

## Construction Effects and Mitigation

The proposed infrastructure will require only very minor earthworks and vegetation disturbance. Footings will generally consist of 600 mm holes filled with rammed earth, or concrete base plates drilled and fixed into existing rock. Across all 10 launch and receive platforms, we have calculated that less than 4 m<sup>3</sup> of earth will need to be moved. This represents a negligible level of ground disturbance relative to the scale of the reserve.

Any areas inadvertently disturbed during construction will be promptly rehabilitated using eco-sourced native plantings, in consultation with DOC. As an additional measure, the applicant commits to providing mitigation planting to offset any vegetation that must be trimmed or removed for the ziplines and platforms. Planting will again be undertaken with eco-sourced species, ensuring that localised disturbance is converted into long-term ecological enhancement.

This approach ensures that the construction footprint is contained, temporary in effect, and balanced by direct mitigation and offset measures that contribute positively to the ecological resilience of the Twelve Mile Delta reserve.

### 1. Tree-Based Attachments

- All tree-mounted connections will use *Macrocarpa* blocks as spacers.
- Standard block size: 300 mm × 100 mm × 75 mm.
- Blocks will be installed as per Images #5 and #6.

### 2. Zipline Cables

- All ziplines will use 12 mm 6×19 Independent Wire Rope Core (IWRC). A IWRC is a wire rope made of 6 bundles of 19 wires, wrapped around a wire-rope core. It looks like standard wire cable.
- All zipline attachment points will also use 12 mm 6×19 IWRC cable with swaged eye terminations. This is describing the end of a wire rope when it's inserted into a metal sleeve (usually aluminium or steel) and then compressed under massive pressure with a hydraulic swager. It is incredibly secure very a small footprint.

### 3. Ground-Based Platforms

- All platforms will be *Ground Based Platforms* and be consistent with Images #1 and #2.
- The platforms will either be 1.2m x 2m; or 2.4m x 2m, as specified in the table below.
- All platforms will be under 5 m<sup>2</sup> surface area.
- All platforms will be less than 1m above natural ground level and if less than 600mm will not require handrails.
- All fixings used on timber platforms will be stainless steel.
- Timber sizes, treatment levels, and construction details are specified in the Ground Based Platform Plan.
- Departure stairs and landing ramps will be mounted to the platform structure.
- No additional footings required.

### 4. Rock Anchors

- Rock anchors are non-invasive and based on the examples shown in Images #3 and #4.
- Each anchor:
  - Uses 25 mm Reid Rod, drilled >3 m into the existing rock.
  - Is secured to a 300 mm × 300 mm × 30 MPa concrete footing to provide a flat bearing surface.
  - Supports a 16 mm fabricated steel base plate, angled to suit site requirements.
  - The plate is locked off with a nut and lock nut configuration.
  - A 3.25 t shackle will connect the zipline cable to the anchor plate.

## 5. Support Posts (Where Trees Are Not Used)

- Short steel posts will be installed to support ziplines where natural anchors are not present.
- Posts:
  - Constructed from 200 NB line pipe (219 mm OD × 4.8 mm wall).
  - Maximum height: 2 m above grade.
- Each post will be stabilised with 2–3 backstays tied into adjacent Rock Anchors.
- All steel attachments to the posts:
  - Use 16 mm steel plate.
  - Welded with 5 mm fillet welds, full weld all around.
- All finished steel, including posts and plates, will be painted forest green with an EHB4 epoxy finish, compliant with AS/NZS 2312.
- The final appearance will be tidy, professional, and visually unobtrusive.

