

Craig Batchelar, Boffa Miskell
Kate Barry-Piceno, RMA Barrister

In Search of the Relocatable Castle

NZPI Conference

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Resilience

- Definition of Resilience: *“The capacity to recover quickly from difficulties, speedy recovery from setback”*.
- Relocatable housing - coastal hazard response adaptable and pragmatic reduces risks of effects of natural hazards and climate change
- Allows communities to remain in existing communities, reduce and recover from coastal erosion risks

Issues

- How can redevelopment and existing houses in identified coastal hazard areas best be protected from hazard effects and climate change?
- Popular beachfront sections previously low cost baches, now coastal properties, expensive holiday homes, and permanent dwellings
- Risks to existing beachfront sections/development in urban areas subject to coastal hazards - challenging end of coastal hazard management.
- Relocation as opposed to setbacks for development in coastal hazard prone areas won't protect houses in severe, sudden storm events

LEGAL CONTEXT

- NZCPS – Encourages designing for relocability or recoverability from hazard event
- Fundamental principles of RMA of sustainable management
- Coastal erosion management common law duty of land owner
- Section 6 matters of national importance(future amendment to add natural hazards?)
- Section 30 and 31-duty of Regional and District Councils, overlap of jurisdiction
- Section 106 - subdivision prohibited if land subject to inundation risk

LEGAL CONTEXT continued

- Section 7 - Climate change required to be taken into account by Councils
- Act overrides private property rights, even right to protect property from the sea, if rights inconsistent with RMA . See: *J.I. Faulkner and Others v The Gisborne District Council and the Minister of Conservation* (AP1/95), High Court, 26/7/95, Justice Barker.
- Other Acts – Section 72, Building Act 2004, Civil Defence Emergency Act (CDEM) 2002, Local Government Act 2002

Principles of Relocability

- Progressive and adaptive risk reduction
- Planned retreat - enables hazard avoidance
- Precautionary approach
- District Council v Regional Council responsibility (joint)
- Cost implications
- Public v private benefit debate
- Requirement of space and alternative locations
- Trigger mechanisms and timeframe.

Coastal hazard Planning responses

- Broad brush/single setback lines v multiple setbacks
- Setbacks - cadastral boundaries v true alignment
- Existing development, existing sections, Greenfield sites - deciding appropriate level of hazard assessment
- Determination of factor of safety – level of conservatism, range of expert opinions , factual context , transparency
- Erosion hazard and inundation hazard – recognition of dynamic relationship
- Tsunamis - low probability/high impact event
- Climate change
- Interrelationship with other hazards (e.g. earthquakes, subsidence)

Challenges

- Existing development is a special case, focus on options for risk reduction
- New subdivisions/re-development in coastal hazard prone areas affected by other legislation, e.g. s.106 of RMA, s.72 Building Act
- May not “avoid” risk e.g. sudden, severe erosion events

Merits of relocatable dwellings

- Recognises high demand and property value in coastal sections
- Flexibility to deal with changing risks and uncertainties
- ‘Managed Retreat’ can be built into consent conditions of relocatable houses at time of granting consent
- A soft protection as opposed to hard protection response
- Recognises unfairness of precluding reasonable use/redevelopment of existing coastal sections and effects on coastal communities

Case Study One (Ohiwa)

Land use consent example (Ohiwa):

- Applicants with unwavering belief and dogged determination to realise their beach house dream
- The extent of innovation and opportunity available under relocatable housing option to create two family beach houses.
- Highlights some of the legal and planning issues, and practicalities of undertaking relocatable development





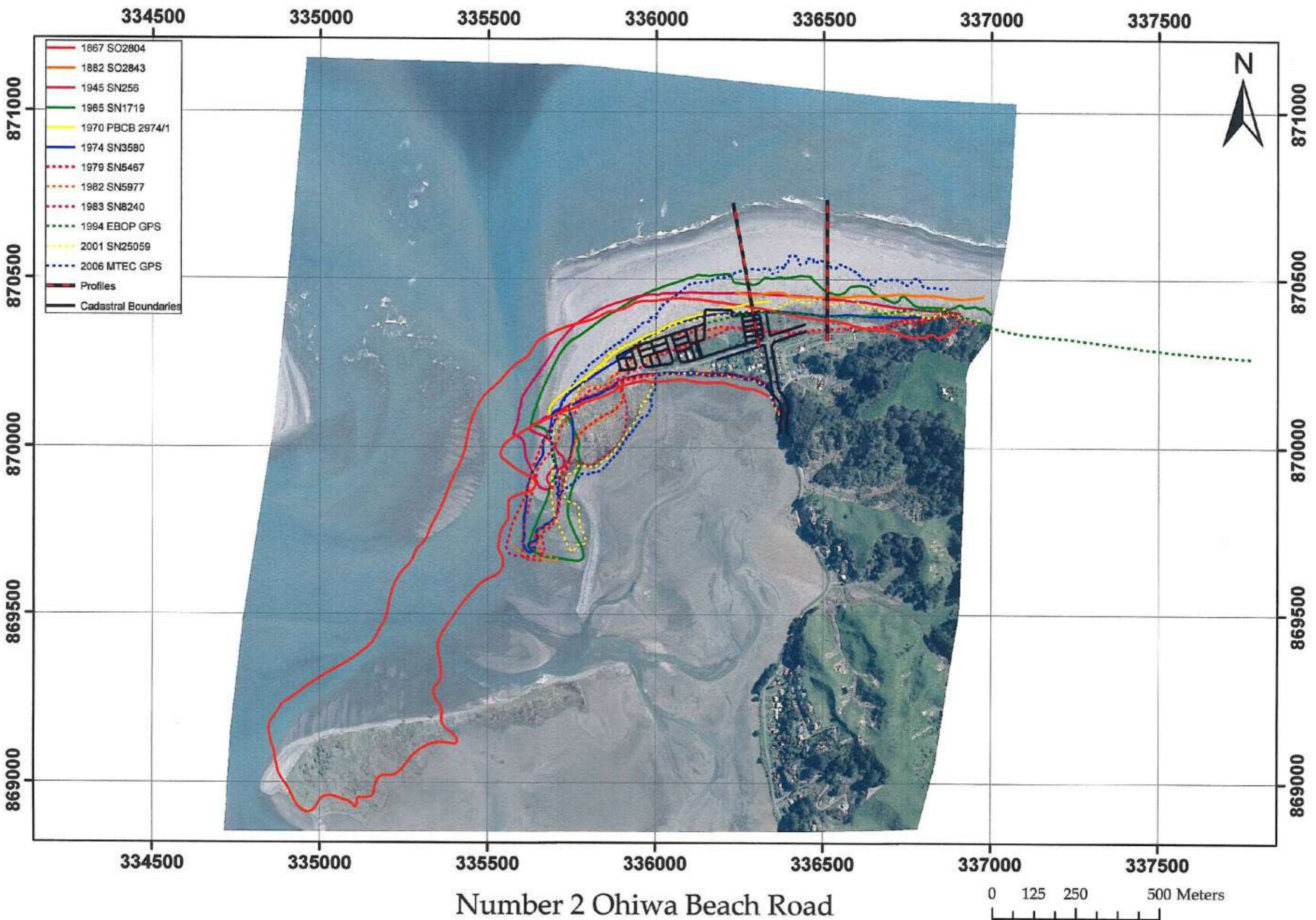
• **Figure 1:** Top photo shows the location of the Property, marked by an arrow on the photograph, at 396B Ohiwa Harbour Road, looking due west from Onekawa Mata Pa. Red arrow identifies the Property location. Ohiwa Spit in mid foreground, Ohope Spit in mid background, Ohiwa Harbour to left and Whale Island to right (Photo taken 14 June 2006 by JG Gibb). Bottom photo taken from Section 4 looking northeast across the Property and adjacent Sections 1 & 3, and vegetated dune field (Photo taken 17 May 2006 by JG Gibb).

