BEFORE THE INDEPENDENT HEARINGS PANEL
OF AUCKLAND COUNCIL

I MUA NGĀ KAIKŌMIHANA MOTUHAKA
I TE TĀMAKI MAKAURAU ROHE

UNDER	the Resource Management Act 1991 ("**RMA**")
AND	
IN THE MATTER	of an application to Auckland Council by Watercare Services Limited ("**Watercare**") for a resource consent to construct, commission, operate and maintain a wastewater tunnel and associated activities in Herne Bay, Auckland ("**Project**")

STATEMENT OF EXPERT EVIDENCE OF RORY MICHAEL BISHOP ON BEHALF OF WATERCARE SERVICES

(CONSTRUCTION METHODOLOGY)

2 FEBRUARY 2024

Russell McVeagh

S H Pilkinton | K M Dibley
P +64 9 367 8000
F +64 9 367 8163
PO Box 8
DX CX10085
Auckland

1. EXECUTIVE SUMMARY

1.1 My full name is Rory Michael Bishop and I am a founding Partner and owner of Alta Consulting Limited. I am also currently on secondment to Watercare as the acting General Manager for Major Projects. This is a temporary secondment while Watercare recruit for a permanent replacement.

1.2 My evidence covers the construction methodology and mitigation measures included to minimise the potential effects that construction of the Project may have on neighbouring landowners and the environment. My evidence should be read in conjunction with the statements of the various subject matter specialists, who have specialist expertise in assessing and recommending mitigation for particular construction effects, including potential noise and vibration, traffic, arboricultural, groundwater and geotechnical effects.

1.3 The construction methodology proposed for the Project is typical for a construction project of this nature. In summary, the construction methodology proposed for the Project includes the following activities:

(a) Secant piling methodology to construct shafts for tunnel and pipeline construction, which range in diameter from 9m to 13m;

(b) Tunnel boring using a tunnel boring machine ("**TBM**") to construct a tunnel up to 2.1m internal diameter to provide a trunk sewer line;

(c) A drilling rig and casing methodology to construct the 3.5m diameter interception shaft;

(d) A combination of open cut and trenchless construction for interception pipelines and connections to Engineered Overflow Points ("**EOP**s") and service relocations; and

(e) Occupation of two open space areas (Salisbury Reserve and 94a - 94b Shelly Beach Road) for use as construction support areas ("**CSAs**").

1.4 In my opinion, the potential effects arising from construction activities associated with the Project can be appropriately managed through the conditions of the consent that have been proposed, including those requiring preparation and certification of various management plans. I am confident that the construction contractor responsible for the delivery of this Project can

manage the Project's construction in a manner that ensures any potential effects are minimised and managed appropriately.

2. INTRODUCTION

Qualifications and Experience

2.1 My full name is Rory Michael Bishop. I am a partner at Alta Consulting Limited and have held this position since March 2017.

2.2 I have the qualification of Bachelor of Engineering (with Honors) in Industrial Geology from the Camborne School of Mines (UK). I am a Chartered Engineer and a Member of the Institute of Materials Minerals and Mining and the Institution of Civil Engineers in the UK. I am also a Chartered Environmentalist and Member of the Society for the Environment (UK).

2.3 I have worked in mining and underground construction since 1994 and have worked on large scale civil infrastructure projects in New Zealand, Australia, the Pacific and the UK. I have worked in New Zealand since 2006 and have been involved in a number of complex underground and trenchless construction projects in sensitive locations, including Watercare's Hobson Bay Tunnel and Rosedale Ocean Outfall, Dunedin and Christchurch Ocean Outfalls and the Waterview Tunnel. I am a founding Partner of Alta Consulting Limited and previously held roles as the General Manager of Hawkins Infrastructure and Harker Underground, GM New Business at McConnell Dowell and Construction Manager at McConnell Dowell.

Involvement in the Herne Bay Tunnel Project

2.4 I have been engaged by Watercare to provide expert advice in relation to the construction methodology required for various elements of the Project. I have been involved in the Project as a peer reviewer and for the provision of cost estimates. The Project involves the construction and operation of a wastewater transfer pipeline, in Herne Bay, Auckland, which will connect to the Central Interceptor in Point Erin Park.

2.5 I am currently seconded to Watercare for 30 hours per week as the acting General Manager for Major Projects. This is a temporary secondment while Watercare recruit for a permanent replacement. This role has oversight of the detailed design and construction stages of Watercare's large infrastructure projects including the Herne Bay Tunnel Project.

Code of conduct

2.6 Although I have set out my academic qualifications and experience above, I am presenting this evidence while I am on secondment at Watercare, and I therefore acknowledge I am not strictly an independent expert witness. However, I confirm my evidence only addresses matters in respect of which I have expertise, and as such I confirm that I have read the Code of Conduct for Expert Witnesses contained in the latest Environment Court Practice Note 2023 and that I agree to comply with it.

2.7 I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that this evidence is within my area of expertise, except where I state that I am relying on the evidence of another person.

3. SCOPE OF EVIDENCE

3.1 This statement of evidence will:

(a) Provide an overview of the proposed construction works, construction hours and duration;

(b) Outline the proposed construction methodology, including construction duration;

(c) Assess the potential construction effects of the Project;

(d) Outline the proposed mitigation measures I have recommended to address any effects;

(e) Respond to the Council Officer's s42A Report;

(f) Respond to any relevant submissions on the Project; and

(g) Comment on the proposed conditions of consent as appended to Ms Drury's evidence ("**Proposed Conditions**").

4. WORKS OVERVIEW

4.1 The Western Isthmus Water Quality Improvement Programme ("**WIWQIP**") involves a range of projects. This includes this Project and the extension of the Central Interceptor from Grey Lynn to Point Erin Park. The extension of

the Central Interceptor has already been consented and is not covered in this evidence.

4.2 Watercare is proposing to build a resilient wastewater system and ensure reliability of service and reduced wastewater overflows to the Waitematā Harbour in Herne Bay and adjacent areas, by constructing a new wastewater trunk sewer for the Herne Bay catchment.

4.3 The new trunk sewer will connect into the Central Interceptor tunnel at Point Erin Park and flows will be conveyed to the wastewater treatment plant at Māngere.

4.4 The main construction activities for the Project include the following:

(a) Installation of approximately 1.5km of up to 2.1m internal diameter trunk sewer line, constructed using a TBM that is able to balance the external ground and water pressures to control ground movement. A method referred to as “closed face” tunnelling.

(b) Installation of approximately 200m of 600mm diameter trunk sewer within Marine Parade, constructed via open-cut trenching;

(c) Construction of eight primary tunnel shafts, ranging in diameter from 8m to 13m and four 3.5m diameter intercepting shafts for EOP connections;

(d) Installation of eight connections to existing EOPs, including three interception pipelines ranging in size from 300mm to 450mm;

(e) The installation and occupation of two CSAs at Salisbury Reserve and 94a – 94b Shelly Beach Road, referred to as CSA-1 and CSA-2 respectively; and

(f) Relocation and reinstatement of utilities as required at the shafts and along the pipeline routes.

