

CLIMATE CHANGE


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at Antarctica NZ

NZPI 2021
CONFERENCE

VALUES VOICES VISION

Nelson, 24-26 March

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**Antarctica
New Zealand**

The Climate Framework, and Taking Action

AN ANTARCTICA NEW ZEALAND STORY

Whakatauki

Whakataka te hau ki te uru

Whakataka te hau ki te tonga

Kia mākinakina ki uta

Kia mātaratara ki tai

E hī ake ana te atakura

He tio, he huka, he hau hū

Haumi e! Hui e! Tāiki e!

Get ready for the westerly
and be prepared for the southerly.

It will be icy cold inland,
and icy cold on the shore.

May the dawn rise red-tipped on ice,
on snow, on frost.

Join! Gather! Intertwine!

Today's talk



Climate Framework

- Low greenhouse gas emissions and climate resilience
 - Leadership – domestically and internationally
 - Productive, sustainable and resilient economy
 - Just and inclusive society

Antarctica

- some quick stats



A white silhouette of the continent of Antarctica is centered on a dark blue background. The map is overlaid with a white grid of latitude and longitude lines, including a vertical line through the continent's center and a horizontal line below it. The grid consists of several concentric circles and radial lines.

Antarctic Governance

THE ANTARCTIC TREATY

TRAITE SUR L'ANTARCTIQUE

ДОГОВОР ОБ АНТАРКТИКЕ

TRATADO ANTARTICO

ARTICLE I

1. Antarctica shall be used for peaceful purposes only. There shall be prohibited, inter alia, any measures of a military nature, such as the establishment of military bases and fortifications, the carrying out of military maneuvers, as well as the testing of any type of weapons.

2. The present Treaty shall not prevent the use of military personnel or equipment for scientific research or for any other peaceful purpose.

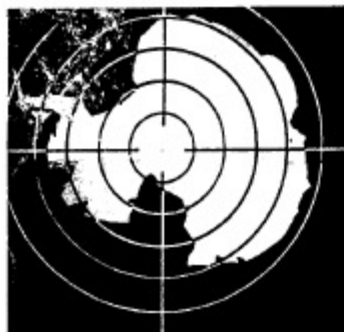
ARTICLE II

Freedom of scientific investigation in Antarctica and cooperation toward that end, as applied during the International Geophysical Year, shall continue, subject to the provisions of the present Treaty.

ARTICLE III

1. In order to promote international cooperation in scientific investigation in Antarctica, as provided for in Article II of the present Treaty, the Contracting Parties agree that, to the greatest extent feasible and practicable:

- (a) information regarding plans for scientific programs in Antarctica shall be exchanged to permit maximum economy and efficiency of operations;
- (b) scientific personnel shall be exchanged in Antarctica between expeditions and stations;
- (c) scientific observations and results from Antarctica shall be exchanged and made freely available.



CONFERENCE ON
ANTARCTICA

CONFERENCE DE
L'ANTARCTIQUE

CONFERENCIA DE LA
ANTARTIDA

КОНФЕРЕНЦИЯ ПО
АНТАРКТИКЕ

Antarctic Treaty System

Including:

- Convention for the Conservation of Antarctic Marine Living Resources - 1982
- Protocol on Environmental Protection (Madrid Protocol) - 1991
- 179 measures and decisions on environmental matters to date

Protocol on Environmental Protection

- “natural reserve, devoted to peace and science” (Art. 2)
- sets forth basic principles applicable to human activities in Antarctica (Art. 3)
- prohibits all activities relating to Antarctic mineral resources, except for scientific research (Art. 7)