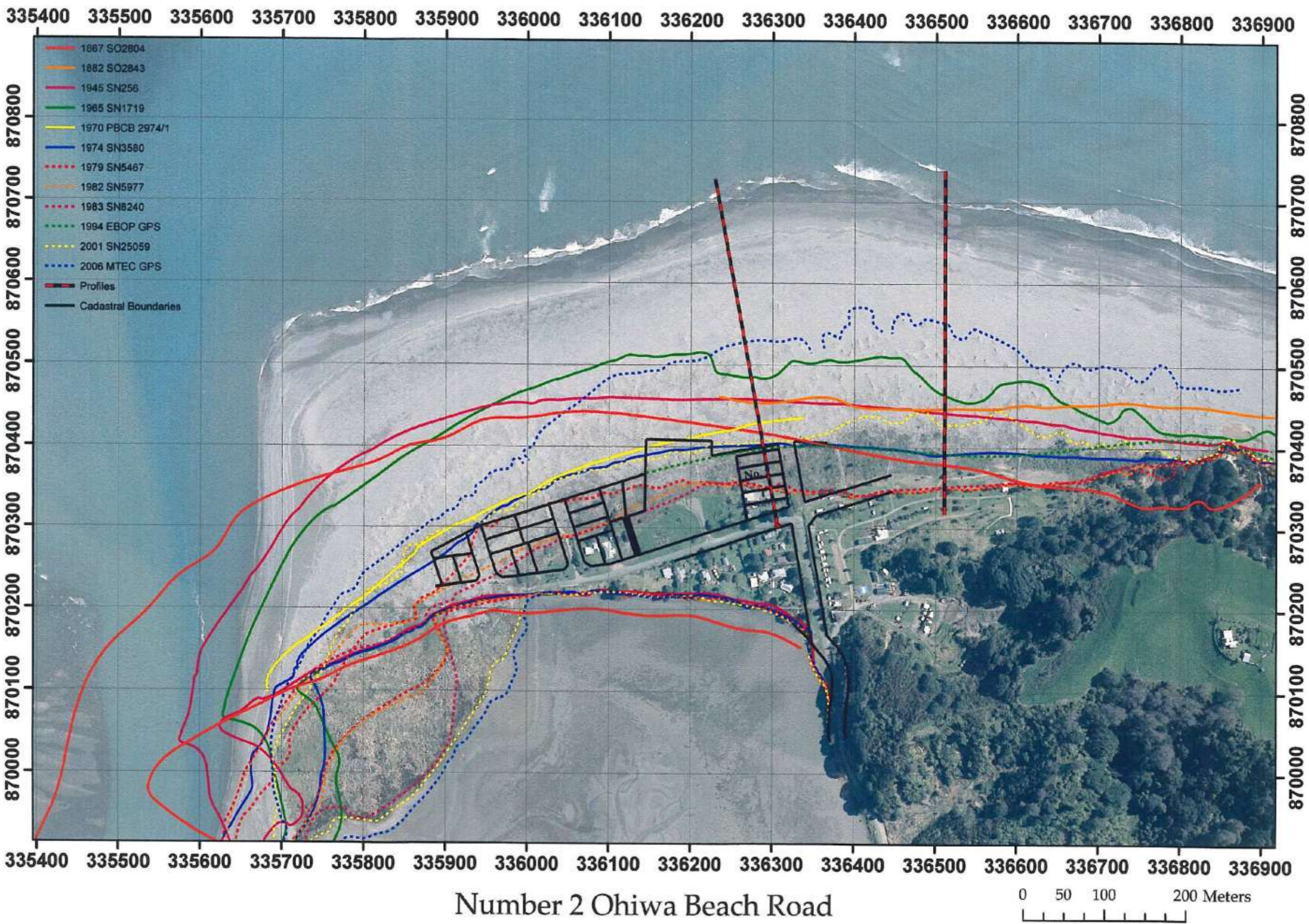


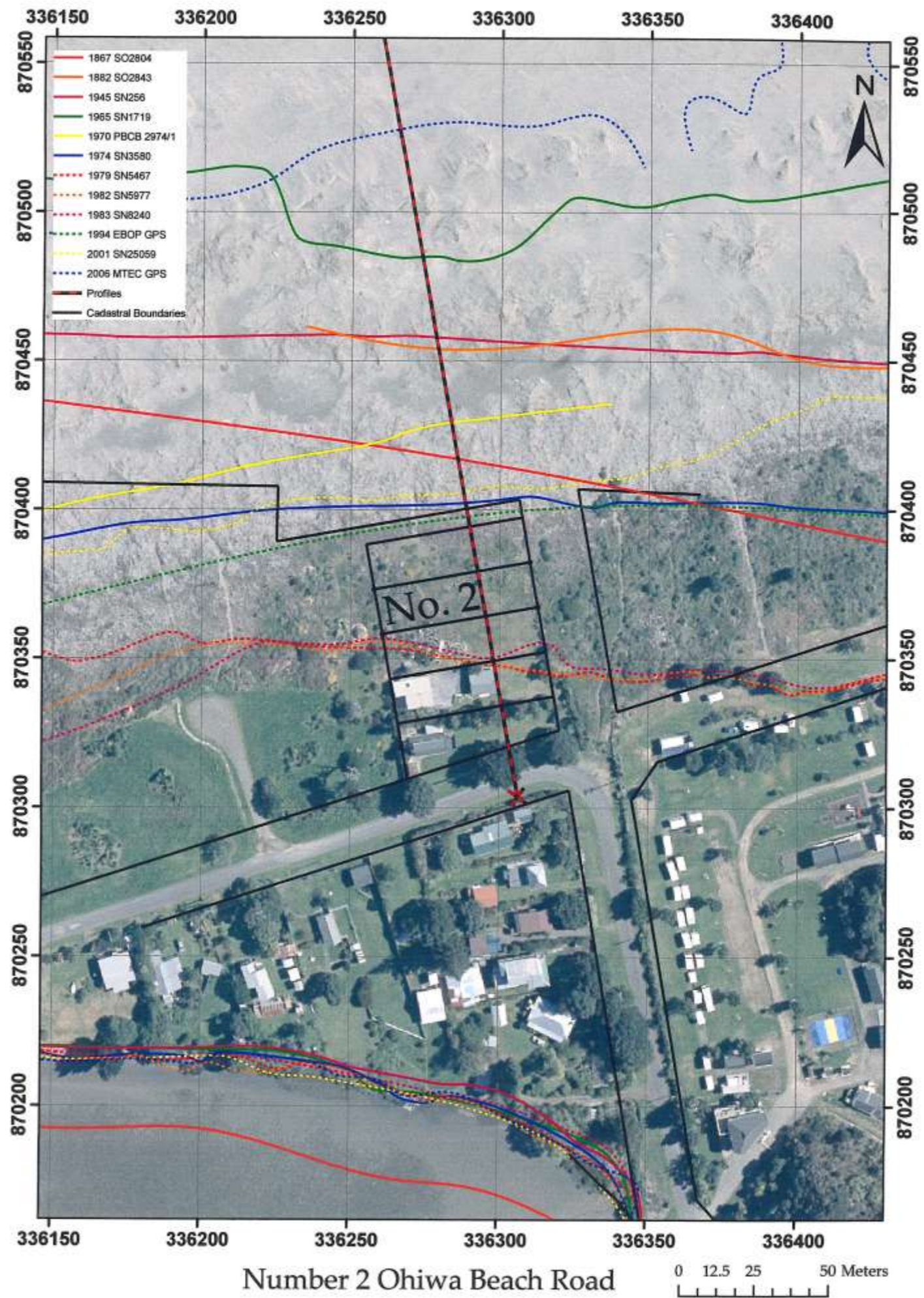
- **Figure 7:** Photograph looking southwest along Ohiwa Spit during the severe erosion phase of the 1970s. The vertical rails in the sea are the remains of the rail and manuka seawall constructed by Poverty Bay Catchment Board from 1969-1970 along the toe of the dune and the car bodies were dumped by locals in a futile attempt to stop inroads by the sea. Photo taken 21 April 1976 by JG Gibb.



