6.8 global hectares per person.

demand

The ecological footprint (EF) measures how much bioproductive area (whether land or water) a population would require to produce on a sustainable basis the renewable resources it consumes, and to absorb the waste it generates, using prevailing technology.

If all people consumed the Earth's resources the way that we do in Australia, it would take the resources of more than

three earths to support us.

biocapacity: the capacity of a given biologically productive area to generate an on-going supply of renewable resources and to absorb its spillover wastes.

unsustainability occurs if the area's ecological footprint exceeds its biocapacity.

supply

Biocapacity (BC) measures the bioproductive supply that is available within a certain area (e.g. of arable land, pasture, forest, productive sea).

australias biocapacity is at least 10.5 global hectares per person. meaning australians live well within australias capacity.

however at a global scale....

the planets estimated ecological footprint capacity 2.1 global hectares per person per year.

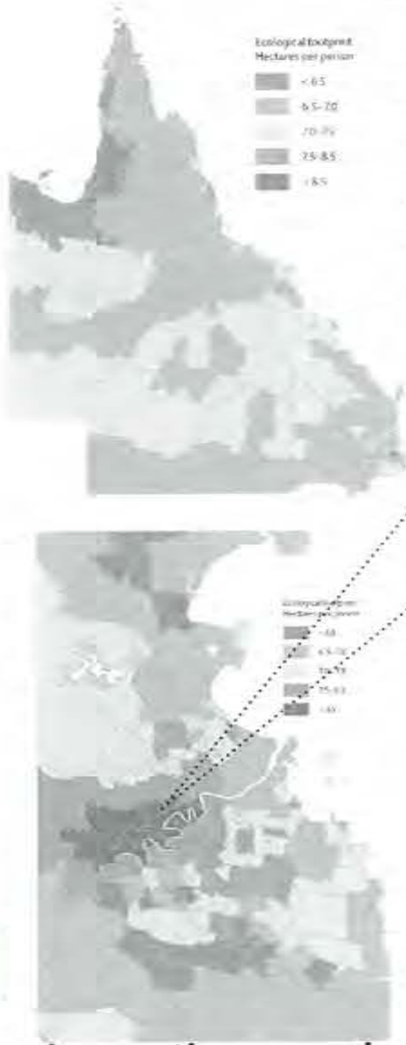
currently it sits approximately at 2.7 global hectares per person

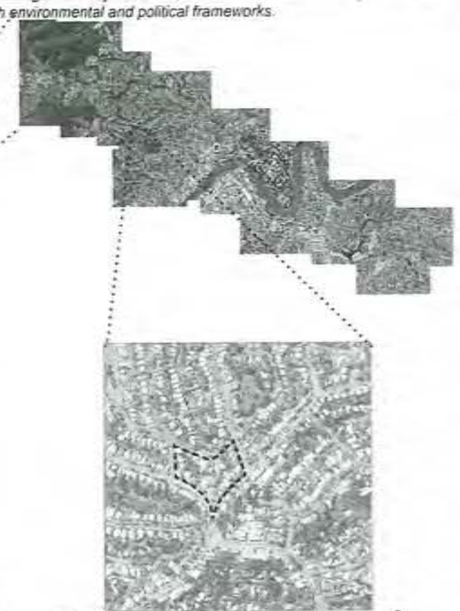
reducing the footprint

a ban on fuel for non commercial needs has forced Australians to make drastic changes to their lifestyle. governments have been pushed to instigate strict changes to how people are to survive in this new world where fuel is rationed for strictly running services large distances.

this proposal attempts to bring harmony between ecological balance and peoples integrity. attempting to disperse the adverse affects of environmental upheaval by creating a new society but marinating a sense of security.

the aim is to reach a 2.1 global hectare footprint per person in the suburb of Bardon Brisbane. such an extreme goal requires a paradigm shift and a challenge to current modes of living. using new and old technologies in conjunction with various theories on best practice for both environmental and political frameworks.





other scenarios

The scenarios show us that it is possible to make dramatic reductions in Ecological Footprint, yet some big choices are ahead of us in two main areas — energy and food. Today the overshoot that takes us to 1.5 planets is largely due to the carbon footprint.

We are of course not setting aside land for CO2 absorption: rather, in order that we may live within the land area that we have, CO2 is being emitted to the atmosphere. The consequence of this is rising atmospheric temperature. To avoid further dangerous increases in atmospheric temperature we need to reduce our carbon footprint through measures to improve energy efficiency, increase the provision of electricity as an energy source, and replace liquid fossil fuels with biofuels.

Whilst a roadmap on carbon footprint is possible, one is not yet available for the next challenge, which will be food production.The differences between the diets of Italy and Malaysia, if multiplied across the world, are dramatic. The crucial difference is not only in the total number of calories available but in the quantity of meat and dairy products consumed. Conversion of vegetable-based calories to animal-based calories is inefficient, and in a resource-constrained world one of the key trade-offs that society will need to grapple with is the quantity of land allocated for meat and dairy production either as grassland or to produce animal feed crops.

Our model shows that, even with a very low carbon footprint, if 9.2 billion people were to aspire to the equivalent of the diet of today's average Malaysian, we would still need 1.3 planets by 2050.This raises some serious consequences. Whilst we are using the atmosphere for our excess CO2 emissions, there is no "safety valve" for land. Even converting forests does not provide enough land to grow the food needed for an Italian diet. We need to make our existing land more productive.

In short, based upon the output from the model, optimizing the use of land for food, fuel, fibre and biomaterials is not our only challenge. If we are to provide enough food for the population of the world in the future, we need both to consider our diets and to devote significant long-term investment to raising biocapacity.
(WWF, 2010).

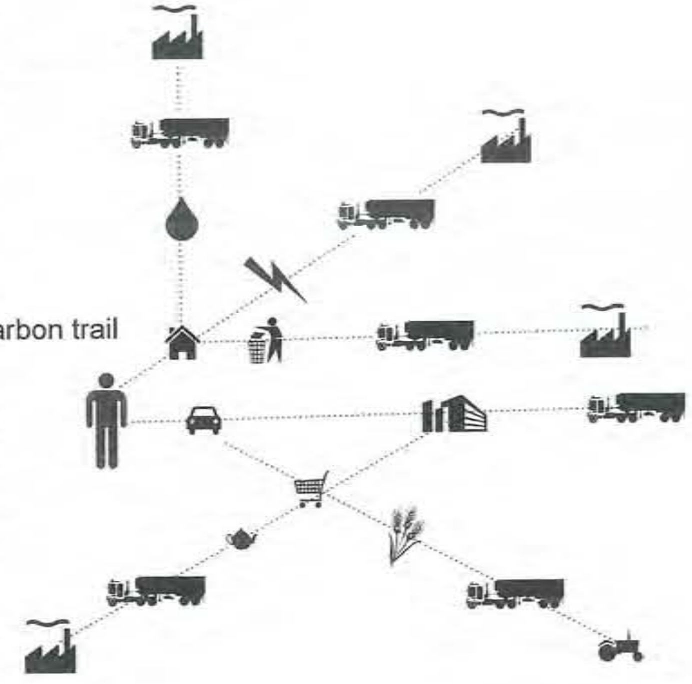
the role of cities in sustainable development

Cities are already the source of close to 80 per cent of global CO2 emissions, and they will account for an ever-higher percentage in the coming years as more and more people reside in and move to cities in search of more prosperous lifestyles.

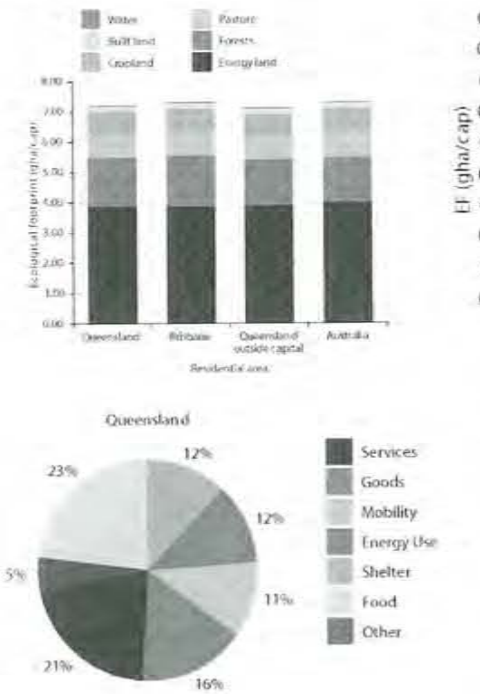
As cities expand and need more space and more resources, they have an increasing effect on the surrounding area. Studies have shown how the expansion of cities has led to predictable "waves" of environmental degradation and biodiversity loss, spreading up to nine kilometers per year from the city, as people need to travel greater distances to find resources such as charcoal and timber (Ahrends, A. *et al.*, in press).

