SERPENTINE PAVILION

Design Charette -2011

Team F:

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Daniel Stollar
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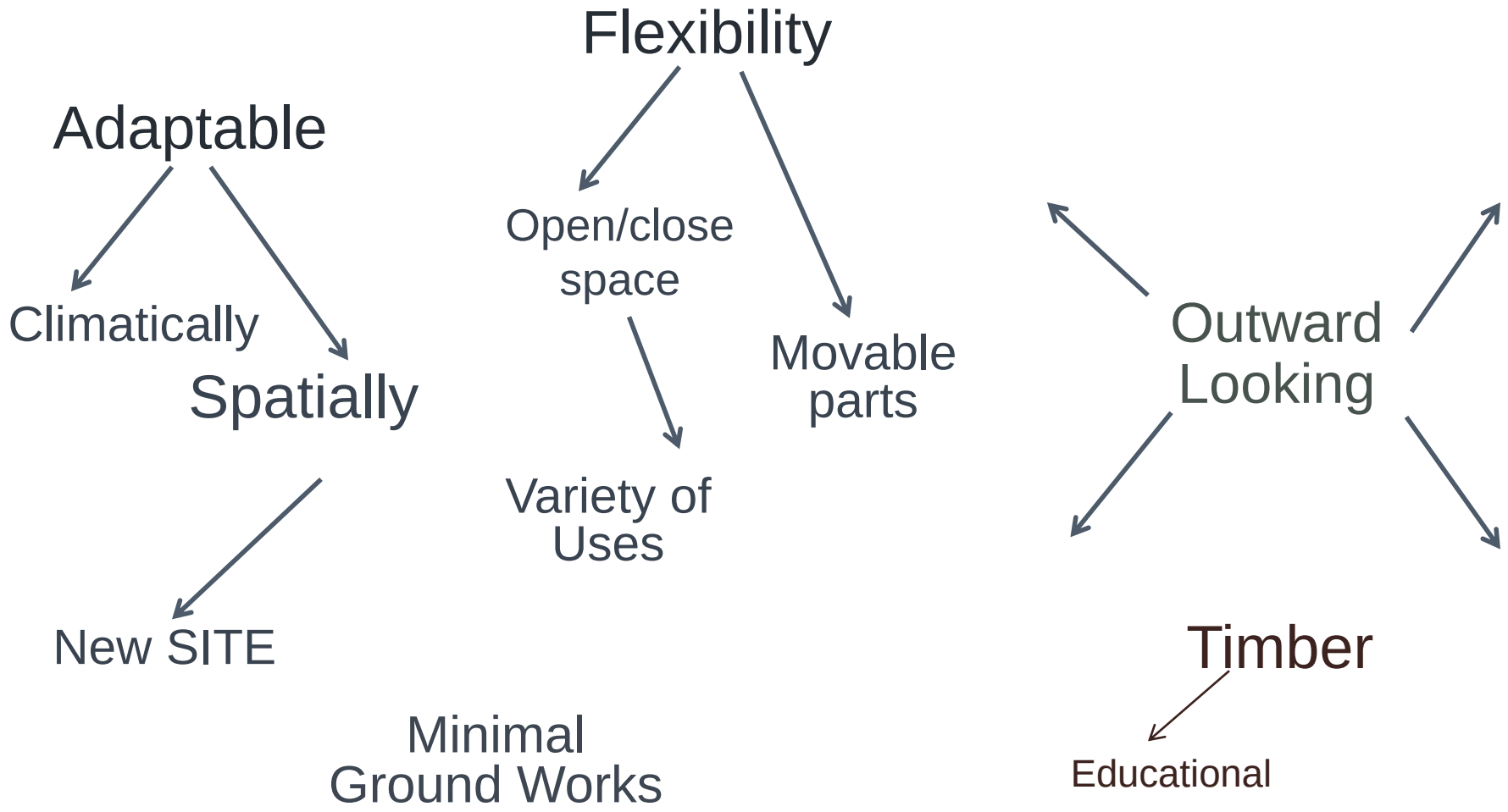
Host Firm-BDP

Serpentine Pavilion

Process



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BDP sustainability checklist

