

SUSTAINABLE HOUSING FOR THE FUTURE:

Design Assessment Using Triple Bottom Line Techniques

Deo Prasad, John Bair, Bruce Judd, Bob Zehner (NSW),
Veronica Soebarto (SA) and Richard Hyde (Q'd)

National Housing Conference, Adelaide, Nov 26-28, 2003



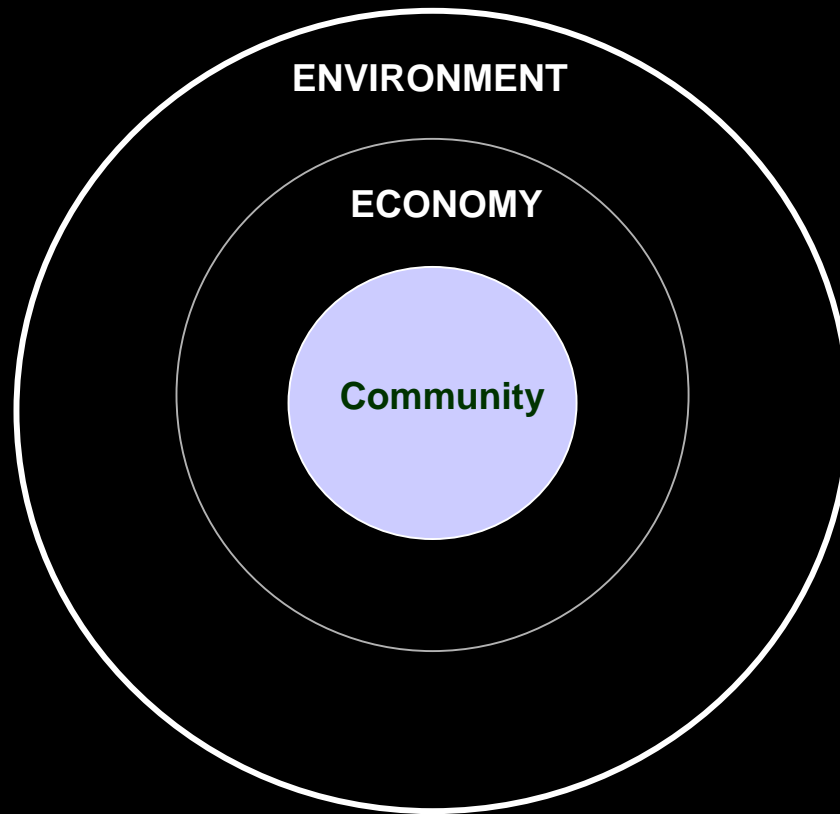
PRESENTATION OUTLINE

1. Introduction and Context
2. Research Objectives
3. Research Methods
4. Performance assessment and TBL indicators
5. Results and Conclusions

1. INTRODUCTION

- Sustainability's emerging standards and codes
- But narrowly based - focused on environmental and specific problems
- Compelling reasons for looking at sustainability in a broader way
- Triple bottom line approach can accommodate the concept

MODELS OF SUSTAINABILITY (1)



MODELS OF SUSTAINABILITY (2)

Social and Economic Interface

- * Contemplate non-market values
- * Code of ethics for employers
- * Holistic design
- * Conserve environmental stocks for cultural purposes



Socio/Environmental Interface

- * Eco-tourism
- * Enhancing environmental ethics
- * Commitment to species equity
- * Conservation principles

Environmental/Economic Interface

- * Code of ethics for exploiting env. assets
- * Concern for soil fertility
- * Concern for bio-diversity
- * Conservation principles
- * Full environmental accounting

2. RESEARCH OBJECTIVES

- Overall aim: to assess the sustainability of residential areas from an environmental, social, and economic point of view .
- Specific aims:-
 - Develop a method for assessing the sustainability of Australian housing in the three dimensions;
 - Test the experimental TBL indicator suite;
 - Examine progress in achieving sustainability in reference to the two specified development forms: **traditional regulatory subdivision (TRS)** and **master planned communities (MPC)**

3. RESEARCH METHODS

- Constructing the TBL suite
- Selecting the case studies: NSW, SA, QLD
- User Group and Multi-state consultation
- Data collection
- Analysis/Testing
- Conclusions/Recommendations

CHIPPING NORTON COMMUNITY SURVEY UNSW

PART ONE YOUR NEIGHBOURHOOD AS A PLACE TO LIVE

The goal of this survey is to identify with residents in your neighbourhood what planning and design and the layout of the neighbourhood impacts the safety of neighbourhoods and access to facilities.

1. How safe do you feel in your neighbourhood?
Could you tell us what aspects of safety are you concerned about?

Very safe	Safe	Not safe	Very unsafe
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. How satisfied are you with neighbourhood amenities (the parks and open spaces)?
Could you tell us why you are satisfied/dissatisfied or why you would change?
How satisfied are you with?

Very satisfied	Satisfied	Not satisfied	Very dissatisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How satisfied are you with?

