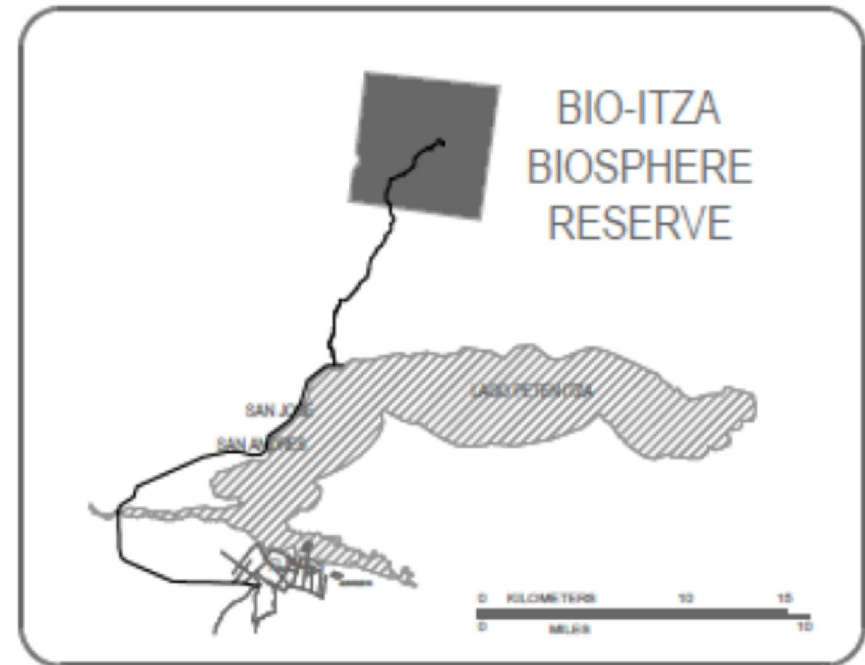


Preservation of The Maya-Itza Culture through Eco-Tourism

Host Club:
Tikal-Peten Guatemala, D4250

Int'l Partner:
RC of Ft Collins, D5440



Background

- **The Maya-Itzá:** Indigenous group in northern Guatemala and a dying culture; only 15 people speak Maya-Itzá
- **Bio-Itzá Association:** 60 member families founded the Bio-Itzá Reserve and Spanish School in 1990's to preserve the Maya-Itzá culture and ecological diversity

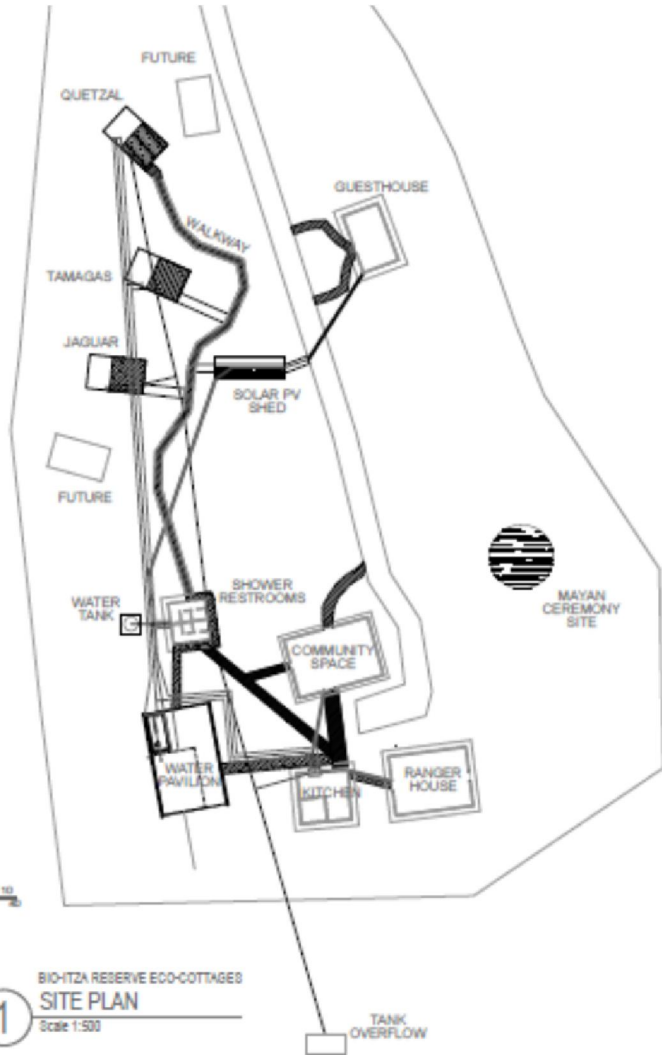
We the Itzá, the last descendants of the Maya lineage in the Petén forest, are watching the forest vanish, its herbs and trees, the animals of its land and water. Our Mayan language is disappearing too, and the traditions of our great fathers.



