Sustainability Report

Taree Pitt Street
Waterfront Masterplan

ARUP

Suters Architects

Pitt Street Waterfront Masterplan

Sustainability Report

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Contents

1 Introduction

A project team has been appointed to plan and design a unique site on the banks of the Manning River at Taree NSW. The project is known as the Pitt Street Waterfront Precinct, with the appointed project team being led by Suters Architects.

The Greater Taree City Council want to ensure the 22 ha site is developed in a manner that incorporates sustainability throughout all stages of development (including masterplanning, detailed design, construction and operation).

The project team encompasses both the public sector and private companies, being assisted by Sinclair Knight Merz project management. Greater Taree City Council is represented by the senior planning officer with three land owners (Chase property developers, Stacks law firm in Taree and the owner of the Big Oyster site) representing the three large landholdings which form part of the Pitt Street waterfront precinct site.

Sustainability on the project has been guided by a three tiered approach:

- NSW government policy on sustainability (BASIX and the draft Mid North Coast Regional Strategy)
- Greater Taree City Council and the three land owners commitment to sustainability and their corporate sustainability policy (if in existence)
- Project specific sustainability initiatives developed by the design team.

The Pitt Street Waterfront site

2 About the Project

The Pitt Street Waterfront project is positioned on the Manning River foreshore between the city centre and the leisure/entertainment precincts of the regional centre of Taree, approximately 350km north of Sydney. The site covers approximately 20 hectares.

The masterplan for the site includes a mixed use development, maintaining significant areas of green space along with a marina, residential areas, retail and commercial development. Key features of the masterplan include the significant heritage buildings from the sites dairy history which are to be adaptively reused, the remediation of the degraded waterfront and creekline, the improvement of public access to the river, the inclusion of a riverfront marina and the linkage of the site to the Taree CBD via a riverfront walkway and cycleway.

The site presents the opportunity for many beneficial outcomes for the city with the project likely to showcase sustainability initiatives in a market where sustainability objectives have not been applied extensively before.

3 About the Report

As part of the sustainability co-ordinator role, Arup developed a sustainability action plan for the project masterplan which sets out a vision for the site and a set of objectives to guide decision making. The action plan aimed to ensure sustainable outcomes were delivered throughout the masterplan process.

This sustainability report assesses the draft masterplan against the objectives stated in the sustainability action plan, while also including guidance for the next steps in project planning such as the DCP.

An assessment against the sustainability action plan is included in Section 5.1.

4 Sustainability Background

4.1 What is Sustainability?

Sustainability (and sustainable development) has emerged as a unified movement with a significant response being made by government and industry. The Rio De Janeiro Earth Summit in 1992 was a key event in promoting the goals of sustainability to a world wide audience, and since this time there have been numerous meetings around the world to address sustainable development. Ten years on from the Rio conference, the World Summit on Sustainable Development (WSSD) was held in Johannesburg, South Africa in 2002. The results of this summit have carried on the movement of sustainability into the 21st century. A key outcome of the WSSD was the need for government to take a stronger role in facilitating and promoting sustainability principles in its activities and outcomes and to provide leadership to industry and the community.

The most commonly quoted description of sustainable development is taken from Gro Harlem Bruntland's 'Our Common Future' 1987;

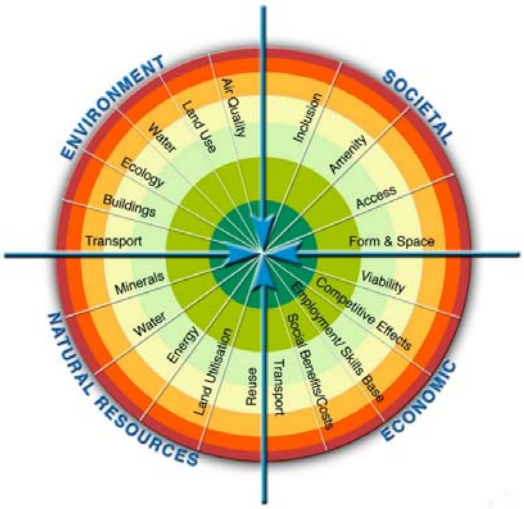
"Sustainable development is development that meets the needs of the present without compromising the ability for future generations to meet their own needs."

4.2 Measuring Sustainability with SPeAR®

Arup's Sustainable Project Appraisal Routine (SPeAR®) is a tool that is used to qualitatively assess the sustainability performance of a project, plan or development. It can be used to compare scenarios and demonstrate continual sustainability performance improvement through the life of a project.

To ensure its robustness, SPeAR® includes a core suite of sustainability indicators that have been refined over recent years. It has been tested on masterplans, preliminary designs and detailed designs of subdivisions, buildings, bridges, roads and other infrastructure.

The SPeAR® appraisal provides scores against a range of sustainability indicators defined in the four key areas of environment, social, economics and natural resources (the four quadrants of the SPeAR® diagram).



The SPeAR Appraisal undertaken for the Pitt Street Waterfront Precinct (Section 5.2) has been made via a simplified scoring system of 1- 5 with 5 as the highest. The scores are allocated according to the following;

Score	Colour	Explanation
5	Dark Green	World best practice
4	Light Green	Well beyond regulatory requirements and industry standard
3	Yellow	Regulatory compliance / at or slightly above expected Australian industry standard
2	Orange	Considered, with significant room for improvement
1	Red	Not considered / a poor sustainability outcome

4.3 Sustainability Workshop

A sustainability workshop for the project was held on Thursday 15 November 2007 at Arup's office in Sydney.

The purpose of the workshop was to harness participants understanding of sustainability issues, identify initiatives already being incorporated into the masterplan and identify gaps where further attention may need to be focussed.

As masterplanning had already commenced, discussions ranged from those at a high strategic level examining broad concepts to some more detailed features or initiatives. It was not the intention of the sustainability workshop to design; rather it was focussed on the process of addressing sustainability.

The following people participated in the sustainability workshop:

- Vaughan Lynch, Architect (Suters Architects)
- Georg Petzold, Landscape Architect (McGregor Partners)
- Peter Marler, Planner (Asquith & DeWitt)
- Louise Unicomb, Water Engineer (Arup)
- Stuart Hood, Environmental Engineer (Arup)
- Georgia Vitale, Urban Planner (Arup)

4.3.1 Key Design Issues

The team discussed their own interpretation of the client's vision regarding sustainability, with much of the focus on energy, water and waste. SPeAR® indicators were used as a prompt for each workshop participant to consider what they consider to be the key sustainability design issues.