• **Figure 9:** Photographs taken in 1979 (top) and 2006 (bottom) looking west showing shoreline changes along Ohiwa Spit mid foreground, and Ohiwa Spit mid background. In 1979 the Property was on the wetted foreshore (arrow) and in 2006 it was on 3.6-4.0m high sand dunes (arrow). Photos taken 2 March 1979 and 16 June 2006 by JG Gibb.



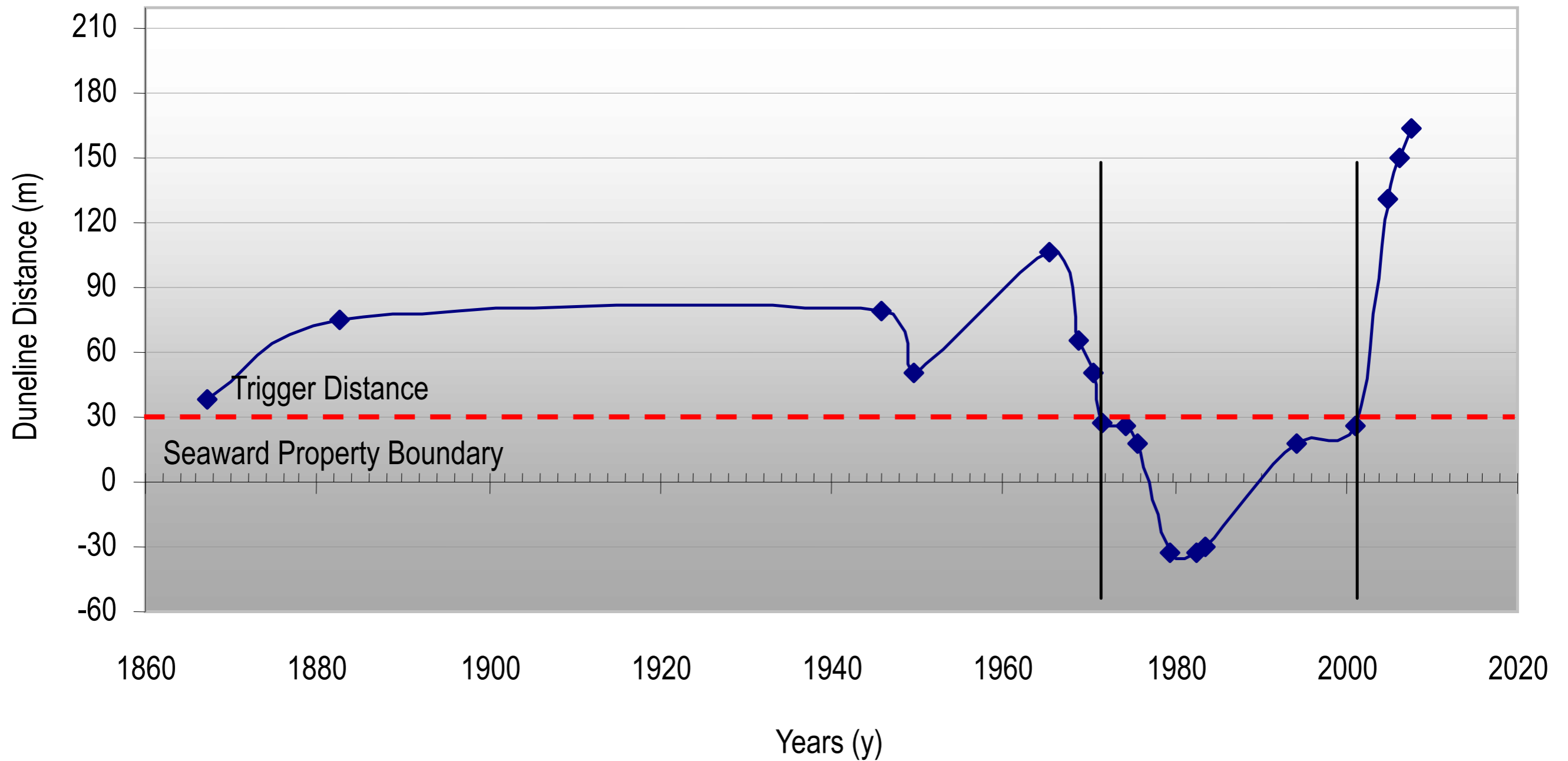


