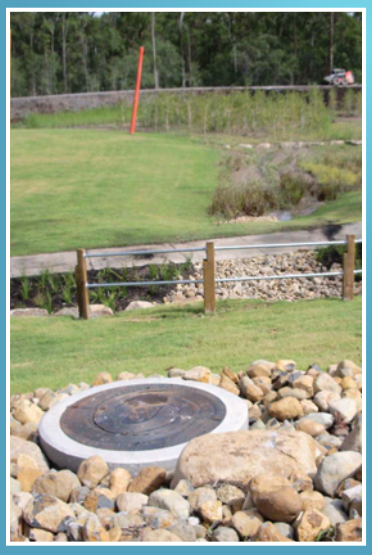




TALLAWARRA LANDS

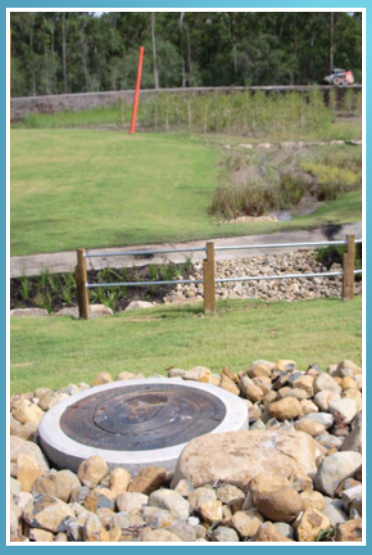
Part 3A Concept Plan Application

SUSTAINABILITY REPORT

Prepared for TRUenergy

15 DECEMBER 2010

urbis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FIGURES:

TABLES:

1 Introduction

This report outlines the sustainability principles, outcomes and actions that will facilitate the delivery of a more sustainable development at Tallawarra Lands through the design, construction and operational phases. It provides an approach that considers the value of sustainability to the project, the sustainability visions of TRUenergy, the inputs from key stakeholders and professionals as well as the requirements set by the Director General. This report is submitted to the Department of Planning as part of the Environmental Assessment associated with the Tallawarra Lands Part 3A concept plan application.

The Tallawarra site at Yallah is currently home to the Tallawarra Gas Power Station. The Tallawarra Gas Power Station (Stages A and B combined) requires only 36.25 hectares of the 572.1 hectare site. With this in mind, over the last few years TRUenergy has investigated future potential land use options for the 535.9 hectares of land that has become surplus to the power station's needs and worked up a vision for the development of the site. This surplus land is referred to as Tallawarra Lands.

Tallawarra Lands is situated on the western foreshore of Lake Illawarra adjacent to the West Dapto release area, approximately 13 kilometres southwest of the Wollongong town centre and is within the Local Government Area of Wollongong. The site includes a number of wetlands and watercourses that flow to Lake Illawarra, the largest being Duck Creek.

The Tallawarra Lands site comprises the majority of the Yallah locality. The surrounding area also includes the suburbs of Koonawarra and Dapto to the north, the recently established suburb of Hawyards Bay to the south, Lake Illawarra to the east and the suburbs of Marshall Mount, Penrose and the future West Dapto urban release area to the west.

1.1 The concept

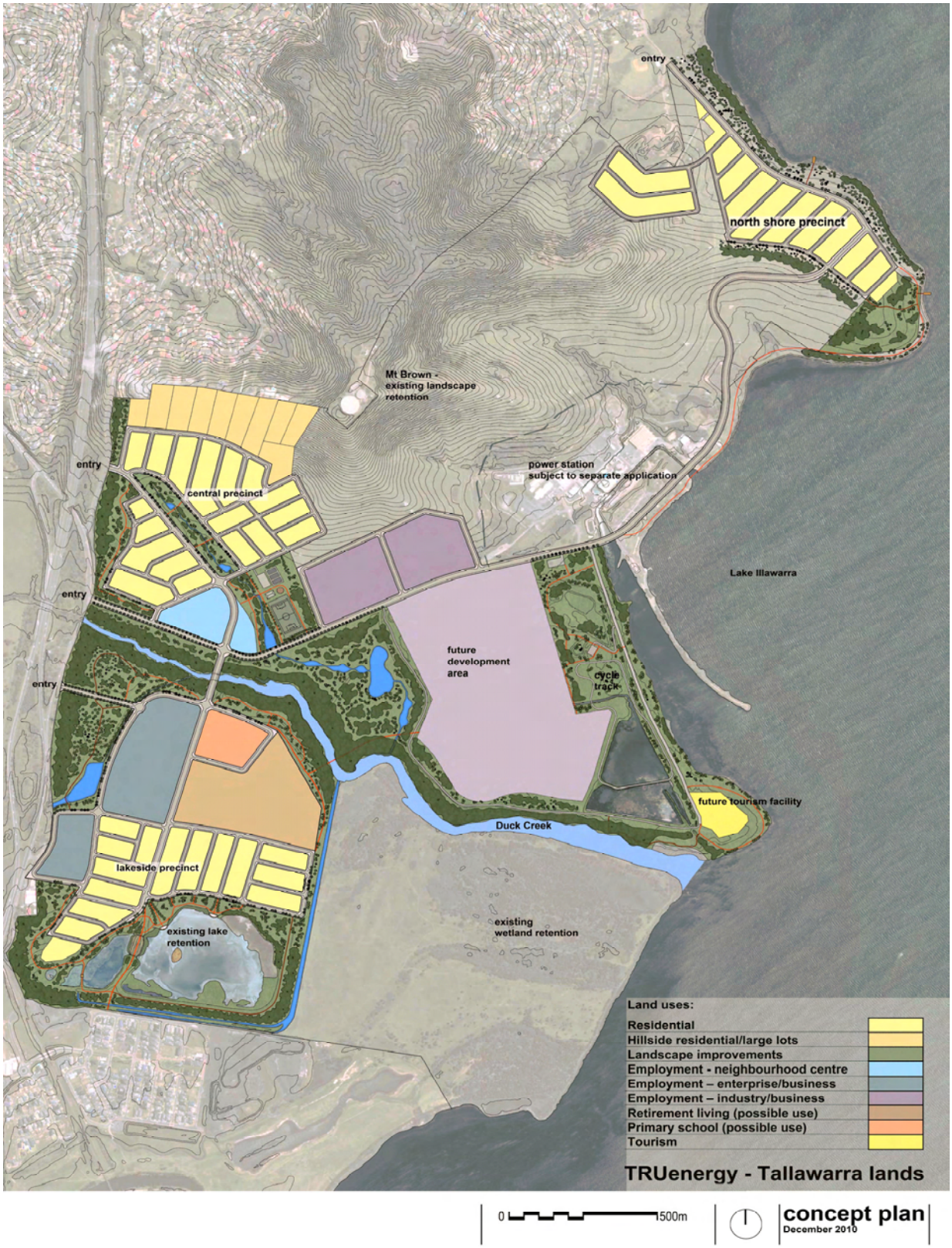
The concept plan proposes a mix of uses across the site as well as significant areas of environmental protection and open space. The proposed uses include:-

- Approximately 1000 lots supported in the current residential zone. Lot sizes will likely range from conventional lots of 450sqm-550sqm, larger lots over 600sqm and large hillside lots of I ha lots
- Potential opportunity for retirement living of approximately 200 units
- Community facilities including possible primary school, convenience retail, scope for medical facility, child care, local business services and sports ground
- Large parts of the site are allocated for employment uses. Much of this is medium to long term and subject to evolution of an employment strategy for the project. Site provision is allowed for an office campus, retail, tourism and industry. Initial employment generators are likely to be local services – retail, health, community, etc.

The key urban design principles for the development are that it:

- Addresses site opportunities and constraints – south east environmental reserve, Duck Creek corridor, Lake Illawarra Foreshore, flood management, topography, context views/access
- Creates three clear precincts – Lakeshore precinct to the south, Central precinct in the middle and the Northshore precinct to the north
- Achieves a physical "fit" of urban layout to the structure of the site, with retention of creek systems/drainage lines; local street pattern responding to site contours; natural systems for stormwater management (e.g. integrated rain garden / biofiltration facilities for treating runoff)
- Respects the context of the site – access/traffic management, views, setbacks/buffers
- Provides a legible and well-connected network of streets and public spaces.

Figure 1 – Tallawarra lands concept plan September 2010



1.2 The approach

This report considers the following elements in setting the sustainability approach for Tallawarra Lands:

- This report utilises the Part 3A planning process to provide a framework to govern decision making and the delivery of a range of desired sustainability outcomes identified for the project over the long term of the Tallawarra Lands development.
- The report sets a framework that adapts the principles identified by the Green Building Council of Australia in its Green Star Communities National Framework to set the sustainability direction for Tallawarra Lands. This will facilitate the potential for precincts to consider a rating under the tool currently being developed.
- The report highlights the activities undertaken as part of the master planning and Part 3A approvals process and identifies other actions and initiatives under consideration. It also provides recommendations of consideration for the next planning approval phase.
- The report builds on existing consultations and sets a confirmed sustainability direction for the long term of Tallawarra Lands.
- The report takes an approach based on setting and holding desired sustainability outcomes and avoids prescribing technologies or innovations that may not be appropriate for the longer term development.
- The report provides a clear response to the key issues identified in the Director General's Requirements (DGRs).

The report provides a framework that goes beyond just the issues identified in the DGRs. It provides a consolidated framework for the delivery of all the desired sustainability outcomes commitments set by the development, and a mechanism for implementation and future monitoring. This will allow a focussed response on the key issues and a broader level of commitment to the sustainability initiatives to be delivered at Tallawarra Lands.

2 Sustainability in development

Sustainability is a concept that aims to optimise outcomes for the human and natural environments both now and into the future. It is about the interaction between the economic, social and environmental factors in relation to human society and the natural environment. The ultimate goal of sustainability policies and practices is to provide a framework to guide human activity so that society, its members and economies are able to reach their greatest potential in the present, without compromising the ability of future generations to reach their full potential. This concept affects every level of humanity from the local neighbourhood to the global community.

There are several other factors that must be considered when looking to achieve sustainable outcomes within an urban development context. These factors include consideration of the timing of the project, the size of the project and the scale at which the development decisions operate. This highlights the critical nature of governance at this stage of development.

It is also important to recognise that sustainability is a fluid concept and there is not a definitive answer to whether something is sustainable or not. Actions and outcomes can be considered more sustainable or less sustainable than others. Put simply, it is not a yes or no answer. The decision-making process is therefore vital to the long-term implementation of sustainability strategies, policies and practices. All decisions must consider the level at which they operate, the time frame involved and the long term impacts of each decision.