Key issues were:

- Transport – cycling, live and work on site, private bus system
- Materials – crush existing concrete for reuse in landscaping on site, recycling of buildings and timbers (benches and boardwalks)

- Waste – community garden using compost, recycling, reduction to landfill
- Cultural heritage and ecology – rehabilitation of habitat for frogs, retention of figs (microclimate), remediating river banks, 100% native vegetation for new landscaping, retention and reuse of buildings, interpretation of elements, protection of indigenous heritage.
- Energy – going beyond BASIX
- Social – affordable housing, community facilities, access to local facilities, adaptable housing

4.4 Sustainability Action Plan

Following the sustainability workshop, Arup developed a sustainability action plan. The action plan was structured to:

- Establish sustainability objectives
- Underpin objectives with potential initiatives to support delivery
- Identify the phase of the project for delivery
- Allocate actions to developer, designer, planner, contractor or occupier.

The sustainability action plan was distributed to the design team to aid the masterplanning process. The sustainability action plan as presented at concept design has been used as a basis for assessing sustainability performance in the draft masterplan (Section 5.1). Performance is presented against the numerous objectives under the four sustainability quadrants of Environment, Natural Resources, Social and Economic.

The key elements of the sustainability action plan as used in development of the masterplan and scoring in the SPeAR appraisal are shown below. The objectives of each of these elements and performance against each objective are included in Section 5.1

Environment	Ecology Water Quality Management Site Climate Design	**Societal**	Community Transport Health and Welfare Heritage Amenity Access
Natural Resources	Land Use Energy Reduction Materials Waste Water Reduction	**Economic**	Planning Employment Viability Innovation Security

5 Sustainability in the Masterplan

5.1 Sustainability Performance

The following table aims to achieve a number of outcomes;

- Tracking the objectives of the sustainability action plan
- Assessing performance of the masterplan against previously decided objectives
- Providing sustainability guidance to inform the DCP and next stages

The Element, Objective Statement and Action columns in the table are sourced from the Sustainability Action Plan (with some minor edits to wording of the Objectives Statements and Actions).

The Project Phase column relates to the applicable project phase for each Objective.

The Projected Outcome column includes a description of how the masterplan has met the agreed Action and/or an assumption on how the next steps (e.g. DCP) will address the Action.

The Score column includes a score made for the SPeAR® appraisal (see Section 5.2) and is based on all aspects of the Projected Outcome being met. The Score ranges from 1-5, with 5 the highest (see Section 4.2).

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
E		**Environment**					
E	**1**	**Ecology**	Retain and enhance terrestrial and aquatic biodiversity	Areas of high biodiversity are identified and retained and enhancement strategies are implemented.	Planning and design Construction Operation	Remediation of creek and adjoining green space with 100% native species. Ecological habitat created via detention pond and biofiltration features. Minimal removal of existing mangroves Requirement in DCP for a comprehensive Landscape and Environment Strategy for the site	4
E	**2**		Enhance ecological links	Avoid land degradation. Revegetate the creek line and enhance waterfront vegetation	Construction Operation	Remediation of creek and adjoining green space with 100% native species with projected outcome the establishment of a diverse forest/ rainforest in this suitable area. Linkage of riverbank vegetation across site not achieved	3
E	**3**		Maximise native planting	Develop species palette of locally native and endemic species, reduce irrigation demands, minimise maintenance requirements.	Planning and design	Landscape Plan states 100% of vegetation planted to be locally native. Significantly increase native vegetation cover along creek line and existing vegetated areas. Increased planting of eucalyptus species in the Gateway Precinct	4
E	**4**		Creation of wetland habitat	Wetland created and maintained by slow feed of excess greywater/ stormwater	Planning and design Construction Operation	Wetland habitat associated with the detention pond, creek and bioswales. Approximately 2% of a catchment area is required to provide effective biofiltration. Existing low flow areas in the creek require retention/improvement	4
E	**5**		Establish green roofs/vegetated roofs on appropriate buildings	Maximise habitat value associated with buildings (rooftop garden/vegetated roofs)	Planning and Design Construction Operation	May or may not be a sustainable outcome dependent on other potential uses of roofs (e.g. photovoltaic cells). To be evaluated during detailed design	NA
E	**6**		Minimise erosion to protect habitat and reduce stress on natural water systems	Preserve steep slopes in a natural vegetated state	Planning and design Construction	Bioswales proposed in drainage lines as filter and erosion protection. Mixture of hard edges and mangroves to protect erosion of riverbank	3

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
E	**7**	**Water Quality**	Water quality is maintained and enhanced	Water Sensitive Urban Design (including bio filtration) to be used to protect the creek and Manning River	Planning and design	Bioswales, detention pond and remediated creek to filter stormwater prior to release to Manning River. Suspended solid loads likely to be reduced over existing condition Requirement in DCP for a comprehensive Water Strategy for the site	4
E	**8**		Potential for waterway pollution reduction	Appropriate treatment devices such oil separators / inceptors or filtration for areas at risk from pollution are installed (e.g. car parks and waste disposal facilities), bio swales, river bank stabilisation and planting	Planning and design Construction	Stormwater treated via biofiltration and detention pond close to the entrance of the remediated creek. Approximately 2% of the catchment is required to be used for effective biofiltration. No treatment of flood event flows is proposed	4
E	**9**		Manage site hydrology to maximise aquatic habitat value	Include buffers around created wetland habitat	Planning and design	Natural hydrology managed due to creek vegetation, addition of detention pond, bioswales and paved surfaces in urban precincts. Overall improvement to aquatic habitat	4
E	**10**	**Management**	Habitats are maintained during operation	Create habitats that are self-sustaining i.e. require negligible maintenance, low water demand, and are not dependent upon high energy input and chemical pesticides	Planning and design Operation	Self sustaining slow release bioswales and creek habitat. Permanent habitat in detention pond. Responsibility for management and construction of these features yet to be determined	4
E	**11**		Environmental management to exceed regulatory compliance	Environmental Management Plans are developed and implemented (construction and operation) in accordance with best practice	Construction and operation	EMP guidelines (i.e. Section 4 of the NSW EMS Guidelines 1998) to be exceeded	3
E	**12**		Commitment to sustainability is demonstrated throughout the supply chain	Contractors to demonstrate sustainability commitment through procurement process (e.g. EMS to ISO 14001 preferred)	Construction	All contractors to be given documentation explaining the sustainability goals of the project. Agreement with the sustainability requirements of the EMP and DCP are to be sought	3

