Stantec

Technical Review

To:	Ian Munro	From:	Mike Smith
	Auckland		Addington
Project/File:	310003230	Date:	9 June 2023

Reference: PC54 - Northlake

Executive Summary

Considering the notified application under PC54, I have undertaken a revision of the previous general material and have considered the matters presented by other parties that made submissions on the PC54 notified Plan Change.
To assist the Commissioners, I have undertaken consideration of the application whereby I respond on the following matters:

1. The existing road network, incorporating the current NIL development, excluding consideration of WFH development linkages.
2. The proposed development relief sought under PC54, being the development of 60 lots (B6 area), and the impact that this will have on the existing NIL development road network.
3. Access to Sticky Forest, and the implications that access would have on traffic and existing road formations within NIL.
4. Forestry Operations
5. The proposed road network of the adjacent WFH development under RM220913
6. Alternate linkages to achieve a wider effective and coherent transport network.

The assessment undertaken has identified that the existing Northlake Special Zone (**NSZ**) road network could absorb the traffic generated from the PC 54 development area, but only where additional treatments are applied to limit the adverse effects of rat-running traffic, and the control of kerbside parking.
It is considered that Stonehenge Road, and the connection to the greater Riverslea Road alignment is appropriate for the PC 54 development area. The assessment has shown that the NSZ road network has never been designed to service external sites like Sticky Forest, and that what has been built is only sufficient to cater for the NSZ development area.
To support the PC 54 B6 development area, the following matters require addressing.

1. Traffic calming of narrow local streets to restrict as far as reasonably practicable any rat-running through residential streets not designed for additional traffic,
2. The closure of Lammermoor Street to through traffic (western end) with the provision of a pedestrian / cycle link through the road closure.
3. The provision of no-stopping lines along the length of Riverslea Road, commencing at the connection of Riverslea Road and Road 2 (WFH development), and extending along Riverslea Road to the junction of Riverslea Road and Northlake Drive.

To support the provision of a road linkage to Sticky Forest, the following matters require addressing.

4. The maximum possible number of lots (Sticky Forest) that could be accommodated within the Stonehenge Road link is likely to be circa 75 Lots.
5. No logging truck activity from deforestation could occur over the NSZ road network.
6. A weight restriction should be imposed over Stonehenge Road, Riverslea Road and Lammermoor Street,
7. If the plan change request is accepted, modifications would be required to ensure the restriction of the movement of large vehicles, logging trucks and deforestation activities.
8. The provision of no-stopping lines along the length of Riverslea Road, commencing at the connection of Riverslea Road and Road 2 (WFH development), and extending along Riverslea Road to the junction of Riverslea Road and Northlake Drive.
9. Northburn Road ***has no residual capacity to absorb*** any further traffic other than that already consented in the NIL development. The restriction of traffic from the Sticky Forest / WFH developments into Mount Nicholas Avenue and Northburn Drive, to prevent adverse negative safety and operational effects on the greater network.

Background

Considering the notified application under PC54, I have undertaken a revision of the previous general material and have considered the matters presented by other parties that made submissions on the PC54 notified Plan Change.
To assist the Commissioners, I outline the following considerations whereby I respond on the following matters:

1. The existing road network, incorporating the current NIL development, excluding consideration of WFH development linkages.
2. The proposed development relief sought under PC54, being the development of 60 lots (B6 area), and the impact that this will have on the existing NIL development road network.
3. Access to Sticky Forest, and the implications that access would have on traffic and existing road formations within NIL.
4. Forestry Operations
5. The proposed road network of the adjacent WFH development under RM2209013
6. Alternate linkages to achieve a wider effective and coherent transport network.

1 The Existing Road Network

This assessment excludes any consideration of linkages to or through the WFH development area. The assessment considers the impacts on the NIL road network only.
PC54 seeks to allow a total of 127 lots from area B6, with access to the greater road network being gained via Stonehenge Road. Current information details that Stonehenge Road is to be formed as a local road. Stonehenge Road connects to Riverslea Road, with all traffic movement occurring via a circuitous route around Riverslea Road, junctioning with Northlake Drive, as indicated in Figure 1 below.
It is acknowledged that the Riverslea Road route has been designed for a higher traffic volume, and its form suggests that intended for the primary route from this development area.
A sub network of narrower residential streets is formed within the loop of Riverslea Road, incorporating Erewhon Crescent, Kyeburn Street, Cambrian Street, Hawkdun Place and Armidale Crescent. These streets connect either via Lammermoor Street, out outward to Riverslea Road.
Of note with the existing road layout is the formation of a shorter route that is offered by traffic movement through Lammermoor Street. Lammermoor Street is formed as a narrow local road for residential access only. The alignment of Lammermoor Street enables a rat-run movement through to Riverslea Road, with a shorter connection to Northlake Drive.
An assessment of the various route lengths reveals that:

1. The Riverslea Road route length is 900 metres
2. The Lammermoor Street route length is 500 metres

Any traffic on Lammermoor Street, outside of the Lammermoor Street catchment, would have a significant negative effect on user safety and amenity.

Figure 1: Existing development road layout (NIL)

Photo A: Northlake Drive Typical Cross Section

Photo B: Riverslea Road Typical Cross Section

A site inspection was undertaken on 2nd and 3rd May 2023. The purpose of the site inspection was to measure actual road formation widths, to determine the suitability of the built road form for current operations, and to determine the impacts of the PC 54 development area, along with the potential impacts of the Sticky Forest connection.

Measurements and photographs were taken periodically along key roads, as detailed in Appendix A.

2 Existing Road Formations

2.1 Riverslea Road

Riverslea Road is characterised as having wide road shoulders (grass verges, footpath), along with an 8.4-metre-wide sealed trafficable pavement. Periodically there are indented parking bays within

the 2.7 m wide grassed shoulder. The road typically has footpaths of 2 metres, along with a 1.1 grass strip adjacent to the property boundary.

Riverslea road currently formed to the QLDC Code of Land Development and Subdivision (**CoP**)/ NZS 4404:2010 (**NZS 4404**) E13 standard with carriageway width of 8.4 m. The E13 standard specifies minimum movement lane of 8.4 m, with separated parking.

Localised narrowing of the trafficable pavement is provided at intersections, where the trafficable width reduces to 7.2 metres. This localised narrowing is formed through the provisions of a kerb buildout one side only, as detailed in Photo D below. The kerb buildout implies provision of kerbside parking on that side as it creates a shelter zone for a parked vehicle.

Photo C: Riverslea Road Cross Section (location)

Photo D: Riverslea Road localised narrowing

There is an absence of no-stopping lines along the route, resulting in users parking on the shoulder of the trafficable pavement, creating localised narrowing's. At the time of the inspection there was established development at the Northlake Drive end, with empty sections west of Cambrian Street.

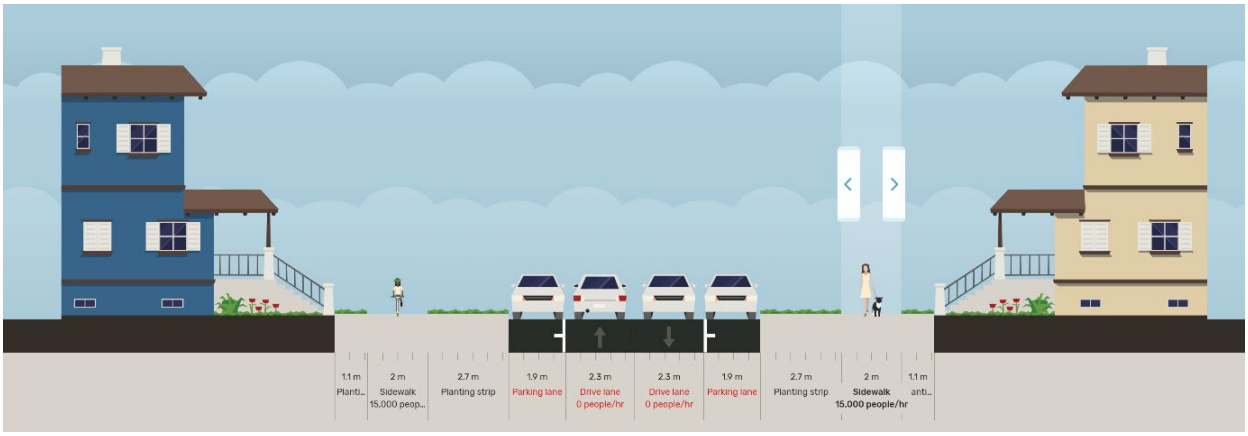


Figure 2: Example effect of kerbside parking

Considering the scenario where there is no parking on Riverslea Road, other than that created by the indented parking, then it is determined that Riverslea Road is of an appropriate formation to cater for the current development.

