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24 March 2017

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Dear Shaq

Ryan Corner Wind Farm - Changes to endorsed Traffic Management Plan

This report has been prepared in relation to a proposed amendment for the Ryan Corner Wind Farm by Ryan Corner Development Pty Ltd. The amendment seeks to alter the scale of the approved turbines, as well as minor alterations to the siting and number of turbines, and realigned access tracks. This report identifies the potential net impacts as a result of the proposed amendment to the endorsed Traffic Management Plan.

The Ryan Corner Wind Farm received planning approval in 2008. On 21 August 2008, Planning Permit No. 20060222 was issued for Ryan Corner for the 'Use and development of land for a Wind Energy Facility'. Condition 3 of the permit details the specifications of the wind farm, including the number and scale of the turbines. The permit originally specified the tower height of the wind turbines at 78 metres, with an overall height of 121.5 metres above natural ground level. On 12 August 2010, the Minister for Planning approved a minor amendment to the specifications of the wind turbines for the wind farm to allow a tower height of 80 metres and overall height of 126.3 metres.

A Traffic Management Plan (Ref 43315958/01/05 dated 23 December 2011) [TMP 2011] was prepared to address items raised in the planning permit relating to the use of public roads during the construction of the wind farm, the TMP 2011 was endorsed in February 2012.

Approval is now sought by Ryan Corner Development Pty Ltd to further vary the turbine specifications as detailed on the permit. It is proposed to increase the tower height to 117 metres, the rotor diameter to 130 metres, and overall tip height to 180 metres. This would result in an overall increase in height of 53.7 metres from natural ground level. In addition, it is proposed to microsite a number of turbines and realign access tracks and ultimately, reduce the number of turbines on the Ryan Corner wind farm site from the approved 68 to 56.

Given the nature of the amendment, any impacts above those approved would be limited to the change in the increase in turbine size, siting, realigned access tracks and number of turbines on the wind farm.

As part of the approval process the endorsed TMP 2011 is revised to reflect the increase in size of the wind turbines, the new Traffic Management Plan (Ref 43315958/01/05 (Dated 24 March 2017) is shown in Annex A. The key differences between the two revisions of the Traffic Management Report and their impact are;

The proposed increase in turbine size will require a greater number of OD vehicles per wind turbine but given the number of proposed turbines is less than the current endorsed layout there will be a negligible increase in OD vehicle traffic. Refar Table 2-1

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The proposed increase in turbine size will result in an increase in Heavy Vehicle (HV) traffic for the foundation construction for the turbines. However the use of an on site quarry for road material for the access track has resulted in a decrease in HV traffic Refer Table 2-1

The proposed increase in turbine size will require the size of the OD vehicle transporting the turbine blades to increase from 56.61m to 68.80m (Figure 2.3). This OD vehicle has the largest turning requirements of all the OD vehicles delivering the wind turbine components to site (Figure 2.4).

The larger OD vehicle will require the following changes to the intersections along the OD route:

An increase in area of road reserve used to construct the pavement at the intersection of Princes Highway and Youles Road (The area of pavement required is reduced from 3,170m^2 to 2,766m^2), to facilitate the movement, the majority of which is in the north-west corner of the intersection. An increase in the clear zone within the road reserve will also be required. These changes will have minor \ moderate impact.

An increase in the clear zone required and an adjustment to the pavement (with no increase in pavement area) at the Western access point is required, these changes are minor and the effect will be negligible.

The proposed increase in turbine size for the Ryan Corner Wind Farm has resulted in moderate changes to the intersections along the OD route overall with no major difference to the original endorsed Traffic Management Plan

Yours sincerely

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Report

Ryan Corner Wind Farm Traffic Management Plan

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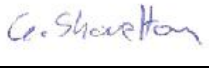
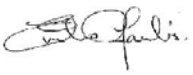
Status: Final

Rev	Purpose of Issue	Author	Checked	Issue Date
0	Final	Peter Cohen	Alex Iljin	May 2010
1	Final – with VicRoads	Peter Cohen	Alex Iljin	September 2010
2	Final – with DPCD comments	Peter Cohen	Alex Iljin	27 April 2011
3	Final – Updated with DPCD comments	Peter Cohen	Alex Iljin	13 May 2011
4	Final – with updated OD Vehicle	Peter Cohen	Alex Iljin	23 December 2011
5	Final – Issued to client with amendments to sections 2.6, 3 and Appendix A	Greg Shovelton	Gavan Banks	24 October 2014
6	Report updated for revised development permit application for new turbine number and size	Greg Shovelton	Emilio De Paulis	1 September 2015
7	Final - client comments included	Greg Shovelton	Emilio De Paulis	4 December 2015
8	Final – Tables 2-1, 3-3 & 3-4 updated vehicle volumes for new turbine size.	Greg Shovelton	Emilio De Paulis	28 February 2017
9	Final – Section 4.5.1 updated and section 4.5.3 added.	Greg Shovelton 	Emilio De Paulis 	24 March 2017

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1 Introduction

URS Australia Pty Ltd (URS) has been engaged by Ryan Corner Development Pty Ltd (Ryan Corner Development) to prepare a revised Traffic Management Plan (TMP) for the proposed Ryan Corner Wind Energy Facility (hereafter 'the development') planned in Moyne Shire near Port Fairy, southwest Victoria. This plan focuses on the route selection of vehicles (particularly those that are Over Dimensional), traffic generated from the development, existing pavement and intersection conditions, impact of the generated development traffic, possible roadside vegetation implications, roadworks required due to the turning movements of larger vehicles, and management programs to ensure compliance with defined planning permit conditions.

The proposed facility is approximately bounded by Hamilton-Port Fairy Road to the north and east, Fingerboard Road to the south and Youls Road and Shaw River to the west. The development has been endorsed to construct and operate up to 67 wind turbines, Ryan Corner Development is proposing to amend the development permit and utilise the latest turbine technology that is both higher in capacity and more efficient. The proposed new turbine envelope size will accommodate a tip height of up to 180 metres, with hub heights up to 117 metres and rotor diameter of up to 130 meters. To reduce the potential impact from the larger turbine envelopes, the Proponent is proposing to reduce the number of turbines in the layout to a maximum of 56 wind turbines.

For the Project, the major wind turbine sections will be delivered by Over Dimensional vehicles along a defined and appropriate route from the Port of Portland to site. Construction materials will be sourced from local suppliers and personnel will reside throughout the surrounding regional centres.

URS was commissioned to carry out the Traffic Management Plan for this project – in response to Ryan Corner Development fulfilling their requirements of Planning Permit Conditions 10, 11 and 12 under Permit No. 20060222 issued by the Minister for Planning and Environment on 21 August 2008.

1.1 Meeting Planning Permit Conditions

The Traffic Management permit conditions under Planning Permit 20060222 outlines 16 particular items to be addressed in this document. A brief summary of the permit conditions and where the responses may be found in this Traffic Management Plan are as follows:

- Permit Condition 10a): Existing condition survey of public roads on designated construction transport vehicle routes and in the vicinity of the wind energy facility
  - Refer sections 3.4 (selected road lengths and existing conditions), 3.6.1 (existing traffic volumes), 3.7.3 (intersections along OD route) and 4.1.3 (overhead constraints)
- Permit Condition 10b): Designation of appropriate construction and transport vehicle routes to the wind energy facility
  - Refer sections 2.3 (route selection), 3.4 (selected road lengths) and 3.5 (existing conditions)
- Permit Condition 10c): Designation of operating hours and speed limits for trucks on routes accessing the site
  - Refer section 4.2 (operating hours and speed limits)
- Permit Condition 10d): Identification of any roadside areas of native vegetation required to be removed or pruned and the pruning practice to be follows
  - Refer section 3.3 (roadside vegetation)
- Permit Condition 10e): Identification and timetabling of any pre-construction works

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  - Refer sections 3.9 (recommendations for road and intersection upgrades) and 4.8 (roadworks and timetabling)
- Permit Condition 10f): Designation of all vehicle access points to the wind energy facility from surrounding roads
  - Refer sections 2.3.2 (route selection – site access), 2.7.1 (swept paths – access points) and 4.3.1 (signage – access points)
- Permit Condition 10g): Details of any large over dimensional vehicles to be used, route to be taken, escort arrangements and permits required from VicRoads
  - Refer sections 2.3 (route selection), 2.6 (details of OD vehicles), 3.7 (swept paths and roadworks involved), 3.9 (recommendations for road and intersections upgrades) and 4.1 (approvals and permits required)
- Permit Condition 10h): Recommendations on the need for road and intersection upgrades to accommodate any additional traffic or site access requirements
  - Refer sections 3.7 (swept paths and roadworks involved), 3.9 (recommendations for road and intersection upgrades) and 4.3 (signage)
- Permit Condition 10i): Measures to be used to manage traffic impacts associated with the ongoing operation of the wind energy facility
  - Refer section 3.6 (traffic volumes)
- Permit Condition 10j): Engineering plans demonstrating how truck movements can be accommodated on sealed roadways and turned where possible without encroaching onto the incorrect side of the road
  - Refer sections 3.7 (swept paths and roadworks involved), 3.9 (recommendations for road and intersection upgrades) and Appendix A
- Permit Condition 10k): A program of regular inspections to be carried out during the construction period to identify maintenance works necessary as a result of construction traffic
  - Refer section 4.4 (program of regular inspections)
- Permit Condition 10l): a program to rehabilitate the roads to the conditions identified in the existing condition survey of permit condition 10a) based on the designs provided under permit condition 10a)
  - Refer section 4.6 (program of rehabilitation)
- Permit Condition 10m): Protocols banning the use of Riverside Road
  - Refer sections 3.8 (Riverside Road bans) and 4.3.2 (Riverside Road protocols)
- Permit Condition 10n): Details of any security deposit required by Moyne Shire Council
  - Refer sections 3.2 (consultation) and 4.6 (payment of security deposit)
- Permit condition 11: The traffic management and road upgrade and maintenance works must be carried out in accordance with the traffic management plan and the cost of any works including maintenance are to the expense of the permit holder (Ryan Corner Development)
  - Refer section 4.8 (upgrades in accordance with TMP)
- Permit condition 12: Design of the upgraded intersection of Princes Highway and Youls Road

  Refer section 3.7 (swept paths and roadworks involved) and Appendix A

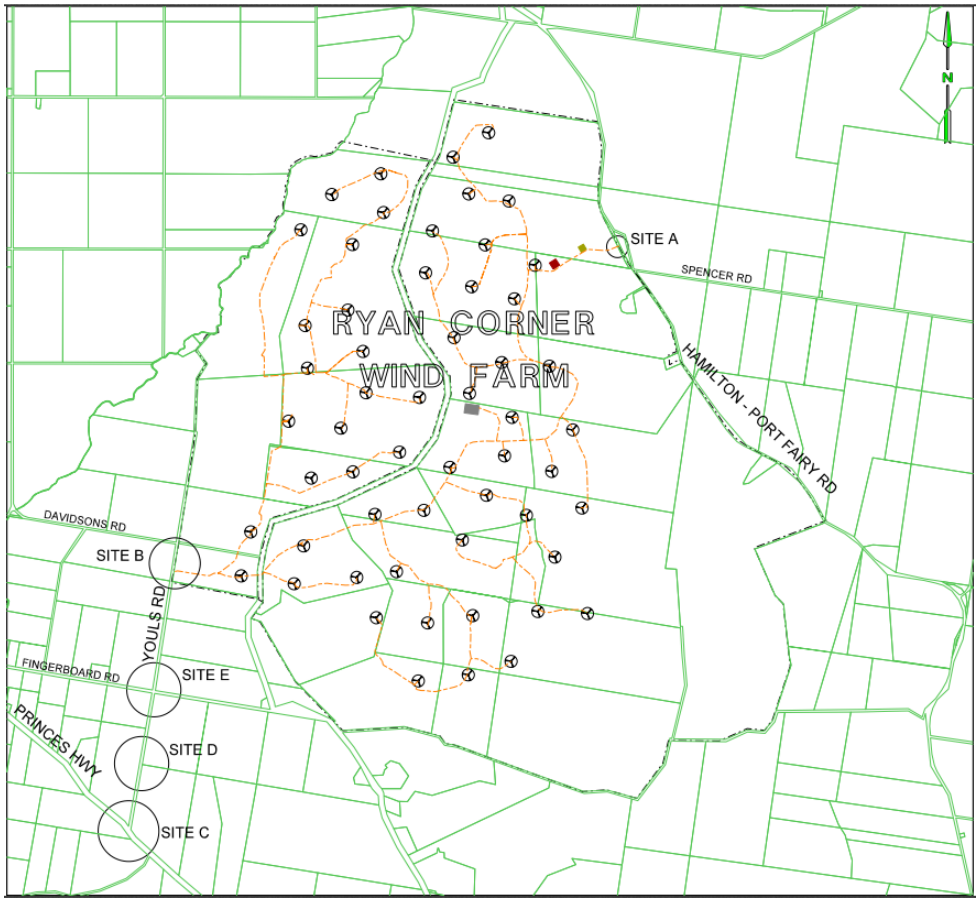
2 Development

This section outlines the information reviewed and assumptions made in the preparation of the TMP. All information has been provided by Ryan Corner Development and relates only to the construction phase of the development.

2.1 Details

The Ryan Corner wind farm development is a is a wind energy facility located approximately 15 km northwest of Port Fairy in southwest Victoria. The site is bounded by Youls Road to the west, Shaw River and Riverside Road to the north, Hamilton-Port Fairy Road to the east and Fingerboard Road and Smittens Road to the south. Harris Road connects Fingerboard Road and Riverside Road, and dissects through the centre of the wind farm site. Princes Highway, a VicRoads nominated over-dimensional (OD) route, has a t-intersection with Youls Road approximately 3km south of the site. Major regional centres surrounding the site include Port Fairy (15 km southeast), Koroit (23 km east), Warrnambool (38 km southeast), Portland (60km west) and Hamilton (69 km north). Figure 2-1 outlines the Ryan Corner wind farm site with a broader locality map provided in Figure 2-2.

Figure 2-1 Ryan Corner Wind Farm Site



2.2 Construction Vehicles

There are three distinct categories of vehicles required during the construction phase of the development of the wind farm site. Firstly, Over-Dimensional (OD) vehicles will be required to transport the larger and bulkier items including the tower sections, wind turbine blades and nacelle. Certain measurements (height, length, width or weight) are beyond the restrictions imposed on the largest unrestricted vehicle permitted on Victorian roads – the B-Double. Therefore specialised vehicles (some including escort arrangements) need to be arranged in order to safely transport these larger deliveries to the wind farm site.

Secondly, a large number of construction vehicles will be required that incorporates the general construction activities on site other than OD deliveries. Construction vehicles will transport goods such as steel, road construction materials, concreting supplies and water. The vehicle classes relating to the construction vehicles will be larger than personnel vehicles (such as cars and utes) but have a maximum size of a B-Double.

Thirdly, the last remaining vehicle category encompasses personnel vehicles. Personnel movement incorporate construction personnel and subcontractors and will only include cars and lights commercial vehicles (LCVs). Any vehicle above 4.5 tonnes (and requiring an endorsed licence) will be considered a construction vehicle and as such be included in the second class of vehicle described above.

2.3 Route Selection

The Port of Portland is the nominated location for the commencement of ground transportation for the larger sections of the wind turbines – namely the tower sections, blades and nacelles delivered via sea freight. Raw materials to construct the foundation works for the towers will be sourced from local suppliers. Personnel will reside in the surrounding regional centres to the site.

Figure 2-2 outlines the route selection for OD vehicles (highlighted in green), the access arrangements for construction and personnel traffic (indicated by the red arrows) and the restricted/prohibited roads surrounding the site (hatched in blue), with the exception of an approved access track crossing at the southern part of the site boundary.

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Figure 2-2 Route Selection

2.3.1 Route Alignment

OD Vehicles

OD vehicles will commence their journey at the Port of Portland and follow the Henty Highway (A200) until it terminates at the Princes Highway (A1) just north of Dutton Way/Portland North. At the Henty Highway / Princes Highway t-intersection, OD vehicles will turn right to head in an easterly direction along the Princes Highway towards Warrnambool and Melbourne. This route will continue along Princes Highway until just east of the township of Yambuk, whereby OD vehicles will make a left hand turn into Youls Road and travel in a north direction. Vehicles will continue along Youls Road for approximately 2.8 km to a location 300 m south of Davidsons Road where they can turn right into the site access located on the eastern side of the road.

OD vehicles will not enter the site via any other route or access point.

Construction and Personnel Vehicles

Construction and personnel vehicles will be originating from different locations and are able to access the site from either the eastern or western access points.

Vehicles originating south or west of the site will follow the Princes Highway in an easterly direction and turn left into Youls Road. They will head north along Youls Road for approximately 2.8 km to a location 300 m north of Davidsons Road and turn right into the western site access located on the right hand side of the road.

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Vehicles originating south or southeast of the site will follow Hamilton-Port-Fairy Road (C184) in a north-westerly direction until approximately 300 m north of Spencer Road (C183) whereby they will turn left into the eastern site access located on the left hand side of the road.

Vehicles originating east of the site will follow Spencer Road (C183) in a westerly direction until it terminates at its t-intersection with Hamilton-Port Fairy Road (C184). They will then turn right and continue along Hamilton-Port Fairy Road for approximately 300 m then turn left into the eastern site access located on the left hand side of the road.

Vehicles originating north of the site will follow Hamilton-Port Fairy Road (C184) in a southerly direction until approximately 300 m north of Spencer Road (C183) whereby they will turn right into the eastern site access located on the right hand side of the road.

Construction and personnel vehicles are prohibited from accessing the site via Riverside Road, Harris Road and Fingerboard Road.

It should be noted that the location of any local quarries and industries for construction materials is yet to be finalised (although preference has been given to on-site quarry) and the routes outlined in this section are based on the most appropriate routes to site from regional centres. However this Traffic Management Plan is a dynamic document that is to be updated should the designated routes for certain vehicles (i.e construction vehicles to/from local quarries and industries) requires additional local roads near the development site to be assessed.

Restricted and Prohibited Road Use

Riverside Road and Harris Road will not be used to provide access to the site. The use of Harris Road within the site should be kept to a minimum.

Fingerboard Road is to be avoided at all times by all vehicles due to safety concerns. Instead, vehicles must utilise the Princes Highway / Youls Road intersection for all movements from the site's western access point.

2.3.2 Site Access

Two accesses will be provided for access and egress from the Ryan Corner Wind Farm site to the public road network as shown in Figure 2-1. The western access will be located on Youls Road approximately 300 m south of Davidson Road, with the eastern access located on Hamilton-Port Fairy Road approximately 300 metres north of Spencer Road. The selection and location of these two accesses were identified in the *Ryan Corner Wind Farm Road Traffic and Transport Study* (2006) based on appropriate sight lines, safe stopping distances, road geometry (vertical and horizontal), width of road reservation and roadside vegetation.

Construction, operational and personnel vehicles not requiring special permits for public road use (i.e. anything not classified as an OD vehicle) will be permitted to enter the site by either access points.

OD vehicles will only be permitted to enter the site via the western access on Youls Road, and are prohibited in utilising the eastern access on Hamilton-Port Fairy Road.

Riverside Road and Harris Road will not be used to provide access to the site.

2.4 Construction Timetable, Road Construction and Road Maintenance

The construction program for this site is to be a total of approximately 18 months – with the eighth month comprising the peak of construction activity.

Working hours will be between 7am and 6pm, Monday to Friday, and 7am to 4pm on Saturday. No works are proposed to occur on Sunday.

The Project will be split into 2 stages:

- (Completed in 2012) Stage 1; Early Works; and
- Stage 2: Main Works.

Stage 1;

The Early Works included the construction of the eastern site access off the Hamilton-Port Fairy Road, along with establishing a site compound, access track from the public road to the compound and ancillary facilities.

Stage 2;

The Main Works include all other works needed to complete the wind farm. This includes intersection and public road upgrades recommended from this TMP, construction of the internal access tracks, crane hard stands, wind turbine foundations, substation and grid connection assets, and the installation of all wind turbines. All OD deliveries will be made to site during Stage 2 works.

2.5 Traffic Generation

The following parameters have been utilised in determining the peak construction activity generated at the Ryan Corner wind farm site:

- 18 month construction program;
- 11-hour (7am to 6pm) working weekday;
- 24 working days per month; and
- The eighth month being the peak construction month.

