City Rail Link Limited, PO Box 9681, Newmarket, Auckland 1149
Tel 0800 CRL TALK (275 8255)

26 July 2021

Plans and Places
Auckland Council
Level 24, 135 Albert Street Auckland Central

Attention: Chris Scrafton

Dear Chris,

Response to Section 92 RMA 'Request for Further Information' - Notice of a Requirement to Alter City Rail Link Limited Designation 2501 in the Auckland Unitary Plan (Operative in Part)

We refer to Auckland Council's request for further information dated 8 July 2021 in respect of the Notice of Requirement (NoR) to alter City Rail Link Limited (**CRLL**) Designation 2501 in the Auckland Unitary Plan (Operative in Part).

CRLL responds to the request as follows, with the text of the request in blue and CRLL's response in black:

A. Planning and General Matters

1. Proposed Conditions

Please confirm which designation conditions (new and existing) and provide a supporting rationale for why, are proposed to be applied to "the Works".

Explanation: It is unclear from the AEE what conditions are proposed to be applied to "The Works". For example, section 5 of the Form 18 for the NOR notes that no conditions are proposed as part of the Works however Section 8 of the AEE proposes changes to designation condition 3.2 and Figure 1 of the existing conditions identifies the area to which the existing conditions apply which includes the area subject to the proposed alteration which would suggest that all the existing conditions could be applied to the alteration. Condition 25 of the existing designation includes construction noise standards whereas Section 3.3.3 of the AEE for the alteration notes that no noise standards are relevant to the Works.

No designation conditions are proposed to be applied to "the Works".

Scope of the current designation conditions

As a matter of interpretation, the current designation conditions apply only to "the Project" as defined in the conditions. They do not apply to any other "construction, operation and maintenance" within the 'dotted area' in Figure 1, including the proposed "Works". This is because:

- On their plain reading, the designation conditions apply to "the Project". While page 1 of the designation states that the conditions apply "to the construction of modifications associated with the ongoing operation and maintenance of the transport centre", the conditions themselves are stated to apply to "the Project". For example, Conditions 1, 5 and 7 provide (emphasis added):

  > "…**the Project** shall be undertaken in general accordance with…the NoR dated May 2015 and supporting documents…"
  >
  > "…the Requiring Authority shall appoint a Communication and Consultation Manager to…be the main and readily accessible point of contact for persons affected by or interested in **the Project**..."

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> "In the period before construction begins on **the Project**, the following activities undertaken by Network Utility Operators will not prevent or hinder **the Project**…"

It is not reasonably open to read the conditions as applying to any other "construction of modifications" in this context.

- In addition, if the conditions were to be read to apply to all construction activity in the 'dotted area', this would lead to more restrictive requirements applying to works in different parts of the designation area. For example, construction works in Station Plaza would be subject to the conditions but works in Takutai Square would not. There is no practical or legal basis for such a discrepancy, and it is highly unlikely that such a discrepancy was intended (or that a Court would interpret the conditions in this way).

- To the extent there is any ambiguity in the text of the designation, this interpretation is also consistent with the history of the designation. By way of explanation, the conditions were added to the designation when the "construction" purpose was added in 2016 to enable "**the Project**". Paragraph [9.1] of the May 2015 AEE in support of that NoR stated that the proposed designation conditions were to apply to "**the Project**" (emphasis added):

  > "*Draft designation conditions which propose management processes, the preparation and implementation of management plans and specific measures to avoid, remedy and mitigate the actual and potential adverse effects associated with **the Project** have been included in Appendix E.*"

  This was notwithstanding that the AEE also recognised that other future "construction" would also be permitted by the amendment to the designation purpose. For example, paragraph [2.2.4] of the AEE recognised that an outline plan of works would be prepared for future changes to the eastern end of the designation area.

Reason for amendments to current designation conditions

This NoR proposes the following amendments to the designation (additions in **bold underlined** and deletions ~~struck through~~):

- Amending the purpose of the designation as follows:
  - This designation provides for the construction, operation and maintenance of a transport centre and the provision of a rail system **(including the Works)**. The centre comprises an underground Railway Station, attendant facilities and public access to the station through the main portal of the former CPO and at other access points. Above-ground features of the centre include the glazed annex to the CPO building, a series of skylights, ventilation stacks and other servicing plant and equipment.
- Inserting a definition of "The Works" after the existing definition of "The Project" in the definitions section as follows:
  - **Construction support works to enable construction in adjoining City Rail Link Designation 2500-1, including site office, worker accommodation and storage of materials in the Station Plaza Accommodation, receiving and pumping concrete from the Britomart Transport Centre into the Designation 2500-1 tunnels, establishing and operating ventilation equipment in Station Plaza, and providing access for workers and delivery of materials to the Designation 2500-1 tunnels via the Glasshouse and former Chief Post Office.**
- Amending Condition 3.2 as follows:

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- The Station Plaza Accommodation shall be ~~removed within one year of~~ **retained following** completion of the Project ~~works~~ **in order to enable the Works (and any other contemporaneous works permitted under this designation), but shall be removed on completion of the Works.**

The insertion of "the Works" definition and the amendment to Condition 3.2 are for clarity only and do not change the fact that the conditions do not apply to "the Works".

By way of explanation, "the Works" to be inserted into the purpose of the designation, and as defined, include the use of the existing Station Plaza Accommodation for a site office, worker accommodation and storage of materials. However, existing Condition 3.2, which applies to "the Project", currently requires the Station Plaza Accommodation to be removed within one year of completion of "the Project" works. This NoR proposes that Condition 3.2 be amended so that it is not inconsistent with this new scope, i.e. so that continued use of the Station Plaza Accommodation for "the Works" as permitted under the new purpose and definition is not inconsistent with the existing condition that relates to "the Project". In summary, the conditions are proposed to be amended only to the extent required to avoid any ambiguity or conflict between what is permitted under "the Works" purpose and definition, and what is required under the conditions that apply to "the Project". These amendments cannot reasonably be interpreted as requiring the application of the conditions to "the Works".

2. Definition of "the Works"

Please provide an assessment of how defining the term "the Works" impacts on the application or otherwise of the existing conditions of designation 2501.

Explanation: Section 1.6 of the AEE sets out the proposed alteration to the purpose and definitions of designation 2501. It is proposed to include a definition of the term "the Works" as part of these alterations. It is noted that the Conditions of designation 2501 include numerous references to "the works" (e.g. conditions 3.1, 14.3(a)(i), 19.2, 19.3) and "construction works" (e.g. condition 6.5(a)). It is unclear how the inclusion of the definition of "the Works" will impact on the application of the existing conditions.

Defining the term "the Works" does not impact the application of the existing conditions. As outlined in response to Question 1, the conditions are drafted to apply to "the Project" only, and the proposed amendments to the designation, including the insertion of a definition of "the Works", does not change this.

The new defined term proposed by this NoR, "the Works", is capitalised. As a result, generic references to "works" lowercase in the conditions cannot reasonably be read as applying to "the Works".

3. Timeframe of the Works

Please clarify the risk of timeframes being exceeded and the associated effects of this occurring. This should include (but not be limited to) whether the works would no longer be considered to be effectively managed using temporary traffic management measures, and the associated construction related effects extending over a more extended period.

Explanation: Section 2.3 of the AEE anticipates the decommissioning of the Station Plaza Accommodation in late 2023. As the effects are assessed as temporary, some clarification is needed on the potential risk of these timeframes being exceeded and the implications of this on effects and proposed mitigation.

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If the Works begin at the proposed commencement date identified in the AEE (Section 2.3 of the AEE and Section 3.4 of the Constructability Report), the Works will occur in accordance with the described timeframes.

If the programme timeframe does not begin as described in the AEE, the duration of each of the construction support activities that comprise the Works will remain the same, but their commencement will be deferred by the same amount of time as the initial delay. In other words, if the start date shifts, the programme dates will shift accordingly. The only current risk to the start date is the approval of this NoR.

Regardless of when the Works commence, the overall duration of the tunnel fit-out is considered realistic and allows sufficient time for the proposed construction activities. It is based on the project delivery team's understanding of the scope of work and associated constructability issues (which have been the subject of fairly rigorous interrogation), including lessons learned from other railway projects.

The main impacts from the Works are traffic and noise effects occurring during the concrete delivery stages, which take place for a short duration only (20 days for Stage 1 in Q1 2022 and 10 days every second day for Stage 2 in Q2 2022). These effects are not at risk of being exceeded to the point where it is considered they cannot be effectively managed using temporary mitigation measures.

In terms of traffic effects, the Integrated Transport Assessment (ITA), dated June 2021 and undertaken by Flow Transportation Specialists, concludes that the effects of the proposal will be minor, with the maximum number of construction related vehicles expected to be 40 trucks per day during the periods of the concrete pours, plus 5 to 10 small delivery vehicles per day. Outside the concrete delivery periods, daily vehicle movements would revert to between 5 to 10 small vehicles per day. At this level of activity, there would appear to be no reason why an extension of the construction period would result in a level of effect that could not continue to be managed through temporary traffic management as required.

4. Assessment of Alternatives

Please provide documentation of the assessment undertaken at the multi-disciplinary workshop held on 10th of May, 2021. In particular, please provide details of how the various workshop attendees assessed and considered the options being assessed.

Explanation: Section 4.1 of the AEE refers to a multidisciplinary workshop held to consider alternative options however, it is unclear from the material provided how the views of the various workshop attendees has influenced the identification of the preferred option. To be able to understand the adequacy of the process applied to consider alternative options, we consider that sufficient transparency of the alternative assessment process is required. We consider that any minutes or notes from the multi-disciplinary workshop would assist in understanding the assessment of alternatives process.

Please see **Attachment 1** for further details on the options workshop that was conducted. The primary focus of the workshop was to understand the concrete works required to fit out the railway tunnels, and what this means in terms of the logistics of concrete delivery. Alternative locations and methods for the delivery of concrete were discussed in detail.

The attendees of the workshop included specialists in railway track form requirements, concrete (including different types of concrete and the logistics of concrete delivery), construction management (including confined-space tunnel works), programme management, environmental effects (traffic and

noise), and RMA planning. These specialists explained the pros and cons of different concrete delivery options.

For instance, the traffic expert outlined the effects of concrete trucks reversing from Commerce Street into Tyler Street during peak hours. This allowed the construction management expert to assess what options would be more appropriate to mitigate traffic impacts associated with concrete delivery.

The concrete expert explained the logistical and health and safety risks of different concrete pumping activities, including the drawbacks of pumping all the concrete downhill over a long distance from the Albert Street end of the tunnels.

The noise expert explained the limitations and opportunities for acoustic mitigation measures for each of the concrete delivery options. This included the practicality and effectiveness of trying to establish acoustic enclosures (particularly given space constraints for the proposed site compound), a preference for undertaking of the Works during daytime and, in an extreme case, the potential for temporarily relocating impacted residents. This allowed the construction management expert to understand the noise impacts for each option and whether particular mitigation options would actually be feasible.

By way of further context, the options workshop on 10 May 2021 was only one part of the alternatives assessment undertaken by the project team. Going into the workshop, the preferred option from a constructability perspective was delivery of Stage 2 concrete at night-time to avoid potential traffic delays that may cause concrete to become unworkable prior to delivery, with resultant cost and programme implications. However, CRLL had not yet received full environmental assessments at this stage. Accordingly, going into the workshop, CRLL and the project team were mindful of the need for a careful analysis of alternatives, including because the effects of night-time delivery could potentially be significant. That said, a full multi-criteria analysis was not considered necessary or appropriate given the limited duration and scale of potential effects.

At the options workshop, the options were carefully refined, including by avoiding aspects that could have generated significant adverse environmental effects. This included focussing on options for day-time delivery of concrete. The consistent feedback from the technical experts was that the key effects – traffic and noise – would be minor or less than minor under day-time delivery options, and this is the mode of delivery that was ultimately selected as preferred (including some delivery of the Stage 1 concrete via the Albert Street end of the tunnels to minimise effects at Britomart).

Further refinement of the preferred option has subsequently occurred in preparing this NoR.

Given the technical experts comments on the minor or less than minor nature and scale of effects, we consider that a very robust approach was undertaken. Case law indicates that further scrutiny of alternatives assessment is required where effects are significant, but this is not the case here.

Please provide details of all the methods considered for construction activities undertaken as part of the assessment of alternative options process.

Explanation: Section 4.2 of the AEE refers to a number of alternative scenarios for construction activities being considered as part of the assessment of alternatives process and notes that this includes site establishment, concrete deliveries and the delivery of materials. This is assumed to be a non-exhaustive list of the scenarios considered. To be able to understand the adequacy of the process applied to consider alternative options, we consider that sufficient transparency of the alternative assessment process is required.

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Section 4 of the AEE detailed the construction methods considered during the assessment of alternatives. Alternative site accommodation locations, and options for concrete deliveries and material deliveries were considered as the main construction activities related to the Works that required consideration of alternative options. A number of variations of the main options were also considered during the assessment of alternatives, however these were deemed to be unfeasible from initial discussions and were not investigated further.

These construction methods were all comprehensively assessed against a number of criteria including constructability, environmental effects, programme implications and cost (see below for a further explanation of the assessment criteria). As noted above, a full multi-criteria assessment was not considered necessary or appropriate given the nature and scale of effects. In terms of the location for the site accommodation, a number of options were assessed based on distance from the CRL tunnels, capacity for storage, fire and evacuation safety, accommodation design and cost of erecting new site accommodation buildings.

Please provide details of all the criteria adopted for of the assessment of alternative options process.

Explanation: Section 4.2 of the AEE refers to a number of criteria including constructability, consenting, programme implications and cost that were used to consider alternative options. This is assumed to be a non-exhaustive list of the criteria applied in the assessment of alternative options. To be able to understand the adequacy of the process applied to consider alternative options, we consider that sufficient transparency of the alternative assessment process is required.

As described in Section 4 of the AEE, each option was considered against various criteria including constructability, environmental effects, programme implications and cost. Specific impacts relating to potential adverse effects were considered such as noise and traffic impacts. Throughout the alternatives assessment process, the consistent feedback from the noise and traffic experts was that effects for day-time options were minor or less than minor.

Other criteria considered included location of the construction support area, productivity implications if the workforce were required to travel longer distances between the CRL tunnels and construction support areas, logistical requirements, health and safety implications, egress routes and lighting, ability to incorporate tunnel ventilation, concrete wastage resultant from extended work-fronts, availability of worker facilities, and fire and evacuation safety. Particularly in relation to the assessment of options for the location of site accommodation, the capacity for materials storage and proximity to the tunnels were determined to be the most important criteria. It was identified that site establishment close to the tunnels was critical to minimise loss of productivity.

5. Cumulative Effects

Please provide an assessment of potential cumulative effects in the context of the CRL project and other construction activities in the CBD

Explanation: Section 2 of the ITA identifies that the local environment is in the process of transformation, due to a variety of projects under construction. Section 3.4.2 of the AEE also notes that there is range of ongoing construction in the Britomart area. In order to appropriately understand and assess the cumulative effects of the NOR, further assessment is required.

Section 3.2.1 of the ITA stated that the understanding was that the current construction works on Quay Street would be completed in June 2021, prior to when the Works which are the subject of this NoR commence in late 2021. However, there were expected to be some works associated with the

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redevelopment of 1 Queen Street, which will require some traffic management on Quay Street in late 2021.

We have now re-checked the above assertions with representatives of AT who are responsible for the Downtown/Quay Street works, and understand that while "substantial completion" was achieved at the end of June, there may be some minor remedial works in the coming months. These could include:

- Works (expected to be minor) to respond to final safety audit close outs. These works are expected to be in the coming few months, i.e. before the Works that are subject to this NoR commence.
- Works along Lower Albert Street, if bus shelters are upgraded. These works could take place at the end of 2021 but are likely to be largely confined to the footpaths, and as such should not affect traffic conditions along Commerce Street.

