PO Box 3737
Richmond 7050
Tasman District
M +64 (0) 21 243 1233
E+gary.clark@traffic-concepts.co.nz

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Mark Lile
Landmark Lile Limited
PO Box 343
Nelson 7040

Dear Mark

Private Plan Change 28
Maitahi Bayview – Further Information (Transport)

Following on from your instructions, development discussions, review of the matters raised in Council's RFI and meeting with Council's traffic consultant, I have the following information to address matters raised in Council's Request for Further Information (RFI) letter dated 4 June 2021.

1. Introduction

Nelson City Council have received a Private Plan Change Request (PPCR) to the east of the current city centre.

The PPCR change area has a total land area of around 287 hectares. The PPCR area is located very close to the Nelson central area, which provides an excellent opportunity to encourage walking/cycling and passenger transport as a preferred transport mode. There will also be a variety of section types which will allow a cross section of the community to live and play in the PPCR area. It is thought the PPCR area, once completed will have around 750 homes. The development of the land will be completed over several stages and will gradually move up the Kaka Valley and separately along the Malvern Hills.

Council have considered the PPCR and requested further information on a number of specific transportation related matters. These are set out in the RFI letter with items 26 through to 33.

2. RFI Matters

This section provides responses to the different matters raised by Council in their RFI. The responses are set out in the order they were raised with extracts from the RFI to assist with the context of the response. Council added helpful feedback on why the information was sought, which hasn't been repeated below, but is in the RFI letter. It should be noted that there was some repetition in some of the individual items within the RFI.

2.1. Transport Item 26

Council has sought more information around the study area that formed the analysis for the transport assessment. Their request was as follows:

> *Please define the study area for the transport assessment*

Attached to this response is a figure page that shows the study area that was considered as part of the PPCR.

2.2. Transport Item 27

Council has requested the following:

> *Please provide an updated Structure Plan that includes a network of other roads that will support the 4.5km long spine road, including to demonstrate the achievability of community connections.*

In the stated Reasons for this request the Council state that the hierarchy and form of the spine road is not defined. The indicative road connecting Ralphine Way with the northern end of the site is identified on the Maps B4.

The RFI has however correctly noted that the hierarchy of connecting would need to elevate. In response to that, Map B4 has been amended and now show Ralphine Way as a "sub collector" and the internal linking road from Bay View Road into the Kaka Valley would also be a "sub collector" road. There is also a need to change the section of Maitai Road and Maitai Valley Road from Ralphine Way to Nile Street East to a "sub collector" as well.

With regard to other new internal roads within the Plan Change Area, these would be of a lesser order and would typically be "Unclassified Road" as defined by the Nelson Tasman Land Development Manual (NTLDM). These will typically be "Local Road – Residential" and "Residential Lanes". This will be considered and confirmed as part of the subdivision process. Showing a full roading network within the site is considered to be unnecessary as a part of this Plan Change Process, and not provided on other approved Structure Plans in the NRMP.

As noted in the TIR, there is a potential connection off the end of Walters Bluff which would access the southern part of the ridge development. This connection has been investigated in the past and the termination of Walters Bluff suggests that this link was to be built. We understand there are some challenges with making this connection, but there is a significant benefit if this could be formed sometime in the future. Because of this the Council has identified Walters Bluff as sub collector in the draft of the Whakamahere Whakatu Nelson Plan.

2.3. Transport Item 28

Council has requested the following:

> *Please confirm the typologies of the suite of roads and lanes proposed, and their achievability, including particularly grades. It is noted that the Land Development Manual requires gradients for bus routes not be steeper than 1 in 15.*

The road typologies will be designed to meet the dimensional requirements set out in Table 4-7 of the NTLDM. All requirements of the NTLDM are expected to be achieved for most of the internal roads.

There will be some exceptions to the NTLDM due to the nature of topography which will be applied for at the time of subdivision consent. These exceptions may relate to legal road width due to terrain, as well as grade. The number of roads that do not meet the NTLDM requirements will be small and most likely limited to the connections between the ridge and the valley floor. These potential exceptions have been discussed with Council staff who have agreed that this would be considered as part of the subdivision process.