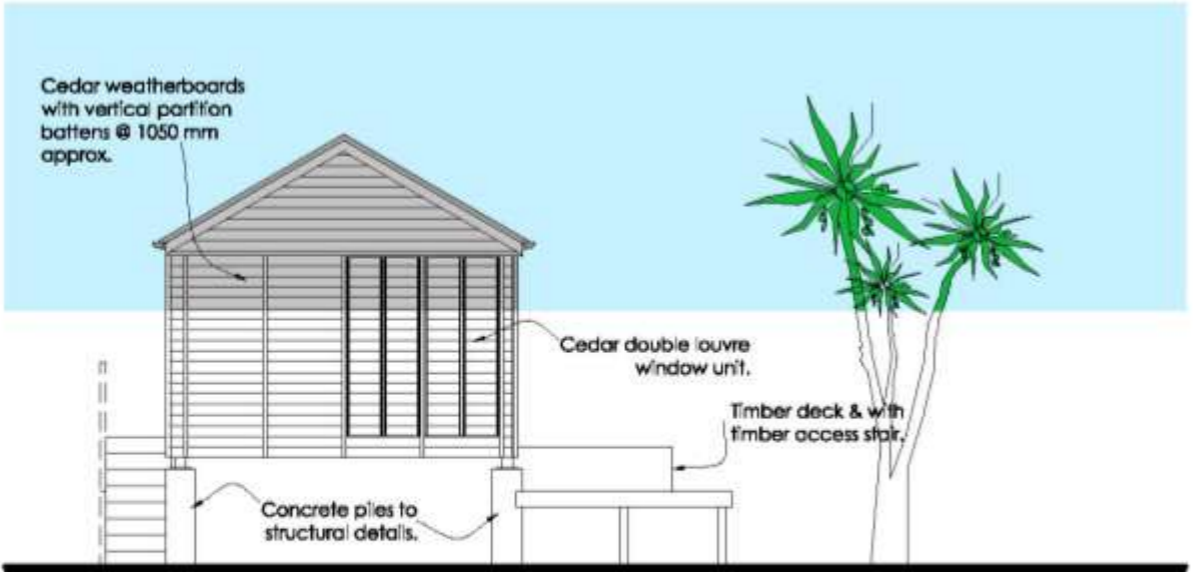


Number 2 Ohiwa Beach Road

0 12.5 25 50 Meters

DUNELINE FLUCTUATIONS FROM SEAWARD PROPERTY BOUNDARY 1867 - 2007

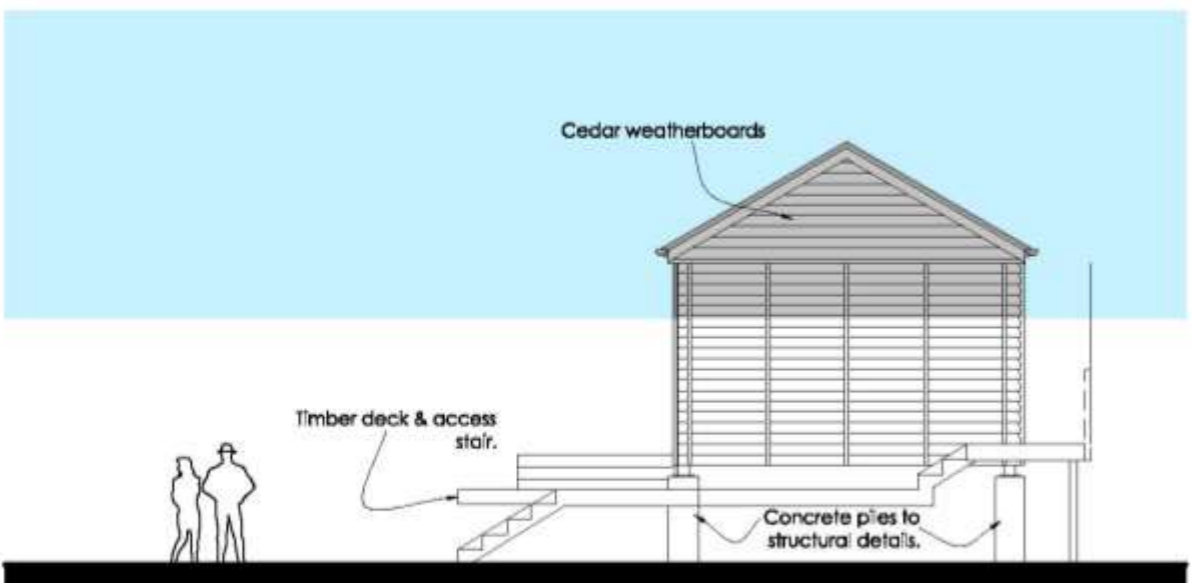




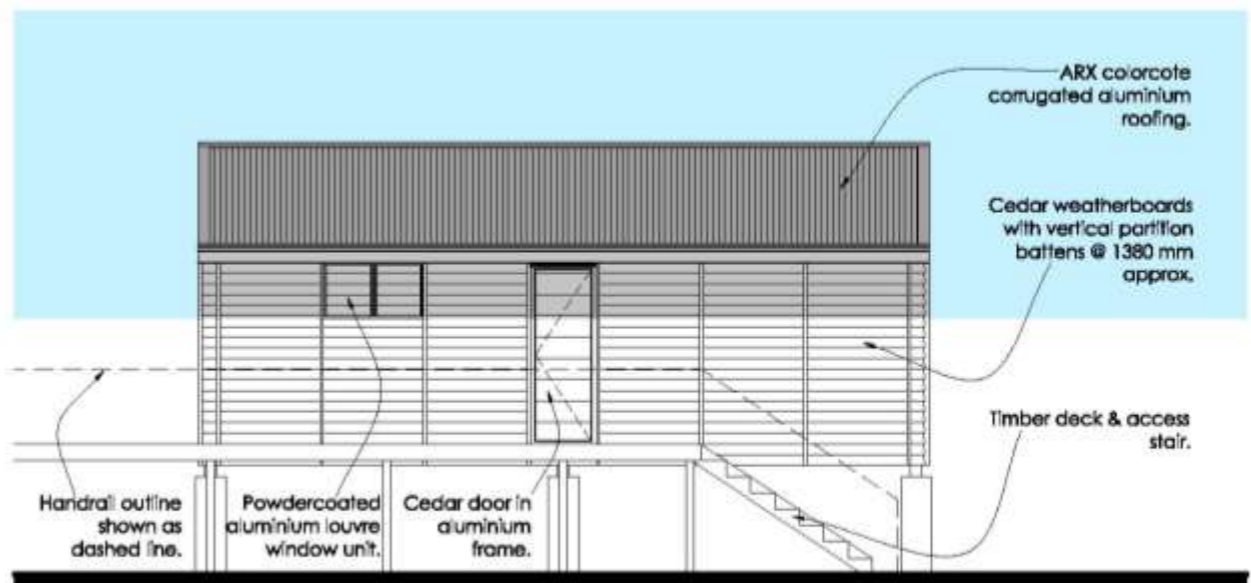
BEDROOM MODULE - FRONT ELEVATION 1:100



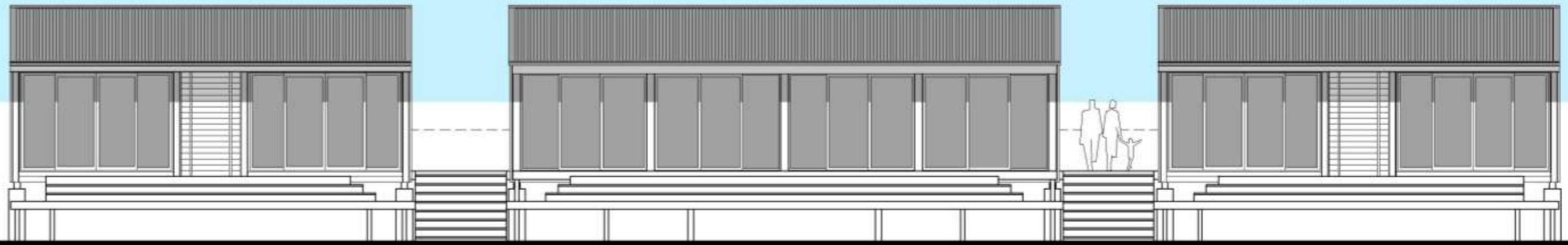
BEDROOM MODULE - SIDE ELEVATION 1:100



BEDROOM MODULE - BACK ELEVATION 1:100

