REPORT

Tonkin+Taylor

Central Interceptor Extension - Point Erin Tunnel

Integrated Transport Assessment (ITA)

Prepared for
Watercare Services Ltd
Prepared by
Tonkin & Taylor Ltd
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1 Introduction and project overview

1.1 Introduction

Tonkin & Taylor Ltd (T+T) has been engaged by Watercare Services Ltd (Watercare) to undertake an Integrated Transport Assessment (ITA) related to the construction of the Central Interceptor (CI) Point Erin Tunnel (the Project).

This report assesses the construction and operational transport effects of the Project based on information provided by Watercare. This ITA report has been prepared in accordance with our Letter of Engagement dated 16 November 2022.

1.2 Project overview

Watercare is proposing to extend the CI wastewater conveyance and storage tunnel from Tawariki Street in Grey Lynn to a new terminal shaft in Point Erin. The tunnel extension will ensure combined overflows are picked up and conveyed to Māngere Wastewater Treatment Plant for safe treatment, reducing overflows to the environment and improving the quality of waterways and swimmable beaches by 2028.

The Project involves the construction, commissioning, operation and maintenance of a wastewater interceptor tunnel and associated activities at Point Erin Park in Herne Bay. The Project can be broken into two distinct parts:

- The Point Erin tunnel which runs from Tawariki Street in Grey Lynn to Point Erin Park in Herne Bay; and
- The Point Erin Park shaft site.

These are described in further detail below.

1.2.1 Point Erin tunnel

Point Erin tunnel runs from Tawariki Street in Grey Lynn to Point Erin Park in Herne Bay over a length of up to approximately 1.6 km. The tunnel is located entirely below ground. There are no surface works required for the tunnel.

Excavation of the tunnel will continue using the existing CI Tunnel Boring Machine ("**TBM**"). Construction spoil from the tunnel will be taken back down the CI tunnel and removed at the existing consented/designated CI May Road construction site and does not form part of this assessment.

There are no construction traffic effects associated with the Tunnel and therefore it is not considered further in this assessment.

1.2.2 The Point Erin Park Shaft Site

The works at the Point Erin Shaft Site are proposed to occur in two discrete locations within the park:

- The terminal shaft and associated construction area is proposed to be located in the grassed area immediately to the south of the Point Erin Pools (referred to as the main construction area); and
- The control chamber, plant room and associated construction area is proposed to be located towards the southwest corner of Point Erin Park near the intersection of Curran and Sarsfield Streets (referred to as the southwestern construction area).

The proposed layout for these activities is shown in Figure 1.1 below:

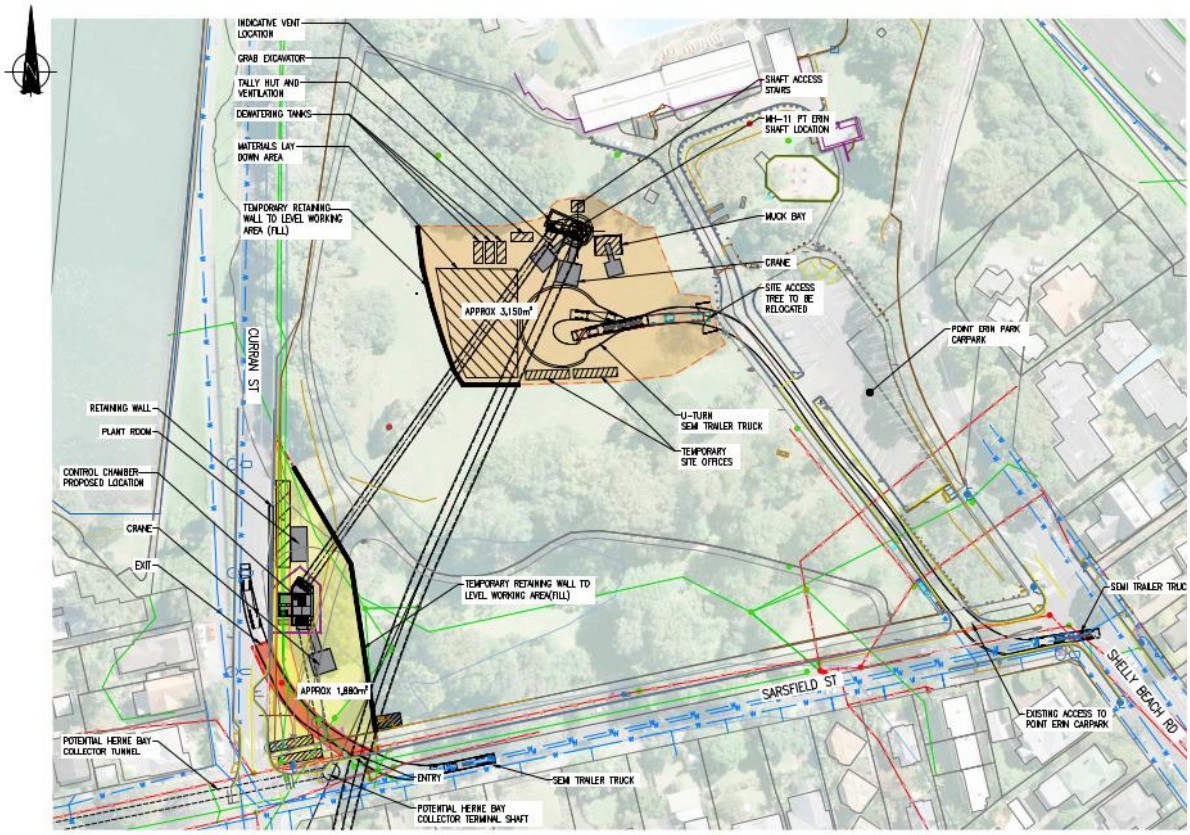


Figure 1.1: Concept plan (main construction area shown in orange and south western construction area in yellow)

The Project works within the abovementioned locations in Point Erin Park broadly comprise:

- The construction of infrastructure including a control chamber and plant room and a terminal shaft for removal of the CI TBM;
- Earthworks of approximately 5,000 m^2 in total across the two construction areas (approx. 3,150 m^2 in the grassed area to the south of the Point Erin Pools and approx. 1,880 m^2 in the southwestern corner of the park);
- Tree works (pruning, works in the root zone, removal, relocation);
- Temporary works including retaining walls to create level working areas, site access and internal circulation and contractor's site compound;
- Transport movements including delivery of plant and construction materials, removal of material excavated during the construction of the shaft and control chamber and removal of the TBM; and
- Park reinstatement and landscaping following completion of construction works.

The Project has been developed to a concept design stage. As it moves through the detailed design process and as construction methodology is confirmed, it is likely that some details will change but remain within the envelope of effects assessed in this assessment. All figures and dimensions provided are approximate and will be confirmed during the detailed design stage.

1.3 Indicative construction programme

The CI TBM is expected to arrive at Tawariki Street in Grey Lynn in February 2025 and at Point Erin Park in May 2025 (noting timeframes may change as the TBM progresses along the CI alignment).

Ideally, construction works at Point Erin Park will commence at least 12 months prior to the expected arrival of the TBM at Point Erin i.e. site establishment in the first half of 2024.

The CI terminal shaft construction is expected to occur over a 4 to 6-month period from around September 2024 to February 2025 potentially followed by a hiatus of a few months due to the time taken for the TBM to arrive at the shaft site. This will be followed by approximately 9 months of activity from May 2025 to February 2026 to remove the TBM and complete the internal structure of the main shaft.

The chamber construction is anticipated to take appropriately 4 to 6-months (indicatively from around January 2025 to June 2025).

Overall construction works at Point Erin are expected to take approximately two years (i.e. around 2024 to mid-late 2026), although it may take longer depending on the TBM's progress and other factors such as supply chains and resourcing (e.g. up to three years). It is relevant to note that construction will not be continuous over this full duration, rather there is likely to be periods of more intensive or less intensive construction and then 'quieter' periods, for example when waiting for the arrival of the TBM. As indicated above, the shaft and chamber are likely to be constructed separately; although, there is the potential there may be some cross over in the construction programme with the programming of works determined by the Contractor.

The Project is expected to be completed mid to late 2026, with the northern section of CI including the Point Erin Tunnel expected to be commissioned in 2026/2027.

It should be noted that the dates above are estimates based on current progress of the TBM and could be subject to change.

1.4 Construction hours

Construction hours at the Point Erin Park site and associated truck movements will typically occur during the standard construction hours for the wider CI works, which are as follows:

- Site construction activities – 7 am to 6 pm Monday to Friday, 8 am to 6 pm Saturday; and
- Truck movements – 7 am to 6 pm Monday to Friday, 8 am to 6 pm Saturday.

Tunnelling activities will occur 24 hours a day, 7 days a week.

There may be occasions where it is necessary to undertake construction activities outside of usual hours, for example, provision to extend hours during summer daylight savings periods and under certain circumstances where it is necessary to complete an activity that has commenced to tie into the existing network, for delivery of large plant or machinery outside of standard working hours, and for emergency works. Concrete pours and deliveries will occur overnight and some activities at Point Erin will need to occur 24 hours a day, 7 days a week such as over-pumping and dewatering from the shaft and chamber (if required).

It is understood that works outside of standard hours will be limited as far as is practicable and that based on experience at other CI sites, works and activities outside of standard construction hours typically occur intermittently and for a limited period of time. Recent examples of works outside of standard construction hours at other CI sites are set out in the Assessment of Noise and Vibration Effects for the Project. Works outside of hours are expected to occur intermittently and for limited periods of time. From a traffic effects perspective, movements outside of peak times will have less effect on traffic movements on the surrounding roads, and as such, are within the envelop of effects considered in this assessment.

Works outside the usual hours will be detailed in the Project's Construction Traffic Management Plan (CTMP) or Construction Management Plan which will identify appropriate management and

mitigation measures to be implemented and, if required, will be coordinated and programmed with AT and Waka Kotahi.

2 Approach to the ITA

2.1 Background and experience to date

The CI project was granted consent in 2013 and construction commenced in 2019. Since this time, the CI project team has established all of the major CI construction sites along the main CI tunnel and link sewer alignments. Over half of the main CI tunnel has been completed (southern section), Link Sewer C is almost complete and most of the 17 shafts along the CI alignment have been built. These works-to-date are similar to that proposed at Point Erin since they include a number of sites located within public parks and reserves (e.g. Keith Hay Park, Western Springs, Miranda Reserve, Rawalpindi Reserve, Mt Albert War Memorial Reserve) and in close proximity to houses.

Given the significant progress already made towards constructing the CI tunnel in Auckland, the activities and effects of construction are well understood. The CI project team's experience over the past three years has demonstrated that the effects associated with the construction of the CI tunnel, including traffic effects, can be successfully managed by the CI designation and resource consent conditions and the suite of management plans approved by Council for the current construction sites. However, it is also acknowledged that every new construction site needs to be assessed for its individual characteristics and its potential for effects on the surrounding transport network.

The ITA to support the resource consent application for this Project has been based on an indicative construction methodology informed by the CI Shaft and Chamber construction works for the Grey Lynn Tunnel and Tawariki Street Shaft Site[1] and other existing CI sites. A detailed construction programme and methodology will be finalised prior to the commencement of construction activities at Point Erin. It is anticipated this will be prepared by the Contractor and incorporated into the Project's CMP consistent with ongoing CI works.

This ITA is heavily informed by practical on-the-ground experience gained through the CI project to date, including directly comparable experience in relation to the type of works (tunnel and shaft) and location of works (in a park and in proximity to houses). However, while this ITA has been informed by this experience to date, careful consideration has been given to the particular characteristics of the area, including the site's proximity to SH1 and to Point Erin Pool and car park. The previous experience is helpful insofar as it provides a solid 'real-world' basis for understanding the nature of activities at Point Erin, the actual and potential traffic effects of those activities, and how the effects are best managed and mitigated to cause the least disruption to surrounding residents and to minimise environmental effects, but ultimately it is the particular receiving environment and characteristics of the surrounding transport network that are paramount and which are the focus of this ITA.

2.2 ITA and the traffic management approach

The ITA forms part of a comprehensive suite of technical reports to support the resource consent application and to inform the Assessment of Effects on the Environment (AEE) report. The ITA assesses the impact of construction traffic on the surrounding transport network and identifies key issues to be addressed within conditions and the Contractor's final Construction Traffic Management Plan (CTMP), which forms part of the overall Construction Management Plan (CMP) and then subsequently to develop Site Specific Traffic Management Plans (SSTMP) and detailed Traffic Management Plan Drawings.

Figure 2.1 shows the relationship between the sequence of documents relating to traffic management activities post approval of the ITA. It is important to note that the CTMP does not

[1] Grey Lynn Tunnel, Notice of Requirement, Resource Consent Application and Assessment of Environmental Effects, Jacobs, IZ027500-709-NP-RPT-001, Feb 2019

enable physical works to take place on the road corridor but rather sets the philosophy as to how traffic is managed for this project. SSTMPs and Corridor Access Requests (CAR) approved by Auckland Transport enable physical works to take place within the road corridor. These will be developed in accordance with the philosophy documented in the CTMP.

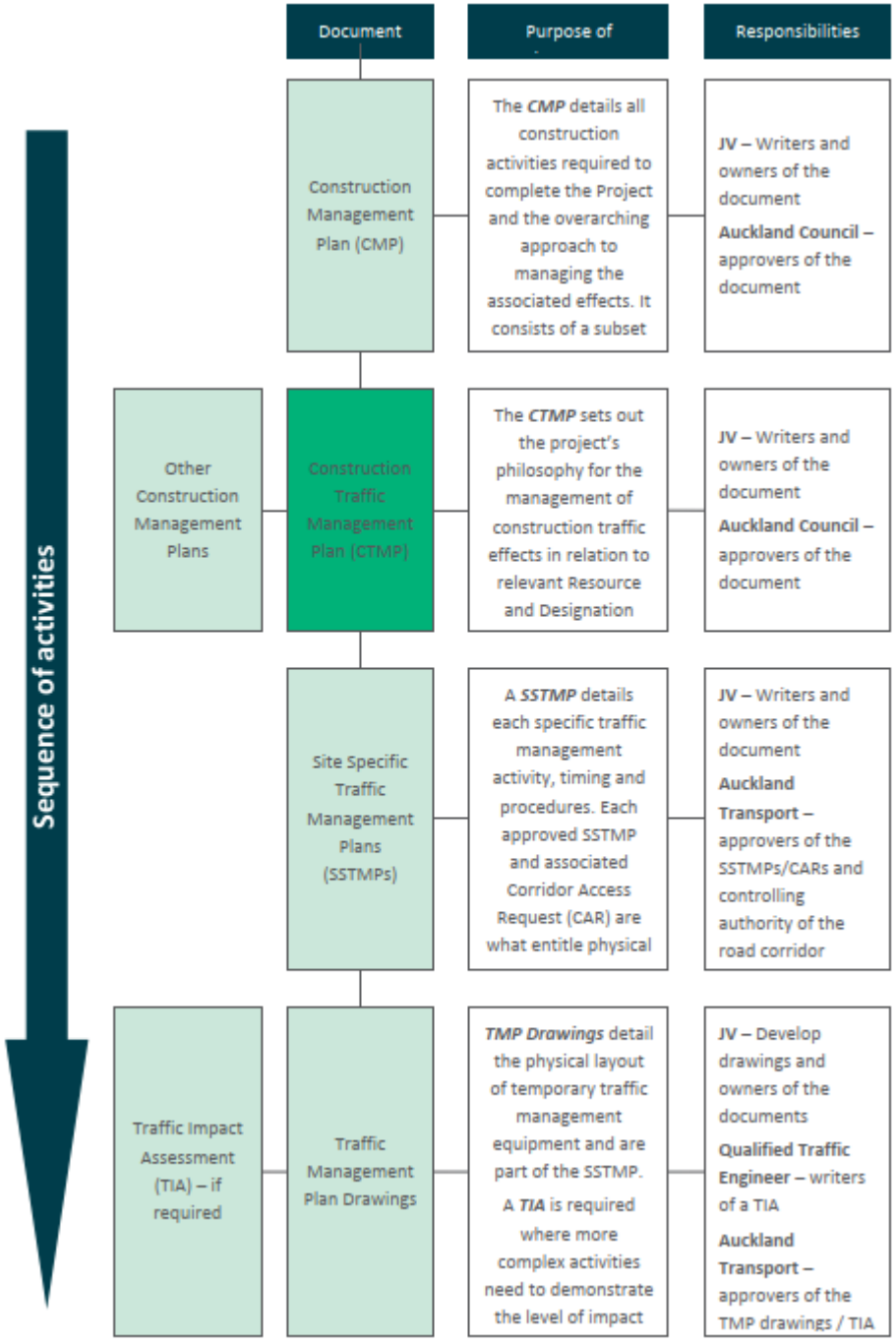


Figure 2.1: Sequence of activities for traffic management related documents following approval of the ITA.