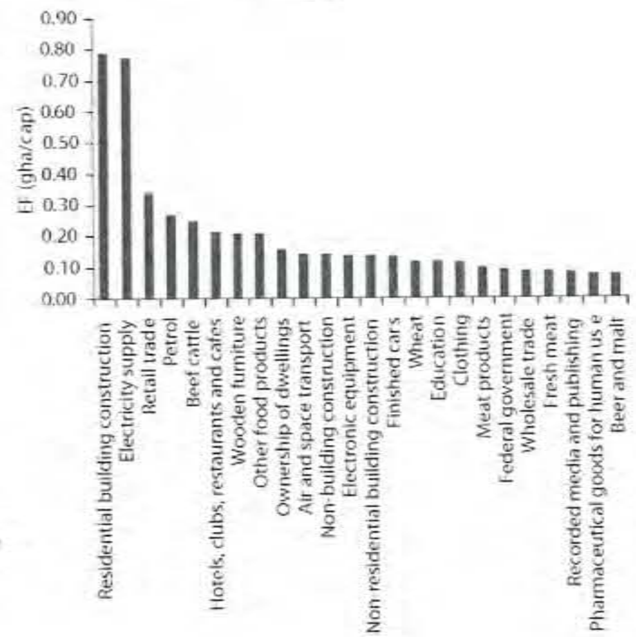
City authorities and citizens therefore have a crucial role to play in preserving global biodiversity, reducing Ecological Footprint and improving social well-being and prosperity. They also have a role to play with regard to carbon footprint — including imports of "virtual emissions". Collectively, cities have a unique opportunity to make a big impact over the next 30 years, during which US$350 trillion will be invested in urban infrastructure. This can be used to develop an attractive "One Planet" lifestyle on a large scale, particularly in fast-growing smaller cities and developing nations.
(WWF, 2010).

carbon trail



the big issue? food & energy





land area	181088.3844m2 or 18hecatres
number of houses	303 at 111.483m2 footprint
number of commercial buildings	8 at 3000m2
total average building footprint	33779.349 + 24000 = 57779.349m2 = 5.77hectares
approx open space	= 12.2hectares
approxomate residential population	= 2.5 people x 303 = 757.5
current global hecatres	= 6.8 x 757.5 = 5151gh
minimum global footprint	= 2.1 x 757.5 = 1590.75gh

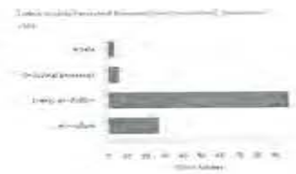
reduce the ecological footprint reduce co2

urban
world: approx 0.07 gh/pp
australia: approx. 0.06 gh/pp

carbon
world: approx. 1.14 gh/pp
australia approx. 0.78 gh/pp

Target: Cut by one-third Queenslanders' carbon footprint with reduced car and electricity use.

Queensland created the second highest carbon dioxide equivalent emissions of all states and territories in 2009, producing 24.4% of total Australian emissions.



water
world: approx. 1,243 m3/pp
australia approx. 1,393 m3/pp

world: approx. 8,999.74 km3/pp
australia approx. 95.50 km3/pp

1mm of rain equals 1L per m2 (minus 50% evaporation)
2.2L of water for drinking per peson per day
220L of water / person / day (but comfy on 140L)
120L of wastewater / person / day (at 140 consumption)

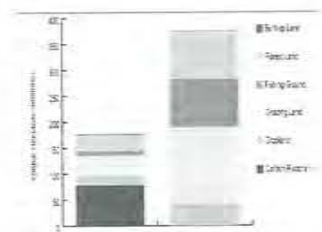


Figure 38: Oceania total Ecological Footprint and biocapacity by land use type, 2007

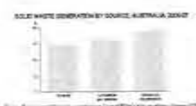
food
world: approx. 0.99 gh/pp
australia approx. 4.83 gh/pp

energy
1.244 kwh / person / day

Solar can get .42 kwh / m2 so per person you need 3m2

waste
The total volume of waste generated in Australia approx, 43.8 million tonnes in 2006-07.
The volume of waste per person approx.2,100 kg over the same period.
Between 2001 and 2007, the volume of waste disposed to landfill 21.3 million tonnes.

Recycling activities in Australia are facilitated by municipal kerbside recycling services. In 2009, over 91% of Australian households used municipal kerbside recycling to recycle waste, an increase from 87% in 2006



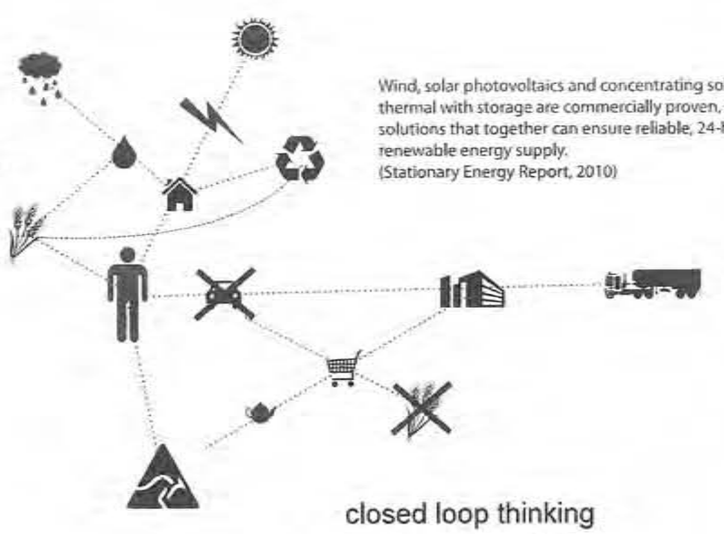
the good news we can reduce quickly and comfortably

LITTLE FEET
BARDONS CARBON FUTURE

DLB830 DESIGN 8
MEGAN MURPHY

QUT
Queensland University of Technology

carbon trail



Wind, solar photovoltaics and concentrating solar thermal with storage are commercially proven, scaleable solutions that together can ensure reliable, 24-hour renewable energy supply.
(Stationary Energy Report, 2010)

closed loop thinking

food

minimum daily and yearly food needs

cerial
1 person
day - 6 serves X (1/2 cup muesli = 113g) = 678g
year = 678g x 360 = 244080g = 244.08kg

82 people
day - 678g X 82 = 55596 = 55.596kg
year - 244.08 X 82 = 20008kg

vegetable
1 person
day - 7 serves X (1/2 cup beans = 113g) = 791g
year = 791g x 360 = 284760g = 284.76kg

82 people
day - 791g X 82 = 64862 = 64.862kg
year - 284.76kg X 82 = 23350.32kg

fruit
1 person
day - 5 serves X (1/2 cup juice = 113g) = 565g
year = 565g x 360 = 203400g = 203.4kg

82 people
day - 565g X 82 = 46330 = 46.330kg
year -203.4kg X 82 = 16678.8kg

dairy
1 person
day - 2 serves X (1 cup milk = 226g) = 452g
year - 452g x 360 = 162720g = 162.72kg

82 people
day - 452g X 82 = 37064g = 37.064kg
year - 162.72kg X 82 = 13343.04kg

meat
1 person
day - 1 serves X 100g = 100g
year = 100g x 360 = 36000g = 36kg

82 people
day - 100g X 82 = 8200 = 8.2kg
year - 36kg X 82 = 2952kg

combined yearly quantity =
76332.16kg approx for 82 people or 76.332t

type	season	yield	area	storage	byproduct
cereals Soybeans, buckwheat, corn, barley and wheat	autumn - summer	approx. 11kg per harvest	100m2	cool dry long lasting	straw, animal feed, pollen for bees.
vegetable	all year	-	-	cool dry perishable	compost
fruit	all year	-	trees can range from 1m - 10m	cool dry perishable	compost, pollen for bees
dairy goat	all year	2.7L per day	1-3 goats need approx. 15ft2	cool perishable	manure, weed control
meat chicken	all year	approx. 1kg of meat and less than 1 egg a day	-	cool perishable	feathers, manure, pest control, soil turning.
alternatives to meat and dairy almonds	nill first 3 years then every autumn	6.8kg per harvest	up to 10m	cool dry long lasting	
soybeans	summer - autumn	-	-	cool dry perishable	

For commercial orchards, grain and seed crop, market gardens, and small animal systems (poultry, pigs), small areas of 5 acres or less work better than large acreages devoted to single or even double cropping. It is impossible to completely mulch, water, maintain *and* raise a large variety of plants and animals for multiple functions and multiple yields over a large area (as can be accomplished on a Zone I or Zone II level). Extensive systems, therefore, tend to simplify.

However, this factor can be overcome by a "commonwork" model, where families or groups agree to divide up the work and the products, so that one is responsible for the orchard, while another grows green crop beneath or runs poultry. Someone else might bring bees in during flowering for pollination (and honey production), and manage the firewood crop interplanted with the fruit and nut crops.

