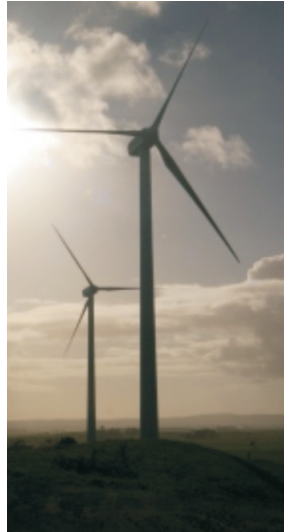


Woodlawn Wind Farm



Traffic and Transport

10

10. Traffic and Transport

This chapter of the SEE describes the traffic and transport issues associated with the construction and operation of the amended Woodlawn Wind Farm project. A comprehensive assessment of the traffic and transport issues was prepared for the 2004 EIS prepared by URS. This chapter describes the traffic volumes and vehicle types currently proposed relative to the 2004 EIS and the measures proposed to mitigate the traffic and transport impacts.

10.1 Overview of traffic and transport issues

The main traffic impacts of the Woodlawn Wind Farm project would occur for the local roads surrounding the site during the construction stage of the project. This is mainly due to the additional volume of traffic on the normally lightly trafficked local roads and the need to use over-size and over-mass vehicles for the delivery of a range of components.

Construction staff would involve about 50 personnel travelling to and from the site on a daily basis. In addition, over-size loads would include about 30 trucks carrying the 44 metre turbine blades, and over-mass loads including 20 nacelles, each of more than 60 tonnes and 80 tower sections of between 30 and 50 tonnes weight. The single 33 kV/330 kV transformer will be an overmass load and delivered directly to the Capital Wind Farm Substation site.

Once the wind farm is operational, there will be a low level of traffic accessing the site, including a small number of on-site staff and periodic visits by additional maintenance staff as required. The traffic impact of the operational stage will be minor and readily managed.

Typical traffic issues for wind farm projects can be broadly divided into off-site and on-site issues.

Off-site traffic issues mainly relate to:

- Choice of local roads used for access and the timing of travel
- Ability of local roads to handle the volume of construction traffic particularly in regard to over-size and over-mass vehicles
- Road safety
- Traffic management measures

On-site issues mainly relate to:

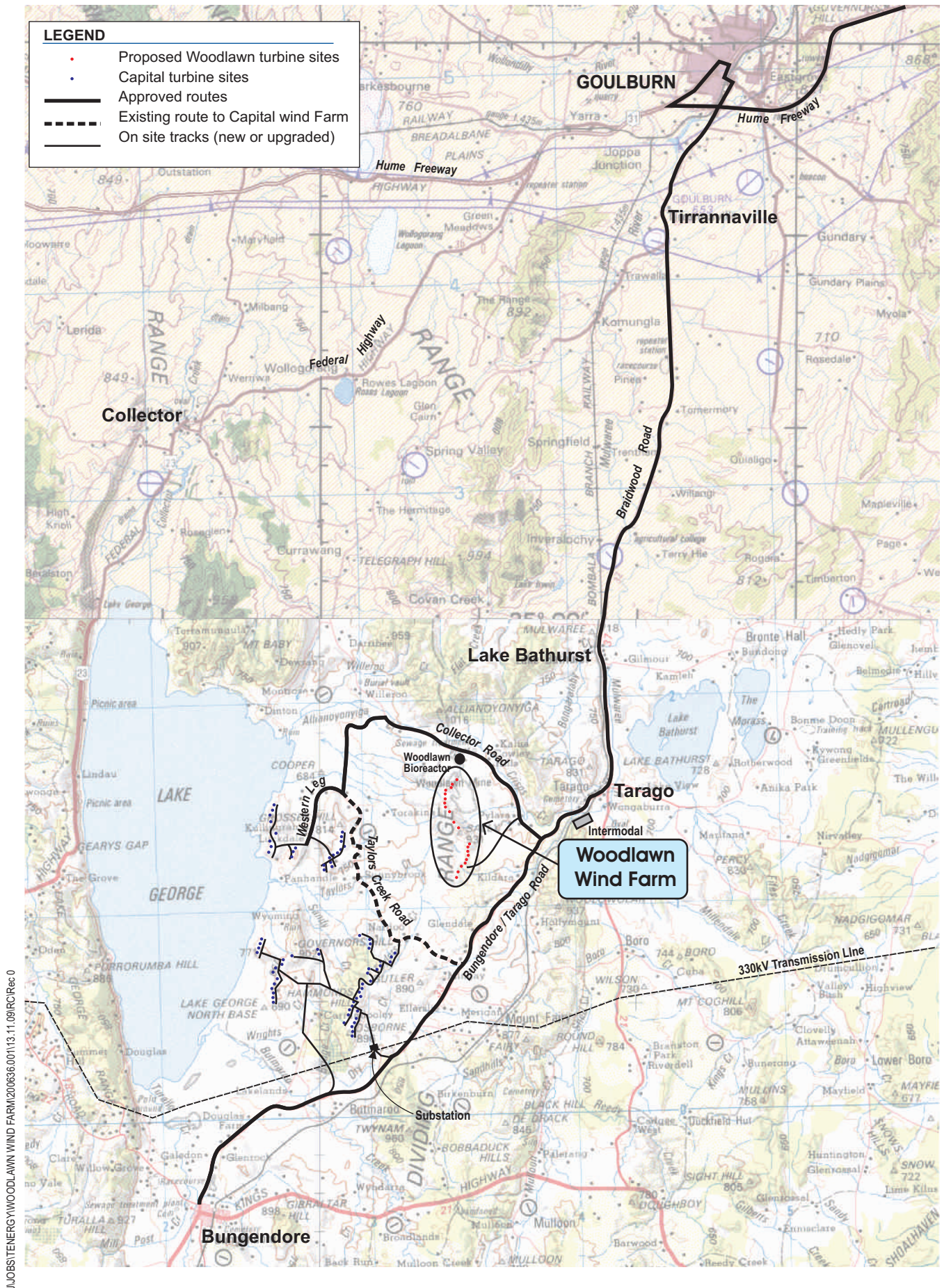
- Location of new track work and environmental considerations
- Standard of track work required, including upgrade of existing tracks
- Erosion and sediment control measures to be incorporated
- Restoration of any temporary tracks on completion of the works

10.2 Deliveries to the wind farm site

Based the 2004 EIS and on the experiences gained in 2008 and 2009 during the transport of similar equipment to Capital Wind Farm located south-west of Woodlawn, the following deliveries, transport requirements and routes are expected.

- Some of the components of the wind turbine equipment will be imported from overseas and will pass through Port Kembla. Sections of the towers will be manufactured and delivered by road from suppliers in other Australian states.
- The large and/or heavy components will be delivered by road using over-mass and over-size vehicles or restricted access vehicles (RAV). Road transport is considered the only practical option for transporting the components due to the vertical and horizontal clearances required on the rail system.

The existing road transport infrastructure for the area surrounding the wind farm site is shown on Figure 10.1.



SCALE
0 3 6km

10.3 Transportation routes

Several route options were reviewed in the 2004 Woodlawn Wind Farm EIS and in the 2006 Environmental Assessment for Capital Wind Farm.

The route used during the delivery phase of Capital Wind Farm is suitable for transport of equipment to Woodlawn Wind Farm. Aspects of suitability of existing roads for the required transport include the directness of various routes, traffic safety issues and the limited extent of community disturbance as well as obtaining agreement from local Councils and the RTA.

The traffic and transport management plan that was produced for Capital Wind Farm is readily applicable for the transport issues associated with Woodlawn Wind Farm except in respect of the additional entry point at Pylara Farm. Specific consultation will be required in relation to these works.

A key difference to the transport arrangements proposed in the 2004 EIS is that the contractor has received the turbine equipment at Port Kembla and is proposing temporary storage near to the Woodlawn Wind Site as an intermediate measure prior to delivery of turbine components to the Woodlawn Wind Farm site. The contractor has selected the option of temporary storage as its most practical option that is compatible with its current site management arrangements.

Transport to Goulburn

The Hume Freeway will be used to transport components from Port Kembla to the Goulburn locality. The Hume Freeway is a four lane divided carriageway which runs from Sydney to Melbourne and passes about 20 kilometers north of the wind farm site. It is a main transport route for freight vehicles, buses and cars and has a speed limit of 110 km/hour.

If required, the Hume Freeway would also be used for equipment being delivered from the south (eg from Melbourne or Portland).

From the Hume Freeway the route via Goulburn and Braidwood Road is the most direct route to the Tarago locality and it is also the most suitable means by which the over-mass and over-size vehicles can access the site. This is also the route that was used for transporting wind turbine and substation components to Capital Wind Farm.

Route through Goulburn

The final part of the route used for transporting components to Woodlawn Wind Farm and particularly the passage through Goulburn will be determined in consultation with Goulburn Mulwaree Council, RTA and the Police. The route is likely to be the same as that used by the contractor to transport the components to Capital Wind Farm but if required by Council or RTA the route may be varied to address specific requirements.

The route from the Hume Highway exits onto Hume Street and Cowper Road then turns right into Clinton Street and right into Sloane Street after which it crosses the rail overpass onto Braidwood Road (Figure 10.1).

Braidwood Road (Goulburn to Tarago)

The Braidwood Road connects Goulburn and Braidwood and passes through Tarago. It is a two lane sealed road in good condition with a general speed limit of 100 km/hour. From Goulburn to Tarago, a distance of about 36 kilometres, the road passes through gently undulating country crossing several water courses.

Approximately seven kilometres south of Goulburn the road passes through Tirranville, which has a small primary school fronting the main road. This section of road is speed restricted to 40 km/hour during school hours. The road also passes through the small settlement of Lake Bathurst approximately 30 kilometres south of Goulburn. There are a number of properties located adjacent to the road and the road is speed limited to 60 km/hour through this village. The use of the Braidwood



Road for access from Goulburn to Tarago does not appear to have presented any significant problems only occasional short term inconvenience would occur for some local road users.

The township of Tarago is located at the junction of the Braidwood and Bungendore Roads. All vehicles will leave the Braidwood Road at Tarago and follow the Bungendore Road through the town of Tarago. The township has a number of residences and commercial business premises fronting the main roads as well as a school, which fronts the Braidwood Road. Speed limits of 50 km/hour and 40 km/hour are applicable as indicated on these roads.

The roads through the town provide adequate clearance for the wind farm traffic however the main intersection at the Loaded Dog Hotel requires careful negotiation for RAVs and temporary removal of a Give Way sign while oversize vehicles negotiate the intersection. Similarly the turn out of the main street (Wallace Street) onto the Bungendore Road will also be subject to traffic control during the passage of the RAVs.

The timing of movements of RAVs to the Woodlawn Wind Farm site, temporary storage and Capital Wind Farm substation will be scheduled to mitigate impact on the local residents and to avoid arrival and departure times at local schools.

Tarago to the Wind Farm

The Bungendore road crosses the Goulburn to Bombala Railway Line and exits Tarago to the south. There is a low level of rail traffic using the line between Goulburn and Canberra and in addition, trains transporting containers of waste pass through the crossing to reach the 'Intermodal' transfer station to the south of Tarago. The level crossing is an ungated, signal controlled level crossing.

The Veolia operated Intermodal Terminal south of Tarago accepts container loads of waste from Sydney. The containers are offloaded from trains and loaded onto trucks for transport and disposal at the Woodlawn Bioreactor site.

The intersection of the Bungendore and Collector Roads is four kilometres south of Tarago. Vehicles accessing the wind farm site would use Collector Road to enter Pylara Farm, approximately 1.5 kilometres west of the intersection. Pylara Farm is the approved entrance to the wind farm site and will need to be upgraded to suit the access by RAVs. Upgrade works will be undertaken in consultation with the relevant authorities.

Collector Road from Bungendore Road to Taylors Creek Road is a two lane road of adequate width for over-size vehicles and has been previously used as the primary access for RAV vehicles accessing the Capital Wind Farm site. The Woodlawn Bioreactor is a further four kilometres west of the intersection.

It is noted that the contractor's decision to use temporary storage of turbines will mean that the turbine components are transported past the Pylara entrance following the route used for deliveries to Capital Wind Farm. Once sites at Woodlawn Wind Farm have been prepared the contractor will bring these turbine components back to Pylara Farm by the same route. Such truck movements will be similar to those for Capital Wind Farm but for a reduced number of truck movements. The movements to and from the temporary storage are being arranged by the contractor in consultation with Palerang Council which has responsibility for the Taylors Creek and Western Leg Roads that are within the Palerang Shire boundary.

Transport to Capital Wind Farm substation

Part of the proposed variations include the installation of an additional 33 kV/330 kV transformer at the already constructed and operational Capital Wind Farm substation. Vehicles used for the transformer delivery and associated items would continue on the Bungendore Road to the south of the Collector Road. Bungendore Road south of Collector Road is a sealed road, which is generally in good condition and has a designated 100 km/hour speed limit.

Access to the Capital Wind Farm substation will be from Bungendore Road, about 2.5 kilometres south of the Mt Fairy Road intersection. This access uses the existing entrance to Capital Wind Farm substation and has good visibility from both directions. Upgrading of the intersection and entrance was undertaken during construction of the Capital Wind Farm substation. The existing entrance and access track is suitable for delivery of the additional transformer, though the causeway will be strengthened. Some minor improvements may be required on the access track to provide for a slightly increased radius of curvature at the tighter bends to accommodate the RAV with the additional 33 kV/330 kV transformer.

The development of the Woodlawn Wind Farm and the traffic it generates will have a temporary impact on the Tarago to Bungendore road and its users. The entrance point to the substation has been designed and constructed in consultation with Palerang Council and RTA.

10.4 Volumes of traffic on local roads

A key part of the traffic assessment for the construction phase is the analysis of the likely types of vehicles to access the site and the approximate number of trips involved.

Table 10.1 provides a breakdown of the components and materials required and the numbers of vehicles or vehicle movements (one way) associated with their delivery. The table includes the estimated number of vehicles for deliveries to the site as shown in the 2004 EIS. The number of vehicle movements was estimated for a six month construction period (months 2 to 8 of the construction program). Table 10.1 also includes the revised estimated material requirements and the one way vehicle movements required for the amended Woodlawn Wind Farm project. The revised information is based on the experience gained from the construction of the nearby Capital Wind Farm.

Table 10.1 – Estimated traffic movements for the approved project and amended project

Material	2004		2009		Vehicle Type
	Quantity	No of vehicles	Quantity	Actual one way vehicle Movements	
Foundation Materials / anchors					
Concrete	8,333 m ³	2,200	2,000 m ³	400	4 axle concrete truck
Reinforcing steel	757 m ³	95	230 t	12	Semi-trailer
Sand / aggregate	6,250 m ³	625	200 m ³	20	2004 – batch on site 2009 – deliver to site
Water	696 m ³	50	see below – dust control		
Cement (grout)	1,387 m ³	231	230 t	12	Semi-trailer
Stand (anchors)			63 t	4	Semi-trailer
Duct (anchors)			22 m ³	1	Semi-trailer
Miscellaneous (anchors)			24 t	2	Semi-trailer
Track construction and other items					
Aggregate for tracks	Not specified		4,000 m ³	400	Truck
Water for dust control	Not specified		1 ML	100	Tanker
Misc equipment			Nominal	60	Semi-trailer
Misc materials			Nominal	15	Semi-trailer
Wind Turbine Components					
Tower sections	81	81	80	80	RAV
Nacelles	25	25	20	20	RAV

	2004		2009		
Hubs	25	25	20	20	RAV
Blades (two/truck)	75	33	60	30	RAV
Generator transformer	25	25	20	5	Semi-trailer
Tools and generator erection	25	25			
Substation					
Substation transformer	2	2	1	1	RAV
Misc substation items	Various	29	Various	29	Semi-trailer
Cables and overhead lines					
Underground cables			7 km	18	Semi-trailer
Sand to fill trench above cable			1,500 m ³	100	Truck
Overhead conductors			12 km	3	Semi-trailer
33 kV transmission poles			120	40	RAV
Site work activities					
Site establishment	50	100	Nominal	5	Semi-trailer
Cranes	2	2	2	25	Semi-trailer
Construction equipment			25	40	Various
Site disestablishment			Nominal	10	Semi-trailer
General deliveries (eg water)	~16 / day	4,500	See above		
Total movements		8,048		1,352	Trucks
Employees cars	45 / day	13,500	45	8,100	Car/4WD
Total movements		13,500		8,100	Cars

Consent was given for approximately 200 trips per day comprising about 90 light vehicle and 98 heavy vehicle trips per day, occurring through the construction period.

The proposed reduction in the number of turbines to be installed will reduce the number of over-size and over-mass vehicles being required for delivery of equipment and in addition it is also expected that the proponent would use the innovative anchored footings design in place of the previously used gravity footings. Anchored footings were installed at Capital Wind Farm and use less concrete volume and less reinforcing steel compared to gravity footings, resulting in a substantial decrease in vehicle movements.

Table 10.1 indicates that approximately 1,352 trucks including about 200 over-size (longer than 19 metres) or over-mass (gross mass in excess of 42.5 tonnes) would need to access the site during the eight month construction period. Over-size or over-mass trucks are referred to as 'Restricted Access Vehicles (RAV)'. The movement of RAV vehicles would involve the contractor's initial delivery to temporary storage and then transfer to Woodlawn Wind Farm from the temporary storage once turbine sites have been prepared. Movement of RAVs is likely to occur for only part of the full construction period.

The intensity of truck movements would vary during the construction stage. Events such as pouring the concrete for a turbine footing can generate up to 20 one way trips per day over a period of about eight hours. The approved project included a batching plant, to be located to the north of the ridgeline near the Woodlawn mine. Using the batching plant would minimise the need for these concrete agitator vehicles to use local roads, however the option to source concrete from a fixed batch plant



elsewhere may be considered during the construction phase due to the limited number of times the batch plant would be used.

It is assumed that the contractor will stage the work so that footings are poured sequentially, with the construction crews preparing them, pouring them and then progressively establishing the tower sections that will support the turbines.

The delivery of the tower and turbine component parts alone will generate about 155 one-way truck movements involving large and heavy vehicles, down from 214 estimated in 2004. The deliveries of the 80 tower sections will be direct to turbine sites once the sites have been prepared. Transport to the site by RAVs may be staged over four to five months and would be arranged to minimise impact on local communities, who will be kept informed of the progress of construction works, potential impacts and safeguards incorporated. These aspects will be addressed by the Traffic Management Plan

10.5 On-Site access management

The main entrance to the wind farm site will be from Collector Road through the Pylara Farm entrance. The construction site office will be located along this main access track. Access to the Capital Wind Farm substation site will be from Bungendore Road via the entry that has already been upgraded as part of the construction of Capital Wind Farm.

Once on site, about 10 kilometres of access tracks will be required to access the turbine sites. The sections of new access tracks will be mostly along the crests of ridges on land that has low to moderate slopes and is mostly on rocky ground with thin soil cover. Steeper grades are involved for the access track in the vicinity of turbine sites 10 to 14. This steep section of access track will be benched into the slope and will require particular attention to drainage to prevent erosion of the track and energy dissipation for stormwater flows being diverted from the track onto surrounding land.

Grids may be installed in place of selected gates to facilitate access between turbine sites. Gates may be used at property boundaries and at other locations.

Figure 10.2 shows the access tracks for the on-site access. The proposed access track to the north of Turbine 1 shown on Figure 10.2 will be used for emergency purposes only.



Woodlawn Wind Farm **Statement of Environmental Effects**
Figure 10.2: Amended Woodlawn Wind Farm layout and access routes

10.6 Mitigation measures

A number of measures will be incorporated for the construction and operation of the wind farm to ensure that transport and traffic impacts arising out of the development are minimised. These measures will be incorporated into a Traffic Management Plan for the project and will be developed in consultation with Goulburn Mulwaree and Palerang Councils and form part of the CEMP to be approved by the Department of Planning.

An important mitigation measure relating to construction traffic impacts will be the implementation of a community information and awareness program. Prior to construction commencing and during the construction period a program would be initiated to ensure the local residents are aware of the construction activities with particular regard being given to construction traffic accessing the site. This program may include press releases in the local newspapers, specific newsletters and individual letter drops to neighbouring residents along the access route to the site.

General signposting of the access roads with appropriate heavy vehicle and construction warning signs could also be undertaken in consultation with, and approval of, local authorities. Specific warning signs would be located adjacent to the entrances to the site to warn existing road users of entering and exiting traffic. The use of day warning notices where signs are activated on a specific day to warn local road users of construction activities will also be considered.

Particular attention can be given to traffic control and warning signs where the geometry of the road dictates that a potential safety issue exists. On-site access will be restricted to defined tracks to ensure minimal environmental impact.

Further mitigation measures will include:

- The route through Goulburn for over-mass and over-size vehicles has previously been determined for transport of equipment to Capital Wind Farm. This was determined in consultation with Goulburn Mulwaree Council and is currently part of the Capital Wind Farm Traffic Management Plan which subject to modification and approval as part of the Woodlawn Wind Farm CEMP can be applied for the Woodlawn Wind Farm transport management
- Provision of traffic control personnel where large vehicles are required to execute difficult or potentially unsafe manoeuvres.
- Compliance with permit requirements for over-size and over-mass vehicles including the use of escort vehicles as required.
- Restrictions on the timing of delivery of large equipment and materials to site to mitigate specific impacts. In particular the following measures were adopted for the Capital Wind Farm Traffic Management Plan and would be adopted for Woodlawn Wind Farm:
 - restriction of traffic movements to avoid RAVs passing schools at Goulburn, Tirranaville and Tarago during the school zone periods
 - local deliveries to the site during daylight hours only to mitigate safety problems on local roads and to reduce disturbance for residences near to the access roads.
- Establishment of an inspection and maintenance program for the local road access network to ensure condition of roads are maintained in a safe state.
- Maintenance program for on-site access tracks to ensure safe access.
- Implementation of a pro-active erosion and sediment control plan for on-site roads and laydown areas.



10.7 Conclusions

The traffic issues for the Woodlawn Wind Farm construction require a comprehensive Traffic Management Plan and consultation with Local Councils and the community. A Traffic Management Plan was developed for Capital Wind Farm in consultation with the Local Councils and enabled safe conduct of the required transport activities to construct the wind farm. The Traffic Management Plan for Woodlawn Wind Farm will largely reflect the approved Capital Wind Farm Traffic Management Plan. The traffic and transport impacts can be appropriately controlled once the plan has been developed and agreed with stakeholders and implemented as part of the Woodlawn Wind Farm Construction Environmental Management Plan.

The operational wind farm will require low levels of vehicle access to the site from local roads and accordingly will have little impact on local traffic.