Technology in an Indigenous Context Project

Group 3

https://cdn.theculturetrip.com/wp-content/uploads/2018/05/aboriginal-artwork--barbara-dieu-flickr-1.jpg

Acknowledgement of Country

We respectfully acknowledge the Wurundjeri People of the Kulin Nation, who are the Traditional Owners of the land on which Swinburne's Australian campuses are located in Melbourne's east and outer-east, and pay our respect to their Elders past, present and emerging.

We are honoured to recognise our connection to Wurundjeri Country, history, culture, and spirituality through these locations, and strive to ensure that we operate in a manner that respects and honours the Elders and Ancestors of these lands.

We also respectfully acknowledge Swinburne's Aboriginal and Torres Strait Islander staff, students, alumni, partners and visitors.

We also acknowledge and respect the Traditional Owners of lands across Australia, their Elders, Ancestors, cultures, and heritage, and recognise the continuing sovereignties of all Aboriginal and Torres Strait Islander Nations.

Project Background

- Bamaga is a small town, in Cape York, Queensland
- Plagued with obsolete telecommunications
- Project aim is to propose solutions to rectify current infrastructure
- It will cover access, health & safety, appropriateness, affordability, and sustainable livelihoods.
- User access, cost, digital literacy, and educational levels concerning communications technology will also be addressed.

Project Scope

- Propose an affordable, yet effective way to solve and upgrade Bamaga’s limited telecommunications coverage
- These can cause increased backhaul capacity to improve service quality, network enhancements to alleviate seasonal congestion or additional mobile towers in areas with patchy coverage

Disaster Awareness
- James Kojdovski

Design Outline

- CubeSat’s (in space)
- Satellite Dish is connected in users home, sending signals to CubeSat’s to wirelessly connect
- Router is used for more coverage (can cover a large house with many users without any delays or deadspots)

Design Benefits

- Cannot be impacted by disasters (flooding, fires, etc.)
- Works better due to no obstructions found in Urban areas
- No on-Earth health concerns
- Minimal maintenance
- Robust and long-life expectancy

Estimation of Budget

Average Number of Households in Bamaga = approx. 250

Project Requirements	Hardware	Unit Cost	Total Cost
Router	←	$100/unit	$25,000
Satellite Dish	←	$400/unit	$100,000
CAT-6 Ethernet Cable	←	$18/10 metres	$4,500
Power Adapter	←	$22/unit	$5,500
Installation/Maintenance	Can be installed individually (satellite maintenance from Saber Astronautics)	$0	$0
Total (+10%)			$148,500

Health
- Shreeya Shrestha

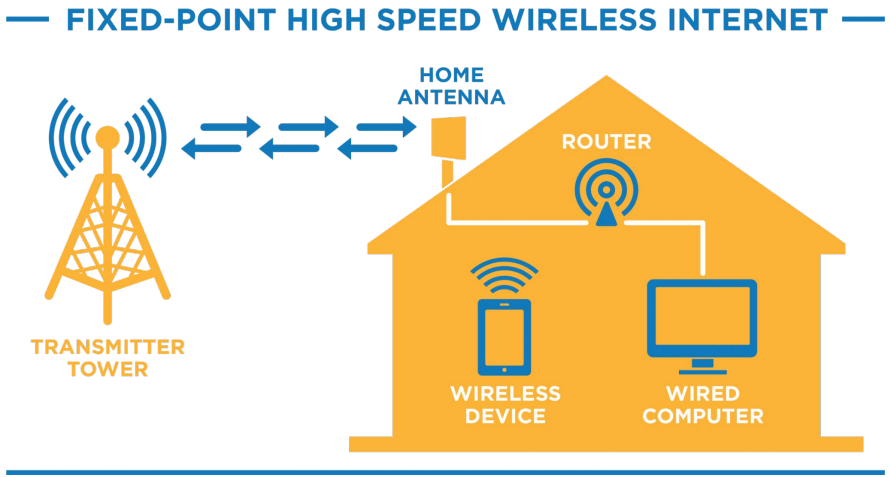
Design Outline

- Fixed Wireless Connection
  - Setting up a main transmission tower/NBN transmission tower
  - All target locations within 14km from the tower can access the Internet

- At the target location
  - Outdoor antenna within line of sight of the tower
  - Customer Premise Equipment (CPE) or Router
  - CAT5 cable to connect antenna to router

Design Benefits

- Affordable
- Efficient and sustainable
- Resilient in harsh weather
- Reliable bandwidth
- Potential to extend to 5G networks



Estimation of Budget

Average Number of Households in Bamaga = approx. 250

Project Requirements	Hardware	Unit Cost	Total Cost
4G compatible Antenna	Telco Antennas Telco XPOL MIMO 17dBi 4G Solid Dish Antenna - 1800-2100 MHz	$264/unit	$66,000
CAT-6 cables	WildCat Cat6 UTP 10m Ethernet Cable - RJ45 - UV Rated Outdoor Cable	$18/10 metres	$4,500
Router	TP-Link Wireless 4G CAT4 LTE Router	$180/unit	$45,000
Installation/Maintenance	Estimate	$70/hour	$35,000
Total (+10%)			$165,550
Monthly cost to Internet provider	Superloop	$59.95/month	

Affordability & Current Infrastructure - Elijah Roberts

Design Outline

- New space-based telecommunication
- Uses large groups of satellites that work together in space, providing fast internet access in remote locations
- Improved affordability compared to other options such as fiber internet.
- The need to build new, expensive infrastructure is reduced to a minimum.
- A 12-meter Internet satellite antenna tower will be established in the center of Bamaga, with 2 long-range satellites attached on the top.

