IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application to **HAMILTON CITY COUNCIL** for private plan change 7 to the operative Hamilton City District Plan by **GREEN SEED CONSULTANTS LIMITED**

STATEMENT OF EVIDENCE OF LEO DONALD HILLS

1. INTRODUCTION

1.1 My name is Leo Donald Hills. I am a director of Commute Transportation Limited ("**Commute**").

Qualifications and experience

1.2 I hold a Master of Civil Engineering (2000) and a Bachelor of Engineering with Honours (1996), both from the University of Auckland. I am a Chartered Professional Engineer (CPEng) and a Chartered Member of Engineering New Zealand (CMEngNZ).

1.3 I have over 23 years' experience as a specialist traffic and transportation engineer. During that time, I have been engaged by local authorities and private companies/individuals to advise on traffic and development issues covering safety, management and planning matters of many kinds.

Involvement in the Rotokauri North Plan Change Project

1.4 I was engaged by Green Seed Consultants Limited ("**GSCL**") to assist with developing a masterplan, assessing the related traffic effects and providing advice on transportation, road design, access and parking in relation to the private plan change application for what is now proposed Plan Change 7 ("**PC7**" or "**Plan Change**") to the operative Hamilton City District Plan ("**District Plan**").

1.5 I am familiar with the Plan Change area ("**Plan Change area**" or "**Site**") and the surrounding locality.

1.6 I have been to the site and travelled the surrounding road network numerous times over a number of years while working in the area, most recently on 8 July 2021. I have read the relevant parts of the application material, the traffic related submissions received on the Plan Change and the Hamilton City Council ("**Council**") report prepared in accordance with S42A of the Resource Management Act 1991 ("**Council Report**").

1.7 I have participated in an expert conferencing session on transportation matters with respect to PC7, on 21 September 2021. The outcomes from that conferencing are detailed in the relevant joint witness statement that has been provided to the Hearing Panel.

Purpose and scope of evidence

1.8 The purpose of my evidence is to assess the potential traffic and transportation effects of the proposed rezoning. In that regard, my evidence:

(a) Provides a high-level summary of the Plan Change (Section 3);

(b) Summarises the existing traffic environment (Section 4);

(c) Describes my assessment of operational traffic effects of the Plan Change (Section 5); including:

(i) Proposed active mode access.

(ii) Public transport access.

(iii) Traffic generation and revised modelling.

(d) Outlines the proposed implementation plan to address operational traffic effects (Section 6);

(e) Addresses the submissions on transport matters (Section 7);

(f) Addresses the Council Report (Section 8);

(g) Comments on the latest version of the PC7 provisions (Section 9); and

(h) Provides concluding comments (Section 10).

1.9 A summary of my evidence is set out in Section 2 below.

1.10 My evidence relies on and should be read in conjunction with that of:

(a) The Rotokauri North PPC Integrated Transportation Assessment ("**ITA**"), dated 30 April 2019 and the Rotokauri North PPC ITA V2.0 dated 20 March 2020 both

prepared by Commute (referred to as the "**Original ITA**" and "**V2.0 ITA**" respectively); and

(b) The revised structure Plan / Traffic modelling letter dated 22 July 2021 (referred to as the "**2021 Addendum**").

Expert Witness Code of Conduct

1.11 I have been provided with a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's 2014 Practice Note. I have read and agree to comply with that Code. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

2. SUMMARY OF EVIDENCE

2.1 I was engaged by GSCL to undertake an ITA of PC7 to the District Plan, which is located at the northwestern edge of Hamilton. The Plan Change area is currently zoned 'Future Urban' under the District Plan.

2.2 Based on the modelling and assessment outlined in the ITAs and through expert conferencing, I consider that the full extent of development enabled by PC7 can be appropriately supported by the existing road network and upgrades to the existing transport network (as I detail below), to maintain appropriate levels of safety and efficiency on the surrounding transport network.

2.3 A number of transport upgrades will be required from the outset (i.e. prior to occupation of any dwellings in the Plan Change area) to support the residential development proposed by PC7. These include:

(a) Construction of the roundabout at the intersection of SH39 and the new collector road within PC7 ("**Collector Road 1**");

(b) Construction of road frontage upgrades to Exelby Road (eastern side only) and Burbush Road (both sides), when the first connections are made to these roads; and

(c) Walking and cycling connections from the PC7 development to the existing walking / cycling network.

2.4 Other upgrades are required (in particular to the Burbush Road – Exelby Road link and Exelby Road / Burbush Road intersection); however, these are not in my opinion required until at least 500 dwellings are established within the Plan Change area.

2.5 In my opinion, the revisions to the PC7 provisions (as outlined above and attached to the evidence of Mr Tollemache and Ms Fraser-Smith) appropriately address and respond to all traffic and transportation matters raised by submitters, including landowners and local residents. These provisions also include appropriate triggers to ensure that all the required transport upgrades I have identified are implemented in a timely manner.

2.6 Finally, I note that there will be cumulative traffic effects on the roading network surrounding PC7 from both that development, and others planned in the local and wider area. Thus, I do not consider that all of the required transport upgrades should be the sole responsibility of PC7 (e.g. upgrading Exelby Road / Rotokauri Road intersection). In this regard, I also note that the Council has a range of tools it can use to fund and implement those upgrades in an equitable manner, including development contributions and targeted rates.

2.7 Overall, I consider that PC7 is acceptable and an appropriate use of the Site from a transport planning perspective and that there is no reason from that perspective for the proposed rezoning not to be approved.

3. THE PLAN CHANGE PROPOSAL

General

3.1 PC7 seeks to rezone approximately 140 ha of land, located within the operative Rotokauri Structure Plan ("**Structure Plan**"), at the northwestern edge of Hamilton. The Plan Change area is currently zoned 'Future Urban' under the District Plan and is proposed to be rezoned as follows:

(a) 137.6 ha of Medium Density Residential Zone; and

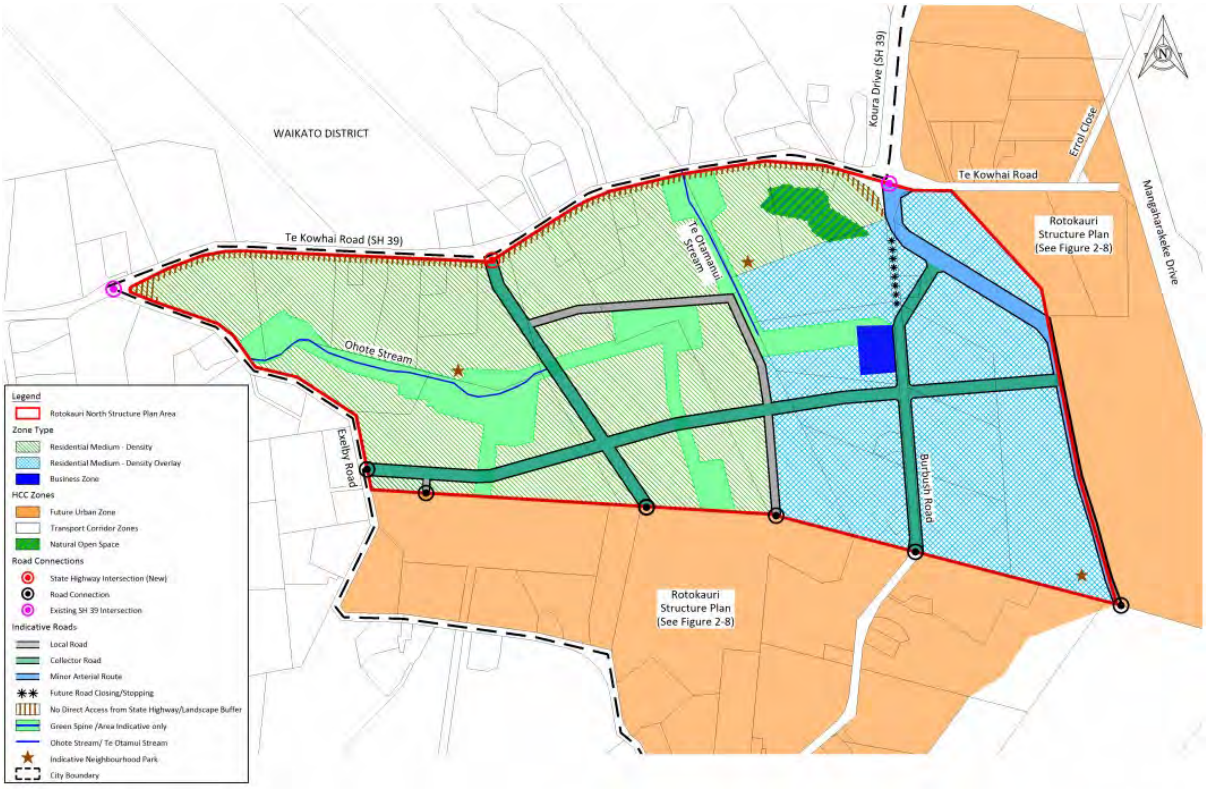
(b) 1.2 ha of Business 6 Zone.

3.2 The PC7 area, including the associated roading provisions outlined within my evidence, will be complementary to the development planned within the Structure Plan, but will be subject to a new/updated Structure Plan specific to the Rotokauri North area ("**Rotokauri North Structure Plan**").

Internal road layout

3.3 Access to the Site is provided via SH39 to the north, Burbush Road to the east and Exelby Road to the west. An additional three future connections to the south have been allowed for once development to the south of the Plan Change area occurs. **Figure 1** below shows the zoning and the hierarchy of roads proposed within the Plan Change area.

