Sustainable Area Planning (SAP) Framework for Sustainable Transport in Growth Centres – Case Study Central Coast, New South Wales, Australia

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Introduction

Governments around the world are expressing a desire to better balance development with current and forecasted diminishing natural resources. These governments are concluding there is a need to adopt sustainability principles within an ecologically sustainable development (ESD) based urban planning framework (Beder 1996). Many of these governments are turning to sustainability programs at both local and regional levels to balance social, economic and environmental components of ESD, including equity and good governance principles. Urban planning that combines land use planning and natural resource planning into one discipline can be called 'sustainable planning' or 'ESD based urban planning' (Brandon 1997). Sustainable transport is one of those ESD based urban planning disciplines. Many current urban planning schools of thought reinforce the need for sustainable transport, including schools of: integrated urban planning (Forster 1999), compact cities (Newman 1998), eco villages (Barton 2000), new urbanism (Crofts 1998), smart growth (Crowe 2000), and sustainable transport (Portland City 2002).

The paper's aim is to illustrate how a sustainable transport program can be achieved using the author's research on a sustainable area planning (SAP) framework. The framework can be applied to biodiversity, land, water or transport with an aim to adopt sustainability programs. The author has selected transport to apply the framework using a case study method. The case subject study area to illustrate how the SAP framework would apply is the Central Coast, a northern growth region within the New South Wales (NSW) Greater Metropolitan Region (GMR) of Sydney-Metropolitan, Illawarra, Central Coast and Lower Hunter regions. The paper firstly explains the concept of sustainability and the SAP framework. Secondly, the paper outlines the SAP framework relative to transport within a case study area. Finally, the paper illustrates the application of the SAP framework to the case study area.

1. Sustainability and sustainable area planning (SAP) framework

A starting point in developing an understanding of sustainable transport and the sustainable area planning (SAP) framework is defining 'sustainable' and **'**ESD'. Throughout the 1980s and into the 2000s there have been numerous definitions and interpretations of the expressions 'sustainable' and 'ESD'. 'Sustainable' according to the Macquarie Dictionary is 'to provide the means of supporting life in a balanced way' (Macquarie Dictionary 2001). 'ESD' definition under Agenda 21 is 'the balance of social, economic and environmental factors in development so as not to impact on the next generation" (UN 1992) **(Fig 1).**

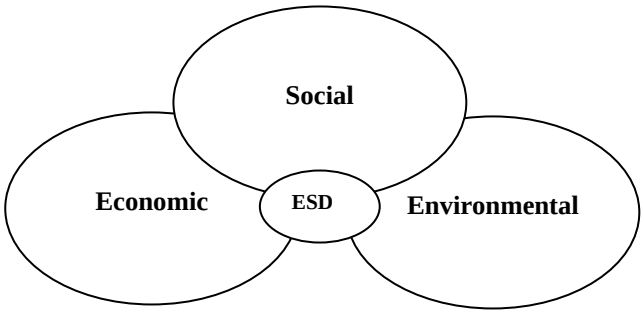

Fig. 1 – ESD Components

The ESD components include balance between social, economic and environmental, with all components are essential to sustainability programs. Within Australia the National Strategy for Ecologically Sustainable Development (NSESD) (Commonwealth 2000) details the importance of development proposals meeting ESD guidelines. While the environmental component of ESD will be used within this paper, the author acknowledges that all three ESD components (social, economic and environmental) need to be incorporated in a full ESD based sustainability program. The environment component consists of both natural (i.e. air and fossil sources) and man made (i.e. infrastructure and housing) parts.

Many professional disciplines and authorities resolve to adopt ESD approaches, but few achieve their intentions (Stillwell 2000). Urban planning is moving to ESD in combining land use planning and natural resource planning components into one discipline called 'sustainable planning' or 'ESD based urban planning'. ESD based urban planning thus utilises ESD criteria in making decisions about land uses and the natural environment in a holistic manner. Authorities are hopeful, in adopting an ESD approach, of achieving better environments and reducing the conflicts often generated over development versus protection arguments (Stimson 1999).