We have also re-checked the programme for other CRL related works. Originally it was proposed to undertake some significant underground structural reconfiguration works at the eastern end of Britomart Station, where the railway tunnels enter the station from the east. This would have required reasonably extensive surface excavation works within Britomart Place, with disruption to traffic and the need for extended temporary traffic management. These Britomart Place works would have coincided with the Works in Station Plaza, resulting in the potential for cumulative effects – particularly in relation to effects on the road network. However, the majority of the Britomart Place works have now been deferred and only utility relocation works will be undertaken. The utility works will largely be completed by the time the Works commence in early 2022.

B. Transport

1. Traffic generating activities

Please clarify the quantity of vehicle movements and where necessary assessments are updated to refer explicitly to vehicle movements (rather than, or in addition to truck loads). With regard to heavy and light vehicle movements, please separate these out from 'vehicle movement' with additional descriptions of vehicle type as appropriate.

Note – these amendments may not only apply to the AEE and ITA, but also other assessments such as the noise assessment which also refers to truck loads (such as at Section 1.4 of the Marshall Day report as Appendix B of the AEE).

Explanation: Further information regarding the quantification and description of vehicle movements would be helpful to understand associated effects. In some cases, concrete and material deliveries are described interchangeably as truck loads, trucks, vehicles etc. Given that this could result in misunderstanding of the scale of an activity and associated effects, clarification is sought.

As described in Section 3.2 ('Major Deliveries') of the Constructability Report, heavy vehicle movements refer to concrete deliveries and those delivering items such as fire hydrant piping, bulk cable containment, blockwork, steelwork and large cable drums. The maximum number of construction related vehicles is expected to be 40 trucks per day (i.e. 80 movements per day) during the periods of the concrete pours, plus 5 to 10 small delivery vehicles per day (i.e. 10 to 20 movements per day).

Section 3.2 of the Constructability Report also identifies 'Minor Deliveries', these being movements by light vehicles which will be used for deliveries. These deliveries are likely to be undertaken by utility

('Ute') or other small goods vehicles. The number of light vehicle movements will be dictated by the construction activity. However, it is expected that there will be 5 – 10 vehicles per day.

2. Commerce Street Performance

Please provide a performance of Commerce Street that is quantified more clearly in transport engineering terms, and with further information provided around observations of performance as they relate to the proposal.

Explanation: The Existing Environment section of the ITA highlights the multi-functional operation and expectation of Commerce Street. However, the assessment of performance is not clearly defined in transport engineering terms. Also, the consideration of whether operating beyond the practical capacity, results in practical issues for access during the peak hours without impacting the area beyond Commerce Street (such as impeding through movement and generating queue back) is unclear. In addition, several measures quantifying movement are referred to as "significant" without further context or quantification. Further clarification on the above matters will enable effects to be assessed more robustly.

The section of Commerce Street between Quay Street and Customs Street is about 140m long, with the signalised pedestrian crossing very close to halfway. Thus, the main issues of interest include:

- The potential for queues from the signalised intersections to extend to the midblock crossing or beyond to the next intersection (from the Customs Street intersection to Quay Street, or vice versa)
- The effects of predominantly southbound buses (some stopping, some passing through) on traffic and pedestrians

In order to respond to this query, one of Flow's transport engineers undertook site visits on 14-15 July 2021. We acknowledge that this was during the school holiday period, and also that traffic conditions may still be settling down following the completion of the Quay Street project, but this was unavoidable due to the timing of the requests. The main observations were as follows:

AM Peak (08:15 – 09:30)

Section 2.6.1 of the ITA noted that traffic flows along Commerce Street are lower than those in the evening peak, and this was reflected in the observations. Similarly, the footfall across the signalised pedestrian crossing, and along Galway Street and Tyler Street seemed lower than in the other time periods.

At one stage there were around 7 buses southbound on Commerce Street, with a couple in the bus stops and a row of buses extending from the lights on Customs Street back to the last bus bay by stop 1338.

Inter-Peak (12:00 – 13:00)

Generally, there were no significant traffic issues observed during this period. However, there was a high footfall across the pedestrian crossing by the Station Plaza Accommodation (**SPA**) building (that until recently provided an alternative Britomart station entrance), which may have been caused by an event at the Spark Arena. These high pedestrian flows at times caused small queues of around 4 vehicles back from the pedestrian crossing. At one point 4 buses arrived together, causing a queue back from Customs Street.

There were very few vehicles using Tyler Street or Galway Street, west of Commerce Street, but pedestrian flows were quite heavy.

One issue that caused some backlog related to buses not turning into the bays properly, with the rear of these buses impeding traffic while people were board/departing.

PM Peak 16:45 – 17:45

There was less footfall across the signalised pedestrian crossing than during the inter peak period.

There were traffic queues heading east on Customs Street and west on Quay Street, past Commerce Street. At times queues back from Quay Street caused tailbacks of up to 6 cars within Commerce Street. As in the inter peak, platoons of buses caused some congestion, but these queues did not extend back from Commerce Street to Quay Street or from Customs Street to Quay Street.

In our view, the above observations back up the proposed traffic arrangements for the Works, with no reversing or manoeuvring to be permitted within Commerce Street during the extended morning and evening peak periods. Such manoeuvres are to be permitted outside of these periods, but under STMS supervision to ensure that satisfactory safety standards are achieved for other road users (including active modes).

3. Heavy Vehicle Access Routes

Please confirm that movement between Commerce Street and Quay Street west of Commerce Street is not proposed.

Explanation: Figure 8 of the ITA indicates all movement from Quay Street will be to and from the east. The text does not provide any further description of movement patterns beyond the site, so on our reading we would assume all construction traffic will follow a traffic management plan that supports the movements shown in Figure 8. Confirmation of the movement will ensure that effects associated with heavy vehicle access is appropriately considered.

Figure 8 within Section 3.1 of the ITA and Figure 2 within Section 3.2 of the CTMP both showed “Site Access”. The text within Section 3.3 of the CTMP stated that the routing of construction vehicles is shown in Figure 2 above, namely approaching the site from Quay Street east, and turning left into Commerce Street, with vehicles exiting the site also leaving via Quay Street east. In other words, we can confirm that no truck movements are proposed via Quay Street, west of Commerce Street.

4. Construction Traffic Management Plan

Please show vehicle tracking of the Tyler Street manoeuvres and concrete delivery access on drawings and set out a draft layout for the key traffic management measures impacting Commerce Street.

Explanation: The primary effect of the NOR identified in the ITA relates to traffic management disruptions. A Construction Traffic Management Plan (“CTMP”) approach is proposed which is a typical process and required in any situation where an activity will temporarily change the operating conditions of a road. To clearly quantify and assess the practicality of the proposed management measures and safety effects of the NOR, further information in relation to vehicle tracking is required on the drawings.

In addition, to provide confidence that safe workable solutions for site workers and the public are achievable, and existing Commerce Street activities can continue to operate as assessed, a draft layout plan outlining the key traffic management measures is required.

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Tracking plans for a truck reversing into Tyler Street (inter peak only) or manoeuvring within Tyler Street (during the morning and evening peak periods) are attached (refer **Attachment 2**). These relate to a four-axle concrete truck of some 8.3m. (This is slightly longer than the actual vehicles that are expected to be used, these being four axle trucks of 8.1m). **Attachment 2** contains two sets of plans, with one showing how reversing is to be carried out from Commerce Street (during the inter-peak period), back onto the footpath immediately adjacent to the SPA building, and the other showing how manoeuvring can be achieved within Tyler Street within the peak periods, again using the footpath/temporary works area.

Detailed layout plans will be required for the temporary traffic measures to be approved by AT, in advance of the Works commencing. However, by way of example, **Attachment 3** contains plans that were approved for the earlier CRL Contract 1 works at Britomart, relating to the concept of stop/go arrangements along Commerce Street to allow reversing into Tyler Street. These are considered to be very relevant to the traffic management works now expected to be required, as they indicate the signs and locations of STMS personnel that can be expected for the Works. We anticipate similar documentation to be submitted to AT for approval of a corridor access request, prior to the Works commencing.

C. Noise and Vibration

1. Effects on receivers

Please provide a subjective assessment of the construction noise effects at all receivers that are predicted to receive noise levels over 70dB LAeq. The assessment should be specific to the receivers that will be exposed to the noise, and should be based on the observed façade constructions. The assessment should include an assessment of the noise effects in any outdoor space, common space or entry lobby and inside the most exposed habitable rooms of each apartment, or office or retail space (or similar) in the case of commercial uses and should describe the noise effects in subjective terms.

Explanation: The Construction Noise Assessment (Appendix B) notes that concrete pumping and ventilation fans are high noise activities. Section 4.2 provides a table identifying predicted noise levels on neighbouring buildings. However, further assessment is required to understand the effects on the receivers as a result of these activities.

Please see **Attachment 4** ('Response to Section 92 Request'), **Attachment 5** (section 4.3 of the updated 'Construction Noise Assessment') and **Attachment 6** (section 2.4 of the updated Construction Noise Management Plan).

2. Best Practicable Option (BPO) Assessment

Please provide an assessment of the methods available to screen / reduce the noise from the concrete deliveries. The objective of the assessment is to demonstrate what options have been considered to screen, enclose or orient the concrete deliveries to reduce the noise levels as far as practicable to the closest receivers. The assessment should include an evaluation of options that have been considered and discounted, and why. A specific assessment addressing the practicability of partially enclosing the delivery area is also requested.

Explanation: The Construction Noise Management Plan (as part of Appendix D) notes that the purpose of the plan is to identify and provide for the implementation of the BPO to manage construction noise effects. However, an evaluation of the options considered has not been provided. In

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order to understand the approach to noise mitigation, further clarification is needed on the assessment.

Please see **Attachment 4** ('Response to Section 92 Request') and **Attachment 5** (section 4.4 of the updated 'Construction Noise Assessment').

Please do not hesitate to contact me should further clarification be required.

Yours sincerely,

Richard Jenkins
Principal Planner
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E: richard.jenkins@cityraillink.govt.nz

Enclosed:

Attachment 1: Options workshop

Attachment 2: Concrete Truck Tracking

Attachment 3: C1 CRL Contract Temporary Traffic Plans

Attachment 4: Marshall Day Acoustics Response to Section 92 Request

Attachment 5: Updated CRL BTC Designation Alteration Construction Noise Assessment (dated 20 July 2020)

Attachment 6: Updated CRL BTC Designation Alteration Construction Noise Management Plan (dated 20 July 2020)

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Attachment 1: Options workshop

Tunnel Concrete Delivery at Britomart – Options Workshop

DATE	Monday, 10th May 2021 at 2:30 – 4:30 pm
LOCATION	Link Alliance – 12 Morgan Street, Newmarket Level 4, Board Room
ATTENDEES	Jon Varndell (Facilitator), Richard Jenkins, Glenn Houpapa, Rudy Seller, Murray Simon, Kostas Kakis, Helen McLean, Andrew Mein, James Whitlock, Ian Howe, Philippe Begou, Matthias Berrux
SUBJECT	Construction support activities at Station Plaza, Britomart – Tunnel Concrete delivery
PURPOSE	The purpose of the workshop is to identify and understand: • The concrete works that need to be undertaken in the CRL tunnels (Wyndham Street to CPO building), and what this means in terms of concrete delivery requirements. • The planning approval process required to enable concrete delivery from Station Plaza, and the key issues that need to be addressed as part of this process. • Alternative options for concrete delivery – with an assessment of options in terms of constructability, environmental effects, programme and cost. The overall objective is to confirm a preferred option that will form the basis for the necessary planning approval process.
AGENDA	1. Introductions and purpose of workshop – Jon Varndell 2. Construction support overview and planning approval process – Richard Jenkins (Appendix 1) 3. Overview of concrete works in the tunnels (Wyndham Street to CPO building) – Rudy Seller (Appendix 2) 4. Concrete delivery – technical and practical issues – Ian Howe 5. Environmental context – traffic – Andrew Mein 6. Environmental context – noise – James Whitlock 7. Consideration of alternative options for concrete delivery – All facilitated by Jon Varndell 8. Conclusions – Jon Varndell

OPTIONS CONSIDERED FOR CONCRETE DELIVERY	The following options were considered during the workshop and was reviewed individually to assess constructability vs impact to local area. 1. Concrete Delivery from Station Plaza – Day Time 2. Concrete Delivery from Station Plaza – Nighttime Only 3. Concrete delivery from northern end of C1/C2 tunnels Aotea Station side (vicinity of Wyndham Street) 4. Split concrete delivery between Britomart Station Plaza and northern end of C1/C2 tunnels (Aotea Station) 5. Concrete Delivery via Rail Concrete Train The workshop reviewed both Stage 1 and Stage 2 concrete together as their impact to that local area would be the same.
ASSESSMENT CRITERIA	The following criteria was considered during the workshop to assess each option. 1. Constructability a. Health and Safety b. Programme Implications c. Technical 2. Environmental a. Noise b. Traffic Below is the matrix of assessment for each of the options consider

Options Assessment Matrix.