4.5 The design and subsequent construction methodology has been developed to ensure that the hydraulic design requirements can be met whilst minimising the requirement for shafts and surface works over the length of the Project.

4.6 The design and methodology has been developed such that the majority of the alignment can be constructed within the road corridor and does not pass under private property.

4.7 The works to construct the trunk sewer line, interception pipelines and EOP connections will be contained within the road corridor, with a connection to the Central Interceptor tunnel to be made in Point Erin Park.

4.8 The two CSAs will be located within Auckland Council open space as noted above.

Construction programme

4.9 The overall construction programme will take no more than two years from establishment of the construction contractor on site.

4.10 The programme excludes work that is required in advance such as utility diversions that will be undertaken by third parties and establishment and disestablishment of the construction sites and CSAs.

4.11 It is expected that utilities will be diverted in advance of the main works by the respective utility provider. This allows the utility providers to plan their works in advance and reduces the risk of delays to the main works. Utilities to be diverted in advance include the relocation of power and fibre optic services and the undergrounding of overhead cables in some locations.

4.12 The start date of the construction programme is also subject to change to depending on the timing of connection works to Central Interceptor and other factors such as staging of the works.

Construction work hours

4.13 The construction works and associated programme has been developed on the basis that general construction works will occur between 7am and 6pm, Monday to Friday and 8am – 6pm on Saturdays. Site mobilisation and pack down works are proposed to occur 30 minutes before and after these windows.

4.14 No works are planned on Sundays or public holidays.

4.15 There will be occasions where it is necessary to undertake construction activities outside of the planned hours, as is similar for other Watercare project sites. Works outside of standard hours will be limited as far as is practicable. Works outside of the specified days or hours are only able to occur in limited circumstances which are outlined in Proposed Condition 16; this includes when work is specifically required to be planned to be carried out at certain times.

4.16 The works enabled by Proposed Condition 16 to occur outside of standard operational hours will be limited to:

(a) where, due to unforeseen circumstances, it is necessary to complete an activity that has commenced;

(b) where work is specifically required to be planned to be carried out at certain times (eg to tie into the existing network during periods of low flow or for commissioning sewer connections);

(c) for delivery of large equipment or special deliveries required outside of normal hours due to traffic management requirements;

(d) in cases of emergency;

(e) for the securing of the site or the removal of a traffic hazard;

(f) for any other reason specified in the Construction Management Plan or Construction Traffic Management Plan; and / or

(g) for site mobilisation and pack down, which may occur up to 30 minutes before and after the hours specified in paragraph 4.13 above.

Construction support areas

4.17 Two CSAs are required to support the construction activities. These sites will act as the central hubs for shaft construction works and will enable short term storage of materials and plant. The CSAs will also provide office accommodation for engineering staff and welfare facilities for workers. The CSAs will be occupied for the duration of the Project (ie up to two years), excluding any time required to set up and reinstate these reserves.

4.18 Ultimately the CSAs are required to ensure that the Project can be delivered efficiently. The CSAs also reduce the disruption and potential effects during construction of the Project as they reduce the space that would otherwise be required in the road reserve and the need to compulsorily acquire private property. Maintaining CSAs close to the main work sites allows staff to readily access the site and efficiently manage logistics for delivery and handling of materials.

Primary construction support area

4.19 Approximately 25% of the area defined as Salisbury Reserve (in Auckland Council's GIS) is proposed to be used as the central CSA for the Project (predominantly the disused bowling green area), providing immediate support to the shaft construction sites and surface work. This site is referred to as 'CSA1'. The site will contain the main site offices and worker welfare facilities, along with the storage for tools, aggregate, small materials, diesel and plant stabling. Staff parking will also be accommodated within the site to reduce demand for on-street parking. This site also allows staff and labour to easily access the working sites on foot reducing the need for parking at the various sites within the road reserve.

4.20 It is important to note that the primary CSA is not an active construction site. In my experience it does not generate effects that are typical of a construction site. It is primarily used for the co-location of technical and engineering staff and providing support facilities for the wellbeing and safety of workers to properly support the efficient running of the Project. The storage of materials is relatively benign and provides for the efficient supply of the work, similar to the use of say a driveway for storing materials in a private property development.

4.21 From a construction perspective, use of Salisbury Reserve as the primary CSA for the Project is critical for a number of reasons, including:

(a) It is very close in proximity to the Project works – in particular, the entrance to Salisbury Reserve is located 780m along the pipeline alignment and 80m from the Shaft Three – launch shaft location which will be used for the second longest tunnel drive on the alignment.

(b) Use of the Reserve will minimise the disruption and level of effects on the community during construction. For example, if the Reserve was not used, a greater footprint for each shaft site would be required in the road reserve, likely impacting on the need and duration of full and partial road closures. A greater footprint in the road corridor would also mean that there would be more situations where residents' access would need to be temporarily blocked.

(c) The other alternative to a greater footprint in the road corridor is to compulsorily acquire private property around shaft sites to support construction activities. This would obviously have very significant

impacts on the private properties involved, which should always be avoided, as is the situation here with the use of the two proposed CSAs, wherever possible.

4.22 As I will discuss in more detail below, in my opinion, there are no alternative areas to Salisbury Reserve that could be used as a primary CSA for the Project. If the Reserve is not able to be used as the Primary CSA, I consider it is a real likelihood that Watercare would need to acquire private property pursuant to the Public Works Act 1981 to support construction activities for the Project, as well as substantially increase the extent of road reserve utilised resulting in significant further restrictions and effects on the local community.

Refinements to the land use requirement for Salisbury Reserve

4.23 Since the application was lodged with Council in June 2023, work has been done to revise the extent of Salisbury Reserve required for the Project.

4.24 I am aware there are concerns held by some local residents regarding the potential effects and extent of use of the Reserve for the primary CSA. As I have explained above, it is my view that use of the Reserve is essential for delivery of the Project, and not using Salisbury Reserve (and, for example, occupying more space in the road reserve) would lead to greater disruption and adverse effects. Despite this, I have reviewed the land requirements for Salisbury Reserve carefully, taking into consideration the concerns raised by submitters (discussed below in my evidence further). I have also discussed potential refinements to the land requirements with Ms Wick to ensure that any potential adverse amenity impacts are reduced insofar as is practicable.

4.25 I have therefore developed a revised land use requirement for Salisbury Reserve which is included as **Attachment 1** to my evidence. I note the base layer to this plan is slightly out of date but is the only GIS image available for use. This has not only reduced the extent of area required, but has also removed the need to remove some vegetation within the Reserve. Ms Wick addresses the impacts these changes will have in terms of amenity.[1] I am confident that this revised plan will continue to provide the required space to support the Project's construction activities, while (based on Ms Wick's evidence) further reducing potential adverse effects as far as practicable.

1 Evidence of Ms Wick dated 2 February 2024.

Secondary construction support area

4.26 A secondary CSA is proposed at 94a – b Shelly Beach Road, referred to as 'CSA2'. The purpose of this site is to provide access for larger trucks and to allow for the delivery and stockpiling of materials, including aggregate and spoil. This site will also contain worker welfare facilities, a secondary site office and a small provision of staff parking. All temporary facilities within this site will be kept clear of the existing Healthy Waters pump station.

