



Weigh Right - Multi-Criteria Analysis

Difficult to Avoid Criteria Assessment

January 17, 2020

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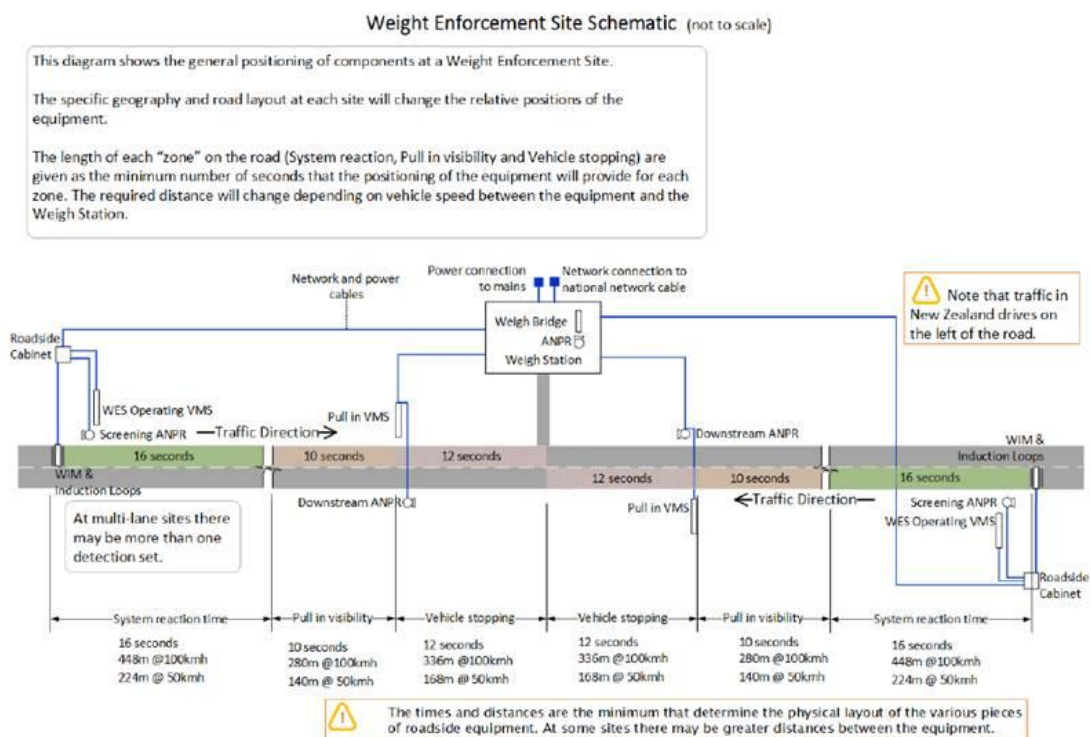
General Assumptions and Disclaimers

Driver Behaviour

It has been assumed that the objective of the heavy motor vehicle drivers is to avoid the weigh-in-motion sensors. Their ability to avoid the weigh-in-motion sensor is the focus of this assessment.

Location of the weigh-in-motion sensors

Weigh-in-motion (WIM) sensors have been indicated on the maps according to the following diagram, which sets out the minimum distance between the weigh-in-motion sensors and the Commercial Vehicle Safety Centre (CVSC) site.



At 100 kilometres per hour, a weigh-in-motion sensor (WIM) has been located at the minimum distance of 1.064km (rounded up to 1.1km) from:

- If the weigh station is located adjacent to the state highway, from the weigh station site;
- If the truck would need to turn at an intersection, from that intersection;
- If the truck would need to take an exit ramp off an Expressway, from the beginning of that exit ramp.

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The minimum distance is based on the time needed for the sensor to communicate the information from the WIM sensor and automatic number plate recognition (ANPR) camera to the Variable Messaging Sign (VMS), and for a driver to see and process the information from the VMS and take an action (turning into a weigh station site, turning at an intersection, or taking an exit ramp). The minimum distance has been indicated on the maps for the purpose of this exercise¹.

The distance can be increased; however, it was not possible to determine a maximum distance (and therefore not possible to determine an average distance) for the purpose of this exercise. For that reason, all maps indicate the minimum distance only².

A maximum distance is context-specific and requires detailed assessments. A lengthy distance between the WIM and VMS introduces possible need to re-detect vehicles to ensure their number plate is displayed on the VMS when they drive past. This would add the need for an additional ANPR camera approximately 300m upstream from the VMS, creates significant additional cost. The background Weigh Right software has not been programmed to operate in accordance with that scenario.

Definition of an Alternative Route

Jacobs Geospatial team were able to identify alternative roads. An alternative road was defined as:

- a road that is classified in the NZ Transport Agency's One Network Road Classification (ONRC) as an arterial, primary collector or secondary collector road, and that allows vehicles to travel north-south. This definition excluded low-volume local roads, as well as some roads that travel in an east-west direction and reach a dead end.
- a road that would allow a heavy vehicle to avoid the weigh-in-motion sensor.

Roads that allow a vehicle to turn off after they travel over the weigh-in-motion sensor were not counted as alternative roads. Once a heavy motor vehicle has been weighed by the sensors, they have effectively been caught and risk committing an offence if they were to turn off between the sensors and the CVSC site. The driver (rather than the company) would be liable for this offence, so there is little incentive for drivers to turn off after being weighed at the sensor³.

¹ All sites are located on 100km/h roads, with the exception of Site B (Ōtaki) where there are 70km/h and 50km/h speeds through the township. The location of the weigh-in-motion sensors have been calculated in accordance with the diagram, and the calculations are provided in the explanatory notes. It is noted that any future speed reviews have not been considered in this assessment.

² Where increasing the distance of the weigh-in-motion sensor from the site, turn-off or exit ramp would result in a different outcome, this is indicated in the explanatory notes that accompany each map. There were no instances where an increased distance would have resulted in the site entering, or not entering, onto the shortlist.

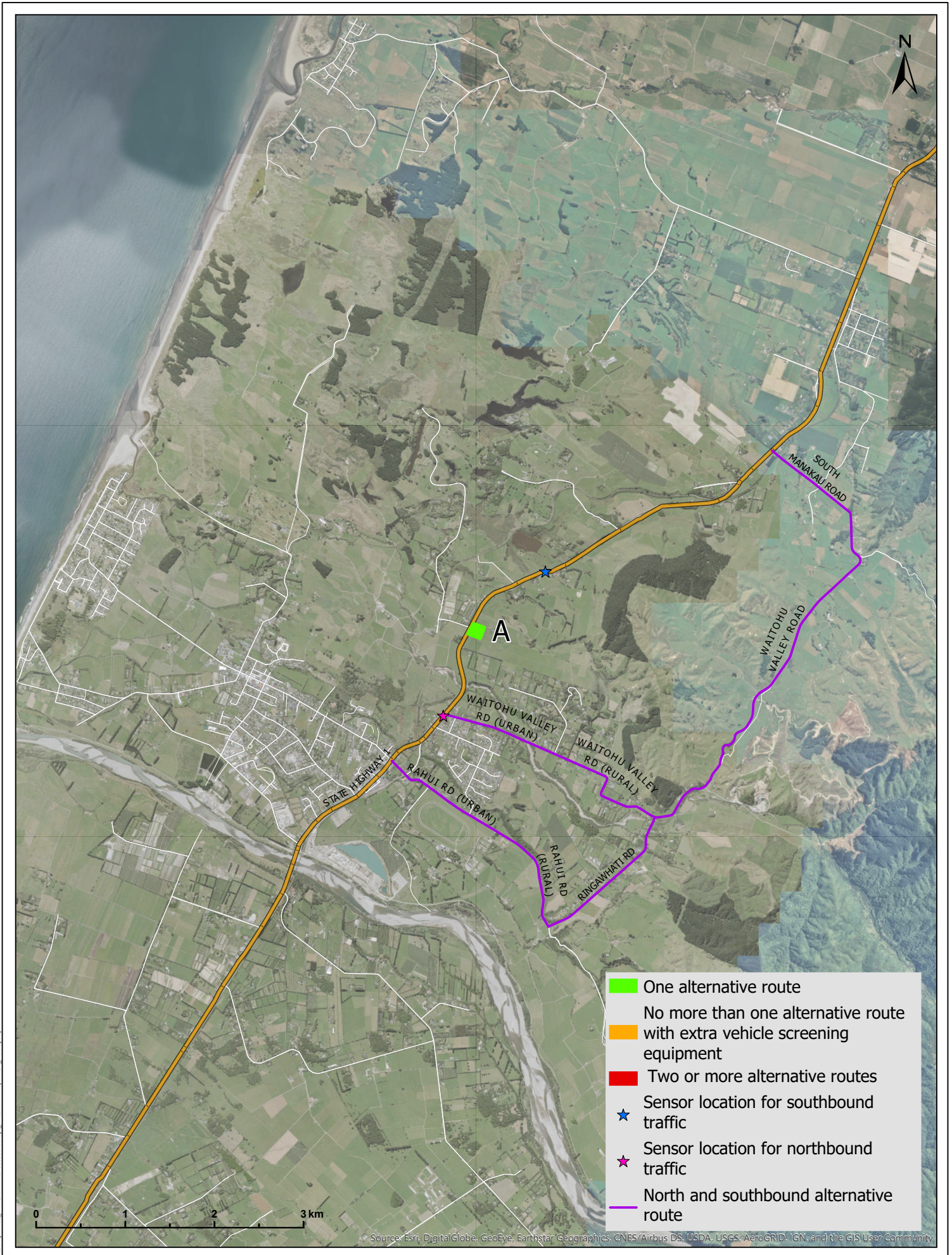
³ There are some instances, for Sites B and E, where a heavy motor vehicle driver could, theoretically, claim that they had a valid reason to turn off the State Highway prior to viewing the VMS, due to the existence of commercial and industrial areas. Such a circumstance makes it difficult for police to pursue enforcement, and creates a situation where police must actively monitor the area even where vehicles are caught by the WIM sensor. To the degree that it diverts police resources, it is akin to an alternative road. This circumstance is assessed in detail in the explanatory notes that accompany Sites B and E.