Very satisfied	Satisfied	Not satisfied	Very dissatisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. How satisfied are you with accessibility to facilities within the neighbourhood are:

Very satisfied	Satisfied	Not satisfied	Very dissatisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

WATTLE GROVE COMMUNITY SURVEY UNSW

PART ONE YOUR NEIGHBOURHOOD AS A PLACE TO LIVE

The goal of this survey is to identify with residents in your neighbourhood what planning and design and the layout of the neighbourhood impacts the safety of neighbourhoods and access to facilities.

1. How safe do you feel in your neighbourhood?
Could you tell us what aspects of safety are you concerned about?

Very safe	Safe	Not safe	Very unsafe
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. How satisfied are you with neighbourhood amenities (the parks and open spaces)?
Could you tell us why you are satisfied/dissatisfied or why you would change?
How satisfied are you with?

Very satisfied	Satisfied	Not satisfied	Very dissatisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How satisfied are you with?

Very satisfied	Satisfied	Not satisfied	Very dissatisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. How satisfied are you with accessibility to facilities within the neighbourhood are:

Very satisfied	Satisfied	Not satisfied	Very dissatisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

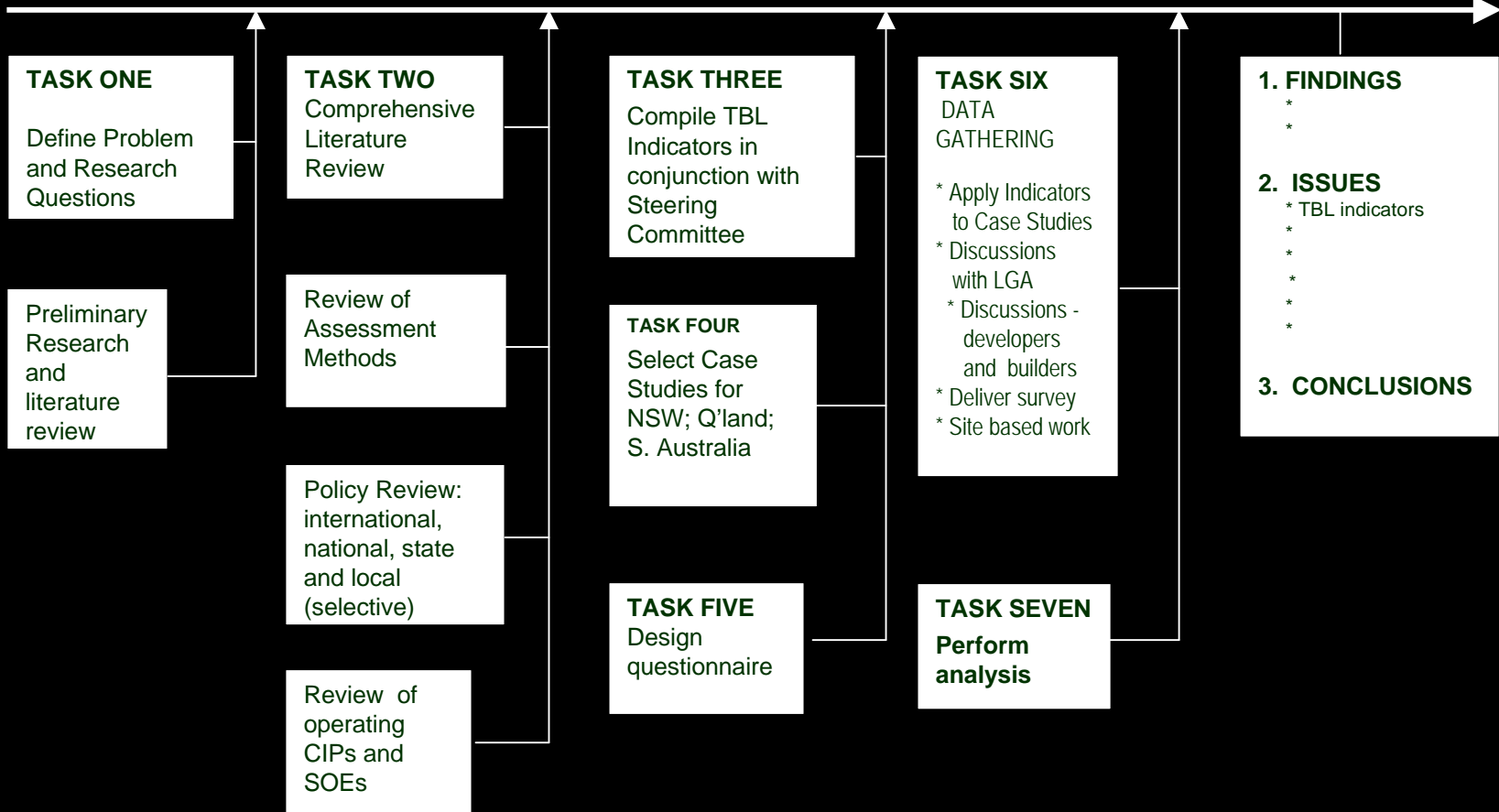
4. WHAT ARE TRIPLE BOTTOM LINE INDICATORS?