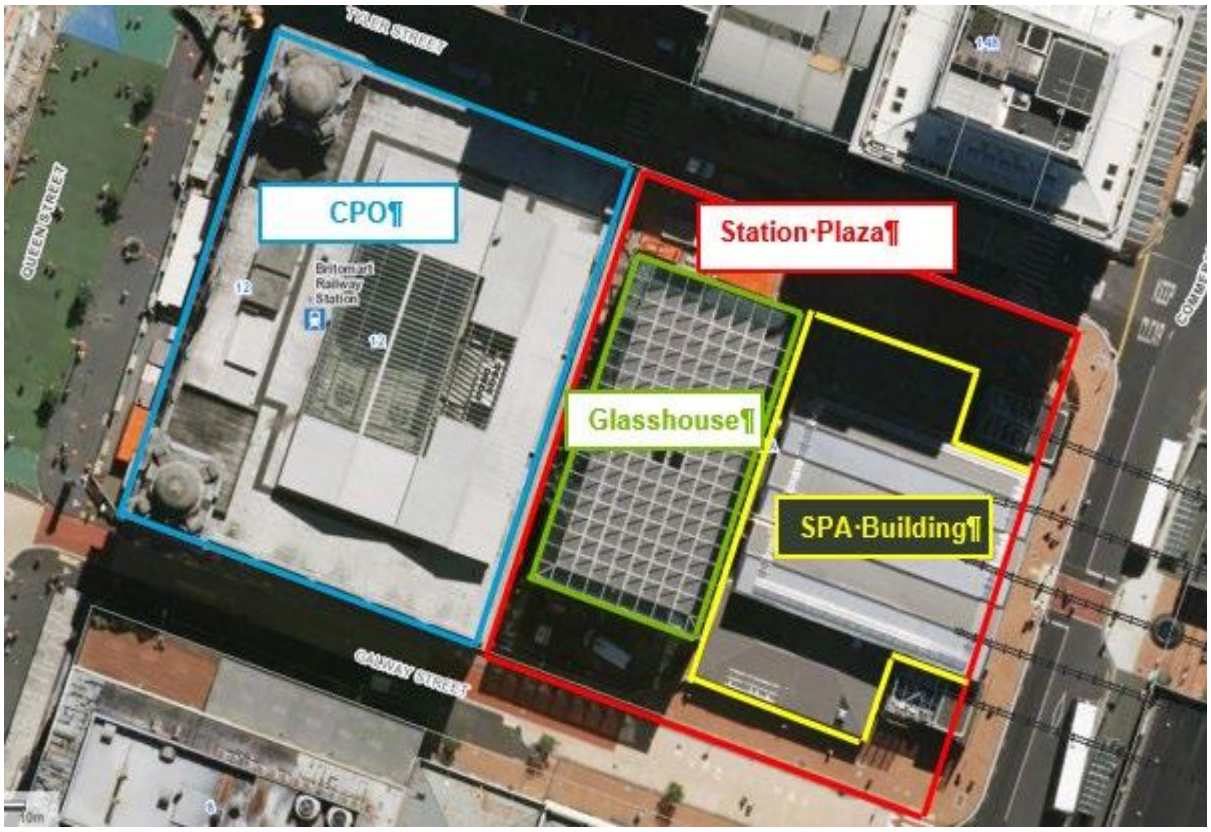
CONCRETE DELIVERY			
Alternative Options Considered	**Constructability Issues**	**Consent Implication**	**Programme Implication**
Option 1 - Concrete delivery from Station Plaza **DAY TIME**	Risk of Concrete going off and being rejected due to Time Limit on Laying Concrete - Traffic Congestion raise reliability issues with concrete and risk of concrete going off in the pipelilne.	**Traffic Key Issue:** - Limitation for reveresing vehicle only between 9:30am and 15:00.	If works are restricted to 9:30am - 15:00 this will double the programme. Additional 20 days. Project team could work with 7:00 - 17:00 and extend until 22:30pm if required.
Option 1.1 - Concrete delivery from Station Plaza **NiIGHT TIME**	Minimal constructability issues, and currently the preferred option. - Risk of concrete going off is limited due to lack of traffic.	**Noise Issues**: Current assessment is that works will exceed allowable noise levels. Noise enclosure will be required,however extent might not be possible. - Double Glazing of Apartements to reduce noise. Rehouse Residents.	Highest Risk of not getting alteration or conditions we cannot meet.
Option 2 - Concrete delivery from northern end of C1/C2 tunnels Aotea Station side (vicinity of Wyndham Street)	Pumping Concrete Down Hill Risk - Concrete Segration - H&S Risk of Pipe bursting - Issues with cleaning pipe and potential major blockages Risk of Concrete going off and being rejected due to Time Limit on Laying Concrete	Covered by Current CRL Designation (Noise/Temp Traffic Mngmt Plans)	6 Weeks Delay Aotea Station overall project Critical Path
Option 3 - Split concrete delivery between Britomart Station Plaza and northern end of C1/C2 tunnels (Aotea Station)	Not discussed as this is is a combination of Option 1 and Option 2		
Option 4 - Concrete Delivery via Rail Concrete Train	Train would have to be imported inot NZ. Cost > $600k Works will take place during KR Engineering hours. Loading of train during day at Quay Park and then entering into tunnel during night.	No issues	10mnth Lead Time Delayed Start to works, and therefore will affect the projects overeall critical path

Appendix 1 – Planning Process Overview

Tunnel Concrete Delivery at Britomart – Planning Approval Process

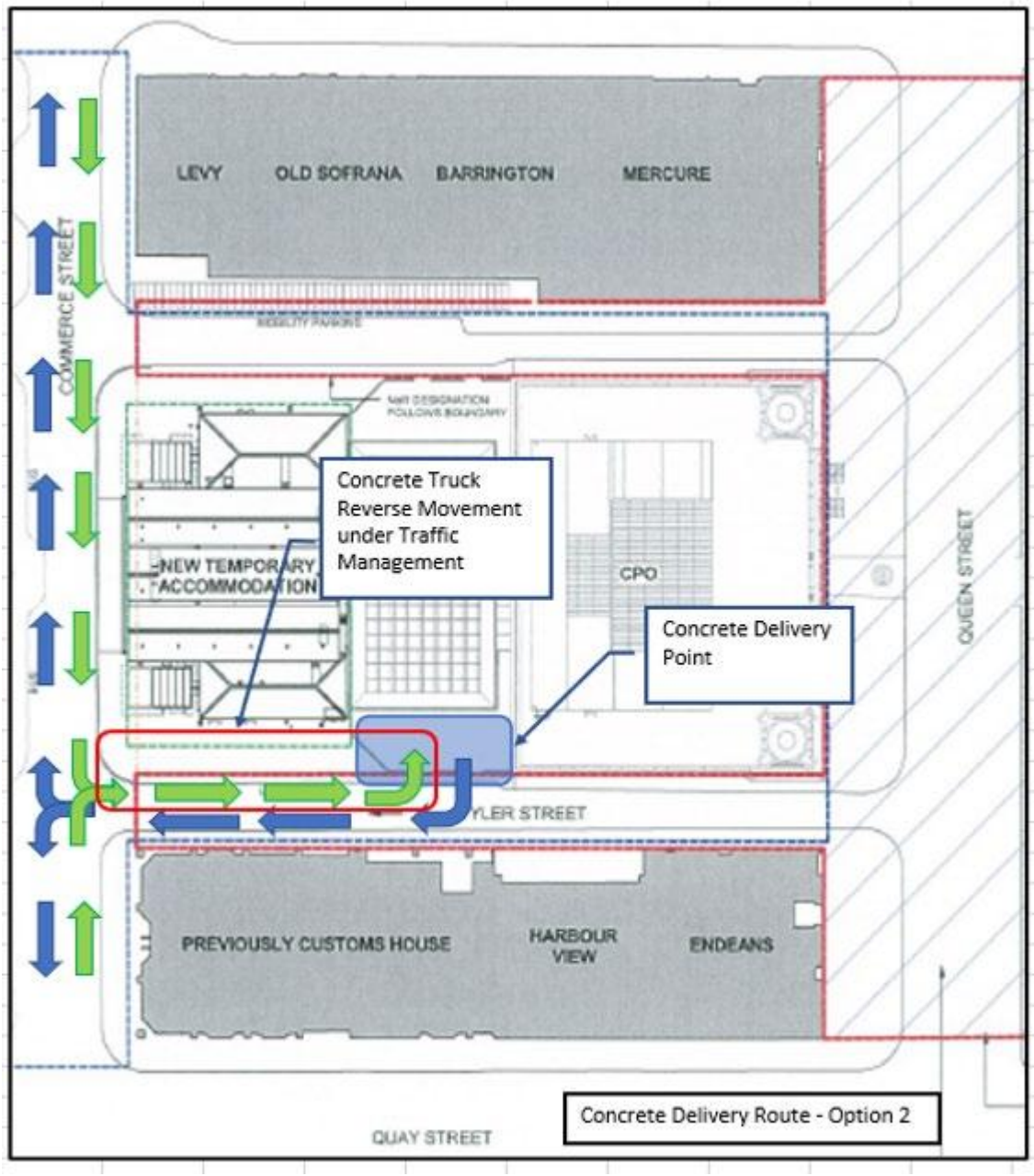
What is proposed ?

Using the 'Station Plaza Accommodation' (**SPA**) building and surrounding Station Plaza area at Britomart as a construction support facility for fit-out works in the CRL tunnels (Wyndham Street to CPO building). The SPA building and Station Plaza will also be used as construction support for works required within Britomart Station to accommodate CRL.



Construction support activities include:

- Site office and worker accommodation within the SPA building.
- Access for workers, and deliveries of equipment and materials, via the 'Glasshouse'.
- **Receiving and pumping concrete down into the tunnels (to construct the track bed) from the Station Plaza area in Tyler Street.**
- Establishing and operating ventilation equipment to provide fresh air for workers in the tunnels.



What planning process is required to achieve this ?

To be allowed to retain the SPA building and then use the building and surrounding Station Plaza area as construction support for works in the tunnels, CRLL has to alter its Britomart Transport Centre (**BTC**) designation.

What is the process for altering the BTC designation ?

The Resource Management Act 1991 prescribes the process that has to be followed in altering a designation.

Two things are fundamentally important in this process (and are effectively 'legal requirements'):

(i) Identifying the **environmental effects** of using Station Plaza for construction support and, in turn, how any adverse effects on the environment can be adequately managed. Key effects include transport, access and parking disruption, and noise.

(ii) Given the potential for some of the support activities to have significant adverse effects on the environment, demonstrating that there has been **adequate consideration of alternatives** for undertaking the activities. *For example – Why can't the tunnel concrete be delivered from the Albert Street end or by work train from Quay Park, instead of concrete trucks using Tyler Street ? Why can't all delivery of equipment and materials be undertaken by train ?*

Who is involved in the process ?

To maintain programme and manage the risk of subsequent appeals, CRLL is proposing that the alteration process be undertaken by way of **direct referral to the Environment Court**. Auckland Council will remain involved in the process, but the Court will decide the outcome of the alteration.

The alteration will be **publicly notified** and affected stakeholders (e.g., neighbouring apartment owners on the northern side of Tyler Street) will have the opportunity to make submissions and be involved in the direct referral process. These stakeholders may obtain their own expert advice (e.g., noise) and have legal representation.

In the first instance, CRLL will request Court-assisted **mediation** involving all stakeholders. Mediation will assist in narrowing (and hopefully in some cases resolving) the issues that then need to be determined by way of a formal hearing.

In then proceeding to a hearing, technical experts (construction, noise, traffic, planning) will need to give evidence. This evidence will be 'tested' through cross-examination from opposing legal counsel and by the Court.

Again, this will involve careful examination of:

- The **management of environmental effects**; and

- **Whether alternatives have been adequately considered**. It is anticipated there will be very robust cross-examination regarding alternative options for concrete delivery - including, for example, any proposal to undertake concrete delivery during night-time hours (when noise is a significant issue for adjacent apartments).

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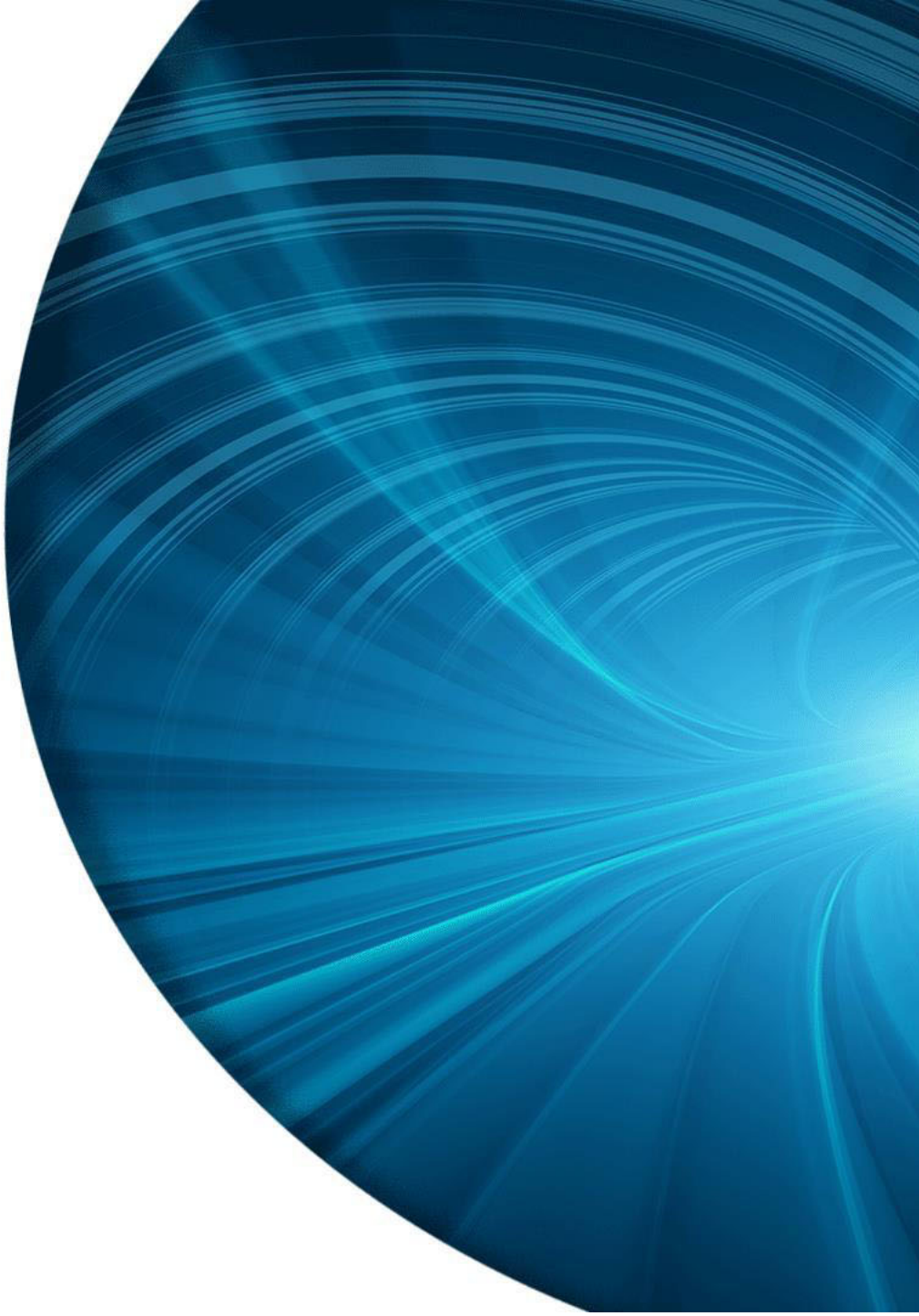
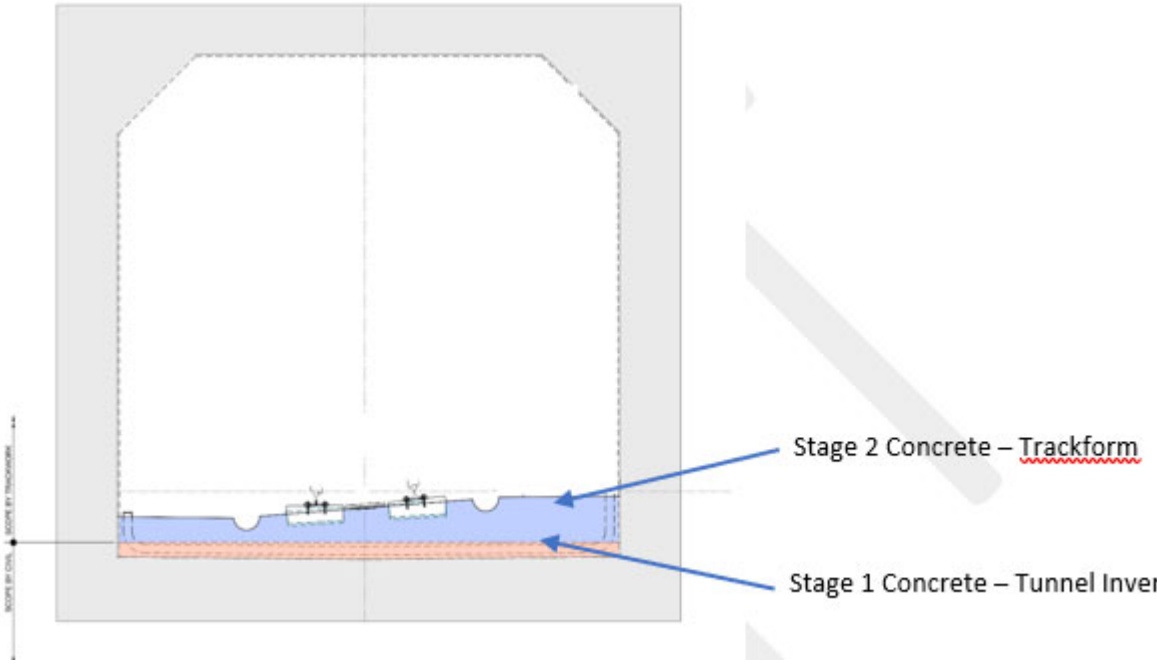
Britomart Concrete Delivery Workshop