The ITA also addresses any potential traffic effects of the Project's operational phase (i.e. any activities that will be associated with the ongoing operation and maintenance of the permanent structures in Point Erin Park), however given the very low traffic volumes associated with the operational phase, the main focus of this report is on construction traffic.

3 Point Erin Park construction activities and access

3.1 Site establishment

Construction at the Point Erin Park Shaft Site will commence with site establishment works which generally involve the following activities:

- Establishment of the construction footprint (including tree survey and fencing off working area);
- Vegetation clearance within the agreed construction footprint and site establishment of both the terminal shaft and control chamber sites;
- Services relocation;
- Site levelling and drainage works, including construction of temporary retaining walls;
- Installation of perimeter sediment and erosion control measures (as per the Draft Erosion and Sediment Control Plan);
- Formation of construction access;
- Establishment of site buildings and services; and
- Construction of site perimeter fencing and noise mitigation barriers (as required).

3.2 Terminal shaft

The shaft is expected to be excavated by conventional mechanical equipment (e.g. CAT 330 medium hydraulics excavator or similar) through overburden soils and East Coast Bay Formation (ECBF) bedrock.

Construction of the terminal shaft will likely occur over a 4 to 6-month period from around September 2024 to February 2025 potentially followed by a hiatus of a few months due to the time taken for the TBM to arrive at the shaft site. This will be followed by approximately 9 months of activity from May 2025 to February 2026 to remove the TBM and complete the internal structure of the main shaft.

It is anticipated two cranes may be required on site at any one time during the construction period. The crane for the shaft construction is likely to be a typical crawler crane which is a 120t crane, 7 m x 5 m footprint with extended belts. These cranes will be on site for the duration of the works within Point Erin Park.

3.3 TBM removal

The crane for the TBM recovery will be large - potentially a Liebherr LR 1280 crane based on the TBM installation methodology, or an alternative based on equivalent lifting capacity. This larger crane will likely be on site for approximately 2 months.

The removal process will systematically recover each of the TBM elements through the terminal shaft. This will require the lifting and transportation offsite of the main TBM ‘cans’ as well as the support system gantries (18 elements). This extraction process will require approximately 21 lifts overall to recover these elements. This will require a specialised crane (Liebherr LR 1280 or similar) and wide-bodied transporters to remove each of the elements from the site.

3.4 Control chamber

A control chamber is proposed to be constructed in the south west corner of Point Erin Park, close to the Sarsfield Street and Curran Street intersection.

The construction of the chamber will follow similar construction methods as described above for the terminal shaft. Based on the construction works at previous CI sites, if sheet piling is required it is likely that it would be undertaken intermittently for an estimated total of 30 days and up to 60 days over a 6-month period.

Access to the control chamber for operational and maintenance purposes will be required on an intermittent basis.

3.5 Park access during construction

3.5.1.1 Pool access road and public car park

Throughout the construction period, the existing public car park within Point Erin Park will remain open and public access to the Pool and playground will be maintained. However, the construction area adjacent to the car park and access road will be required to be cordoned off to restrict public access. The existing pedestrian access to the Pool and playground through the existing public car park will remain unaffected by the construction work. Access to the park from the car park and access road footpath will remain unaffected.

3.5.1.2 Park access (east footpath)

Access to the park at the existing east access footpath (i.e. the footpath 15m west of the Pool access road) is unaffected by the construction work.

3.5.1.3 Park access (west footpath)

The existing footpath into the park at the west end (Curran Street) will be temporarily closed during the construction period and an alternative temporary path and steps will be provided circa 90m east of the existing footpath. Wayfinding signage will be provided for this temporary route and to direct those with mobility issues to the existing path within the park further to the east which will remain open. The existing section of footpath on Sarsfield Street (north) immediately adjacent to the site access will be temporarily closed during the construction period.

An alternative temporary footpath was considered in the form of a temporary ramp as opposed to steps. Due to the grades involved, a ramp would require significant additional retaining works which would impact on trees in Point Erin Park and would have a negative visual impact. This alternative was rejected given the impact on the trees, the fact that this would be a temporary footpath and that there will continue to be an accessible route through the park at the east footpath (with wayfinding signs provided to direct those users who require an accessible route to the east footpath). Furthermore, as detailed in Sections 5.5 and 6.6 below, the existing west path gradient is considered to be too steep to be used by wheelchair users.

3.5.1.4 Construction work completion.

Once construction works are complete, the park will be reinstated and landscaped and the footpath into the park at the west end and the footpath on Sarsfield Street (north) will also be reinstated.

3.6 Site access - construction

3.6.1 Background

Following establishment of erosion and sediment control measures and initial vegetation clearance, the Contractor will establish internal circulation and site access in and out of the two construction areas to allow for safe access of construction traffic as shown in Figure 3.1 below:

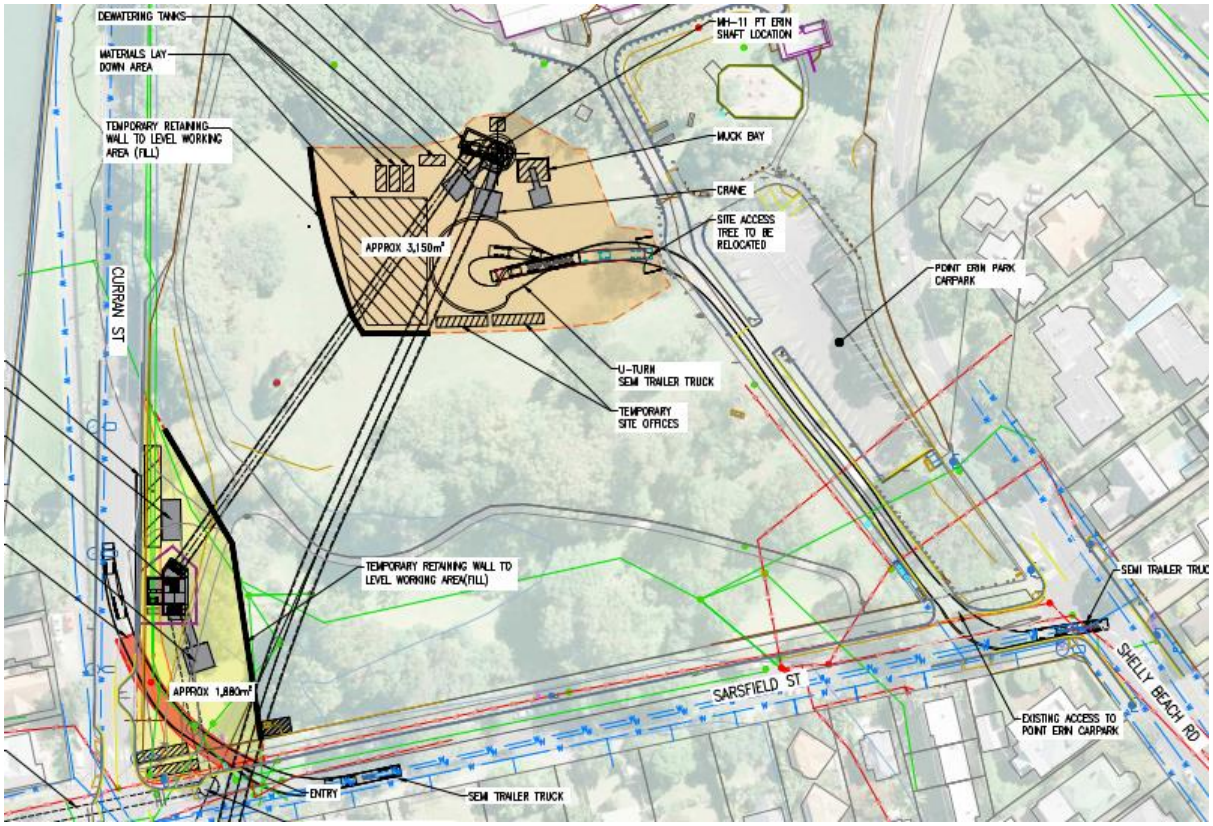
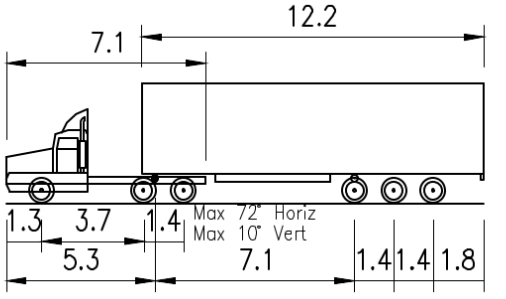


Figure 3.1: Construction access points

Vehicle tracking has been undertaken for both of the site accesses and is detailed in Appendix A. To ensure a worst case vehicle tracking assessment, the tracking is based on the largest construction vehicle typically to be expected on site which is a 17 m semi-trailer. The tracking is based on the Waka Kotahi tracking database for a 17 m semi-trailer, as shown in the image below:



SEMI-TRAILER (TNZ GEN. MIN. DESIGN RADIUS)	
OVERALL LENGTH	17.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.250m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
WALL TO WALL TURNING RADIUS	15.000m

3.6.2 Main access

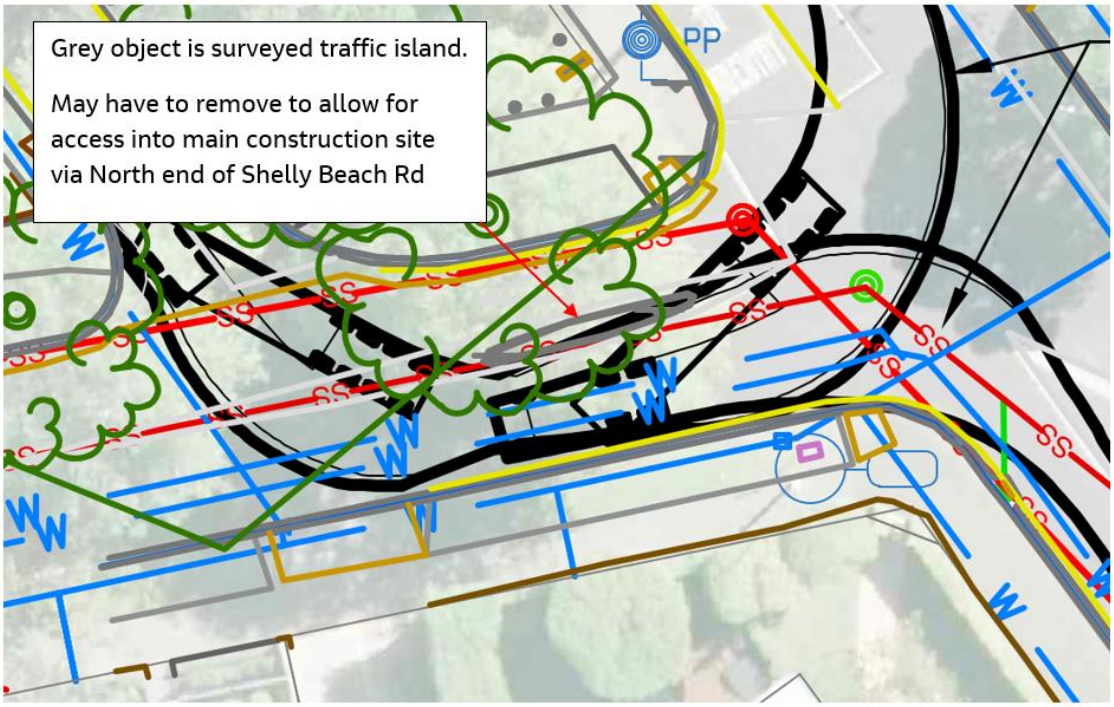
Access to the main construction area will be through the existing Point Erin Pool and public car park access road, which is accessed from Sarsfield Street as shown in Figure 3.1.

Vehicles arriving from the north will do so via Shelly Beach Road and arriving from the south are likely to do so primarily from Shelly Beach Road. Vehicles exiting the site going north will do so via Sarsfield Street and the Curran Street SH1 on ramp. These routes will be defined in the CTMP.

Appendix A provides vehicle tracking for these movements namely:

- Left and right turn in from Shelly Beach Road;
- Left out of Pool access road and right turn to Shelly Beach Road; and
- Right out of Pool access road and right turn from Sarsfield Street to Curran Street.

The tracking drawings demonstrate that construction vehicles can enter and exit the site safely, although the existing traffic island on Sarsfield Street at the Shelly Beach Road intersection will need to be removed to accommodate the 17 m semi-trailer truck (see vehicle tracking extract below):



Appendix A also provides tracking to demonstrate that a 17 m semi-trailer vehicle can turnaround on site and hence construction vehicles can enter and leave the site in a forward direction avoiding the need for any reverse manoeuvres on the Pool access road and Sarsfield Street.

As described above, specialised machinery will require access on a periodic basis including the two crawler cranes (120 t crane with a 7 m x 5 m footprint and extended belts) and a Liebherr LR 1280 crane (and wide-bodied transporters) to remove each of the TBM elements from the site. Separate to the Resource Consent application, bespoke SSTMPs and CARs will be developed once exact details of the machinery and vehicles required is known, as they have successfully been carried out for the rest of the CI project. Agreement with Auckland Transport and Waka Kotahi will be required and over-dimension rules and associated permitting processes will need to be complied with. Controllers may also be required to manage vehicle movements when required. These effects will be safely managed through the over-dimension loads process.

3.6.2.1 Vehicle queuing

It is anticipated that 1 semi-trailer truck can be accommodated within the main construction area at any one time to load/unload. Given the infrequent number of semi-trailer trucks (they are used for large equipment and materials deliveries only), this is considered to be sufficient. In the very unlikely event that two semi-trailer trucks arrive at any one time, the CTMP will set out how the TM Supervisor will have radio control with the trucks to arrange a suitable layover area for a truck to wait.

Within the main construction area, it is anticipated that 5 medium rigid trucks can be accommodated within the site at any one time to load/un load. This is considered to be a sufficient number to park on site, but in the unlikely event that more than 5 medium rigid trucks arrive at any one time arrive, the CTMP will indicate how the TM Supervisor will have radio control with the trucks and arrange a suitable layover area for a truck to wait.

3.6.2.2 Management of construction traffic on pool access road

As set out above, construction traffic will access the main construction area through the Pool access road, which will also remain in use by public vehicles accessing the pool carpark.
Vehicle tracking indicates that cars will be able to pass a medium rigid truck on the Pool access road but will not be able to pass a semi-trailer truck. The CTMP therefore will detail how the TM Supervisor will control movements of the infrequent semi-trailer trucks in and out of the Pool access road.

Vehicle tracking also indicates that medium rigid trucks are unlikely to be able to pass one another on the Pool access road. The CTMP therefore will detail how the TM Supervisor will control movements of medium rigid trucks in and out of the Pool access road. Site trialing will also be undertaken to confirm if 2 medium rigid trucks can pass each other.

3.6.3 Southwestern access

As shown in Figure 3.1, the construction access for the control chamber, plant room and associated infrastructure in the south west corner will be established off Sarsfield Street (ingress only) with egress only onto Curran Street (just north of the existing solid median), where Curran Street is currently one lane.

The ingress from Sarsfield Street will be located circa 20 m from the Curran Street/Sarsfield Street intersection, a Traffic Management supervisor will assist truck drivers to safely enter the site. Construction site fencing will be installed to prevent pedestrians using the section of footpath on Sarsfield Street between Curran Street and the site ingress. The existing footpath into Point Erin Park will be closed during construction and a temporary path and steps will be provided to the east of the site access.

For egress movements onto Curran Street, a Traffic Management supervisor will assist truck drivers to safely exit the site. The egress is located adjacent to the existing solid median which will provide a safe area for trucks to wait for a safe gap in the traffic in which to manoeuvre into. Once the truck has exited the site it will be able to safely manoeuvre into either lane 1 or lane 2 of Curran Street to continue either south via Curran Street/Shelly Beach Road SH1 off ramp or north via the SH1 on ramp. The egress is located on Curran Street and is located outside of the existing Waka Kotahi designation.

Vehicles arriving from the north will do so from Shelly Beach Road. Vehicles arriving from the south are likely to do so primarily from Shelly Beach Road. Vehicles exiting the site going north will do so via the Curran Street SH1 on ramp and vehicles exiting the site going south will do so via Curran Street and the Shelly Beach Road SH1 off ramp.

Appendix A provides vehicle tracking for these movements namely:

- Right turn in from Sarsfield Street; and
- Right turn out to Curran Street.

The tracking drawings demonstrate that construction vehicles can enter and exit the site safely.

