

**Elected Member Briefing – 30 April 2019  
Committee Room 1**

<b>Time</b>	<b>Topic</b>	<b>HCC Presenter(s)</b>	<b>Open / Closed</b>	<b>Time Req'd (mins)</b>
10.30am	Rototuna Village: Community Engagement Feedback (Community, Services and Environment Committee)	Lance Vervoort/Natasha Ryan <u>External</u> Students from Rototuna School	Open	45
11.15am	Garden Place – Expressions of Interest (Council)	Lance Vervoort/Natasha Ryan	Open	15
11.30am	Peacocke Programme: Waikato River Bridge (Growth & Infrastructure Committee)	Chris Allen /Tahl Lawrence/Andrew Parsons	Open	30
12.00pm	<b>MEETING ENDS</b>			

# Rototuna Town Centre

## ➤ Options & Feasibility Study: Engagement Feedback



# Purpose and agenda

- Briefing Purpose:
  - Inform the 14 May 2019 CSE Committee decision on a single option
  - Summarise community feedback to be addressed through a revised design.
- Agenda:
  - Project Overview
  - Engagement Purpose & Process
  - Overview of Feedback
  - Next Steps
  - Student Presentation
  - Questions

# Project overview



## PROJECT PURPOSE:

Identify what community facilities will go where (inside the red border) and how they will be funded:

- Bookable rooms and library
- Town square
- Carparks
- Potential pool partnership

Be ready to design next financial year

## SUCCESS

Rototuna Town Centre is a great place to live, work, play and visit

# Engagement Purpose and Process

## ENGAGEMENT PURPOSE:

- Community members feel:

*“I like spending time in the village, it reflects who I am and connects me with others in my community.”*

- A village design that is visibly influenced by the community engagement



# Engagement Purpose and Process

## PROCESS

- Meetings / Interviews with key groups
- <https://www.hamilton.govt.nz/our-city/citydevelopment/rototuna/Pages/Rototuna-Village.aspx>
- HCC & North Eastern Community Hub facebook group
- 10,000 Brochures
- 3 community conversation days
- Online and paper feedback forms
- Student led project



# Overview of Feedback

## SUMMARY

- 1,000 individual touchpoints
- Overall: people want Rototuna Village to be inclusive, welcoming and unique
- Most common theme for ‘What I like about...’
  - Rototuna A: Proximity of parking to the proposed pool
  - Rototuna B: Connectedness and a ‘sense of place’



# Overview of Feedback

FEEDBACK THEME	DESIGN RESPONSE
safety (transport and personal)	Prioritise cycle and walking: narrow road, wider well lit cycle and walkways with passive surveillance opportunities
a strong connection between spaces	Review visual and/or physical connections between key spaces
a strong 'heart' within the village	Add design detail to town square – connection with adjacent buildings, shape, paved and green spaces, open but with intimate spaces for smaller groups
Impact of active recreational elements on adjacent uses	Review locations and develop activity type detail

# Overview of Feedback

FEEDBACK THEME	DESIGN RESPONSE
defined places for events and creativity	Consider design detail for village square to show how spaces may be used
availability of parking for specific groups	Consider inclusion of parking provision for specific groups
elements such as culture, connectivity, colour	Consider for design brief
creation of a sense of arrival	Review design for opportunities for 'entranceways'

# Overview of Feedback

## **OTHER ASPECTS TO CONSIDER IN THE NEXT OPTION**

- Defined places to meet and gather
- flexibility within the library and bookable spaces
- Inclusive (accessible) design
- Plants, plants and more plants
- Public toilets
- Parking for bikes and scooters
- Connectedness to neighbourhood
- Public art

# Next Steps

- ~ 8 May 2019 Elected Member meetings regarding 'Rototuna Revisited' (the next design)
- 14 May 2019 CSE Committee decision on option to develop Implementation Plan  
Staff develop Implementation Plan: Update programme, budget, risks & issues (including progress third party discussions and interdependent projects)
- 25 June 2019 CSE Committee decision on option for design and implementation.

# Thank you

- Rototuna High School Year 12/13 Student Presentation
- Questions



WE ARE HERE  
WE ARE HERE  
WE ARE HERE  
WE ARE HERE  
WE ARE HERE



"A person is a person, no matter how small"  
- Horton the elephant -



Engaging

through

Empathy

# Engaging through Empathy

GROUP A: ENGAGED

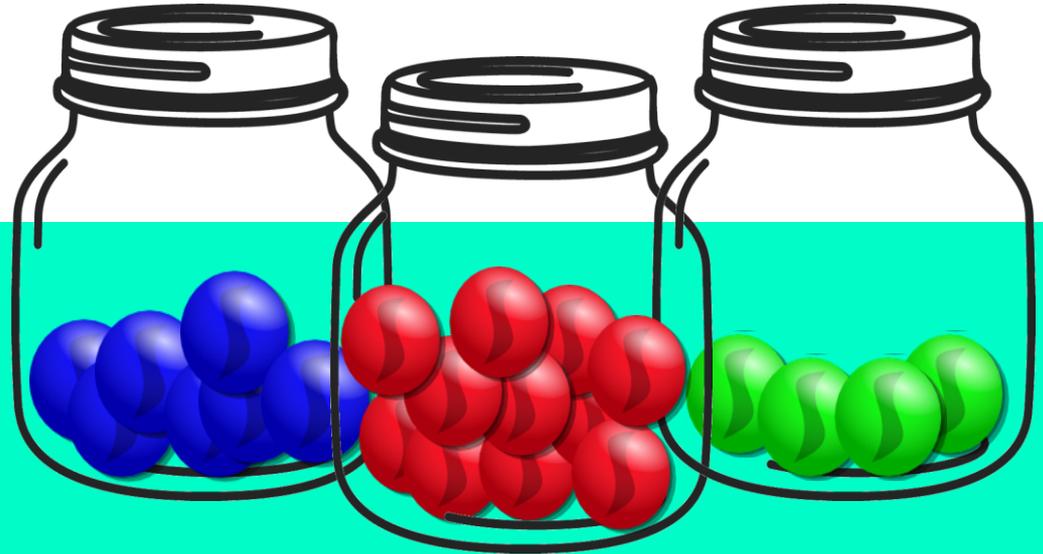
GROUP B: DISENGAGED

GROUP C: INTROVERTS

GROUP D: DISABILITIES

GROUP E: IMMIGRANTS

1. Spaces and Places that feel welcoming to everyone. - 49
2. Community centre and Library. - 72
3. Recreation and Play Activity areas. - 25
4. Creative Outdoor event areas. - 135
5. Other - 37



Thank You



# Garden Place EOI

## Questions

- Do we proceed with the EOI for Garden Place at this time
- If not, given all the potential projects, is it reasonable to assume that Garden Place and Worley Place shared space are relatively high priority within the CBD?

An aerial photograph of a wide river valley. In the foreground, a large green field is divided into sections by dirt paths, with a herd of cattle grazing in one of the sections. A small white building is visible in the middle ground. The river flows through the valley, bordered by dense green trees. In the background, a town is visible, followed by rolling hills and a range of mountains under a clear blue sky with light clouds.

# Bridge form and aesthetics update

Design development and evaluation - Council Briefing 30 April 2019

# Purpose of briefing

1. Re-visit site features and context
2. Present feedback from stakeholder workshops
3. Present technical assessments
4. Confirm next steps

*Our thinking has been “sparked”; now time to put thinking to paper*

# Background

Elected Member briefing on 29 November 2018, followed by G&I on 6 December:

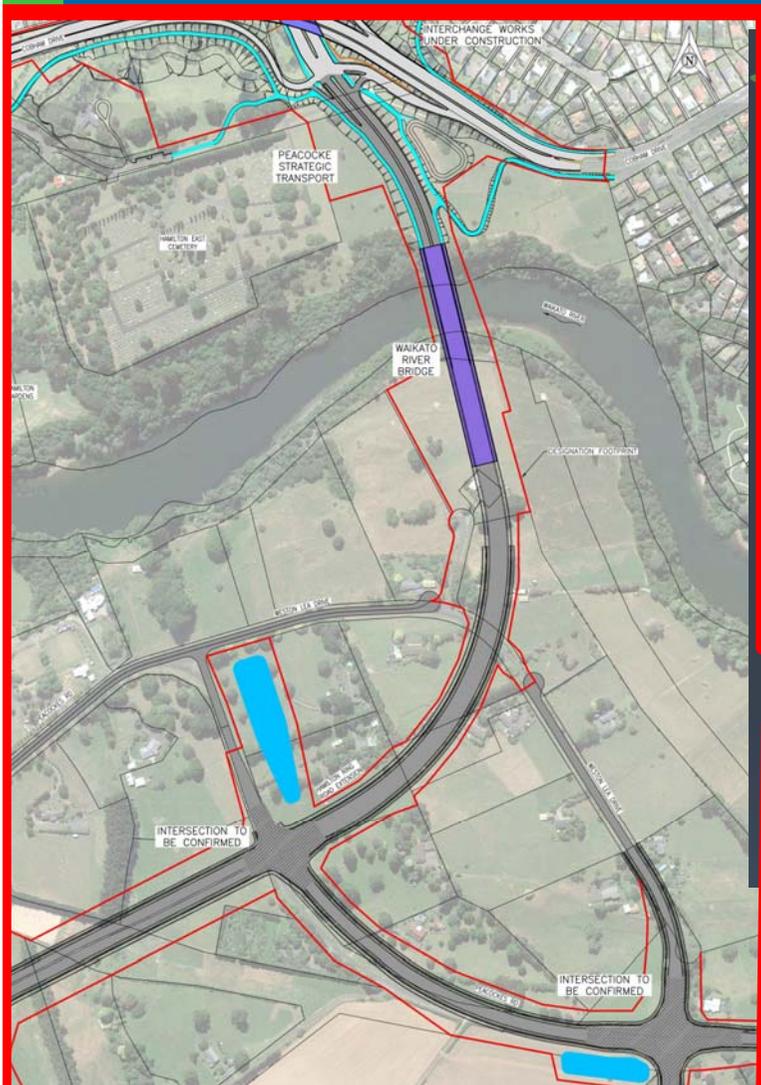
- proposed process to develop and evaluate bridge form and aesthetics
- sought feedback, discussion and approval
- confirmed Council as a governance role and updates through Elected Member briefings.

