BEFORE INDEPENDENT HEARING COMMISSIONERS APPOINTED BY WAIPA DISTRICT COUNCIL

IN THE MATTER	of the Resource Management Act 1991 (Act)
AND	
IN THE MATTER	of an application for resource consent under section 88 of the Act for the establishment and operation of a sand quarry and cleanfill operation located at 928 Kaipaki Road, Cambridge
BETWEEN	**SHAW'S PROPERTY HOLDINGS LIMITED**
	Applicant
AND	**WAIPA DISTRICT COUNCIL**
	Consent Authority

STATEMENT OF EVIDENCE OF ALASTAIR JAMES BLACK
FOR THE APPLICANT

(Traffic)

Dated: 6 November 2020

INTRODUCTION

1. My full name is Alastair James Black. I hold a Bachelor of Engineering degree (Civil, 2002) from the University of Canterbury. I am a Chartered Member of Engineering New Zealand (CMEngNZ) and a Chartered Professional Engineer (CPEng). I have worked in the transportation field for 18 years.

2. I am based in Hamilton and have worked for Gray Matter Ltd as a transportation engineer since March 2009. For two years prior to that I was a Project Engineer for the London Borough of Hammersmith and Fulham. For the previous six years I was a civil/transportation engineer with Opus International Consultants Ltd in Hamilton.

3. I am familiar with the transport issues arising in and around the Waikato, having provided advice to Waipa District Council, Matamata Piako District Council, Waikato District Council, and other local authorities. I have also provided advice to the NZ Transport Agency ("NZTA") and developers on range of transport related projects in the area. I have the following specific experience relevant to the matters within the scope and purpose of this statement of evidence:

   (a) Consultant civil/transportation engineer for Road Controlling Authorities assisting in the review of consent applications including quarries, industrial, intensive farming, commercial, childcare and residential developments within wider Waikato Region;

   (b) Consultant civil/transportation engineer for developers, landowners and local authorities preparing traffic impact assessments for development proposals including quarries, intensive farming, rest homes, museums, childcares, schools, commercial and residential developments.

(c) Consultant project manager for Hamilton City Council and NZTA for the Southern Links Investigation relating to a Notice of Requirement for 32km of proposed arterial road network to the south of Hamilton; and

(d) I have completed the NZTA Road Safety Engineering Workshop and have led safety audits on urban and rural improvement projects for local roads and state highways.

EXPERT CODE OF CONDUCT

4. I confirm that I have read and am familiar with the Code of Conduct for Expert Witnesses in the Environment Court, Practice Note (2014), and agree to comply with that Code of Conduct. I state where I have relied on the statements of evidence of others for my assessment. I have not omitted to consider material facts known to me that might alter or detract from my opinions.

OVERVIEW OF EVIDENCE

5. I have been engaged by Shaw's Property Holdings Ltd ("the Applicant") to provide traffic engineering advice relating to their consent application to Waipa District Council ("Council") to establish a sand quarry and cleanfill operation at 928 Kaipaki Road, Cambridge ("Application" or "Project"). I directed preparation of and reviewed the *'Proposed Sand Quarry, 928 Kaipaki Road, Cambridge 263 Wiseman Road, Integrated Transport Assessment' (Issue 3, 21 April 2020)* ("ITA") for the Application. The ITA is found at Appendix E to the Assessment of Environmental Effects for the Project.

6. The scope of my evidence includes:

(a) A summary of the Project;

(b) Corrections and clarifications to the ITA;

(c) A summary of the transport effects as set out in the ITA and proposed mitigation by the Applicant;

(d) Responses to the transport matters raised in Council's s 42A Report;

(e) Responses to concerns raised in submissions received in opposition to the Application; and

(f) Comments on the draft proposed conditions of consent (as have been updated and are **attached** to Mr Chrisp's evidence at his Annexure "A" ("Applicant's Proposed Conditions")).

7. In preparing this evidence I have reviewed the following:

(a) The submissions received in opposition to the Application;

(b) Council's s 42A Report prepared by Hayley Thomas;

(c) The ITA Peer Review: 928 Kaipaki Road Sand Quarry and Clean Fill Consent Application prepared by Mr Cameron Inder of BBO (29 October 2020). I refer to this as the ("BBO Peer Review"); and

(d) The Proposed Sand Quarry – 928 Kaipaki Road, Leamington, Transportation Peer Review prepared by Mr Mark Apeldoorn of Stantec (28 October 2020). I refer to this as the "Stantec Peer Review").

EXECUTIVE SUMMARY

8. The Applicant seeks to extract sand from the site at 928 Kaipaki Road ("Site") at a maximum rate of 200,000m^3/yr for up to 15 years. This will generate an average of 106HCV/day with peaks of 132HCV/day.

9. As described in the ITA, the potential transport related effects from the increase in traffic associated with the Project relate to safety, efficiency, manoeuvering at the Site access, on-street parking and pavement impacts. The additional traffic generated from the Project is within the capacity of the surrounding network and adverse effects are unlikely. The safety and efficiency effects at the Site access will be mitigated by providing a right-turn bay on Kaipaki Road and by upgrading the vehicle crossing to allow for two-way vehicle movements. The risk of parking on Kaipaki Road is reduced by locating the gate approximately 300m from Kaipaki Road.[1]

10. I do not support the conditions proposed by Council at Appendix 6 to the s 42 A Report ("Council's Proposed Conditions") requiring realignment of the internal access road, erection of active warning signs, monitoring of turning movements at the Kaipaki Road / Mellow Road intersection or construction of the right-turn bay at that intersection, and do not support banning quarry traffic from McEldownie Road and the southern end of Mystery Creek Road. I discuss this later in my evidence.

11. I confirm the conclusion of my ITA for the Project that the traffic effects on the surrounding environment are acceptable provided that appropriate conditions of consent are included to:

    (a) Limit the annual quantity of sand extracted from the Application Site;

    (b) Limit the number of heavy vehicle movements entering and exiting the Site;

    (c) Require the upgrading of the vehicle crossing to a right-turn bay and the internal access roads at the Site; and

    (d) Require the payment of a financial contribution.

[1] Applicant's Proposed Condition 36.

12. In my opinion, the Applicant's Proposed Conditions as **attached** at Annexure "A" to Mr Chrisp's evidence implement the above. As such, I am satisfied that the traffic effects of the Application will be acceptable to the surrounding receiving environment.

SUMMARY OF THE PROJECT

13. The key matters of the Project that are relevant to my assessment of likely transport effects are:

    (a) The operational parameters which provide that a maximum of 200,000m^3 of sand can removed in any 12-month period;

    (b) The Applicant's assumption that 70% of trips will be to/from Cambridge (to the south of the Site);

    (c) That approximately half of trucks visiting the Site will bring in a load of cleanfill before picking up a load of sand; and

    (d) That 10% of loads will be for cleanfill drop-off only.

14. Mitigation of the potential adverse effects associated with the Project is recommended through limits on operational matters as set out in the Applicant's Proposed Conditions that include:

    (a) Capping the annual quantity of sand that can be removed from the Site to 200,000m^3 which in turn controls the number of vehicle movements entering and exiting the Site.[2]

    (b) Providing a maximum limit on the number of heavy vehicle moments on any one day.[3]

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[2] Applicant's Proposed Condition 17.
[3] Applicant's Proposed Condition 34(i).

(c) Providing a daily average limit on the number of heavy vehicle moments calculated over a one month period.[4]

(d) Upgrading the vehicle crossing and including a sealed access road to provide safe access for vehicles entering and exiting the Site.[5]

(e) Installing a wheel wash that reduces the risk of dust and debris being tracking onto Kaipaki Road to avoid potential maintenance and safety effects.[6]

(f) Payment of a financial contribution to Council to mitigate the effect of heavy vehicles reducing the expected pavement life.[7]

15. Since the ITA was finalised in April 2020, the Applicant has confirmed the following amendments to the parameters of the Project which are relevant to the conclusions set out in the ITA:

(a) The Applicant has agreed to limit the duration of the land use consent to 15 years.

(b) The proposed gate at the Site entrance is to be relocated to the end of the sealed access to the Site, approximately 300m from Kaipaki Road.

