

## Technical Specialist Memo - Outstanding Natural Features

To:	Warwick Pascoe – Premium Project Lead Celia Wong – Senior Planner, Resource Consents Louise Barclay & Jo Hart – Senior Planner, Notices of Requirement
From:	Kate Lewis
Qualifications & Relevant Experience:	I hold the qualification(s) of: PhD in Earth Sciences and have 30 years of experience in geology and volcanology. I am a full member of the Geological Society of New Zealand. I have prepared expert evidence and technical assessments for resource consent applications and plan changes, and I have appeared as an expert witness before consent authorities.
Preparation in Accordance with the Code of Conduct:	I confirm that I have read the Environment Court Practice Note 2023 – Code of Conduct for Expert Witnesses ( <a href="#">Code</a> ), and have complied with it in the preparation of this memorandum. I also agree to follow the Code when participating in any subsequent processes, such as expert conferencing, directed by the Panel. I confirm that the opinions I have expressed are within my area of expertise and are my own, except where I have stated that I am relying on the work or evidence of others, which I have specified.
Date:	29 May 2026

## 1.0 APPLICATION DESCRIPTION

### Application and property details

Fast-Track project name:

North West Rapid Transit

Fast-Track application number:

FTAA-2511-1146

**Council Resource Consent References:**

BUN60461580

LUC60461581

DIS60461582 (contamination)

CST60461583 (structures)

CST60461584 (disturbance of seabed (other))

CST60461585 (veg removal)

WAT60461586 (groundwater)

LUS60461587 (structure)

LUS60461588 (works)

**Notice(s) of Requirement**

NOR number	Description
NoR 1	Busway between Brigham Creek Rarawaru station and north of Westgate Te Waiarohia station (including stations, Park and Ride and all local road connections)
NoR 2	Busway between north of Westgate Te Waiarohia station and north of Royal Road Mānutewhau station (including stations, Park and Ride and all local road connections)
NoR 3	Busway between Royal Road Mānutewhau Station and Te Whau River (including all stations and local road connections)
NoR 4	Brigham Creek Rarawaru station including Park and Ride
NoR 5	Westgate Te Waiarohia station
NoR 6	Royal Road Mānutewhau station
NoR 7	Lincoln Road Wai o Pareira station
NoR 8	Te Atatū Ōrangihina station
NoR 9	Busway between Waterview interchange and west of Ivanhoe Road (including all stations and local road connections)
NoR 10	Busway between Ivanhoe Road and Ian McKinnon Drive (including all stations and local road connections)
NoR 11	Point Chevalier station
NoR 12	Western Springs station

Site address:

Generally alongside State Highway 16 between Brigham Creek and Auckland City Centre

- NWRT\_Part 6\_5\_Property Schedule\_Land within designation boundary and

- NWRT\_Part 6\_6\_Property Schedule\_Landadjacent to the designation boundary)

## 2.0 Documents Reviewed

### Application Documents Reviewed

In preparing this memorandum and to inform my specialist review advice for the council, I have reviewed all of the application material that is available for viewing on the Environmental Protection Authority's Fast-track website<sup>1</sup>, noting that the following technical reports are of most relevance to my area of expertise:

- Part 4 – Resource Management Act 1991 Approvals Report, prepared by Helen Hicks (AECOM New Zealand Limited) and Karyn Sinclair (Jacobs New Zealand Limited), dated 15 December 2025
- Indicative-Design\_West, prepared by NZ Transport Agency Waka Kotahi, dated 12 December 2025, Sheet NWRT-00-00-EN-DRW-1106 Rev. A (Te Ara Hauāuru Northwest Rapid Transit – NWRT application Document 1 at Part 6)
- Indicative-Design\_East, prepared by NZ Transport Agency Waka Kotahi, dated 12 December 2025, Sheet NWRT-00-00-EN-DRW-1108 Rev. A (Te Ara Hauāuru Northwest Rapid Transit – NWRT application Document 2 at Part 6)
- Assessment of Construction Noise and Vibration Effects, prepared by Siiri Wilkening, acoustics consultant at Marshall Day Acoustics Ltd, dated 15 December 2025 (Te Ara Hauāuru Northwest Rapid Transit – NWRT application Document 13 at Part 6)
- Assessment of Construction Stormwater Effects, prepared by Campbell Stewart, Erosion and Sediment Control specialist at Southern Skies Environmental Limited, dated 15 December 2025 (Te Ara Hauāuru Northwest Rapid Transit – NWRT application Document 14 at Part 6)
- Landscape and Visual Assessment, prepared by landscape architect Matthew Jones, dated 15 December 2025 (Te Ara Hauāuru Northwest Rapid Transit – NWRT application Document 17 at Part 6).
- Assessment of Flooding and Stormwater Effects, prepared by Paul, Principal Civil Engineer – Stormwater at Jacobs, dated 15 December 2025 (Te Ara Hauāuru Northwest Rapid Transit – NWRT application Document 19 at Part 6)

### Document reviewed in the pre-lodgement process

- Outstanding Natural Feature Technical Memorandum, Revision 1, prepared by Chris Hughes of Jacobs, dated 29 October 2025

During the pre-lodgement engagement process between the applicant and the council's planning and resource consents department, I attended one briefing meeting with the applicant in October 2025. I reviewed a draft version of the above document and provided preliminary advice to the council in November 2025.

I have only reviewed the components of the application that relate to approvals under the Resource Management Act 1991, noting that my focus has been on the NoRs 3 and 9, rather than on the regional consenting matters. I am aware that, if confirmed, designations will be added to the Auckland Unitary Plan (AUP) and there is an opportunity to include conditions within these designations that will inform future Outline Plan processes.

### 3.0 Specialist Assessment

The proposed busway works may impact three Outstanding Natural Features (ONFs), Harbour View Pleistocene terraces (ONF ID 40 in Schedule 6 of the Auckland Unitary Plan), Meola Creek and estuary (ONF ID 95), and North-west motorway lava flow, Western Springs (ONF ID 132). ONF's are protected for both visual and physical values in accordance with section 6(b) of the RMA 1991, and in accordance with the objectives and policies of the Regional Policy Statement B4.2. The review looks at how works may affect both the appearance and physical structure of a feature, which is the basis of my comments below.

The most thorough source of information relating to effects on the Outstanding Natural Features associated with this application was the *Outstanding Natural Feature Technical Memorandum, Revision 1*, (ONF Tech Memo) prepared by Chris Hughes of Jacobs, dated 29 October 2025, which was provided pre-lodgement as indicated in the Documents Reviewed section. The *Part 4 – Resource Management Act 1991 Approvals Report* did not provide a useful description of the sites, the proposed work, or the potential effects, so where appropriate I have cited the assessment in the ONF Tech Memo. The information gap is problematic with respect to the North-west motorway lava flow, which not adequately assessed in the *Approvals Report*. I have suggested conditions for the designation with with to limit effects on the ONFs.

I have visited the sites where the proposed works affect the ONFs to inform my review of this application.

The comments below are organized according to the location of the three features from north to south.

#### **Harbour View Pleistocene terraces (ONF ID 40)**

Overall I agree with the assessment in the ONF Tech Memo from Jacobs, 29 October 2025. The Harbour View Pleistocene terraces comprise a relatively large area, and the proposed works (busway and shared use path requiring earthworks) are along one edge of a flat section of terrace rather than on the steep slopes between terraces. Due to the lack of design information, I cannot assess the possible physical effects on this ONF, but it looks like the works would have a small impact. It would be helpful to have cut and fill volumes for the earthworks and a condition stating that earthworks will not damage the ONF surface outside of the area of the proposed works, including the condition that if damage occurs, the surface will be reinstated.