Available sight distance plays an important role in a driver's decisions. A desktop assessment has been conducted to estimate the available sight distance and compare it to Safe Intersection Sight Distance (SISD) requirements. SISD is referenced in the 'Austroads' guidance as the minimum distance that should be provided on the major road of any intersection from a point 5 m back from the stop line on the side road.[2] Austroads indicates that for roads with posted speed limits of 50 km/h, and with driver reaction times of 2.0 s, the minimum sight distance requirement is 97m for major roads. This sight distance is a minimum and where practicable, designers should provide larger sight distances. The available SISD is shown in Figure 3.2 below.

Figure 3.2: Sightlines measured for West Access (Auckland GeoMaps 2023)

Figure 3.2 demonstrates that the southwestern access meets the minimum sight distance requirement as the trucks exit onto Curran Street and there are no obstructions to sightlines in the direction of oncoming traffic.

3.6.3.1 Vehicle queuing

Within the southwestern construction area site, it is anticipated that 1 semi-trailer truck or 2 medium rigid trucks can be accommodated within the site at any one time to load/unload. Given the infrequent number of semi-trailer trucks where they are used for large equipment and materials deliveries only), and anticipated parking requirements for medium rigid trucks this is considered to be sufficient. In the very unlikely event that two semi-trailer trucks or more than 2 medium rigid

[2] Austroads. (2009). Guide to Road Design Part 4A: Unsignalised and Signalised Intersections. Sydney.

trucks arrive at any one time, the CTMP will indicate how the TM Supervisor will have radio control with the trucks and arrange a suitable layover area for a truck to wait.

3.7 Site access – operation and maintenance

Figure 3.3 outlines the proposed access to provide longer term maintenance and operation at both the main access and southwest access. Access will be required on an infrequent basis (once or twice a year).

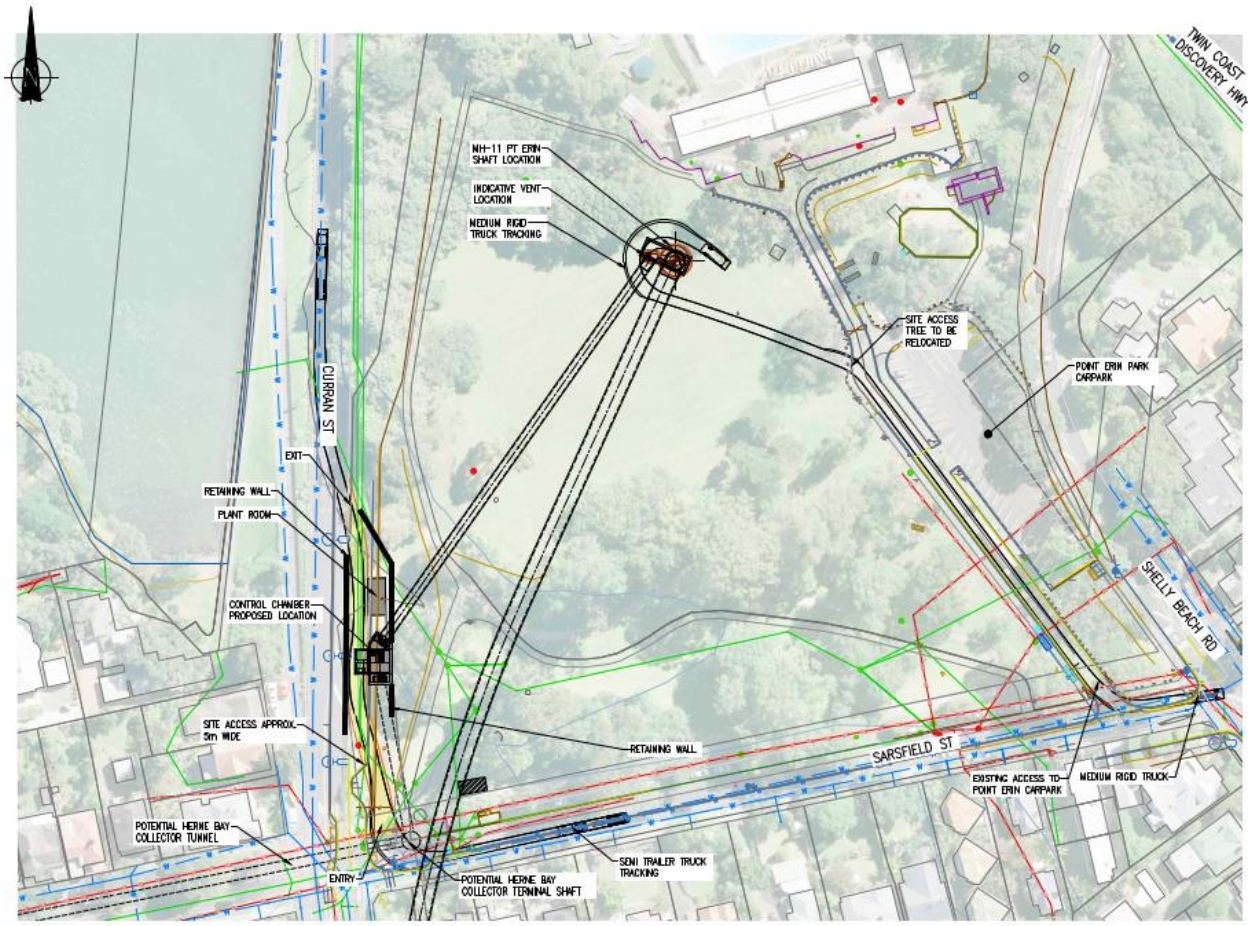


Figure 3.3: Operational and maintenance access

3.7.1 Main access

Once construction work has finished, there will be infrequent access (once or twice a year) to the site required for ongoing longer term maintenance which will continue to be from the Pool access road. This will be carried out by a smaller vehicle (a 7 m medium rigid truck) rather than the 17 m semi- trailer truck assumed in the construction vehicle tracking detailed in Appendix A. Hence, the maintenance vehicles will be able to enter and exit the main site access safely. The intention is to leave the surface as grass, as existing. Maintenance access would be from the existing post and chain fence. Appendix A demonstrates that the 7 m medium rigid truck (using the Waka Kotahi tracking database) can turnaround on site and hence maintenance vehicles can enter and leave the site in a forward direction avoiding the need for any reverse manoeuvres on the Pool access road and Sarsfield Street.

3.7.2 Southwest access

It is proposed that the southwest access is maintained for future infrequent (e.g. once or twice a year) long term maintenance/ routine inspection works.

As shown in Figure 3.3, the ingress point on Sarsfield Street will be slightly realigned and located closer to the Sarsfield Street/Curran Street intersection east of the existing pedestrian ramp across Sarsfield Street. The site ingress will be bollarded to prevent future public vehicle access and will provide access for pedestrians to the Point Erin Park footpath network (as is the existing situation).

As shown in Figure 3.3, the maintenance egress will be located slightly further north on Curran Street than that for the construction egress and will be located just north of where the painted median ends on Curran Street. The egress is located within the existing Waka Kotahi designation. Initial discussions with Waka Kotahi have indicated they are generally comfortable with the proposal. Watercare will continue to liaise with Waka Kotahi in that regard. The egress will be bollarded to prevent future public vehicle access. Maintenance vehicle egress onto Curran Street will be programmed to take place wherever possible, during out of peak times to reduce any impacts in the peak periods.

For egress movements onto Curran Street, truck drivers will be supervised to safely exit the site. Once the truck has exited the site it will be able to safely manoeuvre into either lane 1 or lane 2 of Curran Street to continue either south via Curran Street and the Shelly Beach Road SH1 off ramp or continue north via the SH1 on ramp.

Appendix A provides vehicle tracking for these movements namely:

- Right turn in from Sarsfield Street; and
- Right turn out to Curran Street.

The tracking drawings demonstrate that maintenance vehicles can enter and exit the site safely.

4 Construction traffic volumes

4.1 Overview

Transport movements will be associated with a range of construction activities at the Point Erin Shaft Site, including delivery of plant and construction materials, staff access, site establishment, piling, removal of material excavated during the construction of the shaft and chamber, concrete pours, TBM removal and demobilisation and site remediation and landscaping. Construction vehicles are expected to include:

- Light vehicles associated with contractors and project management/supervision staff;
- 11.5 m rigid truck for spoil removal and material import;
- 17 m semi-trailer for delivery of larger items such as sheet piles and reinforcement; and
- Low loader for one off large plant delivery and pick-up events and therefore will not occur on a day to day basis and will be subject to CAR and over dimension route approvals with AT and Waka Kotahi.

4.2 Construction programme

As detailed in section 1.3, the following works programme is proposed:

- Stage 1 - Site establishment – July/August 2024;
- Stage 2 - Terminal shaft excavation (main shaft) - involving removal of excavated material from the terminal shaft - September 2024 to February 2025;
- Stage 3 - Control chamber excavation and construction - involving removal of excavated material from the chamber and construction of the chamber - January 2025 to June 2025; and
- Stage 4 -TBM removal (one off event) and completion of the internal structure of the terminal shaft - May 2025 to February 2026.

It is relevant to note that construction will not be continuous over this full duration, rather there is likely to be periods of more intensive or less intensive construction and then ‘quieter’ periods, for example when waiting for the arrival of the TBM. The shaft and chamber are likely to be constructed separately; although, there is the potential there may be some cross over in the construction programme (e.g. as indicated above potentially early 2025 (Jan/Feb) and mid 2025 (May/June).

4.3 Construction activities vehicle trip generation

Light vehicle movements for construction and supervision staff, inbound and outbound, are likely to be tidal due to staff arrivals at the start of the shift (i.e. 0600/0700) and departures at the end of the shift (i.e.1800). Construction and supervision staff numbers throughout the Project are expected to be relatively stable at 7 contractor staff and 2 supervisors at any one time.

Table 4.1 provides a summary of the maximum number of construction vehicles predicted for each of the 4 stages of construction work identified in section 4.1 above (with full details provided in Appendix B).

Table 4.1: ***Construction vehicle generation***

	Stage 1 - Site establishment (main and southwest access combined)	**Stage 2 - Terminal shaft excavation (main access only)**	**Stage 3 -Control chamber excavation and construction (southwest access only)**	**Stage 4 -TBM removal and completion of terminal shaft (main access only)**
Programme Date (indicative)	**July/August 2024**	**Sept 2024 to February 2025**	**January 2025 to June 2025**	**May 2025 to February 2026**
Peak Truck Movements/day	7	18	18	40
Peak Car Movements/day	9	9	9	9
Peak total vehicles/day	16	27	27	49
Peak vehicles/hour	1.6	2.7	2.7	4.9

Therefore, the highest number of construction vehicles will occur during stage 4 with a total of 49 vehicles during the day, which averages over a 10 hour working day at 4.9 vehicles per hour, or 1 vehicle every 12 minutes.

As identified in section 4.2 above, the shaft and chamber are likely to be constructed separately, but in the unlikely event that the construction activities do overlap then for the purposes of ensuring a robust and conservative assessment of the effects of the additional construction traffic, the overlap of Stage 3 and Stage 4 activities (which represent the two highest trip generators) has formed the basis of the assessment of construction traffic effects. Based on Table 4.1 above, this would result in a total of 58 trucks and 9 cars per day, which averages over a 10 hour working day at 6.7 vehicles per hour, or 1 vehicle every 9 minutes.

4.4 Truck routes

At this stage, exact origin and destinations for predicted truck movements associated with the construction of the project are not confirmed. Spoil removed during construction of the shaft is mostly likely to be delivered southwards as most of the appropriate facilities, such as Puketutu, are in the south.

The routing of trucks will typically be:

- To/from North- via SH1 and Curran Street SH1 on ramp and Shelly Beach Road SH1 off ramp; and
- To/from South – via primarily Shelly Beach Road and Curran Street.

These routes are considered appropriate to access the Point Erin Shaft Site, as trucks are primarily routed on arterial roads and SH1 (whose role and function is primarily efficient movement of traffic) and thus avoiding excess trucks on the local road network (noting Sarsfield Street is a Collector Road).

4.5 Staff and visitor car parking

Watercare propose to have car parking for staff and visitors on site in the main construction area.

5 Existing transport environment

5.1 Point Erin Shaft Site location

The Point Erin Tunnel Shaft Site is located at Point Erin Park in Herne Bay, Auckland. The site is bounded by Sarsfield Street, Curran Street (and on ramp to State Highway 1), and the Shelly Beach Road off ramp from SH1. Key land uses surrounding the site are the strategic roading network (SH1), residential dwellings, Point Erin Park and Pool and Ponsonby Primary School 100 m to the south of the site on Curran Street. Zoning in the immediate vicinity of the site comprises residential, road, strategic road network and open space zones as shown in Figure 5.1 below:

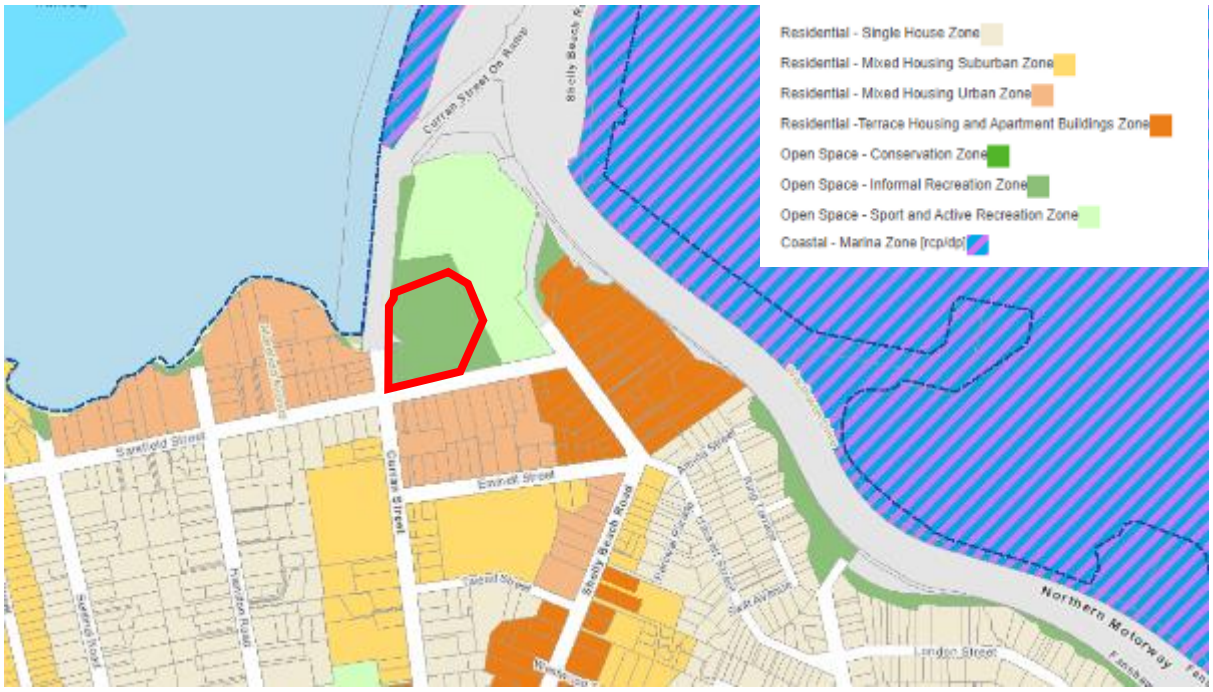


Figure 5.1: Auckland Unitary Plan Zones (Source: Auckland Council GeoMaps, accessed 2022)

5.2 Transport network

5.2.1 Description of roads surrounding the Point Erin Shaft site

Roads surrounding the site are Curran Street, Sarsfield Street and Shelly Beach Road.

Sarsfield Street between Shelly Beach Road and Curran Street has residential properties on the south side and Point Erin Park on the north side. On street parking is available on both sides of Sarsfield Street. Pedestrian ramps have recently been provided across both approaches of Sarsfield Street at the Curran Street intersection. Access to the public car park and Point Erin Pool is via a gated access (closed between 2200 to 0600 daily), located 25 m west of Shelly Beach Road.

Curran Street north of Sarsfield Street is one way northbound leading onto the SH1 on ramp and also continues onto the Shelly Beach Road SH1 off ramp and Westhaven Drive (noting there is a short section which provides for southbound residential access near the intersection of Curran and Sarsfield Streets). There is a weight limit on the Curran Street SH1 on ramp of 3500 kg axles, 50% of class 1 gross weight and a speed limit of 30 km/h. This is due to all vehicles from the Curran Street SH1 on ramp using the clip on section of the Auckland Harbour Bridge. Curran Street south of Sarsfield Street is the key corridor route from Jervois Road to SH1 and is largely residential in nature plus the Ponsonby Primary School.

Shelly Beach Road commences from the SH1 off ramp via a bridge over the motorway and is one-way from the SH1 off ramp, until its intersection with Sarsfield Street. A short right turn bay is provided at the priority intersection with Sarsfield Street. A parallel parking lane on its eastern side is introduced after the bridge. South of Sarsfield Street, Shelly Beach Road transitions into a two-lane road, with a flush median and on-street parallel parking on both sides.