International Bodies

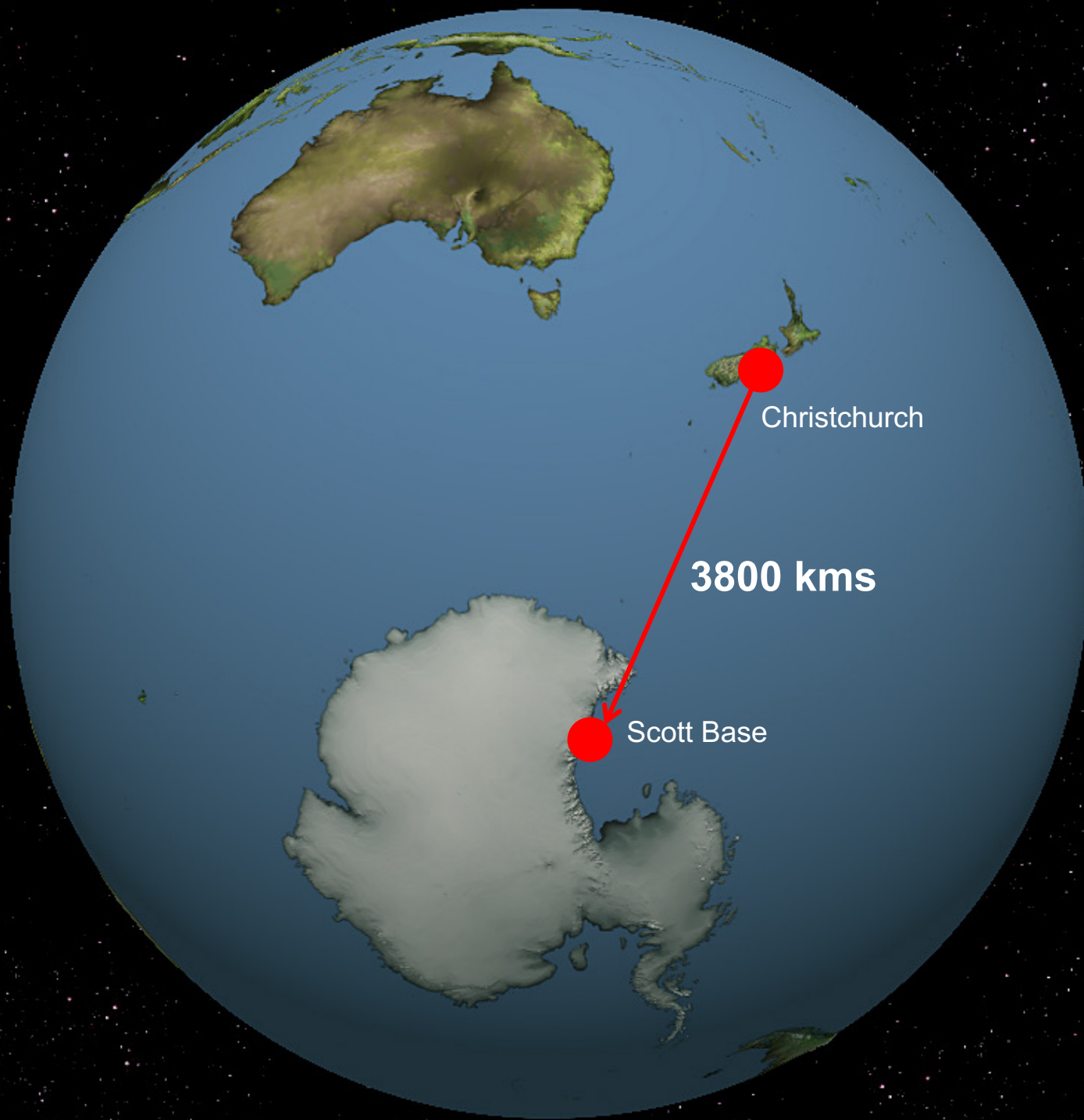
- Antarctic Treaty Consultative Meeting – ATCM
- Committee for Environmental Protection - CEP
- Scientific Community of Antarctic Research – SCAR
- Council of Managers of the National Antarctic Programs – COMNAP
- Antarctic and Southern Ocean Coalition – ASOC

New Zealand's Antarctic Program



**Antarctica
New Zealand**

- Cape Hallett Station built in 1956 – joint NZ and USA program
- Scott Base built in 1957 in support of the Trans-Antarctic Expedition and in contribution to the International Geophysical Year
- 1959 – NZ signs the Antarctic Treaty, Antarctic Division of DSIR created
- 1996 - New Zealand Antarctic Institute (Antarctica New Zealand) established, 21st ATCM hosted in Christchurch
- 2017-2019 planning and launch of the Antarctic Science Platform



Christchurch

3800 kms

Scott Base

New Zealand in Antarctica

New Zealand values a safe and secure Antarctica and is committed to:

- Protecting the environment of Antarctica
- Strengthening the Antarctic Treaty System
- Supporting science that contributes to understanding Antarctica and the Southern Ocean

To deliver on our strategic interests, we need:

- A continuous safe presence in Antarctica
- A credible Antarctic science programme
- Strong environmental credentials
- International collaboration



Scott Base History



Hillary assisting the unloading (1957)



Raising the NZ flag (20 Jan 1957)



The base comprised 6 connected buildings and 3 science buildings



Construction of Q Hut (1977)



Redevelopment Stage 6 (1987)

