REX J ANDREWS
ENGINEERED TRANSPORTATION

TRANSPORT MANAGEMENT PLAN:

BODANGORA WINDFARM:

EX NEWCASTLE PORT.

27/08/2015 REV 00

Rev.	Date	Change	Responsible	Checked
00	26/08/15	Route Assessed	W Andrews	✓
00	27/08/15	Report compiled	W Andrews	✓
00	27/08/15	Report completed	W Andrews	✓

Index:

1.0 Introduction

This document describes observations and previous experience on route and explains the Transport of Wind turbine equipment from Newcastle Port to the Bodangora wind farm project.

This Route study took place on 26-08-15.

2.0 Evaluation

1	No Cost
2	Some Work
3	Urgent Modification
4	Extreme Amount of Work

(Mark below boxes with an X)

		1	2	3	4
A	Harbour	X			
B	Road Modification			X	
C	Road Furnishings		X		
D	Trees		X		
E	Site Entrance			X	
F	Bridge Calculations		X		
G	Traffic Control	X			

3.0 Project data.

Date of latest Route Assessment. 26/08/2015

Survey undertaken by. (Rex J Andrews P/L)

Project name. Bodangora wind farm

Location. Newcastle port (NSW) to Bodangora (NSW)

4.0 Site Location.

The Bodangora Wind farm is located approx. 250 Kilometers West of Newcastle and 20 Kilometres north east of Wellington. It is 381 Kilometers by road from Newcastle port.

5.0 Transport combinations.

Quantity. 30 x GE WTG's 3.2MW 130-85HH.

Component	Type	# units	Length	Top Diameter	Bottom Diameter	Weight
Nacelle		33	9.5	4.0	3.8	87.0
Hub		30	3.8	3.5	3.3	29.0
Nose cone		33	2.9	2.9	1.8	.8
Blade		99	63.7	4.2	2.5	16.1
Transformer		33	2.9	2.6	3.0	11.0
Controller		33	3.9	3.2	3.2	5.6
Convertor		33	2.8	1.1	2.8	4.0
Base Tower		33	12.0	4.3	4.3	46.0
Mid sect B		33	20.6	4.3	4.3	52.5
Mid sect A		33	23.8	4.3	4.3	46.0
Top section		33	24.3	4.3	3.1	36.0
Adapter		33	4.8	4.8	1.0	9.8

6.0 Selected Route.

We have based this study on the turbine components, and all imported towers entering Australia via Newcastle port.

Route to start of Project for all components (381 kilometres): After completing this route survey, we believe the following is the most suitable option.

This route took us via Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Castlereagh Highway, Goolma Road, Gillinghall Road.

7.0 Transport approvals required.

Approvals will need to be sought from the following departments.

- RMS
- TMC
- NSW Police
- Ausgrid
- Essential energy
- Telstra
- ARTC
- CRN John Holland
- Mid Western council
- Wellington council
- Newcastle city council

8.0 Port of Import.

The wind turbine equipment will be imported from various countries, and will arrive on ships into the Port of Newcastle. The client may alternately source local towers. The ideal berth for these shipments is the Mayfield #4 Berth. This facility has a hardstand storage area of roughly 200,000 s/q meters, adjacent to the berth.

Access from the storage to the Public roads, is via a port operated road onto Selwyn Street. This route has no Obstacles.

Image 1: Port overview.