Posted speed limits on all roads surrounding the site are 50 km/h (noting posted speed limit changes on the SH1 on/off ramps to 80 km/h). The school zone on Curran Street has variable speed limit signs, with 40 km/h limits on school days operating at least 35 minutes before the start of school, and 20 minutes at the end of the school day, beginning no earlier than 5 minutes before the end of the school day[3].

5.2.2 Existing traffic flows

Existing traffic counts and heavy vehicle percentages are detailed in Table 5.1 below.

Table 5.1: Traffic counts, heavy vehicle percentages, and road classification

Road name	Average Daily Traffic (veh/day)	Estimated Heavy Vehicle % (number)	Count/Estimate year	Auckland Unitary Plan Road Classification
Sarsfield Street Curran Street to Shelly Beach Road	4,168*	3.7% (154)	2020	Collector
Curran Street Jervois Road to Sarsfield Street	8,179*	8% (654)	2022	Primary Arterial
Curran Street - SH1 on ramp	6,162	2.3% (142)	2021	N/A – SH1 on ramp
Shelly Beach Road Bridge / SH1 off ramp	5,429	1.5% (81)	2021	N/A – SH1 off ramp
Shelly Beach Road North of SH1 Offramp	523	5.4% (28)	2020	Local Road
Shelly Beach Road Sarsfield Street to Emmett Street	7,371*	3.7% (273)	2022	Primary Arterial
Source: Traffic counts from Mobile Road, https://mobileroad.org/desktop.html, accessed November 2022. *Asterisk traffic counts are estimates.				

As to be expected, given the arterial and collector road nature of these roads, daily traffic volumes are high and there are already a large number of daily truck movements on these roads.

5.2.3 Intersections

There are three intersections near the Point Erin Shaft Site.

The Shelly Beach Road / Sarsfield Street intersection is a give way controlled T-intersection, with a bay for right-turning movements from Shelly Beach Road. On Sarsfield Street there is an island, but

[3] Source: https://at.govt.nz/driving-parking/road-safety/road-safety-around-schools/school-speed-zones/, accessed November 2022.

this isn't a pedestrian refuge, since the existing footpath dropped kerbs and pedestrian desire line are to the east of the island.

The Pool access road/Sarsfield Street is a give way controlled T-intersection located 25 m west of Shelly Beach Road. Overhanging trees currently restrict sightlines for Sarsfield Street eastbound vehicles. Given the close proximity of the Shelly Beach Road/Sarsfield Street intersection ,approach speeds on Sarsfield Street westbound are low (expected 15 km/h) and hence SISD sightline requirements are currently met.

The Curran Street / Sarsfield Street intersection has four legs and Sarsfield Road is controlled by STOP signage, with sinusoidal speed humps on the Sarsfield Street approaches. These feature white dragon's teeth pavement markings.

5.2.4 Car parking

There is on-street parallel car parking available on Sarsfield Street which is limited to 120 minutes between 0800-1800 Monday to Friday. Parking is not permitted on the access road into Point Erin Park, and this is delineated by NSAAT (no stopping at all times) broken yellow lines. There are 52 spaces at the public car park within the park with a 240 minute limit plus an additional 2 disabled people parking spaces with a 180 minute limit. Section 6.4 below, assesses the effect of the project on the public car park. On Curran Street, there are NSAAT lines near the intersection, transitioning to parallel parking lanes on both sides of the road near Ponsonby Primary School. There is a parallel parking lane on the eastern side of Shelly Beach Road, after the SH1 off ramp, but the western side has NSAAT markings.

5.2.5 Existing traffic conditions

Typical traffic speeds from Google Maps in the weekday AM and PM peaks, school pick-up, and weekday off-peak times, are shown in Figure 5.2 (noting this is for the worst time period in the AM peak), Figure 5.3 (noting this is for the worst time period in the PM peak) , Figure 5.4 (at 3pm to tie into the school finish time) and Figure 5.5 (1035 is the typical off peak time) below.

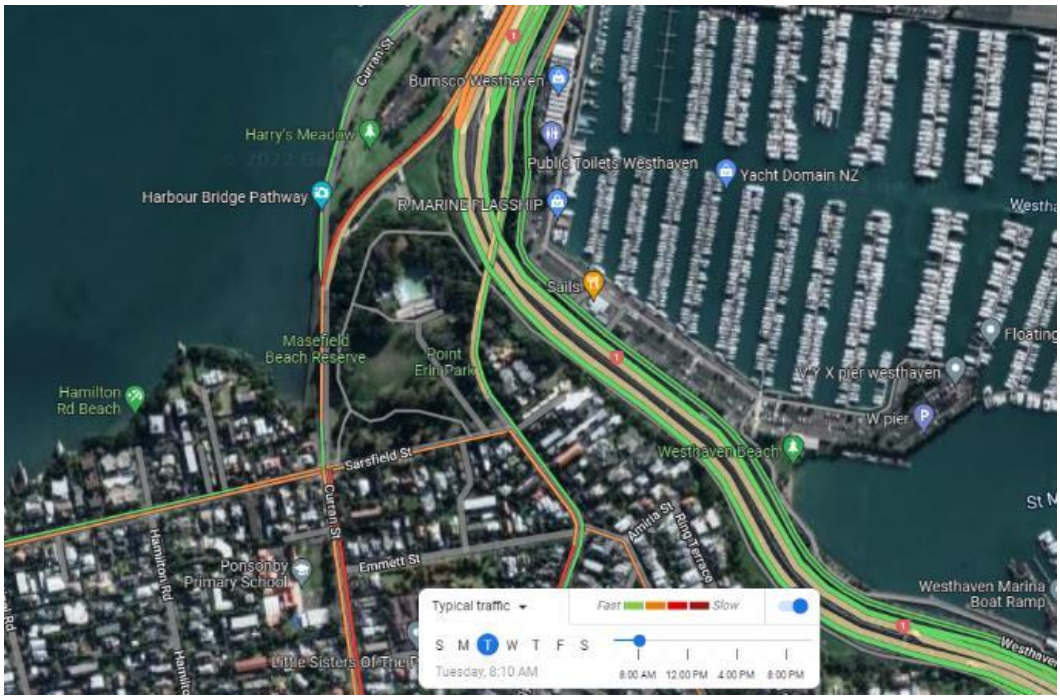


Figure 5.2 Typical AM peak traffic (Source: Google Maps, accessed November 2022)

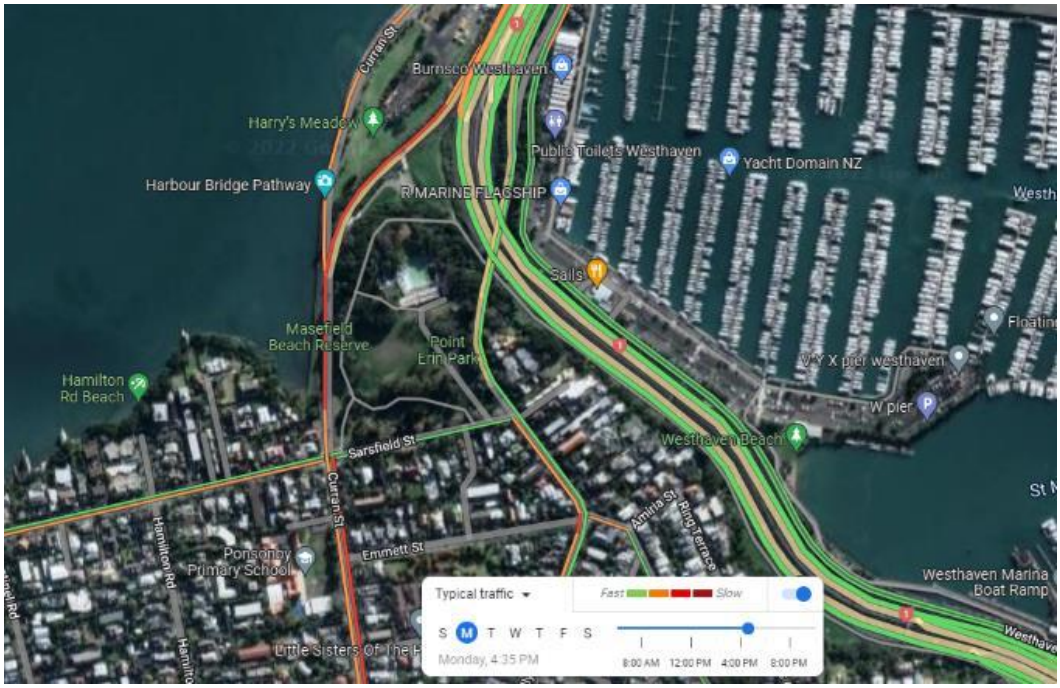


Figure 5.3 Typical PM peak traffic (Source: Google Maps, accessed November 2022)

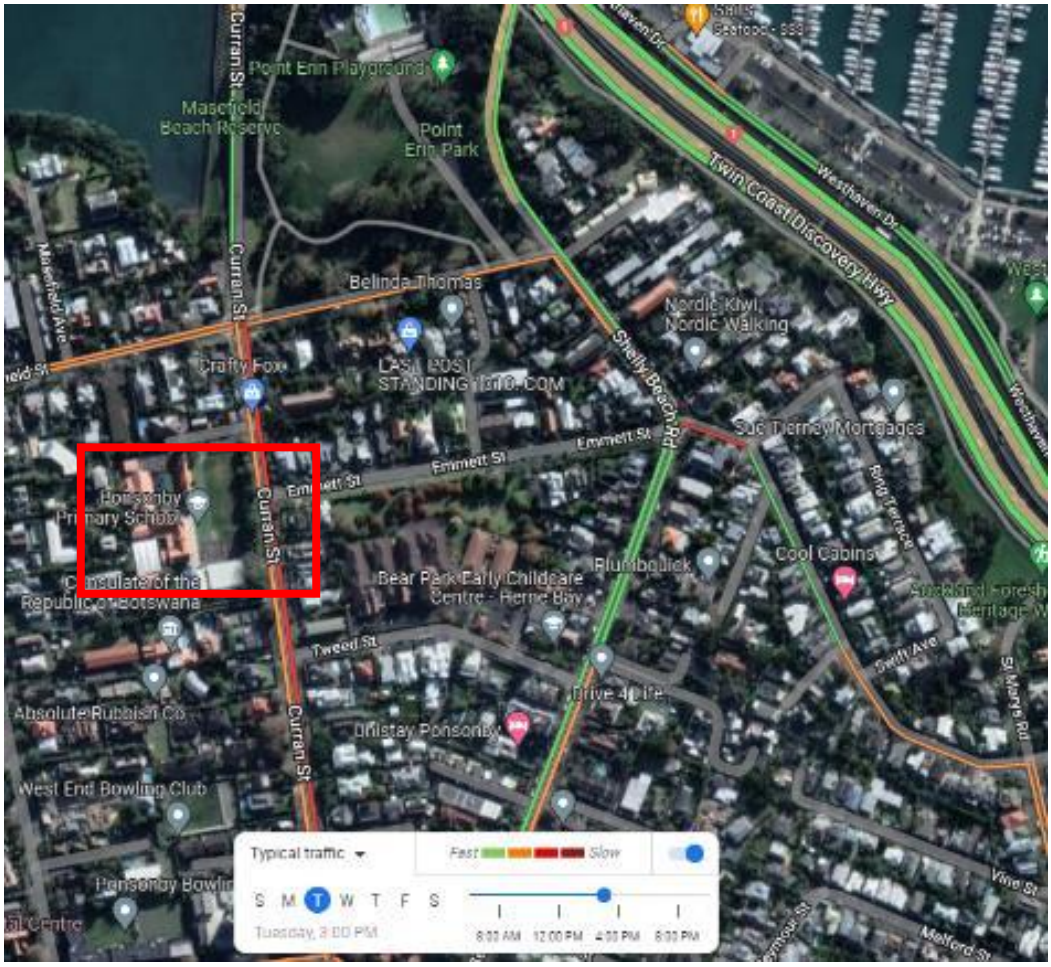


Figure 5.4 Typical traffic at school (denoted by red box) pick-up time (Source: Google Maps, accessed November 2022)

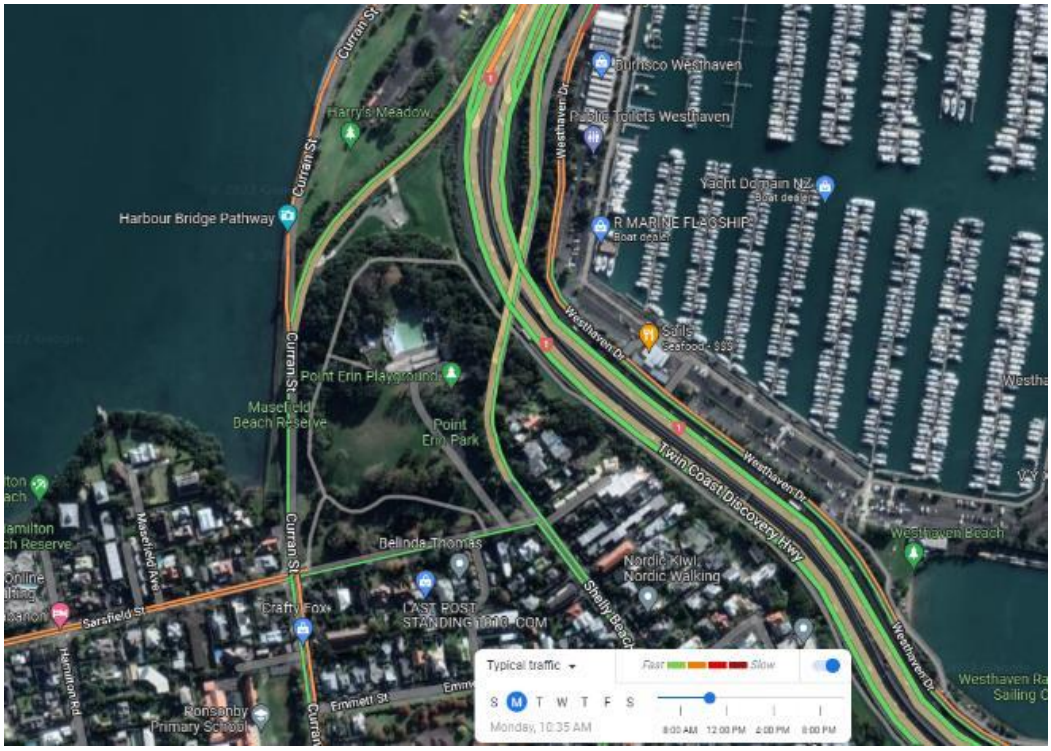


Figure 5.5 Typical off-peak weekday traffic (Source: Google Maps, accessed November 2022)

Congestion is evident on Curran Street and the SH1 on ramp (largely due to the ramp metering of access to the Auckland Harbour Bridge) and to a more limited extent Sarsfield Street in the peak periods and little congestion on Shelly Beach Road. There is little congestion in the off peak.

5.3 Public transport

There are no scheduled bus services on Sarsfield Street. Bus numbers 866 and 966 route via Curran Street and Shelly Beach Road to/from the North Shore. The nearest bus stops from the Point Erin Shaft Site are for the 101 and Outer link routes, on Jervois Road approximately 500 m south of the site.

