) and is not a Motorway.

It is noted that the facilities for turning from and to the Ngauranga gorge at Kiwipoint are of a higher standard than those provided for the Tyers Road industrial area to the south, where deceleration and acceleration lanes are very short with no lane gain. Furthermore, for vehicles approaching from the urban motorway, a short weave length of only 130m is available prior to turn into Tyers Road.

A number of Google 'Streetview' images at **Annexure A** show the general road environment in this area.

3.2 Traffic Volumes

Total Traffic Volumes

The NZTA has a number of traffic counting installations in the Ngauranga gorge area. The most recent data indicates typical daily volumes of 37,800 vehicles/day in the northbound direction in the vicinity of the Kiwipoint access, of which 6-7% are heavy vehicles.

Figure 3.1 shows typical northbound traffic hourly profiles over the Monday – Saturday operating period of the quarry.

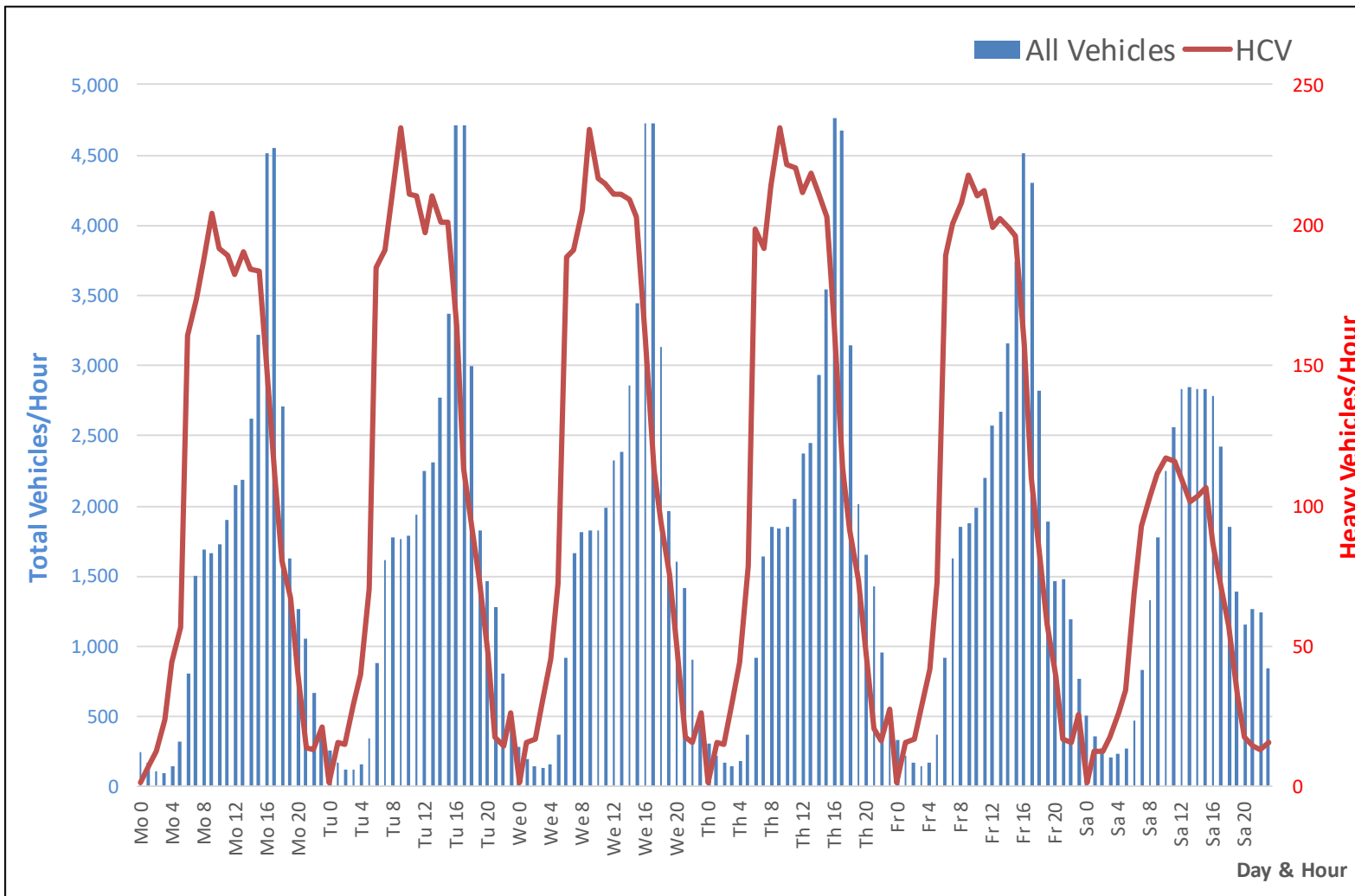


Figure 3.1: Traffic Flow Profiles: Ngauranga Gorge Northbound (Source: NZTA, August 2017 – July 2018)