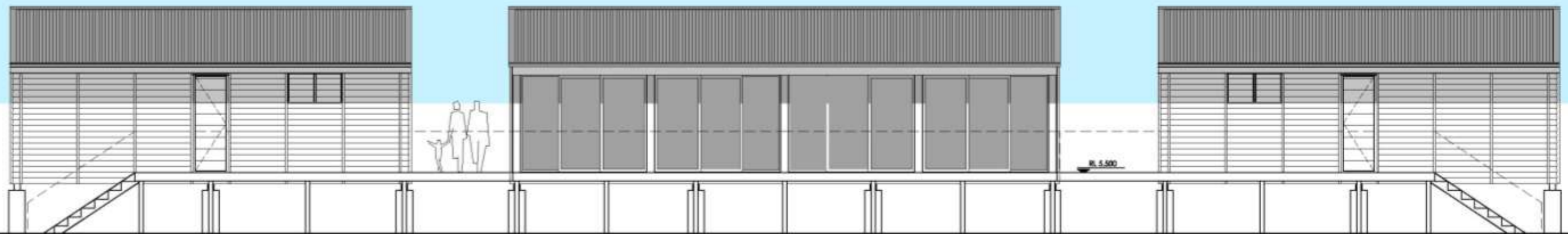


BEDROOM MODULE - SIDE ELEVATION 1:100



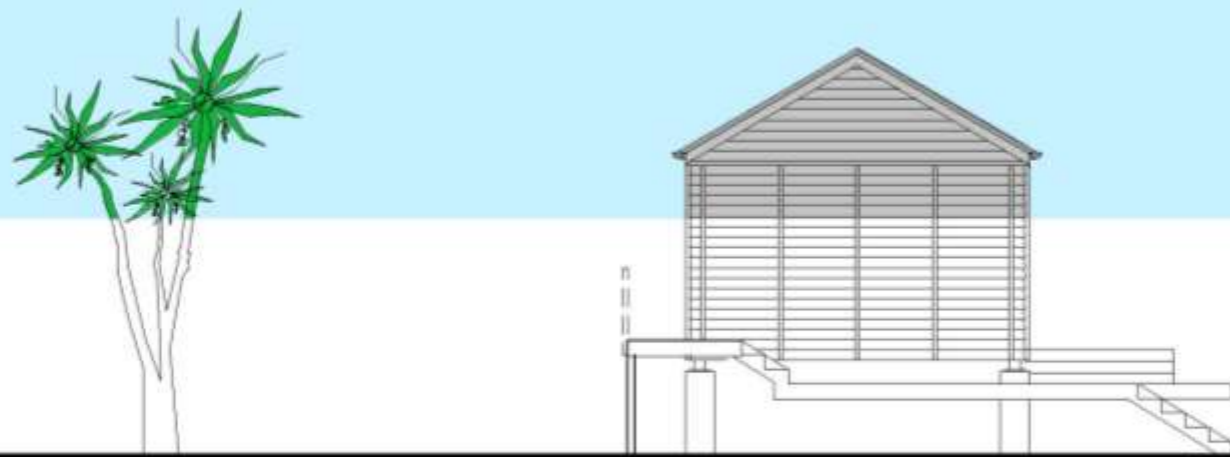
LIVING MODULE - SIDE ELEVATION

1:100



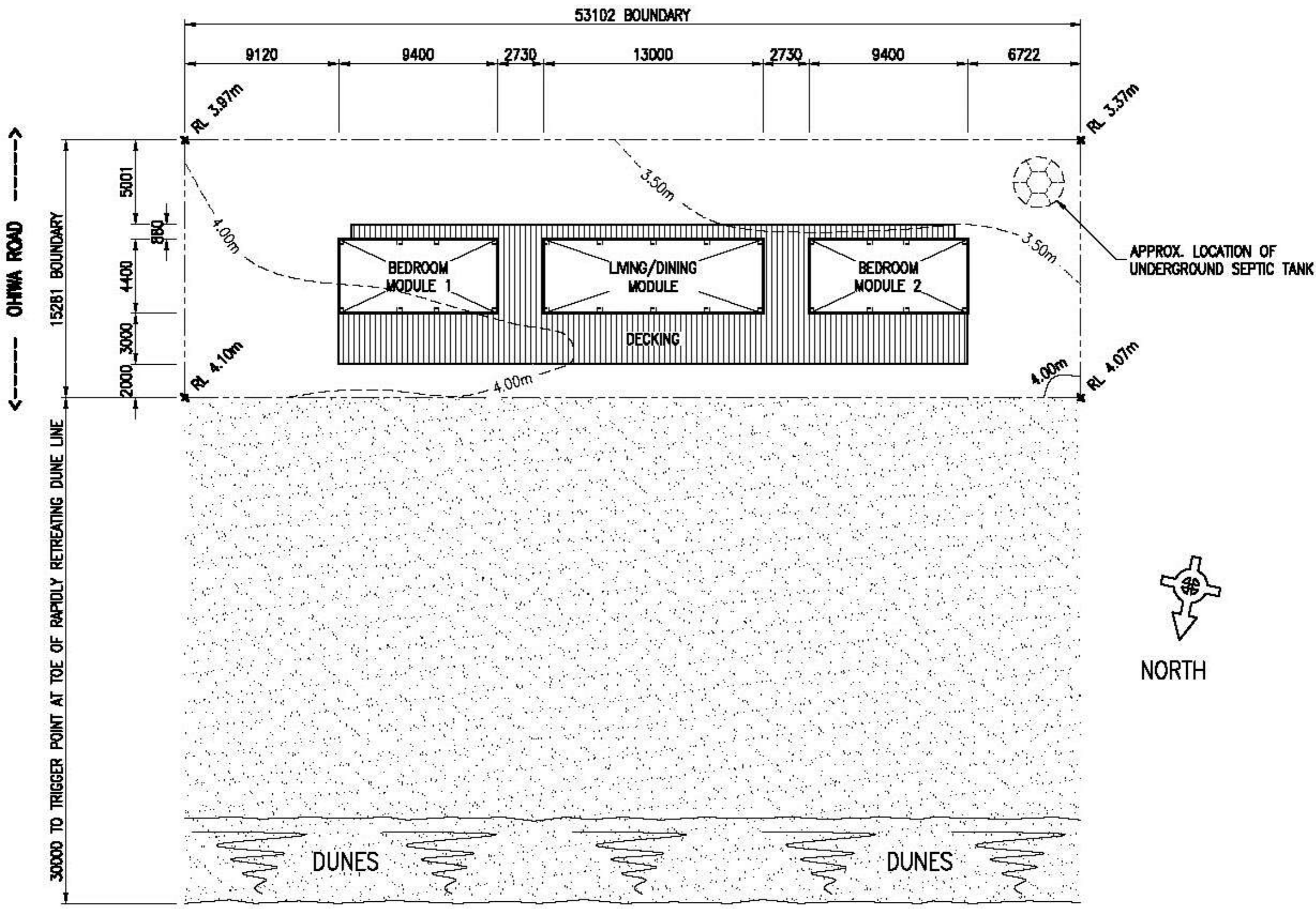
LIVING MODULE - SIDE ELEVATION

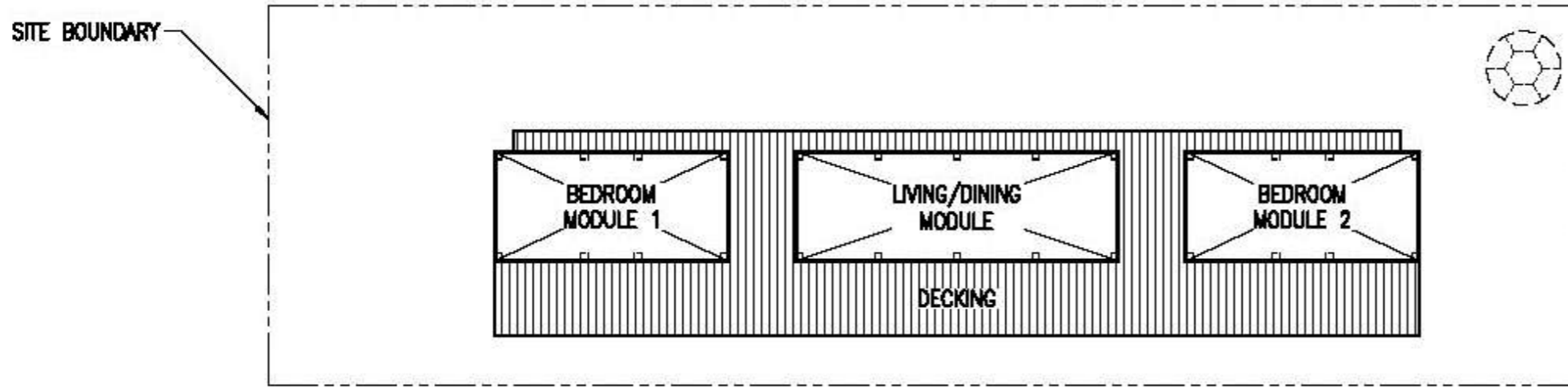
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LIVING MODULE - FRONT ELEVATION