# Option Development & Evaluation Process – We are here

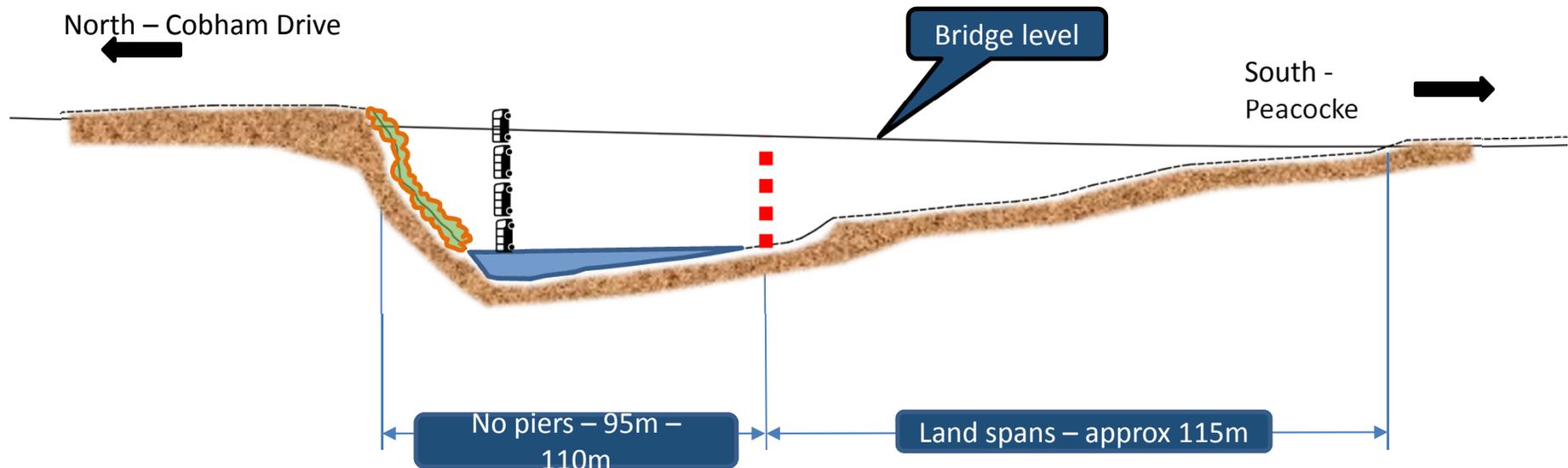
Process stages:

- ✓ Multi stage approach – hear from wide range of interested parties to begin with
- ✓ Use a range of technical experts to listen and rationalise inputs into list of bridge options
- **Assess options using set criteria as well as existing project constraints to identify trade-offs/preferences**
- Seek Council endorsement / approval at each stage
- Feed back to stakeholders at each stage.