On weekdays, pronounced peaks of up to 4,700 vehicles/hour are evident in the weekday evening commuter periods, with lower volumes of 1,500 – 2,500 vehicles/hour during the remainder of the working day. A lower peak of 2,600 – 2,800 vehicles/hour occurs over the late morning to afternoon period on a Saturday.

Heavy Vehicles

Figure 3.1 also shows the number of heavy vehicle movements for the same periods. Maximum levels of heavy vehicle activity occur in the period 7am-4pm on weekdays, with 180 – 240 heavy vehicles/hour. Peak volumes of around half this level occur during the mid-day period on Saturdays.

On an average weekday, quarry-related truck movements make up less than 4% of the total northbound heavy vehicle movements on the Ngauranga gorge.

Growth

Figure 3.2 shows the growth in total (two-way) volumes on the Ngauranga gorge since 2011. The trend growth over this period has been 1.3% per annum.

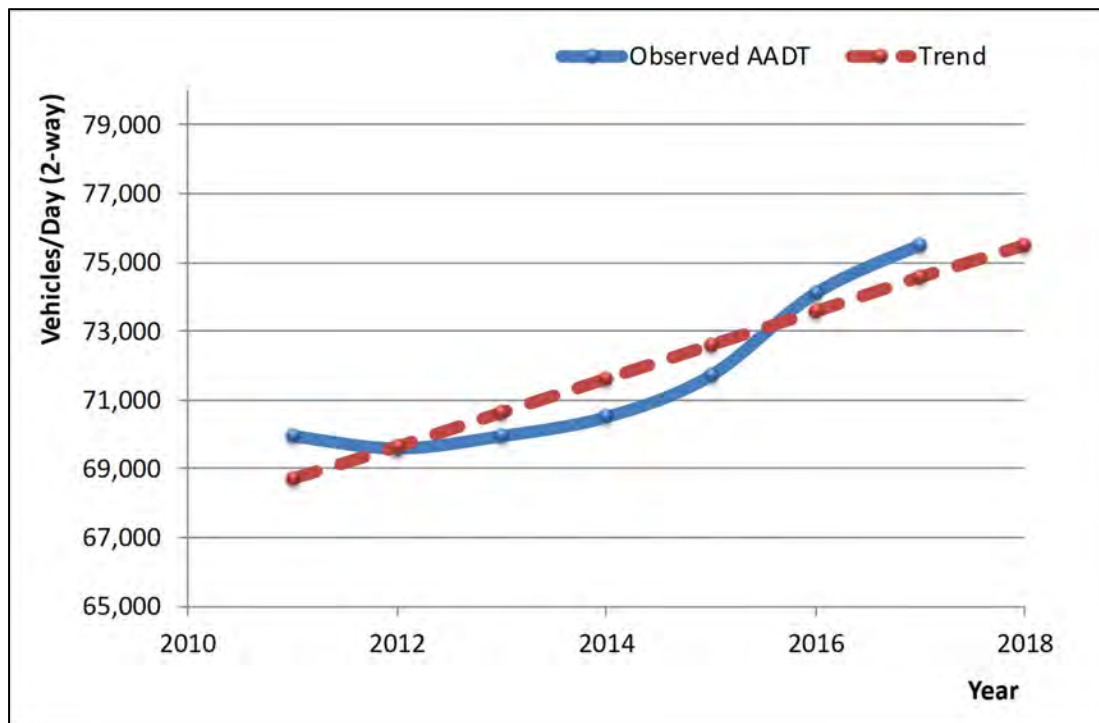


Figure 3.2: Ngauranga Gorge: Traffic Growth from 2011

(Source: NZTA)