Considering the scenario whereby residents park alongside the kerb, and reduce the trafficable lane widths, it is determined that the reduced trafficable pavement width would be inappropriate for the current development area.

A calculation of the number of lots that would be serviced by the NIL subdivision indicates that there are some 303 individual lots (inclusive of the relief sought under this plan change) that will feed through to the Riverslea Road / Northlake Drive intersection.

The assessment of the number of lots, and hence the traffic generation is made on the understanding that granny flats or MDRS-type intensification is currently not permitted under the Northlake Special Zone (**NSZ**), with specific restrictive covenants being in place. Accordingly, traffic impacts have been assessed based on a single dwelling per lot.

It is considered that Riverslea Road is suitable for the total NIL development area PROVIDING that kerbside parking does not occur along its length, outside of the indented parking. Where such parking occurs, this effectively narrows the street to below that required under a E12 layout, and caps capacity for the road to under 200 du.

For clarity, and to support the collector function that Riverslea Road forms, no-stopping lines should be installed for the entire length of Riverslea Road, both side of the road.

2.2 Lammermoor Street

Lammermoor Street is characterised as having a trafficable pavement formation of 5.7 m. The road corridor is formed as a 15 m road reserve width. A 1.5 m wide concrete footpath is formed either side of Lammermoor Street, with the remaining road corridor being occupied by grass verges. A typical road formation is demonstrated in Photo E and Photo F below.

Photo E: Lammermoor Street Cross Section

Photo F: Lammermoor Street Road localised narrowing

Lammermoor Street has localised narrowing's installed at each end of the road. The narrowing's reduce the trafficable lane to a single lane and form local traffic calming.

The look and feel of Lammermoor Street are very much that of a local calmed road.

Lammermoor Street has generally been initially formed to a E12 style. The E12 formation states that where a development area exceeds 100 du, no stopping provisions should be installed along the length of the road to restrict parking on the edges of the trafficable pavement, ensuring sufficient road space for the safe movement of all users. The E 12 road formation standard has an operational capacity of approx. 2,000 vpd.

Observations on site detail that additional localised narrowing has been formed post construction to reduce the trafficable lane to a single 3.5-metre-wide lane. The narrowing therefore results in a road width below that of the E12 style. This style of treatment is typical of a calmed street treatment, with the aim to minimise through movement traffic in a residential area.

Development has occurred at the eastern end of Lammermoor Street, with the western portion being under an as-yet unopened subdivision area. For this assessment, I have considered the nett effects should this whole area be developed as indicated in the Outline Structure Plan and the development drawings as per Figure 3.

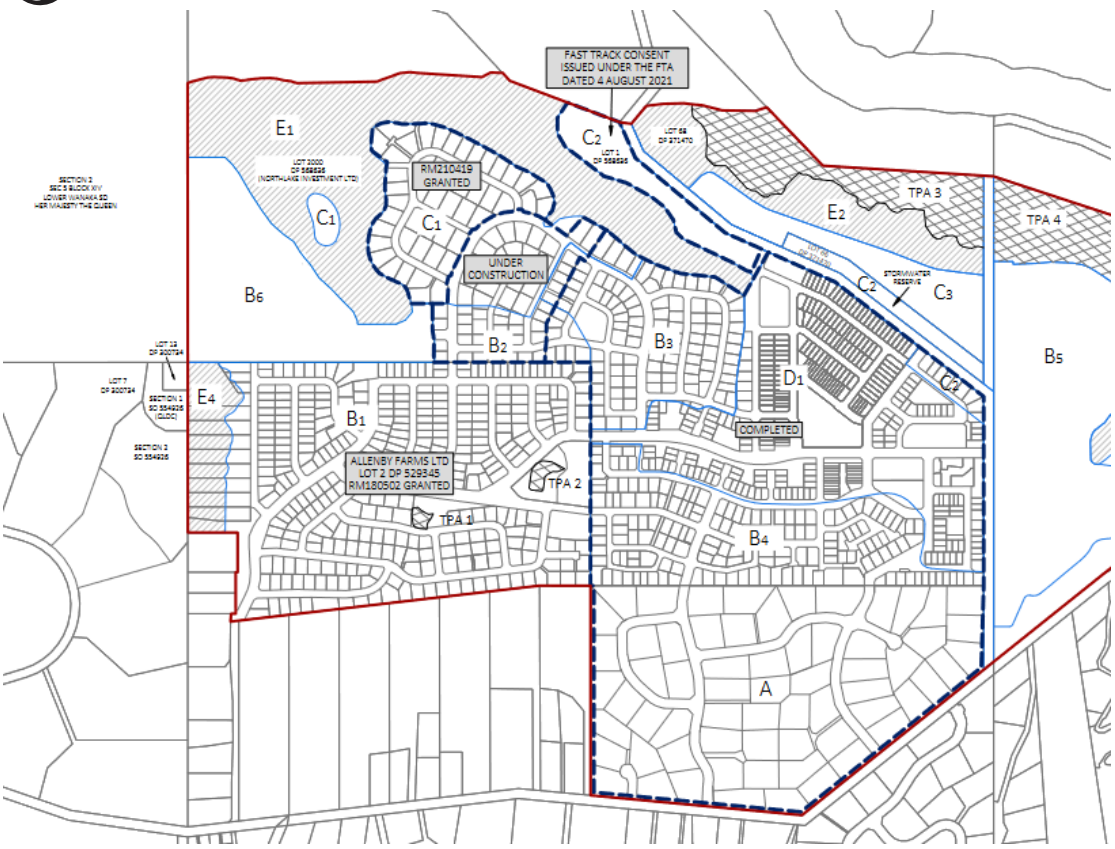


Figure 3: Northlake Structure Plan (Construction)[1]

The current road layout has isolated no-stopping lines installed. Because of high parking demand in isolated sections, there was observed parking over the kerb, and on the grass berms, in locations where there were no restrictions. This reduced the effective trafficable pavement to a single lane operation only.

Photo G: Lammermoor Street Cross Section

Photo H: Lammermoor Street Road localised narrowing

NZS 4404: 2010 requires that the trafficable path be of sufficient width to enable a fire service appliance to traverse through, and operate from, the traffic lane. In the situation whereby parking was observed on both sides of the road, this failed to meet the requirements of NZS 4404: 2010. The specific section of NZS 4404: 2010 is included below.

[1] Source: QLDC PC54 web page, June 2022 Response

> **3.3.6 Parking, passing, and loading**
>
> Parking and loading can be provided either on or off-street. Facilities shall meet the needs of the area and the requirements of the TA, and shall be addressed in the design and access statement (see 3.2.6). Further guidance can be found on the Trips Database Bureau website http://www.tdbonline.org/home.
>
> Passing provision shall be in accordance with the design guidance in table 3.2 and the requirements of the TA.
>
> Acceptable and alternative on-street car park and loading dimensions should be taken from AS 2890.5 and/or the Austroads guides.
>
> Parking and loading shall not be provided so that it has the potential to obstruct the movement of emergency or service vehicles along a road. Alternate provision within sites may be demonstrated in addition to the requirements of the district plan, particularly when establishing rules for new subdivisions.