Smaller systems are usually easily managed by a farm family with seasonal helpers, and provide high yields due to mixed cropping and intensive management.

energy

http://www.wtcc.sa.gov.au/webdata/resources/images/solar_workings.jpg

climate control – heating and cooling
- Greenhouse attachment for warming the house
- Shaded attachments for cooling i.e awnings, vegetated trellis
- Conducted heating using heated water or electric wire system

cooking
- Gas stoves using fuel from biogas digesters that use sewage and other waste
- Solar cooking units that use the suns rays and reflective materials to heat up
- Insulated cooking items that retain heat and cook food longer

electricity and lighting
- Photovoltaic cells and storage batteries
- Wind power
- Energy conserving and long lasting lighting fixtures
- Gas

washing and drying clothes
- Laundromats are more efficient than personally owned machines
- Clotheslines can be hung in a greenhouse or roofed area

refrigeration and cooling
- Gas refrigerators are small and efficient. Or a normal fridge can be run using solar, wins etc power
- Solar food dehydrator to dry and preserve food

water
- Water tanks to capture roof runoff
- Hand basin water, shower and bath water are used to flush toilets and water gardens
- Low water shower nozzles

54

ON-FARM FUELS

Fuel as methane can not only be derived from animal manures, but also from leaf litter and branches under mature forest. Chipped leaves and branches are processed through a biogas digester to produce methane for cooking, heating, and vehicle needs. All waste products, however, should be returned to the forest as nutrient for further growth. For a full explanation of such a bio-energy system, refer to *Another Kind of Garden* by Ida and Jean Pain (see references at the end of this chapter).

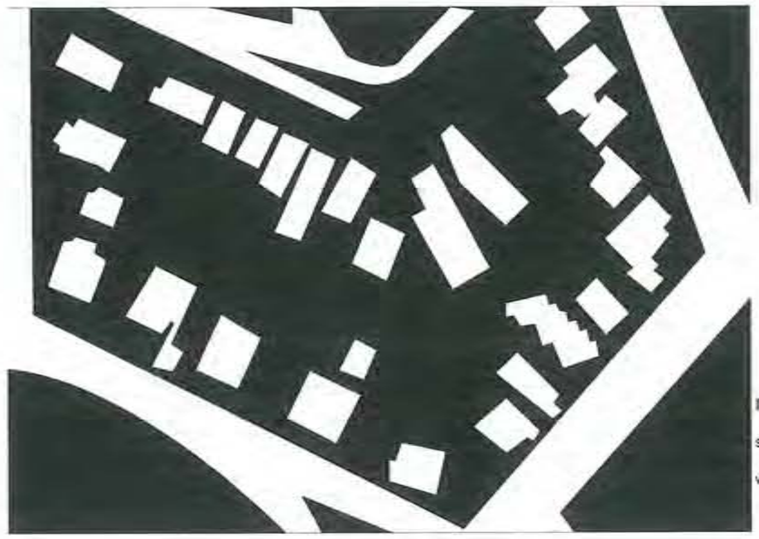
For liquid fuels, species yielding sugars for conversion to alcohol (toddy palm, carob, fruit trees) are planted. The tree itself is not cut down, rather the sap (palm trees) or fruits are gathered. Low or no-tillage grains and starchy root crops, of sugar-rich carob beans, plums, sugar cane and beets can all be fermented to alcohol fuel. After fermentation, waste products are returned to the farm in the form of mulch, stock feed, and soil additives. No critical materials are lost, rather all products not directly used for fuel are recycled via animal feed (pig, worm, fish) to plant food, thus cycling nutrients on the farm.

About 5-10% of farm land devoted to fuel production would provide fuel self-sufficiency, with some surplus. Less area would be needed if sugar-pod-producing tree crops are also developed.

The technology is well-known, but the pretence is that we need more "research" to develop this in Australia. Hogwash! Sixty percent of Brazil's vehicles run on alcohol, and thousands of U.S. farmers now use on-farm stills. These are especially important as energy costs spiral upwards. Perhaps the best argument for alcohol fuel is that the insidious lead pollution from car exhausts is eliminated, thus reducing health hazards in cities. The long-term advantage is that the threat of climatic change due to the burning of fossil fuels and the felling of forests can be reduced or avoided.

Farms and city waste centres are the potential future energy base for essential fuels. With bicycle "freeways" increased and more efficient rail, canal, and sea transport, any society can be self-sufficient in essential transport needs.

The problem is the centralisation of power in large utilities. Vast sums are spent on advising people to "save petrol", whereas the same amount spent on the low-cost distillation plants that would make a community or small town self-sufficient is "not available". The intention is obvious: we are expected to stick with petrol or gas products, lead and pollution, until the oil companies gain control of alcohol fuels. Sometimes one can be pardoned for thinking that we are all crazy, or dumb, or that there is a gigantic conspiracy to keep people down and out. I am inclined to think both factors are operating.



microclimate
ss/e winds april-august
west facing slope

land area	27971m2 or 2.8hecatres
number of houses	25 at 111.483m2 footprint
number of units	1 at 276m2
total average building footprint	3063.075m2 = 0.306 hectares
approx open space	= 2.5hectares
approxomate residential population	= 2.5 people x 33 = 82.5
current global hecatres	= 6.8 x 82.5 = 561gh
minimum global footprint	= 2.1 x 82.5 = 173.25gh

a new social regime

community
shared resources and food production
forced separation of refuse by residents
distribution and collecting organic waste by council

new industries and jobs
re-processing industries for recycling materials
seed merchants collect and redistribute seeds and plants

urban structure
districts provide certain agricultural purposes which includes biofule as well as crops.
each district is its own "company" and mages its internal affairs whilst providing for the wider community
a district is mad up of neighbors who have agreed to share their balural assets. a home owners land is given over to the community with homes the new personal boundary. the inner nebula of the house provides for personal needs while the land is to service the community.
city forestry along roads and on reserves

a new economy
A LETSystem is a trading network supported by its own internal currency. It is self-regulating and allows its users to manage and issue their own 'money supply' within the boundaries of the network.
The key points include:

co-operation: no-one owns the network.
self-regulation: the network is controlled by its users.
empowerment: all network users may 'issue' the 'internal currency'.
money: money, as a means of exchange, is an integral feature.
LETSystem recording services keep track of transactions and issue statements of LETSystem trading.

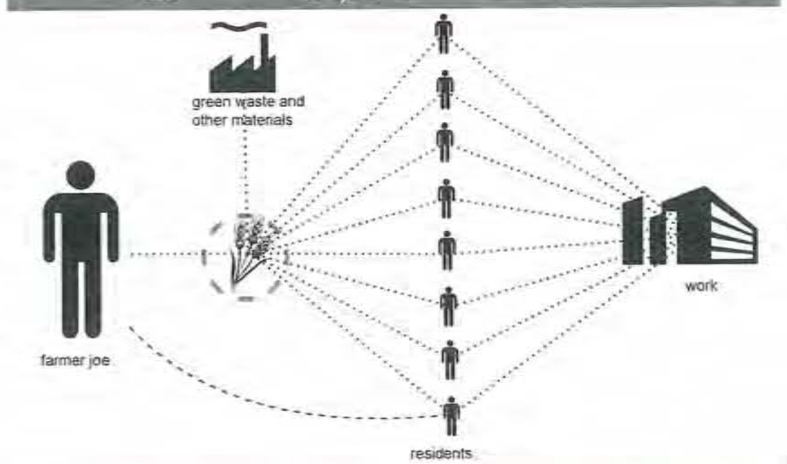
LETS supports trading which results in win-win outcomes. This is to be contrasted to the more coercive types of behavior often seen in communities which are short of money - "I've got the money, so you have to work for me." In LETS, there is never any obligation to trade.
http://www.gmlets.u-net.com

"but i don't want get my hands dirty"
tough luck. your going to contribute whether you like it or not. if you have the money pay someone else

"uhm..what about my land. i want to keep that"
no. its for the greater good. scarcely enough land as it is.

social loops

inputs — care — money waste — money



outputs — food wellbeing

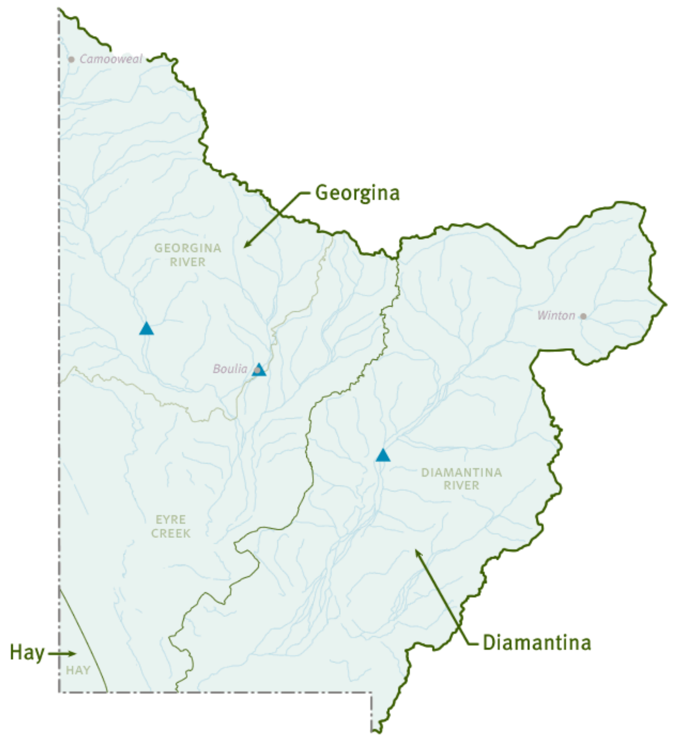
http://www.motherearthnews.com/Organic-Gardening/1978-01-01/You-Can-Raise-Grains-Right-in-Your-Own-Garden.aspx

australian government. food for health dietry guidelines for australian adults.