- Originated in the corporate sector
- The TBL framework is not new (though its application in Australia is)
- Concepts of TBL and sustainability interchangeable
- TBL concept is flexible, pointed and spans all three activity domains
- Disadvantages, eg. data collection effort

RESEARCH PROCESS

INITIAL INPUTS

RESEARCH OUTPUTS



REQUIREMENTS FOR INDICATORS

- Sensitive to change
- Policy relevant
- Valid (no issue if no Goals)
- Reliable data
- Clear and Measurable
- Realistic
- Profound (as opposed to simplistic)
 - Median cost of renting in community vs
% of renters paying 30% of income or more on housing.
 - Per capita water use v. per capita use in relation to aquifer resources
- Targets and standards (especially if SUSTAINABILITY pursued)

THE TBL INDICATORS

- Eight themes used – 37 indicators
- Affordability – 12 indicators
- Sense of community and neighbourhood satisfaction – 8 indicators
- Transportation – 3 indicators
- Environment – 14 indicators
 - Bio-diversity (2 indicators)
 - Energy (5 indicators)
 - Other forms of resource consciousness (3 indicators)
 - Wastewater and storm water (2 indicators)
 - Water consumption and conservation (2 indicators)



AFFORDABILITY INDICATORS

- Median house prices (per bedroom or per sq. metre)
- Median household income
- Housing costs (renters and owners) as % of average household income
- Percent home prices in case study neighbourhoods below the LGA median
- Proportion of households paying more than 30% of income on housing
- Rent assistance for occupants of privately rented housing
- Development costs – subdivision (in 7 dimensions, cost per lot)¹
- Development costs – housing (per m²)
- Development costs (per m²) of green homes v. conventional homes
- Maintenance costs of public domain (in 4 dimensions)²
- Nature and degree of public subsidy³
- Return on investment (average for the neighbourhood)

CASE STUDY CRITERIA

1. Both case studies should have relatively similar soc-ec. characteristics.
2. Both should be reasonably representative of mainstream housing predominantly single-family dwellings in the outer suburbs.
3. Both should be in the same LGA to control for differences in planning and zoning policies.
4. Both should be reasonably mature - completed and occupied for 3-5 years to allow potential for sense of community to develop.
5. Both communities should have been constructed in approximately the same era (a 10 year gap, for example, would not be appropriate).
6. Both should be a minimum of 500 lots in size for questionnaire drop and mail reminder survey techniques to be effective (for a minimum of 100 questionnaire responses from each case study site).