The forest is dying, the animals are dying, and we are dying also. To live, we need the forest, and the forest needs us. We must take care of the forest, and the forest must care for us, because we are partners of the jaguar, owner of the forest; partners of the scarlet macaw, ornament of the Mayas; partners of the tapir, animal of seven skins; partners of the mahogany, tree of our canoes; partners of the Ramón tree, the food of our ancestors; partners of the smoke of the copal tree, the spirit of our great ancestors. United together, we make our home in a piece of jungle, land of the Maya Itzás, on the shore of the great Lake Itza in San Jose, where once lived Kan Ek, the last Maya king.

-- Don Reginaldo Chayax Huex, Founder of Bio-Itza Reserve
Succumbed to COVID on Oct. 1, 2020





In Collaboration with: Colorado School of Mines, Phia Lab and Engineers without Borders



Bio-Itz'a Reserve Eco-Cottages

Eco-Engineers
 Meghan Anderson, Noah Au-Yeung, Lukas Erickson, Maggie Duintz, Rebecca Jewell, Spencer Schmidt, Blake Stendley, Dorothy Welch

Background

- The Maya-Itz'a: Indigenous group in northern Guatemala and a dying culture; only 15 people speak Maya-Itz'a
- Bio-Itz'a Association: 80 member families founded the Bio-Itz'a Reserve and Spanish School in 1990's to preserve the Maya-Itz'a culture and ecological diversity
- Phia Lab: The clients have committed to developing the site to generate consistent revenue; reserve lost funding in the mid-2000s and is threatened by slash and burn agriculture

Design

Highlighted Features:

- Three 2 ft. lofted cottages, each with:
 - Multilevel outdoor patio
 - En-suite bathroom and outdoor shower
 - Fans, lighting, and outlets
- Outdoor pavilion for ecology education classes and utility shed
- Raised and partially covered walkway

Power Specifications:

- 10 solar panels on walkway cover: 2400 Watt power generation
- 18 lithium-ion batteries, 2340 Amp-Hours of power storage
- Independently powered solar walkway lights and water pump

Water and Wastewater Specifications:

- 2520 sq. ft. rain catchment area from cottage and pavilion roofs
- 26,000 gallon concrete storage tank under pavilion
- UV disinfection and sediment filtration
- Pump delivers water to kitchen, cottages, and bathroom
- Passive solar water heating

Project Purpose

To design and model an eco-tourism village on the Bio-Itz'a Reserve to appeal to potential donors. The clients have the intention of implementing the design after funding is achieved.

Validation

Figure 7: Water System Model

Figure 8: Power Usage by Structure

Scope and Design Criteria

- Design 3 off-grid cottages
- Design water, wastewater, and power systems
- Integrate the existing structures
- Visit site for community engagement
- Survey site
- Utilize sustainable development criteria
- Provide visual marketing tools appealing to donors
- Provide construction drawings to be approved by local professional and used in construction

Cost Estimate

Total Cost Estimate	
Category	Cost
Arch	\$14,600
Water	\$24,000
Power	\$18,400
Total	\$57,000

Figure 10: Percentage of cost by category

Community Engagement

- Collaborated with Maya-Itz'a community remotely and traveled to Guatemala
- Co-hosted a community workshop
- Stayed on the reserve to learn from rangers and a spiritual guide
- Design highlights community's desires and utilizes local resources/knowledge