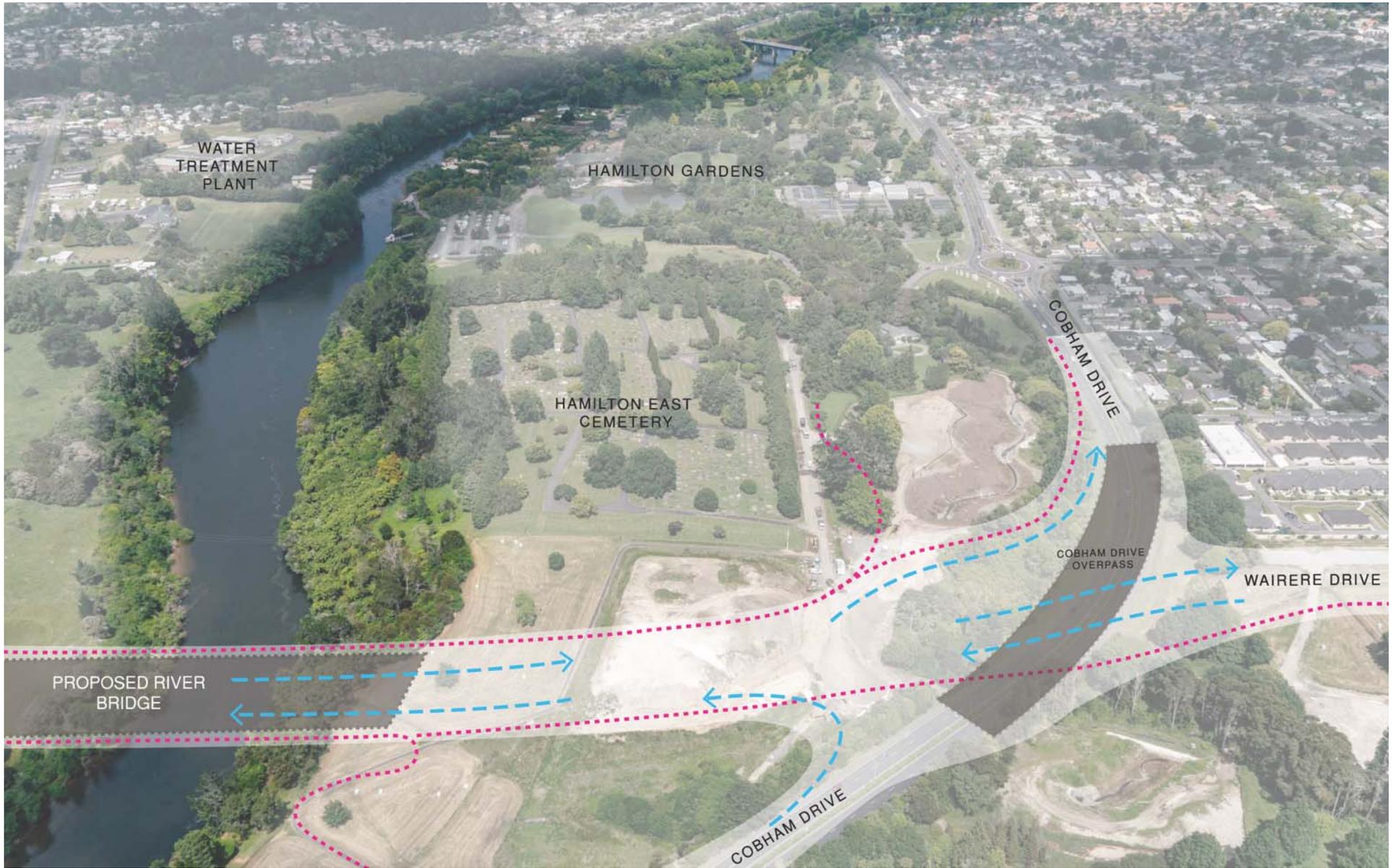
# Site context and features



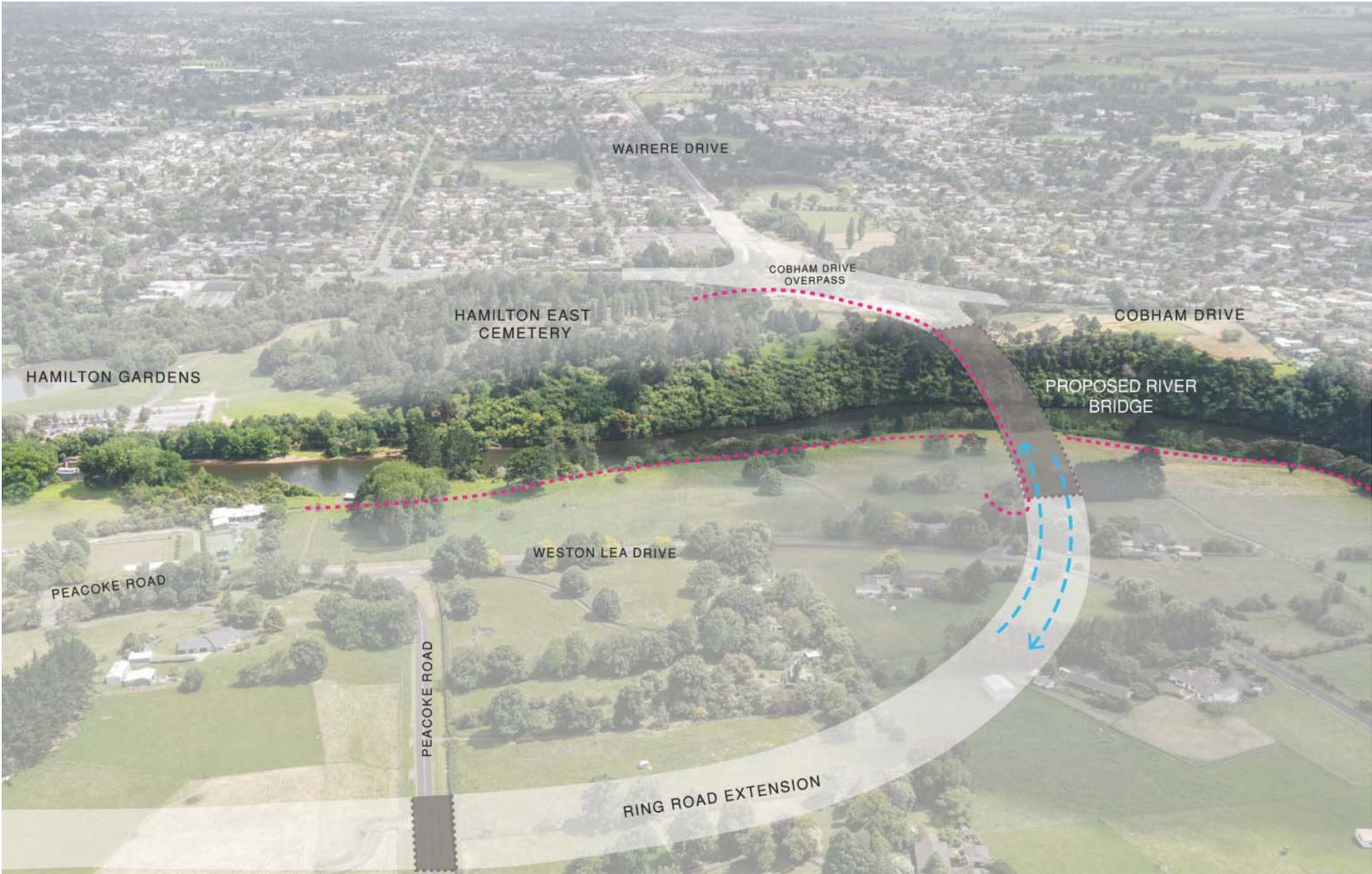
# Bridge cross section



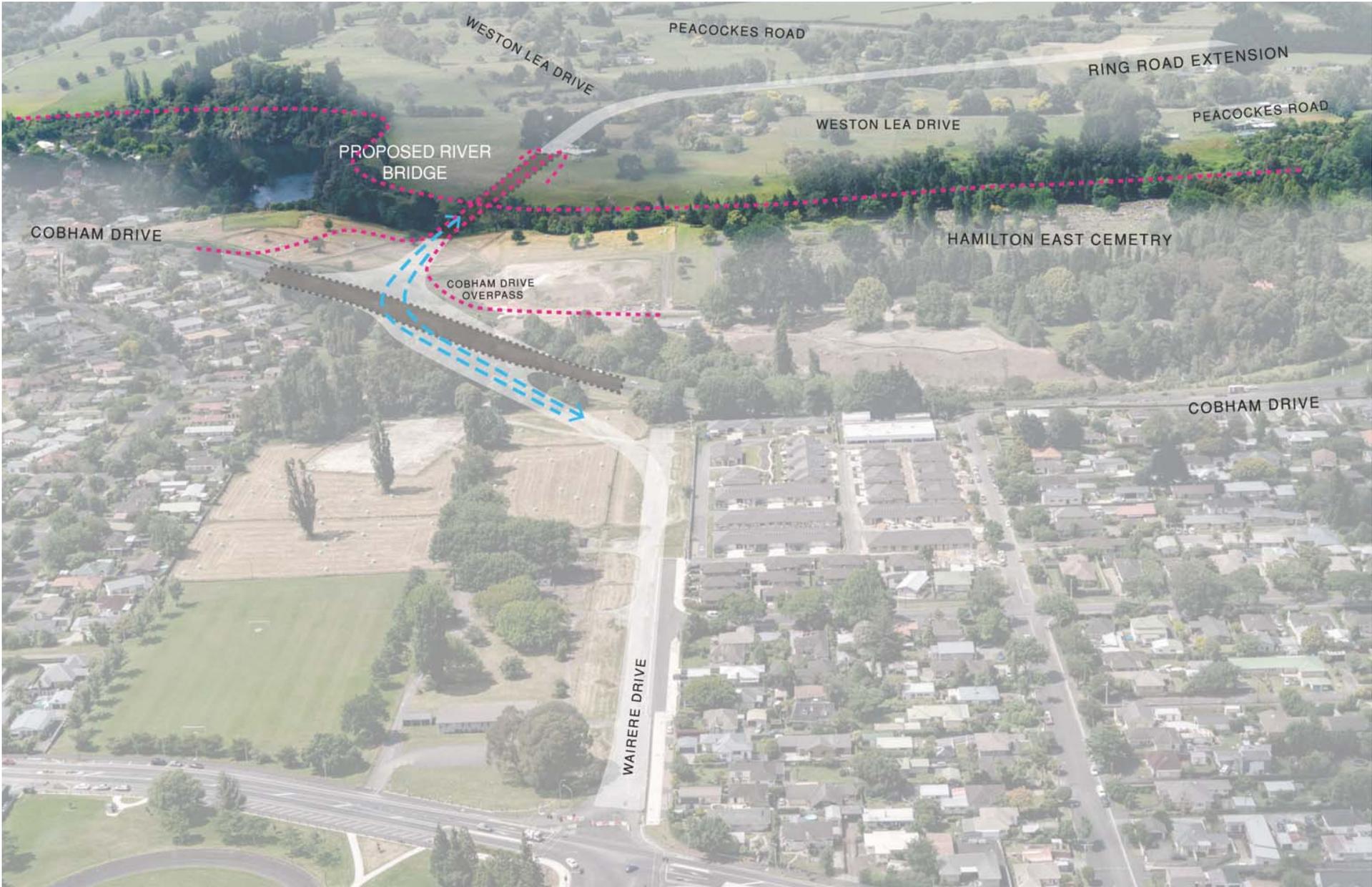


















PROPOSED RIVER BRIDGE

TO BE RELOCATED

APPROXIMATE PIER POSITION











# Stakeholder inputs

Stakeholder workshop themes:

- opportunity
- flexibility
- ecological and environmental impacts
- recognition and integration with surrounding areas
- safety.

# Stakeholder inputs

From Peacocke Your Neighbourhood event:

- focus was all about good connections, accessibility, safe and generous space allocation for a range of users
- very little interest in an aesthetic landmark bridge
- success is creating a great experience (non car based).

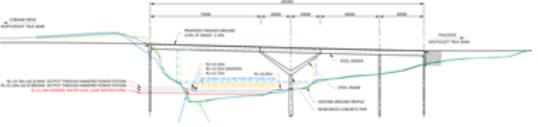
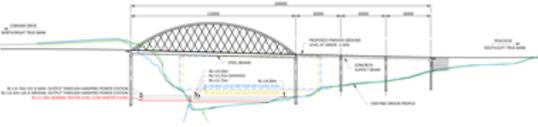
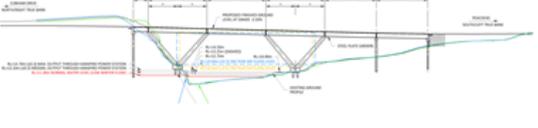
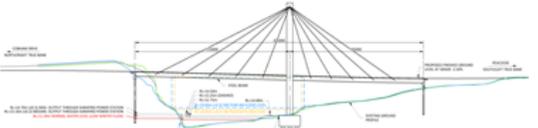


# Technical assessment

Technical team have:

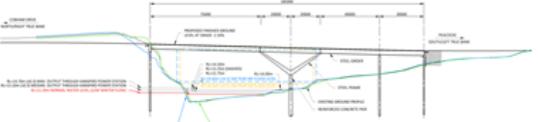
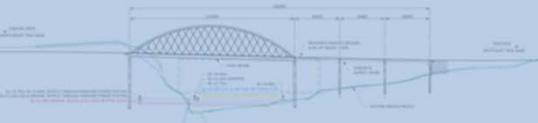
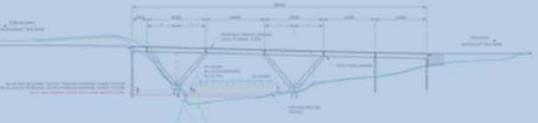
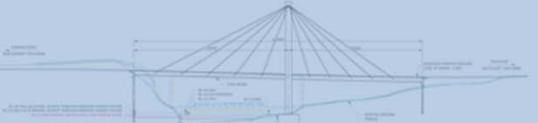
- collaborated in stakeholder workshops to understand inputs
- assessed the technical considerations together with outcomes of the wider stakeholder involvement
- welcomed the challenge of balancing great aesthetic outcomes with time, budget and constructability constraints
- assembled an emerging list of structural bridge forms for further evaluation and aesthetic development
- established cost estimates of options ranging from \$25M to \$110M.