	Type	Details	Resouces displaced	Spatial issues/ location	Planning issues/ (inc noise)	Maintenance requirement	Educational potential	Potential percentage energy saving (in the North Pole)	Estimated capital cost	Life span (years)	CO2 saving potential	Potential for CUT
Energy	**Wind**	 Post mounted or building mounted vertical or horizontal wind turbine.	Power/ Electricity	Not considered due to the lack of suitable site space. Flicker and noise may also cause nuisance on the surrounding neighbourhood.		Not considered	Not considered	Not considered	Not considered	Not considered	Not considered	
	Solar Hot Water Panels	 A roof mounted evacuated tube or flat panel solar collector array linked to a hot water cylinder to act as preheat for a direct fired gas water heater.	Hot water/ gas - serving kitchen, WCs and potentially sports centres. To be integrated with the absorption cooling system	Roof/ façade	No, but visible panels should be indicated on planning submission.	Minimal cleaning as per windows, minimal pump maintenance	Good, if visible	100% of hot water if required	Low	20	High	
	Photovoltaic Panels (PV)	 A roof mounted or building integrated PV array (building façade or atria roof) - Mono/Polycrystalline 12-15% efficiency approx; (Thinfilm 7% efficient approx)	Lighting/ Electricity	Roof/ façade	No, but highly visible panels should be indicated on planning submission.	Minimal cleaning as per windows	Good, if visible	0.50%	High	25	Medium	
	Ground Source Cooling (GSHP)	 Vertical closed loop boreholes using the ground as heat source/sink. A heat pump(s) provide(s) heating and/or cooling.	Cooling/ Electricity	Careful consideration of entry to building plant areas is required. Ground conditions need to be confirmed.	No	As per standard watercooled chiller	Poor, not visible	Depends on the ground conditions	Depends on the ground conditions	30	Low	
	Biomass Boiler (heating only)	 A load wood pellet biomass boiler (supported by high efficiency gas boiler) providing heating to the building. Biomass fuel store to be installed close to the boiler.	Not considered feasible due to low base heating load and low biomass availability on Cyprus.		Not considered	Not considered	Not considered	Not considered	Not considered	Not considered	Not considered	
	Biomass Boiler (heating and DHW)	 As above but providing domestic hot water load in addition via hot water storage calorifiers.	Not considered feasible due to low base heating load and low biomass availability on Cyprus.		Not considered	Not considered	Not considered	Not considered	Not considered	Not considered	Not considered	
	Earth Tubes	 Buried concrete pipework used as intake route for incoming air, steady temperature of ground and contact with thermal mass tempers the incoming air.	Cooling/ Electricity	Concrete pipes 1-1.5m dia buried under ground. 2-3 bends for turbulance and heat transfer 1-1.5m cover to top of pipes	No	Minimal internal cleaning.	Possible if visible intake vents.	#REF!	Medium	30	High	
	Combined Heat and Power (CHP)	 Generates electricity more efficiently than grid electricity while recovering the waste heat as hot water.	Not considered feasible due to low base heating load.		Not considered	Not considered	Not considered	Not considered	Medium	Not considered	Not considered	
	Microclimate Cooling	 The microclimate cooling strategy includes cooling effects from evaporation from trees, grass and water spray systems.	Cooling/Electricity	External landscape	No	Generally as per external gardening. Spray systems may need maintenance in an annual basis.	Evaporative cooling effects may be studied in engineering courses.	#REF!	Medium	20 years for the spray system.	Very high	
	Solar Absorption Cooling	 Roof mounted evacuated solar tubes heat water to power an absorption chiller for cooling.	Cooling/ Electricity	Roof space for solar collectors, plant space for buffer vessel, absorption chiller and heat rejection cooler	No, but visible panels should be indicated on planning submission	Minimal cleaning as per windows, minimal pump maintenance, maintenance regime as per standard watercooled chiller	Reasonable if solar panels visible	#REF!	Medium	20	Medium	
	Green Roofs	 Planted roof to attenuate rainwater, add to biodiversity, reduce heat gain to building.	Cooling/ Electricity	Non accessible roof	No	Once a year	Good, if visible.	#REF!	Medium	If properly maintained life span can be as long as the building's.	High	

