“A digitally fabricated environment; an exploration into creating components that form customisable modules.”
TEAM DYNAMICS

System
Dynamic Environments: the fabrication of customisable components and their ability to adapt to the programmed framework.

New Method (technologies & systems)

Framework
How can digitally fabricated structures define architectural typologies?

Common Ground: the old & the new methods combined to create the teams design brief.

Connection
Cultural Connections: how can manual craft aid in detailed design and assembly of digitally fabricated elements?

Traditional Methods
Figure 230 - Team design process.

James
Simba
Azmon
How can digitally fabricated structures define architectural typologies
The Poetics of Space

The Poetics of Space
The classic look at how we experience intimate places

Gaston Bachelard
With a new foreword by John E Stilgoe
Dynamic environments; the fabrication of customisable components & their ability to adapt to the programmed framework.
THE 3 DEFINING BAYS

1. SLEEPING / DESK / STUDIO

2. STUDIO / PRESENTATION / CRIT

3. ENTRANCE / STORAGE / SEATING

MAX WIDTH 3600MM
100MM OFFSET > BAY TO BAY
300MM PORTAL DEPTH
HEIGHT RANGE 2.0 - 2.7M
CUTTING + OFFSETS

IN MODEL

AS CUT
CONNECTION
‘the action of linking one thing with another’
Research Question

Cultural Connections: how can manual craft aid in detailed design and assembly of digitally fabricated elements?
“Material constraints aside, innovation is, in this sense, contingent upon a self-conscious reading, remarking, and re-collecting of tradition (Andenken), including the tradition of the new, just as tradition can only be revitalized through innovation.”

Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture

By: Kenneth Frampton
Literature Survey

Canoes of Oceania
By: Alfred Cort Haddon & James Hornell

pictures out of the book to show lashing typologies and marine technology compare lashing and joint types to japanese and samoan material culture
Literature Survey

Canoes of Oceania
By: Alfred Cort Haddon & James Hornell

b. Outrigger canoe, lock joint (oblique scarf joint)  d. Boom & yard, scarfed-on butt (scarf joint)  a. Boom lashing, Lozenge lashing
Literature Survey

Samoan Material Culture
By: Te Rangi Hiroa & Sir Peter Buck

pictures out of the book to show lashing typologies on how to lash
compare to canoes of oceania and japanese joinery. use the large
quote at the end
Literature Survey

Samoan Material Culture
By: Te Rangi Hiroa & Sir Peter Buck

a-r. Lashing of the ridgepole (Fly flap lashing)
6. thatch rafter join (oblique scarf joint)

1 - squared join (butt joint)
2 - oblique slant join (scarf joint)
3 - mata sai join (oblique scarf joint)
pictures out of the book to show lashing and building typologies on how to lash and lapping of materials compare to canoes of oceania and japanese joinery.
Diamond lashing with horizontal turns above and below

Samoan Fale Tele (section)

Rafter components, joined together using the oblique scarf joint.

The Samoan Fale
By: F. L. Higginson & John Benyon.
"Historically, the traditional Japanese carpenter has been architect and engineer as much as carpenter or joiner. Because his role has been so momentous, it is impossible to divorce discussion of Japanese joinery and carpentry from discussion of Japanese architecture itself."

The Art of Japanese Joinery
By: Kiyoshi Seike
Japanese ‘Daimochi-tsugi’, oblique scarf joint with stub tenons.


Japanese ‘Daimochi-tsugi’, oblique scarf joint with stub tenons.
Tohi, Tongan decent now residing in New Zealand is well renowned in Oceania for his paintings and sculptures which incorporate Pacific and Maori iconography. Tohi, although an artist by trade, is more recognised for his skill as a Tufunga Lalava, a master craftsman of the traditional art of Lalava – the Pan-Pacific technology used on houses, canoes, and tools before the introduction of Western materials.
Precedent Survey

Sopolemalama Filipe Tohi
The Roots - Lashing workshops
Precedent Survey

Sopolemalama Filipe Tohi
Auckland University Fale Pasifika
Wiki House is an online open source construction set. The creators of the website aimed to allow anyone to design, download, and print Computer Numerated Control (CNC)-milled houses and components, which can be easily assembled with minimal formal building skill or training.
Precedent Survey

WikiHouse
Spacecraft module & Oblique scarf joint
Precedent Survey

WikiHouse

cross "X" & "T" joints
Precedent Survey

WikiHouse

cross “X” joints
Precedent Survey

Folding Whare – Callum Dowie

The Folding Whare was a culmination of Callum Dowie’s thesis research at the Unitec Institute of Technology School of Architecture. The research undertaken by Dowie was targeted at huts in New Zealand, looking at various hut forms, function, technologies used, culture and history. The Folding Whare is a culmination of all these ideas, most significantly the idea taken from Kohika – pre-European Maori shelters.
Precedent Survey

Folding Whare – Callum Dowie
rope, ratchet straps & fence strainer tension system
Precedent Survey

Auckland Museum – Pacific Lifeways and Pacific Masterpieces

The artifacts stored in the museum, provide this research with a reference point, as real life examples of lashings and marine technology are on show to public. The exhibition helps bridge the gap between research text and physical models, therefore gained greater understanding on how the lashing has been achieved.
Precedent Survey

Auckland Museum – Pacific Lifeways and Pacific Masterpieces

canoe models & tools
Precedent Survey

Auckland Museum – Pacific Lifeways and Pacific Masterpieces
canoes & lashing connections
Design Process

an exploration of models
Load Testing
Load testing

Load Testing Gear
Load testing

Load Testing Rig
Load testing

Load Testing Setup
Load testing

Load Testing Tie Downs
Load Testing Tie Downs
Load testing

Load Testing Push Rig
Load testing
Load Testing 6th Push 16kN
Load testing

Load Testing 13th Push 43kN
Load testing

Load Testing 15th Push 48kN
Load testing

Load Testing 15th Push 48kN
Load Testing

Load Testing End Result
Load testing

Load Testing Chart

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## Load Testing

### Load Testing Chart

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### Analysis Spreadsheet

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