Other Disclaimers

This assessment has assumed that direct access from the adjacent state highway or local road is possible for all sites, and have measured the minimum distance for the WIM sensors accordingly.

The maps do not show the proposed alignment for the Peka Peka to Ōtaki Expressway⁴.

⁴ The proposed alignment for the Peka Peka to Ōtaki Expressway is considered in Appendix 6.



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Site Location Figures

A - Taylors Road (North of Ōtaki)



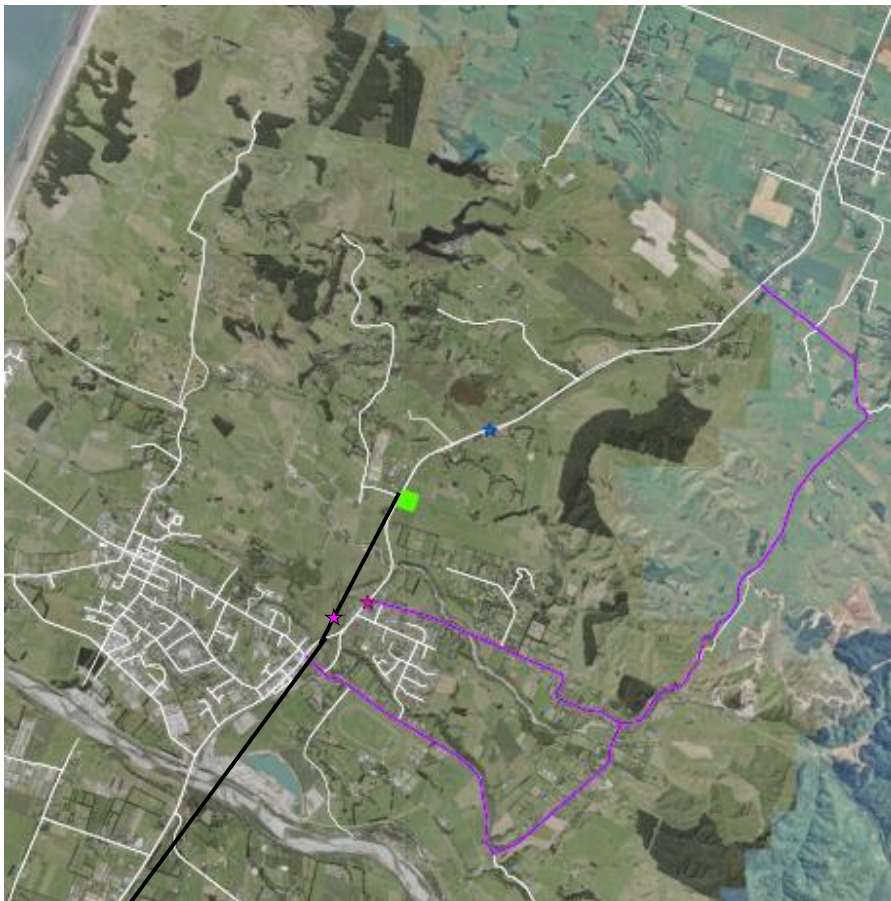
Site A – Taylor’s Road (North of Ōtaki)

Avoidance Route

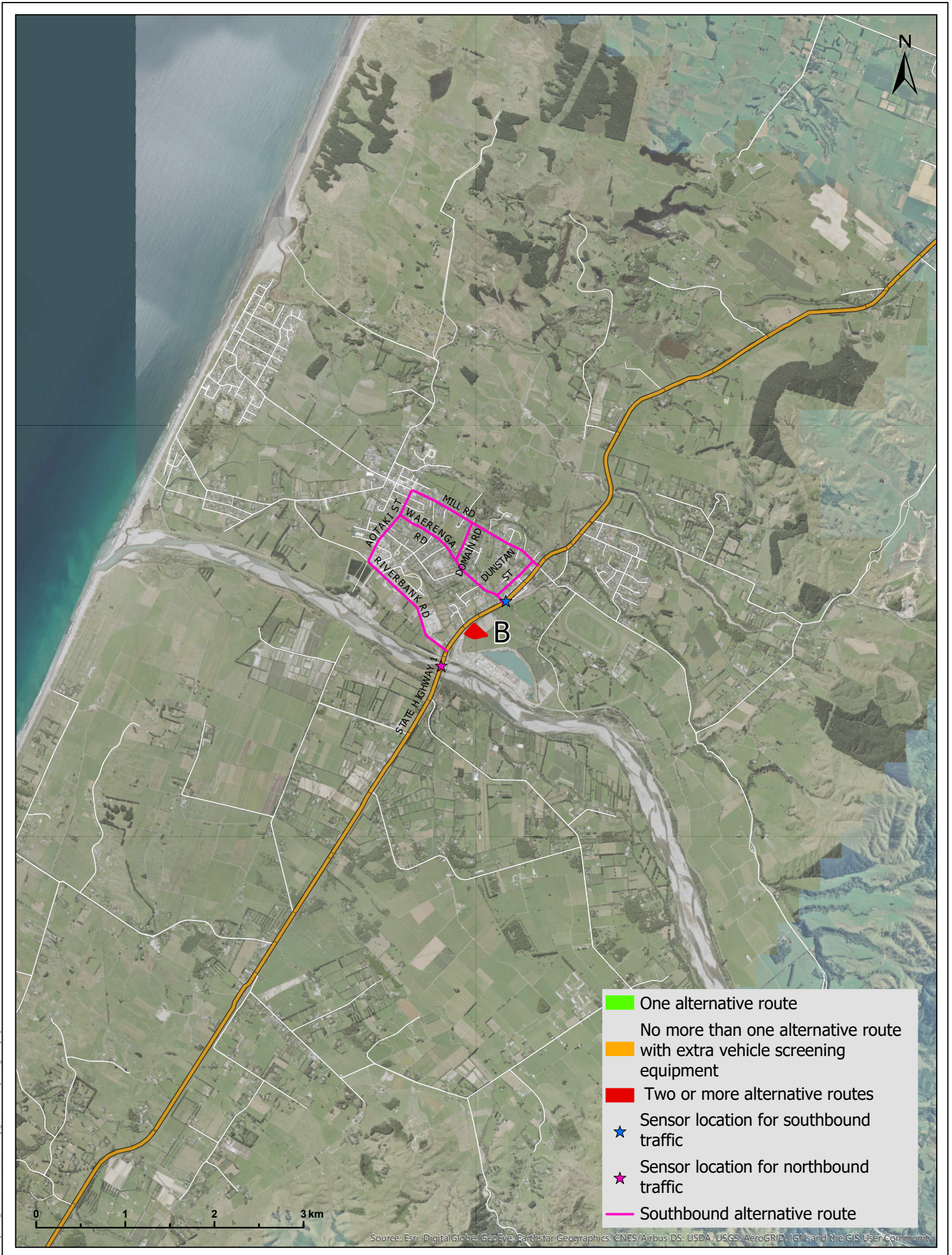
Waitohu Valley Road is able to be used to bypass State Highway 1 in both the northbound and southbound directions.