16. For completeness, I record that the total quantity of sand to be extracted over the lifetime of the Quarry (being 15 years) does not affect the conclusions reached in the ITA as the total quantity of sand was not a key factor considered when assessing the transport effects or setting the limits on trip generation. The key factor determining predicted trip generation is the annual maximum quantity of 200,000m^3 , which, in turn determines the average daily trips. The likely duration and total quantity

[4] Applicant's Proposed Condition 34(ii).
[5] Applicant's Proposed Condition 36.
[6] Applicant's Proposed Condition 10.
[7] Applicant's Proposed Condition 44.

of material does, however, have an effect on cumulative impacts on pavements and the financial contribution payable to Council. I discuss this further in my evidence at paragraphs 65-69.

17. When considering traffic flows in an assessment of effects for an activity such as the quarry, there are a range of measurement options. The Applicant's Proposed Conditions for the Project focus on:

    (a) Peak daily maximum – to consider aspects such as efficiency, intersection performance, safety, etc. relevant to peak demand of short duration and of low probability; and

    (b) Average daily traffic – to consider sustained demand, with effects on pavements, safety, and long-term noise resulting in a greater likelihood of people being affected.

18. The trip generation calculations are set out in the ITA (Section 3.4 and Appendix 4). The average daily trip generation of 106HCV/day is required to extract 200,000m^3/year of sand assuming the quarry operates 276 days/years and an average load of 15m^3/HCV. This also includes an allowance for 10% of trips to bring in a load of cleanfill without extracting sand. The peak daily trip generation of 133HCV/day is based on extracting 5,000m^3 of sand per week.

CORRECTIONS AND CLARIFICATIONS

19. As the Commissioners will be aware, the Application was limited notified by Council and three submissions were received in opposition. Two of the submissions raised concerns relating to the ITA which I wish to address and provide clarification of before addressing the likely adverse traffic effects associated with the Project and proposed mitigation from the Applicant. I will then return to their submissions in further detail later.

20. The Comez's submission[8] queries the available sight distance from the proposed access off Kaipaki Road. The ITA incorrectly states that the available sight distance is 640m to the horizontal curve when looking right from the proposed vehicle crossing (this is a typographical error). [9]

21. Rather, the correct sight distance from the proposed access is approximately 420m as stated in the Stantec Peer Review. This correction does not affect the conclusion of my assessment in the ITA as the available sight distance from the vehicle crossing still exceeds the minimum sight distance of 250m as specified in the NZTA RTS 6 Guidelines for Visibility at Driveways. As such, I am of the view that there is adequate sight distance at the proposed access off Kaipaki Road.

22. The Walker's submission[10] seeks clarification on two points relevant to the ITA, these being:

    (a) Whether the vehicle movements for the sand extraction are calculated in addition to the vehicle movements for the cleanfill operation associated with the quarry; and

    (b) Whether the Applicant is seeking additional vehicle movements to enable 100,000m^3 of cleanfill into the Site annually in circumstances where that volume does not arrive in conjunction with the sand extraction.

23. In response to the questions and as highlighted in paragraph 13 of my evidence and in the ITA,[11] a number of assumptions have been made to determine the most appropriate limits on trip generation. The trip generation limits are described in paragraphs 17 and 18 of my evidence and are reflected in the Applicant's Proposed Conditions (refer condition 34). These limits are independent of whether the material (sand product

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[8] Comez, Section 2.2 Application Discrepancies.
[9] ITA, Section 2.5 Existing Vehicle Entrances and Section 3.2.3 Sight Distance
[10] Walker submission, paragraph 14.
[11] ITA, Section 3.4 Trip Generation.

or cleanfill) is being carted to or from the Site (or both). This provides the quarry operator and transport contractors with the flexibility to manage changes in demand for sand products and cleanfill.

24. The Comez's[12] submission also queries the traffic volume on Kaipaki Road. I note that generally district council's do not count the traffic volumes of every road in its district every year – this is primarily due to budget and time constraints. However, district council's have asset management systems that use actual traffic counts data to provide estimates on other roads within their district. In that regard, Mobileroad.org is a publicly accessible website that provides the most recent traffic data uploaded by the Council. In my view 3,200veh/day provided on Mobileroad.org is the most appropriate traffic volume for assessing the effects on Kaipaki Road.

THE INTEGRATED TRANSPORT ASSESSEMENT

25. The Applicant seeks to extract sand from the Site at a maximum rate of 200,000m^3/yr for up to 15 years. This will generate an average of 106HCV/day with peaks of 132HCV/day.

26. As described in the ITA, the potential transport related effects from the increase in traffic associated with the Project relate to safety, efficiency, manoeuvering at the Site access, on-street parking and pavement impacts. The additional traffic is within the capacity of the surrounding network and adverse effects are unlikely. The risk of parking on Kaipaki Road is reduced by locating the gate at the end of the sealed access approximately 300m from Kaipaki Road.

27. I have reconsidered the conclusion in the ITA and now recommend a right turn bay be implemented on Kaipaki Road to mitigate the potential safety and efficiency effects at the Site access. In my opinion the vehicle crossing should be upgraded to allow for two-way vehicle movements.

[12] Comez, Section 2.2 Application Discrepancies

28. The HVIF calculation has been reviewed to take into account the 15-year maximum duration of the sand quarry.

29. I confirm the conclusion of my ITA for the Project that the traffic effects on the surrounding environment are acceptable provided that appropriate conditions of consent are included to:

    (a) Limit the annual quantity of sand extracted from the Site;

    (b) Limit the number of heavy vehicle movements entering and exiting the Site;

    (c) Require the upgrading of the vehicle crossing to a right-turn bay and the internal access roads at the Site; and

    (d) Require the payment of a financial contribution.

30. In my opinion, the Applicant's Proposed Conditions implement the above. As such, I am satisfied that the traffic effects of the Application will be acceptable to the surrounding receiving environment.

COUNCIL'S S42A REPORT

31. I have reviewed the s42A Report and BBO Peer Review and address the specific matters that are raised in the following sections of my evidence.

Trip Distribution and Need for a Right Turn Bay

32. The assessment of trip distribution in the ITA adopted the Applicant's assumption that 70% of of trips will be to/from Cambridge (to the south of the Site). Both peer reviewers and submitters have raised concerns with this assumption. Trip distribution for the quarry is influenced by the nature, location and scale of activities that require sand or disposal of cleanfill material.

33. Mr Inder has considered the following trip distribution scenarios and considers that a right-turn bay into the Site from Kaipaki Road is required:

(a) 12% peak hour and 100% of trips to the north; and

(b) 15% peak hour and 80% of trips to the north.

34. I have reviewed the assumptions made in the ITA that underly the determination of the threshold for a right turn bay and tested a range of scenarios considering directional split, a higher peak hour for quarry traffic and a higher peak hour for traffic using Kaipaki Road.

35. The current traffic volume on Kaipaki Road is 3,200veh/day which equates to 320-385veh/hr (assuming 10-12% peak hour). With 2% growth on Kaipaki Road for 10 years the passing traffic volume increases to 3,840veh/day and 385-460veh/hr (assuming 10-12% peak hour).

36. Figure 1 shows how the 8veh/hr and 5veh/hr thresholds related to the passing traffic. Table 1 (below on pages 12 and 13) shows the results of our sensitivity testing.