4.27 Each of these sites will be hardfilled to provide an all-weather surface and environmental controls such as erosion and sediment control and containment of materials put in place along with a security fence, gate controls and semi-permanent traffic management. Where possible, services will be connected to the grid for the duration of the construction works.

4.28 Individual construction sites will also be established around each shaft during construction, and will accommodate construction support equipment, such as generators, slurry separation tanks, and excavators. Some vegetation removal and tree trimming is required to enable these sites, as outlined in the evidence of Mr McBride.[2]

Enabling works

4.29 The first stage of the enabling works for the Project is to establish the CSAs. Site establishment works include removing the topsoil off each location and laying a geofabric and hardfill, fencing the perimeter, placing the temporary worker welfare facilities (including site offices and ablution blocks), setting out material storage areas and establishing temporary traffic management.

4.30 The other primary enabling construction activity is network utility service diversions, where these clash with construction sites (such as shafts or trench locations). The services to be diverted typically include 'wet' services, such as water supply and combined wastewater pipelines, and 'dry' services, such as power and telecommunications. Existing services will be surveyed and located by potholing prior to construction commencing to ascertain their location. Should services be within the construction site, they will be diverted by excavation (using hydro-vac trucks if required) and relaying in new trenches. This work may be carried out by third party utility providers such as Vector or Chorus in advance of the Project where possible.

2 Evidence of Mr McBride dated 2 February 2024.

Activity associated with each shaft site

4.31 A total of eight primary shafts are to be constructed, along with four interception shafts. The methodology to construct these shafts is outlined in section 5 of my evidence below. There are generally three phases to each shaft site, being the construction, use and reinstatement of each site.

4.32 The eight primary shafts are required where the tunnel changes direction. These may be launch shafts, to provide entry for the TBM or reception shafts to retrieve the TBM. Shafts will be constructed progressively in advance of the tunnelling works. Reception shafts will be completed prior to the TBM commencing any given section of tunnel.

4.33 Launch shafts will be up to 13m in diameter to accommodate the required plant and equipment for launching the TBM, and progressively advancing the pipeline by installing and jacking lengths of pipe which may be supplied in lengths of up to 3m.

4.34 Receiving shafts will be 9m in diameter and used only for the recovery of the TBM. These shafts are smaller since no space is required for the installation and jacking of pipes.

4.35 Shaft Eight at the western end of the pipeline will be 3.5m in diameter, as it is not required to receive the TBM and will be connected to Shaft seven via a section of trenched pipeline.

4.36 Four interception shafts along the length of the truck sewer tunnel are also required to connect the new pipeline to the existing EOPs. The interception shafts are proposed to have a diameter of 3.5m. The shaft will have subsequent permanent structures installed to direct flows into the tunnel.

4.37 At each shaft location a construction site will be established to support the shaft construction and tunnelling activities. The site footprint at these locations has been minimised to limit the impact on the local road network and property access. The balance of space required to support the construction activities will be provided at the CSAs. The primary CSA for this is CSA1 (Salisbury Reserve) which is equidistant between the start and finish points of the Project. The CSAs will be used for material storage and handling to maintain production efficiency during tunnelling operations and also for handling material for the open trench works to connect the EOPs.

4.38 The shaft construction sites will contain equipment (such as cranes, generators, excavators and dewatering pumps) and storage (such as muck skips and slurry separation tanks).

4.39 Protective fencing will be placed around the edge of each site, and dedicated traffic management will be utilised to ensure the safety of workers and pedestrians is maintained. As activities change within each site and the type of plant varied, the traffic management will be revised to ensure traffic disruptions are minimised. It is expected that the size of each site will be reduced once the shafts have been constructed. Construction equipment, fencing and traffic management will be reduced/removed from each site once construction activities have been completed.

4.40 The timing of shaft reinstatement will vary depending on the subsequent connection works required and any access required for commissioning. In all cases shafts will be reinstated as soon as practicable after completion of the works.

Pipeline and tunnelling works

4.41 The tunnel for the 2.1m diameter trunk sewer line between Shafts One and Seven will be constructed with a closed face TBM capable of providing ground support to the excavation face and balancing the ground water pressures.

4.42 The tunnel will be constructed using the peipjacking method with pipes inserted behind the TBM and pushed continuously from the launch shaft. This provides continuous ground support behind the tunnelling machine.

4.43 The TBM machine will be lowered into the completed launch shafts and recovered from the receiving shafts. The tunnelling methodology is detailed in Section 5 of my evidence below.

Access to properties

4.44 Where possible access to properties along the tunnel alignment will be maintained by keeping the shaft site areas as small as possible by utilising space in the CSAs (particularly in the Salisbury Reserve CSA1) for general construction support. The evidence of Mr Shields addresses the potential impacts to residential properties in detail and I do not repeat that here, except to note that where vehicle access is temporarily blocked (in a few limited circumstances) during construction work hours pedestrian access will be maintained to properties. Access requirements will be managed carefully with the owners and occupiers to understand needs and reduce disruption insofar

as is practicable and provision will be made to support residents with tasks such as the placement of bins for weekly refuse collection outside the site areas.

4.45 The site areas for tunnelling have been developed such that access can be maintained to properties, based on using the CSA1 Salisbury Reserve site. Open trench works to connect EOPs to the shafts will be carried out in front of properties and will require temporary access to be maintained, either by localised backfilling or using steel plates over excavations.

Road reinstatement

4.46 Roads will be reinstated in accordance with Auckland Transport's requirements for utility works.

4.47 Reinstatement will be planned to be completed as soon as practicable after completion of the works at any given shaft location. The timing of reinstatement will be dependent on the completion of permanent works and any access that is required for the commissioning of the works.

5. CONSTRUCTION METHODOLOGY

Shaft construction

5.1 There are three different types of temporary shafts sites: launch, reception and interception.

5.2 Launch and reception shafts will be constructed using secant piling using a piling rig and crane.

5.3 A concrete guide wall is constructed at the surface prior to establishing the piling equipment. The guide walls guide the secant piles to ensure verticality of the piles in the ground.

5.4 Steel casing and pile cages will be brought to the shaft construction sites and the piling plant mobilised. Piling will involve the construction of 'soft' unreinforced piles and 'hard' reinforced piles for the structural ground support and form a continuous structure to control ground water.

5.5 A concrete caping beam is constructed on the top of the piles to provide a continuous beam holding the piles open.

5.6 The piled shaft will then be excavated using excavators in the shaft, with a muck bin being lowered and removed by a mobile crane. At the bottom of the

shaft a concrete base will be poured and concrete structures to support the tunnelling operations (thrust walls, entry and exit eyes).

5.7 Four interception shafts will be constructed following the construction of the primary shafts and completion of the main TBM drives. A drill rig will be mobilised to the site to drill the smaller EOP connection shafts, with a 3.5m diameter temporary steel casing being used to provide ground support and water cut off while constructing connections to the main pipeline and the manhole. On completion of the manhole, the steel casing will be removed and the manhole structure backfilled.