CASE STUDY



MPC

TRS

NSW: Wattle Grove

Chipping North

QLD: Forest Lake

Sinnamon Park

SA: Seaford Rise

Woodcroft

CASE STUDY

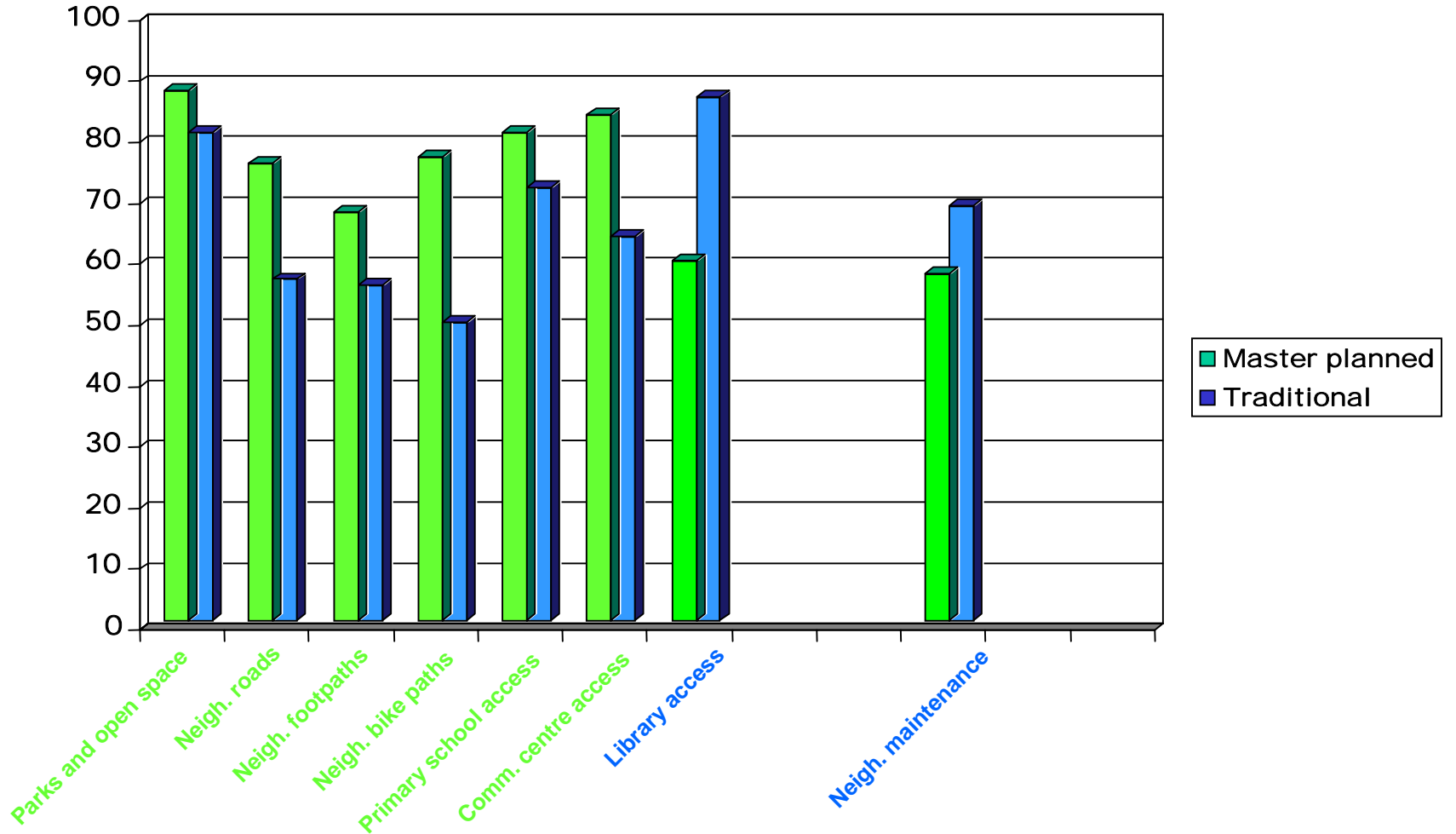


<u>Community</u>	<u># cases</u>	<u>Response Rate</u>
<u>NSW</u>		
Wattle Grove	142	22.5%
Chipping Norton	149	25.3%
<u>Old.</u>		
Forest Lake	105	17.5%
Sinnamon Park	101	16.8%
<u>SA</u>		
Seaford Rise	98	19.6%
Woodcroft	83	16.6%
<i>TOTAL</i>	678	19.8%