Fire and Emergency New Zealand (FENZ) provide guidance on road formations suitable for the movement of fire appliances. The document Emergency Vehicle Access F5-02 GD specifies the requirements of an emergency vehicle within a street design. Parking on the shoulders of Lammermoor Street fails to meet that requirement.

The QLDC Traffic and Parking Bylaw 2018 defines that it is illegal to park on grassed verges, as detailed below.

> **21 Parking off a roadway**
>
> 21.1 A person must not stop, stand or park a motor vehicle on that part of a road which is laid out as a lawn or cultivated area, including a grass plot, a flower bed or a shrubbery.

Lammermoor has a very high potential to be used as a rat run from lower end of Riverslea Road and Stonehenge Road. Lammermoor Street is not designed to carry any additional traffic from Riverslea Road, or the B6 development area proposed. The design and form of Lammermoor Street does not support any increase in traffic that could be generated from Sticky Forest.

The intersection forms of Lammermoor connecting to Riverslea Road are characterised by having tight radius (<6m) inside quadrants. The tight form of the intersections would be suitable for general residential vehicle use, albeit that at times there may be conflict with turn movements due to the tracking paths of various vehicle sizes. This is typically anticipated in a Local / Collector intersection form such as this.

It is acknowledged that such a tight form would severely impact the turning provisions of larger vehicles, especially trucks. The design anticipates that the larger vehicle would be very occasional, and that movement could be achieved through tracking into opposing lanes, only when it is safe to do so.

Position:

Need for effective control to prevent rat-run through the Lammermoor Street development. Given current road layouts, it is essential that all traffic be directed by form and control along Riverslea Road out to Northlake Drive.

An easy solution would be to form a non-trafficable end treatment at west end that prevents vehicles but enables cycle / pedestrian access. This would be consistent with a local calmed street such as Lammermoor Street.

2.3 Stonehenge Road

The initial formed section of Stonehenge Road is constructed to 8.4 m trafficable pavement width. Stonehenge Road is formed at a subbase standard only at the time of the site inspection.

Observations of the greater length of Stonehenge Road reveals that the road is characterised as being two long straight sections, bisected with an approx. 15 metre radius curve. This alignment,

including the tight radius curve is considered suitable for local traffic from the B6 area only, and is not suitable for high traffic volumes.

Photo I: Stonehenge Road intersection form

Photo J: Stonehenge Road formation

Photo K: Stonehenge Road (view from Sticky Forest)

Photo L: Stonehenge Road formation (leading to water reservoir)

While it has been indicated that a connection link would be provided to the Sticky Forest boundary, from Stonehenge Road, the form and nature of that connection is not specified.

Position

While Stonehenge Road is formed to an E13 standard, its placement at the end of the NIL road network results in limitations on total capacity of the road, when considering the movement through the NSZ.

2.4 Vulnerable User Movement

The Northlake Special Zone is a large residential development area, with a wide range of housing types. Critical to this assessment if the consideration of the routes utilised by vulnerable users (Cyclists / children / elderly / parents with children / mobility groups).

The current roads have been designed for and are now operating as local low volume residential streets, serving the local road network for Northlake residential development, and forming the primary routes for vulnerable users such as children and cyclists / pedestrians out to Aubrey Road. Northburn Road currently forms the shortest route for vulnerable users from the NSZ to Aubrey Road, and the wider network (destinations) to the west.

Northburn Road is formed such that school children on bikes either cycle on the footpath (illegal under current legislation), or cycle along the trafficable lane. The 170 metres of Northburn Road leading to the Aubrey Road intersection is characterised by a steep downhill grade, with the road alignment being curvilinear (both horizontal and vertical curves), that is not conducive with safe movement of children on bicycles.

With any increase in traffic along Northburn Road, the safety of children on bikes would be significantly negatively impacted.

The alternate residential route for vulnerable users is Mount Linton Avenue. While Mount Linton Avenue better serves the eastern section of the NSZ, its catchment is much smaller.

The topography of Mount Linton Avenue is flatter, with school children on bikes having to either share the lane with general traffic, of cycle on the footpath (illegal under current legislation). As with Northburn Road, any increase in traffic on Mount Linton Avenue would have significantly negatively impacts on the safety of vulnerable users, especially school children movement.

3 Catchment Areas

For clarity, and for the purpose of this report, I have considered the catchment areas for various roads, and have undertaken my determinations based upon that detailed below.

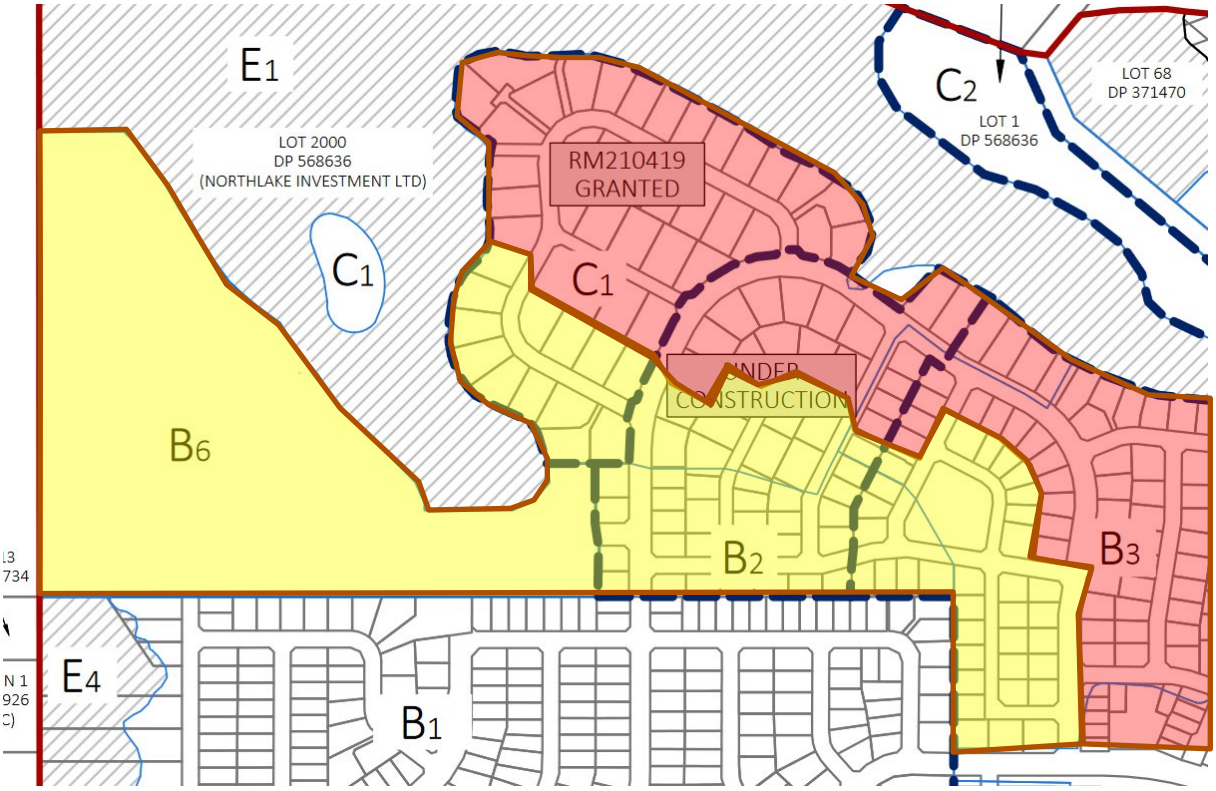


Figure 4: PC 54 Catchment Areas considered

The above catchment areas are assessed as being the general desire of residents for the Riverslea Road (red) catchment, and the Lammermoor Road (yellow) catchment respectively.

4 Relief sought under PC54, traffic impacts.

PC 54 seeks a change in the number and location of lots serviced by Stonehenge Road, connecting onto Riverslea Road. The proposed relief sought is to increase the number of lots from approx. 64 to 127 lots, an increase of some 63 additional lots.

