

# HEAVY VEHICLE SECTION 94 PLAN

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## **Yass Valley Council Heavy Haulage Section 94 Contributions Plan 2006**

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## 1.0 - Citation

This plan shall be referred to as the “Section 94 Contributions Plan for Yass Valley Council - Heavy Vehicle Traffic Generating Development - Maintenance and Construction of Roads”, and has been prepared in accordance with Section 94 of the *Environmental Planning and Assessment Act 1979*, the *Environmental Planning And Assessment Regulations 2000*, and the Department of Infrastructure, Planning and Natural Resources’ *Section 94 Contributions Manual – Second Edition*.

The plan also has regard to other best practice and the issues raised within the Department’s *Review of the Developer Contributions System – 2000*.

## 2.0 - Purpose of the Plan

The purpose of the plan is to provide the necessary framework for the efficient and equitable determination and collection of developer contributions towards the maintenance, upgrade and construction of roads utilised by heavy vehicles associated with developments which generate a significant amount of heavy vehicle movements.

These contributions are intended to be levied upon development which generate heavy vehicle traffic, and will require road maintenance, upgrade or construction with associated works. Such works would be required to ensure adequate maintenance, safety, efficiency, amenity and environmental standards are achieved on existing roads, and to ensure that upgraded and new road networks, are constructed to a standard commensurate with the heavy vehicle usage generated by the development.

For the purpose of this plan, the contributions for “roads” is deemed to include all necessary works of carriageway construction and maintenance, including pavement, associated culverts, bridges, drainage, signs, linemarking, noise attenuation measures, landscaping, safety and traffic management measures.

*This section has been prepared to satisfy the statutory requirements as provided under Clause 27(1)(a) of the Environmental Planning and Assessment Regulations 2000.*

### **3.0 - Objectives of the Plan**

This plan aims to provide a basis for the levying and collection of developer contributions for the ongoing maintenance and upgrade of existing roads, and the provision of new roads. Contributions will be sought where a nexus can be established between heavy vehicle usage resulting from development, and the need for new roads and/or additional maintenance, due to resulting deterioration on the road network.

The plan will enable appropriate and accountable financial management of income derived from developer contributions in accordance with the provisions of Section 94 of the Environmental Planning and Assessment Act 1979, and Part 4 of the Environmental Planning and Assessment Regulation 2000.

By its nature the plan will serve to provide the public with information on developer contributions required and/or provided for the public road network within the Yass Valley Local Government Area.

### **4.0 - Relationship to Environmental Planning Instruments**

This plan applies to all land within Yass Valley Local Government Area ("Council area"), and is made pursuant to Section 94 of the Environmental Planning and Assessment Act 1979, and Part 4 of the Environmental Planning and Assessment Regulation 2004.

### **5.0 - Land to which this Plan Applies**

This plan applies to all existing and future road networks within Yass Valley LGA, required to service development that generates heavy vehicle traffic as a significant and integral component of its operations.

Specific exemptions to this plan are identified in Section 7.3.

*This section has been prepared to satisfy the statutory requirements as provided under Clause 27(1)(b) of the Environmental Planning and Assessment Regulations 2000.*

### **6.0 - Establishment of a Nexus**

Development that generates heavy vehicle movements leads to an increased burden on the existing road system, and may also create the need for new roadworks to be undertaken.

An increase in heavy vehicle usage on existing roads results in a reduction of road life. This necessitates increased construction standards and maintenance work beyond that which could have been previously expected.

The combination of the additional axle loadings (ie. number of wheels on the road surface) and the payloads (ie. gross transport weight of loaded vehicle) generated by heavy vehicle traffic have an impact on the rate of deterioration of the road. As such, any formula utilised to determine a contribution rate should take into account these two factors.

Furthermore an increase of heavy vehicles using the road system also has an impact on road safety and amenity, and may require additional works to ensure that such are maintained at an acceptable standard.

The Roads and Traffic Authority's "Guide to Traffic Generating Development" also identifies the cost impacts of increased heavy vehicle usage, thereby providing professional recognition and technical support for the nexus adopted by this plan. The legal justification of this nexus has also been recognised by the Land and Environment Court (refer also judgements of Land & Env Court (see Colin C. Donges & Assoc. vs Baulkam Hills Council (1989)) and (Capital Quarries P/L v. Gunning and Yass Shire Councils (1987)).