2.1 Sustainability for Part 3A

Master planned development projects go through a number of distinct phases over many years. At each phase a range of decisions and actions can be taken that may facilitate a shift towards achieving more sustainable outcomes. It is critical to understand at what phase in the decision making process a development is, in order to maximise actions that deliver more sustainable outcomes through targeting the correct phase of development.

A Part 3A approval is the NSW government mechanism for progressing approvals for state or regionally significant projects as defined under the Environmental Planning and Assessment Act 1979 (EP&A Act). It has been designed to be flexible in the level of detail considered in the approval and allows for a range of projects to be assessed, from high level concept plan approvals to more detailed project plan approvals. All details not considered within the Part 3A approval are to be considered at the next approval phase. These next phases of approvals can be managed by either the State Government or the Local Council but need to show consistency with the approved concept plan. TRUenergy is currently proposing a concept plan for Tallawarra Lands for approval under Part 3A.

From a sustainability perspective, a Part 3A concept approval at the master planning phase of a development is only one tool in documenting and confirming sustainability measures. One of the risks with sustainability planning at the concept approval phase is trying to provide detailed engineering commitments (that require a level of design, quantification, governance, ownership and costing) that will not be prepared until the subdivision planning, civil works plans, detailed design phase, construction documentation or operational phase of the development.

It is critical that the Ecologically Sustainable Development (ESD) or sustainability reports prepared for the Part 3A provide certainty to the planning authority, government agencies, council and community that more sustainable outcomes will be provided in response to the key opportunities and issues identified. This can be plainly provided in a well structured sustainability framework that identifies appropriate desired outcomes for the development and identifies actions and responses that are being taken at this stage. This framework will also provide a structure to facilitate future decisions and coordinate actions towards achieving the desired outcomes.

Through the provision of a sound framework for developing a coordinated long term response to the desired outcomes, the project provides a level of certainty that incorporates sustainability and ESD principles in the design, construction and operational phases of the development.

The Director General's Requirements (DGRs)

The Director General's requirements developed for Tallawarra Lands also nominate specific focus areas for the ESD response identified through the preliminary environmental assessment and through stakeholder consultation. The ESD elements focus on the environmental features of Sustainability. The approach taken in this report is to focus on the broader features of sustainable development but include details of the ecologically sustainable development in response to the DGRs. Figure 2 below provides the extract from the DGRs relating to ESD.

Figure 2 – ESD DGR for Tallawarra Lands

9. Ecologically Sustainable Development (ESD)

The EA shall detail how the development will incorporate ESD principles in the design, construction and ongoing operation phases of the development and comply with SEPP (Building Sustainability Index: BASIX) 2004. Including commitments of sustainability through:

(a) Lot orientation
(b) Water reuse,
(c) Waste minimisation,
(d) Minimisation of energy use and
(e) Reducing car dependency, etc.
(f) The use of flood compatible design and building materials where relevant.

It is important to note that the ESD response for the project also has significant overlap with some of the other DGRs such as climate change adaptation, environmental and residential amenity, utilities, biodiversity and development contributions. For this reason it is important to ensure that the ESD response was well coordinated with other specialist reports and planning decisions made in the preparation of the Environmental Assessment Report.

2.2 Sustainability for TRUenergy

TRUenergy has a long-standing commitment to responsible sustainable business management with a considered focus on managing both environmental and social impacts from business operations. In 2006 TRUenergy launched its environmental policy as a public commitment to protecting the environment. Since that time the organisation has made some significant steps in reducing the carbon intensity of its generation and undertaken a number of significant steps in managing other environmental impacts. The climate change strategy launched in 2007 set out a strategy for reducing emissions across the business by 60% by 2050.

TRUenergy also seek significant partnerships with respected community organisations and seeks to engage stakeholders closely in the development of significant projects. The Community Liaison Group set up for Tallawarra Lands and the extensive engagement with the surrounding communities and stakeholders is evidence of this approach.

TRUenergy, as part of its public commitment to sustainable business management, voluntarily produces a detailed Social and Environmental Report on an annual basis that outlines its social, environmental and occupational performance and achievements.

2.3 Sustainability for Tallawarra Lands

Tallawarra is an area of great environmental significance. It is also home to the most efficient gas fired power station of its type within Australia. TRUenergy wants to carry this commitment to sustainability into the planning and delivery of Tallawarra Lands.

The principles of Sustainability and ESD have been central to the development of the concept plan for Tallawarra Lands through an overall commitment from TRUenergy to protecting the environment. This

has been further developed for Tallawarra Lands by the project manager and consultant team in close consultation with the Community Liaison Group (CLG), Council and government agencies. These have been further informed through a review of the key site opportunities and constraints.

Some of the principles for the sustainability vision for Tallawarra Lands include:

- Leading practice sustainability initiatives that enhance the natural and urban environment.
- A quality residential component that capitalises upon and complements the unique scenic and environmental qualities of the site.
- Integrated and innovative development that creates shared benefits and allows diverse yet complementary uses.
- A project that returns value to TRUenergy and is in line with the company's commitment to sustainability.

The structure plan also sets a specific principle to provide a best-practice sustainable development model which minimises use of resources and infrastructure.

3 Approach

This section explores the critical elements to achieving sustainable outcomes in a new master planned community. It discusses the decision making framework in which sustainable choices are made in urban development and the role of the planning approvals process in facilitating more sustainable outcomes for development. The proposed concept plan is then placed in this context to better understand the process required to embed more sustainable practices into the planning, construction and operation of Tallawarra Lands.

3.1 Development decisions - regional planning to domestic decisions

In the context of an urban development project, it is important to recognise that the approach taken to sustainability depends on the scale of development decisions that are being made. The scale of development decisions includes those made at a city, sub region, neighbourhood, subdivision, business, dwelling or individual level.

Decisions made at the scale of planning at Tallawarra Lands need to account not only for their current environmental, social and economic impact, but also need to carefully assess their future impact. Decisions made in the early or planning phases of the project can have a fundamental impact on a sustainable outcome for the entire development. These decisions, if made with sustainability in mind, will provide future choices regarding sustainable features for the community and a flexible framework as technology and needs change.

For example, when planning, constructing or operating at a regional level, sustainability decisions may include such things as:

- Energy source, generation, and distribution.
- Regional transport infrastructure.

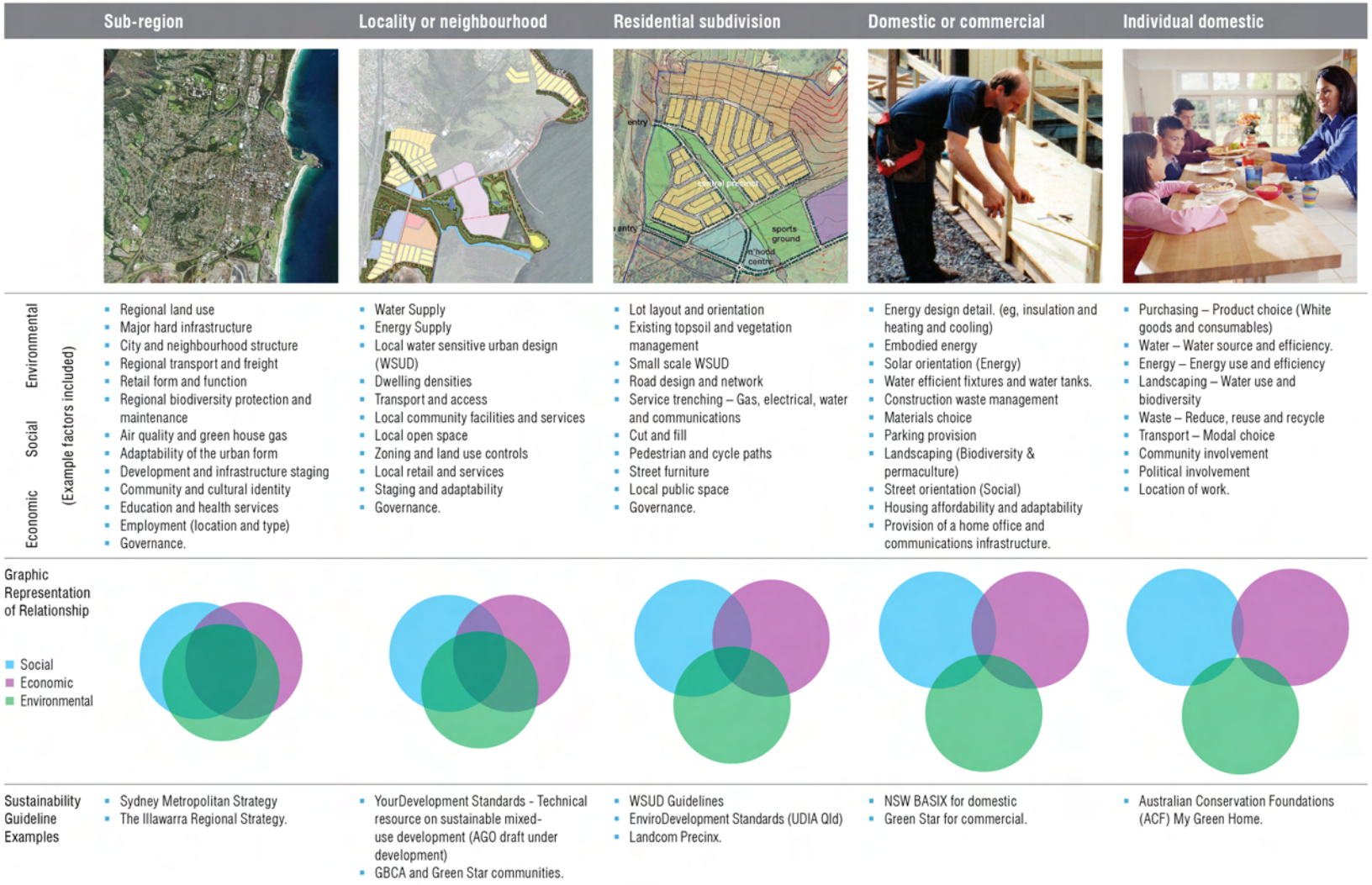
If planning, or operating at a domestic level, decisions may include:

- Selection of low energy light bulbs or a solar energy system
- Choices on the mode of transport to use.

These decisions require completely different processes of decision making, however their outcomes are inherently intertwined and all have an influence on the level of sustainability achieved. Furthermore, the decision to provide good, reliable and efficient regional transport alternatives at the city or regional level, will allow choices to be made at the domestic level regarding how many cars a family may own, how children get to school or how adults get to work.

Figure 3 below identifies the different scales of development and identifies some of the sustainability factors relevant when planning at that scale and some of the strategies and frameworks that can inform appropriate actions.