Figure 1: Proposed zoning and hierarchy layout of Rotokauri North



3.4 I note that that this plan differs from that shown within the Plan Change ITA's (original and V2) and aligns with that shown within the 2021 Addendum. Through the additional analysis and discussions with submitters and Council officers, several changes have been made to the road hierarchy and connections proposed to the existing road network. These include:

(a) Reducing the number of connections onto SH39 from two to one. This remaining location is in the same location as identified in the Structure Plan; and

(b) Adjustments to the internal road layout generally as a result of the reduced number of connections.

Yield

3.5 The potential yield of the Site has generally remained consistent within the ITAs and subsequent 2021 Addendum assessment, with a yield of 2,000 dwellings expected within the Plan Change area plus a neighborhood centre. Based on discussions with the Ministry of Education ("**MoE**"), an education facility within the Rotokauri North area has also been allowed for within the latest model run. That said, I note that confirmation and designation of the school and the site for the school is the responsibility of MoE.

3.6 The expected yields are set out in **Table 1** below.

Table 1: Expected yields within PC7

Land use	Lots	Number of units / GFA
Medium Density Residential Zone	137.6 ha	2,000 dwellings
Business Zoning	1.2 ha	NA

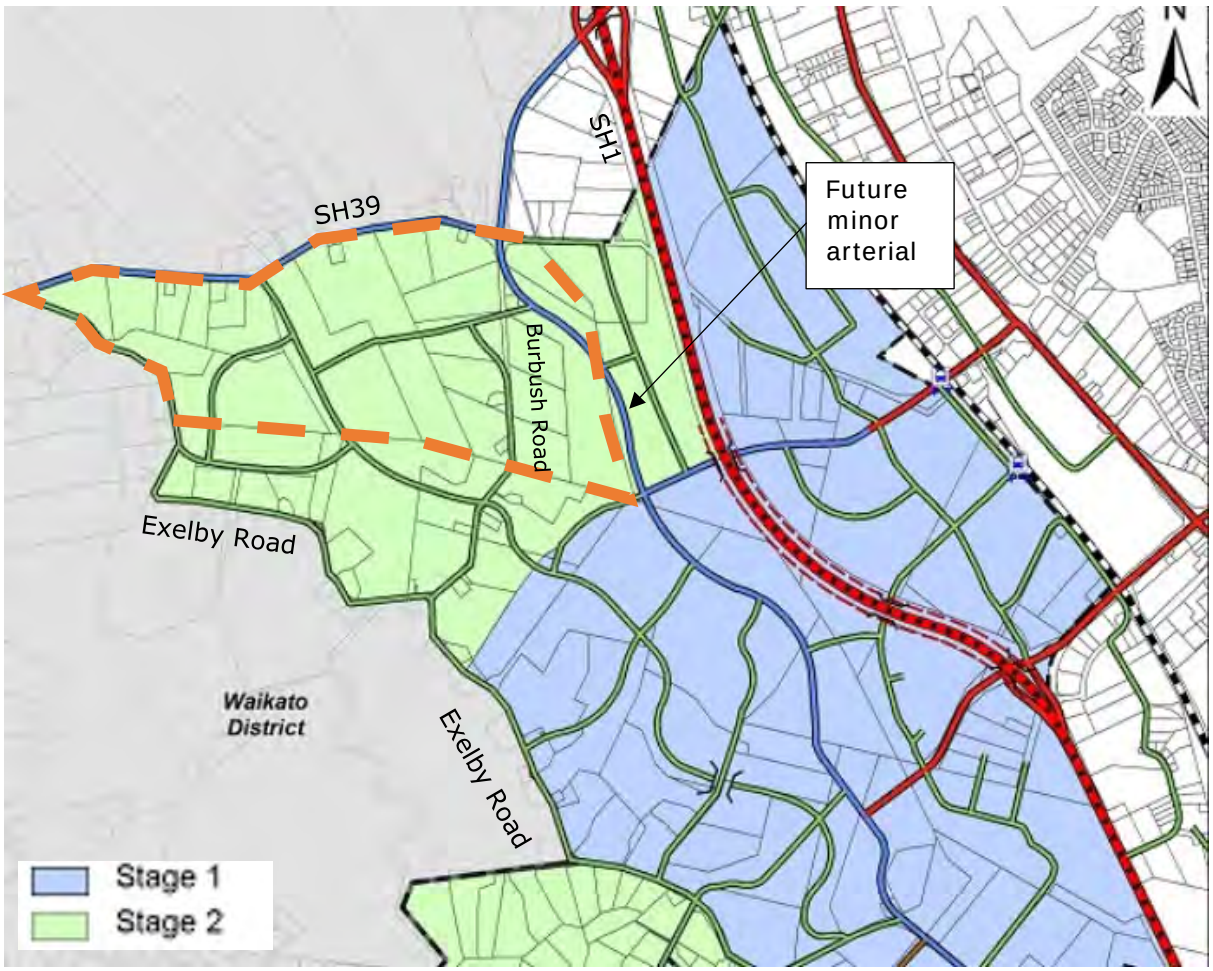
4. EXISTING TRANSPORT ENVIRONMENT

4.1 The relevant components of the existing transport environment are described below.

Site location

4.2 PC7 is located within the north-west of Hamilton, at the northern end of the Structure Plan boundary. The site is zoned as 'Future Urban' in the District Plan. **Figure 2** below shows the Site in relation to the surrounding area, including the Structure Plan.

Figure 2: Location of site in relation to the surrounding area (outlined in orange)



4.3 The Site is currently predominantly rural in nature and serves approximately 20 dwellings. It is located to the west of the SH1 and bounded by SH39 to the north, Burbush Road to the east and Exelby Road to the west. The existing properties currently gain access via SH39, Exelby Road or Burbush Road respectively.

4.4 The site is well located with regard to vehicle connections to and from the wider Hamilton and Auckland regions. The SH1 / Koura Drive interchange is located in close proximity (less than a three-minute drive) to the Site and connects the Site to the Waikato Expressway Northbound ("**NBD**") and Southbound ("**SBD**") ramps as well as the Hamilton suburbs located to the east of SH1.

Surrounding road network

SH39

4.5 SH39 (also known as Te Kowhai Road) runs east-west along the northern boundary of the site. SH39 is a two-way, two-lane road with a typical seal width of approximately 11 m. It is marked with a centre line and edge-line markings and is considered to be in excellent condition. This section of SH39 was upgraded in 2014 as part of a project to re-route SH39 as a more direct link to SH1. The posted speed limit on SH39 (fronting the Site) is 80 km/hr. **Photograph 1** shows the typical layout of SH39 fronting the Site.

Photograph 1: SH39 – typical layout looking west

4.6 Near the north-eastern corner of the Site, SH39 forms a large single-lane roundabout with Te Kowhai Road / Burbush Road and then continues northwards on Koura Drive to a full grade-separated interchange with SH1 (the Waikato Expressway). The SH39 / Burbush Road roundabout provides off-road cycle paths on all approaches as shown in **Figure 3.**

Figure 3: Aerial image of the Te Kowhai Road / Burbush Road roundabout

4.7 SH39 is identified as a 'Major Arterial Transport Corridor' within the Council's Transport corridor hierarchy plan (**HCC Transport Hierarchy Plan**). The Structure Plan identifies SH39 as a 'Minor Arterial Transport Corridor'.

Burbush Road

4.8 Burbush Road runs approximately north-east / south-west between SH39 and Exelby Road, near the eastern boundary of the Site. The posted speed limit along Burbush Road is 80 km/hr.

4.9 Burbush Road is currently rural in nature and has a typical varying seal width of approximately 5.5-5.7 m in the vicinity of the site, and no pedestrian or cyclist facilities (excluding at the approach to the Te Kowhai Road / Burbush Road roundabout). Burbush Road is marked with a dashed centre line from SH39 to Exelby Road. **Photograph 1** shows the typical layout of Burbush Road fronting the site.

Photograph 2: Burbush Road – typical layout looking south

4.10 Burbush Road is identified as a 'Collector Transport Corridor' within the Structure Plan. Further, the HCC Transport Hierarchy Plan identifies Burbush Road as a 'Proposed Collector Transport Corridor'; these corridors are identified as:

> *"…both a movement and property access function. These transport corridors often move goods and people between local destinations or to higher order transport corridors for further travel. Property access is provided with few restrictions. Depending on the land use environment heavy freight and through traffic may be limited on these corridors. Intra-city passenger transport services are likely to use these routes."*

4.11 As noted above, Burbush Road connects to SH39 via a single lane roundabout to the north. The HCC Transport Hierarchy Plan indicates that Burbush Road near the northern end will be realigned to connect to a Proposed Minor Arterial Transport corridor. This aligns with the road network proposed within PC7 and planned as part of the Structure Plan.

Exelby Road

4.12 Exelby Road runs generally north-west / south-east between SH39 and Rotokauri Road respectively and forms the western boundary of the Site. Exelby Road is currently rural in nature and has a typical seal width of approximately 5.7 m near the vicinity of the Site.

4.13 The posted speed limit on Exelby Road is 80 km/hr. **Photograph 1** shows the typical layout of Exelby Road fronting the site.

Photograph 3: Exelby Road – typical layout looking north towards SH39

4.14 Exelby Road is identified as a 'Collector Transport Corridor' within the Structure Plan and 'Proposed Collector Transport Corridor' with the HCC Transport Hierarchy Plan.

4.15 Based on the above, it is anticipated that Burbush Road and Exelby Road are planned to be upgraded to a Collector road function as surrounding area is urbanised.

Existing active mode facilities

4.16 There are currently no dedicated cycle facilities on Exelby Road, Burbush Road or SH39. This excludes some localised off-road shared path provided at the approaches to the Te Kowhai Road / Burbush Road roundabout.