Scenario: Peka Peka to Ōtaki Expressway

This map shows only the current alignment of State Highway 1, and does not include the proposed Peka Peka to Ōtaki Expressway. Using the baseline assumption that direct access from the Expressway is possible, additional vehicle screening equipment would be needed to capture northbound traffic on both the Peka Peka to Ōtaki Expressway and State Highway 1.



The only change that would result is that Site A would be orange rather than green.



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Site Location Figures

B - Ōtaki



Site B – Ōtaki

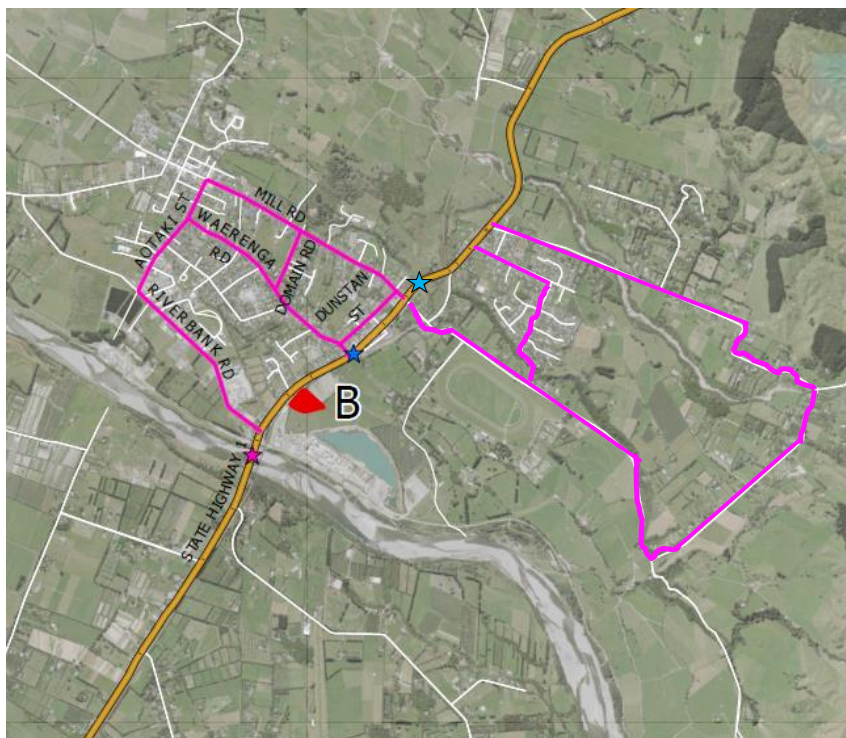
Avoidance Routes

There are multiple avoidance routes that could be taken in the southbound direction, as indicated on this map.

All the routes were traversed on Google Earth Streetview, and there are multiple industrial and commercial premises in the area that could be used by heavy motor vehicle drivers as justification for turning off the State Highway. In practical terms, it would be very difficult for police to operate Site B effectively.

Scenario 1: Increased distance between northern WIM sensors and Site B

One potential solution could be to increase the distance of the WIM sensor north of the CVSC site, to be located north of Mill Road. This was considered.



However, this has the effect of making Waitohu Valley Road– Ringuwhati Road – Rahui Road (or Te Manuao Road – Freemans’s Road – Rahui Road) into an avoidance route.

Though unlikely, drivers could also turn onto Mill Road after driving over the WIM sensor but before seeing the VMS. Due to the industrial and commercial premises in the area, a heavy motor vehicle driver could claim that they had a valid reason to turn off the State Highway. Such

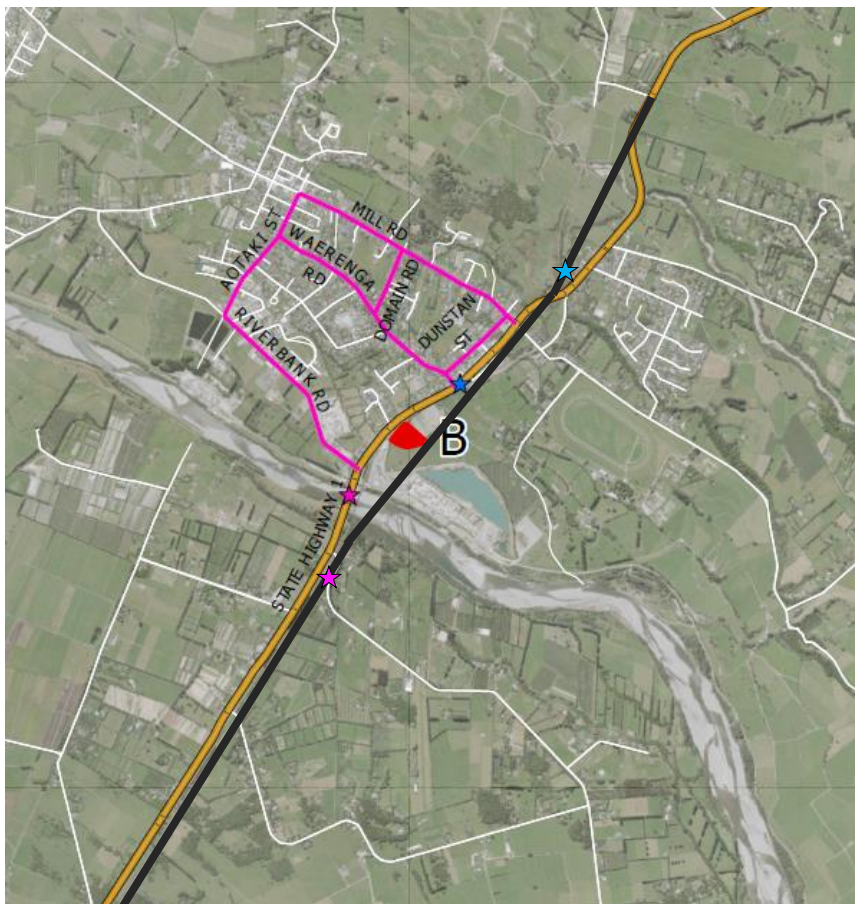
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a circumstance makes it difficult for police to pursue enforcement, and creates a situation where police must actively monitor more than two alternative routes.

