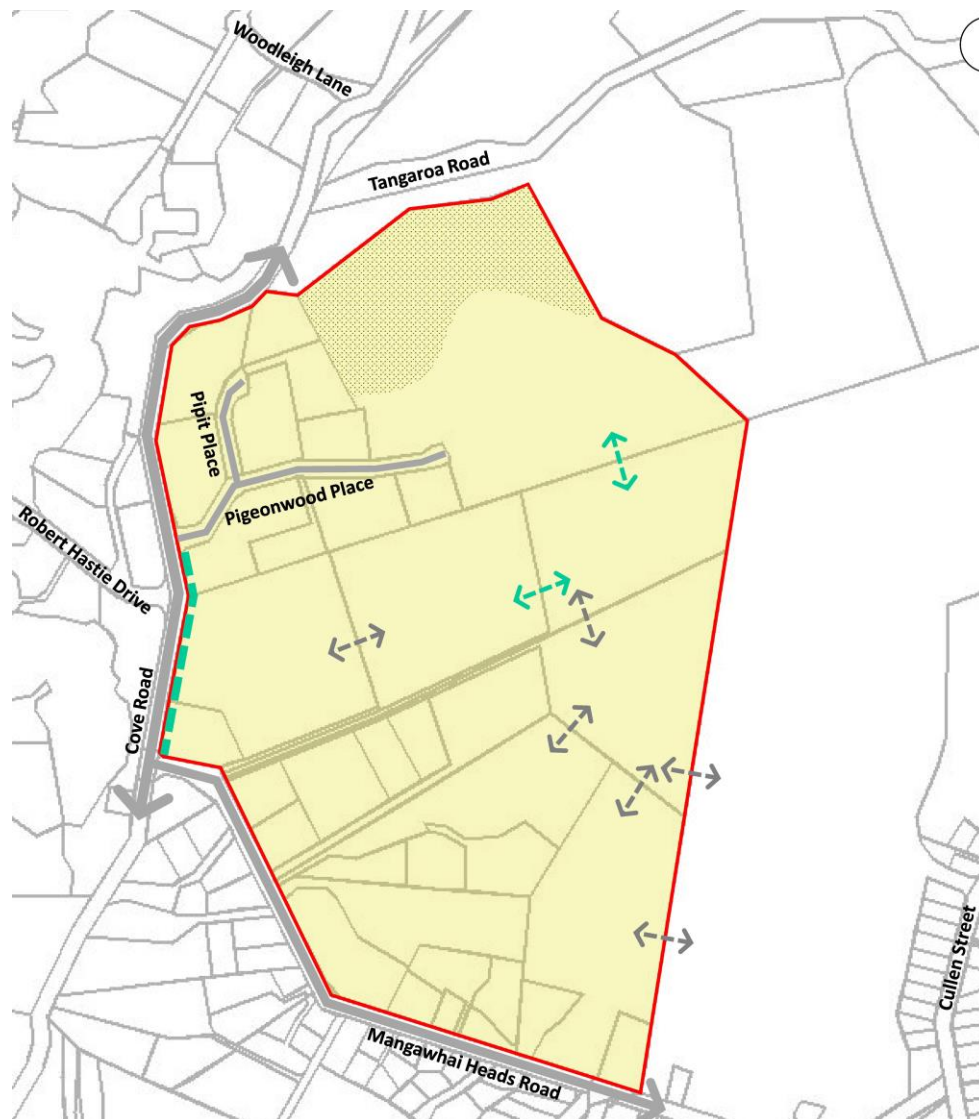


# PRIVATE PLAN CHANGE COVE ROAD NORTH PRECINCT



## ASSESSMENT OF TRAFFIC EFFECTS

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## 1. INTRODUCTION

This is an assessment of traffic effects of a proposed plan change known as “Cove Road North Precinct” (“The Precinct”) in northwestern Mangawhai Heads.