5.4 Walking and cycling – adjacent roads

Shelly Beach Road has wide footpaths of approximately 3.5 m wide on both sides of the road. Sarsfield Street has narrower footpaths of approximately 2.5 m wide, although these are separated from vehicle traffic by grassed berms. At the Curran Street / Sarsfield Street intersection, there are newly installed ramped crossings on both of the Sarsfield Street approaches. There is a shared path on the west side of Curran Street leading to Westhaven. Adjacent cycle routes and on road routes are shown in Figure 5.6 below (extract from the Auckland Cycle network source at.govt.nz):

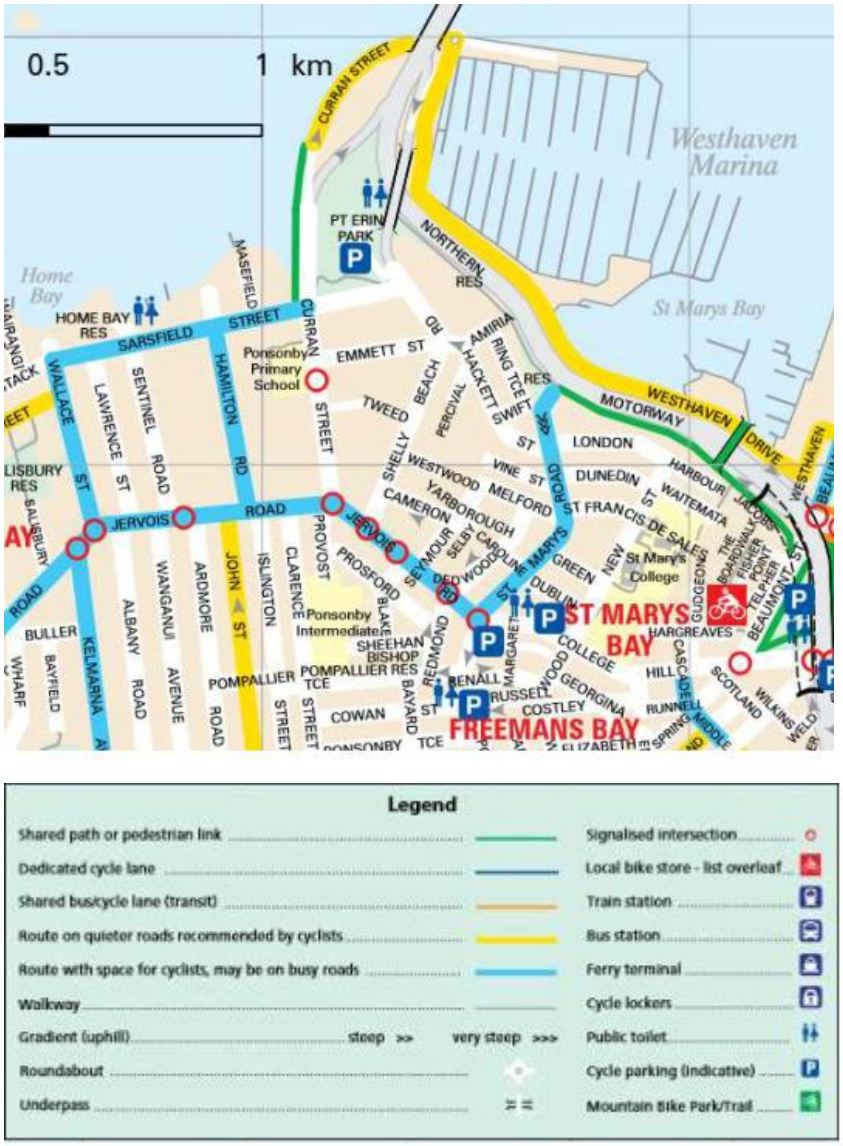


Figure 5.6: Existing adjacent cycle routes and on street routes.

5.5 Point Erin Park

Facilities within the park include the internal paths, Pool, playground, public toilets, basketball half-court, picnic tables and seating, drinking fountain and bike stands. As detailed in the Recreation Assessment Report (prepared to support this Resource Consent), the park is typically used by:

- Dog walkers;
- Casual walking and running;
- Fitness groups;
- Meeting area before people go into the Pool;
- Picnics; and
- Up to 8 per year small scale community events eg family days and 'Gymnastics in the Park'.

As part of the parking surveys (detailed in section 5.7 below), observations were made of usage of the park during January 2023. The observations were generally consistent with the observations made earlier by Greenaway & Associates to inform the Recreation Assessment. Overall, the number of users of the park was observed to be low (typically 1 or 2 users in a 30 minute period), with the

vast majority being dog walkers and a small number of joggers. Usage of the east and west path was evenly split. Only one cyclist was observed, and no mobility impaired users were observed.

Figure 5.7 below shows the layout of the pedestrian paths inside the park.

Figure 5.7 Location of pedestrian paths at Point Erin Park (Source: Auckland Council GeoMaps, accessed 2022)

As shown in Figure 5.7, from Sarsfield Street, access to the park is available from footpaths to the west (noting the gradient of the existing footpath into the park is circa 11% over a distance of 50 m) from the east and also from the footpath adjacent to the Pool access road.

The Pool access road is approximately 80 m long between the car park access and Sarsfield Street, is straight with good visibility and, as such, vehicles are able to observe oncoming traffic. Its current width is 5 m, which is wide enough for two cars to pass each other. The Pool access road is a council asset.

5.6 Point Erin Pool

The Point Erin Pool is managed on contract to Auckland Council by Community Leisure Management (CLM). The Pool is open to the public from the last weekend of November to the last weekend of March with staff working 1 to 2 weeks either side of the opening and closing date. The Pool opening hours are:

- Monday to Friday 0600-2000; and
- Weekends 0900-2000.

Within these times, the Pool is open for lane swimming:

- Monday to Friday 0600-0930 and 1830-2000; and
- Weekends 0900-1000 and 1800-2000.

The aqua run and tube hire is open from 1200-1600 and the café is open 1100-1600.

Based on discussions with the CLM Director & GM of Operations, CLM in November 2022 and January 2023 it is understood that during:

- December in the weekdays the Pool is mainly used by school groups who arrive by bus (with up to 400 children daily) arriving 0930/1000 and leaving 1430/1500. At the weekends (weather permitting) the Pool is very busy with virtually everyone arriving by car (very few walk or cycle);
- January during school holidays - weather permitting this is the busiest period for the Pool both weekdays and weekends with everyone arriving by car. Of the 60,000 visitors for the whole season, up to 40,000 visits are during January. The peak time for parking is from 1100 onwards and there is little variation by day of week; and
- February to mid-March – during weekdays it is quiet with the occasional school event. At the weekends (weather permitting) the Pool is very busy with virtually everyone arriving by car.

The Pool management indicated that at the busiest times (i.e. every sunny day in January and sunny weekends in February to mid-March) from 1100 onwards there is a parking problem with everyone arriving by car, resulting in the public car park being full and people parking on the access road on the NSAAT's. It was also stated that the on street parking on Sarsfield Street is also full.

Usage of the restricted access section of the Pool access road between the Pool and the public car park is typically used:

- Twice a week by refuse truck;
- Once a week by chemical truck;
- Truck deliveries to the café;
- Staff park adjacent to the Pool buildings; and
- The two accessible parking spaces – which are usually full.

As a result of the staff parking adjacent to the building, it is often difficult for the Pool service trucks to be able to turn around adjacent to the Pool.

The management team confirmed no maintenance/upgrade works are proposed for the Pool during the proposed construction works for the Project.

As a result of discussions with the Pool management, they have requested on going communications with them so that information can be provided to the Pool users on social media to pre warn them of upcoming works and any parking implications.

5.7 Point Erin Park parking survey

During January 2023 parking surveys were undertaken to understand peak parking conditions at Point Erin Park over 6 different days over a 2 week period. The surveys were carried out on sunny/hot days and were carried out at different times of the day and on different days of the week (Monday to Saturday). A non-sunny day was also surveyed for comparison purposes. The surveys confirmed the CLM management team observations that:

- The public car park was typically full from 1100 until 1600. The peak parking demand was observed to be from 1245 to 1315;
- There was no difference between the days of the week - as long as the day was sunny;
- If the weather was not sunny/hot then pool usage (and hence parking demand) was low (i.e. the car park was less than 30% occupied));
- No cyclists were observed and no cycles were observed parked in the cycle parks; and
- Pedestrians on the Pool access road footpath were observed to be people who had parked on Sarsfield Street and hence people were not observed to have solely walked to the Pool.

Two key differences between the CLM observations and the parking survey were:

- The chain and post (providing access for Park maintenance vehicles) had been removed and cars were parking on the grass area. Only 1 car was typically observed to park on the Pool access road. We understand that this parking is opportunistic and is not authorised by Council; and
- The private access to the Pool was chained/bollarded off and only a few cars were observed to be parked against the Pool buildings. As a result, it was observed that delivery trucks could access and egress the Pool in a forward direction.

The results from the parking survey for the January peak period of 1245 to 1315 on a sunny day, compared to a non-sunny day are summarised in Table 5.2 below.

Table 5.2: Parking survey summary

	Public car park	**Number of cars parked on grass area on Park**	**Number of cars parked on Pool access road**	**Number of cars parked on Sarsfield Street**
Sunny day (peak)	Full (52 spaces)	36	0	North (park side) – 20 cars (out of approximately 29 on street spaces available) South (houses side) 14 cars
Non sunny day	15	0	0	6 cars in total parked on Sarsfield Street between Curran Stand Shelly Beach Rd

Typical occupancy of the cars arriving to the Pool was observed to be just under 4 people per car.

5.8 Ponsonby Primary School

Ponsonby Primary School is approximately 100 m to the south of the Point Erin Shaft Site. Although not adjacent to the site, there is a walking school bus programme for the school, which currently runs along Clarence Street, Jervois Road, and Curran Street. This initiative is run subject to interest.[4]

[4] Source: https://www.ponsprim.school.nz/walking-bus/, accessed November 2022

5.9 Road safety

An assessment of the road safety records of the road network surrounding Point Erin Park has been undertaken using the Waka Kotahi Crash Analysis System (CAS). Crash history was assessed for the period from 2017 – 2023 (inclusive) on roads adjacent (e.g. Sarsfield Street, Curran Street and Shelly Beach Road) to the proposed site accesses (excluding SH1). From this search, a total of 23 crashes were recorded, with no fatal crashes. A summary of the crash severities and factors can be found in Table 5.3 and Table 5.4 below and the full crash report and collision diagram is attached in Appendix C**:**

Table 5.3: Crash summary

Year	Serious	Minor	Non-injury	Total
2017	0	1	2	3
2018	0	0	2	2
2019	0	1	5	6
2020	1	3	3	7
2021	0	2	3	5
2022-2023*	0	0	0	0
Total	**1**	**7**	**15**	**23**

*There is a delay between crashes and the upload of their data onto CAS. As a result, 2022 and 2023 data provided is indicative and for reference only. This information may not account for recent crashes.

Table 5.4: Crash factor summary.

Crash Type	Crash Numbers
Overtaking crashes	1
Straight road lost control/head on	5
Bend – lost control/head on	2
Rear end/obstruction	7
Crossing/turning	6
Pedestrian crashes	1
Miscellaneous	1
Total	23

The following is concluded from a review of the crash data:

- There was only one serious injury with the remaining crashes resulting in either a minor injury or no injury;
- There have been no crashes at the Pool access road/Sarsfield Street intersection;
- There have been 2 Vulnerable Road User (VRU) crashes in the study area, neither of which were on Sarsfield Street. One crash occurred around 200m south on Shelley Beach Road and involved a turning vehicle and two cyclists. A cyclist was injured after deflecting into a parked car while attempting evasive action. The second crash involved a pedestrian who had knowingly and purposefully walked into an oncoming vehicle, on Sarsfield Street around 130 m west of Curran Street;

- The most common crash types were rear-end/obstruction and crossing/turning;
- At the Sarsfield Street / Curran Street intersection there have been 5 crashes with no common crash type /pattern (and also noting the recent safety and pedestrian/cycle improvements implemented at this intersection);
- On Sarsfield Street between Curran Street and Shelly Beach Road there has been only 4 crashes with no common crash type/pattern; and
- At the Sarsfield Street / Shelly Beach Road intersection there has only been 1 crash.

Overall, the number of crashes is considered to be low, and it is considered that there are no inherent safety issues present in the vicinity of the site.

6 Assessment of Effects

6.1 Traffic impact on the surrounding road network (usual construction hours)

At the main access, construction traffic will arrive:

- From SH1 north via Shelly Beach Road off ramp/Sarsfield Street; and
- From the south primarily via Shelly Beach Road.

At the main access, construction traffic will egress:

- To SH1 north via Sarsfield Street/Curran Street SH1 on ramp; and
- To the south primarily via Shelly Beach Road.

At the southwest access, construction traffic will arrive:

- From SH1 north via Shelly Beach Road off ramp/Sarsfield Street; and
- From the south primarily via Shelly Beach Road.

At the southwest access, construction traffic will egress:

- To SH1 north via Curran Street SH1 on ramp; and
- To the south via Curran Street and Shelly Beach Road SH1 off ramp.

As detailed in Section 4.3 above, the conservative peak total number of daily vehicles generated by the construction traffic will be 67 vehicles (i.e. 134 two way movements). By comparing the anticipated trip generation from the construction activity with the existing traffic flows from Table 5.1 (and assuming as a worst case assessment that the total predicted construction traffic will use each of these roads i.e. not taking into account any truck routing) the impact of these additional trips on the existing surrounding network is summarised in Table 6.1 below:

Table 6.1: Traffic impact of construction traffic

Road name	Average Daily Traffic (veh/day)	% Impact
Sarsfield Street Curran Street to Shelly Beach Road	4,168*	3.2%
Curran Street Jervois Road to Sarsfield Street	8,179*	1.6%
Curran Street SH1 on ramp	6,162	1.1%
Shelly Beach Road Bridge / SH1 off ramp	5,429	1.2%
Shelly Beach Road Sarsfield Street to Emmett Street	7,371*	1.8%

Overall, the increase in traffic generated from the construction of the Project is considered to be minimal and is within the range of typical day to day fluctuations in traffic flow of 5% to 10% that regularly occur on the road network. As demonstrated in Table 5.1, the adjacent roads are Arterial and Collector in nature and are already carrying large numbers of heavy vehicles. Furthermore, as indicated in section 4.3 above, there will be 1 additional vehicle every 9 minutes at a worst case peak. The minimal increase in overall hourly and daily traffic movements therefore will not result in

a noticeable increase in congestion or unreasonable delays for road users. As detailed in section 7, it is proposed that the CTMP includes measures to provide supervisors to manage the movements of construction traffic to and from the road network to ensure the safety of all road users is maintained and that the construction vehicles can negotiate access and egress to avoid any additional queueing on the adjacent road network in the congested peak periods.

6.2 Traffic impact on the surrounding road network (outside of usual construction hours)

As detailed in section 1.3, there may be occasions where it is necessary to undertake construction activities outside of usual construction hours. Given these activities will take place at off peak times on the surrounding road network (when there is no congestion) and also at off-peak Pool times or when the Pool is closed, then it is considered that the traffic impact of these activities is minimal.

6.3 Road safety impact on the surrounding road network

As demonstrated in section 5.9 above, the number of crashes in the vicinity of Point Erin Park is low and it is considered that there are no inherent traffic safety issues present in the vicinity of the Point Erin Shaft Site. It is therefore considered that the low number of additional trips generated by the construction traffic for the Project will have a negligible impact on the safety of the surrounding road network and is not likely to exacerbate any existing crash patterns.

As detailed in section 7 below, it is proposed that the CTMP includes a number of road safety measures to ensure that the construction traffic is safely managed on the adjacent road network and at the proposed Point Erin Shaft site accesses.

6.4 Impact on the Pool access road, footpath, and public car park

Throughout the construction period, the public car park within Point Erin Park will remain open and public access to the Pool and playground will be maintained. The construction area adjacent to the car park and access road will be required to be cordoned off to restrict public access. The existing pedestrian access to the Pool and playground through the existing public car park will remain unaffected by the construction work. Access to the park from the car park and the Pool access road footpath will remain unaffected.

As part of the CTMP detailed in Section 7 below, the site Traffic Management Supervisor will:

- Manage vehicle movements on the Pool access road to ensure the safe movement of construction vehicles and cars, cyclists, pedestrians, service trucks and emergency vehicles accessing the Pool and the public car park;
- Assist pedestrians on the access road footpath to the Pool and playground to cross the site access and also assist any pedestrians from the car park to cross the access road to the park during times that construction vehicles are accessing the site; and
- Co-ordinate (for example via radio control) construction vehicles using the Pool access road to ensure that construction vehicles arriving and departing the site do not use the access road at the same time.

The CTMP will also implement a construction driver education programme due to the proximity to the Pool, park, and pedestrians.

With these controls in place, the public car park will continue to operate safely during the construction work.

To avoid any cars parking on the NSAAT's on the Pool access road, the CTMP will include, subject to agreement by Auckland Council as the asset owner, the contractor having powers on Council's

behalf to tow vehicles who park illegally on the Pool access road to ensure construction vehicles are able to access the main site. This is considered to provide a safety benefit for existing car park users as well as a safety benefit to the Pool in terms of improving access for emergency vehicle and service vehicle access to the Pool. Initially there will be a publicity campaign involving temporary signs and notices to pre warn drivers not to park illegally on the NSAAT's.

Based on the provisional programme (see Table 4.1) construction activity at the main access will occur at the same times as the Pool being open during the Stage 2 works (November 2024 to February 2025) and Stage 4 (November 2025 to February 2026). The Stage 1 site set up will be undertaken when the Pool is closed.

The busiest time for the Pool (and hence peak parking demand) is 1100 until 1600 on sunny days throughout January and at weekends in December and February to mid-March. Given the construction working times (see section 1.3) then the construction workers will have arrived before 1100 and depart after 1600 and therefore will not impact on the peak time for the Pool car park use.