Construction duration for each shaft site

5.8 The projected durations in working days to construct each primary shaft and interception shaft are detailed in Table 1 below. Note that tunnelling activities are detailed separately in Table 2 below.

Table 1: Construction duration in working days for shaft sites

Location	Site set up	Shaft Construction (Working Days)	Total site Occupation
Shaft One	15	82	247
Shaft Two	15	70	251
Shaft Three	15	97	340
Shaft Four	15	82	201
Shaft Five	15	112	233
Shaft Six	15	68	170
Shaft Seven	15	60	94
Shaft Eight	15	30	60 (includes occupation of Marine Parade for trench construction activities)
Interception Shaft SE01	15	60 (includes EOP connection)	50
Interception Shaft SE02	15	30 (includes EOP connection)	55

Interception Shaft SE03	15	50 (includes EOP connection)	47
Interception Shaft SE04	15	37 (includes EOP connection)	37

Tunnelling

5.9 The Herne Bay trunk sewer line will be constructed using a closed-face TBM, which will be lowered into the completed shafts. The TBM will bore along the tunnel alignment; with, pipe sections installed continuously behind the tunnelling machine by pipejacking method.

5.10 Pipes are lowered into the shaft and used to convey thrust loads to the tunnel face and also provide continuous ground support during installation.

5.11 The TBM will excavate the ground whilst balancing the external ground and ground water pressures. The excavation chamber of the TBM is closed to allow the face pressure to be controlled and spoil can be removed from this closed chamber using two methods. These are:

(a) Slurry conveyance from the excavation chamber to the shaft and surface via large diameter steel pipes and pumps.

(b) Using a screw conveyor (an auger in a closed steel tube) to remove spoil from the excavation chamber and transfer it to skips to be hoisted form the shaft using a crane.

5.12 The preferred TBM type will be dependent on the contractor's existing plant and equipment and preferred approach to the tunnelling method.

5.13 Both methods use a closed face tunnelling approach, which refers to the operation of the TBM where pressure is constantly applied in order to maintain face support and reduce ground settlement.

5.14 The site establishment and plant requirements for both methods varies but the overall site areas required are the same. A slurry TBM will require a separation plant to be provide at the launch sites to separate the excavated spoil from the slurry so that dry spoil can be disposed of by conventional trucking.

5.15 The advance rate for both tunnelling methods is likely to be the same as this is dictated by the rate of cutting at the tunnel face and the corresponding

speed at which the pipejack can be advanced. The programme durations are based on a common sequence of works and productivity.

5.16 The projected durations for the tunnel boring drives are outlined in Table 2 below:

Table 2: durations for the tunnel boring drives

Drive	Location	Duration
1	Shaft One to Shaft Two	113 days
2	Shaft Two to Shaft Three	35 days
3	Shaft Three to Shaft Four	100 days
4	Shaft Four to Shaft Five	31 days
5	Shaft Five to Shaft Six	52 days
6	Shaft Six to Shaft Seven	33 days

Surface works

5.17 Open trenching works are required to construct the connecting pipelines between the primary/interception shafts and the EOPs, and between Shafts Seven and Eight within Marine Parade.

5.18 Open trenching construction will use conventional excavation methods, with an excavator used to dig the trenches and trench shields or shoring slide-rail systems used to provide ground support. Spoil will be removed from site using trucks.

5.19 Trenching will be undertaken in a progressive manner, where short sections are opened up at a time, the new wastewater line is installed, and the trench backfilled. This will minimise the effects of the construction works on residents.

5.20 Trenchless construction methods will also be utilised to construct sections of the connecting pipework where feasible to reduce surface excavation works. These works will either utilise a micro-TBM, or Pilot Bore equipment which is similar to drilling with pipe installed behind the drill head.

5.21 The open trenching works will cause temporary disruption to access to some properties during construction, particularly along Marine Parade. As explained by Mr Shields, access to private property will be temporarily affected during construction work hours and will need to be managed as trenching

passes in front of each property.[3] Engagement will be undertaken with each property owner to understand their specific requirements and safe access will be provided through the work areas for residents and where necessary staff will be assigned to support access for residents.

5.22 Where possible, access will be reinstated after construction hours using steel road plates or temporary spot backfilling to create safe access. Parking will be provided outside the site if required.

5.23 In general sections of trench will be closed and temporarily reinstated (permanent sealing will be completed in a single pass at the end) as quickly as possible after the pipeline has been laid.

5.24 It is expected that works outside any given property will be completed within two weeks, depending on the depth of the pipe (and corresponding volume of excavation and backfill) at any given location.

5.25 In the limited circumstances where access cannot be provided for short periods of time, early notice will be provided to residents to ensure that the effects of disruption are minimised.

ASSESSMENT OF POTENTIAL EFFECTS

5.26 In my experience, projects of this nature can lead to potential construction effects such as:

(a) Noise – addressed in the evidence of Ms Yung;[4]

(b) Dust and sediment runoff;

(c) Impact on existing services;

(d) Impact on existing road networks, being delays or damage of existing surfacing – addressed in the evidence of Mr Shields;[5] and

(e) Groundwater drawdown and settlement – addressed in the evidence of Mr Thomas.[6]

5.27 The proposed construction methodology has been carefully developed to consider and address adverse effects and potential adverse effects. I have

3 Statement of evidence of Mr Shields dated 2 February 2024, at [7.70].
4 Evidence of Ms Yung dated 2 February 2024.
5 Evidence of Mr Shields dated 2 February 2024.
6 Evidence of Mr Thomas dated 2 February 2024.

reached this conclusion based on the evidence of the subject matter experts (for example, noise and vibration experts) working on the Project, and my prior experience. Mitigation measures proposed for the Project are described below.

6. MITIGATION MEASURES

6.1 All construction activities will be subject to a number of construction management plans as required by the Proposed Conditions. These will be prepared by a suitably qualified and experienced person and be submitted to Auckland Council for certification prior to works commencing. The management plans are proactive in that they will identify potential exceedances before they occur and set out the methods and frequency of monitoring and reporting. It will also set out the procedure for dealing with complaints, should they happen to arise.

6.2 The site-specific management plans produced in draft to date include:

(a) The draft construction traffic management plan ("**CTMP**") – addressed by Mr Shields;

(b) The draft erosion sediment control plan ("**ESCP**") – I address this in my evidence below;

(c) The draft groundwater and settlement monitoring and continency plan ("**GSMCP**") – addressed by Mr Thomas;

(d) The draft ground contamination site management plan ("**CSMP**"); and

(e) The draft construction noise and vibration management plan ("**CNVMP**") – addressed my Ms Yung.

6.3 Watercare and its subject matter experts have also prepared a set of Proposed Conditions to ensure that the potential effects on the environment from the construction activities will be appropriately mitigated. The Proposed Consent Conditions are attached to the evidence of Ms Drury, which I have reviewed and support from a construction perspective.

Erosion and Sediment Control Plan

6.4 Erosion and sediment controls are proposed at each construction location, including at the CSAs, the shaft construction sites and at surface excavation

locations. The draft ESCP was prepared by WSP to support the resource consent application and was prepared to meet the requirements of Auckland Council's 'GD05' guidelines (Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region). I have reviewed the draft ESCP and endorse it.