Increases in heavy vehicles will have a significant impact on the traffic flows within both the urban and rural areas in Yass Valley Council area. The most significant impact will likely be expected within the rural road system given the design and construction standards historically applied to these roads.

For the purposes of this plan, the road network over which individual contributions will be calculated is to be determined on a development specific basis, thereby making allowance for the actual roads utilised by different developments.

*This section has been prepared to satisfy the statutory requirements as provided under Clause 27(1)(c) of the Environmental Planning and Assessment Regulations 2000.*

## **7.0 - Calculation of Contributions**

Given the distinction between the impact of heavy vehicle traffic on the maintenance of existing roads and the need for additional roadworks,

contributions can be determined for maintenance of existing works or new works.

The applicable contributions will be determined utilising the following formulae:

- 7.1 - Formula for Maintenance Works Contribution; and,
- 7.2 - Formula for Upgrade or Construction Contribution.

In each case a sufficient nexus must be established between the new development and any works that would reasonably be expected to be undertaken to cater for increased traffic that is generated.

*This section has been prepared to satisfy the statutory requirements as provided under Clause 27(1)(d) of the Environmental Planning and Assessment Regulations 2000.*

## **7.1 - Formula for Maintenance Works Contribution**

$$C = (M \times K) \times (E / T)$$

C = annual contribution.

M = annual cost of maintenance works required per kilometre.

K = length of road required to be maintained (in kilometres).

T = estimated total of Equivalent Standard Axles (ESAs) using the road annually.

E = estimated total of ESAs using the road generated by the subject development (annually).

**Further explanation and elaboration on the above formula and its components is provided within Appendix No.1, and a worked example is provided in Appendix No. 2.**



## 7.2 - Formula for Upgrade or Construction Works Contribution

$$C = N \times K$$

C = contribution.

N = cost of upgrade/new construction required per kilometre OR cost of required new works.

K = length of road required to be upgraded/constructed (in kilometres) OR K=1 when cost of new works is used for N.

Further explanation and elaboration on the above formula and its components is provided within Appendix No.1.



## 7.3 - Exemptions and Discounts Applying to Specific Development

With respect to the calculation of the maintenance works contribution, the plan shall **not** apply to the following:

- National highways and State roads within the Council area;
- private roads within the Council area;
- extractive industries with an annual output of up to and including 5,000 cubic metres of material or product (to minimise the impact on the economic viability of smaller operations and to recognise the smaller and localised haulage associated with these developments);
- other developments with an annual total haulage of up to and including 8,000 tonnes of material, product or payload (or equivalent) (applying the same justification as above);
- development located within Business and Industrial Zones within the Council area under the provisions of the Local Environmental Plan, ( This makes allowance for the location of these developments on road networks with pavement designed and constructed with a higher than standard life. Furthermore, the large volume, various types and unpredictable loadings of vehicles generated by both development within zoned commercial and industrial areas, and vehicles operating within these areas, makes collection of data for efficient and equitable determination of contributions uncertain).

## 8.0 - Schedule of Proposed Works

*This section has been prepared to satisfy the statutory requirements as provided under Clause 27(1)(g) of the Environmental Planning and Assessment Regulations 2000.*

Two schedules of works are provided, being:

1. *Schedule of maintenance works required; and,*
2. *Schedule of road upgrade and construction.*

### **Explanatory Notes:**

- *Two specific schedules of works are provided to enable the independent implementation and operation of this plan for maintenance works and road upgrade and construction works that may be required to be undertaken.⇒⇒⇒*

## 8.1 - Roads Maintenance Schedule

Roads are designed to varying standards and are built from natural or processed materials to meet the standards and needs of the communities they serve. Roads are subject to varying rates of deterioration, which commence as soon as each part of the road is completed. If the facility (ie the road) is to provide the standard of service for which it was designed and constructed, the maintenance cycle must begin as soon as construction ends.

Ideally maintenance would ensure that the road always functions as efficiently as when it was first constructed, however, actual resources able to be employed towards maintenance are generally limited by the availability of labour, plant and funds. In employing such limited resources to maintenance, it remains the intention that road serviceability shall not fall below a minimum acceptable level.