## 2. DESCRIPTION OF THE PROPOSAL

The proposal is for a change to residential zoning over an area of a little over 54 hectares in a single continuous area northeast of the intersection of Cove Road and Mangawhai Heads Road. The area and other key components are depicted in the Precinct Map.

Specific provisions, including objectives and rules, are proposed for the area. The key provisions in relation to traffic impacts are the subdivision rules, in which subdivision is a restricted discretionary activity provided that the minimum lot size is:

- 1,000 sq.m in the “larger lot sub-precinct” located in the north of the area,
- 400 sq.m where communal sewerage is available;
- 850 sq.m where communal sewerage is not available

The provisions also encourage and enable strong street connectivity, including connections to at least one street outside of the precinct area<sup>1</sup>, and a network of walking and cycling paths, both on and off roads with associated connectivity to common destinations and existing paths<sup>2</sup>.

## 3. INTERNAL ACCESS

Several private accesses currently lead into the precinct area and connect to the two frontage roads - Cove Road and Mangawhai Heads Road. Only one is currently named - Pigeonwood Place<sup>3</sup>. All but one of the other accesses are individual driveways. They include three relatively lengthy<sup>4</sup> pan-handles side-by-side that all connect to Mangawhai Heads Road 75 to 85 metres from Cove Road.

With the number of lots enabled by the proposals, a new internal network of public roads and walking/cycling paths will almost certainly be necessary. A plan of possible indicative roads and walking and cycling paths is provided with the Precinct Plan, but the proposed district plan provisions<sup>5</sup> only relate to connection points and connectivity, so there is significant flexibility for future developers on the locations of the roads and pathways.

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<sup>1</sup> Probably Cullen Street.

<sup>2</sup> There are no footpaths on either Pigeonwood Place, Cove Road nor the western 700 metres of Mangawhai Heads Road, but there are walkable berms along most of the western side of Cove Road and the northern side of Mangawhai Heads Road. There is also a footpath on the southern side of Mangawhai Heads Road east of Jack Boyd Drive.

<sup>3</sup> Which is a sealed no-exit private roadway with two lanes. It currently leads to eleven lots and 19 hectares in which there is potential for at least 130 lots under the proposed district plan provisions.

<sup>4</sup> The shortest being a little over 200 metres in length.

<sup>5</sup> In addition to existing provisions.

With the proposal being a plan change rather than a subdivision, it is only necessary to demonstrate that:

1. All parts of the precinct that are suitable for development are accessible; and
2. The external transport network either has sufficient surplus capacity to cope with the additional traffic enabled by the plan change, or there is sufficient space, ideally entirely within road-reserve, for any upgrades that are likely to be become warranted before the precinct is fully developed.

The key factors to consider with internal roads include lot accessibility<sup>6</sup> and likely sight distances from intersections and likely driveway connection points<sup>7</sup>.

To determine the availability and suitability of vehicle access, a ground model and potential future internal road network has been created<sup>8</sup>. The main roads have then been draped over the ground model and the gradients and potential sight distances reviewed. The following was found:

- Roads can be constructed to all parts of the precinct with gradients within the limits specified by the *Engineering Standards 2011*<sup>9</sup> and reasonable vertical alignment (such that visibility from driveway connections and internal intersections will be at least adequate); and
- Lot accessibility will not be a significant challenge. In particular, it is not difficult running most roads close to perpendicular to the contour so there will be minimal need for driveways to chase the slope of the ground either up or down.

The existing connection points to the frontage roads will all be suitable as connection points for busier accesses and/or public roads. In particular, sight distances from all are mostly excellent<sup>10</sup> and there are numerous other locations along the frontages in which the sight distance is at least favourable, so there are numerous other potentially suitable connection locations.

As shown in the indicative access plans provided with the application, there is also scope for excellent internal walking and cycling pathways and connectivity to existing roads and suitable pathways.

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<sup>6</sup> For which the gradients of driveways is the main factor. While it is not feasible to determine exact future driveway gradients, it is possible to ensure that workable gradients are achievable by considering the likely level of the roads and the gradient of ground perpendicular to indicative future road locations.