Future volumes will be largely governed by the effects of roading projects within the region. The completion of the Transmission Gully (TG) project in 2020 will see some additional traffic using the SH1 corridor (the combined effect of mode transfer from rail, redistribution and trip induction effects). The proposed Petone to Grenada (P2G) project, if advanced, would result in a significant reassignment of traffic between SH1 (north) and the Hutt Valley away from the Ngauranga Gorge to the new route.

Traffic Conditions

With the exception of queues developing back from the Johnsonville off-ramp, queuing rarely occurs in the northbound direction on the Ngauranga gorge. Slow moving vehicles can cause localised disruptions to traffic flow as the speed differential causes other vehicles to seek to weave between lanes.

In the southbound direction, the gradient requires larger trucks to travel slowly in a high gear, causing some disruption to through vehicle flow, particularly in the vicinity of the Hutt Road / SH2 off-ramp near the base of the gorge.

3.3 Crash History

The crash history for this part of the Ngauranga Gorge for the period since January 2013 has been obtained from the database maintained by the NZTA and is summarised by **Figure 3.3**.

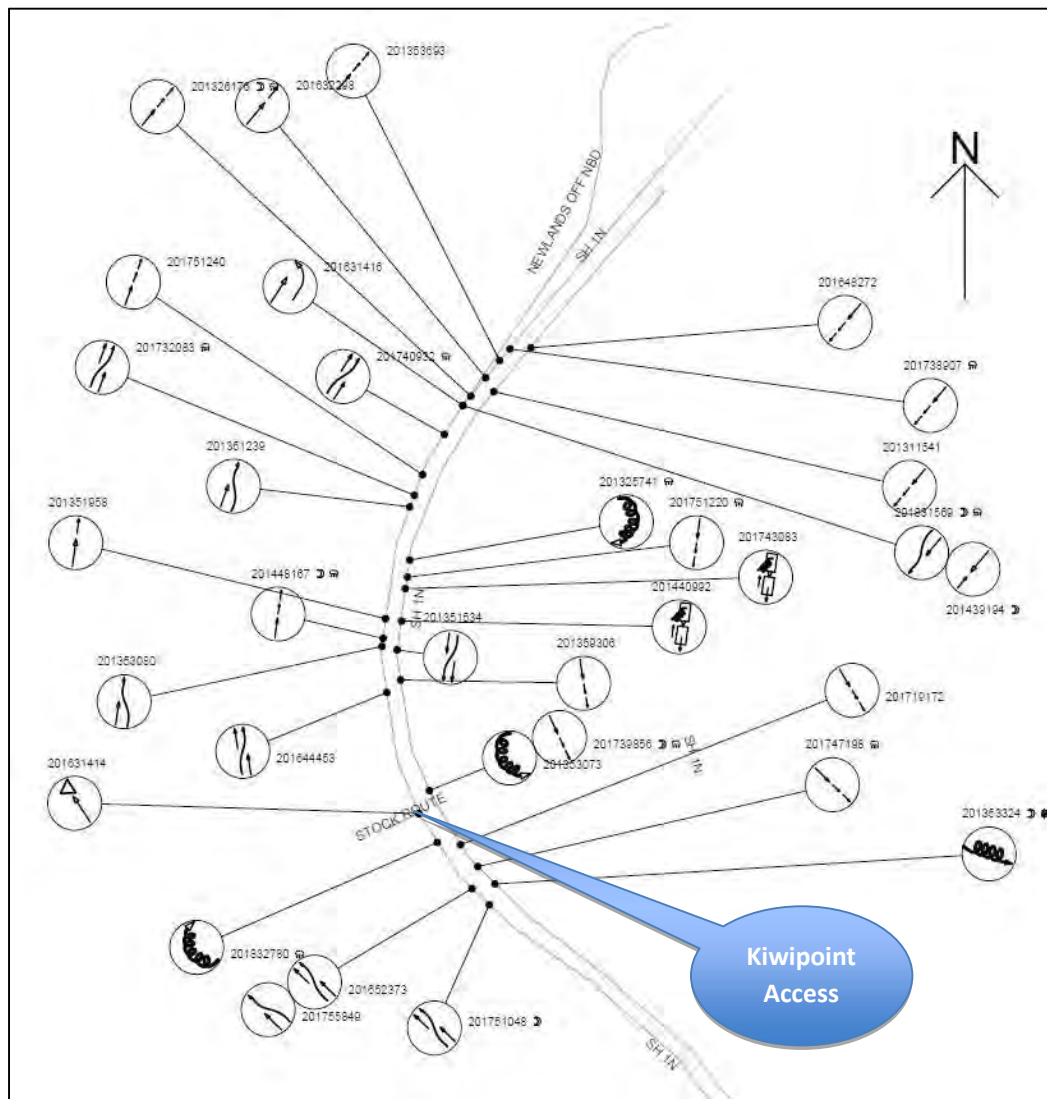


Figure 3.3: Recorded Crashes (from January 2013 on)
(Source: NZTA CAS Database)

While a number of the northbound incidents have been associated with vehicles changing lanes, a review of the detailed records for each incident indicates that none have arisen as a result of a slow-moving truck or a truck moving across lanes to the right between the Kiwipoint exit and the Newlands off-ramp to the north.

One incident (in February 2017) involved a bus changing lanes to the right and colliding with a following car around 90m to the south of the Newlands intersection – though this manoeuvre appears to have been from Lane 2 to Lane 3 and so was unrelated to the use of the Kiwipoint intersection.

Few incidents in the southbound direction have involved a truck movement and there is no indication that any of these involved a quarry-related truck.