Figure 9: Team photo (community members on left, Bio-Itz'a, Capstone on right)

Fun Facts

- Madre de Cacao and Chico Zapote (chico gum tree) are hardwoods that will be sustainably harvested for the cottages
- The Maya Biosphere Reserve is a buffer zone between Tikal and Zatz National Parks in Peten region of Guatemala

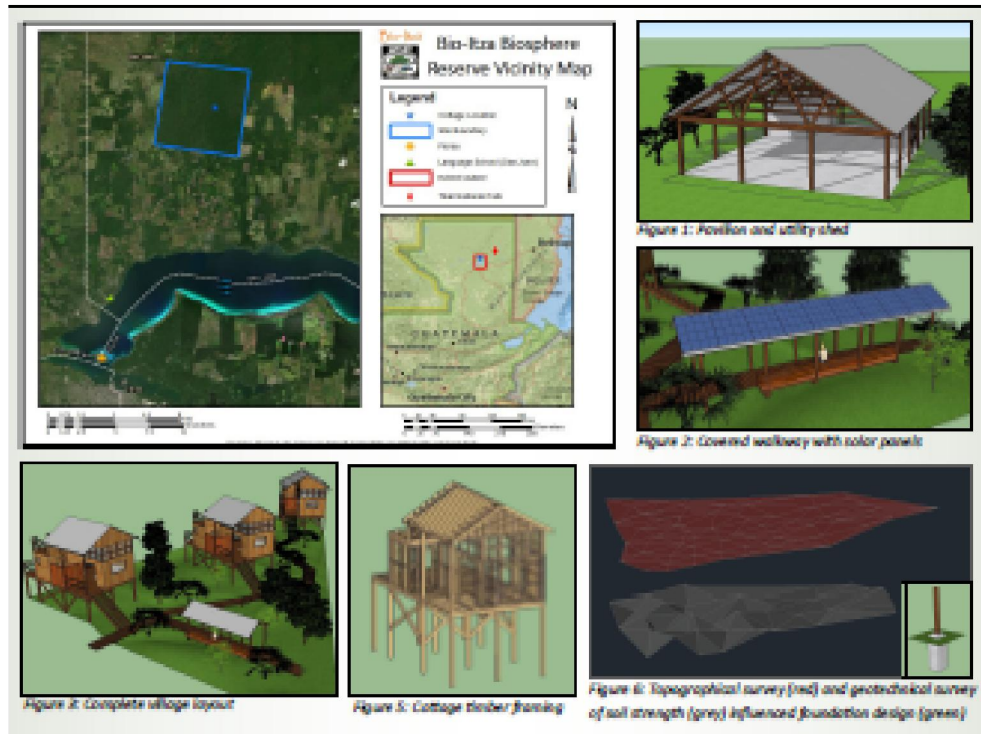
Acknowledgements

- Thanks to the team and the world!
- Project Advisor: Rebecca Jewell
- Bio-Itz'a Association: Katerin, Jeanette, Gabriela, AMP, Di, David, Don, Magdalena
- Phia members: Meghan Anderson, Maggie Duintz, Spencer Schmidt
- Capstone and Bio-Itz'a Healthy Life: Don Erickson, Stefan Hauer, Dr. Andrew Swartz, Dr. Jeff Welch, Christopher, Will Swartz, Dr. John Swartz, Dr. John Swartz, Dr. Chris Bellini
- Thank you to the team, the world, and everyone involved!