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
E	**13**		Provide a user guide	Provide a user guide for residential and commercial tenants explaining user behaviours which maximise the operational effectiveness / benefits of key sustainability elements	Operation	User guide to be distributed to site occupants by developer or GTCC	3
E	**14**	**Site**	Development within flood plain is avoided	Developable area should not adversely affect water flows. Flood plain development should be avoided	Planning and design	Flood studies continuing, assessment based on existing ARI 100 yr events. Development to occur on the floodplain with elevation of buildings on pier preferred. Some fill required	3
E	**15**		Site to fit contextually with surrounding area	Promote connections to surrounding communities	Planning and design	Street grid connection provided to surrounding Chatham community. Pedestrian and cycle link with CBD will promote walking and cycling access/connectivity	3
E	**16**		Development to be compact development	Maximise density of urban components of development	Planning and design	Medium density dwellings planned for urban zones will allow green space to be maximised. No low density residential proposed	4
E	**17**		Optimise Street Grid for Solar Access	Revisit masterplan grid for solar orientation on a grid by grid basis. Orient buildings on an east west axis	Planning and design	Solar access not a key factor in developing street grid and built form orientation	2
E	**18**		Optimise Street Grid for Wind	Maximise natural ventilation by aligning buildings to benefit from typical wind conditions on the site	Planning and design	View corridor extending from Lyndhurst Street aligned to channel river breeze. Significant open space allowance should allow for good airflow between urban buildings	4
E	**19**	**Climate**	Consider microclimate	Consider green walls to provide a cooler environment through evapo-transpirative cooling from plants and minimises reflection and absorption of radiant heat	Planning and design	Use of green walls to be favoured where microclimate benefit can be obtained	3
E	**20**		Heat island effect minimised	Maximise green space and landscaping and utilise light coloured roofing, provide open grid layout	Planning and design	Green space a key component of the site. Native planting throughout the median strip and urban area plus large areas of green space reserved along creek line. Roof colours and materials to be specified in DCP	4
E	**21**		Air quality considered at broad and local scales	No ozone depleting substances to be used in site construction and/or operation	Construction and operation	Include requirement for no ozone depleting substances in the DCP	4

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
E	**22**		Minimise airborne dust and particulate matter	Minimise airborne dust and particulate matter (construction and operation)	Construction and operation	Set guidelines for dust and particulates minimisation in demolition and construction. Example requirements may include covering of stockpiles, watering down demolition works, grass seeding and stabilisation of exposed earth, encapsulation of hazardous particulates (e.g. during asbestos removal)	3
E	**23**	**Design**	Incorporate appropriate innovative sustainable technologies	Consider new technologies in design	Planning and design	Review of latest technology for detailed design. Solar panels and hot water systems to be incorporated in development. A comprehensive grey water recycling and rainwater collection system to be incorporated in detailed design. Rain water collection to include individual residential water tanks. Grey water to be stored for irrigation purposes	3
E	**24**		Maximise the flexibility of the site and buildings	Site and building flexibility and adaptability to be considered during design (e.g. hydraulic and mechanical systems that can cater for increased / decreased loads and can be easily retrofitted with new technologies)	Planning and design Construction	Building design should be required to consider possible future uses and adaptability. Examples for possible change in use include commercial developments, office space and car parks	3
E	**25**		Minimise noise pollution	Consider noise sensitive areas both human and wildlife	Planning and design	All roads are to be low speed (40km/hr or less). Construction with low noise pavements to be investigated. Noise attenuation across river and towards existing Chatham residences from commercial precinct to be addressed in detailed design	3
N		**Natural Resources**					
N	**1**	**Land Use**	Maximise cut/fill balance	Minimise requirement for fill importation	Construction	Very large volumes of Fill removal likely to be required in construction of the marina. Fill importation may be required for certain stages of development, with a goal of cut and fill balance to be applied at all stages of project development	2
N	**2**		Remediate contaminated land	Any contaminated land to be remediated and contamination contained / remediated on site	Construction	Occurrence of contamination onsite yet to be discounted. Additional assessment likely to be required with remediation onsite to be undertaken as required	3

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
N	**3**	**Energy Reduction**	Maximise energy efficiency of buildings	Buildings on site to meet minimum energy performance levels	Planning and design	Building design and construction methodology not addressed in Masterplan. DCP to require that multi unit residential onsite must achieve Min 4 stars from the Green Star Multi Unit Residential Tool (yet to be released). DCP to also include specific building design requirements for commercial (Green Star and ABGR 4 star) and marina development. Note that 4 star ABGR is cost neutral for most commercial buildings Requirement in DCP for a comprehensive Energy and Carbon Strategy for the site	4
N	**5**		Maximise use of renewable energy	Incorporating renewable energy generation on site such as photovoltaics, wind power, hydro/ tidal power (associated with sewage treatment or Manning River)	Planning and design Construction	Solar energy preferred. Wind turbines, hydropower and waste to energy not feasible. Street lighting to be solar powered. Standard PV for street lighting requires $1m^2$ power cell to provide 100watts. Photovoltaics and solar hot water systems to be installed on roof surfaces where feasible. Solar hot water payback period approximately 5 years	4
N	**6**		Maximise use of daylighting in building design	Orientation of buildings with daylighting in mind. Incorporate skylights wherever feasible	Planning and design	Daylighting assessment for individual buildings included within GreenStar rating tools	3
N	**7**		Reduce peak energy demand	Investigate technology to reduce peak energy demand	Planning and design Construction Operation	Inclusion of energy metering and monitoring in DCP and design requirements. Energy metering and monitoring to supply real time feedback to community to allow peak energy to be reduced.	3
N	**8**		Maximise use of solar thermals	Use solar thermals for pools / spas and hot water	Planning and design Construction	Require solar hot water systems for applicable buildings (e.g. residential blocks)	4
N	**9**		Use smart energy metering	Install smart energy metering in residential and commercial to meter energy usage	Construction	Inclusion of energy metering and monitoring in DCP and design requirements	4