Figure 3 – Sustainability factors at different development scales



Source: Urbis 2010

3.2 Sustainable systems and complexity

As the scale of the planning for the urban form becomes larger, the types of questions become more complex and the solutions more involved (this relationship is graphically presented in Figure 3 by the overlaps in the venn diagrams). Solutions become more involved as the environmental, social and economic reasons for the choices are more critical and the impact of those decisions become far greater.

Sustainability decisions at the individual (individual domestic) level are quite simple to make. For example, the choice to recycle a newspaper is a decision based on positive environmental outcomes alone. Social and economic benefits play only a small part in the choice model.

At the building (domestic or commercial) level the choices are slightly more complex and include considerations such as energy design details, solar orientation and landscaping. These choices have environmental implications but also have cost implications that must be considered when making the correct (or more sustainable) decision. Social considerations do not play a major role in such a decision.

It follows that at a locality subject to subdivision level planning, the complexity and repercussions of each decision are greater still. For example, decisions and planning regarding energy generation or public transport networks have long term and far-reaching ramifications. There is not only an environmental impact to consider, but there are also significant social and economic outcomes for the community. Decisions made at this level need to be carefully assessed regarding their full implications on future sustainability.

For this reason it can be unhelpful to introduce sustainability features into individual targets or benchmarks too early in the development process as it can tend to oversimplify the solutions to a point where they do not deliver the outcomes desired. Traditional problem solving techniques and technical engineering solutions to sustainability problems often analyse and ‘deconstruct’ situations to make them appear simpler than they really are. This means that the ‘solution’ is often too simple and when implemented, fails to contribute to the whole. At this scale of planning, it is better to consider sustainability outcomes using systems thinking to:

- Look at the whole, larger context
- Look at multiple influences and relationships when exploring and resolving issues
- Build solutions based around needs and outcomes
- Identify appropriate governance mechanisms to drive outcomes
- Accept a level of uncertainty and ambiguity as a natural part of change
- Integrate decision making and encourage more participatory and holistic approaches.

This process at an urban scale provides a more integrated approach to sustainability that allows the project to focus on outcomes rather than process or technologies. This enables the project to embrace the complexity of the problem yet enabling effective and coordinated solutions and avoid perverse outcomes.

3.3 Development phases and delivery actions

Every level of an urban development goes through a number of distinct phases. At each phase certain decisions and actions can be taken towards more sustainable outcomes. These phases broadly include:

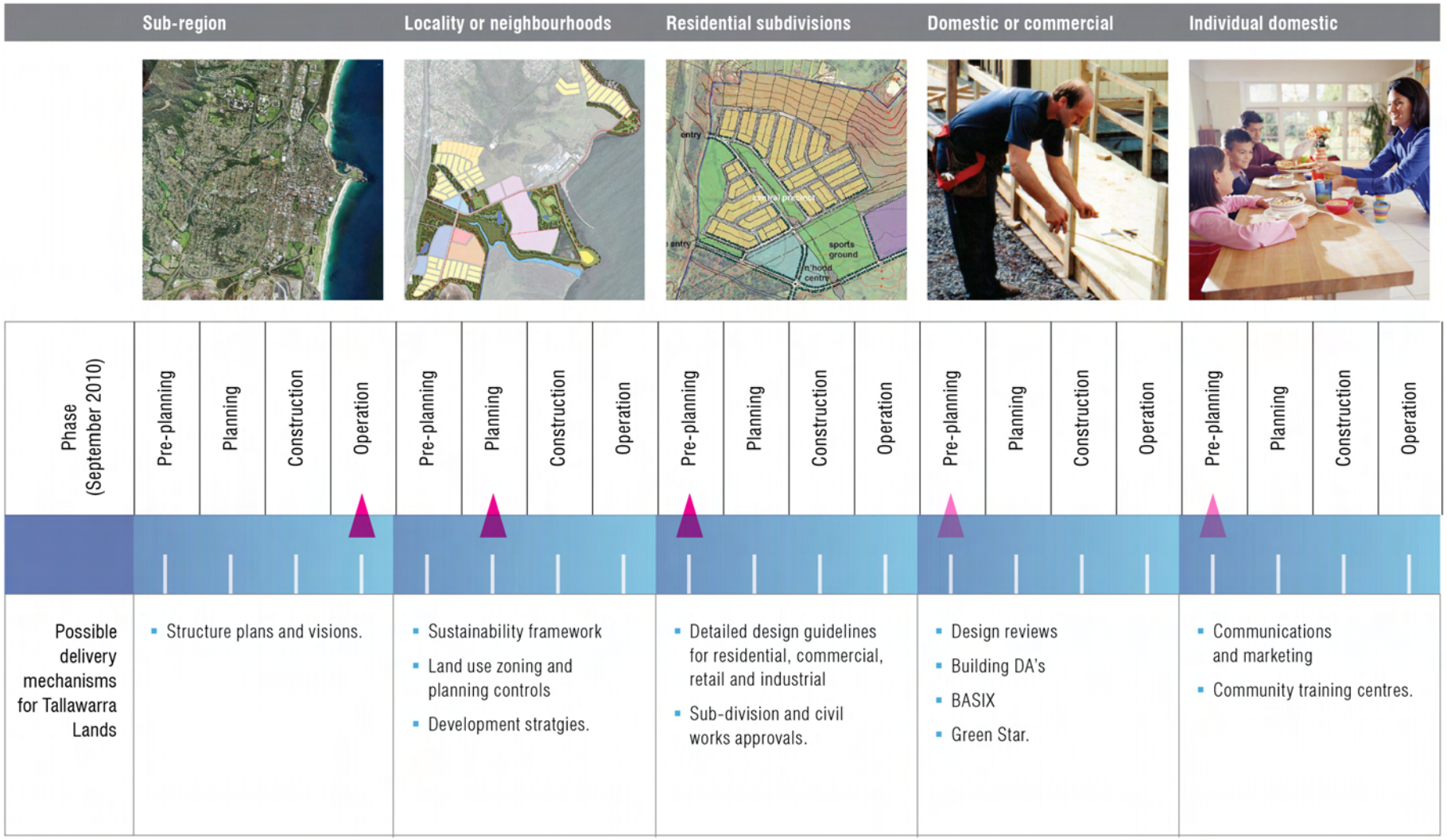
- Pre planning – e.g. visioning, divisions of responsibilities, ownership, governance and early planning.
- Planning – e.g. commitments, structures, policies, contracts and guidelines.

- Construction – e.g physical actions, exchange, civil works and built form.
- Operation – e.g resource use, community development, ongoing vision elements and maintenance.

These phases often occur in parallel across different levels of the development process. For example, at the regional level full construction may be underway at the same time that pre planning is being undertaken on a residential subdivision level.

It is important to understand this framework to ensure that actions taken to deliver more sustainable outcomes are targeted at the right level and the correct phase of development. The following figure shows the phases which Tallawarra Lands will go through at each development scale and where the development is currently at within those phases.

Figure 4 – Tallawarra lands delivery phasing at September 2010



Source: Urbis 2010

TRUenergy is currently completing the planning phase for Tallawarra Lands at the locality or neighbourhood level. The next phase will be the development of detailed subdivision, infrastructure and civil works plans at the locality scale and pre planning at the subdivision scale. To achieve more sustainable outcomes for development it is critical that there is careful consideration of the principles of sustainability at the visioning and planning phases of any development scale. This will enable clear direction and ensure a clear decision-making framework for sustainability that can be carried through the duration of the project.

At each phase of the development cycle there is broad range of tools or influencing factors available to plan for or deliver more sustainable outcomes. These include varying responsibilities, governance models, ownership, controls, incentives, guidance or direct actions available. It is important to maximise the use of all of these in delivering outcomes as an effectively coordinated response can improve the outcome, reduce the costs, maximise the reach and enable shared responsibility and ownership.

3.4 Part 3A at concept approval phase

The Part 3A planning phase at the locality or neighbourhood scale plays a critical role in setting the future project delivery and decision making processes. It plays a key role in setting the plans and frameworks for the development that will carry forward into the delivery of the project.

In terms of its role in delivering more sustainable outcomes at project completion, it plays a critical role in setting a clear direction and the long term sustainability objectives for the development. It provides a mechanism to deliver effective governance and a range of direct actions to influence the sustainability outcomes for the future development. Examples of these include the following:

- Governance – principles, frameworks, desired outcomes, design guidance, a process to maintain the vision and recognition of responsibilities.
- Direct actions – transport infrastructure; utilities supply; efficient and effective responses to site levels, ground conditions and flooding; dwelling mix; land use; affordability; open space; biodiversity; WSUD.

The following sections of the report provide a structured approach to providing an effective governance framework and identifying direct actions taken through the concept approvals phase for Tallawarra Lands.

Following the Part 3A concept approval specific project elements are still to be approved at the locality scale including subdivision DA’s and civil works approvals prior to any on site works. The approach taken in the development of the Framework and in the response to DGRs is to maintain the vision and coordinate delivery of desired sustainability outcomes.

4 Framework

TRUenergy has an organisational commitment to sustainability and recognise that there are significant opportunities for delivering effective sustainability outcomes for the planning and delivery of Tallawarra Lands. Through previous consultation undertaken with key stakeholders and the wider community TRUenergy has identified a number of sustainability initiatives and directions for Tallawarra Lands. To coordinate the sustainability vision that has developed out of this, TRUenergy has consolidated the initiatives into a framework to structure long term commitment. The benefits of developing a framework for Tallawarra Lands include the following reasons:

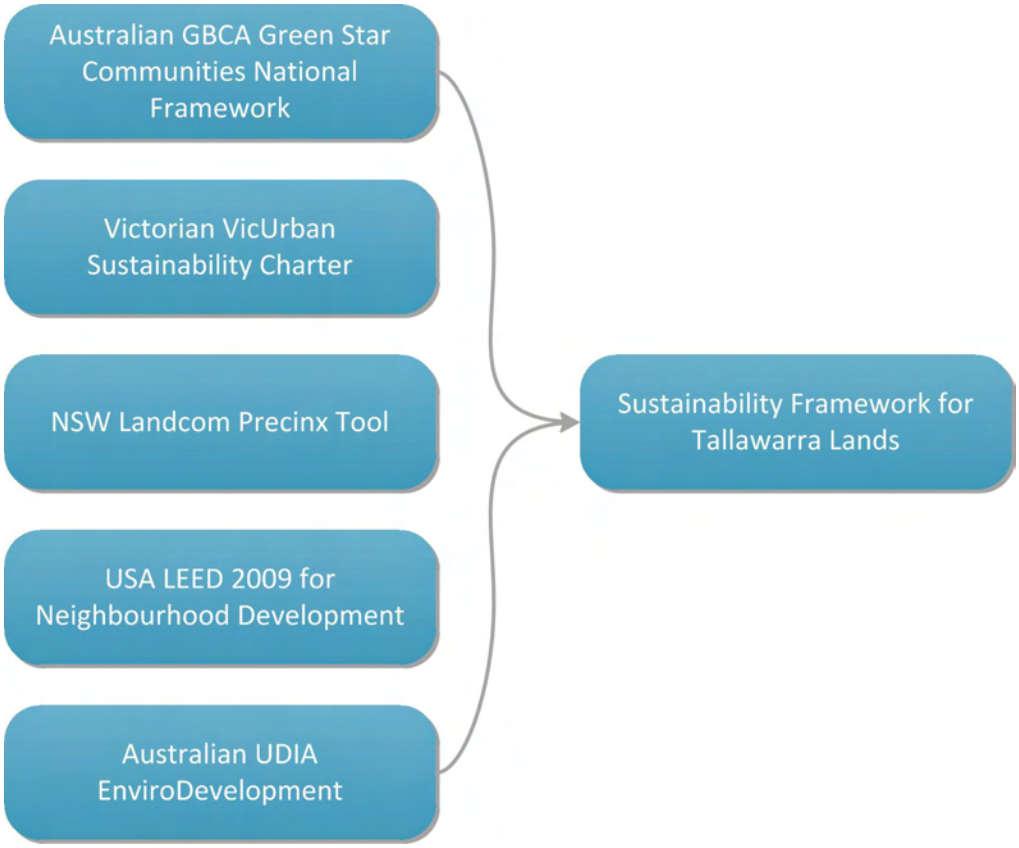
- Provides a clarity of desired outcomes that facilitates systems thinking focussed on outcomes rather than process.
- Provides a decision making structure that requires consideration at each stage of the development cycle.
- Structures a more affordable delivery of improved sustainability outcomes through coordinated actions rather than technical solutions.
- In providing a framework as a component of the Part 3A approvals it will provide an appropriate governance structure to drive decision making.
- Allows market relevant actions to be developed and tailored at appropriate times.
- Encourages partnerships, shared resources, shared outcomes and coordinated delivery.
- Provides a structure to facilitate outcomes while providing flexibility in the detailed approach.
- Does not limit the delivery actions to current technology or current benchmarks.
- Provides predictive commitments rather than performance based targets.
- Provides an effective link with other sustainability tools and controls.
- Embeds the desired outcomes into the planning approvals process and Part 3A.

Given these compelling drivers, a sustainability framework was seen to be most appropriate at the planning phase for Tallawarra Lands.

4.1 Development of a framework and setting desired outcomes

There have been many attempts over the years to define and structure principles and factors for consideration of sustainability in urban planning. When developing the appropriate framework for Tallawarra Lands a number of existing principles, frameworks and rating tools were carefully considered. Figure 5 below shows some of those frameworks considered in the development of the Tallawarra Lands framework and desired sustainability outcomes.

Figure 5 – Framework development considerations



Careful consideration was given to the recent development of the Green Building Council of Australia (GBCA) Green Star Communities National Framework, as it has significant support from industry, will set national benchmarks for provision and encourages industry best practice for development at regional, locality or residential subdivision scale. A focus on this framework will enable the sustainability approach taken at Tallawarra Lands to be benchmarked at a regional and national level and show leadership in urban sustainability planning.

The framework developed for Tallawarra Lands has focussed on the principles and themes developed by the GBCA, as it was considered to be a broad approach to sustainability planning and will provide a good base for any future development to consider rating under a Green Star Communities rating tool currently under development. The following figure shows the principles and themes used to frame the approach to sustainability for Tallawarra Lands.

Table 1 – Sustainability principles and themes for Tallawarra (Aligned with GBCA Green Star Communities)

Principle	Theme
Enhance liveability	Providing diverse and affordable living
	Creating healthy, safe and secure communities
	Fostering inclusiveness and cohesiveness
	Building community adaptability
Create Opportunities for Economic Prosperity	Promoting education and learning
	Enhancing employment opportunities
	Attracting investment
	Encouraging innovation
	Promoting efficiency and effectiveness
Foster Environmental Responsibility	Enhancing natural environment
	Reducing ecological footprint
Embrace Design Excellence	Adopting effective planning practices
	Encouraging integrated design
	Maintaining flexible and adaptable approaches
	Creating desirable places
	Promoting accessibility
Demonstrate Visionary Leadership and Strong Governance	Establish coordinated and transparent approaches
	Build a commitment to implementation
	Engaging with stakeholders
	Fostering sustainable cultures and behaviours
	Encouraging and rewarding innovation

Using the principles and themes identified above, a process of developing a set of desired sustainability outcomes for Tallawarra Lands was undertaken. This considered the long term opportunities and needs for the Tallawarra Lands and identified appropriate vision statements for the future to drive more sustainable outcomes. These desired outcomes also considered the key strengths from the other sustainability frameworks identified in Figure 5. The process of identifying desired outcomes for the project were informed by:

- Consideration of the Director Generals Requirements.
- Past Tallawarra Lands documents and approvals.
- Site opportunities and constraints.
- The TRUenergy sustainability approach and objectives.
- Inputs from the consultant team.
- Results of past consultation and inputs from the community and the Community Liaison Group (CLG).
- Industry best practice sustainability planning case studies and other previously identified frameworks.
- Wollongong City Council Plans and Policies, including the Sustainability Policy.
- The Illawarra Regional Strategy and other State Government plans and policies.

These desired outcomes were developed considering the medium term (5-10 year) sustainability vision for Tallawarra Lands. It is these desired outcomes that set the relevant sustainability direction for Tallawarra Lands. They were developed to stretch the project sustainability features and facilitate

appropriate responses to achieve more sustainable outcomes at the right scale and phase of the planning process. They will maximise the ability of the concept plan to encourage a coordinated approach towards the achievement of the desired outcomes through the ongoing design and development process.

4.2 Sustainability framework

The framework provides a basis for identifying the current concept plan actions towards delivering improved sustainability outcomes. It also provides a framework for future approvals to ensure an effective and coordinated response to the desired outcomes for future development. This will ensure that the principles of ESD are embedded into the design, construction and operation of Tallawarra Lands.

The framework on the following pages shows the following:

Principle and theme

Broadly these are structured against the Green Building Councils Green Star Communities Framework but adapted for the Tallawarra Lands. This will potentially allow any future development on the site to consider a green star rating if desired.

Desired sustainability outcomes

These represent the desired outcomes from the Tallawarra Lands development over the next 5-10 years. These were developed specifically for Tallawarra Lands considering the sustainability drivers identified through consultation, specialist inputs, the DGR's, the site opportunities and constraints and policy context. These remain through the life of the master plan and form the basis for structuring the sustainability initiatives at appropriate phases of the development through measures taken in design, construction and operation.

Concept plan actions that begin to address the desired outcomes

At the concept planning phase of the development there are a number of actions that can be considered to facilitate the development direction towards the desired sustainability outcomes. It is these actions towards the desired outcomes that have been developed and included in the concept plan documentation. They show what the current concept plan is doing to progress the development towards achieving the desired sustainability outcomes.

Considerations for future actions

These are a range of ideas or concepts for future consideration at subdivision or civil works approvals phases or in any joint venture or tendering processes. They are by no means all of the measures that could be considered but provide some ideas that may be worth taking forward. These do not form part of this Concept Plan approval but are provided to inform options for the next phases of development planning and approval.

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Table 2 – Tallawarra Lands sustainability framework

Liveability

Theme	Desired Sustainability Outcomes for Tallawarra Lands	Concept Plan actions that begin to address the desired outcomes	Considerations for future actions (note: these do not form part of this approval)
Affordable	The affordability of the development is appropriate to the local market.	▪ The proposed concept plan yields facilitate a range of lot sizes which will enable a range of affordability options across the development. ▪ Access to local retail, housing, education and employment services within the concept plan area supports affordable lifestyle choices. ▪ The potential for more compact lots and house packages will address the growing market of those mature homebuyers who are wishing to downsize.	▪ Consider developing detailed lot layouts within the subdivisions to consider varying lot sizes and affordability. ▪ The development controls could include sustainability guidelines to consider life cycle costs to ensure both construction and operational affordability is achieved. ▪ Consider house and land products that will address the needs of the first homebuyer as well as those with equity in the market.
Healthy, safe and secure	The development is designed to minimise crime.	▪ Street/road reserves are provided as the edge to public parks, rather than private lots to improve casual surveillance and access. ▪ Built environments will be legible to all users, in particular pedestrians and cyclists, with clear differentiation between public and private territory. ▪ All public spaces – parks and streets, are addressed by active uses or housing to enable passive surveillance by occupants and residents.	▪ Consider applying the principles of Crime Prevention through Environmental Design (CPTED) in detailed master plan design. ▪ Detailed landscape designs should consider planting to minimise opportunities for concealment along footpaths and pedestrian/cycle share ways to provide for passive surveillance.

Liveability

Theme	Desired Sustainability Outcomes for Tallawarra Lands	Concept Plan actions that begin to address the desired outcomes	Considerations for future actions (note: these do not form part of this approval)
	Healthy behaviours such as walking and cycling are encouraged.	▪ A network of footpaths and pedestrian / cycle share ways, are provided together with dedicated cycle lanes along the main road, is integrated into the planning and design of streets and open space areas. ▪ Facilities have been carefully designed to be within close proximity to all allotments. Each house will be within 200m of public open space have potential to be within 400m of a bus stop. ▪ Over half of the site is to be retained as green space with rights of public access. ▪ There is potential for a range of destinations for shopping, education and employment, within walking distance of Tallawarra residents.	▪ Consider street tree planting to provide shade and visual amenity to encourage walking. ▪ Consider 'pedestrian prioritisation' through reduced speed limits, traffic calming measures and designated 'share zones' implemented on pedestrian routes.
Inclusive and cohesive	Uses within the site are physically and visually connected to provide access to local services, employment opportunities and social networks.	▪ A continuous public foreshore edge is provided along the entire eastern edge of the site. ▪ A high proportion of the local roads terminate with open space, regional views, the lake or bushland. ▪ An extensive network of roads, dedicated cycle lanes, footpaths, walking trails and pedestrian/cycle share ways are provided throughout the site and connected to the wider region. ▪ A connective street pattern has been developed that is responsive to the topography.	▪ Identify further opportunities to improve the efficient access and transport options throughout the site. ▪ Landscape design of streets could take account of views to the lake, ridges and hill tops. ▪ Consideration could be given by government to revise minimum lot size requirements, to expand the range of housing choices.
	Uses and environments within the development are diverse to cater to the needs of different groups within the community.	▪ Across the concept plan area there is a diverse mix of uses and residential types proposed. ▪ Spaces and uses are strategically configured to minimise conflicts, but are well connected to improve interaction.	▪ Plan for a range of styles and prices of housing stock to encourage for a varied demographic mix. ▪ Identify community facilities and open space appropriate for a range of ages / cultures.
	The development has access to the services, employment opportunities and communities	▪ The development is well placed with direct access in the west to the Princes Highway with links to Dapto, and in the north through to the communities of	▪ Plan for a high frequency bus service to connect with the existing and proposed rail stations, and to form part of the greater Illawarra Region bus route network

Liveability

Theme	Desired Sustainability Outcomes for Tallawarra Lands	Concept Plan actions that begin to address the desired outcomes	Considerations for future actions (note: these do not form part of this approval)
	of the wider region.	Koonawarra and Kanahooka.	
Adaptable	The development considers the potential of future change.	▪ The concept plan and underlying land use zoning provides some flexibility to permit change of uses as the needs of the community change. ▪ The design of subdivisions and service planning consider the opportunities of future change in use / density ▪ Infrastructure servicing will be phased to respond to the progressive development Tallawarra Lands. This will optimise headworks and support specific servicing outcomes that are efficient and relevant to the time of the respective development stages.	▪ The building and housing design guides could consider the universal housing design principles and consider adaptability in detailed design.