## Peacocke Waikato River Bridge – Structural Form Option Assessment

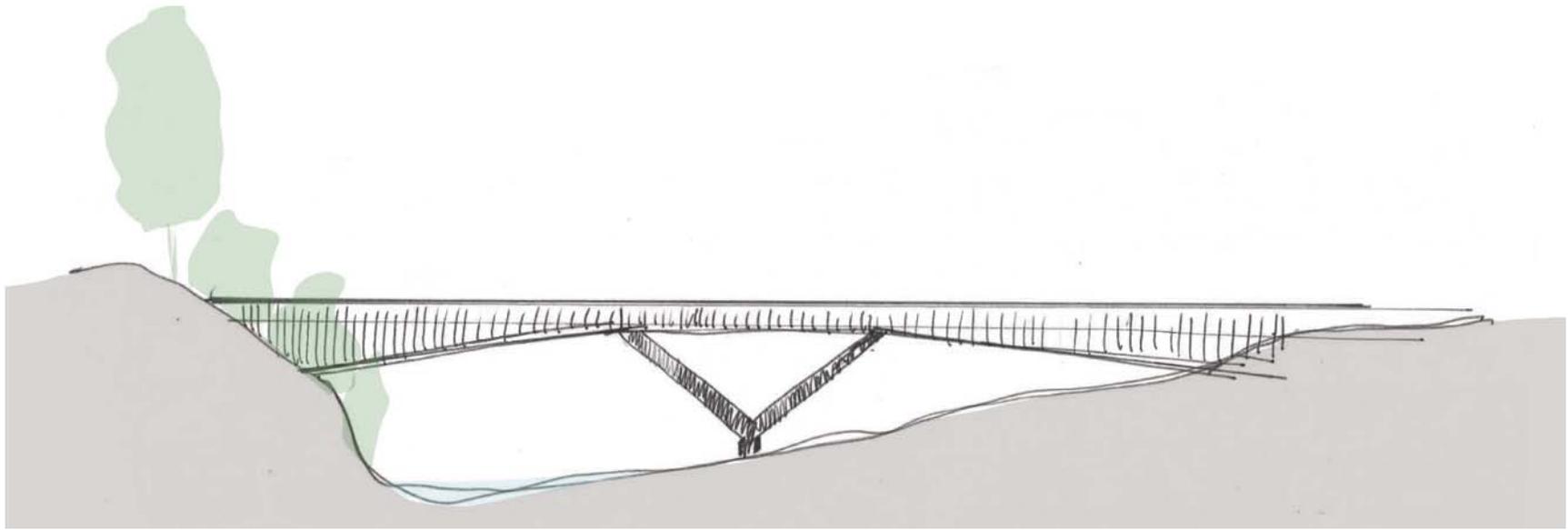
Structural bridge form option	Description	Aesthetic Opportunity ✓ = low ✓✓✓ = high (All structures have acceptable aesthetic potential)	Respond to stakeholder inputs ✓ = poorly ✓✓✓ = very well	Whole of life costs \$ = low \$\$\$\$ = high
<p><b>Option A – Structural steel deck with central “Y” pier</b></p> 	<ul style="list-style-type: none"> <li>Concrete columns/piers with structural steel used for Y-arrangement and steel deck to span between piers</li> <li>Strategic services can be concealed services within boxed deck arrangement, in addition to providing internal access maintenance (within the deck) without scaffolding etc.</li> <li>Approximate deck depth = 3m</li> <li>Assumes 30m deck cross-section</li> <li>Opportunity to vary span arrangements on southern bank (land spans) to <u>optimise</u> outcome to provide visual balance and recreational connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Slim simple structure with one central steel pier</li> <li>Balanced visual profile</li> <li>Limited landmark opportunity with no vertical feature above deck</li> <li>Unique and uncommon form</li> <li>Scope to aesthetically develop pier and underside of bridge</li> <li>Scope for varying balustrade treatments linking back to pier and underside</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓✓</li> <li>Clear flat deck protects opportunity for space reallocation in future</li> <li>Caters for services within deck with easy safe access</li> <li>Lowest environmental and ecological (bats) impact during construction and future O&amp;M</li> <li>Relatively standard construction methodology (although very large scale)</li> </ul>	<p>\$</p> <p>Fits within HIF Business Case Budgets</p> <p>Reasonable O&amp;M costs</p>
<p><b>Option B – Network arch across river with piers across land span</b></p> 	<ul style="list-style-type: none"> <li>Compared to other conventional bridges the system is structurally very efficient so result in relatively light structures.</li> <li>The large arches are typically constructed of structural steel (some with concrete infill), and the cross-over hangers typically made of wound steel cable.</li> <li>Strategic services would be visually suspended underneath the deck structure.</li> <li>Two local examples of this bridge (although this project is significantly larger in scale) include the Waikato River bridge along Eastern Taupo Arterial, and the recently constructed pedestrian/cycle bridge over Waikato River near <u>Horotiu</u>.</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓</li> <li>Strong bridge form generally</li> <li>Visual balance challenge due to height difference of river banks</li> <li>Variations of this form are possible</li> <li>Symmetry and balance of land span may be an issue visually as arch only spans river</li> <li>Side profile perhaps implies a simpler structure, where there would likely be up to 4 arch spans.</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Structural form above deck could limit deck space reallocation</li> <li>Slim deck - services would be suspended under deck which makes access difficult</li> <li>Complex vertical elements negatively impact bats</li> <li>Height risks (climbing, O&amp;M, suicide)</li> </ul>	<p>\$\$</p> <p>Low initial construction</p> <p>Very high ongoing O&amp;M costs (associated with H&amp;S compliance)</p>
<p><b>Option C – Structural steel deck with “V” shaped piers</b></p> 	<ul style="list-style-type: none"> <li>Concrete (or steel) V-shaped piers formed from the ground level up to bridge deck level. Steel girders used to form the structural spans between each of the V-piers.</li> <li>Strategic services can be concealed services within boxed deck arrangement, in addition to providing internal access maintenance (within the deck) without scaffolding etc. Approximate girder depth = 2m</li> <li>Opportunity to vary span arrangements on southern bank (land spans) to <u>optimise</u> outcome to provide visual balance and recreational connectivity</li> <li>Similar form to that used on the Waikato River crossing on Waikato Expressway <u>Ngaruawahia</u> Section, although scale of the V-shapes <u>are</u> significantly larger on this project (approximately 4-times scale).</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓</li> <li>Limited landmark opportunity with no vertical feature above deck</li> <li>Relationship with northern bank where significant works required is cluttered</li> <li>V piers provide plenty of space for aesthetic refinement and treatments</li> <li>Visually unbalanced between north and south banks.</li> <li>Similar form to existing bridge at <u>Horotiu</u> (SH1) – not new (although this project would be 4 times larger)</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓</li> <li>Caters for services within deck with easy safe access</li> <li>Extensive vegetation removal on the north bank for access</li> <li>Erosion and scour likely at base of northern pier</li> <li>Clear flat deck protects opportunity for space reallocation</li> <li>Difficult a complex construction due to north bank access.</li> </ul>	<p>\$\$\$</p> <p>Higher construction and O&amp;M costs than option A.</p> <p>Piles on north bank <u>req's</u> ongoing scour mgmt.</p>
<p><b>Option D – Cable stayed</b></p> 	<ul style="list-style-type: none"> <li>Large number of variations of this form of bridge are possible (single central column, portal column structure, vertical or tilted columns etc)</li> <li>Relies on having very tall column structure (up to 100m tall) to enable cable strands to develop sufficient tension to support bridge deck</li> <li>Column is centrally positioned (along bridge length) so weight is evenly distributed either side of column. Column size usually very large (in order of 10m to 20m diameter) because it bears weight of entire bridge.</li> <li>Strands are typically steel wound cables (or similar).</li> <li>Depth of deck can be more slender (approx. 2m or less) as the cable positions will set intermediate span length which can <u>minimise</u> structural demands on deck</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓✓</li> <li>Significant scale and size presents WOW opportunities from visual presence perspective</li> <li>A landmark structure</li> <li>Scale/size of structure does mean larger costs are involved with any aesthetic refinement</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Structural form above deck could limit deck space reallocation</li> <li>Caters for services within deck with easy safe access</li> <li>Very complex/risky construction, new methodology to NZ which introduces significant time and cost risks</li> <li>Complex vertical elements negatively impact bats</li> </ul>	<p>\$\$\$\$</p> <p>Significantly higher than HIF Business Case Budgets</p> <p>High O&amp;M costs</p>

Green shaded cells indicate preferred option following assessment against technical and stakeholder inputs

## Peacocke Waikato River Bridge – Structural Form Option Assessment

Structural bridge form option	Description	Aesthetic Opportunity ✓ = low ✓✓✓ = high (All structures have acceptable aesthetic potential)	Respond to stakeholder inputs ✓ = poorly ✓✓✓ = very well	Whole of life costs \$ = low \$\$\$\$ = high
<p><b>Option A – Structural steel deck with central “Y” pier</b></p> 	<ul style="list-style-type: none"> <li>Concrete columns/piers with structural steel used for Y-arrangement and steel deck to span between piers</li> <li>Strategic services can be concealed services within boxed deck arrangement, in addition to providing internal access maintenance (within the deck) without scaffolding etc</li> <li>Approximate deck depth = 3m</li> <li>Assumes 30m deck cross-section</li> <li>Opportunity to vary span arrangements on southern bank (land spans) to <u>optimise</u> outcome to provide visual balance and recreational connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Slim simple structure with one central steel pier</li> <li>Balanced visual profile</li> <li>Limited landmark opportunity with no vertical feature above deck</li> <li>Unique and uncommon form</li> <li>Scope to aesthetically develop pier and underside of bridge</li> <li>Scope for varying balustrade treatments linking back to pier and underside</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓✓</li> <li>Clear flat deck protects opportunity for space reallocation in future</li> <li>Caters for services within deck with easy safe access</li> <li>Lowest environmental and ecological (bats) impact during construction and future O&amp;M</li> <li>Relatively standard construction methodology (although very large scale)</li> </ul>	<p style="text-align: center;"><b>\$</b></p> <p>Fits within HIF Business Case Budgets</p> <p>Reasonable O&amp;M costs</p>
<p><b>Option B – Network arch across river with piers across land span</b></p> 	<ul style="list-style-type: none"> <li>Compared to other conventional bridges the system is structurally very efficient so result in relatively light structures.</li> <li>The large arches are typically constructed of structural steel (some with concrete infill), and the cross-over hangers typically made of wound steel cable.</li> <li>Strategic services would be visually suspended underneath the deck structure.</li> <li>Two local examples of this bridge (although this project is significantly larger in scale) include the Waikato River bridge along Eastern Taupo Arterial, and the recently constructed pedestrian/cycle bridge over Waikato River near <u>Horotiu</u>.</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓</li> <li>Strong bridge form generally</li> <li>Visual balance challenge due to height difference of river banks</li> <li>Variations of this form are possible</li> <li>Symmetry and balance of land span may be an issue visually as arch only spans river</li> <li>Side profile perhaps implies a simpler structure, where there would likely be up to 4 arch spans.</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Structural form above deck could limit deck space reallocation</li> <li>Slim deck - services would be suspended under deck which makes access difficult</li> <li>Complex vertical elements negatively impact bats</li> <li>Height risks (climbing, O&amp;M, suicide)</li> </ul>	<p style="text-align: center;"><b>\$\$</b></p> <p>Low initial construction</p> <p>Very high ongoing O&amp;M costs (associated with H&amp;S compliance)</p>
<p><b>Option C – Structural steel deck with “V” shaped piers</b></p> 	<ul style="list-style-type: none"> <li>Concrete (or steel) V-shaped piers formed from the ground level up to bridge deck level. Steel girders used to form the structural spans between each of the V-piers.</li> <li>Strategic services can be concealed services within boxed deck arrangement, in addition to providing internal access maintenance (within the deck) without scaffolding etc Approximate girder depth = 2m</li> <li>Opportunity to vary span arrangements on southern bank (land spans) to <u>optimise</u> outcome to provide visual balance and recreational connectivity</li> <li>Similar form to that used on the Waikato River crossing on Waikato Expressway <u>Ngaruawahia</u> Section, although scale of the V-shapes are significantly larger on this project (approximately 4-times scale).</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓</li> <li>Limited landmark opportunity with no vertical feature above deck</li> <li>Relationship with northern bank where significant works required is cluttered</li> <li>V piers provide plenty of space for aesthetic refinement and treatments</li> <li>Visually unbalanced between north and south banks.</li> <li>Similar form to existing bridge at <u>Horotiu</u> (SH1) – not new (although this project would be 4 times larger)</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓</li> <li>Caters for services within deck with easy safe access</li> <li>Extensive vegetation removal on the north bank for access</li> <li>Erosion and scour likely at base of northern pier</li> <li>Clear flat deck protects opportunity for space reallocation</li> <li>Difficult a complex construction due to north bank access.</li> </ul>	<p style="text-align: center;"><b>\$\$\$</b></p> <p>Higher construction and O&amp;M costs than option A.</p> <p>Piles on north bank <u>reqs</u> ongoing scour mgmt.</p>
<p><b>Option D – Cable stayed</b></p> 	<ul style="list-style-type: none"> <li>Large number of variations of this form of bridge are possible (single central column, portal column structure, vertical or tilted columns etc)</li> <li>Relies on having very tall column structure (up to 100m tall) to enable cable strands to develop sufficient tension to support bridge deck</li> <li>Column is centrally positioned (along bridge length) so weight is evenly distributed either side of column. Column size usually very large (in order of 10m to 20m diameter) because it bears weight of entire bridge.</li> <li>Strands are typically steel wound cables (or similar).</li> <li>Depth of deck can be more slender (approx. 2m or less) as the cable positions will set intermediate span length which can <u>minimise</u> structural demands on deck</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓✓</li> <li>Significant scale and size presents WOW opportunities from visual presence perspective</li> <li>A landmark structure</li> <li>Scale/size of structure does mean larger costs are involved with any aesthetic refinement</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Structural form above deck could limit deck space reallocation</li> <li>Caters for services within deck with easy safe access</li> <li>Very complex/risky construction, new methodology to NZ which introduces significant time and cost risks</li> <li>Complex vertical elements negatively impact bats</li> </ul>	<p style="text-align: center;"><b>\$\$\$\$</b></p> <p>Significantly higher than HIF Business Case Budgets</p> <p>High O&amp;M costs</p>