During the Stage 2 works, the peak truck use is expected to be 18 trucks/day (see Table 4.1). This equates to 1.8 truck per hour or less than 1 truck every 30 minutes on the access road. This is considered to be a low number of trucks and with the CTMP control measures in place, the impact on pedestrian, cycle and vehicle safety and efficiency access to the Pool, the car park and the park from the access road are considered to be minimal during Stage 2.

During the Stage 3 works the peak truck use is expected to be 40 trucks/day (see Table 4.1). This equates to 4 trucks per hour or 1 truck every 15 minutes on the access road. This is considered to be a low number of trucks and with the CTMP control measures in place, the impact on pedestrian, cycle and vehicle safety and efficiency access to the Pool, the car park and the park from the access road are considered to be minimal during Stage 4.

6.5 Impact on park access (east footpath)

Pedestrian and cycle access to the park at the existing east access footpath is unaffected by the construction work and therefore the construction work has no impact.

6.6 Impact on park access (west footpath)

The existing footpath into the park at the west end (Curran Street) will be temporarily closed during the construction period and an alternative temporary path and steps will be provided circa 90m east of the existing footpath. Wayfinding signage will be provided for this temporary route. The existing section of footpath on Sarsfield Street (north) immediately adjacent to the site access will be temporarily closed during the construction period.

As a result of the construction works, pedestrians entering the park from either Curran Street or Sarsfield Street (west) will have a small diversion of circa 90m using the footpath on Sarsfield Street (south), crossing Sarsfield Street and using the temporary steps and path. Temporary improvements for pedestrians to cross Sarsfield Street, adjacent to the temporary footpath/steps are proposed on the north side with provision of a dropped kerb, tactile paving, a short section of surfacing in the berm and a temporary parking restriction, with pedestrians being able to cross from the south side at an existing vehicle crossing.

Any pedestrians entering the park from Sarsfield Street east will continue to use the existing east footpath and will be unaffected.

As noted in section 5.5 above, the gradient of the existing footpath into the park is circa 11% over a distance of 50 m. This is in excess of the 8% maximum gradient specified in the AT Transport Design Manual to ensure that footpaths are accessible for the mobility impaired. Therefore, it is unlikely (due to the existing steep grade), that the mobility impaired are currently using the existing footpath

to the west (and this was confirmed in the park usage surveys carried out in January 2023) and hence it is considered they will be unaffected by the temporary closure of this footpath. The existing footpath 165 m (circa 2 minutes) to the east will remain available for use by the mobility impaired arriving to the park from Curran Street or Sarsfield Street (west).

Overall, the pedestrian connections and amenity at the west end of the park are considered to be largely unaffected, and therefore the impacts on pedestrian safety and efficiency are considered to be minimal.

With the temporary closure of the footpath to the west, cyclists wishing to access the park from Curran Street or Sarsfield Street (west) will need to use the existing park access footpath to the east which is an additional 165 m (less than 1 minute cycle ride). As detailed in section 3.1 of the Recreation Assessment Report, (prepared to support this Resource Consent), cycle use on the park footpaths is relatively low (and this was confirmed in the park usage surveys carried out in January 2023). Given the low cycle usage and less than 1 minute cycle ride diversion, then the cycle connections and amenity at the west end of the park are considered to be largely unaffected and therefore the impacts on cyclist safety and efficiency are considered to be minimal.

As part of the CTMP detailed in Section 7 below, the site Traffic Management Supervisor will assist truck drivers to safely enter the site from Sarsfield Street and exit the site onto Curran Street and ensure the safety of pedestrians and cyclists on Sarsfield Street.

Once the construction works are completed, the footpath into the park at the west end and the footpath on Sarsfield Street (north) will be reinstated.

6.7 Impact on residents' access

Access for residential properties on Sarsfield Street is from the opposite side of the road to Point Erin Park and therefore will not be impacted by construction traffic accessing the Point Erin Shaft Site at both the main and southwest accesses.

6.8 Operational impact

As detailed in section 3.7 above, ongoing maintenance and operation will be required at the main and southwest access on an infrequent basis (once or twice a year) and will be programmed to occur at off peak times wherever possible. Therefore, the negligible increase in traffic movements and timing of these movements at off peak times should not result in a noticeable increase in congestion or unreasonable delays for road users. In accordance with the Auckland Unitary Plan (AUP) objectives, the design of the vehicle crossings will ensure that there is no impact on the efficient movement of people and goods on Sarsfield Street and Curran Street. Furthermore, the design of the vehicle crossings does not cause any adverse effect on the effective, efficient, and safe operation of the Curran Street SH1 on ramp.

At both the main and southwest access, the maintenance vehicles can enter and exit the site safely and at the southwest access management of egress for maintenance vehicles will wherever possible, be planned for out of peak periods. Therefore, maintenance vehicles will have a negligible impact on the safety of the surrounding road network and is not likely to exacerbate any existing crash patterns.

6.9 Compliance with Auckland Unitary Plan (AUP) Transport Rules

Although AUP E27 is not directly applicable to construction activities, the Point Erin Shaft site complies with the following AUP E27 rules of:

- E27.6.1 Trip Generation - E27.6.1 (1) (b),where trips generated from the Project are substantially below the 100 vehicles/hour permitted activity threshold; and
- E27.6.2 Number of parking and loading spaces - Table E27.6.2.3 (T36), noting no maximum parking rates apply.
- E27.6.3 Design of parking and loading spaces, the Project complies with:
  - E27.6.3.1 and E27.6.3.2 – parking and loading space dimensions will comply with these requirements;
  - E27.6.3.3 - access and manoeuvring complies with Waka Kotahi/NZTA tracking curves;
  - E27.6.3.4 – vehicles do not need to reverse into or from the site; and
  - E27.6.3.6 – gradients of parking spaces will not exceed 5% and manoeuvring areas will not exceed 12.5%.
- E27.6.4 Access, the construction phase access for the Project complies with:
  - E27.6.4.1 (3) (a)- Site accesses are located more than 10 m from an intersection and hence no Vehicle Access Restriction applies;
  - Table E27.6.4.2.1 (T146) and Table E27.6.4.3.2 – vehicle crossing width and number of vehicle crossings complied with and noting the requirement that a maximum width of 9 m is permitted where the crossing needs to accommodate the tracking path of large heavy vehicles; and
  - Table E27.6.4.3.2 (T158) maximum gradient of 12.5% will be complied with.
- E27.6.4 Access – for the operational phase, the ingress from Sarsfield Street is moved closer to the Curran Street/Sarsfield Street intersection. Should this be within 10 m of this intersection, then this would be a restricted discretionary activity (E27.4.1 (A5) Construction or use of a vehicle crossing where a Vehicle Access Restriction applies under Standards E27.6.4.1(2) or E27.6.4.1(3)).

7 Summary and recommendations

7.1 Transport effects summary

The following provides a summary of the construction transport impacts of the proposed CI Point Erin Tunnel:

- Overall the increase in construction traffic is considered to be minimal and is within the range of typical day to day fluctuations in traffic flow that regularly occurs on the road network. The adjacent roads are Arterial and Collector in nature and are already carrying large numbers of heavy vehicles. The minimal increase in traffic movements therefore will not result in a noticeable increase in congestion or unreasonable delays for road users;
- There may be occasions where it is necessary to undertake construction activities outside of the usual construction hours. Given these activities will take place at off peak times on the surrounding road network (when there is no congestion) and also at off peak Pool times or when the Pool is closed, then it is considered that the traffic impact of these activities is minimal;
- It is considered that the low number of additional trips generated by the construction traffic will have a minimal impact on the road safety of the surrounding road network and is not likely to exacerbate any existing crash trends. It is recommended that the CTMP include a number of road safety measures to ensure that the construction traffic is safely managed on the adjacent road network and at the proposed Point Erin Shaft Site accesses. The current CI CTMP's include measures to provide supervisors to manage the movements of construction traffic to and from the road network to ensure the safety of all road users is maintained and that the construction vehicles can negotiate access and egress to avoid any additional queueing on the adjacent road network in the congested peak periods;
- Construction workers will have arrived and departed outside of the peak use of the Pool and therefore their vehicular use will not have an impact on the Pool, the park, or the public car park. The amount of truck use of the Pool access road during the Stage 2 works (less than 1 truck every 30 minutes) and during the Stage 4 works (1 truck every 15 minutes) is considered to be low in number and, with the CTMP control measures in place, the impact on pedestrian, cycle and vehicle safety and efficiency access to the Pool, the car park and the park from the access road are considered to be minimal;
- The proposed CTMP control measures will manage vehicle movements on the Pool access road to ensure the safe movement of construction vehicles and cars, cyclists, pedestrians, service trucks and emergency vehicles accessing the Pool and the public car park. Therefore, the impact on pedestrian, cycle and vehicle safety and efficiency access to the Pool and the park from the access road are considered to be minimal;
- Pedestrian and cycle access to the park at the existing east access footpath is unaffected by the construction work and therefore the construction work has no impact;
- The existing footpath into the park at the west end (Curran Street) will be temporarily closed during the construction period and an alternative temporary path and steps will be provided circa 90 m east of the existing footpath. Wayfinding signage will be provided for this temporary route;
- Temporary improvements for pedestrians to cross Sarsfield Street, adjacent to the temporary footpath/steps are proposed on the north side with provision of a dropped kerb, tactile paving, a short section of surfacing in the berm and a temporary parking restriction, with pedestrians being able to cross from the south side at an existing vehicle crossing. The existing section of footpath on Sarsfield Street (north) immediately adjacent to the site access will be temporarily closed during the construction period. During the construction period the impact

on pedestrian and cycle safety and efficiency are considered to be minimal. Once the construction works are completed, the footpath into the park at the west end and the footpath on Sarsfield Street (north) will be reinstated;

- It is considered that access for residential properties on Sarsfield Street will not be impacted upon by construction traffic accessing the Point Erin Shaft Site at both the main and southwest accesses; and
- The existing traffic island on Sarsfield Street at the Shelly Beach Road intersection will need to be removed to accommodate construction vehicles accessing the main site. This is not a pedestrian refuge and hence the impact on safety with its removal is considered to be minimal. This will be reinstated once the works are complete.
- Movements of specialised machinery or large components (e.g. cranes and the TBM removal) will occur very infrequently and not on a day to day basis. Separate to the Resource Consent application, bespoke SSTMP's and CAR's will be developed once exact details of the machinery and vehicles required is known, as they have successfully been carried out for the rest of the CI project. Agreement with Auckland Transport and Waka Kotahi will be required and over-dimension rules and associated permitting processes will need to be complied with;
- Although AUP E27 is not directly applicable to construction activities, the Point Erin Shaft site complies with AUP E27 rules;
- Ongoing maintenance and operation will not result in a noticeable increase in congestion or unreasonable delays for road users. In accordance with the AUP objectives, the design of the vehicle crossings will ensure that there is no impact on the efficient movement of people and goods on Sarsfield Street and Curran Street. Furthermore, the design of the vehicle crossings do not cause any adverse effect on the effective, efficient and safe operation of the Curran Street SH1 on ramp.

7.2 Transport related recommendations

The following transport related recommendations are identified for the Project:

7.2.1 Construction Traffic Management Plan (CTMP)

It is recommended that a condition is imposed on any resource consent for a CTMP to be submitted for certification prior to any works commencing. Specific project issues that the CTMP will need to address include (with who to action in brackets):

- Construction traffic routing main access - Vehicles arriving from the north will do so via Shelly Beach Road SH1 off ramp and arriving from the south via primarily Shelly Beach Road. Vehicles exiting the site going north will do so via Sarsfield Street and the Curran Street SH1 on ramp (Contractor);
- Construction traffic routing southwest access - Vehicles arriving from the north will arrive via Shelly Beach Road SH1 off ramp and Sarsfield Street. Vehicles arriving from the south will do so via primarily Shelly Beach Road. Vehicles exiting the site going north will do so via the Curran Street SH1 on ramp and vehicles exiting the site going south will do so via Curran Street and the Shelly Beach Road SH1 off ramp (Contractor);
- Main access/Point Erin Pool access road - various management measures including:
    - Access to the public car park and to Point Erin Pool is via a gated access (closed between 2200-0600 daily). Gate access will need to be obtained and managed for any works outside of these time periods (Council);
    - Communications with the Pool's management team to inform the public of the upcoming works (Contractor);
    - Contractor to provide staff and visitor parking on site (Contractor);

  - Site Traffic Management Supervisor will manage vehicle movements on the Pool access road to ensure the safe movement of construction vehicles and cars, cyclists, pedestrians, service trucks and emergency vehicles accessing the Pool and the public car park (TM Supervisor);
  - Site Traffic Management Supervisor will assist pedestrians on the access road footpath to the Pool and playground to cross the site access and also assist any pedestrians from the car park to cross the access road to the park during times that construction vehicles are accessing the site (TM Supervisor);
  - Site Traffic Management Supervisor will co-ordinate (for example via radio control) construction vehicles using the Pool access road to ensure that construction vehicles arriving and departing the site do not use the access road at the same time and that a suitable truck layover area is provided if required (TM Supervisor);
  - The Contractor (subject to agreement from Auckland Council as the asset owner) will have powers to tow vehicles who park illegally on the Pool access road to ensure construction vehicles are able to access the main site as well as ensuring emergency vehicle access and delivery truck access to the Pool is maintained. Initially there will be a publicity campaign involving temporary signs and notices (Contractor/TM Supervisor/Council);
  - The existing traffic island on Sarsfield Street at the Shelly Beach Road intersection will need to be removed and reinstated upon completion of works (AT); and
  - Currently at the main access, visibility out of the Pool access road is restricted by existing overhanging trees. It is advisable that AT/Council trim these trees to improve the existing sight lines (AT/Council).
- At the southwest access, Controllers/Supervisors to manage vehicle ingress from Sarsfield Street and the egress onto Curran Street and to manage truck arrivals and departures via radio control and arrange a suitable layover area for a truck to wait .if required. (TM Supervisor);
- At the southwest access construction site fencing will be installed to prevent pedestrians using the section of footpath on Sarsfield Street between Curran Street and the site ingress. The existing footpath into Point Erin Park will be closed during construction (Contractor);
- The CTMP will also implement a construction driver education programme due to the proximity to the Pool, park and pedestrians;
- Communication campaigns should be undertaken in relation to traffic management activities throughout construction activities (including letter drops to affected residents, flier drops, project signage, web based resources, etc) as per the CI communication and complaints protocols (Contractor);
- Appropriate temporary traffic management measures should be incorporated to advise other road users of the construction traffic (AT);
- All construction areas within Point Erin Park will be required to be cordoned/fenced off to ensure public safety (Contractor); and
- Movements of specialised machinery or large components (e.g. cranes and the TBM removal). Separate to the Resource Consent application bespoke SSTMP's and CAR's will be developed once exact details of the machinery and vehicles required is known, as they have successfully been carried out for the rest of the CI project. Agreement with Auckland Transport and Waka Kotahi will be required and over-dimension rules and associated permitting processes will need to be complied with. Controllers may also be required to manage vehicle movements when required. These matters will be addressed through the over-dimension loads process.

Generic issues that the CTMP should also address include:

- Routes to be used to and from the site for times of the day, days of the week;
- Heavy vehicle load sizes;
- Over dimension (O/D) and over weight (O/W) permits if applicable;
- Temporary traffic control;
- Temporary speed limits; and
- Road controlling authority approvals.

7.2.2 Temporary footpaths and reinstatement of footpaths

In respect of the proposed temporary footpath the following is proposed:

- Provide a temporary alternative footpath, steps and wayfinding signs into the park from Sarsfield Street to the east of the footpath which is to be closed during construction at the west end of the park by Curran Street;
- Temporary improvements for pedestrians to cross Sarsfield Street, adjacent to the temporary footpath/steps on the north side with provision of a dropped kerb, tactile paving, a short section of surfacing in the berm and a temporary parking restriction, with pedestrians being able to cross from the south side at an existing vehicle crossing; and
- Once the construction works are completed, the closed footpath into the park at the west end, plus the footpath on Sarsfield Street (north), are to be reinstated.

8 Conclusion

Based on the above assessment of the transport effects and the associated recommendations, it is concluded that there are no transport engineering or transport planning reasons that would preclude construction works associated with the proposed CI Point Erin Tunnel. Any effects can be appropriately managed and mitigated through the measures outlined above and as required through conditions relating to a CTMP and the temporary footpath into the park.

Overall, the increase in construction traffic from the Project on the surrounding road network is considered to be minimal and is within the range of typical day to day fluctuations in traffic flow that regularly occurs on the road network. Through the measures proposed within the CTMP and the provision of the temporary footpath as an alternative accessway, the impact on people accessing the park, the Pool and the public car park is considered to be minimal. By employing standard traffic management procedures, construction traffic vehicles can be safely accommodated within the site and on the adjacent road network.