As stated previously, I have considered the covenants placed on the NSZ, and have only considered traffic generation on the basis of a single dwelling per lot.

The following sections provide an assessment of the impacts of traffic, when considering the proposed PC 54 development area only.

4.1 Riverslea Road

4.1.1 FORMATION:

Riverslea Road has a general trafficable pavement width of 8.4 metres. This is consistent with an E13 style road formation as detailed in the QLDC CoP, suitable for up to 800 domestic units.

For clarity I provide the detail for the E13 road formation, along with the indicative drawing of the E13 road style below. While this is sourced from NZS 4404: 2010, the details are the same as the QLDC CoP.

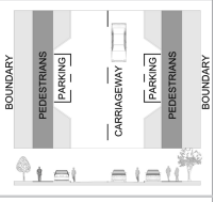
PLACE CONTEXT			DESIGN ENVIRONMENT				LINK CONTEXT					TYPICAL PLAN AND CROSS SECTION	FIGURE NUMBER
Area	Land use	Local attributes	Locality served	Target operating speed (km/h)	Min. road width (m)	Max. grade	Pedestrians	Passing, parking, loading, and shoulder	Cyclists	Movement lane (excluding shoulder)	Classification	SEE APPENDIX E FOR LARGER VERSION OF FIGURES	
Notes	See 3.2.4, table 3.1 & 3.3.1.6	See table 3.1	See table 3.1	See 3.3.5	See 1.2.2, 3.3.1.9, & 3.4.16		See 3.3.11	See 3.3.6 & 3.3.1.4	See 3.3.1.5, 3.3.7, & 3.3.11.2	See 1.2.2, 3.3.1.1, 3.3.1.2, 3.3.1.3, 3.3.1.10, 3.3.11.3	See 3.2.4.2 & 3.3.16 (Typical max. volumes)		
	Live and play	Primary access to housing	Up to 800 du	50	20	10%	2.0 m each side	Parking is separate and recessed. See 3.3.6. Public transport is likely (see clause 3.3.1.4, 3.3.1.5)	Separate provision where local authority defined cycle route	2 x 4.2	Connector/ collector (~ 8,000 vpd)		E13

Figure 5: NZS 4404:2010 Road Type E13

In assessing the existing development for Riverslea Road greater area (excluding Stonehenge Road), approximately 181 lots have been identified.

Considering the 127 lots identified under PC54, Riverslea Road could appropriately absorb the traffic volume generated from the PC 54 development area without any loss of function.

The PC 54, Area B6 development area has a proposed coverage of 127 lots. This equates to 127 domestic units (du) under the District Plan (excluding granny flats and higher density provisions).

Considering the road network of the existing Riverslea Road and Stonehenge Road catchment, the total number of properties that connect to Northlake Drive is in the order of 303 lots.

Localised narrowing at intersections along Riverslea Road assists as a partial calming measure. This reduces the effective trafficable pavement 8.4 metres down to 7.2 metres in width and is below that generally sought for the E13 style of road. With the narrowing being formed on one side only, this visually presents as protection for a parking space along that side of the road.

The localised narrowing at intersections is considered best practice, where slower speeds at intersections through calming measures is desired.

4.1.2 PARKING:

Parking is typically enabled through the provisions of indented parking bays. It is acknowledged that in locations, the kerb buildout is at the end of an indented parking bay. At other locations where is no such indented bay, and presents as a sheltered kerbside park, especially with the absence of any restriction indicating that parking was not permitted.

Photo M: Riverslea Road - kerb buildout at intersections

Photo N: Riverslea Road - kerb buildout at intersections

It is acknowledged that the design style for Riverslea Road may have the intention of parking only within the indented parking bays, however the lack of no-stopping lines along the mid-block sections fails to provide guidance to a driver that parking adjacent to the kerb is not permitted.

The placement of no-stopping lines would visually present a restriction for parking, and where a landowner may have interpreted the lack of such linework as permitted parking, the inclusion may have an impact on residents parking expectations, and residential parking (visitors). During the site inspection it was identified that there was an already demonstrated high demand on the limited number of indented parking bays.

As experienced in other development areas (Shotover Estates etc), a lack of supply of off-street parking can lead to illegal and unsafe parking on verges and garden / landscape areas. This was observed on many roads within the area of assessment for PC 54.

As stated above, providing that Riverslea Road has appropriate controls to restrict kerbside parking, it is considered that the existing formation of Riverslea Road would be suitable for the current use.

4.1.3 TRAFFIC VOLUMES

Considering the 303 lots that will be serviced by the greater development area (excluding Sticky Forest), it has been calculated that the total trip generation for the Riverslea Road / Stonehenge Road catchment is in the order of 2,430 vpd. An E13 style road formation has a theoretical maximum operation of ~8,000 vpd.

Therefore, the current road formation is suitable for the development areas considered under PC 54.

4.2 Stonehenge Road

4.2.1 FORMATION:

At the time of the site inspection (May 2023), Stonehenge Road was partially developed. Stonehenge Road has a formation width of some 8.4 metres in width (kerb to kerb).

Considering the development area proposed under PC54, area B6 would enable the provision of some 127 lots. A development area of this size could be serviced with a local road formation of a form detailed in the CoP as a E12 road style. The E12 road style caters for up to 200 domestic units.

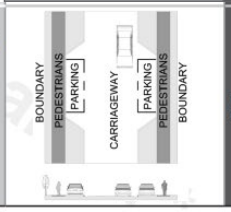
PLACE CONTEXT			DESIGN ENVIRONMENT				LINK CONTEXT					TYPICAL PLAN AND CROSS SECTION	FIGURE NUMBER
Area	Land use	Local attributes	Locality served	Target operating speed (km/h)	Min. road width (m)	Max. grade	Pedestrians	Passing, parking, loading, and shoulder	Cyclists	Movement lane (excluding shoulder)	Classification	SEE APPENDIX E FOR LARGER VERSION OF FIGURES	
Notes	See 3.2.4, table 3.1 & 3.3.1.6	See table 3.1	See table 3.1	See 3.3.5	See 1.2.2, 3.3.1.9, & 3.4.16		See 3.3.11	See 3.3.6 & 3.3.1.4	See 3.3.1.5, 3.3.7, & 3.3.11.2	See 1.2.2, 3.3.1.1, 3.3.1.2, 3.3.1.3, 3.3.1.10, 3.3.11.3	See 3.2.4.2 & 3.3.16 (Typical max. volumes)		
	Live and play	Primary access to housing	1 to 200 du	40	15	12.5%	1.5 m one side or 1.5 m each side where more than 20 du or more than 100 m in length	Shared parking in the movement lane up to 100 du, separate parking required over 100 du	Shared (in movement lane)	5.5 - 5.7	Local road (~ 2,000 vpd)		E12

Figure 6: NZS 4404:2010 Road Type E12

The site inspection indicates that the intent of the Stonehenge Road formation may be that of a E13 road style. The formation of Stonehenge Road as a E13 style would typically enable the servicing of up to 800 du if retained at the full 8.4 metres width as constructed in the initial section. The inclusion of a short radius curve in the Stonehenge Road alignment becomes a limiting factor when considering the operation of Stonehenge Road as a collector status road. The curve would impact on the capacity, despite the road being formed as an E13 style.

It is important to note that the while there is capacity on Stonehenge Road, the downstream capacity of the road network is critical in determining the overall effects.

4.2.2 INTERSECTIONS

The intersection of Stonehenge Road and Riverslea Road is formed with small radius kerb lines, resulting in a compact intersection form that would be typically suitable for a local road / collector road junction. As such, this form would cater to lower traffic volumes, and typically smaller domestic vehicles.

Large vehicles could traverse through the intersection; however, the turn movement would require the larger vehicle to occupy the opposing traffic lane to undertake the turn. This is considered typical for a road where there only an isolated large vehicle movement.

Considering the B6 area only, the current intersection form would be sufficient for the number of lots being proposed under PC 54, being a connection of a local road with a collector road.