<sup>7</sup> For which there is usually significant scope for improvements through the use of general earthworks and road geometrics. While such measures can become very challenging in more mountainous terrain, even cost-prohibitive, this area is far easier than a contour that might create major impediments to suitable access. Forward sight distances are also unlikely to present a significant challenge, even on single-lane accesses.

<sup>8</sup> Using LiDAR data and specialist terrain modelling and road designs computer software.

<sup>9</sup> Especially Table 5.1, with gradient being the most challenging parameter. No new roads would need gradients of more than 12%, which compares with the maximum permitted gradient of 12.5%.

<sup>10</sup> With the sight distance north of Pigeonwood Place being the most restrictive. The traffic report prepared for the original subdivision application that created Pigeonwood Place found that sight distance to be adequate, being only slightly less than the highest standard applicable to safety– safe intersection sight distance.

## 4. EXISTING TRANSPORT ENVIRONMENT

At this locality, both Cove Road and Mangawhai Heads are sealed with two lanes.

The speed limit on Cove Road is 80 km/hr<sup>11</sup>, that on the western 550 metres of Mangawhai Heads Road is 60 km/hr and that for the western 0.55 kilometres of Mangawhai Heads Road is 50 km/hr.

The intersection of Cove Road with Mangawhai Heads Road is a Stop controlled tee intersection with a right-turn bay on, and priority for, Cove Road. The intersection has a single “flag” light opposite Mangawhai Heads Road and a left turn lane albeit relatively narrow.

Widening on Cove Road, opposite Pigeonwood Place, provides space for northbound vehicles to safely pass another vehicle that is turning right into Pigeonwood Place (see photo 8). It is possible that this bay will eventually need to be converted to a full turning bay in conjunction with future subdivision, but there is ample space within the road reserve for this<sup>12</sup>.

Mangawhai Heads Road connects to Molesworth Drive 1.2 kilometres east of Cove Road in a four-leg roundabout, the other two legs being Cullen Street and Mangawhai Heads Road (east). Molesworth Drive is the main thoroughfare between Mangawhai Heads and Mangawhai and also skirts the eastern edge of the Mangawhai Heads urban area. Cullen Street leads to a residential area and residential zoned land in pasture, Mangawhai Heads Road (east) leads to a residential area, the harbour foreshore, a holiday park and boat club.

There are two single-lane bridges on Cove Road within 1.7 kilometres south of Mangawhai Heads Road.

**Photo 1.** Mangawhai Heads Road looking east from 70 metres east of Cove Road. Part of the frontage of the precinct/plan-change area is at left. Note the walkable berm along this part of the frontage.



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<sup>11</sup> With 60km/hr north of Woodleigh Lane, so from 0.9 kilometres north of Mangawhai Heads Road. The speed limit has only very recently been reduced from 100 km/hr throughout.

<sup>12</sup> Pigeonwood Place is within the taper for a right-turn bay for Robert Hastie Drive, which joins the western side of Cove Road 67 metres south of Pigeonwood Place. With the widening already opposite Pigeonwood Place, no additional widening will be necessary as shown later.

**Photo 2.** Mangawhai Heads Road looking west from 620 metres. Part of the frontage of the precinct/plan-change area is at upper right. Note the walkable berm along the frontage.



**Photo 3.** Mangawhai Heads Road looking east from 620 metres. Note the walkable berm along this side, which links to an existing footpath east of the bottom of the hill (and Jack Boyd Drive) in the background. This berm would ideally be wider or with greater separation to traffic, but the speed limit is only 50km/hr along here and previous investigations find an extremely low, often undetectable, rate of incidents associated with people walking in situations like this and, as such, an acceptable risk.



**Photo 4.** Looking north along Cove Road from Mangawhai Heads Road, with the precinct area beyond the trees at upper right. Note the existing widening for left turns.



**Photo 5.** Looking south along Cove Road from Mangawhai Heads Road. Note the excellent visibility, the right-turn bay and the existing single-lane bridge a short distance from the intersection.



**Photo 6.** The existing driveway that connects to Mangawhai Heads Road 80 metres east of Cove Road. There are three long pan-handles side-by-side in this locality, which would be a suitable location for a public road with easy gradients and full lot accessibility.



**Photo 7.** Pigeonwood Place viewed from the western side of Cove Road.





**Photo 8.** Looking north along the western side of Cove Road towards Pigeonwood Place. Note the local widening on this side of Cove Road.



## 5. TRAFFIC

### 5.1 Traffic Generation, origins and destinations

All vehicle movements are one-way, whether an entry or exit or a movement in one direction along public roads.

Previous investigation of traffic generation from residential activity in Mangawhai found traffic generation in the range 4 to 7 movements per household per day depending on the proximity to facilities. For this subdivision, which is located slightly outside the urban fringe, traffic generation is expected to be closer to the upper end of that range, but also be offset somewhat by the proposed improvements to pedestrian facilities. As such, traffic generation from this area is estimated at 5 to 6 movements per dwelling on an average day and 8 to 9 movements per day during holiday seasons.

The potential traffic generation will depend on the realistic lot yield. Taking a conservative average lot size of 1,000 sq.m over 70% of the area<sup>13</sup>, a total ultimate lot yield in the order of 380 lots is realistic.

On this basis, the proposal is expected to generate 1,600 to 1,700 vehicle movements on an average day and as many as 2,500 per day during summer holiday periods.

To estimate the traffic generation and determine the origins and destinations of traffic, monitoring has been carried out of Robert Hastie Drive and Cove Road using digital video. The monitoring was carried out in late November 2021 and a full count was carried out on the Friday.

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<sup>13</sup> With the remainder for roads/access, other services, reserves and areas with unsuitable ground or land stability.

The monitoring yielded a 24-hour count of 420 movements to/from Robert Hastie Drive beyond the gate (so excluding the “Miniwais” childcare centre) of which close to 90% travelled to/from the south. There is occasional tidality in the traffic, but not particularly strong – 58% outbound between 8 and 9am, with none apparent in the afternoon. This is at least partly explained by a high level of construction in the catchment at the time of the monitoring.

There are 68 lots and some 30 occupied houses beyond the gate of Robert Hastie Drive. The measured traffic generation is an average of 14 movements per occupied house per day, but is significantly distorted by the construction traffic at the time of the monitoring and is not representative of ongoing traffic generated by a finished house. The measured directional split is likely to be significantly closer to the long-term proportion and is adopted for all parts of the precinct.

Based on the monitoring and an analysis of traffic on the three approaches to the Cove Road/Mangawhai Heads Road intersection<sup>14</sup>, it is estimated that 65% of the generated traffic will travel to/from Mangawhai Heads and Mangawhai via Molesworth Drive, 25% will travel to/from the south via Cove Road and 10% will travel to/from the north.

## 5.2 Traffic on Existing Roads

There were 2,420 movements on Cove Road on the Friday of the camera monitoring. The traffic on Cove Road between Robert Hastie Drive and the Kaipara district boundary (2.4 kilometres to the north) was also counted by the council in November 2021. That yielded a 7-day average 1,755 movements per day. While this count included a weekend, it does indicate that the day of the full count from the camera was somewhat busier than usual.

As such, the traffic on this part of Cove Road is estimated at close to 2,000 movements on an average day and as high as 3,000 movements, possibly even somewhat more, during holiday periods.

There is some tidality in the traffic on the road, but not enough to have a significant impact on intersection capacity, especially given the relatively low level of the traffic and the low proportion and frequency of right turns out of all new connections.

## 5.3 Crashes

No crashes have been reported at the existing access and driveway connection points to Mangawhai Heads Road and Cove Road along the frontage of the precinct area, including the intersection of Cove Road with Pigeonwood Place, since at least the start of 2017<sup>15</sup>.

Two crashes that resulted in serious injuries have been reported in this vicinity. One was due to a single vehicle running off a straight section of Mangawhai Heads Road, the other involved a vehicle pulling out of Mangawhai Heads Road into the path of a motorbike that was turning right into Mangawhai Heads Road.

No crashes have been reported on either single-lane bridge on Cove Road south of Mangawhai Heads Road since at least the start of 2017.

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<sup>14</sup> As given by Mobile Road, then analysed to calculate the average frequency of each movement through the intersection.

<sup>15</sup> Crash Analysis System (CAS).

## 6. KAIPARA DISTRICT PLAN; PROPOSED ACCESS PROVISIONS

The district plan provisions proposed in conjunction with the plan change and in conjunction with existing provisions, will ensure that the precinct will be developed in a way that ensures all access is suitable and fit-for-purpose.

In particular, proposed policy PRECX-P3 will ensure that a connected and safe pedestrian and transport network will be achieved. Proposed assessment criteria 2 for rule 13.14.2 “Road, Private Way Formation and Property Access” and 13.14.3 “Provision for the Extension of Services” will ensure that road, cycling and pedestrian connections are appropriately provided for in subdivision applications and by the council when processing the applications.

## 7. ASSESSMENT OF TRAFFIC EFFECTS AND PROPOSED MITIGATION MEASURES

With the precinct area able to be fully accessed as previously described, this assessment is limited to the external environment. In particular, whether there are any significant potential impediments to the development of the precinct at the estimated ultimate development density.

### 7.1 Future connections to existing public roads

It is most likely that future connections to existing public roads will be conventional tee intersections. Turn treatments and associated local widening might be required at some connections, but there is ample space in the road reserve for this<sup>16</sup>.

Pigeonwood Place is likely to have the greatest future demand on it and is addressed in the next section.

### 7.2 Pigeonwood Place intersection

This intersection will never experience the demand of the Cove Road/Mangawhai Heads Road intersection, so its capacity will always be well above the demand on it.

The main issue with this intersection is the proximity of Robert Hastie Drive, which is only 67 metres to the south and connected to the opposite (eastern) side of Cove Road. These two side roads are likely to eventually become a left-right double-tee intersection with combined central turning bays. This is an accepted and proven treatment. In fact, a suggested detail for such intersections is included in a current AUSTRROADS publication<sup>17</sup>. An empirical evaluation of the safety of such intersections is difficult because of the low number of such intersections elsewhere. However, there is at least one in Northland at present – the intersection of Kokopu Block and Newton Road with SH14 near Maungatapere, Whangarei district, see photo 9.

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<sup>16</sup> No less than 20 metres, with almost all of the frontage roads currently less than 7.5 metres wide.

<sup>17</sup> *Guide to Traffic Management Part 6 Intersections Interchanges and Crossings Management*.

Since at least the start of 2017, no crashes have been recorded at that intersection involving vehicles turning into the side roads at the same time. Two crashes are reported at the intersection since that time, but both involved vehicles turning out of the side roads, not in. That intersection is also significantly busier than the Pigeonwood Place and Robert Hastie Drive intersections are ever likely to be. In particular, this part of SH14 carries more than 5,000 movements per day and Kokopu Block Road nearly 1,300 movements per day. There is a large childcare centre on the corner of SH14 and Newton Road with its entrance on Newton Road.

The visibility north of Pigeonwood Place is close to the highest standard applicable to safety – “safe intersection sight distance”, so is adequate. All other sightline vectors exceed that standard.

**Photo 9.** The intersection of Newton Road (left) and Kokopu Block (upper right) with SH 14 near Maungatapere. Photo from Google Streetview.



### 7.3 Mangawhai Heads Road/Cove Road intersection

The Mangawhai Heads Road/Cove Road intersection will have capacity for more than 300 right-turns out of Mangawhai Heads Road even during the holiday season.<sup>18</sup> This is only a small fraction of the frequency expected, even at those times. There is an existing left turn lane on Cove Road on the southbound approach to Mangawhai Heads Road. While relatively narrow, there is ample space within road reserve for it to be extended, as necessary, in future.

This intersection already has a central turning bay for right turns into Mangawhai Heads Road, so is already of a high standard and unlikely to need major reconfiguration, even with the additional traffic.

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<sup>18</sup> When accepted capacity theory is applied with double the average through traffic volumes indicated by Mobile Road. This indicates current northbound traffic on Cove Road past Mangawhai Heads Road of little more than 1,000 movements per day or some 150 during peak hours during holiday seasons.

## 7.4 Mangawhai Heads Roundabout

While more than half of the generated traffic is expected to travel through this intersection, it currently experiences total demand of only a little more than 6,000 movements on an average day even with two known large subdivisions proposed on Cullen Street.

This is well below the level of traffic that can create stress on such roundabouts. For example, the Kiripaka Road roundabout in Tikipunga, Whangarei, which has four legs and only a single lane, experiences total demand of 22,000 movements on an average day but only some congestion during peak commuting hours. The demand through the Kiripaka Road roundabout during average hours is significantly greater than that on the Mangawhai Heads Roundabout during peak hours during holiday periods, even with the precinct fully developed<sup>19</sup>.

The busiest roads in this vicinity are Mangawhai Heads Road east of the roundabout and Molesworth Drive, both of which carry traffic close to 4,500 movements on an average day at the roundabout. The proposal, along with other known subdivision in the catchment, has the potential to increase the traffic on Moleworth Drive (especially) to more like 6,000 on an average day and closer to 10,000 during peak holiday periods. While 10,000 movements per day is a relatively high level of traffic for two-lane roads, the roads will be able to cope with it over the relatively short holiday periods without significant problems.

In particular, Molesworth Drive, south of Mangawhai Heads, already carries such levels of traffic on average days. A number of two-lane, two-way roads in Whangarei carry significantly higher levels of traffic with only occasional and relatively minor congestion on the busiest during peak commuter hours. Most notably, Riverside Drive and Onerahi Road carry more than 15,000 movements on an average day and are also subject to significant seasonal peaks.

## 7.5 Single-lane bridges on Cove Road

At full anticipated development of the precinct and during holiday periods, there is expected to be another 500 to 600 movements per day on Cove Road south of the area including the two single-lane bridges. While those are two of the busier single-lane bridges in Northland<sup>20</sup>, they still have ample surplus capacity for the potential additional traffic. In fact, even with that additional traffic and once Kaeo Bridge on SH10 has been replaced, there would still be six single-lane bridges in Northland that are busier. Those are listed in Table 1 along with their key parameters (AADT = traffic movements over an average 24-hour period).

There are no known plans to upgrade any of those bridges. In fact, a recent detailed analysis of Landing Road bridge, in relation to another project, found that it has capacity for significantly more traffic still. It is longer than both of the bridges on Cove Road south of the site and already carries significantly more traffic even with the precinct at full development.

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<sup>19</sup> The additional traffic from which is only expected to add an estimated 1,600 to 1,700 movements a day through this locality during holidays, so an increase to a total of fewer than 12,000 per day at those times. Compared with commuter traffic, traffic during holiday periods is also more evenly distributed throughout each day and this will dampen the impact even further.

<sup>20</sup> With only 12 of more than 1,000 single-lane bridges in Northland currently experiencing greater demand.

**Table 1.** The six busiest single-lane bridges in Northland once Kaeo Bridge is replaced.

<b>Roadway / Structure Name</b>	<b>Number</b>	<b>Roadway</b>	<b>AADT</b>
Ngunguru Hall	405	Ngunguru Road	3664
Sawmill Bridge	406	Ngunguru Road	3664
Landing Road (Kerikeri) Bridge	S09	Landing Road	2945
McKenzies Bridge	53	Cove Road	2756
Old Bay Road Bridge	R19	Old Bay Road	2223
Old Bay Road Bridge	R20	Old Bay Road	2223

## 7.6 Overall Conclusion

Overall, it is concluded that the precinct area will be easily accessible for all anticipated development, that the effects of the generated traffic can be readily managed internally and that external road network has ample surplus capacity for it.

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