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
N	**10**	**Materials**	Minimise material use	Minimise use of new materials	Planning and design Construction	DCP to include materials specification. The steel rail line, concrete and timber from the site to be reused where possible	4
N	**11**		Maximise use of renewable and recycled resources	Materials to be from a renewable, reused or recycled source whenever possible, secondary / recycled aggregates used, all timber materials and products selected from sustainably harvested, managed and independently accredited sources	Planning and design Construction	Sustainable materials are to be specified in design and construction. DCP to include requirements for sustainably harvested timber, recycled rubber and gravel, concrete and steel with recycled content	4
N	**12**		Minimise embodied energy	Incorporate basic embodied energy considerations into decision making e.g. reduce freight, prefer rail to road freight, prefer lightweight to heavyweight	Construction	Address to some extent in DCP (e.g. materials specification)	3
N	**13**		Maximise use of local materials	Maximise use and sourcing of local materials wherever possible to minimise the embodied energy, reduce building cost and environmental impact	Planning and design Construction	Include within materials specification in DCP	4
N	**14**		Specification and supply of materials	Material specification and purchasing policy requiring suppliers to demonstrate their approach to sustainability (EMS, transport, employment, purchasing etc)	Planning and design Construction	Include materials specification in DCP. Preference local labour and materials when all else is equal, prohibit refrigerants with ozone depleting potential. Specify low VOC and low formaldehyde materials. Specify sustainably harvested timber and encourage use of materials which include reused or recycled content	4
N	**15**		Maximise use of naturally finished materials	Preference for selecting materials that do not need to be finished with materials such as paints to reduce the amount of embodied energy in that material and future maintenance	Planning and design Construction	Include objective of naturally finished materials in public spaces in construction and design documentation	4

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
N	**16**		Use low emitting materials (low VOC)	Low VOC paint will be important for exterior and interior walls. Other low VOV materials include carpets and textiles used in furniture	Planning and design Construction	Specify the use of low VOC materials in the design guidelines/DCP	4
N	**17**		Reuse heritage materials	Reuse heritage materials on site (e.g. railway line)	Planning and design Construction	Key purpose of the Dairy Heritage Precinct is to include refurbishment of unique heritage buildings. Uses in the area may include taverns, restaurants, markets, community facilities, museum, hotel and conference etc. The disused rail line to be adaptively reused in some form onsite	5
N	**18**	**Waste**	Maximise construction waste recycling	Majority of construction waste is to be sorted and recycled	Construction	Construction waste recycling target of 80% by weight to be specified. Include a preference for onsite reuse (e.g. crushed concrete for new paths) against offsite recycling Requirement in DCP for a comprehensive Waste Strategy for the site	4
N	**19**		Maximise operational recycling facilities	Provide waste and recycling receptacles in public access areas and common areas on the site	Operation	Provide recycling bins in appropriate areas. Supply waste bins adjacent to recycle bins to reduce contamination or the recycling stream. Monitor the collection and contamination rates and adjust bin locations accordingly	3
N	**20**		Consider ease of deconstruction in design	Consideration is made for the disposal or reuse of materials at the end of their use	Planning and design	Preference modular design which allows for ease of deconstruction. Include materials specification in DCP with recyclability to be a key deciding factor in material selection	3
N	**21**		Recycle green and organic waste for composting and topsoil generation	Vegetated waste to be collected and composted either on site or at a district wide facility. Integrate with community garden	Planning and design Construction Operation	Green waste collection points to be regularly dispersed throughout the precincts. Regular collection and composting at a central compost facility (adjacent to community garden). Organic waste to be collected separately from major generators (e.g. growers market).	4
N	**22**		Maximise integrated fitout	Reduce material wastage during tenancy fitouts	Construction Operation	Encourage integrated fitout of commercial developments in the DCP	4
N	**23**		Minimise the amount of hazardous / special waste generated	Ensure hazardous/special waste is not generated and / or is disposed of properly	Construction	Asbestos roofing (e.g. Heritage Precinct) and other hazardous material will require removal from site. Due diligence and OHS procedures to be followed in their removal	3

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
N	**24**		Establish and encourage composting	Allocate areas for communal composting facilities, collect organics from residential and commercial sources onsite	Operation	Residential units to be supplied with individual compost collection units (e.g. Bokashi Bucket), for inclusion of kitchen scraps and organics (no meat). Centralised collection point for each building and removal to composting facility	4
N	**25**		Establish recycling strategy for users	Develop a strategy for recycling in partnership with Greater Taree City Council	Construction and operation	Develop a strategy with GTCC. Strategy to address all waste collection and community composting, recycling in public spaces, kerbside recycling and waste collection	3
N	**26**	**Water Reduction**	Water efficiency	Highly water efficient through construction and operation. Design specifically to avoid / reduce the need for water consumption. Water efficient operations, fittings, smart meters	Construction Operation	Greywater recycling onsite, requiring purpose built plumbing system. Irrigation from rainwater to be directed to storage tanks and utilised for irrigation and personal use. Specify at least 3.5 star rated water efficient fittings (Australian Water Efficiency Labelling Standards) on all new and refurbished buildings	4
N	**27**		Harvest rainwater	Collect rainwater from commercial and residential roofs. Use for irrigation and personal use	Planning and design Construction Operation	Rainwater to be harvested from rooftops and directed to storage tanks for personal use and irrigation	5
N	**28**		Certify low water turf for fields / lawns / landscaping	All turf should be low water use	Construction	All landscape grass species to be native. All turf to be low water use varieties (and will be irrigated with recycled greywater and rainwater)	4
N	**29**		Reduce flow to sewer	Maximise grey water treatment and reuse on site	Planning and design	Greywater to be recycled onsite. Requirement for greywater recycling plumbing system on each building (divert water from kitchen and laundry). Educate community in use of biodegradable soaps and warn against toxics disposal in kitchen sinks and laundry	4
N	**30**		Undertake water monitoring	Install water conservation devices and monitor water consumption for all uses	Construction Operation	Requirement for metering and monitoring of major water uses in Design Guidelines/DCP.	4
N	**31**		Landscaping water reduction	Use non-potable water and / or water efficient delivery systems	Planning and design Operation	All irrigation sourced from greywater recycling and rainwater. Minimal irrigation is likely to be required once landscaping is established due to native plantings and incorporation of bioswales in landscape	5