It is assessed that Stonehenge Road, and the connection to the greater Riverslea Road alignment is appropriate for the PC 54 development area. The assessment has shown that the NSZ road network has never been designed to service external sites like Sticky Forest, and that there are signs that what has been built is only sufficient to cater for the NSZ development area.

Also refer to further assessments below regarding the proposed access provisions to Sticky Forest.

5 Considering the impacts of PC 54, and traffic through the WFH development area

The analysis of the traffic capacity and effects has generally been directed at movement through the NSZ road network. However, in considering the PC 54 relief sought, and considering the provisions presented in RM220913, WFH development, road network, it is important assess the impacts that diverted traffic through the WFH development road network would have on the greater development area.

It is determined that movement from Stonehenge Road could, once formed, travel through the WFH road network to access sub-network roads within the NSZ. Specifically, traffic movement into and through Mount Nicholas Avenue, and Northburn Road, require assessment for impacts.

5.1 Mount Nicholas Avenue

Mount Nicholas Avenue is characterised as a narrow local road serving a limited number of properties. Considering the link from the WFH boundary to Northburn Road the road corridor is 15 metres in width, with a 6-metre-wide carriageway.

Photo O: Mount Nicholas Avenue – refuse collection with parked vehicle

Photo P: Mount Nicholas Avenue – typical formation

No stopping lines are installed on one side of Mount Nicholas Avenue only, resulting in kerbside parking on the opposite side of the road. The usable trafficable lane remaining is only 4 metres in width, suitable for a single vehicle movement only. As demonstrated in Photo O above, this resulted in a rubbish truck fully occupying the usable lane, preventing opposing movement where vehicles were parked kerbside.

Mount Nicholas Avenue connects into Northburn road through a tight Give Way controlled cross-road junction. Turning movements are constrained, with opposing movements having to be separated in time to ensure traffic can safely turn and avoid conflicts with over tracking of an opposing vehicle. This is a typical for a local road to local road junction with low use.

Position

It is considered that the Mount Nicholas Avenue / Northburn Road route ***has no residual capacity to absorb*** any further traffic other than that already consented in the NIL development.

5.2 Northburn Road

Northburn Road traverses through two residential environments with resulting different road layouts. Commencing at Aubrey Road, Northburn Road is characterised as having a 6.3-metre-wide trafficable lane, with swales formed either side of the road. A 2-metre-wide footpath is formed on the west side only.

Photo Q: Northburn Road – Rural residential area - view towards Aubrey Road

Photo R: Northburn Road – higher density residential area.

The land use and dwelling density changes in and around Bargour Street. The road formation at this location is characterised as having a 6-metre-wide trafficable lane, with indented parking. A 2-metre-wide footpath is formed either side of the road. The remaining road space is formed as grass berms.

The form of Northburn Road is that of a E12 style road. As stated above, an E12 road can service up to 200 domestic units. A review of the QLDC GIS site reveals that the current catchment of Northburn Road (excluding WFH land) is already 195 lots. Assuming 1 domestic unit per site, this equates to 195 domestic units.

Position

It is considered that Northburn Road ***has no residual capacity to absorb*** any further traffic other than that already consented in the NIL development.

6 Sticky Forest Catchment Area

Under discussion in this Plan Change is the consideration of the impacts of, and ultimately potential effects of the inclusion of an as-yet unknown connection to the Sticky Forest area.

It has been submitted that Sticky Forest is land-locked, and consideration of potential access, of an as-yet unknown form and volume, would be prudent at this early stage to understand the potential effects should a development of Sticky Forest occur.

In undertaking an assessment of the potential impacts of the Sticky Forest area, consideration is given to the land area currently covered by forest, and indicative lot yields, to determine the nett effect on the greater road network.

Sticky Forrest has a land area of some 506,742 m^2 (50.6 ha)[2]. While no development details have been supplied, various scenarios of land development have been tested to allow determination of the effects, and suitability of any potential future connection.

In the first instance, it is acknowledged that a E13 style road formation has a theoretical operation of ~8,000 vpd. Considering the current development area fed by the Riverslea Road catchment, the current volume is in the order of 2,430 vpd, based upon a single dwelling per lot.

[2] QLDC GIS Land Information

For the potential development of Sticky Forest, I have evaluated scenarios for traffic yield under the following parameters:

1. Assume a percentage of land area for road / reserve etc
    a. 20 %
    b. 30 %
    c. 40 %
2. Assume various Lot sizes;
    a. 450 m^2 lot size
    b. 600 m^2 lot size
    c. 900 m^2 lot size

For clarity, I have detailed the potential traffic generation based upon a single dwelling per lot, with an additional calculation of traffic generation based upon 50% of the lots being able to support the provisions of a Granny Flat or MDRS-type intensification.

The results of the evaluations are tabulated in Table 5-1 below.

Table 5-1: Traffic Generation – Various Scenarios

Total Land Area (m2)			***506,742***		
Road / Reserve				***Lot Size***	
Area (%)	**Land Area (m2)**		**450 m2**	**600 m2**	**900 m2**
20%	101,348		901	676	450
Traffic Generation	***8 vpd/lot***		7,207	5,405	3,603
Granny Flat etc (50%)	***8 vpd/lot***		3,603	2,703	1,802
Total Traffic (vpd)			*10,810*	*8,108*	*5,405*
Road / Reserve				***Lot Size***	
Area (%)	**Land Area (m2)**		**450 m2**	**600 m2**	**900 m2**
30%	152,023		788	591	394
Traffic Generation	***8 vpd/lot***		6,306	4,730	3,153
Granny Flat etc (50%)	***8 vpd/lot***		3,603	2,703	1,802
Total Traffic (vpd)			*9,910*	*7,432*	*4,955*
Road / Reserve				***Lot Size***	
Area (%)	**Land Area (m2)**		**450 m2**	**600 m2**	**900 m2**
40%	202,697		676	507	338
Traffic Generation	***8 vpd/lot***		5,405	4,054	2,703
Granny Flat etc (50%)	***8 vpd/lot***		3,603	2,703	1,802
Total Traffic (vpd)			*9,009*	*6,757*	*4,504*

Critical to the assessment of the impacts of the Sticky Forest land area is the provisions for the connection to Sticky Forest through the PC 54 Plan Change area.

At the time of writing this report, it is understood that the proposed connection would be via a local road connection stub from the main alignment of Stonehenge Road, north of the tight road curvature. As it is understood, the indicative link road position is generally located within a natural gully system within the Sticky Forest area, as presented in Figure 7 below.

It is presented that this would be in the form of a Tee intersection (or crossroad if access is required into adjacent NIL development area B6.

Figure 7: Existing development road layout (PC 54, NIL), with Sticky Forest access location (arrowed)

As stated, the nature of Stonehenge Road, with the tight curve alignment and the intersection form built are not consistent with a primary connection to the Sticky Forest area. It is acknowledged that such a link could provide access to a limited number of properties, albeit that the function would be that of a local road.

As presented above, Sticky Forest has the potential to generate traffic volumes almost three times that of the whole Northlake Development Area serviced by Riverslea Road. It is considered poor transport planning to enable uncontrolled access via any link enabled to Sticky Forest.

The formation of a connection during the PC 54 development, should the Commissioners be of a mind to grant consent, could, without controls, result is significant adverse effects on the greater road network in the Northlake Development Area. This includes, but not limited to, safe operation of the road corridor and intersections, residential safety due to very high traffic volumes at peak times, congestion at key intersections, and the pressure to find additional rat-run routes to avoid the issues.

Specifically, it has been identified that the shortest route from Stonehenge Road through to Northlake Drive is via Lammermoor Street. This is considered detrimental to the community in that area and would result in unsafe vehicle movements and conflicts.

The formation of the proposed link has no means to control entry into NIL. The submitted planning framework for PC 54 does not contain any triggers where the assessment of transport effects from Sticky Forest can be assessed.