6.5 As set out in the draft ESCP, the following erosion and sediment controls are proposed for the construction works:

(a) **Hot Mix Bunds:** For clean and dirty water diversion around the shaft sites, hot mix bunds have been designed around the perimeter of the working boundaries on road surfaces.

(b) **Silt Socks** will be placed around berms and footpaths and will filter dirty water exiting the construction sites.

(c) **Stabilised Entrances:** Access points/entrances to CSAs will be stabilised to prevent sediment runoff and dust generation.

(d) **Silt Fences / Super Silt Fences** will be installed around the perimeter of the construction sites to treat sediment-laden sheet flow where dirty water cannot practicably be removed by other devices. Super silt fences have a higher capacity to treat sheet flows than silt fences, and will be used on construction sites with larger overland flow catchments.

(e) **Silt separation clarifying devices** will be used to treat any silt laden site water and collect sediment for offsite disposal.

6.6 Monitoring and maintenance of the erosion and sediment controls will be undertaken during construction. Weather forecasts will be monitored to assess the risks of poor weather and amend existing controls where required. All controls will be inspected and repaired (where required) after heavy rainfall. Finally, all serious incidents will be reported to Council within 24 hours.

Access to private properties

6.7 Temporary restrictions to private property access will be required during certain surface construction works, as detailed below. Where closure of the road or private accessway is required, entry/egress to the properties will be provided before and after construction hours using road plates or spot filling. Early engagement with affected residents will be undertaken, and where possible to schedule works to reduce disruption.

6.8 **Impact on Existing Services**

6.9 Network utility relocations are proposed where existing services conflict with surface excavations at the shaft construction and open cut excavation locations. Existing services have been surveyed to ensure they are accurately located, and relocation plans are being prepared. Service relocations are expected to be constructed with trenching, using a similar methodology to the construction of EOP connections as described above.

6.10 The potential for groundwater drawdown and settlement effects on existing services and proposed mitigation measures have been addressed in the evidence prepared by Mr Thomas.

7. RESPONSE TO COUNCIL OFFICER'S REPORT

7.1 I have reviewed the section 42A report insofar as it relates to construction related matters. I have no specific comments on the contents of the section 42A report, apart from to note that since notification the land use requirement plan for Salisbury Reserve has been revised. I have explained this in section 4 of my evidence above and note that Ms Yung and Ms Wick have both considered how this revision impacts on their respective effects assessments.[7]

8. RESPONSE TO SUBMISSIONS

8.1 I have read the submissions received on the Project that relate to construction methodology matters. A number of submissions raise questions and/or express concern about some aspects of the construction methodology for the Project. I respond to those concerns individually below.

Use of Salisbury Reserve for a CSA

8.2 A number of submitters oppose the use of Salisbury Reserve as a CSA for the Project. The late submission from the Salisbury Residents' Group consider that Watercare should instead consider occupying other locations in the vicinity of the Project. Some submitters also consider that the construction hours proposed should be limited for Salisbury Reserve with only very limited specified reasons for permitting extended hours.[8]

---

7 Evidence of Ms Yung dated 2 February 2024 at [7.14]; Evidence of Ms Wick dated 2 February 2024 at [5.12]-[5.25].

8 Submission from Herne Bay Residents Association Inc.

8.3 In response to these concerns, I consider that use of Salisbury Reserve is critical to the efficient delivery of the Project. The Project team did consider a range of sites to be used as CSAs to facilitate the construction of the Project and also initially looked for a single CSA that could provide all the functions required. However, given the need to limit shaft site size, and the need to store plant, materials and site facilities more generally for the Project, two CSAs are required for the Project.

8.4 It is noted that all of the launch and reception shaft sites proposed for the Project are smaller than would generally be required for the safe and efficient construction of similar microtunnelling operations. These areas have been minimised to limit the extent of road closures which will impact general road users as well as blocking access to residential property. However, to enable that reduction in the site size required at each shaft site and the associated potential impacts on road users and private properties, the CSAs must be in close proximity to the works.

8.5 In terms of using Salisbury Reserve as the primary CSA, the equidistant location of Salisbury Reserve is a good location for site offices and worker facilities as well as the storage and handling of plant and construction materials for both the tunnelling works and the connections to existing overflows of which there are five to be constructed east of Shaft Three and Five to be constructed west of Shaft Three.

8.6 By using the flat area of Salisbury Reserve (predominantly the disused bowling green area which is approximately 25% of the reserve) an additional 1,800m^2 of usable space can be provided to the Project that can be used to support the smaller working spaces required in the street. For example, at Shaft Three this would provide an equivalent working area of 2,915m^2 (1,800m^2 + 1,115m^2). Although the area is greater than the minimum 2,500m^2 splitting this working area (between Shaft Three and Salisbury Reserve) is not optimal for construction of microtunnelling.

8.7 Applying the same approach to the Shaft Five – launch shaft location gives an equivalent usable area of 2,530m^2, which is sub optimal but can be made to work by retaining the shaft site in the road for a period of time until the drive from Shaft Five to the next shaft is completed.

8.8 Applying the same approach to the Shaft Six – launch shaft location gives an equivalent usable area of 2,915m^2.

8.9 The use of a central CSA at Salisbury Reserve will facilitate the quick demobilisation of the site areas in the road once microtunnelling works are complete in any given section.

8.10 Shafts Two, Three and Four are located 160m and 80m respectively east of the entrance to Salisbury Reserve.

8.11 Shafts Four, Five and Six are located 460m, 500m and 700m respectively west of the entrance to Salisbury Reserve.

8.12 In summary, use of Salisbury Reserve as a CSA is necessary from a construction perspective because:

(a) The central location of Salisbury Reserve will reduce the amount of light vehicle access required to the shaft sites, since technical staff will be able to walk from site offices at Salisbury Reserve to these sites. It also provides a single central location for the provision of site facilities for workers for pre-start briefings and training as well and break areas.

(b) The large flat area of the disused bowling green can be utilised without significant earthworks to prepare the area. Some drainage will be required to the bowling green that floods due to the enclosed nature of the green. On completion the area can be easily reinstated.

(c) There is natural screening of properties to the southeast of the site due to the raised ground that surrounds the disused bowling green.

8.13 I note however that since the application was lodged with Council in June 2023, work has been done to revise the extent of Salisbury Reserve required for the Project. As I have set out above, the revised land use requirement is included as **Attachment 1** to my evidence. This has been developed with input from Ms Wick to reduce the extent of potential adverse amenity effects on residents surrounding the Reserve.

Alternative locations suggested

8.14 The late submission from the Salisbury Reserve Residents' Group seek that Watercare instead consider occupying other locations in the vicinity of the Project. These alternative locations include:

(a) Utilising streets and berms for site office, storage of pipes, machinery;

(b) The site adjacent to the second CSA at 105-125 Curran Street;

(c) Point Erin car park at the corner of SarsfieldStreet/Shelly Beach Road;

(d) The large green space west of the Point Erin car park - Point Erin Park;

(e) The area to the east of Westend Tennis Club; and

(f) Part of Victoria Park.