Economic Prosperity

Theme	Desired Sustainability Outcomes for Tallawarra Lands	Concept Plan actions that begin to address the desired outcomes	Considerations for future actions (note: these do not form part of this approval)
Education	The development provides education facilities.	▪ A primary school site has been identified in the lakeside precinct of the concept plan. ▪ The extensive areas retained as green space and revegetation provide opportunities for the community to appreciate and learn about the natural environment.	▪ Consider potential shared use of the school facilities for educational or community use after school hours.
Employment	Local employment opportunities are considered.	▪ Tallawarra Lands is likely to create over 2000 jobs locally when developed. This will include employment associated with the following: - School - Aged Care - Retail - Commercial - Tourism - Future employment lands	▪ Identify opportunities to generate a range of different and innovative employment opportunities for locals or others within the employment lands and the town centre.
	Employment lands within the development are well connected to non-employment uses.	▪ The network of roads, dedicated cycle lanes, footpaths and pedestrian/cycle share ways provide efficient connection across the range of proposed uses. ▪ While inter-connecting, the access networks promote defined transport links to employment lands that are external to residential precincts.	▪ Consider developing a street and public landscape plan that enables visual connection between uses.
Investment	Investment will be attracted into the area through the provision of business facilities.	▪ TRUenergy is considering the provision of optical fibres throughout the development to enable improved connection of businesses and the new community. ▪ TRUenergy is investigating opportunities to partner with Integral in installing Smart Grid technologies to enable greater energy certainty for businesses and the new community.	▪ Consider opportunities to sponsor business start-up space or retail to get early provision. ▪ Consider opportunities for investment though the use of future planning agreements. ▪ Incorporate diversity in communications services / providers to maintain options for future development and future technologies.

Economic Prosperity			
Theme	**Desired Sustainability Outcomes for Tallawarra Lands**	**Concept Plan actions that begin to address the desired outcomes**	**Considerations for future actions (note: these do not form part of this approval)**
Innovation	Consideration is given to opportunities for shared resources and knowledge between businesses with a focus on achieving efficiency.	▪ The consideration of a Smart Grid could enable businesses to share energy assets from renewable energy or cogeneration.	▪ Consider opportunities for residents / tenants to access or share storm water infrastructure for harvesting and re-use. ▪ Consider opportunities for community precincts / larger-scale tenants to re-use treated effluent from the Tallawarra Lands sewage network. ▪ Consider / promote transport sharing / pooling initiatives between aged care, business, retail and / or industrial occupants (e.g. bicycles (local), cars (local / regional), buses (regional))
Efficiency	Land use and infrastructure are tailored to forecast demand efficiently.	▪ Residential precincts will be developed at a density of between 12 and 15 dwellings/ha of net residential area. Smaller lots are also being considered to further improve efficiency and affordability. ▪ The retirement living precinct will be developed at 18 to 25 dwellings/ha of site area. ▪ Infrastructure servicing will be phased to respond to the progressive development Tallawarra Lands. This will optimise headworks and support specific servicing outcomes that are efficient and relevant to the time of the respective development stages	▪ Consider smaller lots and increased density where appropriate ▪ Consider the demand and supply of utilities when planning infrastructure to match the demand measures being taken.
	Consideration is given to long term operation costs of the development in the design detail.	▪ Investigations into on site rainwater reuse and Smart Grid for Tallawarra Lands may enable reductions in future operating costs through improved resource efficiencies. ▪ Higher water and energy targets proposed in the concept plan will reduce the long term operating costs of the development. ▪ The inclusion of a range of uses and effective local transport options will reduce reliance on the private vehicle and potentially reduce operating costs for residents.	▪ Consider careful staging to manage the infrastructure delivery costs / excavation and public infrastructure. ▪ Where possible, consider points for connecting site services that are convenient to development stages / precincts to minimise mains extensions / augmentation and optimise site servicing runs. ▪ Develop integrated servicing strategies that consider life-cycle costs, environmental costs, operating costs and overall cost-benefit.

Environmental Quality

Theme	Desired Sustainability Outcomes for Tallawarra Lands	Concept Plan actions that begin to address the desired outcomes	Considerations for future actions (note: these do not form part of this approval)
Environmental enhancement	High quality native vegetation is protected, and enhanced.	▪ Preparation of an Environmental Management Strategy (EMS) that integrates the approach for management in non development areas within the Tallawarra Lands development area to ensure continued protection, maintenance and improvement of recognised values. This includes actions to: - Enhance high conservation riparian areas - Improve the condition of native remnant vegetation - Manage the bushfire risks - Provide habitat connectivity - Set development controls ▪ The concept plan and EMS protects approximately 96% of the EEC's on site	▪ Preparation of a Construction Environmental Management Plan (CEMP) incorporating a Soil and Water Management Plan (SWMP) ▪ Consider detailed actions around site management, revegetation, weed control, urban environmental interface, riparian management and bushfire risk management in line with the EMS prepared under the concept plan.
	Development recognises and protects existing watercourses.	▪ WSUD measures will be provided to retain and filter runoff from development areas prior to discharge into existing watercourses. ▪ Retention of stormwater will assist to minimise impacts on existing stream form and ecology. ▪ Riparian buffers will be provided to protect water quality and bank stability.	▪ Consideration of the significant opportunities for harvesting and use of rainwater from roofs and stormwater from other surfaces. Diversion of excess stormwater from the watercourses by harvesting would provide additional benefits to long term stream health. ▪ TRUenergy is considering opportunities for rainwater harvesting from within the catchment for use within the neighbouring Power Station.

Environmental Quality			
Theme	**Desired Sustainability Outcomes for Tallawarra Lands**	**Concept Plan actions that begin to address the desired outcomes**	**Considerations for future actions (note: these do not form part of this approval)**
	Water quality from Tallawarra Lands is prioritised through construction and operation.	▪ Biofiltration basins are incorporated into the landscape design of open space areas to manage sediment, nutrients and other common stormwater pollutants. ▪ Erosion and Sediment Control measures will be employed throughout all construction phases of development to protect local drainage systems, watercourses and Lake Illawarra.	▪ Consideration of the opportunity to exceed current best-practice WSUD objectives building on the concept plan works.
Reducing footprint	Transport options are available that reduce the use of fossil fuels.	▪ Road network and bike paths connective to existing residential areas of Kanahooka and Hayward's Bay. ▪ Significant provision of pedestrian and cycle infrastructure in the concept plan. ▪ Careful location of different land use activities to minimise the need for internal travel by car.	▪ Identify appropriate actions to seek access to the regional bus network. ▪ Consider identifying opportunities to promote transport sharing / pooling initiatives between aged care, business, retail and / or industrial occupants (e.g. bicycles (local), cars (local / regional), buses (regional))
	Construction and operational waste is managed to minimise waste sent to landfill.	▪ The concept plan and staging have considered the cut and fill requirements from the site to minimise exporting off site.	▪ Consider a target of 90% of waste generated from civil works is either reused or recycled and diverted from land fill. ▪ Consider a target of 90% of waste generated from building works reused or recycled. ▪ Consider developing waste management plans for the collection, separation, storage and recycling/reuse of construction waste
	Water efficiency is maximised at Tallawarra Lands.	▪ The concept plan commits future residential development to an equivalent of NSW BASIX water target +10% (50% at August 2010). ▪ The concept plan encourages future commercial and retail developments to aspire to a target of a 40% reduction in operational potable water use in comparison to similar types of development in NSW. ▪ Stormwater harvesting is being considered for the Central Precinct to irrigate the sports fields and open space.	▪ Consider preparing guidance for water reuse for the proposed domestic and commercial buildings. ▪ Consider selection of landscape species that minimise areas of landscape that require high levels of irrigation. ▪ Ensure that detailed planning does not create barriers to use of alternative water sources.

Environmental Quality			
Theme	**Desired Sustainability Outcomes for Tallawarra Lands**	**Concept Plan actions that begin to address the desired outcomes**	**Considerations for future actions (note: these do not form part of this approval)**
	Energy efficiency is maximised at Tallawarra Lands.	▪ The concept plan commits future residential development to an equivalent of NSW BASIX energy target +10% (50% at August 2010). ▪ The concept plan requires future commercial and retail developments to aspire to a target of a 40% reduction in operational greenhouse gas emissions associated with energy use in comparison to similar types of development in NSW. ▪ A Smart Grid is being considered by TRUenergy in discussion with appropriate agencies and engineers. ▪ At the superlot scale the master plan facilitates around half of the lots to have the passive energy preferred long axis of between 200^0W of N to 300^0E of N or between 200^0N of E to 300^0S of E.	▪ Consider preparing detailed design guidance or providing a design advisory service to assist builders in orienting and arranging housing to maximise passive energy design principles. ▪ Consider design efficiencies, demand management and alternative sources of energy to maximise energy efficiency at Tallawarra Lands.
	The development uses materials of high environmental quality.	▪ Landscape design will focus on local natural and recycled materials as well as those with minimal embodied energy. ▪ Site top soil and rock are to be reused as much as possible. ▪ Where appropriate green waste including any vegetation cleared during the development process will be recycled in the landscape works.	▪ Consider preparing design guidelines to include specification for preferred building method and materials.