10/05/2021



Concrete Delivery

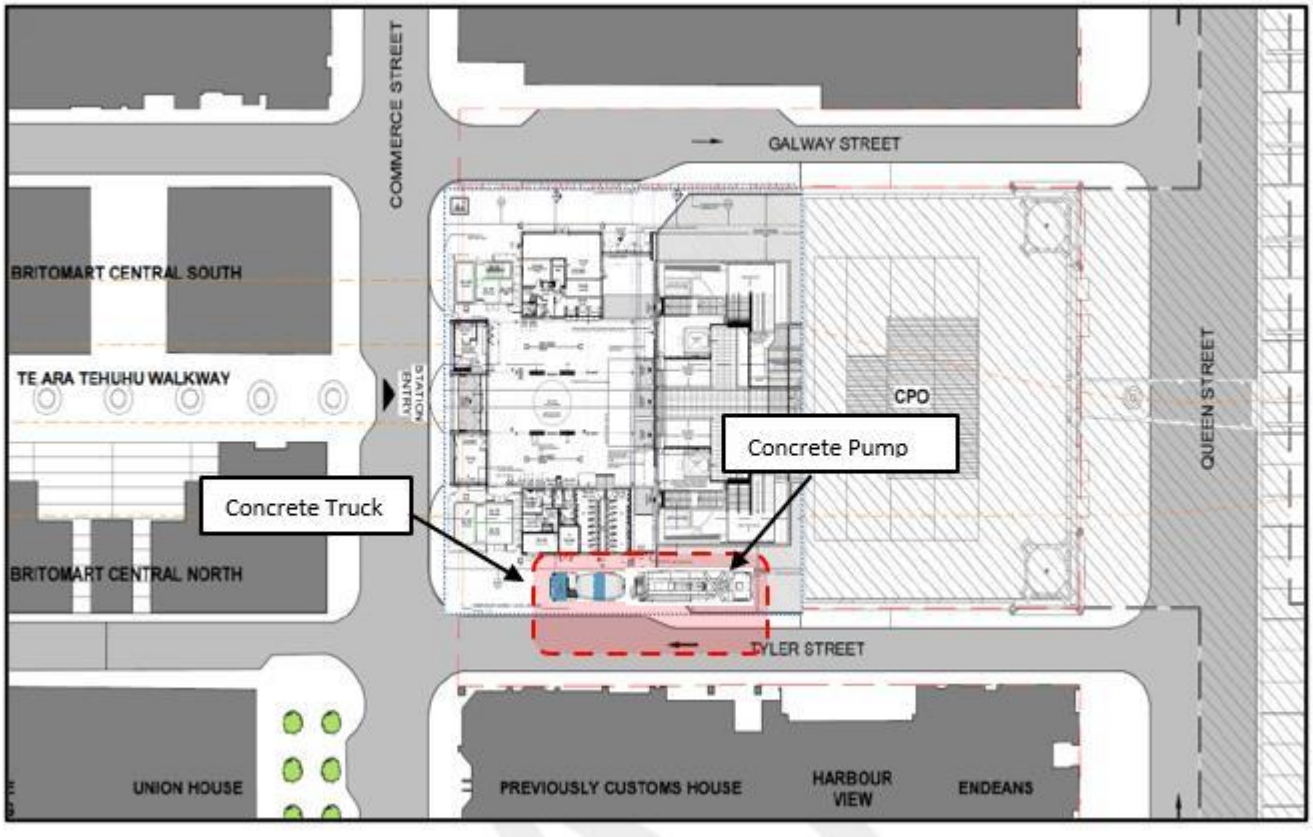
- Concrete delivery is required for a number of activities within the tunnels but also Britomart Station for associated works.
- The activities requiring concrete have different technical restrictions
  - Stage 1 Concrete – Tunnel Invert
  - Stage 2 Concrete – Trackform Concrete
  - Britomart Appendix 26 Works
  - Britomart C9 Works

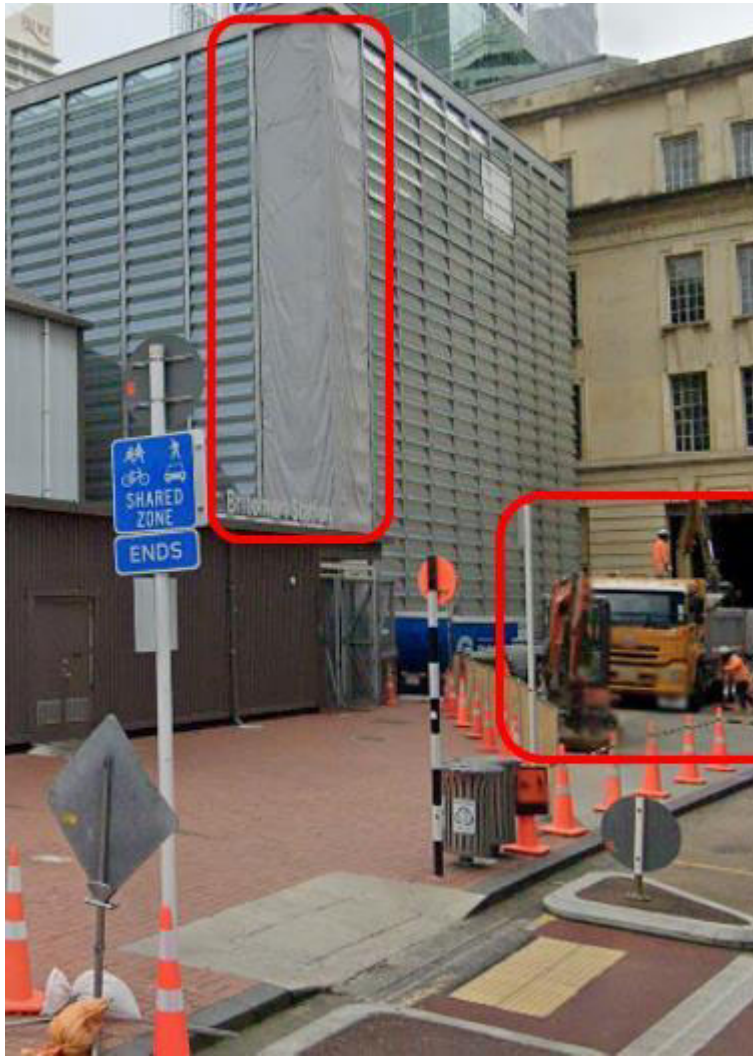


Current Understanding/Proposals

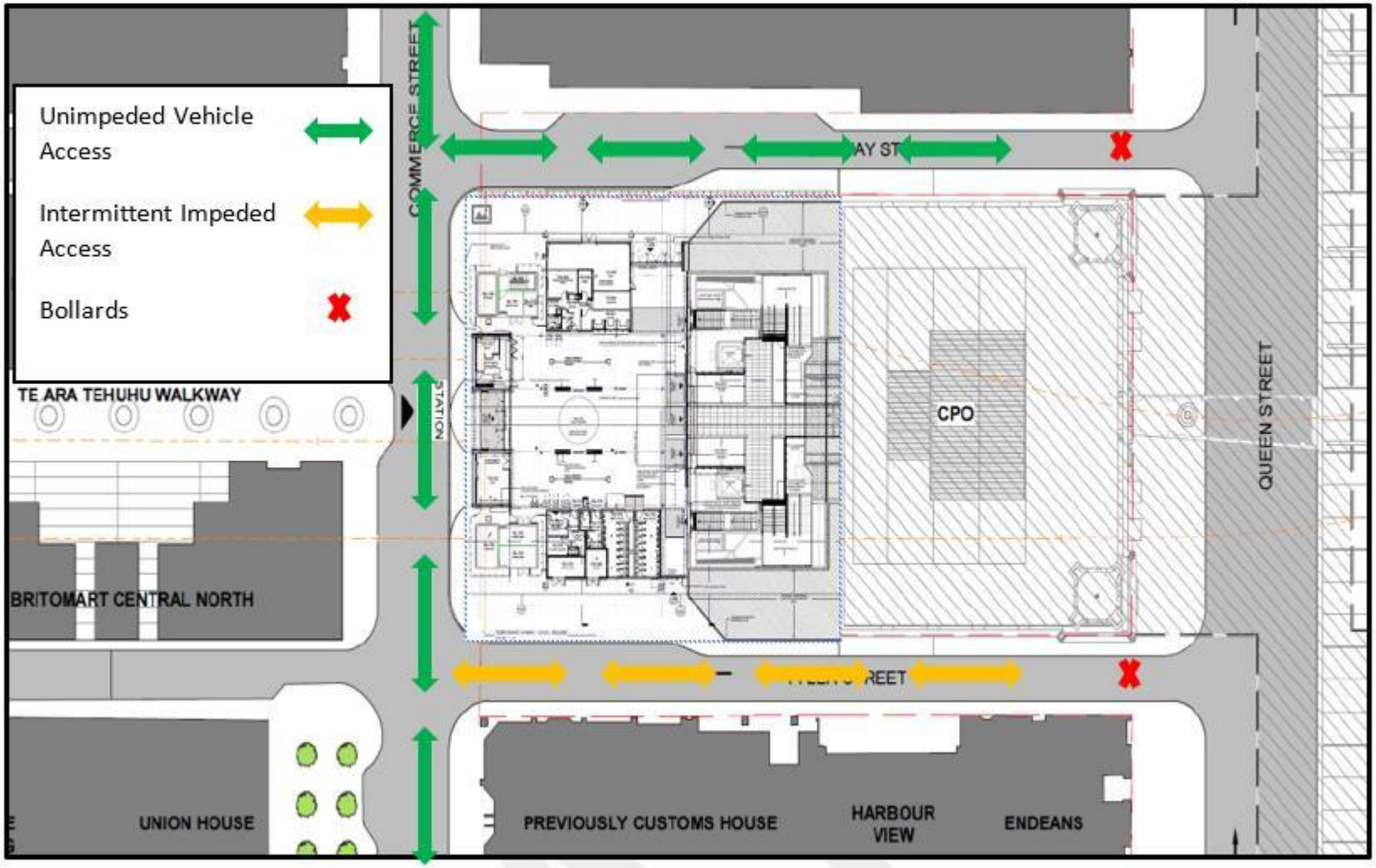
Activity	Time of Day	Location	Quantity	Trucks Per Day	Programme
Stage 1	6:30am – 6:30pm	Britomart and Aotea	MC30: 1550m3 MC20: 1617m3	20 Trucks per day	MC30: 24th Nov Dec 2021 MC20: 15th Dec January 2022
Track form	22:00pm – 4:00am	Britomart only	MC30: 1400m3 MC20: 1400m3	29 Trucks per shift	6th April – 27th M Concrete delive days, where cor delivered every

Britomart – Tyler Street Concrete Pump location





Vehicle Route



Key Issues

- Time of Day (Batch time until laying Time)
- Location from where concrete will be delivered.
- Number of Trucks per Day.
- Quantity of Concrete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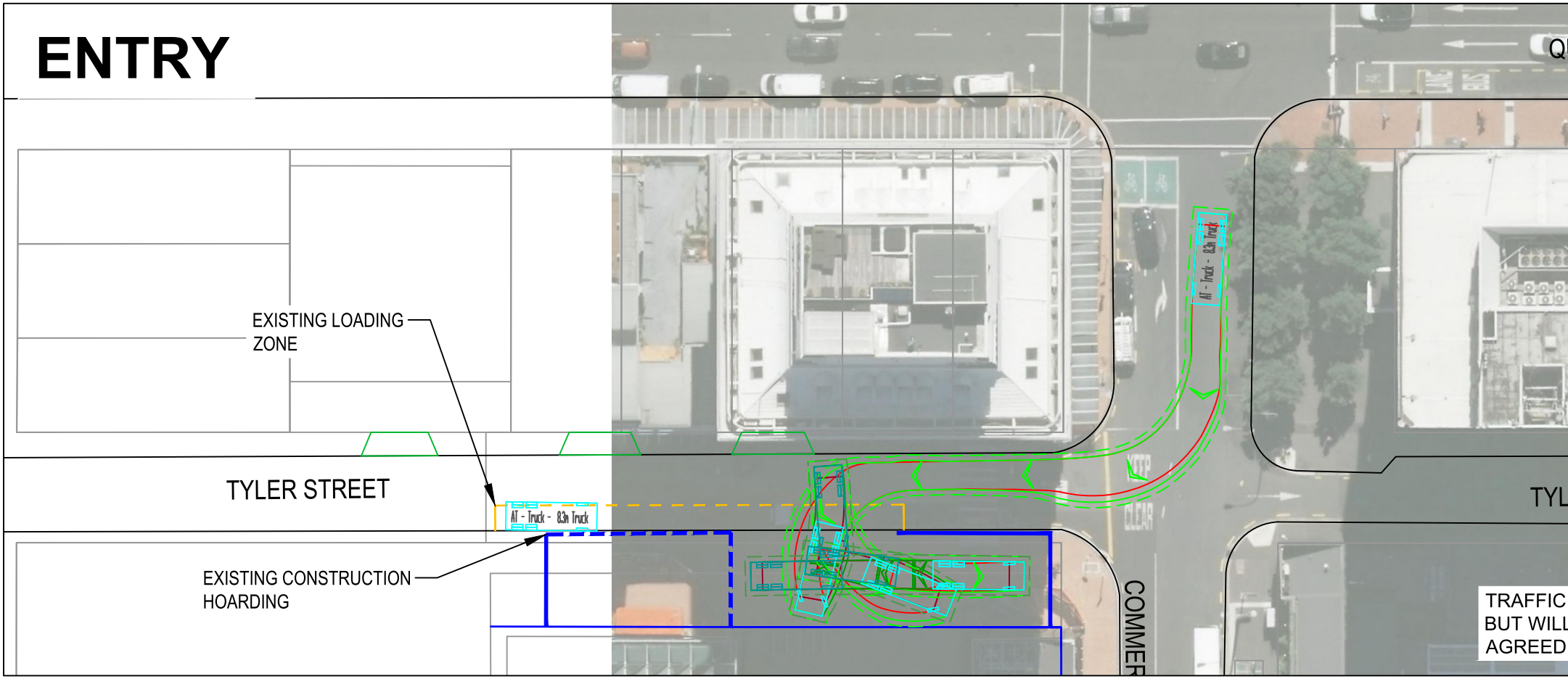
Attachment 2: Concrete Truck Tracking