8.15 None of the above sites can be supported from a construction perspective for the reasons set out in the memorandum I prepared for Watercare dated 19 January 2024 and included with my evidence as **Attachment 2.**

No works on Saturday or Sundays

8.16 The submission from Gary Lane seeks that no works occur on a Saturday or Sunday.

8.17 No works on Sundays (or public holidays) are proposed. However, a restriction on Saturday works would extend the proposed construction timeframes by around 15 – 20%. Not only would this be less efficient and increase the length of the programme, it will mean the duration of potential impacts on the submitter will also be lengthened.

57 Sentinel Road

8.18 The submission from Rebecca Kimpton has queried how long the construction works will take for the Project.

8.19 The current draft programme anticipates a 24-month construction period, excluding preliminary activities such as site set-up and procurement. The works closest to 57 Sentinel Road are the construction of the interception pipeline within Sentinel Road and connection to EOP200. These works are expected to take approximately 30 working days to construct.

92 and 96 Sarsfield Street

8.20 The owners of 92 and 96 Sarsfield Street express concern regarding a need to ensure that adequate ablution facilities are provided for the workers during the construction period.

8.21 Adequate welfare facilities will be set-up at multiple locations throughout the project to facilitate the work team's needs, including at the CSAs and individual shaft construction sites. This will include areas for lunch, bathroom facilities and training spaces for pre-start meetings. Workers will not need to use residents' facilities.

Parking at CSAs

8.22 Some submitters consider that there should be a requirement for non-operational vehicles to park at one of the CSAs.

8.23 Where practical staff and workers will park at the CSAs, however, light vehicle access and parking will be required at the site locations to allow staff to bring tools and equipment to the site such as survey equipment, small hand tools and power tools as well as light materials.

8.24 Providing the CSA at Salisbury Reserve, which is equidistant from most of the work areas, allows for greater access to the sites on foot from the site offices and this will mitigate the need to park some vehicles at each site location.

9. CONSENT CONDITIONS

9.1 I have reviewed the Proposed Conditions. I fully support the conditions as proposed and attached to the evidence of Ms Drury.

Rory Michael Bishop
2 February 2024

Attachment 1 – Updated indicative land requirement plan for Salisbury Reserve


SITE ENTRANCE & EXIT
TEMPORARY ACCESS ROAD
BOUNDARY SITE FENCING - EXISTING PLANTING RETAINED
BOUNDARY SITE FENCING - EXISTING PLANTING RETAINED
PEDESTRIAN THROUGH WALKWAY RETAINED
TURNING CIRCLE
OFFICE & DOME
SKIPS
EXISTING WALL RETAINED
PARKING SPACES
TOOL CONTAINERS & MAINTENANCE AREA
N

Attachment 2 – Memo regarding construction support area review for the Herne Bay Trunk Sewer Project

Memorandum

To	Catherine Hemi – Watercare Services Ltd
From	Rory Bishop
Date	19 January 2024
Reference	J000522
Subject	Herne Bay Trunk Sewer – Construction Support Area review

1. Alta has been engaged by Watercare to provide a review of the possible Construction Support Areas ("CSAs") required for the construction of the Herne Bay Trunk Sewer Project.

2. This work has been carried out based on information provided by Watercare for the consent application along with additional supporting information and a visit to the site and proposed CSAs.

Introduction

3. Several submitters to Watercare's resource consent application for the proposed Herne Bay trunk sewer line in Herne Bay ("**Herne Bay Tunnel**" or "**Project**") oppose the use of Salisbury Reserve as a construction support area ("**CSA**") for the Project.

4. A group of submitters (the Salisbury Reserve Residents' Group) seek that Watercare instead consider occupying other locations in the vicinity of the Project. These alternative locations include:

   (a) Utilising streets and berms for site office, storage of pipes, machinery;

   (b) The site adjacent the second CSA at 105-125 Curran Street;

   (c) Point Erin car park at the corner of Sarsfield/Shelly Beach Road;

   (d) The large green space West of the Point Erin car park - Point Erin Park;

   (e) The area to the East of Westend Tennis Club; and

   (f) Part of Victoria Park.

5. Watercare also considered a location within Cox's Bay, and Onepoto Domain in the North Shore as an alternative location to Salisbury Reserve for the CSA.

6. This memo sets out what is required in terms of a CSA for the Project and advises why the alternative sites considered by Watercare and put forward by the Salisbury Reserve Residents' Group are either not supported or not appropriate from a construction perspective.

Construction support areas

7. The Project consists of approximately 1.5km of tunnelled pipeline and approximately 170m of open cut pipeline in Marin Parade, as well as interconnecting pipework and structures to connect existing overflows. The tunnelled pipeline will have a 2.1m internal diameter and will be constructed using a tunnel boring machine ("**TBM**") working within the road corridor. Watercare has sought resource consent to construct the pipeline within the road corridor in Herne Bay to avoid the need for construction activities within, and ultimately a pipeline to be located beneath, private property.

8. To accommodate the required changes in direction of the TBM along the proposed alignment of the pipeline following the road corridor, eight shafts will be constructed within the road corridor. A number of other interception shafts are also required to facilitate the construction of connections to existing overflow points in the Herne Bay catchment. The construction of the trunk sewer pipeline will be by microtunnelling using the pipejacking method and this requires shafts for the launch and reception of the tunnelling plant at any change in direction.

9. The shaft sites will facilitate the construction of the shaft itself, the launch and reception of the tunnelling machine, and the removal of excavated spoil and installation of the new pipes. The microtunnelling launch sites will also need to handle ancillary tunnelling equipment such as rails, internal temporary pipework, electrical equipment and facilities for ventilation and safe access. The launch and reception shafts require a combination of full and partial road closures to provide sufficient safe working space and access. Launch shaft sites require more working space and storage.

10. The shafts, their locations and approximate maximum usable site areas along the alignment are:

    (a) Shaft 1 – Launch Shaft – Corner of Sarsfield Street and Curran Street – 700m^2

    (b) Shaft 2 – Reception Shaft – Corner of Sarsfield Street and Wallace Street – 960m^2

    (c) Shaft 3 – Launch Shaft – Corner of Wallace Street and Argyle Street – 1,115m^2

    (d) Shaft 4 – Reception Shaft – Corner of Argyle Street and Herne Bay Road – 730m^2

    (e) Shaft 5 – Launch Shaft – Corner of Herne Bay Road and Upton Street – 745m^2

    (f) Shaft 6 – Launch Shaft – Corner of Upton Street and Marine Parade – 1,115m^2

    (g) Shaft 7 Reception Shaft – Marine Parade – 622m^2

11. Based on previous similar projects, the construction of similar sized tunnels requires site areas of between 2,500m^2 and 3,000m^2 for a launch site and between 800m^2 and 1,000m^2 for a reception site. A similar recent example being the St Mary's Bay Outfall Project which utilised a launch shaft construction area of approximately 4,000m^2 and a reception shaft area of approximately 2,000m^2 to support the construction of a 1.8m diameter tunnel.