LITTLE FEET
BARDONS CARBON FUTURE
DLB830 DESIGN 8
MEGAN MURPHY
QUT Queensland University of Technology

HOUSE
POOL
HOUSE
POOL
HOUSE

POST INDUSTRIAL QUEENSLAND

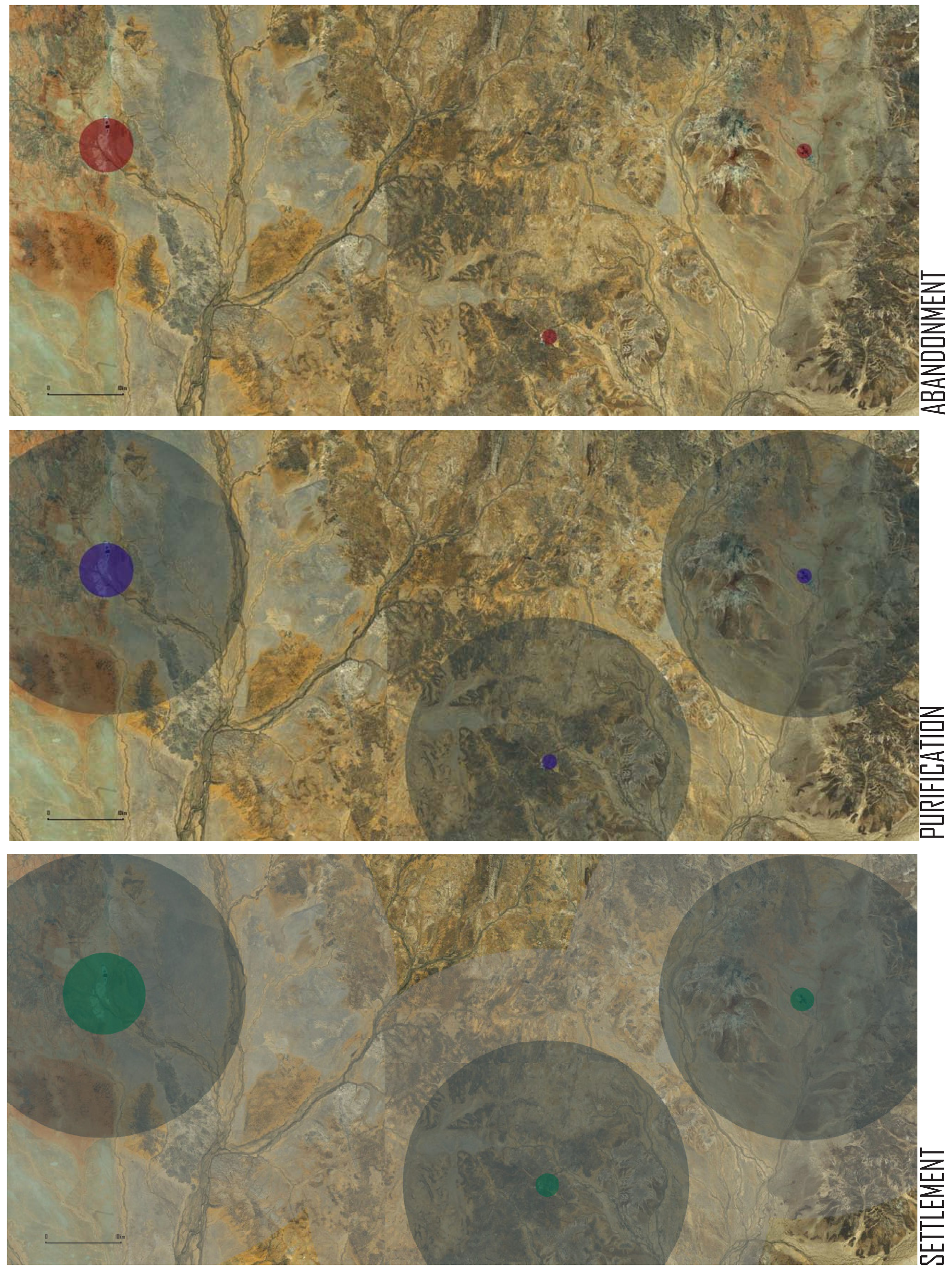


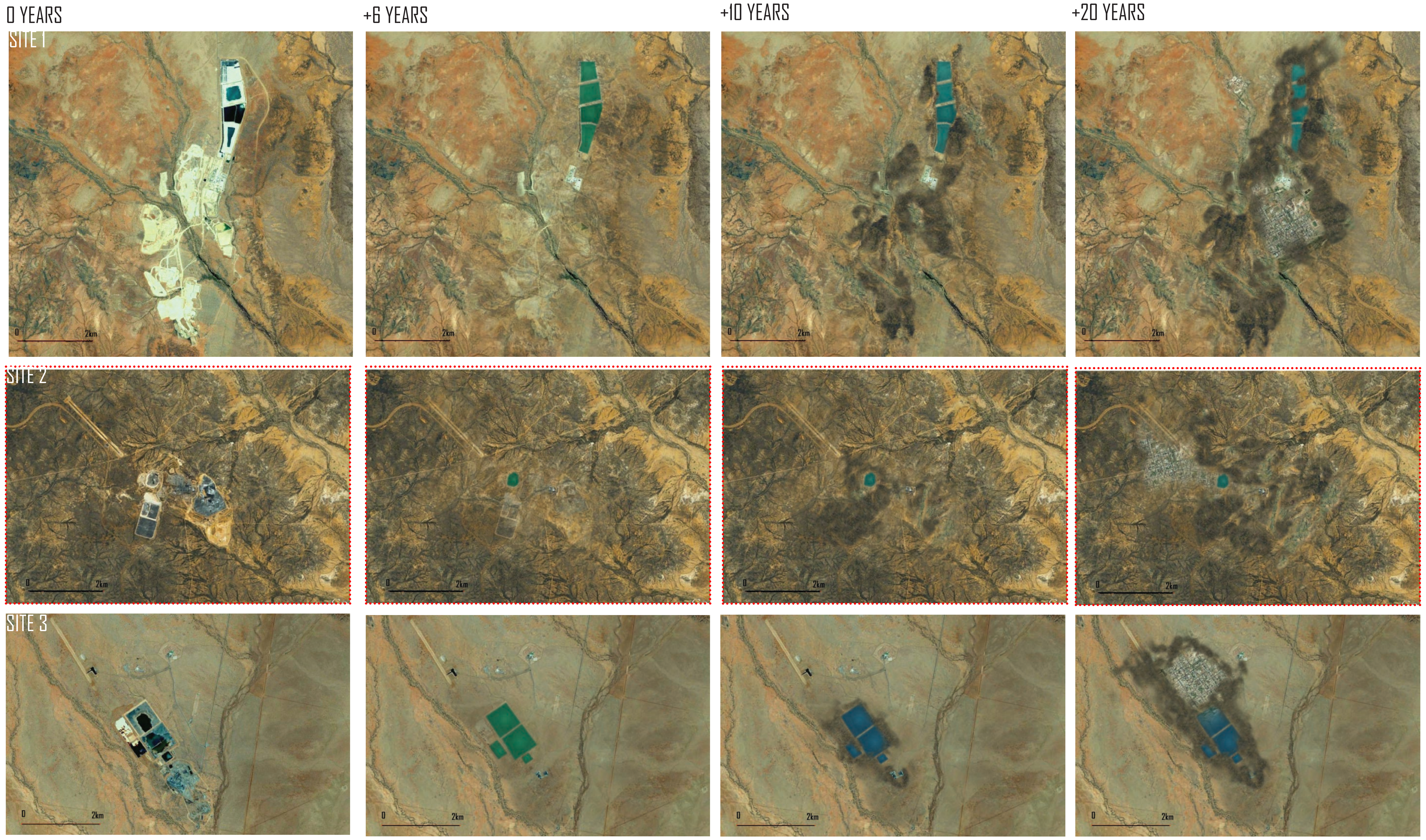
A significant portion of Queensland's wealth is in the mining industry with sites located across the state. It provides employment opportunities for many Australians and produces one of our greatest sources of income. However, the process of mining contributes to the decline in our environment both directly and indirectly.

Imagine what happens to these sites after they have picked the last of the minerals and metals from the site (Abandonment). What happens then? With the increase in mine sites, leaving Queensland's landscape poked marked with deep pit mines of immense size. And what of the communities that rely on these mines to provide the lifeblood of their communities?