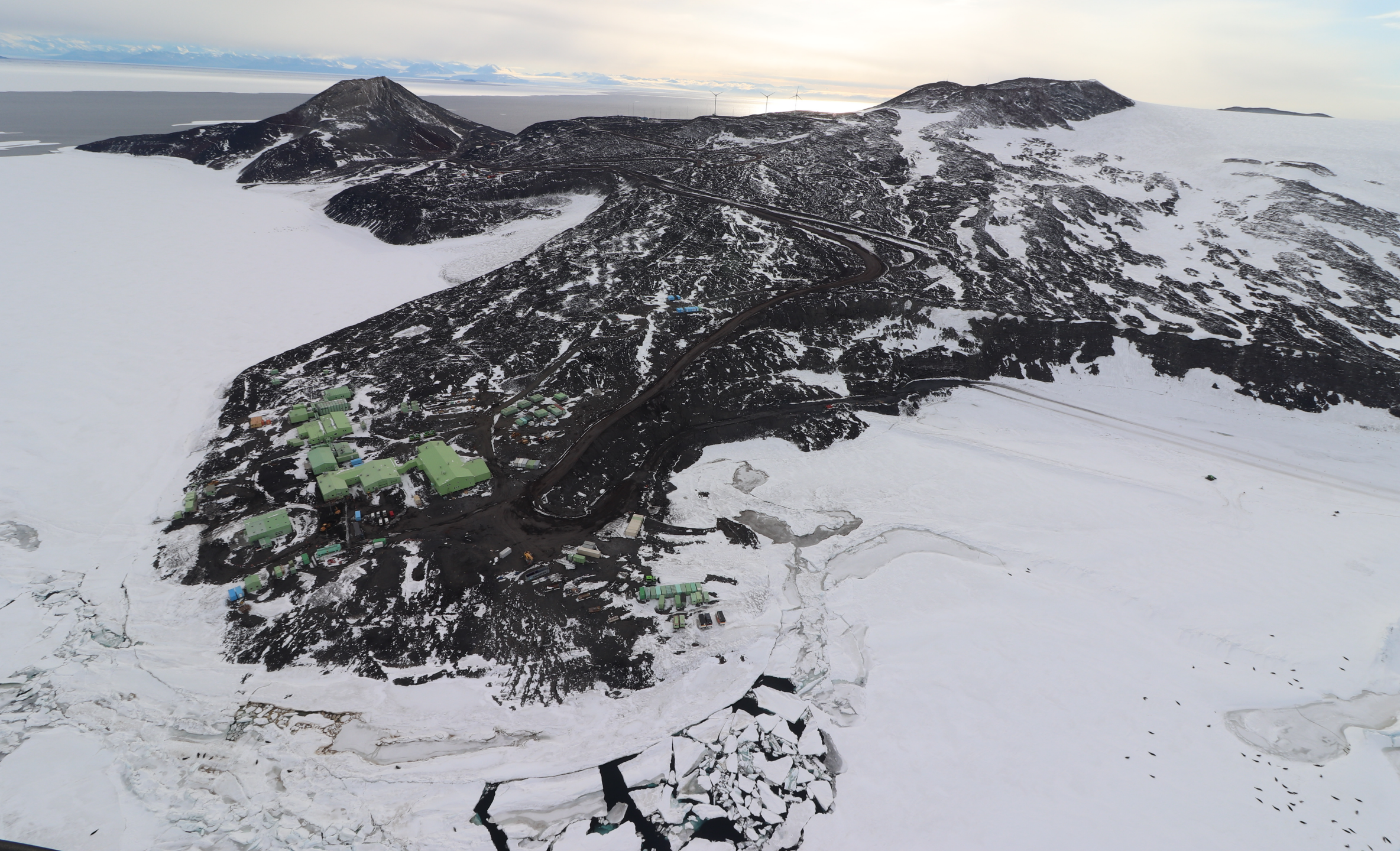


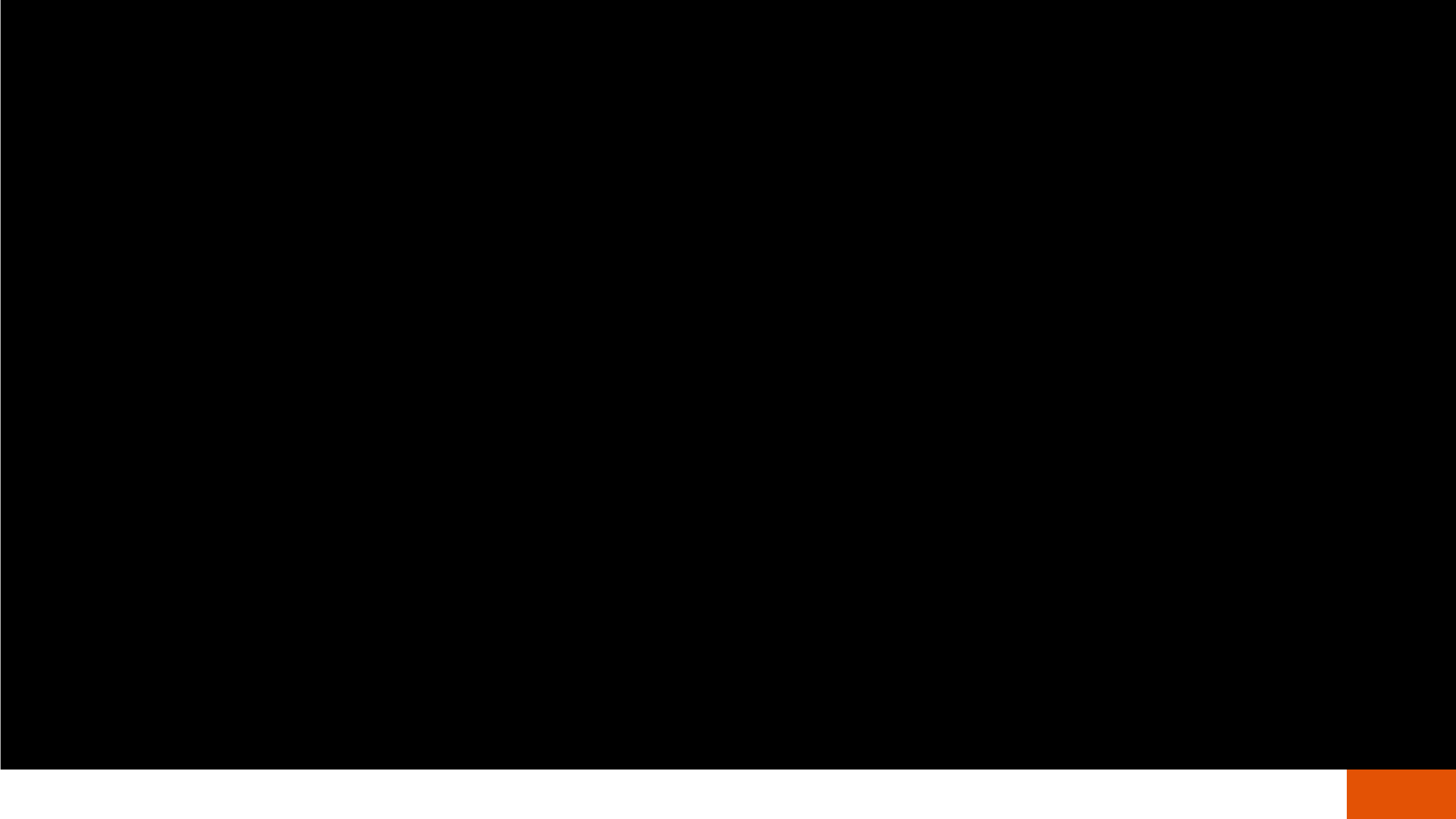
TAE Hut conserved by AHT



8/04/21

16





Short history of Antarctic Science

- 1904 - Scott's Discovery Expedition - biological sampling, plant, animal, geologic, weather and magnetic observations
- 1911 - Scott's Terra Nova Expedition – 12 Scientists, first detailed weather recordings, 2100 plant, animal and fossil samples returned, 400 new to science
- 1957 - present – Magnetic, climate, gravity, sea level
- 1967 - 1991 – Vanda Station – Climate, hydrology, seismology, magnetics
- 1990 - 2007 – RICE, Cape Roberts Project, ANDRILL
- 2019 - ongoing – Kamb Ice Stream drilling project



Antarctic Science Platform

- NZ\$49million
- 7 years: 2018-2025
- 100+ researchers
- 25 early career researchers
- 30+ graduate students
- 10 research organisations



Antarctic Science Platform

Projects

- Antarctic Ocean Mechanics
- Antarctic Ice Dynamics
- Sea Ice and Carbon Cycle Feedbacks
- Projecting Ross Sea Region Ecosystem Dynamics in a Warming World

Future Projections and Science-to-Policy

How will Antarctica and the Southern Ocean change as the world warms, and what are the local, regional and global consequences?