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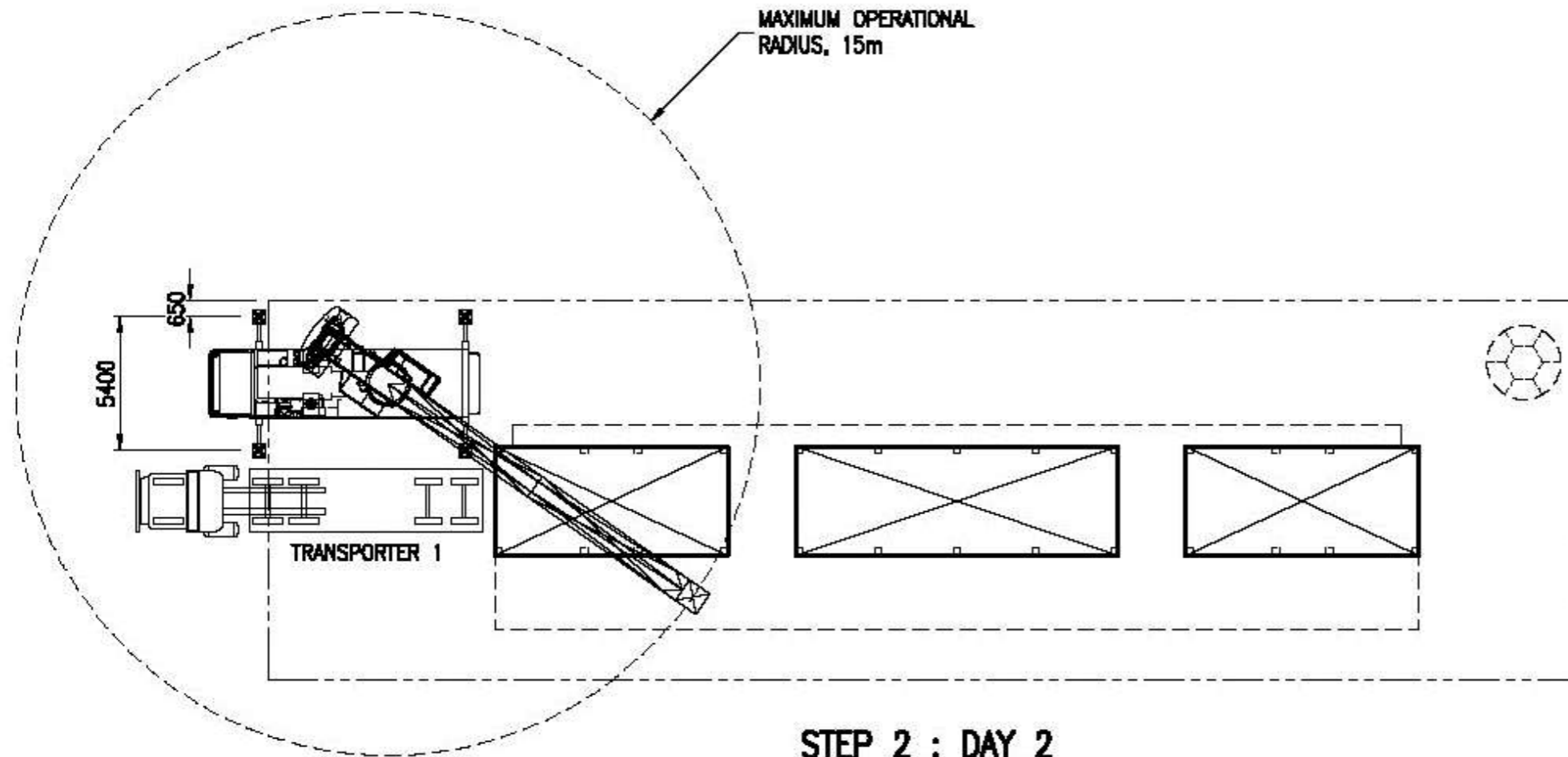




STEP 1 : DAY 1

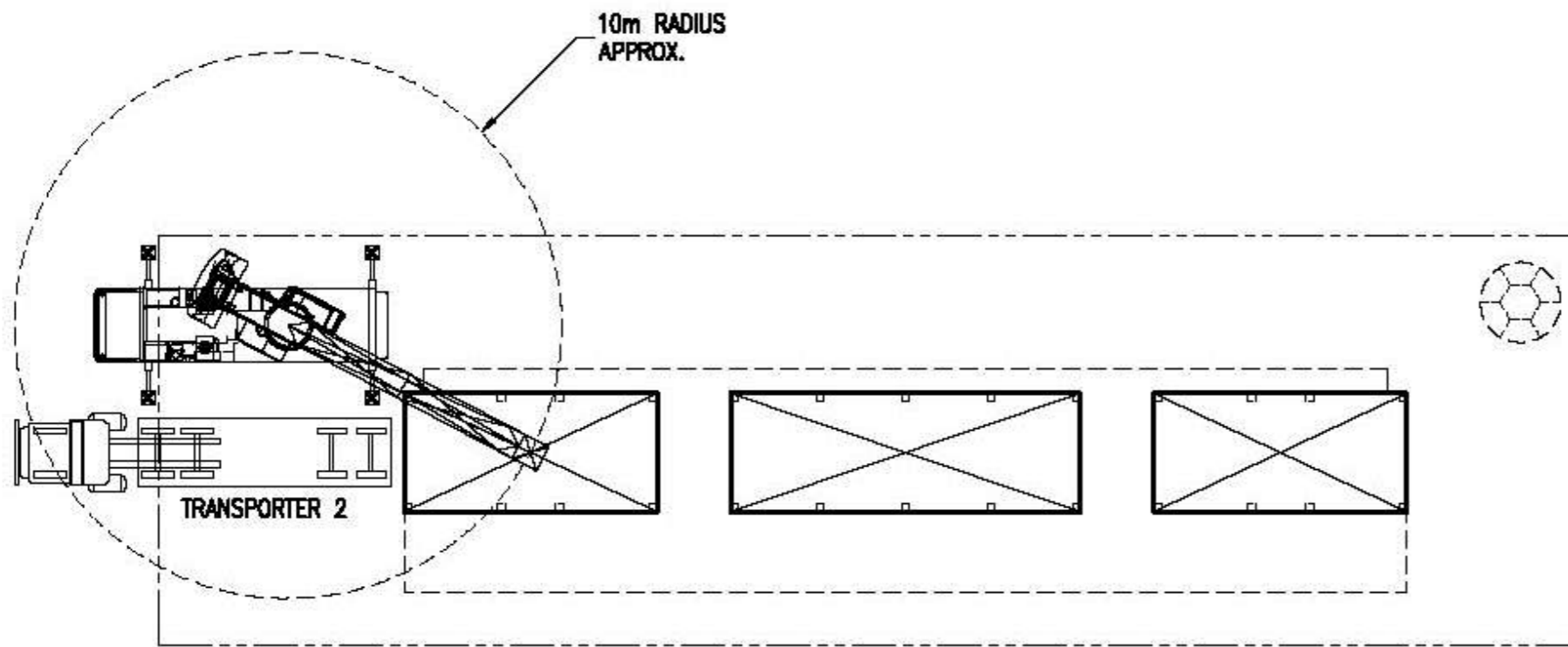
STEP 1 : DAY 1

1. MOBILISE 50T KATO SS500 ROUGH TERRAIN CRANE FROM TITAN CRANES, MOUNT MAUNGANUI TRANSPORTER.
2. MOBILISE TRANSPORTERS (4No.) FROM ROTORUA FOREST HAULAGE LTD.
3. DISCONNECT ALL UNDERGROUND SERVICES.



STEP 2 : DAY 2 (ESTIMATED TIME, 4 HOURS)