#### **Meola Creek and Estuary (ONF ID 95)**

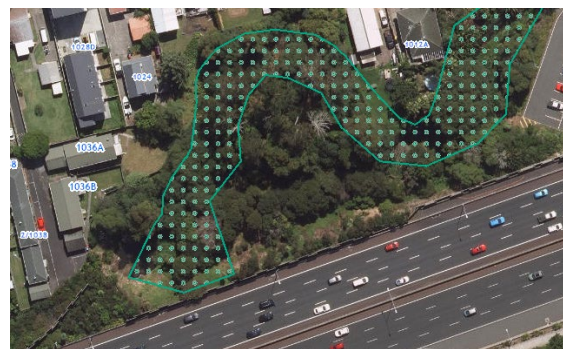
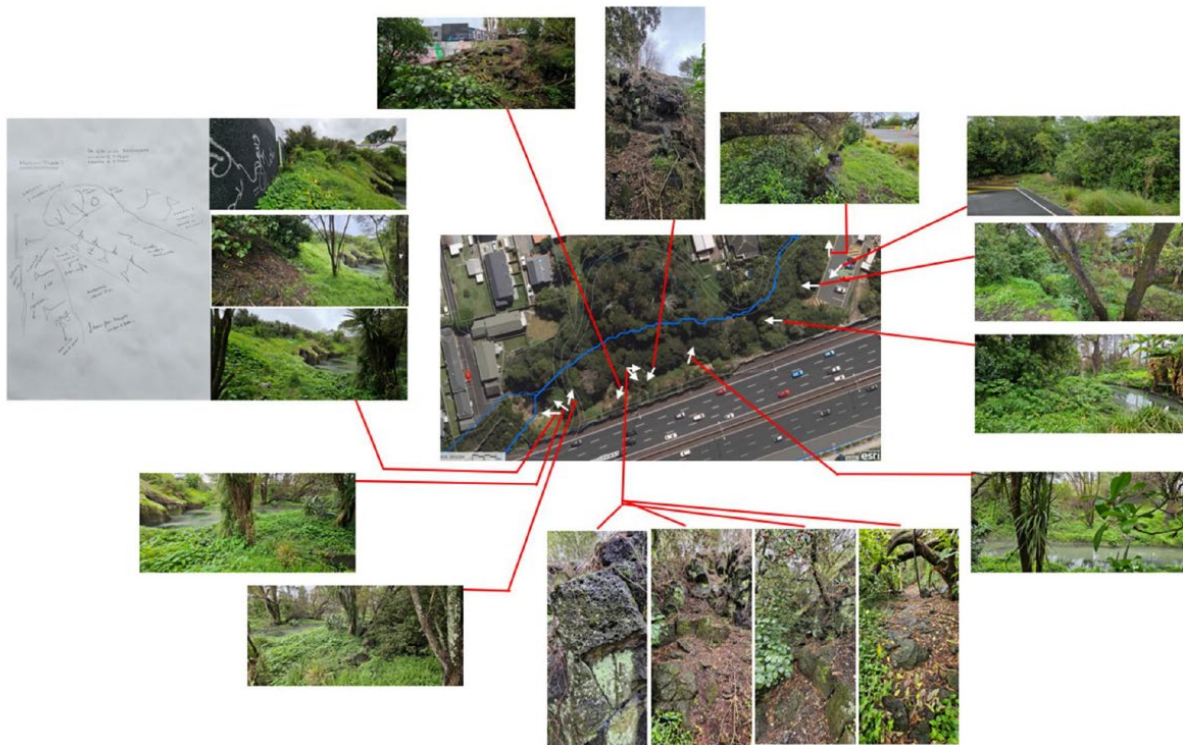
Overall I agree with the assessment in the ONF Tech Memo from Jacobs, 29 October 2025. Waititiko / Meola Creek ONF is a long feature, extending from Meola Road in the north to State Highway 16 / Northwestern Motorway in the south, and the works (building a bridge) are proposed adjacent to the motorway in order to get the busway over the creek.

An important point is that the current path of the stream does not follow the path of the mapped ONF Overlay in the area of the proposed bridge (Figure 1). This variation is consistent with the characteristics of this feature, which is protected in the Auckland Unitary Plan / RMA as a dynamic landform; the path of the stream may change, subject to natural physical processes beyond the feature. This is especially relevant as the timeframe for the proposed works is 25 years.