Initial Design: Mines Senior Design Team

- Design 3 off-grid cottages
- Design water, wastewater, and power systems
- Integrate the existing structures
- Visit site for community engagement
- Survey site
- Prioritize sustainable development criteria



Community Engagement

- Collaborated with Maya-Itz'á community remotely and traveled to Guatemala
- Co-hosted a community workshop
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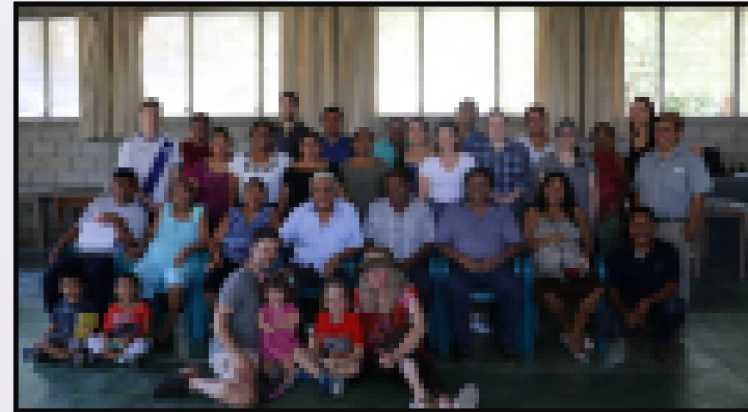


Figure 6: Thom hosts community workshop in San Jose, Guatemala



Formal Project/Site Plans and Costing: EWB

Highlighted Features:

- Road improvements for visitor access
- “Glamping” Platforms/Tents vs. Cottages

• Fans, lighting, and outlets

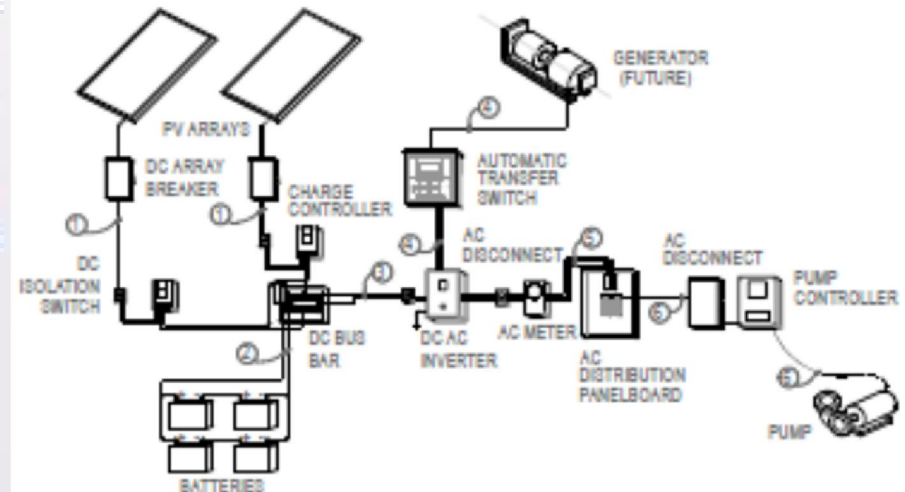
- Outdoor pavilion for ecology education classes and utility shed
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- Pump delivers water to kitchen, cottages, and bathroom
- Passive solar water heating



1 SOLAR PV SCHEMATIC
30

Courtesy of EWB

Plans for Sustainability

- **Economic Sustainability**
 - Job creation
 - Revenue from operations/donations will fund maintenance, road repair, fire mitigation, etc..
- **Preserving the Mayan Culture**
 - utilizing Mayan symbols
 - building a pavilion for the reserve to help educate guests on the medicinal plants used traditionally by the Maya-Itzá, traditional Mayan cooking, and the Maya-Itzá culture.
- **Protecting the Environment**
 - maintaining the existing building, utilizing local knowledge on building materials
 - restoring the wastewater system, using solar energy, and preventing new lumber from being cut down.
- **Business Sustainability**
 - education/training will be provided on business planning, financial management, marketing/promotion, etc...
 - this includes more formalized governance and use of an advisory board for the association.
- **Ease of Maintenance**
 - maintenance training and operations/maintenance manuals will be provided in Spanish.
 - note that thatched roofs are difficult to maintain but hold significant value to the community. The project will preserve some of the existing thatched roofs, but will use new corrugated metal roofs on new structures.
- **Security:** Theft has been an issue in the past. The design includes localizing the water treatment, batteries, and electrical equipment in one structure that will be locked.