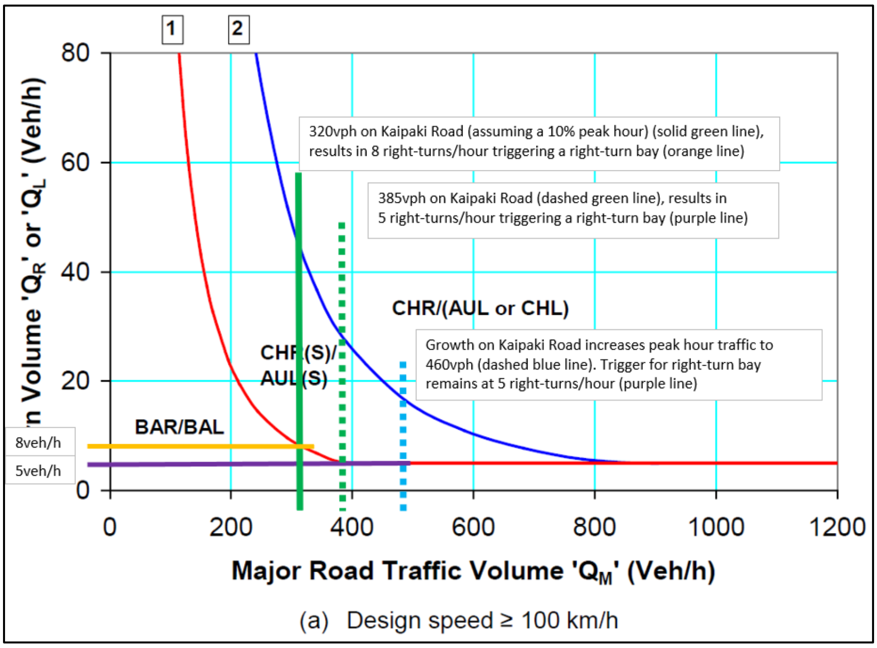

Figure 1: Austroads Warrant Assessment[13]

[13] Austroads Guide to Road Design Part 4: Intersections and Crossings – General, Figure A 10

37. The results indicate that the conclusion in the ITA that a right-turn bay is not required remains valid for the scenario with a 10% peak for quarry traffic and passing traffic on Kaipaki Road (i.e. Scenarios A and B in Table 1). Sensitivity testing for 12% and 15% peaks in quarry traffic and a slight change in direction (Scenarios C and D) show that the activity is within 1veh/hr of requiring a right-turn bay. A right-turn is not required for a 50/50 direction split (Scenario E).

38. Sensitivity testing for higher peaks in traffic passing the Site shows that a right-turn bay is warranted in all scenarios where the majority of trips are to/from the north (i.e. Scenarios G, H and I). Where trips are distributed 50/50 (Scenario J) the activity is within 1veh/hr of warranting a right-turn bay.

39. Taking into account factors such as the uncertainty in the direction of trips, peaks in quarry activity, peaks in passing traffic and the proposed 15 year life of the quarry, I agree with Mr Inder that a right-turn bay provide a safer treatment at the vehicle crossing. As such, I have reconsidered the conclusion in the ITA and now recommend that a right-turn bay into the Site from Kaipaki Road be implemented at the vehicle crossing.

Table 1: Sensitivity testing

Quarry Scenario (106HCV/day)		Right-turns by Quarry Traffic	Right-turn Threshold	Threshold Exceeded?
Based on 10% Kaipaki Road Peak Hour (320veh/hr)				
A	30% north, and 10% peak hour	2 veh/hr	8 veh/hr	No
B	100% north, and 10% peak hour	6 veh/hr	8 veh/hr	No
C	100% north, and 12% peak hour	7 veh/hr	8 veh/hr	**Near threshold**
D	80% north, and 15% peak hour	7 veh/hr	8 veh/hr	**Near threshold**
E	50% north, and 12% peak hour	4 veh/hr	8 veh/hr	No

	Quarry Scenario (106HCV/day)	Right-turns by Quarry Traffic	Right-turn Threshold	Threshold Exceeded?
Based on 12% Kaipaki Road Peak Hour (385veh/hr)				
F	30% north, and 10% peak hour	2 veh/hr	5 veh/hr	No
G	100% north, and 10% peak hour	6 veh/hr	5 veh/hr	**Yes**
H	100% north, and 12% peak hour	7 veh/hr	5 veh/hr	**Yes**
I	80% north, and 15% peak hour	7 veh/hr	5 veh/hr	**Yes**
J	50% north, and 12% peak hour	4 veh/hr	5 veh/hr	**Near threshold**

Vehicle Crossing Upgrade

40. The BBO Peer Review includes the following recommendations relevant to the vehicle crossing:

> *"Design should be in general accordance with NZTA Manual of Traffic Signs and Markings, "Rural Right Turn Bay" Figure 3.25*
>
> *"…and the extent of sealed access being no less than 100 m from the road reserve boundary"*
>
> *"That the site entrance upgrade includes a realigned access road to 90 degrees from Kaipaki Road to maximise safety for the travelling public."*
>
> *"Provision of Traffic Control Devices Manual compliant electronic permanent warning signs on Kaipaki Road approaches to the quarry entrance that are triggered and lit / operational when trucks are crossing. The detection system shall be design to be fit for purpose to detect trucks entering the right turn bay, slowing to turn left into the site access, and exiting from the site access."*

41. As discussed above, I now consider that a right-turn bay into the Site from Kaipaki Road is the most appropriate treatment at the vehicle crossing to address uncertainty in trip distribution and peaks in quarry activity. A concept design showing the extent of the right-turn bay is provided at **Attachment 1** to my evidence. The design is based on NZTA Manual of Traffic Signs and Markings, "Rural Right Turn Bay" Figure 3.25. The key features of the right-turn bay are:

(a) 3.5m traffic lanes;

(b) 3.0m wide right-turn bay;

(c) 1.5m shoulder adjacent to the southbound lane and 0.5m shoulder for the northbound lane;

(d) No-overtaking lines will extend from the vehicle crossing and connect with the exiting no-overtaking lanes to the north; and

(e) No-overtaking lines will extend for 80m south of the vehicle crossing with an additional 100m of advanced (dashed) no-overtaking lines.

42. As set out in paragraph 15 of my evidence, the Project has been revised to include sealing the access for 300m from Kaipaki Road and locating the gate at end of the sealed access.[14] This exceeds the 100m sought by Mr Inder and submitters. The additional length addresses concerns raised in submissions about queuing and further reduces the likelihood of dust being tracked onto the road.

43. The BBO Peer Review recommends realigning the vehicle crossing as originally proposed in the Application. The alignment of the crossing is addressed in the ITA (Section 3.2.2) and is considered adequate. The Applicant's proposed crossing allows exiting vehicles to be aligned at 70-90 degrees to Kaipaki Road and the driver observation angle is expected to less than 120 degrees (the maximum recommend by Austroads).[15] The purpose of the proposed splitter island is to assist with speed management at the crossing and promote good vehicle alignment. I consider that the detailed design safety audit provides the appropriate opportunity for the detailed design of the vehicle crossing layout and

[14] Applicant's Proposed Conditions 8 and 36.

[15] Austroads Guide to Road Design Part 4A Unsignalised and Signalised Intersections, Section 3 and Figure 3.6.

alignment to be reviewed and refined if required prior to construction and as part of Council's authorisation for works in the road corridor.

44. The BBO Peer Review also recommends the installation of a permanent electronic sign that activates when a truck is entering or exiting the Site. The Traffic Control Devices Manual[16] (Section 6.2) restricts the use of active warning signs and states that (emphasis added):

> *"However, both permanent and temporary active warning sign installations should only be used or approved by an RCA when **all other options** for using standard reflective signs **are considered inadequate** and that **road users need additional warning**."*

45. The NZTA Traffic Note 57 Active Warning Signs provides guidelines and selection criteria. It states that (emphasis added):

> *"Active warning signs are intended to meet the following objectives:*
> - *To highlight and draw drivers' attention to a particular type of hazard at a site **where the standard reflectorised warning signs have been tried and have been found not to be sufficiently effective** in warning drivers to modify their behaviour so they safely negotiate the hazardous site;*
>
> *"Active warning signs should be restricted to sites where the RCA considers that none of the standard warning sign options … will provide adequate warning to approaching drivers."*

46. I am aware of active warning signs being used at high risk curves, slippery surfaces, school zones and for queue/intersection warnings. I have provided advice to NZTA on the suitability and installation of Rural Intersection Activated Warning Signs ("RIAWS") which reduce the speed limit when vehicles are turning at an intersection. I am not aware of any active warning sign being used at a private vehicle crossing. None of the quarries or cleanfills I am familiar with within in the Waikato or Waipa Districts, including busier quarries in similar road contexts, have active warnings signs installed at their vehicle crossings.

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[16] Traffic Control Devices Manual, Part 1 General Requirements for Traffic Sign, Section 6.2 Active Signs.