Values associated with the feature may extend beyond the mapped overlay, so we consider the extent of the feature must still be protected from inappropriate use, development or subdivision in accordance with

section 6(b) of the RMA 1991, and in accordance with the objectives and policies of the Regional Policy Statement B4.2. We consider the assessment should be based on the qualities and values of the feature, not merely its mapped extent.

Consideration must be given to the design and location of the bridge piers in order to avoid impacts to the Meola Creek and associated lava flows. The lava flows are exposed extensively along the stretch of the creek where the bridge is being proposed, and the stream runs approximately parallel to the motorway (Figure 1). The effect on the stream depends on the location and size of the bridge piers, which have the potential to destroy both existing lava flow exposures and affect the stream itself.



**Figure 1. Top: Map view of the area of Meola Creek where the NW busway is proposed and photographs of the stream and associated lava flows. The blue line indicates the path of Meola Creek. Image taken from *Outstanding Natural Feature Technical Memorandum, Revision 1*, by Chris Hughes of Jacobs, 29 October 2025 Bottom: Same view with the Outstanding Natural Feature Overlay in green dots. Image from GeoMaps. The stream does not follow the path of**

the ONF Overlay in this area, which speaks to its ability to vary course over time and the importance of protecting the feature for its qualities and values, not merely its mapped extent.

Because of the nature of this feature it is impossible to mitigate or reinstate for damage to either the stream or the associated lava flows. Therefore the works must avoid effects.

#### **North-west motorway lava flow, Western Springs (ONF ID 132)**

This feature is not addressed in the assessment in the ONF Tech Memo from Jacobs, dated 29 October 2025. It was discussed briefly in the *Part 4 – Resource Management Act 1991 Approvals Report*, dated 15 December 2025.

The proposal is for “an elevated viaduct structure ... with the busway bridging over the St Lukes Road bridge over SH16, and the Western Springs motorway on and off ramps” (*Part 4 – Resource Management Act 1991 Approvals Report*, dated 15 December 2025, p. 69). The stated intention is to avoid the ONF because the bridge extends over it.

Based on the narrow space available between the motorway and the pōhutukawa trees on Great North Road, and, based on the appearance of the image that shows the busway above the cliff, it is unclear how the supports can be built, possibly requiring rock breaking and excavating, without significant damage to the lava flows. In addition to the issue of excavation itself, if the vibrations from rock breaking are strong enough, this work could damage the front of the lava flow facing the motorway by shattering the rock.

The feature is protected for the face of the lava flows in the cutting on the motorway, but the values include that the flow is connected to the body of the lava flows that extend from Mt St John (Te Kōpuke) to Meola Reef<sup>1</sup>. The proximity of the works to the visible face of the flows may mean that rock breaking and vibration could affect the face of the flows.

Due to the lack of geotechnical / design information, I cannot assess the possible effects on this ONF. The final plan to be reviewed by Auckland Council must include the locations of the intended bridge piers with respect to the lava flow face and explain how the proposal will avoid damaging the lava flows. The plan needs to include detailed engineering data and a construction methodology that can be assessed by a geotechnical engineer and vibration specialist and established whether it is possible to avoid damaging the feature.

In lieu of any further information request the Panel may be minded to request that the Applicant clarify how effects on the ONF's will be avoided or appropriately "enveloped;" I recommend that stronger conditions on the designation are included to ensure effects on these ONF's are avoided. This is further discussed in section four below.

## **4.0 Proposed Conditions (Notices of Requirement)**

<sup>1</sup> In the ONF Tech Memo the author states that the lava flows that comprise this area and Meola Reef are from Three Kings and cites L.O. Kermodé, 1989. More recent research (Jeremy Eade, MSc, 2008) has shown that the lava flows are from Mt St John (Te Kōpuke). The research is described in *Volcanoes of Auckland: An Essential Guide* by Bruce W. Hayward et al. 2011.