4.17 A connection to the 'Waikato Expressway Cycle Path' is provided at the eastern end of Te Kowhai Road (the non-State Highway section of Te Kowhai Road). This facility runs parallel to SH1 and connects the Site (via Te Kowhai Road) to numerous existing walking and cycling facilities on the eastern side of SH1.

4.18 No walking or cycle facilities are currently provided along Te Kowhai Road between the SH39 / Burbush Road roundabout and the Waikato Expressway Cycle Path. However, the provisions included as part of PC7 will "close this gap" by providing a 3m shared path along one side of Te Kowhai Road, thereby enabling a continuous route between the SH39 / Burbush Road roundabout and Waikato Expressway Cycle Path. **Figure 4**[1] shows the existing cycle provisions (yellow being off road cycle provision and blue being on-road provisions) within Hamilton including the Te Kowhai Road connection.

Figure 4:HCC Bike Hamilton Bike map

Road safety

4.19 A search of the road safety record using the New Zealand Transport Agency's ("**NZTA**") Crash Analysis System ("**CAS**") has been undertaken to identify all crashes reported

[1] Hamilton Bike Map (February 2017 edition), taken from the Council's website.

near the vicinity of the site during the five-year period from 2016 to 2020 including all available crashes in 2021. The study area includes the following road sections:

(a) SH39 (between Exelby Road and SH1 including the SH1 southbound off-ramp);

(b) Burbush Road (between SH39 and Exelby Road);

(c) Exelby Road (between SH39 and Rotokauri Road); and

(d) Other several local roads including Te Kowhai Road (east of SH39) and Errol Close.

4.20 In total, 22 crashes were identified within the study area and are summarised in Table 2 below.

Table 2: CAS summary

Road name / intersection	No. of crashes and severity	Description
Exelby Road / SH39 intersection	1 crash (serious injury)	Crash near the intersection involving a vehicle westbound on SH39 losing control and going off road to the right (attempted suicide).
Exelby Road (SH39 to Burbush Road)	0 crashes	N/A
Exelby Road / Burbush Road intersection	0 crashes	N/A
Exelby Road (Burbush Road to Rotokauri Road)	2 crashes (non-injury)	Two loss of control crashes from vehicles; loss of control when turning / too far left were listed as contributing factors.
Exelby Road / Rotokauri Road intersection	0 crashes	N/A
SH39 / Burbush Road roundabout	1 crash (non-injury)	Lost control turning right, Car/Wagon1 hit non-specific traffic island / non-specific pole (alcohol test above limit or test refused).
Burbush Road	2 crashes (non-injury)	Two loss of control crashes from vehicles turning left / right; loss of control when turning and inappropriate speed for road conditions / worn tread on tire were listed as contributing factors.
SH39 (Te Kowhai Road)	2 crashes (non-injury)	One loss of control crash (too far left / wrong pedal) and one crash involving a truck westbound on Te Kowhai Road hitting obstruction (animal).
SH39 / SH1 NBD ramps	5 related crashes (non-injury) 1 crash (minor injury)	The majority of crashes involved vehicles merging from the right, turning right and hit by oncoming car and crossing at a right angle. Failure to give way at priority traffic

Road name / intersection	No. of crashes and severity	Description
		control / failed to give-way turning to non-turning traffic and visibility limited by curve were listed as contributing factors. One minor injury related crash involved a vehicle turning right hit by an oncoming car on Koura Drive (failed to give way turning to non-turning traffic and new driver/under instruction were listed as contributing factors).
SH39 / SH1 SBD ramps	3 crashes including 2 minor injury related crashes	One crash involved a vehicle southbound on Koura Drive hitting a car crossing at a right angle from the right resulting in two minor injuries (failed to give way at priority traffic control and alcohol suspected were listed as contributing factors). One crash involved a vehicle northbound on Koura Drive hitting a car turning right onto road from the left resulting in two minor injuries (turning vehicle did not stop at stop sign).
Other crashes	1 minor injury related crash and 1 non-injury related crash on SH1 northbound off ramp 1 crash on Koura Drive (non-injury) 2 crashes on SH39 / Koura Drive (non-injury)	The minor injury related crash recorded on the SH1 northbound off-ramp involved a van northbound losing control when turning left (attention diverted). Two crashes were recorded on SH39 / Koura Drive and involved a UTE hitting rear end of car stopped / moving slowly (other intentional / criminal were listed as a contributing factors) and one loss of control crash (fatigue due to lack of sleep was listed as a contributing factor).

4.21 As can be seen, a number of 'loss of control' crashes have been reported within the study area. A number of crashes were also recorded at the SH39/ Koura NBD and SBD ramps connections; however, the majority of these involved vehicles turning / merging and were largely non-injury. This excludes three crashes which resulted in minor injuries and, of those, two crashes resulted in two minor injuries each; these crashes resulted from a driver failing to stop at stop sign / failed to give way to priority traffic.

4.22 Provided that any new intersection on SH39 and internal intersections are designed appropriately and comply with Austroads sight distance requirements, I consider that potential residential development in accordance with PC7 (including the restriction on private access to SH39) will not exacerbate the existing road safety record. It is noted that the surrounding road network is currently rural in nature. Following development in accordance with PC7 (and eventually, the Structure Plan), the area will be urbanised. As such, the speed limits are likely to decrease.

4.23 I note that no reported crashes have occurred at the Burbush Road / Exelby Road intersection or the Rotokauri Road / Exelby Road intersection over the last 5 years.

Traffic volumes

4.24 Daily traffic volumes have been extracted from a TDG preliminary transportation review (dated 2017) and NZTA state highway traffic count database for Exelby Road, Burbush Road and SH39 (Te Kowhai Road). The Hamilton City Traffic Counts website also provides traffic counts along SH39 (near the Site) and Rotokauri Road in 2020. The peak hour volume has been estimated to be 10% of the daily volume; this is outlined in Table 3 below.

Table 3: Traffic volumes

Road name	Average daily traffic (ADT)	Peak hour traffic (estimate)
Exelby Road	550 vpd	55 vph
Burbush Road	590 vpd	59 vph
SH39 Te Kowhai Road (between Limmer Road and Duck Road)	5,813 vpd	581 vph
SH39 Te Kowhai Road (80 m east of Exelby Road)	4,600 vpd	460 vph
Rotokauri Road (89 m east of Brymer Road)	1,900 vpd	190 vph

Future network

4.25 A minor arterial road is proposed in the eastern edge of the site as per the Rotokauri North Structure Plan (as shown previously in Figure 2). This will connect to the Te Kowhai Road / Burbush Road roundabout at the northern end. As a result of establishing the new minor arterial road, Burbush Road will be realigned at the northern end and is planned to connect to the minor arterial road, rather than the Te Kowhai Road / Burbush Road roundabout (as existing). The alignment also locates the northern section of this minor arterial entirely within the PPC area. I understand that a notice of requirement for this minor arterial is currently being prepared.

5. ASSESSMENT OF OPERATIONAL TRAFFIC EFFECTS OF THE PLAN CHANGE

Proposed active mode access

5.1 A comprehensive walking and cycling network will serve the Site, which will include the following:

(a) Dedicated walking and cycling facilities along the proposed minor arterial (both sides);

(b) Dedicated walking and cycling facilities along the proposed internal collector road network including 1.5 m wide on-road cycle lane and 1.8 m wide footpath (both sides); and

(c) 3m off-road shared path along Te Kowhai Road (non-State Highway section to the east of the site) extending between the SH39 / Burbush Road roundabout and Mangaharakeke off-road shared path.

5.2 The initial stages of development are planned to occur with access from SH39 (via the new roundabout). In this regard, a walking / cycling connection along SH39 from the roundabout to the SH39 / Burbush Road roundabout will also need to be provided as part of the PC7, potentially as a temporary solution. This will enable a continuous path between the new dwellings and the existing cycling network at Mangaharakeke (SH1).

5.3 The proposed active mode facilities will enable residents to cycle to nearby destinations such as The Base shopping centre and the Rotokauri Transport Hub. The proximity of the site to the Waikato Expressway cycle path is also likely to encourage residents to commute via cycle.

5.4 Additional active mode connections will be provided as the road network to the south of the site is developed and the minor arterial road is constructed.

Proposed public transport provision

5.5 As outlined within the Implementation Plan discussed in Section 6 below, provision of a public transport network to serve the area is recommended to occur after 1,000 dwellings have been constructed. This proposal is supported in particular by Waikato Regional Council ("**WRC**")[2].

5.6 In this regard, it was agreed as a result of expert caucusing that an indicative specific bus route (and facilities) will be identified within the Site, and the road network (specifically the collector and minor arterial roads) will be designed to cater for public transport access. This will give WRC the necessary flexibility to determine appropriate bus routes and bus stop locations, when there is sufficient demand to begin those services.

5.7 The Rotokauri Transport Hub was recently constructed approximately 4.8km southeast of the site. This is a connection point for the Hamilton to Auckland passenger rail service (Te Huia) as well as bus routes 0 (Orbiter) and 9 (Nawton) which link to wider Hamilton. The Transport Hub also currently provides a park 'n ride facility, rail station, bus interchange and pedestrian connection to The Base.

[2] WRC Submission, Topic 3, at page 5.

Anticipated traffic generation / effects of the Plan Change

5.8 Traffic modelling has been undertaken using the current version of the TRACKS (Waikato Regional Transport Model ("**WRTM**")), to determine the level of anticipated traffic generation resulting from development within the Plan Change area for the years 2021 and 2041 respectively. The initial modelling included two connections onto SH39.