By law, only those crashes involving personal injuries are required to be reported. Accordingly, it is possible that a number of other non-injury crashes may have occurred which have not been included in these records.

3.4 Walking, Cycling and Public Transport

Shared walking and cycling tracks run on both sides of the Ngauranga gorge adjacent to the traffic lanes. At the Kiwipoint access, pedestrians and cyclists are required to give-way to vehicle movements in order to cross the entry and exit lanes.

A bus stop is located within a separate lane at the Kiwipoint intersection. This has frequent services to the Johnsonville, Newlands, Churton Park and Grenada Village areas. No shelter is provided.

4 Potential Issues Associated with Quarry Truck Activity

4.1 Safety

As described in **Section 3**, there is no evidence of any reported crashes in the Ngauranga gorge area arising from truck movements associated with quarry activities (including those from the Allied Concrete or Downer facilities).

Although the crash history is favourable, the stochastic nature of crashes means that it is also appropriate to consider to what extent a potential might exist for incidents involving the movement of quarry-related trucks in this area.

The standard of the KIWIPPOINT access intersection is significantly higher than that provided for the Tyers Road industrial area to the south. The provision of a long off-ramp for arriving vehicle movements, and the continuation of the on-ramp into an additional northbound traffic lane means that there is no sudden requirement for weave movements or for other vehicle movements to give-way.

The speed differential between departing trucks and through vehicle movements on the Ngauranga gorge can be significant. Departing trucks (quarry, Allied Concrete and Downer) are loaded, and the turn to access the on-ramp means there is no opportunity to develop any significant speed. As a result, loaded trucks are likely to be moving at 20 – 40 km/hr with through vehicles at up to 90 km/hr.

Truck movements taking the Newlands off-ramp (to return to the south) remain in the left lane and other vehicles merging into this lane have around 400m in which to judge whether to go ahead of or behind a slow-moving truck. With good sight-lines in this area, this is not a difficult or dangerous manoeuvre for drivers to make.