I have concentrated on reviewing the proposed designation conditions that have been suggested by the applicant (as set out as Appendix A of the Part 4 – Resource Management Act 1991 Approvals document).

### **Currently proposed conditions**

The conditions that have been proposed which have relevance to an assessment of effects on Outstanding Natural Features are proposed Condition 24 under the heading “Waitītiko / Meola Creek, Western Springs - Outstanding Natural Feature” and 25 under the heading “North-west lava flow, Western Springs - Outstanding Natural Feature.”

In my experience, these conditions do not provide enough certainty that actual and potential adverse effects will be avoided, given the level of design flexibility being sought. With geological features it is almost never possible to mitigate damage, as the features are irreplaceable and any damage and destruction is permanent.

The third Outstanding Natural Feature involved in the proposal, Harbour View Pleistocene terraces (ONF ID 40) has not been and must be acknowledged with a condition that works do not impact the feature outside of the construction footprint.

### **Recommended conditions**

#### **NoR 9, Proposed Condition 24, Waitītiko / Meola Creek, Western Springs - Outstanding Natural Feature ID 95**

~~The Requiring Authority shall design and construct a bridge structure to cross the Waitītiko / Meola Creek, Western Springs within the Outstanding Natural Feature (AUP ID 95). This condition does not restrict piers within the Outstanding Natural Feature.~~

A Construction Management Plan (CMP) must be prepared for each stage of work that affects the Waitītiko / Meola Creek and estuary Outstanding Natural Feature (ONF ID 95) and submitted with the relevant Outline Plan. The path of the stream may have changed and continue to change from when the ONF Overlay was enacted. The CMP must demonstrate that works will avoid effects on the Waitītiko / Meola Creek whether or not it follows the shape of the ONF Overlay at the time of works.

The CMP must also demonstrate that works will avoid effects on the basalt lava flows that are the basis on which the Waitītiko / Meola Creek is protected as an Outstanding Natural Feature. The CMP must include how construction methods and design will avoid effects on the Waitītiko / Meola Creek and estuary and associated lava flows. This includes the location and design of the pier(s) to be located at or adjacent to the Waitītiko / Meola Creek and the location and volume of earthworks required to construct the pier(s).

Designing the CMP requires an assessment from a suitably qualified geological or geotechnical specialist in order to map the extent of the lava flows and stream.

Modification of the Outstanding Natural Feature (Waitītiko / Meola Creek, ID 95) shall be restricted to the completed footprint of the proposed works.

Surrounding areas of the Outstanding Natural Feature (Waitītiko / Meola Creek, ID 95) shall be protected from ground disturbance, vehicles, equipment movements, and storage of materials.

No vehicle access shall occur that could damage the ground surface of the Outstanding Natural Feature (Waititiko / Meola Creek, ID 95), beyond the footprint of the consented plans.

**NoR 9, Proposed Condition 25, North-west lava flow, Western Springs - Outstanding Natural Feature ID 132**

~~(a) The Project shall be designed to minimise impacts on the exposed face of the Northwestern Lava Flow Outstanding Natural Feature (AUP ID 132) as far as practicable.~~

~~(b) The Outline Plan(s) shall describe the measures that will be implemented to minimise any permanent impacts.~~

A Construction Management Plan (CMP) must be prepared for each stage of work that affects the North-west lava flow, Western Springs Outstanding Natural Feature (ONF ID 132) and submitted with the relevant Outline Plan.

The CMP must include how construction methods and design will avoid effects on the North-west lava flow, Western Springs. This includes the location and design of the pier(s) to be located in the North-west lava flow, Western Springs ONF and the location and volume as well as type of earthworks required to construct the pier(s). If rock breaking is required, the plan must include proposed levels of vibration and an assessment of possible impacts on the face of the lava flow.

Modification of the Outstanding Natural Feature (North-west lava flow, Western Springs, ID 132) shall be restricted to the completed footprint of the proposed works.

