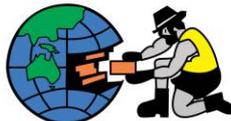


# Quantifying and Improving Environmental and Human Sustainability in Remote-Region Health Clinics, Australia

Dr Steve Burroughs A/Professor University of Canberra, Australia

*Dr Steve Burroughs Foundation Limited provides support to improve the social, economic and wellbeing of Australian indigenous people whilst acknowledging their culture and spiritual connection to the land.*



Dr Steve Burroughs

Sustainable Building Consultant / Academic Advisor



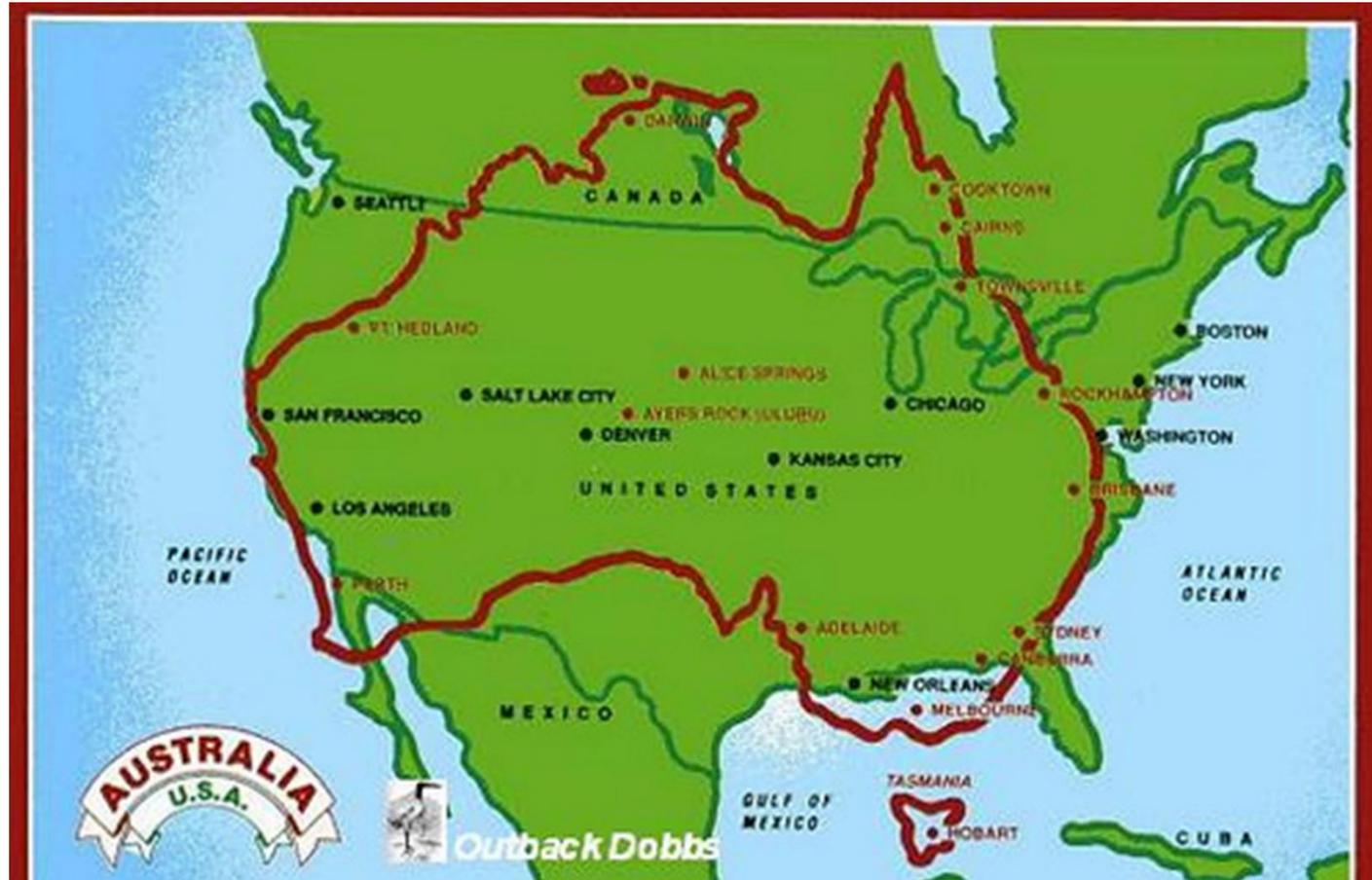
Organisers:



International Co-owners:

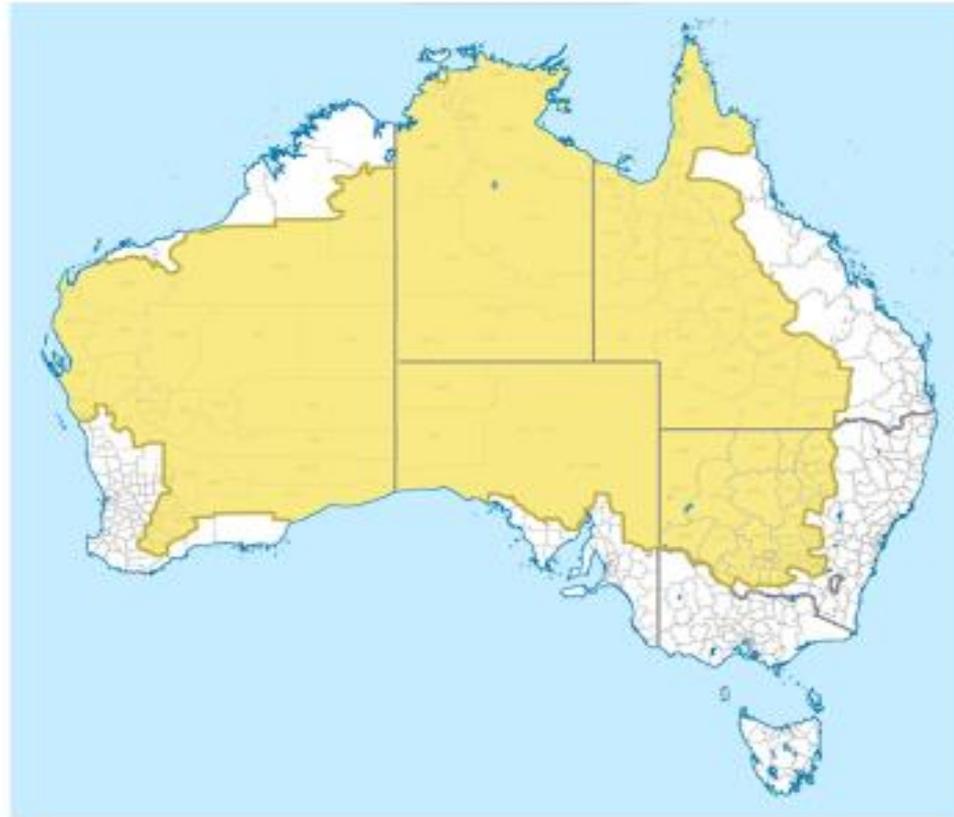


# Australia overlaid onto the North American Continents of USA, Canada and Mexico



# Remote Area of Australia in Yellow

Only 2% of Australia's population lives in the yellow area



Organisers:



International Co-owners:



# Wanarn, Western Australia – Gibson Desert



Organisers:



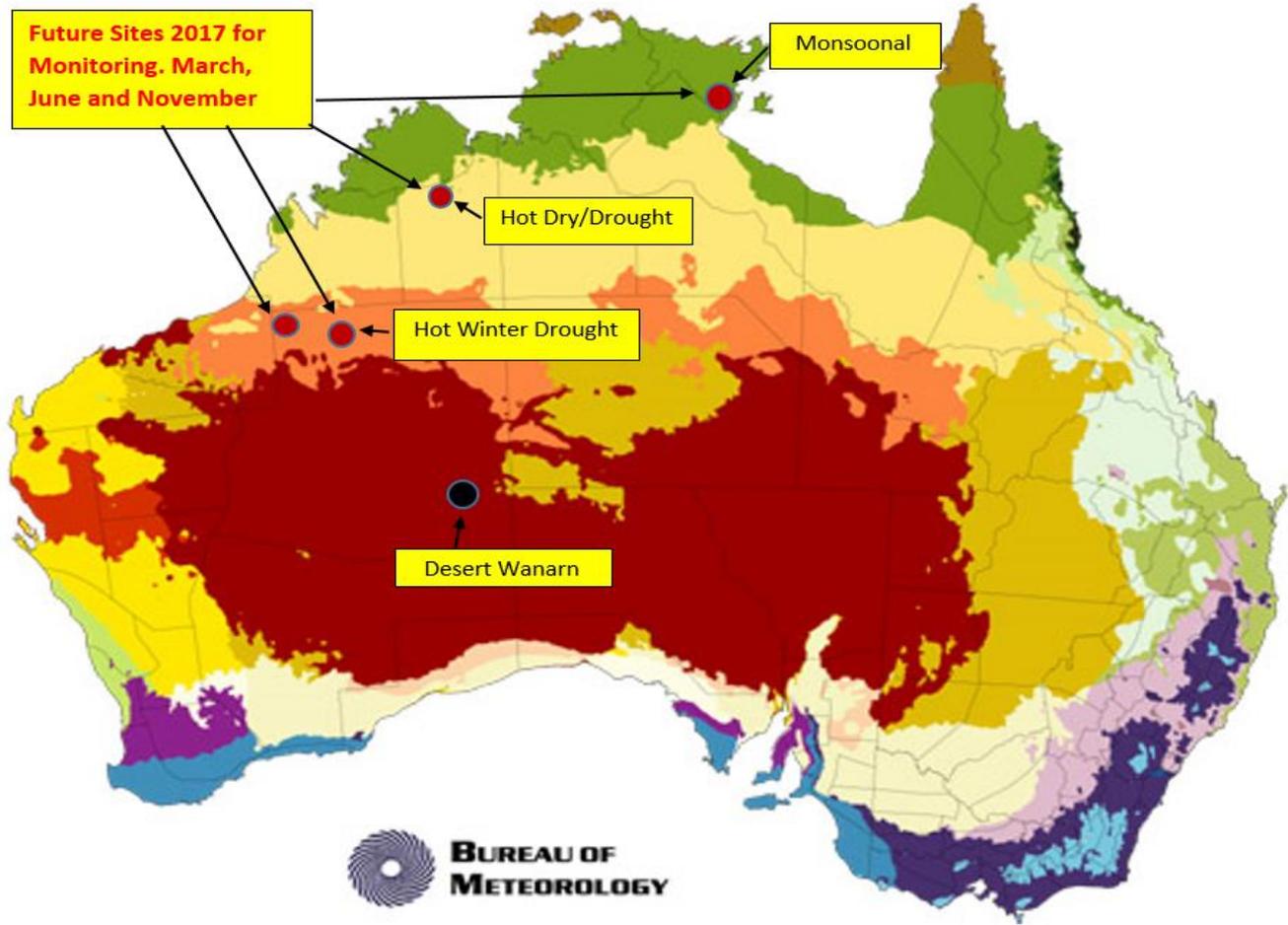
International Co-owners:



# Wanarn Logistics Transporting Goods and Tradesmen to Site



# Climatic Zones – Existing Site & Future Sites for Monitoring 2017



Organisers:



International Co-owners:



# Driving in the Northern Territory Heading West Toward the Gibson Desert



International Co-owners:



# Wild Camels and other Animals Causing Problems in the Desert



# Arriving in the community of Wanarn, Western Australia 866 km (21 Hr West of Alice Springs)



# Indigenous Community of Wanarn population 200



Organisers:



International Co-owners:



# Award Winning Wanarn Clinic

## Budget Aus \$1,857,000



Construction Cost:

Aus \$9621 M<sup>2</sup>

Euro 6836 M<sup>2</sup>

USA \$ 7418 M<sup>2</sup>

HK\$ 57,275 M<sup>2</sup>



Organisers:



International Co-owners:



# Inside Wanarn Clinic

## Front Entrance/Treatment Room



Organisers:

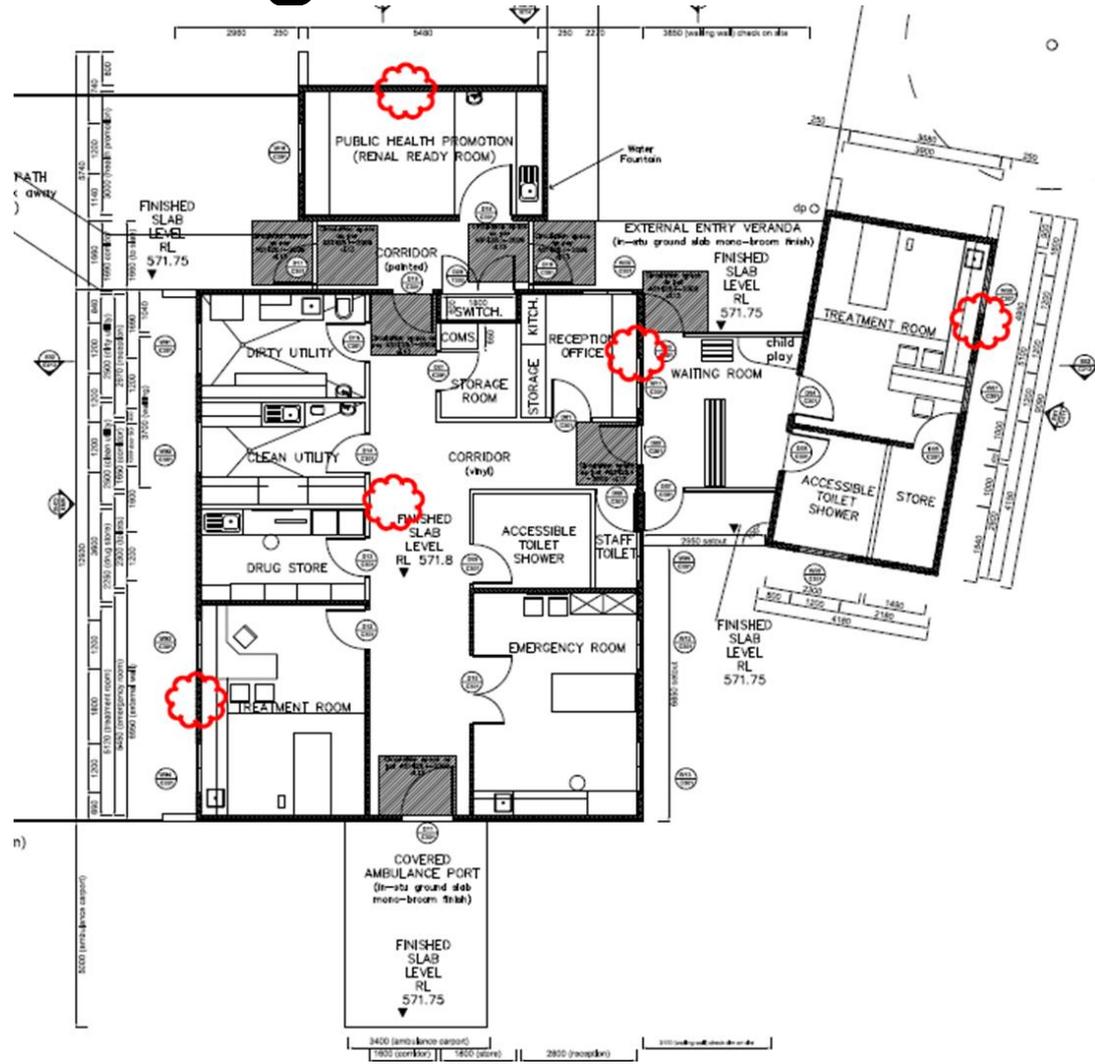


International Co-owners:



# Data Monitoring Locations

Monitoring the clinic to understand the performance of the building and the potential effects of the design decisions on the health and well-being of the eventual occupants



# Building Management Standards

- Profile systems
- Temperature
- Humidity
- Volatile Organic Compounds (IAQ)
- Energy Consumed
- Outcomes
- Generate data that will allow sustainability gaps in buildings to be identified so that cost-effective solutions can be developed with particular reference to remote communities and geographical locations with similar characteristics.
- The generation of data that will enable the identification of IEQ levels that guide the setting of performance standards for both energy use and IEQ for existing and new builds
- The study is expected to provide workable and reliable data that will inform and influence architectural practice and other disciplines with the education and knowledge required towards the planning and design of high performing buildings in remote regions under varying climatic conditions.



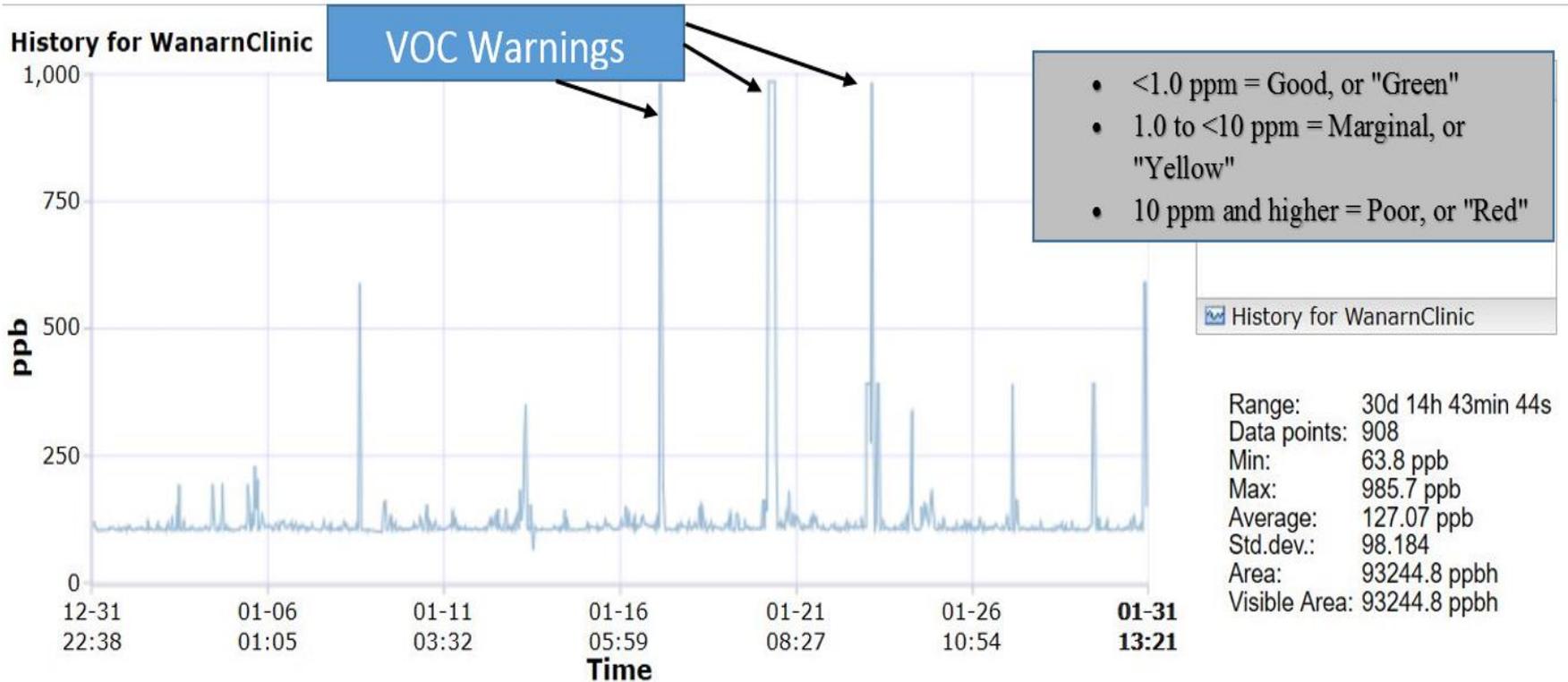
Organisers:



International Co-owners:



# Indoor Air Quality Wanarn Clinic



Organisers:



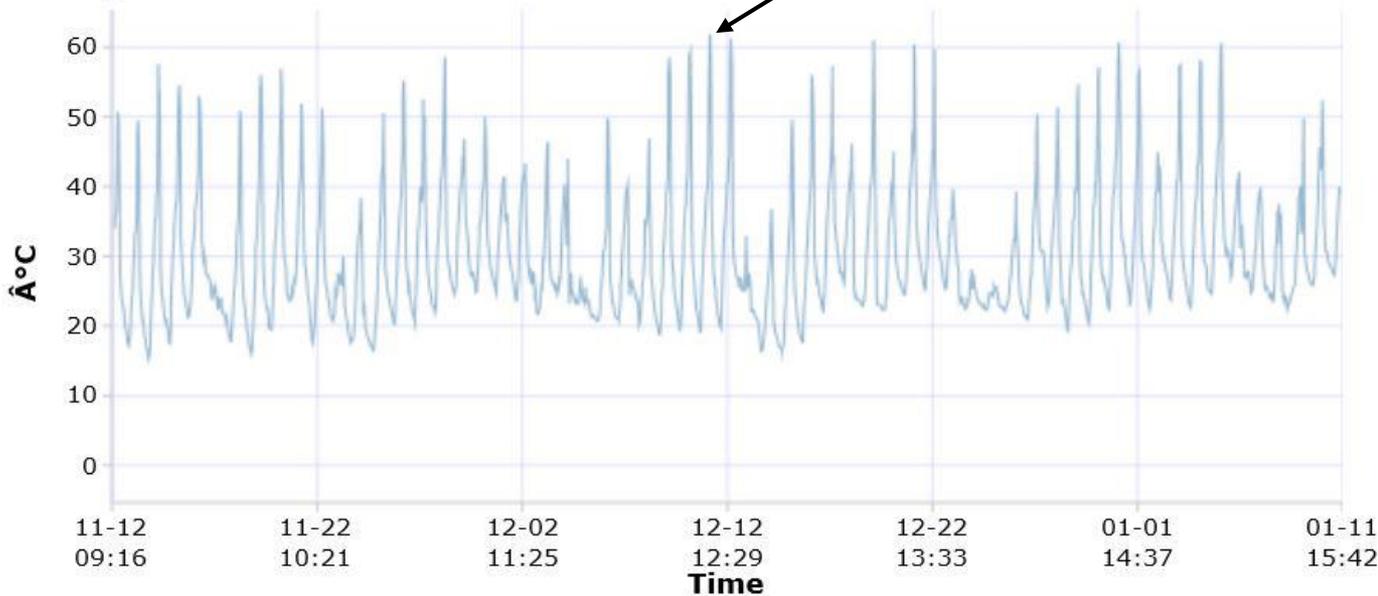
International Co-owners:



# Example Data Being collected

Temperatures Reach 70°C

History for WanarnClinic



**Chart Legend**

- West Facade - Temperature [icon]
- West Facade - Temperature [icon]

History for WanarnClinic

Range: 60d 6h 25min 16s  
 Data points: 1782  
 Min: 15.3 Â°C  
 Max: 61.8 Â°C  
 Average: 30.15 Â°C  
 Std.dev.: 9.011  
 Area: 43294.3 Â°CCh  
 Visible Area: 50495.4 Â°CCh



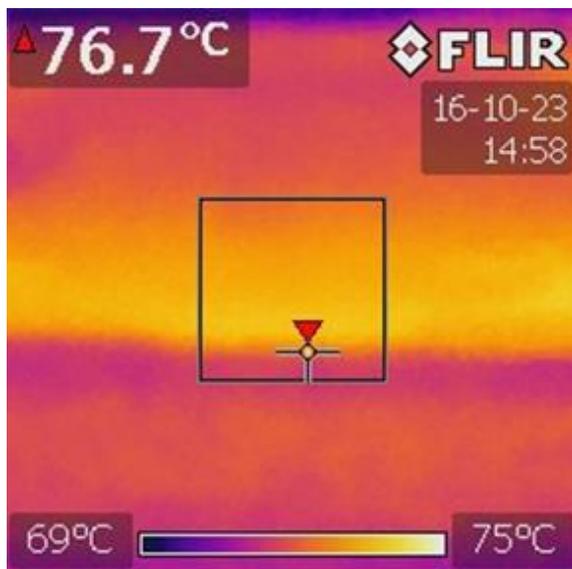
International Co-owners:



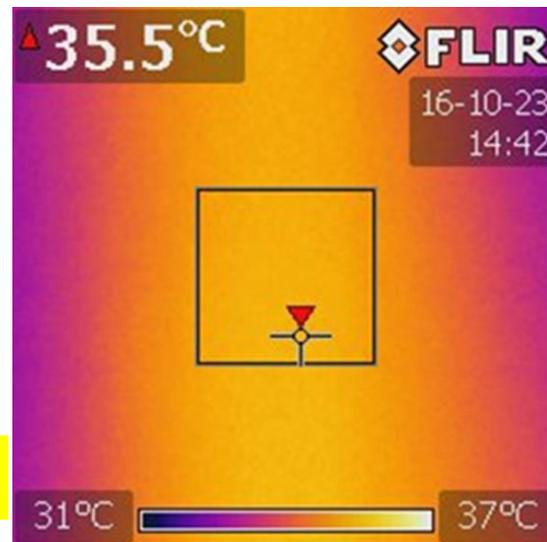
Sustainable Buildings and Climate Initiative  
 Promoting Policies and Practices for Sustainability



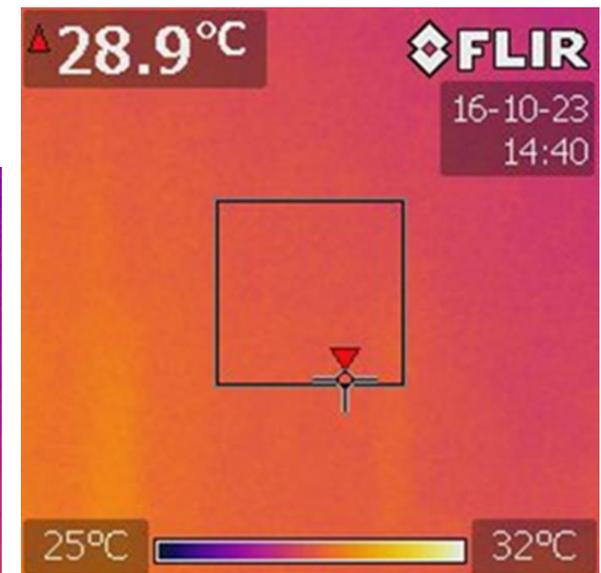
# Thermal Imaging of the Clinic walls Take in the Treatment Room on the West side of Clinic