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
N	**32**		Reduce reliance on potable water	Rainwater and catchment reuse through rainwater harvesting from roofs	Planning and design Construction	Potable water reduction to be greater than 50% due to 3.5 star (WELS) rated water fittings and rainwater and capture for household usage. Include 80% as a target for water consumption reduction against normal case	4
N	**33**		Consider sewer mining	Investigate potential for sewer mining for treatment and use on open spaces	Planning and design	Not implemented due to inappropriate scale of the development	2
N	**34**		Use pervious surfaces to maximise groundwater recharge	Use surfaces such as pervious pavers, reinforced grass pavings and porous concrete	Planning and design Operation	Pervious surfaces to be used in median strips, as part of bioswales and in paved areas and carparking if possible	3
S		**Social**					
S	**1**	**Community**	Maximise community facilities	Majority of key facilities e.g. shops, banks and post office to be easily accessible. Good range of high quality key facilities affordable to all e.g. retail, fresh food, child care, commercial etc in the vicinity	Planning and design	Figtree Commercial Precinct and Dairy Heritage Precinct to include a variety of services and entertainment. The masterplan is designed to allow easy walking and cycling access from residential areas to the central commercial areas. Linkage to CBD via walkway Requirement in DCP for a comprehensive Healthy Community Strategy for the site (inclusive of all elements in the Social category)	5
S	**2**		Include public art	Incorporate high quality community art programs into public spaces and buildings.	Planning and design Construction	Significant opportunities for public art. No specific sites for public art have been identified in the masterplan. GTCC or developers to investigate opportunities at a later stage	3
S	**3**		Provide appropriate housing	Provide diverse housing with a diversity and density appropriate to need	Planning and design	Housing to be of medium density, and of differing design and height. No discussion of affordable housing in masterplan	3
S	**4**		Design to increase use of recreational space	Encourage access to nearby recreational facilities through design	Planning and design	Recreational space to be incorporated in the green space along creekline. Walkways, cycleways, passive recreation areas, playground and community garden all proposed. Layout to be confirmed in detailed design	4

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
S	**5**		Incorporate open spaces and encourage linkages to surrounding precincts, green spaces and natural places	Ensure public spaces are accessible, safe, functional and appropriate for the needs and lifestyle expectations. Provide access to quality green space and natural space	Planning and design	Significant open space and public space. Walkways and cycleways to link site with the river, green spaces, the CBD and the recreation ground. Design incorporates existing residential areas and encourages linkages	4
S	**6**		Incorporate an Urban Farm/Community Garden	Utilise low lying area for farm. Opportunity to combine with proposed growers market	Planning and design Construction Operation	Community garden to be located in open space area behind the Riverpark Village Precinct. Compost to be created from residential and commercial organic and green waste	5
S	**7**		Site river education centre	Investigate educational/sustainability/ community information possibilities on site	Planning and design	Further investigation required, no details included in the masterplan	2
S	**8**		Maintain community / social identity	Enhance the physical or social context of the precinct by encouraging social identity e.g. through interpretation, cultural celebration	Planning and design Operation	Achieved via heritage reuse, extensive community consultation and inclusion. Include interpretive signage onsite detailing site heritage	4
S	**9**		Involve the community	Through consultation, participation, information sharing, education and feedback mechanisms.	Planning and design Construction Operation	Community consultation program has been held, inclusive of 3 community information sessions and a site open day. Community feedback regularly sought during planning	4
S	**10**		Minimise light pollution	Consideration given to rights of light both within the precinct and for neighbours	Planning and design	Require that rights of light are considered in street lighting design	3
S	**11**	**Transport**	Encourage public transport	Maximise available public transport and make provision for increased services in the future	Planning and design	No provision made for bus transport in the masterplan, however pedestrian links to existing bus route (Manning River Drive) have been incorporated. Rail transport is not feasible	2
S	**12**		Allow for safe and efficient pedestrian and cyclist mobility	Design appropriately sized and placed pedestrian and cyclist paths. Provide a safe and continual pedestrian and cycling path along the entire length of the project	Planning and design	Major cycleway and walkway along riverfront and through green space. Adaptive reuse of rail cutting and addition of bridge across Browns Creek to form link with the CBD.	5

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
S	**13**		Allow for alternative vehicles	Provision to be made in design for alternative fuel vehicles	Planning and design	No allowance made	1
S	**14**		Maximise cyclist facilities	Provide facilities and maximise opportunities for cycling. Provide undercover bike parking	Planning and design	Commercial precinct to include appropriate cyclist facilities. Bike stands in public zones are required to encourage cycling to the precinct	3
S	**15**		Minimise car park size and number	Reduce the number and size of car parks	Planning and design Operation	Numerous car park configurations investigated. Reduction of spaces not a key goal, however no significant carparks are included in the masterplan	3
S	**16**		Provide bikes bundled with homes	Include bikes as part of home package	Planning and design	Encourage bicycles as part of home packages in the Design Guidelines/DCP	4
S	**17**		Consider traffic safety	Servicing vehicles have nominated locations for loading and unloading	Planning and design Operation	Existing intersections to be upgraded through lane configurations and traffic signals. Roundabouts to control flow through the site. A low speed limit (<40km/h) to be set	4
S	**18**	**Health and welfare**	Consider public health and safety in design	Create public space for passive or active recreation	Planning and design	Significant green space to include recreation areas (playground, walkway and cycleway and passive recreation areas)	4
S	**19**		Crime Prevention through Environmental Design. Enhance natural surveillance and security within the public realm	Minimise secluded areas, incorporate passive surveillance, install security systems, CPTED, design active frontages	Planning and design Construction Operation	Security cameras and surveillance equipment to be investigated during detailed design. Target 90% coverage of public zones with security cameras. CPTED through integrated public and residential zones, open vistas and interconnectivity which increases passive surveillance	3
S	**20**		Provide local food outlets	Ensure easy and close access to food outlets (cafes, restaurants and market)	Planning and design Construction Operation	A growers market is proposed for the dairy heritage precinct in an adapted heritage building. Market is to supply locally grown fresh food. Cafes and restaurants are also planned for the commercial and dairy heritage precincts	5