Design Excellence

Theme	Desired Sustainability Outcomes for Tallawarra Lands	Concept Plan actions that begin to address the desired outcomes	Considerations for future actions (note: these do not form part of this approval)
Effective planning practice	The concept plan sets clear planning and design direction for the future of Tallawarra Lands	▪ This concept plan and sustainability framework provides a mechanism for holding and delivering the design and sustainability vision for the project.	▪ Leverage next phases of development of the concept plan and sustainability actions and seek alignment with the vision. ▪ Consider how the land uses can be effectively coordinated.
Integrated	The development is consistent with the character of surrounding neighbourhoods.	▪ The development will complement the suburban character of surrounding areas - both the new area of Haywards Bay and the existing areas of southern Dapto. ▪ It will be low-rise, comprised primarily of detached buildings framed by the greenery of well-planted streets and public spaces.	
	The design for Tallawarra Lands responds to its location and considers the site opportunities and constraints.	▪ The concept plan maximises public access to the waterfront and visual amenity of the lake. ▪ The concept plan responds to the sites topographic, flooding and biodiversity assets.	▪ Dwelling designs could consider aspect and views when locating rooms and living areas.
Adaptable	Buildings and spaces are able to be changed to meet different needs.	▪ The street grid of the project will enable redevelopment of individual sites over time, while maintaining the overall urban fabric.	▪ Consider preparing design guidelines that will enable buildings and spaces to be able to be changed to meet different needs over time.
Desirable	Housing districts have a distinct and recognisable character.	▪ Development precincts are shaped by the environmental features of the site, including the lake foreshore. ▪ Duck Creek and creek systems, lakes, ridges and escarpment. The relationship between development precincts and these features is an intrinsic element of the character	▪ Consider creating attractive and memorable entry points to Tallawarra Site and within each precinct

Design Excellence			
Theme	**Desired Sustainability Outcomes for Tallawarra Lands**	**Concept Plan actions that begin to address the desired outcomes**	**Considerations for future actions (note: these do not form part of this approval)**
	The development has good visual amenity.	▪ The majority of streets within the project will have vistas directly toward water, bushland and open spaces. ▪ New electrical distribution, telecommunications and gas services shall be located underground. ▪ Landscape design of streets and public open spaces will create an integrated series of attractive public places.	▪ Consider recognising the existing distinctive character of the site in preparing the detailed landscape design of open space areas.
	Development will enhance views of water and ridgelines.	▪ External views toward the development will be enhanced by the protection and planting of ridgelines, foreshores and creek systems. Street tree planting will take account of views to water and hills as well as undeveloped hills and ridges.	▪ Consider at detailed design phase to maximise the potential for local and regional views.
	Development will have a visual connection with region.	▪ The urban structure of the development both protects and integrates natural and cultural features into the new urban fabric.	▪ Consider the regional visual context in preparing detailed design.
	Indigenous and European heritage is identified, considered and protected where possible.	▪ A review of the indigenous heritage on Tallawarra Lands has been undertaken in the preparation of the concept plan. ▪ Further research into the history of individual buildings on the site can establish the level of significance of the archaeological deposits where they exist.	▪ Consider how archaeology can be retained on site or if not feasible, recorded and perhaps interpreted within future development.

Design Excellence

Theme	Desired Sustainability Outcomes for Tallawarra Lands	Concept Plan actions that begin to address the desired outcomes	Considerations for future actions (note: these do not form part of this approval)
Accessibility	The development provides physical connections internally and to surrounding areas.	▪ The connections of the project to external road network enable connectivity but do not create undue adverse impact upon surrounding developed areas ▪ Roads, dedicated cycle lanes, footpaths and pedestrian/cycle share ways will connect to those in adjoining areas where possible ▪ The development is well placed with direct access in the west to the Princes Highway with links to Dapto, and in the north through to the communities of Koonawarra and Kanahooka. ▪ The streets have been planned to accommodate a bus route with good accessibility between residential and employment areas within the development and surrounding areas and train stations. ▪ General precinct and pedestrian and cycleway planning responds to topography to support desirable gradients for areas requiring greater accessibility / permeability. ▪ The road hierarchy network has been developed to differentiate different 'orders' and characters for streetscape and access throughout Tallawarra Lands.	▪ Consult with bus operators to provide a high frequency bus service to connect with the existing and proposed rail stations. ▪ Review compliance of gradients for pedestrians and cyclists in areas where high and / or recreational use is envisaged.

Governance			
Theme	**Desired Sustainability Outcomes for Tallawarra Lands**	**Concept Plan actions that begin to address the desired outcomes**	**Considerations for future actions (note: these do not form part of this approval)**
Coordinated and transparent approach	Tallawarra Lands share the achievement of its vision in partnership with key stakeholders and the community.	▪ Through engagement with the CLG and through the Part 3A approvals process the concept development has progressed through a transparent and accountable decision making process and through a process of considered engagement and approvals.	▪ Public consultation and exhibitions would be associated with future subdivision or civil works approvals. ▪ Plan for continued engagement with the CLG in preparing the plans and approvals for subdivision and civil works approvals
Committed to implementation	The vision for Tallawarra Lands will be delivered through practical and market appropriate staging and through utilising the governance embedded in the planning and approvals framework.	▪ The sustainability framework sets the desired outcomes for Tallawarra Lands to ensure consistency enable implementation of a coordinated vision.	▪ Consider developing a voluntary planning agreement with Council and relevant agencies that considers the sustainability framework.
	Applications at the Concept, Master Planning, Subdivision and Project Application stages provide an assessment of the proposal against the provisions of this sustainability framework.	▪ The sustainability framework is carried through inclusion in the statements of commitments for the concept approval. ▪ This table provides the assessment of the sustainability initiatives planned for the concept approvals phase against the framework.	▪ Assess the next master plan level planning approvals against this framework.
	The responsibility for establishing the next action towards achieving the desired sustainability outcomes is transferred to the next development phase.	▪ The next phase of development needs to identify and set actions to progress the desired sustainability outcomes for the Tallawarra Lands.	▪ Consider developing detailed design guidelines that include sustainability features to inform the next development phase. ▪ Consider covenants, incentives, bonds, development agreements to drive sustainability outcomes. ▪ Consider developing sustainability guidance relevant to individual lots or buildings at the appropriate planning phase.
	Significant property transactions	▪ Proponents of significant property transactions or	

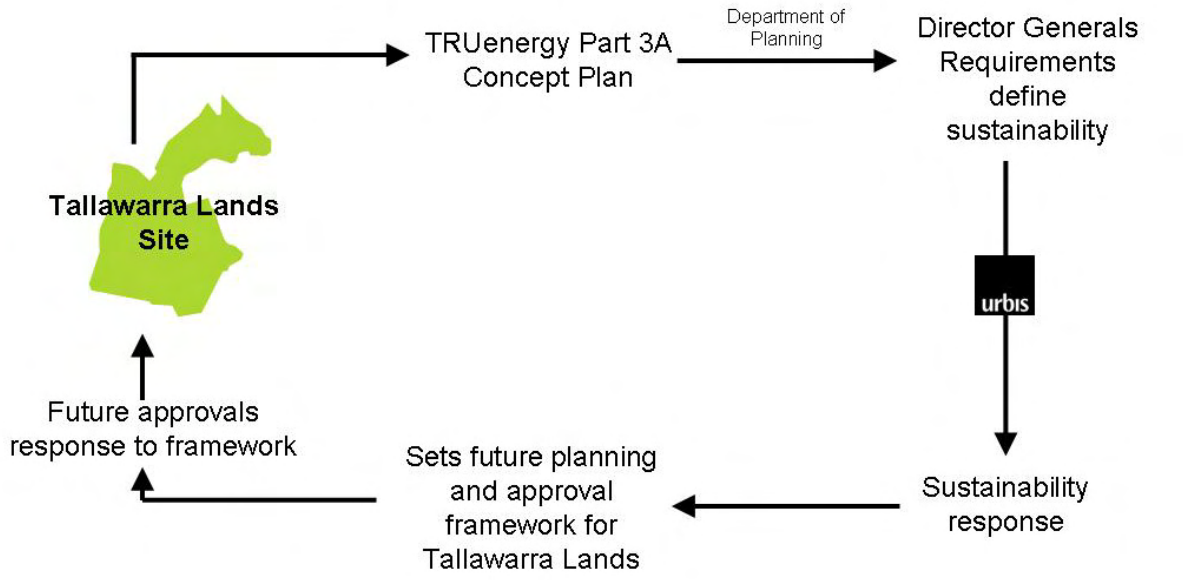
Governance			
Theme	**Desired Sustainability Outcomes for Tallawarra Lands**	**Concept Plan actions that begin to address the desired outcomes**	**Considerations for future actions (note: these do not form part of this approval)**
	or development agreements include an assessment against the desired outcomes set out in this framework.	development agreements on Tallawarra Lands will be required to prepare an assessment of proposed actions in response to desired sustainability outcomes.	
Engaged	The Tallawarra Lands Community Liaison Group (CLG) and the surrounding community are actively engaged in any future development proposals at Tallawarra Lands.	▪ The CLG was engaged throughout the development of the structure plan and concept plan for Tallawarra Lands. Presentations and meetings were arranged monthly with TRUenergy and members of the consultant team. ▪ Five public community information sessions were held throughout the master planning process for Tallawarra Lands to engage and share with the surrounding community.	▪ Plan for continued engagement with the CLG in preparing the plans and approvals for subdivision and civil works approvals.
Sustainable cultures and behaviours	Tallawarra Lands in its operational phase provide a case study for effective sustainability for the community and development industry.	▪ The framework through requiring a response to desired outcomes at appropriate development phases will encourage sustainable decision making and planning by key project stakeholders.	▪ Consider highlighting the sustainability features of the development in the community centre, sales office and public signage within the development site.
Rewarding innovation	Tallawarra Lands provides the flexibility to support innovations in planning for improved liveability, economic and environmental outcomes.	▪ Embedding a sustainability framework into the concept plan approvals and requiring coordinated response for the next development phases.	▪ Identify innovations appropriate to stage. ▪ Consider development incentives for improved sustainability outcomes.

4.3 Framework governance

To ensure effective delivery a sustainability framework must sit within a governance structure that can hold the vision and ensure an effective response to the desired outcomes. It is proposed that this sustainability framework requires stakeholders (or parties responsible for decision making) at each phase to respond to what steps they are taking to deliver actions on achieving the desired outcomes. This focuses on using the regulatory process and process of the Part 3A to ensure effective response to the projects desired outcomes.

The intent is that the response to the desired sustainability outcomes is managed at the appropriate level of planning, at the appropriate phase. This enables a coordinated delivery towards the desired sustainability outcomes. The following diagram shows this relationship.

Figure 6 – Sustainability Governance



For example the consideration of a Smart Grid at the concept approvals phase will achieve network efficiencies in its own right and facilitate future delivery of renewable or low carbon infrastructure at a later stage. It is the later stages where the appropriate renewable energy options will be considered.