Current Committed Funding

G-2223		Bio-Itza Reserve Eco-Cottages			Administration
+	Description	Financing	Documents	Photos	History Logs
Proposed Financing					
	Existing Contributions Towards This Project	Date	Cash	DDF	Total
	Fort Collins (5440)	23-Sep-19	\$5,000	\$6,000	\$11,000
	Fort Collins (5440)	10-Oct-19	\$6,168	\$4,000	\$10,168
	Fort Collins (5440)	10-Oct-19	\$1,000	\$0	\$1,000
	Matching Grants Website DAF Donations <input type="checkbox"/>	Collected	\$1,200	-	\$1,200
	District 4250 DDF	24-Sep-20	-	\$585	\$585
	Remaining Amount to Raise				
	<i>Additional Club Contribution (Needed) - Add a contribution</i>		\$65,462	-	\$65,462
	Amount Requested from The Rotary Foundation		-	\$10,585	\$10,585
	Total				\$100,000

Detailed budget estimate from EWB, Tikal-Peten Rotary is finalizing through a formal bidding process

5440 DDF proposed for approval in Dec.

\$4000 Cash and \$4000 DDF under consideration by D5450

Tikal-Peten Rotary is actively fund-raising in Guatemala

Thank you for your time!

Questions?

Fun Facts

- Madre de Cacao and Chico Zapote (chicle gum tree) are hardwoods that will be sustainably harvested for the cottages
- The Maya Biosphere Reserve is a buffer zone between Tikal and Zatz National Parks in Petén region of Guatemala

Acknowledgements

- Phia Lab Foundation
- Colorado School of Mines Sr. Design Team
- Engineers Without Borders (USA and Guatemala)
- CSU Rotaract
- RC of Fort Collins
- Tikal-Peten Rotary
- Districts 5440 and 4250

More questions?

Please Contact:

Robin Steele
Rotary Club of Fort Collins,
Colorado

robinlynnsteele@msn.com

Back-up Slides for Q&A

CURRENT BUDGET ESTIMATES in US \$

SITE CONSTRUCTION - UTILITIES	
DEMOLITION	1,000.00
ARCHAEOLOGICAL, HAND EXCAVATION	500
SITE GRADING, EXCAVATION	2,250.00
SITE LIGHTING	5,400.00
SOLAR PV - 3 KW	7,650.00
ELECTRICAL DISTRIBUTION	4,200.00
WASTE COLLECTION PIPING	3,000.00
SEPTIC TANK	18,000.00
DRAIN FIELD / SAND FILTER	7,500.00
RAINWATER COLLECTION	7,500.00
WATER DISTRIBUTION	3,900.00
WATER PUMP & CONTROLS	4,500.00
PARKING AREA	1,400.00
ACCESS ROAD - 7 m wide, grade, resurface	48,000.00
	114,800
SITE CONSTRUCTION - OTHER	
WATER PAVILION - PILINGS ea 18	400.00
WATER PAVILION - FRAMING sm 156	36.00
WATER PAVILION - ROOFING ltr 200	18.00
WATER PAVILION - WATER STORAGE ltr 100,000	0.35
WATER PAVILION - FLOOR SLAB lf 300	25.00
WATER PAVILION - PUMP ROOM sm 20	90.00
WATER PAVILION - ELECTRICAL ls 1	1,750.00
WALKWAY - 110 m - PILINGS ea 160	200.00
WALKWAY - DECKING/BEAMS sm 253	32.00
WALKWAY - SOLAR SHED FRAMING sm 41	38.00
WALKWAY - SOLAR SHED ROOFING sm 41	18.00
	738
	104,858
SUBTOTAL	219,658.00
PROJECT MANAGEMENT - 10.00 %	21965.8
CONTINGENCY - 10.00 %	21965.8
TOTAL	263,590

NOTES:

This budget , from EWB-USA, is in US \$ if the project was done here

EWB-Guatemala Area Manager and an engineer from Tikal-Peten Rotary are working on detailed costing in Guatemalan Quetzal

Materials costs will be similar but labor costs will be much less

Glamping Platforms still need to be designed and added

Current educated estimate = <\$100,000