At the time of writing this report, we don't know what may come to be enabled on Sticky Forest land (if anything). However, our assessment of traffic generation, and effects reveals that there appears to be only very limited capacity available for any development traffic from the Sticky Forest area.

Initial assessments have determined that Sticky Forest is either not developable to its eventually identified planning optimum without additional road accesses being provided, or without significant changes and upgrades occurring to the NSZ network.

Position

If the plan change request is accepted, modifications would be required to ensure that provision of the traffic from the PC 54 area only was permitted, and that where any connection from Sticky Forest would trigger the need for a specific transport assessment to assess effects, impacts, and remedial provisions that would need to be undertaken on the existing NSZ road network to cater for the Sticky Forest traffic generation.

7 Forestry Activities

7.1 DEFORESTATION / LOGGING

The first assessment would be that for development to occur, deforestation / logging would be required. Logging operations are typically undertaken with large logging trucks, that operate under both normal vehicle weight constraints, along with High Productivity Motor Vehicles (HPMV).

An HPMV is defined as:

- exceeds a mass of 44,000kg and/or the maximum length dimensions allowed for standard vehicles, but meets higher individual axle and axle group limits and is no wider or higher than a standard vehicle, and
- operates under a route specific HPMV permit issued by a road controlling authority (RCA) on roads and bridges that have been determined to be able to accommodate the additional mass and/or length, and
- displays an 'H' sign on the front and rear if specified on the permit or if route specific.

Both of these vehicles are conventionally operated on the open road network, and do not align with the safe operation of a local road network.

Typical logging operations are undertaken utilising vehicles with sufficient capacity for the rate of tree felling and processing on site. A typical logging truck configuration would comprise of a truck / trailer unit. I consider that this is totally inappropriate for the residential development that it would traverse through.

For assistance, I detail below typical logging truck configurations. The assessment of a HPMV rated vehicle currently requires route specific effects by the Road Controlling Authority. Approval for use is not guaranteed by means of an application.

It is acknowledged that smaller vehicles, still of the HCV classification, could be utilised. While such a vehicle would be smaller, the effects would be of a similar nature. It is also recognised that smaller vehicles have a reduced payload per trip, therefore the overall effects are considered high due to the increased number of vehicle movements for the same yield area of forest. In this regard, I consider the use of smaller vehicles to have the same detrimental effects on the existing road network.

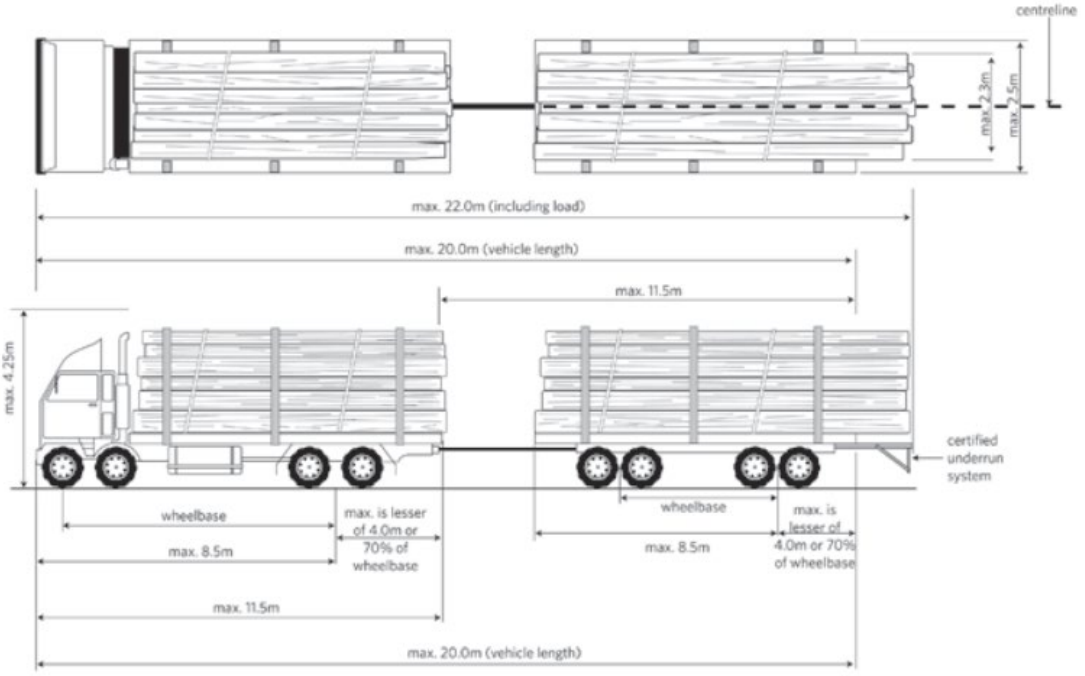


Figure 8: Typical Logging truck dimensions

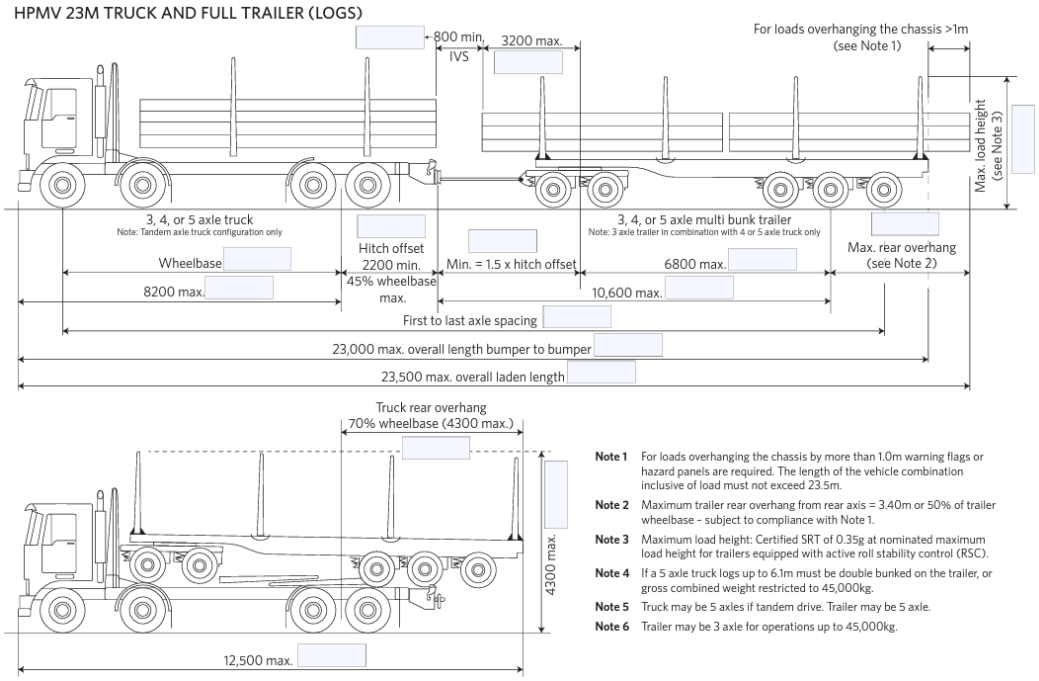


Figure 9: HPMV logging truck dimensions

Considering the movement of logs from the Sticky Forest area, through the NSZ road network, has identified a significant number of extremely adverse effects that would be felt by both the residents, and the constructed road formation.

In this regard, it is my opinion that the existing road network is insufficient for large logging trucks, with a significant unsafe impact on vulnerable users, and a high potential for damage to road infrastructure that could not have been reasonable anticipated by Northlake Development, from an as then unknown Sticky Forrest development.

Any associated large scale works that would utilise the existing road network would have a very strong reliance on Temporary Traffic Management. Considering the scale and nature of the potential logging operations from the Sticky Forrest area, I am of the opinion that even with this measure, it would have significant negative effect on the safety of the residential area access, and vulnerable users.