Truck movements heading further north on SH1 have 400m in which to move across one lane to the right. Again, this provides plenty of time for other drivers to view the intentions of the truck and respond by adjusting their speed appropriately.

As shown by the count information in **Section 3**, there are a significant number of truck movements using the Ngauranga gorge which are unrelated to the quarry activity. Even for through northbound truck movements, the gradient in the gorge results in a progressive loss of speed and by the time the KIWIPPOINT intersection is passed, such vehicles can be moving slowly, creating a significant speed differential with light vehicles. The good sight-lines enable other drivers to view slow-moving trucks and respond by changing lanes accordingly. Inevitably, some drivers do get 'boxed-in' behind slow moving vehicles but the effect appears to be limited to a degree of inconvenience rather than a potential hazard.

As described in **Section 2**, most of the quarry-related truck activity occurs in the morning period when northbound traffic volumes are lighter on the Ngauranga gorge. With the quarry closing at 5pm, there are few, if any, truck movements exiting during the busiest weekday evening peak periods.

To the south of the Newlands interchange, southbound quarry-related truck movements join higher volumes of through traffic during the weekday morning peak period. Most of

these movements (heading to SH2 or the Hutt Road), can remain in the left lane with no requirement to merge – and only those continuing to the Wellington urban motorway would be required to merge one lane to the right. As a result, these manoeuvres appear to be undertaken safely.

4.2 Efficiency

Slow-moving trucks have a potential to impair the efficiency of the Ngauranga gorge route to carry high volumes of traffic at busier periods, especially if these aggregate into convoys, effectively removing one traffic lane from use by light vehicles.

As described in **Section 2**, in the northbound direction the periods of highest truck activity on the gorge do not coincide with the weekday evening peaks. An exception occasionally occurs with the evening arrival of the Bluebridge ferry into Wellington, which can result in a convoy of trucks northbound on SH1. This occurs regardless of the quarry operation, which is responsible for few truck movements during the weekday evening peak period.

As described above, some quarry-related trucks are required to descend the gorge slowly in the southbound direction and this may cause some disruption to traffic flow during the busier morning peak period. Again, in the context of quarry-related trucks being a small proportion of the total volume of heavy vehicles, the extent of any disruption which might be attributable to quarry operations is minimal.

4.3 Other Operational Issues

The Wellington TOC has advised that there are occasional problems associated with the spillage of rock material onto the Ngauranga gorge carriageway from loaded quarry trucks as they ascend the gorge – this requires a road crew to remove the material with a requirement for associated traffic management.

Truck breakdowns are also a reasonably frequent occurrence on the Ngauranga gorge, triggered by the sudden demand on engines from the incline – though the number of incidents specifically associated with quarry-related truck movements is likely to be very low.

5 Effects Associated with Plan Change 83

5.1 Scenario without PC83

Quarrying operations currently take place as a Permitted Activity within an area which is zoned as 'Business 2'.

Aside from the general Business 2 standards relating to traffic, access and parking, standard 34.6.5.6.1 relates specifically to the Kiwipoint quarry and requires that:

'There shall be one entry point to the quarry, via Crossing Place 22 from State Highway One (also the main access to the adjacent Abattoir). This must be the sole means of entry and exit and quarry vehicles. This access must be maintained to the standard of local streets.'

If PC83 did not become operative, an option would remain for consents to be sought for quarrying activity, but with such activity being contrary to the relevant Open Space objectives and policies, these would be unlikely to be granted. Quarrying activity would cease once the current rockface is exhausted (expected to be within four years).¹

With a background of increasing demand for rock materials in the Wellington area, an increased volume of materials would need to be supplied from further afield to meet demand. While it is not possible to determine how this would affect the pattern of truck movements, it is likely that an overall increase in haulage distances would be required, with resulting wider effects arising from additional truck vehicle-kilometres travelled on the state highway network.