External Wall Temperature

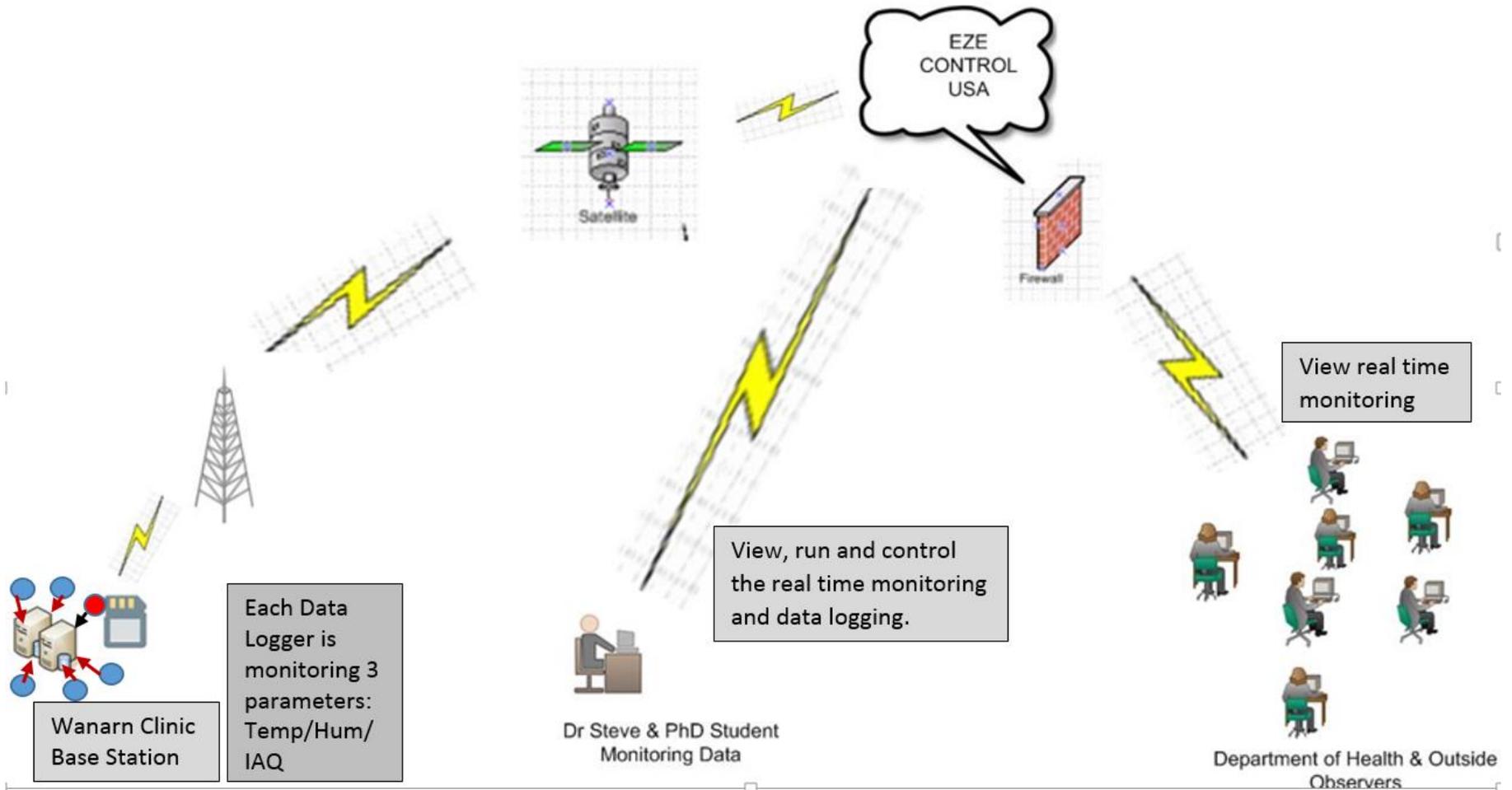


Internal Wall Temperature

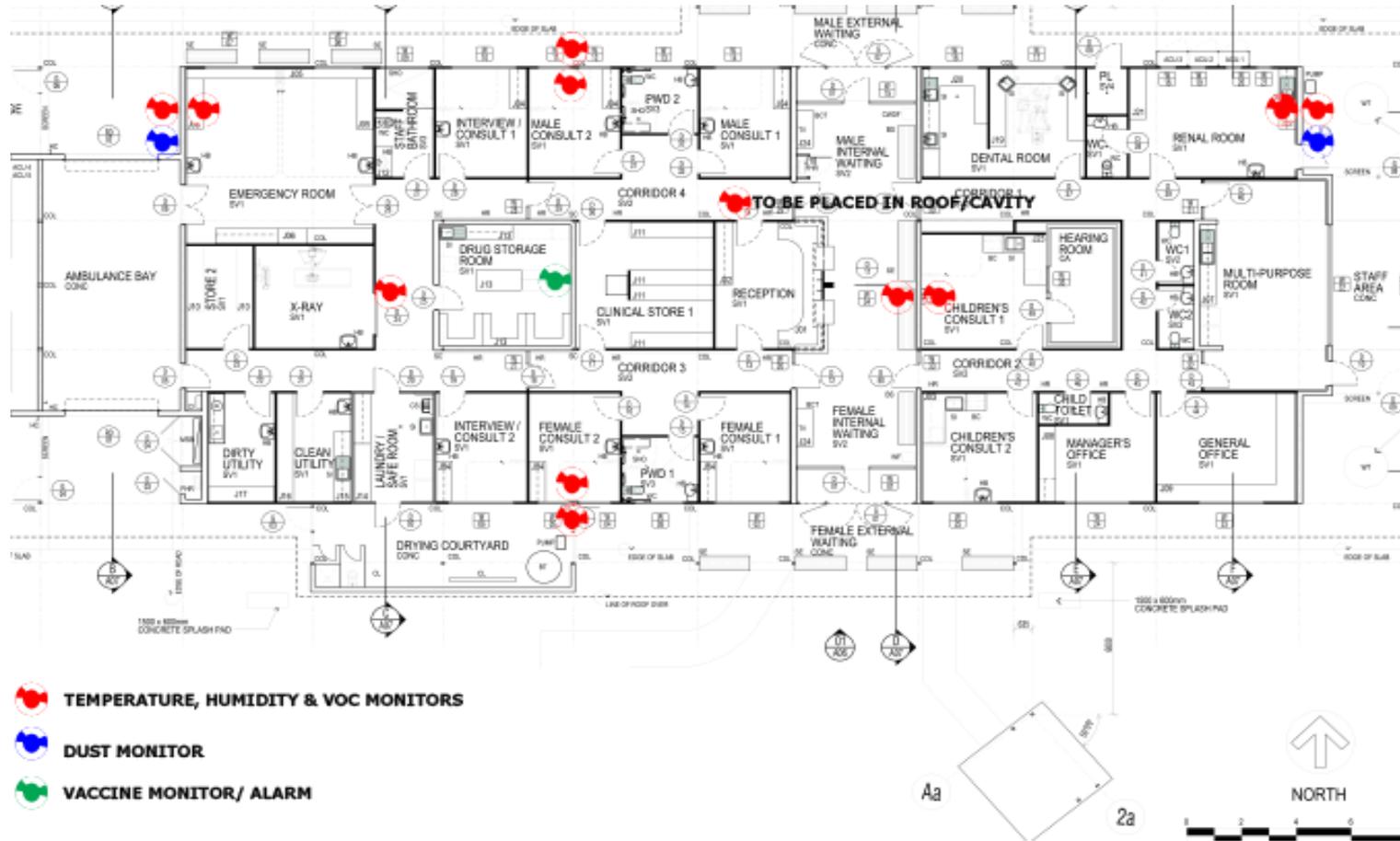


Corridor Wall Temperature

# Machine 2 Machine Transmission



# Numbulwar Health Clinic Northern Territory



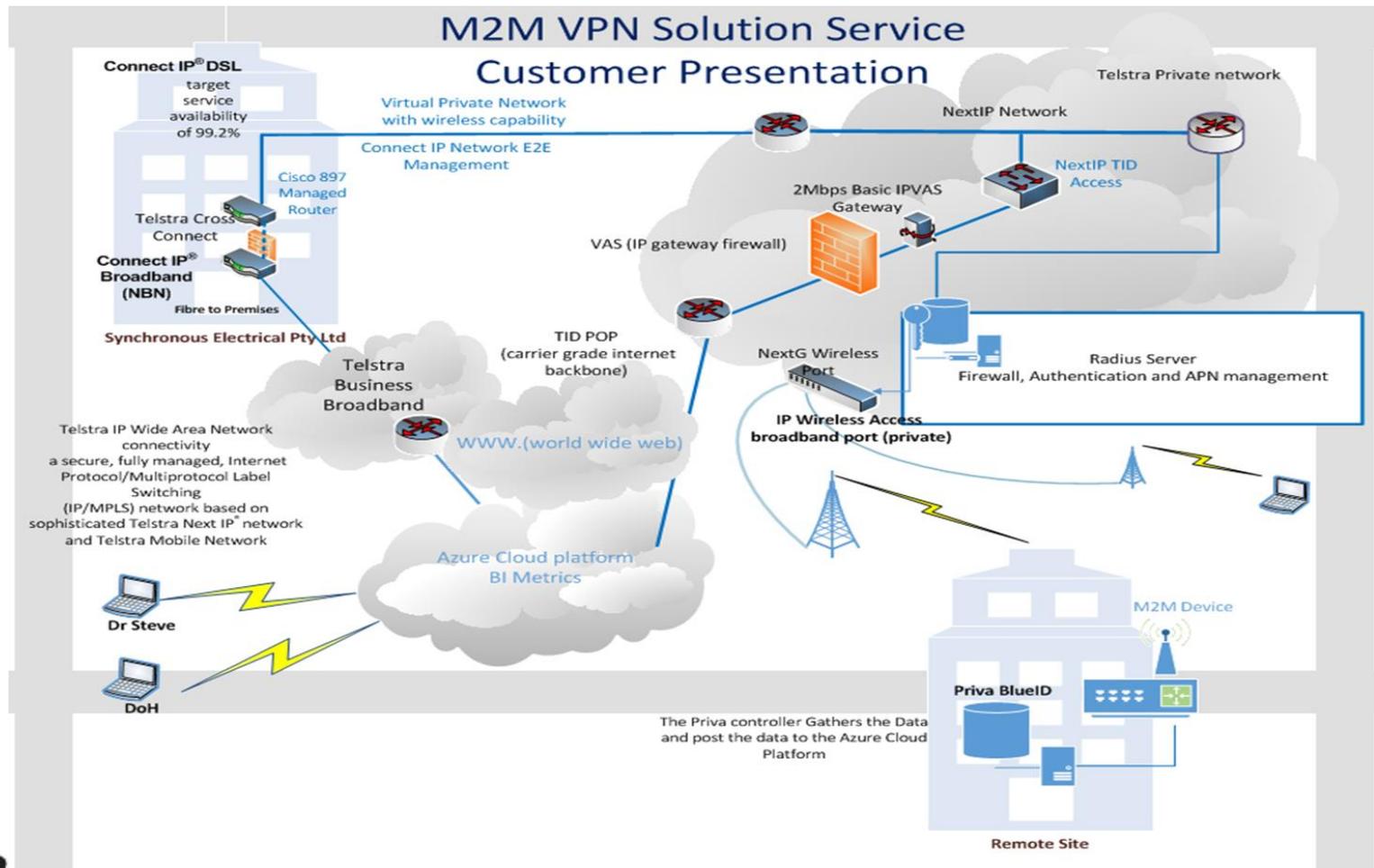
Organisers:



International Co-owners:



# New Network Developed M2M Virtual Private Network



# Dash Board Display

Monitoring of the air con units & other units 1000's K away

In remote Australia we don't have BMS (building management systems)

We don't have HVAC systems

We use split air con units running at maximum output 24x7





Dr Steve Burroughs | Adjunct Associate Professor  
University of Canberra, Arts & Design Faculty Sustainable/Resilience Consultant & Academic Advisor



# Thank you



Organisers:



International Co-owners:



Sustainable Buildings and Climate Initiative  
Promoting Policies and Practices for Sustainability

