ROAD ASSET BENCHMARKING PROJECT 2008

ROAD MANAGEMENT REPORT

The Roads and Transport Directorate is a joint initiative with the

The Local Government Association of NSW

The Shires Association of NSW

JRA

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Version 4 issued in February 2010 includes updates of data and minor corrections to the Version 3 Report.
Version 5 issued in September 2010 includes bridge renewal costs and useful life estimate distributions.

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Executive Summary

Introduction

There are currently 152 Councils in New South Wales. The 2002-2003 Report on the Operation of the *Local Government (Financial Assistance) Act 1995* reported that NSW Councils are responsible for managing 143,084 km of local and regional roads. 60,620 km of these are sealed and 82,463 are unsealed. The replacement value of NSW local roads was estimated at approx $30.8 billion.

The report estimated a NSW annual local road renewal shortfall of $156 million (2001-02) for the next five years. Beyond this period, this renewal shortfall is likely to increase due to network ageing.

The Roads & Transport Directorate of the IPWEA NSW Division reported a snapshot of the current reported condition of Regional and Local Roads in NSW at 30 June 2005 in its *Road Management Report,* The report concluded that present levels of road funding were not sustainable and identified a life cycle funding gap of $783 million per annum. Overcoming this funding gap will require a 108% increase in 2005 funding levels.

The Directorate commissioned this report to update the 2005 Road Asset Benchmarking report on the condition on NSW roads and bridges at 30 Jun 2008, update the shortfall in funding required to bring them to a satisfactory condition, provide specific recommendations about rectification of the problems identified and whether councils have made any improvement in management of their road and bridge assets since the 2005 Road Asset Benchmarking Project survey.

Survey Findings

1. 91% (138) of NSW councils responded to the IPWEA NSW Roads & Transport Directorate's Road Asset Benchmarking Survey and the Local Government Inquiry survey. Of these responses 89% (135 of 152) were assessed as valid for analysis.

2. Asset management practice and capability was limited with 33% (42) of responding councils reporting that they used the principles of the International Infrastructure Management Manual, the internationally recognised reference on infrastructure asset management, in full. 29% (38) of councils have an adopted Road Asset Management Plan. 76 (58%) of councils have joined IPWEA NAMS.PLUS Asset Management, the IPWEA's system to assist them in developing their road asset management plans

3. Road related risk was being addressed through a road asset management plan or within a corporate risk management plan in 46% (60) of the responding councils.

4. 66% (84) of responding councils indicated they have a long term financial plan, 45% (57) of the responding councils' plans cover a period of at least 10 years.

5. 22% (28) of responding councils' long term financial plans recognise the effects of infrastructure including financing infrastructure renewal, and providing for growth and life cycle costs for new infrastructure.

6. The 135 responding councils are responsible for the management of 139,909 km of regional and local roads combined and 9,028 concrete/steel and timber bridges.

7. The responding councils' roads and bridges have a replacement value of $40,775 million, which is being consumed at the rate of $653 million per annum.

8. Road and bridge assets for the reporting councils are reported to have 67.7% of their service life remaining. The assets are being consumed at a rate of 1.7% of the depreciable amount. 2007/08 asset renewal is less than asset consumption for roads being 82% of consumption for sealed roads, 50% for unsealed roads and 54% for concrete/steel bridges. Timber bridge renewal is 542% of consumption recognising the investment priority given by councils to renewal of ageing timber bridges.

9. The road life cycle cost for the responding councils was estimated at $1,226 million per annum. Funding in 2007/08 was reported at $680 million leaving a funding gap of $545 million per annum below the life cycle cost.

10. Sealed road resurfacing/resealing life cycle cost for the responding councils was estimated at $302 million per annum. Funding of $135 million in 2007/08 was $166 million less than the annual life cycle cost.

11. Unsealed road resheeting life cycle cost for the responding councils was estimated at $141 million per annum. 2007/08 funding was $31 million which is $110 million less than the annual life cycle cost.

12. The estimated apportionment of road life cycle cost to the three major road usage categories based on councils' best estimate of percentage traffic usage of roads was that residential use was responsible for 76% of the road life cycle cost, business and commercial usage 21% and high mass vehicles 3%.

13. The life cycle cost for the responding councils' concrete/steel bridges was estimated at $15.1 million for regional roads and $25.6 million for local roads per annum. Expenditure in 2007/08 of $10.1 million for bridges on regional roads and $8.7 million for bridges on local roads was $5.0 million and $16.9 million less than the life cycle cost.

14. The life cycle cost for the responding councils' timber bridges was estimated at $3.1 million for regional roads and $11.1 million for local roads per annum. Funding in 2007/08 of $14.7 million for regional roads and $17.9 million for local roads was $11.6 million for regional roads and $6.8 million per annum **greater** than the life cycle cost. This indicates the investment priority given to timber bridge renewal in 2007/08.

15. Survey data quality was variable with a few of the responding councils having good and reliable data and others lacking in both quantity and quality of data.

Discussion on Findings

Asset management practices and skills

The response to the survey, low level of asset and risk management practices and identification of a funding gap for roads and bridges indicated the need for improved asset management awareness and practice in NSW councils.

Very few councils provided the complete survey dataset in a form suitable for database analysis. The data sought was considered to be basic financial data and data used for strategic and day-to-day management of roads and bridges. This data should be readily available in councils with good asset management capability. The availability, accuracy and use of asset management data needs improvement.

In 2008, IPWEA released NAMS.PLUS Asset Management (www.namsplus.org.au), a system of templates and modelling tools to assist councils write their infrastructure asset management plans. The take-up of 76 councils (58%) joining NAMS.PLUS to develop their roads asset management plans is a positive result.

The lack of asset management plans to manage service delivery from infrastructure places councils at risk of not being able to sustain service delivery in the medium term. If councils do not manage the funding gap, they will be faced with decreasing service levels and/or increased funding needs in the future.

It is critical that councils have a 10 year financial plan supported by 20 year asset management plans to ensure sustainable service delivery for their communities.

The funding gap identified in the survey and level of road related risk practices also requires councils to improve their road related risk management practices to sustain service delivery, minimise liability exposure and potential for increases in insurance premiums.

Road Investment

The estimated investment to replace the NSW local transport infrastructure is $45.9 billion based on extrapolation of values reported in financial statements of the 135 responding councils.

The assets are reported as being consumed at an estimated $735 million per annum.

Road funding

The road funding gap for all 152 NSW councils is estimated at $614 million per annum based on the data from the 135 responding councils extrapolated to 152 councils. Funding at this level will require an 80% increase on 2007/08 road expenditures if asset management principles are not applied to managing the gap. Asset management principles to be applied to managing the funding gap include:

- ensure that all councils have adequate accurate knowledge on their road assets and how their assets are performing,
- ensure that sealed roads are resurfaced/resealed at the optimum time to maintain waterproofing of pavements. This will require an increase in funding from $152 million in 2007/08 to $340 million per annum for all councils (a 122% increase),
- consult with and select appropriate levels of service and costs to meet community needs and available resources,
- ensure that unsealed roads are resheeted at the optimum time to meet agreed service levels within available resources. This will require an increase in funding from $35 million in 2007/08 to $159 million for all councils if service levels reported in the survey are to be maintained (a 352% increase),
- make efficiencies in operations, maintenance, resurfacing and pavement renewal aimed at reducing life cycle costs,
- improve maintenance practices and funding if necessary to extend pavement life and defer projected renewal,
- rationalise (dispose) of unnecessary infrastructure assets,
- reduce service levels in consultation with the community,
- identify future renewal needs and expenditure required to meet agreed service levels and document in a road asset management plan,
- increase funding, and
- combinations of all actions above.

Bridge funding

Extrapolating the sample data for 135 responding councils will also give an indication of sustainable funding levels for bridges on regional and local roads. The life cycle expenditure for bridges on regional and local roads is estimated at $3.9 million less than the life cycle.

Road and bridge funding

The total funding position for roads and bridges can be estimated for all NSW councils from the extrapolated sample data.

Life Cycle cost ($M/yr)		
Roads	$1,381	
Bridges	$62	
Subtotal		**$1,443**
2007-08 expenditure ($M)		
Roads	$767	
Bridges	$58	
Subtotal		**$825**
Estimated funding gap ($M/yr)		**$618**

Apparent errors are due to rounding

The estimated funding gap is equivalent to a 75% increase in funding above the 2007/08 expenditure levels and emphasises the need to take action to manage the funding gap and ensure infrastructure services are sustainable.

Asset consumption and depreciation expense

There is a considerable difference in assessment of asset consumption as reported by local road asset managers in this survey and that reported by depreciation in council's financial reports.

Reported depreciation expense for 2007-08 is 53% of the asset managers' assessment of asset consumption of local roads and bridges.

2007-08 capital renewal expenditure is 81% of local roads and bridge asset consumption as reported by depreciation expense.

While the comparison of capital renewal expenditure with depreciation indicated a rate of asset renewal of 81% of consumption, the true picture is worse than this when the difference between the asset managers' assessment of asset consumption and depreciation is taken into account.

Using the depreciation expense figures reported in this survey as a measure of average asset renewal may give a false position of actual funding needed to sustain services from local roads and bridges.

Depreciation expense as reported by NSW councils is $579 million per annum, some 53% of the asset manager's assessment of asset consumption.

The amount spent on capital renewal of the assets for 2007/08 was $484 million. This is 44% of the life cycle cost and 81% of depreciation expense.

Use of depreciation expense as a measure of renewal need indicates that local road assets are being renewed at a rate of 81% of asset consumption. Analysis of the survey data shows that asset renewal in 2007-08 was 44% of the asset managers' assessment of asset consumption.

The survey analysis shows that the councils' reported depreciation expense is 53% of the asset managers' assessment of asset consumption.

Reasons for this variation may include:

- councils reporting depreciation expense at 'Cost' values rather than 'Fair Value' may be understating current asset consumption. 'Cost' values based on assets recognised in 1994 may be understated by up to 30%. Note that councils are required to revalue road, bridges, footpaths and drainage assets at fair value by 30 June 2010.
- the estimated asset useful lives used by councils for financial reporting may be based on 'industry standards', not actual performance and field operating conditions of the assets and understate depreciation expense.
- the estimated asset lives assessed by the asset managers may be based on technical measures, not community priorities/available resources and overstate the life cycle renewal cost.

The two measures of asset consumption, depreciation expense and life cycle renewal cost should be the same. Asset managers and finance managers should be providing the same information on asset consumption.

Conclusion

Present funding to meet existing service levels for NSW regional and local roads and bridges is 57% of the life cycle costs. Current level of service with current level of expenditure is not sustainable.

Councils may be facing a large risk exposure at present and in the future. These risks include:

- the condition of roads and bridges infrastructure will decline,
- potential increase in personal injury and legal claims,
- road life cycle expenditure 'savings' will be passed onto road users through higher transportation operating costs,
- funding will not be available to renew ageing road and bridge assets,
- councils will not be able to provide services needed by communities in medium-long term.

Renewal costs are being transferred to the next generation.

Asset consumption as reported by depreciation expense is understating the assessment of asset consumption by local road asset managers by up to 50%.

Managing the Gap

The Gap consists of several components. Each gap component requires a different treatment to reduce the gap and move towards sustainable service provision.

Gap Component	Gap ($M / yr)	Asset Management Treatment
Resurfacing	$187	• Increase knowledge of asset performance and useful life, • Develop and use resurfacing treatments that result in reduced life cycle cost, • Increase funding to life cycle cost.
Pavement renewal	$303	• Increase knowledge of asset performance and useful life, • Develop and use optimum (low cost) renewal methods, • Develop renewal projections and funding plan and document in Road Asset Management Plan
Unsealed resheeting	$124	• Increase knowledge of asset performance and useful life, • Develop/review road hierarchy and service levels for maintenance and resheeting to suit available resources. • Develop resheet projections and funding plan and document in Road Asset Management Plan
Bridges	$4	• Increase knowledge of asset performance and useful life, • Develop/review road hierarchy and service levels to suit available resources. • Develop renewal projections and funding plan and document in Road Asset Management Plan
Total	**$618**	

Improvement Indicators

The initiative of the Roads and Transport Directorate to repeat the 2004-05 Road Asset Benchmarking Survey in 2008 provides the opportunity to report on whether councils had made any progress in:

- managing the road assets, and
- improving their asset management knowledge and capability.

The assessment of whether councils have improved their asset management practices, knowledge and capacity to manage their road and bridge bridges is shown in the Table below.

Of the eleven (11) improvement indicators, ten (10) show a positive improvement in road and bridge management practices over the period 2005-2008.

	Performance Indicator	Improvement	Comment
	Managing Road & Bridge Assets		
1.1	Road & bridge asset sustainability	Yes	Sustainability has increased from funding of 48% of life cycle cost in 2005 to 57% in 2008.
1.2	Road & bridge asset life cycle funding gap	Yes	The funding gap has reduced by 14% from 2005 to 2008.
1.3	Road & bridge state of the asset	Yes	The service potential remaining in the assets has increased from 57% to 67% in 2008. This may be largely due to growth assets contributed to councils.
1.4	Road & bridge asset consumption and renewal	Yes	Asset Renewal ratio has increased from 70% of consumption in 2005 to 81% in 2008.
	Knowledge and Capacity		
2.1	Capacity to complete benchmarking survey	No	Overall response rate has decreased by 6% since the 2005 survey.
2.2	Use of IIMM principles	Yes	55% increase from 2005.
2.3	Adoption of road asset management plans	Yes	46% increase from 2005.
2.4	Management of road related risks	Yes	42% increase from 2005.
2.5	Use of long-term financial plans	Yes	21% increase from 2005.
2.6	Period of long-term financial plans	Yes	62% increase from 2005.
2.7	Infrastructure effects in long-term financial plans	Yes	3% increase from 2005.

Recommendations

The Final Report of the Independent Inquiry into the Financial Sustainability of Local Government identified that councils in NSW have a "huge backlog in infrastructure renewals (over $6 billion), which is expected to grow to almost $21 billion within 15 years". The report highlighted challenges for councils in "managing rising community expectations, maintaining existing service commitments in the face of a huge infrastructure bill and constraints on rate income" and "overcoming skills shortages".

As a result, competition for adequate funding to maintain council's infrastructure assets is also under pressure. However, it is of critical importance that councils:

- identify their infrastructure assets and the current condition of such assets,
- implement life cycle asset management plans,
- provide adequate funding to maintain and renew what are in effect their community's greatest financial assets.

To this end it is recommended that:

1. Councils improve their asset management capability to a position that will enable them to provide services to their communities in a sustainable manner. The survey analysis indicated that the current level of road infrastructure services councils are providing to their communities is not sustainable.

2. Councils set a target to have an adopted long term financial plan (10 yr minimum) supported by 20 year asset management plans and risk management plans within a 3 year period for sustainable delivery of services.

3. Councils use the road management model in the survey form as a tool to manage road infrastructure services and life cycle costs. This to be achieved by improving knowledge of assets and asset performance, developing road hierarchies and appropriate service levels, increasing funding for sealed resurfacing/ resealing and unsealed road resheeting to the life cycle cost and managing pavement and bridge renewals through asset management plans.

4. The Roads & Transport Directorate establish an industry partnership with the NSW Department of Local Government, Local Government Association of NSW, Shires Association of NSW and Local Government Managers Association tasked with the objective of improving the asset management capability of NSW councils to an acceptable position within a 3 year period.

5. The industry partnership set a target to 'manage out' the annual funding gap of $618 M within a 3 year timeframe and report annually on performance of the industry towards the target.

6. The industry partnership set a target to improve the accuracy of financial reporting of infrastructure asset consumption within a 3 year timeframe.

1. Introduction

The 2002-2003 Report on the Operation of the *Local Government (Financial Assistance) Act 1995* reported that the 152 NSW Councils are responsible for managing 143,084 km of local and regional roads. 60,620 km of these are sealed and 82,463 are unsealed[1].

The replacement value of NSW local roads was estimated at approx $30.8 billion.

The report estimated the NSW annual local road renewal shortfall of $156 million (2001-02) for the next five years.[2] Beyond this period, this renewal shortfall is likely to increase due to network ageing.[3]

The NSW Local Government Inquiry identified a sum of $6.3 billion required to bring existing (including road and bridge) assets to a satisfactory standard. The figure of $6.3 billion is 13% of total asset value and eight times the current level of expenditure. In addition, a further $14.6 billion was required for replacement of existing assets over the next 15 years[4].

The Roads & Transport Directorate of the IPWEA NSW Division reported a snapshot of the current reported condition of Regional and Local Roads in NSW at 30 June 2005 in its *Road Management Report,* The report concluded that present levels of road funding were not sustainable[5] and identified a life cycle funding gap of $783 million per annum equivalent to a 108% increase in 2005 funding levels.[6]

The Directorate commissioned this report to update the 2005 Road Asset Benchmarking report on the condition on NSW roads and bridges at 30 Jun 2008, update the shortfall in funding required to bring them to a satisfactory condition, provide specific recommendations about rectification of the problems identified and report on whether councils have made any improvement in management of their road and bridge assets since the 2005 Road Asset Benchmarking Project survey.

[1] DoTaRS, 2003, Table 4.1, p 63.
[2] DoTaRS, 2003, Table 4.3, p 64.
[3] DoTaRS, 2003, p 62.
[4] JRA, 2006a, p 4.
[5] .JRA, 2006b, p viii
[6] JRA, 2006b, p v.

2. Background

The IPWEA New South Wales Division recognised the need for improved asset management practices by Councils in managing infrastructure assets that provide essential services to the community including access and mobility, recreation, flood protection and cultural and community facilities.

The Division allocated asset management as a specific responsibility to a Director and formed the Roads & Transport Directorate in partnership with the Local Government Association of NSW and the Shires Association of NSW.

In view of the estimated $30.8 billion investment in NSW local access and mobility infrastructure, the Directorate wanted to quantify the investment and life cycle funding needs, identify any funding 'gap' and identify and promote asset management practices that will assist Councils in sustaining the provision of access and mobility services to the community.

Good access and mobility services are essential for the modern community to survive. Good access and mobility services supports and makes possible needed community services from infrastructure including.

- transport of produce from farm to market and to the manufacturer and finished goods to the retailer and onto the consumer;
- mobility of the community to work, education, recreation and culture.
- mobility of the community to service, community and retail centres.

3. Road Asset Management Practices

The benchmarking survey included questions on road asset management practices of councils. Questions and responses are shown below.

3.1 Use of the International Infrastructure Management Manual

The International Infrastructure Management Manual (IIMM) published by the IPWEA and INGENIUM is recognised as the international reference for infrastructure asset management. Councils were asked if they employed the principles contained within the IIMM. Responses are summarised in Table 1 and shown for IPWEA regions in Appendix A.

Table 1: Use of IIMM Asset Management Principles

	Response			
	No	**In part**	**Yes**	**Total**
Councils using IIMM Principles	18	69	42	129
Percent of total	14%	53%	33%	100%

33% of responding councils reporting using the IIMM principles in full and 53% in part. 14% of responding councils do not use the IIMM.

3.2 Road management

Good practice in managing roads can be demonstrated by the adoption and use of methods and procedures for managing service levels, risks and costs. These may be documented in a Road Asset Management Plan and/or a Road Risk Management Plan/System.

Councils were asked if they had an adopted Road Management Plan and/or a documented system for managing road risks either in a Road Asset Management Plan or included within the corporate risk management system. Responses are shown in Tables 2 and 3 and shown for IPWEA regions in Appendix A.

Table 2: Adoption and Use of Road Asset Management Plans

	Response				
	No	**Planned in 1 yr**	**In progress**	**Yes**	**Total**
Councils with adopted Road Asset Management Plans	13	18	61	38	130
Percent of total	10%	14%	47%	29%	100%

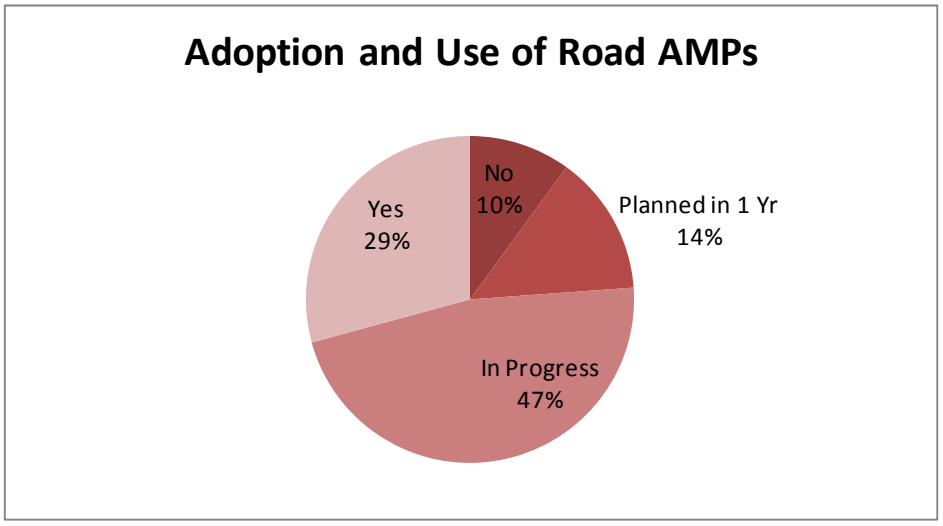

Figure I: Use and Adoption of Road Asset Management Plans

The adoption of Road Asset Management Plans is limited with 29% of Councils in the sample reporting having an adopted Road Asset Management Plan. A further 47% are in the process of developing a Road Asset Management Plan and 14% plan to do so within 1 year. 10% of the responding councils are not planning the development of Road Asset Management Plans.

Table 3: Use of Documented System for Managing Road Risks

	Response				
	No	Planned in 1 yr	In progress	Yes	Total
Councils with a documented system for managing road related risk	13	13	45	60	131
Percent of total	10%	10%	34%	46%	100%

Management of road related risk is more developed with 46% of Councils having a documented system for managing road risk, either in a road management plan or incorporated into the corporate risk management plan. 34% of responding councils are in the process of developing a road risk management system with 10% planning to do so within 1 year.

Since the 2005 benchmarking survey, IPWEA has developed NAMS.PLUS Asset Management providing templates and web based modelling to assist councils prepare road asset management plans. Councils reporting membership of NAMS.PLUS are shown in Table 4.

Table 4: Membership of NAMS.PLUS Asset Management

	Response			
	No	Planned in 1 Year	Yes	Total
Council members of NAMS.PLUS	51	5	76	132
Percent of total	39%	4%	58%	100%

Over half of councils are using NAMS.PLUS to develop their road asset management plans.

Long term financial plans are seen as an important tool by both finance managers and asset managers to manage service delivery and costs in the long term.

Councils were asked if they had a long term financial plan, the term of the plan and whether the plan contains infrastructure effects. Summary responses are shown in Tables 5 – 7 and for IPWEA regions in Appendix A.

Table 5: Use of Long Term Financial Plans

	Response				
	No	Planned in 1 Year	In progress	Yes	Total
Councils with Long Term Financial Plan	12	7	25	84	128
Percent of total	9%	5%	20%	66%	100%

66 % of Councils responding to the survey reported having long term financial plans. 20% were in the process of developing long term financial plans with a further 5% planning this in the next year. This data indicates that Councils have recognised the need for long term financial plans and are progressing towards this objective.

Table 6: Length of Long Term Financial Plans

	Length of Long Term Financial Plans					
	1 yr	3 yrs	5 yrs	10 yrs	10+ yrs	Total
Councils with Long Term Financial Plans	7	31	30	44	13	125
Percent of total	6%	25%	24%	35%	10%	100%

Good practice in asset management requires long term financial plans covering a 10 year period supported by 20 year asset management plans. 45% of the responding councils have developed 10 year financial plans. 24% have 5 year plans and a further 25% have 3 year plans. Only 6% of councils manage by annual budgets.

Table 7: Infrastructure Effects in Long Term Financial Plans

	Response			
	No	In part	Yes	Total
Councils recognising infrastructure effects in long term financial plans	41	58	28	127
Percent of total	32%	46%	22%	100%

Infrastructure has long term financial impacts on councils including planning for and financing infrastructure renewal and providing for growth of networks, and life cycle costs for new infrastructure.

Long term financial effects of infrastructure services include:

- infrastructure renewal. The NSW Local Government Inquiry reported data from councils' Special Schedule Seven reports estimating that $6.3 billion is required to bring existing assets to a satisfactory standard with a further $14.6 billion needed over the next 15 years to replace existing assets[7].
- infrastructure network growth. Councils need to provide for upgrade of existing services to meet higher levels of service and for expansion of services to new consumers. Upgrade adds to asset inventory generally without increasing revenue. Expansion also adds to asset inventory but may be associated with generation of additional revenue.
- life cycle costs for new infrastructure. Councils acquire new infrastructure both funded by council and provided by developers and others at no cost. Each new infrastructure asset commits council to fund additional operating and maintenance costs over the life of the infrastructure service and to plan and fund infrastructure renewal.

It is critical that these infrastructure effects are fully incorporated into long term financial plans.

22% of responding councils reported the inclusion of infrastructure effects in long term financial plans. 46% include part infrastructure effects with 32% reporting they do not include the financial impacts of infrastructure.

[7] JRA, 2006a, p 4.

4. Regional and Local Roads as an Investment

4.1 Road inventory

The responding councils reported a total road length of 139,909 km as shown in Table 8. Road lengths for IPWEA regions are shown in Appendix B.

Table 8: Regional & Local Road Length for Responding Councils

	Road Length in km		
	Sealed	**Unsealed**	**Total**
Regional Roads	12,840	2,905	15,745
Local Roads	57,694	66,470	124,164
Total	70,534	69,375	139,909

Note: 135 Councils responded to question

4.2 Bridge inventory

Responding councils reported a total of 9,028 bridges as shown in Table 9. 22% are located on regional roads and 78% on local roads. Concrete /steel bridges account for 74% of the total, with 26% of timber construction. Bridge inventory for IPWEA regions is shown in Appendix B

Table 9: Bridges on Regional and Local Roads for Responding Councils

	No. of Bridges		
	Concrete/steel	**Timber**	**Total**
Regional Roads	1,708	234	1,942
Local Roads	4,969	2,117	7,086
Total	6,677	2,351	9,028

Note: 135 Councils responded to question

4.3 Roads and Bridges Investment

The responding councils reported a replacement value of $40,775 million for their road and bridge assets. 9% of this value is held in non-depreciable assets such as earthworks/formation and residual value. The assets are reported to have a depreciated replacement cost of $25,286 million. Annual consumption of the assets, reported by depreciation expense is estimated at $653 million. Investment details are shown in Tables 10 and 11 and Figure II.

Table 10: Road and Bridge Valuations

	Replacement Cost ($M)	Depreciable Amount ($M)	Depreciated Replacement Cost ($M)	Annual Depreciation Expense ($M)
Sealed Roads	$27,014	$24,536	$17,341	$422
Unsealed Roads	$4,212	$3,528	$2,496	$63
Concrete/Steel Bridges	$1,913	$1,823	$1,200	$25
Timber Bridges	$298	$254	$120	$5
Roads Ancillary	$7,338	$7,192	$4,129	$139
Total	**$40,775**	**$37,334**	**$25,286**	**$653**

Note: Data from 135 councils.

Table 11: Asset Management Position for Roads & Bridges

Asset Category	State of the Asset (DRC/RC)	Asset Consumption (Deprn/DA)	Asset Renewal (Renewal Exp/ DA)
Sealed roads	70.7%	1.7%	1.4%
Unsealed roads	70.7%	1.8%	0.9%
Concrete/Steel bridges	65.8%	1.4%	0.7%
Timber bridges	47.0%	1.9%	10.1%
Roads ancillary	57.4%	1.9%	NA
Total	**67.7%**	**1.7%**	**1.4%***

Note: Data sources as for Table 9.
Asset renewal expenditures sourced from Tables 11 and 12.
* excluding Roads Ancillary Assets

The remaining service potential of the road and bridge assets of the responding councils is reported at 67.7%. On average the assets are approaching the third point of their expected life.

The assets are being consumed at a rate of 1.7% of the depreciable amount per annum. This is an average figure over the life cycle of the asset (up to 100 years).

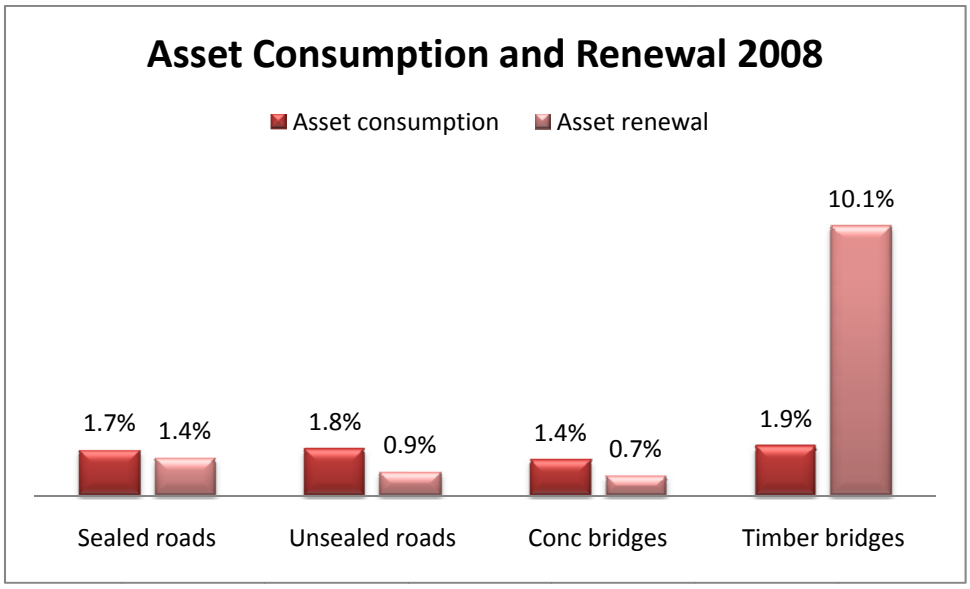

Figure II: Asset Renewal and Consumption

Asset renewal in 2007/08 was less than asset consumption for sealed and unsealed roads and concrete bridges.

- sealed roads – asset renewal 1.4% which is 82% of asset consumption (1.7%)
- unsealed roads - asset renewal 0.9% - 50% of asset consumption (1.8%)
- concrete/steel bridges – asset renewal 0.7% - 54% of asset consumption (1.4%)

For timber bridges, asset renewal was greater than asset consumption in 2007/08:

- timber bridges – asset renewal 10.1% 542% of asset consumption (1.9%).

Timber bridges in the responding councils are being renewed at a rate significantly higher than asset consumption, which reflects the investment priority given by councils to renewing ageing timber bridges.

For sustainability in service delivery, the rate of asset renewal should equal to the rate of asset consumption on average over the long term. This does not mean that asset renewal should equal asset consumption in each and every year. Asset consumption is an average figure, whereas the rate of annual asset renewal can vary widely, depending on community and council priorities and available funds.

It is important that councils understand their asset management position, know what asset renewals are required to continue to provide the levels of service that the community needs and how the asset renewals are to be funded.

An asset management plan documents the services to be provided, how the services are to be provided and the funds required for asset operation, maintenance and renewal over a 20 year period. The asset management plan expenditure forecasts feed into the long term financial plan and assist Councils in deciding the allocation of the community's resources.

5. Funding Needs and Funding Gap

5.1 Regional and Local Roads

Councils were asked to provide details on road management actions and costs including routine maintenance costs, reseal cycles and costs, sealed pavement renewal cycles and costs and resheet cycles and costs. This data was analysed to provide a road management model for each council and is aggregated into a State-wide position for regional and local roads.

The road life cycle cost, expenditure and life cycle funding gap for the responding councils is shown in Table 12.

Table 12: Regional and Local Roads Life Cycle Cost and Expenditure 2008

	Length (km)	Rate ($/km/yr)	Life Cycle Cost ($/yr)	Expenditure ($.yr)	Funding Gap ($/yr)
REGIONAL ROADS					
Sealed Roads					
Routine maintenance	12,840	$3,606	$46,294,853	$46,294,853	
Resurfacing	12,840	$4,014	$51,535,243	$22,465,136	
Pavement renewal	12,840	$6,564	$84,283,557	$60,132,930	
Sub total	12,840	$14,183	$182,113,653	$128,892,918	$53,220,735
Unsealed Roads					
Routine maintenance	2,905	$2,664	$7,738,622	$7,738,622	
Resheeting	2,905	$3,057	$8,879,110	$1,856,487	
Sub total	2,905	$5,721	$16,617,731	$9,595,109	$7,022,622
Total Regional	**15,745**	**$12,622**	**$198,731,384**	**$138,488,027**	**$60,243,357**
LOCAL ROADS					
Sealed Roads					
Routine maintenance	57,694	$2,938	$169,491,429	$169,491,429	
Resurfacing	57,694	$4,342	$250,494,871	$113,057,449	
Pavement renewal	57,694	$6,865	$396,055,188	$151,339,761	
Sub total	57,694	$14,144	$816,041,488	$433,888,639	$382,152,849
Unsealed Roads					
Routine maintenance	66,470	$1,190	$79,110,604	$79,110,604	
Resheeting	66,470	$1,993	$132,502,807	$29,413,126	
Sub total	66,470	$3,184	$211,613,411	$108,523,731	$103,089,681
Total Local Roads	**124,164**	**$8,277**	**$1,027,654,899**	**$542,412,370**	**$485,242,529**
Grand Total	**139,909**	**$8,766**	**$1,226,386,283**	**$680,900,397**	**$545,485,886**

Note: 135 Councils responded to question, apparent errors are due to rounding.
Road maintenance expenditure is assumed to be adequate.
Rates for total regional, total local and grand totals are averages for sealed and unsealed roads.

The survey indicated that the responding councils are responsible for the management of 139,909 km of regional and local roads. The life cycle cost of their road network is $1,226,386,000 per annum. The responding Councils are currently spending $680,900,000 per annum leaving a funding gap of $545,485,000 per annum.

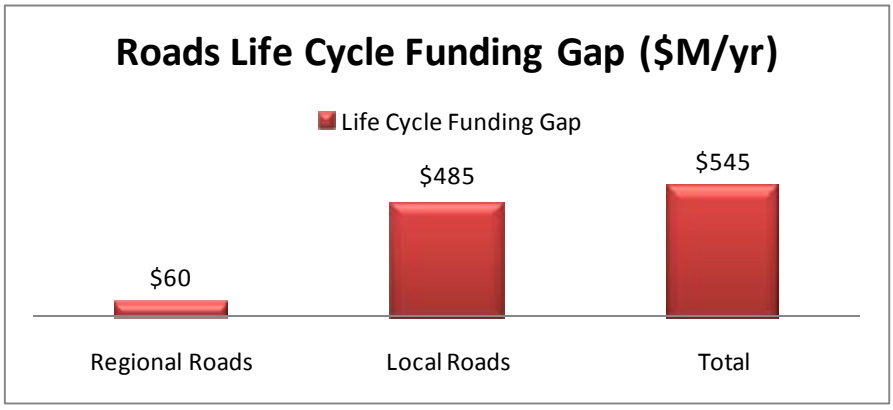

Figure III: Roads Life Cycle Funding Gap for 135 Councils

Councils will need to manage this funding gap by improving knowledge of assets and asset performance, reviewing service levels and costs of delivery, improving maintenance to extend asset lives, improving efficiency in service delivery, asset operation, maintenance and renewal, developing and using low cost asset renewal methods, rationalising assets, increasing funding and combinations of all actions.

5.2 Life Cycle Cost apportioned to Usage

The survey asked councils to estimate the percentage use of their roads by traffic volumes for three vehicle usage categories:

- residential associate usage,
- business and commercial usage, and
- higher mass vehicle usage.

The survey form apportioned the percentage of road life cost to the three road usage categories. The results are summarised in Table

Table 13: Road Life Cycle Cost apportioned to Usage Categories

Road Use Category	% of Road Life Cycle Cost
Residential	76.4%
Business/Commercial	20.8%
High Mass Vehicles	2.8%
Total	100.0%

5.3 Bridges

Councils were asked to provide details on bridge management actions and costs including routine maintenance and renewal (replacement) cycles and costs. This data was analysed to provide a bridge management model for each council and is aggregated into a State-wide position for regional and local roads.

Table 14: Regional and Local Bridges Life Cycle Cost and Expenditure 2008

	Area (m2)	Rate ($/m2/yr)	Life Cycle Cost ($/yr)	Expenditure ($/yr)	Funding Gap ($/yr)
REGIONAL ROADS					
Concrete/steel bridges					
Routine maintenance	403,850	$5.60	$2,261,589	$2,261,589	
Bridge renewal	403,850	$31.98	$12,915,491	$7,849,869	
Sub total	403,850	$37.58	$15,177,080	$10,111,457	$5,065,622
Timber Bridges					
Routine maintenance	37,607	$44.53	$1,674,748	$1,674,748	
Bridge renewal	37,607	$38.88	$1,462,055	$13,071,527	
Sub total	37,607	$83.41	$3,136,804	$14,746,276	-$11,609,472
Total Regional	**441,457**	**$41.49**	**$18,313,883**	**$24,857,733**	**-$6,543,850**
LOCAL ROADS					
Concrete/steel bridges					
Routine maintenance	752,133	$4.22	$3,176,752	$3,176,752	
Bridge renewal	752,133	$29.88	$22,472,101	$5,560,903	
Sub total	752,133	$34.10	$25,648,852	$8,737,654	$16,911,198
Timber Bridges					
Routine maintenance	167,231	$31.84	$5,324,152	$5,324,152	
Bridge renewal	167,231	$34.82	$5,822,238	$12,658,402	
Sub total	167,231	$66.65	$11,146,390	$17,982,553	-$6,836,163
Total Local Roads	**919,364**	**$40.02**	**$36,795,242**	**$26,720,208**	**$10,075,035**
Grand Total	**1,360,821**	**$40.50**	**$55,109,126**	**$51,577,941**	**$3,531,185**

Note: 135 Councils responded to question, apparent errors are due to rounding.
Bridge maintenance expenditure is assumed to be adequate.
Rates for total regional, total local and grand totals are averages for concrete and timber bridges.

The responding councils manage 6,677 bridges with a deck area of 1,360,821 m2. The life cycle cost of the bridge network is $55,109,000 per annum. The responding Councils' expenditure in 2007-08 was $51,578,000 which was $3,531,000 less than the life cycle cost.

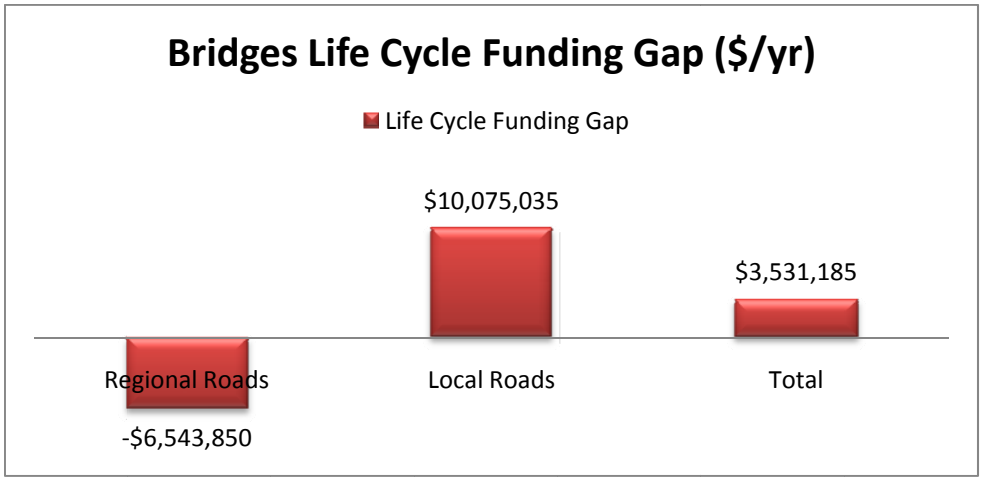

Figure IV: Bridges Life Cycle Funding Gap for 135 Councils

6. Response to the Survey

6.1 Survey responses

Response to the survey from councils was less than expected.

The Roads & Transport Directorate launched the survey within the Road Asset Benchmarking Survey on Monday 19 August 2008 in a Roads and Transport Directorate Newsletter to all councils. A web site www.jr.net.au/rabm was established on 25 August 2008 to provide detail on the benchmarking survey and facilities to download the benchmarking survey form. The survey form is shown in Appendix C.

The Directorate arranged a series of nine (9) regional workshops to explain the purpose of the Road Asset Benchmarking Survey and outline the methodology for completing the survey form. Dates and locations for the regional workshops are detailed below.

Monday 15 September	Lismore
Tuesday 16 September	Sydney Metro South - Mascot
Wednesday 17 September	Griffith
Thursday 18 September	Sydney Metro North - St Ives
Friday 19 September	Singleton
Monday 22 September	Dubbo
Tuesday 23 September	Sydney Metro West - Liverpool
Wednesday 24 September	Queanbeyan
Thursday 25 September	Armidale

Persons attending the regional workshops were requested to complete and return the survey form within 3 weeks.

By Friday 17 October 2008, a total of thirty five (35) councils had responded to the survey.

The Roads & Transport Directorate Manager followed up councils who had not responded by Directorate Newsletter, e-mail and telephone.

To assist councils who have not returned a completed survey for, the consultant prepared a draft survey for the 41 councils who had not downloaded the survey form from the project web site or had not submitted a completed survey form. The draft survey form was prepared using readily available road length and expenditure data from previous road asset benchmarking surveys and asset values from council's annual financial statements. The draft survey forms were e-mailed to 41 councils with a request to check the draft figures and advise if the data was correct or of any corrections required. This process assisted 27 councils to complete the survey form.

The consultant also visited three councils in December 2008 and seven in March 2009 to provide assistance in completing the survey form. Eight completed survey form were received from the 10 councils visited.

By closure of the survey on 14 April 2009, a total of 138 completed survey form had been received. Of these, 135 were checked and validated for analysis.

Survey form responses are shown in Appendix D. Some survey forms were incomplete and validation considered whether the survey data contained sufficient

and reasonable data for analysis. The majority of councils were queried on the completeness and reasonableness of their survey data.

The survey results show the number of councils responding to that question as a note on relevant tables.

The response rate of 91% (138 responses from 152 councils) over a seven month period and validated response rate of 89% (135 from 152) provides a measure of asset management capability.

The survey requested data that should be readily available from councils being:

- asset management practice data
- asset valuation data
- road management data
    - sealed and unsealed road lengths
    - sealed and unsealed roads maintenance costs
    - resurfacing costs and average useful lives
    - sealed pavement renewal costs and average useful lives
    - unsealed resheeting costs and average useful lives.
- bridge management data
    - concrete/steel and timber bridge inventory and attribute data
    - concrete/steel and timber bridge maintenance costs
    - concrete bridge renewal average costs and average useful lives
    - timber bridge renewal average costs and average useful lives.

The survey form includes a road and a bridge life cycle management model for each council which compares road and bridge life cycle, costs with current funding levels and identifies any funding gap. The model can be used to run scenarios on varying service levels and costs with the objective of managing the funding gap to an acceptable level.

6.2 Reasons for the level of response

Reasons for the level of response could include

- lack of data,
- lack of resources to complete survey,
- no understanding of the issue,
- lack of asset management skills.

6.3 Organisational commitment to asset management

The level of response and quality of responses may indicate a low level of asset management capability in councils. Given the funding gap indicated by the survey response, councils will need to increase asset management capability if they are to manage their funding gap and satisfy community demands for services.

6.4 Data quality issues

The road and bridge model uses average cost and useful life data. There are inherent inaccuracies in use of averaging data for a complex and highly varied road and bridge network. Options were made for councils to provide road data at a network level or asset/service hierarchy level. Councils predominately provided data at the network level indicating a low level of use of road hierarchies and service levels to manage road networks.

The consultants queried survey forms with councils where data was not provided for all fields, typographical errors were evident or where the data appeared inappropriate, to assist in validating the survey forms and maximising the number of valid survey form returns.

There was a large variability in data values provided for key datasets being

- average cost of sealed road resurfacing ($/km)
- average useful life of sealed road surfaces (yrs)
- average life of sealed pavement renewal ($/km)
- average useful life of sealed pavements (yrs)
- average cost of unsealed road resheets ($/km)
- average useful life of unsealed road gravel sheeting (yrs)

The distributions of maintenance costs for regional and local roads are shown in Figs V and VI as an example of the variability in data values.

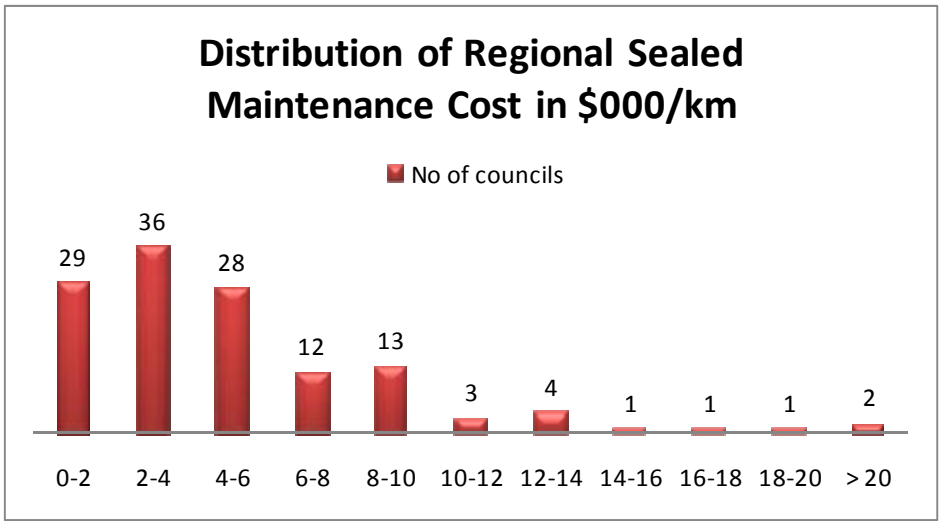

Figure V: Distribution of Regional Sealed Road Maintenance Costs

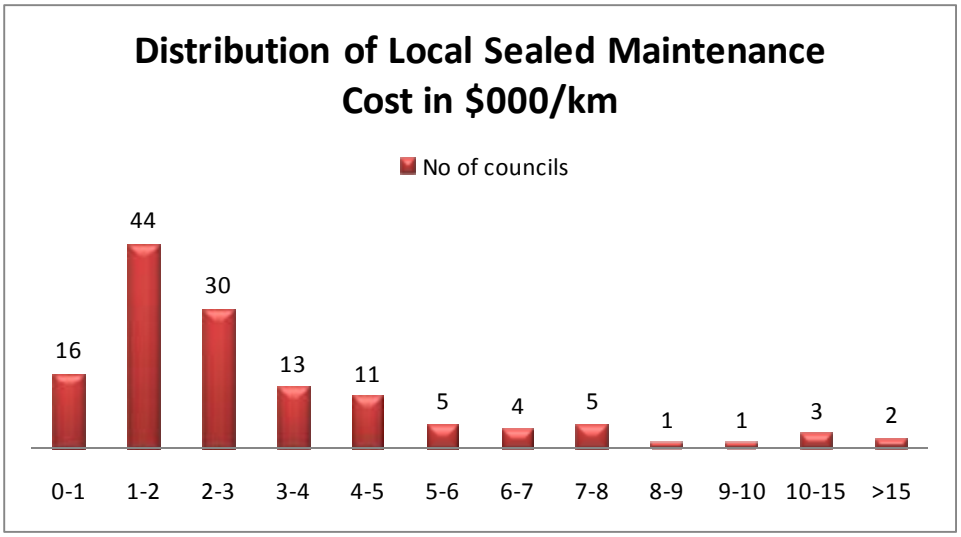

Figure VI: Distribution of Local Sealed Road Maintenance Costs

The large variations may be explained by the relative condition of sealed surfaces and inclusion of capital renewal and non road maintenance items such as resurfacing, street lighting, street sweeping, verge mowing and similar operational activities.

7. Findings

7.1 91% (138) of NSW councils responded to the IPWEA NSW Roads & Transport Directorate's Road Asset Benchmarking Survey and the Local Government Inquiry survey. Of these responses 89% (135 of 152) were assessed as valid for analysis.

7.2 Asset management practice and capability was limited with 33% (42) of responding councils reporting that they used the principles of the International Infrastructure Management Manual, the internationally recognised reference on infrastructure asset management, in full. 29% (38) of councils have an adopted Road Asset Management Plan. 76 (58%) of councils have joined IPWEA NAMS.PLUS Asset Management, the IPWEA's system to assist them in developing their road asset management plans

7.3 Road related risk was being addressed through a road asset management plan or within a corporate risk management plan in 46% (60) of the responding councils.

7.4 66% (84) of responding councils indicated they have a long term financial plan, 45% (57) of the responding councils' plans cover a period of at least 10 years.

7.5 22% (28) of responding councils' long term financial plans recognise the effects of infrastructure including financing infrastructure renewal, and providing for growth and life cycle costs for new infrastructure.

7.6 The 135 responding councils are responsible for the management of 139,909 km of regional and local roads combined and 9,028 concrete/steel and timber bridges.

7.7 The responding councils' roads and bridges have a replacement value of $40,775 million, which is being consumed at the rate of $653 million per annum.

7.8 Road and bridge assets for the reporting councils are reported to have 67.7% of their service life remaining. The assets are being consumed at a rate of 1.7% of the depreciable amount. 2007/08 asset renewal is less than asset consumption for roads being 82% of consumption for sealed roads, 50% for unsealed roads and 54% for concrete/steel bridges. Timber bridge renewal is 542% of consumption recognising the investment priority given by councils to renewal of ageing timber bridges.

7.9 The road life cycle cost for the responding councils was estimated at $1,226 million per annum. Funding in 2007/08 was reported at $680 million leaving a funding gap of $545 million per annum below the life cycle cost.

7.10 Sealed road resurfacing/resealing life cycle cost for the responding councils was estimated at $302 million per annum. Funding of $135 million in 2007/08 was $166 million less than the annual life cycle cost.

7.11 Unsealed road resheeting life cycle cost for the responding councils was estimated at $141 million per annum. 2007/08 funding was $31 million which is $110 million less than the annual life cycle cost.

7.12 The estimated apportionment of road life cycle cost to the three major road usage categories based on councils' best estimate of percentage traffic usage of roads was that residential use was responsible for 76% of the road life cycle cost, business and commercial usage 21% and high mass vehicles 3%.

7.13 The life cycle cost for the responding councils' concrete/steel bridges was estimated at $15.1 million for regional roads and $25.6 million for local roads per annum. Expenditure in 2007/08 of $10.1 million for bridges on regional roads and $8.7 million for bridges on local roads was $5.0 million and $16.9 million less than the life cycle cost.

7.14 The life cycle cost for the responding councils' timber bridges was estimated at $3.1 million for regional roads and $11.1 million for local roads per annum. Funding in 2007/08 of $14.7 million for regional roads and $17.9 million for local roads was $11.6 million for regional roads and $6.8 million per annum **greater** than the life cycle cost. This indicates the investment priority given to timber bridge renewal in 2007/08.

7.15 Survey data quality was variable with a few of the responding councils having good and reliable data and others lacking in both quantity and quality of data.

8. Discussion on Findings

8.1 Asset management practices and skills

The response to the survey, low level of asset and risk management practices and identification of a funding gap for roads and bridges indicated the need for improved asset management awareness and practice in NSW councils.

Very few councils provided the complete survey dataset in a form suitable for database analysis. The data sought was considered to be basic financial data and data used for strategic and day-to-day management of roads and bridges. This data should be readily available in councils with good asset management capability. The availability, accuracy and use of asset management data is needs improvement.

Guidelines to assist councils in asset management and for preparing asset management plans have been available since 1994 with the National Asset Management Manual 1994[8] and International Infrastructure Management Manual 2006[9]. All Councils should be using the International Infrastructure Management as their asset management reference.

In 2008, IPWEA released NAMS.PLUS Asset Management (www.namsplus.org.au), a system of templates and modelling tools to assist councils write their infrastructure asset management plans. The take-up of 76 councils (58%) joining NAMS.PLUS to develop their roads asset management plans is a positive result.

The lack of asset management plans to manage service delivery from infrastructure places councils at risk of not being able to sustain service delivery in the medium term. If councils do not manage the funding gap, they will be faced with decreasing service levels and/or increased funding needs in the future.

[8] IMEA, 1994
[9] IPWEA, 2006

It is critical that councils have a 10 year financial plan supported by 20 year asset management plans to ensure sustainable service delivery for their communities.

The funding gap identified in the survey and level of road related risk practices also requires councils to improve their road related risk management practices to sustain service delivery, minimise liability exposure and potential for increases in insurance premiums.

8.2 Road transport infrastructure investment

The estimated investment to replace the NSW local transport infrastructure is $45.9 billion based on extrapolation of values reported in financial statements of the 135 responding councils.

The assets are reported as being consumed at an estimated $735 million per annum.

Road infrastructure investment values are shown in Table 15.

Table 15: Road and Bridge Values Extrapolated to 152 Councils

	Replacement Cost ($M)	Depreciable Amount ($M)	Depreciated Replacement Cost ($M)	Annual Depreciation Expense ($M)
Sealed Roads	$30,416	$27,626	$19,524	$475
Unsealed Roads	$4,742	$3,973	$2,811	$71
Concrete/Steel Bridges	$2,154	$2,052	$1,351	$28
Timber Bridges	$336	$286	$135	$5
Roads Ancillary	$8,262	$8,098	$4,649	$156
Total	**$45,910**	**$42,035**	**$28,470**	**$735**

Note: Data from Table 12, 135 councils extrapolated to 152 councils.

8.3 Road funding

Extrapolating the 2007/08 funding gap of $545 million for the 135 responding councils to cover the 152 NSW councils will give an indication of the size of the road funding gap. The extrapolated road funding gap for 152 councils in NSW is estimated at $614 million

Table 16 shows the road model for the 135 responding councils extrapolated to 152 councils. Funding the life cycle cost will require an 80% increase over 2007/08 expenditures.

Table 16: Roads Life Cycle Cost and Expenditure extrapolated to 152 Councils

	Length (km)	Rate ($/km/yr)	Life Cycle Cost ($/yr)	Expenditure ($/yr)	Funding Gap ($/yr)
REGIONAL ROADS					
Sealed Roads					
Routine maintenance	14,457	$3,606	$52,124,575	$52,124,575	
Resurfacing	14,457	$4,014	$58,024,867	$25,294,079	
Pavement renewal	14,457	$6,564	$94,897,042	$67,705,225	
Sub total	14,457	$14,183	$205,046,483	$145,123,878	$59,922,605
Unsealed Roads					
Routine maintenance	3,270	$2,664	$8,713,115	$8,713,115	
Resheeting	3,270	$3,057	$9,997,220	$2,090,267	
Sub total	3,270	$5,721	$18,710,334	$10,803,382	$7,906,953
Total Regional	**17,727**	**$12,622**	**$223,756,817**	**$155,927,260**	**$67,829,558**
LOCAL ROADS					
Sealed Roads					
Routine maintenance	64,959	$2,938	$190,834,794	$190,834,794	
Resurfacing	64,959	$4,342	$282,038,669	$127,294,313	
Pavement renewal	64,959	$6,865	$445,928,805	$170,397,360	
Sub total	64,959	$14,144	$918,802,268	$488,526,468	$430,275,800
Unsealed Roads					
Routine maintenance	74,840	$1,190	$89,072,680	$89,072,680	
Resheeting	74,840	$1,993	$149,188,346	$33,117,002	
Sub total	74,840	$3,184	$238,261,026	$122,189,682	$116,071,344
Total Local Roads	**139,799**	**$8,277**	**$1,157,063,294**	**$610,716,150**	**$546,347,144**
Grand Total	**157,527**	**$8,766**	**$1,380,820,111**	**$766,643,410**	**$614,176,702**

Note: Data from 135 Councils extrapolated to 152 councils, apparent errors are due to rounding.
Road maintenance expenditure is assumed to be adequate.
Rates for total regional, total local and grand totals are averages for sealed and unsealed roads.

The life cycle cost and 2007-08 expenditure for NSW regional roads and local roads is show in Fig VII. The life cycle funding gap for regional and local roads is shown in Fig VIII.

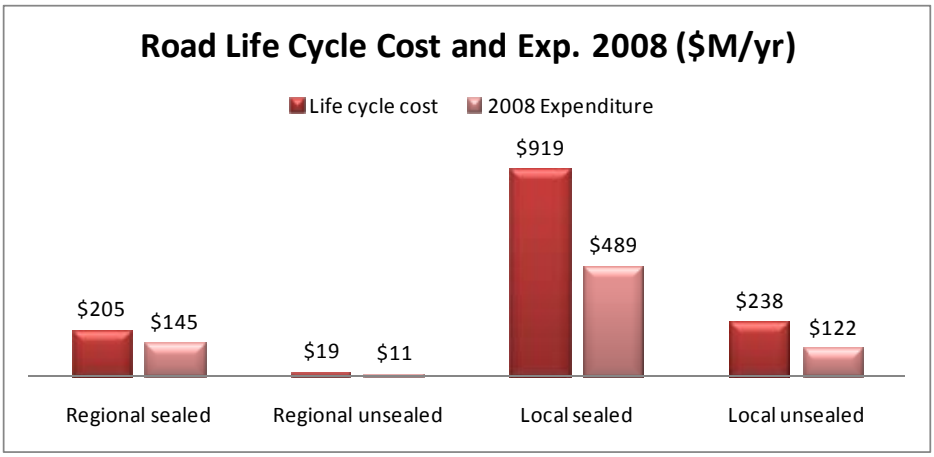

Figure VII: Road Life Cycle Cost and Expenditure 2008

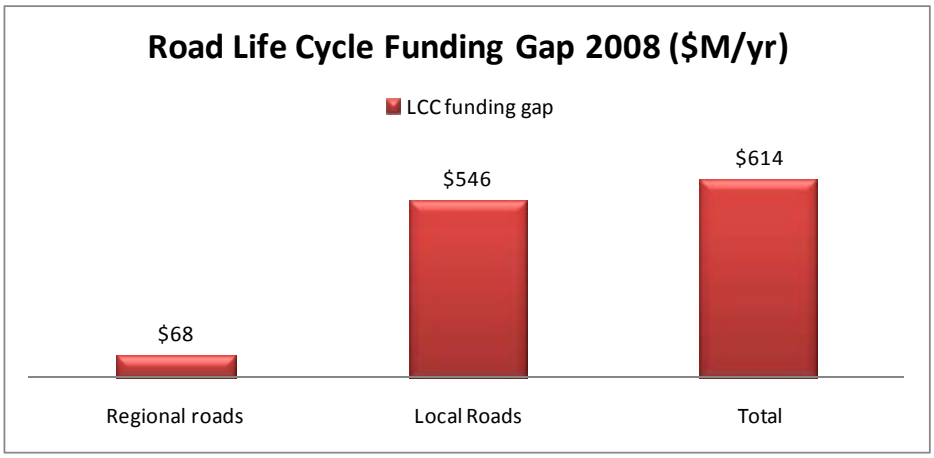

Figure VIII: Road Life Cycle Cost Funding Gap 2008

8.4 Road life cycle cost and road usage.

Table 13 showed the calculated percentages of the road life cycle cost that is estimated to be related to usage of the roads by residential, business and commercial and high mass vehicles for the 135 responding councils. The estimated road life cycle cost related to usage for all 152 councils is shown in Table 17.

Note that the sample traffic volumes used in this instance are ‘best estimates’ only as no data is held for traffic volumes classified by road use.

This usage data and life cycle cost analysis was included in the benchmarking survey to test the methodology. Further research into the life cycle cost and road usage focus on firstly improving the accuracy of road usage traffic volume involving detailed sampling of typical urban and rural category road, and secondly, relating the traffic usage to effect on the road usage on useful life of the road asset components. This will take into account load effects on surfaces and pavements for the three road uses.

Table 17: Road Life Cycle Cost and Road Usage

Road Use Category	% of Road Life Cycle Cost	Road life cycle cost for 152 councils ($/yr)
Residential	76.4%	$1,055,013,839
Business/Commercial	20.8%	$287,488,944
High Mass Vehicles	2.8%	$38,317,328
Total	**100.0%**	**$1,380,820,111**

8.5 Bridge funding

Extrapolating the sample data for 135 responding councils will also give an indication of sustainable funding levels for bridges on regional and local roads. 2007-08 expenditure on bridges on regional and local roads is estimated at approximately $3,975,000 greater than the life cycle cost.

Table 18: Bridge Life Cycle Cost and Expenditure 2008

	Area (m2)	Rate ($/m2/yr)	Life Cycle Cost ($/yr)	Expenditure ($/yr)	Funding Gap ($/yr)
REGIONAL ROADS					
Concrete/steel bridges					
Routine maintenance	454,705	$5.6	$2,546,381	$2,546,381	
Bridge renewal	454,705	$32.0	$14,541,886	$8,838,371	
Sub total	454,705	$37.6	$17,088,268	$11,384,752	$5,703,515
Timber Bridges					
Routine maintenance	42,343	$44.5	$1,885,642	$1,885,642	
Bridge renewal	42,343	$38.9	$1,646,166	$14,717,572	
Sub total	42,343	$83.4	$3,531,809	$16,603,214	-$13,071,406
Total Regional	497,048	$41.5	$20,620,076	$27,987,966	-$7,367,890
LOCAL ROADS					
Concrete/steel bridges					
Routine maintenance	846,846	$4.2	$3,576,787	$3,576,787	
Bridge renewal	846,846	$29.9	$25,301,921	$6,261,165	
Sub total	846,846	$34.1	$28,878,708	$9,837,952	$19,040,756
Timber Bridges					
Routine maintenance	188,289	$31.8	$5,994,600	$5,994,600	
Bridge renewal	188,289	$34.8	$6,555,409	$14,252,423	
Sub total	188,289	$66.7	$12,550,010	$20,247,023	-$7,697,014
Total Local Roads	**1,035,136**	**$40.0**	**$41,428,717**	**$30,084,975**	**$11,343,743**
Grand Total	**1,532,184**	**$40.5**	**$62,048,793**	**$58,072,941**	**$3,975,852**

Note: Data from 135 Councils extrapolated to 152 councils, apparent errors are due to rounding.
Bridge maintenance expenditure is assumed to be adequate.
Rates for total regional, total local and grand totals are averages for concrete and timber bridges.

A comparison of the sample and extrapolated bridge data in shown in Table 19.

Table 19: Sample Bridge Data extrapolated to 152 Councils

	Sample of 135 Councils	Extrapolated to 152 Councils
No. concrete/steel bridges	6,677	7,518
No. timber bridges	2,351	2,646
Total bridges	9,028	10,164
Bridge Replacement Value	$2,211 M	$2,490 M
Bridge Asset consumption	$29.4 M/yr	$33.1 M/yr
Bridge life cycle cost	$55.1 M/yr	$62.0 M/yr
2007/08 Expenditure	$51.6 M/yr	$58.1 M/yr
Funding gap	$3.5 M/yr	$3.9 M/yr

The life cycle cost and 2007-08 expenditure for bridges on NSW regional roads and local roads is show in Fig IX. The life cycle funding gap for regional and local road bridges is shown in Fig X.

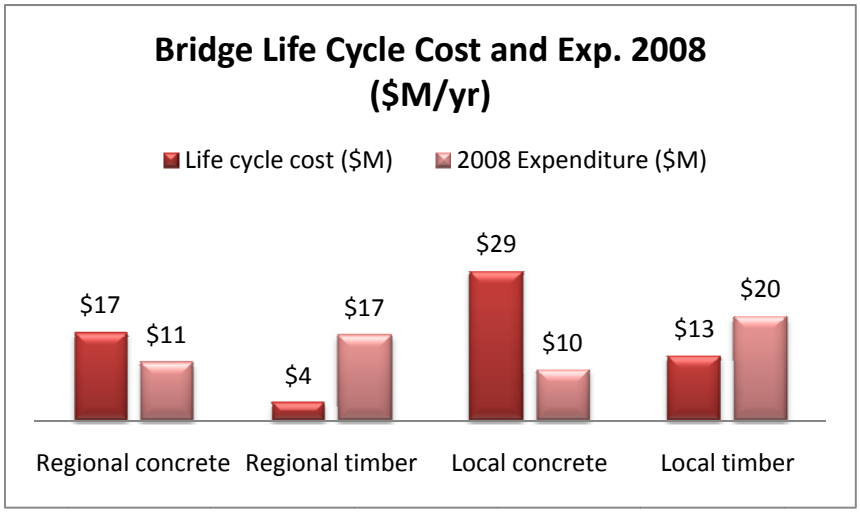

Figure IX: Bridges Life Cycle Cost and Expenditure 2008

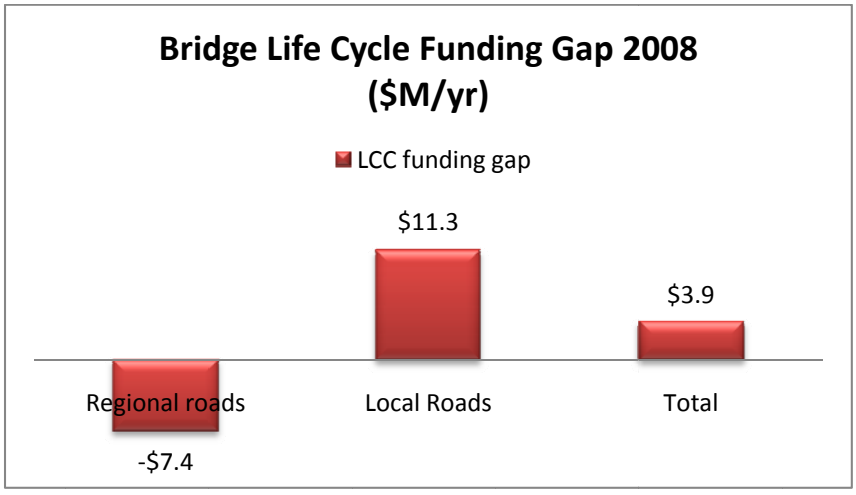

Figure X: Bridges Life Cycle Cost Funding Gap 2008

The funding gap for regional road bridges is negative meaning that the RTA and Councils have given investment priority and funding to renewal of ageing timber bridges on regional roads.

Bridge funding in 2007/08 was $3.9 M less than the life cycle costs, where the life cycle costs represents the average cost of maintenance and replacement over the life cycle of all bridges.

8.6 Roads and Bridges Combined Funding Position

The estimated funding position for roads and bridges extrapolated for all NSW councils is shown below and in Fig XI.

Life Cycle Cost		$M/yr	$M/yr
	Roads	$1,381	
	Bridges	$62	
	Subtotal		$1,443
2007-08 Expenditure			
	Roads	$767	
	Bridges	$58	
	Subtotal		$825
Estimated funding gap			**$618**

The estimated funding gaps is equivalent to a 75 % increase in funding above the 2007/08 expenditure levels and emphasises the need to take action to manage the funding gap and ensure infrastructure services are sustainable.

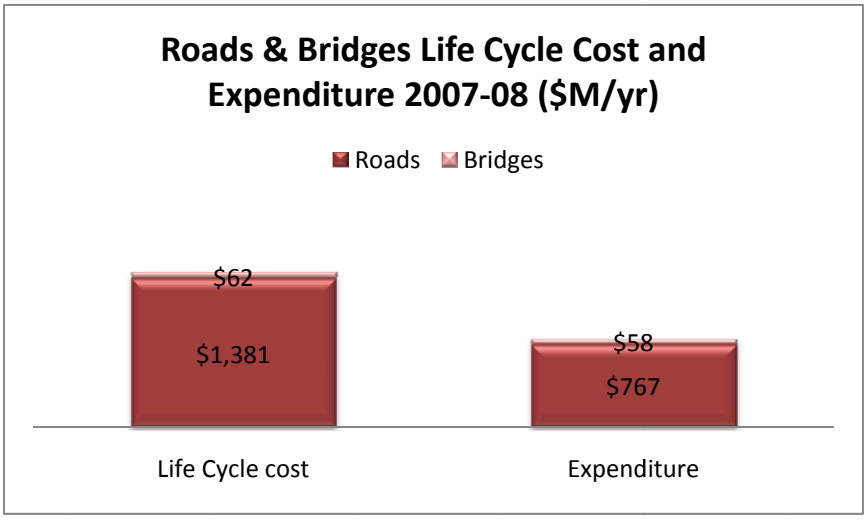

Figure XI: Roads & Bridges Life Cycle Costs and Expenditure 2008

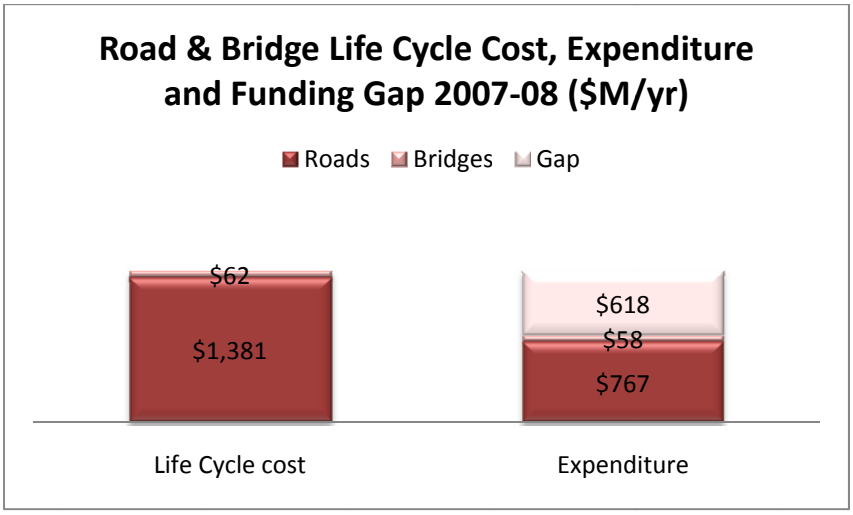

Figure XII: Roads & Bridges Life Cycle Costs and Funding Gap 2008

The road and bridge funding gap for all 152 NSW councils is estimated at $618 million per annum based on the data from the 135 responding councils extrapolated to 152 councils. This is equivalent to a 75% increase in 2007/08 road and bridge expenditure if asset management principles are not applied to managing the gap. Asset management principles to be applied to managing the funding gap include:

- Ensuring that all councils have adequate accurate knowledge on their road assets and how their assets are performing.
- Ensuring that sealed roads are resurfaced/resealed at the optimum time to maintain waterproofing of pavements. This will require an increase in funding from $153 million in 2007/08 to $340 million per annum for all councils (a 122% increase).
- Consultation and selection of appropriate levels of service and costs to meet community needs and available resources.
- Ensuring that unsealed roads are resheeted at the optimum time to meet agreed service levels within available resources. This will require an increase in funding from $35 million in 2007/08 to $159 million for all councils if service levels reported in the survey are to be maintained (a 352% increase).
- Making efficiencies in operations, maintenance, resurfacing and pavement renewal aimed at reducing life cycle costs.
- Improving maintenance practices and funding if necessary to extend pavement life and defer projected renewal.
- Rationalise (dispose) of unnecessary infrastructure assets.
- Reduce service levels in consultation with the community.
- Identify future renewal needs and expenditure required to meet agreed service levels and document in a Road Asset Management Plan
- Increase funding, and
- Combinations of all actions above.

8.7 Comparison of 2007/08 depreciation with renewal cost and expenditure

Consumption of service potential from assets is reported in financial terms as depreciation expense. Depreciation is often used as an initial 'first cut' or proxy for future asset renewals required to maintain service levels. A comparison of life cycle renewal cost (the local road asset managers' assessment of what it costs on average to renew the assets) and reported depreciation expense for the 152 NSW councils is shown in Table 20.

Table 20: 2007/08 Life Cycle Renewal Cost and Depreciation Expense

	Sealed Roads ($M)	Unsealed Roads ($M)	Conc. bridges ($M)	Timber bridges ($M)	Total ($M)
LIFE CYCLE RENEWAL COST					
Renewal (Required Capex)					
- Resurfacing (reseals)	$340				$340
- Pavement renewal	$541				$541
- Resheets		$159			$159
- Bridge renewal			$40	$8	$48
Subtotal renewal	**$881**	**$159**	**$40**	**$8**	**$1,088**
Depreciation Expense (07-08)	$475	$71	$28	$5	$579
Depreciation / LC Renewal Cost	**54%**	**44%**	**70%**	**65%**	**53%**

Table 20 indicates that there is a considerable difference in assessment of asset consumption as reported by local road asset managers in this survey and that reported by depreciation in council's financial reports.

Reported depreciation expense for 2007-08 is 54% of the local road asset managers' assessment of asset consumption of sealed roads, 44% for unsealed roads, 70% for concrete/steel bridges, 65% for timber bridges and 53% overall for local roads and bridges.

Table 21 compares 2008 capital renewal expenditure with 2007-08 depreciation expense.

Table 21: 2007/08 Life Cycle Renewal Expenditure and Depreciation Expense

	Sealed Roads ($M)	Unsealed Roads ($M)	Conc. bridges ($M)	Timber bridges ($M)	Total ($M)
LIFE CYCLE RENEWAL EXP.					
Capital Renewal Exp. 2007-08					
- Resurfacing (reseals)	$153				$153
- Pavement renewal	$238				$238
- Resheets		$35			$35
- Bridge renewal			$15	$29	$44
Subtotal renewal expenditure	**$391**	**$35**	**$15**	**$29**	**$470**
Depreciation Expense (07-08)	$475	$71	$28	$5	$579
2008 Renewal Exp / Depreciation	**82%**	**50%**	**54%**	**542%**	**81%**

2007-08 capital renewal expenditure is 81% of asset consumption as reported by depreciation expense. For sealed roads, capital renewal expenditure is 82% of depreciation expense, 50% for unsealed roads, 54% for concrete/steel bridges and 542% for timber bridges.

While the comparison of capital renewal expenditure with depreciation indicates a rate of asset renewal of 81% of consumption, the true picture is worse than this when the difference between the asset managers' assessment of asset consumption and depreciation is taken into account.

Using the depreciation expense figures reported in this survey as a measure of average asset renewal may give a false position of actual funding need. The measures of asset consumption and asset renewal expenditure are shown in Table 22.

Table 22: 2007/08 Life Cycle Renewal Cost, Expenditure and Depreciation

	Sealed Roads ($M)	Unsealed Roads ($M)	Conc. bridges ($M)	Timber bridges ($M)	Total ($M)
Life Cycle Renewal Cost	$881	$159	$40	$8	$1,088
Depreciation Expense (07-08)	$475	$71	$28	$5	$579
2008 Capital Renewal Exp.	$391	$35	$15	$29	$470

The local road asset managers' assessment of life cycle renewal cost is $1,088 million per annum. This is their estimate of the value of the local road assets that is being consumed (used up) each year.

Depreciation expense is the financial representation of this asset consumption. Depreciation expense as reported by NSW councils is $579 million per annum, some 53% of the asset manager's assessment of asset consumption.

The amount spent on capital renewal of the assets for 2007/08 was $470 million. This is 44% of the life cycle cost and 81% of depreciation expense.

Use of depreciation expense as a measure of renewal need indicates that local road assets are being renewed at a rate of 81% of asset consumption. Analysis of the survey data shows that asset renewal in 2007-08 was 44% of the asset managers' assessment of asset consumption.

The survey analysis shows that the councils' reported depreciation expense is 53% of the asset managers' assessment of asset consumption.

Reasons for this variation may include:

- councils reporting depreciation expense at 'Cost' values rather than 'Fair Value' may be understating current asset consumption. 'Cost' values based on assets recognised in 1994 may be understated by up to 30%[10]. Note that councils are required to revalue road, bridges, footpaths and drainage assets at fair value by 30 June 2010. [11]
- the estimated asset useful lives used by councils for financial reporting may be based on 'industry standards', not actual performance and field operating conditions of the assets and understate depreciation expense.

[10] Tasmania Audit Office, 2004, Report No. 14 p 17.
[11] DLG, 2009, Circular No 09-09.

- the estimated asset lives assessed by the asset managers may be based on technical measures, not community priorities/available resources and overstate the life cycle renewal cost.

The two measures of asset consumption, depreciation expense and life cycle renewal cost should be the same. Asset managers and finance managers should be providing the same information on asset consumption.

Trends in the comparison of renewal expenditure and life cycle renewal cost can be used as indicator of whether councils are maintaining the operating capability of their assets. Over the life of the assets, asset renewal should equal asset consumption if the services from the assets are to be sustained.

The survey compared life cycle cost (maintenance plus required renewal) with life cycle expenditure. Life cycle cost and expenditure is summarised in Table 23.

Table 23: 2007/08 Life Cycle Cost and Life Cycle Expenditure

	Sealed Roads ($M/yr)	Unsealed Roads ($M/yr)	Conc. Bridges ($M/yr)	Timber bridges ($M/yr)	Total ($M/yr)
LIFE CYCLE COST					
Maintenance	**$243**	**$98**	**$6**	**$8**	**$355**
Renewal (Required Capex)					
- Resurfacing (reseals)	$340				$340
- Pavement renewal	$541				$541
- Resheets		$159			$159
- Bridge renewal			$40	$8	$48
Subtotal renewal	**$881**	**$159**	**$40**	**$8**	**$1,088**
Life Cycle Cost (maint & renewal)	$1,124	$257	$46	$16	$1,443
LIFE CYCLE EXPENDITURE					
Maintenance	**$243**	**$98**	**$6**	**$8**	**$355**
Renewal (2007-08 Capex)					
- Resurfacing (reseals)	$153				$153
- Pavement renewal	$238				$238
- Resheets		$35			$35
- Bridge renewal			$15	$29	$44
Subtotal renewal	**$391**	**$35**	$15	**$29**	$470
Life cycle expenditure (maint & renewal)	$634	$133	$21	$37	$825
Life Cycle Exp / Life Cycle Cost	**56%**	**52%**	**46%**	**229%**	**57%**

8.8 Conclusion

Present funding to meet existing service levels for NSW regional and local roads and bridges is 57% of the life cycle costs.

Present service levels and expenditure is not sustainable.

Councils may be facing a large risk exposure at present and in the future. These risks include:

- the condition of roads and bridges infrastructure will decline,
- potential increase in personal injury and legal claims,
- road life cycle expenditure 'savings' will be passed onto road users through higher transportation operating costs,
- funding will not be available to renew ageing road and bridge assets,
- councils will not be able to provide services needed by communities in medium-long term.

Renewal costs are being transferred to the next generation.

Asset consumption as reported by depreciation expense is understating the assessment of asset consumption by local road asset managers by almost 50%.

8.9 Managing the Gap

The Gap consists of several components as shown in Fig XIII. Each gap component requires a different approach to manage the gap and move towards sustainable service provision. Table 24 summarises the recommended management treatments to 'manage out' the funding gap.

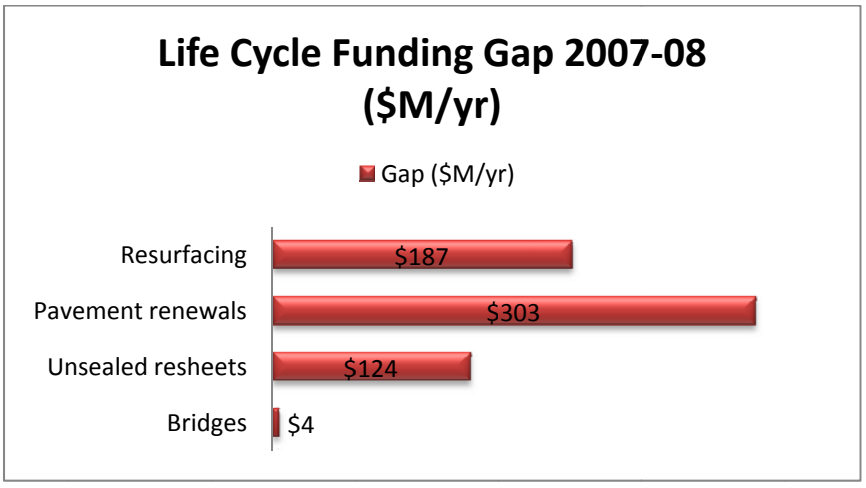

Figure XIII: Life Cycle Funding Gap Components

Table 24: Life Cycle Funding Gap Components and Asset Management Treatments

Gap Component	Gap ($M / yr)	Asset Management Treatment
Resurfacing	$187	• Increase knowledge of asset performance and useful life, • Develop and use resurfacing treatments that result in reduced life cycle cost, • Increase funding to life cycle cost.
Pavement renewal	$303	• Increase knowledge of asset performance and useful life, • Develop and use optimum (low cost) renewal methods, • Develop renewal projections and funding plan and document in Road Asset Management Plan
Unsealed resheeting	$124	• Increase knowledge of asset performance and useful life, • Develop/review road hierarchy and service levels for maintenance and resheeting to suit available resources. • Develop resheet projections and funding plan and document in Road Asset Management Plan
Bridges	$4	• Increase knowledge of asset performance and useful life, • Develop/review road hierarchy and service levels to suit available resources. • Develop renewal projections and funding plan and document in Road Asset Management Plan
Total	**$618**	

9. Improvement Indicators

The initiative of the Roads and Transport Directorate to repeat the 2004-05 Road Asset Benchmarking Survey in 2008 provides the opportunity to report on whether councils had made any progress in:

- managing the road assets, and
- improving their asset management knowledge and capability.

The assessment of performance indicators is undertaken in these two areas.

9.1 Managing road assets

Performance measure 1.1 Road asset sustainability

Road asset sustainability measures funding of life cycle cost of providing the service. For sustainability in providing services from infrastructure, funding of the life cycle cost is required on average over the life cycle. An increase in the sustainability measure indicates an increase in funding of the life cycle cost.

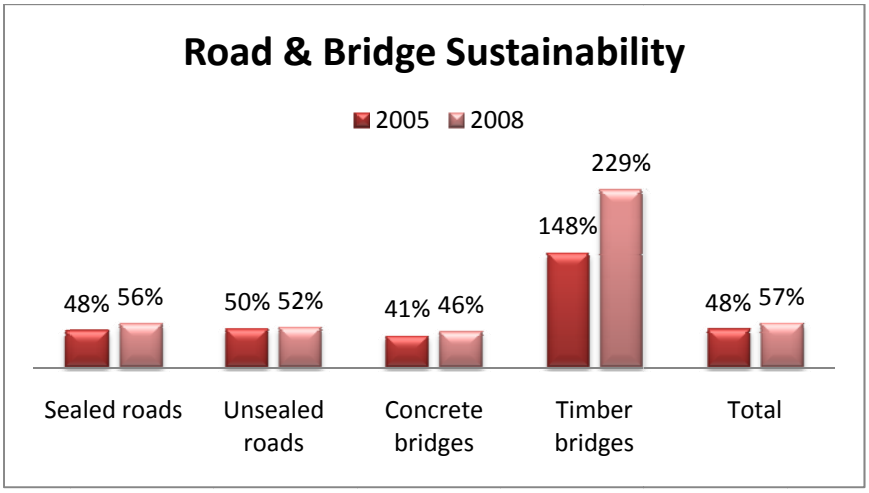

Figure XIV: Road & Bridge Asset Sustainability 2005-2008

The sustainability of the road assets has increased from 48% of life cycle cost in 2005 to 57% in 2008. The sustainability of all asset categories increased in the period with timber bridges seeing a significant increase in sustainability funding. Timber bridges continue to be funded at well above life cycle cost as a result of allowing ageing timber bridges to deteriorate to levels requiring expenditure well above the life cycle cost. Similar funding levels above life cycle costs may be required for other road assets. Developing asset management plans and funded long-term financial plans will minimise the financial impact of deteriorating assets.

Performance measure 1.2 Road & bridge asset life cycle funding gap

The road asset life cycle funding gap is a snapshot of the gap between life cycle costs and annual expenditure.

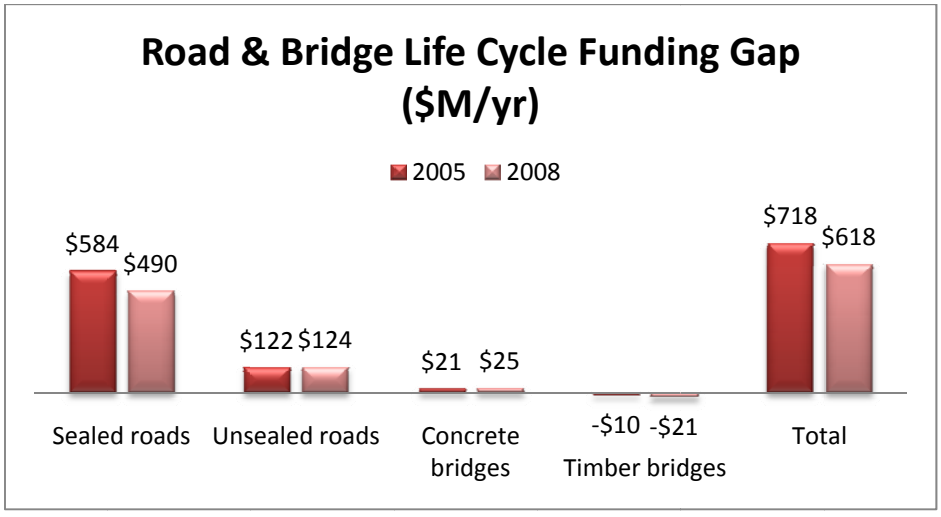

Figure XV: Road & Bridge Life Cycle Funding Gap 2005-2008

The Roads and Bridges life cycle funding gap decreased from $718 million per annum in 2005 to $618 million in 2008, a reduction of 14%. Sealed roads and timber bridges asset categories saw a reduction in life cycle funding gap from 2005-08. The funding gap for unsealed road and concrete/steel bridges increased slightly.

Performance measure 1.3 Road & Bridges State of the Asset

The State of the Asset indicator gives a snapshot of the service potential remaining in the assets.

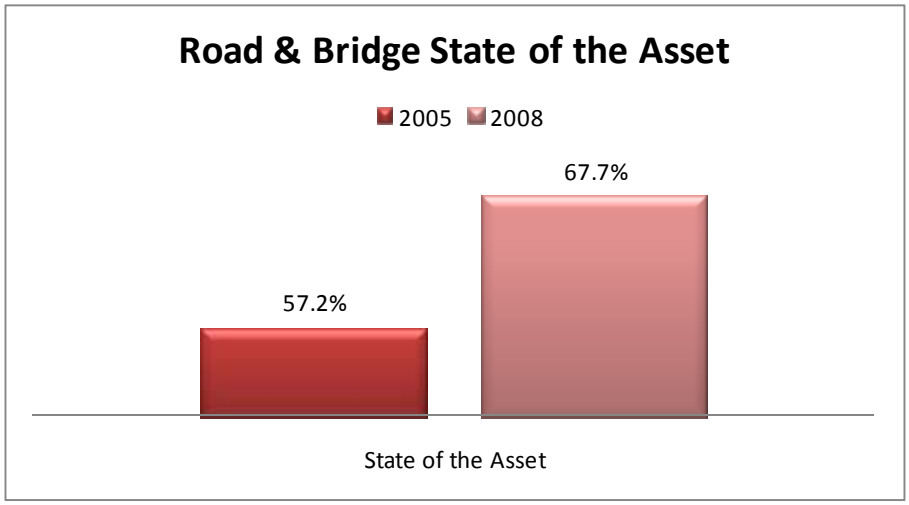

Figure XVI: Road & Bridges State of the Asset 2005-2008

Figure XVI indicates that the 'average age' of road and bridge assets has become younger since 2005. In 2005, road and bridge assets had 57.2% of their life remaining. The remaining life has increased to 67.7% in 2008. This may be due to asset renewals exceeding consumption (as has occurred for bridge assets, the extension of useful lives (from improved asset information) and/or the addition of new assets constructed/acquired by councils and growth assets constructed by developers and contributed to councils free of charge.

The increase in the State of the Asset indicator is probably due to the addition of growth assets and the carrying of existing assets at 'cost' without revaluation.

If a council is operating sustainably, with asset renewal is equal to asset consumption and annual revaluation of assets, the change in the State of the Asset indicator would be due to the value of contributed assets.

A council that is renewing assets at a rate less than consumption and with no or limited contributed growth assets should see its State of the Asset indicator reducing.

Performance measure 1.4 Road & Bridges Asset Consumption and Renewal

For sustainability, asset renewals should equal asset consumption on average over the life of the assets.

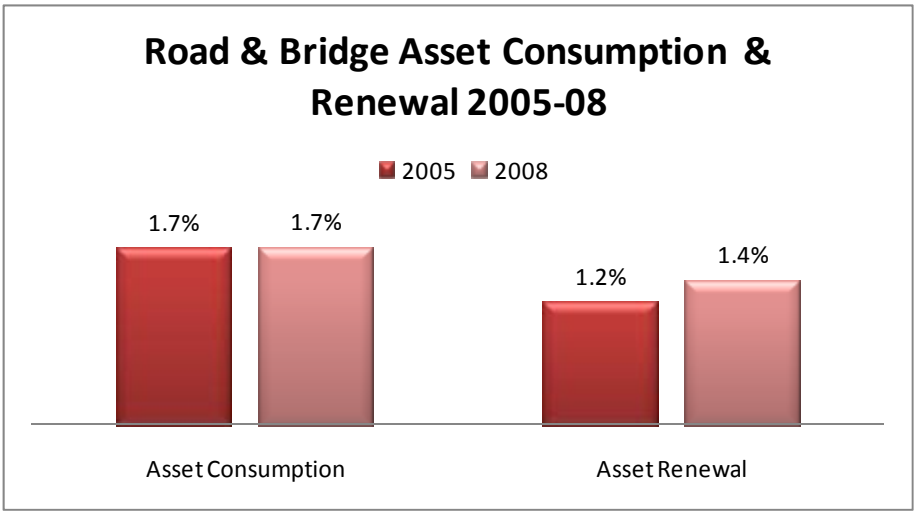

Figure XVII: Road & Bridges Asset Consumption and Renewal 2005-2008

In 2005, asset renewal of 1.2% was 70% of asset consumption. In 2008, asset renewals increased to 81% of asset consumption (as reported by depreciation expense) and in the direction of a more sustainable funding position.

9.2 Improving asset management knowledge and capability

Performance Measure 2.1 Capacity to Complete Benchmarking Survey 2005-2008

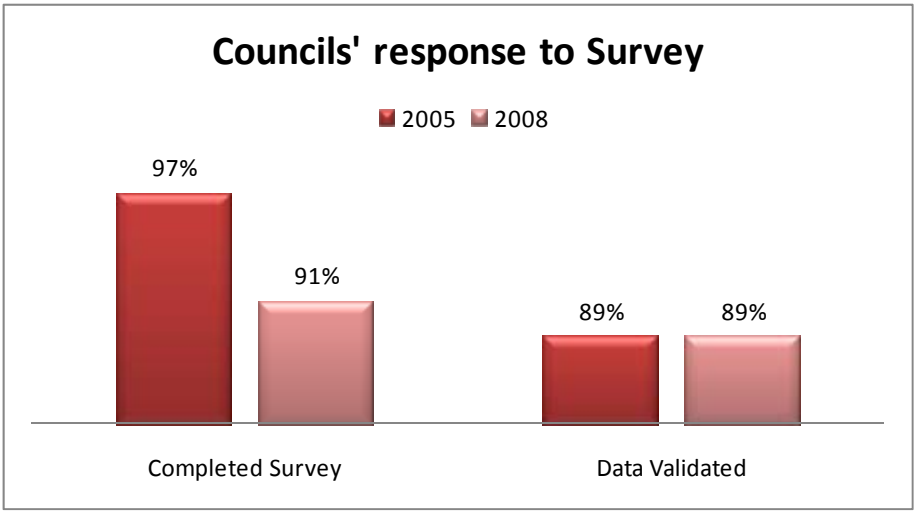

Figure XVIII: Capacity to Complete Benchmarking Survey 2005-2008

Figure XVIII indicates that the number of councils providing data to the benchmarking survey decreased from 2005 to 2008 by 6%. The number of validated survey forms is the same as 2005.

Performance measure 2.2 Use of IIMM principles

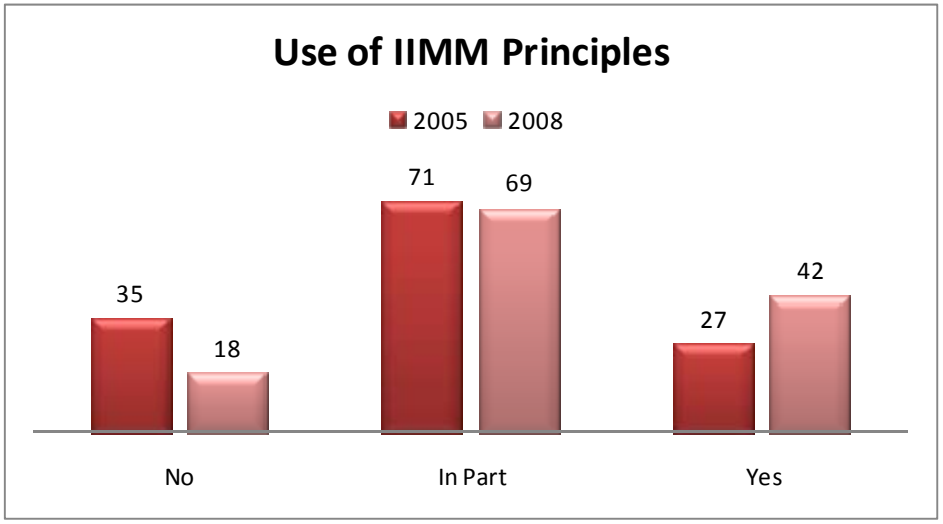

Figure XIX: Use of IIMM principles

Figure XIX indicates that the number of councils and adopting the international reference for asset management, IPWEA's International Infrastructure Management Manual to guide their asset management practices has increased from 27 in 2005 to 42 in 2008, an increase of 55%.

Performance measure 2.3 Adoption of road asset management plans

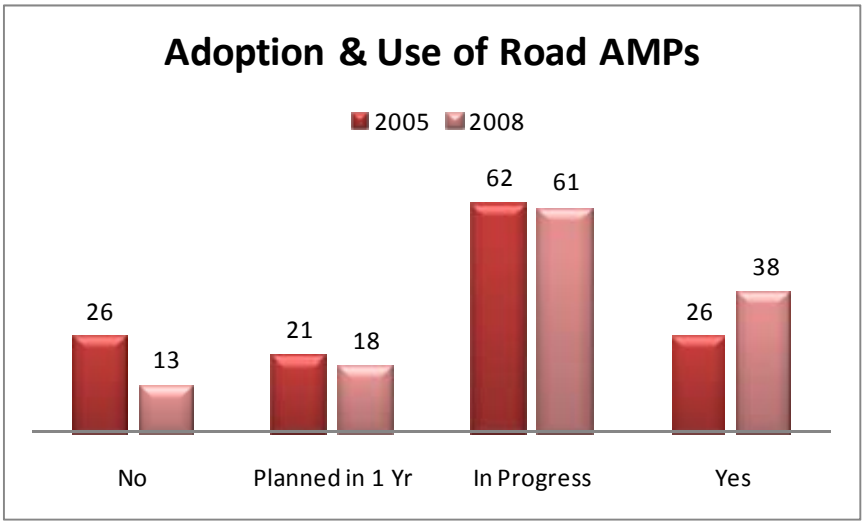

Figure XX: Adoption and Use of Road Asset Management Plans

The number of councils who have adopted road asset management plans has increased from 26 in 2005 to 38 in 2008, a 46% increase.

Performance measure 2.4 Management of road related risks

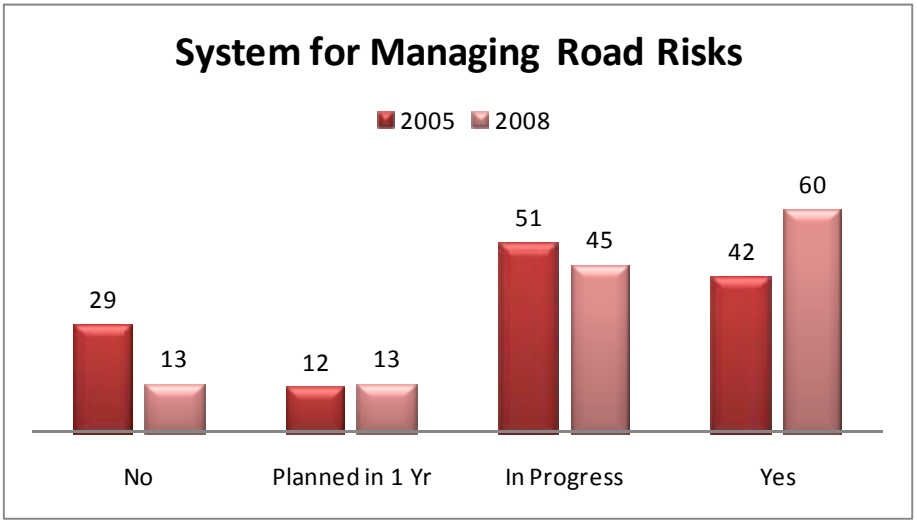

Figure XXI: System for Managing Road Related Risks

Fig XXI illustrates an increased number of councils have adopted systems for managing road related risks either in a corporate risk management system or in an adopted road asset management plan. 60 councils have such a system compared to 42 in 2005. This represents a 42% increase.

Performance measure 2.5 Use of long-term financial plans

A long-term financial plan provides a tool to develop sustainable service delivery from infrastructure.

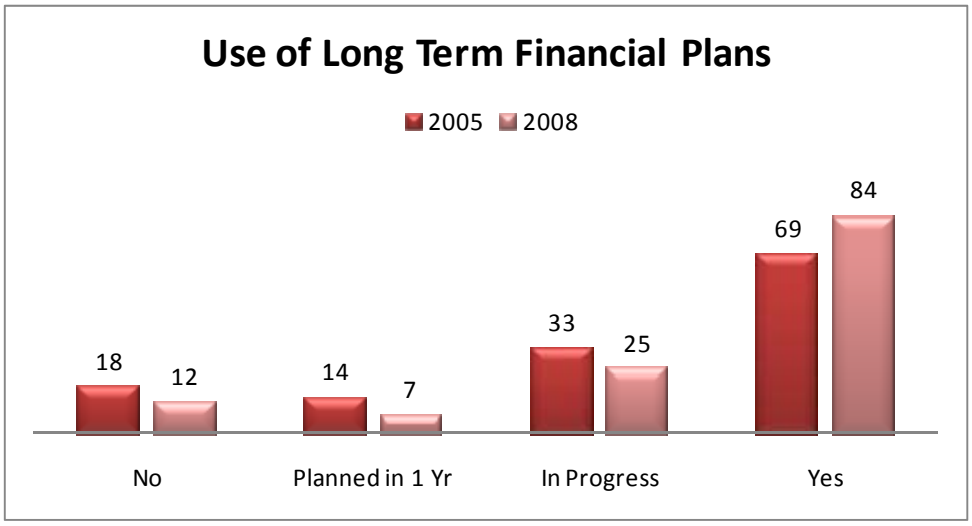

Figure XXII: Use of Long-Term Financial Plans

The use of long-term financial plans by NSW councils has increased from 69 in 2005 to 84 in 2008. This is a increase 21% over the 2005 capability levels as illustrated in Fig XXII.

Performance measure 2.6 Period of long-term financial plans

For organisations providing services from infrastructure a long-term plan covering a period of at least 10 years is recommended.[12]

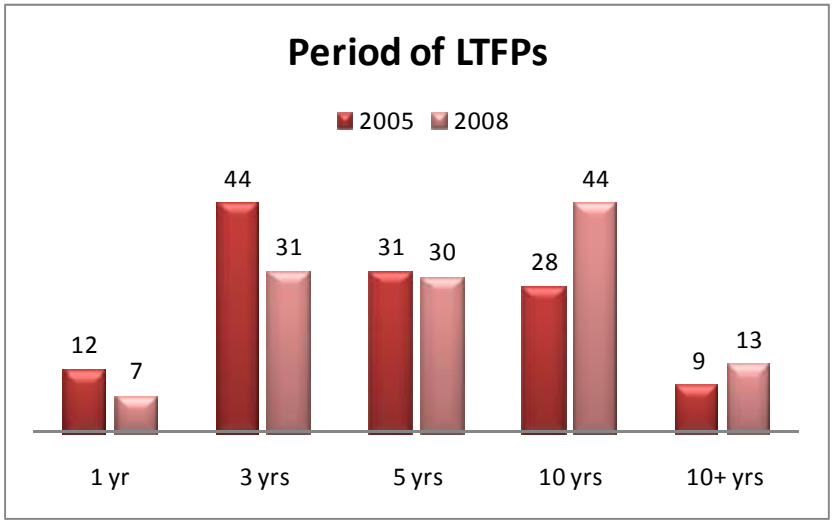

Figure XXIII: Period of Long-Term Financial Plans

Fig XXIII indicates that councils are making good progress in long-term financial planning. 35 councils in 2005 had long-term financial plans of at least 10 years. This has increased by 62% to 57 in 2008.

Performance measure 2.7 Infrastructure effects in long-term financial plans

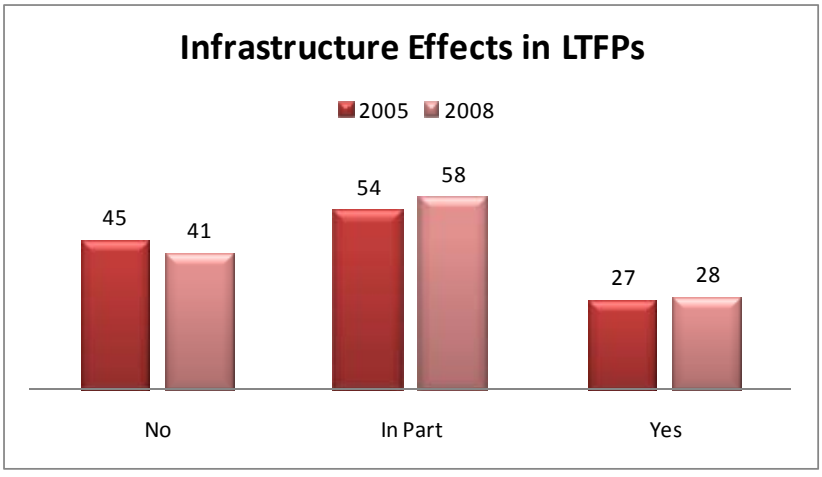

Figure XXIV: Infrastructure Effects in Long-Term Financial Plans

Recognition of infrastructure effects in long-term financial plans has increased slightly with one additional council recognising the financial effects of infrastructure effects including renewal of assets, provision of growth and life cycle costs for new assets in the period 2005-2008. This is a 3% increase in capability as shown in Fig XXIV.

[12] DLG, 2006, Recommendation 6, p 19.

9.3 Improvement Assessment

Table 25 summarises the assessment of whether councils have improved their asset management practices, knowledge and capacity to manage their timber bridges.

Of the eleven (11) improvement indicators, ten (10) show a positive improvement in road and bridge management practices over the period 2005-2008.

Table 25: Road & Bridge Asset Management Improvement Assessment

Performance Indicator		Improvement	Comment
	Managing Road & Bridge Assets		
1.1	Road & bridge asset sustainability	Yes	Sustainability has increased from funding of 48% of life cycle cost in 2005 to 57% in 2008.
1.2	Road & bridge asset life cycle funding gap	Yes	The funding gap has reduced by 14% from 2005 to 2008.
1.3	Road & bridge state of the asset	Yes	The service potential remaining in the assets has increased from 57% to 67% in 2008. This may be largely due to growth assets contributed to councils.
1.4	Road & bridge asset consumption and renewal	Yes	Asset Renewal ratio has increased from 70% of consumption in 2005 to 81% in 2008.
	Knowledge and Capacity		
2.1	Capacity to complete benchmarking survey	No	Overall response rate has decreased by 6% since the 2005 survey.
2.2	Use of IIMM principles	Yes	55% increase from 2005.
2.3	Adoption of road asset management plans	Yes	46% increase from 2005.
2.4	Management of road related risks	Yes	42% increase from 2005.
2.5	Use of long-term financial plans	Yes	21% increase from 2005.
2.6	Period of long-term financial plans	Yes	62% increase from 2005.
2.7	Infrastructure effects in long-term financial plans	Yes	3% increase from 2005.

10. Recommendations

The Final Report[13] of the Independent Inquiry into the Financial Sustainability of Local Government identified that councils in NSW have a "huge backlog in infrastructure renewals (over $6 billion), which is expected to grow to almost $21 billion within 15 years". The report highlighted challenges for councils in "managing rising community expectations, maintaining existing service commitments in the face of a huge infrastructure bill and constraints on rate income" and "overcoming skills shortages".

As a result competition for adequate funding to maintain councils' infrastructure assets is also under pressure. However, it is of critical importance that councils:

- identify their infrastructure assets and the current condition of such assets.
- implement life cycle asset management plans.
- provide adequate funding to maintain what are in effect their community's greatest financial assets.

To this end it is recommended that:

1. Councils improve their asset management capability to a position that will enable them to provide services to their communities in a sustainable manner. The survey analysis indicated that the current level of road infrastructure services councils are providing to their communities is not sustainable.

2. Councils set a target to have an adopted long term financial plan (10 yr minimum) supported by 20 year asset management plans and risk management plans within a 3 year period for sustainable delivery of services.

3. Councils use the road management model in the survey form as a tool to manage road infrastructure services and life cycle costs. This to be achieved by improving knowledge of assets and asset performance, developing road hierarchies and appropriate service levels, increasing funding for sealed resurfacing/ resealing and unsealed road resheeting to the life cycle cost and managing pavement and bridge renewals through asset management plans.

4. The Roads & Transport Directorate establish an industry partnership with the NSW Department of Local Government, Local Government Association of NSW, Shires Association of NSW and Local Government Managers Association tasked with the objective of improving the asset management capability of NSW councils to an acceptable position within a 3 year period.

5. The industry partnership set a target to 'manage out' the annual funding gap of $618 million within a 3 year timeframe and report annually on performance of the industry towards the target.

6. The industry partnership set a target to improve the accuracy of financial reporting of infrastructure asset consumption within a 3 year timeframe.

[13] Local Govt Association of NSW & Shires Association of NSW, May 2006.

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Appendices

Appendix A	Asset Management Practices by IPWEA Regions
Appendix B	Road and Bridge Inventory for IPWEA Regions
Appendix C	Road Asset Benchmarking Survey Form
Appendix D	Response from Councils
Appendix E	Cost Distributions by IPWEA Regions
Appendix F	Bridge Renewal Costs and Estimated Useful Life Distribution

APPENDIX A

Asset Management Practices by IPWEA Region.

A1. Use of International Infrastructure Management Manual Principles

Region	No	In part	Yes	Total
Central Metro	0	3	3	6
Central West	2	3	4	9
Hunter	0	6	5	11
Illawarra	0	4	2	6
Metro North	2	6	2	10
Metro West	2	4	2	8
Mid North Coast	2	6	0	8
New England	0	5	5	10
North Coast	0	3	3	6
Orana	3	6	3	12
South East Metro	2	3	6	11
South Eastern	1	8	2	11
South West	4	12	5	21
Grand Total	**18**	**69**	**42**	**129**
Percent of total	**14%**	**53%**	**33%**	**100%**

A2. Adoption and Use of Road Asset Management Plans

Region	No	Planned in 1 yr	In progress	Yes	Total
Central Metro	0	0	4	2	6
Central West	1	1	5	2	9
Hunter	0	2	2	7	11
Illawarra	0	0	4	2	6
Metro North	1	1	3	5	10
Metro West	0	0	5	3	8
Mid North Coast	2	2	4	0	8
New England	1	0	6	3	10
North Coast	0	2	3	1	6
Orana	1	4	4	3	12
South East Metro	2	2	2	5	11
South Eastern	0	3	7	1	11
South West	5	1	12	4	22
Grand Total	**13**	**18**	**61**	**38**	**130**
Percent of total	**10%**	**14%**	**47%**	**29%**	**100%**

A3. Use of Documented System for Managing Road Related Risk

Region	No	Planned in 1 yr	In progress	Yes	Total
Central Metro	0	1	3	2	6
Central West	0	0	4	5	9
Hunter	0	1	1	9	11
Illawarra	1	0	2	3	6
Metro North	2	0	3	5	10
Metro West	0	0	3	5	8
Mid North Coast	2	0	2	4	8
New England	1	2	3	4	10
North Coast	0	1	1	4	6
Orana	1	3	5	3	12
South East Metro	2	2	0	7	11
South Eastern	0	2	7	2	11
South West	4	1	11	7	23
Grand Total	**13**	**13**	**45**	**60**	**131**
Percent of total	**10%**	**10%**	**34%**	**46%**	**100%**

A4. NAMS.PLUS Asset Management Members

Region	No	Planned in 1 Yr	Yes	Total
Central Metro	4	0	2	6
Central West	3	0	6	9
Hunter	4	0	7	11
Illawarra	2	0	4	6
Metro North	8	0	2	10
Metro West	3	0	5	8
Mid North Coast	2	0	6	8
New England	0	0	10	10
North Coast	2	0	4	6
Orana	7	1	6	14
South East Metro	2	3	6	11
South Eastern	1	0	10	11
South West	13	1	8	22
Grand Total	**51**	**5**	**76**	**132**
Percent of total	**39%**	**4%**	**58%**	**100%**

A5. Long Term Financial Plans

Region	No	Planned in 1 Year	In progress	Yes	Total
Central Metro	0	1	1	4	6
Central West	0	0	3	6	9
Hunter	0	0	2	9	11
Illawarra	0	1	0	5	6
Metro North	0	0	0	9	9
Metro West	0	0	4	4	8
Mid North Coast	2	0	2	4	8
New England	2	1	1	6	10
North Coast	2	0	2	2	6
Orana	4	1	2	5	12
South East Metro	1	0	1	9	11
South Eastern	0	3	2	5	10
South West	1	0	5	16	22
Grand Total	**12**	**7**	**25**	**84**	**128**
Percent of total	**9%**	**5%**	**20%**	**66%**	**100%**

A6. Length of Long Term Financial Plans

Region	1 yr	3 yrs	5 yrs	10 yrs	10+ yrs	Total
Central Metro	1	3	0	1	1	6
Central West	1	2	3	3	0	9
Hunter	0	3	2	4	2	11
Illawarra	0	0	2	4	0	6
Metro North	0	2	3	3	1	9
Metro West	0	2	2	3	1	8
Mid North Coast	0	3	3	2	0	8
New England	0	3	2	3	2	10
North Coast	1	2	0	1	1	5
Orana	1	4	2	3	1	11
South East Metro	1	1	2	5	2	11
South Eastern	1	1	4	4	0	10
South West	1	5	5	8	2	21
Grand Total	**7**	**31**	**30**	**44**	**13**	**125**
Percent of total	**6%**	**25%**	**24%**	**35%**	**10%**	**100%**

A7. Infrastructure Effects in Long Term Financial Plans

Region	No	In part	Yes	Total
Central Metro	3	2	1	6
Central West	4	3	2	9
Hunter	1	4	6	11
Illawarra	2	3	1	6
Metro North	0	4	5	9
Metro West	0	4	4	8
Mid North Coast	4	4	0	8
New England	3	4	3	10
North Coast	3	2	1	6
Orana	1	9	1	11
South East Metro	4	4	3	11
South Eastern	2	7	1	10
South West	14	8	0	22
Grand Total	**41**	**58**	**28**	**127**
Percent of total	**32%**	**46%**	**22%**	**100%**

Appendix B

Road and Bridge Inventory for IPWEA Regions

B1. Road Lengths

Region	Road Length in km						
	Regional Roads			Local Roads			Total
	Sealed	Unsealed	Subtotal	Sealed	Unsealed	Subtotal	
Central Metro	90	0	90	1,216	18	1,234	1,324
Central West	1,133	103	1,236	4,148	6,845	10,993	12,228
Hunter	833	23	856	7,401	2,269	9,670	10,526
Illawarra	374	65	439	3,874	817	4,691	5,130
Metro North	247	1	248	3,361	66	3,428	3,676
Metro West	426	40	466	5,355	313	5,669	6,134
Mid North Coast	719	59	778	3,415	3,513	6,928	7,706
New England	1,442	241	1,683	3,607	10,370	13,977	15,660
North Coast	855	55	910	3,871	3,073	6,944	7,854
Orana	2,581	1,596	4,177	4,527	15,475	20,002	24,179
South East Metro	253	0	253	3,124	0	3,124	3,377
South Eastern	1,242	299	1,541	4,407	6,711	11,117	12,658
South West	**2,646**	**422**	**3,068**	**9,387**	**16,999**	**26,386**	**29,455**
Grand Total	**12,840**	**2,905**	**15,745**	**57,694**	**66,470**	**124,164**	**139,909**

Note: 135 councils responded to question

B2. Bridge Inventory

Region	No. of Bridges						
	Regional Roads			Local Roads			Total
	Conc.	Timber	Subtotal	Conc.	Timber	Subtotal	
Central Metro	19	0	19	45	1	46	65
Central West	125	8	133	366	62	428	561
Hunter	126	19	145	596	188	784	929
Illawarra	54	3	57	356	71	427	484
Metro North	17	3	20	64	5	69	89
Metro West	120	1	121	325	28	353	474
Mid North Coast	141	30	171	568	693	1,261	1,432
New England	288	33	321	408	245	653	974
North Coast	135	55	190	558	461	1,019	1,209
Orana	252	27	279	390	49	439	718
South East Metro	31	0	31	63	0	63	94
South Eastern	220	39	259	519	225	744	1,003
South West	**180**	**16**	**196**	**711**	**89**	**800**	**996**
Grand Total	**1,708**	**234**	**1,942**	**4,969**	**2,117**	**7,086**	**9,028**

Note: 135 councils responded to question

Appendix C

Road Asset Benchmarking Survey Form

Introduction

IPWEA NSW Roads & Transport Directorate

Road Asset Benchmarking Project
2007/08 Financial Year

1. Introduction

In early 2006, the Roads & Transport Directorate completed the first Road Asset Benchmarking Project, collecting data on the condition of local roads and bridges across New South Wales.

Final Reports titled *Road Asset Benchmarking Project - Road Management* and *Road Asset Benchmarking Project - Timber Bridge Management* were published in September 2006.

The Road Asset Benchmarking Project was commissioned to provide a snapshot of the condition of regional and local roads in NSW, estimate the shortfall in funding required to bring the roads to a satisfactory condition and bring forward recommendations to alleviate any identified problem.

The project was also to identify and promote asset management practices that will assist councils in providing the regional and local road service in a financially sustainable manner.

The reports indicated that councils manage 159,835 km of local and regional roads. 77,312 km of which are sealed and 82,532 km are unsealed. The replacement value of local and regional roads is $43.5B.

The reports identified a road life cycle cost of $1,416M per annum and a funding gap of $718 million per annum and recommended an approach to assist councils in managing the gap and its medium-long term service delivery implications.

In view of this significant finding, the Directorate has decided to repeat the survey to monitor trends in local road service delivery and be in a position to present councils' case for increased funding from the Australian and State governments.

Councils are asked to complete the survey for financial year 2007/08 and return the survey form to Jeff Roorda & Associate at survey@jr.net.au prior to the 2008 regional workshops.

The regional workshop schedule is shown below.

Monday 15 September	Lismore
Tuesday 16 September	Sydney Metro South - Mascot
Wednesday 17 September	Griffith
Thursday 18 September	Sydney Metro North - St Ives
Friday 19 September	Singleton
Monday 22 September	Dubbo
Tuesday 23 September	Sydney Metro West - Liverpool
Wednesday 24 September	Queanbeyan
Thursday 25 September	Armidale

Workshop locations are available from the Directorate or from www.jr.net.au/rabm

2. The Survey Form

The survey form consists of a MS Excel spreadsheet with 7 worksheets. 3 worksheets are for data entry and 2 show models of each council's road and bridge networks. The survey worksheets are to collect the following information.

Introduction

Provides background and guidelines for completing the survey.

Form 1 - General Data

Council and contacts, asset management practices and financial data.

Form 2 - Roads Data

Road lengths, maintenance expenditure, renewal expenditure, unit costs and renewal cycles, plus forecast renewal funding requirements.

Form 3 - Bridge Data

Bridge inventory, maintenance expenditure, renewal expenditure, unit costs and renewal cycles plus usage of regional and local roads by residential, business/commercial and high mass vehicles.

Form 4 - Timber Bridge Data

Detailed timber bridge inventory, condition, bridge management systems and in-house skills plus forecast training needs.

Form 5 - Road Model

Data from Form 2 is used to calculate a model of the Council's road network showing life cycle cost, present funding, any 'funding gap' and the life cycle costs associated with residential, business/commercial and high mass vehicles.

Form 6 - Bridge Model

Data from Form 3 is used to calculate a model of the Council's bridge network showing life cycle cost, present funding, any 'funding gap' and forecast 15 years renewal funding.

3. Guidelines

Help Notes are included as comments on each worksheet. Cells with Help Notes are designated by a small red triangle in the upper right corner. To see the Help Notes, move the cursor over the cell indicated by the red triangle.

Help Desk services are provided by Jeff Roorda & Associates. Contact mobile 0427 949 035 or e-mail to johnhoward.jra@bigpond.com if you have any questions on the survey form.

4. Completing the Survey

Form 1 - General Data

Data entry cells are shown in yellow. The survey form used pre-set responses in drop down boxes where possible. Select the appropriate response that is nearest to your current position. All forms are locked to only allow data entry in the required yellow cells. Print areas are set to limit printing to the data entry forms and not the support areas of the worksheets.

Financial data questions use the new IFRS accounting standards terminology. Data is sought for the 'depreciable amount' This is the value of the asset that is depreciated over its useful life. This is the current replacement cost of the asset less any asset that is not depreciated (eg earthworks) under council's accounting policy and residual value.

Where a council depreciates earthworks and does not account for residual values, the current replacement cost is the depreciable amount.

Form 2 - Roads Data

The survey form provides options for councils to report roads data, by hierarchies or for the whole road network. Up to six road hierarchy categories are provided for use. Please use the reporting option that is most suitable to you.

Insert the names of your hierarchy categories in cells E13-18 and H13-18. These names are copied down into this survey form and the road model in Form 5.

If you complete the survey for your road network in total, insert 'Network' in cells E13 and H13 and insert the data into the first hierarchy category.

You may enter either actual maintenance costs for each road local road category in the light yellow cells [E40-E45 and J40-J44] or the total in cells E39 and J39. Where you enter the total expenditure, the model will calculate the proportional expenditure based on road. length for each category.

Form 3 - Bridge Data

Concrete/steel bridges including major culverts (> 6m) in centreline length are to be reported. Concrete/steel bridges and minor culverts (< 6m) are to be treated as part of the road asset and not included in Form 3.

Timber bridge includes ALL timber bridges.

Form 4 - Timber Bridge Data

Form 4 is to collect detailed timber bridge data and is to assist the Directorate's Timber Bridge. Working Party investigate and report on the issue of upgrading and managing timber bridge assets across the State.

Where there are alternate responses, select the closest response to your current position.

5. Interpreting the Road Model

The road and bridge models shown on Forms 5 and 6 were developed for the IPWEA's National Asset Management Strategy Committee (NAMS.AU) to assist councils in managing their road and bridge networks.

The models are a first pass, high level asset management tool that provides a snapshot of a council's asset management position, identifying any 'funding gap' that may exist between the funds required to operate the road and bridge networks and funds currently available.

The road model also calculates the proportion of the life cycle cost that may be attributed to the various uses of the road network; residential, business/commercial or high mass vehicles.

The models use long term 'average' funding levels that are estimated to be required by the council. These funding levels are the 'average' annual amount required over the 50+ year life cycle of the road and bridge networks.

This does not mean that this 'average' funding level is required now.

The size of any funding gap is an indication of the amount of management effort that should be applied to managing the council's road assets.

The IPWEA is encouraging all councils to develop 20 year asset management plans and 10 year long term financial plans to assist councils to provide service that are financially sustainable.

The Road Asset Benchmarking survey was developed by Jeff Roorda & Associates for the IPWEA NSW Division Roads & Transport Directorate.

Contact the Roads & Traffic Directorate
Mick Savage Manager Roads & Transport Directorate
Level 12, 447 Kent St, Sydney 2000
T 02 8267 3000 F 02 9283 5255
E msavage@ipwea.org.au W www.ipwea.org.au

Contact Jeff Roorda & Associates
717 Paterson Rd, Springwood NSW 2777
T 02 4751 7657 F 02 4751 3683
E jrajra@bigpond.com W www.jr.net.au

Please return the completed survey to survey@jr.net.au prior to your regional workshop.

HELP DESK support

Contact John Howard JRA
M 0427 949 035 E johnhoward.jra@bigpond.com

Form 1 General Data

FORM 1 - GENERAL DATA

DATA INPUT Insert data into yellow cells

1.1 Council Details		ACLG Classification
1.1.1 Contact Officer		IPWEA Region
1.1.2 Telephone		DLG Region
1.1.3 Mobile telephone		
1.1.3 Officer's E-mail address		

1.2 Asset Management Practices

Does your council

1.2.1 Employ the principles contained in the International Infrastructure Management Manual?	
1.2.2 Have an adopted Road Asset Management Plan?	
1.2.3 Have a documented system for managing Road Risks either in a Road Asset Management Plan or included in the corporate risk management structure?	
1.2.4 Have membership of IPWEA NAMS.PLUS Asset Management?	
1.2.4 Have a long term financial plan?	
1.2.5 What is the term of the existing financial plan?	
1.2.6 Does the existing financial plan include infrastructure effects including infrastructure renewal, growth of networks, life cycle costs for new services/assets.	

Financial Data (for 2007/08)

1.3 Sealed Roads Financial Data

	($000)
1.3.1 What is the current replacement cost for sealed road assets?	,000
1.3.2 What is the depreciable amount for sealed road assets? (see help notes for definitions)	,000
1.3.3 What is the depreciated replacement cost?	,000
1.3.4 What is the annual depreciation expense?	,000

1.4 Unsealed Roads Financial Data

	($000)
1.4.1 What is the current replacement cost for unsealed roads?	,000
1.4.2 What is the depreciable amount for unsealed road assets? (see help notes for definitions)	,000
1.4.3 What is the depreciated replacement cost?	,000
1.4.4 What is the annual depreciation expense?	,000

1.5 Concrete/Steel Bridges & Major Culverts Financial Data

	($000)
1.5.1 What is the current replacement cost for conc/steel bridges?	,000
1.5.2 What is the depreciable amount for conc/steel bridge assets? (see help notes for definitions)	,000
1.5.3 What is the depreciated replacement cost?	,000
1.5.4 What is the annual depreciation expense?	,000

1.6 Timber Bridges Financial Data

	($000)
1.6.1 What is the current replacement cost for timber bridges?	,000
1.6.2 What is the depreciable amount for timber bridge assets? (see help notes for definitions)	000
1.6.3 What is the depreciated replacement cost?	,000
1.6.4 What is the annual depreciation expense?	,000

1.7 Road Ancillary Financial Data

	($000)
1.7.1 What is the current replacement cost for road ancillary assets?	,000
1.7.2 What is the depreciable amount for road ancillary assets? (see help notes for definitions)	,000
1.7.3 What is the depreciated replacement cost?	,000
1.7.4 What is the annual depreciation expense?	,000

Form 2 Road Data

FORM 2 - ROAD DATA

IPWEA NSW Roads & Transport Directorate

Data is required for the 2007/08 financial year

Insert data into yellow cells

Road Hierarchies

Use this section to record your local road hierarchy (excluding regional roads)

		Sealed	Unsealed	
Hierarchy Category	1			Formed & sheeted
Hierarchy Category	2			Formed & sheeted
Hierarchy Category	3			Formed & sheeted
Hierarchy Category	4			Formed & sheeted
Hierarchy Category	5			Formed
Hierarchy Category	6			Unformed not included

2.1 Road length

at 1 July 2008 (excluding unformed roads)

	Sealed km	Unsealed km
2.1.1 Regional Roads		
2.1.2 Local Roads		
Total Local Roads	0	0

2.2 Road Maintenance Expenditure (2007/08)

	Sealed	Unsealed
2.2.1 Regional Roads		
2.2.2 Local Roads		
	$0	$0
	$0	$0
	$0	$0
	$0	$0
	$0	$0
	$0	$0
Total Local Roads	$0	$0

2.3 Resurfacing/Reseals

	2007/08 Exp.	Avge Cost		Avge Useful life	
2.3.1 Regional Roads			$/km		yrs
2.3.2 Local Roads					
			$/km		yrs
			$/km		yrs
			$/km		yrs
			$/km		yrs
			$/km		yrs
			$/km		yrs
Total Local Roads	$0				

2.4 Sealed pavement renewals

	2007/08 Exp.	Avge Cost		Avge Useful life	
2.4.1 Regional Roads			$/km		yrs
2.4.2 Local Roads					
			$/km		yrs
			$/km		yrs
			$/km		yrs
			$/km		yrs
			$/km		yrs
			$/km		yrs
Total Local Roads	$0				

2.5 Unsealed road resheets

	2007/08 Exp.	Avge Cost		Avge Useful life
2.5.1 Regional Roads			$/km	
2.5.2 Local Roads				
			$/km	
			$/km	
			$/km	
			$/km	
Total Local Roads	$0			

2.6 Local Road Usage

Percentage of traffic use by Transport Use Categories

	Residential	Business/Commerce	Higher Mass Vehicles
2.6.1 Sealed Regional Roads			
2.6.2 Sealed Local Roads			
2.6.3 Unsealed Regional Roads			
2.6.4 Unsealed Local Roads			

Form 3 Bridge Data

FORM 3 - BRIDGE DATA

IPWEA NSW Roads & Transport Directorate

Data is required for the 2007/08 financial year

Insert data into yellow cells

3.1 Bridge & Major Culvert Inventory (> 6m in length)

	Concrete/steel		Timber (all timber bridges)	
3.1.1 Regional Roads				
No. Bridges/Major Culverts				
Overall Deck Area		m2		m2
3.1.2 Local Roads				
No. Bridges/Major Culverts				
Overall Deck Area		m2		m2

3.2 Bridge Maintenance Expenditure (2007/08)

	Concrete/steel	Timber (all timber bridges)
3.2.1 Regional Roads		
3.2.2 Local Roads		

3.3 Concrete/Steel Bridge Renewals

	2007/08 Exp.	Avge Cost		Avge Useful life	
3.3.1 Regional Roads			$/m2		yrs
3.3.2 Local Roads			$/m2		yrs

3.4 Timber Bridge Renewals

	2007/08 Exp.	Avge Cost		Avge Useful life	
3.4.1 Regional Roads			$/m2		yrs
3.4.2 Local Roads			$/m2		yrs

3.5 Forecast Concrete/Steel Renewals

to meet Council's Policy on bridge service levels

	1-5 years	6-10 years	11-15 years
3.5.1 Regional Roads			
3.5.2 Local Roads			

3.6 Forecast Timber Bridge Renewals

to meet Council's Policy on bridge service levels

	1-5 years	6-10 years	11-15 years
3.6.1 Regional Roads			
3.6.2 Local Roads			

Form 4 Timber Bridge Data

FORM 4 - TIMBER BRIDGE DATA

IPWEA NSW Roads & Transport Directorate

DATA INPUT Insert data into yellow cells

4.1 Timber Bridge Inventory Data

4.1.1 Number of timber bridges on public roads (regional and local roads)	0	from Form 3 Q 3.1
4.1.2 Number of single lane bridges (<6m kerb - kerb)		
4.1.3 Number of double lane bridges (>6m kerb - kerb)		
4.1.4 Total number of spans		
4.1.5 Number of spans <6m		
4.1.6 Number of spans >6m		
4.1.7 Number of truss bridges		

4.2 Estimated Timber Bridge Condition (2007/08)

	No. of bridges	
4.2.1 Good condition (above satisfactory)		
4.2.2 Fair condition (satisfactory)		
4.2.3 Poor condition (below satisfactory)		
Check total with Q4.1.1	0	OK

4.3 Special Schedule 7 Return for Timber Bridges (2007/08)

		($000)	
4.3.1 Funds required to bring to satisfactory standard			,000
4.3.2 Funds required to maintain at satisfactory standard (life cycle cost - maintenance & renewal)			,000
4,3.3 Program of maintenance (& renewal) for 2007/08			,000
07/08 Expenditures from Form 3, Sec 3.2, 3.4			
Regional road bridges	Maintenance	$0	
	Renewal	$0	
Local road bridges	Maintenance	$0	
	Renewal	$0	
		$0	,000

4.4 Bridge Management Systems

What computer system do you use for

4.4.1 Timber bridge inventory?		Enter name of system
4.4.2 Timber bridge management?		Enter name of system
4.4.3 Do you use drill testing?		
4.4.4 What is the frequency of timber bridge inspections?		
4.4.5 Do you use load testing of timber bridges?		
4.4.6 Do you know the load capacity of all timber bridges?		

4.5 Timber Bridge Skills

What skills does council have available in house

4.5.1 Accredited inspection?	
4.5.2 Accredited testing?	
4.5.3 Qualified bridge carpentry?	

4.6 Training Needs

What areas of training would your council be prepared to invest in

	Yes/No	Possible number of training participants
4.6.1 Bridge carpentry skills?		
4.6.2 Supervisor skills?		
4.6.3 Bridge testing skills?		
4.6.4 Termite testing/treatment?		
4.6.5 Environmental issues?		
4.6.6 OH&S issues?		

4.7 Other Issues

4.71 Is there any other issues you would like to raise?	

Appendix D

Response from Councils

Council	Survey Form Received	Survey Form Validated
Albury City Council	X	X
Armidale Dumaresq Council	X	X
Ashfield Municipal Council	X	X
Auburn Council	X	X
Ballina Shire Council	X	X
Balranald Shire Council	X	X
Bankstown City Council	X	X
Bathurst Regional Council	X	X
Baulkham Hills Shire Council	X	X
Bega Valley Shire Council	X	X
Bellingen Shire Council	X	X
Berrigan Shire Council	X	X
Blacktown City Council	X	X
Bland Shire Council		
Blayney Shire Council		
Blue Mountains City Council		
Bogan Shire Council	X	X
Bombala Council	X	X
Boorowa Council	X	X
Botany Bay City Council	X	X
Bourke Shire Council	X	X
Brewarrina Shire Council	X	X
Broken Hill City Council	X	X
Burwood Council	X	X
Byron Shire Council		
Cabonne Shire Council	X	X
Camden Council	X	X
Campbelltown City Council	X	X
Canada Bay City Council	X	X
Canterbury City Council	X	X
Carrathool Shire Council	X	X
Central Darling Shire Council		
Cessnock City Council	X	X
Clarence Valley Council	X	X
Cobar Shire Council	X	X
Coffs Harbour City Council	X	X
Conargo Shire Council	X	X
Coolamon Shire Council		
Cooma-Monaro Council	X	X
Coonamble Shire Council	X	X
Cootamundra Shire Council	X	X
Corowa Shire Council	X	X
Cowra Shire Council	X	
Deniliquin Council	X	X
Dubbo City Council	X	X
Dungog Shire Council	X	X
Eurobodalla Shire Council	X	X
Fairfield City Council	X	X

Forbes Shire Council	X	X
Gilgandra Shire Council	X	X
Glen Innes Severn Shire Council	X	X
Gloucester Shire Council	X	X
Gosford City Council	X	X
Goulburn Mulwaree Council	X	X
Great Lakes Council	X	X
Greater Hume Shire Council	X	X
Greater Taree City Council	X	X
Griffith City Council	X	X
Gundagai Shire Council	X	X
Gunnedah Shire Council		
Guyra Shire Council	X	X
Gwydir Shire Council		
Harden Shire Council	X	X
Hastings Council	X	X
Hawkesbury City Council	X	X
Hay Shire Council	X	X
Holroyd City Council	X	X
Hornsby Shire Council	X	X
Hunters Hill Municipal Council	X	
Hurstville City Council		
Inverell Shire Council	X	X
Jerilderie Shire Council	X	X
Junee Shire Council	X	X
Kempsey Shire Council	X	X
Kiama Municipal Council	X	X
Kogarah Municipal Council	X	X
Ku-ring-gai Council	X	X
Kyogle Council	X	X
Lachlan Shire Council		
Lake Macquarie City Council	X	X
Lane Cove Municipal Council	X	X
Leeton Shire Council	X	X
Leichhardt Municipal Council	X	X
Lismore City Council	X	X
Lithgow City Council	X	X
Liverpool City Council	X	X
Liverpool Plains Shire Council	X	X
Lockhart Shire Council	X	X
Maitland City Council	X	X
Manly Council	X	X
Marrickville Council	X	X
Mid-Western Regional Council	X	X
Moree Plains Shire Council	X	X
Mosman Municipal Council		
Murray Shire Council	X	X
Murrumbidgee Shire Council	X	X
Muswellbrook Shire Council	X	X
Nambucca Shire Council	X	X
Narrabri Shire Council	X	X
Narrandera Shire Council	X	X
Narromine Shire Council	X	X

Newcastle City Council	X	X
North Sydney Council	X	X
Oberon Council	X	X
Orange City Council	X	X
Palerang Council	X	X
Parkes Shire Council	X	X
Parramatta City Council	X	X
Penrith City Council	X	X
Pittwater Council	X	X
Port Stephens Council	X	X
Queanbeyan City Council	X	X
Randwick City Council	X	X
Richmond Valley Council	X	X
Rockdale City Council	X	X
Ryde City Council	X	X
Shellharbour City Council	X	X
Shoalhaven City Council	X	X
Singleton Shire Council	X	X
Snowy River Shire Council	X	X
Strathfield Municipal Council		
Sutherland Shire Council	X	X
Sydney City Council	X	X
Tamworth Regional Council		
Temora Shire Council	X	
Tenterfield Shire Council	X	X
Tumbarumba Shire Council	X	X
Tumut Council	X	X
Tweed Shire Council	X	X
Upper Hunter Shire Council	X	X
Upper Lachlan Council	X	X
Uralla Shire Council	X	X
Urana Shire Council	X	X
Wagga Wagga City Council	X	X
Wakool Shire Council	X	X
Walcha Council	X	X
Walgett Shire Council	X	X
Warren Shire Council	X	X
Warringah Council	X	X
Warrumbungle Shire Council	X	X
Waverley Council	X	X
Weddin Shire Council	X	X
Wellington Council	X	X
Wentworth Shire Council		
Willoughby City Council	X	X
Wingecarribee Shire Council	X	X
Wollondilly Shire Council	X	X
Wollongong City Council	X	X
Woollahra Municipal Council	X	X
Wyong Shire Council	X	X
Yass Valley Council	X	X
Young Shire Council	X	X
TOTAL	**138**	**135**

Appendix E

E1 Regional Sealed Road Maintenance Costs for IPWEA Regions

Note: Data is for 135 responding councils.

Region	Length (km)	Rate $/km/yr
Central Metro	90	$6,836
Central West	1,133	$3,702
Hunter	833	$6,768
Illawarra	374	$4,540
Metro North	247	$9,223
Metro West	426	$4,455
Mid North Coast	719	$7,226
New England	1,442	$2,416
North Coast	855	$3,398
Orana	2,581	$2,528
South East Metro	253	$5,207
South Eastern	1,242	$3,497
South West	2,646	$2,345
Total	**12,840**	**$3,606**

E2 Regional Sealed Resurfacing Life Cycle Costs for IPWEA Regions

Region	Length (km)	Resurfacing Life Cycle Cost ($/km/yr)
Central Metro	90	$17,280
Central West	1,133	$1,647
Hunter	833	$7,225
Illawarra	374	$7,117
Metro North	247	$12,848
Metro West	426	$9,225
Mid North Coast	719	$3,576
New England	1,442	$1,883
North Coast	855	$2,086
Orana	2,581	$1,813
South East Metro	253	$30,044
South Eastern	1,242	$1,651
South West	2,646	$4,126
Total	**12,840**	**$4,014**

E3 Regional Sealed Pavement Life Cycle Costs for IPWEA Regions

Region	Length (km)	Pavement LCC ($/km/yr)
Central Metro	90	$17,926
Central West	1,133	$3,474
Hunter	833	$12,150
Illawarra	374	$7,139
Metro North	247	$16,020
Metro West	426	$15,654
Mid North Coast	719	$11,105
New England	1,442	$5,196
North Coast	855	$8,116
Orana	2,581	$4,149
South East Metro	253	$10,271
South Eastern	1,242	$5,382
South West	2,646	$4,881
Total	**12,840**	**$6,564**

E4 Regional Unsealed Road Maintenance Costs for IPWEA Regions

Region	Length (km)	Rate $/km/yr
Central Metro	0	NA
Central West	103	$1,631
Hunter	23	$1,512
Illawarra	65	$3,555
Metro North	1	$17,910
Metro West	40	$5,817
Mid North Coast	59	$3,393
New England	241	$3,399
North Coast	55	$3,041
Orana	1,596	$1,467
South East Metro	0	NA
South Eastern	299	$10,149
South West	422	$1,176
Total	**2,905**	**$2,664**

E5 Regional Unsealed Road Resheeting Life Cycle Costs for IPWEA Regions

Region	Length (km)	Resheet LCC $/km/yr
Central Metro	0	NA
Central West	103	$3,069
Hunter	23	$606
Illawarra	65	$4,256
Metro North	1	$7,500
Metro West	40	$10,000
Mid North Coast	59	$4,477
New England	241	$4,759
North Coast	55	$2,115
Orana	1,596	$2,686
South East Metro	0	NA
South Eastern	299	$3,608
South West	422	$2,297
Total	**2,905**	**$3,057**

E6 Local Sealed Road Maintenance Costs for IPWEA Regions

Region	Length (km)	Rate $/km/yr
Central Metro	1,216	$5,937
Central West	4,148	$1,731
Hunter	7,401	$4,133
Illawarra	3,874	$4,440
Metro North	3,361	$5,747
Metro West	5,355	$3,680
Mid North Coast	3,415	$3,789
New England	3,607	$1,676
North Coast	3,871	$2,354
Orana	4,527	$1,836
South East Metro	3,124	$3,389
South Eastern	4,407	$1,791
South West	9,387	$1,426
Total	**57,694**	**$2,938**

E7 Local Sealed Road Reseal Life Cycle Costs for IPWEA Regions

Region	Length (km)	Rate $/km/yr
Central Metro	1,216	$10,018
Central West	4,148	$1,768
Hunter	7,401	$5,390
Illawarra	3,874	$6,183
Metro North	3,361	$9,501
Metro West	5,355	$5,625
Mid North Coast	3,415	$3,246
New England	3,607	$1,886
North Coast	3,871	$1,846
Orana	4,527	$2,399
South East Metro	3,124	$14,001
South Eastern	4,407	$1,687
South West	9,387	$1,918
Total	**57,694**	**$4,342**

E8 Local Sealed Road Pavement Life Cycle Costs for IPWEA Regions

Region	Length (km)	Rate $/km/annum
Central Metro	1,216	$13,544
Central West	4,148	$2,330
Hunter	7,401	$10,811
Illawarra	3,874	$8,564
Metro North	3,361	$8,214
Metro West	5,355	$8,494
Mid North Coast	3,415	$9,270
New England	3,607	$4,274
North Coast	3,871	$7,673
Orana	4,527	$3,263
South East Metro	3,124	$10,502
South Eastern	4,407	$3,425
South West	9,387	$4,706
Total	**57,694**	**$6,865**

E9 Local Unsealed Road Maintenance Costs for IPWEA Regions

Region	Length (km)	Rate $/km/annum
Central Metro	18	$994
Central West	6,845	$1,015
Hunter	2,269	$4,392
Illawarra	817	$3,537
Metro North	66	$5,583
Metro West	313	$11,021
Mid North Coast	3,513	$2,135
New England	10,370	$1,063
North Coast	3,073	$2,571
Orana	15,475	$784
South East Metro	0	NA
South Eastern	6,711	$1,039
South West	16,999	$585
Total	**66,470**	**$1,190**

E10 Local Unsealed Road Resheeting Life Cycle Costs for IPWEA Regions

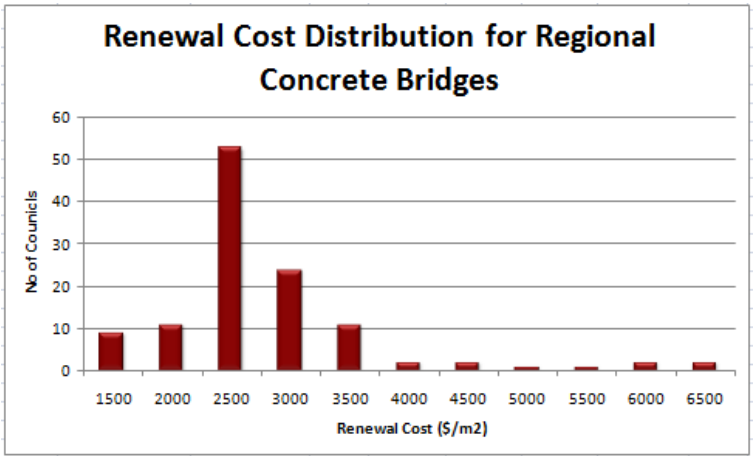
Region	Length (km)	Rate $/km/annum
Central Metro	18	$4,000
Central West	6,845	$1,405
Hunter	2,269	$1,666
Illawarra	817	$4,532
Metro North	66	$3,460
Metro West	313	$9,574
Mid North Coast	3,513	$3,203
New England	10,370	$2,716
North Coast	3,073	$2,177
Orana	15,475	$1,788
South East Metro	0	NA
South Eastern	6,711	$2,014
South West	16,999	$1,460
Total	**66,470**	**$1,993**

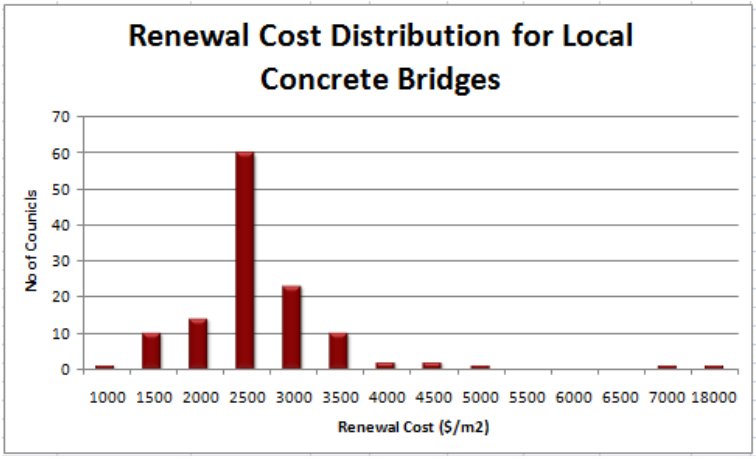
APPENDIX F

Bridge Renewal Cost and Estimated Useful Life Distributions

F1. Concrete Bridges Renewal Cost Distribution

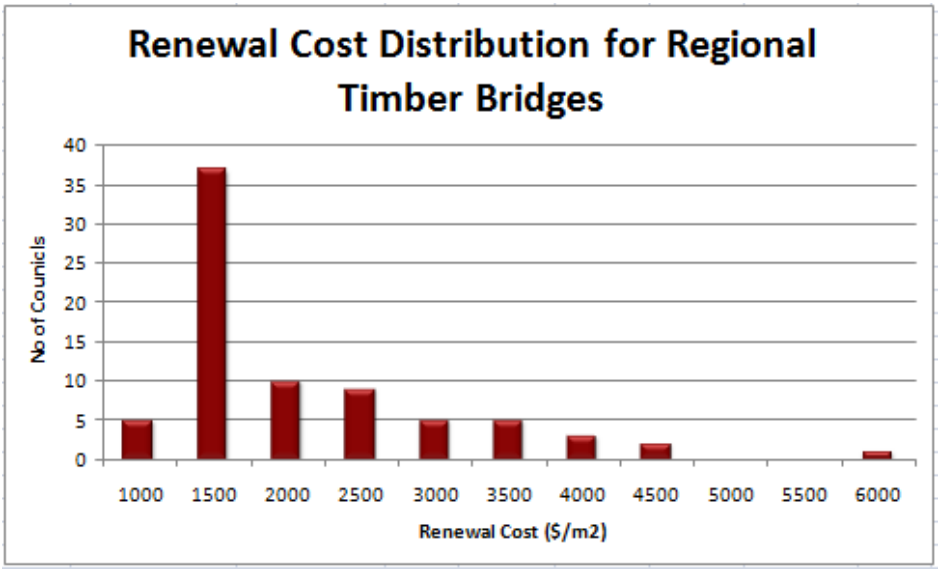
Renewal Cost (< $/M2)	No of Councils reporting at this value	
	Bridges on Regional Roads	Bridges on Local Roads
$1,000		1
$1,500	9	10
$2,000	11	14
$2,500	53	60
$3,000	24	23
$3,500	11	10
$4,000	2	2
$4,500	2	2
$5,000	1	1
$5,500	1	0
$6,000	2	0
$6,500	2	0
$7,000		1
$18,000		1
Average	**$2,717 / m2**	**$2,738 / m2**

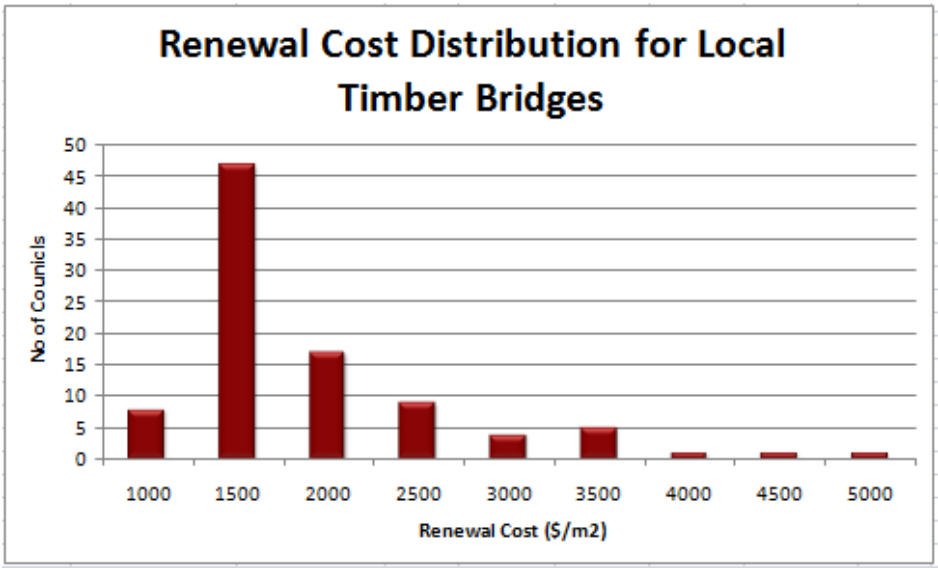




F2. Timber Bridges Renewal Cost Distribution

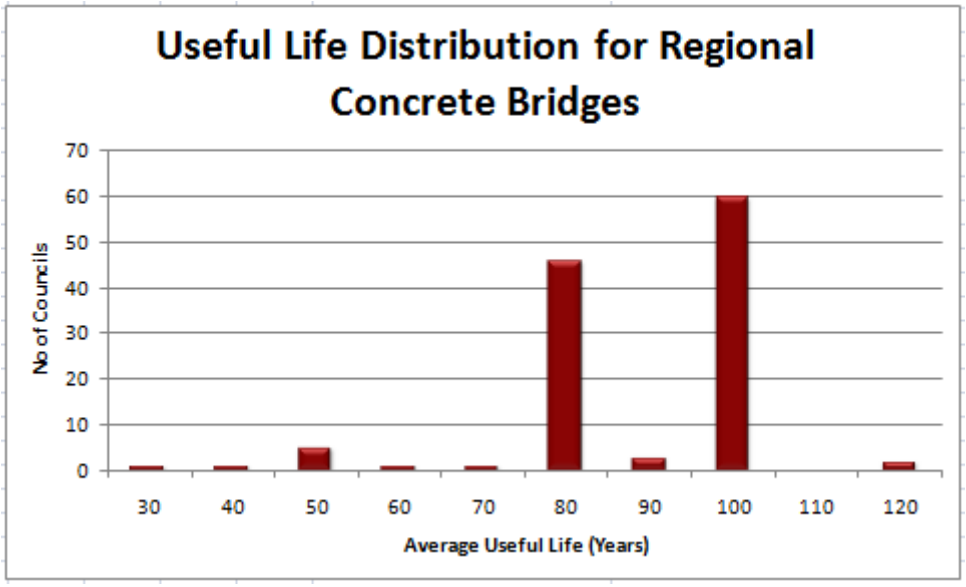
Renewal Cost (< $/M2)	No of Councils reporting at this value	
	Bridges on Regional Roads	Bridges on Local Roads
$1,000	5	8
$1,500	37	47
$2,000	10	17
$2,500	9	9
$3,000	5	4
$3,500	5	5
$4,000	3	1
$4,500	2	1
$5,000	0	1
$5,500	0	
$6,000	1	
AVERAGE	**$1,318 / m2**	**$1,441 / m2**

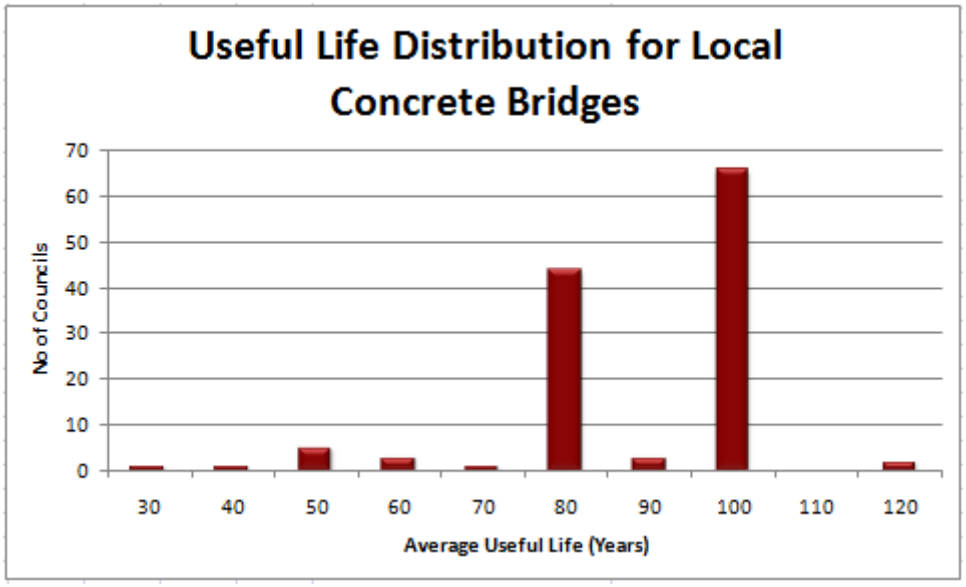




F3. Concrete Bridges Estimated Useful Life Distribution

Estimated Useful Life (yrs)	No of Councils reporting at this value	
	Bridges on Regional Roads	Bridges on Local Roads
30	1	1
40	1	1
50	5	5
60	1	3
70	1	1
80	46	44
90	3	3
100	60	66
110	0	0
120	2	2
Average	**88.4 years**	**90.8 years**





F4. Timber Bridges Estimated Useful Life Distribution

Estimated Useful Life (yrs)	No of Councils reporting at this value	
	Bridges on Regional Roads	Bridges on Local Roads
10	1	1
20	2	3
30	4	6
40	8	9
50	38	46
60	4	5
70	3	3
80	15	13
90	0	0
100	9	11
Average	**41.0 years**	**46.1 years**