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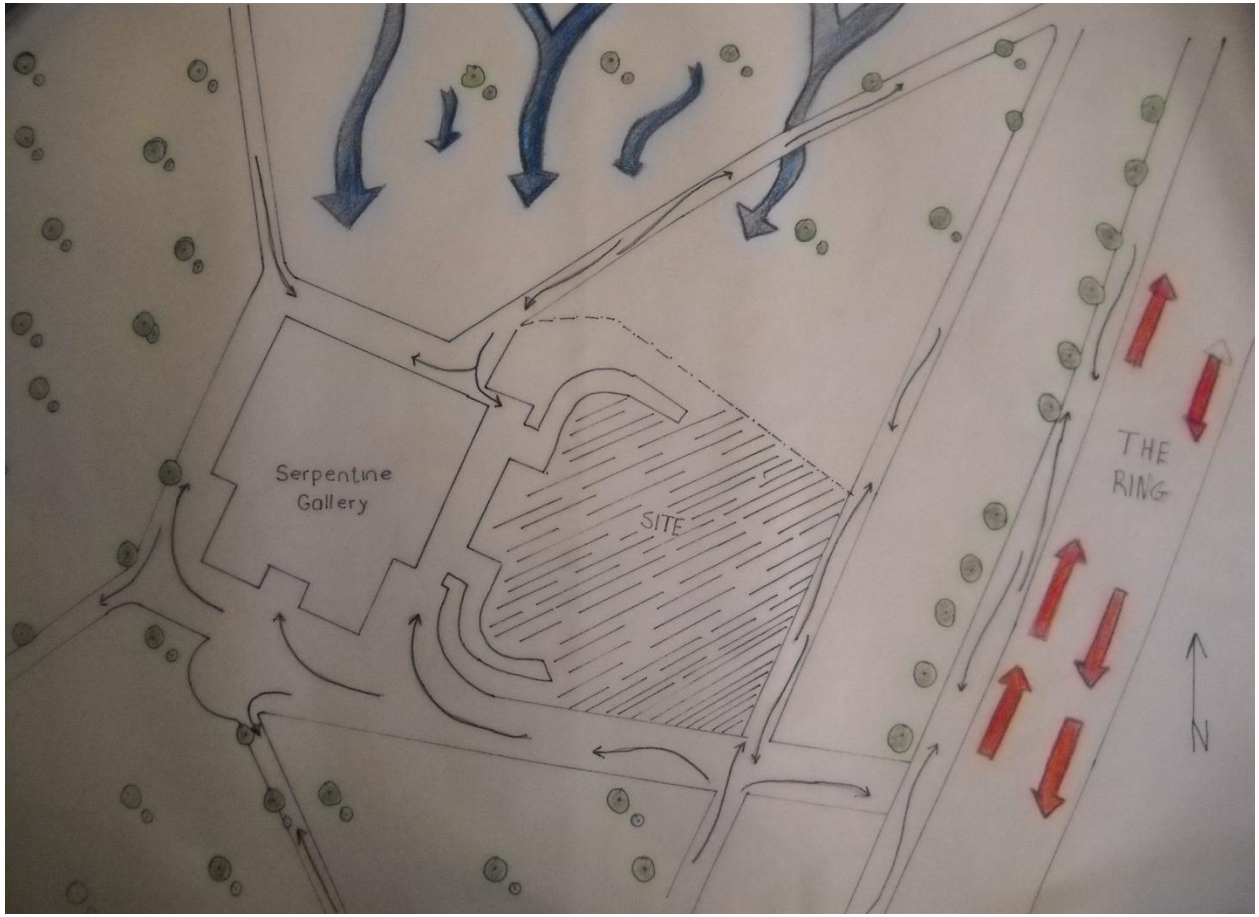
Site Analysis



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Consultants

James Hepburn- environmental engineer

- Dry compost toilet and other fixtures
- Materiality: nano-gels
- Leaving a legacy to minimize ground works

Mark Bax- architect

- Carbon neutral does not exist

Cathy Bishop- civil and structural engineer

- Foundation types
- Uplift consideration

Paul Driscoll- acoustician

- Desired outcomes of the spaces

Ellie Coombs- lighting designer

- Day lighting vs. artificial lighting
- Ambient lighting
- Lighting products
- Event considerations