12. Therefore, all of the launch and reception shaft sites proposed for the Project are smaller than would generally be required for the safe and efficient construction of similar microtunnelling operations. These areas have been minimised to limit the extent of road closures which will impact general road users as well as blocking access to residential property. However, to reduce the site size required at each shaft site and the associated potential impacts on road users and private properties, CSAs are therefore also required in close proximity to the works.

13. In addition to tunnelling operations excavation of interconnecting surface pipelines to intermediate shafts will be constructed concurrently with some tunnelling works and these operations will require areas for the storage and handling of plant and materials and the provision of site facilities for workers and technical staff.

14. Given the need to limit shaft site size, and the need to store plant, materials and site facilities more generally for the Project, two CSAs are required for the Project. These will be located at Salisbury Reserve and a site off Shelly Beach Road. The two CSAs will act as hubs for the satellite construction sites at each shaft and will enable short term storage of materials and plant. These CSAs enable a

reduction of materials and equipment stored at each shaft location and will reduce the size of vehicles and number of truck movements on the local road network. As set out above, if materials and plant were stored at each satellite construction site, Watercare would need to occupy a much greater footprint in the road corridor at each shaft site, which would cause more significantly impacts and associated disruption to the local community.

15. Ultimately the CSAs are required to ensure that the Project can be delivered efficiently. The primary CSA is proposed to be located at Salisbury Reserve which is close to the Project works. Maintaining CSAs close to the main work sites allows staff to readily access the site and efficiently manage logistics for delivery and handling of materials.

Use of Salisbury Reserve as a CSA

16. The Project team considered a range of sites to be used as CSAs to facilitate the construction of the Project (these are set out below) and initially looked for a single CSA that could provide all the functions required.

17. The Project team considered the following criteria when selecting a CSA:

    (a) Distance from the work – a reasonable distance from all the individual worksites in the Project from Bella Vista Road to Point Erin.

    (b) Workable area – gives a minimum area suitable for use as a CSA (2,000-2,500m² based on similar projects in an urban setting).

    (c) Transport links – access to roads for logistics of deliveries to maintain supply to worksites while maintaining traffic management requirements.

    (d) Traffic impacts – impacts to traffic in the overall Project area as well as local to the CSA considering truck travel routes and number of movements. Also includes minimising disruption due to satellite construction area size, diversions, and road closures.

    (e) Impacts on neighbours – Noise, dust, vibration, loss of amenity impacts to those immediately surrounding the CSA. Particularly for the road corridor, maintenance of vehicle access was considered.

    (f) Reinstatement – works needed to return site to a condition and amenity at least as good as prior to use as CSA.

    (g) Amenity – disruption to site users during construction and post construction benefits from the Project.

    (h) Availability – after discussions with owners, where held, availability of the CSA.

18. Commenting on the above criteria insofar as it relates to construction related matters, the entrance to Salisbury Reserve is located 780m along the pipeline alignment and 80m from the Shaft 3 – launch shaft location. This is optimal in terms of proximity to the Project works.

19. The equidistant location of Salisbury Reserve is a good location for site offices and worker facilities, as well as the storage and handling of plant and construction materials for both the tunnelling works and the connections to existing overflows of which there are five to be constructed east of shaft 3 and five to be constructed west of shaft 3.

20. By using the flat area of Salisbury Reserve (predominantly the disused bowling green area, approximately 40% of the Reserve) an additional 1,500m^2 of usable space can be provided to the Project that can be used to support the smaller working shaft site spaces currently required in the road corridor. For example, at shaft 3 this would provide an equivalent working area of 2,615m^2 (1,500m^2 + 1,115m^2). While splitting this working area is not optimal for construction, it does mean the area available is greater than the minimum 2,500m^2 and comes with the associated reduction in impacts on road users and private properties discussed above.

21. Applying the same approach to the shaft 5 – launch shaft location gives an equivalent usable area of 2,230m^2, which again is sub optimal from a construction perspective but can be made to work by retaining the shaft 3 site in the road for a period of time until the drive from shaft 5 to shaft 6 is completed. Applying the same approach to the shaft 6 – launch shaft location gives an equivalent usable area of 2,615m2.

22. The use of a central CSA at Salisbury reserve will facilitate the quick demobilisation of the site areas in the road once microtunnelling works are complete in any given section. This has significant benefits in terms of reducing the disruption caused to traffic movements through road closures.

23. Shafts 2, 3 and 4 are located 160m and 80m respectively east of the entrance to Salisbury Reserve and Shafts 4, 5 and 6 are located 460, 500m and 700m respectively west of the entrance to Salisbury Reserve.

24. Ultimately the use of Salisbury Reserve as the primary CSA for the Project was determined necessary because:

    (a) The central location of Salisbury Reserve means that the amount of light vehicle access required to the shaft sites will be reduced since technical staff will be able to walk from site offices at Salisbury Reserve to these sites. It also provides a single central location for the provision of site facilities for workers for pre-start briefings and training as well as break areas.

    (b) The large flat area of the disused bowling green can be utilised without significant earthworks to prepare the area. Some drainage will be required to the bowling green that floods due to the enclosed nature of the green. On completion the area can be easily reinstated.

    (c) There is natural screening of properties to the southeast of the site due to the raised ground that surrounds the disused bowling green.

    (d) Alternate options were considered unfeasible for the reasons set out in this memorandum.

25. The above, combined with the assessment of Salisbury Reserve against the other criteria, meant that Salisbury Reserve was determined to be necessary as the Primary CSA.

Alternative locations

26. The below section considers the potential alternative locations for the CSA.

    Utilising streets and berms for site office, storage of pipes, machinery

27. It has been suggested that street and berm space could be utilised as an alternative to using the disused bowling green area at Salisbury Reserve. This is not recommended from a construction

perspective and was discounted due to the large amount of space required in the road corridor, the number of driveways likely to be blocked, the number of on-street parking spaces that would need to be removed, the need to move the CSA several times (i.e. from shaft to shaft), and the overall level of significant adverse environmental effects and associated disruption this would cause to the entire Herne Bay community.

28. Using the shaft 3 – launch shaft site as an example, an equivalent work area of 2,500m^2 would require the complete closure of Argyle Street between Wallace Street and Cremorne Street and would result in restricted access for 15 properties on Argyle Street. It would also result in the need to close both accesses to Salisbury Reserve from Argyle Street.

29. Using the same approach at the shaft 5 – launch shaft site, to provide 2,220m^2 of working space would require the complete closure of Upton Street between Herne Bay Road and Galatea Terrace as well as additional closed road space on Herne Bay Road. This would impact access to approximately 10 properties.

30. Using the same approach at the shaft 6 – launch shaft site, to provide just 2,000m^2 of working space (ie 500m^2 less than optimal) would require the complete closure of the western section of Upton Street between Marine Parade and Galatea Terrace. This would impact access to approximately seven properties.

31. Whilst areas can be provided for in the street and berm between shafts 5 and 6 the disruption on Upton Street will be more extensive than currently planned and both east and west sections of Upton Street will need to be closed at the same time to allow for the concurrent construction of the shafts in preparation for microtunnelling.