Position

If the plan change request is accepted, modifications would be required to ensure the imposition of suitable controls such as vehicle weight restrictions on the existing road network to ensure that logging operations are not permitted to use the road network through the Stonehenge Road development (PPC) area. Imposing a weight restriction on the road network will require additional specific assessments in the future, for the relaxation of the limitations, should that be determined the appropriate approach.

Logging movement through the NSZ development would require modifications within the provisions of PC54 preventing logging. It is considered that logging operation movement through the NSZ road network is unsafe and would have significant negative impact on the existing network.

This measure is considered to minimise the detrimental effect of large heavy vehicle movement on the road network, or present a road safety risk to residents, especially children / pedestrians / cyclists etc.

8 WFH Subdivision Area

Considering the PC 54 application, and the proposed development of the WFH land area, I have put my mind to the combination of the proposed road networks, and how they interconnect to form the greater network from the combined developments.

This assessment is informative and seeks to understand the greater effects to the road network, once full development of the greater area has been achieved.

WFH have applied for Resource Consent (RM220913) to develop the Stage 1 and Stage 2 areas of the greater development. An outline of this development is indicated in Figure 10 below.

The outline roading plan[3] details three connection points to the NIL development area, being Riverslea Road (A), Northlake Drive (B) and Mount Nicholas Avenue (C).

It is understood that a pedestrian and cycle link via Peak View Road has been granted previously under RM180502.

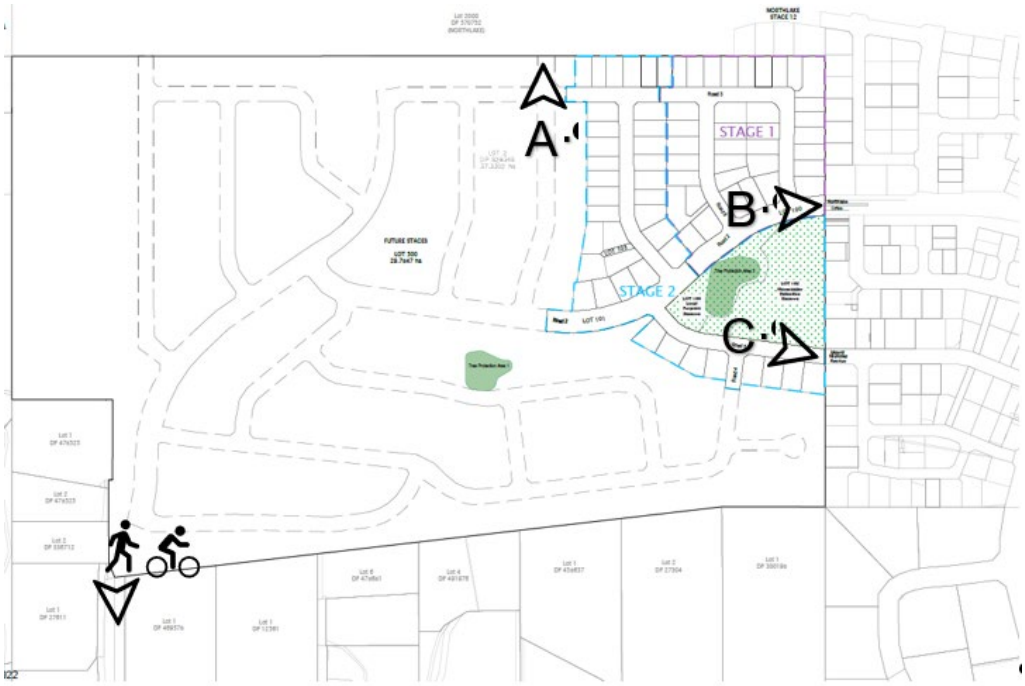


Figure 10: WFH road connections (proposed)

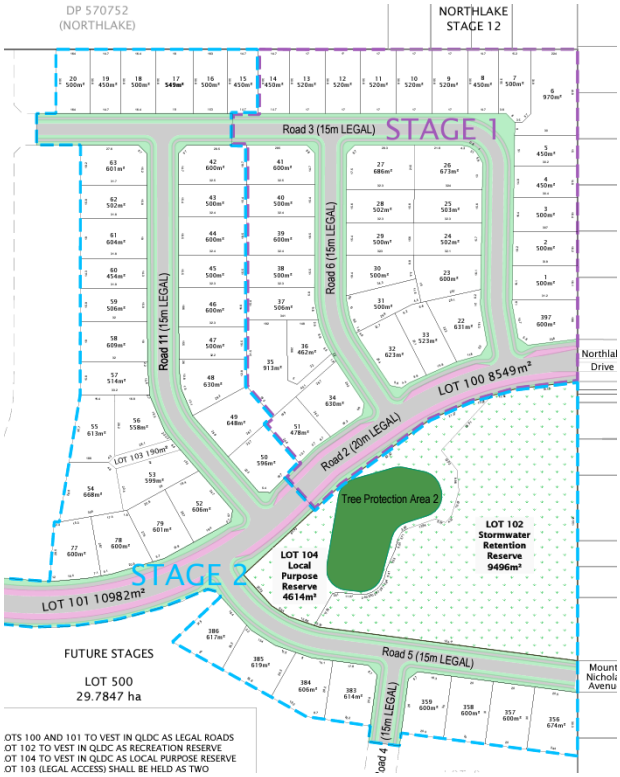


Figure 10: Proposed road layout – Allenby Farms (WFH) RM220913

[3] RM 220913 - Proposed Subdivision of Lot 2 DP 529345, Allenby Farm, 44 Peak View Ridge, Wanaka, Overall Scheme Plan – 21091; Drawing 100

Details of the proposed road formation are indicative only within the supplied plan set. It is noted that Road 2 (connecting to Northlake Drive) is stated to be a 20-metre-wide road corridor, with indented parking. Roads 3, 4, 5, 6 and 11 are stated to be a 15-metre-wide road corridor.

A review of the WFH development area identified in the ODP outlines the inclusion of some 364 individual lots. The larger proportion of the development could be accessed via Northlake Drive, however, the internal road system and linkages to local roads such as Mount Nicholas Avenue, could result in adverse effects on the existing local road network within the NIL development area.

For the purpose of this assessment, I have assumed a single dwelling per lot, and have not considered any provisions for Granny Flats or MDRS-type intensification.

The following sections present on the connections to, and effects of traffic movement through and generated from the WFH development area. This is presented to ensure that the greater transport effects are understood.

8.1 Riverslea Road Connection

While no details have been supplied, it is assumed that the connection of the WFH roading network to Riverslea Road will be of a form consistent with that of the NIL formation. For the purpose of this assessment, I have considered an 8.4-metre-wide pavement, with 2-metre-wide footpaths.

This connection would serve as a collector road connection to Northlake Drive. The WFH road alignment route is characterised by a deviation in the road alignment, leading to a Tee intersection with the primary road through the WFH development. The form of the intersection is not specified, so I have been unable to assess the impacts of form.

It is noted that Road 3 (WFH; Stage 1 & 2) forms a shorter route from Riverslea Road and connects closer to the Northlake Drive tie-in. It is determined that this route is unsuitable for traffic from anything other than the properties that directly feed to Road 3 (Stage 1 & 2).

As the greater Northlake and WFH areas develop, there will be increased pressure, and delays along the Northlake Drive / Outlet Road route. This increase in pressure will result in drivers seeking alternate routes to gain access to Aubrey Road.

This use of alternate routes will have a negative effect on low volume residential streets such as Mount Nicholas Avenue, and Mount Linton Avenue. It is considered that traffic generated from the WFH land should be discouraged or restricted from access through the NIL local street network. This may require significant restriction measures within the WFH design to prevent the adverse effects being generated.

8.2 Mount Nicholas Avenue Connection

As presented above, the Mount Nicholas Avenue / Northburn Road route is meets the expected maximum domestic units (200) for the formed road type (E12).

At the time of writing this report there were no details on the connections proposed, however the WFH road network does indicate that a development area of land connects to Mount Nicholas Avenue.