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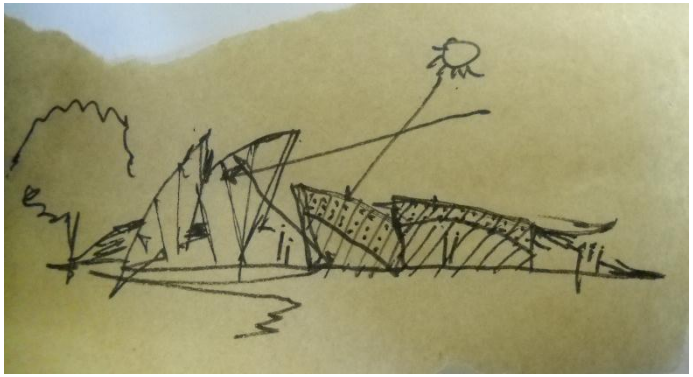
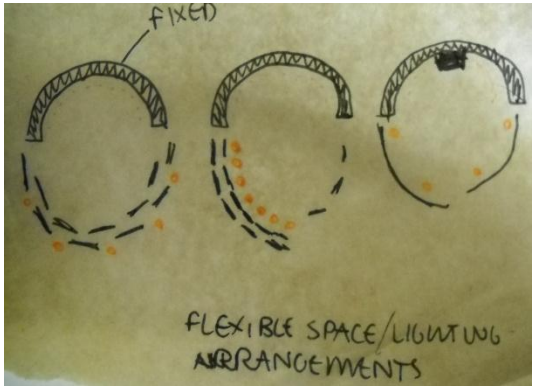
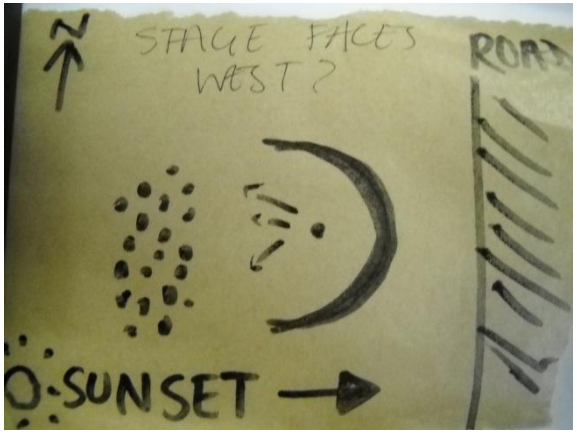
Final Design Criteria





An exercise that allowed us to quickly talk about and filter all of our ideas, surprisingly many of them had common features: sound protection, flexibility etc.



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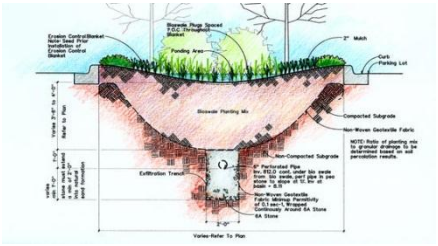
Final Design Criteria