Based on these parameters, the breakdown of vehicles generated at the site during the peak construction phase is outlined in Table 2-1.

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Table 2-1 Peak Construction Activity Generated (Construction Month 8)

VEHICLE CLASS	PEAK ONE-WAY VEHICLE MOVEMENTS GENERATED			ACTIVITY
	Per month	***Per day****	***Peak Hour*** **	
Over-Dimensional	32	2	1	Delivery of Tower Sections
	19	1	1	Delivery of Blades/Nacelles etc.
Heavy Vehicles	124	5	1	Gravel for Foundations
	27	1	1	Water for Concreting
	18	1	1	Cement for Foundations
	8	1	1	Steel for Foundations
	107	4	1	Water for Foundations
	1	1	1	Fuel for Foundation Works
	0	0	0	Gravel for Road Construction*****
	1	1	1	Substation Works
	2	1	1	Sand for Cabling Works
	2	1	1	Cables for Cabling Works
	3	1	1	Conduit for Cabling Works
	3	1	1	Switchgear Works
	2	1	1	Steel for Substation Electricals
	3	1	1	Switchgear for Substation Electricals
Light Vehicles (cars, utes etc.)****	2,000	84	84	Construction Personnel
	102	6***	4***	Escort Vehicles for OD Deliveries
Total	2,463	120	103	Vehicle Proportion during Peak Hour
Over-Dimensional	*51*	*3*	*2*	*OD Proportion: 2%*
Heavy Vehicles	*310*	*27*	*13*	*HV Proportion: 13%*
Light Vehicles	*2,102*	*90*	*88*	*LV Proportion: 85%*

Notes:

** Rounded up to next whole vehicle.*

*** During AM or PM peak hour it is assumed that all personnel vehicles will arrive or depart in that hour, with construction vehicle activities being spread evenly over the 11-hour working weekday. NB: all values are rounded up to the next whole vehicle.*

**** Due to total number of OD vehicles – based on two escort vehicles per OD vehicle (one pilot and one escort at rear).*

***** It is assumed that no car pooling is taking place.*

****** These values are estimates only. Final numbers are to be confirmed depending on final quarry site(s) selection. Refer to Section 4.5 and Appendix B which detail the individual Sub-TMP documents to be developed per quarry site.*

2.6 Details of Over Dimensional Vehicles

OD vehicles will be required during the transportation of certain components to the wind farm turbines – particularly in the delivery of the tower sections, nacelles and rotor blades. A selection of wind turbines have been established for the assessment process and are as follow::

1. Vestas V126
3. Senvion M122
5. GE 130

The delivery of the tower sections, nacelles and rotor blades are the critical OD transport movements as these determine the necessary height clearances, road widths, shoulders and swept paths required for safe manoeuvrability of the OD vehicles. As a final manufacturer has not been selected for the wind turbines at this site, a 'worst-case scenario' will be adopted whereby the greatest width, height and turning circle requirements are taken into account based on the transport requirements of each manufacturer – see Table 2-3.

Table 2-2 Critical measurement for Transport Requirement

TURBINE COMPONENT	DIMENSION
Rotor Diameter	130m
Blade Length	63.7m
TRANSPORTATION REQUIRMENT	
OD VEHICLE LENGTH	68.8 m
MINIMUM HEIGHT CLEARANCE REQUIRED	5m
MINIMUM ROAD WIDTH REQUIRED	5.5 m
MAXIMUM SLOPE GRADIENT PERMITTED	6%
MAXIMUM SIDE INCLINATION PERMITTED	2%

It is acknowledged that the specifications of the supplier turbine options listed above exceed the specifications contained in Condition 3 of the planning permit. This report forms part of an application for permit amendment to vary the permitted turbine specifications to the options listed in this section. This report addresses the relevant traffic management considerations required to be attended to under Condition 10 of the planning permit. An application for secondary consent to vary the turbine specifications to the options listed in this report has been lodged with the Department of Planning and Community Development (Now Department of Transport Planning and Local Infrastructure)and is currently being assessed. This report nevertheless addresses the relevant traffic management considerations required to be attended to under Condition 10 of the planning permit.

The transport requirement for the nominated 'worst-case' scenario for OD vehicular movements, encompassing the requirements of all wind turbine manufacturers, is therefore defined as follows:

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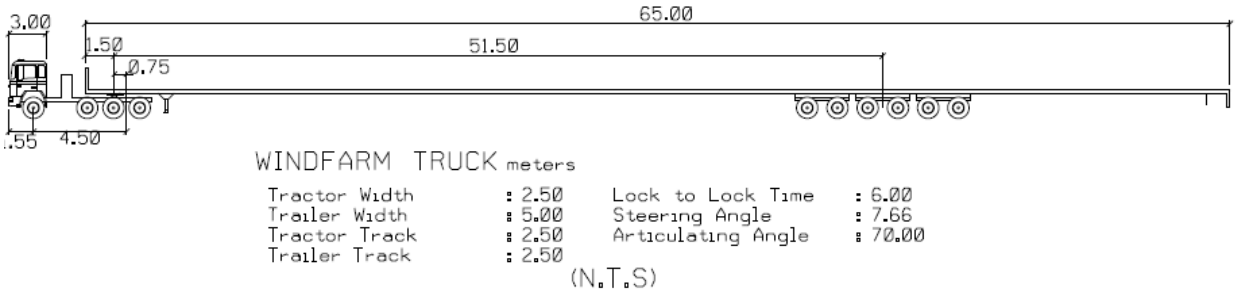
- Maximum OD Vehicle Length: 68.80 metres
- Minimum Height Clearance Required: 5 metres
- Minimum Road Width Required: 5.5 metres
- Maximum Slope Gradient Permitted: 6%
- Maximum Side Inclination Permitted: 2%

2.6.1 Swept Paths

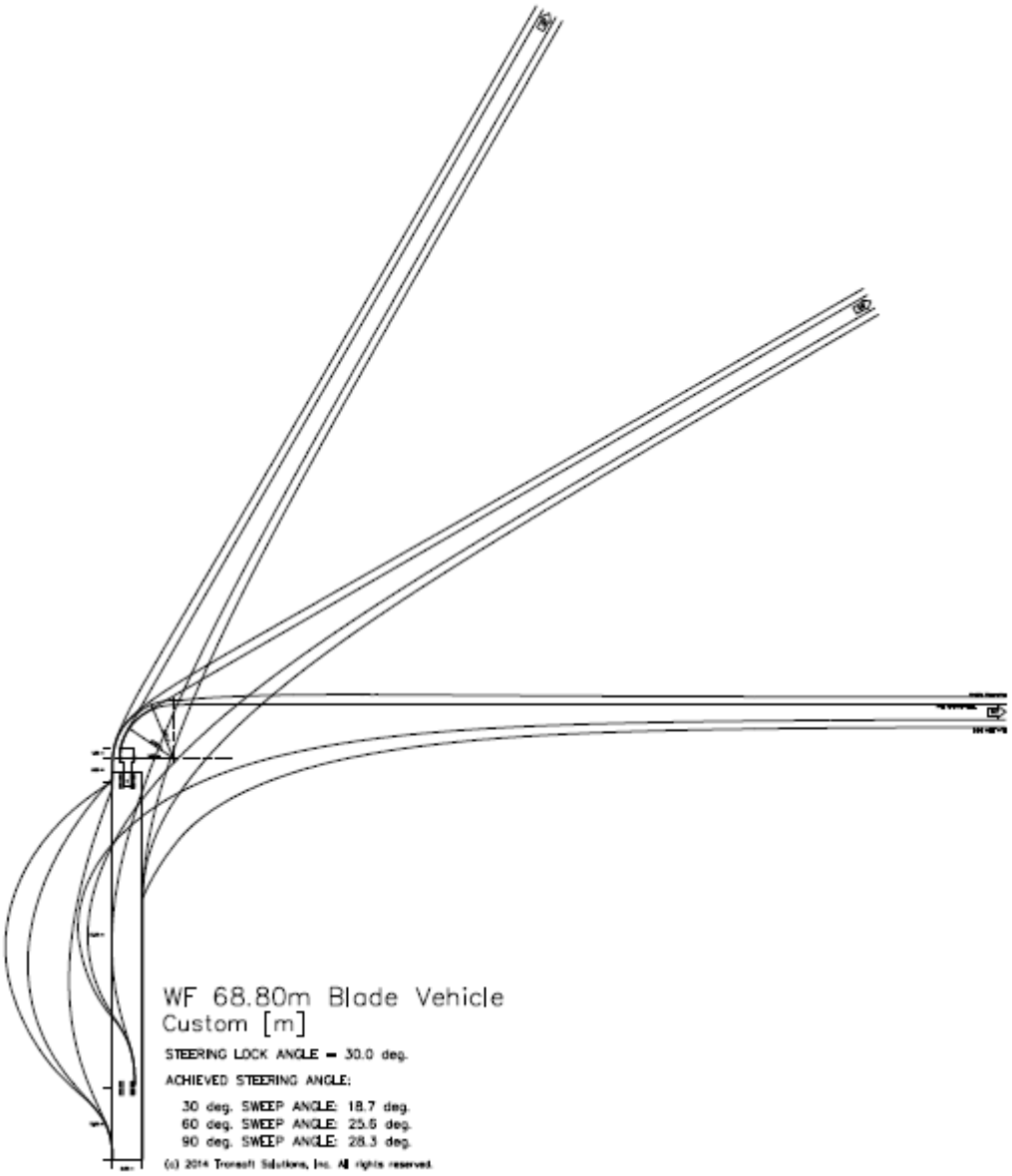
The longitudinal section of an OD vehicle with a length of 68.80 metres is defined in Figure 2-3. The resultant swept path of this vehicle is detailed in Figure 2-4.

Figure 2-3 OD Vehicle



2 Development

Figure 2-4 OD Vehicle Swept Path



3 Routes

3.1 Summary

This section relates to the measurements required to reduce the impact that the vehicles generated during the construction phase of the project may have on the nominated routes and access points. The aspects considered include consultation outcomes with relevant authorities, mitigating roadside vegetation removal, impact of vehicles generated by the development on the surrounding road network and recommended upgrades required to allow safe and adequate access by OD and construction vehicles.

3.2 Consultation

VicRoads

URS liaised with VicRoads officers during the development of this traffic management plan as requested in the conditions of Planning Permit Number 20060222. In particular, the Traffic Safety Services, Works and Program Development Divisions were contacted with regards to the movements of the over-dimensional loads and proposed transmission line locations. Their comments are outlined as follows and have been incorporated with the development of this traffic management plan.

The consultation with the Traffic Safety Services Division related with the escort arrangements required during OD transportation along VicRoads declared roads. In particular it was highlighted that the route to be chosen was at the discretion of the transport operator with VicRoads providing a permit if approved. VicRoads is familiar with the transportation constraints associated with the size and mass of OD vehicles for wind farm developments in southwest Victoria. The OD deliveries for the Ryan Corner wind farm development will require escort vehicles for the roundtrip between Portland and the site. An escort is particularly important due to the overhang and turning movement of the OD vehicle encroaching onto the incorrect side of the road. Furthermore, VicRoads is aware that such large OD vehicles will from time to time block an intersection or section of roadway and as such suitably trained escort drivers and appropriate traffic management will be required.

The consultation with the Works Division involved the process requirements of the transmission lines layout where they intersected road reserves. VicRoads require detail of Traffic Management Plans where transmission lines intersect road crossings. The detail of pavement restoration is required where road underboring techniques are adopted prior to VicRoads approving transmission line installation. However it is proposed for this project that the high voltage transmission lines will intersect public roads overhead with all poles being erected within private land and will therefore avoid any installations within road reserves.

The consultation with the Program Development Division concerned the design and footprint required for the site access locations where they intersected VicRoads declared roads. The access driveways will be larger than a standard crossover as the turning movement of an OD vehicle will generate a far greater footprint than a normal heavy or light vehicle. As such, the final design for construction drawings of these accesses will need to be submitted to VicRoads prior to construction.

Various permit applications will be required to be submitted to VicRoads prior to certain vehicle movements (particularly those for OD vehicles). Section 4.1 outlines the various permit applications necessary prior to these movements occurring.

3 Routes

Moyne Shire Council

A meeting was held with the Director of Physical Services from Moyne Shire Council at Council's offices in Port Fairy on 15 September 2009 along with subsequent phone and email correspondence. During the meeting the planning permit conditions were discussed and Council outlined several concerns and suggested a number of recommendations to be considered in the development of the Ryan Corner Wind Farm Traffic Management Plan.

Youls Road is a local Council road and as such the number of cross-points for OD and construction vehicles should be minimised as far as possible to reduce impact on the local road network. Council also requests that Fingerboard Road is to be avoided at all time for personnel and construction vehicles due to safety concerns. Furthermore, Harris Road is to be avoided except for where it is traversed by the internal access tracks, even though it is located through the spine of the wind farm site.

Youls Road is to be widened to a 6.2 metre wide seal from Princes Highway to the access for the full 2,800 metre length. The pavement must be widened, sealed and maintained for the duration of the construction period.

Sufficient and appropriate signs (such as Give Way, Construction Vehicles etc.) are to be in place along Youls Road and other local roads identified as being unsuitable for construction traffic. Warning signs are also to be in place on Youls Road where it intersects with Fingerboard Road.

School bus routes operate throughout the area and construction vehicles must not interfere with their operation. The current routes identified surrounding the Ryan Corner wind farm site include:

- School bus service along OD route
  - Princes Highway (whole length within municipal boundaries)
- Additional service along Construction Vehicle routes
  - Hamilton-Port Fairy Road (whole length within municipal boundaries)

Council does not wish to impose a blanket ban of '8am – 9:30am, 2:30pm – 4pm', but rather provide a smaller window of 30 minutes where it is anticipated that the school bus will be utilising a certain road. This window of timeframe will be confirmed upon finalisation of the wind farm's delivery timetable.

Although Council does not impose mandatory curfew hours of operation, they expect that all construction activities will occur during reasonable hours of the day. As an indication, it was suggested that this refers to daylight hours for most of the year (eg. 6am – 7pm Monday to Friday).

Due to the scale of upgrade works along Youls Road, in addition to the proposed number of heavy vehicles during the construction phase of this project, Council will require a security deposit. It is estimated that a security deposit of $100,000 is required for the extent of these works. Council has requested that the Princes Highway / Youls Road t-intersection be reinstated as a true t-intersection (i.e. approaching Youls Road leg to be perpendicular to Princes Highway).

Due to local climatic conditions, upgrade works will need to align with summer months (November to May inclusive) in order to avoid boggy conditions. Council has requested that consultation be made with them with regards to access points, power line post locations and traffic routing up front.

Several local developments were also identified by Council that may also be in construction during the construction phase of the Ryan Corner wind farm site. These include:

- A proposed gas pipeline between Warrnambool and Tarrone;
- A proposed water pipeline from Port Fairy to Orford;
- Harvesting vehicles for the local Bluegum plantations.

3.3 Roadside Vegetation

Robert Galbraith, an arborist from Galbraith and Associates, and Ian Wheatland, a botanist from Ecology Partners, were present during a site inspection on 14 September 2009 to determine whether the construction transportation activities may impact on any roadside vegetation. The Ryan Corner site was inspected from both Youls Road and Hamilton-Port Fairy Road approaches, and the following comments are based on the observations of Robert Galbraith and Ian Wheatland.

Arborist Comments / Concerns – Robert Galbraith

The arborist notes that there are no concerns raised with the Ryan Corner wind farm development given that all vehicles generated from the construction and operational phases of the project will avoid Riverside Road.

Botanist Comments / Concerns – Ian Wheatland

All intersection upgrades and site access points (along Youls Road, Yambuk) which are proposed for development associated with the Ryan's Corner wind farm are located within areas of predominantly introduced vegetation. These areas are dominated by common exotic pasture species with few scattered remnant native grasses such as Wallaby Grass *Austrodanthonia* spp. and Spear Grass *Austrostipa* spp.

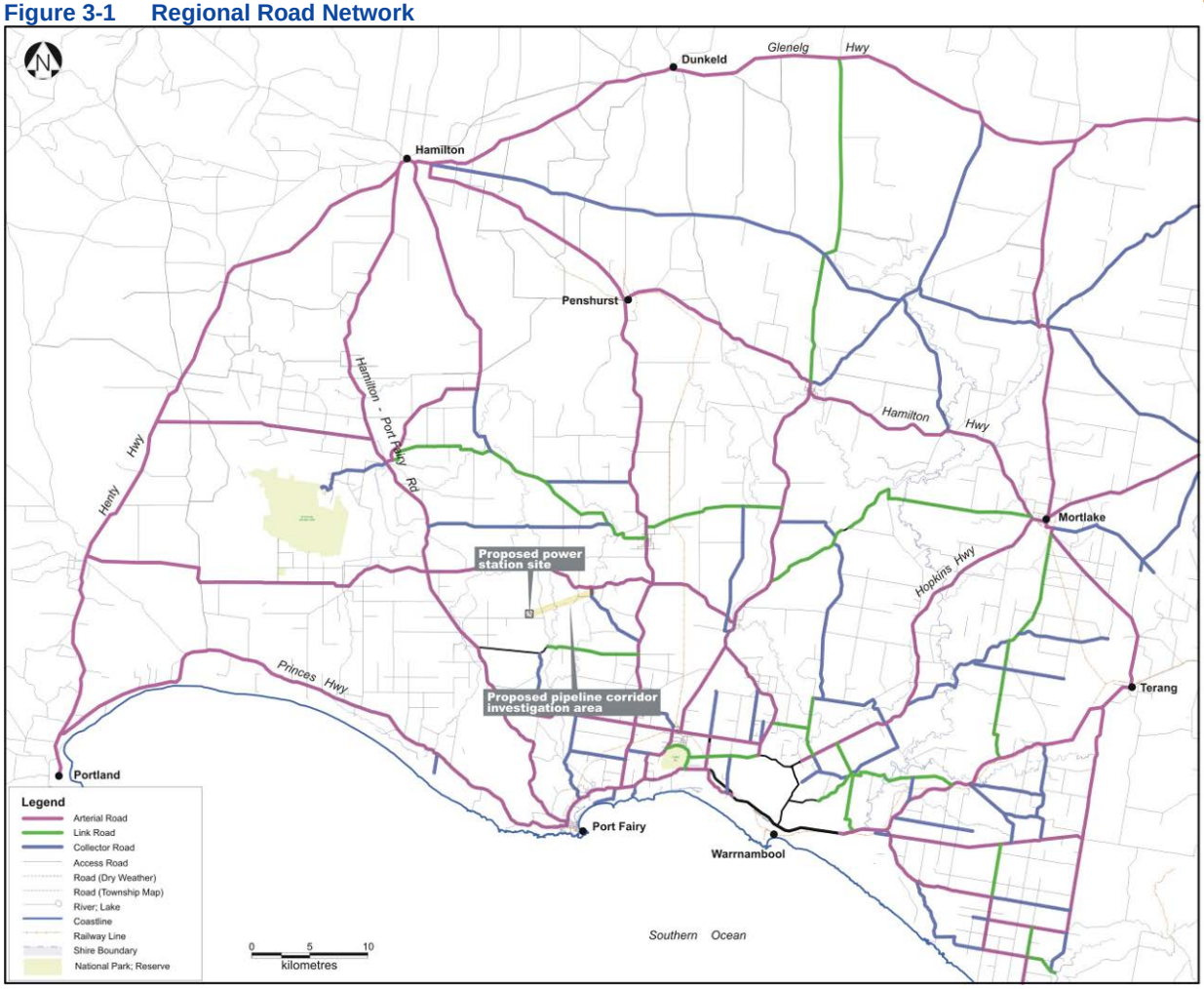
The specific details and findings of the vegetation assessment of the proposed traffic management and site access works are addressed in the *Vegetation Offset Management Plan* was prepared by Ecology and Heritage Partners.

3.4 Selected Road Lengths

The south-west region of Victoria is serviced by a network of highways that provide connections to Geelong to the east, Ballarat to the north-east, Horsham to the north and Portland and Mt Gambier to the west. A map of the regional road network is provided in Figure 3-1.

3 Routes

Figure 3-1 Regional Road Network



A description of the relevant regional roads as identified in the transport routes (Section 2.3) is provided below. All surrounding roads to the Ryan Corner site are managed and maintained by VicRoads.

It is assumed that all VicRoads declared roads are maintained to an appropriate standard to allow safe usage by B-double trucks.

Henty Highway

The Henty Highway (A200) connects the Port of Portland to the south with the Princes Highway (A1) to the north just beyond Dutton Way/Portland North. The route is a declared OD road and provides larger vehicles an appropriate egress from the Port area without the use of the local road network.

The Henty Highway (A200) is an approved OD route; however vehicles exceeding the OD mass and dimension standards will require approval from VicRoads who maintain and manage the highway. It is generally a two-lane, two-way road.

3 Routes

Princes Highway – Henty Highway to Hamilton-Port Fairy Road

The Princes Highway (A1) is an A-class highway which links Portland to the west with Geelong in the east via Port Fairy, Koroit, Warrnambool, Terang, Camperdown, Colac and Winchelsea. It is generally a two-lane, two-way road. At its closest point, the Princes Highway is approximately 3 km south of the Ryan Corner wind farm site. From Portland, the Princes Highway extends north to Heywood and then west towards the South Australian border.

The Princes Highway splits just north of Dutton Way/Portland North into northern and eastern routes.

The Princes Highway (A1) is an approved OD route; however vehicles exceeding the OD mass and dimension standards will require approval from VicRoads who maintain and manage the highway. Nonetheless, Princes Highway is suitable for standard dimension commercial vehicles. The highway comprises of 3.5 m width traffic lanes with 2.5 m sealed shoulders. In addition, this length of Princes Highway has numerous rest areas allowing temporary refuge of OD vehicles to allow for queued traffic to pass.

It is expected that no maintenance along this section of the highway will be required during the construction of the wind farm (with the exception of the improvements to the Princes Highway / Youls Road intersection).

It should be noted that the Princes Highway, between Portland and Port Fairy, passes through the township of Narrawong. This town has a local primary school which operates a 40km/h speed zone during school drop-off and pick-up times.

Hamilton-Port Fairy Road

Hamilton-Port Fairy Road (C184) provides a north-south link from Hamilton in the north (at its junction with the Henty Highway (A200), Hamilton Highway (B140) and Glenelg Highway (B160)) to Port Fairy in the south (at its junction with the Princes Highway (A1)). The Hamilton-Port Fairy Road straddles a significant portion of the Ryan Corner site's eastern boundary and is a two-lane, two-way road. A proposed site access is to be constructed on the road's eastern side approximately 300 m north of Spencer Road (C183).

Hamilton-Port Fairy Road (C184) is the terminus of the east-west link of Spencer Road (C183) to the east of the wind farm site.

Hamilton-Port Fairy Road is a declared OD route and is maintained and managed by VicRoads. The road is therefore suitable for these larger vehicles.

Youls Road

Youls Road is a declared access road within Moyne Shire Council and is a two-way, one-lane single carriageway. The roadway has a total sealed width varying between 3.3 m and 3.8 m with unpaved grassed shoulders. Its intersection with Princes Highway has adequate Safe Intersection Sight Distance and truck Stop Sight Distance. A wide turning space at the intersection is available to be constructed within the road reserve. Permit condition 12 of the planning permit requires that the Princes Highway / Youls Road intersection be upgraded to a 'Type C' treatment prior to any construction works taking place. However a Type C intersection for Rural Turn Lane Treatments has now been superseded since the planning permit application was made and as such this design has been replaced by a CHR Treatment for this intersection (Austroads 2009).

Youls Road remains a straight road in a northerly direction from Princes Highway until Shaw River (beyond the proposed site access). The width and formation of Youls Road remains constant north of the Princes Highway / Youls Road intersection. Youls Road has two main intersections along its length with Fingerboard Road (cross intersection) and Davidsons Road (t-intersection) – although all roads carry very low local traffic volumes. Youls Road becomes a no through road north of its intersection with Davidsons Road.

3.5 Existing Condition and Intersections Nominated

3.5.1 Ryan Corner Wind Farm Traffic and Transport Study (2006) Observations and Recommendations

The *Ryan Corner Wind Farm Traffic and Transport Study* (2006) was produced during the original planning permit application for the Ryan Corner wind farm project. A number of observations were made during the 2006 site inspections with regards to the condition of the existing road network. Recommendations were proposed for certain road improvements based on existing conditions and proposed construction vehicle activities, and included:

- The width of Youls Road is currently unsuitable for OD vehicles and has an average to poor road surface – therefore an upgrade to the width and pavement will be required for the full length between Princes Highway and the Youls Road site access (2.8km length);
- Princes Highway / Youls Road intersection is to be upgraded to a 'Type C';
- Rehabilitation of the Hamilton-Port Fairy Road / Princes Highway intersection may be required; and
- Hamilton-Port Fairy Road is in reasonable condition although some pavement has become distressed and may require reconstruction.

3.5.2 Existing Conditions – site inspection (2009)

A site inspection was undertaken on the 14th and 15th of September 2009 that inspected the route for OD vehicles from Portland as well as the local surrounding road network to the Ryan Corner wind farm site. The recommendations set out in the *Ryan Corner Wind Farm Traffic and Transport Study* (2006), refer section 3.5.1, were reassessed during the 2009 inspection and were all still valid.

The existing condition of the surrounding road network can be found in Figures 3-2 to 3-5.

3 Routes

Figure 3-2 Existing Condition of Princes Highway / Youls Road Intersection

Figure3-3 Existing Condition of Youls Road

3 Routes

Figure 3-4 Existing Condition of Hamilton-Port Fairy / Princes Highway Intersection

Figure 3-5 Existing Condition of Hamilton-Port Fairy Road

It was also observed that the number of truck rest areas along Princes Highway could provide a suitable refuge for OD and heavy vehicles to pull into to allow for queuing vehicles behind to pass safely.

3.5.3 Pre-construction Phase Road Condition Survey (Baseline Assessment)

The existing condition survey undertaken in Section 3.5.2 is mainly for the purposes in developing this TMP. It is acknowledged that there may sometime between completion of the TMP and construction commencing and as such infrastructure changes (improvements or deterioration) may occur in the region beyond those outlined in this TMP.

As such it is recommend that a baseline condition survey be undertaken immediately prior to the construction phase commencing between representatives of Ryan Corner Development and the appropriate road authority (VicRoads or local Council) depending on the respective road asset. The purpose of this survey is to photograph and document the existing condition of the selected road sections. This will determine the actual baseline condition of the road network and be used as a comparison during the construction phase to determine whether any impacts have been caused by vehicles generated for this Project.

The pre-construction phase road condition survey is to be undertaken for the following road sections:

- A distance of approximately 500m in both direction for each site access point (this has been agreed with VicRoads);
- All local roads intended to be used by vehicles generated by the Project (i.e. Youls Road); and
- Along all routes to be used for transporting quarry materials when finalised (refer Section 4.5 and Appendix B).

These pre-construction phase surveys can be undertaken in stages depending on the timing of finalising certain details of the Project (i.e. the selection of quarry sites). Existing condition reports are to be developed and include text and still pictures and provided to the relevant road authority prior to any construction or road upgrades commencing for the relevant stage of works.

It should be noted that VicRoads road assets are classified as ‘C Roads’ and are therefore assumed to be suitable and these are therefore not considered as part of this pre-construction phase road condition survey (except where site access points are along these roads)

3.6 Traffic Volumes

3.6.1 Existing Traffic Volumes

Traffic volume data has been collected in 2006 to indicate the existing conditions with an annual population increase of 1.2% per annum applied (based on ABS data for Port Fairy) in order to estimate 2010 traffic volumes. Table 3-1 outlines the 2006 traffic data collected with the inclusion of the estimated 2010 traffic volumes based on an annual traffic increase of 1.2% per annum.

3 Routes

Table 3-1 Existing AADT Data (2006) and 2010 Estimates

ROAD	2006 DATA		2010 ESTIMATES	
	Total Volumes (two-way AADT)	*Commercial Vehicle Proportion*	*Total Volumes (two-way AADT)*	*Commercial Vehicle Proportion*
Princes Highway	3,000	20%	3,070	20%
Hamilton-Port Fairy Road	560	12%	570	12%
Youls Road	40	25%	41	25%

The existing traffic volumes collected have been collated into two-way Annual Average Daily Traffic (AADT) data. However, AADT data is not the preferred value to indicate a normal weekday as it takes into account all periods throughout the year (including weekends and school holidays). As such, the AADT values are translated into Average Weekday Daily Traffic (AWDT).

Weekly volumes can be estimated by multiplying the AADT by seven days. It is assumed that 80% of weekly volumes will occur on weekdays, with 20% of the weekly volumes occurring over the weekend – therefore a normal weekday will represent 16% of the total weekly traffic volumes. No significant centres are located near the site (i.e. urban environments); a 50/50 directional split can be assumed between directions. As such, the AWDT in each direction will be half of the two-way AWDT calculated from the existing traffic data.

It is further assumed that the peak period will correspond to 10% of the total AWDT – although somewhat generous will provide a worst-case scenario when comparing against the construction vehicles generated during the AM and PM peak periods.

Table 3-2 provides the AWDT values for Princes Highway, Hamilton-Port Fairy Road and Youls Road, as well as their respective AM or PM peak hour periods. It should be noted that there will be no difference in volumes between the AM and PM peak hour periods as a 50/50 directional split has been assumed.

Table 3-2 2010 Average Weekday Daily Traffic Volumes and Peak Hour (one hour) Volumes

ROAD	ESTIMATED 2010 AWDT VOLUMES		ESTIMATED 2010 PEAK HOUR VOLUMES		COMMERCIAL VEHICLE PROPORTION
	Two-way	One-way*	Two-way	One-way*	
Princes Highway	3,440	1,720	344	172	20%
Hamilton-Port Fairy Road	640	320	64	32	12%
Youls Road	50	25	5**	3**	25%

Notes:

** Rounded up to next whole vehicle.*

*** Due to the low volume of vehicles, it will be assumed that the majority of these vehicles will make right-hand turns in and out of Youls Road at Princes Highway (this produces the worst-case scenario).*

3 Routes

3.6.2 Construction Traffic Volumes

Background traffic volumes and generated construction volumes will be compared in order to determine the impact of the construction activity on the public road network.

Based on the information provided in section 2.5, traffic movements from both accesses can be estimated that will provide the direct inputs into the traffic modelling to determine construction vehicle activity impacts on the public road network. Table 3-3 illustrates the turning movement estimations from the construction activity at the Youls Road / Princes Highway intersection, the eastern site access and the Hamilton-Port Fairy Road / Princes Highway intersection based on the data provided in the *Ryan Corner Wind Farm Road Traffic and Transport Study* (2006).

Please note that the arrows indicated under each intersection illustrate the assumption that:

- All construction and personnel vehicles during the AM peak will be arriving at site; and
- All construction and personnel vehicles during the PM peak will be departing the site.

3 Routes

Table 3-3 Construction Activity Turning Movements (AM and PM Peak Hour)

VEHICLE CLASS	ACTIVITY	YOULS ROAD / PRINCES HIGHWAY INTERSECTION		HAMILTON – PORT FAIRY ROAD SITE ACCESS	
		Site ⇅ Portland	Site ⇄ Port Fairy	Hamilton ⇅ Site	Site ⇄ Port Fairy
OD Vehicles	Delivery of Tower Sections (1 vehicle)	100%			
	Delivery of Blades/Nacelles etc. (1 vehicle)	100%			
	Total (OD)	***100%***	***0%***	***0%***	***0%***
Construction Vehicles**	Gravel for Foundations (1 vehicle)	12.5%	12.5%	37.5%	37.5%
	Water for Concreting (1 vehicle)	12.5%	12.5%	37.5%	37.5%
	Cement for Foundations (1 vehicle)	12.5%	12.5%	37.5%	37.5%
	Steel for Foundations (1 vehicle)	40%	40%	10%	10%
	Water for Foundations (1 vehicle)	12.5%	12.5%	37.5%	37.5%
	Fuel for Foundation Works (1 vehicle)	40%	40%	10%	10%
	Gravel for Road Construction (1 vehicle)	0%	0%	0%	0%
	Substation Works (1 vehicle)	12.5%	12.5%	37.5%	37.5%
	Sand for Cabling Works (1 vehicle)	46.5%	46.5%	3.5%	3.5%
	Cables for Cabling Works (1 vehicle)	40%	40%	10%	10%
	Conduit for Cabling Works (1 vehicle)	40%	40%	10%	10%
	Switchgear Works (1 vehicle)	40%	40%	10%	10%
	Steel for Substation Electricals (1 vehicle)	50%	50%		
	Switchgear for Substation Electricals (1 vehicle)	40%	40%	10%	10%
	Total (HV)	***30.7%***	***30.7%***	***19.3%***	***19.3%***
Cars and LCVs	Construction Personnel* (84 vehicles)	1.6%	58.4%	1.7%	38.3%
	Escort Vehicles for OD Deliveries (4 vehicles)	100%			
	Total (LV)	***6.1%***	***55.7%***	***1.6%***	***36.6%***

Notes:

** The personnel proportions are based on 60% of employees exiting from the western site access on Youls Road and 40% exiting from the eastern site access on Hamilton-Port Fairy Road. The following is an estimation of the proportions of employees residing in these town centres (based on population and distance): Portland 2.6%, Port Fairy 31.0%, Warrnambool 46.6%, Koroit 15.5% and Hamilton 4.3%.*

3 Routes

*** Due to the dispersed nature of quarries and other construction suppliers surrounding the wind farm site, a directional split of 50/50 at each intersection has been assumed for all heavy vehicles.*

As a result of the estimated traffic generation and directional split indicated in Tables 2-1 and 3-3 above, the following summary outlined in Table 3-4 can be used for the SIDRA traffic modelling. Please note that the AM Peak period will have identical values to these but in the opposite direction.

Table 3-4 Summary of Construction Vehicle Turning Movements (PM Peak Hour)

VEHICLE CLASS	YOULS ROAD / PRINCES HIGHWAY INTERSECTION		HAMILTON – PORT FAIRY ROAD SITE ACCESS		TOTAL
	Site ⇄ Portland	Site ⇄ Port Fairy	Hamilton ⇄ Site	Site ⇄ Port Fairy	
OD Vehicles*	2				***2***
Construction Vehicles*	4	4	3	3	***14***
Cars and LCVs*	4	51	2	33	***90***
Total	***10***	***55***	***5***	***36***	***106***

Notes:

** Rounded up to next whole vehicle.*

Total Traffic Volumes and Directional Movements during Peak Construction Activity

The volumes from Table 3-3 and 3-4 can therefore be summed together (depending on AM inbound or PM outbound construction movements) in order to produce the total traffic volumes and directional movements expected during the peak construction activity of the wind farm site. The resultant volumes and directional split are used as the inputs into SIDRA modelling for determining the impact of the 2010 construction activities when compared to the 2010 existing traffic volumes.

3.6.3 Intersections Nominated

Based on the locations of the eastern and western access points to the Ryan Corner wind farm site, the following key intersections will be analysed by SIDRA in determining the construction impacts on the existing traffic volumes:

- Eastern Access
  - The intersection of Hamilton-Port Fairy Road and the proposed eastern site access (300 metres north of Spencer Road) – t-intersection; and
  - The intersection of Hamilton-Port Fairy Road and Spencer Road – t-intersection.

- Western Access
  - The intersection of Youls Road and Princes Highway – t-intersection.

Please note that SIDRA analysis is considered inappropriate for the intersection of the western access point at Youls Road based on the very little existing traffic volumes along Youls Road during the peak periods. It is expected that the vehicles generated during the construction phase of the project will not significantly impact on the background traffic volumes along Youls Roads.

Furthermore, the intersection of Hamilton-Port Fairy Road and Spencer Road is only being considered due to its close proximity to the site's eastern access point. In order to determine the 'worst-case' scenario for this intersection, it has been assumed that all commercial vehicle movements south of the eastern site access (whether inbound or outbound) will utilise Spencer Road. It is considered irrelevant whether this reflects the actual construction activities due to the very small number of vehicles utilising Spencer Road (whether construction-related or not), and as such it is anticipated that very little impact will occur at this intersection.

3.6.4 SIDRA Modelling

The SIDRA modelling package was used to analyse the performance of the existing road network to identify the current traffic characteristics (in 2010 estimates) to the three key intersections surrounding the development identified on the nominated routes for OD, construction and personnel vehicle movements during the peak construction phase of the project. The three intersections are:

- Hamilton-Port Fairy Road / eastern site access intersection;
- Hamilton-Port Fairy Road / Spencer Road; and
- Princes Highway / Youls Road.

The 'degree of saturation' and '95% queue length' are used to compare the affect that construction vehicles will have on the operation of the intersections.

The Degree of Saturation refers to the ratio of an intersection between the traffic demand at the intersection compared to its total capacity. An intersection with a Degree of Saturation approaching 0.90 to 0.95 is considered to be at capacity.

The 95% queue length value is used as an indication of the length whereby the probability of exceeding it is only 5% - often referred to as the design queue length.

The results of the SIDRA modelling are provided in Tables 3-5 and 3-6.

3 Routes

Table 3-5 SIDRA Results – Degree of Saturation

INTERSECTION		2010 EXISTING CONDITIONS (PRE-CONSTRUCTION)	2010 CONDITIONS – DURING PEAK CONSTRUCTION	CRITICAL TURNING MOVEMENT – DURING PEAK CONSTRUCTION
Hamilton-Port Fairy Road / eastern site access intersection	AM Peak Hour	0.02	0.04	Northbound traffic turning left from Hamilton-Port Fairy Road into eastern site access
	PM Peak Hour		0.05	Exiting traffic from eastern site access turning right into Hamilton-Port Fairy Road
Hamilton-Port Fairy Road / Spencer Road intersection **	AM Peak Hour	0.03	0.05	Westbound traffic on Spencer Road turning right into Hamilton-Port Fairy Road
	PM Peak Hour		0.03	Westbound traffic on Spencer Road turning right into Hamilton-Port Fairy Road
Princes Highway / Youls Road intersection	AM Peak Hour	0.11	0.10*	Eastbound Traffic on Princes Highway turning left into Youls Road
	PM Peak Hour		0.13*	Southbound traffic on Youls Road turning right into Princes Highway

Notes:

** '2010 Conditions – During Peak Construction' incorporate all upgraded works to Youls Road and the Youls Road / Princes Highway intersection.*

*** For the purposes of the Hamilton-Port Fairy Road / Spencer Road intersection, it has been assumed that all southbound construction vehicles from the site (excluding personnel vehicles) will turn left onto Spencer Road to produce the worst-case scenario.*

3 Routes

Table 3-6 SIDRA Results – 95% Queue Lengths

INTERSECTION		2010 EXISTING CONDITIONS (PRE-CONSTRUCTION)	2010 CONDITIONS – DURING PEAK CONSTRUCTION*	CRITICAL TURNING MOVEMENT – DURING PEAK CONSTRUCTION *
Hamilton-Port Fairy Road / eastern site access intersection	AM Peak Hour	No more than one car**	No more than one car	Southbound traffic turning right from Hamilton-Port Fairy Road into eastern site access
	PM Peak Hour		No more than one car	Exiting traffic from eastern site access turning right into Hamilton-Port Fairy Road
Hamilton-Port Fairy Road / Spencer Road intersection***	AM Peak Hour	No more than one car	No more than one car	Westbound traffic on Spencer Road turning right into Hamilton-Port Fairy Road
	PM Peak Hour		No more than one car	Westbound traffic on Spencer Road turning right into Hamilton-Port Fairy Road
Princes Highway / Youls Road intersection	AM Peak Hour	10 metres	No more than one car	Westbound traffic on Princes Highway turning right into Youls Road
	PM Peak Hour		No more than one car	Southbound traffic on Youls Road turning right into Princes Highway

Notes:

** '2010 Conditions – During Peak Construction' incorporate all upgraded works to Youls Road and the Youls Road / Princes Highway intersection.*

*** 95% queue lengths of 'No more than one car' represent outputs from SIDRA of queue lengths of six metres or less.*

*** For the purposes of the Hamilton-Port Fairy Road / Spencer Road intersection, it has been assumed that all southbound construction vehicles from the site (excluding personnel vehicles) will turn left onto Spencer Road to produce the worst-case scenario.*

The outputs of the SIDRA analysis show that all three intersections perform with no significant increases (of any) in the Degree of Saturation and 95% Queue Lengths – for both the existing, non-construction period as well as during peak construction activities at the site.

The Degree of Saturation for all three intersections (before and during construction) ranges between 0.02 and 0.13. This is well below the 0.90 to 0.95 threshold where the performance on the intersection is considered unacceptable.

All 95% Queue Lengths during the peak construction phase of the project are less than one vehicle (i.e. less than six metres) and do not produce any queuing concerns for the intersections modelled. In fact, the upgraded Princes Highway / Youls Road intersection improves queuing lengths during the construction phase to those currently being experienced.

In summary, the SIDRA analysis identifies that there are no concerns or impacts of the construction traffic during the project's peak activities on the intersections modelled when compared to the existing 2010 non-construction traffic volumes.

3.6.5 Operational Phase Volumes

The number of vehicles generated by the Ryan Corner wind farm site during its operational phase will be insignificant relative to that experienced during the construction phase. The impact that construction traffic had on the existing Degree of Saturation and Queue Lengths of all intersections modelled were minimal if non-existent. As such, the impact produced by operational traffic associated with the wind farm will be insignificant.

3.7 Swept Paths and Roadworks Involved

3.7.1 Access Points

Two access points will be provided at the Ryan Corner wind farm site which together will provide access and egress for all vehicles required during the construction phase of this project. The western access point will intersect Youls Road 300 m south of Davidsons Road, while the eastern access point will intersect Hamilton-Port Fairy Road approximately 300 m north of Spencer Road.

Eastern Access Point – Hamilton-Port Fairy Road

The eastern access point intersects with the western side of Hamilton-Port Fairy Road at a location approximately 300 m north of the Hamilton-Port Fairy Road/Spencer Road t-intersection.

This access was designed and built to cater for construction and personnel vehicles only – no OD vehicles will enter or exit via this access point. The dimensions of the access point when intersecting with Hamilton-Port Fairy Road is designed based on the maximum vehicle size proposed to enter and exit at this location. As no OD vehicles will utilise this access, the design has been based on the requirements of a B-Double vehicle that accesses and egresses from all possible turning movement combinations at this t-intersection (i.e. left-in, left-out, right-in and right-out).

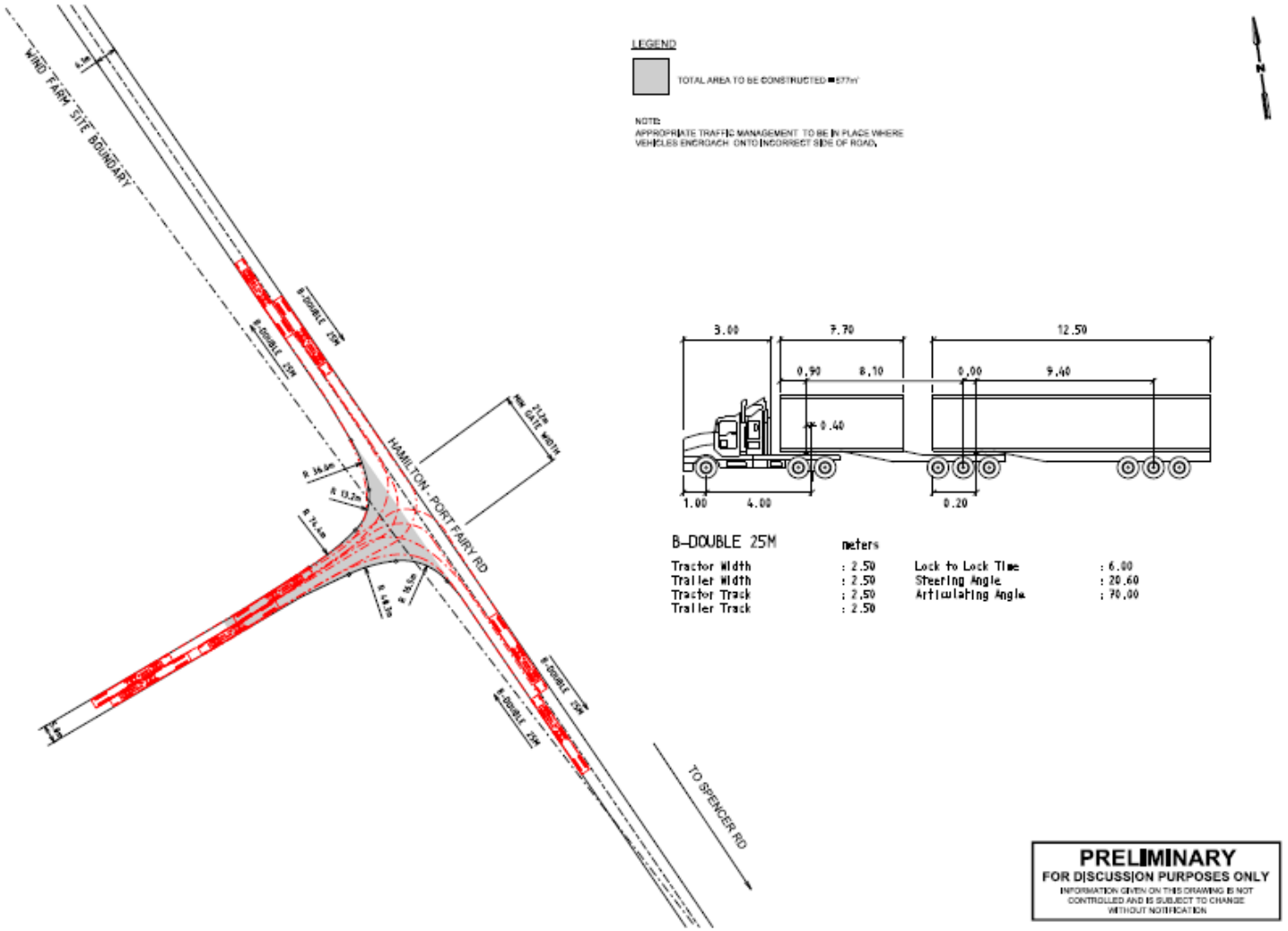
3 Routes

The extent of pavement required in addition to the existing road network to allow for site access and egress at the eastern access point will be approximately 160 m^2 and located within the road reserve between the road edge line and the property boundary. This area is based on upgrade works required as so far as to allow for safe manoeuvrability of all vehicle types indicated up to a point inside the site where no overhang or sweeping occurs (i.e. where the 5.5m width access tracks are only required).

Figure 3-6 outlines the turning movements required for each of the turning movements at this intersection, indicating the footprint required to construct the eastern access point.

3 Routes

Figure 3-6 Turning Movements – Eastern Access Point



3 Routes

Western Access Point – Youls Road

The western access point to be constructed as part of Stage-2 works, and will intersect the eastern side of Youls Road approximately 300 m south of Davidsons Road at a location 2.8 km north of the Princes Highway / Youls Road t-intersection.

This access will be designed to cater for OD, construction and personnel vehicles. An OD vehicle will only enter this access point from the south, and will exit to the south when it egresses the site. Therefore the right-in and left-out movements of the western access point must be designed to cater for OD vehicles.

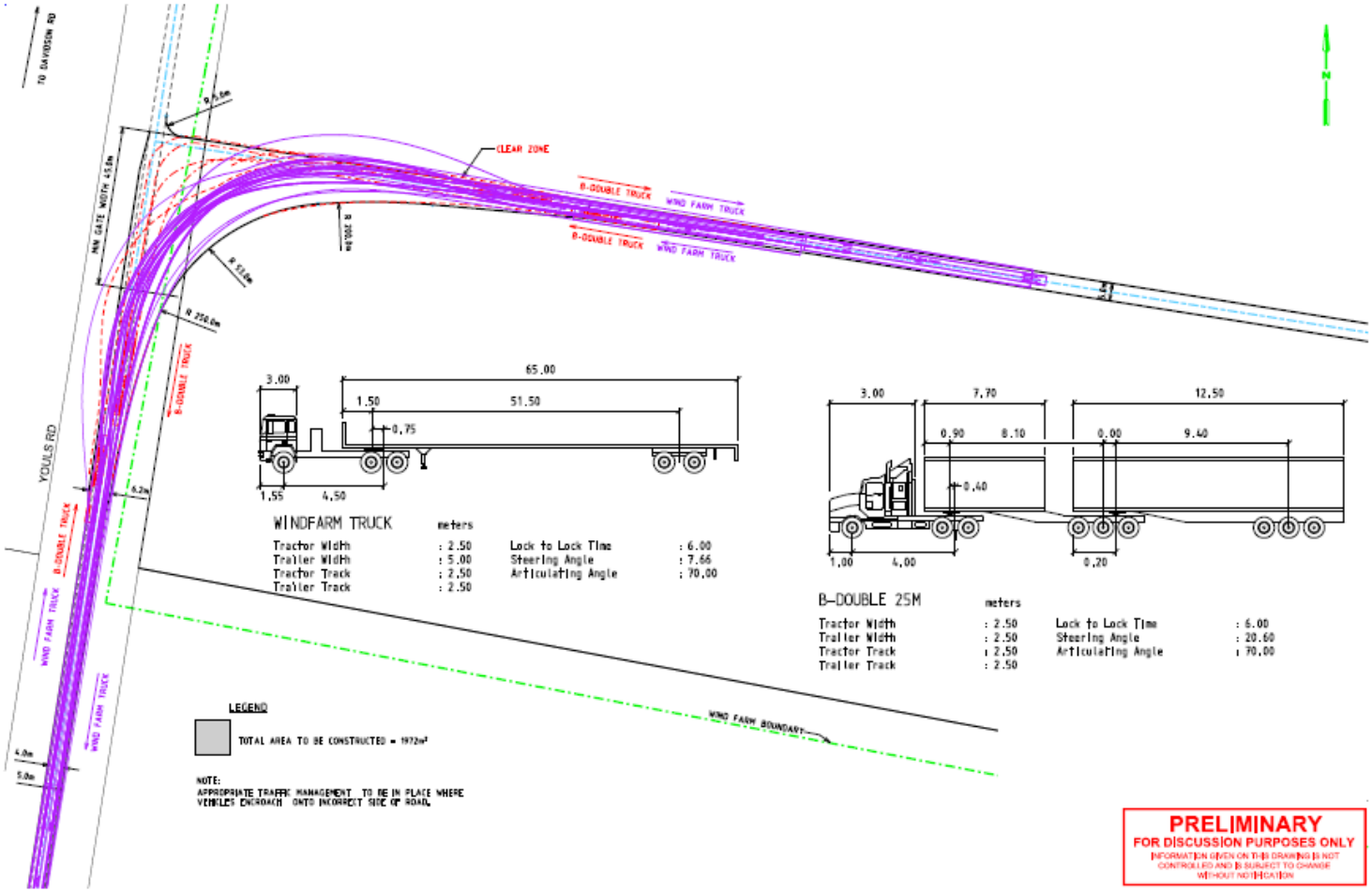
The extent of pavement required in addition to the existing road network to allow for site access and egress at the western access point will be approximately 2085 m^2 of which 632 m^2 is located within the road reserve between the road edge line and property boundary. This area is based on upgrade works required as so far as to allow for safe manoeuvrability of all vehicle types indicated up to a point inside the site where no overhang or sweeping occurs (i.e. where the 5.5 m width access tracks are only required). It should be noted that an access width of approximately 45 m is required at the property boundary due to the swept path of the OD vehicles.

The western site access point is to be constructed to the minimum standard as specified in Moyne Shire Council's 'Access conditions'.

Figure 3-7 outlines the turning movements required for each of the turning movements at this intersection, indicating the footprint required to construct the western access point.

3 Routes

Figure 3-7 Turning Movements – Western Access Point



3.7.2 Road Section Upgrades

Youls Road

Youls Road is currently a sealed local road however its existing condition is not suitable for the consistent stream of OD and construction vehicles proposed during the construction phase of the project. Therefore the road section upgrades for Youls Road must provide the minimum requirements for safe OD and construction vehicle transport.

Youls Road is to be widened to a 6.2 metre wide seal from Princes Highway to the access for the full 2,800 metre length. The pavement must be widened, sealed and maintained for the duration of the construction period.

The western access point intersection with Youls Road is to be a t-intersection for all construction vehicles. The intersection should be reduced in size with bollards installed at a maximum 20m radius when OD vehicles are not using the intersection.

Youls Road is to be widened and sealed prior to commencement of the stage-2 construction works.

The design detailing these upgrades can be found in Appendix A.

3.7.3 Intersections along OD Route

The critical turning movement along the OD route between Portland and the site is at the intersection of Princes Highway and Youls Road. The *Ryan Corner Wind Farm Road Traffic and Transport Study* (2006) has already referred recommendations for this intersection to be upgraded to 'Type C', however a Type C intersection for Rural Turn Lane Treatments has now been superseded since the planning permit application was made and as such this design has been replaced by a CHR Treatment for this intersection (Austroads 2009).

Princes Highway / Youls Road Intersection

The critical OD movement at the Princes Highway / Youls Road intersection will be for deliveries being made to the western access point. Inbound deliveries will be arriving from the west and will turn left at this intersection (left-in), and outbound movements will arrive from the north and turn right to head towards Portland (right-out). These two movements cannot occur under the current geometry of the intersection (even when encroaching onto the incorrect side of the road). Therefore a portion of the road reserve will be required to be developed to provide for safe manoeuvrability during these OD movements. The reconstruction will be required to occur on the northwest and northeast corners of the intersection as well as the southern side to accommodate the new right-hand (right-in) turning lane. The total area of constructed works is approximately 2766 m^2 and is located completely within road reserve.

It must be ensured that all existing signs and guideposts at this intersection affected by these turning movements are fully mountable or easily removed. In particular, it was identified at site that the following signs may obstruct OD turning movements:

- 'Give Way' sign located at the northeast corner of the intersection;
- Road name fingerboard located at the northeast corner of the intersection; and
- Guideposts places on the northeast and northwest sections of the intersection.

3 Routes

Planning Permit Condition 10(j) requires engineering plans demonstrating how OD movements can be accommodated on sealed roadways and turned without encroaching onto the incorrect side of the road. Performing this manoeuvre within the existing road reserve, while maintaining general traffic movements, will have a major impact to an abutting property.

The swept path analysis when not encroaching onto the incorrect side of the road has illustrated that the OD vehicle (when transporting the blades) will travel and overhang into the property located on the northern corner of the Princes Highway / Youls Road intersection. This will be a significant impact given the property boundaries and the likelihood of the interaction between the OD vehicle and the residential property. A large tree is located within the road reserve in close vicinity to this residence and would need to be removed in addition to a large extent of the domestic landscaping within the property – as illustrated in Figure 3-8.

Figure 3-8 OD Swept Path (when not encroaching onto incorrect side of Princes Highway)

3 Routes

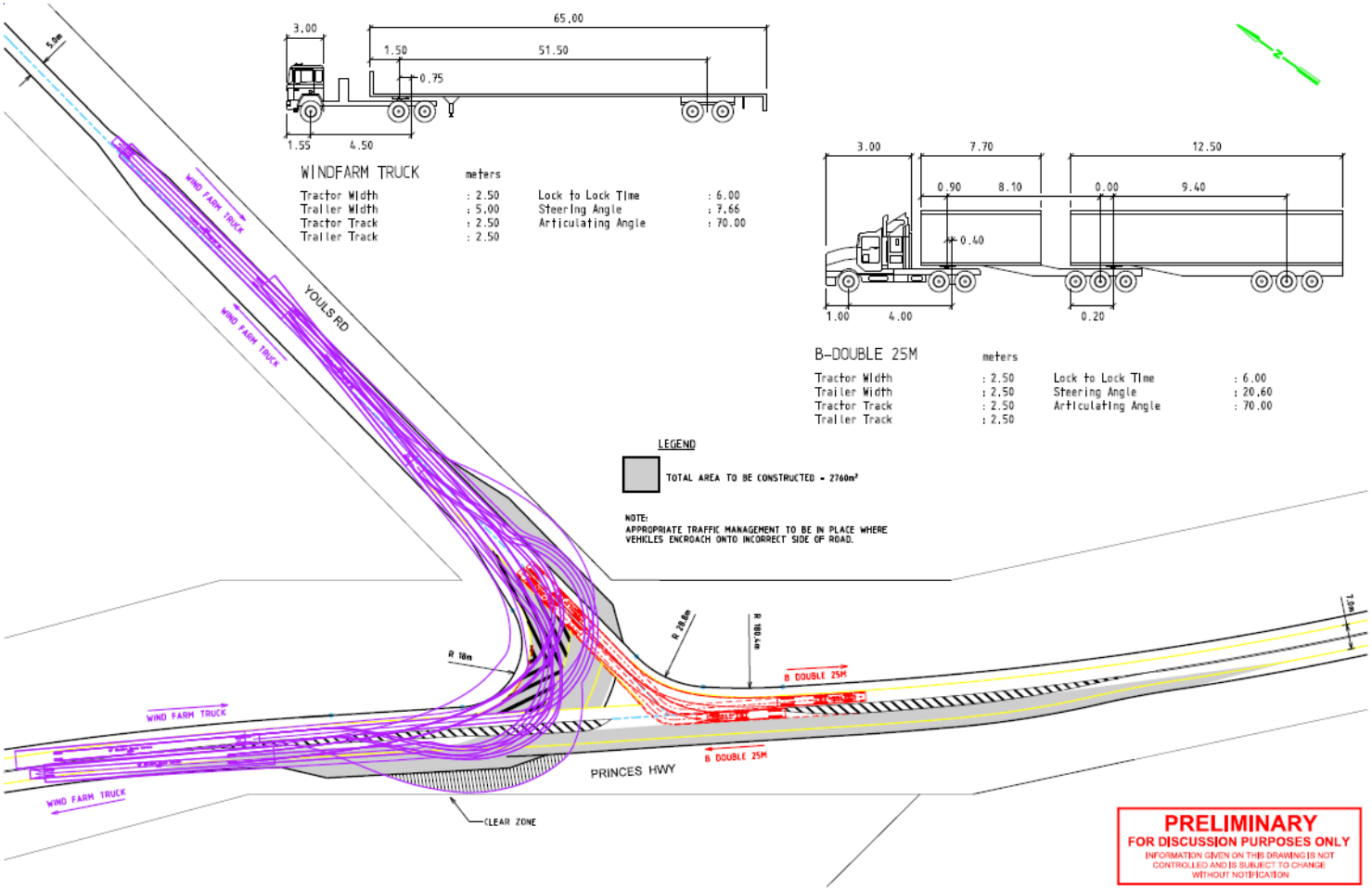
For practicality purposes, and minimising major impacts to abutting properties, it is therefore recommended that the Princes Highway / Youls Road intersection be temporarily closed during OD deliveries (for blades only) that need to encroach onto the incorrect side of the Princes Highway. It would be expected that this Permit Condition intends to ensure that general traffic travelling in the opposite direction does not strike the overhang of a turning OD vehicle. Temporarily closing this intersection for a short period removes the possibility of this occurring while ensuring the safety of the general motoring public. It would be expected that the temporary closure will have a minimal impact to the motorists – particularly if the OD movements were undertaken at night. This is considered the most suitable and common sense approach based on a comparison between the potential removal of a residence against minimal impacts to traffic. The corresponding advance temporary warnings signs are to also be in place during these OD movements and temporary closures at this intersection (refer AS1742.3:2009). This is standard practise for OD vehicle movements and should be undertaken with VicRoads consent

All other truck movements can be performed within the sealed roadway without encroaching onto the incorrect side of the rode at this intersection.

Figure 3-9 illustrates the OD turning movements at the Princes Highway / Youls Road intersection.

3 Routes

Figure 3-9 Turning Movements - Princes Highway / Youls Road Intersection



3.8 Riverside Road Bans

Riverside Road has been identified as a sensitive ecological area, and planning permit condition 10(m) bans trucks or heavy vehicles to utilise the road north of the newly constructed access track – with smaller vehicles to avoid the vegetated areas by using the formed road surface and designated turning sites.

The use of this section of Riverside Road by construction and personnel vehicles can be avoided due to the nearby access point on Hamilton-Port Fairy Road (300 m north of Spencer Road). No access point to the site will be available via Riverside Road and therefore construction and personnel vehicles do not need to use the road. Nonetheless, signage will be installed at both ends to this section of Riverside Road to outline that construction vehicles are prohibited. An example of the signage to be installed is outlined in Figure 3-10.

Figure 3-10 Riverside Road Signage

The restricted use of this section of Riverside Road will be included in the site induction of all wind farm personnel to outline heavy vehicles are prohibited from its use, and personnel vehicles must remain within the formed road surface if required to utilise the road.

3.9 Recommendations for Road and Intersection Upgrades

Based on the results of SIDRA analysis (outlined in section 3.3), road and intersection upgrades will not be required based on the increased number of traffic generated during the construction phase of this project. However, the physical size and mass of the OD and construction vehicles require upgrades to certain roads and intersections to ensure these vehicles do not deteriorate the existing road network and that safe manoeuvrability of the OD and construction vehicles can be attained.

In addition, the *Ryan Corner Wind Farm Road Traffic and Transport Study* (2006) has recommended a handful of upgrades to be undertaken during the pre-construction phase of the Ryan Corner wind farm project, and also in consultation with Moyne Shire Council officers for additional requirements for Youls Road upgrades.

Therefore the upgrades required based on site access construction and previous recommendations include:

- Road works

Youls Road is to be widened to a 6.2 metre wide seal from Princes Highway to the access point for the full 2,800 metre length. The pavement must be widened, sealed and maintained for the duration of the construction period.

3 Routes

Some reconstruction works required along Hamilton-Port Fairy Road where the pavement is distressed. The extent of re-sheeting or patching necessary is to be determined by a joint inspection between VicRoads offices and representatives from the Ryan Corner Development.

- Install signage at Riverside Road to indicate the construction vehicle bans to be imposed.
- Stage 2 Intersection works
  - Construct a 'CHR treatment' at the intersection of Princes Highway and Youls Road;
  - Construct the intersection of Youls Road and the site's western access (located 300 m south of the Youls Road / Davidsons Road t-intersection). This access is to be designed to have adequate provision for safe and unobstructed access and egress for vehicles up to and including the OD vehicle specified in section 2.5 of this document.

3.9.1 Engineering Plans

The engineering plans relating to the recommendations outlined in section 3.9 can be found in Appendix A. These are to be submitted to the relevant road authority for their review and approval prior to the commencing construction of any road upgrades for the relevant stage of the works.

Assumptions

The following is a list of assumptions associated with developing the engineering plans:

- The design of upgrades to all intersections, road sections and access points was based on available high-resolution aerial imagery;
- The largest OD vehicles will be modelled on the swept path of a 68.80 metre truck with locked rear axles (i.e. no independent rear dolly);
- The engineering plans are not to be used as an 'issue for construction' document.

4 Management

This section outlines the various authorities and individuals to consider in managing the OD vehicle deliveries (in particular the approvals required beforehand). In addition, restrictions requested by the relevant authorities and certain permit condition requirements are outlined.

4.1 Routes

There are two major considerations with regards to the proposed OD route between Portland and the Ryan Corner wind farm site. Firstly, there are a number of approvals and permits required to be obtained from VicRoads, Department of Economic Development, Jobs, Transport and Resources (DEDJTR) and Moyne Shire Council prior to OD vehicles using public roadways and conditions in these permits include specific escort arrangements. Secondly, overhead constraints may pose a hazard in the safe and efficient delivery of OD deliveries and as such certain temporary management measures may be required.

4.1.1 VicRoads Approvals

Over Dimensional Permit Application

The OD vehicles used for the delivery of the larger wind turbine sections (i.e. nacelle, towers and blades) are beyond that of the maximum permitted vehicle in Victoria and as such will require a VicRoads approved permit prior to commencement of OD movements. An OD vehicle of the sizes outlined in section 2-6 is classified as a Class 1 OD vehicle.

The details required in submitting the *Over Dimensional Permit Application* include:

- Applicant details (including the registered operator and owner of the vehicle);
- Vehicle details (including vehicle type, make, registration information, axle configuration, tare and gross mass, rear overhang and tyre details);
- Load details (including description, dimensions, mass, and plan of load); and
- Travel and route details (including number of trips, exact origin and destination addresses, travel times and preferred route).

This information must be provided to VicRoads (along with the nominated fee) and no OD vehicle can enter the public road network without approval being provided.

Restrictions are also imposed for this size of OD vehicle for when it may travel on main roads and highways in rural Victoria during the day and during peak times. *Additional Permit Condition Table 2* illustrates that the use of OD vehicles on major roads outside of Melbourne and Geelong is permitted between sunrise and sunset, except for 4:00pm to sunset on public holidays, the day before a holiday period and the last day of a holiday period. This is further emphasised by *Additional Permit Condition 8.1* which bans vehicles higher than 4.6 m to operate after sunset.

A blanket ban is imposed on OD vehicles prohibiting them from operating on any major road between 23 December and 3 January (*Additional Permit Condition 8.4*).

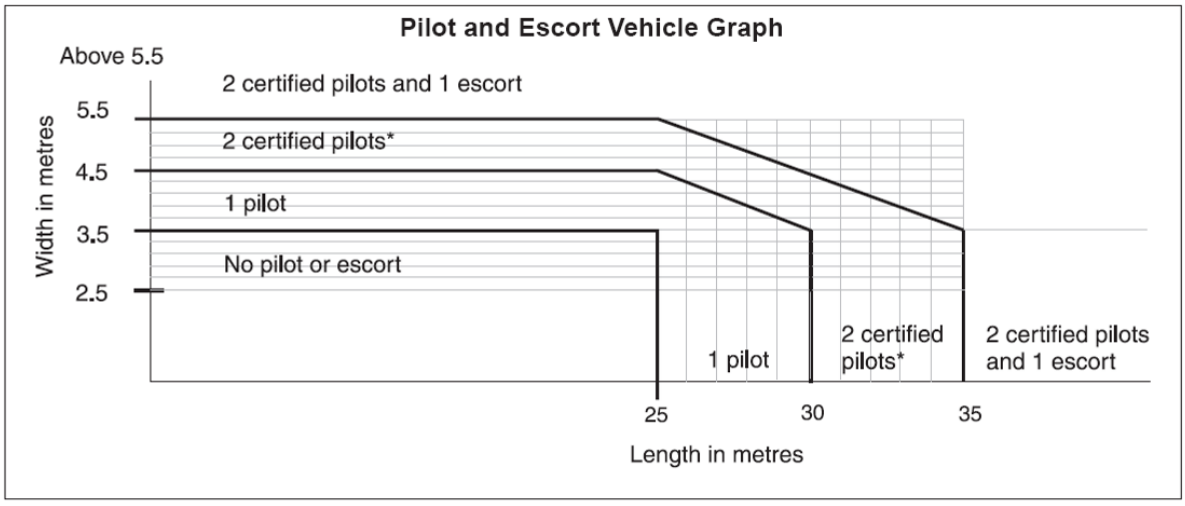
4 Management

Escort Arrangements

The transportation of OD vehicles requiring a Class 1 *Over Dimensional Permit* will also require an escort arrangement while they are transporting goods on the public road network. The *Additional Permit Conditions* stipulate that two certified pilots and one escort vehicle are required for vehicles that are over 35 m in length or wider than 5.5 m. A 'pilot' vehicle refers to a vehicle driven by someone with the appropriate training and certification to guide an OD vehicle of the particular size and/or mass. An 'escort' vehicle incorporates an accompanying VicRoads or Victoria Police vehicle. Smaller OD vehicles will still require an escort arrangement and will need to refer to the *Pilot and Escort Vehicle Graph* in the *Additional Permit Conditions* provided in Figure 4-1.

A maximum of two Class 1 OD vehicles are able to share the same pilot and escort vehicles in a convoy (*Additional Permit Condition 9.5*).

Figure 4-1 Pilot and Escort Vehicle Graph
(source: VicRoads *Over Dimensional Permit – Additional Permit Conditions*)



Note: *When travelling on a Freeway outside the Melbourne and Geelong Urban areas, only one certified pilot vehicle is required.

4.1.2 Department of Economic Development, Jobs, Transport and Resources (DEDJTR)

Owners and operators of vehicles of OD vehicles require a special permit to cross train or tram lines and must make their application to the Victorian Department of Transport Planning and Local Infrastructure (DEDJTR). Approvals for these vehicles must be made when crossing all railways or tram tracks throughout Victoria – including disused lines and tourist lines. Failure to apply for a permit may void vehicle insurances, public liability insurance and may breach certain VicRoads regulations. The DEDJTR approvals process is governed by Victorian Government Gazette s330 of December 2006.

All vehicles longer than 26 m, wider than 3 m or above 4.9 m in height must apply for a special permit for crossing railway tracks. A 'Trip Movement Permit' (for vehicles exceeding these measurements) can either allow 'cross with caution' conditions or an 'attendance permit' whereby a DEDJTR officer is required to supervise each railway crossing (48 hours advanced notice must be provided). Over-dimensional vehicles below the measurements outlined may apply for a 'restricted movement permit'

which permits railway crossings without the attendance of a DEDJTR officer and is effective for a 12 month duration.

There is one known railway crossing location at the Port of Portland – depending on which access road is used in departing the Port area (No. 2 Quay Road or Cliff Street).

In order to apply for the relevant permit a written application must be made to DEDJTR and include the following information:

- Full contact details
  - Company name and registered address
  - Contact person
  - Contact phone number
  - Other contact details such as email address or fax number
- Load details
  - Full description
  - Total number of loads
  - Height, width, length and weight
- Travel details
  - Full outline of proposed route
  - Origin and destination
  - Time of departure
  - Estimated time of first railway track crossing
  - The location and number of known train and or tram crossings
- VicRoads permit number (if known)

4.1.3 Overhead Constraints

Overhead cabling (particularly electricity) can pose a hazard in the delivery of wind turbine components both for safety reasons and in restricting vehicle movements. The clearance required for the largest OD deliveries is 5 m from the ground surface. Temporary raising of overhead cables may be required if the currently do not meet the minimum 5 m clearance.

Locations identified where overhead cabling will need to be checked and may need raising (as outlined in the *Ryan Corner Wind Farm Road Traffic and Transport Study* (2006) and during the site inspection) include:

- Hamilton-Port Fairy Road
  - OD vehicles are not proposed to utilise Hamilton-Port Fairy Road and as such the existing overhead cables are assumed to be suitable for all vehicles sizes up to that of a B-Double (given that the road is a declared OD route)
- Youls Road
  - Overhead cable 1.1 km north of Princes Highway
  - Overhead cable 1.2 km north of Princes Highway

The responsible party for ensuring the route overheads are of sufficient clearance is the operator and driver of the delivery vehicles (VicRoads *Additional Permit Conditions* section 3.2).

Overheads that must have sufficient clearance include wires, structures and trees. This condition also applies to sufficient ground clearance at all railway level crossings outlined in section 4.1.2.

A request for raising overhead cables is to be made with the relevant asset owner who will perform these works for a fee should there be insufficient clearance for passage of the OD vehicles.

4.1.4 Temporary Road Closures

Liaison prior to OD transport movements should be made with VicRoads (VicRoads declared roads) and Moyne Shire Council (local roads) in the event that temporary road closures are required.

4.2 Operating Hours and Speed Limits

4.2.1 Operating Hours

Construction times proposed during the construction period are proposed to occur between 7am to 6pm Monday to Friday and 7am to 4pm on Saturday. No construction activity is proposed to occur on Sundays. These times conform to the limits of construction activity hours of operation set by Moyne Shire Council – outlined in section 3.2 of this document.

School bus routes operate throughout the area and construction vehicles must not interfere with their operation. The current routes identified surrounding the Ryan Corner wind farm site include:

- School bus service along OD route
  - Princes Highway (whole length within municipal boundaries)
- Additional service along Construction Vehicle routes
  - Hamilton-Port Fairy Road (whole length within municipal boundaries)

These school bus routes will not be used by construction and over-dimensional vehicles during bus operating times.

4.2.2 Speed Limits

Traffic volumes are quite low for Hamilton-Port Fairy Road and sight distances at the eastern access point are generally adequate for larger vehicles. This indicates that the reduction of the unrestricted 100 km/h speed limit along Hamilton-Port Fairy Road (adjacent to the wind farm site) is not warranted.

It is recommended that appropriate signage be installed at suitable locations near all wind farm site accesses to give warning of the increased construction vehicle activity in the area – see section 4.3.

Moyne Shire Council has requested that vehicles generated during the construction of the wind farm have their speed limit reduced along Youls Road. However, reducing the entire length of Youls Road to a regulatory 60 km/h speed limit (i.e. applicable to all vehicles) may be ineffective as motorists will travel for several kilometres with no changed environment indicating why the speed limit has been reduced. The consequence of this is that motorists may be susceptible to continue travelling at an unrestricted 100 km/h and as such not adhere to the posted 60 km/h speed limit. Instead customary advisory signs are to be positioned along Youls Road.

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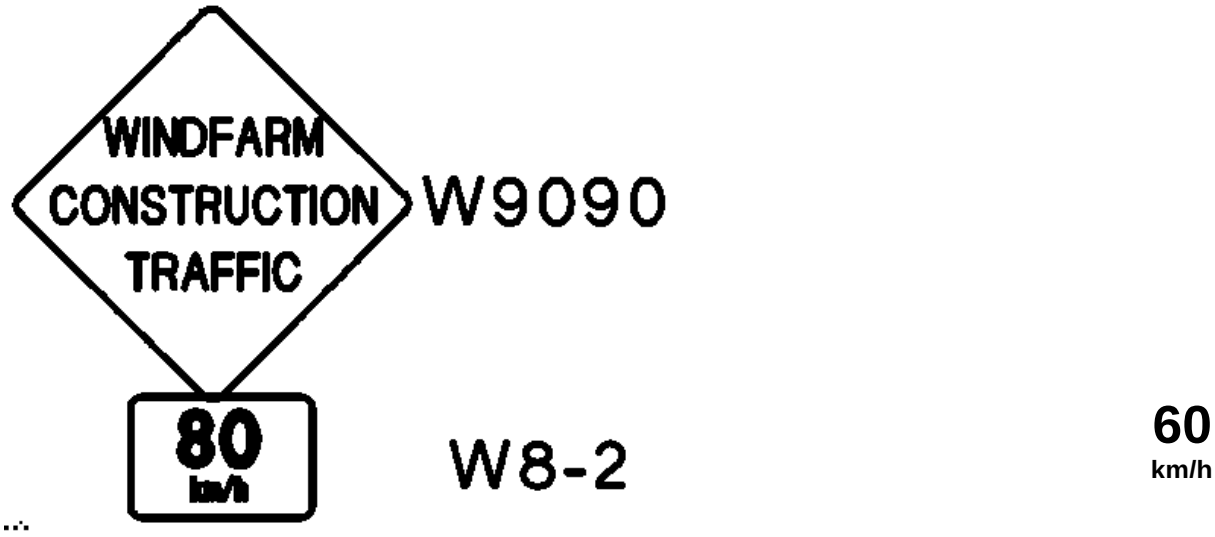
Figure 4-2 Advisory Speed Signs along Youls Road



The speed at which OD vehicles will be able to operate will be contingent upon the vehicle configuration, size of the load and any restrictions imposed (whether by the delivery operator or any authority). As such, it is expected that OD vehicles will travel significantly slower than the marked speed limit, with the escort arrangement being configured as to remain in close proximity to the OD vehicle.

As identified in section 3, there will be occasions where intersections will need to be shutdown to allow for safe passage and manoeuvrability of OD vehicles. During these times the appropriate warning signage, along with temporary reductions in speed limits (from 100 km/h to stationary), will be in place for all affected intersection approaches. The temporary reductions in speed limits are to only be in place while the OD movements are taking place and must not be visible to traffic at all other times.

4.3 Signage

4.3.1 Access Points

Hamilton-Port Fairy Road – eastern site access

Hamilton-Port Fairy Road is a declared VicRoads road and as such impact to its speed restrictions should be minimised where possible. OD vehicles will not enter or exit via this access point and therefore will not warrant a reduced speed limit in the vicinity of this t-intersection with Hamilton-Port Fairy Road.

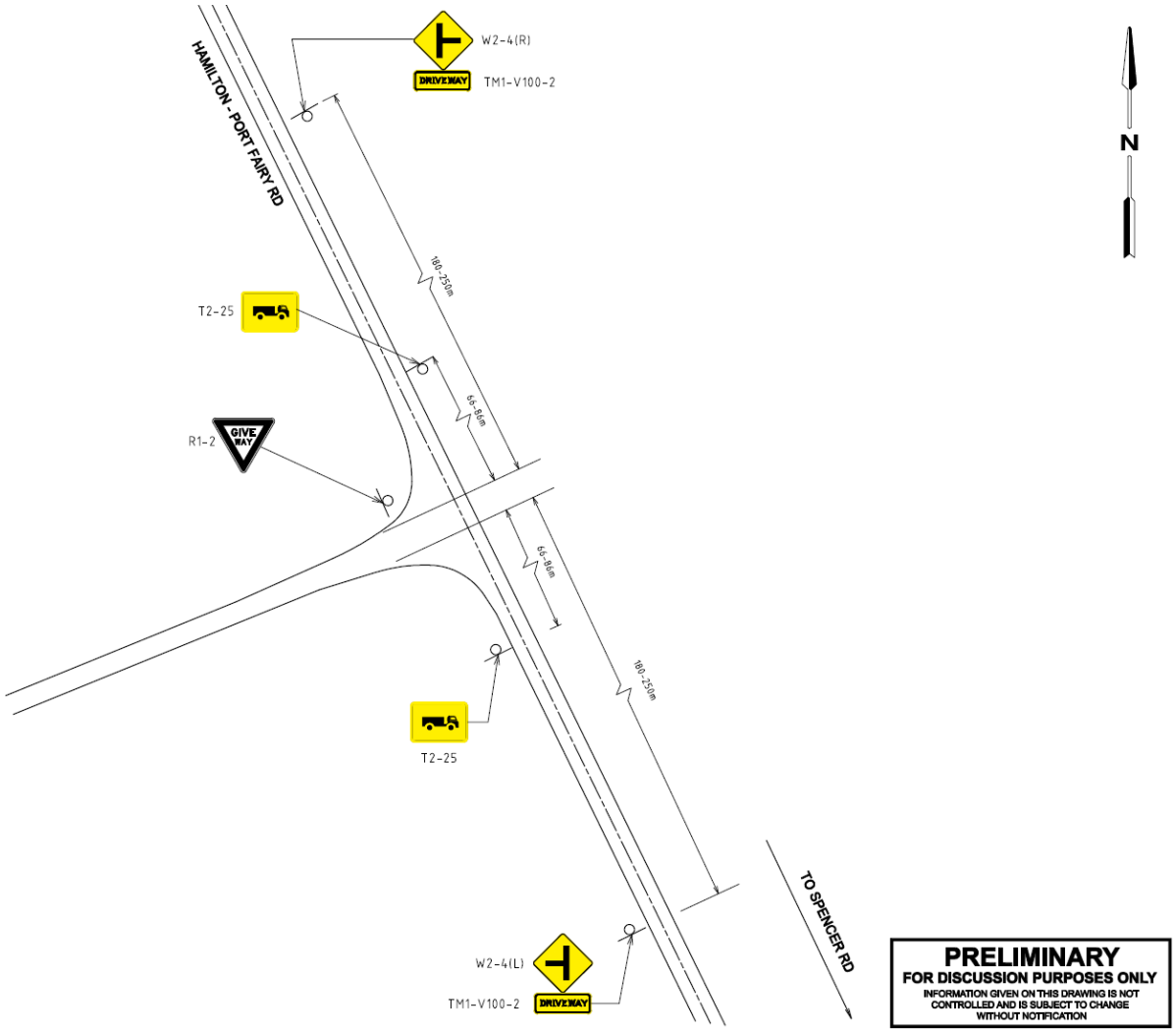
As such, construction vehicle signage is the only signage proposed to be installed along both approaches to the eastern site access in order to inform motorists of the construction activity associated with this section of this site. The 'Trucks (crossing or entering)' sign (T2-25) is to be

4 Management

installed for both approaches along Hamilton-Port Fairy Road. These signs are to be installed between 66 and 86 m from the Hamilton-Port Fairy Road / eastern site access intersection.

Figure 4-3 outlines the proposed construction vehicles signage layout at the eastern site access.

Figure 4-3 Proposed Signage Layout - Eastern Site Access



Youls Road – western site access

In order to provide safe access and egress from the site, as well as ensure safety to through traffic, advisory speed limits are to be installed along Youls Road. Youls Road currently has an unrestricted speed limit (i.e. 100km/h). It is proposed to establish an advised 80km/h speed limit to be applied only to traffic generated by the wind farm development.

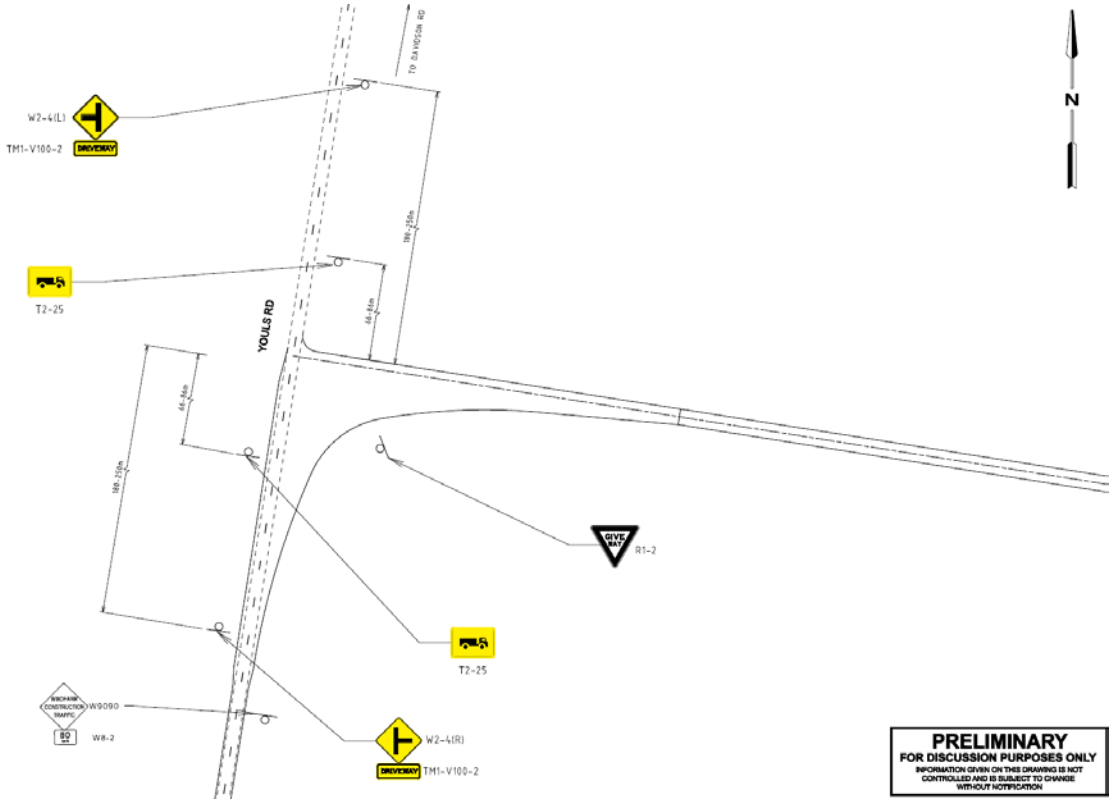
The 'Trucks (crossing or entering)' sign (T2-25) is to be installed for both approaches along Youls Road. These signs are to be installed between 66 and 86 m from the Youls Road / western site access intersection.

4 Management

Due to the adequate site distance, the control for exiting vehicles from the western site access onto Youls Road will be 'Give Way'. The installation of this sign further emphasises to construction vehicles that the normal t-intersection rule applies (i.e. terminating approach must give way).

Figure 4-4 outlines the proposed construction vehicles signage layout at the western site access.

Figure 4-4 Proposed Signage Layout - Western Site Access



The signage layout required at the Youls Road / Fingerboard Road intersection is provided in Appendix A.

4.3.2 Riverside Road Protocols

Section 3.8 indicates the signage to be installed at the sensitive area identified for Riverside Road. The measures to be put in place manage these protocols is by:

- Installation of signage prohibiting truck and personnel vehicle access;
- Inclusion of these protocols with the site induction procedures to ensure this is communicated with wind farm personnel;
- Monitoring throughout the construction phase of the project and provides appropriate follow-up measures for vehicles not adhering to these protocols; and
- Thorough inspections conducted monthly (fortnightly on Youls Road) along this road section to determine if there is evidence of prohibited activity.

4.4 Program of Regular Inspections and Road Maintenance

It is recommended that monthly (fortnightly on Youls Road) inspections be carried out during the construction period of the project by representatives of Ryan Corner Development along the OD and construction vehicle routes specified along the Princes Highway, Hamilton-Port Fairy Road and Youls Road. The purpose of these inspections is to monitor and determine whether adverse impacts to the road surface have been caused by the OD vehicle movements. It is strongly suggested that an initial inspection take place (with a photograph log) immediately prior to construction activities in order to form a baseline condition of these road sections once the upgraded works have been completed.

These monthly (fortnightly on Youls Road) inspections will focus particularly on:

- Evidence of road surfaces cracking or becoming stressed;
- Locations of newly formed potholes or rutting;
- Ensuring roadwork upgrades are safe, maintained and are trafficable;
- Signage and linemarking are erected and maintained correctly;
- Observe where OD vehicles have encroached beyond the newly constructed roads and intersection upgrades; and
- Any other indications that may illustrate that OD movements have impacted on the surrounding road network.

All inspection materials (photographs and notes) are to be logged and followed-up accordingly if necessary.

Any maintenance works shall be undertaken within one week of inspection.

Although attendance by VicRoads and Moyne Shire Council representatives may not be necessary for every monthly (fortnightly on Youls Road) inspection, it is suggested that an inspection every 3 to 4 months be carried out by representatives from all parties.

4.5 Quarry Sites and Transmission Line Sub-TMPs

4.5.1 Quarry Sites

It is acknowledged that there is potential for a large number of vehicles using the route between an off-site quarry and the Project site to transport the material required for construction of the access tracks and crane hardstand platforms. There are existing approved quarries located within the wind farm site boundary that are currently considered for the wind farm construction phase, although the use of these quarries are not finalised at this stage, however it is anticipated they will be able to service the wind farm based on the cost-effectiveness and consideration for significantly reducing the heavy haulage traffic on the public roads. If the on-site quarry option is not used, it is recommended that a sub-TMP be developed for the quarry site selection in accordance with the Schedule provided in Appendix B.

These sub-TMPs will form part of this overarching TMP and will adhere to all information provided in this document. The framework for the sub-TMP as outlined in the Schedule within Appendix B will include:

- Estimated vehicle generation;
- Preferred route;
- Pre-construction phase road condition survey along route;
- Defined maintenance schedule and/or required infrastructure upgrades;

- The identified sticker colour for quarry vehicles generated by this Project; and
- A 'make good at end of Project' statement relating to the baseline road condition survey.

4.5.2 Transmission Line

Similar to Section 4.5.1, the final alignment of the transmission line connecting the Ryan Corner Wind Farm site with the electricity grid has not been confirmed at this stage. Therefore a sub-TMP with a similar framework to the quarry sites is recommended to be developed. This framework is provided in Appendix C.

4.5.3 Concrete Material

An on site concrete batching plant is proposed for the production of concrete for use in constructing the windfarm. Raw materials for the production of concrete would be transported to site by Heavy Vehicles. The following VicRoads roads have been nominated for servicing the heavy haulage for the construction phase: B140 (Hamilton Highway), C143, C146, C164, C171. The current consideration for the off-site quarries are:

1. Davidson Quarry (owned by Davidson & Sons) Tower Hill - Bushfield Road Illowa, located south of the site, ~37km of heavy haulage corridor for deliveries via either via Princes Highway (A1) -> Penshurst - Port Fairy Road (C178) -> Penshurst - Warrnambool Road (C178) -> and Woolsthorpe – Heywood Road (C176); or via Southern Cross Road -> Mailers Flat Koroit Road -> Warrnambool - Caramut Road (C174) -> through Woolsthorpe -> Woolsthorpe - Heywood Road (C176);
2. Holcim Quarry (owned by Holcim Australia) at 765 Tarrone Lane, Tarrone, located along Tarrone Lane west of the site, ~28km of heavy haulage corridor for deliveries via western part of Tarrone Lane -> Tarrone North Lane -> Woolsthorpe – Heywood Road (C176), return trip via Penshurst – Warrnambool Road (C178) -> Tarrone Lane;

However the selection of quarry site/s has not been finalised at this stage. It is acknowledged that there is potential for a large number of vehicles using the route between the quarry and the Project site to transport the material required for construction of the access tracks and crane hardstand platforms. Selection of the appropriate route can only be determined once the selection of the preferred quarry sites has been finalised. As such, it is recommended that a sub-TMP be developed for the quarry site selection in accordance with the Schedule provided in Appendix B.

At this stage a suitable on-site water source has not been identified for use during construction as such it is currently proposed that water be transported from Warrnambool by Heavy Vehicle.

Similar to Section 4.5.1 Selection of the appropriate routes can only be determined once the selection of the preferred quarry site and potable water source have been finalised. As such, it is recommended that sub-TMPs be developed for each quarry site and potable water source selection in accordance with the Schedule provided in Appendix B.

4.6 Program of Rehabilitation

All upgraded and temporary works along road sections and intersections (as outlined in sections 3.7 and 4.1.3) are to be rehabilitated so that any damage is repaired and maintained to at least pre-construction conditions upon the conclusion of the construction phase of the project. This is in compliance with Planning Permit Condition 10(l) and includes all shoulder and road section reconstruction works, temporary intersection improvements, widened access points and signage. It should be noted that the two site accesses are to be kept as general site accesses and permit the appropriate vehicles during the operational phase of the project (i.e. delivery of replacement goods etc.).

It is expected that a VicRoads representative will sign off on the rehabilitated works once they have inspected each location and satisfied that the rehabilitated works are suitable.

Should VicRoads (or any other authority) wish for the upgraded works during the construction activities is to remain post-construction, then this can be discussed upon Ryan Corner Development's receipt of a written request.

4.7 Payment of Security Deposit

A bond of $100,000 is to be paid to Moyne Shire Council as provision for undertaking additional shoulder and pavement maintenance on Youls Road between the Princes Highway and Fingerboard Road as required during the wind farm construction phase (as advised in Council's letter dated 5 May 2010). Any unused funds will be returned to Ryan Corner Development.

It should be noted that Moyne Shire Council will rehabilitate any existing failed sections of Youls Road prior to the construction phase commencing – subject to rehabilitation works occurring during summer months.

This security deposit will be payable to Moyne Shire Council at the completion of the Youls road upgrade, and relates only to the completion of the Youls Road upgrade and no other road asset in the municipality. The road will be surveyed by representatives of Ryan Corner Development and Moyne Shire Council after the upgrade has been completed to determine its baseline condition. This security bond will revert back to Ryan Corner Development should following completion of the construction phase should the road be maintained/rehabilitated as detailed in Section 4.6.

4.8 Upgrades in Accordance with TMP

The traffic management and road upgrade and maintenance works associated with the Ryan Corner wind farm site must be carried out in accordance with this traffic management plan.

The costs of any works, including maintenance for damage caused by Ryan Corner Development construction vehicle activity, are to be at the expense of Ryan Corner Development.

4.9 Roadworks and Timetabling

The road and intersection upgrade works must align with the timetable proposed for construction activities. Although some minor activities may be able to occur without these works, OD deliveries in particular cannot commence until the intersection upgrades have been completed. Furthermore, general construction and personnel vehicles (other than OD vehicles) will require a dedicated site access in order to access and egress the site.

It is therefore suggested that the road and intersection upgrades and rehabilitation works be undertaken in the following stages;

- Stage 1; Early Works (Completed 2012)
  - Construct Hamilton-Port Fairy Road / eastern site access intersection
- Stage 2; Main Works - Prior to delivery of materials for internal site works
  - Youls Road upgrade and the widening of the Princes Highway
  - Construct Youls Road / western site access intersection
- Stage 2; Main Works - Prior to OD deliveries
  - Widening of the Princes Highway and Youls Road intersection on the north western side for OD vehicle movements. The intersection should be reduced in size with bollards installed at a maximum 20m radius when OD vehicles are not using the intersection.
- Post-construction / Operational phase
  - Rehabilitate all intersections and road sections to their condition during the pre-construction phase
  - Remediate all site access points to only cater for operational phase traffic

4.10 Measures to Manage Traffic Impacts

The measures outlined in section 3 and 4 have been included in this Traffic Management Plan to ensure that traffic impacts to the surrounding road network and background traffic are managed appropriately. In summary, the measures put in place include:

- Selecting appropriate routes given the size and number of vehicles (OD, construction and personnel movements);
- Constructing site access points that allow for single turning movements into and out of the site;
- Upgrading existing intersections on the public road network to ensure safe passage and efficient manoeuvrability of OD and construction vehicles;
- Submit applications to VicRoads and DEDJTR for approval of OD vehicle movements;
- Defining escort arrangements for OD vehicle movements;
- Acknowledge that temporary raising of overhead constraints may be required;
- Limit the operating hours to respect surrounding properties;
- Appropriate signage to be installed (particularly in the vicinity of the site access points);
- Regular inspections to ensure road sections and intersections are not being adversely impacted by construction vehicles (particularly OD vehicles);
- Rehabilitation works to road sections and intersections prior to the post-construction phase; and
- Ensuring all upgrades are in accordance with this traffic management plan.

4.11 Communications Strategy

A separate community engagement program will be developed for this Project which will include the notification requirements of the road and intersection upgrades outlined in this TMP. The details of this community engagement program will be prepared in consultation with Moyne Shire Council, VicRoads, and the community engagement committee.

5 Actions

The greatest traffic impact of the Ryan Corner wind farm development near Port Fairy will occur during the construction period of the development. Traffic generated during this phase will consist of OD vehicles, construction vehicles and personnel vehicles.

The proposed development is not expected to create a significant adverse impact on the operation of the surrounding road network when compared to background traffic. The outputs of SIDRA modelling at the four identified critical intersections indicate very small queue lengths and volumes well below capacity during the construction phase of the project. As such, impacts during the construction and operational phase of this project produce negligible impacts to the surrounding road network.

The use of OD and construction vehicles require that some localised road upgrades are required based on their swept paths and in consultation with relevant authorities. These include:

- Upgrade a total length of 2,800 m of Youls Road to a sealed formation width of 6.2 m between the Princes Highway and the western access point.
- Some reconstruction works required along Hamilton-Port Fairy Road where the pavement is distressed. The extent of re-sheeting or patching necessary is to be determined by a joint inspection between VicRoads offices and representatives from the Ryan Corner Development. (if not already done so by VicRoads)
- Install signage at Riverside Road to indicate the construction and personnel vehicle bans to be imposed.
- Construct a 'CHR treatment' at the intersection of Princes Highway and Youls Road;
- Construct the intersection of Youls Road and the site's western access (located 300 m south of the Youls Road / Davidsons Road t-intersection). This access is to be designed to have adequate provision for safe and unobstructed access and egress for vehicles up to and including the OD vehicle specified in section 2.5 of this document.
- Construct the intersection of Hamilton-Port Fairy Road and the site's eastern access (located 300 m north of the Hamilton-Port Fairy Road / Spencer Road t-intersection). This access is to be designed to have adequate provision for safe and unobstructed access and egress for vehicles up to and including B-doubles.

It is recommended that the following issues be finalised prior to commencing the construction of the main works for the Ryan Corner wind farm;

- Oversize vehicles will require permits and approvals from at least VicRoads and DEDJTR;
- Liaise with Moyne Shire Council and DEDJTR to confirm school bus operating times and routes along roads to be used by construction and OD vehicles;
- Appropriate signage will need to be installed near access points and along the surrounding road network; and
- Finalise program of regular inspections and rehabilitation works.
- Prepare community engagement program to notifications of activities.

A summary of the timetabling required to manage traffic impacts is outlined in Table 5-1.

5 Actions

Table 5-1 Timetable for Traffic Management Plan

PRE INTERNAL SITE CONSTRUCTION	INTERNAL SITE CONSTRUCTION	POST CONSTRICTION
• Upgrade Princes Highway / Youls Road intersection • Upgrade length of Youls Road between Princes Highway and western site access • Update TMP if local roads not assessed in this document are to be used by construction vehicles (i.e commercial vehicles to/from local quarries and industries) • Agreements be made with the relevant authorities to confirm certain details of this TMP as outlined by the actions in section 5 • Construct all site access points • Submit permits and attain approvals from the relevant authorities (including VicRoads and DEDJTR) • Install signage • Perform first monthly (fortnightly on Youls Road) inspection to note baseline conditions of upgraded intersections and road network • OD contractor to perform pre-delivery audit of overhead cables along OD route, and temporary raising to be performed if insufficient clearances • Prepare community engagement program to notifications of activities.	• Deliver material and goods to the site • Conduct monthly (fortnightly on Youls Road) inspections • Perform maintenance works based on outcomes of monthly (fortnightly on Youls Road) inspections	• Rehabilitate all upgraded intersections and road sections to their existing condition • Remediate all site access points to only cater for operational phase traffic • Continue operational phase of wind farm

6 Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Ryan Corner Development Pty Ltd and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the Proposal dated 13 March 2009.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

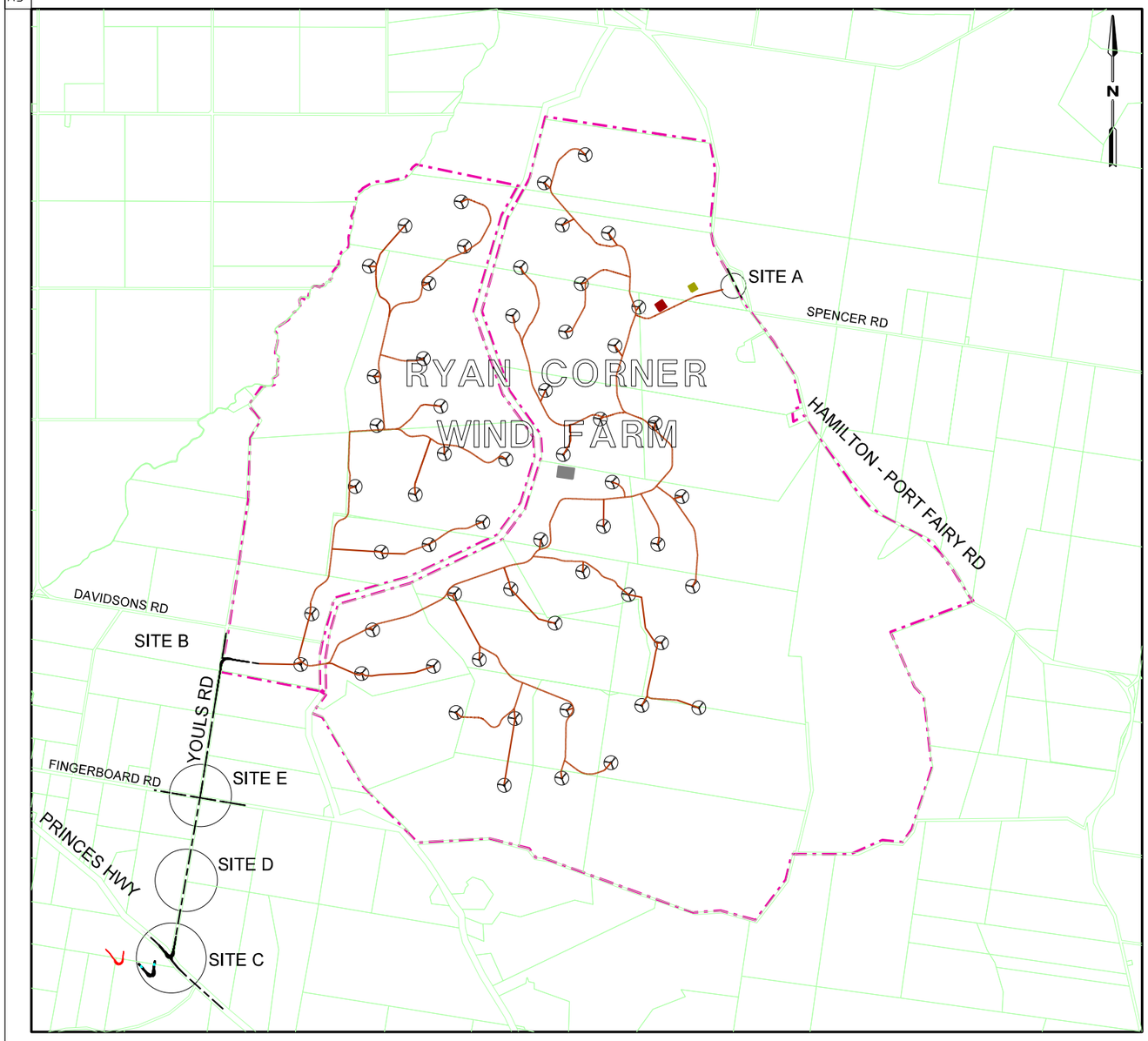
This report was prepared between 31 August 2009 and March 2017 (and revised in February 2017) and is based on the information supplied and reviewed by Ryan Corner Development Pty Ltd at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

A

Appendix A Engineering Plans

A3



LOCALITY PLAN

DRG INDEX

SHEET No.	TITLE
100	LOCALITY PLANS & DRAWING INDEX
110	TYPICAL SECTIONS
120	TURNING MOVEMENTS SITE A
121	TURNING MOVEMENTS SITE B
122	TURNING MOVEMENTS SITE C
123	SIGNAGE PLAN FOR SITE A
124	SIGNAGE PLAN FOR SITE B
125	SIGNAGE PLAN FOR SITE E
126	WIDENED SHOULDER AT SITE D

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E	GRS		09.09.15	TURBINE LAYOUT UPDATED
D	GM		14.05.10	ADDED SHEETS
C	LL		22.01.10	SHEET 124 ADDED
B	GM		18.01.10	AS PER CLIENT REVIEW
A	LL		07.12.09	DRAFT CONCEPT ISSUE

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Drawn: GCM / LL
Checked: P.C
Approved:
Scale in meters: Hor 0 500 1000; Ver 0

Client: RYAN CORNER DEVELOPMENT P/L

Project Title: RYAN CORNER WINDFARM TRAFFIC MANAGEMENT

Drawing Title: LOCALITY PLAN & DRAWING INDEX

Status: DRAFT CONCEPT
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Date: 07.12.09
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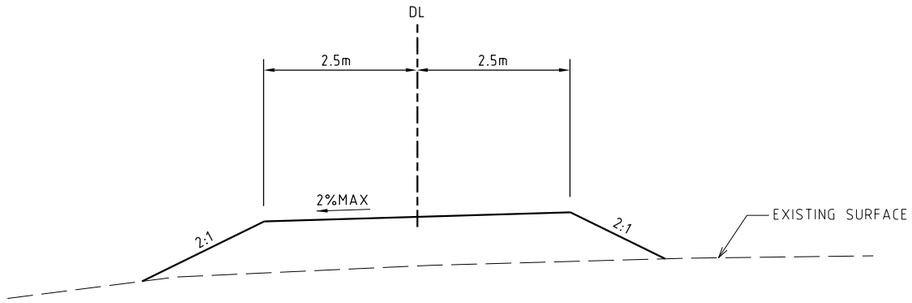
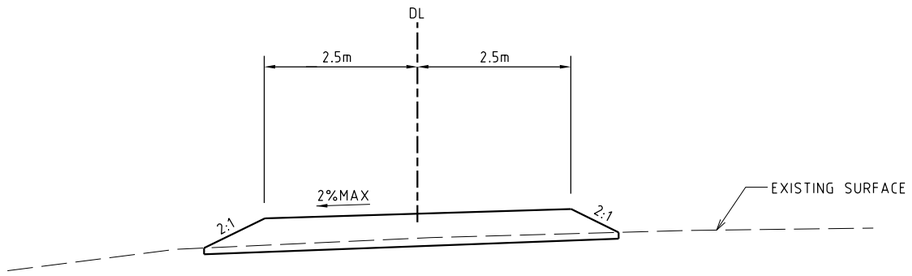
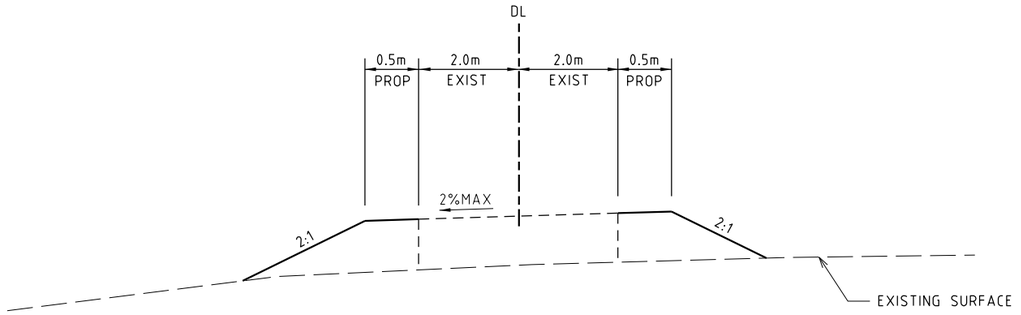


TYPICAL CROSS SECTION IN FILL
(NTS)



TYPICAL CROSS SECTION IN CUT
(NTS)

CROSS SECTION
AT 6.2m WIDTH
(NTS)



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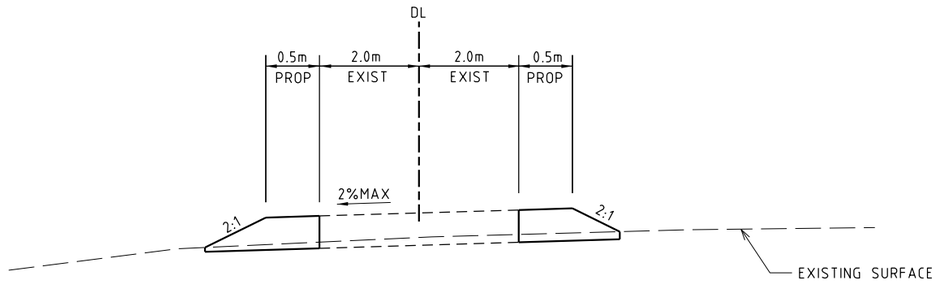
(YOULS ROAD UPGRADES)
(NTS)



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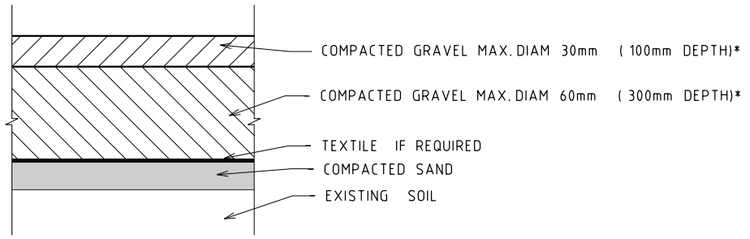

PAVEMENT DETAILS
(NTS)

NOTE:

* SURFACE OF COMPACTED GRAVEL IS TO MEET SURFACE LEVEL OF EXISTING ROADWAYS.
* SPRAY SEAL TO BE IN PLACE FOR ALL UPGRADES ADJACENT TO PRINCES HWY.

GENERAL NOTE: GUARDFENCE TO BE INSTALLED ON FILLS GREATER THAN 2 METERS.

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B	GM		13.05.10	REVISED CROSS SECTIONS
A	LL		07.12.09	DRAFT CONCEPT ISSUE

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Drawn GCM / LL
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Scale in meters Hor 0 N.T.S Ver 0

Client: RYAN CORNER DEVELOPMENT P/L

Project Title: RYAN CORNER WINDFARM TRAFFIC MANAGEMENT

Drawing Title: TYPICAL SECTIONS

Status: DRAFT CONCEPT
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Date: 07.12.09
CAD File Number: $FILE$
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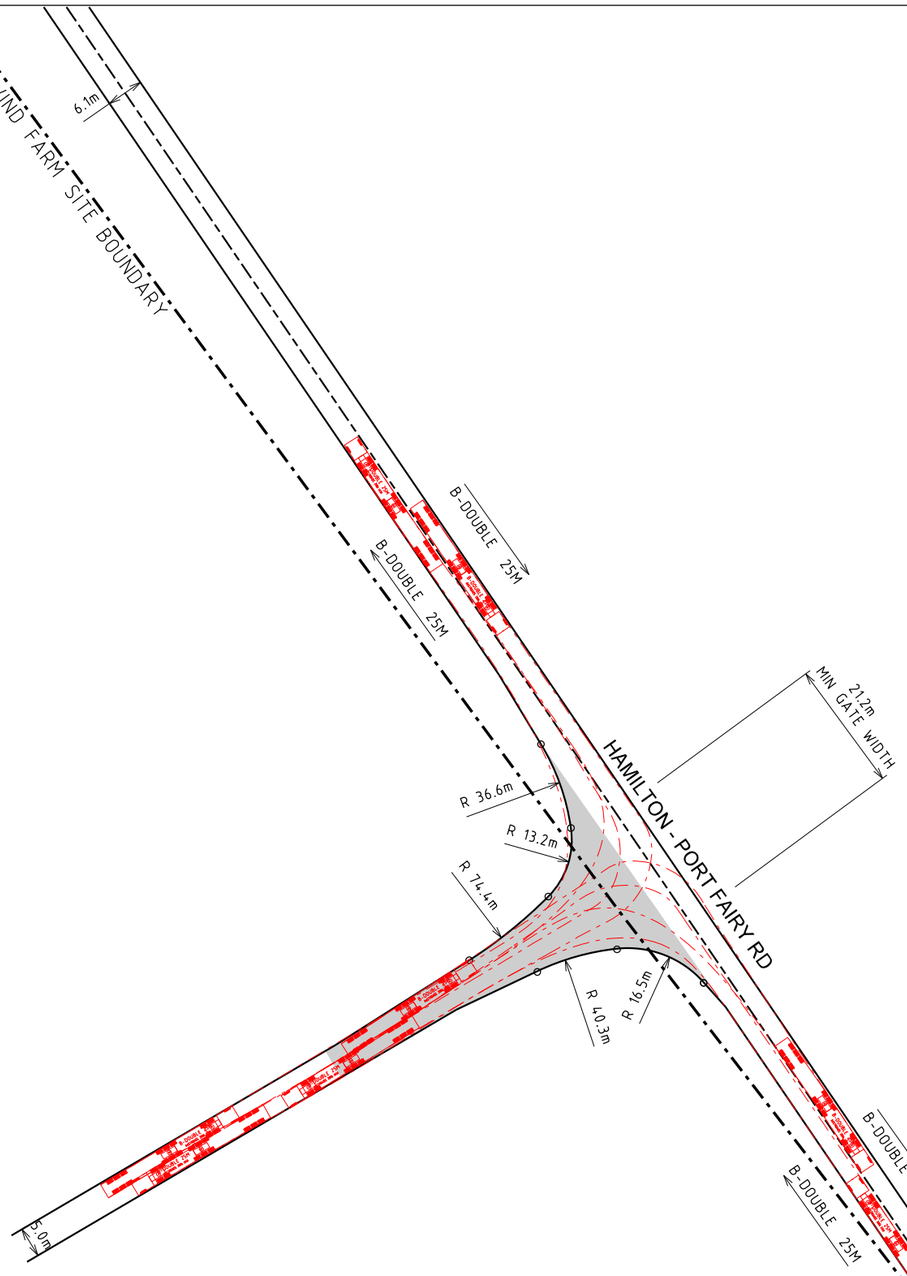
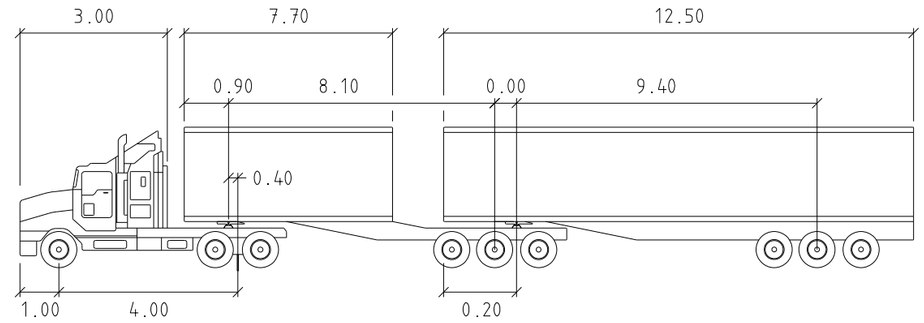


LEGEND

TOTAL AREA TO BE CONSTRUCTED = 577m`

NOTE:
APPROPRIATE TRAFFIC MANAGEMENT TO BE IN PLACE WHERE VEHICLES ENCROACH ONTO INCORRECT SIDE OF ROAD.



B-DOUBLE 25M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.00
Trailer Width	: 2.50	Steering Angle	: 20.60
Tractor Track	: 2.50	Articulating Angle	: 70.00
Trailer Track	: 2.50		

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A	LL		07.12.09	DRAFT CONCEPT ISSUE

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Drawn: GCM / LL
Checked: P.C
Approved:
Scale in meters: Hor 0 10 20, Ver 0

Client: RYAN CORNER DEVELOPMENT P/L

Project Title: RYAN CORNER WINDFARM TRAFFIC MANAGEMENT

Drawing Title: SITE ACCESS TURNING MOVMENTS SITE A

Status: DRAFT CONCEPT
Datum: AMG66/54
Date: 07.12.09
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Rev: B

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A3

TO DAVIDSON RD

YOULS RD

R 5.0m

MIN GATE WIDTH 45.0m

R 200.0m

R 53.0m

R 250.0m

CLEAR ZONE

B-DOUBLE TRUCK

WIND FARM TRUCK

B-DOUBLE TRUCK

WIND FARM TRUCK

5.0m

B-DOUBLE TRUCK

6.2m

B-DOUBLE TRUCK

WIND FARM TRUCK

WIND FARM TRUCK

4.0m

5.0m

WIND FARM BOUNDARY

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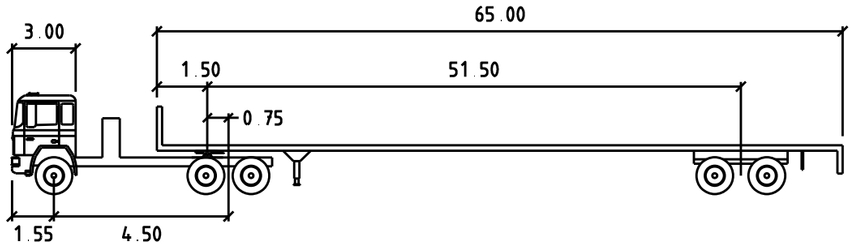

WINDFARM TRUCK

	meters		
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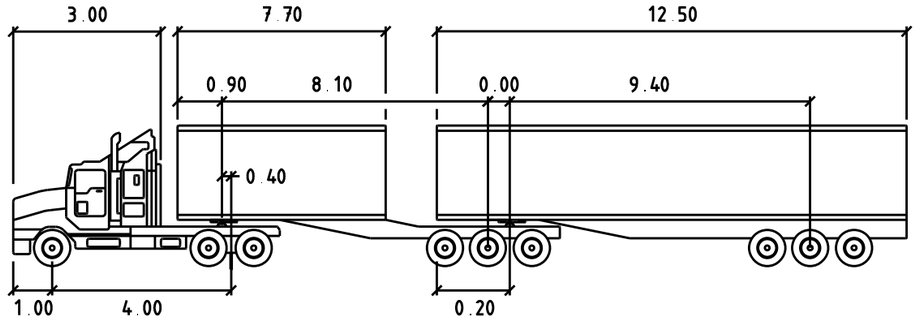
Trailer Width	: 5.00	Steering Angle	: 7.66
Tractor Track	: 2.50	Articulating Angle	: 70.00
Trailer Track	: 2.50		



B-DOUBLE 25M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.00
Trailer Width	: 2.50	Steering Angle	: 20.60
Tractor Track	: 2.50	Articulating Angle	: 70.00
Trailer Track	: 2.50		

LEGEND

TOTAL AREA TO BE CONSTRUCTED = 1972m²

NOTE:
APPROPRIATE TRAFFIC MANAGEMENT TO BE IN PLACE WHERE VEHICLES ENCROACH ONTO INCORRECT SIDE OF ROAD.

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D	GRS	EDP	26.08.15	UPDATED OD VEHICLE TEMPLATE
C	GRS		17.10.14	UPDATED OD VEHICLE TEMPLATE
B	GM		18.05.10	AS PER CLIENT REVIEW
A	LL		07.12.09	DRAFT CONCEPT ISSUE

Designed GCM
Drawn GCM / LL
Checked P.C
Approved
Scale in meters Hor 0 10 20 Ver 0

Client: RYAN CORNER DEVELOPMENT P/L

Project Title: RYAN CORNER WINDFARM TRAFFIC MANAGEMENT

Drawing Title: SITE ACCESS TURNING MOVMENTS SITE B

Status: DRAFT CONCEPT

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Date: 07.12.09

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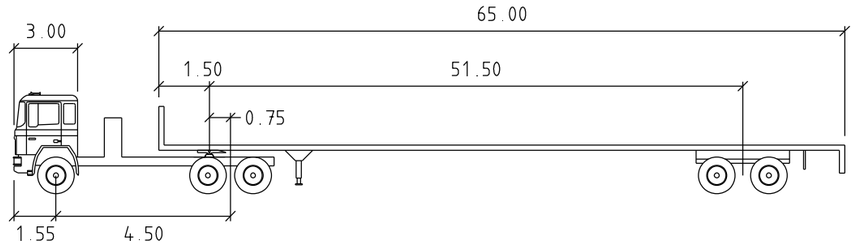

WINDFARM TRUCK

meters

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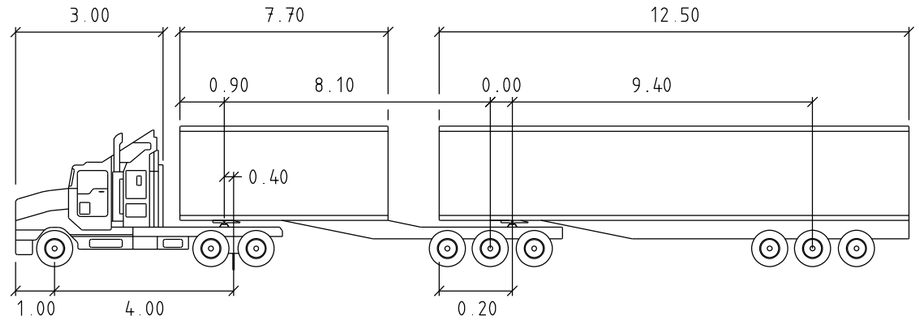
Trailer Width	: 5.00	Steering Angle	: 7.66
Tractor Track	: 2.50	Articulating Angle	: 70.00
Trailer Track	: 2.50		



B-DOUBLE 25M

meters

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Trailer Width	: 2.50	Steering Angle	: 20.60
Tractor Track	: 2.50	Articulating Angle	: 70.00
Trailer Track	: 2.50		

LEGEND

TOTAL AREA TO BE CONSTRUCTED = 2760m²

NOTE:
APPROPRIATE TRAFFIC MANAGEMENT TO BE IN PLACE WHERE VEHICLES ENCROACH ONTO INCORRECT SIDE OF ROAD.

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D	GRS	EDP	26.08.15	UPDATED OD VEHICLE TEMPLATE
C	GRS		17.10.14	UPDATED OD VEHICLE TEMPLATE
B	GM		18.05.10	AS PER CLIENT REVIEW
A	LL		07.12.09	DRAFT CONCEPT ISSUE

Designed: GCM
Drawn: GCM / LL
Checked: P.C
Approved:
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Client: RYAN CORNER DEVELOPMENT P/L

Project Title: RYAN CORNER WINDFARM TRAFFIC MANAGEMENT

Drawing Title: SITE ACCESS TURNING MOVMENTS SITE C

Status: DRAFT CONCEPT
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Date: 07.12.09
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Sheet Number: 122
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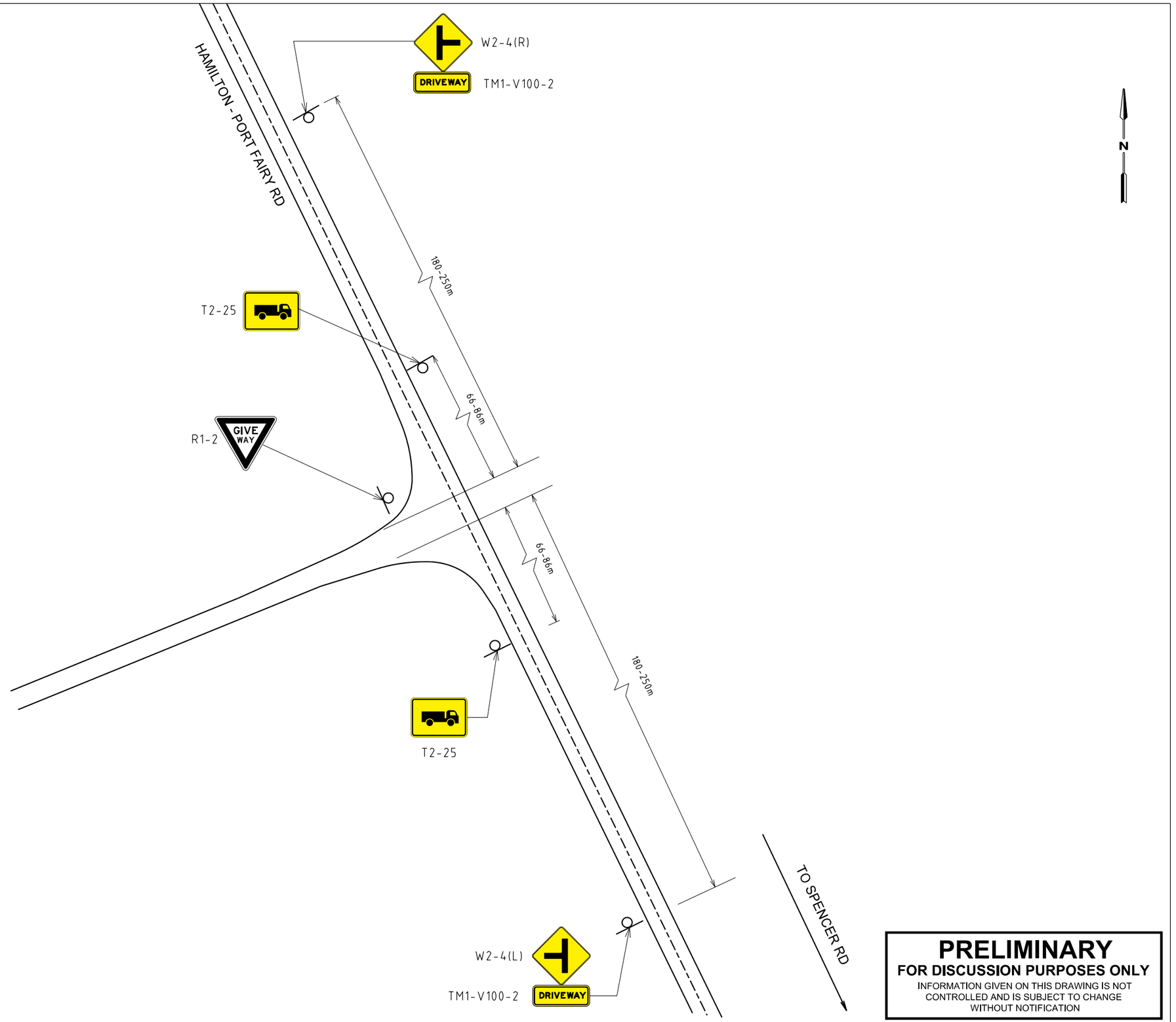

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Approved:
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Client: RYAN CORNER DEVELOPMENT P/L

Project Title: RYAN CORNER WINDFARM TRAFFIC MANAGEMENT

Drawing Title: SIGNAGE PLAN FOR SITE A

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Date: 22.01.10

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Rev: A

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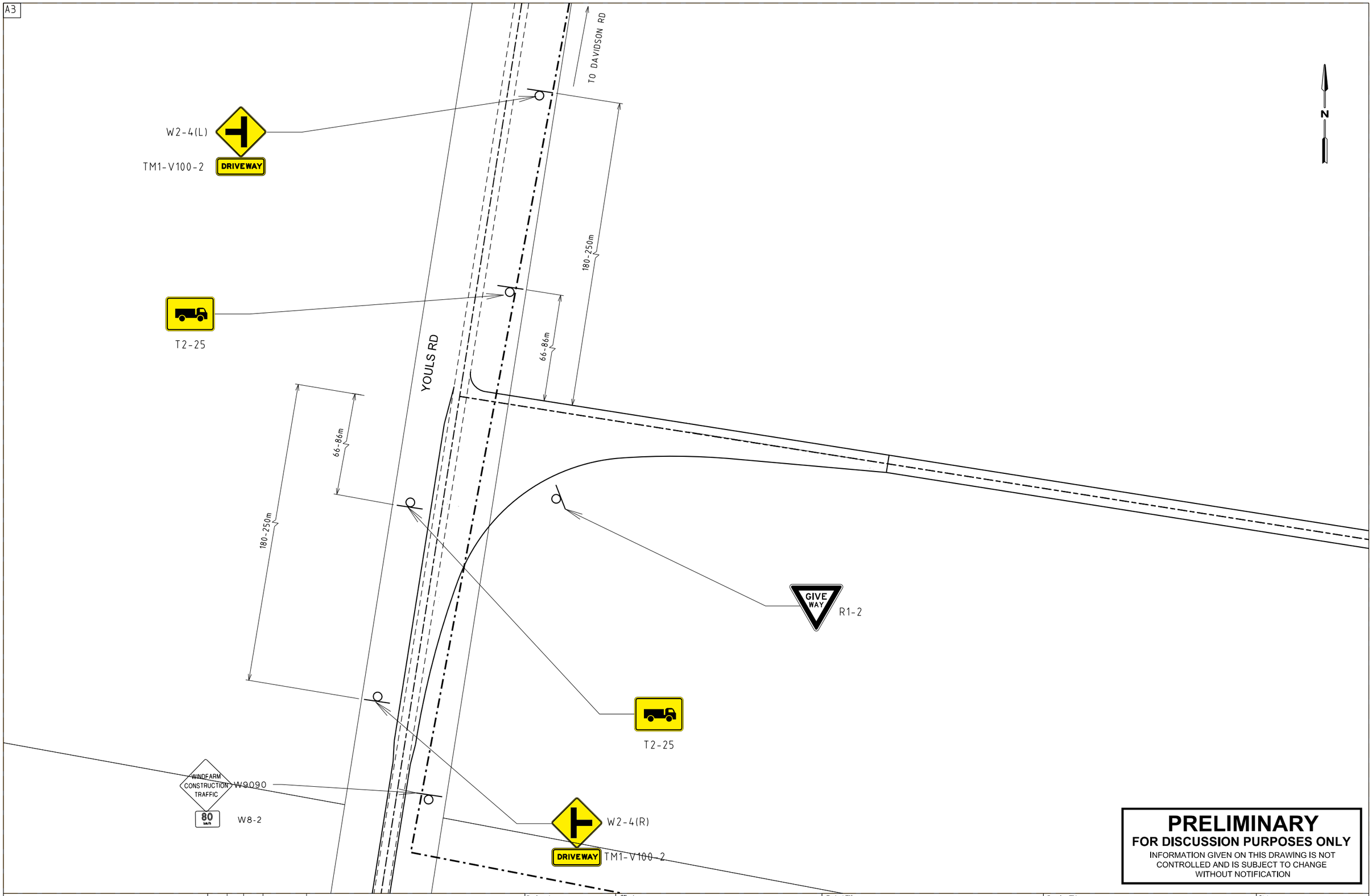

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A	LL		22.01.10	DRAFT CONCEPT ISSUE

Designed: GCM
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Client: RYAN CORNER DEVELOPMENT P/L

Project Title: RYAN CORNER WINDFARM TRAFFIC MANAGEMENT

Drawing Title: SIGNAGE PLAN FOR SITE B

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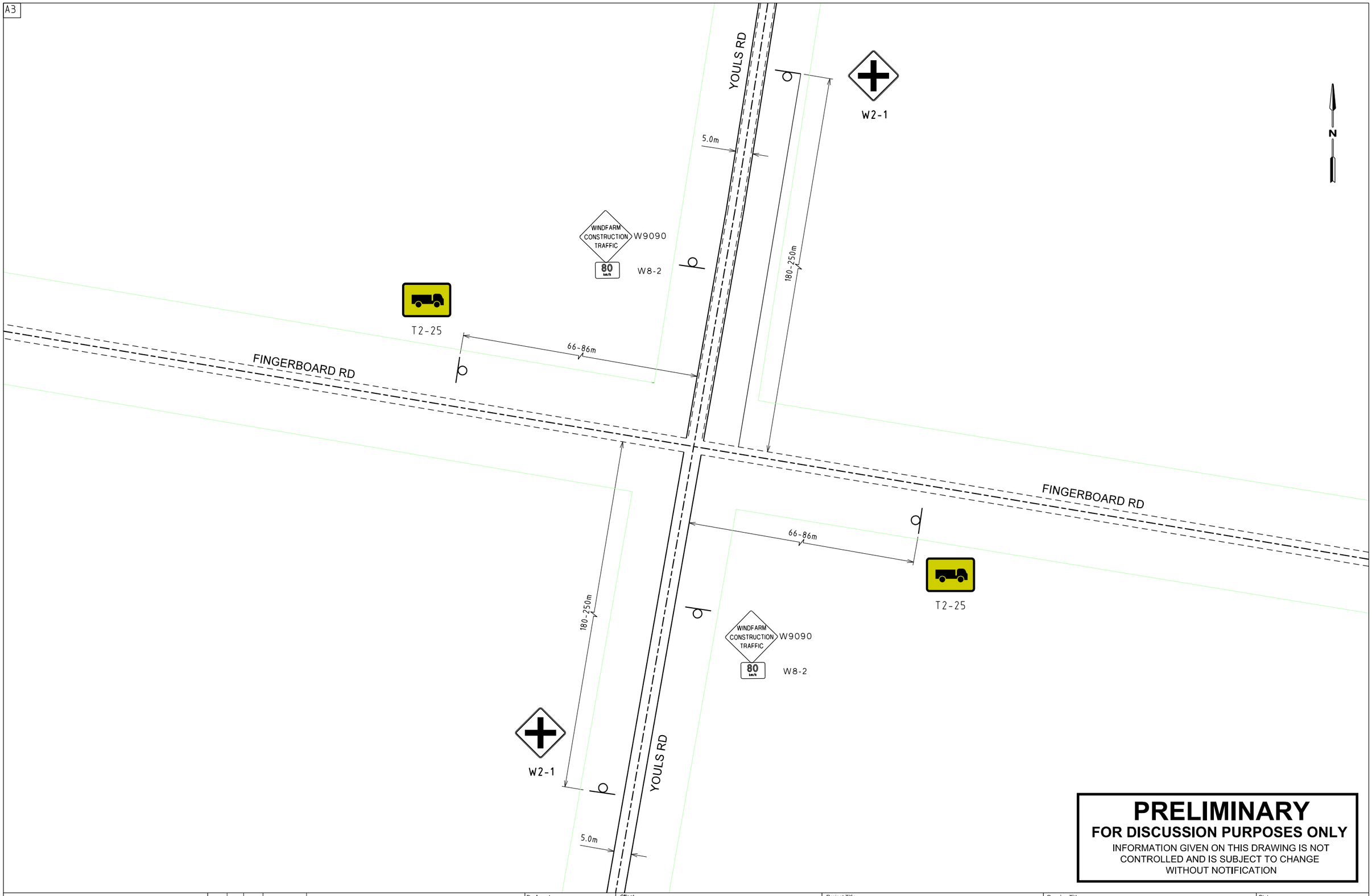

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Rev	By	App	Date	REVISION RECORD
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Checked P.C
Approved
Scale in meters
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Ver 0

Client: RYAN CORNER DEVELOPMENT P/L

Project Title: RYAN CORNER WINDFARM TRAFFIC MANAGEMENT

Drawing Title: SIGNAGE PLAN FOR SITE E

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Date: 07.12.10
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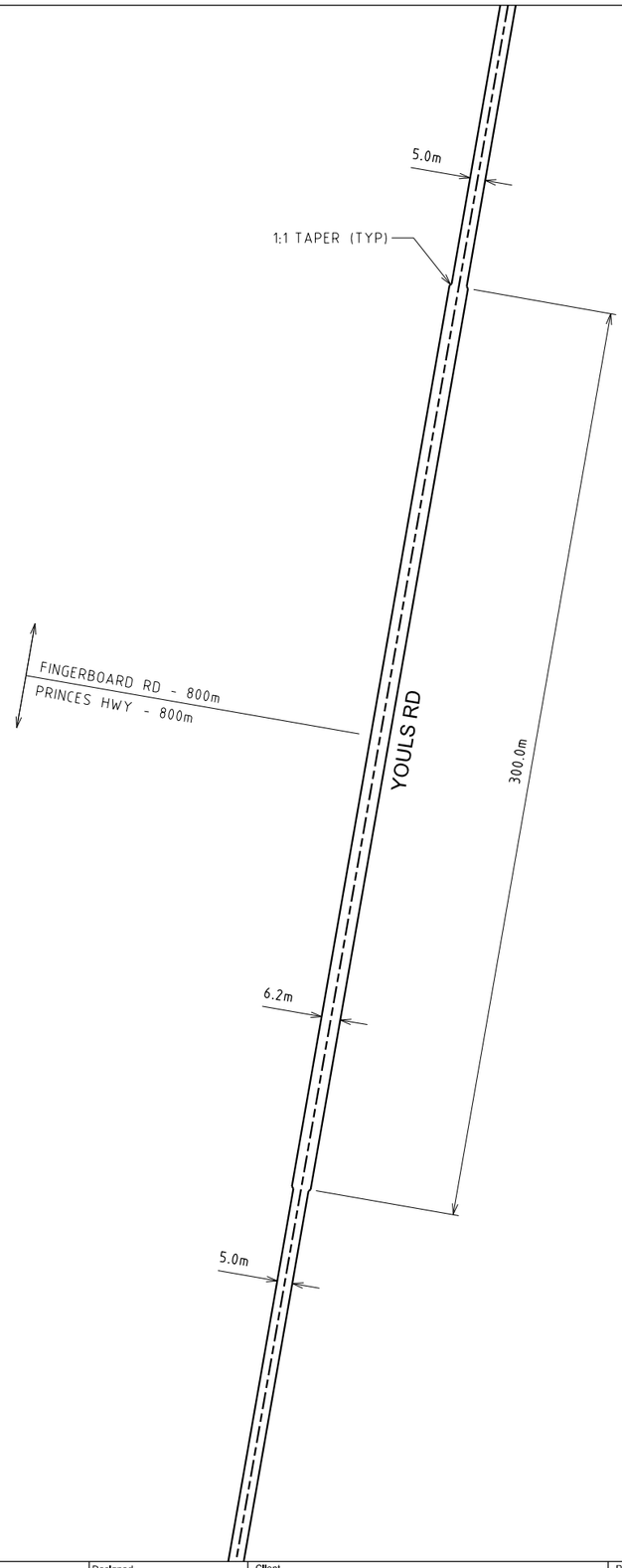

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PRELIMINARY

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Client: RYAN CORNER DEVELOPMENT P/L

Project Title: RYAN CORNER WINDFARM TRAFFIC MANAGEMENT

Drawing Title: WIDENED SHOULDER AT SITE D

Status: DRAFT CONCEPT

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Rev: A

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B

Appendix B Quarry Sub-TMP Schedule Framework

Appendix B

Table: Quarry Sub-TMP Schedule Framework

Sub-TMP Section	Summary of Section Particulars
Introduction	• Detail that the Sub-TMP is attached to the Ryan Corner Wind Farm TMP • Provide an overview of the quarry site location respective to the Ryan Corner site
Quarry Activities	• Detail material type and quantities to be transported to the Ryan Corner site • Provide estimate of vehicle generation based on material required
Defined Routes	• Summarise consultation with the respective road authorities/stakeholder (VicRoads, local Council and DEDJTR) in relation to the route options identified between quarry and the Ryan Corner site • Detail preferred route for construction vehicles between quarry and Ryan Corner site. Maps showing routes to be provided.
Existing Conditions	• Detail the existing condition of each of the road sections along the preferred route including current traffic volumes, road geometry, linemarking/delineation measures, pavement condition, surrounding vegetation, infrastructure constraints (i.e. bridge load limits, overhead tress/wires, potential alignment issues etc.), key intersections and other observations. • Undertake pre-condition phase road condition survey along preferred route in conjunction with representatives from the relevant road authority • Outline native vegetation removal that may be required along route
Route Assessment	• Assess key intersections along defined route to determine whether operational performance is impacted by quarry transport vehicle generation • Undertake an additional assessment along the defined route to determine the cumulative impacts with other projects in the area (if information is available) • Perform swept path analysis at locations where horizontal alignment may be restrictive (particularly at intersections) • Outline road section and/or intersection upgrades required based on assessment of intersection operational performance and swept paths analysis • Provide engineering drawings for required infrastructure upgrades (to be submitted and approved by relevant road authority)
Management and Mitigation Measures	• Define maintenance schedule and/or required infrastructure upgrades based on route assessment outcomes • Outline the roadworks required and the proposed timetabling • Specify the program of regular inspections along the route • Indicate particular operating hours and/or speed limits if these are to apply along sections of the route (particularly with reference to school bus routes) • Detail the security bond required (if any) for use of the particular route based on consultation with the respective road authority • A provision stipulating that the Proponent will 'make good at end of Project' of all road sections used to transport material between the quarry and the Ryan Corner site • A defined sticker colour is to be adopted and applied to all vehicles transporting materials between the quarry and the Ryan Corner site – this is to be determined through consultation with DEDJTR (for identification purposes for the public)
Actions	• Summarise the works/requirements that are to be undertaken during the pre-construction, construction and post-construction phases of the Sub-TMP activities

C

Appendix C Transmission Line Sub-TMP Schedule Framework

Appendix C

Table: Transmission Line Sub-TMP Schedule Framework

Sub-TMP Section	Summary of Section Particulars
Introduction	• Detail that the Sub-TMP is attached to the Ryan Corner Wind Farm TMP • Provide an overview of the transmission line connection site location respective to the Ryan Corner site
Transmission Line Activities	• Detail material type and quantities required along the transmission line alignment and at connection site • Provide estimate of vehicle generation based on material required
Defined Routes	• Summarise consultation with the respective road authorities/stakeholder (VicRoads, local Council and DEDJTR) in relation to the route options identified between transmission line alignment and the Ryan Corner site • Detail preferred route for construction vehicles between transmission line alignment and Ryan Corner site. Maps showing routes to be provided.
Existing Conditions	• Detail the existing condition of each of the road sections along the preferred route including current traffic volumes, road geometry, linemarking/delineation measures, pavement condition, surrounding vegetation, infrastructure constraints (i.e. bridge load limits, overhead tress/wires, potential alignment issues etc.), key intersections and other observations. • Undertake pre-condition phase road condition survey along preferred route in conjunction with representatives from the relevant road authority • Outline native vegetation removal that may be required along route
Route Assessment	• Assess key intersections along defined route to determine whether operational performance is impacted by vehicles generated during the construction of the transmission line • Undertake an additional assessment along the defined route to determine the cumulative impacts with other projects in the area (if information is available) • Perform swept path analysis at locations where horizontal alignment may be restrictive (particularly at intersections) • Outline road section and/or intersection upgrades required based on assessment of intersection operational performance and swept paths analysis • Provide engineering drawings for required infrastructure upgrades (to be submitted and approved by relevant road authority)
Management and Mitigation Measures	• Define maintenance schedule and/or required infrastructure upgrades based on route assessment outcomes • Outline the roadworks required and the proposed timetabling • Specify the program of regular inspections along the route • Indicate particular operating hours and/or speed limits if these are to apply along sections of the route (particularly with reference to school bus routes) • Detail the security bond required (if any) for use of the particular route based on consultation with the respective road authority • A provision stipulating that the Proponent will ‘make good at end of Project’ of all road sections used by vehicles during the construction of the transmission line
Actions	• Summarise the works/requirements that are to be undertaken during the pre-construction, construction and post-construction phases of the Sub-TMP activities

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