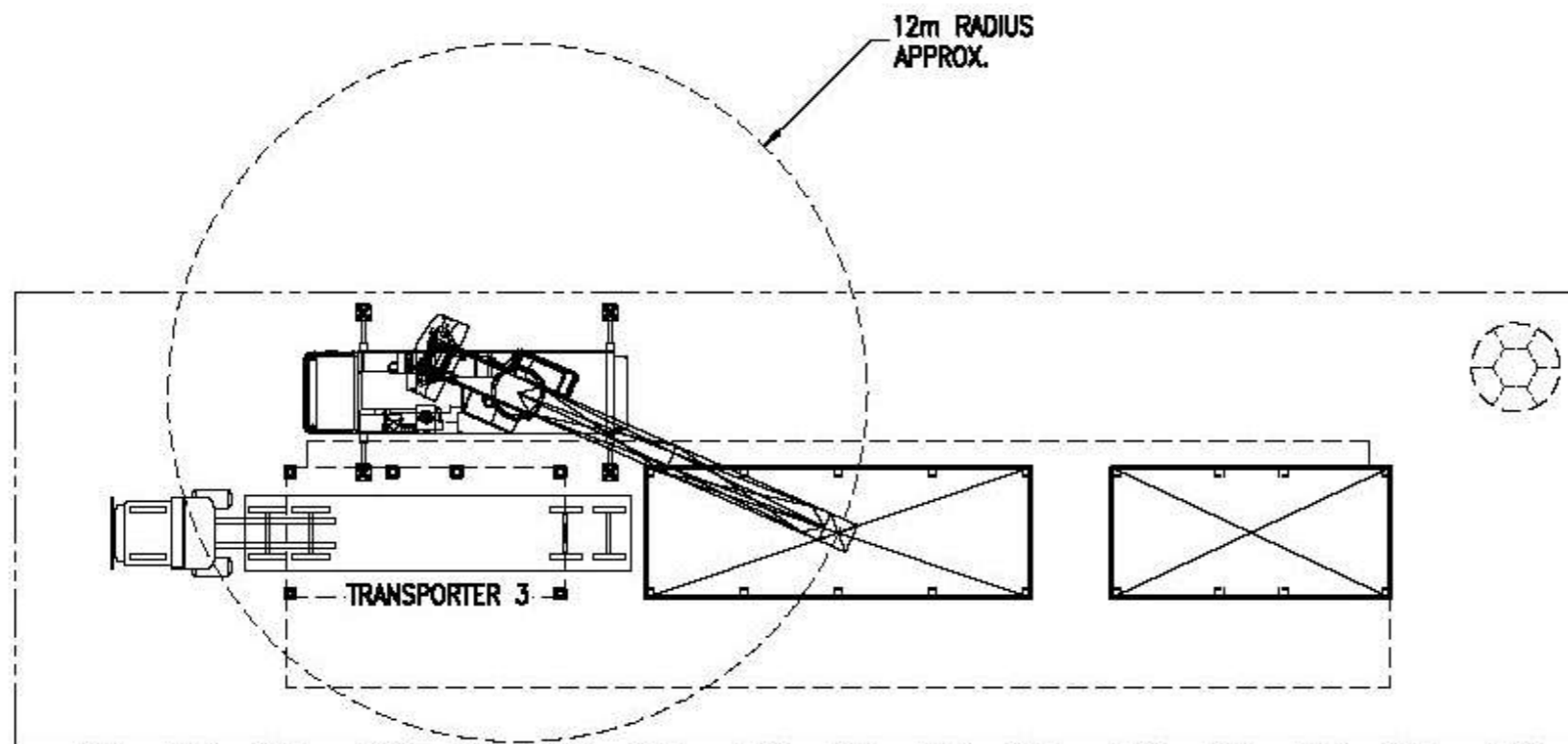
1. POSITION CRANE AND TRANSPORTER 1 TO RECEIVE DECKING.
2. DISCONNECT EXTERNAL DECKS FROM PILED FOUNDATIONS.
3. LIFT EXTERNAL DECKS ONTO TRANSPORTER 1 FOR REMOVAL OFF SITE. ESTIMATED WEIGHT LESS THAN 5 TONNES.



STEP 3 : DAY 2

STEP 3 : DAY 2 (ESTIMATED TIME, 2 HOURS)

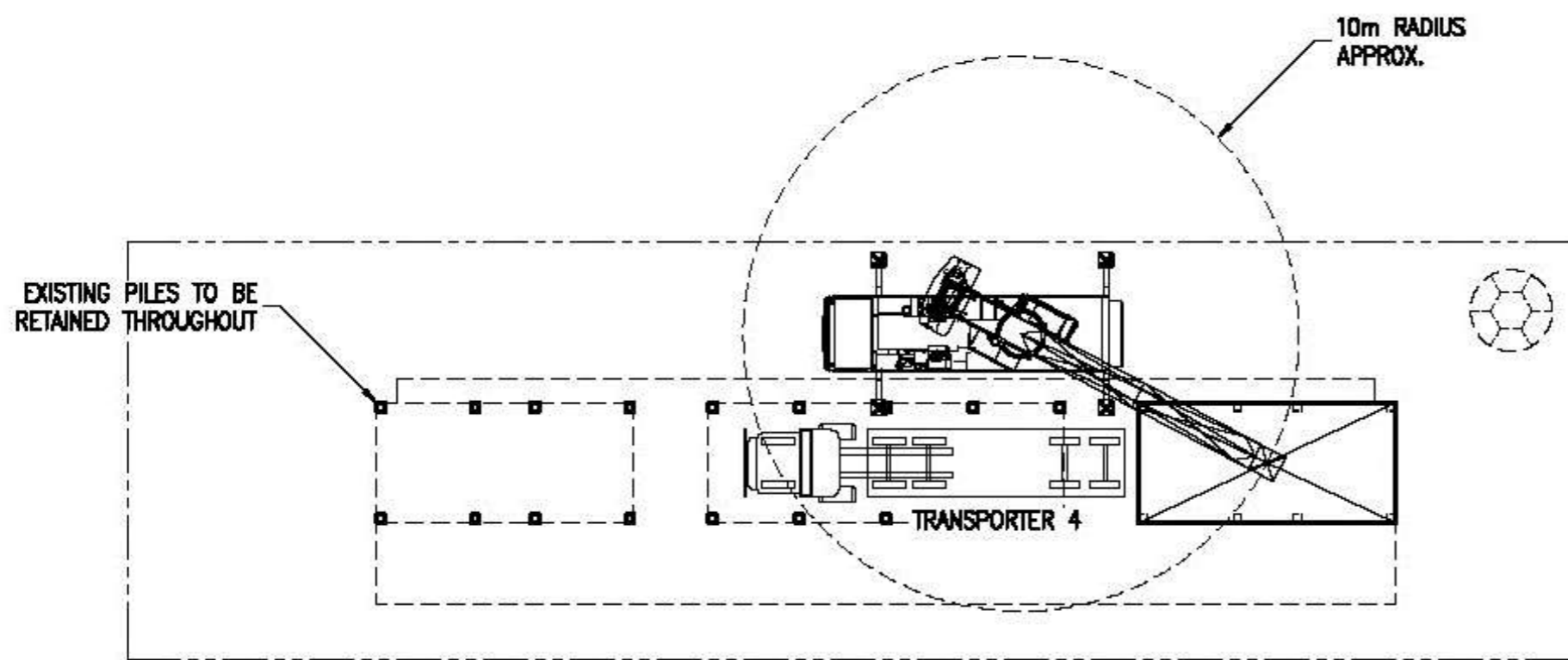
1. LOCATE CRANE AND TRANSPORTER 2 TO RECEIVE FIRST BEDROOM MODULE.
2. DISCONNECT FIRST BEDROOM MODULE FROM PILED FOUNDATIONS.
3. LIFT FIRST BEDROOM MODULE ONTO TRANSPORTER 2 FOR REMOVAL OFF SITE. ESTIMATED WEIGHT LESS THAN 5 TONNES.



STEP 4 : DAY 2

STEP 4 : DAY 2 (ESTIMATED TIME, 2 HOURS)