Earth Mound

- To provide site protection
- To utilize the displaced site soil



Acoustic Barrier

- Dissipate traffic noise by up to 40 DB

Bio-Swale

- Manage all storm water on site

Light Weight vs. Heavy Weight

- Heavy base with a light weight canopy

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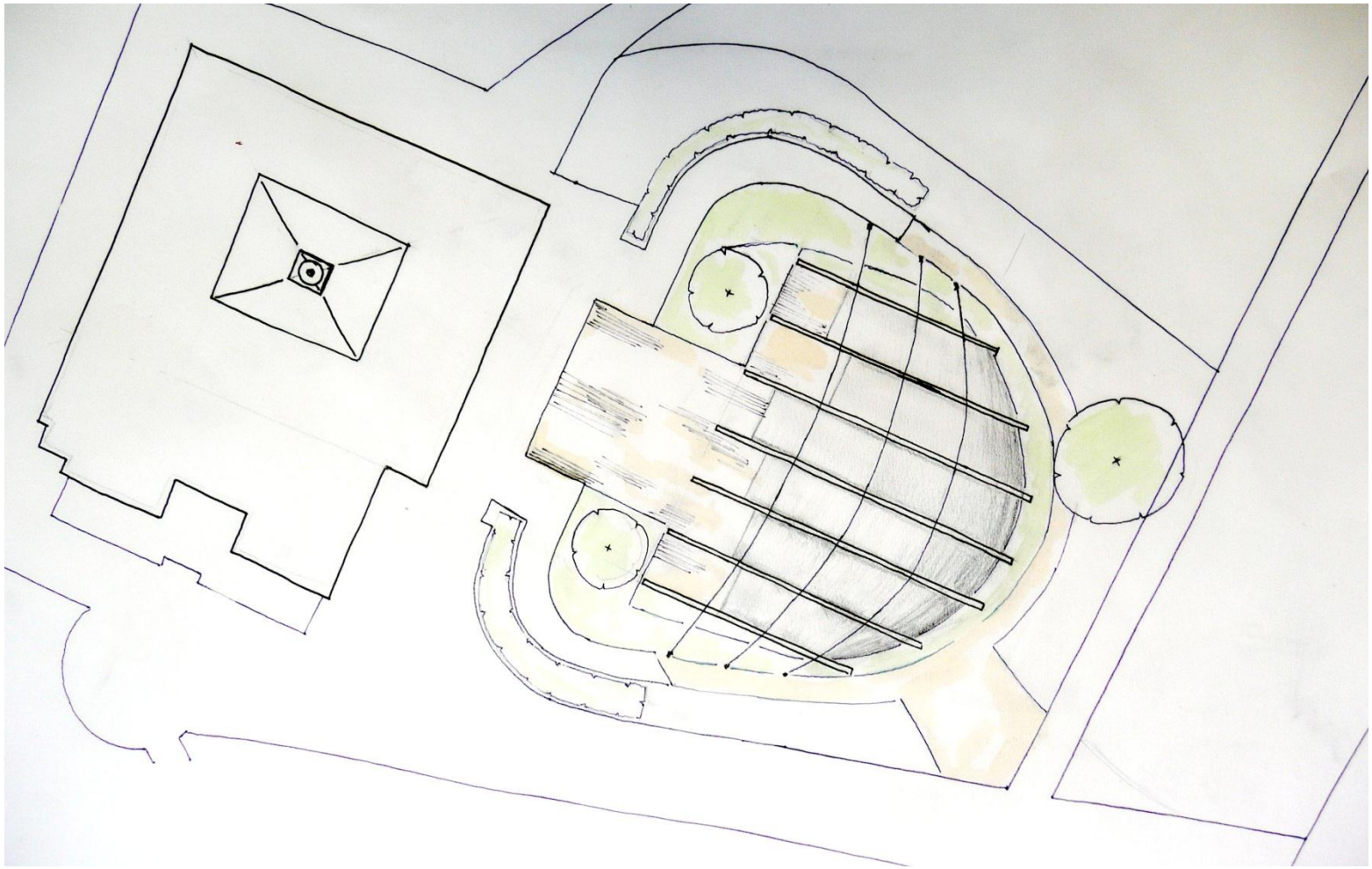
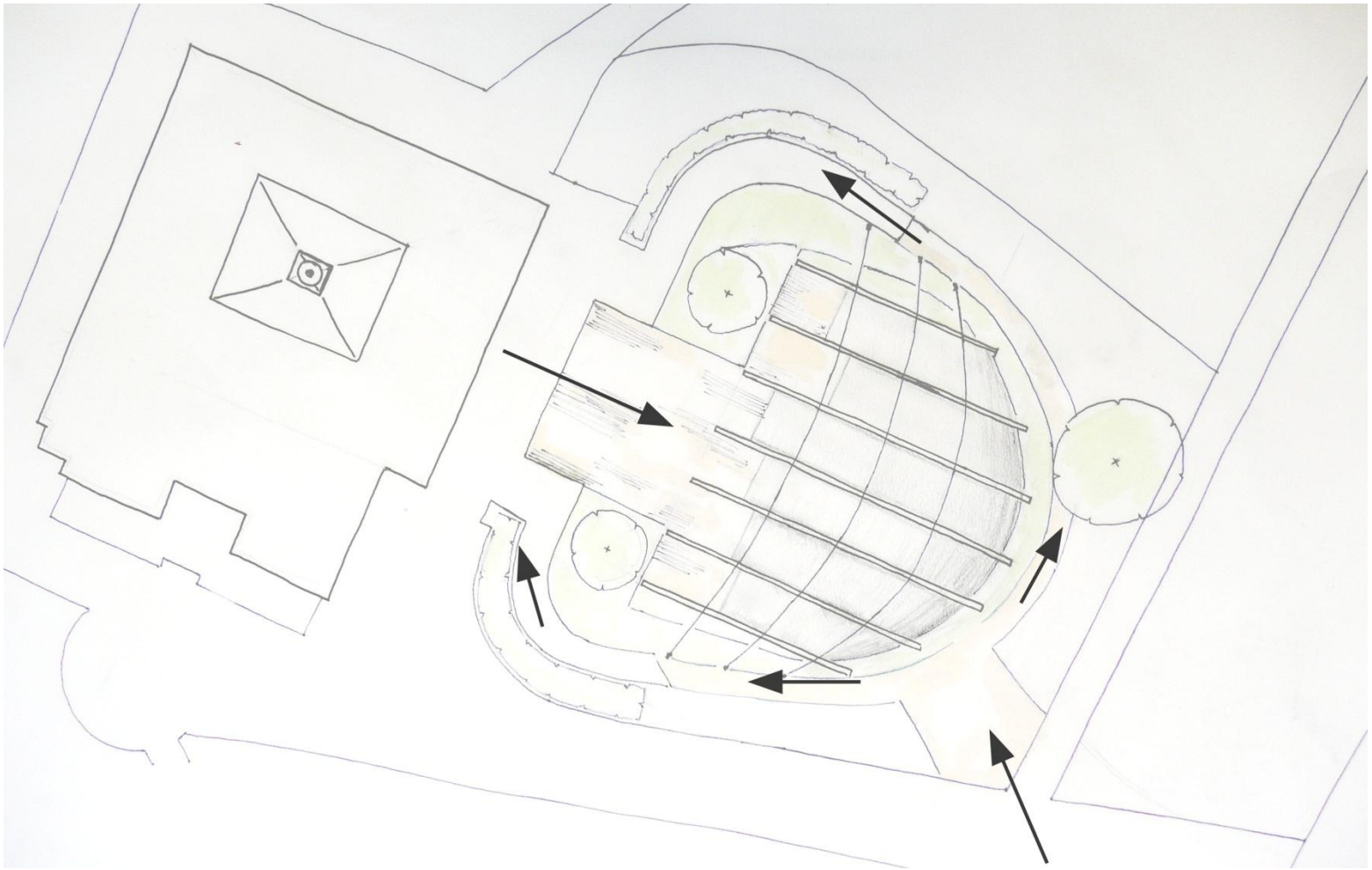
Aerial Plan