Sustainable transport forms a prime component of urban planning. Rose (1997), for example, argues that authorities need to look at land use planning not in terms of zonings but new dimensions of creating healthy communities, locally and globally. Crowe (2000) goes a step further and states that we can build a more civil society through land use planning based on sustainable building principles. In New South Wales the government introduced a State Environmental Planning Policy (SEPP) – Building Sustainability Index (Basix) (referred t as the Basix SEPP) 2004 (DIPNR 2004a) requiring all newly constructed buildings to be more energy and water efficient commencing in metropolitan areas in July 2004 and outer metro areas in July 2005.

The sustainable area planning (SAP) framework is built around ESD criteria, including ESD protocols, principles, goals and indicators of sustainability (**Fig 2**).

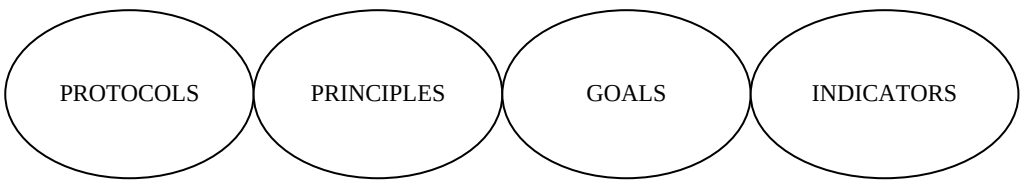

Figure 2 – ESD Criteria – Protocols, Principles, Goals and Indicators of Sustainability

Government or community initiated ESD **protocols** can be adopted at international, national, state, local government (LG) and non-government organisation (NGO) levels. A protocol is 'rules of behaviour to be agreed upon by heads of organisations (the Macquarie Dictionary 2001). The central international protocol relating to ESD is Agenda 21 Program of Action for Sustainable Development). This protocol was adopted in 1992 at the United Nations Conference on Environment and Development (UNCED) (UN 1992a) (called the Earth Summit and often referred to as the Rio Summit given the conference was in Rio de Janeiro, Brazil). Agenda 21 lays out key procedures for governments to adopt ESD strategies, including transport strategies. Also adopted at the Summit were the Rio Declaration on Environment and Development and the Statement of Forest Principles. Advancing on Agenda 21 the UN later developed Local Agenda 21 (LA 21) (UN 1993) from one chapter (Chapter 28) of Agenda 21. LA21 is a mechanism to encourage greater involvement by local authorities in delivering Agenda 21 programs.

The most recent international protocol to gain major public debate is the Greenhouse Gas Reduction Agreement (known as Kyoto Protocol (UN 1997). This protocol came out of the United Nations Framework Convention on Climate Change (UN 1992b). The Kyoto protocol sets targets for greenhouse emission reduction for signature countries within a timeframe (activated by the subscribing countries in 2005). NSW and several other states are examining greenhouse targets under Kyoto principles that could be activated in the absence of the Federal government signing up to Kyoto. Finally, an example of an NGO transport protocol is the 'Toronto Protocol on Public Transport'. This protocol was signed before NGO and professional transport representatives from 79 countries at the 53rd Congress of the International Union of Public Transport in Toronto, Canada, in 1999 (LHCPTLG and Transit Planners 2003). Enactment of New South Wales (NSW) State (herein referred to as State) government acts will often interpret Federal and international protocols and spell out statutory powers to implement the spirit of protocols.

ESD **principles** are integral parts of ESD protocols and related legislative acts. Having adopted ESD principles, authorities are in the position to establish ESD **goals**. Equipped with ESD principles and goals authorities are then in a position to adopt **indicators of sustainability**. Indicators of sustainability are standards that enable ESD goals to be measured and for ESD benchmarks to be established. Transport indicators, for example, include the measurements of greenhouse gases and transport safety.

A case study method is the preferred means of illustrating the application of the sustainable area planning (SAP) framework to sustainable transport. The Central Coast, consisting of Gosford City and Wyong Shire, makes an ideal case study area given the regions transport challenges resulting from high growth rates and dispersed population. The Central Coast is immediately north of the Sydney Metropolitan region and south of Lake Macquarie, Newcastle and Cessnock LG areas and contains a population of just fewer than 300,000 (**Fig 3**).