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
S	**21**		Maximise local food production	Promote community based and local food production to minimise transport and increase direct access to fresh foods	Planning and design Construction Operation	Community garden to be established in green space behind the Riverside Village precinct. Green waste and organic waste to be collected from the development and used as compost for the community garden. Garden should ideally be divided into pre prepared plots raised above ground surface with residents renting the spaces for a low fee	5
S	**22**		Maximise adaptable housing	Dwellings to demonstrate adaptability for changing demographic needs	Planning and design Construction Operation	Adaptable housing considered but not incorporated in masterplan. Require guidelines for adaptable residential housing (e.g. for elderly) in design guidelines	2
S	**23**		Maximise indoor environmental quality	Design systems and maintenance to ensure ideal indoor air quality e.g. low VOC, daylight and air flow maximised, low formaldehyde	Planning and design	To be addressed during detailed design. Require user operated climate controls (e.g. windows that can be opened, blinds that can be drawn). Materials specifications to require low VOC and low formaldehyde products. IEQ is included in GreenStar rating tools for design and operation	4
S	**24**	**Heritage**	Maintain and enhance heritage	Maintain significant cultural values, incorporate heritage into design and operational features	Planning and design Construction Operation	Significant reuse and adaption of heritage buildings and features is proposed (e.g. disused rail line). Indigenous heritage is to be protected in situ at railway cutting area. Suggest that further indigenous heritage investigation and consultation with indigenous community regarding site history be undertaken	5
S	**25**		Rehabilitate historic buildings	Encourage the use of historic buildings in a manner that preserves their historic materials and character	Planning and design Construction Operation	Dairy Heritage precinct to include adaptive reuse of existing heritage buildings. Not all buildings are expected to be salvaged. Those reused will be those where a demonstrable reuse opportunity exists	4
S	**26**	**Amenity**	Maintain and enhance amenity	Identify and solve current amenity conflicts, no conflict with surrounding land uses	Planning and design Construction Operation	Include ongoing consultation with the local community. Investigate potential issues with noise and social impacts from commercial development on riverfront	3

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
S	**27**		Provide user controls	Provide user controls wherever possible including lighting, temperature and natural ventilation	Operation	Design guidelines to specify user controls wherever possible including lighting, temperature and natural ventilation. IEQ and user controls are included as a component of the GreenStar rating system which can be specified for individual developments in the precinct	4
S	**28**		Maximise open space	Provide a range of open spaces within walking distance from dwelling	Planning and design	Open space along riverbank. Riverside board walk and walking/cycling paths. Green space along creek line to be remediated to allow access, a mixture of native plantings and open space to be provided	5
S	**29**		Provide signage	Provide signage and site maps to provide clear direction to points of interest	Construction	Requirement for signage to be included in DCP. Preferable to include site history and historic photographs/facts on public signage	3
S	**30**		Orient buildings with regard to thermal comfort	Orientate the long axis of the building parallel to east – west to minimise the area subject to heat gain from the hot morning and afternoon sun	Planning and design Construction Operation	Considered as part of street layout. Include building orientation in regards to thermal comfort in requirements of design guidelines/DCP	3
S	**31**		Minimise fencing and walls	Minimise usage of fencing and walls. Encourage alternative methods to define space (e.g. change of surface, greenscaping)	Planning and design Construction Operation	Minimal fencing required, spaces defined via greenscaping, bioswales, roads and pathways. Design guidelines to prohibit fencing along street fronts	3
S	**32**		Provide access to the riverbank	Ensure public access to the riverbank along the entire site	Planning and design Construction Operation	Foreshore access to be provided along entire riverfront via walkway and cycleway, two viewing platforms and boardwalk. Riverbank to be a mixture of hard edge, mangrove and boardwalk	4
S	**33**		Minimise solar radiation	Windows should be made from high performance glass, shading devises like building overhangs should be used	Planning and design Construction Operation	Specification for glazed glass on north facing windows or a suitable exterior shade structure to reduce solar radiation and air conditioning load	4

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
S	**34**		Enhance the usability and aesthetics of footpaths and streets	Provide high quality landscaping (trees with large shade canopy) and provide seating	Planning and design Construction Operation	Streets, footpaths and cycleways to be designed to encourage pedestrian usability and attractiveness. Seating to be installed at regular intervals along foreshore	4
S	**35**	**Access**	Maximise access for mobility impaired people	Full accessibility for physically impaired people. Standards have been improved beyond what is legally required	Planning and design Construction Operation	Eliminate steps from public footpaths. Provide disabled parking. Ensure design meets best practice for disabled access (refer to BCA Standards and preferred guidelines of the Human Rights and Equal Opportunities Commission)	4
S	**36**		Maintain connectivity between and within areas	Design must allow for access and ingress to flow easily to adjacent areas and avoid severing access for other communities	Planning and design Construction Operation	Connectivity between existing residential area and new precinct aided by the extension of Lydhurst street via a wide walkway through to the waters edge. Landscaping and street layout to be extended into existing residential area. Walkways providing easy access into the site form the northern and southern ends	4
S	**37**		Design retail area to encourage connection with surrounding community	Orient retail for ease of access for the surrounding community	Planning and design Construction Operation	Surrounding community essential for success of commercial area, especially in early years. Commercial and retail uses to be chosen based on community need	4
Ec		**Economic**					
Ec	**1**	**Planning**	Developed land is within defined growth area	The development is within the urban growth area	Planning and design Construction Operation	Development is within a close radius of Taree CBD but requires changes to current zoning	3
Ec	**2**		Ensure proposed use is suitable for site	Preference for new development within and near existing communities to reduce impacts of sprawl	Planning and design Construction Operation	The site is a mixture of brownfield and greenfield and is effectively infill development	3