- Circulation Diagram



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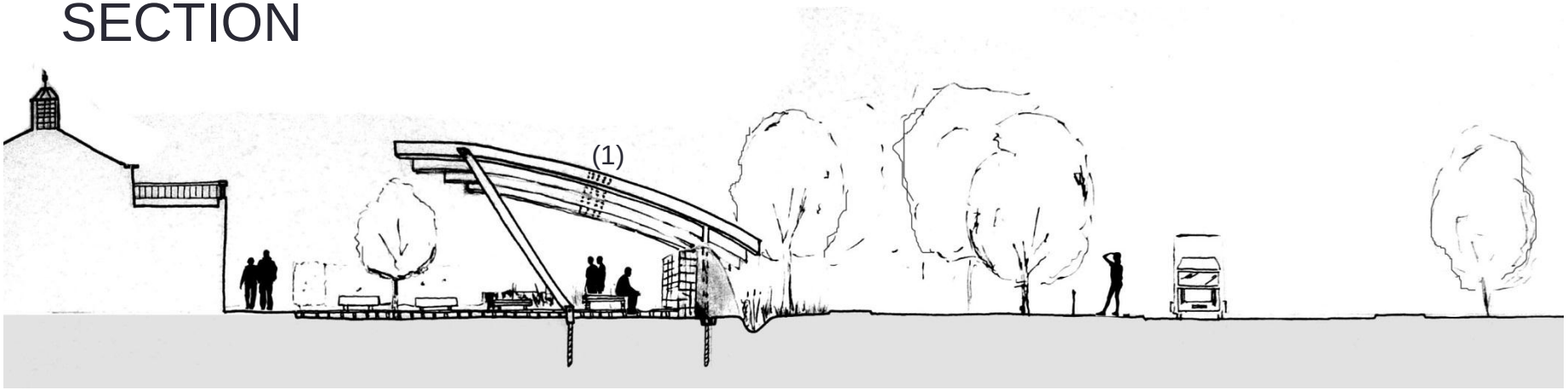
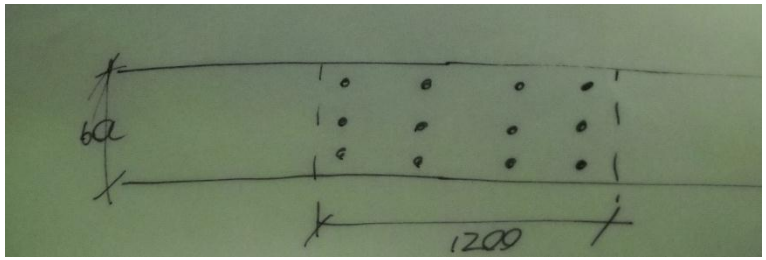
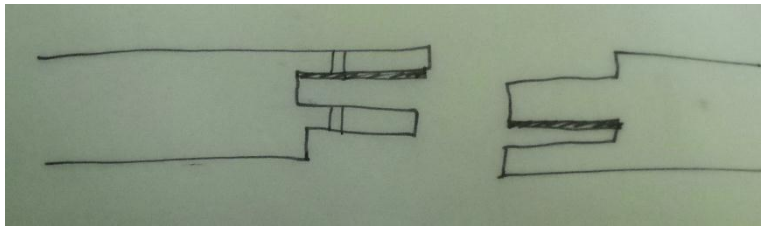
SECTION



DETAILS

1





Glulams are delivered to site in pieces and must be bolted together

There connections ensure that the pieces are a manageable size to deliver to the site and be removed from the site