ENTRY



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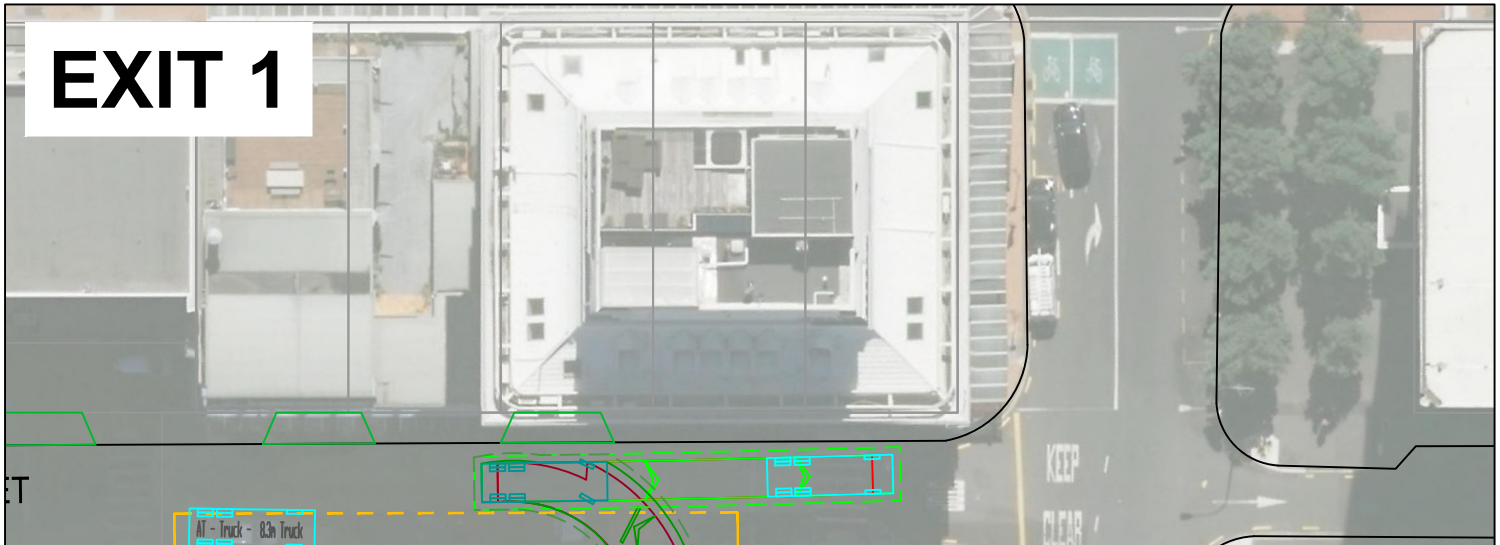
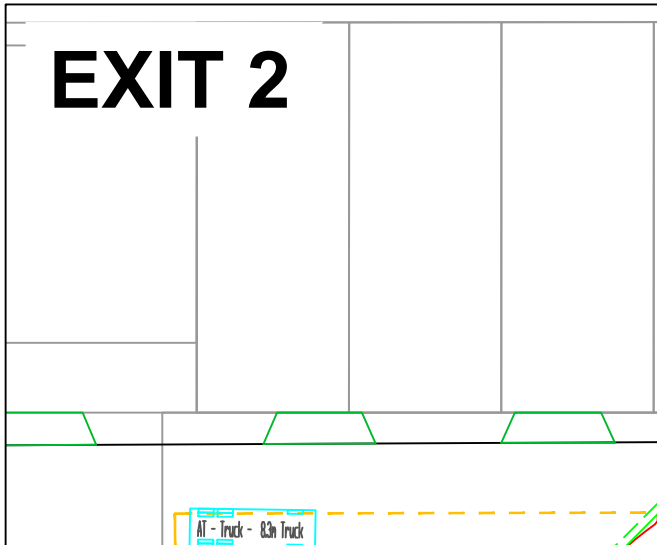


EXIT 2



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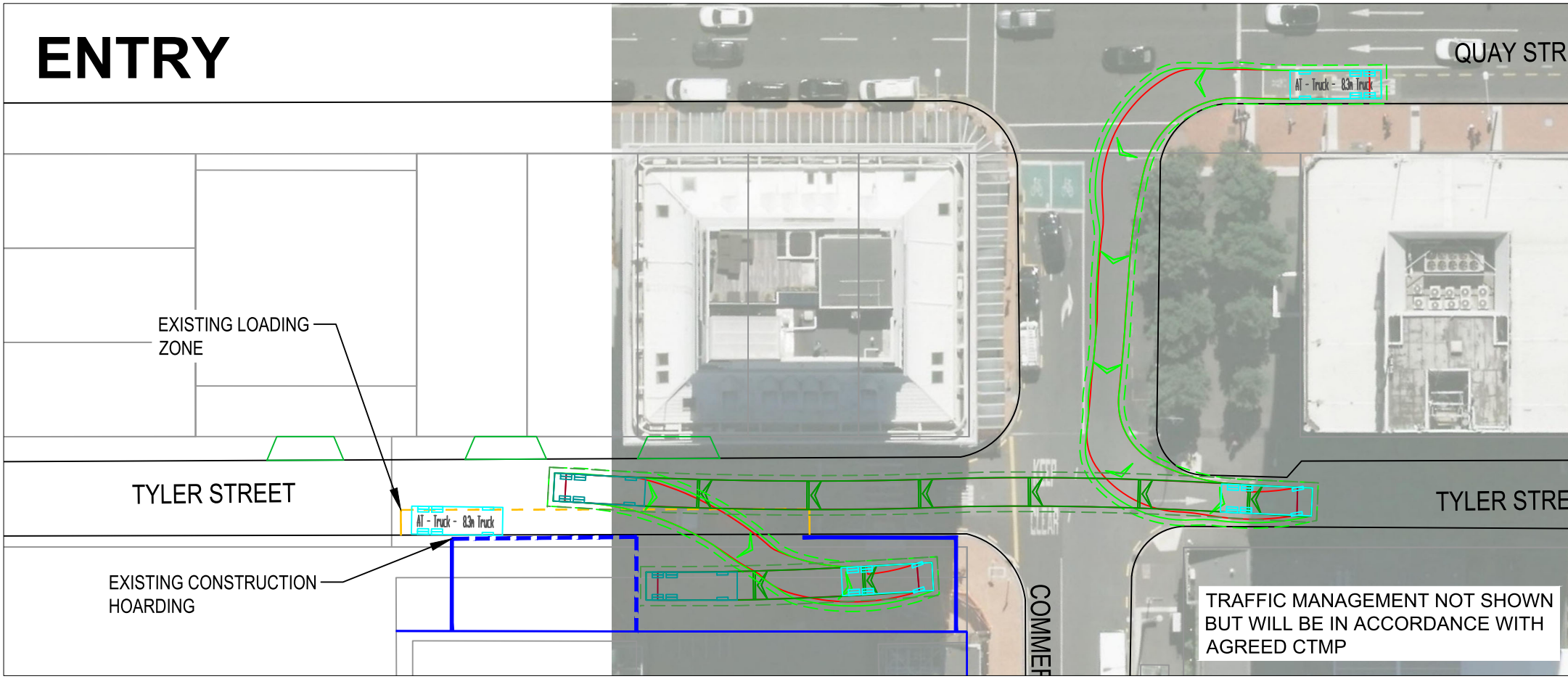
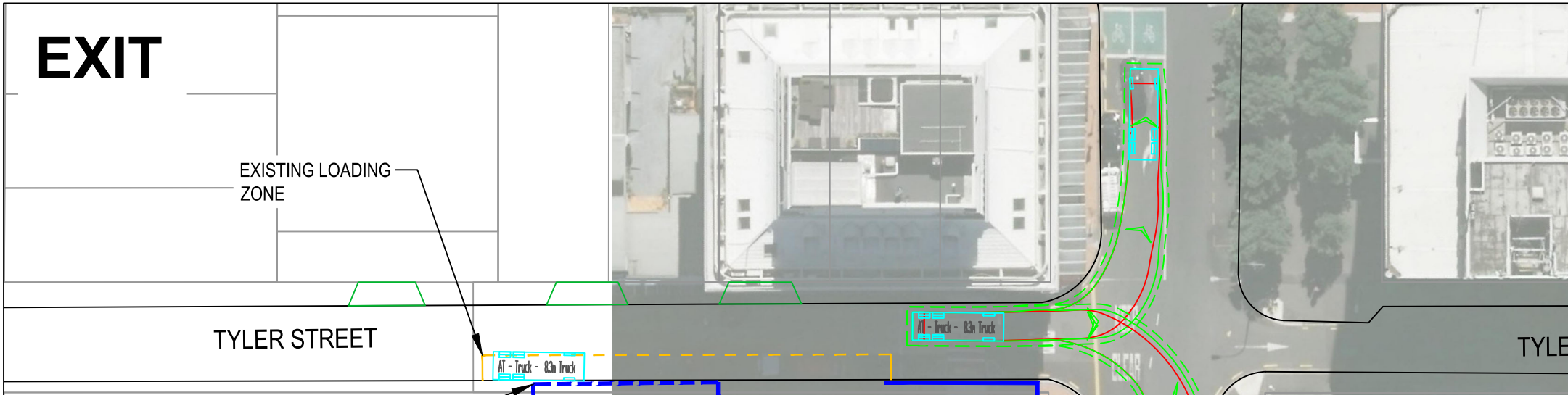

QUAY STR
AT - Truck - 8.3m Truck
EXISTING LOADING ZONE
TYLER STREET
AT - Truck - 8.3m Truck
TYLER STRE
EXISTING CONSTRUCTION HOARDING
COMMER
TRAFFIC MANAGEMENT NOT SHOWN BUT WILL BE IN ACCORDANCE WITH AGREED CTMP

EXIT


EXISTING LOADING ZONE
TYLER STREET
AT - Truck - 8.3m Truck
AT - Truck - 8.3m Truck
TYLE

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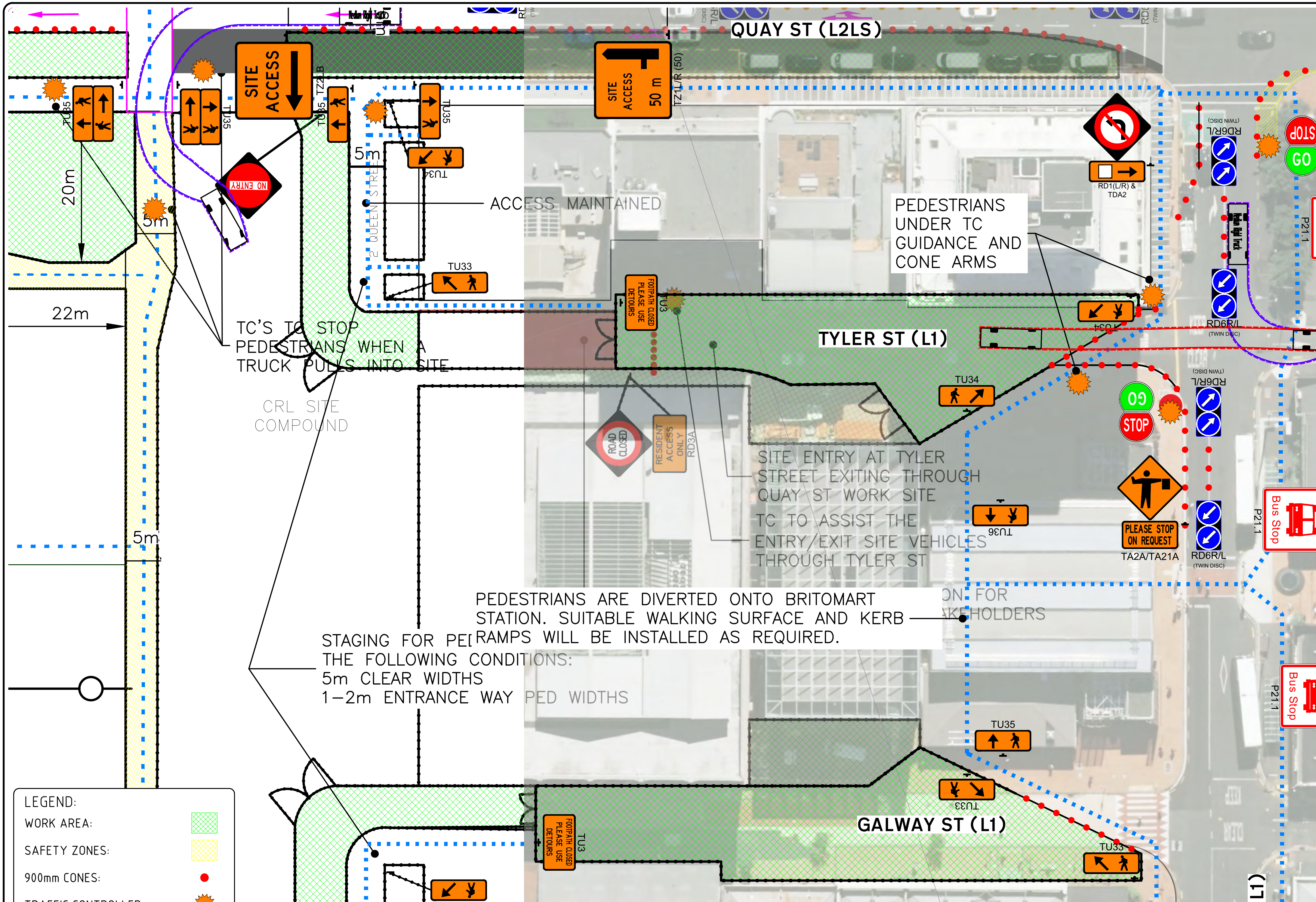
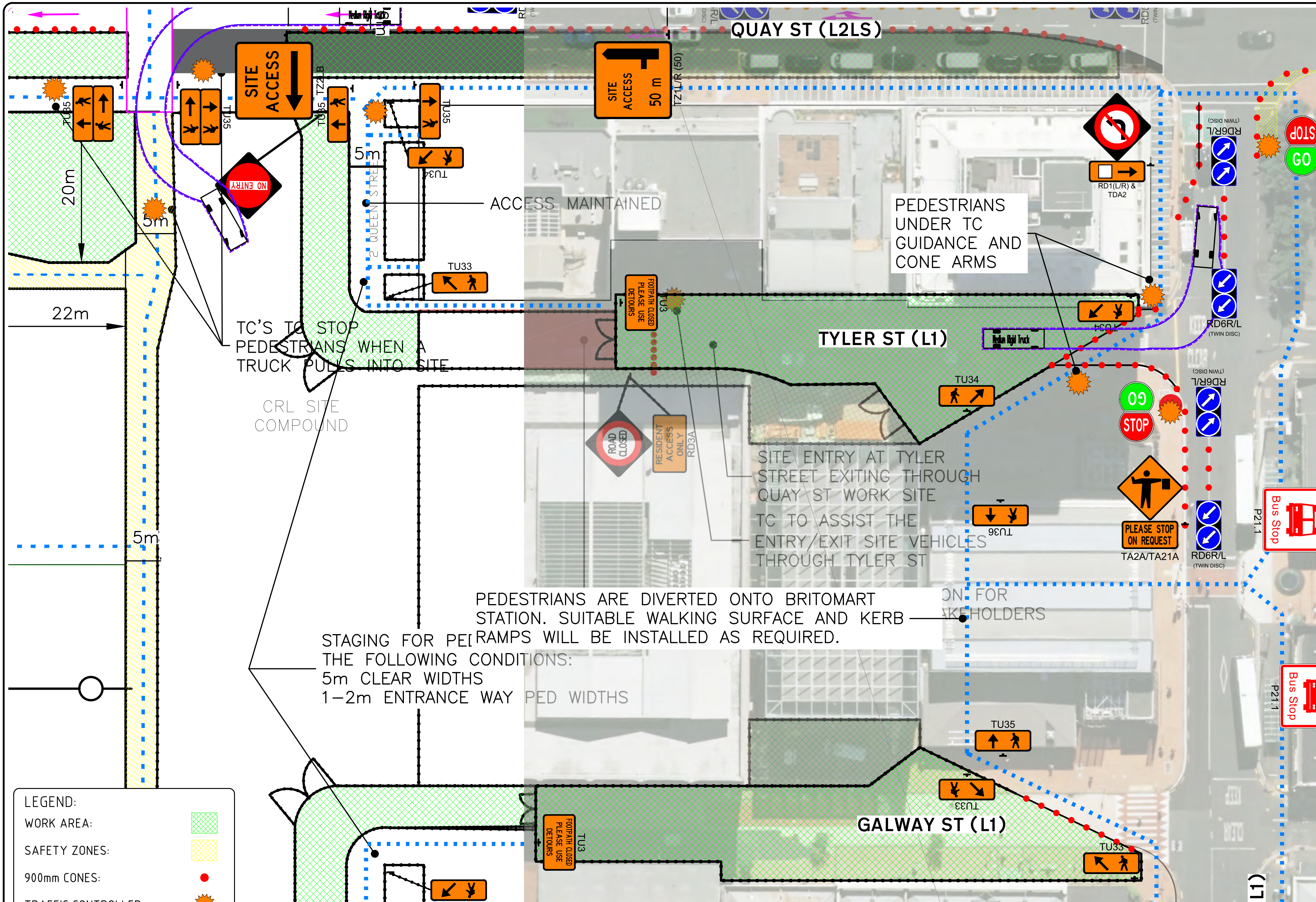
Tel 0800 CRL TALK (275 8255)