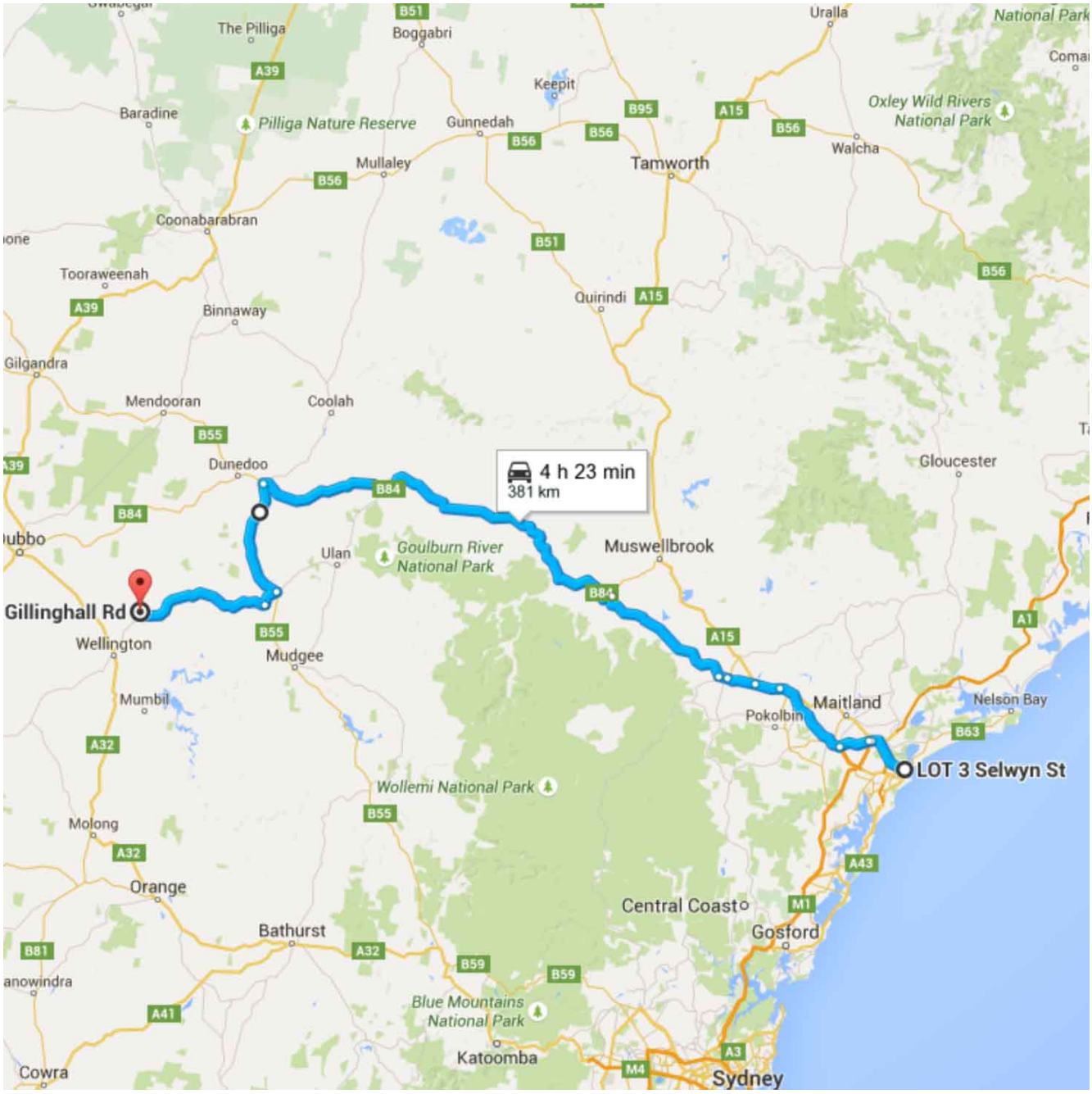
Image 2: Mayfield #4 Berth

Image 3: Mayfield #4 Port storage area.

9.0 Route Survey: Newcastle Port to Bodangora.

Distance of route: 381 Km's

Route: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Castlereagh Highway, Goolma Road, Gillinghall Road.



0.0 Km's: Mayfield #4 onto Selwyn Street at Mayfield.

Image 1:

Image 2:

PROCEDURE: Right hand turn from port access road onto Selwyn Street.

COMMENTS: Blade tips can overhang the chain wire fence on the left hand side if required. The fence has a maximum height of 2.1 metres. The bottom of the tip up to 10 metres in would approx. 2.6 metres from ground level.

CONCLUSION: No problems with this section of road. Spotter to watch the rear of blade as the load turns the corner. Spotter to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

0.4 Km's: Rail crossing over Selwyn Street at Mayfield.

PROCEDURE: Travel over crossing.

COMMENTS: Large width clearance and good ground clearance over this crossing.

CONCLUSION: No problems with this section of road.

NOTE: ARTC approval will need to be obtained to travel over this crossing. Likely to cross with caution, no escort required.

1.3 Km's: Selwyn Street onto Industrial Drive, via George Street at Mayfield.

Image 1:

Image 2:

Image 3:

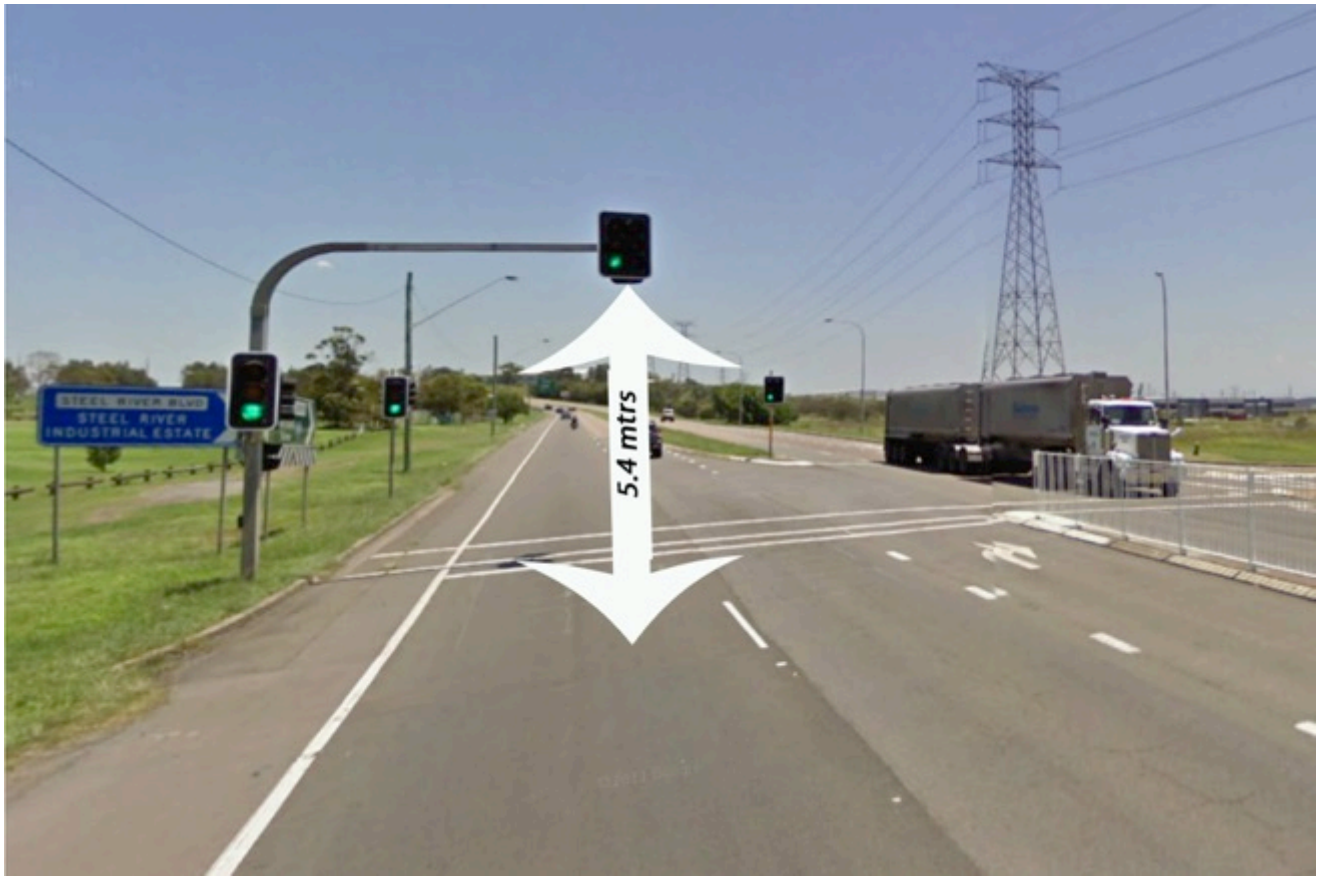
PROCEDURE: Right hand turn from Selwyn Street through George Street and onto Industrial Drive.