The NTLDM also allows for modified road cross sections in "Hillside Environments" to account for the more difficult terrain to construct a road within. It was mentioned in the RFI that parts of Bay View Road do not meet the NTLDM provisions. The formation width and other elements of Bay View Road do meet the important requirements set out in Table 4-7 for a sub collector in a "Hillside Environment". The only element that

does not meet the NTLDM requirements is the legal road width which has no impact on the usability of the road.

The NTLDM sets out grades for bus routes. While it is anticipated and desirable for the Plan Change Area to have public transport, there has been no confirmation of the actual future bus services. The NTLDM requires bus routes to be not steeper than 1 in 15, which is not practical in the Nelson landform.

It should be noted that there are already bus routes in Nelson that are much steeper than 1 in 15 and have not presented any impediment for the success of those routes.

Due to the topography of the Plan Change Area, it is not possible to provide roads at 1 in 15 grades and especially the connecting road from Bay View Road to Ralphine Way. This was discussed with Council staff and it was accepted that this would not be possible to provide a 1 in 15 grade. Council acknowledged that the road grades would not be an impediment to the provision of bus services, as there are bus routes in Nelson and other parts of NZ that operate on roads much steeper than 1 in 15.

2.4. Transport Item 29

Council RFI is seeking:

> *In respect of anticipated traffic generation, please provide:*
>
> *a* *Sensitivity testing of the effects of higher generation and*
>
> *b* *Mapping of the residential catchments and analysis of the data to validate the appropriateness of the assumptions made.*

Part A

As noted in the Transportation Impact Report (TIR) for the PPCR trip generation rates, around six movements per household have been used. These rates are based on surveys carried out on Bay View Road which is an isolated road catchment where the trip rate can be calculated with good accuracy.

This trip rate was accepted by Council as part of the 163-lot development at the top of Bay View Road. The traffic counts were carried out on the week of 22 July 2019 with the counter being placed outside 42 Bay View Road.

The seven-day count for the last week of July 2019 around 370 vehicles per day on the upper sections of Bay View Road with peak flows of around 35 for the morning and evening peak periods.

The traffic count data shows a distinct peak in the morning with the evening peak being more spread, which is typical of residents returning home over a longer period of time as they leave work later or carry out other tasks after leaving work.

The location of the traffic counter allowed a simple calculation to be carried out to determine the trip generation rates for the residential catchment.

The calculated trip generation rates for the homes in the Bay View Road area were around six trips per day per dwelling. The flows during the morning and evening peak periods were recorded as 0.6 trips per dwelling per hour. It should be noted that this is much lower than the NZTA trip generation rates (10.7) for residential properties.

The calculated trip had no discount for cycle and pedestrians. The location of the Plan Change Area and particularly the southern parts are likely to have a higher portion of cycling and walking trips compared to the Bay View Road traffic count data.

It is understood that Council staff have concerns about this data so further traffic counts have been taken on Bay View Road, as it provides an excellent catchment for the Plan Change Area. Bay View Road is the furthest point associated with the Plan Change Area. It is expected that this would give a higher number of vehicle trips due to it being further from Central Nelson than Kaka Valley. The northern end of The Plan Change Area (Bay View) is being less favourable to alternative transport modes.

A further traffic count was carried out from 19 July 2021 to 13 August 2021. It should be noted that the first week of the traffic counts was in the school holidays. This first week has been excluded from the trip generation analysis as it is considered not typical of the normal day to day movements. The traffic count data also included construction traffic associated with the development of the subdivision at the top of Bay View Road.

Figure 1 below shows the weekly traffic patterns along Bay View Road for July 2021.