Attachment 3: C1 CRL Contract Temporary Traffic Plans



QUAY ST (L2LS)
TYLER ST (L1)
GALWAY ST (L1)
SITE ACCESS
SITE ACCESS 50 m
TZ1L/R (50)
TZ2LB
NO ENTRY
RD1(L/R) & TDA2
RD6R/L
(TWIN DISC)
STOP
GO
PLEASE STOP ON REQUEST
TA2A/TA21A
Bus Stop
P21.1
TU33
TU34
TU35
TU36
TU3
FOOTPATH CLOSED PLEASE USE DETOURS
ROAD CLOSED
RESIDENT ACCESS ONLY
RD3A
2 QUEEN STREET
5m
20m
22m
ACCESS MAINTAINED
PEDESTRIANS UNDER TC GUIDANCE AND CONE ARMS
TC'S TO STOP PEDESTRIANS WHEN A TRUCK PULLS INTO SITE
CRL SITE COMPOUND
SITE ENTRY AT TYLER STREET EXITING THROUGH QUAY ST WORK SITE
TC TO ASSIST THE ENTRY/EXIT SITE VEHICLES THROUGH TYLER ST
PEDESTRIANS ARE DIVERTED ONTO BRITOMART STATION. SUITABLE WALKING SURFACE AND KERB RAMPS WILL BE INSTALLED AS REQUIRED.
STAGING FOR PE[THE FOLLOWING CONDITIONS:
5m CLEAR WIDTHS
1–2m ENTRANCE WAY PED WIDTHS
LEGEND:
WORK AREA:
SAFETY ZONES:
900mm CONES:



QUAY ST (L2LS)
TYLER ST (L1)
GALWAY ST (L1)
SITE ACCESS
SITE ACCESS 50 m
TZ1L/R (50)
TZ2LB
RD1(L/R) & TDA2
RD6R/L
(TWIN DISC)
TA2A/TA21A
PLEASE STOP ON REQUEST
STOP
GO
Bus Stop
P21.1
NO ENTRY
ROAD CLOSED
RESIDENT ACCESS ONLY
RD3A
FOOTPATH CLOSED PLEASE USE DETOURS
TU3
TU33
TU34
TU35
TU36
Medium Rigid Truck
PEDESTRIANS UNDER TC GUIDANCE AND CONE ARMS
ACCESS MAINTAINED
2 QUEEN STREET
TC'S TO STOP PEDESTRIANS WHEN A TRUCK PULLS INTO SITE
CRL SITE COMPOUND
SITE ENTRY AT TYLER STREET EXITING THROUGH QUAY ST WORK SITE
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5m
20m
22m
LEGEND:
WORK AREA:
SAFETY ZONES:
900mm CONES:

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Attachment 4: Marshall Day Acoustics Response to Section 92 Request

MEMO

MARSHALL DAY Acoustics

Project:	CRL - Designation 2501 Alteration	**Document No.:**	Mm 001		
To:	Aurecon	**Date:**	20 July 2021		
Attention:	Helen McLean	**Cross Reference:**			
Delivery:	Email	**Project No.:**	20210287		
From:	James Whitlock	**No. Pages:**	2	**Attachments:**	No
Subject:	Response to section 92 request				

We have reviewed Auckland Council's section 92 request for this project, dated 8 July 2021.

They raised two matters in relation to our construction noise and vibration assessment and draft management plan. We have accepted both matters, in general, and have made changes to those documents as follows:

1. Effects on receivers

Please provide a subjective assessment of the construction noise effects at all receivers that are predicted to receive noise levels over 70dB LAeq. The assessment should be specific to the receivers that will be exposed to the noise, and should be based on the observed façade constructions. The assessment should include an assessment of the noise effects in any outdoor space, common space or entry lobby and inside the most exposed habitable rooms of each apartment, or office or retail space (or similar) in the case of commercial uses and should describe the noise effects in subjective terms.

Explanation: The Construction Noise Assessment (Appendix B) notes that concrete pumping and ventilation fans are high noise activities. Section 4.2 provides a table identifying predicted noise levels on neighbouring buildings. However, further assessment is required to understand the effects on the receivers as a result of these activities.

Our response:

We have updated our documents to address this – refer new Section 4.3 in the updated assessment report (revision 4), and Section 2.4 in the updated draft CNMP (revision 4).

However, we note two things about Council's request:

- The relevant noise level in the Business – City Centre zone is 75 dB, not 70 dB L_{Aeq}
- The ventilation fans are not high noise activity, as demonstrated in our assessment

2. Best Practicable Option (BPO) assessment

Please provide an assessment of the methods available to screen / reduce the noise from the concrete deliveries. The objective of the assessment is to demonstrate what options have been considered to screen, enclose or orient the concrete deliveries to reduce the noise levels as far as practicable to the closest receivers. The assessment should include an evaluation of options that have been considered and discounted, and why. A specific assessment addressing the practicability of partially enclosing the delivery area is also requested.

Explanation: The Construction Noise Management Plan (as part of Appendix D) notes that the purpose of the plan is to identify and provide for the implementation of the BPO to mangage (sic) *construction noise effects. However, an evaluation of the options considered has not been provided. In order to understand the approach to noise mitigation, further clarification is needed on the assessment.*

Our response:

We have updated our assessment report – refer new Section 4.4 in the updated revision 4.

Note that we interpreted the request as only relating to the assessment report, not the CNMP (which should only include BPO measures, not dismissed ones).

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Attachment 5: Updated CRL BTC Designation Alteration Construction Noise Assessment (dated 20 July 2020)

MARSHALL DAY Acoustics

CRL BTC DESIGNATION ALTERATION CONSTRUCTION NOISE ASSESSMENT

Rp 001 20210287 | 20 July 2021

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Victoria Street West
Auckland 1142 New Zealand
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www.marshallday.com

Project: **CRL – BTC DESIGNATION ALTERATION NOISE ASSESSMENT**

Prepared for: **Aurecon**
PO Box 9762
Newmarket
Auckland 1149

Attention: **Helen McLean**

Report No.: **Rp 001 20210287**

Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Draft	-	For client comment	20 April 2021	James Whitlock	Craig Fitzgerald
Approved	r01	Following client review and methodology update	10 June 2021	James Whitlock	Consenting team
Approved	r02	Updated programme and concrete details	15 June 2021	James Whitlock	Consenting team
Approved	r03	Updated wording	22 June 2021	James Whitlock	-
Approved	r04	S92 response	20 July 2021	James Whitlock	Council expert

TABLE OF CONTENTS

1.0 SUMMARY

This noise assessment supports the City Rail Link Limited (CRLL) Notice of Requirement (NOR) to alter CRL Designation 2501 at Britomart Station pursuant to section 181(1) of the Resource Management Act 1991 (RMA).

The purpose of the alteration is to provide for retention of the Station Plaza Accommodation (SPA) building, so that the building and surrounding Station Plaza area can be used as a construction support facility for works in the CRL tunnels located within the adjoining Designation 2500-1 to the west.

A full description of the activities associated with the NOR is contained in the Assessment of Effects on the Environment (AEE), Form 18 and Constructability Report (Appendix A to the AEE).

This report on construction noise forms part of a suite of technical reports that accompany and form part of the NOR. Its purpose is to assess the potential construction noise effects of the NOR works within and outside Designation 2501, and to recommend mitigation and management measures to address potential adverse effects.

We predict that all construction support activities will comply with relevant noise limits, except concrete pumping which may marginally exceed at 2 – 4 apartments in the 148 Quay St apartments overlooking the site. These potential exceedances will be managed by a Construction Noise Management Plan (CNMP).

None of the proposed activities generate high vibration levels, and we predict compliance with all relevant cosmetic building damage (including heritage limits for the AUP Historic Heritage Overlay) and vibration amenity standards. So, in this report we have only addressed construction noise.

2.0 PROPOSED CONSTRUCTION SUPPORT ACTIVITIES

2.1 Site

In summary, the construction support activities associated with the NOR ('the Works') are:

- Site office, worker accommodation and some storage of materials within the SPA building
- Establishing and operating ventilation equipment in the Station Plaza area (to provide ventilation for workers in the CRL tunnels to the west)
- Access for workers and deliveries of equipment and materials via the Glasshouse and former Chief Post Office (CPO) building
- Receiving and pumping concrete into the CRL tunnels (to construct the railway track bed) from the Station Plaza area in Tyler Street

The location of the Works associated with the NOR is shown in Figure 1 overleaf.

2.2 High noise activities

Of the Works listed in Section 2.1, only the concrete pumping and ventilation fans are high noise activities. All other activities are predicted to generally comply with the construction noise rules (refer Section 3.0).

We sourced noise level data for concrete pumping from British Standard BS 5228-1:2009. The data includes a concrete truck, pump and agitator.

Noise level data for the ventilation fans were provided by the mechanical engineer. The fans are Cogemacoustic axial fans with an airflow of 28 m^3/s, fitted with an acoustic attenuator (1.6m x 1.6m x 1.5m).

The engineer stated each fan would generate 52.4 dB L_{Aeq} at 10 metres. This is not a particularly high noise level, but we assessed it because the fans will operate 24/7.

The noise level data for these sources are shown in Table 2 (Section 4.0).

Figure 1: Station Plaza and Station Plaza Accommodation (SPA) building at Britomart Transport Centre

2.3 Works timeframe and hours of operation

We understand that, subject to the NoR being confirmed, the Works will follow on directly from the current CRLL C1[1] project works in the area and extend through to Q4 2023.

Quiet work inside the SPA, Glasshouse, and down on track level will occur 24/7, as it does currently for the CRLL C1 project. This work readily complies with the limits in Section 3.0, is generally inaudible for neighbours, and will continue as such.

The ventilation fans will also run 24/7, so must comply with the night-time limits in Table 1.

The concrete delivery will be in two stages, as follows:

- Stage 1 – 50/50 split between Aotea Station end of the tunnels (already provided for by CRL Designation 2500-1) and Britomart Station. Assuming a worst-case scenario, Aotea Station delivery (15 days) would be Q4 2021 and Britomart delivery (20 days) would be in Q1 2022
- Stage 2 – Britomart delivery only in Q2 2022. Delivery would occur over 20 days, with deliveries every second day i.e. 10 delivery days

On concrete delivery days, pumping will occur between 6.30am – 9pm Monday to Saturday, but in the event of on-site delays could extend to 10.30pm i.e. use the full extent of the AUP daytime hours (refer Table 1). We understand that a peak day would involve up to 40 concrete truck loads (3 – 4 trucks per hour).

Note that truck arrival and departure is quieter than the concrete pouring activity itself.

3.0 NOISE PERFORMANCE STANDARDS

The Britomart Designation 2501 construction noise and vibration conditions don't apply to the Works, so we have assessed noise according to the permitted activity levels in the Auckland Unitary Plan (AUP).

[1] CRLL Contract 1 (C1) project is the construction contract name for CRL works in the CPO and lower Queen Street

The Station Plaza and all surrounding sites are zoned *Business – City Centre* in the AUP. This means that the construction noise levels from AUP Table E25.6.28.2 apply (at 1 metre from the façade of any neighbouring building) – refer Table 1 below. The most relevant limits are shown in bold font.

Table 1: Construction noise limits (from AUP Table E25.6.28.2)

Construction of 15 consecutive calendar days or more (total duration of works)		
Time	**$L_{Aeq(30\ min)}$**	**L_{AFmax}**
Monday to Friday 6.30am – 10.30pm	**75 dB**	90 dB
Saturday 7am – 11pm	80 dB	90 dB
Sunday 9am – 7pm	65 dB	85 dB
All other times (night-time)	**60 dB**	75 dB

4.0 PREDICTED NOISE LEVELS

4.1 Noise source data

Table 2 shows the noise source data for concrete pumping and ventilation fans, predicted levels at various distances and the setback distances needed to comply with the limits.

Table 2: Data for high noise equipment

Equipment	Sound Power Level (dB L_{Aeq})	Noise Level (dB L_{Aeq})			Setback (m)	
		10 m	20 m	50 m	Daytime 75 dB L_{Aeq}	Night-time 60 dB L_{Aeq}
Concrete truck and pump discharging	103	68	62	53	14	N/A
Ventilation fan (with attenuator)	77	52	46	37	1	4

4.2 Noise levels at neighbouring receivers

Table 3 shows the predicted noise levels at 1 metre from the façades of neighbouring buildings. The potential exceedances are shaded grey.

We understand that a 2 metre site hoarding is proposed along the Tyler St footpath and we have included this in the model. It helps to mitigate noise levels to the ground floor of adjacent buildings, and for passing pedestrians. It won't mitigate noise to upper levels because they are high enough to see over the barrier.

Table 1: Predicted noise levels

Receiver	Predicted noise level (dB L_{Aeq})		Compliant?
	Concrete pumping	Vent fan	
2 Queen St	63	36	Yes
152 Quay St	73	36	Yes
148 Quay St	76	41	No
8 Customs St East	59	36	Yes
10 Customs St East	59	40	Yes
2 Commerce St	64	< 35	Yes
25 Galway St	64	< 35	Yes

Appendix B shows indicative noise contour maps for each activity. The maps show how the sound propagates from source to receivers, and the neighbouring buildings are coloured according to the highest noise level incident on their façade. The insert in each plan shows a 3D 'soundsplash' of how the sound projects up the building façades.

The results show that concrete pumping may marginally exceed the construction noise limit at one building (148 Quay Street) and that operation of the ventilation fans will readily comply 24/7.

We understand that 148 Quay Street is an apartment building, with carparking and retail on the ground and first floor. Exceedance is only predicted to the first and second floors at the western end of the building – refer the soundsplash insert. These receivers (perhaps one or two apartments) are directly adjacent the concrete pump, and look over the 2m site hoarding.

4.3 Potential effects on neighbours

The apartments at 148 Quay Street don't have balconies. The façade is concrete with windows, some of which are openable.

A façade of this type would typically provide 25 – 30 decibels sound reduction. This means that the predicted 76 dB at the façade would translate to 46 – 51 dB inside the apartment.

The responses of building occupants vary person to person. In our experience we have found that with effective prior engagement, levels of around 45 – 50 dB L_{Aeq} are typically acceptable, but concentration and communication may begin to be affected.

4.4 Mitigation options

Our recommend mitigation measures are summarised in Section 5.0 below.

The primary mitigation tool is the CNMP, which sets out in detail how to manage noise from the site. In terms of other mitigation on site, the consenting team investigated the following:

- Alternative concrete delivery methods, including pumping all concrete from Aotea Station, gravity feeding and rail-based delivery at Britomart (refer Constructability Report (RS140621))
- Alternative barriers at the concrete pumping site, including an enclosure, cantilevered barriers and larger barriers on the ground
- Reorienting the concrete pump to facilitate better acoustic shielding

These options were dismissed for reasons including space constraints, risks around compromising the concrete's physical properties and cost-benefit – noting that we predict only a 1 decibel exceedance at 148 Quay St.