Green shaded cells indicate preferred option following assessment against technical and stakeholder inputs



# Timeframes

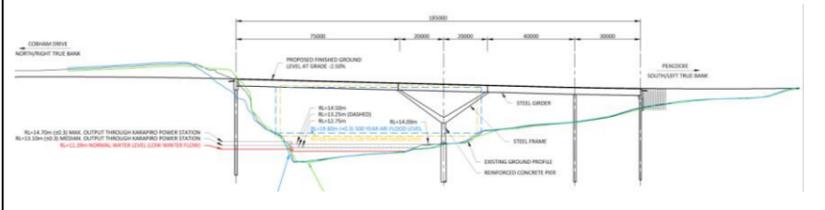
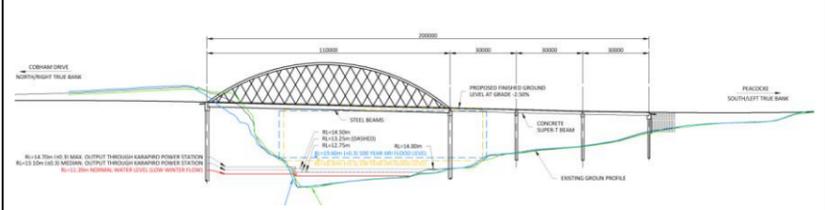
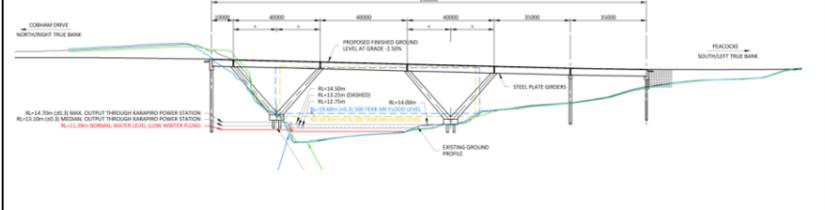
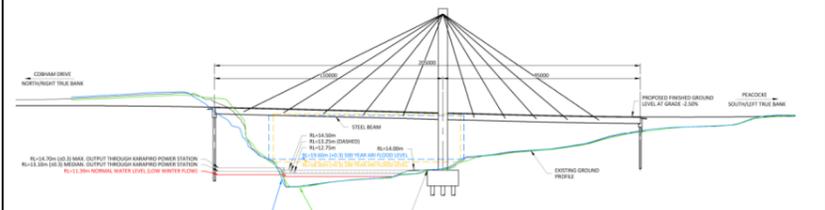
- May 2019 – Develop and refine a preferred bridge form
- June 2019 – Recommend & Confirm preferred bridge form
- Late 2019 – Engage with construction industry and begin procurement process
- 2020 – Begin construction
- **Mid 2023 - Bridge (and roading) complete and open for use as required by HIF**

These timeframes are extremely tight – any delay will impact HIF agreement deadlines.

# Next steps

- Refine aesthetic response for Option A (opportunity for additional investment in greater visual outcomes?)
- Continue working closely with key stakeholders, Iwi and technical experts
- Progress deck space allocation opportunities and connectivity through Access Hamilton Task Force
- Refine and review construction costs and risks

# Peacocke Waikato River Bridge – Structural Form Option Assessment

Structural bridge form option	Description	Aesthetic Opportunity ✓ = low ✓✓✓✓ = high (All structures have acceptable aesthetic potential)	Respond to stakeholder inputs ✓ = poorly ✓✓✓✓ = very well	Whole of life costs \$ = low \$\$\$\$ = high
<p><b>Option A – Structural steel deck with central “Y” pier</b></p> 	<ul style="list-style-type: none"> <li>Concrete columns/piers with structural steel used for Y-arrangement and steel deck to span between piers</li> <li>Strategic services can be concealed services within boxed deck arrangement, in addition to providing internal access maintenance (within the deck) without scaffolding etc</li> <li>Approximate deck depth = 3m</li> <li>Assumes 30m deck cross-section</li> <li>Opportunity to vary span arrangements on southern bank (land spans) to optimise outcome to provide visual balance and recreational connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Slim simple structure with one central steel pier</li> <li>Balanced visual profile</li> <li>Limited landmark opportunity with no vertical feature above deck</li> <li>Unique and uncommon form</li> <li>Scope to aesthetically develop pier and underside of bridge</li> <li>Scope for varying balustrade treatments linking back to pier and underside</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓✓</li> <li>Clear flat deck protects opportunity for space reallocation in future</li> <li>Caters for services within deck with easy safe access</li> <li>Lowest environmental and ecological (bats) impact during construction and future O&amp;M</li> <li>Relatively standard construction methodology (although very large scale)</li> </ul>	<p>\$</p> <p>Fits within HIF Business Case Budgets</p> <p>Reasonable O&amp;M costs</p>
<p><b>Option B – Network arch across river with piers across land span</b></p> 	<ul style="list-style-type: none"> <li>Compared to other conventional bridges the system is structurally very efficient so result in relatively light structures.</li> <li>The large arches are typically constructed of structural steel (some with concrete infill), and the cross-over hangers typically made of wound steel cable.</li> <li>Strategic services would be visually suspended underneath the deck structure.</li> <li>Two local examples of this bridge (although this project is significantly larger in scale) include the Waikato River bridge along Eastern Taupo Arterial, and the recently constructed pedestrian/cycle bridge over Waikato River near Horotiu.</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓</li> <li>Strong bridge form generally</li> <li>Visual balance challenge due to height difference of river banks</li> <li>Variations of this form are possible</li> <li>Symmetry and balance of land span may be an issue visually as arch only spans river</li> <li>Side profile perhaps implies a simpler structure, where there would likely be up to 4 arch spans.</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Structural form above deck could limit deck space reallocation</li> <li>Slim deck - services would be suspended under deck which makes access difficult</li> <li>Complex vertical elements negatively impact bats</li> <li>Height risks (climbing, O&amp;M, suicide)</li> </ul>	<p>\$\$</p> <p>Low initial construction</p> <p>Very high ongoing O&amp;M costs (associated with H&amp;S compliance)</p>
<p><b>Option C – Structural steel deck with “V” shaped piers</b></p> 	<ul style="list-style-type: none"> <li>Concrete (or steel) V-shaped piers formed from the ground level up to bridge deck level. Steel girders used to form the structural spans between each of the V-piers.</li> <li>Strategic services can be concealed services within boxed deck arrangement, in addition to providing internal access maintenance (within the deck) without scaffolding etc Approximate girder depth = 2m</li> <li>Opportunity to vary span arrangements on southern bank (land spans) to optimise outcome to provide visual balance and recreational connectivity</li> <li>Similar form to that used on the Waikato River crossing on Waikato Expressway Ngaruawahia Section, although scale of the V-shapes are significantly larger on this project (approximately 4-times scale).</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓</li> <li>Limited landmark opportunity with no vertical feature above deck</li> <li>Relationship with northern bank where significant works required is cluttered</li> <li>V piers provide plenty of space for aesthetic refinement and treatments</li> <li>Visually unbalanced between north and south banks.</li> <li>Similar form to existing bridge at Horotiu (SH1) – not new (although this project would be 4 times larger)</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓</li> <li>Caters for services within deck with easy safe access</li> <li>Extensive vegetation removal on the north bank for access</li> <li>Erosion and scour likely at base of northern pier</li> <li>Clear flat deck protects opportunity for space reallocation</li> <li>Difficult a complex construction due to north bank access.</li> </ul>	<p>\$\$\$</p> <p>Higher construction and O&amp;M costs than option A.</p> <p>Piles on north bank req's ongoing scour mgmt.</p>
<p><b>Option D – Cable stayed</b></p> 	<ul style="list-style-type: none"> <li>Large number of variations of this form of bridge are possible (single central column, portal column structure, vertical or tilted columns etc)</li> <li>Relies on having very tall column structure (up to 100m tall) to enable cable strands to develop sufficient tension to support bridge deck</li> <li>Column is centrally positioned (along bridge length) so weight is evenly distributed either side of column. Column size usually very large (in order of 10m to 20m diameter) because it bears weight of entire bridge.</li> <li>Strands are typically steel wound cables (or similar).</li> <li>Depth of deck can be more slender (approx. 2m or less) as the cable positions will set intermediate span length which can minimise structural demands on deck</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓✓</li> <li>Significant scale and size presents WOW opportunities from visual presence perspective</li> <li>A landmark structure</li> <li>Scale/size of structure does mean larger costs are involved with any aesthetic refinement</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Structural form above deck could limit deck space reallocation</li> <li>Caters for services within deck with easy safe access</li> <li>Very complex/risky construction, new methodology to NZ which introduces significant time and cost risks</li> <li>Complex vertical elements negatively impact bats</li> </ul>	<p>\$\$\$\$</p> <p>Significantly higher than HIF Business Case Budgets</p> <p>High O&amp;M costs</p>

Green shaded cells indicate preferred option following assessment against technical and stakeholder inputs





# Bridge form and aesthetics update

Design development and evaluation - Council Briefing 30 April 2019

# Purpose of briefing

1. Re-visit site features and context
2. Present feedback from stakeholder workshops
3. Present technical assessments
4. Confirm next steps

*Our thinking has been “sparked”; now time to put thinking to paper*

# Background

Elected Member briefing on 29 November 2018, followed by G&I on 6 December:

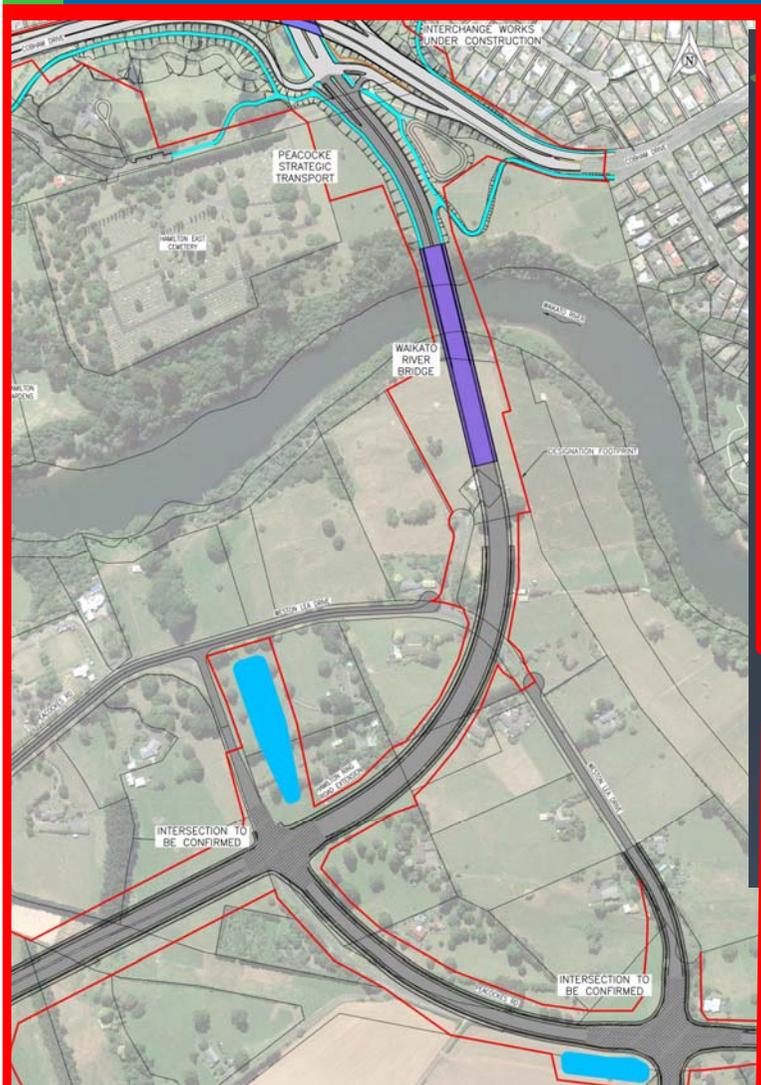
- proposed process to develop and evaluate bridge form and aesthetics
- sought feedback, discussion and approval
- confirmed Council as a governance role and updates through Elected Member briefings.

# Option Development & Evaluation Process – We are here

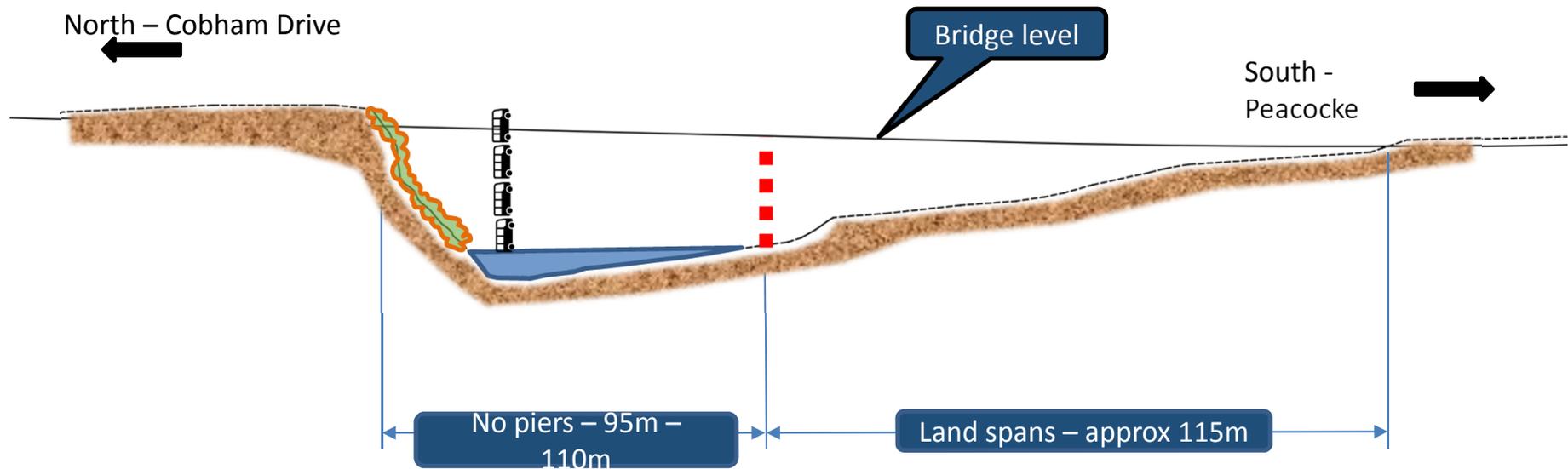
Process stages:

- ✓ Multi stage approach – hear from wide range of interested parties to begin with
- ✓ Use a range of technical experts to listen and rationalise inputs into list of bridge options
- **Assess options using set criteria as well as existing project constraints to identify trade-offs/preferences**
- Seek Council endorsement / approval at each stage
- Feed back to stakeholders at each stage.

