

Before Independent Hearings Commissioners At Wellington

Under the Resource Management Act 1991

In the matter of Applications for resource consents, and a Notice of Requirement for a Designation by Wellington Water Limited on behalf of Upper Hutt City Council, for the construction, operation and maintenance of the structural flood mitigation works identified as the Pinehaven Stream Improvements Project.

Statement of evidence of Tim Adam Haylock for Wellington Water Limited (Construction Methodology)

Dated 20 July 2020

大成 DENTONS KENSINGTON SWAN

89 The Terrace
PO Box 10246
Wellington 6143

P +64 4 472 7877
F +64 4 472 2291
DX SP26517

Solicitor: N McIndoe/L D Bullen

E nicky.mcindoe@dentons.com/liam.bullen@dentons.com

Table of contents

1	Qualifications and experience	2
2	Code of conduct	3
3	Scope of evidence	3
4	Executive summary	4
5	Construction methodology and programme	4
6	Alternative construction methodologies considered	8
7	Transportation effects	9
8	Noise/ vibration effects	10
9	Erosion and sediment control	12
10	Effects on public access to the stream	13
11	Discharge permit matters	14
12	Recommended mitigation	15
13	Responses to issues in submissions	16
14	Response to section 42A reports	16
15	Conclusions	17

Statement of evidence of Tim Haylock

1 Qualifications and experience

- 1.1 My full name is Timothy Adam Haylock.
- 1.2 I am a Project Manager at Downer. My project experience ranges from wharf buildings, dock extensions, tunnelling and road contracts through to rail, hospitals and bridges.
- 1.3 I have been working for Downer for the past 6 years on various projects including:
- a Present – Construction Project manager – Early Contractor Involvement ('**ECI**') phase Pinehaven Stream;
 - b New Plymouth Long Term Plan Reservoirs Construction ECI Phase, New Plymouth District Council;
 - c Design and construction of SH2/58 Haywards Interchange, NZ Transport Agency;
 - d Design and construction of Mt Victoria Tunnel Upgrade Stage 2, Memorial Park Alliance - NZ Transport Agency;
 - e Arras Tunnel and Pukeahu National War Memorial Park, Memorial Park Alliance - NZ Transport Agency.
- 1.4 I have 18 years of civil engineering experience internationally and in New Zealand. My qualifications include:
- a BEng Civil (Hons) Portsmouth University, UK;
 - b NZQA Certificate IV Project Management;
 - c NZ Certificate in Business Level 4.
- 1.5 My evidence relates to a Notice of Requirement ('**NOR**') for Designation and associated resource consent applications for the construction, operation and maintenance of the structural flood mitigation works identified as the Pinehaven Stream Improvements Project ('**the Project**'). Wellington Water Limited ('**WWL**') has lodged the resource consent applications and NOR on behalf of Upper Hutt City Council ('**UHCC**').

1.6 I am familiar with the area that the Project covers, and have been involved with the Project as the Construction Project Manager since September 2019. I took part in expert witness conferencing on erosion and sediment control matters.

2 Code of conduct

2.1 While these applications are not before the Environment Court, I have read and am familiar with the Code of Conduct for Expert Witnesses in the current Environment Court Practice Note (2014). I have complied with the Code in the preparation of this evidence, and will follow it when presenting evidence at the hearing.

2.2 The data, information, facts and assumptions I have considered in forming my opinions are set out in my evidence to follow. The reasons for the opinions expressed are also set out in my evidence to follow.

2.3 Unless I state otherwise, my evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

3 Scope of evidence

3.1 My evidence addresses the following matters:

- a Construction methodology and programme;
- b Alternative construction methodologies considered;
- c Transportation effects;
- d Noise/vibration effects;
- e Erosion and sediment control;
- f Public access effects;
- g Discharge permit matters;
- h Recommended mitigation;
- i Responses to issues raised in submissions;
- j Response to section 42A reports.