Maintenance works for which a contribution is to be levied in accordance with this plan shall be undertaken to ensure that a minimum standard compatible with the road user demands is achieved, and shall include:

- (a) Routine Maintenance: works to repair defects and prevent the road system from deteriorating below acceptable safety and construction standards, due to the fact that their extent, timing and means of execution are not amenable to detailed forward planning.
- (b) Periodic Works: works undertaken to repair the pavement wearing surface and/or adjoining shoulders, and are generally more expensive and planned.
- (c) Rehabilitation Works: works undertaken to repair and replace a road pavement due to substantial deterioration.

Monies collected pursuant to this plan shall be expended by Council on either routine maintenance throughout the year, periodic maintenance at fixed intervals, or rehabilitation works in accordance with Council's usual road maintenance practices, which generally accord with the standards and practices provided by Australian Standards and other relevant technical and best practice documents.

## **8.2 - Amenities to be Provided**

Contributions collected for individual developments will be expended on the principal haulage routes utilised by the heavy vehicle traffic generated by each development. This will ensure that the nexus between monies collected and the impact of each individual development exists. (An inventory of the Council areas's road system to which this plan applies, and the standard of individual roads within it, is currently being developed by Council as part of it's Asset Register).

## **8.3 - Staging of Roads Maintenance Works**

Contributions towards maintenance costs will be determined and collected on an annual basis at the conclusion of each financial year from the time the consent becomes operational, and shall be collected for every twelve (12) month period or part thereof that the development is operating.

All maintenance works undertaken in accordance with this plan shall be undertaken by Council on the following basis:

- routine pavement maintenance: shall be undertaken annually on an ongoing basis.
- rehabilitation and periodic maintenance: will be undertaken as per Council's works program which will reflect the planned maintenance required over the life cycle of the road pavement (eg. Tables 8.4.1 and 8.4.2) and also following major unexpected pavement failure.

## 8.4 - Estimated Cost of Maintenance Works

The estimated costs for maintenance works as shown in Tables 8.4.1 and 8.4.2, is offered as a guide, with the intention of providing a range of maintenance works schedules which may be encountered. Table 8.4.1 shows typical maintenance scenarios for rural sealed roads.

Scenario 1 is considered the normal maintenance cycle for Council roads over a twenty (20) year period. Scenarios 2-5 illustrate increased routine maintenance and earlier periodic and rehabilitation maintenance required if road life expectancies are reduced to 16, 13, 11, 10 years respectively, as a result of increased heavy vehicle traffication. This Table (8.4.1) provides a range of typical maintenance costs which may be encountered in Yass Valley Council area as a result of heavy vehicle traffic generating developments utilising the road system.

Table 8.4.2 shows typical maintenance scenarios for unsealed rural roads within Yass Valley Council area. The various scenarios (1-3) are provided in a manner similar to those above.

**Table 8.4.1 - Typical Maintenance Scenarios (Sealed Rural Roads)**

<b>No. Years (20 yr cycle)</b>	<b>Scenario 1</b>	<b>Scenario 2</b>	<b>Scenario 3</b>	<b>Scenario 4</b>	<b>Scenario 5</b>
<b>Life</b>	<b>20 years</b>	<b>16 years</b>	<b>13 years</b>	<b>11 years</b>	<b>10 years</b>
	<b>Annual Cost &amp; Activity</b>				
<b>00</b>	Const	const	const	const	const
<b>01</b>	1500	1900	2200	2700	3000
<b>02</b>	1500	1900	2200	2700	3000
<b>03</b>	1500	1900	2200	2700	3000
<b>04</b>	1500	1900	2200	2700	3000
<b>05</b>	1500	1900	2200	2700	30000 reseal
<b>06</b>	1500	1900	2200	30000 reseal	3000
<b>07</b>	1500	1900	29000 reseal	2700	3000
<b>08</b>	1500	27000 reseal	2200	2700	3000
<b>09</b>	1500	1900	2200	2700	3000

No. Years (20 yr cycle)	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Life	20 years	16 years	13 years	11 years	10 years
	Annual Cost & Activity				
10	20000 reseal	1900	2200	5400	160000 rehab
11	1500	1900	2200	156000 rehab	3000
12	1500	1900	2200	3000	3000
13	1500	1900	154600 rehab	3000	3000
14	1500	1900	1500	3000	3000
15	1500	3800	1500	3000	30000
16	1500	153800 rehab	1500	30000 rehab	3000
17	1500	1500	1500	3000	3000
18	1500	1500	1500	3000	3000
19	1500	1500	1500	3000	3000
20	150000 rehab	33000 rehab	56000 rehab	71000 rehab	80000 rehab
<b>Total</b>	197000	247000	273000	335000	348000
<b>Annual Amount</b>	9850	12350	13660	16750	17400