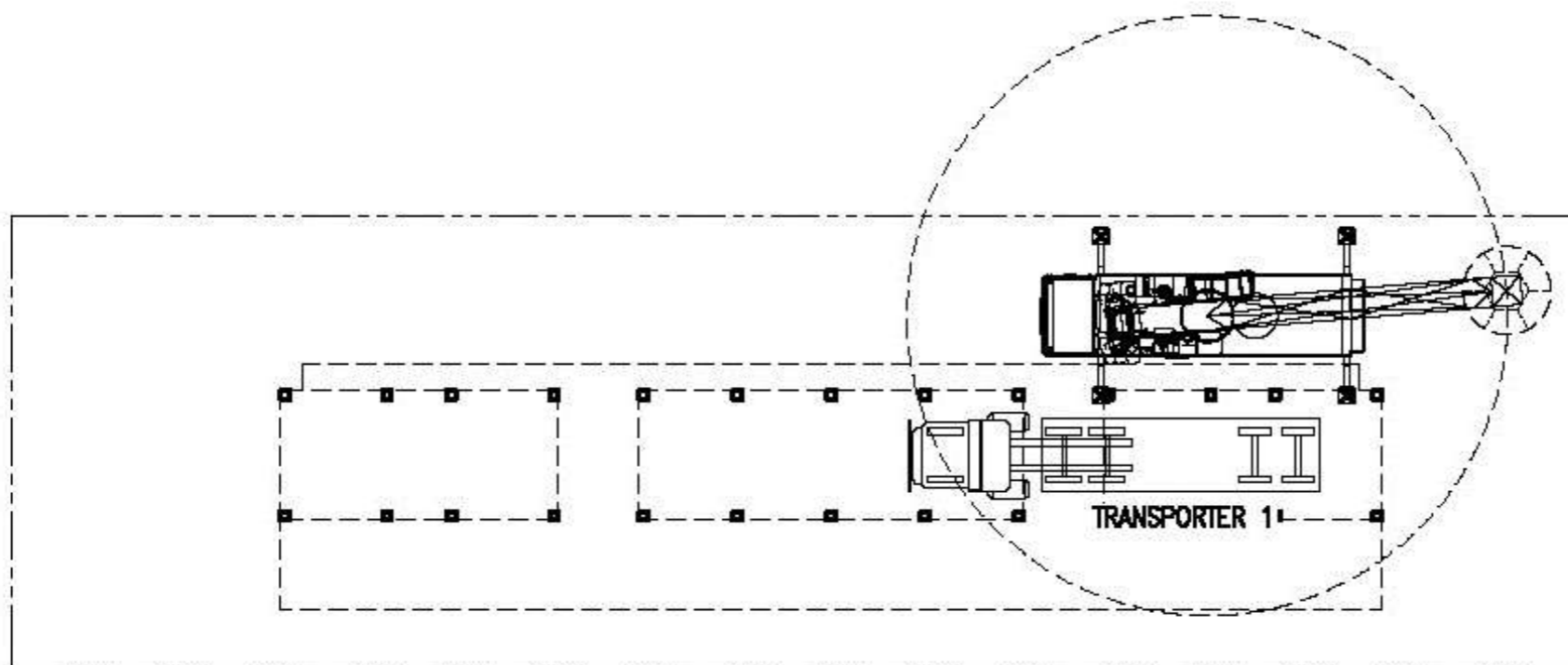
1. LOCATE CRANE AND TRANSPORTER 3 TO RECEIVE LIVING/DINING MODULE.
2. DISCONNECT LIVING/DINING MODULE FROM PILED FOUNDATIONS.
3. LIFT LIVING/DINING MODULE ONTO TRANSPORTER 2 FOR REMOVAL OFF SITE. ESTIMATED WEIGHT LESS THAN 8 TONNES.



STEP 5 : DAY 2

STEP 5 : DAY 2 (ESTIMATED TIME, 2 HOURS)

1. LOCATE CRANE AND TRANSPORTER 4 TO RECEIVE SECOND BEDROOM MODULE.
2. DISCONNECT SECOND BEDROOM MODULE FROM PILED FOUNDATIONS.
3. LIFT SECOND BEDROOM MODULE ONTO TRANSPORTER 4 FOR REMOVAL OFF SITE. ESTIMATED WEIGHT LESS THAN 5 TONNES.



STEP 6 : DAY 2

STEP 6 : DAY 2 (ESTIMATED TIME, 2 HOURS)

1. LOCATE CRANE AND TRANSPORTER 1 TO RECEIVE IN-GROUND SEPTIC TANK.
2. DISCONNECT IN-GROUND SEPTIC TANK FROM CONNECTIONS.
3. LIFT IN-GROUND SEPTIC TANK ONTO TRANSPORTER 1 FOR REMOVAL OFF SITE.

Ohiwa Planning Framework

- Opotiki District Plan – Policy framework
- Ohiwa Harbour Zone
- Controlled Activity

“Activities located within areas sensitive to coastal hazards
...where a report from a suitably qualified person detailing:

- (i) The impacts of the perceived hazard on the proposed activity; and
- (ii) The impacts of the proposed activity on the perceived hazard; and
- (iii) Where the outcome of the report indicates there will be no significant adverse effects from the activity, or from the hazard.”

Coastal Hazard Assessment

- Site erosion prone – cyclical
- 20-30 years of safe occupancy between erosion events affecting site
- Relocation a hazard avoidance option with no adverse effects

Ohiwa Planning and Legal Process

- Process:
 - Pre-application process – “over my dead body” (anon)
 - Notified controlled activity hearing- special circumstances s.95A(4) due to strong opposition
 - 93 submissions in opposition including Regional Council and Environmental Defence Society
 - 3 Commissioner Decision(lawyer, coastal scientist, councillor - October 2007
 - Environment Court appeals by RC and EDS (EDS, BOP Regional Council v Ohiwa No. 2 Limited, Env-2007-WLG-00143/144) – settled with agreed future Plan Change to shut down future use of Rule provision (non-complying)
 - Consent process - 160 working days - \$250,000.00
 - Section purchase (April 2006), construction completed November 2008













Relocatability Requirements

- Building construction type – timber on driven piles
- Regular monitoring of beach erosion
- Trigger for removal - 30m from boundary to toe of dune
- Removal in three calendar days
- Hard protection works prohibited
- Trigger for re-establishment - 30m from boundary to toe of dune

Case Study Two – Mt Maunganui/ Papamoa

- 25 kilometres of open coastline
- Coastal Hazard Assessment began in early 1980's
- Developed urban coastline – 300 plus houses in hazard zone.
- Prime coastal real estate and expensive homes
- Major tourist area and permanent community
- Dynamic dune system, severe storm events

Plan Policy Framework

- Tauranga City Plan Review - Coastal Hazard Erosion Plan Area (CHEPA)
 - Current Erosion Zone (CERZ)
 - 50 year Erosion Zone
 - 100 year Erosion Zone

Legal Challenges/Process

- Major challenges to implementation hazard assessment and setback lines from residents with beachfront properties.
- Environment Court Skinner v TDC (2001) - lengthy conflicting expert evidence .
- General approach upheld including relocatability requirements.



TAYLOR ROAD

MOTT ROAD

POMPANO KEY

35

PALAZZO DRIVE

SERENA KEY

CALYPSO DRIVE

PARAKOA BEACH ROAD

VENTURA KEY

BALBOA KEY

MCDLACOURT

WAIRAKEI AVENUE

MADELEINE TERRACE

RODOKANA PLACE

MADELEINE TERRACE

CALYPSO DRIVE

GOLDEN SANDS DRIVE

KAREWA PARAKOA

PUMBA LANE

SPINIFEX STREET



Objectives and Policies

- Avoidance of coastal erosion and inundation hazards by:
 - Enhancing natural protection from dunes (via dune management/Coastcare)
 - Managing hazards:
 - For existing buildings/activities via scale limits, relocatability and retreat
 - By avoiding new subdivision or use

Relocatability Policy

- Building in the CHEPA shall be able to be practicably moved or relocated to an alternative building site beyond the CHEPA
- Location of buildings reviewed when dune crest within 10m of building – removal may be required

Rules

Application Assessment Criteria:

- Able to be relocated and removed with minimal disturbance to the land or adjacent land.
- Access sufficient to enable relocation
- Alternative building site for relocated dwelling
- Review when crest within 10 of building
- Relocation when crest with 5m of building
- Dune sand volumes maintained after reinstatement

Definitions

Able to be relocated means:

- Able to be "practicably moved" to an alternative building site, or moved as far landward as possible within the site, or off-site clear of the CHEPA.
- Alternative building site means vacant land comprising a minimum area of 325m² clear of the CHEPA

Information Requirements

- Compliance with guidelines
 - Guidelines provide acceptable solutions for lightweight structures which are relocatable.
 - Specialist Reports where guidelines not met.
 - Relocatability to be certified by an expert.

Design Responses

- Lightweight timber buildings
- But also:
 - Large masonry buildings on rails
 - Cantilevered buildings
 - Modules capable of demolition/removal

DISCUSSION

- What happens if numerous buildings are designed in this way at one location?
- A severe or sudden erosion event affects many properties at the same time?
- What is the appropriate relocation trigger? How should it be set? Monitored? By whom?

DISCUSSION Continued...

- Will relocatable buildings prevent continued pressure to put seawalls or other hard protection measures in place to protect residential communities?
- Areas potentially affected by coastal hazards over at least 100 years - how much of the coastline of New Zealand falls within this definition, how is this defined, how often?

CREDITS/ACKNOWLEDGEMENTS

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- Special acknowledgement to the expertise and knowledge of Dr. Jeremy Gibbs.