Figure 3. Part of Greater Metropolitan Region (GMR) Sydney to Newcastle. **Source: Wyong Council (WC 1999)**

Over the past 30 years (1973-2003) the Central Coast experienced an approximate 3% annual growth rate (Wyong 2005). In Wyong Shire the growth averaged 3.2% during these 30 years for an overall population percentage increase of over 300%. During this time Gosford and Wyong councils have experienced many policy debates over development versus the environment. These debates have included subjects such as sewer outfalls, hazardous industry zonings, threatened species, airport expansion and car versus public transport conflicts (Troy 1998). It is this latter policy debate area of transport and sustainability that this paper wishes to examine.

2. The sustainable area planning (SAP) framework in relation to transport

Sustainable transport is a fundamental component of ESD based urban planning. Examining recent transport and urban planning studies provides an understanding to how to approach sustainable transport challenges. The table below summarises transport and urban planning studies and inquiries from 2001-2004, these influencing transport decision making within the case study area **(Table 1**).

Table 1. Transport and Urban Planning Studies and Inquiries

Transport and Urban Planning Studies and Inquiries (Source and Date) 2001-2004	**Synopsis**
1. Federal	
Auslink Green Paper (DTARD 2003)	Australia wide transport priorities
Inquiry – Report on Sustainable Cities 2025 (Commonwealth 2004)	Parliamentary inquiry into sustainable city requirements
2. State	
Integrated Transport and Land Use - SEPP 66 (DUAP 2001)	Transport criteria needing to be met for approval of major developments
F3 to Sydney Orbital Link Study (RTA 2003)	New expressway link proposal between Central Coast and Sydney
Parry Report (DOT 2003a)	Improving the transport system in the NSW
Unsworth Report (DOT 2003b)	Improving bus transport in the Greater Metropolitan Region (GMR)
Metropolitan Strategy Discussion Paper (DIPNR 2004b)	A Sydney urban planning strategy
NSW Planning Reform Papers (DIPNR 2004c)	Package of planning reforms, including new LGA wide LEPs required within 3-5 years
Managing Sydney's Growth Centres (MSGC) (DIPNR 2005)	A report for settlement within the release areas of NW and SW Sydney
3. Local/Regional government	
Shaping the Central Coast (DUAP 2001)	Regional planning for the Central Coast
Central Coast Transport Action Plan (DOT 2002)	A plan for Central Coast transport projects
Shaping the Central Coast Action Pan (DIPNR 2003)	Actions to implement the Shaping the Central Coast defined needs
Sustainability Report 2004 (Gosford 2004)	Measuring the Gosford state of environment, including transport initiatives
State of Environment (SOE) 2003/4 (Wyong 2005)	Measuring the Wyong state of environment, including transport

At the **Federal** government level, transport proposals have generally not been developed within a sustainable transport framework. Within the Auslink's funding package in late 2003 (after green paper submissions) nearly all of the ten year multi-billion dollar funding went into non-metropolitan programs with minimal references to indicators of sustainability. The Federal government's House of Representatives Environment Committee's Inquiry on Sustainable Cities 2025 (Commonwealth 2004) contained many submissions that raised prospects of how sustainable transport methods would be considered by the government. The Inquiry (suspended after the 2004 Federal election), was reinstated in mid-2005 to report back to the public. Finally, the planning and recent funding of additional F3 laneways on the Central Coast appeared to lack scrutiny by the Federal government of long term sustainable transport options.

At the **State planning** level, there has been considerable focus on transport in recent studies and papers. Firstly, under the Integrated Transport and Land Use draft of State Environmental Planning Policy (SEPP) 66 (DUAP 2001a) sustainable transport was to be a consideration in State and LG approvals of major development applications. In practice LG councils have not applied the SEPP to any level of effectiveness. The SEPP has thus not

developed the statutory teeth required to see sustainable transport results on the ground. Secondly, the State government announced in 2003 that there would be a Metropolitan Strategy (MS) development. MS documents released under this program, ((Ministerial Directions Paper (DIPNR 2004d) and the Metropolitan Strategy Discussion Paper (DIPNR 2004b)) use sustainable cities and sustainable transport terminology, but implementation clauses are few. Under the F3 to Sydney Orbital Link Study (RTA 2003) the Roads and Traffic Authority (RTA) appeared to give only minimal consideration to sustainable transport alternatives, such as public transport and population settlement options. The only options offered to LG were three route alternatives **(Fig 4**).