4 Executive summary

- 4.1 The Project will involve a range of typical construction activities including demolition, earthworks, piling, the placement of structures, and heavy vehicle movements, with associated noise and dust emissions.
- 4.2 The construction phase of the Project will seek to minimise disruption to the stream bed, adjacent properties and property owners and the wider community.
- 4.3 In accordance with the advice of GWRC, damming and a 'piped-diversion'¹ methodology¹ is to be used for all 12 sections of the stream works.
- 4.4 I consider that the spatial extent of the proposed designation allows for the Project to be efficiently and effectively constructed.
- 4.5 After reviewing the effects of alternative methods of construction (from inside the stream versus outside), working within the dry stream with the stream water diverted through a pipe would have the least impact on the environment, due to the small footprint and because isolating the stream water in the pipe would separate it from the excavation area and moving plant.
- 4.6 While best practicable options are proposed to mitigate noise effects (including consultation, timing of activities, and temporary relocation of residents), the potential effects of construction noise and vibration on those residents in close proximity to the area of the works are likely to be moderate.
- 4.7 The potential effects of the discharge of sediment from construction will be temporary and will be mitigated as far as possible through the erosion and sediment control plan ('**ESCP**') and site specific method statements.

5 Construction methodology and programme

Overview and general philosophy

- 5.1 The Project will involve a range of typical construction activities including demolition, earthworks, piling, the placement of structures, and heavy vehicle movements, with associated noise and dust emissions.
- 5.2 The construction phase of the Project will seek to minimise disruption to the stream bed, adjacent properties and property owners and the wider community.

¹ This means that a diversion pipe will be constructed to protect stream flows from adjacent excavations during construction. Upon completion of stream widening and wall construction on one side, the diversion pipe can be shifted adjacent to the new wall, enabling adequate room for construction of improvements on the other bank from within the stream, AEE 6.2.5.

- 5.3 The stream walls and new bridge structures are all to be built off-site to reduce construction time, minimise disruption and reduce overall potential adverse effects. The amount of materials that would need to be transported into the construction zone (such as reinforcing, shutters, concrete) will be minimised, which reduces the number of construction vehicles and reduces the requirement for in-situ concrete within or near the stream.
- 5.4 Overall, working from within the stream will reduce the construction footprint as well as the effects on stakeholders and the environment.

Management plans

- 5.5 Management plans will be used to minimise adverse environmental effects during the construction phase of the Project. This allows the mitigation to be appropriately integrated into the construction methodology and planning.
- 5.6 Before commencement of the Project, Downer and Jacobs will develop a number of management plans to identify structure, resources and procedures to achieve the Project obligations and values. These management plans will include:
- a A Construction Management Plan ('**CTMP**'), which will include:
 - i A Dust Management Plan; and
 - ii An ESCP;
 - b A Construction Traffic Management Plan ('**CTMP**');
 - c A Construction Noise and Vibration Management Plan ('**CNVMP**');
 - d A Site Office Management Plan;
 - e Landscape Plans;
 - f Riparian Planting Plans;
 - g A Lizard Management Plan; and
 - h A Community Communication Strategy.
- 5.7 In addition, Site Specific Environmental Management Plans will be submitted for each area of work or activity. These will instruct the work force on how to achieve the obligation, values and consent conditions in a planned and safe way.

Construction staging

- 5.8 The Project will be constructed in 12 stages, which have been derived from the number of access points along the stream and the nature of what is required to be constructed in each section (i.e. walls, bridges, natural slopes) and previously outlined in the draft ESCP.

Enabling works and site establishment

- 5.9 To enable the widening of the stream, houses at 4 Sunbrae Drive, 28 Blue Mountains Road and 48 Blue Mountains Road will be removed/ demolished and services disconnected. Sewers crossing the stream will also be diverted once this work is complete. 10A Blue Mountains Road is proposed to be used as the site office and stakeholder engagements base (communication/ showing samples of fencing, walls, planting etc).
- 5.10 Each of these properties has been purchased by GWRC with the exception of 10A Blue Mountains Road which has been purchased by UHCC.²

Stream works

- 5.11 In accordance with the advice of GWRC, a damming and piped-diversion methodology is to be used for the stream works at all sections.³
- 5.12 Any water that enters the excavations will be treated through a sediment tank before being discharged back in to the stream. There will be continuous field turbidity monitoring upstream and downstream of the works to control and maintain the sediment levels.
- 5.13 Alternative methods of carrying out the stream works were considered as part of the Project design, as discussed in section 6 below.