5.9 Following comments received from both the Council and NZTA, the Rotokauri North Structure Plan was amended to include one connection only onto SH39 (as shown in Figure 1 above). As a result, the 2041 scenario was then re-modelled to incorporate the revised Rotokauri North Structure Plan layout. No additional modelling was undertaken for the 2021 scenario; this was not considered necessary as this generally aligned with the proposed roading connections.

5.10 The modelling results for the years 2021 and 2041, based on the roading network shown in the current Rotokauri North Structure Plan, are accordingly outlined within the 2021 Addendum. This document essentially supersedes the 2041 modelling outputs within the Original ITA and V2.0 ITA.

5.11 A high-level assessment of the revised modelling outputs has then been made to understand the change in volumes particularly along Burbush Road and Exelby Road (rural roads) as a result of the Plan Change development for the years 2021 and 2041. I summarise that assessment, and the mitigation (roading upgrades) that the modelling shows as being required to accommodate those traffic volumes, as follows.

Modelling outputs and required upgrades – 2021 "base" scenario (150 dwellings)

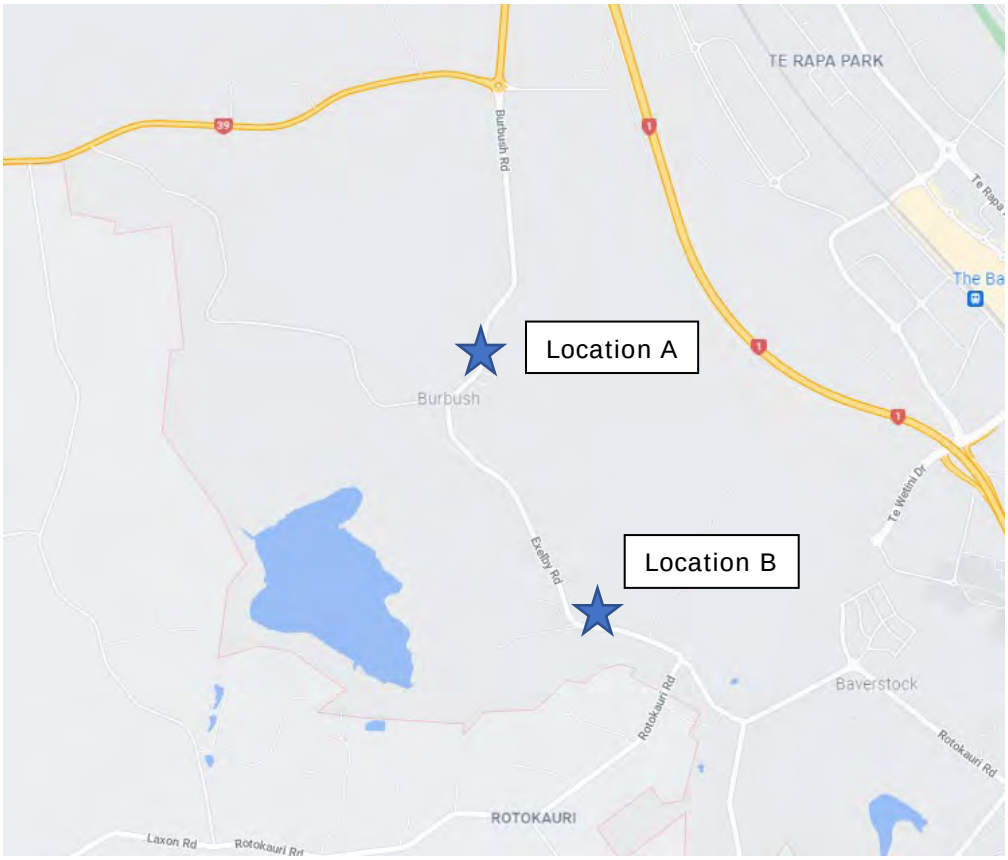
5.12 The 2021 scenario includes the development of 150 dwellings with a single connection via SH39 only. This scenario aligns with the proposed staging plan for the Plan Change[3] and essentially provide a "baseline" scenario. Traffic modelling was undertaken using SIDRA analysis at the Collector 1 / SH39 intersection (using a single lane roundabout) and at nearby intersections.

5.13 I have also obtained from the WRTM a "Select Link" analysis (for the locations in **Figure 5**) which provides information as to where on any part of the road network in the model the traffic originates from. I have obtained information for both Exelby Road and Burbush Road (the Burbush – Exelby Road link to the south), as a number of submitters and Council's traffic reviewer have specifically queried the potential traffic effects of the Plan Change on these roads. It is therefore necessary to examine the potential traffic

[3] I note that this is not an indication that PC7 should be limited to a first stage of 150 dwellings for any specific period of time. Rather, it simply represents an appropriate scenario to run as a test model.

effects from PC7 on these roads, to determine whether (and, if so, when) they should be upgraded as a result of the current rezoning proposal.

Figure 5: Select Link analysis locations



5.14 In summary, the modelling demonstrated that:

(a) A single lane roundabout onto SH39 could cater for the volumes predicted at the roundabout for the 2021/baseline scenario;

(b) No upgrades to the existing road network were identified as a result of the initial Stage 1 development;

(c) A small portion of trips are expected to utilise the Burbush Road – Exelby Road link to the south (up to 11-12 trips per hour); and

(d) No trips are expected to utilise Exelby Road (north of Burbush Road).

Modelling outputs and required upgrades – 2041 "future" scenario

5.15 The 2041 "future" scenario has been modelled both with and without the provision of the Minor Arterial Road shown in the Structure Plan, which crosses the north-eastern corner of the Site. This was done at the request of the Council, to understand the effect of the volumes on the surrounding road network should the Minor Arterial Road not be

constructed or operational by 2041 (as the Rotokauri Stage 2 area is not funded in the Council's current Long Term Plan).

5.16 Through expert caucusing and in his report, Mr Black (the Council's traffic expert) has also queried whether there is certainty regarding the construction of links to Te Kowhai Road East and Taitea Drive and a link from Rotokauri Stage 1 to Burbush Road, given I have included these in the 2041 model (without the Minor Arterial Road). I note that both these links are shown as being within Stage 1 of the Structure Plan and thus I would expect them to be in place by 2041. If they are not in place, I would expect that the level of development within (and thus traffic generation from) Stage 1 of the Structure Plan would accordingly be less than currently anticipated. I have therefore retained those links for the purposes of my revised modelling exercise. I do however recognise that there is uncertainty in traffic modelling especially in the long term such as models for the 2041 scenario.

5.17 Following expert caucusing, I have endeavoured to have additional model testing completed by essentially removing more of the 2041 road network including a future link from Burbush Road to the Minor Arterial and beyond to arterial road east of SH1. With these further road links removed, the modelled traffic has less route choice and traffic volumes generally increase (including to Exelby and Burbush Roads). However, from my discussions with the consultants in charge of the WRTM model, in 2041 essentially all the land use (including residential dwellings) are occupied for Rotokauri (both Stage 1 and Stage 2 including the subject site). Removing a number of roading links within Rotokauri in the future model means some land will not be developed (if the roads are not in place, the dwellings will not be constructed). Therefore, if roading links are removed in Rotokauri, then land-use / dwellings (and therefore traffic) should also be removed. As such, I consider this to be an unrealistic scenario (leaving all the land-use but removing a number of critical roads) and have therefore used previous modelling results in the 2021 Addendum in my evidence.

Modelling outputs

5.18 In summary, the most recent modelling outputs and Select Link analysis demonstrates that for the year 2041:

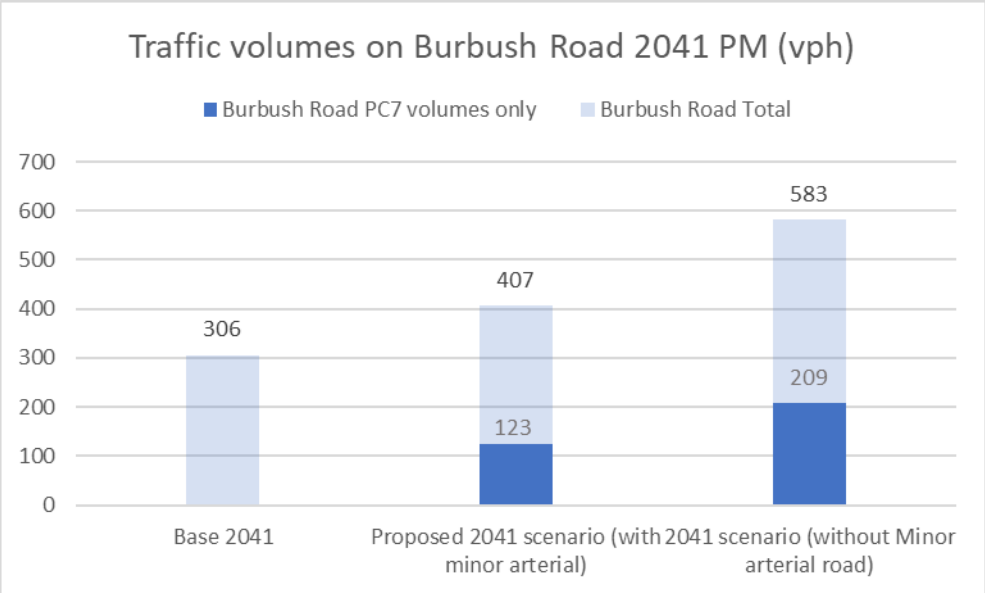
(a) The proposed single lane roundabout at the intersection of Collector Road 1 and SH39 is expected to operate at a Level of Service "A" with the Minor Arterial Road operational. As such, this is intersection can comfortably accommodate all the volumes predicted at this intersection, including that arising from development of the Site.