9 Applicability

This report has been prepared for the exclusive use of our client Watercare Services Ltd, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

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Project Director

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Appendix A Vehicle tracking

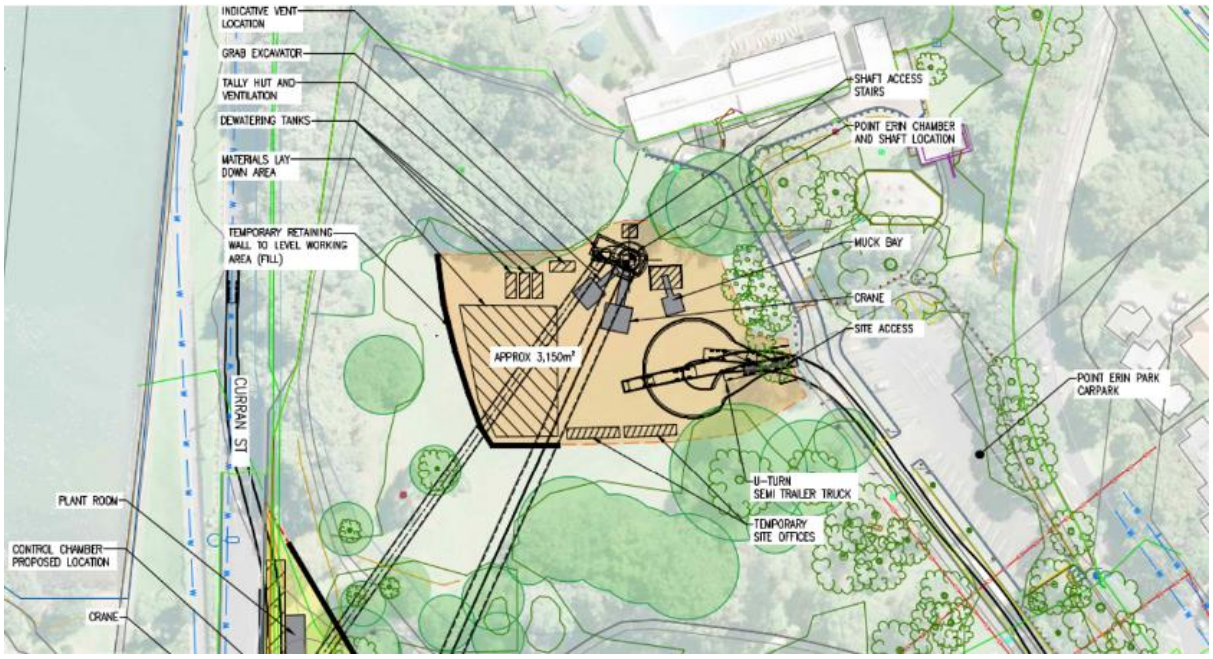
Main Access - Construction and Operation Phase

Left and right turn in from Shelly Beach Road

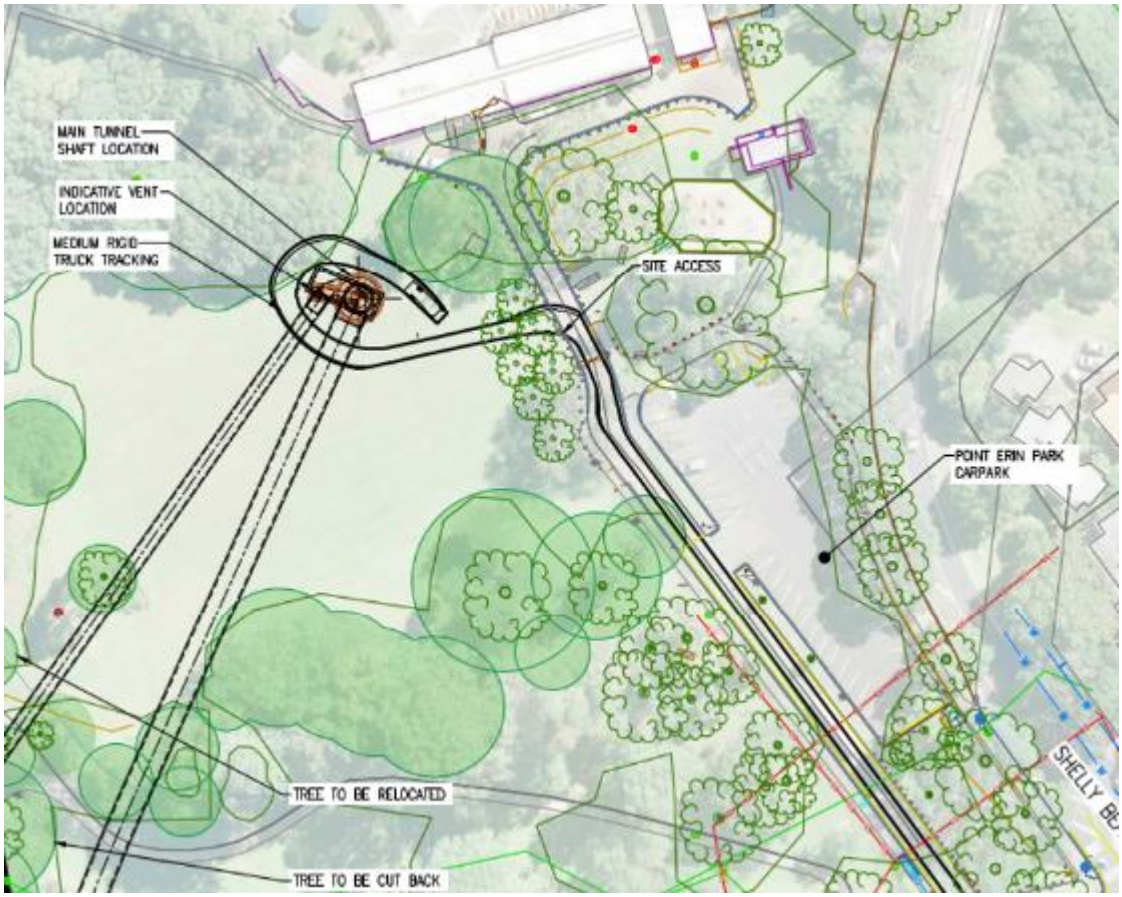
Left out of Pool access road and right turn to Shelly Beach Road

Right out of Pool access road and right turn from Sarsfield Street to Curran Street

Turn around within main site - construction.



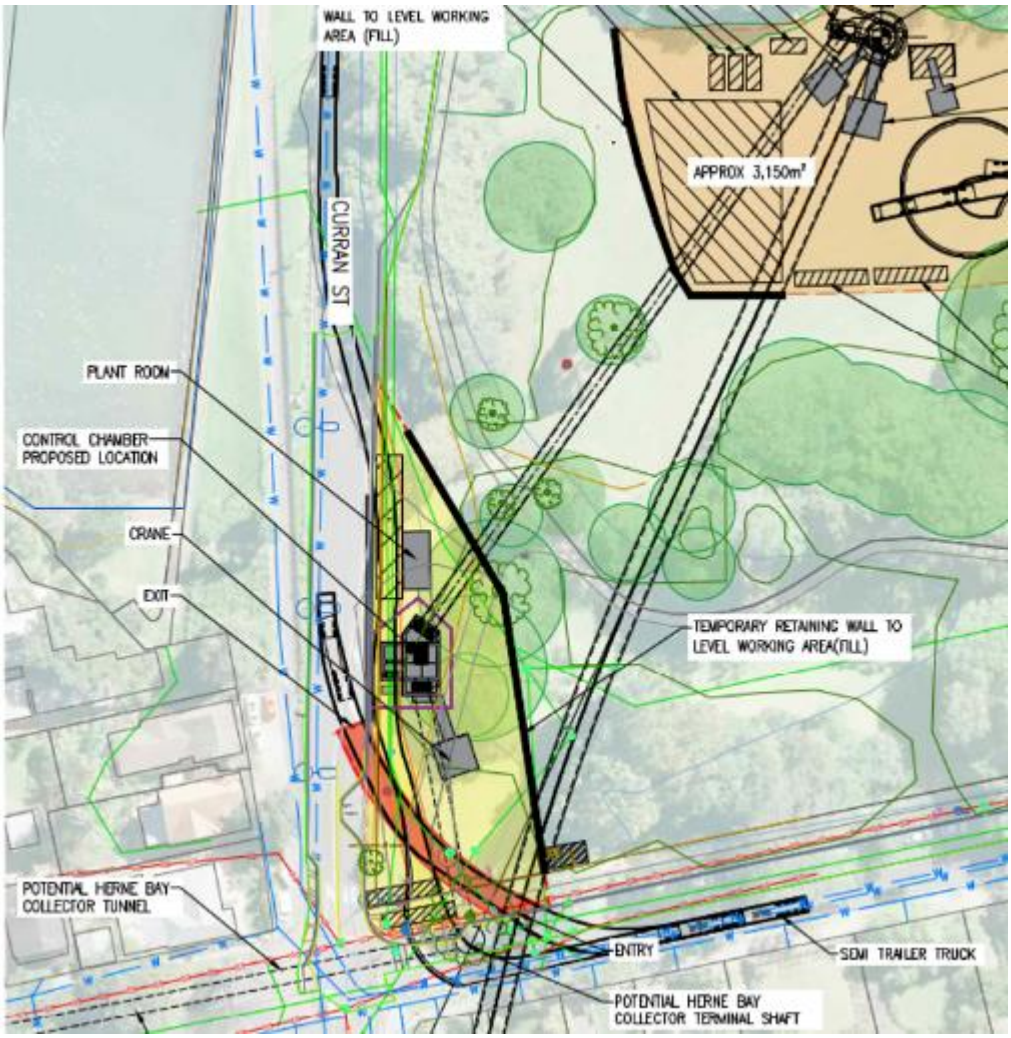
Turn around within main site - Maintenance/operation.



Southwest Access - Construction Phase

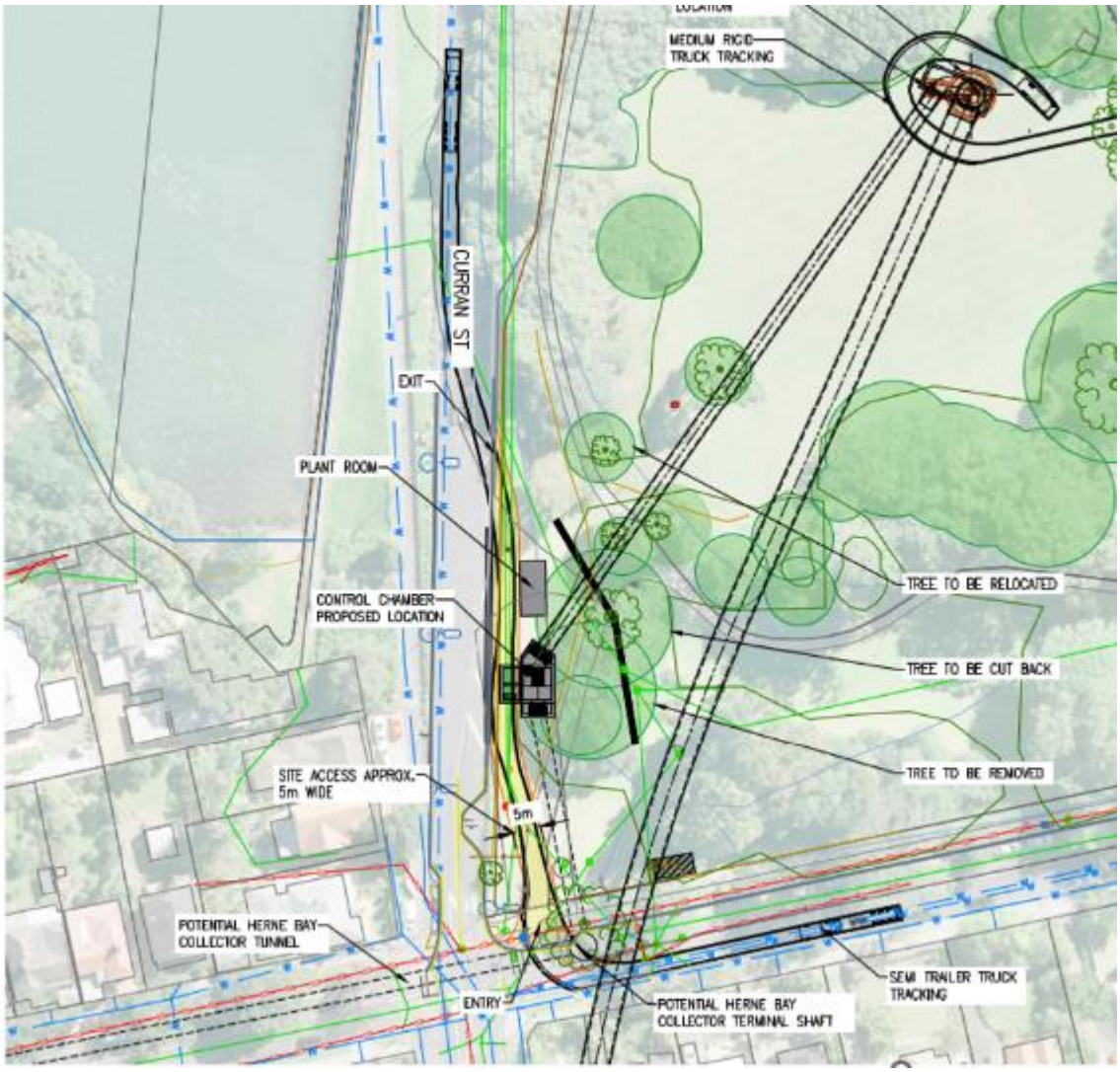
Ingress from Sarsfield Street and egress onto Curran Street

(Note: Ingress from Sarsfield Street via left hand turn – TBC)



Southwest Access - Operation/Maintenance Phase

Ingress from Sarsfield Street and egress onto Curran Street



Appendix B Construction vehicle trip generation

Stage 1 Site establishment (1 month) – main access and southwest access.

The Stage 1 activities and construction vehicle trip generation are detailed below:

- Mobilise offices and equipment = 20 deliveries over the month i.e. typically 1 truck per day bringing in excavators and equipment initially and then more elements as the site becomes more established).
- Import fill material = 150 trucks month i.e. typically 6 trucks per day (based on a 11m long 6 wheel truck with a 6m^3 truck capacity, 10 tonne).
- 7 contractor staff and 2 supervisors = 9 cars per day.

Total worst case (peak) daily movements in Stage 1 = 7 trucks and 9 cars per day (total of 16 vehicles/day) and over a 10 hour working day this represents an average of 1.6 vehicles per hour.

Stage 2 Terminal shaft excavation – main access only

The Stage 2 activities and construction vehicle trip generation are detailed below**:**

Staff

- 7 contractor staff and 2 supervisors = 9 cars per day.

Piling

- Spoil (600mm dia. Pile @ approx. 19m depth 5.4m^3/pile) = 1 -2 trucks per pile with a maximum of 3 piles per day i.e. maximum of 6 trucks/day over a 3 to 4 week period.
- Concrete = two piles per pour or 2-3 trucks i.e. peak of 3 trucks/day.
- Total = 9 trucks/day

Excavation

- Materials = 1 -3 flatbed truck and trailer per day for steel or other materials i.e. peak of 3 trucks/day.
- Spoil (12m diameter @ 30m deep = 3,395m3 un-bulked. Assume 0.5m excavation rate per day or 56m3/day un bulked or 80m3 bulked) therefore = 13-15 trucks per day (@ 6m3 capacity). i.e. peak of 15 trucks/day.
- Total = 18 trucks/day.

The piling and excavation will be separate activities and hence the worst case (peak) daily movements in Stage 2 = 18 trucks and 9 cars per day (total of 27 vehicles/day) and over a 10 hour working day this represents an average of 2.7 vehicles per hour..

Stage 3 Control chamber excavation and construction – southwest access only

The Stage 3 activities and construction vehicle trip generation are detailed below**:**

- Excavation of spoil (approx. 12m x 12m @ 20m deep = 2880m^3 un-bulked. Assume 0.5m excavation rate per day or 72m^3/day un bulked or 100m^3 bulked) therefore = 16-18 trucks per day (@ 6m^3 capacity).
- 7 contractor staff and 2 supervisors = 9 cars per day.

Total worst case (peak) daily movements in Stage 3 = 18 trucks and 9 cars per day (total of 27 vehicles/day) and over a 10 hour working day this represents an average of 2.7 vehicles per hour..

Stage 4 Completion of the internal structure of the terminal shaft – main access only

The Stage 4 activities and construction vehicle trip generation are detailed below**:**

Staff

- 7 contractor staff and 2 supervisors = 9 cars per day.