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
Ec	**3**		Encourage innovation	Retain space within the precinct for future development of PV and wind power generation when electricity and CO_2 costs increase	Planning and design Construction Operation	Significant open space has been proposed which could be utilised in future	3
Ec	**4**		Design for mixed use	Provide focal points to support walkable neighbourhoods provide a mix of uses in neighbourhood centres to encourage activity	Planning and design Construction Operation	Masterplan is for a diverse, mixed used development. Viewing platforms, regular rest points along walking paths and the commercial, heritage and marina precincts to all focus points	5
Ec	**5**		Design for low maintenance	Ensure pedestrian and cycle paths are free from obstructions, plant low maintenance trees, ensure timely and adequate asset management	Planning and design Construction Operation	Maintenance to be a significant issue with green areas, community garden, walkways and cycleways and composting system. Maintenance requirements to be minimised via appropriate native plantings and use of long life materials	3
Ec	**6**	**Employment**	Maximise employment opportunities	Project creates additional local jobs, commitment to use local labour, materials and services wherever possible	Planning and design Construction Operation	Include requirement for use of local labour and materials where all else equal in the DCP	4
Ec	**7**		Maximise business activity	Diverse range of employment opportunities created	Planning and design Construction Operation	Businesses to include a wide diversity; e.g. cafes, restaurants, marina and marine industries, growers market and possibly office space	5
Ec	**8**		Provide a diversity of housing types	Provide housing for a wide range of economic levels	Planning and design Construction	Medium density housing types chosen for the development	2

		Element	Objective Statement	Action	Project Phase	Projected Outcome	Score
Ec	**9**	**Viability**	Ensure financial viability	Demonstrate sustainability initiatives have undergone a cost benefit analysis and report	Planning and design	Sustainability initiatives are put forward which include economic considerations. Initiatives need to be assessed against pay back periods (e.g. solar cells), and value added commercial and business areas (e.g. increasing access by pedestrians, daylighting, green space)	3
Ec	**10**		Ensure funding security	Provide sufficient working capital for the project	Planning and design Construction Operation	To be addressed at later date	2
Ec	**11**	**Innovation**	Maximise expenditure on improving environmental and societal performance	Expenditure on improving environmental and social performance beyond best practice e.g. technology to improve performance of facilities or products, creation of employee well-being facilities, wildlife habitat creation	Planning and design Construction Operation	Numerous potential opportunities for innovation (water supply, energy, built form). Expenditure yet to be finalised	2
Ec	**12**	**Security**	Reduce the cost of crime and crime prevention	Minimise dependence on managed security and maintenance	Construction Operation	Initial expenditure on security design and systems to be made so that ongoing maintenance, security and remediation costs are minimised. Precedence is given to Crime Prevention by Environmental Design over systems that require ongoing cost (e.g. security guards)	3

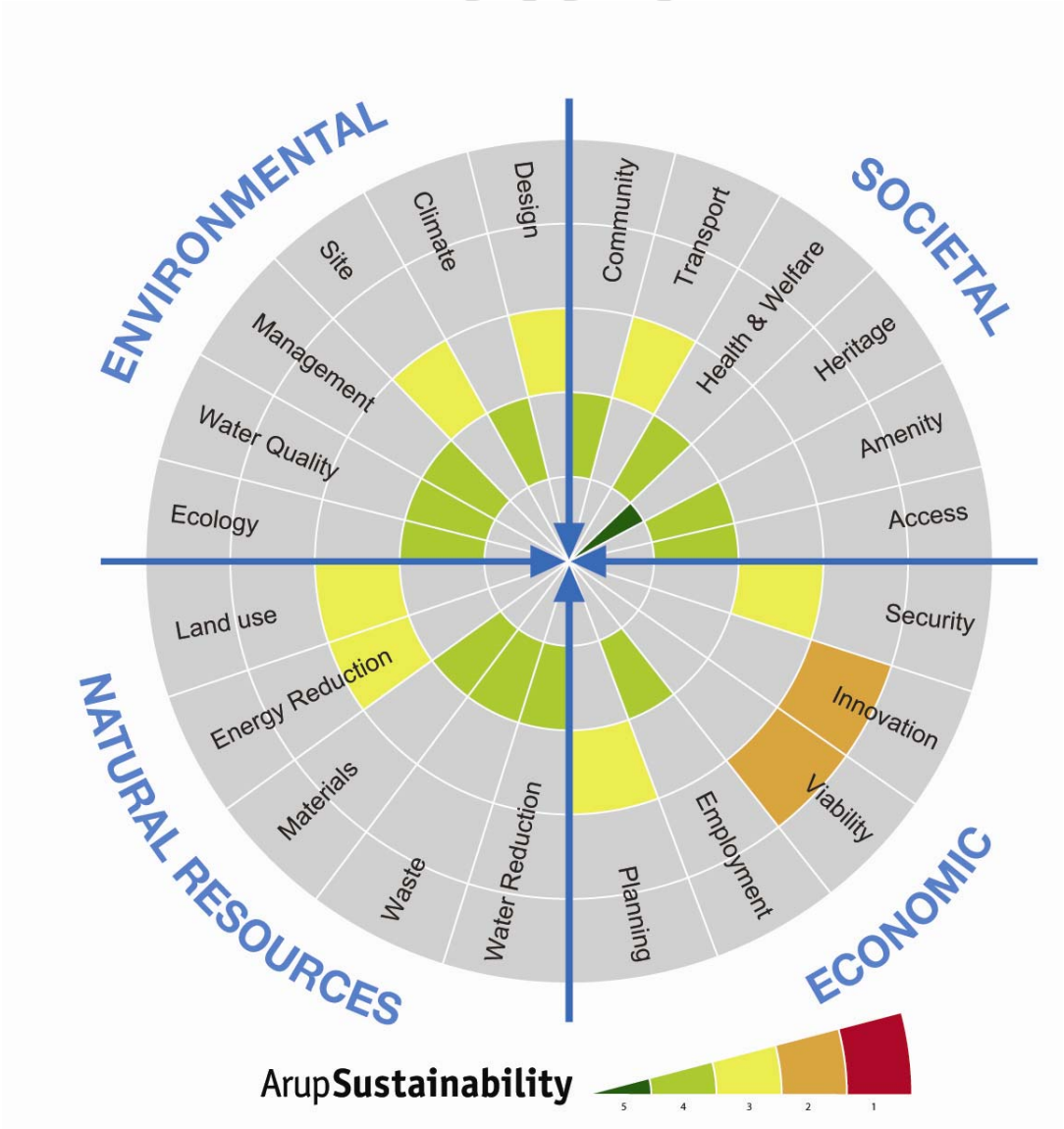
5.2 SPeAR® Appraisal

A SPeAR® appraisal has been undertaken on the draft masterplan, which expands upon the preliminary SPeAR® completed as part of sustainability workshop in the concept design. The purpose of the appraisal is to graphically represent the sustainability measures of the masterplan and to aid the documentation process.