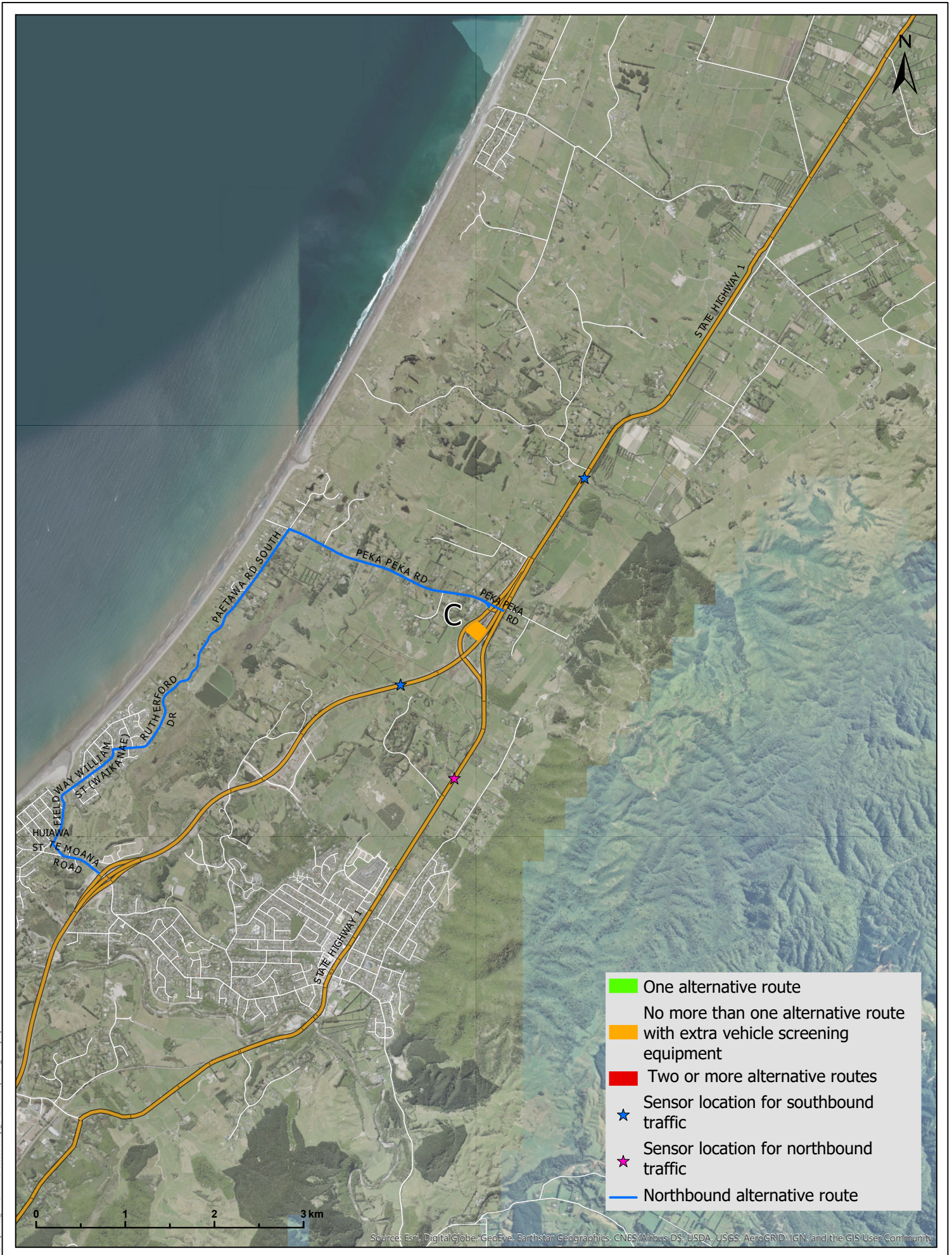
Therefore, a red classification was judged to be most appropriate.

Scenario 2: Peka Peka to Ōtaki Expressway

Assuming that direct access is possible from both the Expressway and from State Highway 1, additional vehicle screening equipment would be required.



There would still be multiple alternative routes able to be accessed from State Highway 1.



- One alternative route
- No more than one alternative route with extra vehicle screening equipment
- Two or more alternative routes
- ★ Sensor location for southbound traffic
- ★ Sensor location for northbound traffic
- Northbound alternative route

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Site Location Figures

C - Peka Peka Interchange

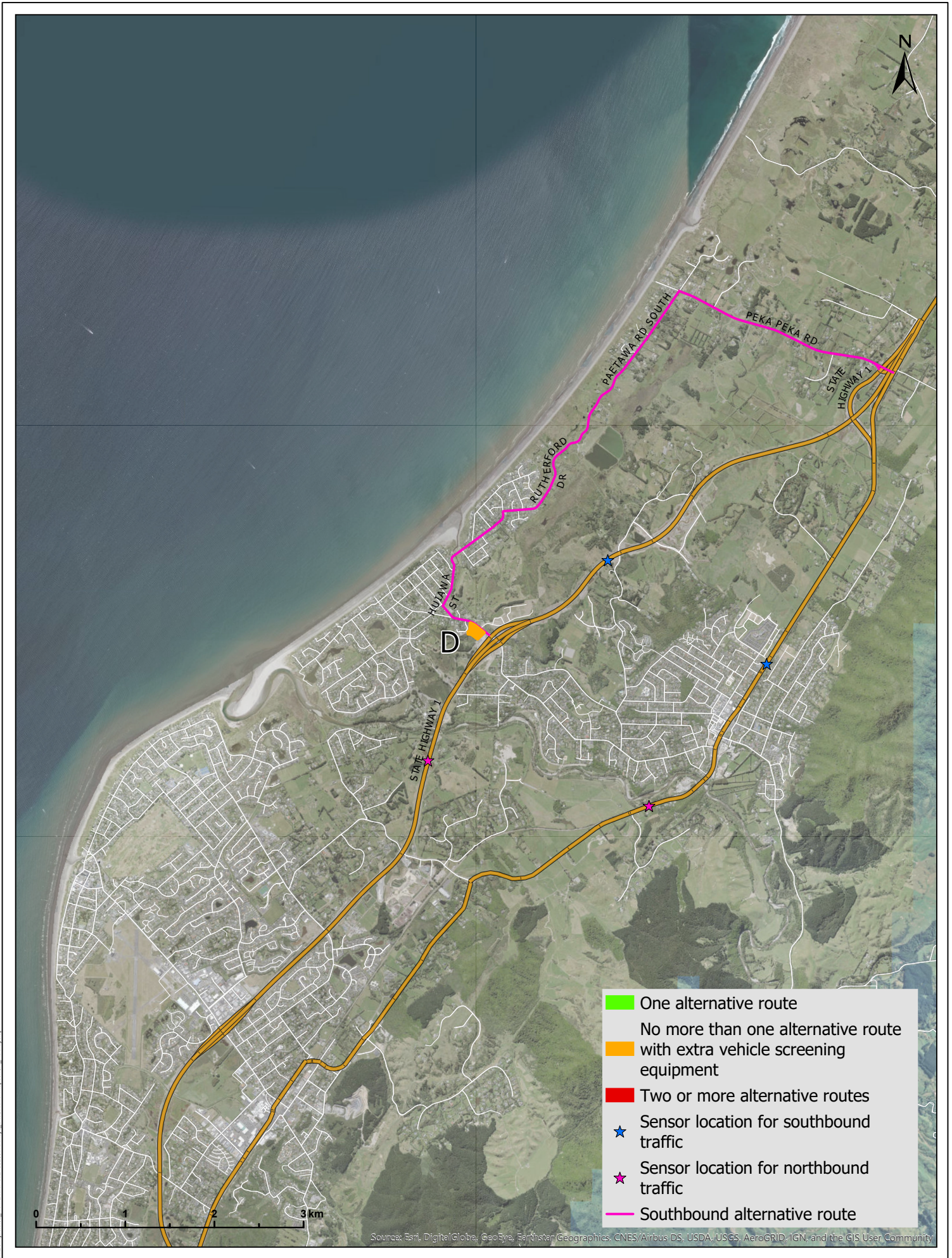


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Site C – Peka Peka Interchange

There is one alternative route northbound on the Kapiti Expressway (new State Highway 1), as shown on the map.

No alternative scenarios needed to be considered.