The aim of this design is to address the afterlife of mining sites within the Georgina and Diamantina Catchments located south west of Queensland. With over 15 mines within the Georgina and Mt Isa regions, the issue of abandoned mine sites is prevalent. The design proposes that these sites potential in combating Australia's CO2 emissions is underutilized (Purification) in conventional mine rehabilitation and addresses this directly.

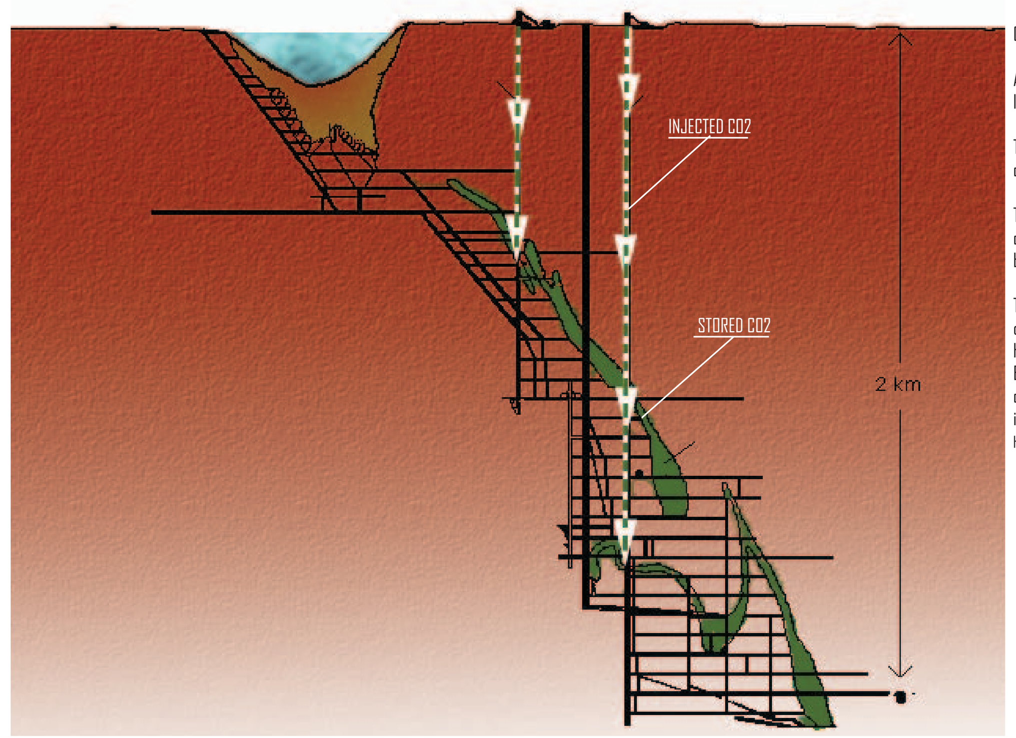
The sites purpose is twofold, the first being as sequestering points for future production of CO2. This prevents more CO2 from being emitted into the atmosphere and increasing the effects of Global Warming. Secondly, as water capture and treatment facilities; providing more water north of the catchment to support agriculture and future urban growth (Settlement).





TECHNOLOGY

GEOSEQUESTRATION



There is enough worldwide capacity for sequestering 1,100 gigatons of CO2 underground.
Using abandoned mine sites, their extensive shaft works and cavities left from deep pit mining, CO2 can be pumped under the earth to prevent it escaping into the atmosphere.
Liquefied CO2 is pumped through existing and new pipelines from CO2 generating points to the former mines sites.

Further on site sequestering will take the form of trees and grasslands; however the impact of these will be significantly less than that of Geosequestration. There is also the option to sequester small amounts in the basins of the open pits once filled with water.

SEQUESTRATION STATISTICS

Soil 700 - 3000 gigatons
Plants Dependant on amount of vegetation
Geo 1,100 gigatons
Ocean 1000 to 1000 Gigatons

Forest capacity 0.05 - 3.9 Gigatons
Grassland capacity 0.12 – 1.0 Gigatons
Swamp/Floodplain/Wetland capacity 2.23 – 3.71 Gigatons

WATER PURIFICATION & RHABILITATION

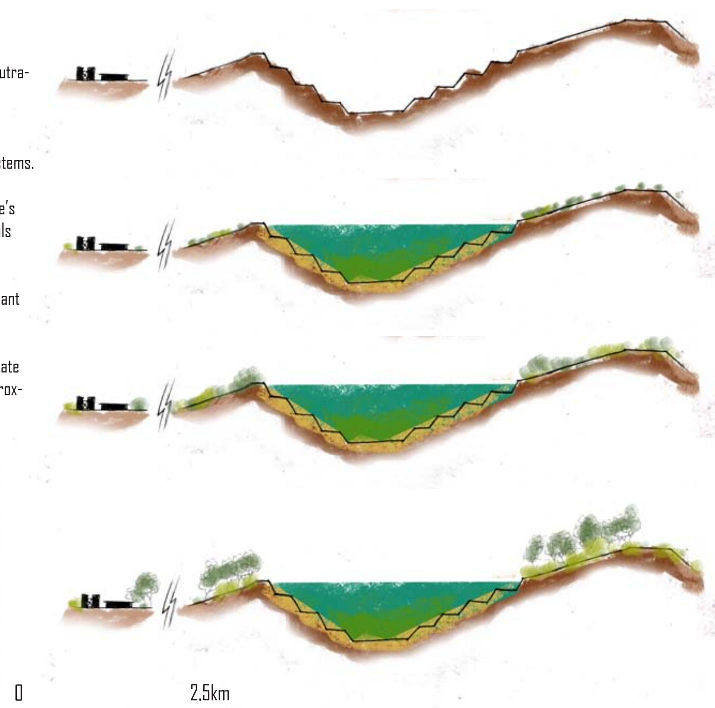
Captured water is transferred into the open cut pit for evaporative loss and/or water treatment.

Active treatment involves installing a water treatment plant, where the AMD is first dosed with lime to neutralise the acid and then passed through settling tanks to remove the sediment and particulate metals.

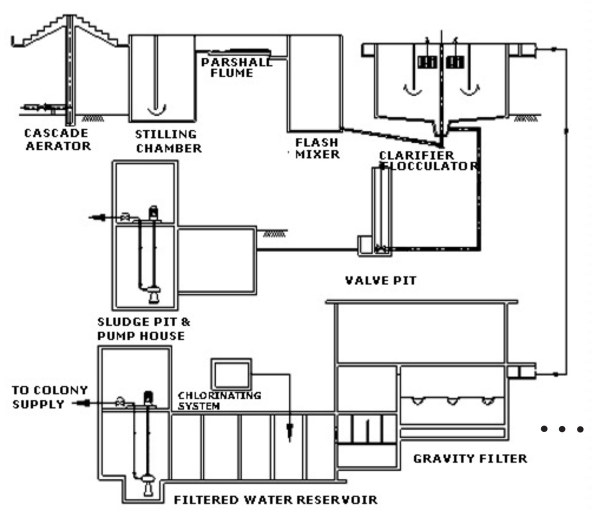
There is an ongoing program of maintenance and upgrades. The program is aimed at improving seepage capture across the mine site and minimising the discharge of contaminants to the surrounding water systems.

The lime dosing (water treatment) plant, manages risks associated with potential spills from the mine site's open cut pit. The plant draws water from the open cut pit and neutralises the water to remove toxic metals before releasing the treated water into the environment.

The objective of the treatment process is to neutralise the pit water to remove target metals and significant quantities of salts before discharging the water to the Dee River. The process is based on the addition of hydrated lime to the pit water that raises the pH from around 2.7 to around 7.5.
By neutralising the water to a controlled pH, most of the heavy metals in solution in the pit water precipitate out (metals will become separated from the water and be removed predominantly as insoluble metal hydroxides).
http://www.dme.qld.gov.au/zone_files/mt_morgan_pdf/project_summary_mount_morgan_mine.pdf



TYPICAL POTABLE WATER TREATMENT PLANT



http://www.durhamcountync.gov/departments/ceng/Wastewater_Treatmen.html

WATER TREATMENT SYSTEM

~ Raw water is pumped to an Aerator, which oxidizes soluble iron in the water.
~ Water flows to the Stilling Chamber to break the turbulence State.
~ Water is then taken into the Flash Mixer where chemicals are mixed with the raw water.
~ The raw water is dosed with Alum, Lime and Polyelectrolyte to suspend matter, enhancing the efficiency of sedimentation.
~ Chemically dosed raw water is then fed into the clariflocculator unit to further settle the sediments.
~ The sludge generated in the clariflocculator is bled via Telescopic Bleeds to an underground Sludge Pit. The sludge collected from the plant is finally pumped out.
~ Clarified water is collected in the launder of the clarifier from where it flows to the gravity filter for further filtration.
~ Chlorine dosing is done for disinfection purpose.
~ Filtered water is collected in filtered water storage tank from where it is pumped to various consuming points.
http://www.driplexwater.com/Portable_Water_Treatment.asp