Backfilling

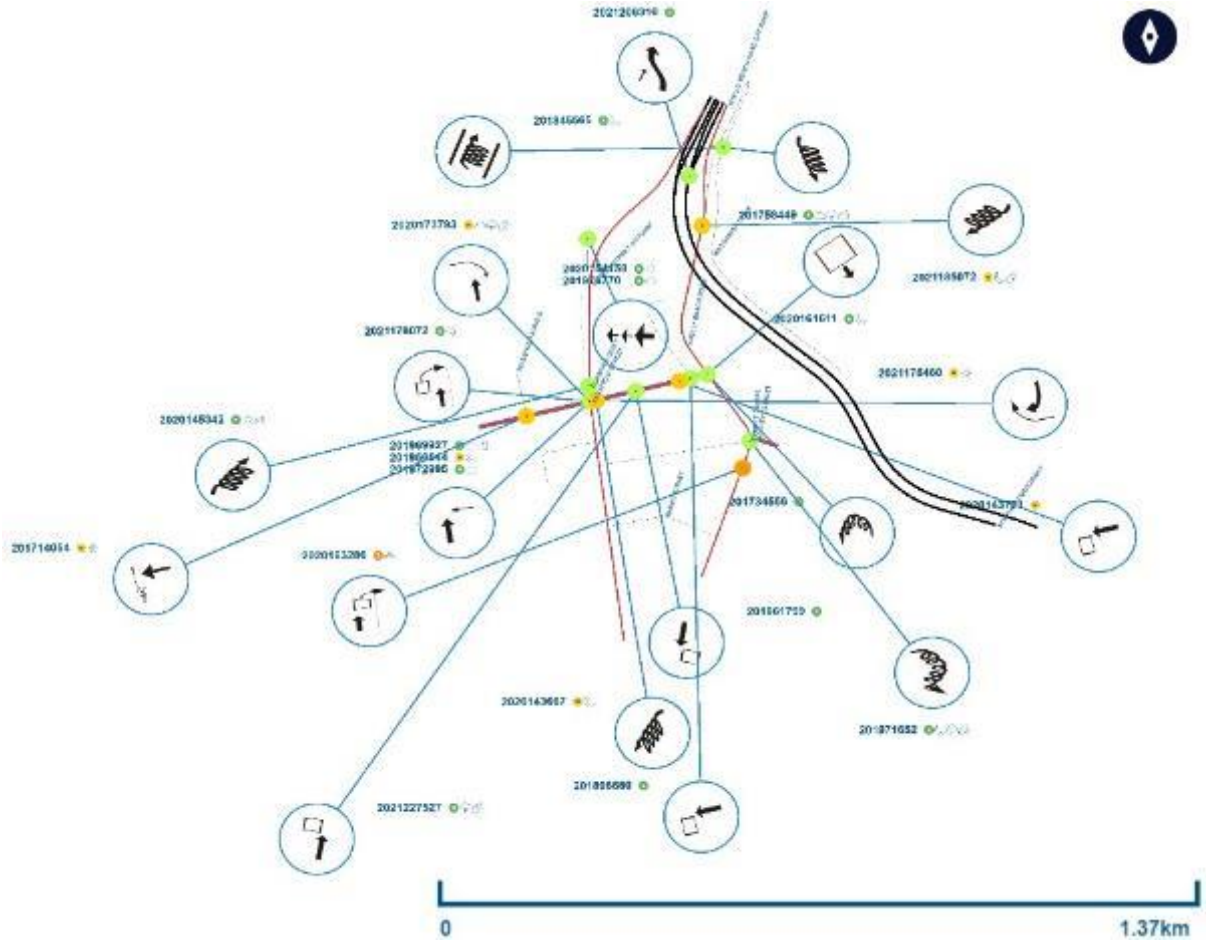
- 30-40 trucks per day at peak for importing backfill material (180-240m3/day)- this could be less depending on stockpile arrangements.

Concrete

- There could be 12-15 trucks in a lift/pour. It would occur in one day for each lift with at least 1- 2 weeks between pours typically. To avoid concrete issues (with large pours) this is done in night works to prevent tucks getting delayed in arriving at site. The base chamber would take 2-3 pours possibly and the riser/chimney may be precast and transported to site (consider 10 deliveries). i.e. peak of 15 trucks/day.
- 7 contractor staff and 2 supervisors = 9 cars per day.

The backfilling and concrete pours will be separate activities and hence the worst case (peak) daily movements in Stage 4 = 40 trucks and 9 cars per day (total of 49 vehicles/day) and over a 10 hour working day this represents an average of 4.9 vehicles per hour.

Appendix C Crash data



Untitled query

Crash year

2017 — 2023

Saved sites

Point Erin Extension

On state highway

No

Site details report

Fatal crashes: 0 | **Injury crashes:** 8 | **Non-injury crashes:** 15 | **Total crashes:** 23

Overall crash statistics

Overall casualty statistics

Crash severity

Crash severity	Number	%	Social cost $(m)
Fatal	0	0	0
Serious	1	4.35	0.90
Minor-injury	7	30.43	0.75
Non-injury	15	65.22	0.53
TOTAL	23	100	2.18

Crash numbers

Year	Fatal	Serious	Minor	Non-injury
2017	0	0	1	2
2018	0	0	0	2
2019	0	0	1	5
2020	0	1	3	3
2021	0	0	2	3
TOTAL	0	1	7	15
Percent	0	4.35	30.44	65.22

Injury severity

Injury severity	Number	% all casualties
Fatal	0	0.00
Serious Injured	1	7.69
Minor Injured	12	92.31
TOTAL	13	100.00

Casualty numbers

Year	Fatal	Serious Injured	Minor Injured
2017	0	0	1
2018	0	0	0
2019	0	0	3
2020	0	1	6
2021	0	0	2
2022	0	0	0
2023	0	0	0
TOTAL	0	1	12
Percent	0.00	7.69	92.31

Note: Last 5 years of crashes shown (unless query includes specific date range).

Crash type and cause statistics

Crash type

Crash type	Crash numbers	% All crashes
Overtaking crashes	1	4.35
Straight road lost control/head on	5	21.74
Bend - lost control/Head on	2	8.7
Rear end/obstruction	7	30.43
Crossing/turning	6	26.09
Pedestrian crashes	1	4.35
Miscellaneous crashes	1	4.35
TOTAL	23	100

Casualty types

Casualty types	Fatalities	Serious injuries	Minor injuries
Cyclists	0	1	0
Drivers	0	0	8
Motorcycle pillions	0	0	0
Motorcycle riders	0	0	0
Passengers	0	0	3
Pedestrians	0	0	1
Other	0	0	0
TOTAL	0	1	12

Note: Motorcycle stats include Mopeds.

Driver and vehicle statistics

Crash factors

Crash factors	Crash numbers	% All crashes
#N/A	9	39.13
Alcohol	5	21.74
Disabled, old age or illness	1	4.35
Failed to give way or stop	5	21.74
Fatigue	2	8.70
Incorrect lanes or position	6	26.09
Miscellaneous factors	1	4.35
Overtaking	0	0.00
Pedestrian factors	1	4.35
Poor handling	6	26.09
Poor judgement	2	8.70
Poor observation	7	30.43
Position on Road	0	0.00
Road factors	1	4.35
Travel Speed	3	13.04
Unknown	0	0.00
Vehicle factors	1	4.35
Weather	0	0.00
TOTAL	50	217.39

Drivers at fault or part fault in injury crashes - by age

Age	Male	Female	Unknown	Total	Percentage (%)
0-4	0	0	0	0	0.00
5-9	0	0	0	0	0.00
10-14	0	0	0	0	0.00
15-19	2	0	0	2	25.00
20-24	1	2	0	3	37.50
25-29	1	0	0	1	12.50
30-34	0	0	0	0	0.00
35-39	0	0	0	0	0.00
40-44	1	1	0	2	25.00
45-49	0	0	0	0	0.00
50-54	0	0	0	0	0.00
55-59	0	0	0	0	0.00
60-64	0	0	0	0	0.00
65-69	0	0	0	0	0.00
70-74	0	0	0	0	0.00
75-79	0	0	0	0	0.00
80-84	0	0	0	0	0.00
85-89	0	0	0	0	0.00
90-94	0	0	0	0	0.00

Crashes with:

Factor groups	Crash numbers	% All crashes
All road user factors	15	65.22
Driver only factors	21	91.30
Pedestrian factors	1	4.35
Vehicle factors	1	4.35
Road factors	1	4.35
Environment factors	0	0.00
No identifiable factors	0	0.00
Retired codes - no future use	0	0.00
TOTAL	39	169.57

Notes: Factors are counted once against a crash - i.e. two fatigued drivers count as one fatigue crash factor.

Driver/vehicle factors are not available for non-injury crashes for Northland, Auckland, Waikato and Bay of Plenty before 2007. This will influence numbers and percentages.

% represents the % of crashes in which the cause factor appears.

Number of parties in crash

Party type	All crashes	% All crashes
Single party	6	26.09
Multiple party, including pedestrian	1	4.35
Multiple party, excluding pedestrian	16	69.57
TOTAL	23	100

Age	Male	Female	Unknown	Total	Percentage (%)
95-99	0	0	0	0	0.00
100+	0	0	0	0	0.00
Unknown	0	0	0	0	0.00
TOTAL	5	3	0	8	–
Percent	62.50	37.50	0.00	100.00	–

Note: Driver information is not calculated for non-injury crashes.

Drivers at fault or part fault in injury crashes - by licence

Licence	Male	Female	Unknown	Total	Percentage (%)
Full	2	3	0	5	62.50
Learner	1	0	0	1	12.50
Restricted	0	0	0	0	0.00
Overseas	0	0	0	0	0.00
Wrong class	0	0	0	0	0.00
Never Licensed	0	0	0	0	0.00
Unknown	2	0	0	2	25.00
Forbidden	0	0	0	0	0.00
TOTAL	5	3	0	8	–
Percent	62.50	37.50	0.00	100.00	–

Note: Driver information is not calculated for non-injury crashes.

Vulnerable road users

Crash types	Number	Percentage (%)
Cyclist crashes	1	4.35
Pedestrian crashes	1	4.35
Motorcycle crashes	1	4.35
All other crashes	20	86.96

Note: Some crashes involve more than one vulnerable road user type.

Note: Motorcycle stats include Mopeds.

Road environment statistics

Road type

Road type	State highway	Local road	Unknown	N/A	Total	Percentage (%)
Urban	0	19	0	0	19	82.61
Open	0	4	0	0	4	17.39
Unknown	0	0	0	0	0	0.00
TOTAL	0	23	0	0	23	–
Percent	0.00	100.00	0.00	0.00	100.00	–

Vehicles involved in injury crashes (vehicle count)

Vehicle type	No. of vehicles	% of vehicles in injury crashes
Car/Wagon	14	87.50
SUV	0	0.00
Van	0	0.00
Ute	0	0.00
Truck	0	0.00
Truck HPMV	0	0.00
Bus	0	0.00
Motorcycle	0	0.00
Moped	0	0.00
Train	0	0.00
Cycle	2	12.50
Other	0	0.00
Unknown	0	0.00
50 Max	0	0.00
Left scene	0	0.00
Uncoupled towed vehicle	0	0.00
TOTAL	16	100.00

Natural light conditions

Conditions	Injury	Non-injury	Total	%
Light/overcast	2	7	9	39.13
Dark/twilight	6	5	11	47.83
Unknown	0	3	3	13.04
TOTAL	8	15	23	100

Conditions

Conditions	Injury	Non-injury	Total	%
Dry	6	9	15	65.22
Ice or Snow	0	0	0	0.00
Wet	2	4	6	26.09
Null	0	2	2	8.70
TOTAL	8	15	23	100

Intersection/midblock

Intersection/mid-block	Total	%
Intersection	14	60.87
Midblock	9	39.13
TOTAL	23	100

Vehicles involved in injury crashes (crash count)

Vehicle type	Injury crashes	% of injury crashes
Car/Wagon	8	100.00
SUV	0	0.00
Van	0	0.00
Ute	0	0.00
Truck	0	0.00
Truck HPMV	0	0.00
Bus	0	0.00
Motorcycle	0	0.00
Moped	0	0.00
Train	0	0.00
Cycle	1	12.50
Other	0	0.00
Unknown	0	0.00
50 Max	0	0.00
Left scene	0	0.00
Uncoupled towed vehicle	0	0.00
TOTAL	9	112.50

Objects struck

Objects struck	Injury crashes	%	Non-injury crashes	%
Crashes w/obj struck	3	13.04	9	39.13

Object struck	Injury crashes	%	Non-injury crashes	%
Animals	0	0.00	0	0.00
Bridges/Tunnels	0	0.00	0	0.00
Cliffs	0	0.00	0	0.00
Debris	0	0.00	0	0.00
Embankments	0	0.00	0	0.00
Fences	0	0.00	0	0.00
Guide/Guard rails	1	4.35	1	4.35
Houses	0	0.00	0	0.00
Traffic Islands	0	0.00	2	8.70
Street Furniture	1	4.35	0	0.00
Kerbing	0	0.00	0	0.00
Landslips	0	0.00	0	0.00
Parked vehicle	1	4.35	4	17.39
Trains	0	0.00	0	0.00
Sight Rails	0	0.00	0	0.00
Poles	0	0.00	0	0.00

Vehicle usage in injury crashes

Vehicle usage	Fatal Crash	Serious Crash	Minor Crash	Total	Percentage (%)
Private	0	4	11	15	93.75
Attenuator Truck	0	0	0	0	0.00
Agricultural	0	0	0	0	0.00
Ambulance	0	0	0	0	0.00
Campervan	0	0	0	0	0.00
Concrete mixer	0	0	0	0	0.00
Fire	0	0	0	0	0.00
Logging truck	0	0	0	0	0.00
Mobile crane	0	0	0	0	0.00
Police	0	0	0	0	0.00
Rental	0	0	0	0	0.00
Road Working	0	0	0	0	0.00
Scheduled service Bus	0	0	0	0	0.00
School bus	0	0	0	0	0.00
Tanker	0	0	0	0	0.00
Taxi	0	0	0	0	0.00
Tour Bus	0	0	0	0	0.00
Trade person	0	0	0	0	0.00

Object struck	Injury crashes	%	Non-injury crashes	%
Stationary Vehicle	0	0.00	1	4.35
Roadwork	0	0.00	0	0.00
Traffic Sign	0	0.00	1	4.35
Trees	0	0.00	1	4.35
Drainage Structures	0	0.00	0	0.00
Ditches	0	0.00	0	0.00
Other	0	0.00	0	0.00
Thrown or dropped objects	0	0.00	0	0.00
Water	0	0.00	0	0.00
TOTAL	3	–	10	–

Note: % represents the % of crashes in which the object is struck.

Vehicle usage	Fatal Crash	Serious Crash	Minor Crash	Total	Percentage (%)
Work travel	0	0	0	0	0.00
Work vehicle	0	0	0	0	0.00
Other	0	0	0	0	0.00
Null	0	0	1	1	6.25
TOTAL	0	4	12	16	–
Percent	0.00	25.00	75.00	100.00	–

Time period statistics

Month by injury/ non-injury crashes

Month	Injury crashes	%	Non-injury crashes	%	Total	%
Jan	3	37.5	2	13.33	5	21.74
Feb	0	0	2	13.33	2	8.7
Mar	0	0	2	13.33	2	8.7
Apr	1	12.5	1	6.67	2	8.7
May	2	25	0	0	2	8.7
Jun	0	0	2	13.33	2	8.7
Jul	0	0	1	6.67	1	4.35
Aug	1	12.5	3	20	4	17.39
Sep	0	0	0	0	0	0
Oct	0	0	0	0	0	0
Nov	1	12.5	0	0	1	4.35
Dec	0	0	2	13.33	2	8.7
TOTAL	8	100	15	100	23	100

Day/period

Day/Period	All crashes	% All crashes
Weekday	19	82.61
Weekend	4	17.39
TOTAL	23	100

Day/period by hour

Day/Period	00:00 - 02:59	03:00 - 05:59	06:00 - 08:59	09:00 - 11:59	12:00 - 14:59	15:00 - 17:59	18:00 - 20:59	21:00 - 23:59	Total
Weekday	0	1	3	1	1	7	6	0	19
Weekend	2	0	0	0	0	1	1	0	4
TOTAL	2	1	3	1	1	8	7	0	23

Day/period by hour DOW

Day/Period	00:00 - 02:59	03:00 - 05:59	06:00 - 08:59	09:00 - 11:59	12:00 - 14:59	15:00 - 17:59	18:00 - 20:59	21:00 - 23:59	Total
Mon	0	0	0	0	0	2	2	0	4
Tue	0	0	0	0	1	3	2	0	6
Wed	0	0	1	0	0	0	1	0	2
Thu	0	1	1	1	0	0	1	0	4
Fri	0	0	1	0	0	2	1	0	4
Sat	2	0	0	0	0	0	0	0	2
Sun	0	0	0	0	0	1	0	0	1
TOTAL	2	1	3	1	1	8	7	0	23

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