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Site Location Figures

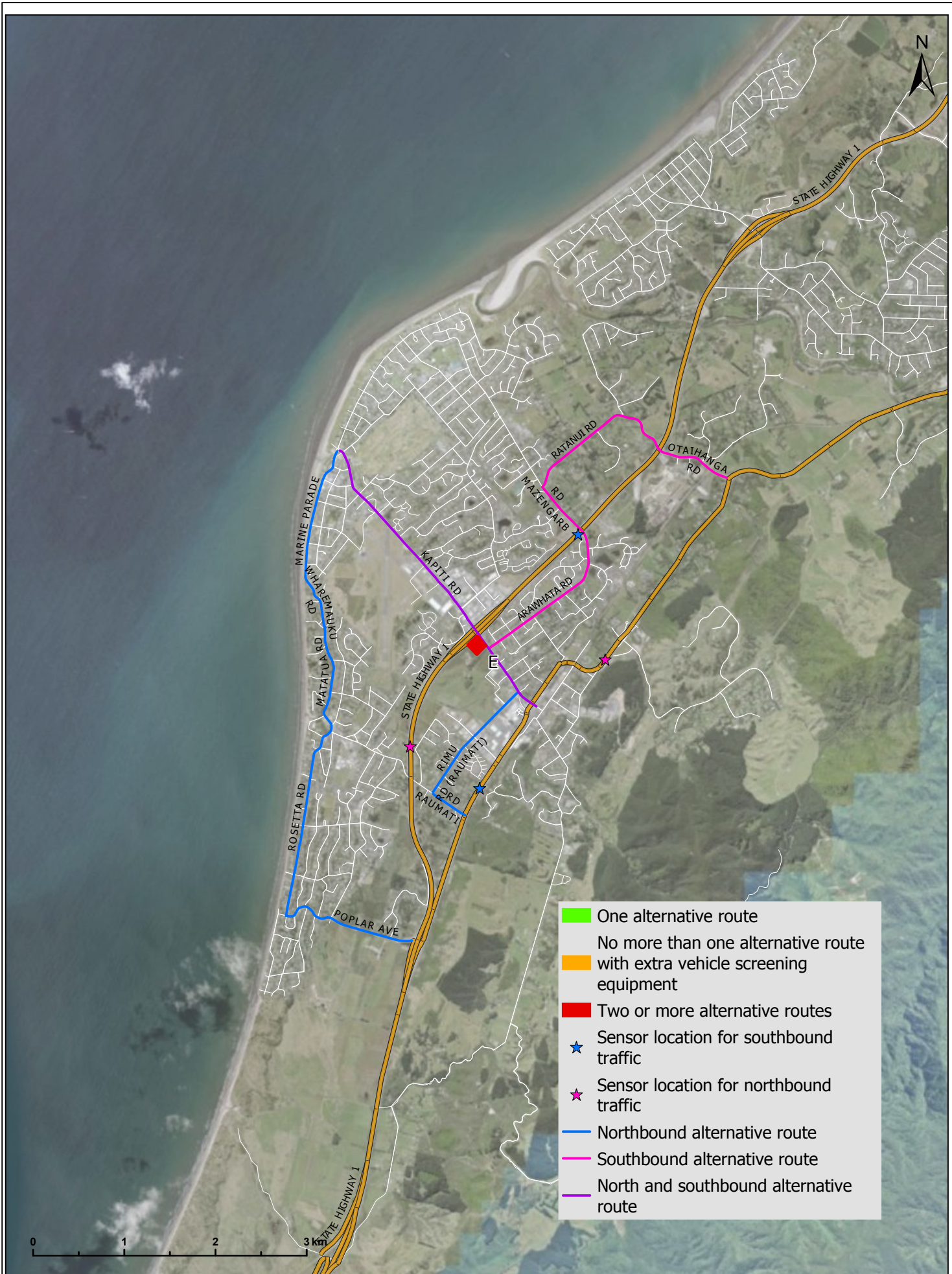
D - Te Moana Road



Site D – Te Moana Road

PekaPeka, Paetawa and Rutherford roads are an alternative route southbound that would bypass the sensors on State Highway 1 (Kapiti Expressway) southbound.

No alternative scenarios need to be considered.



- █ One alternative route
- █ No more than one alternative route with extra vehicle screening equipment
- █ Two or more alternative routes
- ★ Sensor location for southbound traffic
- ★ Sensor location for northbound traffic
- Northbound alternative route
- Southbound alternative route
- North and southbound alternative route

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Site Location Figures

E - Kapiti Road



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Site E – Kapiti Road

Poplar Avenue – Roseatta Road – Matatua Road – Kapiti Road is an alternative route northbound.

Rimu Road is an alternative road northbound on State Highway 1.

Otaihanga Road – Ratanui Road – Mazengarb Road and Arawhata Road is an alternative route southbound on State Highway 1⁵.

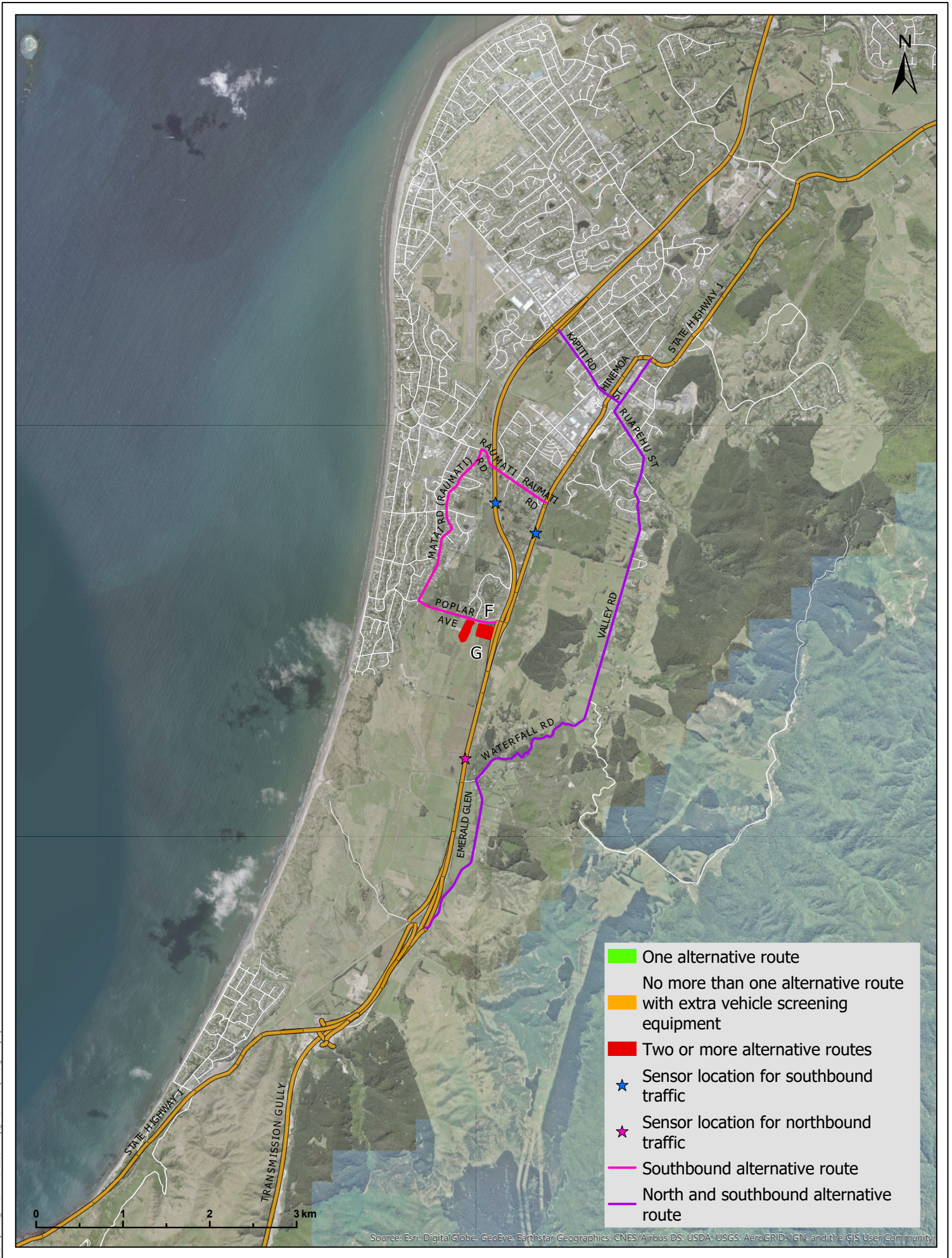
Scenario: Increase distance of WIM sensor south of Kapiti Road intersection on State Highway 1



This scenario would remove the ability of heavy motor vehicle drivers to avoid the WIM sensor when travelling northbound on State Highway 1. However, a driver could claim that they had a valid reason to turn off the State Highway prior to viewing the VMS, as Rimu Road allows access to an industrial and commercial area. Such a circumstance makes it difficult for police to pursue enforcement, and creates a situation where police must actively monitor Rimu Road. To the degree that it diverts police resources, Rimu Road is akin to an alternative road.