Private bridges

- 5.14 To construct the private bridges at 10A-C Birch Grove, 50 Blue Mountains Road, 34-36 Blue Mountains Road, 28-32 Blue Mountains Road, Willow Park and 4 Blue Mountains Road, permanent Redi-Rock walls adjacent to the bridge will be completed, to allow a temporary pedestrian bridge to be installed. Once the

² AEE, 8.2.1.2,

³ Gregor McLean "Pinehaven – ESCP review – WGN200083" GWRC (21 October 2019) <<https://haveyoursay.gw.govt.nz/Pinehaven-Streamworks/widgets/268043/documents>>.

temporary pedestrian bridge is installed then the existing bridge can be demolished.

- 5.15 For locations that only have one access way (for example stage 1 (10A-C Birch Grove)), all plant and material to construct the permanent walls and bridges will need to be stored on the residence side of the stream before demolishing the bridge. Once the permanent walls have been constructed then the bridge piles can be driven into the ground and precast abutments will be installed. The bridges will be precast off site, in sections. A crane will lift each section into position with handrails on the outside pre-installed. Once the bridge is in place, tie bars will be installed and grouted. The new bridges will be approximately 500mm above the existing level and new approaches will be constructed.

Project objective relating to efficient and effective construction

- 5.16 One of the Project objectives is:

To enable efficient and effective construction and ongoing maintenance of all structures and stream improvements.

- 5.17 I consider that the construction methodology to be adopted for this Project will achieve this objective because it will ensure sufficient space is provided adjacent to the proposed works to enable access for maintenance, storage of construction materials, and working space for equipment.

- 5.18 The proposed designation boundary varies over the length of the stream, due to the differences in construction requirements for the various components of the Project. This can be seen in the General Arrangement Plans⁴ and Updated Designation Plans⁵. The spatial extent of the designation has been determined by considering the minimum area required for construction of the stream improvement works. Once construction is complete the designation is proposed to be partially withdrawn so that only the land that is required for the long-term operation, maintenance and mitigation of effects of the Project is kept within the designation.

- 5.19 Ongoing design refinement and discussions with landowners have in some instances resulted in construction access and/or works not being required in some locations. The designation footprint can be reduced in a number of

⁴ Provided to GWRC and UHCC on 11 June 2020.

⁵ Attached to a letter from Helen Anderson to UHCC dated 1 May 2020.

locations where refinements have occurred post-lodgement of the NOR and resource consent applications.⁶

- 5.20 I consider that the spatial extent of the proposed designation allows for the Project to be efficiently and effectively constructed.

6 Alternative construction methodologies considered

- 6.1 The Project team considered a number of alternative construction methodologies when determining how to construct the Project.

- 6.2 The options for construction methodology were assessed against the MCA criteria established during preliminary design⁷. Two main options were identified:

- a Construction from outside of the stream; and
- b Construction from within the stream.

Construction from outside of the stream

- 6.3 If the widening of the stream was to be constructed solely from outside of the stream, then a larger construction footprint would be required. An access road would need to be installed through all properties on both sides, which would have a major impact on residents and their properties, and more trees/vegetation would need to be cleared.

Construction from within the stream

- 6.4 The original concept to work within the stream was to install sheet piles along the length of the bank, segregating the excavated material from the live stream and using the stream to gain access to each stage. This would allow a large fluctuation in the stream levels without flooding the construction zone, and minimal construction footprint, which would in turn result in less impact on the residents and the landscape around the stream.
- 6.5 However, due to the environmental impact associated with operating machinery within a live (wet) stream, diverting the stream through a pipe and operating from the dry stream bed is now the preferred and proposed construction method, as it causes fewer adverse effects on the environment.

⁶ Letter from Helen Anderson to UHCC dated 1 May 2020. It is also able to be reduced at 11 Birch Grove.

⁷ Refer AEE, paras 8.4.1-8.4.4.

- 6.6 Some sections of work will require over pumping for short periods, such as the bridge at 10 Birch Grove. The existing pipe/bridge will need to be demolished and the stream over pumped around the excavation area. This method would isolate the sediment from the bridge excavation. Pumps will also be used for dewatering each stage, passing the flow through a settlement tank or similar structure⁸ to remove the sediment.