It is proposed that the governance framework for sustainability be applied at the locality, neighbourhood, civil works and subdivision scales and a response included in any planning approvals, sales or joint venture agreements set up at Tallawarra Lands. A template for response at later development phases is included in Appendix B.

It is proposed that the actions towards the desired outcomes would be considered at each of these development and approvals phases to build on previous activities and hold the vision for the desired sustainability outcomes. This effectively passes the responsibility for detailing appropriate actions at each scale and phase to the appropriate stakeholder.

It is not proposed that this framework be applied at individual lot or building development scale. It would be proposed that alternative sustainability guidance is prepared to facilitate this scale of development.

5 Response to the DGRs

The DGRs for Tallawarra Lands were developed following consultation with relevant government agencies and key project stakeholders. The following extract from the DGRs provides the ESD requirements for the Tallawarra Lands concept plan.

> *The EA shall detail how the development will incorporate ESD principles in the design, construction and ongoing operation phases of the development and comply with SEPP (Building Sustainability Index BASIX) 2004, including commitments of sustainability through:*
>
> *a) Lot orientation*
>
> *b) Water reuse*
>
> *c) Waste minimisation*
>
> *d) Minimisation of energy use and*
>
> *e) Reducing car dependency, etc*
>
> *f) The use of flood compatible design and building materials where relevant*

The sustainability framework in the previous section highlights some of the responses being undertaken as part of the current concept plan. The section below provides further details to those ESD features specifically identified in the DGRs.

5.1 Principles of ESD and Sustainability

The development will incorporate ESD principles in the design, construction and operation through requiring a response for each phase of the development planning to prepare a response to the desired sustainability outcomes set in the Tallawarra Lands sustainability framework.

The framework was set up through careful consideration of the long term or ultimate outcomes which then translated to the identification of the shorter term desired outcomes for Tallawarra Lands. This then provided for targeted actions to be developed to deliver appropriate steps towards achieving those desired outcomes applicable to this stage of planning approvals. The framework then commits the next stages of the development approvals to respond to the desired outcomes and identify the further actions towards progressing their delivery.

Preparing a response to the framework requires consideration and decision making to identify opportunities to align with the desired outcomes. This facilitates support for achieving a coordinated response towards the desired outcome that effectively hands the baton to the next owner, developer or consent authority to ensure a consistent approach. This will enable the principles of ESD to be embedded in the design, construction and operation of the development.

5.2 Response to BASIX

The DGRs require that the development shows a commitment to complying with State Environmental Planning Policy (Building Sustainability Index BASIX) 2004 (BASIC SEPP 2004). The BASIX SEPP 2004 requires new residential dwellings within the concept plan to achieve a 40% reduction in energy and water use over the NSW average. The actions being undertaken to facilitate BASIX at the concept phase include the following:

- This concept plan commits future residential development at Tallawarra Lands to achieving energy and water reductions equivalent to BASIX +10%. At this stage of the master planning the development facilitates this achievement through a consideration of lot orientation, maximising breezes, design guidance and though achieving infrastructure efficiencies. (Note: This does not

commit the dwellings to BASIX 50 but to an energy / water reduction equivalent. This means that considerations outside the BASIX rating tool can be used to achieve the outcome.)

- Additional steps required to meet the energy and water targets could be delivered through infrastructure design (Smart Grid / network savings), indigenous landscaping, scaled grey water systems and solar thermal (hot water) or solar photovoltaic (electricity).
- In addition to steps taken on the residential components the concept plan requires that the principles of BASIX are used for the commercial and retail components proposed in Tallawarra Lands. This will be achieved by aspiring to a target of a 40% reduction in greenhouse gas emissions associated with energy use and a 40% reduction in potable water use compared to that of similar types of development in NSW. The intent would be to utilise Green Star and the NSW energy and water Savings Action Plans as means to target, deliver and report on utility reductions.

5.3 Lot orientation

Considering lot orientation is an important factor in achieving energy efficiency and amenity benefits for the future residents and tenants. The factors for consideration when designing lot orientation include:

- Facilitate effective solar orientation of future buildings for energy and aesthetic benefit. Wherever practicable, lots will have a long axis of between 20^0W of N to 30^0 E of N or between 20^0N of E to 30^0 S of E. This can be achieved for over half of the lots. The rest are fixed by key site features, including land slope, foreshore, creek lines and existing infrastructure.
- Providing access to local and regional views. The majority of streets provide a vista into key environmental attributes, including Lake Illawarra, Duck Creek and other riparian corridors, retained lakes and other open space and vegetated areas.
- Ensuring the lots respond to the existing topography to minimise excavation. Roads are arranged to run perpendicular to contours where the slope exceeds 1in 15 (6.7%). This ensures that retaining wall heights are minimised and that vehicular access is achieved with least earthworks.
- Positioning to maximise access to through breezes. Street alignments are perpendicular to the lake foreshore and to the contours of the Mt Brown escarpment. This will favour the penetration of breezes into the residential precincts.
- Consideration of natural surveillance and address to the street. All streets and public spaces are addressed by residences and active uses.

At the scale which the current concept plan is being prepared, the details of individual lot orientation is not being fixed. The road network and super lots have been defined to facilitate future lot orientation that maximises the assets of the land for both passive energy and amenity considerations. The roads have generally been aligned to a North Westerly or North Easterly direction which enables the long side of the lots to achieve effective lot and building orientation to maximise passive solar design principles.

The concept plan has included an indicative lot orientation which will be finalised and confirmed through future subdivision DA's. The indicative layout in the concept plan specifies the following break down of lot orientation:

- Around 50% of indicative lots are oriented to easily facilitate future building orientation to maximise passive solar design principles. Other lots can still consider passive solar design principles and building orientation independent of lot orientation.
- The balance of lots is oriented to provide for access to local or regional views or in line with topographical constraints.

To further build on the lot orientation considerations, future design guidance could include passive solar design principles such as building orientation, external shading, thermal zoning, cross ventilation, use of thermal mass and glazing.

5.4 Water reuse

One of the stated desired outcomes for Tallawarra Lands is to maximise water efficiency. This includes a commitment to identifying opportunities for water reuse. The actions being undertaken as part of the concept approvals phase include the following:

- A BASIX equivalent potable water target is set for the residential, commercial and retail portions of the development.
- Stormwater harvesting is being investigated for the central precinct. In this precinct the topography provides a catchment for stormwater harvesting for use irrigating the sports grounds and possibly the landscaping in the neighbourhood centre. This system would collect water from the street network for treatment and storage in tanks beneath the sports fields. The stormwater harvesting system will be considered in consultation with Council and confirmed at the civil works phase and agreements with Council.

Other actions being considered include:

- TRUenergy is considering installing in ground water tanks on lots at civil works stage. The scale of economy in construction of multiple tanks could result in larger storages being provided on individual sites, thereby embedding value and water conservation initiatives into the overall development of Tallawarra Lands. It is noted this initiative would require careful planning to offer some flexibility for integrating / connecting future buildings on the Lots.
- TRUenergy is investigating opportunities to harvest and treat water from portions of the site for potential use in the neighbouring Power Station.
- Sydney Water has confirmed their preferred strategy for water servicing to Tallawarra Lands should incorporate rainwater harvesting for non-potable uses (where appropriate). They have not confirmed whether a third pipe recycled water system would be supported. TRUenergy and Northrop are in discussions with Sydney Water about opportunities to provide a third pipe recycled water system for the development.
- TRUenergy is considering using lakes for irrigation of the public domain where water quality is appropriate (particularly salinity).

5.5 Waste minimisation

One of the stated desired outcomes for Tallawarra Lands are to minimise the construction and operational waste sent to landfill. This can be achieved firstly through minimising the generation of waste and then through seeking reuse or recycling options before considering land fill.

The actions being undertaken as part of the concept approvals phase include the following:

- The design incorporates careful consideration of the existing topography in the design to reduce waste generation from civil works. The concept plan layout and proposed staging limit the need to export fill off the concept plan area.
- The desired outcome for waste in the sustainability framework will require a response at the civil works and the subdivision phases which will facilitate appropriate actions to minimise waste at those stages.
- The former ash storage areas will be potentially transformed for urban development and employment lands.

Other actions being considered include:

- TRUenergy are considering requiring waste management plans as part of the building approvals process to target a 90% of waste generated from civil works and building construction to be diverted from landfill.

5.6 Minimisation of energy use

The stated desired outcome for energy at Tallawarra Lands is to maximise the energy efficiency of the development. The ultimate outcome from the perspective of minimisation of energy use is a reduction in the greenhouse gas emissions associated with energy use. For this reason the focus for Tallawarra Lands extends the minimisation of energy use to a focus on the reduction on carbon intensity of energy use.

The most energy and cost efficient means of minimising energy use in development is to focus firstly on reducing demand through behaviour change and passive design measures, then seeking key energy efficiency measures from structure, fit outs and appliances and then a focus on low carbon or renewable energy supply options. At the master planning phase, key decisions are made around super lot orientation, energy infrastructure provision and energy supply options. The actions being undertaken as part of the concept approvals phase include the following:

- TRUenergy is currently investigating the use of Smart Grid technologies in the development which has the potential to achieve improved energy efficiencies and provide effective support for renewable energy systems and demand management actions. Refer to Appendix C for details.
- The super lots and the road design in the master plan have been arranged to maximise breeze corridors and solar access, to meet the topographic challenges of the land and to facilitate building orientation to maximise the principles of passive solar design.
- Extending the energy target for residential development to achieve an equivalent to the BASIX +10%.
- Requiring future commercial and retail developments to aspire to a target of a 40% reduction in operational greenhouse gas emissions associated with energy use in comparison to similar types of development in NSW.

Other actions being considered include:

- TRUenergy is considering the role of a distributed energy system using in ground generators providing efficient electricity, heat and cooling to the community.
- TRUenergy and Northrop are investigating opportunities for networked gas. This may enable consideration of other energy options including gas boosted solar hot water / instant gas hot water / efficient heating or more energy efficient cooking. Industrial gas supplies are also being considered to provide opportunities for cogeneration systems for the community or energy intensive businesses.
- Consideration is being given to encouraging any future display village to feature and promote sustainable housing design principles and examples of energy efficient homes.
- TRUenergy will investigate with Council and relevant authority's opportunities for low energy street lighting or on the off road footpaths and pedestrian/cycle share ways or potential electric car charging stations in appropriate locations around the development site.

5.7 Reducing car dependency

Reducing car dependency can provide a positive outcome for the local community in terms of cost, social benefit and reduced greenhouse gas emissions. In master planning, reduced car dependency can be achieved by ensuring good access to essential services, employment and schools through local provision or through providing for effective connections through public transport or footpaths and pedestrian/cycle share ways, together with dedicated cycle lanes along the main road.