47. The proposal for an active warning sign appears related to safety concerns from fog restricting visibility. Based on the information provided by Mr Inder, fog occurred on approximately 10% of days. In the past 10 years three crashes have listed fog/mist as a factor. Two were single vehicle loss of control crashes (one minor injury) and one non-injury crash at the SH3/ Kaipaki Road intersection. None were related to vehicle manoeuvring at vehicle crossings.

48. I do not consider an active warning sign necessary at the Site's access because:

(a) There is good visibility to the proposed vehicle crossing for traffic approaching from both directions;

(b) A right-turn bay into the Site from Kaipaki Road is now proposed at the vehicle crossing which provides a space for right-turning vehicles to wait without affecting following traffic, and approach and departure marking that provide visual cues of a vehicle crossing coming up;

(c) If required, a standard reflective sign should be sufficient warning for drivers of the crossing; and

(d) In foggy conditions drivers should adjust their driving behaviour as set out in the Road Code.[17]

Review Condition

49. The BBO Peer Review recommends:

> *"A monitoring and trigger condition relating to the provision of a right turn bay at Kaipaki Road / Mellow Road intersection if the right turn into Mellow Road consistently (over at least one typical month of weekday AM peak hours) exceeds 8 vehicles per hour. "*

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[17] https://www.nzta.govt.nz/roadcode/general-road-code/road-code/about-driving/when-conditions-change/driving-in-bad-weather/

50. Council's Proposed Condition 35 as included at Appendix 6 to the s 42A report states:

> *"Within 6 months after the commencement of mineral extraction activities, the consent holder shall arrange for the independent monitoring of the use of the intersection of Kaipaki Road and Mellow Road. A copy shall be provided to Council's Development Engineering Team Leader. If the monitoring demonstrates more than 8 vehicles per hour over at least one typical month of weekday morning peak hours uses the intersection from the consented activity, the consent holder shall upgrade the intersection to include a right turn bay. The works must be agreed with Council's Development Engineering Team Leader and all costs associated with the upgrade shall be met by the consent holder."*

51. As proposed, Condition 35 would require the Applicant to upgrade the intersection even if there was no quarry related traffic turning right at the intersection during the survey period.

52. The existing traffic volume on Kaipaki Road near Mellow Road is 2,100veh/day with Mellow Road carrying 1,100veh/day. In discussing the concerns raised by the Hartstone's (non-submitter) letter, Mr Inder states:

> *"if the quarry is operating at the maximum daily trip generation of 133 HCV per day, it is very unlikely there will be any more than 20 movements per hour added to Mystery Creek Road. As mentioned, the addition of 10 truck movements in each direction per hour will have negligible effects on traffic performance at the intersection or during events."*[18]

53. Mr Inder's 20HCV/hour is based on the quarry generating 133HCV/day which is the daily peak so should be considered a worst case. The effect of the Applicant's Proposed Condition 34(ii), which limits trips to an average of 106HCV/day, is that peak generation cannot be sustained for long periods. For example, for every day the Project generates 133HCV/day there needs to be a day with 79HCV/day or less for the quarry to comply with that condition. At 106HCV/day the peak hour could be 16HCV/hour (15% peak hour) (eight HCV in each direction).

[18] BBO Peer Review, Section 5 (page 5)

54. The existing commuter traffic turning right from Kaipaki Road into Mellow Road is likely to exceed the 8veh/hr trigger for a right turn bay. Assuming a 12% peak hour traffic volume of 315veh/hr on Kaipaki Road with a conservative estimate of 50% travelling north and 25-50% turning right into Mellow Road, the existing peak turning volume would be 40-80veh/hr. With 100% of quarry trips turning at the intersection the quarry is expected to contribute an average of 8veh/hr, or an additional 10-20%. Requiring the quarry to provide a right turn bay at this intersection is disproportionate to the potential adverse effect associated with their contributing traffic volume.

55. In the past five years there have been two minor injury rear-end type crashes. One where a motorcyclist was stuck by a car following too close with dazzling sun listed as a factor. The other involved a driver following too close while being distracted by a navigation device. Neither fog nor wet weather were identified as factors.

56. Using the NZTA Monetised Benefits and Costs Manual, the cost of the two minor injury rear-end (slow vehicle) crashes is approximately \$70,000.[19] Assuming a benefit-cost ratio of 4 is required as a trigger, an investment of \$17,500 is appropriate. This is significantly less that the costs for a right-turn bay.

57. A right-turn bay would provide a space for turning vehicle to wait clear of following vehicles. To avoid a crash a following driver would need to observe and react to a stationary vehicle. This is referred to as the stopping sight distance ("SSD"). Using Council's online maps, I have measured the available sight distance to the rear of a stationary truck waiting to turn right into Mellow Road as approximately 160m. This is illustrated on Figure 2 below. The existing curve radius of Kaipaki Road at the intersection with Mellow Road is approximately 350m, which is

[19] NZTA Monetised Benefits and Costs Manual, Table A26: \$32,000 (\$2015) x 1.09 (update factor) = \$34,880/crash

equivalent to a design speed of approximately 85km/h (based on side friction of 0.12 and 5% superelevation).[20] Austroads states the SSD for a 90km/h design speed as 139m.[21]

58. In conclusion, the available SSD for vehicles on Kaipaki Road approaching the intersection with Mellow Road of 160m exceeds what is required for the 90km/h design speed of the curve. Therefore, it is my opinion that there is a low risk of rear-end crashes occurring as the result of no right-turn bay. As such, I do not consider a right turn bay to be necessary in the circumstances.

Figure 2: Approximate sight distance to a stationary vehicle waiting to turn right into Mellow Road

59. I do not support Council's Proposed Condition 35 requiring monitoring at this intersection because:

(a) Trip distribution for the quarry is influenced by the nature, location and scale of activities that require sand or disposal of cleanfill material.

(b) The proposed trip generation conditions limit the maximum number of vehicles from the quarry which also limits trips through the Mellow Road / Kaipaki Road intersection.

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[20] Austroads Guide to Road Design Part 3: Geometric Design, Section 7.6 Side Friction and Minimum Curve Size.

[21] Austroads Guide to Road Design Part 3: Geometric Design, Table 5.5 Stopping sight distances for cars on sealed roads.

(c) The quarry traffic is likely to represent a small portion of traffic turning right during peak periods, and requiring the quarry to bear the entire cost of a right turn bay on Kaipaki Road is disproportionate to the Applicant's contributing traffic volume.

(d) There is sufficient SSD for a following vehicle on Kaipaki Road to avoid a rear-end crash with a stationary truck at the Mellow Road/ Kaipaki Road intersection.

(e) The condition as proposed by Council would require the Applicant to upgrade the intersection even if there was no quarry related traffic turning right at the Mellow Road/ Kaipaki Road intersection during the survey period.

Use of McEldownie Road and Mystery Creek Road (south of Mellow Road)

60. The BBO Peer Review recommends that *"No quarry related trucks shall use McEldownie Road and the south end of Mystery Creek Road."* This has been adopted by Council as Proposed Condition 30. However, no reasons are provided for this proposed condition.

61. Route selection by individual drivers is not within the Applicant's control as the individual drivers are not engaged/ employed by the Applicant, but by the consumer.

62. If Council's Proposed Condition 30 on this matter was adopted, it would not be possible for the quarry to supply sand or take cleanfill from any of the properties on these two roads.

63. The section of Mystery Creek Road between Mellow Road and McEldownie Road is a local road and is estimated to carry 1,800veh/day including 10% HCV.[22] McEldownie Road is also a local road carrying 1,000veh/day including 10% HCV, except that north-east of the

[22] Mobileroad.org

intersection with Mystery Creek Road, the road is unsealed and the traffic volume reduces to 30veh/day. Mobileroad.org indicates that the sealed sections of these roads are 6m wide. A carriageway width of 6m is sufficient for two opposing vehicles to pass.

64. I acknowledge that it is not desirable for high numbers of heavy vehicles to use these roads due to the comparatively narrow sealed width[23] and position in the road hierarchy. I do not consider this proposed condition necessary.