Extent of stream diversion

- 6.7 If Pinehaven Stream was in a green field site, the preferred method would have been to divert the stream outside the footprint of the existing stream widening, in order to segregate the stream from the construction and allow free access to build the proposed new widened stream. However, due to the proximity to houses and roads this is not a feasible option.
- 6.8 After reviewing the effects of both methods, my view is that working within the dry stream with the stream diverted through a pipe would have the least impact on the environment due to the smaller footprint, and isolating the stream in the pipe would protect water quality by separating it from the excavation area and moving plant.

7 Transportation effects

Existing transport environment

- 7.1 Along the length of the Project area there will be two main transport environments impacted. The two environments are separated by the Sunbrae Drive/Blue Mountains Road intersection.
- 7.2 The first transport environment, to the west of this intersection, is generally a cul-de-sac type development. These roads include Birch Grove and Deller Grove.
- 7.3 The second transport environment, to the north and south of the Sunbrae Drive/Blue Mountains Road intersection, has access to the north via Blue Mountains Road. This is the main school route and bus route, and is more sensitive to any disruption than the first traffic environment. These roads include Blue Mountains Road, Pinehaven Road and Whitemans Road, which are classified as 'Collector Routes' or 'Local Distributor Routes' in the Upper Hutt City District Plan, and 'Primary Collector' roads using the NZ Transport Agency's One Network Road Classification system. The section of Blue Mountains Road

⁸ AEE, 10.7.2.1.3.

between Sunbrae Drive and Pinehaven Road carries approximately 5,631 vehicles daily on average.

Traffic effects during construction

- 7.4 The relatively small scale of individual parts of the work and the fact they are spread out along the stream reduces the impact on traffic.
- 7.5 Each construction stage will cause different traffic effects due to the location of the access point, restrictions within each stage and type of construction. There will be pedestrian access for residents at all times but the vehicle access to private properties may be restricted at times, for example 10 Birch Grove will only have pedestrian access while the access bridge is being constructed over a 6 week period.
- 7.6 All traffic management will be installed as per the approved CTMP /CMP and there will be mitigations such as reviewing the traffic count and staging the works to reduce the impact. The traffic management plan will control construction vehicle entry and exit crossings as well as heavy vehicle routes to and from the site. It will also address access to private properties, and effects on pedestrian and cycle routes.
- 7.7 Based on my experience, the overall construction traffic effects, in terms of heavy vehicle effects and traffic disruption, will be acceptable, with minor disruptions on the cul-de-sac roads and the main impacts along 4-8 Blue Mountains Road and 48 Blue Mountains Road during the lane closures. There are no planned road closures, so the impact would be moderate.

8 Noise/ vibration effects

- 8.1 This section of my evidence considers the effects of the Project construction on noise and vibration. While I am not an acoustic engineer, I have experience managing the effects of noise and vibration on large construction projects.
- 8.2 The Project works will occur in close proximity to a number of properties, so some noise effects will be unavoidable. Accordingly, good stakeholder communication will be important to mitigate the noise impacts affecting the residential dwellings.
- 8.3 The main sources of noise effects during construction will be:
 - a Demolition of existing structures including concrete breaking;

- b Heavy machinery including cranes and excavators (along the full length of the stream);
- c Heavy vehicles such as trucks (along the full length of the stream);
- d Stationary plant such as mobile generators and pumps (along the full length of the stream);
- e Piling for foundation construction (sheet piles at stage 11 in front of the Silverstream Reformed Church) and 4 new bridge piles; and
- f Use of construction tools such as power tools (along the full length of the stream).

8.4 These activities have the potential to have a major impact on users of the residential dwellings, due to the proximity to the working zone. The main noise mitigation measures that are proposed in order to manage these effects are:

- a Consultation with the community, including notification of the works to potentially affected properties and the wider community;
- b Timing of activities – noisy and vibration inducing activities will be timed appropriately (for example while the residents are at work, stopping work if the residents have planned a gathering or timing of breaks to suit the residents) so as to cause the least disruption to surrounding residents' daily routines;
- c Avoidance of unnecessary construction noise through management practices, such as minimum separation distances , or using the types of plant and construction technique that will reduce noise emissions
- d Temporary relocation of residents who are significantly affected by construction noise; and
- e Use of acoustic barriers where practicable. These will be considered where the works need to occur for a longer time period in a particular location, and they are particularly noisy.