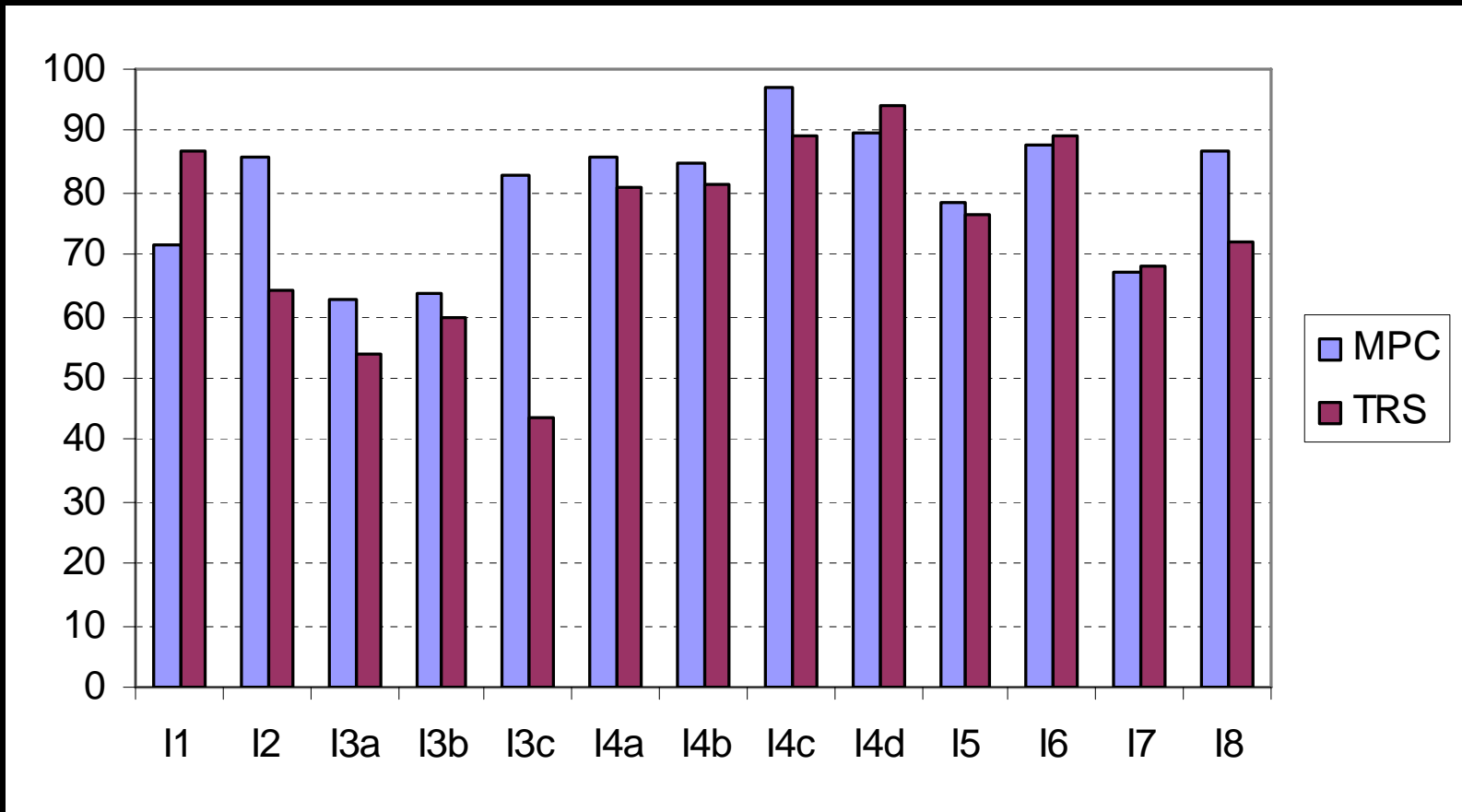
COMMUNITY CHARACTERISTICS

	NSW		QLD		SA	
	<i>Wattle Grove</i>	<i>Chipping Norton</i>	<i>Forest Lake</i>	<i>Sinnamon Park</i>	<i>Seaford Rise</i>	<i>Woodcroft</i>
Residential density	10.7du/ha	7.8du/ha	21p/ha	17p/ha	10.3du/ha	9.7du/ha
Lot size "small"	32%	4%	46%	8%	31%	16%
Three bedroom dw.	68%	47%	68%	38%	63%	63%
Median home value	\$387K	\$450K	\$177K	\$274K	\$184K	\$184K
Area park/open space	3.2ha/dw	0.8ha/dw	7.5ha/dw	6.3ha/dw	22ha/dw	5ha/dw
Journey to work, Person 1 = car only	71%	94%	80%	83%	79%	86%

5. RESULTS: Neighbourhood Satisfaction, NSW



5. RESULTS: Neighbourhood Satisfaction, SA



5. RESULTS: Neighbourhood Satisfaction, SA

Q1: How safe in neighbourhood

Q2: How satisfied with amenities like parks/open space

Q3a: How satisfied with neighbourhood roads

Q3b: How satisfied with neighbourhood footpaths

Q3c: How satisfied with neighbourhood bike paths

Q4a: How satisfied with access to primary school

Q4b: How satisfied with access to community centre

Q4c: How satisfied with access to library

Q4d: How satisfied with access to shops

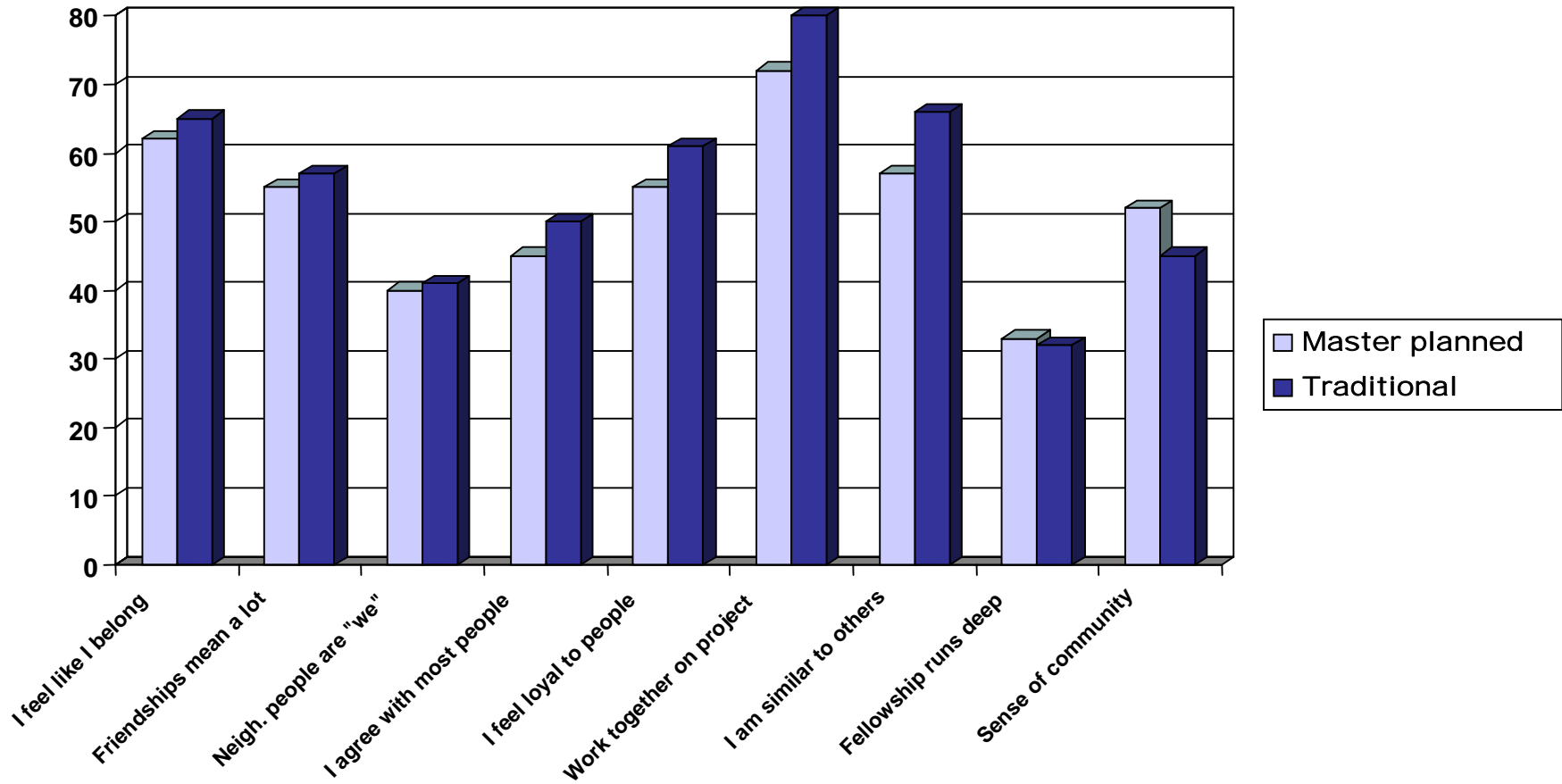
Q5: How satisfied with access to facilities/services outside n'hood