**Table 8.4.2 - Typical Maintenance Scenarios (Unsealed Rural Roads)**

No. Years (20 yr cycle)	Scenario 1		Scenario 2		Scenario 3	
	Annual Cost	Activity	Annual Cost	Activity	Annual Cost	Activity
00	const		const		const	
01	2400		3000		4000	
02	2400		3000		5600	
03	2400		3000		10600	maint
04	2400		14200	maint	5600	
05	12400	maint	3000		5600	
06	2400		3000		15600	maint
07	2400		3000		5600	
08	2400		14200	maint	5600	
<b>No.</b>	<b>Scenario 1</b>		<b>Scenario 2</b>		<b>Scenario 3</b>	

<b>Years (20 yr cycle)</b>						
	<b>Annual Cost</b>	<b>Activity</b>	<b>Annual Cost</b>	<b>Activity</b>	<b>Annual Cost</b>	<b>Activity</b>
<b>09</b>	2400		3000		10600	maint
<b>10</b>	12400	maint	3000		5600	
<b>11</b>	2400		3000		5600	
<b>12</b>	2400		14200	maint	15600	maint
<b>13</b>	2400		3000		5600	
<b>14</b>	2400		3000		5600	
<b>15</b>	12400	maint	3000		10600	maint
<b>16</b>	2400		14200	maint	5600	
<b>17</b>	2400		3000		5600	
<b>18</b>	2400		3000		15600	maint
<b>19</b>	2400		3000		5600	
<b>20</b>	12400	maint	14200	maint	10600	maint
<b>Total</b>	98000		124000		162000	
<b>Annual Amount</b>	4900		6200		8100	

These figures are provided as an estimate of the current base expenditure on maintenance of the rural road system within the Council area. However, a number of factors will impact upon the actual cost of maintenance works, including:

- the impact of new development on the road system, particularly increased heavy vehicle movements;
- changes to required minimum road standards in accordance with statutory safety standards and the like;
- changes in funding received from State and Federal Government;
- environmental impacts that may adversely impact upon the road system eg. extreme heat or heavy or sustained rainfall;
- political decisions from Federal, State or Local Government;
- increased road traffication not generated by specific development;

Due to the variables identified above, annual or periodic review of the schedules and costs will be undertaken and any development specific variations to the estimates (ie. annual costs) will be determined (refer to Table 8.4.1 and 8.4.2).

It is the intent of this plan that the contribution rates for each development are determined by the average costs expended in a twelve (12) month period as estimated for the design life of the principal traffic routes utilised by the heavy traffic generated by development to which the plan applies.

The contribution rate for each development will take account of the proportion of the actual annual maintenance costs attributable to the increase in heavy vehicles on the routes which individual developments utilise.

In the determination of contributions towards the maintenance of actual haulage routes, this contributions plan is ensuring the accountability of the developer contribution process, and provides a clear “nexus” or link between the provision and maintenance of the road system, and the monies collected from developers impacting upon such.

## **8.5 - Road Upgrade and Construction Schedule**

Roads within Yass Valley Council area have, over some period of time, been designed and constructed with various standards prevailing, and hence are only capable of safely and efficiently handling specific traffic volumes and types.

Any development that may increase the traffic volumes and proportion of heavy vehicle usage may require works to be undertaken to ensure that acceptable traffic, safety, environmental and amenity standards are maintained throughout the road system.

These works may be in the form of maintenance works, if the roads to be utilised are already designed and constructed to an acceptable standard, or in the form of road upgrades or construction of new roads if the existing road system is not designed and built to a standard capable of accommodating the traffic that will be generated by a development.

## **8.6 - Amenities to be Provided**

All monies collected for the purpose of road upgrades or new road construction, in accordance with this plan, shall be expended upon the road system shown on the map which forms part of this plan.

Contributions collected for individual developments will be expended on the principal routes utilised by the traffic generated by each development. This will ensure the nexus between monies collected and the impact of each individual development exists.