(b) A significant volume of traffic is expected to utilise the Minor Arterial Road to connect to the south, some 610-680 vehicles during the peak hour period (as is expected for a corridor with an arterial function).

(c) In a situation where the Minor Arterial Road is not yet constructed, the majority of volumes generated by the Site that were expected to utilise the Minor Arterial Road will largely shift to Burbush Road and a future link ("**link**") connecting to Burbush Road; this link is identified within the Structure Plan. I note that traffic volumes on this route will also increase in any event, even if the Minor Arterial Road is constructed.

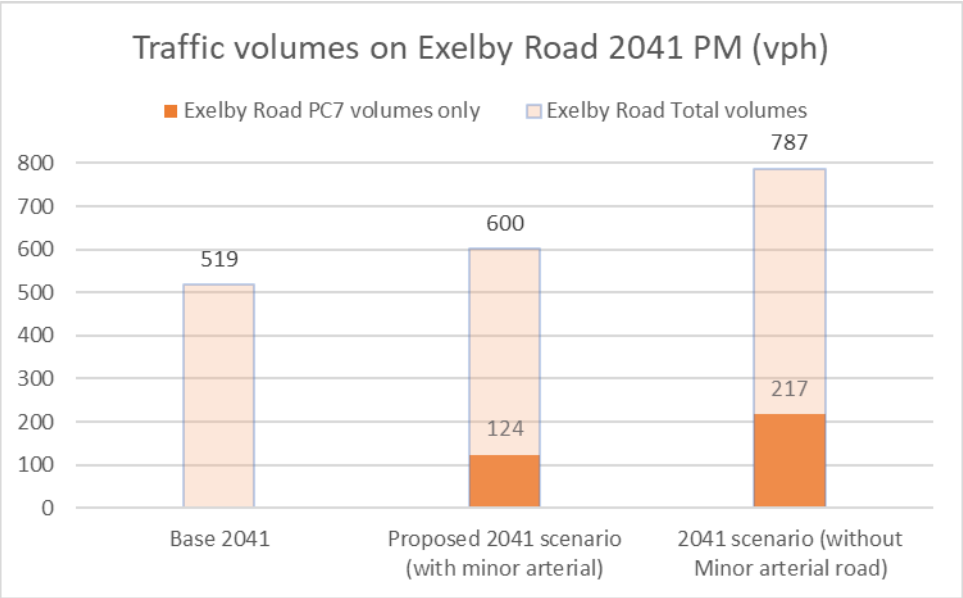
(d) As shown in **Figure 6** below (in which the dark blue represents PC7 traffic and light blue all other traffic), the Site is expected to generate approximately 123 vph (two-way) on the Burbush Road – Exelby Road link at Location A during the peak periods with the Minor Arterial Road in place, and 209 vph (two-way) without the Minor Arterial Road in place.

Figure 6: Burbush Road Select Link volumes (south of link)



(e) As shown in **Figure 7** below (in which the dark orange represents PC7 traffic and light orange all other traffic), the Site is expected to generate approximately 124 vph (two-way) on Exelby Road at Location B during the peak periods with the Minor Arterial Road in place, and 217 vph (two-way) without the Minor Arterial Road in place.

Figure 7: Exelby Road Select Link volumes



Required upgrades

5.19 From the above assessment, I conclude that for the year 2041:

(a) Both Burbush Road and Exelby Road will experience an increase in traffic as a result of PC7 (but also from other development in the Rotokauri growth cell); and

(b) Approximately 25-35% of the total traffic on these links will be generated as a result of development on the Site.

5.20 That said, it is also relevant to note that these roads (outside the boundaries of PC7) will be eventually upgraded by other developers (fronting these roads) in the Rotokauri Stage 1 and 2 Areas (to the south of the PC7). As such, any required upgrade to these corridors provided as part of PC7 would be an interim measure only.

5.21 Further, the existing road widths along Burbush Road and Exelby Road (south of Burbush Road) are already less than typical rural standards. That is, the carriage widths are currently less than 6.0m, whereas typically, a minimum 6.5m width including sealed shoulder is required for a local road.

5.22 Taking the above into account, I consider it is reasonable that the relevant sections of Burbush Road and Exelby Roads be upgraded (by widening to 7.7m) when traffic volumes reach the status of Collector Road (i.e. changes classification), that is 2,500 vpd.

5.23 Using a Peak Hour Factor ("**PHF**") of 15% (consistent with that recommended by Mr Black[4]), a peak hour flow of 375vph is therefore the threshold before these roads require an upgrade to a collector road standard. Of note, the volumes predicted in 2041 on Exelby Road already exceed this volume without PC7 traffic and thus would already warrant an upgrade.

5.24 Reviewing the PM peak modelling results (critical PM period), the anticipated traffic volumes on the Burbush – Exelby Road route are as outlined in **Table 4** below:

Table 4: Exelby link volumes

Site	150 Dwellings	2000 dwellings	
	Base	With arterial	Without arterial
Exelby Road (north of Lee Road)	280 vph	563vph	749vph
Increase from Base (150 dwellings)	N/A	+283 vph	+469 vph
Growth per year (assume linear growth)	N/A	14 vph / year	23 vph / year
Years to reach 375 vph	N/A	7 years	4 years

5.26 Assuming a linear growth of the 2,000 dwellings over the 20 years (excluding the initial 150 dwellings) of 93 dwellings per year this translates to:

(a) 520 dwellings before upgrade of route is required without the Minor Arterial Road; and

(b) 800 dwellings before upgrade of route is required with the Minor Arterial Road.

5.27 Accordingly, I consider that this level of development can occur in the Plan Change area before the upgrades of the Burbush – Exelby Road Link is required. I would, however, note that these upgrades would be required regardless of PC7, with PC7 effectively simply accelerating the need for the upgrade.

5.28 I do, however, recognise (and agree with Mr Black) that there are a number of variables in the above analysis, including a number of assumptions on growth in Rotokauri Stage 1, minor arterial status, potential new road links in the area and which roads are constructed. This influences the timing / threshold for the Burbush / Exelby link to be upgraded (noting again that it will be required at some point). As such, following the

[4] See page 7, footnote 8 of Mr Black's 'Updated Transportation Review' (Appendix D to the Council Report) (**Grey Matter review**).

expert caucusing, I consider that it would be more appropriate to use the lower level (say 500 dwellings) as the threshold.

5.29 The modelling also demonstrates that the section of Exelby Road to the north of Burbush Road never reaches the 2,500 vpd threshold, as a result of traffic generated by development within PC7. Thus, in my opinion, PC7 does not in itself result in this section of road needing to be upgraded. I do, however, consider that along the PC7 site frontage, Exelby Road should be upgraded to an urban road (on its eastern side). This should occur prior to any new roading connection from the Site to Exelby Road.

5.30 As I have noted in the 2021 Addendum, I also consider the intersection of Exelby Road / Burbush Road warrants an upgrade from the current (rather unusual) two leg priority intersection to a more standard give-way intersection (with right turn bay). In my view, this upgrade should be required after the construction of approximately 600 dwellings within the Site.

6. IMPLEMENTATION PLAN

6.1 As stated above and in the 2021 ITA, there are a number of roading and infrastructure projects required to facilitate the growth anticipated in Rotokauri North, under both PC7 and the Structure Plan. Several of those upgrading projects are directly relevant to this Site, and these are listed in **Table 5** (developer responsibility), while others relate to wider network and are shown in **Table 6** (other parties' responsibility). The below also includes a clearer trigger/timing for each infrastructure item.

6.2 Table 5 below sets out the projects proposed for implementation and funding as part of PC7 including external triggers and indicative timing of implementation.

Table 5: Implementation Plan (developer)

Project	Upgrade	Trigger / timing	
		With Arterial	**Without Arterial**
SH39 / New Road roundabout	Single lane roundabout at intersection of SH39 / New Collector Road	First dwelling with connection to SH39 via the new Collector Road.	Same.
Burbush Road upgrade (along site frontage)	Urban upgrade (both sides) along site frontage through to SH39.	Any new roading connection from the site to Burbush Road. Upgrade should include realignment of Burbush Road to link to new arterial in final location.	Same, however without new arterial in place a temporary upgrade of Burbush Road (northern end) should occur to widen to 7.7m. A temporary shared path to SH39 / Burbush Road roundabout will also

Project	Upgrade	Trigger / timing **With Arterial**	 **Without Arterial**
			likely be required however this is considered to be covered by separate "Shared Cycle Path" project below.
Exelby Road upgrade to collector road (along site frontage)	Urban upgrade (eastern side). Upgrade of entire carriageway to western side of road (rural). Along site frontage through to SH39.	Any new roading connection from the site to Exelby Road.	Same.
Burbush Road / Exelby Road link from the PPC site to the south to urban upgraded road (from others)	Rural road seal widening to the south to meet urban road in rest of Rotokauri.	Same as no arterial given uncertainty.	500 dwellings.
Exelby Road (between Burbush Road and the PPC site)	None	N/A	N/A
Exelby Road / Burbush Road intersection	Intersection upgrade (single intersection) including right turn bay.	Same as no arterial given uncertainty.	600 dwellings however more likely at same time as Burbush Road / Exelby Road link (i.e. 500 dwellings).
Bus provision within site	Provide bus route(s) as required throughout site.	As development occurs.	Same.
Shared Cycle Path	3m shared path (or dedicated cycle facility, or a combination of both) to connect to SH39 / Burbush Road roundabout.	As development occurs forming the main collector roads where walking and cycling are provided. This is anticipated to occur incrementally to match the relevant development frontage. However, the first stage of any development should make a connection to SH1 shared path (even via any temporary measures) to enable cycling provision from day 1.	Same.