The Tallawarra Lands concept plan provides a mix of uses that will encourage local non-car based trips. The concept plan includes the provision of local shops, community facilities, a school and employment lands as well as the residential component. These are all well connected through a network of footpaths, pedestrian/cycle share ways, dedicated cycle lanes and the local road network.

Other actions being considered include:

- TRUenergy is currently investigating opportunities to extend the local bus network to run through the site to enable regional trips to be made via public transport.
- TRUenergy is currently identifying opportunities to extend existing local school bus routes to include Tallawarra Lands when the local student population demand is sufficient.
- TRUenergy is considering including provisions for cycle parking in the design guidance for the residential and commercial uses.
- TRUenergy is considering requiring a sustainable travel plan to be prepared as part of every commercial development DA.

5.8 The use of flood compatible design and building materials where relevant

The concept plan levels have been designed to minimise the risk of flooding and all habitable floor areas have been designed above the 1:100 year flood levels. The risks associated with the potential sea level rise benchmarks have also been considered.

The impact of overland flows and water velocity have been carefully considered in the concept plan and where appropriate water flows will be detained or retarded through storm water systems.

Appendix A Recommended Statements of Commitment

A.1 Recommended inputs into statement of commitments for the Concept Plan

Recommended statement of commitments to carry the sustainability commitments for Tallawarra Lands:

- Commit next approvals phase to providing a response to the desired sustainability outcomes identified in the framework at the Concept, Master Planning, Subdivision, Civil Works and Project Approvals phases of development.
- Commit the proponents of significant property transactions or development agreements on Tallawarra Lands to prepare an assessment of proposed actions in response to desired sustainability outcomes.
- Commit to residential development achieving potable water and greenhouse gas reductions equivalent to BASIX +10% (2010 = 50%).
- Require future commercial and retail developments to aspire to a target of a 40% reduction in operational greenhouse gas emissions associated with energy use in comparison to similar types of development in NSW.
- Require future commercial and retail developments to aspire to a target of a 40% reduction in operational potable water use in comparison to similar types of development in NSW.

Appendix B Framework Template for future approvals

Table 3 – Sustainability framework template for further approvals

Principle	Theme	Desired Sustainability Outcomes for Tallawarra Lands	Actions that address the desired outcomes
Liveability	**Affordable**	The affordability of the development is appropriate to the local market.	
	Healthy, safe and secure	The development is designed to minimise crime.	
		Healthy behaviours such as walking and cycling are encouraged.	
	Inclusive and cohesive	Uses within the site are physically and visually connected to provide access to local services, employment opportunities and social networks.	
		Uses and environments within the development are diverse to cater to the needs of different groups within the community.	
		The development has access to the services, employment opportunities and communities of the wider region.	
	Adaptable	The development considers the potential of future change.	
Economic Prosperity	**Education**	The development provides education facilities.	
	Employment	Local employment opportunities are considered.	
		Employment lands within the development are well connected to non-employment uses.	
	Investment	Investment will be attracted into the area through the provision of business facilities.	
	Innovation	Consideration is given to opportunities for shared resources and knowledge between businesses with a focus on achieving efficiency.	
	Efficiency	Land use and infrastructure are tailored to forecast demand efficiently.	
		Consideration is given to long term operation costs of the development in the design detail.	

Principle	Theme	Desired Sustainability Outcomes for Tallawarra Lands	Actions that address the desired outcomes
Environmental Quality	**Environmental enhancement**	High quality native vegetation is protected, and enhanced.	
		Development recognises and protects existing watercourses.	
		Water quality from Tallawarra Lands is prioritised through construction and operation.	
	Reducing footprint	Transport options are available that reduce the use of fossil fuels.	
		Construction and operational waste is managed to minimise waste sent to landfill.	
		Water efficiency is maximised at Tallawarra Lands.	
		Energy efficiency is maximised at Tallawarra Lands.	
		The development uses materials of high environmental quality.	
Design excellence	**Effective planning practice**	The concept plan sets clear planning and design direction for the future of Tallawarra Lands	
	Integrated	The development is consistent with the character of surrounding neighbourhoods.	
		The design for Tallawarra Lands responds to its location and considers the site opportunities and constraints.	
	Adaptable	Buildings and spaces are able to be changed to meet different needs.	
	Desirable	Housing districts have a distinct and recognisable character.	
		The development has good visual amenity.	
		Development will enhance views of water and ridgelines.	
		Development will have a visual connection with region.	
		Indigenous and European heritage is identified, considered and protected where possible.	
	Accessibility	The development provides physical connections internally and to surrounding areas.	

Principle	Theme	Desired Sustainability Outcomes for Tallawarra Lands	Actions that address the desired outcomes
Urban Governance	**Coordinated and transparent approach**	Tallawarra Lands share the achievement of its vision in partnership with key stakeholders and the community.	
	Committed to implementation	The vision for Tallawarra Lands will be delivered through practical and market appropriate staging and though utilising the governance embedded in the planning and approvals framework.	
		Applications at the Concept, Master Planning, Subdivision and Project application stages provide an assessment of the proposal against the provisions of this sustainability framework.	
		The responsibility for establishing the next action towards achieveing the desired sustainability outcomes is transferred to the next development phase.	
		Significant property transactions or development agreements include an assessment against the desired outcomes set out in this framework.	
	Engaged	The Tallawarra Lands Community Liaison Group (CLG) and the surrounding community are actively engaged in any future development proposals at Tallawarra Lands.	
	Sustainable cultures and behaviours	Tallawarra Lands in its operational phase provide a case study for effective sustainability for the community and development industry.	
	Rewarding innovation	Tallawarra Lands provides the flexibility to support innovations in planning for improved liveability, economic and environmental outcomes.	

Appendix C Smart Grid initiative

C.1 Preliminary investigations and actions for a Smart Grid at Tallawarra Lands

Tallawarra Lands will always have a legacy associated with its history in energy generation and its ownership by TRUenergy. There will also be a strong future relationship with energy given its proximity to the new power station, its best practice design and its visual prominence in the catchment. For this reason there is an opportunity to stretch initiatives around energy use and energy efficiency on the site to leverage off this relationship and highlight TRUenergy's commitment to energy efficiency and low carbon technologies.

To best enable the Tallawarra Lands in delivering on the desired energy efficient outcomes the base network infrastructure requirements need to be carefully considered. The most recent generation of electrical network technology enables significant efficiency gains, and provides for the flexibility of adding renewable energy, distributed generation, Electric Vehicles and storage capacity to the network; this technology is referred to as "Smart Grid". The following is a simple definition of a smart grid provided by the USA Energy Agency:

Far more than "smart meters," a fully functioning Smart Grid will feature sensors throughout the transmission and distribution grid to collect data, real-time two-way communications to move that data between utilities and consumers, and the computing power necessary to make that intelligence actionable and transactive. - http://www.smartgrid.gov/

Evaluating a deployment of smart grid technology at the infrastructure delivery phase will enable the following energy technologies to be considered at the subdivision and development phase for Tallawarra Lands:

- Distributed generation – small, widely dispersed plants, generally in close proximity to load.
- Renewable energy – domestic or commercial solar PV, micro wind or hydrogen fuel cells and particularly return to grid.
- Energy storage – residential or grid-scale storage, including batteries, capacitors, hydrogen or compressed air storage, fuel cells, electric vehicle-to-grid discharge, flywheels, and other emerging technologies.
- Distributed Heat / Cooling – enable the tracking, sale and grid management of distributed heat or cooling either from a distributed generation system.
- Demand response – decreasing demand instead of increasing supply in response to peak loads, and empowering energy consumers (residential and commercial/industrial) to control their energy usage, optimise when they use power, and mitigate their carbon footprint.
- Support for electric vehicles – plug in electric vehicles are forecast to have an impact on grids. This impact could be positive (by using vehicle-to-grid discharging to support the grid at peak times) or negative (by dramatically increasing peak loads if charging is uncontrolled).
- Improved reliability, safety and power quality as a benefit to businesses and residents.
- Maximised demand response and efficiencies in the dwellings / businesses.

Energy distributors and retailers across Australia are at different stages of currently testing, piloting and rolling out Smart Grid technology across their networks. Integral have prepared a multi-year strategy for Smart Grid technology and are currently considering pilot programs in NSW. The first generations of this technology are likely to become standard practice for new developments over the next few years.

Tallawarra Lands offers a unique opportunity to stretch some of the current thinking on smart grids and the opportunity to pilot and test some of the available technologies due to its mix of uses, proximity to a generator/heat load, data network and focus on other sustainability initiatives. Some of these may be worth considering by TRUenergy and Integral:

- A pilot for demand matching commercial / residential uses and shifting non-critical load to off-peak times.

- A pilot for considering heat / cooling demand in the smart grid technology (CHCP community heating and cooling plant utilising waste heat from the generator).
- A pilot focussing on the sustainability benefits (rather than just the peaking, infrastructure and demand benefits) on a project.
- A pilot for using NBN optical fibre network as a last-mile communications technology for smart grid devices, including smart meters, LV transformer monitoring devices, and feeder automation.

The set up of a Smart Grid at Tallawarra Lands will rely on a close partnership to be developed between Integral and TRUenergy to facilitate an outcome. A technical specialist would also be worth including in the partnership such as GE who specialise in Smart Grid technology. Some of the key considerations for the partnership include:

- For Tallawarra Lands, it provides effective support for the desired energy efficiency outcomes and may provide a more cost efficient network. It also provides improved energy security and a first class energy network for both the business and residential users.
- For Integral, it provides an opportunity to advance their experience with the technology and trial it across a new master planed estate with a diverse range of land uses, energy sources and fibre network. It will also increase Integrals ability to manage peak loads and manage demand within the new development.
- For TRUenergy, it provides and opportunity to positively position energy leadership on a legacy project and to share experiences and findings with Integral in understanding the planning and industry implications of Smart Grid technology.
- For GE, it provides an opportunity for Tallawarra Lands to leverage off global experience in Smart Grid technology to develop an integrated world class model for Tallawarra Lands, maximising the energy assets and the sustainability focus of the development.

The development is currently going through the planning approvals phase and seeking approvals from government agencies and utilities providers. The next steps for TRUenergy are to develop a formal partnership between TRUenergy, Integral and GE to develop a Smart Grid strategy for Tallawarra Lands.

Sites for reference / information

- http://en.wikipedia.org/wiki/Smart_grid
- http://ge.ecomagination.com/smartgrid/
- http://www.itsyoursmartgrid.com/
- http://www.oe.energy.gov/SmartGridIntroduction.htm
- http://www.oe.energy.gov/DocumentsandMedia/Environmentalgroups.pdf

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