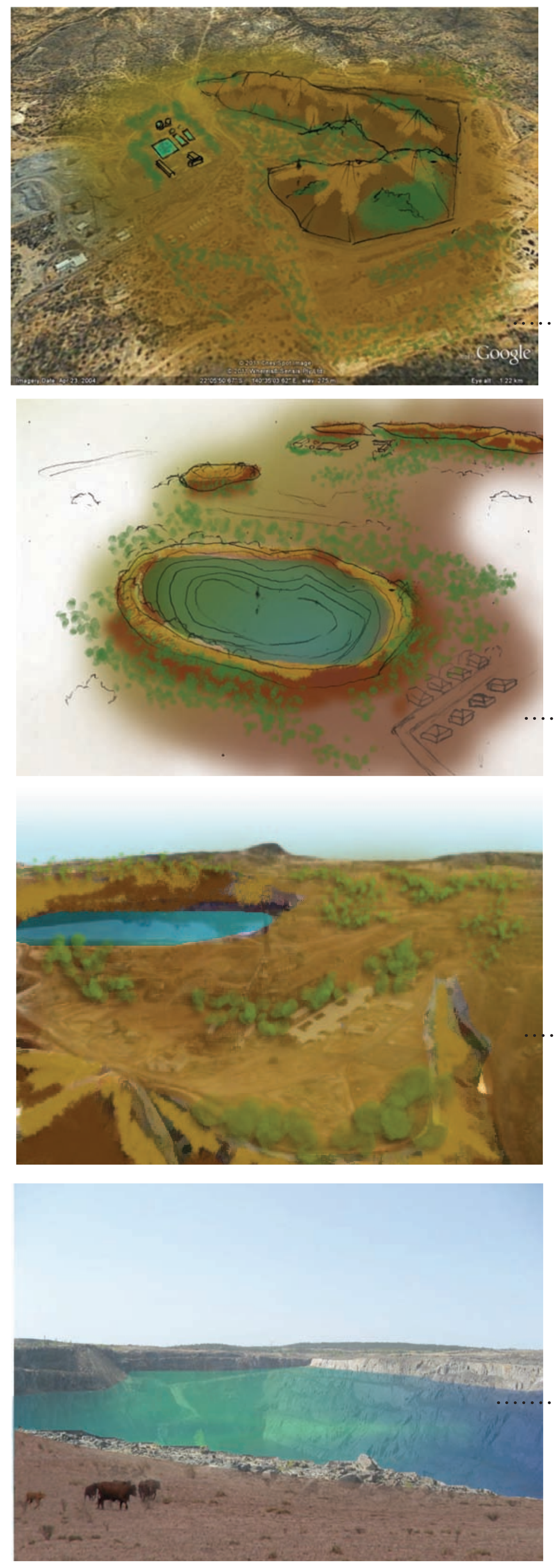
FLORA

TREE/BUSH

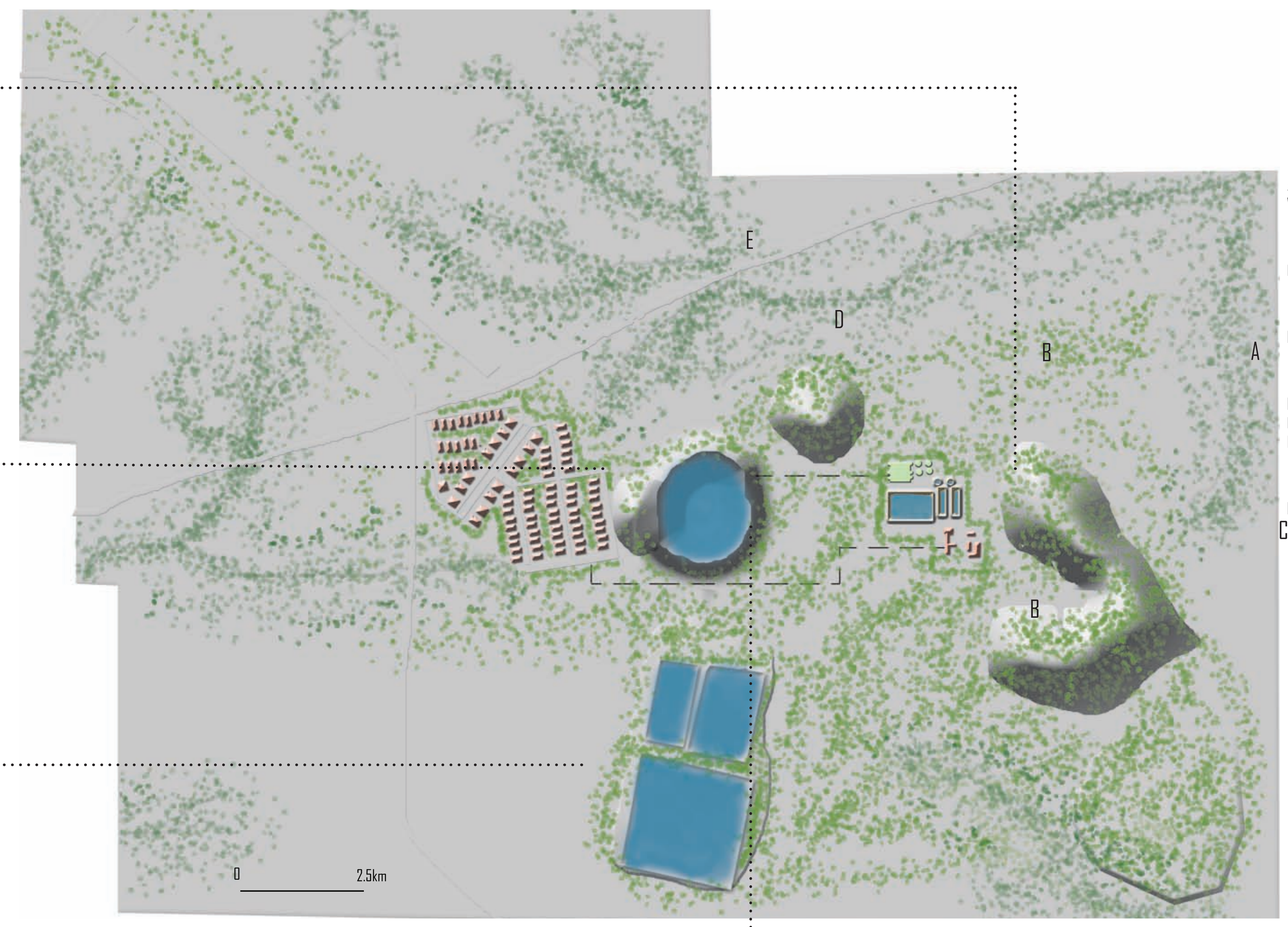
desert bloodwoods
Hakea suberea
E.coolabah
Acacia woodlands
E. pruinosa
Eucalyptus leucophloia

SHRUB/GROUNDCOVER

Triodia pungens
lignum/saltbush



SITE 2 DETAILED PLAN



A
WATER TREATMENT FACILITY

B
CONVERTED DEEP PIT MINE AND SETTLING POOLS

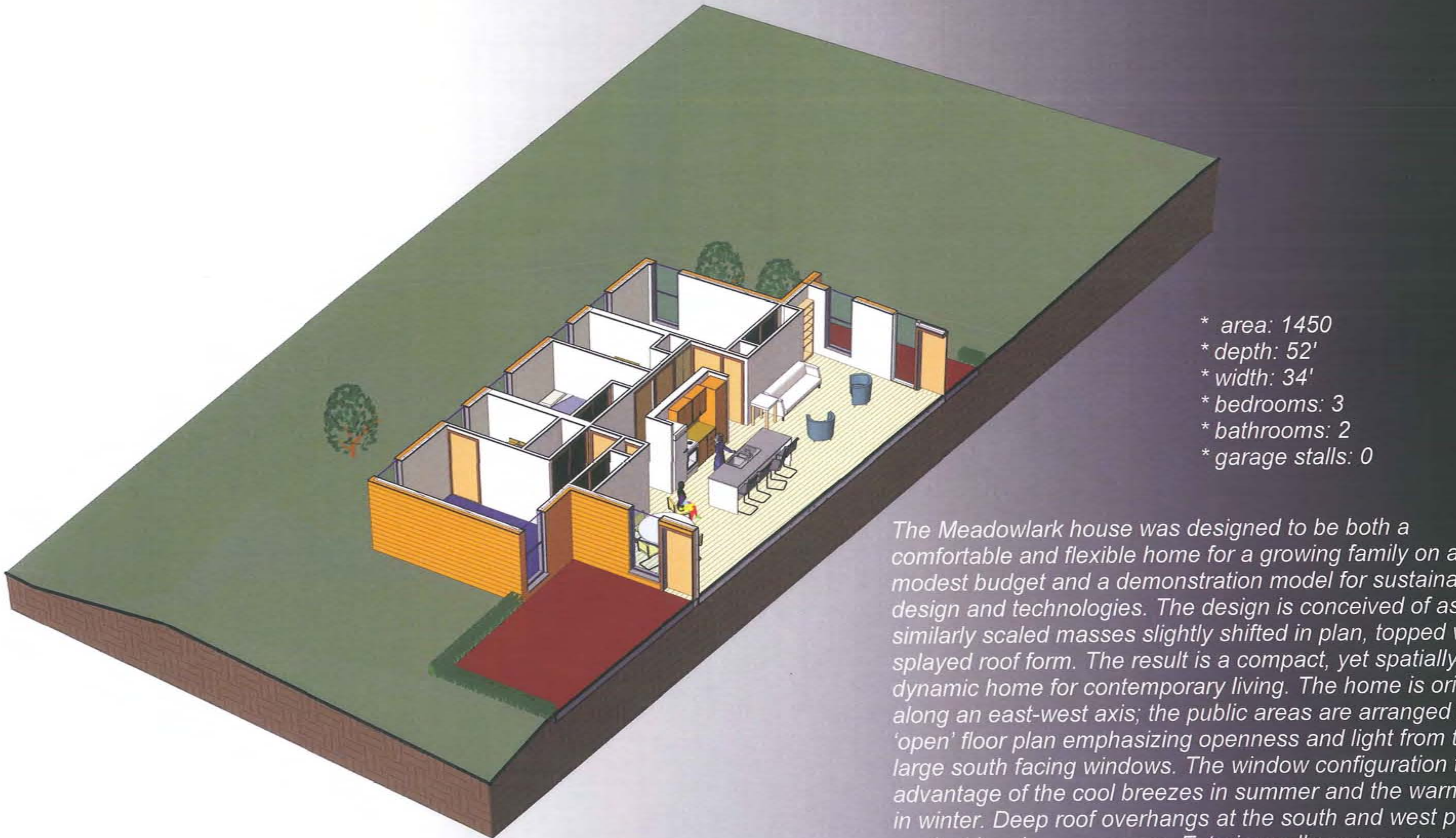
C
RVEGETATED ZONE AND CONVERTED DIRT PILES