32. Use of Salisbury Reserve as a CSA does not have the same impact on residents' access to their properties, nor the same impact on Upton Street, Argyle Street and Herne Bay Road. In addition, using multiple large sites in the street and berms as suggested as an alternative would require additional facilities to be provided at each site and will likely extend the duration that any shaft site is required, since the site will need to be re-established at the next location prior to moving the construction operations. This will ultimately extend the construction duration period for the Project, resulting in in considerable additional impacts on residents and road users, as well as cost to Watercare (and ultimately ratepayers).

The site adjacent the second CSA at 105-125 Curran Street

33. The CSA at 105 – 125 Curran Street is suitably sized to suit the Project requirements but is located approximately 1.8km from the shaft 2 and 3 sites and 2.3km from the shaft 4 and 5 sites. Travel distances from the CSA at 105 – 125 Curran Street to the furthest site location at Marine Parade are up to 2.7km.

34. The long travel distances from the CSA at 105 – 125 Curran Street means that staff and labour will likely need to bring light construction vehicles to the shaft sites and will also increase the need for additional facilities at each shaft site location, reducing the usable working space.

35. The use of this site is also likely to be dependent on the needs of other users and complete control of the site by Watercare's contractor may not be possible, compromising productivity.

36. If this site was available, it would not eliminate the need for the use of the site at Salisbury Reserve. This site would be able to be utilised for additional storage of materials such as pipes, reducing the need to pay for additional storage at the manufacturer's facility prior to use. It would also provide

space for storing large items such as the prefabricated fibreglass manhole inserts which will be too large to store at Salisbury Reserve or in the site areas in the road reserve.

Point Erin car park at the corner of Sarsfield/Shelly Beach Road

37. The use of the Point Erin car park has been suggested as a possible CSA however, this has similar issues to the CSA at 105 – 125 Curran Street in that it is located at one end of the Project and will result in more complex travel and logistics between the sites. The location also means that staff and labour will likely need to bring light vehicles to the shaft sites.

38. To obtain an area of 1,400m^2 would require the use of the entire carpark and would mean that there is no parking available for the park or the Point Erin Pool.

39. The complete occupation of the carpark will also require use of the access road and would require shared access to be provided for pedestrian access to the park and pools.

40. There are also planned construction works in this area associated with the construction of the Central Interceptor and there will not be sufficient space to use this site if the projects are constructed concurrently.

The large green space West of the Point Erin car park - Point Erin Park

41. The area of Point Erin Park to the west of the carpark has also been suggested as a CSA and whilst this area is approximately 4,500m^2 it is not flat and has a fall of up to 8m over the east to west axis of the site. To make this area useable would require additional earthworks to create a flat area. This is earthwork that is not required at the Salisbury Reserve site.

42. This site is also appears to be used for additional parking at Point Erin during weekends and other busy periods (although it is not clear that this is a formally accepted practice).

43. In addition to requiring additional earthworks the proposed CSA west of the Point Erin carpark has similar constraints to those associated with the use of the carpark itself.

The area to the East of Westend Tennis Club

44. An area to the east of the Westend Tennis Club has also been identified as a possible CSA. Access to this site is via Westend Road and the Westend Tennis Club access road and carpark. The usable area at the Westend Tennis Club is approximately 900m^2 with limited space for manoeuvring and turning vehicles. This small area makes this operationally unsuitable for large construction vehicles and another CSA will be required in conjunction with this site.

45. Travel distances from Westend Tennis Club CSA to the shaft 2 and 3 sites is just over 1km and it is 1.5km to the shaft 5 and 6 sites.

46. Considering the restricted access to the Westend Tennis Club CSA, the small working area and the relatively long distances to the sites this location is impractical as a CSA.

Part of Victoria Park

47. There is significant space available at Victoria Park that could be used to provide up to 1,500m^2 of additional CSA. However, this is not a feasible option for the Project as the distances to the shaft 3 location (at the centre of the Project) are in excess of 2km and as with other remote CSA sites this

will increase the need to light transport to the site location and will require additional facilities to be provided at each site location for staff and labour.

48. The distance and low likelihood of being able to secure suitable and sufficient space in Victoria Park make this option impractical as a CSA.

Further alternative sites also considered by Watercare

Cox's Bay

49. There is sufficient land at Cox's Bay Reserve to provide a CSA of up to 1,500m2 and the most appropriate space to use would be part of the marked football field adjacent to West End Road.

50. The distance from this location on West End Road to the shaft 3 location (at the centre of the project) is approximately 1.8km and this has similar issues to other remote CSA sites in terms of additional light traffic to the sites and additional facilities at each site location.

51. The long travel distances to the site and the need for additional facilities at each site location make this option impractical as a CSA.

Site north of the Auckland Harbour Bridge

52. Areas north of the Auckland Harbour bridge are considered impractical due to the long distance between all the site locations which will require additional amenities to be provided at each site location and will result in larger sites being required in the street at each shaft location. Sites north of the Harbour Bridge would also require vehicles to travel over the Harbour Bridge when moving between the CSA and the construction area. This would delay the overall construction duration for the Project, and would increase the costs associated with the Project.

53. A site north of the Auckland Harbour Bridge is also likely to require additional site space to be taken in the streets for the connections to the existing overflows, since there is no local adjacent space for the storage of materials associated with these works.

54. Locations north of the Auckland Harbour Bridge also transfer the construction disruption to communities that have a limited benefit from the works.

Other sites

55. There are only two other potential locations for a CSA within a 700m radius (the maximum distance from Salisbury Reserve to any shaft site on the alignment) of the proposed CSA at Salisbury Reserve. These are at Ponsonby Primary School on Curran Street and Bayfield School on the corner of Clifton Road and Jervois Road. Both of these locations would increase the distances to any given shaft site to more than 700m.

56. Both of the school sites have sufficiently large open spaces to provide a CSA, but the sites are within primary schools and given they would be in use and occupied for the construction duration, would require significant interface management including managing working around school entrances (particularly to keep children safe from construction activities).

Conclusion

57. The site at Salisbury Reserve is well positioned at the centre of the Project with easy access to all of the shaft construction sites along the length of the Project.

58. The Salisbury Reserve CSA has suitable access and a large flat area (the disused bowling green) that can be used without significant additional earthworks and can be reinstated easily on completion.

59. Whilst other remote sites could be used as a CSA this is likely to result in additional facilities being required at each of the shaft sites and will increase the footprint of these sites, increasing the impact and disruption to residents.

60. Taking additional site areas in the street will have a significant impact on residents, removing street parking, footpaths and access to property.

61. The use of Salisbury Reserve provides an appropriate balance between the need for space in the street and an area from which to manage the project efficiently.

62. The optimal solution will be to have more than one CSA being the Salisbury Reserve AND the site at 105 – 125 Curran Street. This will ensure that adequate space is provided to maximise construction efficiency and maintain a presence close to the works for staff and labour and immediate access to construction materials.

63. However, even if 105-125 Curran Street was available, the site at Salisbury Reserve would continue to be required for the reasons already set out.

Yours sincerely,

Rory Bishop
Alta Consulting Ltd
021 585 567

Reviewed by: