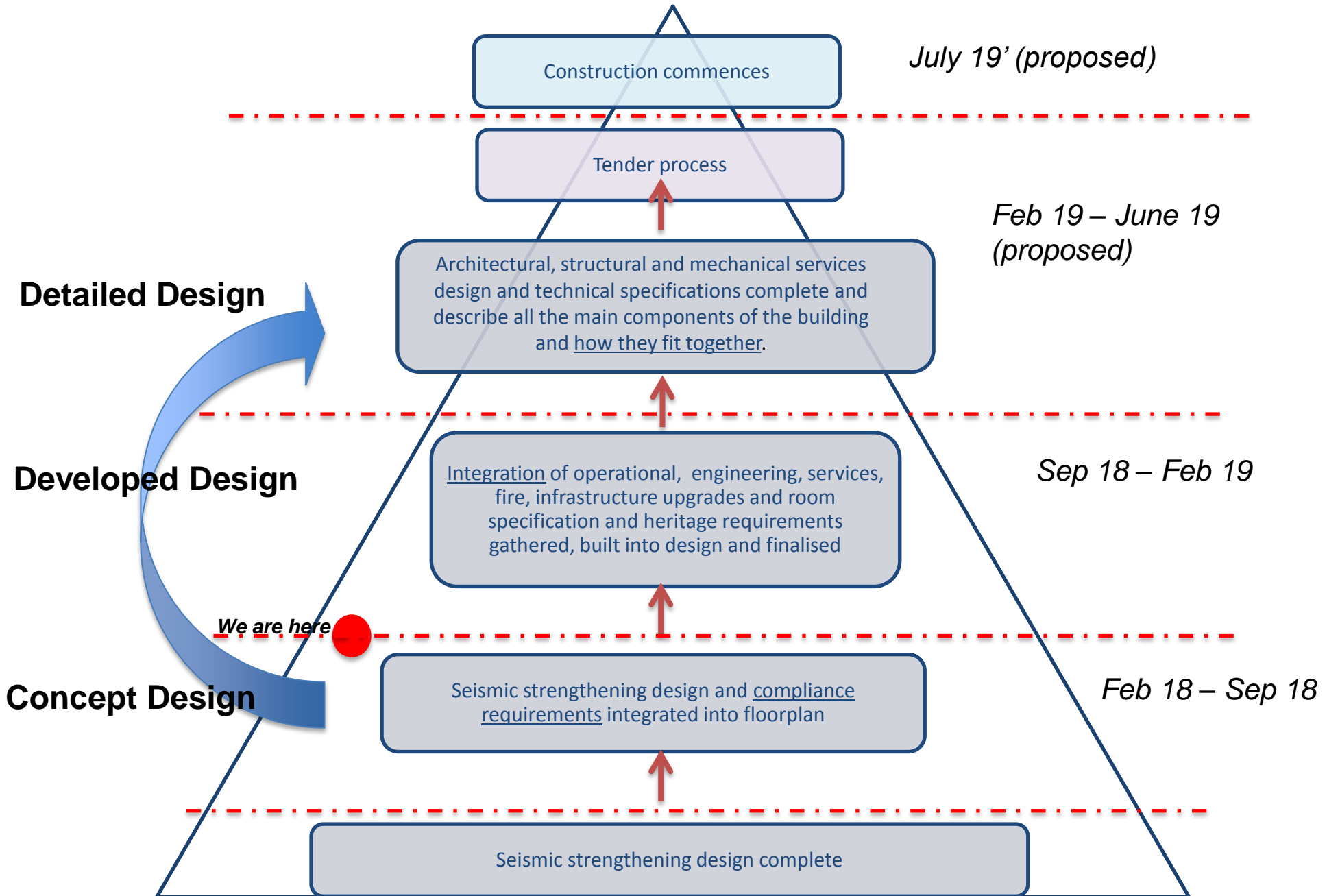


Rotorua Museum Project – O&M Update



Project Progress



What has been achieved?

DESIGN PROCESS/STAGE	DATES	KEY DELIVERABLES
Initial Seismic Assessment (ISA)	November 2016	<ul style="list-style-type: none"> This assessment was undertaken by GDC and determined the Museum buildings were well below the 33% NBS rating required.
Information Gathering stage	November 2016 – March 2017	<ul style="list-style-type: none"> 3D building scan Existing documentation review Structural and Geotechnical assessments Destruction testing plan development
Invasive Investigation	March 2017 – May 2017	<ul style="list-style-type: none"> Core samples; walls and floor Removal of wall linings to investigate structural connections Soil tests, Cone penetrometer tests (CPTs) and Bore holes (geotechnical)
Detailed Seismic Assessment (DSA)	May 2017 – August 2017	<ul style="list-style-type: none"> Information collected from previous steps assist Engineers develop a picture of building structure (and weaknesses), connections, construction and condition. Structure then digitally modelled and tested. Actual NBS rating delivered; 74%NBS South, 19%NBS North. <u>19% NBS overall.</u>
Review period	September – October 2017	<ul style="list-style-type: none"> Initial structural design peer review Initial architectural design and heritage NZ review
Concept and Developed Design	November 2017 - February 2019	WE ARE HERE
Detailed Design	February 2019 – May 2019	

Concept and developed design – key milestone

MILESTONE	DATE
Architectural revisions made to access way to basement, ground walkway and café mezzanine floor	May – June 2018
Mechanical, electrical, hydraulic and fire engineers engaged	May – June 2018
De-installing and planning of galleries with Auckland Museum, Te Papa and specialised conservators to remove and relocate Taonga to offsite storage	June – September 2018
Initial QS cost estimate for structural steel received	June 2018
HIVAC services initial report complete	June 2018
Composite roof tile samples reviewed with Design team and Heritage New Zealand	June – July 2018
Heritage NZ agree in principle to light weight roof tile	July 2018
Resource Consent complete and ready for consultation	August 2018
Architect engaged. DPA Architect and local partnering firm, Carling architects on board	August 2018
Early contractor involvement (ECI) to be progressed and contractor secured by end of October	September – October 2018

Key challenges and our approach

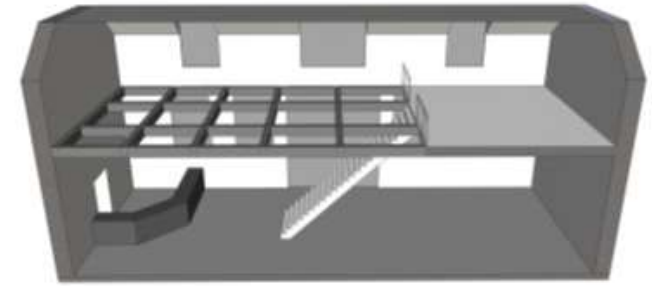
- Light weight roof tile
- HVAC services
- Mezzanine changes (reference slide 5)
- Covered walkway/Airbridge (reference slide 5)
- Public access to the basement (reference slide 5)
- Viewing platform additional fire egress (reference slide 6)

The concept/developed design phase has had the added complexity of each issue having an architectural, engineering, heritage and operational considerations.

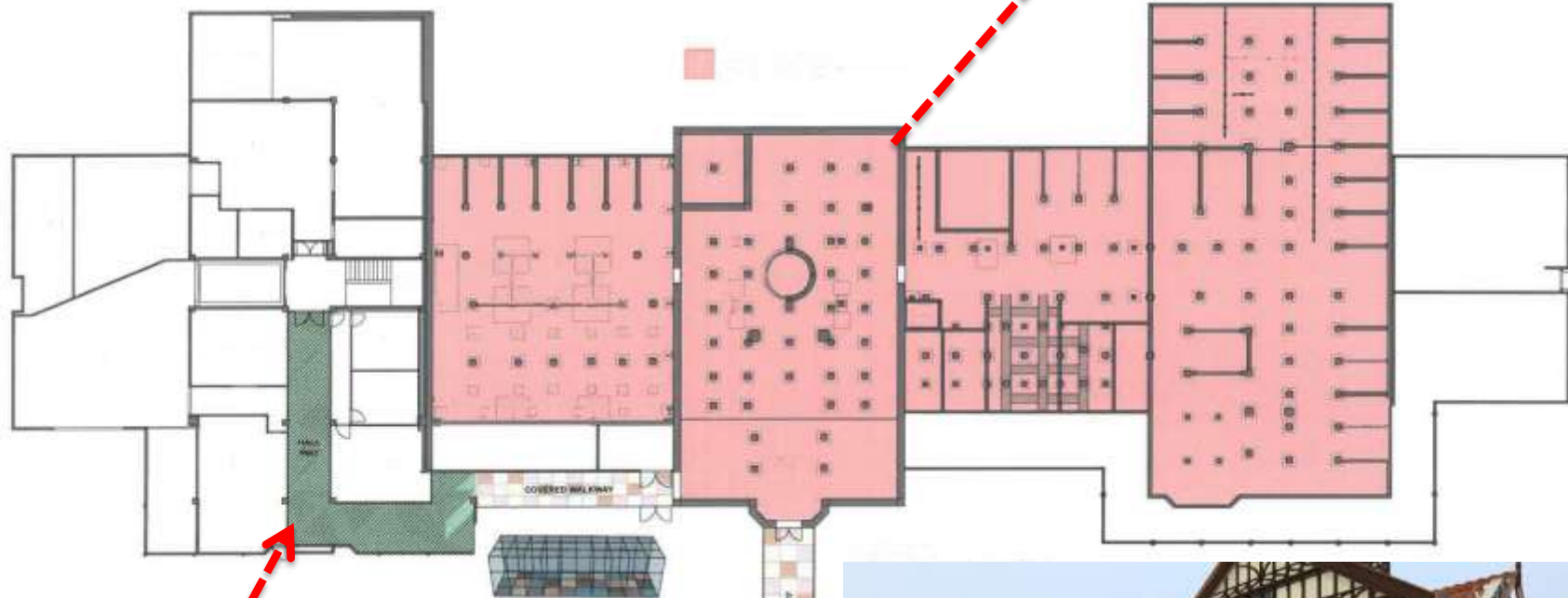
The project team has addressed each challenge successfully due to:

- A strongly solution focussed team
- A collaborative approach – no idea was discounted
- Expertise and patience!

Floor plan layout changes



New mezzanine in café space

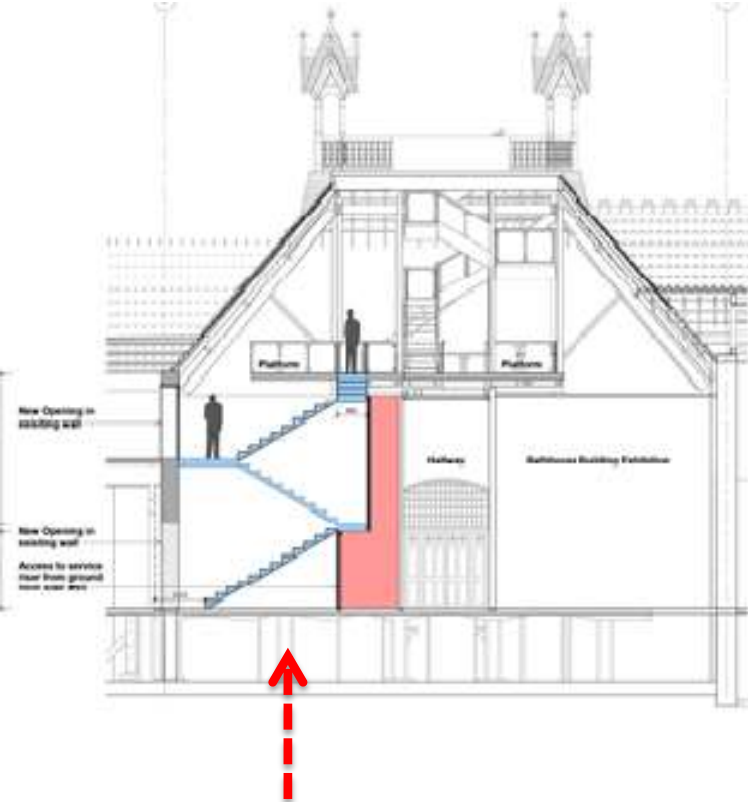


Accessibility changes to access mud bath entrance

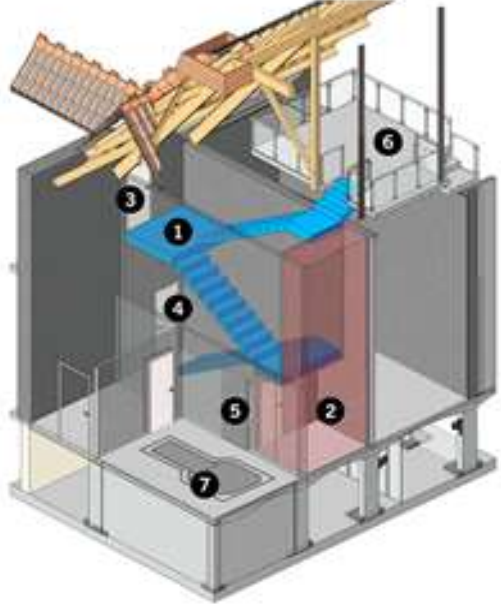
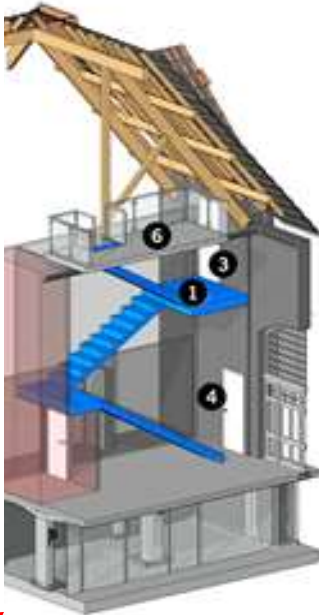
Covered walkway connection concepts



Floor plan layout changes — additional egress from north end platform



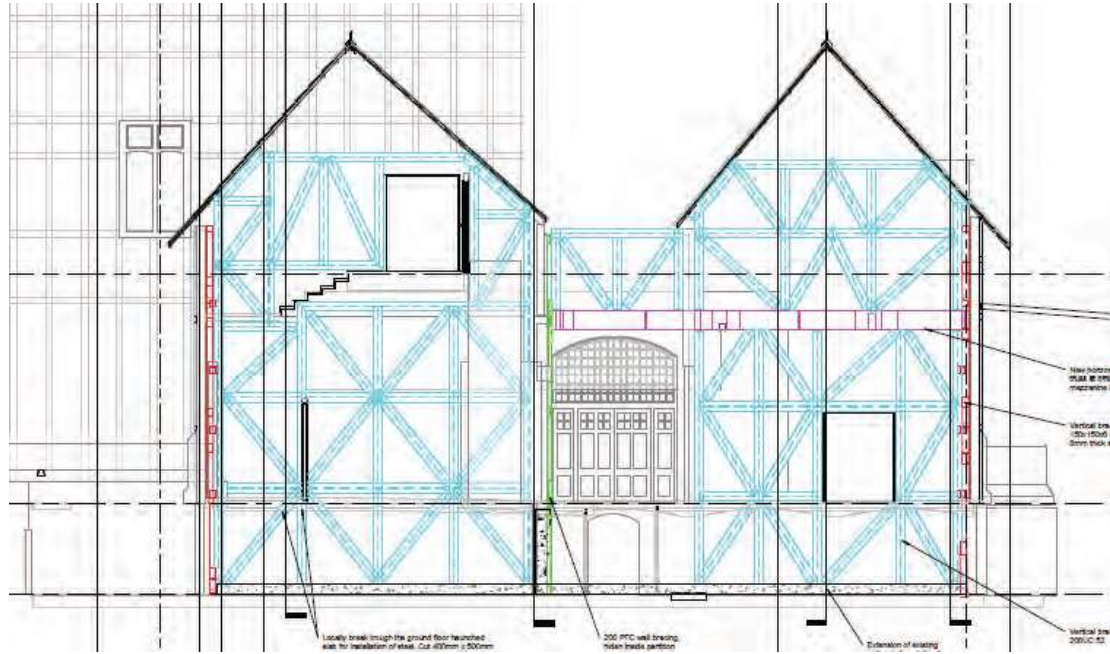
Preferred egress option. This egress allows public in the viewing platform to escape through the interior of the north end and into the 'honeymoon suite' room. Public can then exit through the café doors.



PROPOSED STAIRCASE TO LOFT



Critical structural repair - example



Full Height Concrete Gable End Walls

Issue

Four of the original five full height unreinforced concrete gable end walls constructed in 1906 remain and are severely weak against out of plane flexural forces caused by seismic loading. These walls may suffer overturning failure under excessive lateral loads. This will lead to catastrophic failure and collapse of the walls and supported roof structure. Collapse of these 12+m high walls will cause critical damage to adjacent building elements.

Solution

These walls are the most significant structural weakness in the building and require immediate replacement or strengthening works. Strengthen the walls with steel brace frames bolted to the concrete walls. Strengthen lower perpendicular adjacent walls and their connection to the full height concrete walls to provide lateral support against failure. Create structural diaphragm out of existing mezzanine floor by installing steel bracing to floor framing and replacing timber T&G flooring with structural plywood sheet flooring.

Next Steps

MILESTONE	
<ul style="list-style-type: none">• Light weight tile test production and approvals from heritage NZ and Code Mark (Critical)	
<ul style="list-style-type: none">• Submit resource consent application and approval	
<ul style="list-style-type: none">• Funding discussions with Central Government	
<ul style="list-style-type: none">• Contract Project Manger and Contractor for ECI	
<ul style="list-style-type: none">• Complete developed design phase• Begin detailed design phase	