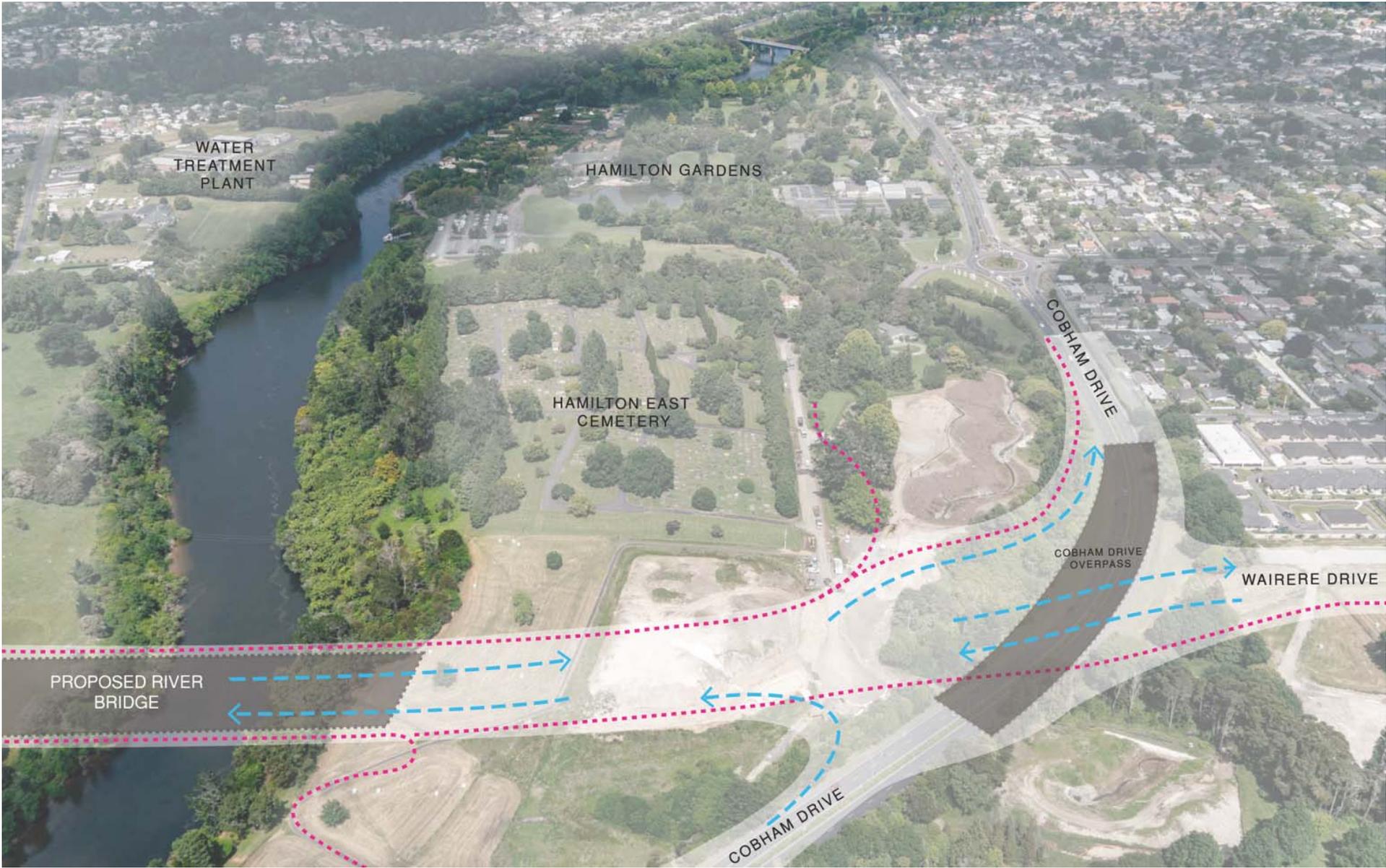
# Site context and features



# Bridge cross section



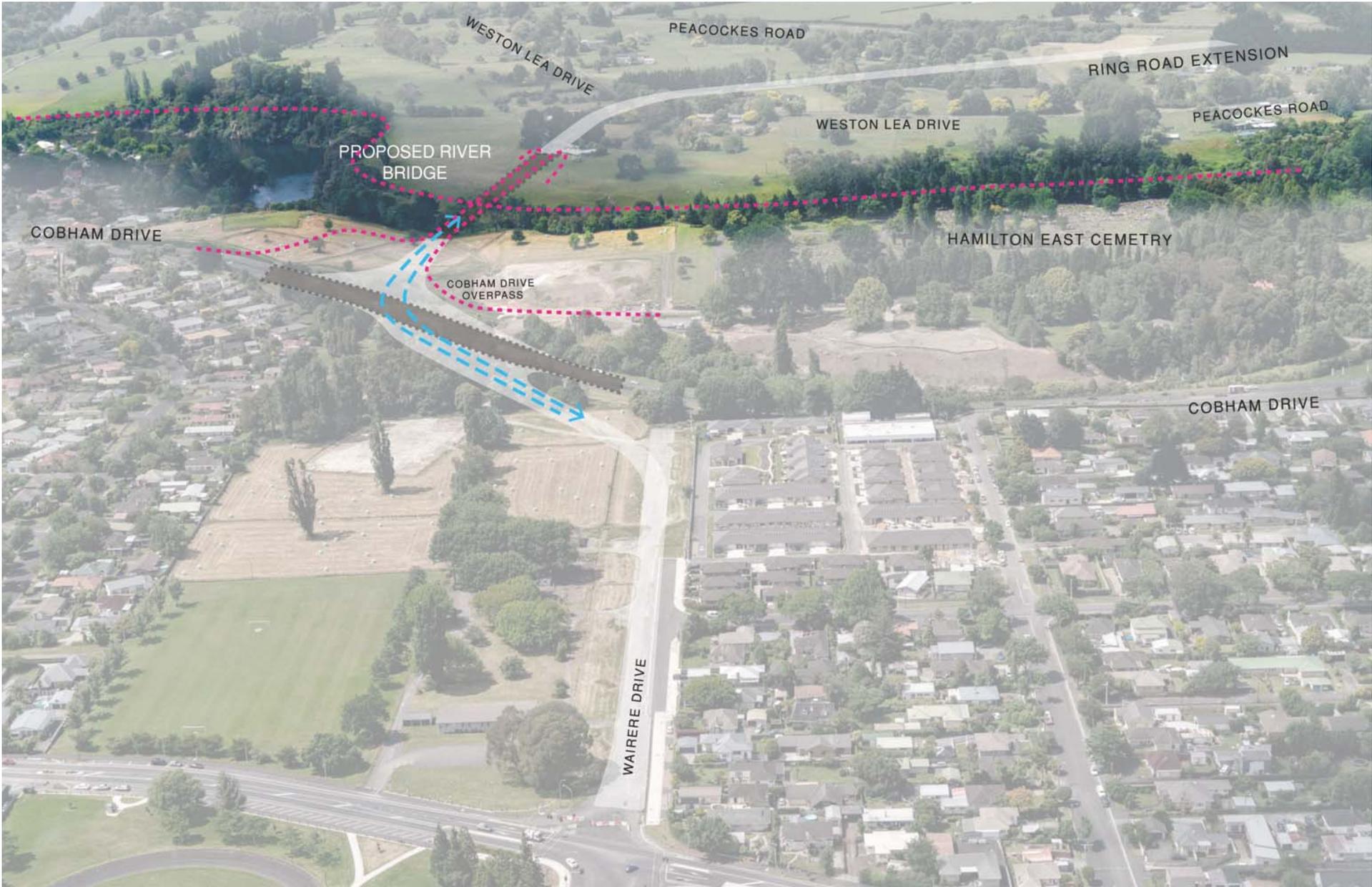


















PROPOSED RIVER BRIDGE

TO BE RELOCATED

APPROXIMATE PIER POSITION











# Stakeholder inputs

Stakeholder workshop themes:

- opportunity
- flexibility
- ecological and environmental impacts
- recognition and integration with surrounding areas
- safety.

# Stakeholder inputs

From Peacocke Your Neighbourhood event:

- focus was all about good connections, accessibility, safe and generous space allocation for a range of users
- very little interest in an aesthetic landmark bridge
- success is creating a great experience (non car based).

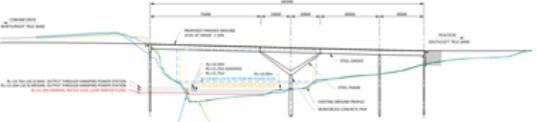
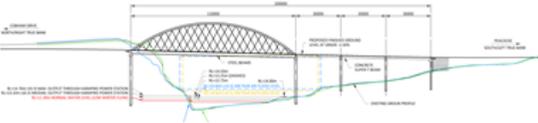
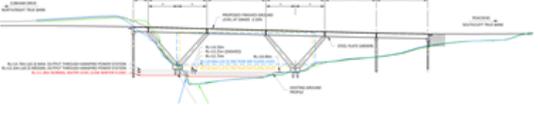
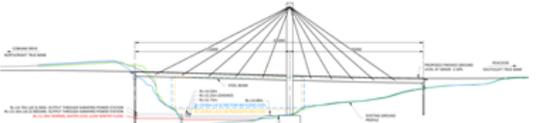


# Technical assessment

Technical team have:

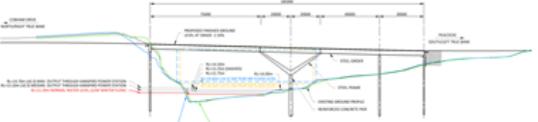
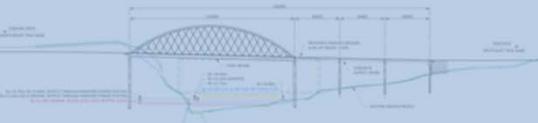
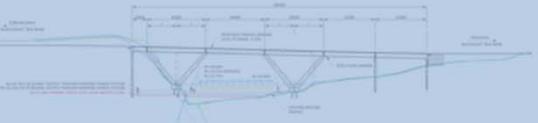
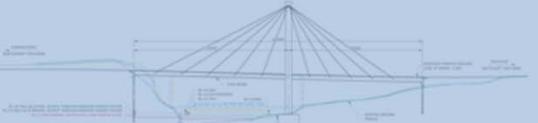
- collaborated in stakeholder workshops to understand inputs
- assessed the technical considerations together with outcomes of the wider stakeholder involvement
- welcomed the challenge of balancing great aesthetic outcomes with time, budget and constructability constraints
- assembled an emerging list of structural bridge forms for further evaluation and aesthetic development
- established cost estimates of options ranging from \$25M to \$110M.

## Peacocke Waikato River Bridge – Structural Form Option Assessment

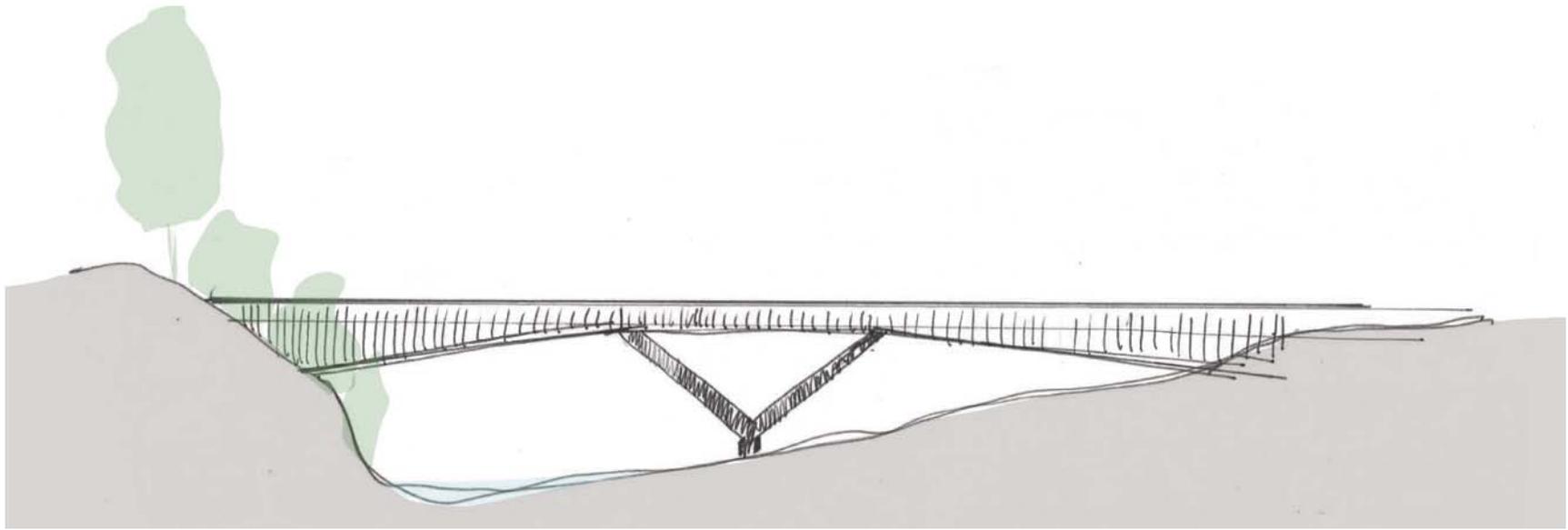
Structural bridge form option	Description	Aesthetic Opportunity ✓ = low ✓✓✓ = high (All structures have acceptable aesthetic potential)	Respond to stakeholder inputs ✓ = poorly ✓✓✓ = very well	Whole of life costs \$ = low \$\$\$\$ = high
<p><b>Option A – Structural steel deck with central “Y” pier</b></p> 	<ul style="list-style-type: none"> <li>Concrete columns/piers with structural steel used for Y-arrangement and steel deck to span between piers</li> <li>Strategic services can be concealed services within boxed deck arrangement, in addition to providing internal access maintenance (within the deck) without scaffolding etc.</li> <li>Approximate deck depth = 3m</li> <li>Assumes 30m deck cross-section</li> <li>Opportunity to vary span arrangements on southern bank (land spans) to <u>optimise</u> outcome to provide visual balance and recreational connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Slim simple structure with one central steel pier</li> <li>Balanced visual profile</li> <li>Limited landmark opportunity with no vertical feature above deck</li> <li>Unique and uncommon form</li> <li>Scope to aesthetically develop pier and underside of bridge</li> <li>Scope for varying balustrade treatments linking back to pier and underside</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓✓</li> <li>Clear flat deck protects opportunity for space reallocation in future</li> <li>Caters for services within deck with easy safe access</li> <li>Lowest environmental and ecological (bats) impact during construction and future O&amp;M</li> <li>Relatively standard construction methodology (although very large scale)</li> </ul>	<p>\$</p> <p>Fits within HIF Business Case Budgets</p> <p>Reasonable O&amp;M costs</p>
<p><b>Option B – Network arch across river with piers across land span</b></p> 	<ul style="list-style-type: none"> <li>Compared to other conventional bridges the system is structurally very efficient so result in relatively light structures.</li> <li>The large arches are typically constructed of structural steel (some with concrete infill), and the cross-over hangers typically made of wound steel cable.</li> <li>Strategic services would be visually suspended underneath the deck structure.</li> <li>Two local examples of this bridge (although this project is significantly larger in scale) include the Waikato River bridge along Eastern Taupo Arterial, and the recently constructed pedestrian/cycle bridge over Waikato River near <u>Horotiu</u>.</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓</li> <li>Strong bridge form generally</li> <li>Visual balance challenge due to height difference of river banks</li> <li>Variations of this form are possible</li> <li>Symmetry and balance of land span may be an issue visually as arch only spans river</li> <li>Side profile perhaps implies a simpler structure, where there would likely be up to 4 arch spans.</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Structural form above deck could limit deck space reallocation</li> <li>Slim deck - services would be suspended under deck which makes access difficult</li> <li>Complex vertical elements negatively impact bats</li> <li>Height risks (climbing, O&amp;M, suicide)</li> </ul>	<p>\$\$</p> <p>Low initial construction</p> <p>Very high ongoing O&amp;M costs (associated with H&amp;S compliance)</p>
<p><b>Option C – Structural steel deck with “V” shaped piers</b></p> 	<ul style="list-style-type: none"> <li>Concrete (or steel) V-shaped piers formed from the ground level up to bridge deck level. Steel girders used to form the structural spans between each of the V-piers.</li> <li>Strategic services can be concealed services within boxed deck arrangement, in addition to providing internal access maintenance (within the deck) without scaffolding etc. Approximate girder depth = 2m</li> <li>Opportunity to vary span arrangements on southern bank (land spans) to <u>optimise</u> outcome to provide visual balance and recreational connectivity</li> <li>Similar form to that used on the Waikato River crossing on Waikato Expressway <u>Ngaruawahia</u> Section, although scale of the V-shapes <u>are</u> significantly larger on this project (approximately 4-times scale).</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓</li> <li>Limited landmark opportunity with no vertical feature above deck</li> <li>Relationship with northern bank where significant works required is cluttered</li> <li>V piers provide plenty of space for aesthetic refinement and treatments</li> <li>Visually unbalanced between north and south banks.</li> <li>Similar form to existing bridge at <u>Horotiu</u> (SH1) – not new (although this project would be 4 times larger)</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓</li> <li>Caters for services within deck with easy safe access</li> <li>Extensive vegetation removal on the north bank for access</li> <li>Erosion and scour likely at base of northern pier</li> <li>Clear flat deck protects opportunity for space reallocation</li> <li>Difficult a complex construction due to north bank access.</li> </ul>	<p>\$\$\$</p> <p>Higher construction and O&amp;M costs than option A.</p> <p>Piles on north bank <u>req's</u> ongoing scour mgmt.</p>
<p><b>Option D – Cable stayed</b></p> 	<ul style="list-style-type: none"> <li>Large number of variations of this form of bridge are possible (single central column, portal column structure, vertical or tilted columns etc)</li> <li>Relies on having very tall column structure (up to 100m tall) to enable cable strands to develop sufficient tension to support bridge deck</li> <li>Column is centrally positioned (along bridge length) so weight is evenly distributed either side of column. Column size usually very large (in order of 10m to 20m diameter) because it bears weight of entire bridge.</li> <li>Strands are typically steel wound cables (or similar).</li> <li>Depth of deck can be more slender (approx. 2m or less) as the cable positions will set intermediate span length which can <u>minimise</u> structural demands on deck</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓✓</li> <li>Significant scale and size presents WOW opportunities from visual presence perspective</li> <li>A landmark structure</li> <li>Scale/size of structure does mean larger costs are involved with any aesthetic refinement</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Structural form above deck could limit deck space reallocation</li> <li>Caters for services within deck with easy safe access</li> <li>Very complex/risky construction, new methodology to NZ which introduces significant time and cost risks</li> <li>Complex vertical elements negatively impact bats</li> </ul>	<p>\$\$\$\$</p> <p>Significantly higher than HIF Business Case Budgets</p> <p>High O&amp;M costs</p>