As described above, it is anticipated that if the quarry ceased operation, the Allied Concrete and Downer operations would also cease. Nonetheless, a possibility exists that these operations might remain, instead importing material from other quarries (such as Horokiwi). If this was to occur, then there would be a change in the pattern of truck movements (for example, loaded trucks arriving to Kiwipoint from SH2/SH1 and unloaded trucks exiting to the north to then return southbound from the Newlands interchange). The net effect of such a change is likely to be an increase in the number of trucks and/or truck haulage distances, again with impacts upon the wider Ngauranga gorge area and state highway network.

5.2 Scenario With PC83

PC83 would enable quarrying activity to take place in an area to the south of the existing quarry, by re-zoning this from 'Open Space B' to 'Business'.

PC83, if approved, would extend the life of the quarry by a further 15 – 20 years.

There are currently no controls upon the level of quarrying activity or the associated number of vehicle movements and this would remain the case under the PC83 provisions.

¹ Proposed District Plan Change 83: Kiwi Point Quarry Extension. Section 32 Report: Consideration of Alternatives, Benefits and Costs. Incite, 5 February 2018 (page 38).

The constraints upon activity levels are the availability of a single rock crusher for the processing of rock materials and an inability to stock-pile any significant quantity of material (due to space restrictions and inefficiencies of double-handling).

While in theory it would be possible for a second crushing unit to be installed without any consent requirement, in practice this is precluded by other constraints.

5.3 Effects of PC83

If PC83 became operative, there would be no change in the level of quarrying activity or the number of associated truck movements using the Ngauranga gorge during the course of a typical day, month or year.

The only effect would be a continuation of these levels and patterns of quarry-related truck activity for a further 15 – 20 period.

By enabling the continued operation of the only quarry located within the Wellington city area, PC83 would minimise the overall extent of truck haulage required, with beneficial effects for the state highway network.

6 Conclusions

Wellington City Council, as the owner of the Kiwipoint Quarry, is seeking a plan change to enable the continued working of the quarry for a further 15 – 20 years. Without the plan change, quarrying operations are expected cease in around four years.

In response to concerns raised in a submission made by the NZ Transport Agency, this assessment has reviewed the potential for any effects associated with quarry-related traffic movements in the Ngauranga gorge area.

The conclusions of this assessment are that:

- slightly over half of the quarry output is supplied to other activities within the Kiwipoint area (Allied Concrete and Downer);
- the number of external quarry-related truck movements should include those associated with these other facilities and on an average day, these total 210 (split equally between arriving and departing movements);
- northbound between Kiwipoint and the Newlands interchange, the quarry-related truck movements account for under 4% of total heavy vehicle movements;
- vehicular access to and from the Kiwipoint area is of a good standard (especially when compared to the corresponding access to the Tyers Road area to the south);
- a detailed analysis of crash records provides no evidence of any incidents associated with quarry-related truck movements;
- while loaded slow-moving trucks have a potential to cause some disruption to traffic flow, the good standard of forward visibility, room for lane-changing by other drivers and low activity levels during the periods of highest traffic demand means that any effects are minimal;
- occasional problems associated with material spillage to the road surface can be addressed through improved loading and monitoring procedures;
- the plan change will enable existing levels of truck activity to continue over a longer period and will not affect the daily quarry output (which is primarily constrained by the availability of rock crushing equipment and an inability to stockpile material); and
- if the plan change was not approved, the need to source rock materials from other locations would result in an overall increase in truck haulage distances, with some adverse effects upon the efficiency of the wider state highway network.

**Image 1**

Southern off-ramp to
Kiwipoint intersection

*(Source: Google
Streetview)*

**Image 2**

Kiwipoint intersection

*(Source: Google
Streetview)*

**Image 3**

Kiwipoint internal
access and exit to
northbound on-ramp

*(Source: Google
Streetview)*

**Image 4**

Kiwipoint northbound
on-ramp

*(Source: Google
Streetview)*

**Image 5**

Southern approach to
Newlands interchange

*(Source: Google
Streetview)*

**Image 6**

View to south of
Kiwipoint on-ramp

*(Source: Google
Streetview)*