As this contributions plan will be implemented on the basis of the individual characteristics of each development to which it applies, a more specific works program will be determined prior to the assessment of specific development applications. In determining what works will be required to be undertaken, or design and construction standards that need to be met, Council will assess each application on its merits, taking into account such matters as:

- the existing volume of traffic utilising the identified haulage route;
- the existing road standards over the proposed haulage route;
  - sealed or unsealed surface
  - pavement width and thickness
  - pavement construction materials
  - subgrade construction
  - intersection standards
  - road furnishings etc
  - road alignment/geometry
  - physical characteristics of the locality
- the amount and type of traffic (eg. number of ESAs) that will be generated by the proposed development;
- the road standard required to safely and efficiently cater for existing traffic and the traffic generated by the development (determined by statutory and other design and safety standards, with reference to technical and best practice manuals such as those produced by AUSTRROADS);
- the need to maintain environmental and amenity standards in the locality;
- environmental conditions within the locality;
- physical characteristics of the locality eg. topography.

However, in order to provide a guide to works required and an estimate of their cost, the following Table 8.6.1 identifies the basic minimum traffic standards applicable to heavy vehicle traffic generating developments.

**Table 8.6.1 - Minimum Standards Required for Heavy Vehicles**

Design Traffic (AADT) (veh/day)	AUSTRROADS - Rural Road Design - 1993		Yass Valley Council "Guide" To Road Standard	
	lane width 2 lane road (m)	shoulder width 2 lane road (m)	lane width 2 lane road (m)	shoulder width 2 lane road (m)
1 - 500	3.0	1.0 - 1.5	3.0	1.0
500 - 1000	3.0 - 3.5	1.0 - 2.0	3.5	1.0
> 1000	3.5	1.0 - 3.0	3.5	1.5

**Note:** Minimum standards adopted to reflect heavy vehicle traffic and to maintain road safety and efficiency.

Where the actual existing standard of the principle haulage routes utilised by the heavy vehicle traffic generated by a development to which the plan applies is less than the minimum construction standard (Yass Valley Council “Guide” to Road Standard - Table 8.6.1), an upgrade to that standard will be required.

## 8.7 - Staging of Road Construction and Upgrade Works

All road construction and upgrade works to be undertaken in accordance with this plan shall generally be undertaken prior to the subject consent becoming operational, except as otherwise determined by Council.

## 8.8 - Estimated Cost of Upgrade Works

The estimate of costs for upgrade works is provided as a guide, and obtained by adopting average unit rates for road construction works within the Council area. The unit rates have been compiled from information including that supplied by other Local Government areas.

The following Table 8.8.1 provides estimated costs for upgrade works based on an existing road type being upgraded to the Yass Valley Council “guide” standard. The road types shown are selected as examples of what may be encountered within Yass Valley Council area.

**Table 8.8.1 - Cost Estimates for Upgrade Works**

Example of Existing Road Types	Yass Valley Council “Guide” Standard	Estimated Upgrade Cost \$ per km
Gravel 4.0 m wide	9.0 m wide 7.0 m seal	250 000
7.0 m wide	9.0 m wide 7.0 m seal	200 000
Sealed 6.0 m wide 5.5 m seal	9.0 m wide 7.0 m seal	200 000
Sealed 8.0 m wide 6.0 m seal	9.0 m wide 7.0 m seal	150 000

It should be noted that the estimated upgrade costs represent a “straight-forward” reconstruction project where difficult site conditions have been ignored. Difficult site conditions may need to be assessed separately, and may comprise steep terrain, large drainage structures or bridges, poor existing sub-grade material, below standard intersection works, groundwater and groundwater drainage paths and the like.

The aforementioned upgrade construction cost per kilometre, provides an estimate of costs for rural roads within the Council area. However, it is the intent of this plan that the contribution rates for each development be

determined utilising these guidelines on a development specific basis taking into account differing existing standards of road over the principal haulage routes utilised for each individual development.

By determining the contribution rate on a proportional basis for works actually required on specific haulage routes, this contributions plan is ensuring the accountability of the developer contribution process, and provides a clear “nexus” or link between the required construction or road upgrade of the road system, and the monies collected from developers impacting upon such.

The contribution rate for each development will take account of the proportion of the actual costs attributable to the increase in heavy vehicles on the subject haulage routes that individual developments utilise.

## **9.0 - Method and Timing of Payments**

Contributions for the maintenance and/or construction of roads utilised by development requiring heavy vehicle haulage are to be levied in accordance with this plan. The amount of such development contribution shall be calculated on the basis of the adopted rate at the time of payment of the contribution, and any consent issued requiring the application of this plan shall contain appropriate conditions stating the timing, form and amount of payment to be made.

Generally, the timing of the payment of contributions will be as follows:

- contribution for maintenance works: will be determined and collected on a quarterly or annual basis (ie. 3 or 12 months) at the discretion of Council - based on the submission to Council of returns calculated from weighbridge dockets or other suitable records for the applicable period, from the time the consent becomes operational, and shall be collected for every period or part thereof that the development is operating.
- construction and upgrade contributions: will be determined and collected (and works undertaken) prior to the subject consent becoming operational, except as otherwise determined by Council.

The value of cost for road works presented in this plan, may be adjusted by Council to reflect any changes in the Consumer Price Index (CPI) (all groups - Sydney), or to reflect changing costs of materials and the like. This adjustment is required to ensure the equitable application of this plan over time making allowance for the variations in the “real” value of money over time.

Developer contributions made in accordance with this plan will usually be in the form of monetary payments, however alternative “in kind” contributions may be accepted if they are deemed by Council to represent an “equivalent public benefit”. In the case of alternative payments being proffered, a

developer is required to make prior representations to Council at which time the proposal can be negotiated.

*This section has been prepared to satisfy the statutory requirements as provided under Clause 27(1)(f) of the Environmental Planning and Assessment Regulations 2000.*

## **10.0 - Reviews to Contributions Plan**

This contributions plan is to be regularly monitored and reviewed to allow for future variations to works programmes and costings.

## **11.0 - Review to Contributions Rate**

The contributions rate shall be revised annually to reflect the “real” value of the contributions at that time, and the revised rates are to be adopted by Council at its “estimates meeting” held in June each year.

The contributions rate for heavy vehicle traffic generating development will generally be required to be determined at the following times:

- contribution for maintenance works: will be determined and collected on a quarterly basis (ie. three months) based on the submission to Council of quarterly returns calculated from weighbridge dockets or other suitable records for the applicable period, from the time the consent becomes operational, and shall be collected for every period or part thereof that the development is operating.
- construction and upgrade contributions: will be determined and collected (and works undertaken) prior to the subject consent becoming operational, except as otherwise determined by Council.

## Glossary

- **heavy traffic generating development:** any development (requiring the consent of Council) that generates (or requires) heavy vehicle movements as a significant component of its operations.
- **principal haulage route:** those roads utilised by vehicles generated by a development to which this plan applies up to the intersection of the subject road with a main road (for the purpose of this plan main road shall include the Coast Road).
- heavy vehicle: any vehicle within the Golden River Vehicle Classification Scheme which has:
  - Gross Vehicle Mass (GVM) > 20 tonnes, or,
  - Tare Mass > 6 tonnes, or,
  - Number of Axles > 2 (including trailers).

This plan utilises the Austroads Vehicle Classification Scheme, and as such the minimum definition of a heavy vehicle is a vehicle with a minimum of two (2) axles, with the distance between these two axles being greater than 3.2 metres (refer to classification table in Appendix 3 ). Note: The Scheme cannot distinguish vehicle mass, so the classification of a heavy vehicle must be based on the Number of axles, and axle spacing.”

- **equivalent standard axles (ESA):** The standard axle is defined as a single axle with dual tyres carrying a total of 8.2 tonne mass gross. The ESA is used as a standard measure to compare the damaging effect on the pavement of masses and tyre configurations other than the standard axle.

The axle mass to cause 1 ESA of damage is also determined by the tyre configuration. The load on a number of different tyre configurations to cause 1 ESA of damage is as per the following table.

<b>Axle Configuration</b>	<b>Load (kN)</b>
single axle, single tyre	53
single axle, dual tyre	80
tandem axle, dual tyre	135
triaxle, dual tyre	181

The performance of a pavement is influenced only by the heavy end of the traffic spectrum. No account is taken of cars and light commercial vehicles as far as loadings are concerned though their existence may affect road capacity.

- **Vehicle Classification Scheme** when classifying traffic (refer to the following table for details). Based upon this vehicle classification scheme and a function class of three(3) for New South Wales (refer to Appendix E of “Pavement Design” - AUSTRROADS) the number of ESAs per vehicle class is as follows:

Vehicle Class	Vehicle Type	ESA per Vehicle
1	light vehicle	0
2	light vehicle towing	0
3	two axle heavy vehicle	1.2
4	three axle heavy vehicle	1.6
5	four axle heavy vehicle	2.2
6	three axle articulated vehicle	1.8
7	four axle articulated vehicle	2.2
8	five axle articulated vehicle	2.8
9	six axle articulated vehicle	2.4
10 - 13	not applicable within Yass Valley	-

**Note:** Vehicle class and ESA per vehicle is based on the respective vehicles being laden such that the load on each of the vehicles axles is as per the table on page 24. Unladen heavy vehicles will be assumed to have zero ESAs.

If vehicle classes 10-13 are encountered within Yass Valley Council area they will be included as Class 9 vehicles for the ESA calculation.

Based on the Classification System Annual ESAs can be determined by the following formula:

$$\text{Total Annual ESA} = 365 \times \{ 1.2 (C3) + 1.6 (C4) + 2.2 (C5) + 1.8 (C6) + 2.2 (C7) + 2.8 (C8) + 2.4 (C9) \}$$

where “C” is the daily traffic volume for each class of vehicle, and “C3” being volume for class 3, “C4” volume for class 4, and so on.

# ***APPENDICES***

## Appendix Number 1 - Further Information Pertaining to Formulas

(1) ***Formula for the collection of contributions towards the cost of maintenance works required;***

$$C = (M \times K) \times (E / T)$$

C = annual contribution

M = annual cost of maintenance works required per kilometre

K = length of road required to be upgraded/maintained (in kilometres)

T = estimated total of Equivalent Standard Axles (ESAs) using the road annually.

E = estimated total of ESAs using the road generated by the subject development (annual estimate).

**Notes:**

**E will be determined by ;**

- the total amount of material hauled within the relevant three (3) month period as stated in submissions to be provided to Council on a quarterly basis by the proponent of the development;
- the usual type of vehicle utilised for haulage of material or product, stating ESA and capacity.(this should be provided quarterly by the proponent, and if it is not provided it shall be calculated on the basis of a three axle vehicle being utilised.)

**M will be determined by:**

- due to the varying standards of roads utilised by each individual development there will need to be applicable costs per kilometre determined for haulage routes (refer Section 8.13), and an average cost per kilometre determined for each development.

**K will be determined by:**

- the length of road required to be upgraded or maintained due to the impact of traffic generated by a particular development, shall be determined by an assessment of the proposed principle haulage routes for each development (as provided in documentation submitted quarterly ,by the proponent to determine the contribution rate) .

**T will be determined by:**

- an estimate derived from actual traffic count data, collected by, or acceptable to Council, for the individual roads to be used by specific developments. This data shall provide traffic volume by type eg. number of heavy vehicles etc.), or;
- a total of existing ESAs in addition to that generated by development to which the plan applies, which are utilising the subject haulage route.

**(2) Formula for the collection of contributions towards upgrade or works required;**

$$C = N \times K$$

C = contribution towards upgrade or construction

N = cost of new works required per kilometre OR total cost of required new works.

K = length of road required to be constructed, if applicable (in kilometres) OR

K = 1 when the total cost of new works is used for N.

**Notes:**

**N will be determined by:**

- a case by case assessment of the impact of new developments and the roads used as usual haulage routes for each individual development (as provided in documentation submitted with the development application) ,and;
- an estimated cost provided by Council's Engineering Department to undertake new works required to ensure that acceptable efficiency, safety, environmental and amenity standards are maintained throughout the road system (refer Section 8.23).

**K will be determined by:**

- the length of road required to be upgraded or constructed to cater for the traffic generated by a particular development, shall be determined on the merits of each application considering the proposed traffic volumes and the existing standard of the road system, and any new works that may be required (as provided in documentation submitted with the development application), OR;
- $K = 1$  when the total cost of new works is used for N.

## Appendix Number 2 - Simplistic Worked Example for Calculating Road Maintenance Contribution.

### Case Example:

Mr Brown is proposing a sand quarry on his property in Smith Road. The sand quarry is anticipated to have a life of 20 years at an average annual extraction rate of 75 000 tonnes per year ( ie. a total sand resource of 1 500 000 tonnes).

The sand is suitable for filling use only and it is anticipated that all of the material would be used in Smithtown to fill residential land above the flood level.

The proposed quarry will access Smith Road some 4.2 kilometres from its junction with the Capital Highway. From this intersection it is a further 5.6 kilometres to Smithtown (refer to diagram).

Smith Road is a two (2) laned sealed rural road with a seven (7) metre seal and one and a half (1.5) metre shoulders.

1. During the first year of quarry operations a vehicle classifier is placed on Smith Road by Council for the purpose of assessing the traffic volume (by class of vehicle) that utilises the road. The monitoring is conducted for a period of one(1) month and the results by class of vehicle are as follows:

class of vehicle	1	2	3	4	5	6	7	8	9
ave daily traffic volume	1215	6	4	14	2	3	9	1	6

From these values the number of equivalent standard axles (ESAs) passing the point of monitoring can be determined as follows:

Based on the Vehicle Classification System

$$\text{Ave Daily ESA} = \{ 1.2 (C3) + 1.6 (C4) + 2.2 (C5) + 1.8 (C6) + 2.2 (C7) + 2.8 (C8) + 2.4 (C9) \}$$

where "C" is the daily traffic volume for each class of vehicle, and "C3" being volume for class 3, "C4" volume for class 4, and so on.

An annual estimation can then be determined:

$$\begin{aligned} \text{Estimated Annual ESA} &= 365 \times \{ 1.2 (4) + 1.6 (14) + 2.2 (2) + 1.8 (3) \\ &\quad + 2.2 (9) + 2.8 (1) + 2.4 (6) \} \\ &= 27\,010 \text{ ESA} \end{aligned}$$

2. To determine the annual ESA for Year 1 for vehicles generated by the quarry, the annual production for Year 1 is used. In this example it is assumed that all haulage trucks have a 12 tonne payload, and are three (3) axle trucks (Class 4 vehicle). It is also assumed that all the trucks haul to Smithtown via Smith Road and the Coast Highway.

The empty return trucks are assumed to have zero ESAs.

Therefore, for a Year 1 production of 64 128 tonnes;

No. of loaded trucks per Year 1 =  $64128 / 12$

$$= 5344 \text{ trucks}$$

Therefore Year 1 ESA generated by the subject quarry;

$$\begin{aligned} &= (5344 \times 1.6) \\ &\quad \textit{laden} \\ &= 8550 \text{ ESA} \end{aligned}$$

3. From Council's Section 94 Plan the formula for the collection of contributions towards the cost of maintenance works is:

$$C = (M \times K) \times (E / T)$$

**being in this case:**

C	=	annual contribution for year 1 = ?
M	=	average annual cost of maintenance per kilometre of the subject road by Council
	=	\$ 6325 (determined by Council)
K	=	length of road to be maintained
	=	length of Smith Road from the quarry to the Capital Highway
T	=	estimated total of ESAs in the Smith Road for Year 1
	=	27010 + 8550
	=	35 560
E	=	estimated total ESAs generated by the quarry for Year 1
	=	8550

Therefore  $C = (\$6325 \times 4.2) (8550 / 35560) = \$ 6387 .25$

That is, the section 94 contribution for the maintenance of the road utilised by the vehicles generated by the subject quarry for Year 1 amounts to \$ 6387 .25

This process is then repeated for every year, or part thereof, that the quarry is operational.

## References:

- ◆ AUSTRALIAN ROAD RESEARCH BOARD (1993). Unsealed Roads Manual - Guidelines to Good Practice.
- ◆ AUSTRALIAN ROAD RESEARCH BOARD (1995). Sealed Local Roads Manual - Guidelines to Good Practice for the Construction, Maintenance and Rehabilitation of Pavements.
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- ◆ AUSTROADS (1992) Pavement Design - A Guide to Structural Design of Road Pavements.
- ◆ AUSTROADS (1993) Rural Road Design - Guide to Geometric Design of Rural Roads.
- ◆ DUAP (1994) Section 94 Contributions Plans Manual – Second Edition.
- ◆ ROADS AND TRAFFIC AUTHORITY (1993) Guide to Traffic Generating Developments.