Heavy Vehicle Impact Fee (HVIF)

65. I have reviewed the BBO Peer Reviewer's comments on the heavy vehicle impact assessment. Our updated assessment is provided at **Attachment 2** to my evidence. This includes changes to reflect the amended operational parameters for the Project, being the:

(a) 15 year duration;

(b) Likely economic sand quantity to be extracted over the lifetime of the quarry as 900,000m;[24]

(c) 276 working days (not 250 days); and

(d) Change in directional split.

66. Our previous assessment in the ITA included separate HVIF calculations for sand and cleanfill trips. This effectively double counted the pavement impact for the activity. The HVIF calculations should consider the pavement impacts on the "worst lane" which then sets the HVIF required

[23] Mobileroad.org states that the sealed width of Kaipaki Road is 7m and 12.5m on Mystery Creek Road (north of Mellow Road)

[24] While the Applicant's Consent Conditions set the maximum volume of sand from the site in any 12-month period at 200,000m^3, and that the consent duration is for 15 years, I am advised that the geotechnical data and assessment (at Appendix C to the AEE) indicated an economic sand resource on Site of around 900,000m.[3] The Applicant is required to record the quantity of sand extracted monthly (Proposed Condition 32). The Applicant's Proposed Conditions includes a method for review of the HVIF if the sand quantity extracted exceeds 900,000m^3.

which is based on rehabilitation of the entire pavement width, not just one direction.

67. The trips related to importation of cleanfill are expected to be less than or equal to the trips related to sand extraction. For this reason, I consider that the HVIF should be based on trips related to sand extraction. The Applicant's Proposed Condition 32 requires annual reporting of sand and cleanfill quantities. These reports can be used by Council to confirm that sand extraction remains the dominant activity and that the assumptions remain valid.

68. I have revised the calculation of the HVIF based on the sand extraction scenarios presented by Mr Inder. Table 2 presents our revised calculation with a comparison to Mr Inder's assessment. We note the minor difference in results is likely related to cumulative rounding errors. The difference is less than one cent per tonne.

Table 2: Comparison of Heavy Vehicle Impact Fee Assessments

Scenario	Duration	HV/day	BBO Peer Review $/t (pre FAR)	Gray Matter $/t (pre FAR)
900,000m^3 with 70% south	7 years	62	0.055	0.054
900,000m^3 with 80% north	7 years	62	0.097	0.093
900,000m^3 with 80% north	15 years	29	N/A	0.093

69. Mr Inder's calculations for the 2,200,000m^3 quantity of sand were based on an activity duration of 11 years and an average of 97 HV/day. Applying the 900,000m^3 over a 15 year activity duration results in an average of 29 HV/day and an HVIF contribution rate of $0.093/t (pre-FAR). When the Waka Kotahi Financial Assistance Rate ("FAR") is taken into account the HVIF contribution is $0.046/tonne.

SUBMISSION OF KEITH AND AMANADA WALKER

Concerns

70. The Walker's submission seeks a range of additional mitigation. The submission seeks:

(a) A right turn bay for traffic turning into the Site;

(b) A reduced speed limit along that section of Kaipaki Road extending 500m to the east and 1200m to the west;

(c) Double yellow no overtaking lines along Kaipaki Road extending along the area of reduced speed as above;

(d) An acceleration and deceleration lane for heavy vehicles to the Site;

(e) A redesign of the entry to the Site to provide a safer access and reduce conflict with other traffic;

(f) The Site gates moved 100m further into the Site to ensure there is sufficient parking for trucks that arrive earlier than the opening time; and

(g) No parking signs along Kaipaki Road for at least 500m in each direction.

71. The Stantec Peer Review raises safety concerns with:

(a) The previously proposed Diagram E treatment. This has been changed to a right-turn bay;

(b) Integration of the residential access;

(c) Overtaking risk; and

(d) Heavy vehicle acceleration and deceleration.

72. I deal with these issues raised by and on behalf of the Walker's below.

Right-Turn Bay and Auxiliary Lanes

73. Mr Apeldoorn raises concerns with the left-in vehicle tracking and the shoulder widening proposed as part of the previously recommended Diagram E treatment. As a result of the change to a right-turn bay this widening has been removed and limited to the minimum widening necessary to provide for heavy vehicle tracking.

74. The Walker's have requested acceleration and deceleration lanes. I am concerned that a heavy vehicle turning left-into the Site from a wide shoulder or deceleration lane will shadow a following vehicle which could lead to a crash between a northbound vehicle and a vehicle exiting the quarry. Mr Inder also notes that auxiliary lanes can lead to safety issues where large trucks are present. The consequence of vehicles turning left from the through lane is a short delay to the following vehicles, the likelihood of this occurring reduces if the dominant movement is to/from the north. If 80-100% of trips are to/from the north, the left-in movement would be 0-10veh/day which is significantly lower than the 37veh/day expected in the ITA. I do not consider that acceleration or deceleration lanes are required for the Project.

No-overtaking lines

75. As discussed at paragraph 41 of my evidence, the right-turn bay concept includes extending no-overtaking lines from the vehicle crossing to connect with the existing no-overtaking lanes to the north. No-overtaking lines associated with the right-turn bay will extend 80m south of the crossing plus an additional 100m of advanced warning (dashed) lines. The advance lines will start approximately 180m north of the horizontal curve.

76. No-overtaking lines (solid yellow lines) are a regulatory marking which instructs road users by prohibiting a specific action. The criteria for

installing them is described in Manual of Traffic Signs and Markings (MOTSAM), Part 2: Markings, Section 2.05 and is provided below 3.

(b) Application:

(i) No-overtaking lines shall be used:

1 on the approaches to raised traffic islands and medians that separate opposing traffic flows *(Refer to Section 2.08.02)*,

2 on the approaches to hazards or obstructions located within a carriageway and which separate opposing traffic flows *(Refer to Section 5.03.02)*,

3 on the approaches to railway level crossings, and

4 as centrelines on undivided four lane rural roads.

(ii) No-overtaking lines may be used:

1 where it is considered necessary to prohibit overtaking because drivers may not be aware of visibility restrictions caused by vertical curves,

2 as remedial measures on lengths of roads with proven overtaking accident histories, and

3 as centrelines on multi-lane undivided urban roads.

Figure 3: Application of No-overtaking Lines[25]

77. I do not consider it necessary to extend the solid no-overtaking lines further south and around the horizontal curve as their installation would be inconsistent with the MOTSAM guidance which specifically refers to vertical curves. None of the other situations where no-overtaking lines are to be used apply as:

(a) There are no obstructions or hazards within the carriageway;

(b) There are no visibility restrictions due to vertical curves; and

(c) There is no history of overtaking accidents.

Vehicle Crossing Design

78. As discussed at paragraph 43 of my evidence, I consider the vehicle crossing layout within the Site appropriate for the proposed activity. The

[25] MOTSAM Part 2: Markings, Section 2.05.01(b)

detailed design safety audit provides an opportunity for the vehicle crossing layout and alignment to be reviewed and refined prior to construction.

79. Mr Apeldoorn[26] raises concerns with the location of the residential access within the vehicle crossing. The residential dwelling is likely to generate approximately 10veh/day and 1-2veh/hr entering the driveway. On average the quarry will generate 12HCV/hr[27] entering and exiting the Site, or one heavy vehicle every five minutes. The likelihood of a heavy vehicle entering while the light vehicle is waiting to access the residential dwelling is very low.

80. The risk of conflict would be reduced if the residential access were located 30m from Kaipaki Road – providing 5m queuing space for the vehicle plus 25m for a heavy vehicle. This could be reviewed and refined during detailed design and considered during the detailed design safety audit.

81. The Walker's seek that the quarry gate is located 100m further info the Site. As set out above the Project has been revised to include sealing the access for 300m from Kaipaki Road and locating the gate at end of the sealed access.