## 6. Zipline Termination and Client Muster System (Per Zipline)

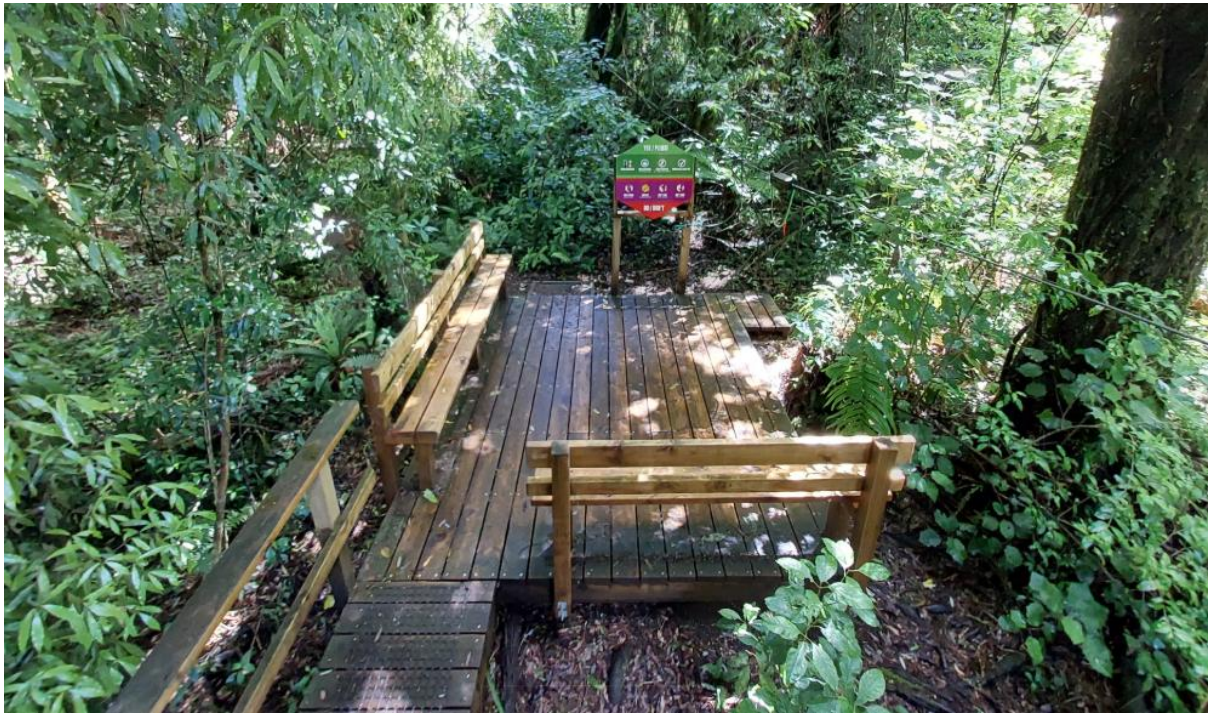
Each zipline section will have the following clearly defined components:

- Upper (Launch) Anchor Point
  - Secure top attachment point using the specified cable, blocks, posts, or rock anchors.
  - Hardware scaled to design load requirements.
- Launch Platform
  - Constructed as per platform specifications in Section 3.
  - Sized per location.
  - Serves as the guest muster area and launch point.
- Lower (Landing) Anchor Point
  - Bottom attachment point using approved cable terminations, posts, or rock anchors.
  - Designed to manage dynamic load and maintain correct sag/tension.
- Landing Platform
  - Built to the same standards as other platforms.
  - Guides will manage guest arrival and disembarkation from this structure.