Antarctic Ocean Mechanics

How are regional atmospheric and oceanic variations linked to anthropogenic forcings?

How do sea ice variability and Southern Ocean CO₂ exchange relate to atmospheric and oceanic changes?

Sea Ice and Carbon Cycle Feedbacks

What is driving changes in sea ice extent and Southern Ocean CO₂ exchange?

How does atmosphere and ocean circulation influence ice sheet retreat?

How do sea ice, oceans and ice shelves interact?

How will atmospheric, oceanic and sea-ice changes influence ecosystem baselines?

How does sea ice influence ecosystems?

How do marine-based ice sheets respond to a warming world and what are the global consequences for sea level rise?

How do ecosystem changes influence Southern Ocean CO₂ exchange?

How will ecosystems and ice sheets respond to increased production of meltwater?

What are the key vulnerabilities of existing Ross Sea Region ecosystems in a warming world?

Antarctic Ice Dynamics

Ross Sea Region Ecosystem Dynamics



**Antarctic
Science Platform**

Expert Groups

- Modelling Hub – Future Projections for Antarctica and New Zealand
- Science to Policy

**Connecting the Antarctic, Southern Ocean and
New Zealand**

**Leadership – on the domestic and international
stage**



Scott Base Redevelopment

Project Objectives

1. Maintain a continuous presence in the Ross Dependency
2. Protect the Antarctic environment
3. Provide an environment that keeps people safe and healthy
4. Enable effective logistics support to maintain and enhance high-quality science that is relevant to New Zealand and the world
5. Maintain New Zealand's credibility amongst Antarctic Treaty nations



Sustainability



Scott Base Redevelopment and the Climate Framework

Transitioning to low-emissions

- Wind farm upgrade – 24% to 97% renewables plus export
- Building efficiency
- Life Cycle Modelling – embodied impacts
- Green Star accreditation

Green Star – Custom Antarctic Tool

- Developed in collaboration with the NZ and Australian Green Building Councils
- Developed for use by any Antarctic nation for station builds
- Presented to the COMNAP 2020
- Papers drafted for consideration at the CEP

Scott Base Redevelopment and the Climate Framework

Planning for change

- Sea level change study
- Temperature studies
- Wind and Snow modelling
- Designing for 50 year life

An adaptive design

KEY

- Primary operational area extents
- Primary on-grade power / communications cables
- Local electrical and communications service routes
- Primary on-grade water / sewer
- Primary underground water / sewer
- Primary vehicle routes
- Pedestrian routes (Hillary Track)