Q6: How satisfied with design of home

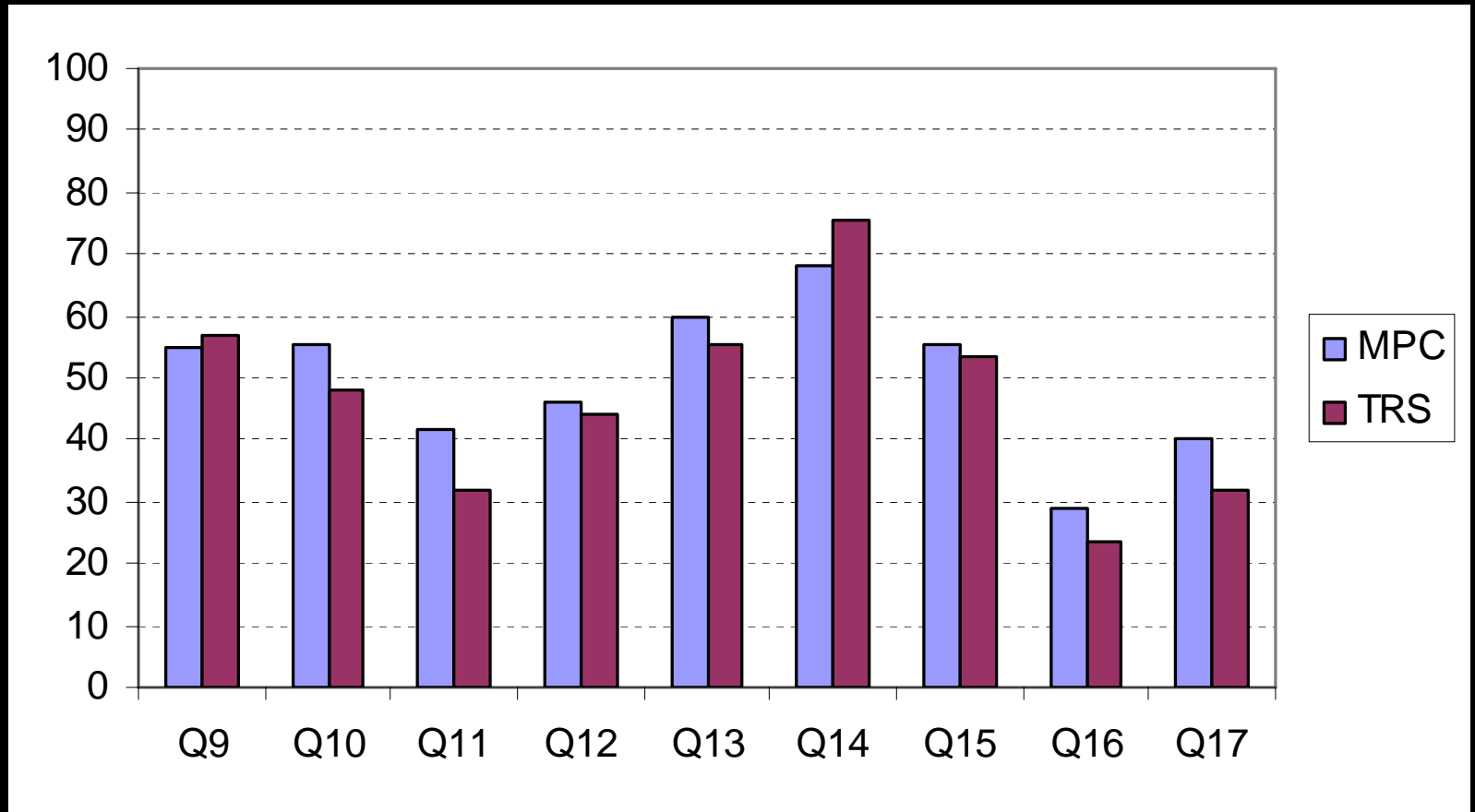
Q7: How well maintained is your neighbourhood