D
POTENTIAL NEW SETTLEMENT
CATTLE FARMING CAN PROCEED IN THE SURROUNDING AREAS
INCLUDING THE FORMER MINE SITE

E
EXISTING ROAD

MEGAN MURPHY
DLB730_11se1: Landscape Design 7
QUEENSLAND UNIVERSITY OF TECHNOLOGY
2 JUNE 2011

Meadowlark



1 Meadowlark House Inside

* area: 1450
* depth: 52'
* width: 34'
* bedrooms: 3
* bathrooms: 2
* garage stalls: 0

The Meadowlark house was designed to be both a comfortable and flexible home for a growing family on a modest budget and a demonstration model for sustainable design and technologies. The design is conceived of as two similarly scaled masses slightly shifted in plan, topped with a splayed roof form. The result is a compact, yet spatially dynamic home for contemporary living. The home is oriented along an east-west axis; the public areas are arranged in an 'open' floor plan emphasizing openness and light from the large south facing windows. The window configuration takes advantage of the cool breezes in summer and the warming sun in winter. Deep roof overhangs at the south and west protect against harsh summer sun. Exterior walls are constructed with the HIB system, with engineered roof joists. The mechanical systems include radiant floor heating and a ducted energy recovery ventilator. A large portion of the roof faces south, allowing for optional photovoltaic panels.

http://www.freegreen.com/greensburg/plan-general.aspx?id=60

A102 Meadowlark House Cut

Megan Murphy

0101667510

26th May 2010

Project 3

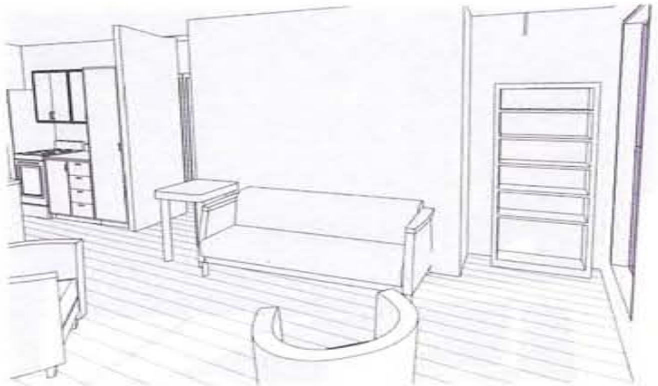
David Gooding

BDCAD501A

Digital 3D Model of architectural environments

Wednesdays

Meadowlark



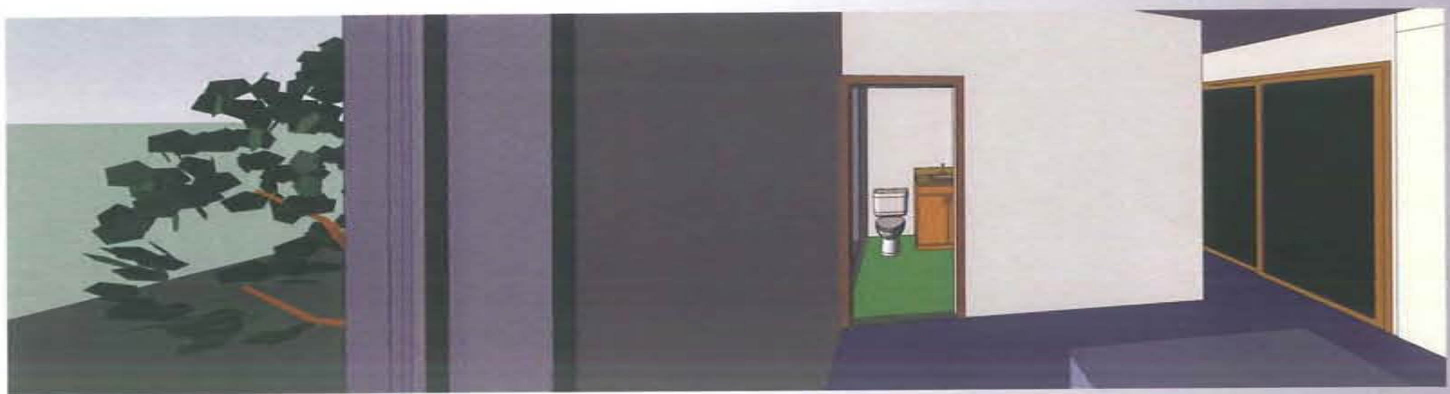
3 Lounge

2 West Kitchen

1 North East Kitchen

6 Hall View

7 Master Bedroom Hall View



5 Master bedroom

4 South East Kitchen

Megan Murphy

0101667510

26th May 2010

Project 3

David Gooding

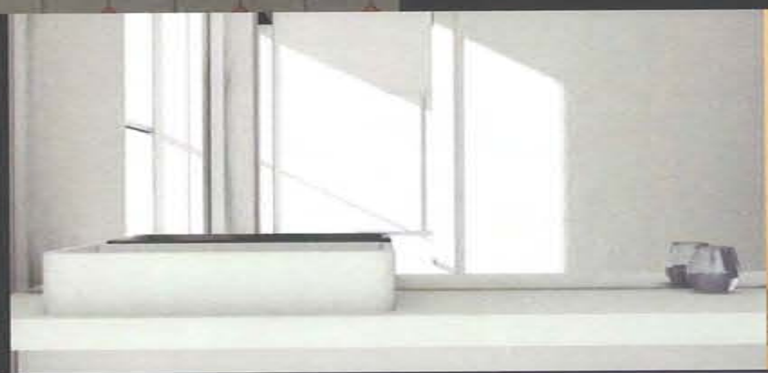
BDCAD501A

Digital 3D Model of architectural environments

Wednesdays

A106 Camera Views

Meadowlark House



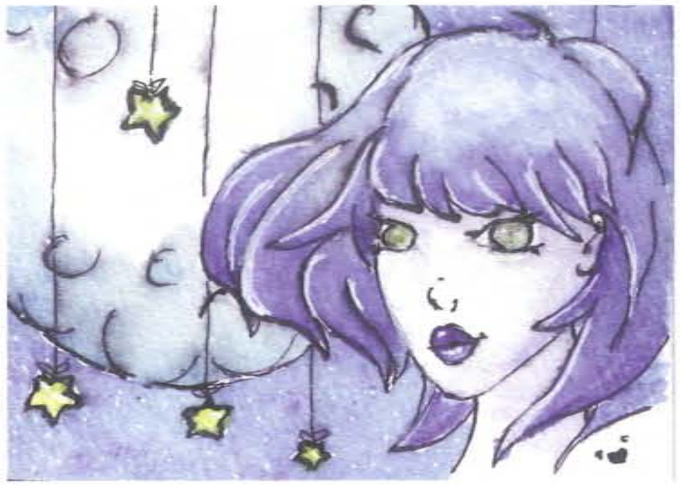
Name: Megan Murphy
Student Number: 0101667410