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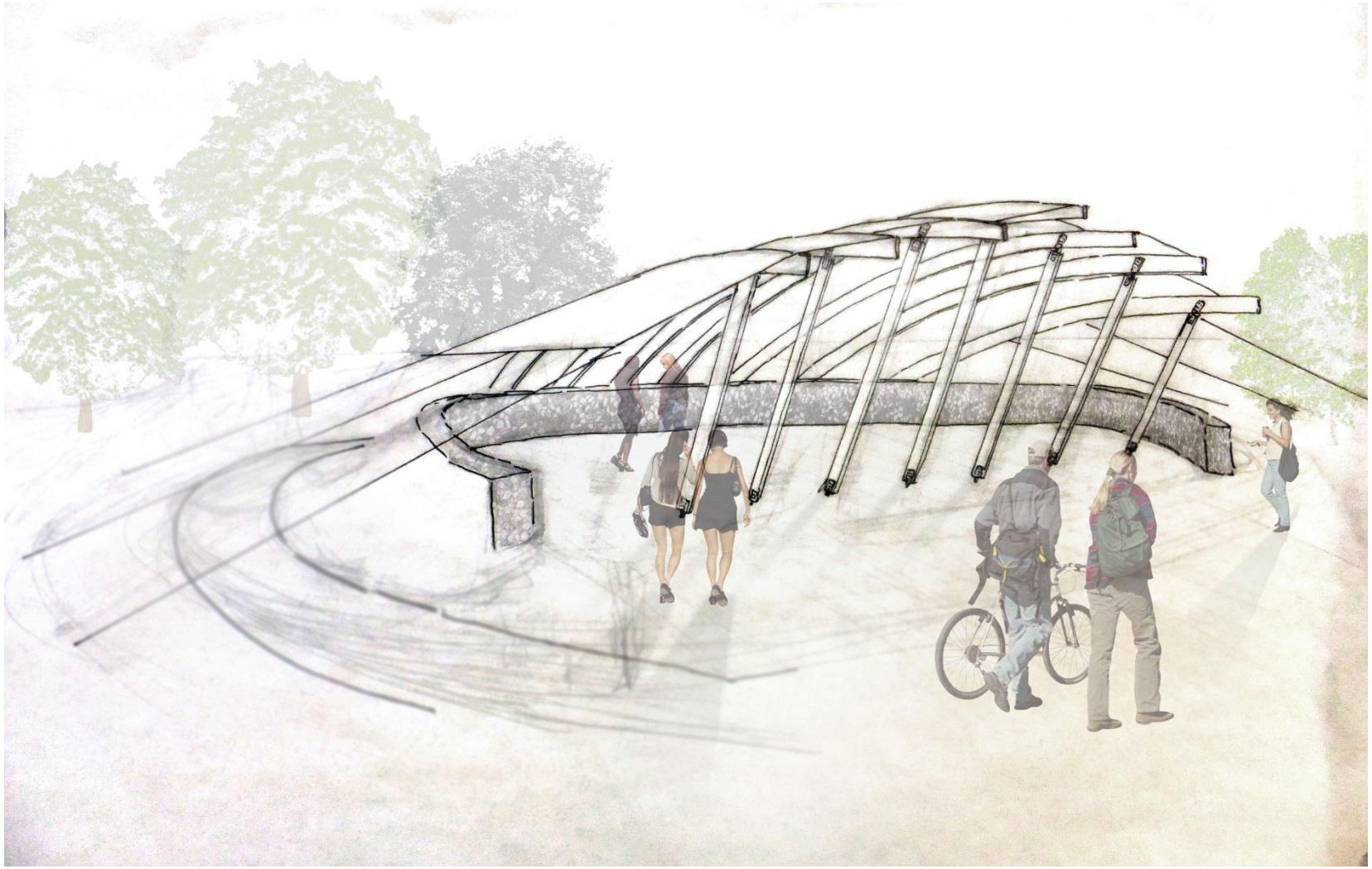