Table 6: Implementation Plan (by others)

Project	Responsibility	Upgrade	Trigger / timing
Bus services within site	WRC	Provide bus route(s) as required throughout site	Likely feasible after 1000 dwellings
North-south arterial	Council / NZTA	Construction of the north-south minor arterial corridor between SH39 and the south-eastern corner of Rotokauri North and its connection to the proposed east-west minor arterial that will pass under the Waikato Expressway Te Rapa Section, or the continuation of the north/south minor arterial to the south.	No trigger necessary, scenarios without this roading connection have been included above in Table 1.

7. COMMENTS ON MATTERS RAISED IN SUBMISSIONS

7.1 I have read the submissions lodged on PC7 in relation to traffic / transportation matters.

7.2 As I have noted previously, additional expert traffic / transport conferencing has subsequently occurred relating to matters raised in some of these submissions. The only submitters who had transport engineers attend that conferencing were NZTA and WRC.

7.3 As a result of our ongoing engagement with key stakeholders and the discussions at expert conferencing, several changes have been made to the PC7 provisions (including the Rotokauri North Structure Plan) as those were notified, to address traffic and transportation concerns raised by submitters. In summary, the key amendments that have been agreed are as follows:

(a) Changes to the Rotokauri North Structure Plan relating to road location / intersection treatment, in particular by removing one of the proposed connections from PC7 to SH39, with consequential changes to the roading network internal to PC7.

(b) Clarification in the PC7 provisions that a shared walking / cycling facility will be provided from any site dwellings to SH39 / Burbush Road roundabout.

(c) Changes to the various District Plan provisions. These are discussed in detail in Section 9 below and in the evidence of Mr Tollemache and Ms Fraser-Smith.

(d) Clarification in the PC7 provisions that an upgrade of Burbush Road and Exelby Road (south of Burbush Road) is required.

7.4 In my opinion, these changes appropriately address and respond to the traffic / transportation issues raised in submissions, particularly those from landowners.

7.5 That said, there is one additional specific issue I would like to address. The submission by Lorraine van Asbeck expresses a concern that it may be difficult to access properties at 336 and 338 Te Kowhai Road (opposite the new Collector Road 1 roundabout with SH39). In this regard:

(a) I note a new house has recently been constructed at No 338 Re Kowhai Road;

(b) The Structure Plan has always had an intersection in this location, so this issue will arise regardless of whether PC7 is approved; and

(c) I have reviewed the design of the roundabout and the access to the properties at 336 and 338 Te Kowhai Road. Based on that review, I consider through detailed design at resource consent stage, a safe and efficient access arrangement can be found. **Figure 8** shows a concept of this roundabout with the accesses marked (concept drawn by BBO in reliance on my advice). This is not intended to be a final concept, but demonstrates that there are solutions available that will ensure access to 336 and 338 Te Kowhai Road can be provided for with the new road layout.

Figure 8: Revised SH39 roundabout

8. COMMENTS ON MATTERS RAISED IN THE COUNCIL SECTION 42A REPORT

General

8.1 The Council Section 42A Report addresses key submission points and provides an assessment of PC7. In relation to the traffic effects of PC7, a transportation review has been undertaken by Gray Matter Limited ("**Mr Black**"), on behalf of Council and is provided in Appendix D of the Council Report.

8.2 In summary, the key comments that Mr Black makes in relation to traffic / transportation matters relate to:

(a) Concerns regarding the staging of the Site;

(b) The need to upgrade existing rural corridors near the vicinity of the Site including Burbush Road and Exelby Road (full length);

(c) The need to upgrade of two existing intersections to a roundabout control, including:

(i) Burbush Road / Exelby Road intersection; and

(ii) Rotokauri Road / Exelby Road intersection.

(d) Walking and cycling provisions; and

(e) Public transport provisions.

8.3 I address each of these matters as follows.

Staging

8.4 Mr Black considers that a staging plan is necessary to manage the effects of PC7. In this regard, I acknowledge that without some form of staging, unacceptable outcomes may eventuate. In particular, the modelling and assessment I have undertaken assumes access to the initial dwellings is via the SH39 / Collector Road 1 roundabout (rather than say from Exelby Road or Burbush Road). Accordingly, rather than a full staging plan, I recommend that the connection to SH39 and construction of the roundabout be part of the first stage of development. This recommendation has been adopted, as addressed in Section 9 below.

8.5 I consider Mr Black's concerns regarding the staging of development in other locations, and the consequential interim effects, are also addressed by way of this additional planning provision. This identifies that the initial stage of development will occur via

access onto SH39 (including the roundabout with Collector Road 1) as modelled for the year 2021 scenario.

Upgrade of existing rural corridors

Burbush Road – Exelby Road link

8.6 Both Mr Black and I (through the 2021 Addendum) have identified the need to upgrade Burbush Road / Exelby Road link from the site to near the Rotokauri Road / Exelby Road intersection. This upgrade is essentially to widen the road (currently 5.5-6.0m sealed width) to a collector standard of 7.7m sealed width (5.7m carriageway plus 1m sealed shoulders). Our differences relate to when this should occur, with Mr Black considering the upgrade should occur with 200 dwellings without the Minor Arterial Road and 800 dwellings with the Minor Arterial Road[5]. By contrast, based on the assessment outlined above, I consider the threshold to be approximately 500 dwellings (now regardless of the Minor Arterial Road).

8.7 Mr Black identifies that in the 2021 proposed scenario (with 150 dwellings), the traffic volumes on Exelby Road (north of Lee Road) will "*increase to approximately 275veh/hr, almost three times the current hourly volume*"[6]. I consider that this is misleading, as it does not consider where this traffic originates from and, in particular, the level of traffic directly associated with PC7. Essentially, it implies that PC7 is tripling the traffic volume on this route. For the reasons I explain in detail below, this is not the case.

8.8 Mr Black is also incorrect when he states that in this location "*the base model indicates the peak hour volume as 200-250 veh/hr*"[7]. I refer to Attachment A of Mr Black's report (which I generally agree is an accurate representation of the WRTM outputs). In this location on Exelby Road (2021 north of Lee Road known as Intersection E), the WRTM outputs shows:

(a) Base volumes: 309 vehicles per hour AM Peak and 311 vehicles per hour in PM peak; and

(b) Development (150 dwellings): 276 vehicles per hour AM Peak and 280 vehicles per hour in PM peak.

8.9 As such, the model shows PC7 results in a decrease (33 and 31 vehicles per hour in AM peak and PM peak respectively) when compared with the base model, indicating the PC7 essentially has no effect (if not a positive effect) to this road, at least initially. The reason for this reduction is more to do with traffic re-routing as a result of the access location of the new dwellings (all via SH39) in the model, as opposed to the existing

[5] Page 9 of the Grey Matter review.
[6] Page 7 of the Grey Matter review.
[7] Page 7 (footnote 9) of the Grey Matter review.

dwellings on the Site, which have access spread across other roads including Exelby Road.

8.10 Notwithstanding the above, I have obtained from the WRTM model a "Select Link" analysis which provides information as to where on any part of the road network in the model the traffic originates from. The location is as per **Figure 5** above.

8.11 The Select Link analysis shows that the initial development of 150 dwellings is expected to generate an additional 11-12 vph[8] (AM and PM) in both locations (Burbush Road and Exelby Road) in 2021 or one vehicles every five minutes. In my opinion, it is therefore clear that of the increase in volumes Mr Black is referring to on Burbush Road / Exelby Road link ("*almost three times the current hourly volume*"), only a very minor portion is attributed to PC7 (11-12 vph). The remaining increase in volumes predicted along this corridor is in fact attributable to other surrounding developments that are already planned to occur.

8.12 To further put this into context, traffic associated with 150 dwellings being constructed on the Site will comprise approximately 4% of the total traffic volumes predicted along Burbush Road and Exelby Road (south of Burbush Road) in 2021.

8.13 Mr Black further considers that the triggers for widening Burbush Road and Exelby Road provided in the Implementation Plan are "*too high"*, due to uncertainty in delivery of the minor arterials, along within uncertainty in staging and location of the proposed development. As already outlined, Mr Black considers the upgrade should be 200 dwellings without the Minor Arterial Road and 800 dwellings with the Minor Arterial Road. In this regard, a development of 200 dwellings within the Site (as outlined above) would be expected to generate approximately 15-16 vph along Burbush Road and Exelby Road (pro-rata of the 150 dwellings) or one vehicle every 3-4 minutes. This level of traffic, in my opinion, will not adversely affect the performance of these corridors in any noticeable way.

8.14 I do, however, recognise that as development within PC7 progresses, the amount of traffic on this link will also increase and an upgrade will become necessary. There are a number of variables relating to the timing of this upgrade. As a result, I now consider it appropriate for an upgrade to be required at the lower level (500 dwellings) regardless of the arterial. Without any additional links associated with Rotokauri Stage 1 this would likely result in an increase in traffic of 35-45 vehicles per hour (one vehicle every 80-100 seconds).

[8] Using a two-hour to one hour factor of 0.55-0.57, as per Mr Black's assessment in Attachment A of the Grey Matter review.

Exelby Road (north of Burbush)

8.15 Mr Black considers this section of Exelby Road is required to be upgraded by PC7. In my opinion, this is not warranted as the modelling shows this section of Exelby Road does not ever meet the threshold for change in classification to a "collector" road. I also note that there have been no reported crashes on this section of road in the last 5 years. With the access staging now proposed (SH39 roundabout constructed first), there is no possibility of all PC7 traffic only using Exelby Road for access.