8.5 These methods will be captured in the management plans, including the CNVMP and site specific method statements.

8.6 The works which could cause vibration effects for residential dwellings are:

- a Sheet piling;

- b Bridge abutment piles;
- c Demolition; and
- d Movement of plant.

8.7 Where it is not practicable to achieve the vibration criteria, a vibration monitoring consultant will be appointed during this work and the CNVMP will identify any issues and mitigations.

8.8 While the best practicable options will be implemented to mitigate noise and vibration effects, in my experience the potential effects of construction noise and vibration on those residents in close proximity to the area of the works are likely to be adverse. With good stakeholder procedures and communication and following the stakeholder engagement complete to date, I expect the majority of the residents will tolerate the disruption for the proposed time line of the staged Project.

9 Erosion and sediment control

9.1 The construction of the Project will require earthworks within the Pinehaven Stream bed and adjacent riparian area. The earthworks have the potential to generate sediment within the Stream which if not appropriately controlled could be transported via Hulls Creek to Hutt River. Accordingly, an ESCP has been developed and will be implemented during construction.

9.2 One of the key ways in which the Project will manage erosion and sediment control is by using a piped-diversion methodology. The dam and pipe system will divert the stream flow and allow the construction to occur in a dry stream. All water pumped from the excavations will be treated through sediment tanks before discharging back into the stream.

9.3 The draft ESCP describes the principles and methods which will be used to minimise the effects of sediment discharge during construction. To minimise the potential adverse environmental effects of erosion and sediment from the site, the following principles will be followed:

- a Minimise disturbance;
- b Stage construction;
- c Protect steep slopes;

- d Protect watercourses – for this Project, this will be achieved by piping and diverting the stream flow, so the streamworks can be undertaken ‘offline’;
- e Stabilise exposed areas rapidly;
- f Install perimeter controls;
- g Employ detention devices – sediment filtration tanks and decanting topsoil bunds are most likely to be used, with silt fences and filter socks used for smaller catchment areas;
- h Make sure the plan evolves - continuous monitoring and inspections during construction will identify and rectify any issues; and
- i Inspect.

9.4 The erosion and sediment control methods to give effect to these principles will be captured in the Site specific Environmental Management Plans required by the ESCP and consent conditions.

9.5 The effects of the construction works on water quality are assessed further in the evidence of **Dr Claire Conwell**.

10 Effects on public access to the stream

10.1 It is my understanding that the RMA requires consideration of any implications of the Project for the public access to rivers.

10.2 Much of the Pinehaven Stream is located in private property, so there is currently limited public access to the Stream.

10.3 During construction, there will be no public access to the active work site, and temporary security fencing will be installed to separate the work site from the public.

10.4 During operation (once the stream works are complete) the public access into the stream will be reduced due to the vertical walls and the edge protection fencing, with the exception being at Willow Park. These physical barriers to access are necessary either because of health and safety, or to reduce effects on private property.

11 Discharge permit matters

- 11.1 WWL is seeking a discharge permit to authorise the discharge of water taken for dewatering purposes and construction phase stormwater associated with the construction of the Project.⁹ It is my understanding that under the RMA there are several matters relevant to discharge permits:
- a The nature of the discharge and sensitivity of the receiving environment;
 - b The applicant's reasons for the proposed choice; and
 - c Any possible alternative methods of discharge, including discharge into any other receiving environment.
- 11.2 The nature of the discharge (in terms of water quality) is discussed in the evidence of **Dr Claire Conwell**. The sensitivity of the receiving environment is discussed in the evidence of **Dr Alex James**. My evidence focuses on the reasons why the Project discharges are proposed, and possible alternatives.
- 11.3 The Project discharges will occur:
- a During installation and removal of the dam/pipe diversions;
 - b As treated groundwater is discharged back to the Stream; and
 - c As stormwater through the construction site is captured, treated and discharged back to the Stream.
- 11.4 While installing and removing the dam/pipe diversion the only access will be from within the stream, Due to the existing sediment levels within the river bed stone, I expect that the disturbance to the sediment and the suspended solids will be higher than 150g/m³, so the proposed conditions exclude this task from complying with the normal discharge limits, and manage them separately.¹⁰
- 11.5 To widen the stream and construct the walls, it is necessary to install foundations below the existing stream bed level. The stream diversion will divert the majority of the flow during this processes, but it is expected that the groundwater will still be present and will require pumping, treating it through a sediment tank/silt curtain and then discharging back into the stream below the dammed section. This is considered to be the reasonable and most practical option.