82. Appropriate design and construction, subject to Council authorisation, will manage the risks of pavement issues at the vehicle crossing. Any issues with maintenance of the vehicle crossing due to heavy vehicle loading/ turning would fall to the Applicant, not Council.[28]

Parking Restrictions

83. The Traffic Control Devices Manual, Part 13 Parking Control, sets out the requirements for parking control. In this situation where there is no kerb

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[26] Stantec Peer Review, Section 2.7 Integration with Residential Access.
[27] 106HCV/hr x 12% peak hour = 12HCV/hr (or 6HCV entering + 6 HCV exiting
[28]Stantec Peer Review, Section 2.7 Integration with Residential Access.

on Kaipaki Road, erecting no parking signs by themselves is not sufficient to prohibit parking on Kaipaki Road. Instead both no stopping lines and no stopping signs are required (as illustrated in the Traffic Control Devices Manual, Part 13 Parking Control, Figure 6.3).

84. The Site has sufficient space for onsite parking and manoeuvering to take place without impacting on Kaipaki Road. I am aware that some quarries with large supply contracts have resulted in off-site parking prior to the site opening. I understand that the quarry currently has no large supply contract and there is no reason to expect off-site effects. The proposed gate will be located 300m from Kaipaki Road which is sufficient to accommodate parking for approximately 10-12 heavy vehicles. I do not consider it necessary to mark no stopping lines or erect no stopping signs on Kaipaki Road.

Speed Limit

85. As stated in the ITA (Section 2.2, page 5) *"The NZ Transport Agency's (NZTA's) Safer Journeys Risk Assessment Tool indicates the Safe and Appropriate Speed for the full length of Kaipaki Road is 80km/h."* Reducing the speed limit is likely to reduce the severity of crashes should they occur and reduces the likelihood of a crash occurring. I support a lower speed limit on Kaipaki Road. However, only Council can implement a change to the Speed Limits Bylaw through the processes set out in the Local Government Act 2002. I understand that changes in speed limit cannot be imposed as a condition of consent through the Resource Management Act 1991.

SUBMISSION OF ROB AND DEBBIE COMEZ

Concerns

86. Rob and Debbie Comez list three transport related issues in their submission. The Submission seeks that the resource consent require:

(a) No engine braking from trucks at, or approaching, the Site entrance;

(b) The implementation of a traffic management plan for peak times at the Quarry between 6am-8am and 3pm-5pm;

(c) That if the road is to be widened, that the power pole opposite the entrance be moved.

87. I respond to these issues below.

Engine Braking

88. The Land Transport Act 1998only allows road controlling authorities to prohibit or restrict engine braking through a bylaw where the permanent speed limit does not exceed 70km/h.[29] The speed limit on the surrounding road network is 100km/h and it will not be possible to introduce an enforceable bylaw for engine braking restrictions.

89. Under the New Zealand Road Code, heavy vehicles are restricted to a maximum speed of 90km/h. Good practice road design allows for vehicles to be travelling 10% above the speed limit and therefore a 100km/h vehicle speed is a reasonable assumption for heavy vehicles. Based on the Austroads Design Guide[30], The stopping sight distance for heavy vehicles at an operating speed of 100km/h is 191m, this sight distance is achieved for an approaching driver. Therefore, I do not consider that engine braking will be necessary by vehicles accessing the Site.

90. With Council's agreement, it may be possible to introduce an advisory engine braking sign reading *"Heavy vehicles please no engine braking next [distance] km".* However, in my opinion there will be no need for truck

[29] Land Transport Act 1998, s22AB (1) (e)
[30] Austroads Design to Road Design Part 3: Geometric Design, Table 5.6

drivers to engage the engine brakes and compliance with such a sign would be voluntary.

Traffic Management Plan for Quarry Activities

91. The Comez's submission also seeks that a traffic management plan be implemented for peak times at the quarry between 6am-8am and 3pm-5pm. I am not aware of other quarries that are required to implement a traffic management plan during peak periods. Nonetheless, I note that quarry operators have very little control over the timing of vehicle movements at the site. It is likely that there may be days when there are very few movements during the peak periods on Kaipaki Road.

92. In my opinion, the NZTA Code of Practice for Temporary Traffic Management ("CoPTTM") provides best practice guidelines to operate temporary traffic management. The Principles[31] include that Temporary Traffic Management ("TTM"):

    (a) Must be fit for purpose, suitable for the nature and duration of the work, installed, set up, and used correctly.

    (b) Clear and positive guidance must be provided for road users approaching, travelling through and exiting the worksite.

93. Erecting traffic management when there is low or no activity at the access provides a false message to drivers and increases the likelihood of non-compliance with temporary traffic management measures at active worksites. In my view erecting traffic management at the Site access would be inconsistent with the Principles of CoPTTM and is therefore neither necessary, nor appropriate.

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[31] CoPTTM, Section A3 Principles

Power Pole Relocation

94. The proximity of the power poles to the carriageway has been considered in the right-turn bay concept (**Attachment 1** to my evidence) and will be further considered during detailed design and the safety audit. I recommend that "details of existing services" be added as an additional bullet point to the proposed detailed design condition so that it is specifically considered at the time of design.

SUBMISSION OF THE NZ NATIONAL FIELDAYS SOCIETY INC AND KAIPAKI PROMOTIONS LIMITED ("THE SOCIETY")

95. The Society is concerned about the impact of quarry related traffic on events at Mystery Creek.[32] For large events, such as Fieldays, there is significant temporary traffic management used on Mystery Creek Road and SH21 to manage the significant increase in traffic and access to the parking areas. I would expect experienced transport operators to avoid Mystery Creek Road due to the risk of delays associated with the temporary traffic management implemented for large events. Mr Inder supports this view.

96. Many events at Mystery Creek Events Centre are held over weekends. For example, the recent Motorhome, Caravan and Leisure Show[33] was held from Friday 9 to Sunday 11 October 2020. The quarry would only be open on Friday and Saturday morning, meaning there would be no quarry traffic passing the Site on Saturday afternoon or Sunday.

97. As set out in the ITA,[34] Mystery Creek Road is a minor arterial. While the District Plan does not provide a definition for 'Minor Arterial', other District Plans and guidance documents provide the following definitions:

    (a) NZS 4404: 2010 Land Development and Subdivision Infrastructure (C3.2.4.2)

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[32] Submission of the Society, para 5.4.4 and para 5.4.6

[33] https://nzmotorhomeshow.co.nz/

[34] ITA, Table 1: Traffic Volumes for Road Network

Minor Arterial: A road that provides access between connector / collector and minor arterial roads. Minor arterial roads have a dominant through vehicular movement and carry the major public transport routes. Access to property may be restricted and rear servicing facilities may be required. Urban traffic volumes are typically 8,000veh/day to 20,000veh/day and rural from 1,000 to 5,000 veh/day with a higher proportion of heavy vehicles. Typical urban operating speed are 40 to 60km/h and rural 80 to 100km/h.

(b) Hamilton City Operative District Plan[35]

A 'minor arterial' transport corridor's principal function is the movement of high levels of goods and people between parts of the City. Heavy freight distributing goods to parts of the City may use these corridors. Through-traffic moving between parts of the City may use these corridors. Property access is managed. Intra-city passenger transport services are likely to use these routes.

98. The One Network Road Classification ("ONRC")[36] identifies Mystery Creek Road, Kaipaki Road and Mellow Road as Primary Collector routes. Primary Collectors are described as:

(a) Primary Collector: These are locally important roads that provide a primary distributor/collector function, linking significant local economic areas or areas of population. They may be the only route available to some places within the region and in urban areas they may have moderate passenger transport movements and numbers of cyclists and pedestrians using the road.

(b) These roads need to meet at least one of the following movement criteria: carrying >1,000veh/day or >150 heavy vehicles per day (rural).

99. Mystery Creek Road carries 2,260veh/day and 9.3% HCV (or 210 HCV/day) which is consistent with level of movement expected through the definitions for a minor arterial and primary collector road. It meets both of the ONRC traffic volume criteria. I consider that the use of

[35] Hamilton City Operative District Plan, Volume 2, Appendix 15 Transportation, Section 15-4 Transport Corridor Hierarchy Plan and Definitions.
[36] https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/projects/onrc

Mystery Creek Road by quarry traffic is consistent with its movement function.

100. The Applicant's Proposed Conditions will limit the trip generation of the site to an average of 106HCV/day of which the ITA expects 20% (or 21HCV/day) to use Mystery Creek Road. An increase of 21HCV/day represents a 0.9% increase in trips. The BBO Peer Review (Section 5) considers scenarios where 80%-100% of quarry traffic uses Mystery Creek Road, or 85-106HCV/day. If all trips from the quarry used Mystery Creek Road the traffic volume would increase by 4.7%.

101. Typically, traffic volumes can vary 10-20% due to factors like day of week, school holidays and seasonal variation. In my view, it is unlikely that an increase in volume by less than 5% will be noticeable on Mystery Creek Road. This is consistent with the view expressed by Mr Inder.

102. I disagree with the Society[37] that *"the modern way of transporting sand is not only by truck and trailer but by large four-wheel drive tractor and tip trailers …."* In my experience the primary delivery vehicles are truck and trailer units or 6-wheel trucks. The use of tractors and tip trailers is generally limited to carting of material within a construction site or over short distances of public road to access different parts of very large construction sites. These vehicles would be subject to the same weight limits as truck and trailers, and in my view the effects on the pavement are unlikely to be different to transport by trucks.

CORRESPONDANCE FROM HELEN AND WARWICK HARTSTONE, 531 MYSTERY CREEK ROAD

103. I understand that the Hartstone's are not submitters. Nevertheless, I address their concerns as their email has been included at Appendix 4 to the s 42 A report for information. The Hartstone's email (28 September 2020) requests four points of additional mitigation:

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[37] Submission of the Society, para 5.4.10

(a) The extension of the double yellow lines on Kaipaki Road from the right hand bend north of the Speake Road intersection to the bend south of the quarry entrance;

(b) The imposition of an appropriate speed restriction through the area covered by the double yellow lines;

(c) That the Applicant liaise with Cycling New Zealand to provide a safe cycleway; and

(d) That the resource consent restricts quarry operations during periods of heavy traffic flows during National events.

104. I have addressed the matter of no-overtaking lines earlier (refer paragraphs 75-77 of my evidence).

105. I have addressed the matter of a change in speed limit earlier (refer paragraph 85 of my evidence).

106. Kaipaki Road currently has 0.5m sealed shoulders and on-road cycling is not well provided for. This is an existing deficiency on much of the rural road network. As the quarry is expected to generate approximately 20HCV/hr[38] any interaction between cyclists and quarry traffic is likely to be infrequent. The Road Code[39] provides guidance for drivers on how to manage the interaction between heavy vehicles and cyclists.

107. I am not aware of other quarries that have conditions limiting their operations due to other events on the transport network. As discussed in paragraph 95 of my evidence, I expect transport operators to avoid Mystery Creek Road during large events. The Applicant has offered a condition that restricts quarry activity during the Fieldays event.

[38] BBO Peer Review, Section 5
[39] https://www.nzta.govt.nz/roadcode/heavy-vehicle-road-code/road-code/sharing-the-road/sharing-the-road-with-cyclists/

APPLICANT'S PROPOSED CONDITIONS

108. To address concerns raised by the submitters on design of the access, I recommend the following amendments to the Applicant's Proposed Condition 36 covering detailed design matters:

> *The consent holder shall submit engineering plans detailing the vehicle crossing and proposed haul road to the Council's Manager Development Engineering for approval in a technical certification capacity in advance of any construction works being undertaken. The design should be in general accordance with <u>the concept design (Gray Matter Plan No 195_01_100_1, Sheet 1, R0) and the NZTA Manual of Traffic Signs and Markings, "Rural Right Turn Bay" Figure 3.25</u> and include:*
> *(i)*
> *(ii)*
> *(iii) Location of the proposed gate <u>(to be located approximately 300m from the edgeline)</u>*
> *(iv) etc*
> *(v)*
> *(vi)*
> *<u>(vii) Details of existing services.</u>*

109. The condition requiring a heavy vehicle impact fee should be revised to require a fee of \$0.04/tonne (taking into account the FAR of 51%).

110. I note that Council's Proposed Condition 39 incorrectly refers to \$/m^3, the units should be \$/tonne.

111. For the reasons provided earlier in this statement, I do not consider that the following conditions proposed by Council are necessary:

(a) Condition 30 relating to the use of McEldownie Road and Mystery Creek Road south of Mellow Road;

(b) Condition 31(g) relating to the realignment of the internal access road;

(c) Condition 31(h) requiring an electronic warning sign; and

(d) Condition 35 requiring monitoring and upgrade of the Mellow Road/ Kaipaki Road intersection.

CONCLUSION

112. In summary:

(a) The Project will generate an average of 106HCV/day with daily peaks of 133HCV/day over the 15 year life of the quarry;

(b) The potential for adverse effects at the vehicle crossing are mitigated by upgrading to a right-turn bay and consent conditions limiting trip generation;

(c) The detailed design safety audit provides the appropriate opportunity for the vehicle crossing layout and alignment to be reviewed and modified prior to construction;

(d) The HVIF should be paid at a rate of $0.04/t.

113. I confirm the conclusion of my ITA that subject to conditions relating to limiting the quantity of sand extracted and heavy vehicle trip generation, upgrading the vehicle crossing and internal access, and payment of a financial contribution, the traffic effects on the surrounding environment are expected to be acceptable.

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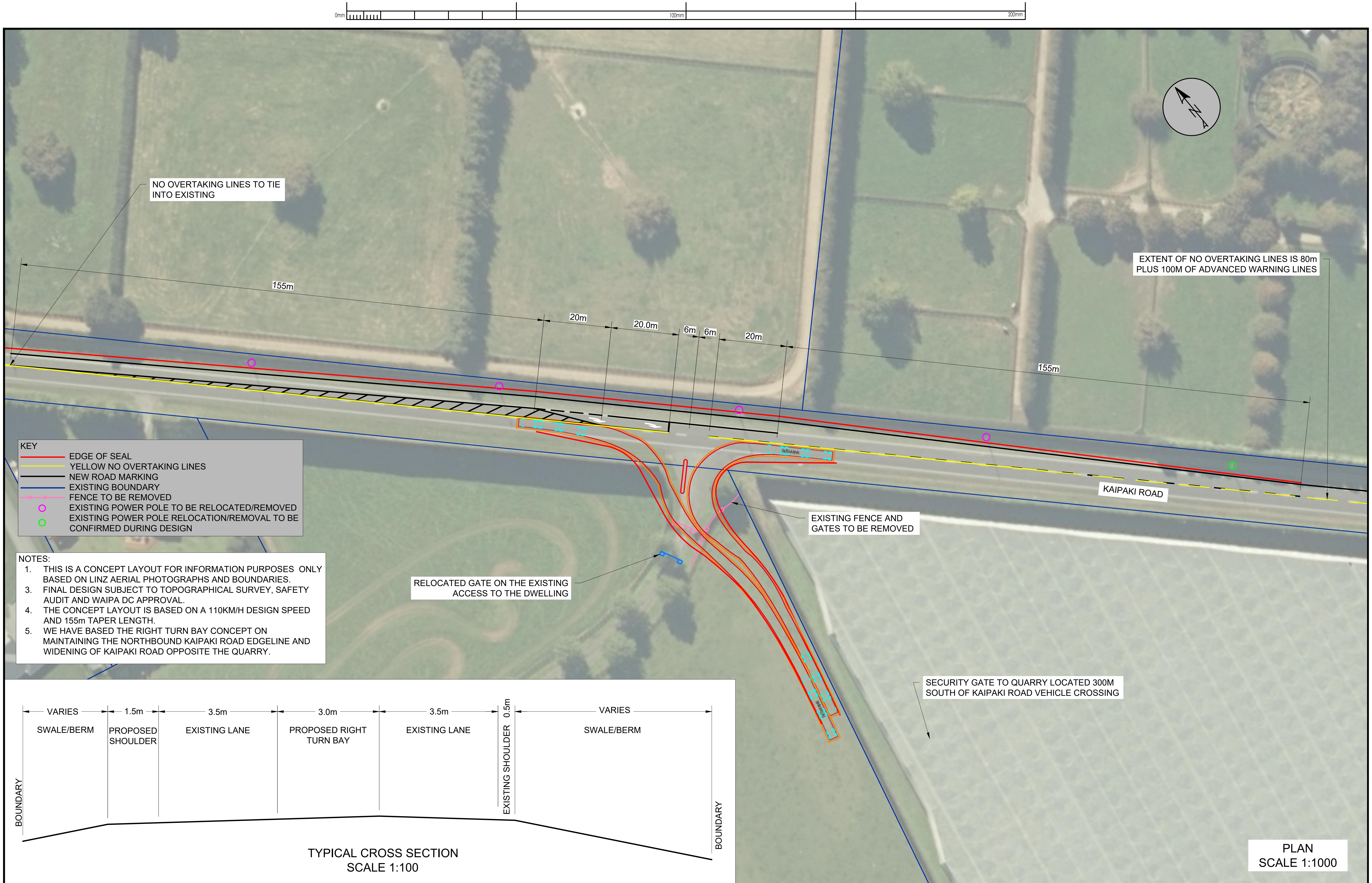
Alastair Black
Dated 6 November 2020

Attachment 1: Proposed Right-Turn Bay Concept



NOTES:

1. THIS IS A CONCEPT LAYOUT FOR INFORMATION PURPOSES ONLY BASED ON LINZ AERIAL PHOTOGRAPHS AND BOUNDARIES.
3. FINAL DESIGN SUBJECT TO TOPOGRAPHICAL SURVEY, SAFETY AUDIT AND WAIPA DC APPROVAL.
4. THE CONCEPT LAYOUT IS BASED ON A 110KM/H DESIGN SPEED AND 155m TAPER LENGTH.
5. WE HAVE BASED THE RIGHT TURN BAY CONCEPT ON MAINTAINING THE NORTHBOUND KAIPAKI ROAD EDGELINE AND WIDENING OF KAIPAKI ROAD OPPOSITE THE QUARRY.

TYPICAL CROSS SECTION
SCALE 1:100

SECTION

PROPOSED RIGHT TURN BAY CONCEPT PLAN AND TYPICAL SECTION

REF	AMENDMENT	APP'D	DATE

	BY	CHECKED	DATE
DESIGN	----	----	----
DRAWN	RM	----	NOV 20

COMPLETE QA REVIEW & CHECK
STAMP TO REMAIN UNTIL APPROVED FOR RELEASE

RECOMMENDED ---- 00/00/00 DATE

APPROVED ---- 00/00/00 DATE

OFFICE: gray matter

CLIENT: SHAWS PROPERTY HOLDINGS LTD

PROJECT: 928 KAIPAKI ROAD, CAMBRIDGE
PROPOSED SAND QUARRY

SHEET TITLE: PROPOSED RIGHT TURN BAY CONCEPT
PLAN AND TYPICAL SECTION

DRAFT

STATUS: FOR INFORMATION ONLY

GEODETIC & VERTICAL DATUM: -

PLAN NUMBER: 195_01_100_I

SHEET: 1

SCALE: AS SHOWN(@ A3)

REVISION: R0

COMPLETE DRAWING CHECKLIST & CHECK
STAMP TO REMAIN UNTIL APPROVED FOR RELEASE
ORIGINAL SIZE A3

CAD FILE RIGHT-TURN BAY-3-11-2020.DWG

ATTACHMENT 2: REVISED HEAVY VEHICLE IMPACT FEE (HVIF)

LUC0015/16 Sand Quarry, 928 Kaipaki Road - Assessment of Pavement Impacts

Waipa District Council Methodology, Proposed District Plan Rule 18.4.2.14

Updated figures in Red

	Current Traffic Volume	%HCV	Baseline HV	Road length	Direction factor	Pavement life	HVs in each lane	ESAs/ HVAG	NHVAG	ESA/ vehicle	DESA [F]
	vpd		HCV/day	(km)		(yrs)	365day/yr				
10% SH3, 70% SH21, 20% Camb											
Kaipaki Road (west to McEldownie)	3200	10.2%	326.4	2.3	0.5	40	59,568	0.6	2.4	1.44	3,431,117
Kaipaki Road (McEldownie to Mellow Road)	2100	9.3%	195.3	1.3	0.5	40	35,642	0.6	2.4	1.44	2,052,994
Kaipaki Road (Mellow Road to Tarr Road)	2100	9.3%	195.3	1.8	0.5	40	35,642	0.6	2.4	1.44	2,052,994
Kaipaki Road (Tarr Road to SH3)	1900	9.3%	176.7	3.8	0.5	40	32,248	0.6	2.4	1.44	1,857,470
Mellow Road (north)	1100	7.1%	78.1	0.75	0.5	40	14,253	0.6	2.4	1.44	820,987
Mystery Creek Road (to SH21)	2260	7.1%	160.46	3.6	0.5	40	29,284	0.6	2.4	1.44	1,686,756
Kaipaki Road (east to Cambridge Road)	3200	10.2%	326.4	3.9	0.5	40	59,568	0.6	2.4	1.44	3,431,117

	Proportion	Proposed Development Traffic: Additional traffic	Direction factor	Activity Duration	HVs in each lane	ESAs/ HVAG	NHVAG	ESA/ vehicle	DESA [G]
	29	HCV/day		(yrs)	276				
					days/year				
Kaipaki Road (west to McEldownie)	80%	**23.2**	0.5	15	3,202	0.6	3	1.8	86,443
Kaipaki Road (McEldownie to Mellow Road)	80%	**23.2**	0.5	15	3,202	0.6	3	1.8	86,443
Kaipaki Road (Mellow Road to Tarr Road)	10%	**2.9**	0.5	15	400	0.6	3	1.8	10,805
Kaipaki Road (Tarr Road to SH3)	10%	**2.9**	0.5	15	400	0.6	3	1.8	10,805
Mellow Road (north)	70%	**20.3**	0.5	15	2,801	0.6	3	1.8	75,638
Mystery Creek Road (to SH21)	70%	**20.3**	0.5	15	2,801	0.6	3	1.8	75,638
Kaipaki Road (east to Cambridge Road)	20%	**5.8**	0.5	15	800	0.6	3	1.8	21,611

	Renewal cost ($/km)	Financial Contibution
	$ 350,000	
Kaipaki Road (west to McEldownie)	$ 805,000	$ 19,783
Kaipaki Road (McEldownie to Mellow Road)	$ 455,000	$ 18,384
Kaipaki Road (Mellow Road to Tarr Road)	$ 630,000	$ 3,298
Kaipaki Road (Tarr Road to SH3)	$ 1,330,000	$ 7,692
Mellow Road (north)	$ 262,500	$ 22,144
Mystery Creek Road (to SH21)	$ 1,260,000	$ 54,076
Kaipaki Road (east to Cambridge Road)	$ 1,365,000	$ 8,544

Total Cost	$/t
$ 133,921	0.093

Quantity (m^3)	900,000
Conversion factor	1.6
Quantity (tonne)	1,440,000

Annual cost $ 8,928.09

With FAR	51%
Cost per tonne	$ 0.046
Annual cost	$ 4,374.77

Rule - Determination of the maximum amount of financial contribution

18.4.2.14 The maximum amount of financial contribution for traffic and pedestrian routes that may be taken shall be determined on the basis of the following:

$[(G)/[(F) + (G)]] x (H)

where:

F = the volume of vehicular traffic (measured in equivalent standard axles for a 40 year design period) currently using routes that will require construction, upgrading or earlier renewal as a consequence of the development.

G = the volume of heavy vehicular traffic (measured in equivalent standard axles for a 40 year design period) directly attributable to the development.

H = the cost of construction, upgrading or renewal of traffic and pedestrian routes as a consequence of the development.

Advice Notes:

1. The fee will be charged as a lump sum where the activity is expected to continue for less than three years. Where the development activity is expected to continue for longer than three years, the fee may by agreement be allocated on the basis of a unit rate related to the materials transported.
2. In respect of the Significant Mineral Extraction Zone only - Council, at its sole discretion, may accept any monetary value of financial contribution required, as a supply of aggregate for Council use up to the equivalent monetary value at the market rate at time of calculation.

Assumptions and Notes:

- Based on 900,000m^3 over 15 years, operating 276 days per year with an average load of 15m^3 per HV = 29 HV/day

- A conversion factor of 1.6t/m^3 has been used to calculate the sand quantity in tonnes.