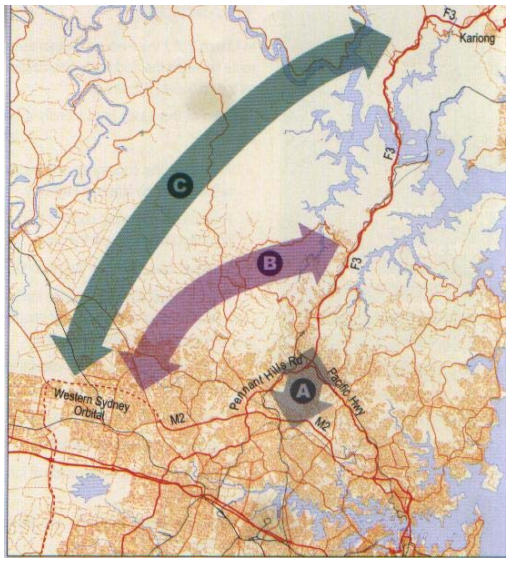

Figure 4. F3 to Sydney Orbital Link Study – Broad Corridor Types
Source: RTA 2003

Finally, under Managing Sydney's Growth Centres (MSGC) (DIPNR 2005) (Sydney's NW and SW growth areas to settle 300,000 residents over the next 25-30 years) the State adopts eight sustainability criteria. Two criteria (access and jobs/economy), as noted by the NSW Government Sustainability Commissioner in MSGC, will only be assessed as people move into the new release areas. The report notes that standards in a range of criteria will be assessed by the Commissioner as development proceeds. It would appear critical that sustainability criteria, including the application of indicators of sustainability, be carried out before the MSGC is adopted. There is a prospect that experience gained by LG and the State in implementing a best practice MSGC could allow the State (in cooperation with LG) to set sustainability benchmarks for all release areas and renewal of existing urban areas throughout the State. This would auger in a new era for ESD based urban planning across the Greater Metropolitan Region (GMR) and NSW regional areas.

There have been a number of **State inquiries** into transport questions. The Parry Report (DOT 2003a) focused on many transport issues, but the inquiry resulted in minimal recommendations on achieving sustainable transport. The NSW Bus Review (Unsworth Review) (DOT 2003b) outlined the need for a comprehensive plan for bus systems, including infrastructure (i.e. bus shelters, signage and timetables). Finally, the in-house NSW Planning Reform State review (DIPNR 2004c) resulted in a number of new requirements on LG, including the requirement that all LG councils prepare new LG wide local environment plans (LEPs) over the next 3-5 years. Another reform requirement is that LG councils link their State of Environment (SOE) reporting into their annual Management Plans and LG wide strategic plans. Finally, considerable more detail from the State is required on these reform

requirements, particularly how sustainability principles (i.e. applying to transport) can be accommodated within the new LEPs and SOE reports.

Local/regional government is central to translating sustainable transport policies at the local/regional level, though many councils prefer to refer all non-traffic transport matters to the State. Several councils in the State, however, have instituted policies moving their areas toward sustainable transport, including Newcastle City, Lake Macquarie City and Sutherland Shire. The Australian Capital Territory (ACT) LG council produced a benchmark sustainable transport plan in 2003 (ACT Office 2003).

The first local/regional government transport planning study on the Central Coast was contained in the Central Coast Structure Plan (CCSP) (SPA 1977), nearly 30 years ago. The CCSP proposed innovative radial public transport right-of-ways (corridors) for buses and light rail under a 'Radial Corridor Structure Plan' **(Fig 5**). Proposals such as these were not investigated beyond 1977; hence these public transport rights-of-ways never eventuated. Only now are road outer lanes near busy town centres being declared and painted 'bus only'.