https://media.istockphoto.com/photos/network-connection-concept5g-smart-cellular-network-antenna-base-on-picture-id1261105375?k=20&m=1261105375&s=612x612&w=0&h=93I...wJZZVcfjH39KkO1EpDfJ9yKUOYy_Qns4btPhnA=

Design Benefits

This solution will provide Bamaga citizens with an inexpensive way of accessing high-speed and up-to-date telecommunications

This will offer numerous benefits

Emergency services	Telehealth	Education	Wellbeing

Estimation of Budget

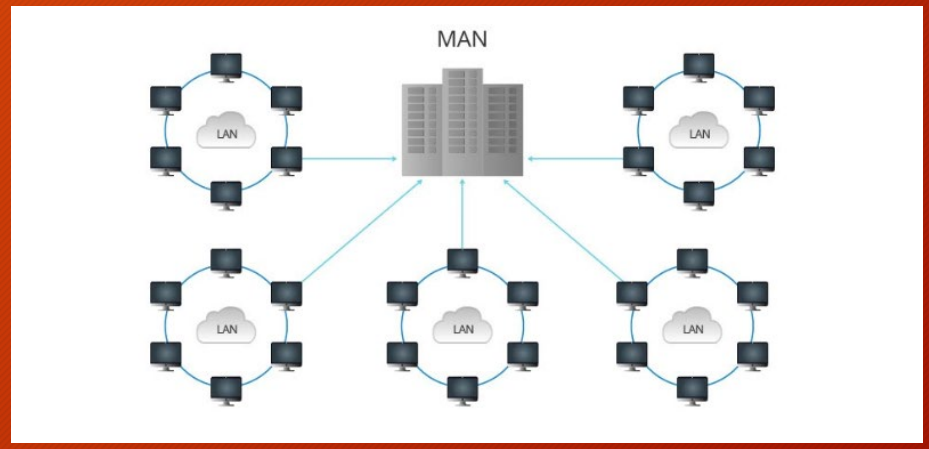
- The table on the right highlights the budget estimation of the space-based telecommunication towers to be constructed in Bamaga.
- The total cost of the communication satellite tower, including labour costs, is estimated to be $30,280.

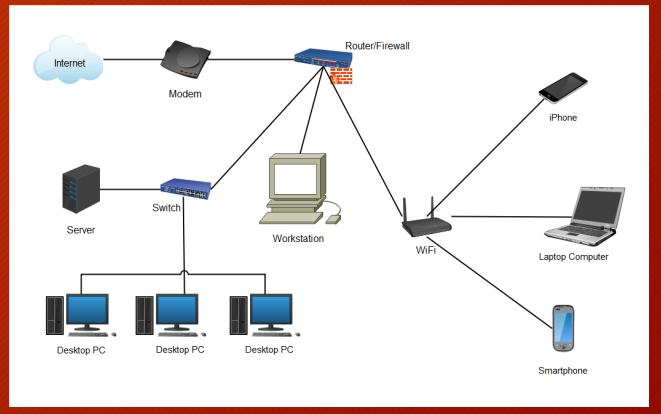
Component	No. of Units	Cost/Unit	Total Cost
Free standing communication tower (6 m) https://www.telcoantennas.com.au/free-standing-tower-per-communication-section-6m	2	$ 8,140.00	$ 16,280.00
Long Range Internet Satellite (1.2-1.5 km) https://www.globaltt.com/en/Products-WiFi-Long-Range-Satellite-Internet.html	2	$ 6,000.00	$ 12,000.00
Cabling & Power Connections	1	$ 1,000.00	$ 1,000.00
Labour Costs	N/A	N/A	$ 1,000.00
Modem	1/household	$ 200.00	N/A
			TOTAL
			$ 30,280.00

Network Management
- Md Nahid Tanjum

Design Outline

- Setting up Metropolitan Area Network (MAN) in a central location
- High-speed carriers use to transmit communication through a MAN
- Current NBN satellite connects through Local Area Network (LAN) to the MAN
- Maintain and provide high-quality telecommunications infrastructure





Design Benefits

- High-speed Internet
- Secure network
- Cost-effective
- Strong data effectiveness
- Environmentally friendly

Estimation of Budget

Devices & Components	No. of Units	Cost / Unit	Total Cost
NICs	1	$450	$450.00
Server	.75GB	Hosting $25/month	$300.00/year
Station	2	$4000	$8000.00
HUB	4	$500	$2000.00
Switch	1	$300	$300.00
Router	5	$200	$1000.00
Connector	20	$5	$100.00
Total =			$12,150.00

Education
- Kayes Ahmed

Design Outline

- Learning from Online Education Platform through Cyber Cafe
  - Setting up PC’s. Monitor overall set up for Internet (router)
  - Setting up Physical Server in the Cyber Café
  - LAN for Network Connectivity
  - Network Tower for data transmission within the allocated range
  - Connecting with Satellite using the Tower
  - Connection is established inside the Cyber Cafe

Design Benefits

- Accessible for Everyone
- Affordable
- Eco-friendly
- Sustainable
- Reliable
- E-Learning Platform

Estimation of Budget

Devices/Components	No. of Units	Cost/Unit	Total Cost
Computers & Projectors	15 & 1	$12,300.38 & $2,899.00	$184,505.70 & $2,899.00
Router & Cloud Server	2 & 1	$153.70 & 2,931.00	$307.40 & $2,931.00
LAN	2	$1,474.50	$2,949.00
Cabling & Power Connections	1	$1000.00	$1,000.00
Internet Satellite & Tower	2	$4,999.00	$9,998.00
Installation/Maintenance Costs	Estimate per household	$80.00	$4,000.00
Total			= **$208,590.10**

Conclusion

Design Ideas:

- Disaster Awareness
- Health
- Current Telecommunications & Affordability
- Network Management
- Education