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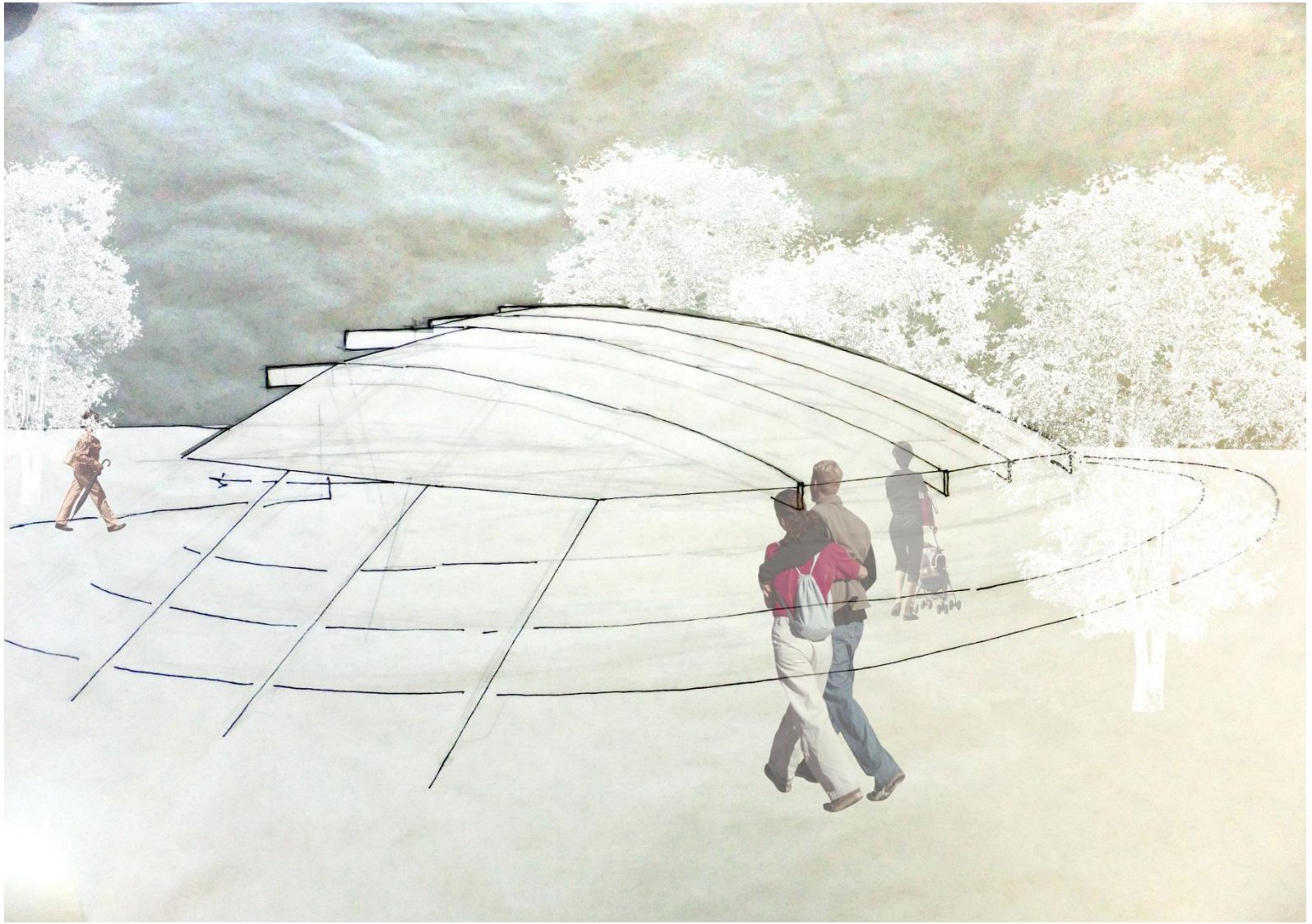

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Features and Sustainability

Water Management

- Treat rainwater runoff through a bio-swale
- All water required for events shall be provided through the Serpentine Gallery

Orientation

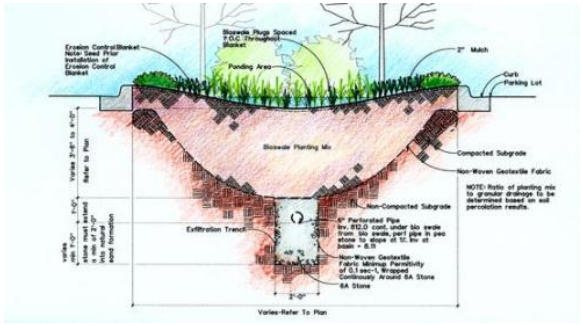
- Flexible features to respond to sun paths on this and other sites

Materiality

- Gabion Wall
- Glulam timber
- Light recycled hemp canvas (retractable)

Lighting

- Primary lighting will be direct solar lights
- Event lighting shall be provided from outside source



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Special Thanks to BDP

Especially:

James Hepburn- environmental engineer

Mark Bax- architect

Cathy Bishop- civil and structural engineer

Paul Driscoll- acoustician

Ellie Coombs- lighting designer

Vanessa