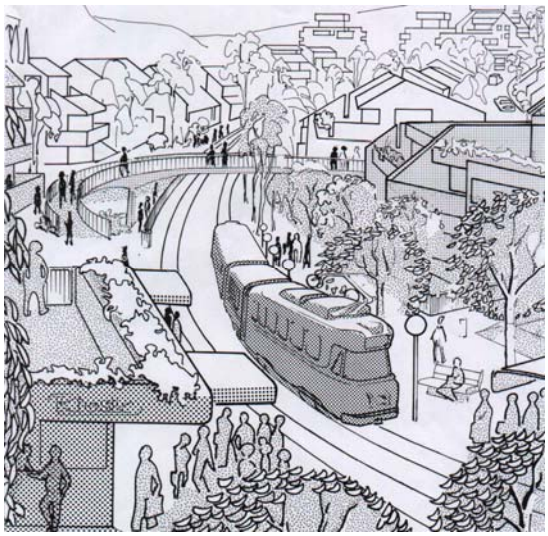

Figure 5. Central Coast Structure Plan ('Gosford/Wyong Sector – Radial Corridor')
Source: State Planning Authority 1977

Since the adoption of this 1977 Central Coast plan, neither the State, Gosford nor Wyong Council has expanded these early plan concepts to develop a sustainable transport plan. On a Central Coast regional basis, Shaping the Central Coast (SCC) (DUAP 2001b) provides an overview of development projected for the Central Coast over the next twenty years. The Shaping the Central Coast Action Plan (SCCAP) (DIPNR 2003), the implementation plan following SCC, contains a number of actions under State Government Departments and Gosford and Wyong Councils. The SCCAP has to date not been adopted by State, Gosford or Wyong Councils. The Central Coast Transport Action Plan (CCTAP) (DOT 2002) listed various road, rail, bus and cycleway projects, but to date the Department of Transport (DOT) has avoided setting out requirements of a sustainable transport strategy. A CC Transport Task Force was established to guide and monitor the implementation of the CCTAP, but the Task Force was abandoned by the State in 2005.

The state of environment (SOE) reports at the LG level often contain transport indicators highlighting the need for authorities to move to more sustainable transport programs. SOE reports of Gosford City (Gosford 2004) and Wyong Shire (Wyong 2005) indicate an increased need for sustainable transport on the Central Coast. Finally, NGOs at the LG level

are becoming more involved in promoting sustainable transport, including the Sutherland Shire Environment Centre (SSEC), the Community Environment Centre (CEN) (Central Coast), the Central Coast Community Council (CCCC) (Transport Projects Office), the Natural Conservation Council (NCC) and the National Road and Motoring Association (NRMA). The Department of Transport has assisted several LG councils and regional NGOs to produce broad based overview needs of transport, for example the Illawarra (DOT 2004).

3. Applying the SAP framework to achieve a sustainable transport program

Given the complexities of transport planning refected in Table 1 and Figures 4, 5 there is a clear need to apply a sustainability framework to achieve sustainability programs. The sustainable area planning (SAP) framework, introduced earlier, enables sustainable transport programs to be considered within six steps. These steps (**3S's** and **3A's**) are outlined in **Table 2**.

Table 2 – Sustainable Area Planning (SAP) Framework Steps

Step 1 Sustainability Review of ESD Components, ESD Criteria and ESD Studies	**Step 2 Survey** Study Area for Environmental Impacts and Trends and Threats	**Step 3 Select** Indicators of Sustainability for Study Area	**Step 4 Apply** Indicators of Sustainability to Study Area	**Step 5 Adopt** Sustainability Programs Contained in Sustainability Plan	**Step 6 Adjust and Monitor** Sustainability Programs Sustainability Plan through Report Card

Step 1 – Sustainability Review

Step 1 consists of three sustainability reviews relative to the geographical area. The first review looks at ESD components that apply to transport (i.e. air quality and energy use). The second review examines ESD criteria, including protocols and legislative acts, principles, goals and indicators of sustainability relative (in this instance) to transport. The third review critiques current planning, environmental studies and sustainability studies relevant to transport.

Step 2 - Survey

Surveying a study area provides an up-to-date summary of that area's state of transport. The survey includes for example examining air quality, impact of transport volumes and congestion, car dependence versus public transport use, walkability, cycling provisions, energy consumption, and transport safety measures.

Step 3 – Select Indicators

Selecting indicators of sustainability follows SAP steps One and Two. Key indicators of sustainability, with units of measurement and standards, can be selected from a range of sources. The research used a regionally based best practice source of state of environment standards (i.e. greenhouse, air pollution and use of fossil sources) under the Lower Hunter and Central Coast Regional Environmental Management Systems (LHCCREMS 2003). The indicators that would apply to the Central Coast are laid out within the SAP framework matrix for ease of reference, calculations and for making comparisons between indicators (**Table 3**).