Green shaded cells indicate preferred option following assessment against technical and stakeholder inputs

## Peacocke Waikato River Bridge – Structural Form Option Assessment

Structural bridge form option	Description	Aesthetic Opportunity ✓ = low ✓✓✓ = high (All structures have acceptable aesthetic potential)	Respond to stakeholder inputs ✓ = poorly ✓✓✓ = very well	Whole of life costs \$ = low \$\$\$\$ = high
<p><b>Option A – Structural steel deck with central “Y” pier</b></p> 	<ul style="list-style-type: none"> <li>Concrete columns/piers with structural steel used for Y-arrangement and steel deck to span between piers</li> <li>Strategic services can be concealed services within boxed deck arrangement, in addition to providing internal access maintenance (within the deck) without scaffolding etc</li> <li>Approximate deck depth = 3m</li> <li>Assumes 30m deck cross-section</li> <li>Opportunity to vary span arrangements on southern bank (land spans) to <u>optimise</u> outcome to provide visual balance and recreational connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Slim simple structure with one central steel pier</li> <li>Balanced visual profile</li> <li>Limited landmark opportunity with no vertical feature above deck</li> <li>Unique and uncommon form</li> <li>Scope to aesthetically develop pier and underside of bridge</li> <li>Scope for varying balustrade treatments linking back to pier and underside</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓✓</li> <li>Clear flat deck protects opportunity for space reallocation in future</li> <li>Caters for services within deck with easy safe access</li> <li>Lowest environmental and ecological (bats) impact during construction and future O&amp;M</li> <li>Relatively standard construction methodology (although very large scale)</li> </ul>	<p style="text-align: center;"><b>\$</b></p> <p>Fits within HIF Business Case Budgets</p> <p>Reasonable O&amp;M costs</p>
<p><b>Option B – Network arch across river with piers across land span</b></p> 	<ul style="list-style-type: none"> <li>Compared to other conventional bridges the system is structurally very efficient so result in relatively light structures.</li> <li>The large arches are typically constructed of structural steel (some with concrete infill), and the cross-over hangers typically made of wound steel cable.</li> <li>Strategic services would be visually suspended underneath the deck structure.</li> <li>Two local examples of this bridge (although this project is significantly larger in scale) include the Waikato River bridge along Eastern Taupo Arterial, and the recently constructed pedestrian/cycle bridge over Waikato River near <u>Horotiu</u>.</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓</li> <li>Strong bridge form generally</li> <li>Visual balance challenge due to height difference of river banks</li> <li>Variations of this form are possible</li> <li>Symmetry and balance of land span may be an issue visually as arch only spans river</li> <li>Side profile perhaps implies a simpler structure, where there would likely be up to 4 arch spans.</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Structural form above deck could limit deck space reallocation</li> <li>Slim deck - services would be suspended under deck which makes access difficult</li> <li>Complex vertical elements negatively impact bats</li> <li>Height risks (climbing, O&amp;M, suicide)</li> </ul>	<p style="text-align: center;"><b>\$\$</b></p> <p>Low initial construction</p> <p>Very high ongoing O&amp;M costs (associated with H&amp;S compliance)</p>
<p><b>Option C – Structural steel deck with “V” shaped piers</b></p> 	<ul style="list-style-type: none"> <li>Concrete (or steel) V-shaped piers formed from the ground level up to bridge deck level. Steel girders used to form the structural spans between each of the V-piers.</li> <li>Strategic services can be concealed services within boxed deck arrangement, in addition to providing internal access maintenance (within the deck) without scaffolding etc Approximate girder depth = 2m</li> <li>Opportunity to vary span arrangements on southern bank (land spans) to <u>optimise</u> outcome to provide visual balance and recreational connectivity</li> <li>Similar form to that used on the Waikato River crossing on Waikato Expressway <u>Ngaruawahia</u> Section, although scale of the V-shapes are significantly larger on this project (approximately 4-times scale).</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓</li> <li>Limited landmark opportunity with no vertical feature above deck</li> <li>Relationship with northern bank where significant works required is cluttered</li> <li>V piers provide plenty of space for aesthetic refinement and treatments</li> <li>Visually unbalanced between north and south banks.</li> <li>Similar form to existing bridge at <u>Horotiu</u> (SH1) – not new (although this project would be 4 times larger)</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓</li> <li>Caters for services within deck with easy safe access</li> <li>Extensive vegetation removal on the north bank for access</li> <li>Erosion and scour likely at base of northern pier</li> <li>Clear flat deck protects opportunity for space reallocation</li> <li>Difficult a complex construction due to north bank access.</li> </ul>	<p style="text-align: center;"><b>\$\$\$</b></p> <p>Higher construction and O&amp;M costs than option A.</p> <p>Piles on north bank <u>req's</u> ongoing scour mgmt.</p>
<p><b>Option D – Cable stayed</b></p> 	<ul style="list-style-type: none"> <li>Large number of variations of this form of bridge are possible (single central column, portal column structure, vertical or tilted columns etc)</li> <li>Relies on having very tall column structure (up to 100m tall) to enable cable strands to develop sufficient tension to support bridge deck</li> <li>Column is centrally positioned (along bridge length) so weight is evenly distributed either side of column. Column size usually very large (in order of 10m to 20m diameter) because it bears weight of entire bridge.</li> <li>Strands are typically steel wound cables (or similar).</li> <li>Depth of deck can be more slender (approx. 2m or less) as the cable positions will set intermediate span length which can <u>minimise</u> structural demands on deck</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓✓✓</li> <li>Significant scale and size presents WOW opportunities from visual presence perspective</li> <li>A landmark structure</li> <li>Scale/size of structure does mean larger costs are involved with any aesthetic refinement</li> </ul>	<ul style="list-style-type: none"> <li>Yes ✓✓</li> <li>Structural form above deck could limit deck space reallocation</li> <li>Caters for services within deck with easy safe access</li> <li>Very complex/risky construction, new methodology to NZ which introduces significant time and cost risks</li> <li>Complex vertical elements negatively impact bats</li> </ul>	<p style="text-align: center;"><b>\$\$\$\$</b></p> <p>Significantly higher than HIF Business Case Budgets</p> <p>High O&amp;M costs</p>

Green shaded cells indicate preferred option following assessment against technical and stakeholder inputs



# Timeframes

- May 2019 – Develop and refine a preferred bridge form
- June 2019 – Recommend & Confirm preferred bridge form
- Late 2019 – Engage with construction industry and begin procurement process
- 2020 – Begin construction
- **Mid 2023 - Bridge (and roading) complete and open for use as required by HIF**

These timeframes are extremely tight – any delay will impact HIF agreement deadlines.

# Next steps

- Refine aesthetic response for Option A (opportunity for additional investment in greater visual outcomes?)
- Continue working closely with key stakeholders, Iwi and technical experts
- Progress deck space allocation opportunities and connectivity through Access Hamilton Task Force
- Refine and review construction costs and risks