COMMENTS: The first right hand turn through George Street has no obstructions. Entering Industrial Drive the loads will cross to the right of the traffic signal in the centre of the intersection, and over the median strip.

CONCLUSION: No problems with this section of road. Overhang has no obstruction. Spotter to watch the traffic signal on the inside of the corner. Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

4.9 Km's: Standard overhanging Traffic signals Mayfield to Hunter Expressway.



PROCEDURE: Overhanging signals while travelling through, or turning at an intersection.

COMMENTS: The lowest signal has 5.4 metres clearance. This signal is on the corner of Steel River Blvd at Mayfield West.

CONCLUSION: Loads with an overall height of 5.3 or higher, can avoid this signal by travelling in the centre lane. Loads to slow down while doing this manoeuvre. All other signals exceed 5.6 metres high on this section of road.

5.5 Km's: Industrial Drive onto Maitland Road at Mayfield West.

Image 1:

Image 2:

PROCEDURE: Right hand turn from Industrial Drive onto Maitland Road.

COMMENTS: Large right hand sweeping corner, traffic signal on the centre of the intersection, and signs on the left.

CONCLUSION: Care to be taken with this section of road. Overhang will be tight on the left side as the load starts the turn. Spotter to watch the overhang on the rear of the load. Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

13.9 Km's: Lowest structure (Bridge or Sign) between Mayfield and the Hunter Expressway.

PROCEDURE: Lowest structure between Port and Hunter Expressway.

COMMENTS: At its lowest point in the centre of the road, the sign has 5.95 metres clearance.

CONCLUSION: No problems with this section of road.

18.4 Km's: Intersection of John Renshaw Drive and M1 at Beresfield.

Image 1:

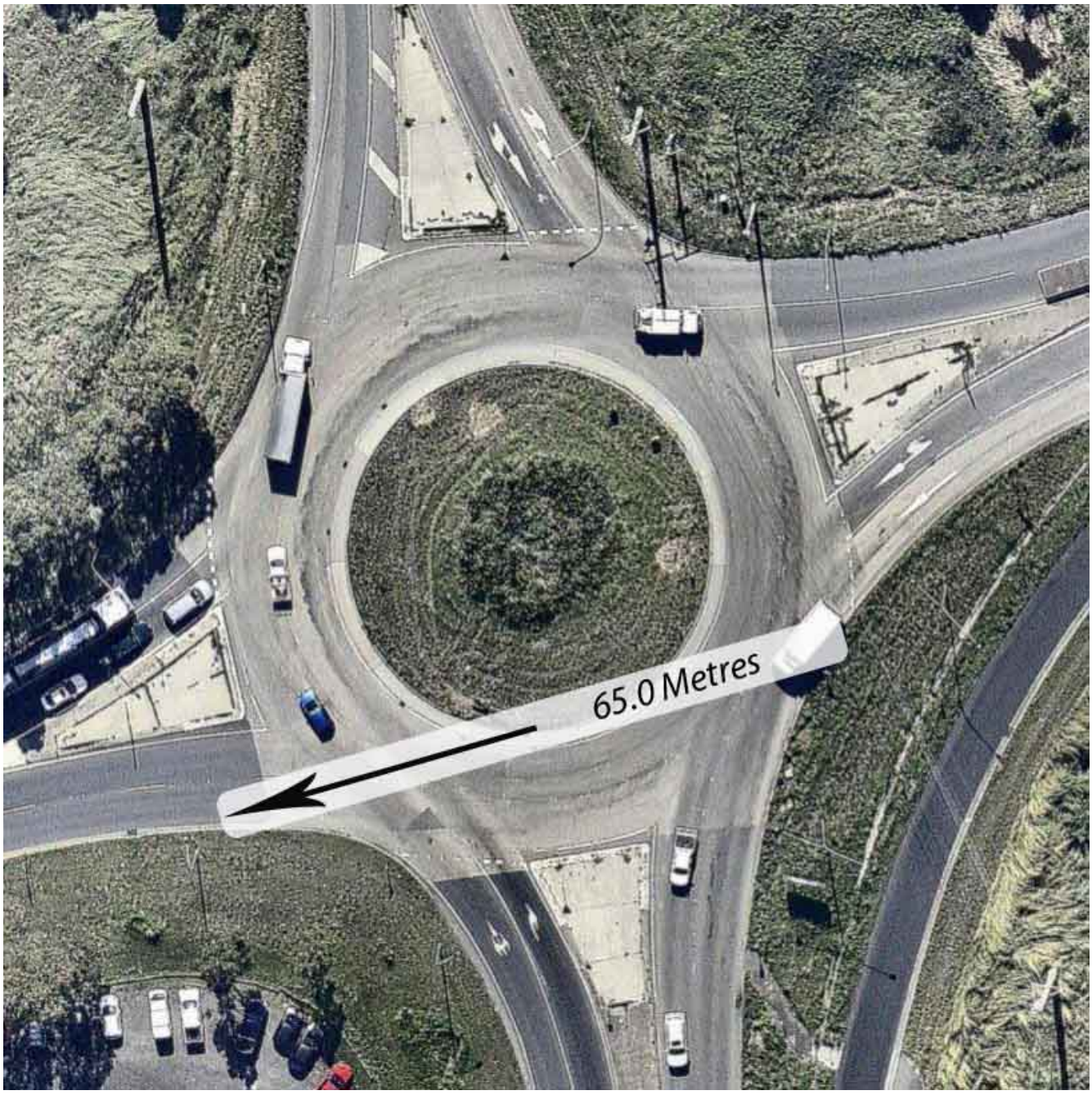


Image 2:

PROCEDURE: After loads veer left of the New England Highway and onto John Renshaw Drive, they will enter the Roundabout at the intersection of the M1, and travel straight through.

COMMENTS: Large dual lane roundabout with low delineators approx. 800 mm in height. Signs on the left as loads enter the roundabout.

CONCLUSION: Care to be taken with this section of road. Overhang will be tight on the left side as the load starts the turn. Spotter to watch the overhang on the rear of the load. Or alternatively the sign can be removed, than no obstructions at all.

Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

28.7 Km's: John Renshaw Drive onto the Hunter Expressway at Buchanan.

PROCEDURE: Right hand turn around roundabout, than exit to the left onto Hunter Expressway.

COMMENTS: This large sweeping right hand turn has no obstructions.

CONCLUSION: No problems with this section of road, Spotter to monitor the rear overhang.

Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

30.0 Km's: The Hunter Expressway.

PROCEDURE: Dual carriageway through to Branxton.

COMMENTS: Wide roadway with 2.0 metre breakdown lane. Lowest bridge structure has a minimum of 5.8 metres clearance.

CONCLUSION: No problems with this section of road.

65.2 Km's: New England Highway onto Golden Highway at Whittingham.

Image 1:

Image 2:

PROCEDURE: Left hand turn from the New England Highway onto the Golden Highway.

COMMENTS: Large left hand sweeping corner, Signs on the centre of the median strip need removal. Loads to cross from incorrect side to incorrect side.

CONCLUSION: Care to be taken with this section of road. Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

75.2 Km's: Golden Highway intersection with Putty Road at Whittingham.

Image 1:

Image 2:

PROCEDURE: Left hand turn from the Golden Highway onto the Putty Road.

COMMENTS: Large left hand sweeping corner, Signs on the inside and centre of the median need removal. Loads to cross from incorrect side to incorrect side.

CONCLUSION: Care to be taken with this section of road. Spotter to keep the driver informed throughout the procedure.

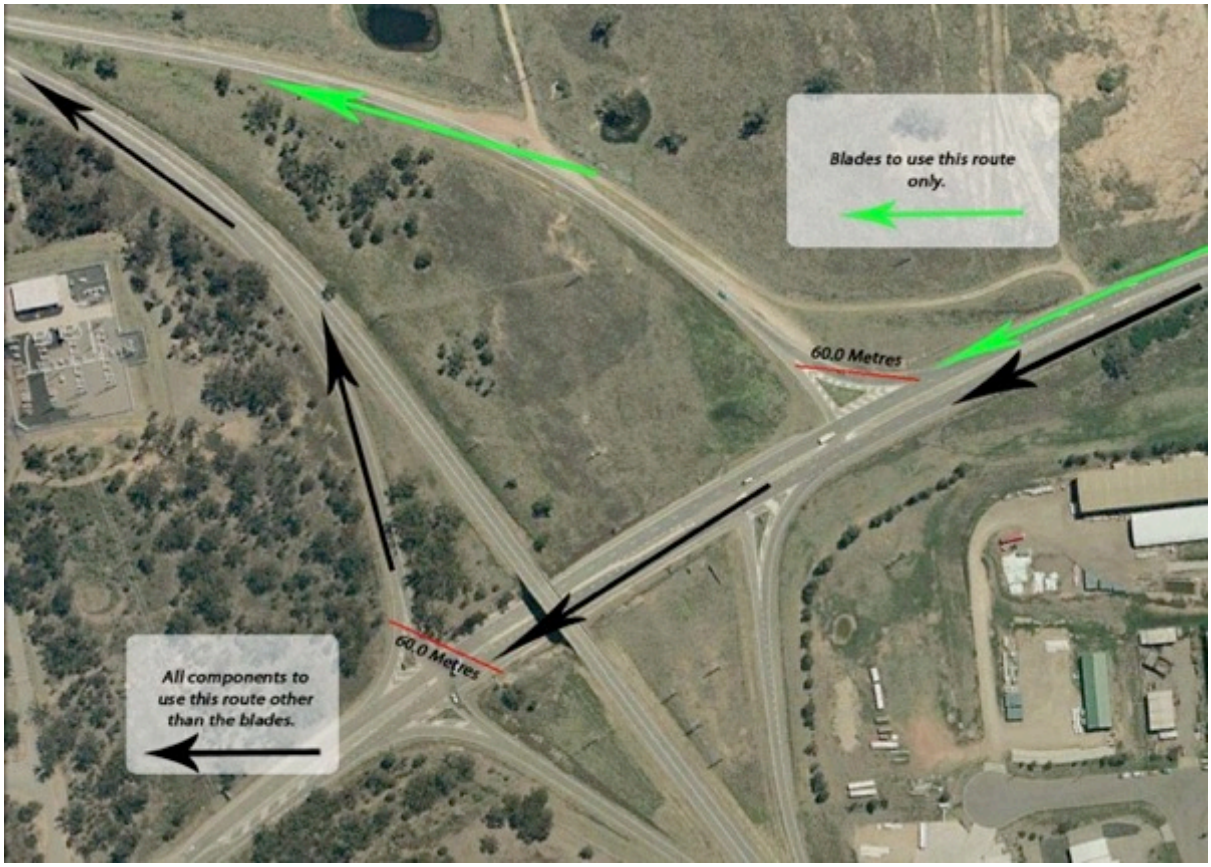
Police and escorts to control local traffic either side of the intersection.

78.6 Km's: Golden Highway intersection with Putty Road at Mount Thorley.

Image 1:

Image 2:

Image 3:



PROCEDURE: Right hand turn from the Putty Road onto the Golden Highway.

COMMENTS: Large right hand sweeping corner. Loads to cross from incorrect side to incorrect side.

CONCLUSION: Care to be taken with this section of road. Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

130.0 Km's: Golden Highway intersection with Denman Road at Denman.

Image 1:

Image 2:

PROCEDURE: Left hand turn from the Golden Highway at the intersection of Denman Road.

COMMENTS: Large left hand sweeping corner, Sign on the inside of the corner need removal. Loads to cross from incorrect side to incorrect side.

CONCLUSION: Care to be taken with this section of road. Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

133.0 Km's: Golden Highway intersection with Palace Street at Denman.

Image 1:

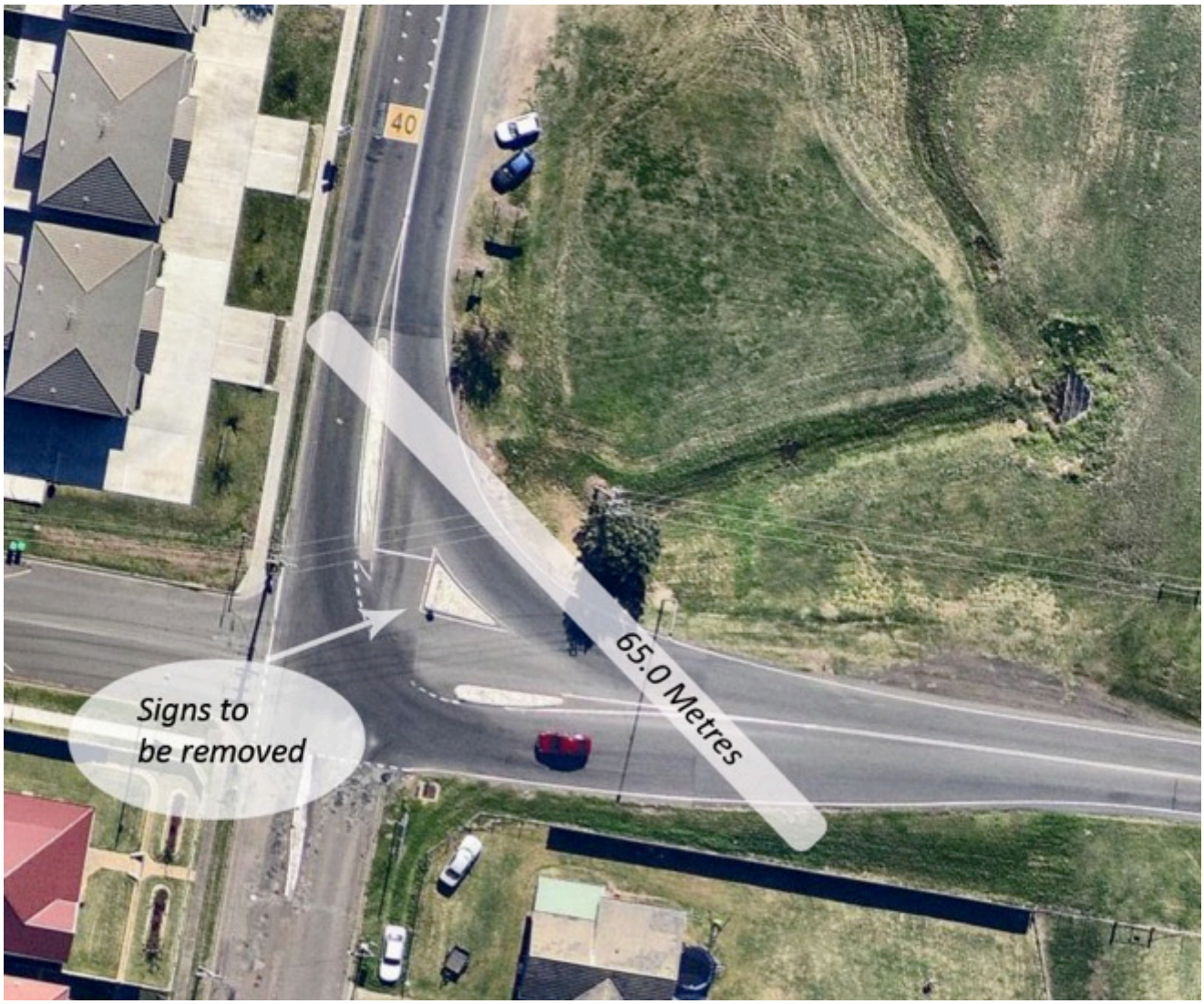


Image 2:

PROCEDURE: Right hand turn at the Golden Highway intersection of Palace Street.

COMMENTS: Large right hand sweeping corner, Sign on the inside of the corner needs removal. Loads to cross from correct side to correct side.

CONCLUSION: Care to be taken with this section of road. Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

135.0 Km's: Denman Rail crossing.

PROCEDURE: Travel over crossing.

COMMENTS: Large width clearance and good ground clearance over this crossing.

CONCLUSION: No problems with this section of road.

NOTE: ARTC approval will need to be obtained to travel over this crossing. Likely to cross with caution, no escort required.

135.0 Km's: Typical bridge on this section of the Golden Highway.

Image 1:

Image 2:

PROCEDURE: Travel over bridges.

COMMENTS: Large width clearance on all bridges.

CONCLUSION: No problems with these bridges, however RMS may require some slow downs over these structures.

NOTE: RMS Approval required to cross structures.

280.0 Km's: Golden Highway onto the Castlereagh Highway at Dunedoo.

Image 1:

Image 2:

PROCEDURE: Left hand turn at the Golden Highway intersection with the Castlereagh Highway.

COMMENTS: Large leftt hand sweeping corner, Sign on the inside of the corner needs removal. Loads to cross from incorrect side to incorrect side.

CONCLUSION: Care to be taken with this section of road. Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

290.0 Km's: Birriwa Rail crossing.

PROCEDURE: Travel over crossing.

COMMENTS: Large width clearance and good ground clearance over this crossing.

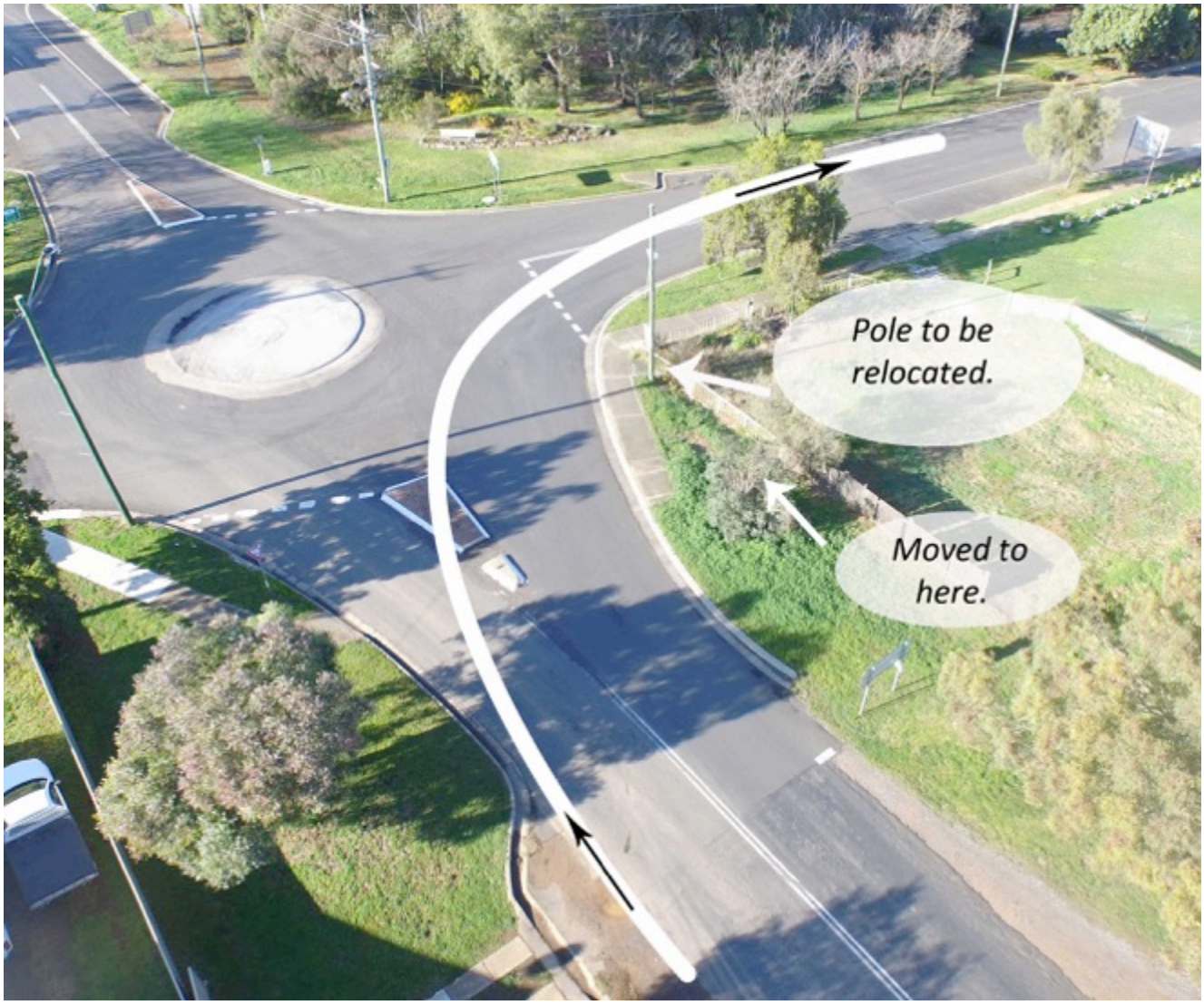
CONCLUSION: No problems with this section of road.

NOTE: ARTC approval will need to be obtained to travel over this crossing. Likely to cross with caution, no escort required.

323.0 Km's: Castlereagh Highway onto the Goolma Road at Gulgong.

Image 1:

Image 2:



PROCEDURE: Right hand turn from the Castlereagh Highway onto the Goolma Road.

COMMENTS: Tight right hand turn at the roundabout. The power pole will need relocating. Loads to cross from correct side to correct side.

CONCLUSION: Care to be taken with this section of road. Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

331.4 Km's: Goolma Road intersection with Guntawang Road at Gulgong.

Image 1:

Image 2:

PROCEDURE: Right hand turn at the Goolma Road and Guntawang Road.

COMMENTS: Large right hand sweeping corner. Loads to cross from correct side to correct side.

CONCLUSION: No problems with this section of road.

Police and escorts to control local traffic either side of the intersection.

372.0 Km's: Southern Cluster, accessed from Goolma Road.

Image 1:

PROCEDURE: Turn from Goolma Road into site.

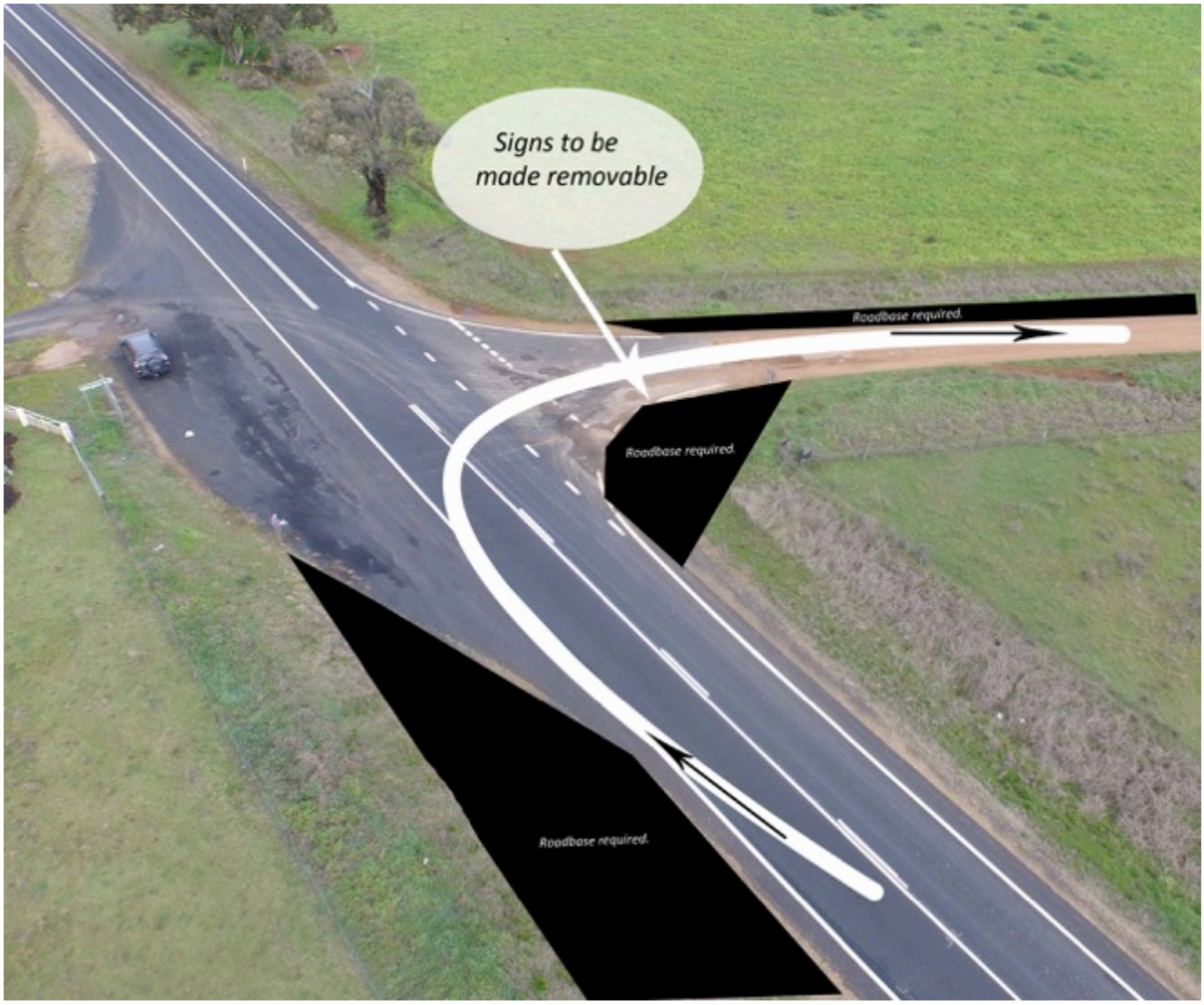
COMMENTS: There are no entrances to this section of site as yet.

CONCLUSION: As the Entrance is yet to be determined; we would recommend that the corner into site has a swept path suitable for blades up to 65.0 Metres in length.

379.6 Km's: Goolma Road intersection with Gillinghall Road Road at Bodangora.

Image 1:

Image 2:



PROCEDURE: Right hand turn at the Goolma Road and Gillinghall Road.

COMMENTS: Tight right hand corner. Loads to cross from correct side to correct side.

CONCLUSION: Upgrades are a must for this corner. Roadbase on the entrance and exit, including the inside of the corner will be required. Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

279.8 Km's: Typical section of Gillinghall Road.

Image 1:

PROCEDURE: Travel over gravel sections of road.

COMMENTS: Typical road width is 4.4 metres wide.

CONCLUSION: This road will need some upgrades. The surface is currently poor in wet weather conditions.

NOTE: Approval will be required from council for this section of road.

279.8 Km's: Typical overhanging trees on Gillinghall Road.
Image 1:

PROCEDURE: Travel under overhanging trees.
COMMENTS: Sections of this road has low clearance under trees.
CONCLUSION: Some trees will need to be trimmed.
NOTE: Approval will be required from council for this section of road.

280.2 Km's: Small floodways on Gillinghall Road.
Image 1:

PROCEDURE: Travel over floodway.
COMMENTS: These couple of floodways have a width of 4.2 metres.
CONCLUSION: No problems with these floodways. Trucks to slow down while crossing.
NOTE: Approval will be required from council for this section of road.

280.8 Km's: Large floodway on Gillinghall Road.
Image 1:

Image 2:

PROCEDURE: Travel over floodway.

COMMENTS: This floodway has a steep bank in and out.

CONCLUSION: A survey would be required to pass through with the blades. But as it looks there would be very little problems, maybe just removing some material on the crests before and after the floodway would be adequate. Trucks to slow down while crossing.

NOTE: Approval will be required from council for this section of road.

381.0 Km's: Quartz outcrop Cluster, accessed from Gillinghall Road.

Image 1:

PROCEDURE: Turn from Gillinghall Road into site.

COMMENTS: There are no entrances to this section of site as yet.

CONCLUSION: As the Entrance is yet to be determined; we would recommend that the corner into site have a swept path suitable for blades up to 65.0 Metres in length.

383.0 Km's: Northern Cluster, accessed from Gillinghall Road.
Image 1:

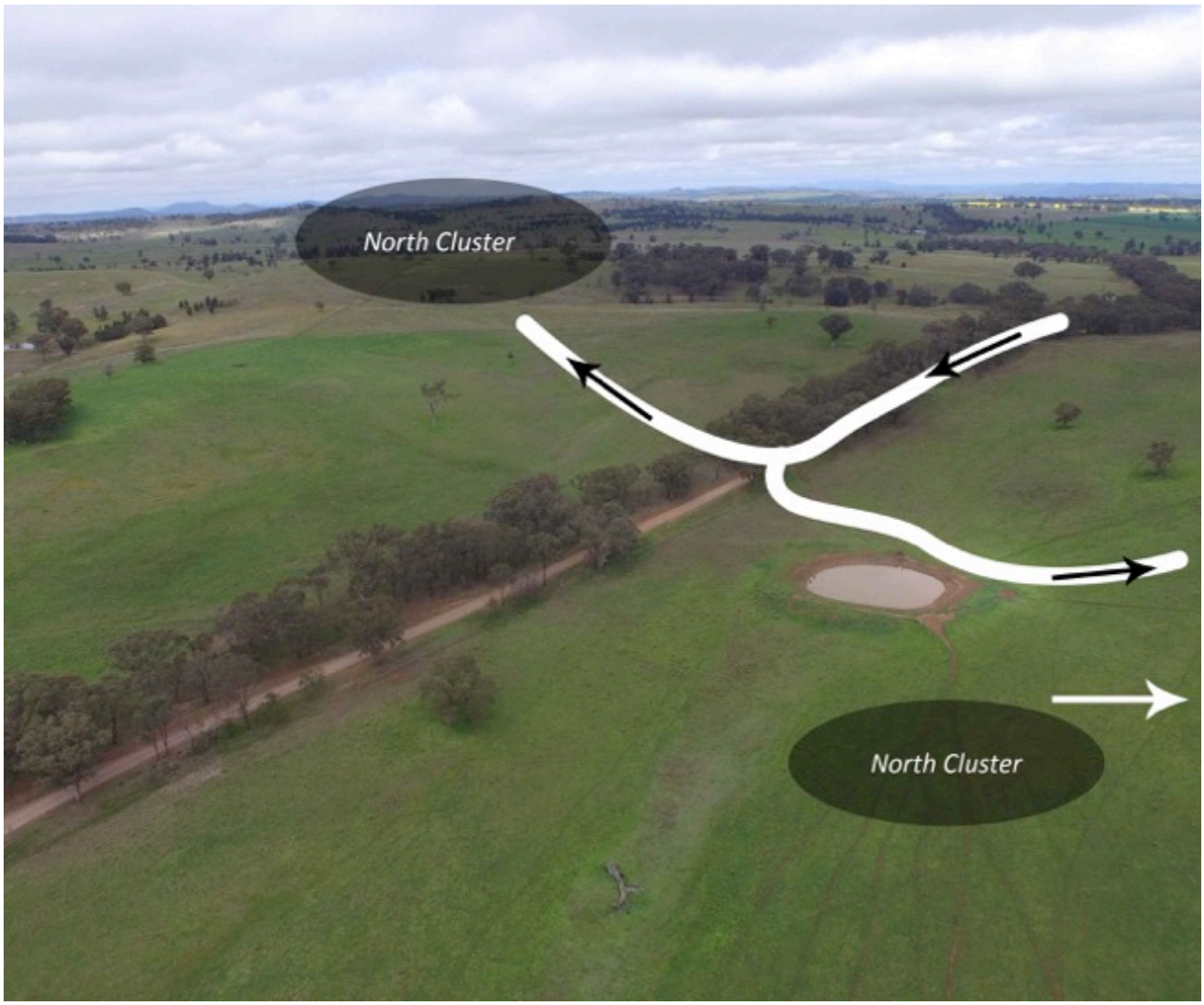


Image 2:


Northern cluster on
the Wellington side
of Gilinghall Road.

Image 3:

PROCEDURE: Turn from Gillinghall Road into site.

COMMENTS: There are no entrances to this section of site as yet.

CONCLUSION: As the Entrance is yet to be determined; we would recommend that the corner into site have a swept path suitable for blades up to 65.0 Metres in length.

10.0 Conclusion:

After studying all options and undertaking a route survey, we believe with some upgrades in Gulgong and on Gillinghall Road, the loads could travel these routes unrestricted. The following are observations, which would need to be noted.

PORT:

The port has an excellent Break bulk berth that runs at approx. 40% berth occupancy. This would than rarely delay any shipments that arrive at the port.

The berth has axle and crane loadings well above what is required for this project.

The storage area is asphalt hardstand with a current area of 200,000 s/q metres available, all level. It is adjacent to the port, and within 300 metres of the berth, all within the Port grounds. No local roads need to be used during the discharge.

Access to the local roads from the port is unrestricted.

ROUTE:

Before undertaking the route survey, we expected Gulgong would be the biggest hurdle for the 65 metre blades. The remainder of the route has very little issues other than the odd sign to be removed. Below are our comments regarding this route.

GULGONG: The intersection of the Castlereagh Highway and Goolma Road has a right hand turn at the roundabout, which will be tight. There is a telegraph pole on the inside of the corner that would need to be relocated. It has only a small amount of services hooked to it, so relocating would not be a huge challenge. A small amount of work would be required on the exit of the corner also.

GILLINGHALL ROAD:

The corner off Goolma Road will need a large amount of upgrades. We would recommend road basing the entrance and exit of the corner. Also the inside of the corner will need some fill, and the signs made removable.

Gillinghall road itself will need a number of trees trimmed, and the road made suitable for all weather transport.

SITE ENTRANCES:

As the Entrances are yet to be determined; we would recommend that the corners into the sites have a swept path suitable for blades up to 65.0 Metres in length. Also local traffic should be taken into account, allowing a good line of sight before and after the entrances.

ALTERNATE ROUTE:

The original route that continued via the Golden highway, and into Dubbo, than south to Wellington via the Mitchell Highway was looked at. However there are a number of large upgrades required through Dubbo, and the route is longer.

11.0 References:

RMS 2008 Version 2:Operating Conditions: Specific permits for oversize and overmass vehicles and loads

Rex J Andrews P/L Drawing

Rex Andrews Engineered Transportation Pty. Ltd.

Rex J Andrews route survey LL123

Google Earth/Maps

Nearmaps

NHVAS Maintenance Management (NHVAS21193)

NHVAS Basic Fatigue Management (NHVAS21193)