Connection of movement from the WFH land will exceed the maximum dwelling units that can be serviced by the E12 road style. The QLDC CoP requires that where the yield exceeds 200 du, a E13 road style is required.

Measurements taken on site reveal a 15-metre-wide road corridor. This is insufficient for a E13 road form. Given the new residential form of the area, land purchase to widen to a E13 road style is considered unachievable.

8.3 Northlake Drive Connection

The Northlake Drive connection is designed as the primary collector route from the NIL development. The connection of the primary road from the WFH development area is considered good form, albeit that there is only this single primary link.

As stated previously, pressure from a greater development will result in drivers seeking alternate routes to gain access to Aubrey Road. This will have a significantly adverse effect on the communities that they seek to travel through, with very high negative safety outcomes.

9 Alternate Linkages

The nature and connection of the greater transport assessment undertaken in this review has identified that there is significant reliance on a single primary link to the greater road network. The current design incorporates the primary link via Northlake Road, regardless of development area.

The incorporation of any development in the Sticky Forest area will result in adverse effects on the greater network, over and above anything that could have been anticipated through earlier stages of the NIL development. As a result, given that the NIL development area is progressing to maximum yield, and that the WFH development is coming online through the Resource Consent application for Stage 1 and 2, there is now very little opportunity to retrospectively change the road network.

While outside of consideration of this hearing, I make the following comments to inform the context of the greater network.

In considering the identified negative impacts on the NSZ road network, and the lack of capacity for traffic generated from the Sticky Forest area, it has been identified that there is a strong need for an alternate connection to the greater network.

A direct link could, theoretically, be achieved through a road formation that creates a crossroad alignment at the Aubrey Road / Andersons Road intersection. The likely form of such a connection would be a suitably sized four leg roundabout.

It is acknowledged that such a link provision is outside of the consideration of the relief sought under the PC 54 application, however, the analysis has identified that without a new link, only very limited capacity is available for any development from Sticky Forest. The assessment has determined that Sticky Forest is either not developable to its eventually identified planning optimum without additional road accesses being provided, or without significant changes and upgrades occurring to the NSZ network.

STANTEC NEW ZEALAND

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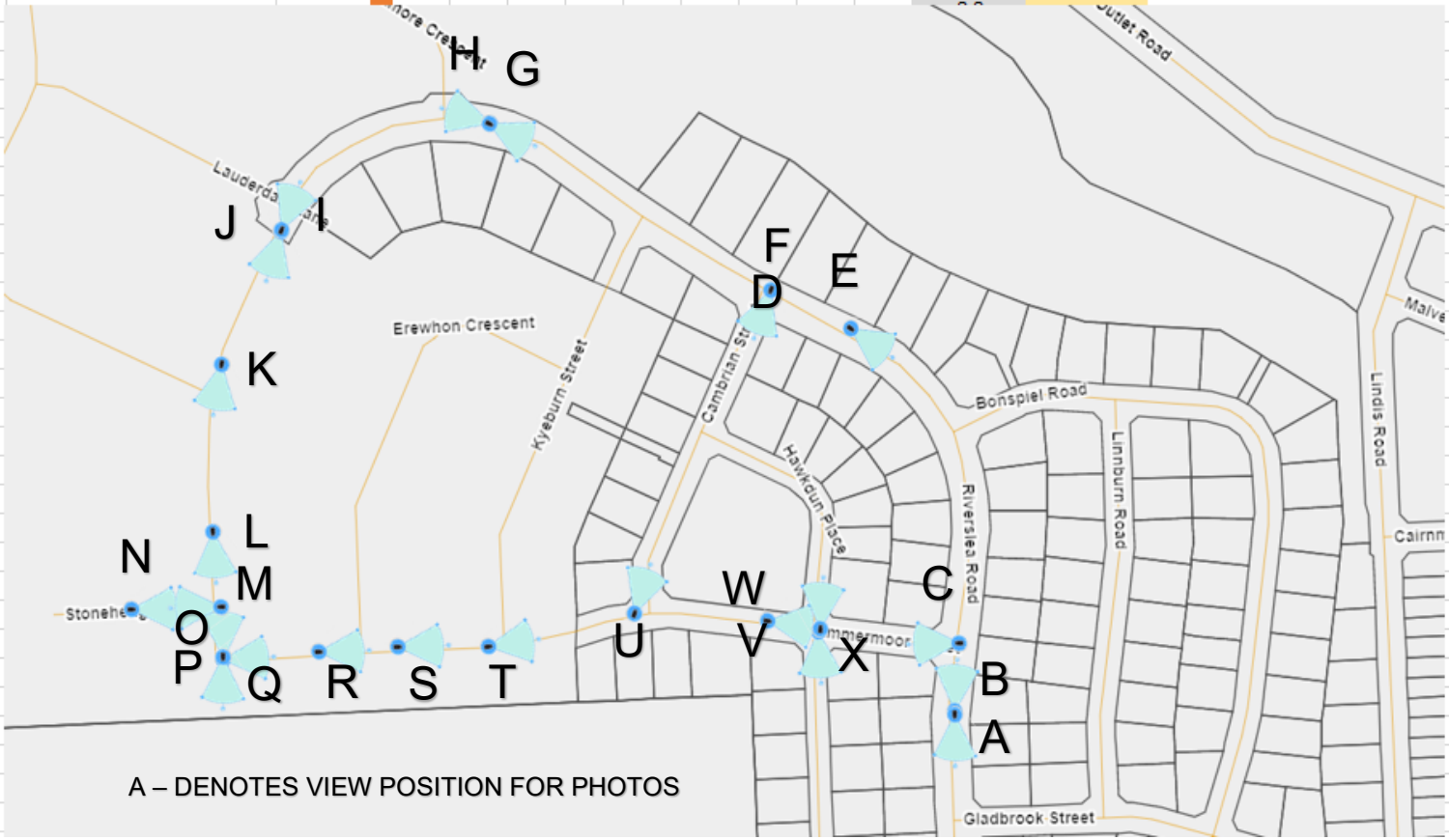
Appendix A

Reference: PC54 - Northlake

Site #	Roadname	House No.	A	B	C	D	E	F	G	H	J	Total Width	Design Style	Comments
	Riverslea Road	14	1.1	2.0	2.7	0.0	8.4	0.0	2.7	2.0	1.1	20.0	E13	Indented Parking
	Lammermoor Street	1	1.5	1.5	1.7	0.0	5.7	0.0	1.7	1.5	1.5	15.0	E12	At Riverslea Road (east) intersection
	Riverslea Road		1.1	2.0	2.7	0.0	8.4	0.0	2.7	2.0	1.1	20.0		
	Riverslea Road		1.1	2.0	2.7	0.0	7.2	0.0	3.9	2.0	1.1	20.0		Narrowing created by kerb buildouts
	Cambrian Street		1.5	1.5	1.7	0.0	5.7	0.0	1.7	1.5	1.5	15.0		At Riverslea Road intersection
	Riverslea Road		1.1	2.0	2.7	0.0	8.4	0.0	2.7	2.0	1.1	20.0		At Carrickmore Crescent; no stopping lines only at intersection
	Carrickmore Crescent		1.5	1.5	1.7	0.0	5.7	0.0	1.7	1.5	1.5	15.0		At Riverslea Road Intersection
	Stonehenge Road		1.1	2.0	2.7	0.0	8.4	0.0	2.7	2.0	1.1	20.0		At Riverslea Road Intersection
	Lammermoor Street		1.5	1.5	1.7	0.0	5.7	0.0	1.7	1.5	1.5	15.0		At riverslea Road (west) intersection



Reference: PC54 - Northlake

View A

View B

View C

View D

View E

View F

Reference: PC54 - Northlake

View G

View H

View I

View J

View K

View L

Reference: PC54 - Northlake

View M : Stonehenge Road

View N

View O

View P

View Q

View R

Reference: PC54 - Northlake

View S

View T

View U

View V

View W

View X

Stantec

Technical Review

Design with community in mind