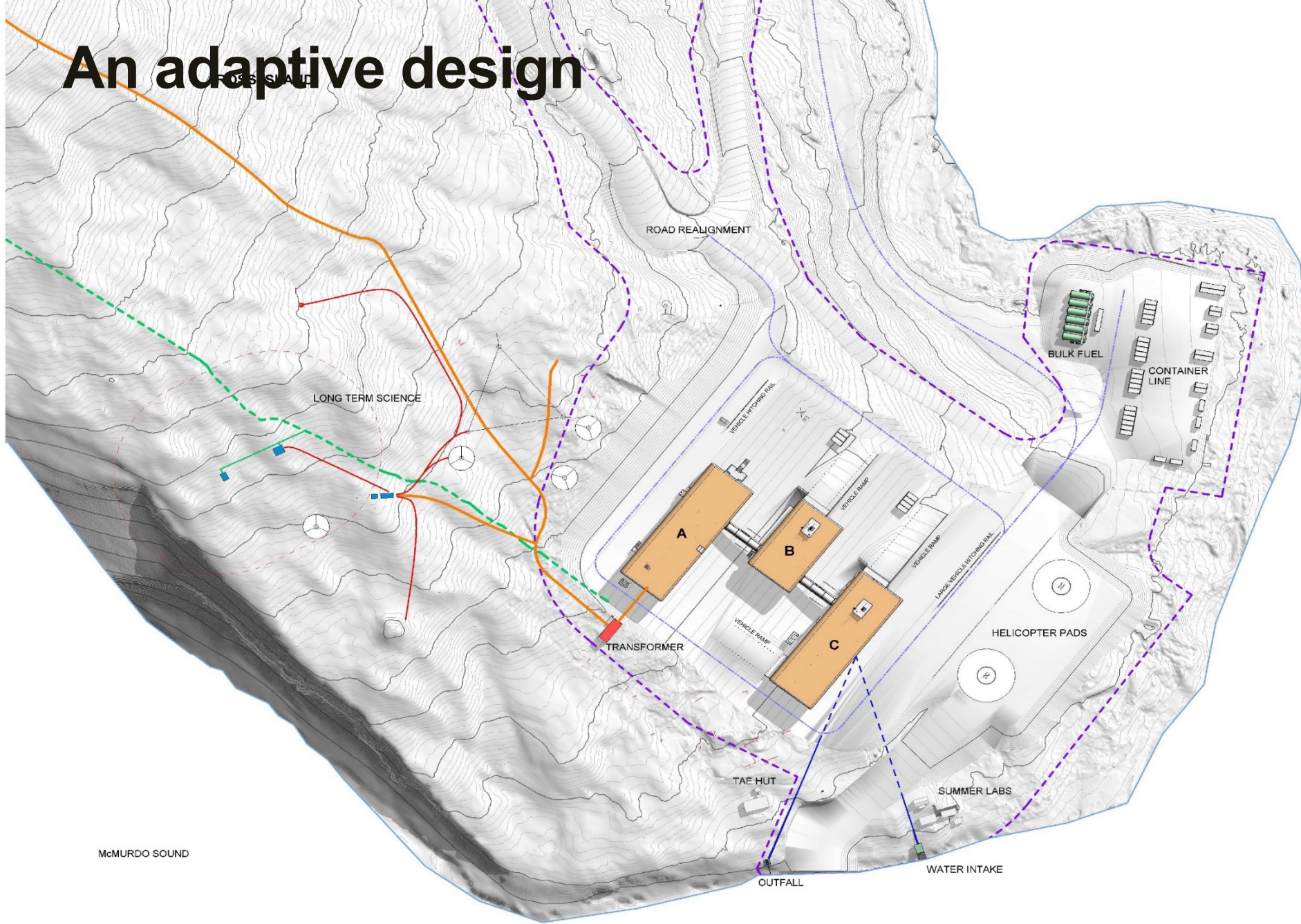
Science or communications aerials

LONG TERM SCIENCE

- Indicative locations of long term science huts

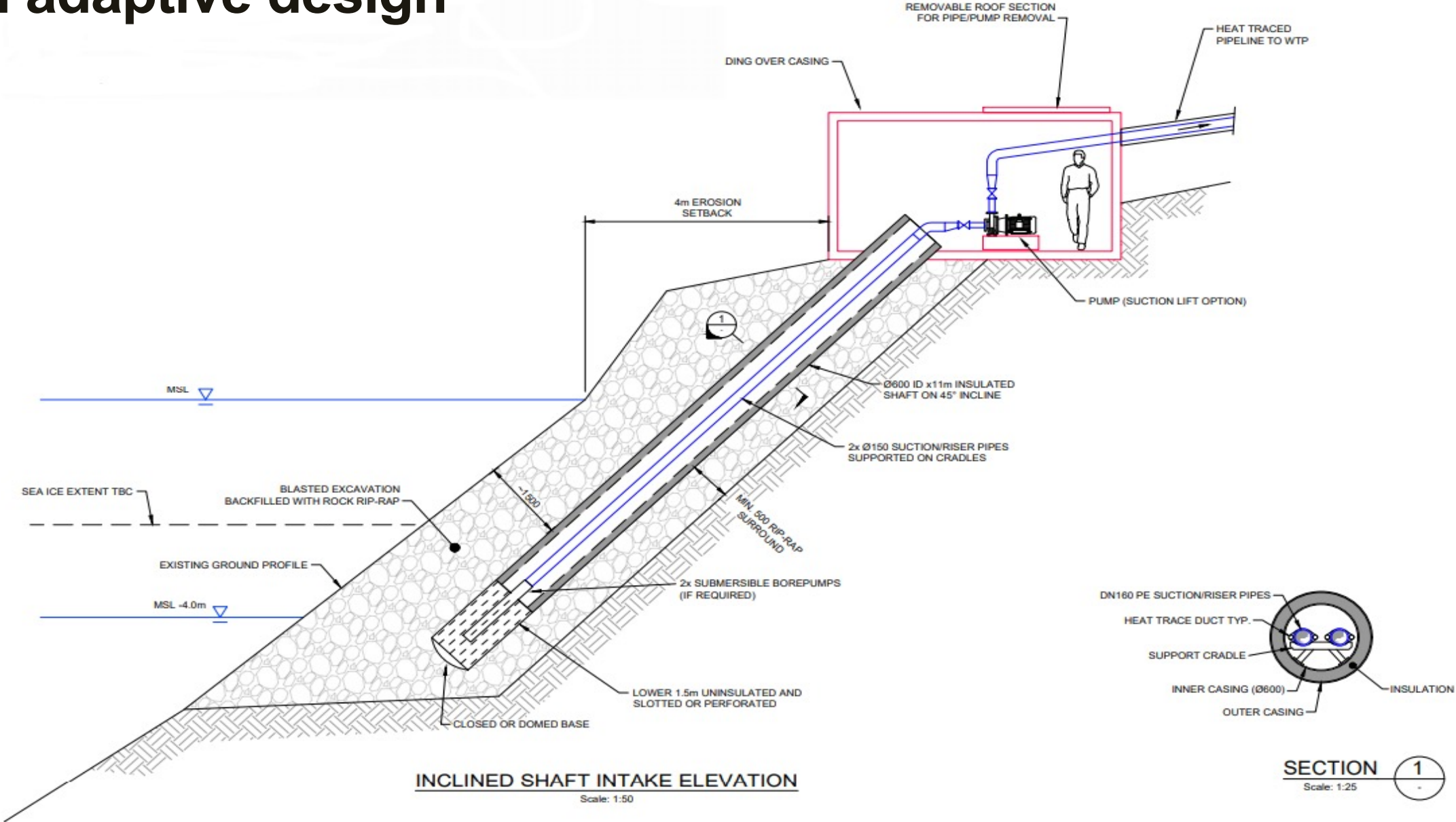
BUILDING DIRECTORY