Rotokauri Road / Exelby Road intersection

8.16 The Rotokauri Road / Exelby Road intersection is situated approximately 2.9 km to the south of the PC7 southern boundary and actually borders the Rotokauri Rise development (future stage) as shown in **Figure 9** below. This area is live zoned as "Rotokauri Residential" and is identified within a mix of Residential High Density and Ridgeline Character area. I further note that this intersection is located directly adjacent to the Stage 1 Rotokauri as shown in **Figure 10** below.

Figure 9: Location of Rotokauri Road / Exelby Road in relation to live zoned land

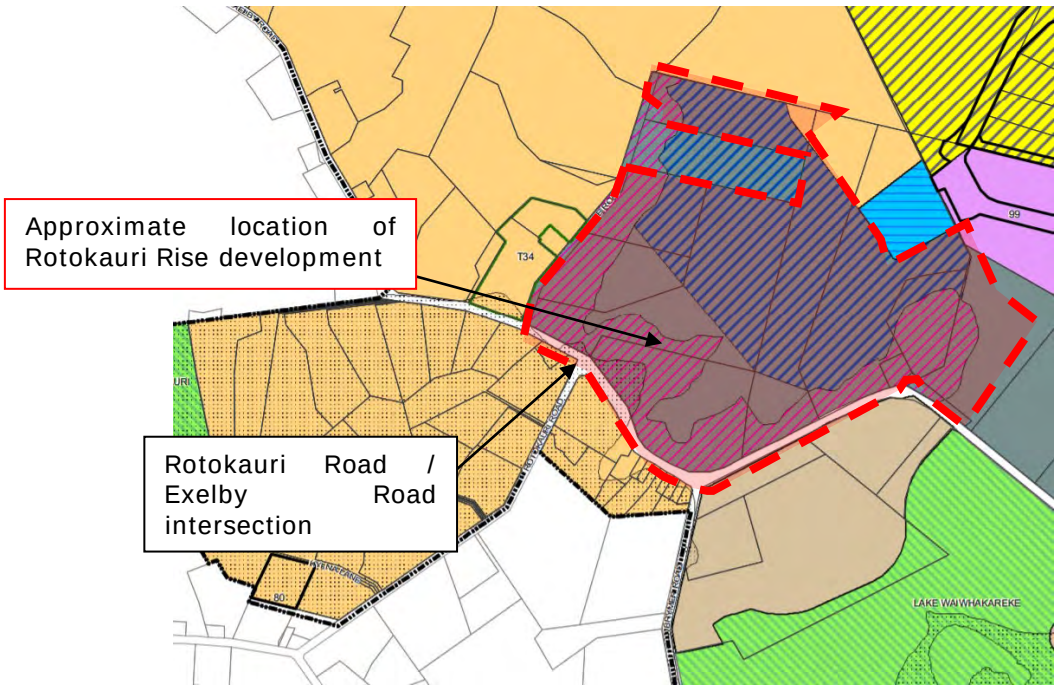
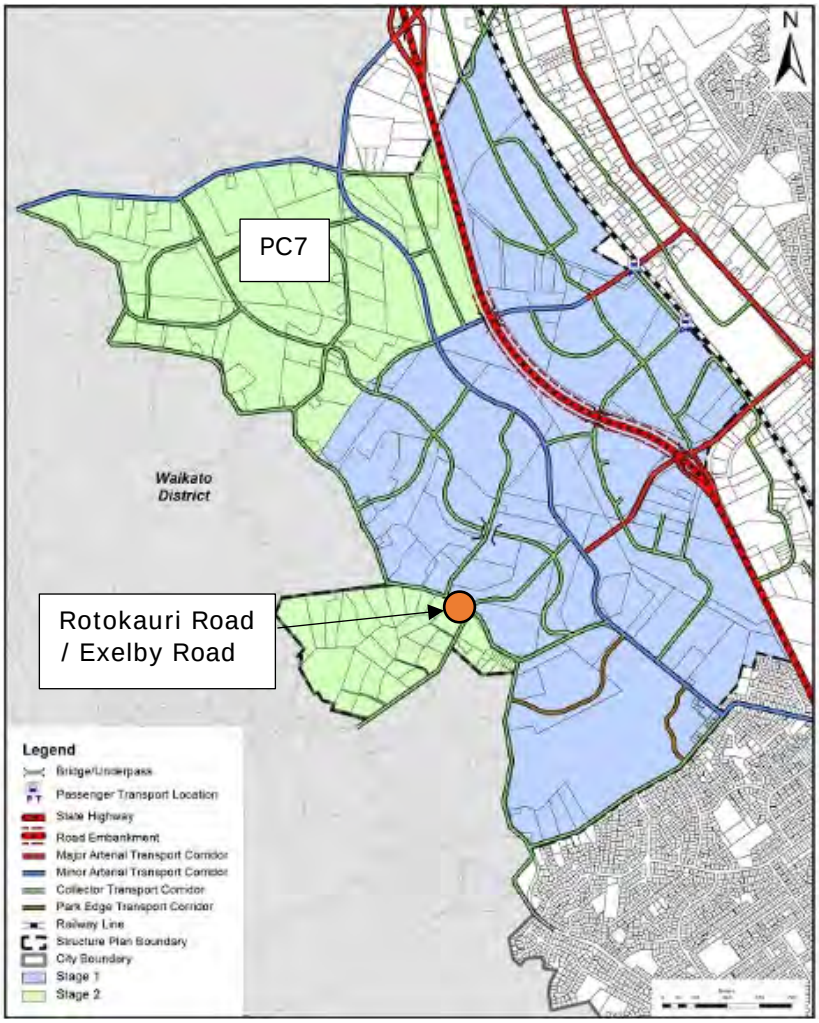


Figure 10: Rotokauri Structure Plan – Staging and Transport Network



8.17 In relation to Mr Black's comment about the right turning movements at this intersection, I highlight the following:

(a) In 2021 Base (PM) a right turn movement of 142-143 vph is predicted to occur (from Rotokauri Road to Exelby Road).

(b) In the 2021 Proposed (PM) with 150 dwellings from PC7 the right turn movement actually decreases to 134-135 vph (showing some rerouting with the additional roads in PC7).

(c) Mr Black recommends that this intersection should be upgraded to a roundabout with the development of 200 dwellings on the Plan Change site. Further analysis of the modelling indicates that the Stage 1 development comprising 150 dwellings (with a connection to SH39) will result in a potential increase of 11-12 vph on Exelby Road (and further afield at the aforementioned intersection). Assuming a linear increase in trips, 200 dwellings (the number Mr Black considers should be the threshold) is expected to result in an increase of 15-16 vph.

8.18 I also note that there have been no reported crashes at this intersection over the last five years and the intersection includes a right turn bay (from Rotokauri Road into Exelby Road). The NZTA CAS database provides crash data from 1980 onwards.

8.19 In this regard, I have undertaken a search of the CAS database to identify all the crashes recorded at this intersection (i.e. from 1980 onwards). Based on this, I note that:

(a) Five crashes were recorded at the Rotokauri Road / Exelby Road intersection over the past 40 years including two minor injury related crashes and three non-injury related crashes.

(b) The majority of crashes (and most recent, however, not within the last five years) involved vehicles losing control turning right / left on the bend (lost control when turning / speed entering corner / curve were listed as contributing factors).

(c) The remaining two crashes occurred in the 1990's (over 20 years ago) and involved a vehicle turning right onto Exelby Road being hit by a car eastbound on Rotokauri Road and one minor injury related crash involving a car northbound on Rotokauri Road hitting a car turning right onto road from the left (failure to give way to traffic crossing from right was listed as a contributing factor).

8.20 As such, Mr Black is recommending PC7 upgrade an intersection (to a full roundabout) that has no apparent poor safety record, no apparent efficiency issues, is some 3km from PC7, and at a point where PC7 would increase the number of vehicles at the intersection by only some 15-16 vph. In my opinion, PC7 does not warrant an upgrade of this intersection to a roundabout. It is evident that the level of turning volumes at this intersection is already expected to occur without PC7 and is likely a result of other developments within the area (potentially external to the Structure Plan).

8.21 In my opinion, the change in volumes at this intersection cannot be attributed to the PC7 site only, but rather I consider it to be a cumulative effect from vehicles from the neighbouring developments (as well as the PC7 site).

Burbush Road / Exelby Road intersection

8.22 The 2021 Addendum outlines that the Exelby Road / Burbush Road intersection is rather unusual in that it has two "legs" and no right turn bay as shown in **Figure 11** below.

Figure 11: Exelby Road / Burbush Road intersection

8.23 That assessment concluded that:

> *"From a review of the traffic volumes in 2021 and 2041 as well as the Austroads 'right turn bay warrants', the right turn bay will likely be required after approximately 30% of all traffic (including other development in Rotokauri) is generated at the intersection. In terms of the PPC, this equates to 600 dwellings (worst case) in that only PPC develops".*

8.24 In this regard, Mr Black considers that the trigger of 600 dwellings outlined within the proposed Implementation Plan is too high and the intersection improvement appears warranted following development of around 400 dwellings. However, he notes that the upgrade of this intersection should be co-ordinated with the widening of the Burbush Road / Exelby Road corridor, which he recommends should occur following development of 200 dwellings.

8.25 As I have noted, the initial development of 150 dwellings is expected to result in an increase of 11-13 vph on Burbush Road (and Exelby Road further afield). As such, the development of 200 dwellings (as recommended by Mr Black) is likely to follow a similar pattern and correspond to an increase of 15-16 vph. Further, the Select Link analysis of the modelling outputs I have undertaken indicates that none of these additional vehicles turn right onto Exelby Road (from Burbush Road). As such, vehicles associated with PC7 therefore do not contribute to any increase in right turn movements at this intersection.

8.26 In my opinion, the addition of 15-16 vph at an intersection to warrant an upgrade to a roundabout control, particularly since the initial development is unlikely to add to the turning movements at this intersection.