Table 3. Sustainable Area Plan (SAP) Framework Matrix

Step 1 **Sustainability Review** of ESD Components, ESD Criteria and ESD Studies	**Step 2** **Survey** Study Area for Environmental Impacts and Trends and Threats	**Step 3** **Select** Indicators of Sustainability for Study Area	**Step 4** **Apply** Indicators of Sustainability to Study Area	**Step 5** **Adopt** Sustainability Programs Contained in Sustainability Plan	**Step 6** **Adjust** and Monitor Sustainability Programs and Sustainability Plan through Report Card
Federal, State and Local Government	Air quality Impact of transport volumes and congestion	Air pollution Greenhouse gases	Tons/day/ pollutant Tons/day of CO_2	Air pollution reductions by source Greenhouse gas reduction targets	Pollutant source monitoring Targets met
	Car dependence versus public transport use	Car/public transport journeys	Number	Public transport program	Public transport program implemented
	Walkability	Footpaths	Km	Footpaths and shared pathways programs	Footpaths and shared pathways completed
	Cycling provisions	Cycleways	Km	Cycleway program	Cycleways constructed
	Energy consumption	Use of fossil sources	Kj	Energy plan with targets	Energy targets met
	Transport Safety	Danger spots and accidents	No. of danger spots eliminated	Transport safety program	Safety audits

Step 4 – Apply Indicators

The indicators of sustainability for transport can be applied across a State, LG area, region or locality. In the instance of applying indicators the data available will often be for different geographically sized areas (i.e. catchments, cities or regions). Extrapolation of the data to apply to the subject area needs to be done under rigorous standards procedures (**Table 3)**.

Step 5 – Adopt Sustainability Programs Contained in a Local Sustainability Plan (LSP)

A sustainability program contains ESD principles, goals, indicators of sustainability and actions to achieve sustainability in particular geographical areas under key components (i.e. air, biodiversity, housing, transport etc.) This program can be built on from the results of applying the first four SAP steps. A sustainable transport program would contain, for example, policies under areas such as greenhouse emission reduction, transport safety, and fossil fuel energy savings. A more comprehensive Local Sustainability Plan (LSP) is a plan containing a cluster of sustainability programs. The LSP spells out how a local area, district, LGA, city or region can move to an overall sustainability, such as in the area of transport. The matrix above illustrates for example specific sustainability programs within transport that could be contained within a sustainable transport plan (**Table 3)**.

Step 6 – Adjust and Monitor Sustainability Programs and Sustainability Plan through Report Card

A sustainability report card enables authorities and communities to compare their areas' progress towards sustainability and to become aware of strengths and weaknesses within their sustainability programs. The report is ongoing and identifies trends such as improvements and declines. The report carding includes the crucial component of monitoring (i.e. measurement) selected sustainability indicators, sustainability programs and a sustainability plan (**Table 3)**. The governance of the Central Coast for example would ultimately adopt and systematically report on a Central Coast Sustainable Transport Plan. Finally, the report carding under any plan, in the long term, needs to include an administrative process of legal accountability for failing to achieve the stated sustainability targets.

Conclusions

The author's research to date has drawn a number of conclusions. Firstly, in spite of major use by authorities of the terms 'sustainable', 'ESD', and 'sustainable transport' the outcomes of studies and recommendations of authorities may not be matching their rhetoric. More analysis is required to determine the effectiveness of programs claiming to adhere to sustainability principles. Secondly, a sustainable area planning (SAP) framework provides a useful tool within ESD based urban planning to assist local government to develop sustainability programs, such as sustainable transport. Thirdly, an authority can develop a cluster of sustainability programs leading to a more comprehensive area wide Local Sustainability Plan (LSP). Fourthly, there is a prospect that experience gained by LG and the State in implementing best practice sustainability approaches (i.e. sustainable transport programs) in one locality (growth area or renewal of an existing area) could set sustainability benchmarks for other localities throughout the GMR and regional NSW. Finally, further research on State and LG methods of accountability for implementing and monitoring sustainability programs and sustainability plans is required if a SAP framework is to be workable and long lasting.

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