- A** Building A
Accommodation
- B** Building B
Science labs
Offices
Event staging
- C** Building C
Stores
Cargo
Workshops

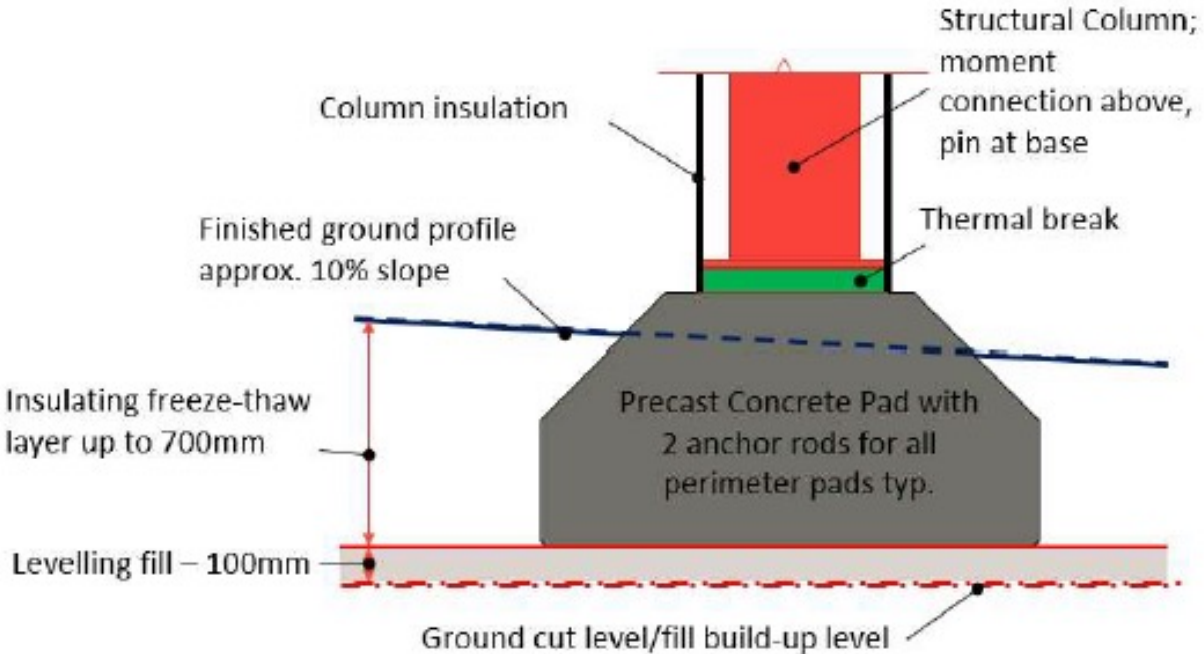
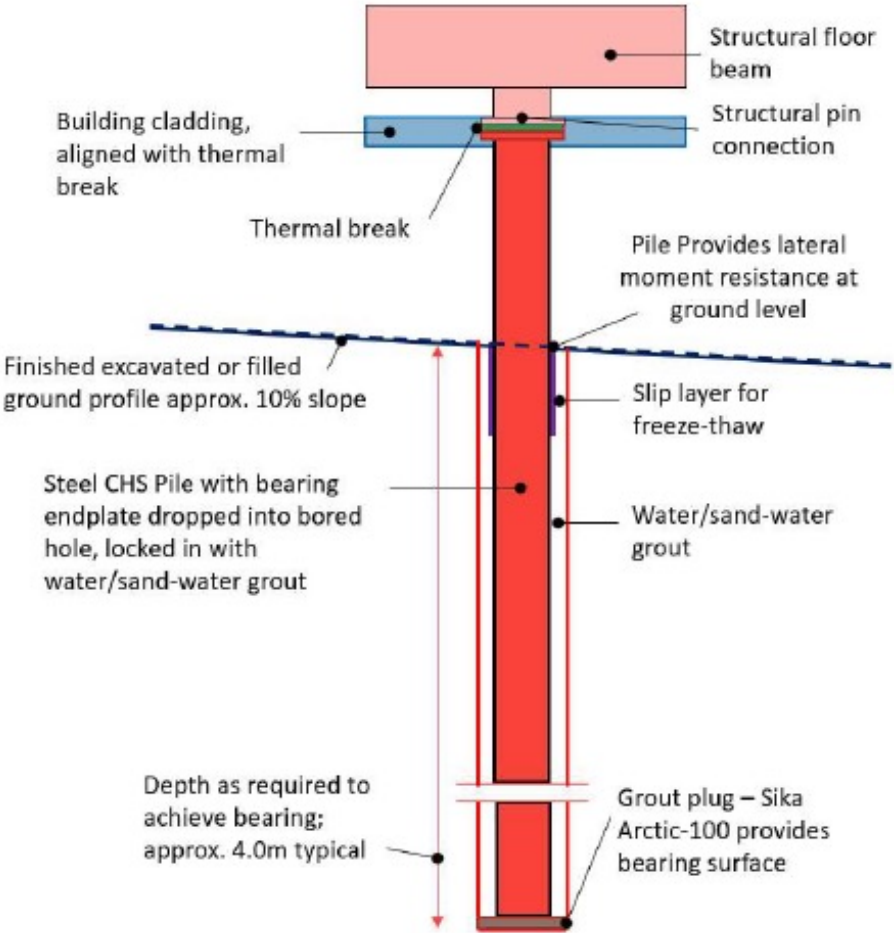