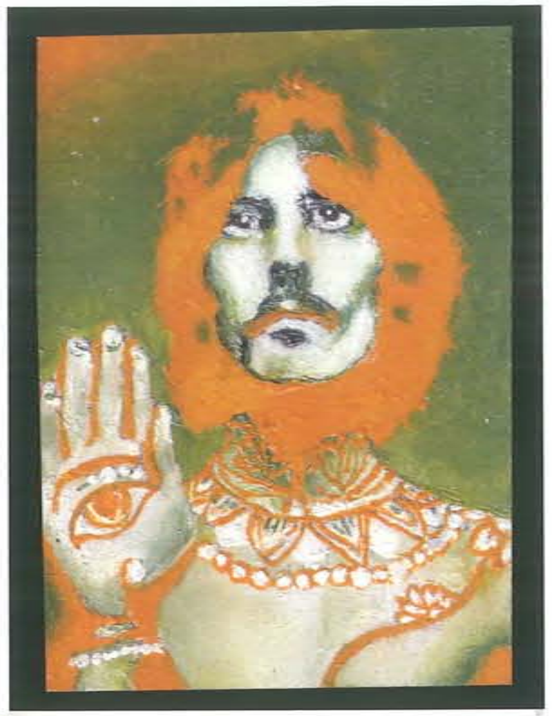
Due Date: 26th May 2010

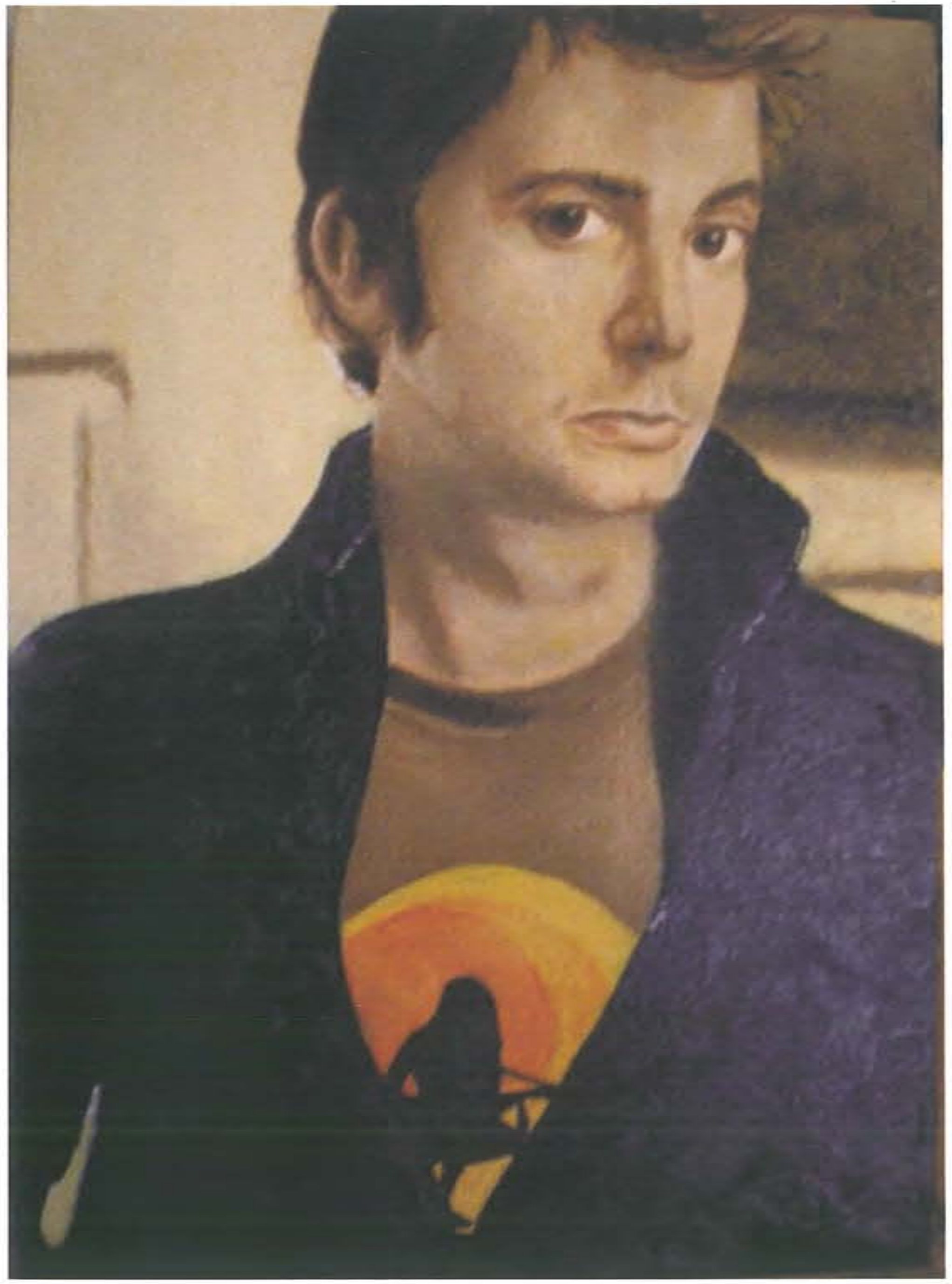
Course: BDCAD502A - Digitally render a 3D Model to photo-realistic quality
Wednesdays 11.15am

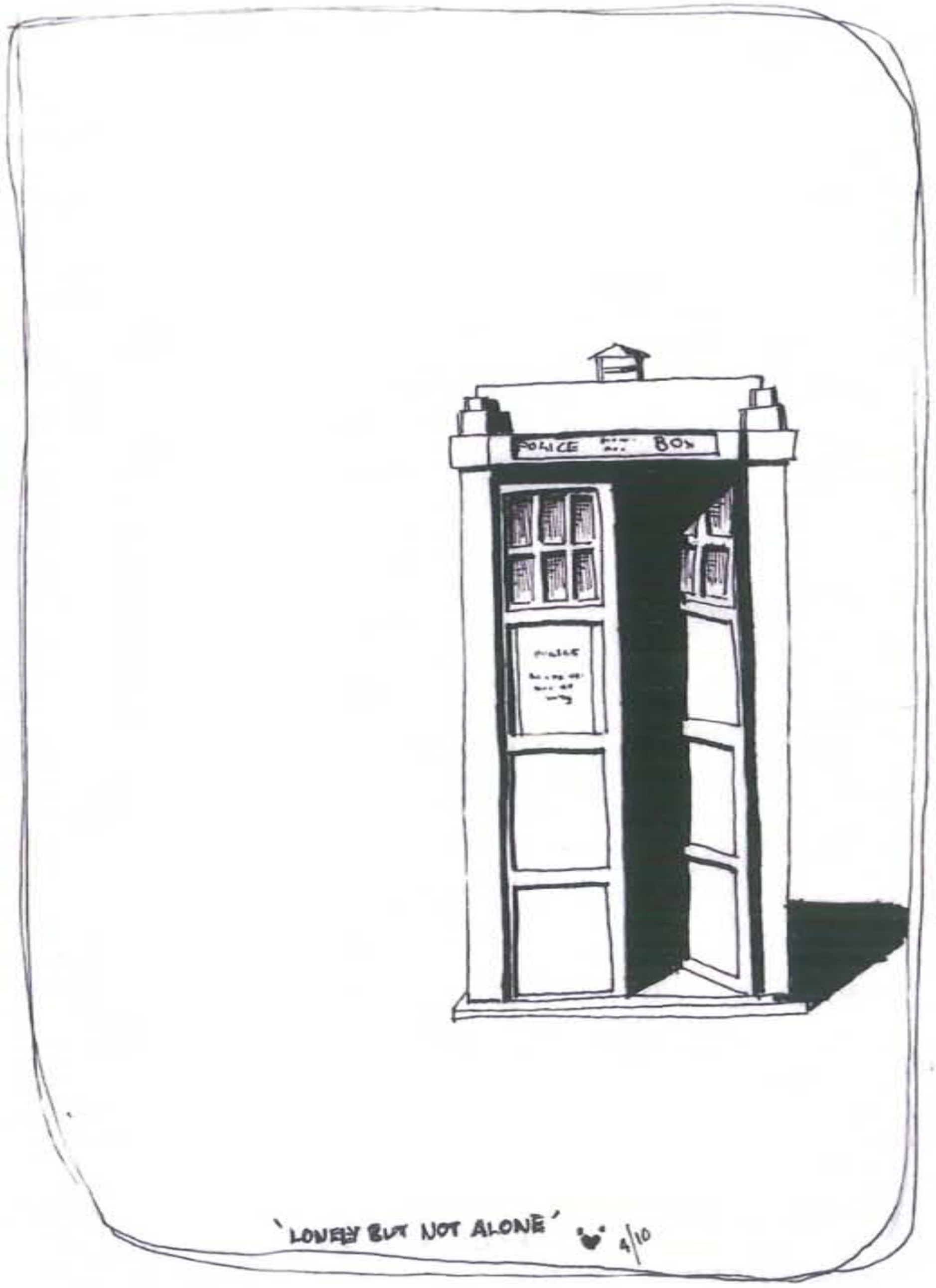
Project: 1
Tutor: Michael Gibson

traditional art:
water, oil, ink









digital art