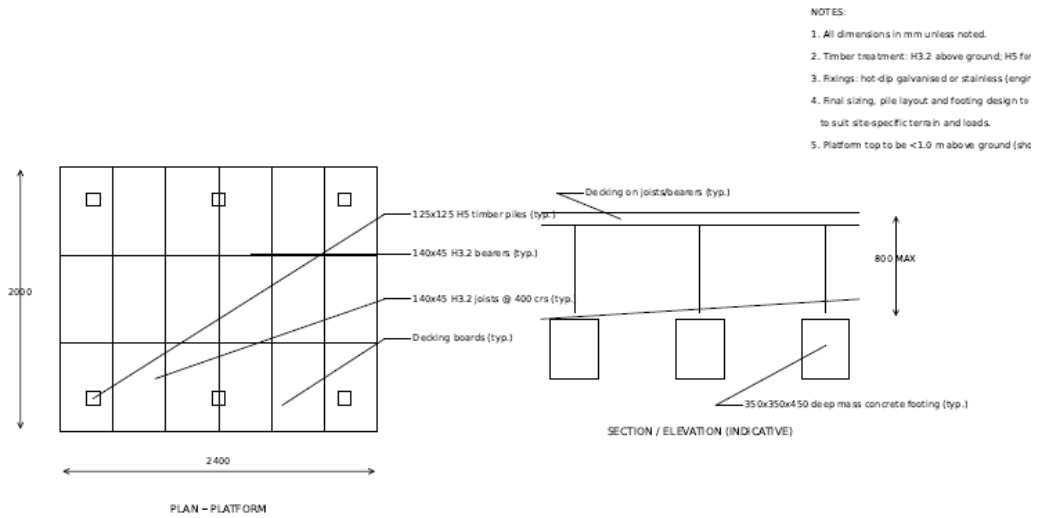
## Zipline Construction Table

Zipline #	a. Top Attachment Point	b. Launch Platform	c. Bottom Attachment Point	d. Landing Platform
Zip 1	<b>Tree-Based Bracing</b> <ul style="list-style-type: none"> <li>• Non-impact Macrocarpa blocks as spacers.</li> <li>• Images #5 and #6</li> </ul>	<b>Ground-Based Platform</b> <ul style="list-style-type: none"> <li>• 2.4 m × 2 m</li> <li>• Images #1 and #2</li> </ul>	<b>Tree-Based Bracing</b> <ul style="list-style-type: none"> <li>• Non-impact Macrocarpa blocks as spacers</li> <li>• Images #5 and #6</li> </ul>	<b>Ground-Based Platform</b> <ul style="list-style-type: none"> <li>• 2.4 m × 2 m</li> <li>• Images #1 and #2</li> </ul>
Zip 2	<b>Tree-Based Bracing</b> <ul style="list-style-type: none"> <li>• Non-impact Macrocarpa blocks as spacers</li> <li>• Images #5 and #6</li> </ul>	<b>Ground-Based Platform</b> <ul style="list-style-type: none"> <li>• 1.2 m × 2 m</li> <li>• Images #1 and #2</li> </ul>	<b>Rock Anchors (×3)</b> <ul style="list-style-type: none"> <li>• Drilled system</li> <li>• Images #3 and #4</li> </ul>	<b>Ground-Based Platform</b> <ul style="list-style-type: none"> <li>• 1.2 m × 2 m</li> <li>• Images #1 and #2</li> </ul>
Zip 3	<b>Tree-Based Bracing</b> <ul style="list-style-type: none"> <li>• Non-impact Macrocarpa blocks as spacers</li> <li>• Images #5 and #6</li> </ul>	<b>Ground-Based Platform</b> <ul style="list-style-type: none"> <li>• 2.4 m × 2 m</li> <li>• Images #1 and #2</li> </ul>	<b>Tree-Based Bracing</b> <ul style="list-style-type: none"> <li>• Non-impact Macrocarpa blocks as spacers</li> <li>• Images #6 and #7</li> </ul>	<b>Ground-Based Platform</b> <ul style="list-style-type: none"> <li>• 1.2 m × 2 m</li> <li>• Images #1 and #2</li> </ul>
Zip 4	<b>Rock Anchors (×3)</b> <ul style="list-style-type: none"> <li>• Drilled system</li> <li>• Images #3 and #4</li> </ul>	<b>Ground-Based Platform</b> <ul style="list-style-type: none"> <li>• 2.4 m × 2 m</li> <li>• Images #1 and #2</li> </ul>	<b>Rock Anchors (×3)</b> <ul style="list-style-type: none"> <li>• Drilled system</li> <li>• Images #3 and #4</li> </ul>	<b>Ground-Based Platform</b> <ul style="list-style-type: none"> <li>• 2.4m × 2m</li> <li>• Images #1 and #2</li> </ul>

Image #1 – Example of a ground based platform



## Image #2 – Plans of ground based platforms



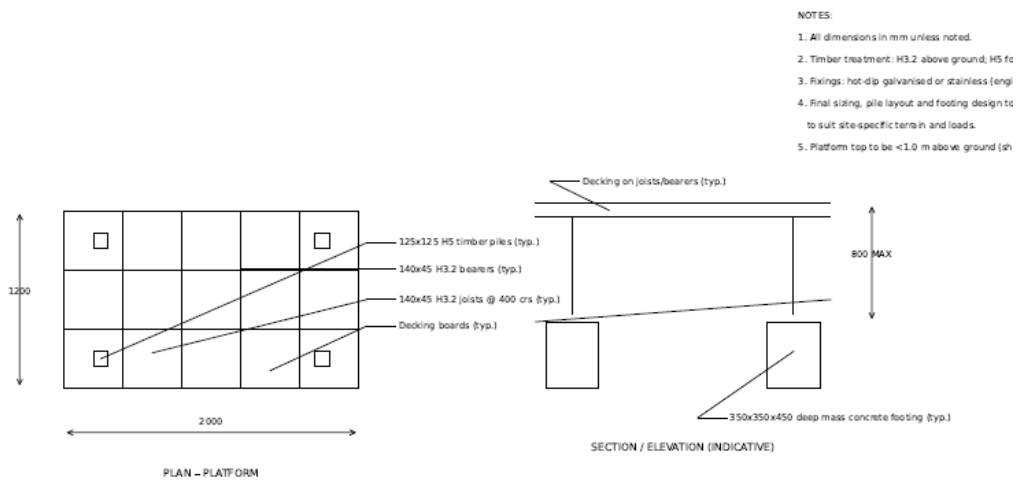
RCT GROUP LTD – TWELVE MILE DELTA ZIPLINE

DRAWING: Typical Ground-Based Platform – 2000 x 2400

REV: A

DWG. NO: QTN-P02

SCALE: Indicative – not for construction



RCT GROUP LTD – TWELVE MILE DELTA ZIPLINE

DRAWING: Typical Ground-Based Platform – 1200 x 2000

REV: A

DWG. NO: QTN-P01

SCALE: Indicative – not for construction

Image # 3 – Zipline Rock Anchor



Image #4 – Zipline Rock Anchor



Image #5 – Macrocarpa spacing blocks



Image # 6 – Macrocarpa Spacing Blocks