The southbound alternative route from State Highway 1 remains. There are also multiple primary and secondary collector roads within Raumati Beach and Paraparaumu that Police may need to monitor, including Matai Road, Matatua Road, Marine Parade, Guildford Drive, and Mazengarb Road. The red classification would remain unchanged.

⁵ It is noted that Otaihanga Road is not accessible from the Kapiti Expressway. This is a bridge (with no exit ramp) rather than an intersection.



- One alternative route
- No more than one alternative route with extra vehicle screening equipment
- Two or more alternative routes
- ★ Sensor location for southbound traffic
- ★ Sensor location for northbound traffic
- Southbound alternative route
- North and southbound alternative route

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Site Location Figures

F - Poplar Avenue East
G - Poplar Avenue West



Site F – Poplar Avenue East

Ruapehu Street- Valley Road- Waterfall Road – Emerald Glen Road is an alternative route both northbound and southbound⁶.

Raumati Road – Matai Road – Poplar Avenue is also an alternative route southbound from State Highway 1⁷.

No alternative scenarios need to be considered.

⁶ It is noted that while it is possible to use this route, in practice, the nature of the route (gravel, narrow, some tight turns) makes it unlikely that heavy motor vehicle drivers would choose to use it.

⁷ It is noted that access to Raumati Road from the Kapiti Expressway is not possible. This is a bridge (with no exit ramp) rather than an intersection.

Site G – Poplar Avenue West

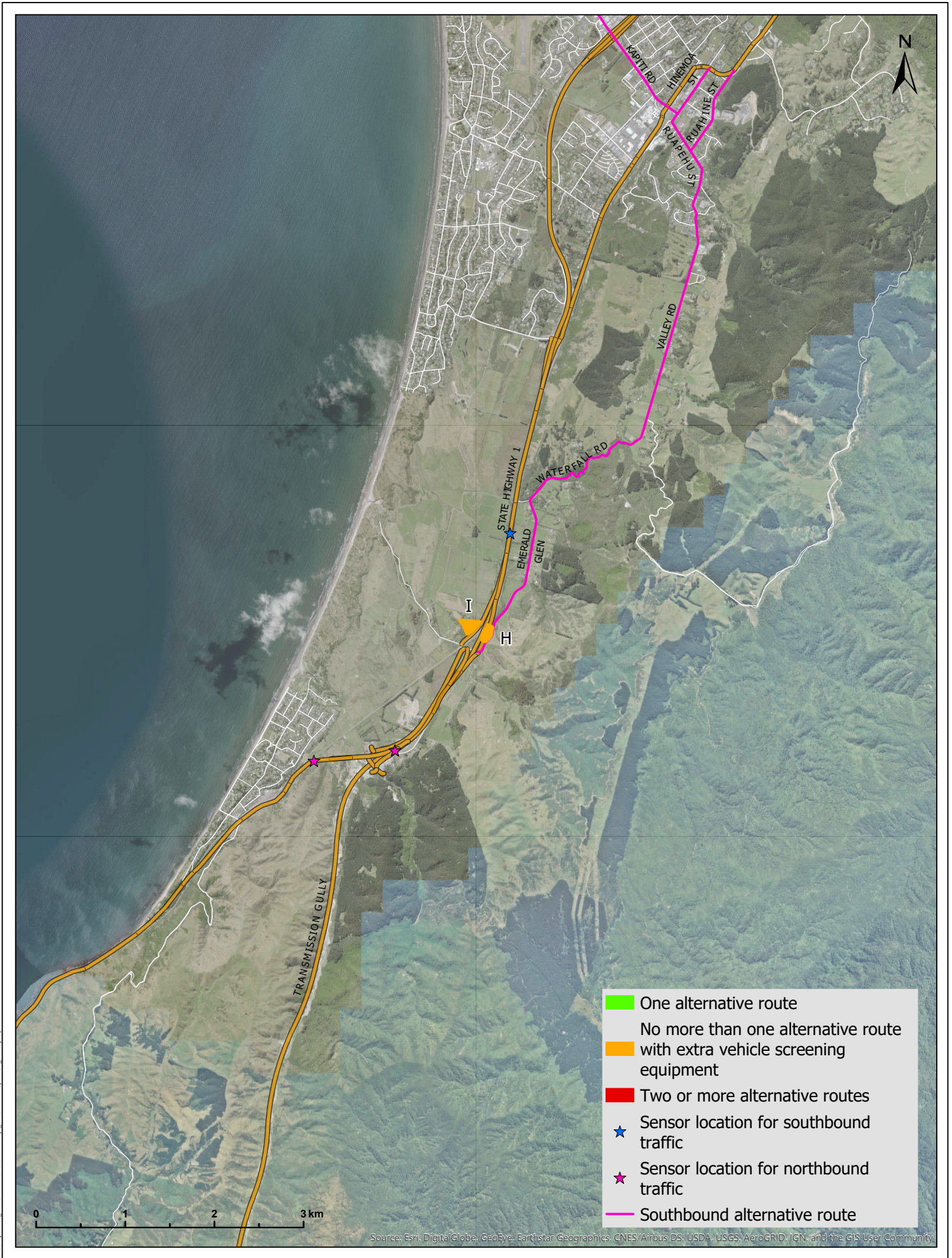
Ruapehu Street- Valley Road- Waterfall Road – Emerald Glen Road is an alternative route both northbound and southbound⁸.

Raumati Road – Matai Road – Poplar Avenue is also an alternative route southbound from State Highway 1⁹.

No alternative scenarios need to be considered.

⁸ It is noted that while it is possible to use this route, in practice, the nature of the route (gravel, narrow, some tight turns) makes it unlikely that heavy motor vehicle drivers would choose to use it.

⁹ It is noted that access to Raumati Road from the Kapiti Expressway is not possible. This is a bridge (with no exit ramp) rather than an intersection.



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Site Location Figures

H - Whareroa Farm (Emerald Glen Road)
I - QEII Park



Site H – Whareroa Farm (Emerald Glen Road)

Ruapehu Street- Valley Road- Waterfall Road – Emerald Glen Road is an alternative route both northbound and southbound¹⁰.

No alternative scenarios need to be considered.

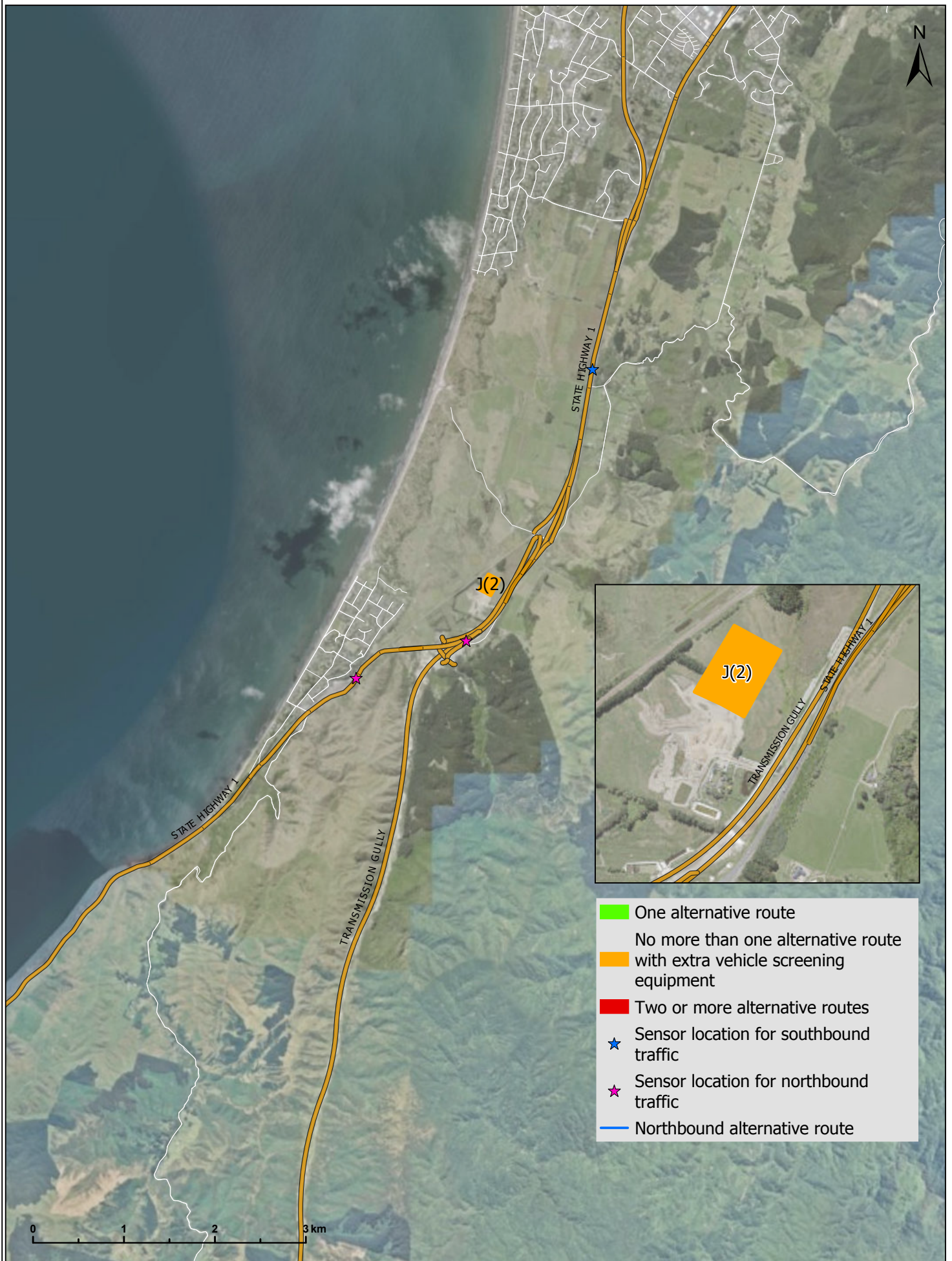
¹⁰ It is noted that while it is technically feasible to use this route, in practice, the nature of the route (gravel, narrow, some tight turns) makes it unlikely that heavy motor vehicle drivers would choose to use it.