We note that Section 3.5 of the CNMP addresses the site hoarding, and says it should be 'higher than 2 metres if practicable (within space constraints) to block line-of-sight'. A taller barrier will require a wider base support structure, and the practicability of this must be assessed once the site is established.

We consider that the selected mitigation measures are the best practicable option, given the modest non-compliance we have predicted.

5.0 RECOMMENDATIONS

We predict that proposed Works activity will comply with the AUP permitted noise standards except concrete pumping. This activity may marginally exceed the AUP permitted construction noise levels at a few apartments on Tyler Street that overlook the site.

Concrete pumping will only occur during the daytime, and for a few weeks at a time, so despite the potential exceedances we consider that the effects will be reasonable.

The neighbours adjacent to these activities are the same as for the CRLL C1 project. The scale of construction activity, and therefore the noise levels, from the proposed Works will generally be less than from CRL C1.

However, the neighbours will be accustomed to a certain level of consultation and construction management. We understand that during the C1 works, the neighbours identified communication and consultation as a key measure for managing construction effects and expectations. So, despite likely changes in construction personnel and activity types, and lesser noise effects, we recommend transitioning to the proposed Works with the following mitigation and management measures in place:

- A CNMP that sets out the mitigation and management framework to manage effects according to the best practicable option (BPO). A draft CNMP (dated 10 June 2021) accompanies the NoR (contained within the Construction Environmental Management Plan which is Appendix D to the AEE)
- Consultation with the south-facing occupants of 148 Quay Street, so they are aware of the proposed Works, their timeframes and potential noise levels. This will be particularly crucial if concrete pumping extends to 10.30pm on some nights because of on-site delays (refer Section 2.3)
- Written communication to other building occupants within 50 metres of the worksite, including:
  - Details of the overall Works, its timing and duration
  - Contact details and names of personnel whose job is to receive complaints and enquiries
  - Acknowledge that some activities (listed in this document) are predicted to generate high noise levels and may result in disturbance for short periods
- Physical mitigation as described in this report. Specifically:
  - A 2-metre site hoarding along Tyler Street
  - The attenuators recommended by the mechanical engineer for operation of the ventilation fans
- Install a fixed noise monitor at the same location on the first floor of 148 Quay Street as used to monitor the CRL C1 works. This is an ideal location for the key receivers identified in our assessment.

  It measures noise levels continuously and automatically uploads them to cloud software, and alerts contractor personnel of any exceedances

APPENDIX A GLOSSARY OF TERMINOLOGY

Noise	A sound that is unwanted by, or distracting to, a receiver.
dB	Decibel (dB) is the unit of sound level. Expressed as a logarithmic ratio of sound pressure (P) relative to a reference pressure (Pr), where dB = 20 x log(P/Pr).
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) to more closely approximate the frequency bias of the human ear. A-weighting is used in airborne acoustics.
$L_{Aeq\ (t)}$	The equivalent continuous (time-averaged) A-weighted sound level commonly referred to as the average level. The suffix (t) represents the period, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
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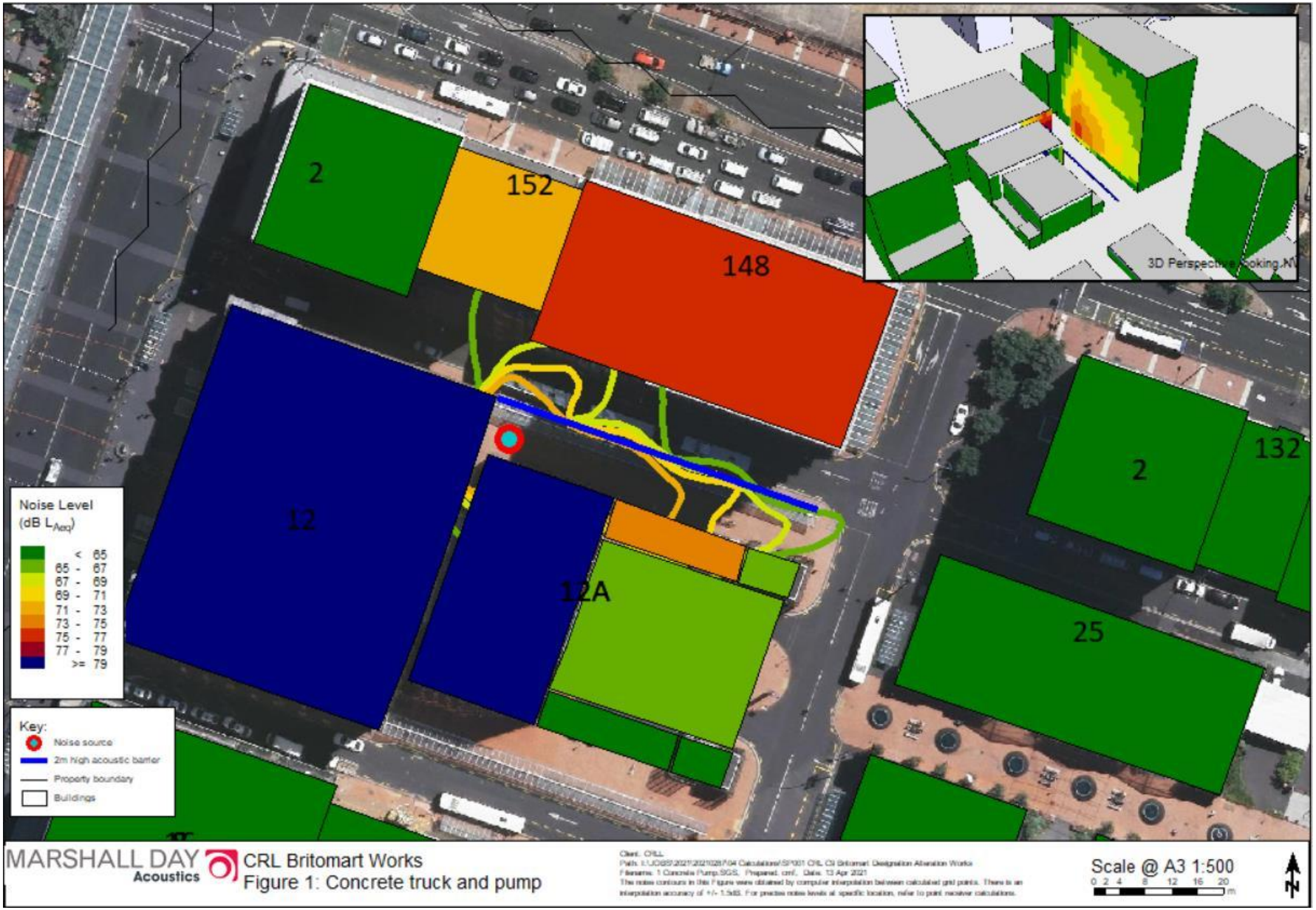
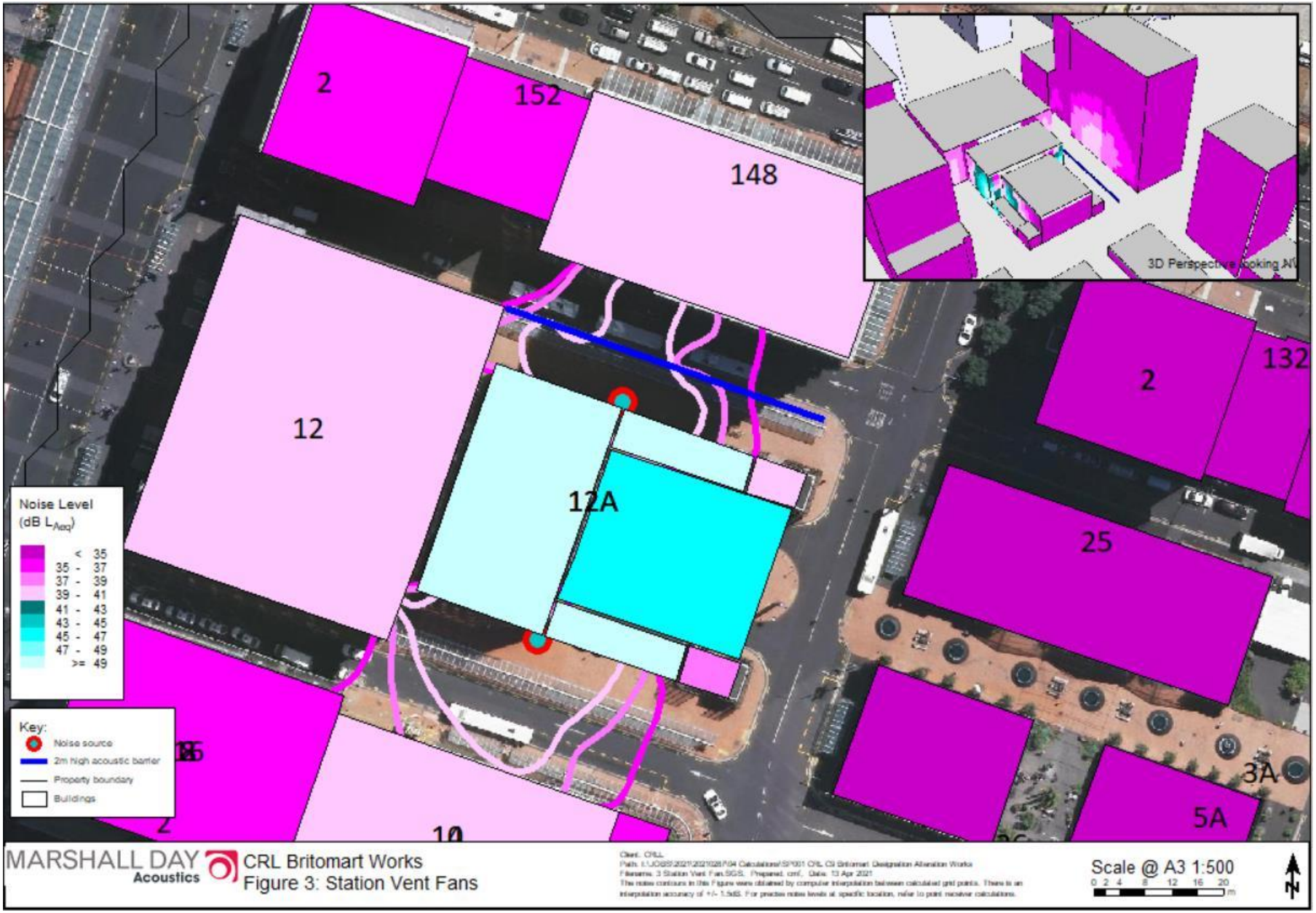
APPENDIX B NOISE CONTOURS





City Rail Link Limited, PO Box 9681, Newmarket, Auckland 1149
Tel 0800 CRL TALK (275 8255)

Attachment 6: Updated CRL BTC Designation Alteration Construction Noise Management Plan (dated 20 July 2020)

MARSHALL DAY Acoustics

CRL BTC DESIGNATION ALTERATION CONSTRUCTION NOISE MANAGEMENT PLAN (CNMP)

Rp 002 20210287 | 20 July 2021

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Project: **CRL BRITOMART TRANSPORT CENTRE**

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Report No.: **Rp 002 20210287**

Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Draft	-	For client review	20 Apr 2021	Craig Fitzgerald	James Whitlock
Draft	r01	Following client review and methodology update	10 June 2021	James Whitlock	Consenting team
Draft	r02	For consent	15 June 2021	James Whitlock	Consenting team
Draft	r03	Update wording	22 June 2021	James Whitlock	-
Draft	r04	S92 response	20 July 2021	James Whitlock	Council expert

Cover Photo: Creative Agency 514-806-1644

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HOW TO USE THIS DOCUMENT

This Construction Noise Management Plan (CNMP) will be read by people with different perspectives and levels of expertise. Constructors, CRLL, Auckland Council, experts and affected parties must all be able to extract the information they need from this document.

The primary function of this CNMP is to advise the constructor about the location of sensitive noise receivers, and what management and mitigation measures need to be used to reduce adverse effects. These measures have been chosen because they are the best practicable option (BPO) and/or because of agreements with certain parties.

If you are working for the constructor:

- Project noise standards are in Section 2.1
- High noise activities, and associated safe distances are in Section 2.2. Check to make sure all relevant activities have been included
- Best practice mitigation measures are in Section 3.0. Review construction methodology
- Engagement with affected receivers is Section 4.0. Ensure effective communication and be aware of community sensitivity

If you are involved in the regulatory process:

- Project noise standards are in Section 2.1
- Review Sections 2.2 for high noise activities, and safe distances
- Review Section 2.3 for affected receivers

If you are an affected party:

- Contact details of key personnel in Section 1.5. These are the people responsible for managing noise from the worksite
- Note Section 2.2 for high noise activities, and safe distances
- Note Section 2.3 for affected receivers. Check if your address is included
- Note Section 3.0 to understand the general mitigation that should be in place to manage noise

1.0 INTRODUCTION

1.1 Overview

This CNMP supports the City Rail Link Limited (CRLL) Notice of Requirement (NOR) to alter CRLL Designation 2501 at Britomart Station pursuant to section 181(1) of the Resource Management Act 1991 (RMA).

The purpose of the alteration is to provide for retention of the Station Plaza Accommodation (SPA) building, so that the building and surrounding Station Plaza area can be used as a construction support facility for works in the CRL tunnels located within the adjoining Designation 2500-1 to the west.

A full description of the activities associated with the NOR is contained in the Assessment of Effects on the Environment (AEE), Form 18 and Constructability Report (Appendix A to the AEE).

None of the proposed activities generate high vibration levels, so this management plan only addresses construction noise.

1.2 Project Description

In summary the activities associated with the NOR ('the Works') are:

- Site office, worker accommodation and some storage of materials within the SPA building
- Establishing and operating ventilation equipment in the Station Plaza area (to provide ventilation for workers in the CRL tunnels to the west)
- Access for workers and deliveries of equipment and materials via the Glasshouse and former Chief Post Office (CPO) building
- Receiving and pumping concrete into the CRL tunnels (to construct the railway track bed) from the Station Plaza area in Tyler Street

The location of the Works associated with the NOR is shown in Figure 1.

Figure 1: Station Plaza and Station Plaza Accommodation (SPA) building at Britomart Transport Centre

1.3 Purpose of this CNMP

This CNMP forms part of a suite of technical reports that accompany and form part of the NOR. Its purpose is to identify and provide for implementation of the Best Practicable Option (BPO) to avoid, remedy or mitigate adverse construction noise effects from the Works. This requirement aligns with CRL Designation 2500-1 condition 36 and BTC Designation 2501 condition 28, although different noise performance standards apply to these construction support works (refer Section 2.1).

This CNMP will be implemented throughout the Works period. It should be considered a 'living document' that will be expanded and updated as the Works progress. It is the primary tool for managing the Works' construction noise effects.

A glossary of terminology is included in 0.

1.4 Works timeframe and hours of operation

The Works period will follow on directly from the current CRL C1 works and extend through to Q4 2023.

Work inside the SPA, Glasshouse, and down on track level will occur 24/7 and is expected to comply with the noise limits. The ventilation fans will also run 24/7.

Concrete pumping will only occur during daytime hours (refer Table 2). There will be up to 40 truck deliveries per day.

The concrete delivery will be in two stages, as follows:

- Stage 1 – 50/50 split between Aotea Station end of the tunnels (already provided for by CRL Designation 2500-1) and Britomart Station. Assuming a worst-case scenario, Aotea Station delivery (15 days) would be Q4 2021 and Britomart delivery (20 days) would be in Q1 2022
- Stage 2 – Britomart delivery only in Q2 2022. Delivery will occur over 20 days, with deliveries every second day i.e. 10 delivery days

On concrete delivery days, pumping will occur between 6.30am – 9pm Monday to Saturday, but in the event of on-site delays could extend to 10.30pm i.e. use the full extent of the AUP daytime hours (refer Table 2).