McMURDO SOUND

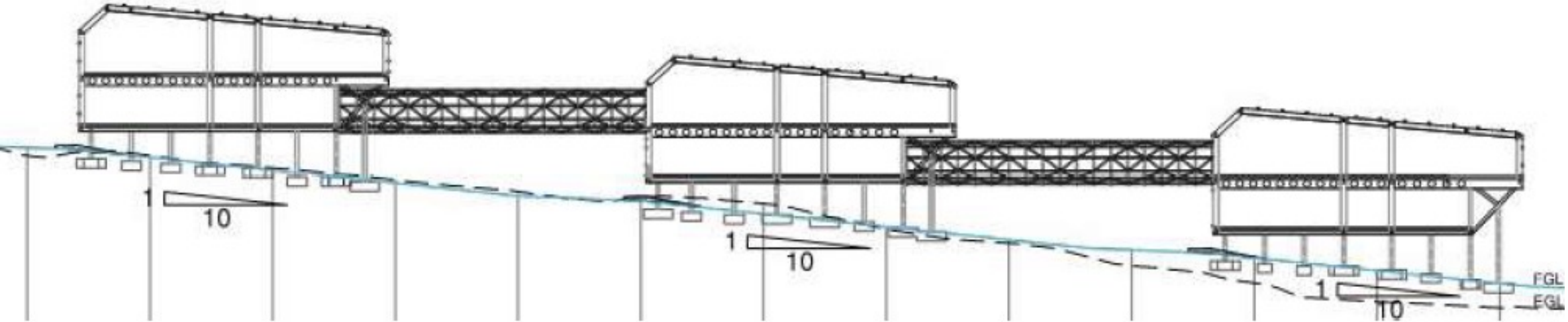
An adaptive design



An adaptive design



An adaptive design



A Changing Natural Environment

- Detailed risk identification and management process
- Climate adaptation planning
- Designing for flexibility

Navigating the Policy Environment

- Responding to New Zealand's policy on Climate Change
- Understanding our role as a leader internationally
- Introducing Antarctic Sustainable Design Standards



Thank you



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