⁹ AEE, pg 167.

¹⁰ GWRC Section 42A Report, Appendix 2, Conditions 26 and 28.

- 11.6 The dam and diversion construction methodology being used for the majority of works will mean most of the construction will be done in the dry and physically separated from the flowing water such that the likelihood of ongoing fine sediment mobilisation during the construction works is minimal. Only during the construction of diversion dams and at the resumption of flow through dewatered areas will there be a short period of unavoidable sediment release. Relative to the overall construction period each of these high suspended sediment events will be short.
- 11.7 The construction methodology will, as far as practicable, minimise any release of sediment from the works. My evidence has already described the construction methodologies considered. The damming and over-pumping methodology proposed will result in less sediment being discharged to the Stream than other methodologies considered.
- 11.8 Due to the need for the disturbance of soil adjacent to the Stream and the need for a dry working environment for the installation of structural works there are no practical alternatives for undertaking the discharge, except for not undertaking the works at all. Expert witness conferencing agreed that the construction methodology proposed is best practice.

12 Recommended mitigation

- 12.1 Construction activities will be managed through the CMP and associated management plans:
- a CNVMP;
 - b CTMP;
 - c Dust Management Plan.
- 12.2 Construction traffic effects outlined above will be managed through the CTMP which will describe the methods for avoiding, remedying and mitigating the local and wider network traffic effects.
- 12.3 Mitigation measures for noise and vibration will include notification of noisy activities to the surrounding community, timing of activities, use of acoustic barriers where practicable and temporary relocation of residents where necessary.

- 12.4 Potential erosion and sediment control effects will be managed and mitigated through the implementation of the ESCP. The particular measures proposed and their suitability are discussed further in the evidence of **Dr Claire Conwell**.
- 12.5 Management plans/ Site specific Method statements will control the mitigation required to meet the Consent conditions. The site specific method statements will be developed for each stage of work. These will show the plan as well as instructing the site crew on what to do and how to do it safely while also meeting consent requirements.

13 Responses to issues in submissions

- 13.1 I have reviewed the submissions lodged in relation to the resource consent applications for the Project. Only one of those submissions raised concerns about the construction methodology.
- 13.2 Submitter 10 (David Kyle) raised concerns about the deposition of excavated material on the Silverstream Reformed Church site.
- 13.3 The fill proposed to be deposited on the Silverstream Reformed Church site is no longer proposed to be included in the Project works.¹¹

14 Response to section 42A reports

- 14.1 I have read the relevant parts of the Section 42A reports prepared for GWRC and UHCC. These reports¹² accurately describe the construction methodology proposed.
- 14.2 Both Section 42A Reports recommend conditions relating to Project construction. These conditions are generally workable and consistent with those which were proposed in the application documents, with the following exceptions:
- a Conditions 40 and 41 recommended in the GWRC Section 42A Report would require approval to be obtained before any works could occur over the winter period. If works cannot occur during winter, this will increase the programme, cost and impact on neighbours and stakeholders. These concerns are set out in the Joint Witness Statement.

¹¹ Section 92 response to GWRC dated 21 February, 2020, appendices F and G

¹² Section 4.3 of the GWRC Section 42A Report, and paragraphs 10.2-10.7 of the UHCC Section 42A Report.

- b I have some concerns about whether the proposed SSC limit of 50 mg/L in condition 26 is workable. These concerns are set out in the Joint Witness Statement.

15 Conclusions

- 15.1 The Project will involve a range of typical construction activities. These will be carefully managed to minimise disruption to the stream bed, adjacent properties and the wider community.
- 15.2 The best practicable options will be implemented to mitigate noise effects, but some effects will be unavoidable due to the close proximity of residents to the works.
- 15.3 The potential effects of the discharge of sediment from construction will be temporary and will be mitigated through the ESCP and site specific method statements.

Timothy Adam Haylock

20 July 2020