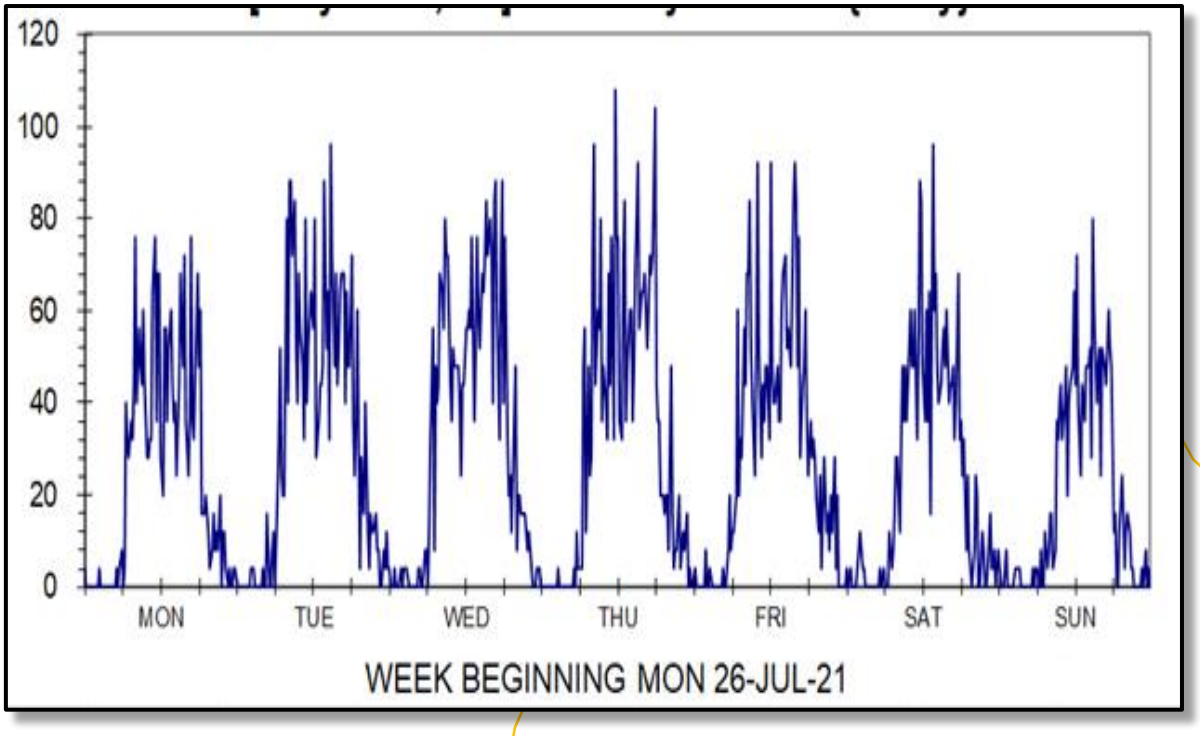

Figure 1: Traffic Count Data – July 2021

As shown the weekly flows are fairly consistent with more traffic using Bay View Road during the week. Traffic counts of the construction traffic associated with the Bay View Development were also carried out for the same time period as the tube counts. There was on average 100 vehicles trips per day during this time over the weekday. The vehicle movements of construction vehicles were recorded with a geofence around the construction site which enable count data to be collated. This accounted for around 5% of the total daily flow on Bay View Road. These flows have been taken off the analysis below.

Therefore, the more recent survey data shows around 725 vehicles per day for a five-day week (670 for AADT) with peak flows of around 65 vehicles in the AM peak and the PM peak. These overall flows are higher than those recorded in July 2019 because the counter was located closer to Atawhai Drive and therefore more homes being included in the traffic count.

The traffic patterns shown in the graph above were similar to the July 2019 survey data with more concentrated flows in the AM peak with PM (evening) flows more spread out. The two traffic counts showed good alignment in regard to the traffic patterns.

The traffic count data showed that the number of trips per dwelling per day was around 6.3. This is lower than the 6.6 trips per dwelling per day measured in July 2019. This is likely to be due to the July 2019 data including construction traffic which has been removed from the July 2021 counts. The location of the traffic counter was closer to the bottom of Bay View Road, which may also affect the trip rates.

The peak hour flows from the July 2021 traffic counts show an AM peak of 0.61 trips per household and an PM peak of around 0.50 trips per household. This would equate to around 458 trips in the AM peak and 375 trips in the PM peak for the Plan Change Area.

Based on this new trip data and proposed 750 homes, the following table provides an analysis of different traffic flows from different trip rates.

Table 1 shows the traffic flows for the different trip rates.

Trip Rate (per dwelling per day)	Number of Homes	Traffic flows
6.0 Trips	750	4,500
6.5 trips	750	4,875
7.0 trips	750	5,250
7.5trips	750	5,625
8.0 trips	750	6,000
10.7 trips (Old NZTA Rate)	750	8,025

As shown lower trip rates obviously lead to lower total and peak hour flows. Based on the traffic counts already collected in this area the conservative trip rate of seven movements per dwelling per day would be a reasonable assumption for the Plan Change Area. However, it is important to note that this trip does not account for the expected higher use of alternative modes such as walking and cycling and especially the more southern parts of the Plan Change Area. This is discussed later in the response.

Part B

The analysis of trip movements within the TIR assumed around 55% would use Maitai Valley Road, 28% would use Walters Bluff Extension and 18% would use Bay View Road. Since writing the TIR the connection from Walters Bluff has become more uncertain and therefore it is prudent to consider traffic movements on the assumption that a connection in this area can't be not built. As noted above there is a significant advantage in completing this link from a connectivity perspective and also gaining access to other parts of the road network and employment areas.

Based on this assumption and the likely routes new residents would take to access the wider road network the expected trip distribution would be around 30% of the new lots using Bay View Road and 70% of the new lots using Maitai Valley Road. This assumes there is a connecting road from the ridge into the valley. It should be noted that the connecting road will take some time to complete due to the development staging so the two catchments (Bay View and Kaka) will in effect be isolated initially. This will mean all traffic from the Bay View ridge will use Bay View Road and all traffic in the Kaka Valley will use Nile Street.

Based on the above trip distribution percentages, assumed trip rate and lot areas the expected vehicle flows (no discounting for alternative modes) using Bay View Road and Maitai Road are 1,575 vehicles per day and 3,675 trips per day respectively.

Based on the traffic counts this would equate to the following flows at peak times:

- AM peak for Bay View Road would be 168 vehicles per hour.
- PM peak for Bay View Road would be 140 vehicles per hour.
- AM peak for Maitai Road would be 282 vehicles per hour.
- PM peak for Maitai Road would be 235 vehicles per hour.

These flows have not been adjusted for cycle and walking modes. It should also be noted that the expected number of vehicle movements would be less for the Maitai Road flows due to its relative proximity to the central city.

2.5. Transport Item 30

Council seeks further information on the following:

In respect of anticipated traffic distribution, please:

A Demonstrate the viability of the expected traffic distributions, including mapping and sensitivity testing

B Provide details of anticipated walking and cycling trip distributions, as the TIR only addresses car traffic

C Address the capacity of local schools to accommodate the additional demand from new residents in the area (this should be undertaken with consultation with the Ministry of Education).

Part A

The trip distribution associated with the Plan Change Area consider the likely routes residents would use to access the wider road network and employment areas. There were four motor vehicle connections to the wider road network that were used which were Frenchay Drive, Bay View Road, a new connection via Walters Bluff and the connection from Kaka Valley.

The assessment of the trip distribution was based on the topography of the Plan Change Area and the likely route choice based on distance, ease of use and the desirability of the route. The attached plan shows the two trip distribution areas.

The Walters Bluff connection has some issues in terms of securing the route but for the purpose of the evaluation was used as it is preferred that this link is built.

Around 28% was attributed to the Walter Bluff connection, if formed. If this link road is not constructed, then this would likely lead to a 50/50 split for traffic using the connections via Maitai Valley Road or Bay View Road but will depend on the density of the development on the hill and its location.

If the Walters Bluff connection was constructed, then the expected vehicle traffic volumes (no alternative transport modes) across the three network connections would be noted below. These flows are based on seven trips per dwelling per day.

- Bay View Road – 945 vehicles per day
- Maitai Road – 2,835 vehicles per day
- Walters Bluff – 1,470 vehicles per day

The Walters Bluff connection provides an excellent link directly into the centre of the city which reduces the flows from Bay View. The TIR noted a trip distribution of 28% of the total flows being attracted to this connection. It would also open up a convenient walking and cycling connection which would result in more cycle and walking use.

Part B

The TIR deliberately only assessed vehicle trips from the Plan Change Area as a worst-case scenario in terms of vehicle movements. Traffic data from Bay View Road was used as a typical trip generation rate. Any take up of alternative transport modes would have the effect of reducing the trip rates which would have a positive effect.

Due to the uniqueness of the Plan Change Area being so close to the central area of Nelson, it is difficult to provide exact trip distributions for the cycling and walking component of the PPCR.

The only data source that can provide some reasonable approximation for the expected number of cycle and walking trips is the census data. The most recent census data has some issues in terms of participation and older census results may not pick up the more recent trends in the use of alternative modes. The data sets used for this analysis were how people travelled to work.

Interrogating the census data for 2008, 2103 and 2018 for different statistical areas around the Plan Change Area provided some interesting information. The statistical blocks that were considered included areas to the seaward side (Atawhai) separately from those on the inward side (Maitai).

The Atawhai side of the Plan Change Area showed cycle trips for traveling to work ranged from 3% up to 15% and largely depended on the proximity of the surveyed area. The walking trips ranged from 0% up to around 6%.

On the Maitai side of the Plan Change Area, as expected, showed much higher trips to work for cycling and walking. This is due to the close proximity of this side of the PPCR. The work trips that used a cycle ranged from 5% up to 20% with walking ranging from 3% through to 27%. It was noticed in this dataset that some statistical areas were more popular than others for walking or cycling.

So, from analysing the census data, it is likely that people living in the Kaka Valley are more likely to use alternative modes than those on the Atawhai side of the Plan Change Area. The Plan Change Area is likely to provide a convenient link from the southern end of the Bay View ridge down into the central city. This link will assist in alternative transport modes from the upper parts of the Plan Change Area.

For the purpose of the assessment and in responding to Council's further information, the alternative mode components of the trip distribution have been broken into two parts. This will more accurately reflect the differences in the upper and lower parts of the Plan Change Area.

The Bay View part of the PPCR is likely to have trip distribution rates of around 8% for cycling and 3% for walking based on census data. The Kaka side for the PPCR is likely to have higher cycling rates of 20% and walking rates of around 12%.

As noted above in this response, the traffic flows presented in the TIR and above did not include alternative transport modes. With the data above and the assumptions around traffic generation the following information on traffic flows can be calculated. The adjustments to the daily traffic flows are only applied to the peak flows as the census data relates to journeys to work. It is expected outside of peak times there will also be other trips that do not use vehicle trips. Accordingly, any assessment is considered to be conservative as there is no adjustment to the daily flows outside the peak hours.

Table 2 provides the calculation of the expected traffic movements generated by the PPCR on the two connecting roads at peak times.

Road	Unadjusted Vehicle Traffic Flows	Cycle Trips	Walking Trips	Peak Hour Flows	Adjusted Peak Flows (hr)
Bay View Road	1,575	8%	3%	158	140
Maitai Road	3,675	20%	12%	368	250
Total	5,250			526	390

As shown the total number of vehicle movements generated in the peak hours (discounted for alternative modes) is around 530 vehicles per day with around 250 vehicles using Maitai Road and 140 vehicles using Bay View Road.

The peak flows have been calculated by taking the rule of thumb of 10% of the daily flows occur during the peak periods. It should be noted that using the rate calculated from the traffic count data would have lower peak hour flows. The survey data had calculated peak flow rates of around 0.55 per dwelling per peak hour. This, based on 750 homes the number of peak hour trips is around 410 movements (unadjusted) compared with 526 trips. Accordingly, the analysis is expected to be conservative based on actual survey data.

These calculations are based on seven trips per dwelling per day and 30% of the traffic using Bay View Road and 70% using Maitai Road. It should be noted that no adjustment has been made for Frenchay Drive to the north of the Plan Change Area or the Walters Bluff connection should this be built. Due to the nature of that connection the expected number of vehicles using it will be low and estimated to be around 5%. This route is most likely to be used by people travelling north or possibly going to the local shops. It is unlikely to be used to gain access to the central city. For this reason, the traffic

distribution has not included an adjustment for this route. Ignoring these flows/trip distributions has no material effect on the calculations above.

Part C

Council is seeking consultation with the Ministry of Education around the capacity of school to accommodate the new demands. No response to this request is provided as it is not a matter for the PPCR. Ministry of Education will do their school planning based on plan changes, population demand, census data and other factors for programming.

2.6. Transport Item 31

Council has requested further information on the following:

> *In terms of the walking and cycling network and connections shown on the Structure Plan, please address:*
>
> *A The achievability of the links, particularly in terms of grades.*
>
> *B Linkages to the established network beyond the site with they are proposed to connect.*
>
> *C The need (or otherwise) for the existing links to be strengthened*
>
> *D Quantification of walking and cycling numbers and distributions (as per earlier questions)*
>
> *E A hierarchy of walking and cycling routes.*

These are discussed below.

Part A

The structure plan provides a high-level approach to where cycle and pedestrian linkages may be formed. The level of detail is appropriate for a PPCR. The indicative walkways/cycleways show the intent, not necessarily the final or precise locations and so some flexibility is available. The detailed design as part of the subdivision consent process, which will better define the location, widths and grades of the new linkages. These will be designed to meet the NTLDM where possible and in discussion with Council staff at the time of applying for subdivision consent.

Part B

While this matter is also considered to be part of the subdivision process as it will relate to design and location, the following potential options are provided below to assist Council advisors of the possible routes.

- From the bottom of Kaka Valley through Dennes Hole to Maitai Road.
- Down Ralphine Way across Gibbs and Jenkins Bridge (via new pedestrian/cycle bridges) onto Council paths.

- Maitai Road along bluff and then onto Nile Street East.
- Maitai Road onto track to Hardy Street East
- From the top of the ridge down to Botanical Hill and then onto Atawhai Drive
- From the top of the ridge down Pearce Way onto Walters Bluff.

These options have not been fully considered at this stage but are listed here to demonstrate the different options that may are available. Some, but not all may not meet the usual Council standards (potentially mostly around grade) but do provide the opportunity to provide alternative transport modes.

The critical link is the Maitai Road / Nile Street East connection. While this link has some challenges, it is feasible. This is a missing link in the current Council cycle path network and is already used by large number of users. Constructing this piece of the link will enable cyclists to connect to the Nile Street shared paths. It should however be noted that there is a cycle track on the opposite side of the Maitai River that connects through to Nile Street East.

Part C

The existing poor linkage on the first part of Maitai Road needs to be provided to enable existing and future users to gain access to the central city area and Maitai Valley. There is also some benefit in improving the existing cycle track on the left bank of the Maitai River as this would provide a fully off-road shared path if it can be widened.

Part D

See comments above.

Part E

The hierarchy of walking and cycling routes has not been developed at this stage and will form part of the subdivision process. The detail around routes, grades and linkages will be developed as part of the detailed design stage and in discussion with Council as they are likely to be the owners of these new linkages.

Further to the above Council would also like to see the following:

Note: The Council's Parks and Facilities Department would like to see, amongst other routes:

a. A recreational walking/ cycling route from the top of Kaka Hill down the east face to the valley floor.

b. Continuation of the recreational walking/cycling route from Sir Stanley Whitehead Reserve as a mid-level path away from the road network through to Frenchay Drive together with linkages to other road connections.

c. *A shared path from the esplanade reserve along Kaka Stream tributary to the Bayview ridgeline.*

d. *Linkages to other park tracks and trails including the Maitai Esplanade Reserve and along the true right of the Maitai River alongside Dennes Hole.*

These matters relate to detail and will be dealt with as part of the subdivision process. These connections will be looked at through the process, but with the limited information at this part of the PPCR process it is impractical to confirm these routes are possible as part of the PPCR framework.

2.7. Transport Item 32

Council seeks further information on the following:

In terms of road capacity, please:

A *Provide further information on the capacity of the roads in terms of levels of service, safety and community outcomes anticipated.*

B *Further evaluate the capacity of Gibbs Bridge with one-way traffic and safety analysis that quantifies the expected changes, including also in terms of walking and cycling for which facilities are currently lacking*

C *Provide an analysis of road capacity against the relevant LDM good practice guidance.*

Part A

The TIR provided an analysis of road capacity at a high level of analysis based on Austroads and other similar best practice guidelines. As noted under ideal situations the adjacent road network is able to handle much higher flows than what is currently moving along the roads. The capacity of a road is also related to the accepted level of service (LoS) anticipated by the road hierarchy. Roads that will service the Plan Change Area are expected to have a LoS of no worse than D.

As noted in the TIR the traffic volumes on the adjacent road network are well below the operation capacity of the adjacent road network.

Council has asked for more clarification around the road capacity. To assist in providing some context to traffic flows based on the road widths of existing roads adjacent to the development, NZS 4404:2010 Land Development and Subdivision Infrastructure standard has been used. The NTLDM also has context in terms of the expectations and outcomes on the Nelson road network.

The NZS 4404 standard provides typical road cross sections and the traffic volumes that could be expected to be carried on them. Table 3.2 of the standard sets out road elements with different functions such as rural, suburban and urban land uses.

Mostly the roads within PPCR would be classified as suburban and urban under the NZS4404:2010. Under suburban roads there are different categories which include "make and move", "live and play" and "shop and trade". The table also provides road widths, parking and other elements as part of road design.

Within Table 3.2 local roads with carriageway widths of more than 5.7 metres such as Nile Street, Bay View Road, Maitai Road are able to carry more than 2,000 vehicles per day.

The next category up in the road classification within NZS 4404:2010 is a collector road which has a much wider traffic lane width of 4.2 metres and are expected to carry up to around 8,000 vehicles per day. It should be noted that collector roads in the Nelson context would generally not meet this requirement. Notably NZS 4404:2010 does not have a category between a collector and a local road.

The NTLDM has a number of different road classifications shown in Table 4-6 and Table 4-7. "Collector Roads" as set out in the NTLDM. The road classifications have been developed over time and with consideration to NZS 4404. The key fundamental philosophy of the road layout within the NTLDM is to encourage narrower roads to provide better outcomes in terms of speed and function.

As part of that process, the NTLDM has included several additional road categories than what is provided in NZS 4404. This allows a better road hierarchy to be developed and particularly around the roads that sit between arterial roads and local roads.

The dimensions of a collector road in the NTLDM have a width of 3.0 metre traffic lanes which is noticeably less than the NZS 4404 provision of 4.2 metres. This highlights the different philosophy and endeavouring to control vehicle speeds through design. Collector roads in Nelson carry different traffic flows and include roads such as The Ridgeway, Nayland Road, Saxton Road, Nile Street, Collingwood Street and Bridge Street. A collector road is expected to carry up to around 8,000 vehicles per day.

The dimensions for a sub collector road under the NTLDM have a width of 5.7 metres for the moving carriageway. Traffic volumes for a sub collector road would sit somewhere between 2,000 and 8,000 vehicles per day. Sub collector roads in Nelson include Bay View Road, Princes Drive, Panorama Drive, Walters Bluff and Dodson Valley Road on to Frenchay Drive.

As noted in the TIR the roads that will provide access to the wider road network from the Plan Change Area include Ralphine Way, Maitai Valley Road, Bay View Road,

Frenchay Drive, Atawhai Drive, Nile Street East, Nile Street, Bridge Street, Tory Street and Milton Street.

Nile Street East carries around 2,700 vehicles per day with Maitai Valley Road carrying around 950 vehicles per day. Bay View Road at the bottom end carries around 725 vehicles per day.

Upon completion of the development the traffic flows on the adjacent road network without the construction of the Walters Bluff link or adjustments for alternative transport modes are as follows:

- Bay View Road – around 2,100 vehicles per day
- Maitai Valley Road – around 3,750 vehicles per day
- Nile Street East – around 5,500 vehicles per day

Based on NZS 4404 and NTLDM it is reasonable to expect the adjacent road network to provide for traffic volumes that sit somewhere between 2,000 and 8,000 vehicles per day. The increases in the traffic flows are noticeable on the adjacent road network but well within existing road carriageways to accommodate the expected number of vehicle movements.

Part B

The TIR sets out an analysis of the effects associated with the one lane Gibbs Bridge. As noted, as the traffic volumes increase the level of inconvenience increases. This is a direct result of more traffic and the need to wait more often.

There are a number of one lane bridges in New Zealand that are on roads carrying much higher flows than what will go across Gibbs Bridge. Most of these bridges are also on higher speed roads.

In attempting to provide more information, I have used an old National Road Board Document "Delays and Conflicts at One Lane Bridges" – November 1988. Table 1 within this document provides a table of bridge length over AADT for a 50 km/h operating speed. Gibbs Bridge is around 50 metres long.

By using the table and assuming a traffic flow of 1,000 vehicles per day (existing) we get a total delay per day of six minutes. With the new flows upon completion expected to increase to around 3,750 vehicles per day, the total delay per day is 195 minutes. This is an average delay of three seconds per vehicle. In practice not all vehicles will be delayed, but when a vehicle must wait for opposing traffic it will be more than three seconds.