8.27 I further note that no crashes have occurred at this intersection over the five-year period and a wider search period (1980 onwards) also shows that only one crash has ever been reported at this intersection in 40 years, (in 2012) when the nearby area was undergoing roadworks.

8.28 The modelling included in the 2021 Addendum shows that the development of 2000 dwellings (by 2041) corresponds to an increase in approximately 20 right turn movements at this intersection during the PM peak period. However, I note that without the development, approximately 66 right turn movements are already anticipated at this intersection.

8.29 Mr Black has partly based his recommendation to upgrade to a roundabout on a Safe Systems Assessment Framework ("**SSAF**") (Tables 1 and 2 of his report). This assessment provides a method to assess the impact of increasing traffic volumes at the existing intersection. It provides a "score" out of 320, with the lowest scores indicating the closest alignment with the Safe Systems design approach. I note that Mr Black's assessment with the full 2,000 dwellings associated with PC7 shows "*The result is an increase in the total score from 8 to 23 (or 20/256 if pedestrians are excluded from the future scenario)*". In this regard, I note:

(a) The SSAF is meant to be a tool to compare intersection upgrade options, not necessarily to evaluate when to upgrade an intersection; and

(b) A score of 23 out of 320 does not in my opinion warrant an upgrade, especially such a significant one of a rural priority intersection with no apparent poor safety record to a full rural roundabout (which would be difficult to implement).

8.30 I do, however, agree with Mr Black that this intersection should eventually be upgraded. In my opinion, an upgrade whereby the intersection is made more "typical" by removing the two legs, together with a right turn bay is appropriate, especially as it will essentially be a temporary measure until the land surrounding the intersection is urbanised. I have based my analysis on Austroads Right 'right turn bay warrant' which I still consider to be appropriate.

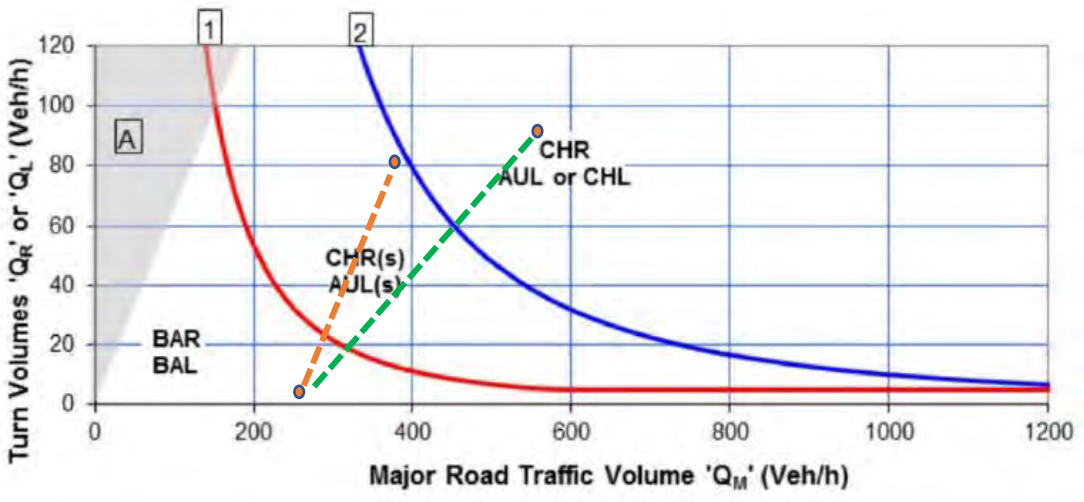
8.31 In this regard I have obtained critical PM peak volumes right at this intersection (Mr Black has use volumes at a slightly different location) for the various scenarios, as shown in Table 7 below:

Table 7: Volume at Exelby / Burbush Road intersection

PM peak	1hr Right turn volume	1hr through volume + left turn
2021 (with 150 dwellings)	1	236
2041 base (no PC7) with arterial	59	312
2041 2000 dwellings (with arterial)	80	394
2041 2000 dwellings (no arterial)	90	577

8.32 I have then plotted the 2041 2000 dwellings (with and without the Minor Arterial Road) scenarios against the relevant Austroads 'right turn warrant' in **Figure 12** below. The orange line indicates the 2041 2,000 dwellings scenario with the Minor Arterial Road, and the green line is the 2041 2,000 dwellings scenario without the Minor Arterial Road.

Figure 12: Austroads Warrant



(b) 70 km/h < Design Speed < 100 km/h

8.33 From my analysis, the upgrade (when the volume passes the red line) is 30% in the orange line (with arterial) and 22% in the green line (without arterial). Again, this is after the original 150 dwellings and thus represents 560-700 dwellings (I have used 600 dwellings). I would, however, emphasise that even without PC7, the volume would still indicate an upgrade is required (simply moved forward slightly). Again, I agree with Mr Black that there are a number of variables within this assessment and thus have now recommended that the timing of this upgrade be the same as the Exelby Road / Burbush Road upgrade (500 dwellings).

8.34 I also note that Mr Black considers a right turn bay may be difficult to construct and may have sight distance issues. I do not share Mr Black's concerns and consider the intersection can be upgraded safety. **Figure 13** and **Attachment A** shows a concept

of this intersection upgrade. Regardless of this, in my experience any upgrade would be further assessed during the resource consent process and would be subject to a full safety audit.

Figure 13: Exelby Road / Burbush Road intersection (upgrade)

Walking and cycling provisions

8.35 Mr Black has suggested changes to the Rotokauri North Structure Plan (Figure 14 of his report) relating to walking and cycling provisions. The changes including showing future off-road walking and cycling links through the green corridors.

8.36 In my view, off-road walking and cycling links through green corridors are not strictly a traffic engineering issue. I therefore leave this matter to be addressed in detail by Messrs Munro and Tollemache, and Ms Fraser-Smith.

Public transport provisions

8.37 Mr Black has suggested changes to the Rotokauri North Structure Plan (Figure 15 of his report) which essentially includes identification of future bus routes and generally public transport infrastructure (e.g. bus stop, shelters). In my experience with residential subdivisions, it is not usual (or necessary) to be provided with and allow for exact bus routes and specific details of bus infrastructure, at the plan change stage.

8.38 Bus routes typically change and evolve within developing areas, and it is thus my opinion that exact bus routes do not need to be defined in the Rotokauri North Structure

Plan. However, I do accept that key roads should be designed to allow bus routes to occur in future (which in this case are all the Collector Roads).

8.39 Regardless of this, WRC has indicated they would prefer at least “indicative” bus routes and stops to be shown in the Rotokauri North Structure Plan. This has now been included in the latest version of that plan, as attached to the evidence of Mr Tollemache and Ms Fraser-Smith.

8.40 Finally, I understand that there is currently no public transport funding for any future bus route. Therefore, any initial services are likely to be demand responsive public transport services, which typically comprise flexible routes and scheduling. In my experience, this is common (and appropriate) in developing greenfield areas.

9. PROPOSED PLAN PROVISIONS

9.1 A number of planning provisions are proposed to achieve the desired traffic outcomes (in conjunction with the Hamilton-wide traffic provisions that will apply to the Site). I have reviewed the revised PC7 provisions as attached to the evidence of Mr Tollemache and Ms Fraser-Smith, which (as explained in that evidence) ensure the relevant roading upgrades will be required (and implemented) in accordance with my recommendations. I accordingly consider that the transport-related effects associated with development in the Plan Change area will be appropriately managed, with the adoption of those amended provisions.

10. CONCLUSION

10.1 Based on the modelling and assessment outlined in the ITA’s and through expert conferencing, I consider that the full extent of development enabled by PC7 can be appropriately supported by the existing road network and upgrades to the existing transport network (as I have detailed), to maintain appropriate levels of safety and efficiency on the surrounding transport network.

10.2 In my opinion, the revisions to the PC7 provisions (as outlined in the evidence of Mr Tollemache and Ms Fraser-Smith) appropriately address and respond to all traffic and transportation matters raised by submitters, including landowners and local residents.

10.3 There are a number of transport upgrades that will be required from the outset, to support development of the PC7 area. These include construction of the roundabout at the SH39 / Collector Road 1 intersection, road frontage upgrades to Exelby Road and Burbush Road (when the first connections are made to these roads) and walking and cycling connections to the existing network.

10.4 Other upgrades are required (in particular to the Burbush Road – Exelby Road link and Exelby Road / Burbush Road intersection), however these are not required in my opinion until at least 500 dwellings.

10.5 Appropriate triggers to ensure that all the required upgrades are implemented in a timely manner have been included in the revised PC7 provisions, as I have also outlined above.

10.6 Finally, I note that there will be cumulative traffic effects on the roading network surrounding PC7 from both that development, and others planned in the local and wider area. Thus, I do not consider that not all of the required transport upgrades should be the sole responsibility of PC7 (e.g. upgrading Exelby Road / Rotokauri Road intersection). In this regard, I also note that the Council has a range of tools it can use to fund and implement those upgrades in an equitable manner, including development contributions and targeted rates.

10.7 Overall, for the reasons and based on the assessment I have outlined above, I consider that PC7 is acceptable and an appropriate use of the Site from a transport planning perspective and that there is no reason from that perspective for the proposed rezoning not to be approved.

Leo Donald Hills
24 September 2021

Attachment A

Revision notes:		
Rev:	Date:	Notes:

Drawn by: LH	Project: Rotokauri North	Date: 20 September 2021	commute TRANSPORTATION CONSULTANTS	Figure: 1
Rotokauri North	Exelby Road / Burbury Road upgrade	Scale @ A3: 1:500		
Client:	Drawing Title: Right turn bay	Revision: A		