Site I – QEII Park

Ruapehu Street- Valley Road- Waterfall Road – Emerald Glen Road is an alternative route both northbound and southbound¹¹.

No alternative scenarios need to be considered.

¹¹ It is noted that while it is technically feasible to use this route, in practice, the nature of the route (gravel, narrow, some tight turns) makes it unlikely that heavy motor vehicle drivers would choose to use it.



- One alternative route
- No more than one alternative route with extra vehicle screening equipment
- Two or more alternative routes
- ★ Sensor location for southbound traffic
- ★ Sensor location for northbound traffic
- Northbound alternative route

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Site Location Figures

J(2) - Kāpiti



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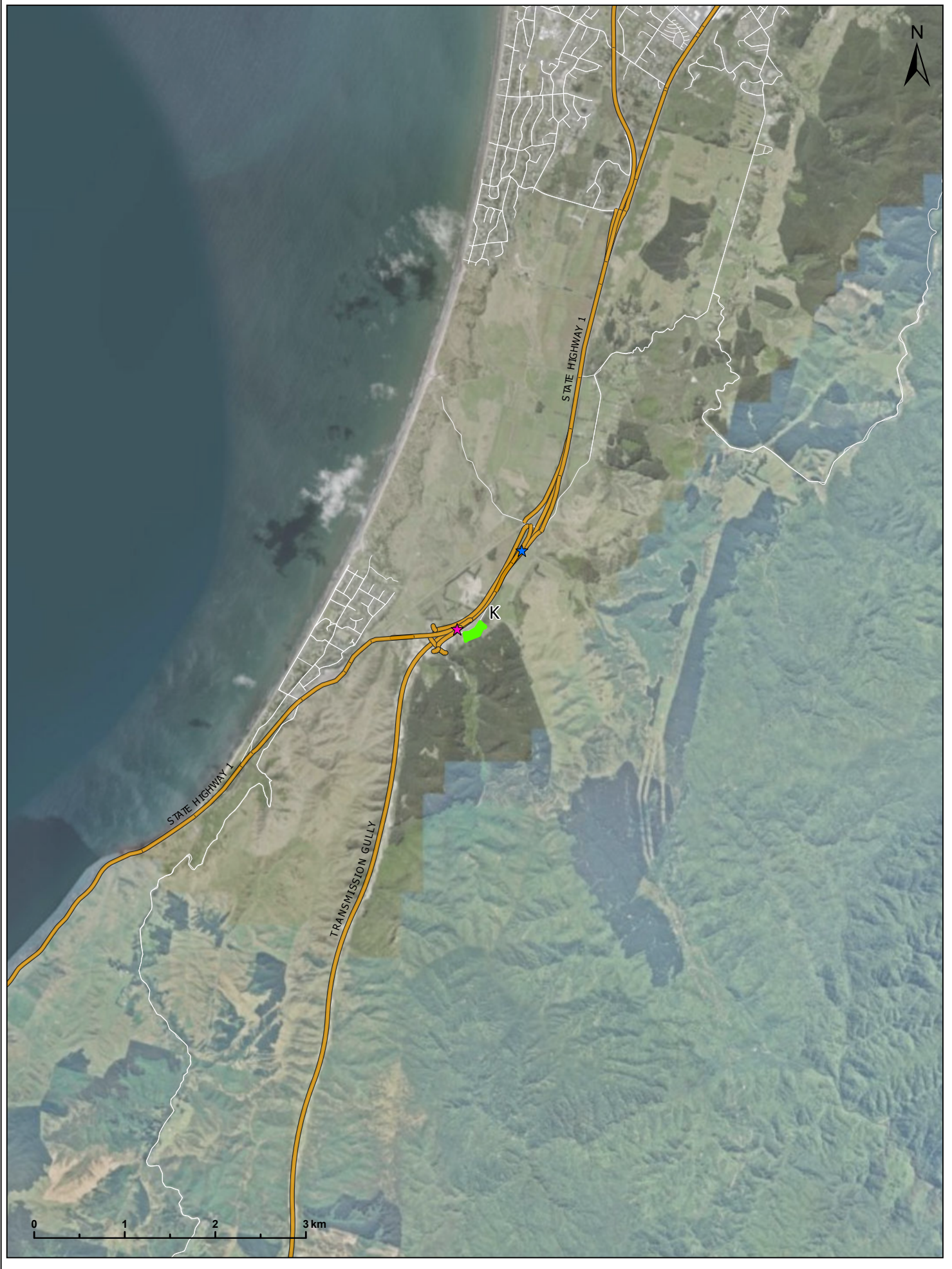
Site J(2) – Kāpiti

Ruapehu Street- Valley Road- Waterfall Road – Emerald Glen Road is an alternative route both northbound and southbound¹².

The local road between the Paekākāriki Interchange and QEII Park has not been considered as an alternative road, as there is no commercial or industrial development down that road that could provide heavy motor vehicle drivers with a valid reason to be there. In addition, no drivers would miss the VMS.

No alternative scenarios needed to be considered.

¹² It is noted that while it is technically feasible to use this route, in practice, the nature of the route (gravel, narrow, some tight turns) makes it unlikely that heavy motor vehicle drivers would choose to use it.