From a safety perspective this is not expected to change as the bridge is well sign posted with one lane bridge signs and priority controls. There is excellent visibility across and to the approaches to the bridge.

The further information request seeks more evaluation of effect on cycling and walking with increased use of the bridge. As noted above the cycle and walking connections will be better developed as part of the subdivision process. However, one of the options for improving cycle and walking connection includes a separate shared bridge at Gibbs and Jickells Bridge. This will provide a safe facility and assist in the uptake of alternative transport modes.

Part C

C *Provide an analysis of road capacity against the relevant LDM good practice guidance.*

The NTLDM provides guidance and standards around subdivision development. As noted in the TIR and above the transport infrastructure within the development will be designed to meet the requirements of the NTLDM. There will be some exceptions when it comes to detailed design for some transport infrastructure and consent for any departures from the NTLDM will be sought at that time.

In particular the transport infrastructure will be designed to meet the Performance Outcomes set out in Sections 4.1, 4.3, 4.4, 4.5 and 4.6 of the NTLDM along with other relevant sections of Section 4 of the NTLDM. As set out in the TIR the connections to the existing road network being Bay View Road and Ralphine Way are appropriately designed to provide for the increases expected by the development.

It was noted that the NTLDM does not provide any guidance on road capacity with good practice focusing on setting performance measures to achieve positive outcomes. As noted above the transport network within the development will be designed to meet these performance measures and therefore meet good practice.

It is expected that the design of the transport infrastructure for the PPCR will meet the guidance contained within the LDM. The detail design plans and assessments of the transport infrastructure will form part of the subdivision consent process.

2.8. Transport Item 33

Council seeks further information on the following:

Please update the PPC to include an equivalent analysis to authenticate the full package of improvements required to deliver the development.

Chapter 12 of the TIR for the application considered the only works necessary to address adverse effects from the PPCR was the intersection of Nile Street East and Maitai Road. However, the TIR also identified other projects which included the following:

- Continuation of Cycle and Pedestrian Connection on Nile Street
- Intersection of Ralphine Way and Maitai Valley Road

- Intersection of Bay View Road and Atawhai Drive
- Domett Street

These projects were identified as part of a much wider consideration of the various issues for future growth and existing deficiencies. These projects were identified as part of the Long Term Plan (LTP) process and were documented in the "Transportation Infrastructure Report March 2020" (Report) written by Traffic Concepts. The report was prepared in consultation with Council who have a number of network issues that needed to be included in the LTP funding process.

There was general agreement when preparing this report that there were no projects that could be wholly attributed to future development as there were existing gaps in the network.

The Report provided a gap analysis and identified options for addressing the issues as required by Council. This report has been provided to Council in March 2020 and provides the information sought in the RFI.

It should be noted however that not all of these projects are necessary to meet the needs or more importantly address any adverse effects of the PPCR. The key project is the intersection of Maitai Road and Nile Street East as this will see an increase of vehicle traffic movements on an already substandard layout. Other projects have some bearing on the PPCR but the need for them to be completed is not as great. For example, the cycle/pedestrian linkage from Kaka Valley to the central area needs further improvements, but there is already a link provided that can be used. It is agreed that improvements to this link, which the applicant is investigating, will make the Plan Change Area more attractive for cycling and walking, the effects of not constructing are considered to be less than minor. This also applies to the other projects identified in the Report.

The projects identified in the Report should be included in the LTP funding process to enable better outcomes for the future development. As part of that process development contributions are set for the different projects based on growth and existing deficiencies. This then sets the development contributions for subdivision which will apply to the PPCR.

Separately it has been identified above that there was a need to strengthen the cycle/ pedestrian link from the Kaka Valley and Nile Street East, also from the upper parts of the Bay View portion of the PPCR. These would be picked up as part of the subdivision process. As noted above further consideration of potential cycle/pedestrian links is ongoing and will form part of the development in the subdivision process.

The projects identified by Council as part of existing network deficiencies and future growth needs can be found in the Report which Council already has been provided.

Regards

Gary Clark
Director
NZCE (Civil), REA, MIPENZ, CPEng