Standard indicators were applied which the masterplan was then individually assessed against a ranking between 5 and 1. The tool averages the scores for all the sub-indicators within an indicator to produce an overall rating of that indicator. The ratings are displayed within wedges in a circle as different colours; dark green (5) as best practice, red (1) as worst case (see SPeAR® scoring definition in Section 4.2).

For masterplans where detail is still at a high level, there are certain elements that aren't necessarily considered such as the identification of material types. For this reason, some key assumptions (included in the assessment table in Section 5.1) have been made as to what will be included in the next steps of the project (e.g. DCP) to allow the SPeAR® Appraisal to be most effective.

The completed SPeAR® diagram of the draft masterplan is attached below;



SPeAR®: Pitt Street Waterfront Masterplan

The SPeAR® Appraisal is based on the scoring allocated in the table in Section 5.1. The appraisal indicates that the Heritage category performs very well (5 out of 5). This indicates best practice and if initiatives are maintained through design and construction this will contribute to an exceptional development.

The majority of categories have scored well (between 3 and 4), with additional scope for improvement in indicators where final decisions/design are yet to be determined (e.g. energy efficiency guidelines, water saving initiatives).

Only two categories fall into the below average category (Innovation and Viability). It should be noted that Innovation and Viability, and the Economic quadrant in general, has scored lowly predominantly due to a lack of documentation. These scores are expected to improve with future commitments.

A total of 14 of the 22 categories in the SPeAR digram have achieved a score of 4 or above which demonstrates that the project will achieve a very high standard in regards to sustainability performance.

5.3 Key Outcomes

A brief summary of some of the key sustainability outcomes of the masterplan are listed below. The list is not extensive, as it is assumed that the detail provided in the table in Section 5.1 will be used to inform the DCP.

Environment

- Ecology: Remediation of creek and adjoining space with 100% native species. Significant increase of vegetation cover against existing condition. Bioswales, creek line and detention pond improve and create new aquatic habitat. Requirement in the DCP for a comprehensive Landscape and Environment Strategy to be developed for the site
- Water Quality: Bioswales, detention pond and remediated creek to filter stormwater prior to release to Manning River. Requirement in the DCP for a comprehensive Water Strategy to be developed for the site. The Water Strategy to address both water quality and water reduction requirements
- Management: Regulatory compliance to be exceeded. Best practice sustainability outcomes to be the goal
- Site: Connections with the surrounding community implemented. Inclusion of a pedestrian and cycle link through the site and linking the CBD

Natural Resources

- Land Use: No requirement for fill to leave the site (except for Marina excavation). No contaminated land known to be present
- Energy Reduction: Solar energy is preferred renewable energy source. Use of solar powered street lighting, solar hot water and PV panels. DCP to include energy efficiency standards (e.g. Green Star). Requirement in the DCP for a comprehensive Energy and Carbon Strategy to be developed for the site
- Materials: DCP to include materials specification. Local materials and local labour to be maximised. Heritage materials to be reused onsite (e.g. rail line)
- Waste: Green and organic waste to be collected as feedstock for composting and community garden. Recycling bins provided in public areas, construction waste recycling target of 60% by mass. Requirement in the DCP for a comprehensive Waste Strategy to be developed for the site
- Water Reduction: Greywater recycling onsite. Rainwater to be captured, stored and used for irrigation and other non-potable purposes. AAA water efficient fittings to be specified. Requirement in the DCP for a comprehensive Water Plan to be developed for the site. The Water Plan to address both water quality and water reduction requirements

Societal

- Community: Design incorporates significant open space areas, public space, entertainment and recreational opportunities. A community garden is proposed, opportunities for public art to be investigated. Requirement in the DCP for a comprehensive Healthy Community Strategy to be developed for the site
- Transport: Major cycleway and walkway along the riverfront. New road network, to be kept low speed and designed to minimise through traffic
- Health and Welfare: Crime Prevention Through Environmental Design including passive surveillance by mixed use zones. Local food outlets, low impact traffic, encouragement of walking and cycling

- Heritage: Significant reuse and adaption of heritage buildings and features
- Amenity: Provide access to riverbank for entire community. Design guidelines to include minimised fencing use, building orientation to maximise thermal comfort, IEQ requirements (e.g. user controls and natural ventilation).
- Access: Access to the site from many entry points, via road, walkway, cycleway and riverfront. The existing community will be encouraged to use the site

Economic

- Planning: Site is a mixture of brownfield and greenfield and is effectively infill development. A number of land uses and large areas of open space are proposed
- Employment: A wide variety of business to be established onsite, scope for inclusion of commercial office space
- Viability: Funding security and staging to be determined
- Innovation: Numerous potential opportunities for Innovation (water supply, energy, built form). Yet to be fully determined
- Security: Precedence is given to Crime Prevention Through Environmental Design over systems that require ongoing cost (e.g. security guards)

6 Conclusion

The draft masterplan of the Pitt Street Waterfront Precinct includes many desirable sustainability outcomes, as included in this report.

Many of the listed sustainability outcomes in this report cover the entirety of the site such as density of built form, the significant provision of green space, inclusion of walking and cyclepaths and riverfront access. However, there are key actions that can only be of use if expanded in detail and included within the DCP, and implemented during detailed design, construction and operation of the site (e.g. energy and water efficiency standards, materials specification, recycling and organic waste collection).

As the Pitt Street Waterfront site is most likely to be developed in small stages, a guide for all developments which includes sustainability standards will be necessary if the desired sustainability outcomes as discussed in this report are to be achieved.

As the development progresses it would be useful to monitor sustainability through use of future appraisals.