Material extracted from earthworks must be re-used for backfilling or reinstatement purposes to the extent possible. All excess rock, sand, soil or any other material beyond what is re-used must be disposed of outside of the Outstanding Natural Feature Overlay

**Suggested conditions for NoR 3, Harbour View Pleistocene terraces Outstanding Natural Feature ID 40**

Modification of the Outstanding Natural Feature (Harbour View Pleistocene terraces, ID 40) shall be restricted to the completed footprint of the proposed works.

Surrounding areas of the Outstanding Natural Feature (Harbour View Pleistocene terraces, ID 40) shall be protected from ground disturbance, vehicles, equipment movements, and storage of materials.

Material extracted from earthworks in the Outstanding Natural Feature (Harbour View Pleistocene terraces, ID 40) must be re-used for backfilling or reinstatement purposes to the extent possible. All excess rock, sand, soil or any other material beyond what is re-used must be disposed of outside of the Outstanding Natural Feature Overlay

5.0 Designation Review Matrix (Kate Lewis – Outstanding Natural Features)				
NOR number	Location Description	Information Adequacy (High / Moderate / Low)	Key Issues Identified	Comments / Recommendations
NoR 1	Busway between Brigham Creek Rarawaru station and north of Westgate Te Waiarohia station (including stations, Park and Ride and all local road connections) (0.3km length)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low		<i>Not applicable to Outstanding Natural Features</i>
NoR 2	Busway between north of Westgate Te Waiarohia station and north of Royal Road Mānutewhau station (including stations, Park and Ride and all local road connections) (3.3km length)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low		<i>Not applicable to Outstanding Natural Features</i>
NoR 3	Busway between Royal Road Mānutewhau Station and Te Whau River (including all stations and local road connections) (5km length)	<input checked="" type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low	No acknowledgement of the Harbour View Pleistocene terraces in the Designation conditions	A condition is requested to protect the feature adjacent to the proposed works.
NoR 4	Brigham Creek Rarawaru station including Park and Ride (within NoR 1)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low		<i>Not applicable to Outstanding Natural Features</i>
NoR 5	Westgate Te Waiarohia station (within NoR 2)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low		<i>Not applicable to Outstanding Natural Features</i>
NoR 6	Royal Road Mānutewhau station (within NoR 3)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low		<i>Not applicable to Outstanding Natural Features</i>
NoR 7	Lincoln Road Wai o Pareira station (within NoR 3)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low		<i>Not applicable to Outstanding Natural Features</i>
NoR 8	Te Atatū Ōrangihina station (within NoR 3)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low		<i>Not applicable to Outstanding Natural Features</i>
NoR 9	Busway between Waterview interchange and west of Ivanhoe Road (including all stations and local road connections) (2.7km length)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input checked="" type="checkbox"/> Low	<ul style="list-style-type: none"> <li>Lack of detail for bridge construction and pier / support design over Waitītiko / Meola Creek and Northwest Motorway Lava flow</li> <li>Substantial scale / impacts of bridge construction in the lava flow of which the face is Northwest Motorway Lava flow and potentially in Waitītiko / Meola Creek</li> </ul>	<p>The location and method of construction of the structural supports for the bridges will require checks to confirm that they will not damage the Outstanding Natural Features.</p> <p>The proposed bridge over Waitītiko / Meola Creek and associated earthworks within Waitītiko / Meola Creek may involve substantial landform modification which could impact the flow and integrity of the stream.</p> <p>The proposed bridge over the Northwest Motorway Lava flow may involve substantial rock breaking and vibration which could impact the face of the lava flow that is the ONF.</p>
NoR 10	Busway between Ivanhoe Road and Ian McKinnon Drive (including all stations and local road connections) (2.7km length)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low		<i>Not applicable to Outstanding Natural Features</i>
NoR 11	Point Chevalier station (within NoR 9)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low		<i>Not applicable to Outstanding Natural Features</i>
NoR 12	Western Springs station (within NoR 10)	<input type="checkbox"/> High <input type="checkbox"/> Mod <input type="checkbox"/> Low		<i>Not applicable to Outstanding Natural Features</i>