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· Site Location Figures

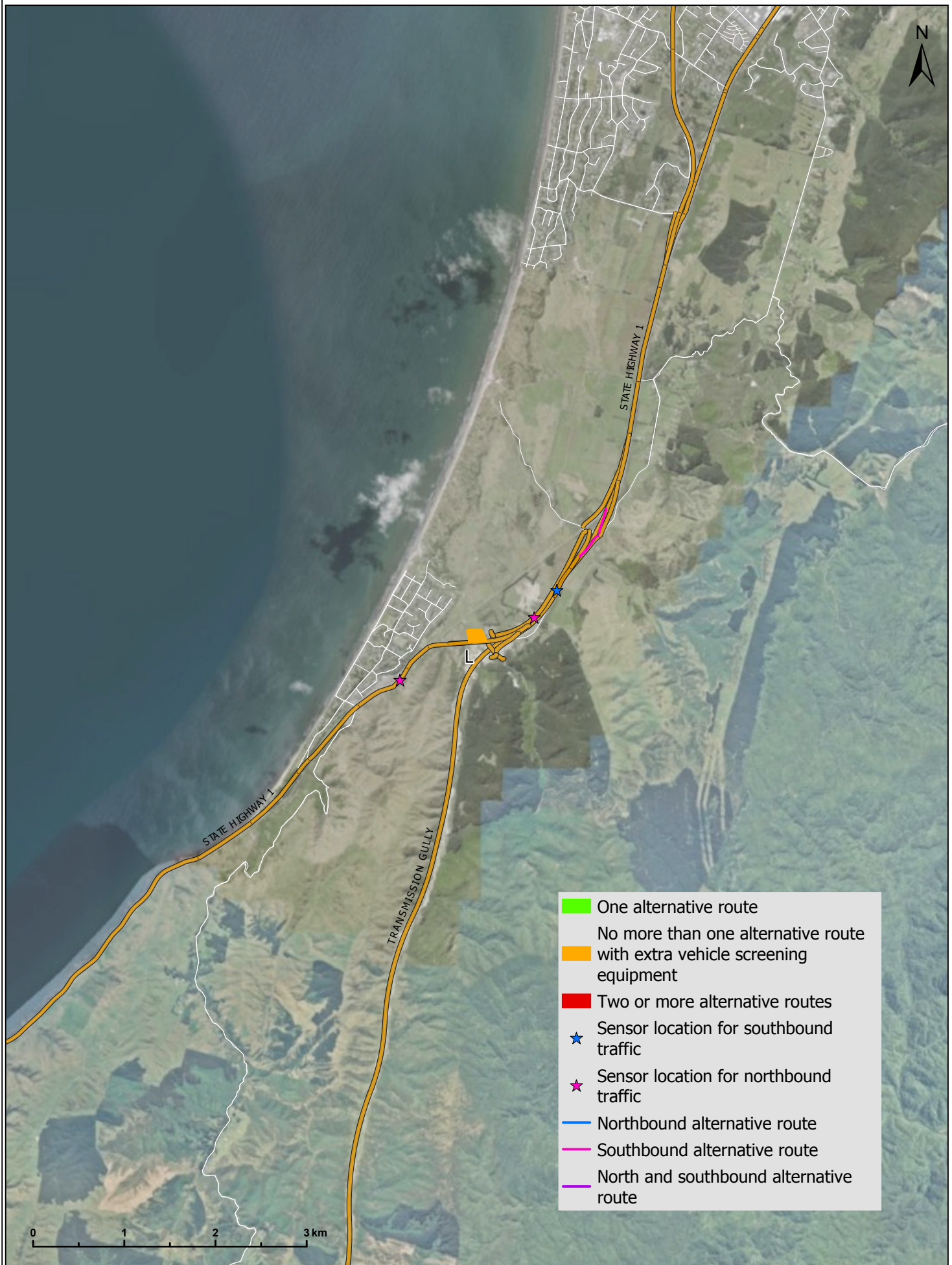
K - Sang Sue Corner South



Site K – Sang Sue Corner South

The local road between the Paekākāriki Interchange and QEII Park has not been considered as an alternative road, as there is no commercial or industrial development down that road that could provide heavy motor vehicle drivers with a valid reason to be there. Even if the local road was counted as an alternative road, the classification would still be green.

No alternative scenarios need to be considered.



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Site Location Figures
L - Paekākāriki Interchange

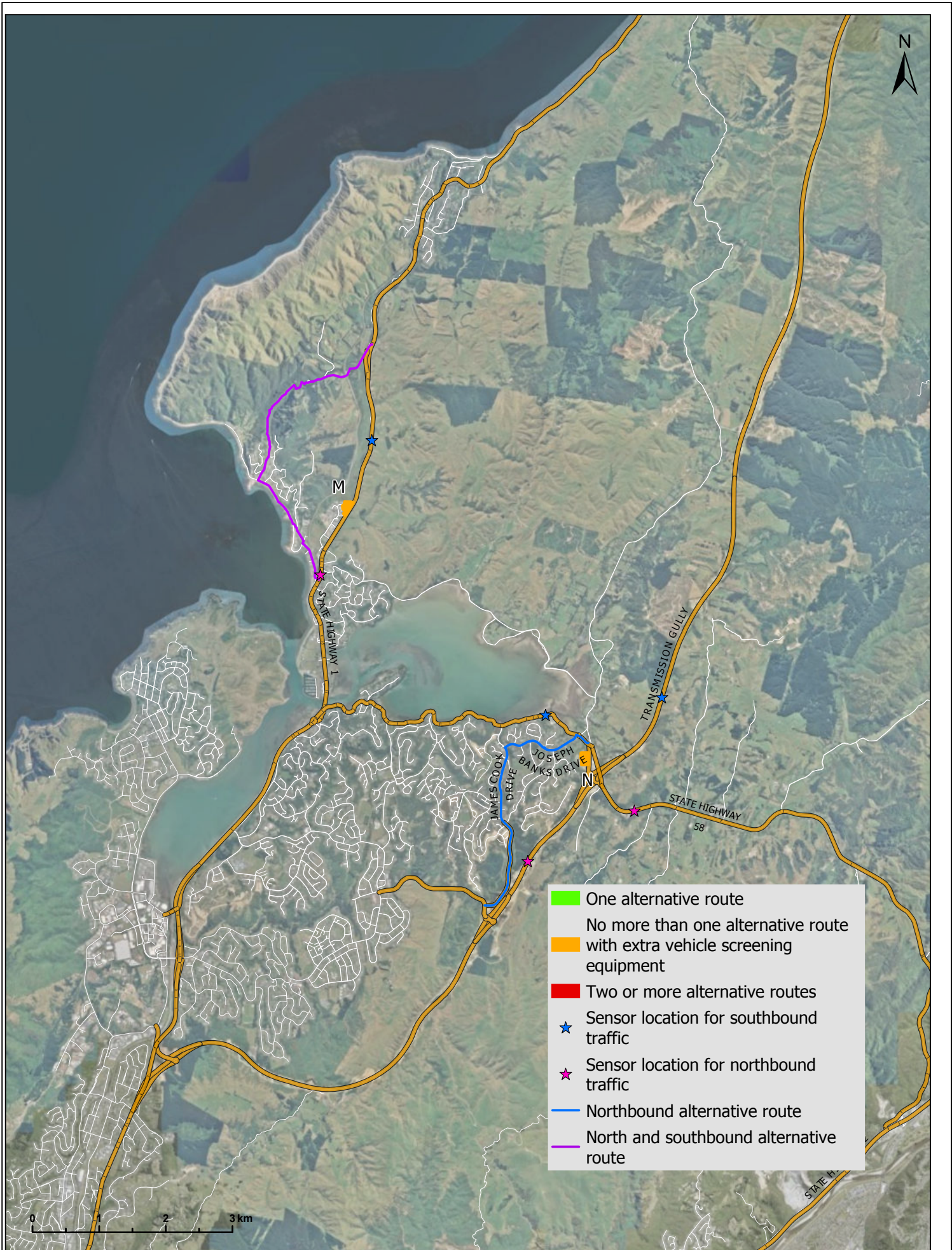


Site L – Paekākāriki Interchange

There are no alternative routes available.

The local road between the Paekākāriki Interchange and QEII Park has not been considered as an alternative road, as there is no commercial or industrial development down that road that could provide heavy motor vehicle drivers with a valid reason to be there. In addition, no drivers would miss the VMS.

No alternative scenarios need to be considered.



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Site Location Figures

**M/N - Plimmerton (Existing Weigh Station) /
Lane's Flat (Current TG Site Office)**



Site M – Plimmerton (Existing Weigh Station) and Site N – Lane’s Flat (Current TG Site Office)

It has been assumed that both sites would operate in tandem. Both sites are therefore classified as orange due to the resulting need for additional vehicle screening equipment.

Paekākāriki Hill Road is not considered to be an alternative route. Due to the narrowness and rough terrain, the road is not accessible for heavy motor vehicles. In addition, there are no right turns permitted at the bottom of that road.

Airlie and Moana Roads are an alternative route on State Highway 1 both north and south bound.

James Cook Drive and Joseph Banks Drive provide an alternative route northbound on Transmission Gully.

Each site has one alternative route for police to monitor.