

Lark Quarry Dinosaur Trackways

Lark Quarry Dinosaur Trackways specialises in Ecologically Sustainable Design (ESD) for self-sufficiency. The site, including the new conservation building, demonstrates world best practice in ecologically sustainable design and preservation techniques and is harmonious with the local natural and cultural environments. The success of the initiatives has resulted in fewer bills and less costs than a similar sized building that does not employ ESD principles.

Lark Quarry Dinosaur Trackways complex is a self-sufficient facility showcasing the 100 million-year-old dinosaur Trackways protected by Lark Quarry Conservation Park.



GETTING STARTED

Sustainability played a large role in the original concept design of The Dinosaur Trackways complex in 1999. Due to the isolation and location of the facility in the Conservation Park, the goal was that it be self-sufficient. This goal led to a project which integrated leading edge technology with an ancient, naturally preserved environmental resource.

MAJOR INITIATIVES

The Lark Quarry buildings and infrastructure have been designed using ecologically sustainable design (ESD) principles, for maximum water, waste and energy efficiency. ESD principles minimise impacts on the local and global environments, while benefiting the local community. ESD principles at Lark Quarry Dinosaur Trackways include:

- 🌱 Using local materials and labour where possible

- Choosing materials that have low embodied energy and are reusable or recyclable (embodied energy is the energy used to create or manufacture materials)
- Collecting water from roofs and processing waste water on site
- Installing closed system composting toilets which use little water, with the end product disposed of off site or used as fertiliser
- Using solar power as main source of power supply
- Using natural daylight, and passive heating and cooling
- Making sure there was minimal impact during construction and revegetating with local native plants.

KEY OUTCOMES

Lark Quarry's success in implementing sustainable initiatives is evident in the daily operation of the buildings and the efficiency of the systems. Most of the sustainable elements were incorporated into the original design of the building and only require maintenance on an irregular basis. The success of the initiatives has resulted in fewer bills and less costs than a similar sized building that does not employ ESD principles.

MAJOR CHALLENGES

Cost was the biggest challenge in addressing achieving self-sufficiency at Lark Quarry Dinosaur Trackways. Original concept designs for the Lark Quarry Dinosaur Trackways incorporated a larger facility and broader visitor experiences, with a focus on being self-sufficient and ecologically sustainable. The cost for a larger-scale facility was prohibitive, requiring far more funding than the project received. The project was therefore scaled back to the current facility, still incorporating all the sustainability features but offering a narrower, yet still highly valuable, visitor experience.

Outlined below is an overview of other challenges faced in building and maintaining the Lark Quarry Dinosaur Trackways and how they were overcome.

	Conservation Issue	Sustainability Issue	Solutions
Temperature Regulation	Rock expansion – contractions cause cracks. Daily temperature fluctuation is 20 degrees in summer	Air conditioning uses large amounts of energy	<ul style="list-style-type: none"> ▪ Created high thermal mass via rammed earth walls, the ground. Thermal mass takes longer to heat up and cool down, stabilising the temperature ▪ Reduced heat absorption through use of insulation,

	Conservation Issue	Sustainability Issue	Solutions
			shading, sunscreens, insulated panels, verandas
Construction Impacts	Damage to site during construction	Need to benefit local economy via jobs and materials	<ul style="list-style-type: none"> ▪ Site construction plan dictates minimal impacts ▪ Prefabrication components maximise labour on site which benefits the local economy and minimises transport and wastage ▪ Used local material which needs far less manufacturing and transport than concrete
Water and Waste Efficiency		Water is scarce, has a high cost to purify, transport, treat. Disposal of waste and water on site create problems with weeds and pollution	<ul style="list-style-type: none"> ▪ Cut water use by using minimum flush toilets ▪ Collect pure rainwater from roofs (no treatment needed) ▪ Overflow from storage tanks mimics site's natural water runoff ▪ Process wastes via toilet system and then remove off site
Damage to Trackways	Dust, dirt, people and wildlife damaging track surfaces		<ul style="list-style-type: none"> ▪ Dust minimization: sealed walls to halt windborne dust, walkway grids remove shoe grit ▪ Walkway design and visitor management ensures people

	Conservation Issue	Sustainability Issue	Solutions
			keep off the tracks
Energy Generation	The supply via the powerline is not reliable, site needs continuous power	Conventional electricity generation creates greenhouse gases and a lot of electricity is lost in transmission.	<ul style="list-style-type: none"> ▪ Solar generation installed as main power supply, stabilising and augmenting mains power ▪ Utilise energy-efficient and minimal equipment (light, pumps etc.)

ADVICE TO OTHER OPERATORS

"The most effective measures are those built into a business from the beginning... If an operator has established facilities they wish to upgrade to be sustainable, (they should) discuss their options with a professional to avoid pitfalls and achieve cost-effectiveness in their operations"

Rosanne Mollenhagen
Tourism Development Officer, Winton Shire Council

NEXT STEPS

Excluding the adjacent caretaker's house and the temporary use of mains power at the Trackways while the solar panels are undergoing maintenance, the site at Lark Quarry is wholly sustainable. Any future development will occur if there are significant improvements in technology that can increase the sustainability of the operation. Any changes will be considered based on necessity and cost-effectiveness and will most certainly follow the theme of sustainability.