1.5 Contact Details

Contact details for the relevant personnel are listed in Table 1. The Project Manager is responsible for implementing this CNMP.

Table 1: Contacts

Role	Name	Organisation	Phone	Email
Construction Manager	Kostas Kakis	CRLL	+64 21 374 006	Kostas.Kakis@linkalliance.co.nz
Communications Lead	Rachel Blundell	CRLL	+64 27 306 9156	Rachel.blundell@linkalliance.co.nz
Acoustic Specialist	James Whitlock	Marshall Day Acoustics	0212546651	james.whitlock@marshallday.co.nz

1.6 Document Review

This CNMP is a live document that will be reviewed at least annually, or:

- As a result of a material change to the Works
- To address unforeseen adverse noise effects arising from the Works

2.0 CONSTRUCTION NOISE

2.1 Performance Standards

The Station Plaza and all surrounding sites are zoned *Business – City Centre* in the AUP. This means that the construction noise levels from Auckland Unitary Plan (AUP) Table E25.6.28.2 apply (at 1 metre from the façade of any neighbouring building) – refer Table 2 below.

Table 2: Construction noise limits (from AUP Table E25.6.28.2)

Construction of 15 consecutive calendar days or more (total duration of works)		
Time	**$L_{Aeq(30\ min)}$**	**L_{AFmax}**
Monday to Friday 6.30am – 10.30pm	75 dB	90 dB
Saturday 7am – 11pm	80 dB	90 dB
Sunday 9am – 7pm	65 dB	85 dB
All other times (night-time)	60 dB	75 dB

2.2 High noise activities

Of the Works listed in Section 1.2, only the concrete pumping and ventilation fans are high noise activities. All other activities are expected to comply.

Noise level data for concrete pumping and ventilation fans are shown in Section 2.3.

2.3 Predicted Noise Levels

Table 2 shows the noise source data for concrete pumping and ventilation fans, predicted levels at various distances and the setback distances needed to comply with the limits.

Table 2: Data for high noise equipment

Equipment	Sound Power Level (dB L_{Aeq})	Noise Level (dB L_{Aeq})			Setback (m)	
		10 m	20 m	50 m	Daytime 75 dB L_{Aeq}	Night-time 60 dB L_{Aeq}
Concrete truck and pump discharging	103	68	62	53	14	N/A
Ventilation fan (with acoustic baffle)	77	52	46	37	1	4

Table 3 shows the predicted noise levels at 1 metre from the façades of neighbouring buildings. The potential exceedances are shaded grey. The table will be kept up to date by the Acoustic Specialist when new information becomes available, e.g. through noise monitoring (Section 5.0).

The predicted levels include shielding of ground floor receivers by a 2 metre site hoarding along the Tyler Street footpath.

Table 3: Predicted noise levels

Receiver	Predicted noise level (dB L_{Aeq})		Compliant?
	Concrete pump	Vent fan	
2 Queen St	63	36	Yes
152 Quay St	73	36	Yes
148 Quay St	76	41	No
8 Customs St East	59	36	Yes
10 Customs St East	59	40	Yes
2 Commerce St	64	< 35	Yes
25 Galway St	64	< 35	Yes

Appendix B shows noise contour maps for each activity. The neighbouring buildings are coloured according to the highest noise level incident on their façade. The insert in each plan shows a 3D 'soundsplash' of how the sound projects up the building façades.

The results show that concrete pumping may marginally exceed the construction noise limit at one building (148 Quay Street) and that operation of the ventilation fans will readily comply 24/7.

The exceedance at 148 Quay Street is limited to the lower two floors (not including ground floor) at the western end of the building – refer the sound splash insert (Appendix B). These receivers are directly adjacent the concrete pump, and look over the 2m site hoarding.

2.4 Potential noise effects

The 148 Quay Street is concrete with windows, some of which are openable.

A façade of this type would typically provide 25 – 30 decibels sound reduction, so the predicted 76 dB at the façade would translate to 46 – 51 dB inside the apartment.

The responses of building occupants vary person to person. Generally, with prior engagement (Section 4.0), levels of around 45 – 50 dB L_{Aeq} are typically acceptable, but concentration and communication may begin to be affected.

3.0 MITIGATION AND MANAGEMENT

Compliance is predicted for most receivers for most of the Works period, but best practice must still be used to ensure good site control and to ensure that other activities do not become noisy.

The following specific mitigation has been recommended:

- A 2 metre site hoarding along Tyler Street (refer Section 3.5)
- Attenuators for the ventilation fans (1.6m x 1.6m x 1.5m), as specified by the mechanical engineer

3.1 Training

All personnel will participate in an induction training session before commencement of the Works, with attention given to the following matters:

- Construction noise limits
- High noise activities
- Noise mitigation and management procedures
- Sensitive receivers and any agreements made through engagement

As the Works progress, any updates of noise matters will be addressed during regular site meetings and/or 'toolbox' training sessions.

3.2 Equipment Selection

When selecting construction equipment, the following are considered to be best practice:

- Use quieter construction methodologies where practicable and available
- Use electric motors rather than diesel engines where practicable
- Use equipment that is suitably sized for the task
- Maintain equipment well to minimise rattles, squeaks etc
- Fit engines with exhaust silencers and engine covers where practicable
- Avoid tonal reversing or warning alarms (beepers). Alternatives include broadband alarms (squawkers/quackers), flashing lights, proximity sensors, reversing cameras and spotters

3.3 Scheduling

Scheduling is an important management tool, particularly where a receiver expresses concern about construction works at a certain time of day. Where necessary, high noise activities will be programmed to minimise disturbance.

3.4 Best practice measures

Complaints can arise even if the noise levels comply with the Works limits. To minimise complaints, the following common mitigation measures are recommended:

- Avoid unnecessary noise. This means managing the site to ensure:
  - No shouting
  - No unnecessary use of horns
  - No loud site radios
  - No rough handling of material and equipment
  - No unnecessary steel on steel contact (e.g. during the loading of trucks)

  - No high engine revs. This includes choosing the right sized equipment and turning engines off when idle
- Minimise construction duration near sensitive receivers
- Locate any stationary equipment away from noise sensitive receivers and/or screen them behind site buildings and material stores
- Orient mobile machinery to maximise the distance between the engine exhaust and the nearest sensitive building façade
- Consultation should be complete prior to commencing high-noise activities (Section 2.2)
- Undertake noise monitoring (Section 5.0)

3.5 Noise Barriers

A temporary 2 metre site hoarding will be installed along the Tyler Street southern footpath – refer plans in Appendix B for its extent. The hoarding will be installed prior to works commencing and maintained throughout the Works.

If any other noisy activities are identified, barriers should be the first mitigation measure to be investigated. Effective noise barriers typically reduce the received noise level by 10 decibels.

Where practicable, the following guidelines will be used in designing and installing temporary noise barriers:

- The panels will have a minimum surface mass of 6.5 kg/m^2. Suitable panels include 12 mm plywood or the following proprietary 'noise curtains': proprietary
  - SealedAir 'WhisperFence 24dB' (www.sealedair.com)
  - Hushtec 'Premium Series Noise Barrier' (www.duraflex.co.nz)
  - Soundbuffer 'Performance Acoustic Curtain' (soundbuffer.co.nz)
  - Hoardfast 'Fast Wall Premium PVC partition panels' (www.ultimate-solutions.co.nz)
  - Safesmart 'Acoustic Curtain 6.5kg/m^{2}' (www.safesmartaccess.co.nz)
  - Alternatives will be approved by a suitably qualified and experienced acoustic specialist
- The panels will be a minimum height of 2 m, and higher if practicable (within space constraints) to block line-of-sight
- The panels will be abutted, battened or overlapped to provide a continuous screen without gaps at the bottom or between panels
- Barriers will be positioned as close as practicable to the high-noise activity to block line-of-sight between the activity and noise sensitive receivers. A site hoarding at the boundary may not be effective for all receivers. Add extra barriers close to high-noise activities to ensure effective mitigation for sensitive receivers on upper floors.

4.0 ENGAGEMENT

4.1 Communication

4.1.1 Before Works

Written communication (e.g. newsletter) will be provided to building occupants within 50 m of the site at least 1 week prior starting the Works. It will include:

- Details of the overall Works, its timing and duration
- Contact details and names of personnel whose job is to receive complaints and enquiries - refer Section 1.5 of this CNMP
- Acknowledge that some activities (listed in this document) are predicted to generate high noise levels and may result in disturbance for short periods

4.1.2 During Works

Once the Works have begun, ongoing communication is important. Regular communication during the Works will include:

- Public site signage that includes contact details
- Details of upcoming activities that may result in disturbance
- Any changes to scheduled timing and duration of activities

4.2 Consultation

Consultation will be undertaken with the south-facing occupants of 148 Quay Street. These are the neighbours who overlook the noisiest activities, and where noise may exceed the limits.

The purpose of consultation is to address concerns about noise on a case-by-case basis. The Project Manager will address any concerns and complaints in accordance with this Section. A copy of all correspondence will be made available to Council upon request.

Some receivers may not want ongoing consultation, in which case they will be included in the communication list (Section 4.1).

The following process will be implemented by the Project Manager (or nominated person):

- Review the construction methodology, mitigation measures and management strategies to ensure they represent the BPO. The BPO considers:
  - Practicability
  - Predicted noise benefits
  - The interests of affected parties
  - Implications for Project timing and duration
  - Cost
- Consultation with affected parties to understand their sensitivities, including times they are home. The objective is to establish a collaborative approach to managing adverse noise effects
- A project representative will be contactable at all times during work hours
- A record of consultation will be kept at the site office and be available to affected parties and Council if requested
- Implement any measures agreed with the affected party in good faith
- Monitor the activity to verify the extent of any adverse effects

4.3 Complaints Response

All construction noise complaints will be recorded in a complaints file that is available to affected parties and Council on request. For each complaint, an investigation will be undertaken as soon as practicable using the following steps:

- Acknowledge receipt of the concern or complaint and record:
  - The name, address and contact details of the complainant (unless they elect not to provide)
  - Time and date the complaint was received and who received it
  - Time and date of the activity that caused the complaint (estimated where not known)
  - The complainant's description of the activity and its resulting effects
  - Any relief sought by the complainant (e.g. scheduling of the activity)
- Identify the relevant activity and review the activity log to verify the complaint (or otherwise)
- If a complaint relates to building damage, inform the on-duty site manager as soon as practicable and stop the offending works pending an investigation.

  In most cases, stopping the activity will provide immediate relief. But in some cases, this may not be practicable for safety or other reasons, in which case the complainant will be kept updated regularly during the time it takes to stop the activity
- Review data from long-term monitors to identify the time in question and, if possible, confirm exceedance
- Review the predicted noise levels to determine if the activity was identified as high-noise. Consider attended monitoring to verify the underlying reference level assumptions
- Review the mitigation and management measures in place to ensure the BPO has been applied. Review the relief sought by the complainant. Adopt further mitigation and management measures as appropriate
- Report the findings and recommendations to the Project Manager, implement changes and update this CNMP as appropriate
- Report the outcomes of the investigation to the complainant, identifying where the relief sought by the complainant has been adopted or the reason(s) otherwise

5.0 NOISE MONITORING

There are two types of noise monitoring:

- Attended monitoring: This is where a suitably qualified acoustic engineer visits the site and measures levels in real time. This enables immediate assessment of the activities, whether they are being carried out in the correct location, using the correct equipment, and whether any BPO measures are being correctly applied (refer Section 3.0).
- Long-term monitoring: This is where a fixed noise monitor measures continuously for a long period of time. Exceedance alerts are automatically sent to the Project Manager (or nominated person) for them to act on.

A long-term noise monitor is attached to the exterior of 148 Quay Street – southern (Tyler Street) side of the building at first floor level. It was installed to monitor noise from CRL C1 activities, and will be retained for the duration of the Works. It measures noise levels continuously and automatically uploads them to cloud software, and alerts construction team personnel of any exceedances.

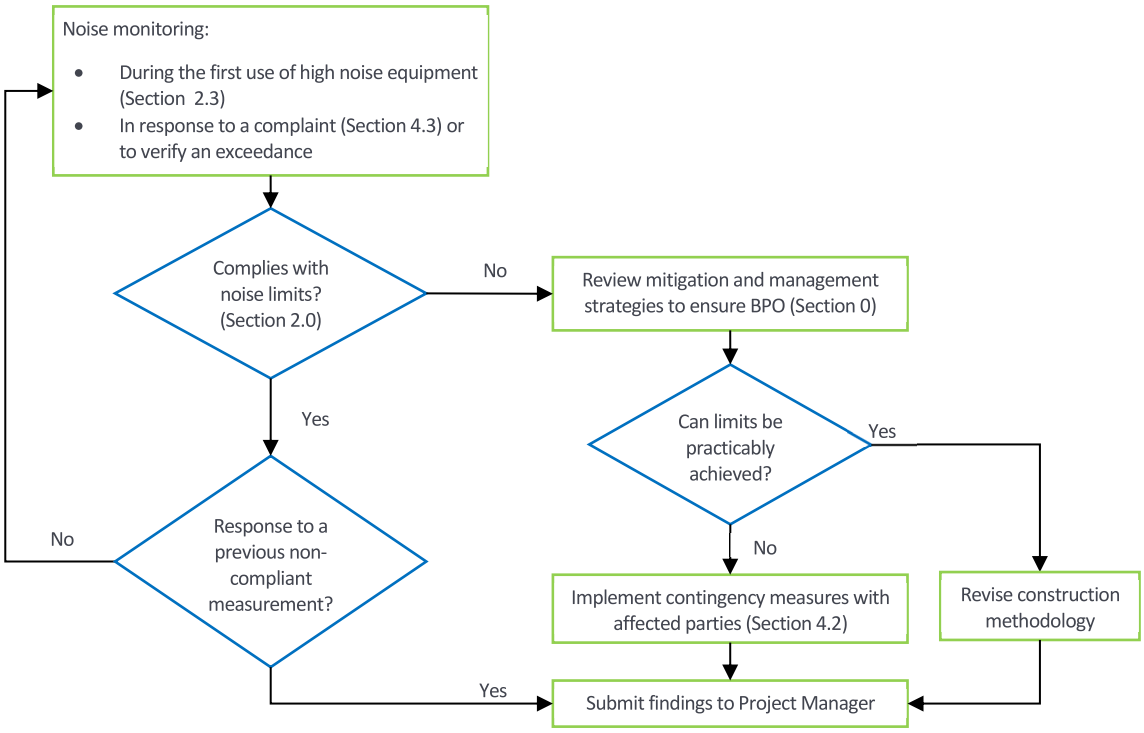
Attended monitoring will be used where the long-term noise monitor is unable to capture the noise source of interest.

Construction noise will be monitored:

- The first time a concrete delivery is undertaken on site
- In response to a reasonable noise complaint (Section 4.3)
- At 1m from the building façade facing the Station Plaza construction support area, or a proxy position adjusted for distance
- By a suitably qualified and experienced specialist (e.g. Member of the Acoustical Society of New Zealand) in accordance with the requirements of New Zealand Standard NZS 6803: 1999 *"Acoustics - Construction Noise"*
- For an appropriate duration, reported with the measured level (e.g. 65 dB $L_{Aeq\ (30min)}$)
- The results will be used to update Section 2.3 if appropriate

A noise monitoring flowchart is presented in Figure 2.

Figure 2: Noise Monitoring Flow Chart



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