Q8: How attractive is your neighbourhood

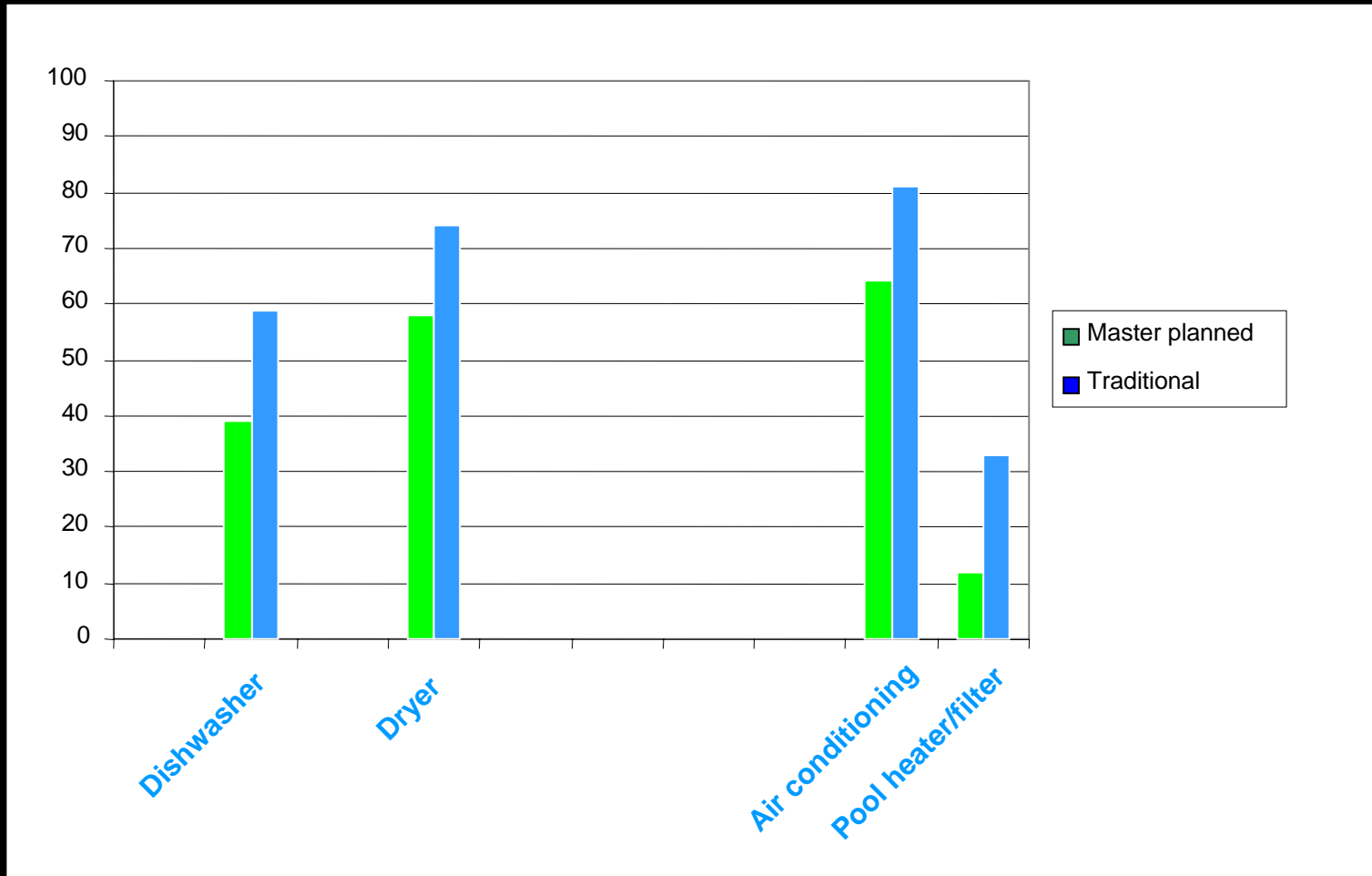
5. RESULTS: Sense of Community, NSW



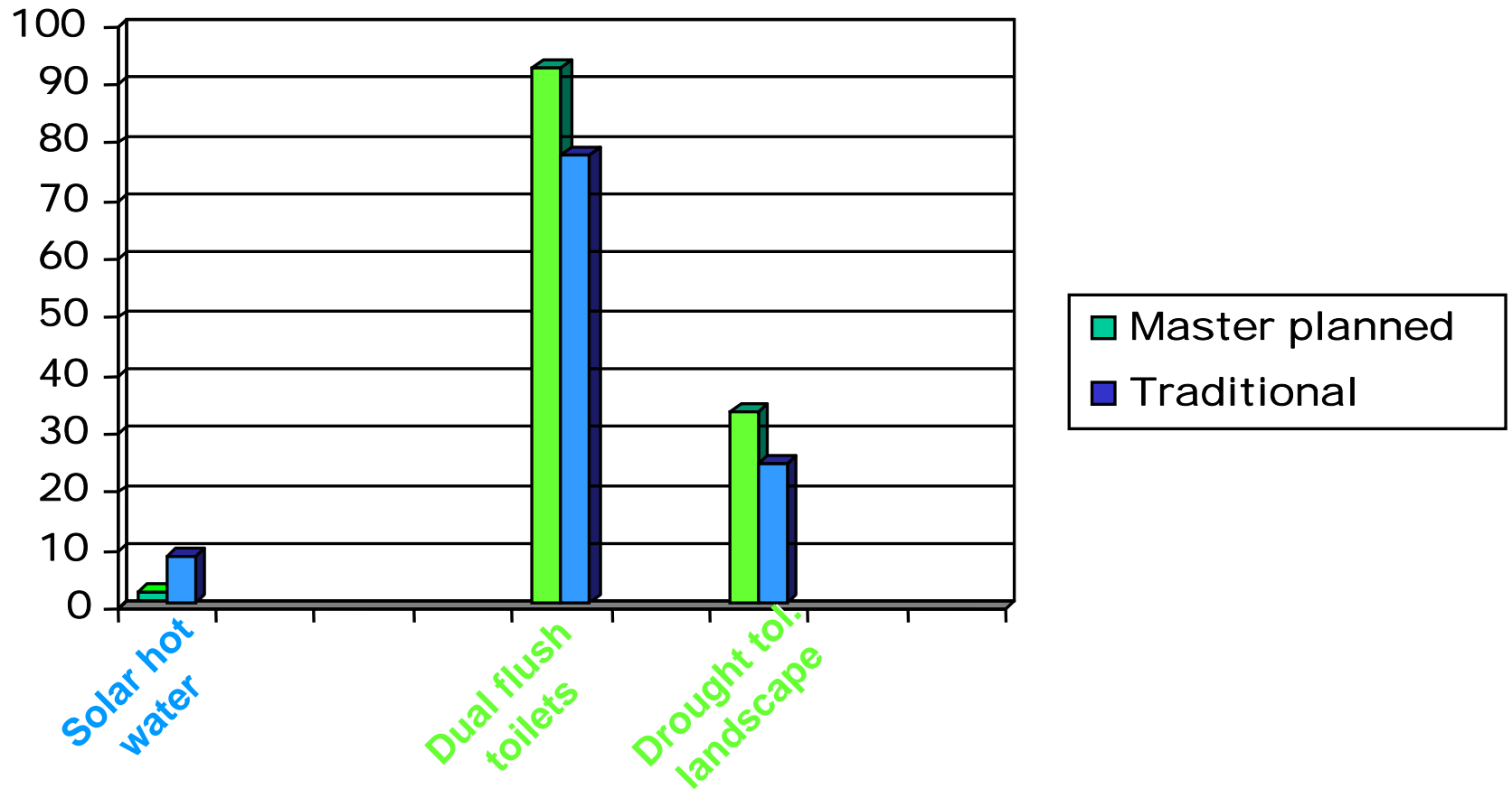
5. RESULTS: Sense of Community, SA



5. RESULTS: Appliances, NSW



5. RESULTS: Appliances, NSW



5. RESULTS – MPC PERFORMANCE IN RELATION TO THE TRS

Indicator Theme	NSW	South Australia	Queensland
Affordability	Slightly better	No difference	Slightly better
Neighbourhood cohesion N'hood satisfaction	Slightly worse Slightly better	Better Better	Slightly worse Better
Transportation	Better	No difference	Slightly better
Environment <ul style="list-style-type: none"> · Biodiversity · Energy · Other Resources · Waste/Stormwater 	No difference Better Better Slightly better	No difference Slightly Worse Slightly better No difference	Slightly better Slightly worse Better Slightly better

5. RESULTS – TBL INDICATORS

- Size of suite and mix of indicators is questionable:-
 - Some are problematic (easier to get data for recent developments)
 - Develop multi-dimensional indicators
 - Suite needs to be smaller for cost and management reasons; split into primary and secondary suites
- Greatest potential of TBL suite is monitoring at whole city scale
- A snapshot is useful but good governance requires permanent performance measurement

5. RESULTS – POLICY IMPLICATIONS

- Most results not dependent on one development form being pursued in preference to another
- But the integrated design and planning of MPCs appears to produce generally better outcomes than the TRS
- The higher density and smaller houses of MPCs bring spectacular synergies (eg GHGs; other impacts; less energy and water; and major financial savings on infrastructure investments)
- These synergies mean there is much potential for greater housing affordability at both construction and operating stages.

5. RESULTS - POLICY IMPLICATIONS (Cont)

- Applying physical and financial sustainability principles to housing **aids** affordability rather than detracts from it.
- There are a number of promising initiatives that can be pursued to improve affordability and sustainability simultaneously
- Inadequate application of sustainability means performance measurement must become routine if government is genuine about moving along the pathway to sustainability

5. RESULTS - POLICY IMPLICATIONS (Cont)

- There is a substantial policy gap between the adoption of sustainability principles and their application in development
- Some sustainability policies are applied successfully but others are weakly applied. Resource consumption has worsened in new Sydney TRSs and MPCs - larger houses, more air conditioning and swimming pools
- New home construction represents only 2% of existing building stock annually. Virtually none of the existing stock was built in a sustainability context so retrofitting programs are also essential

THEMATIC RECOMMENDATIONS

- Building strong communities is crucial to sustainability
- Transportation in the metropolitan cities will need highly innovative solutions if mobility is to be maintained
- Flora and fauna: permanent protection of ecosystems in dense metro environments is extremely challenging
- Water supply: integrate rainwater systems into existing as well as *new* dwellings and introduce market pricing to reflect a scarce resource

ISSUES ARISING IN APPLYING THE TBL INDICATORS

- The first post-development residential performance assessment using TBL indicators in Australia
- Data Constraints: commercial financial information; energy; records in LGA
- Opportunities: ABS C-Data 2001 for housing affordability v. ABS unpublished data
- Analyzing and comparing data (within and between states)
- Coordination needs to bring together three research projects

