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Phill Bragg and Carolyn Ridge
'Glenvale'
A371 Princes Highway
Berry NSW 2535

14th Dec 2012

Re: Foxground and Berry Bypass - The Roads and Maritime Services (RMS) is seeking approval under Part 3A of the *Environmental Planning and Assessment Act 1979* to upgrade 11.6 kilometres of the Princes Highway between Toolijooa Road north of Foxground and Schofields Lane south of Berry.

As owners of the 'Glenvale' property (CH12250 to CH 13750) which is impacted by the upgrade we wish to lodge our submission to the NSW Department of Planning and Infrastructure so that our concerns can be considered.

Although we think that the Environmental Assessment (EA) of the concept plans are thorough, we do have specific concerns about issues directly affecting our property 'Glenvale', given the lack of available information which is pertinent to it. Rather than comment generally on matters affecting Berry Township and its environs we have concentrated on only those matters specifically relating to our property as we feel there has not been adequate data collection or scrutiny of matters relating to flood levels & rainfall.

It is essential that the missing data be applied to address our concerns before the final design is developed.

Overview of the concerns and options covered in this submission:-

- **Flooding**
  - Background and photographic evidence of overtopping of Princes Highway at 'Glenvale'
  - Appropriateness of data used for flood modelling at 'Glenvale'
  - Culvert Capacity and reduction in the flood plain storage capacity, ongoing maintenance
  - Risk
  - Historical significance of 'Glenvale'

- **Underpass option**
  - emergency spillway, fauna underpass and vehicle access for 3 households
  - land value
  - emergency U-turn facility

- **Maintenance of boundary and fauna funnel fencing**

- **Access**
  - Access at 'Glenvale' needs to provide for articulated vehicles
  - opportunity for access by Emergency Fire brigade in event of bush fire and maintenance crews servicing the Eastern Gas pipeline;
  - Positive aspect of access to 'Glenvale'
  - Negative aspect of access to 'Glenvale'

- **Noise mitigation measures**

- **Water Quality**

- **Fauna crossings**

- **Land use**

- **Heritage and Pastoral Landscape**

FLOODING

- **BACKGROUND**

Our family has owned the property since 1950 and as you can see from the following family photos, the present highway has been overtopped by flooding from the creek at 'Glenvale' on many occasions during that time (some 60 years) at CH 12800. Our discussions with RMS office staff suggest to us that they are unaware of this and in the EA there is no mention of the overtopping which occurs regularly at this point. We have been advised to include these photos in our submission to show that this does occur.

Below is a family photo which shows water overtopping the highway in 1959.

1959

And again in another family photo of flooding at 'Glenvale' dated 1963.

1963

Our concern is not so much that the water presently overtops the Princes Highway but that the proposed increase in the amount of fill to build the embankment as documented in the EA may have a catastrophic impact on life and property should for any reason the culverts are unable to cope with the volume, whether this be due to inadequate sizing or blockage.

As shown below the landscape in the 1950s was far less vegetated than it is now. Hence there's more potential for blockages to occur as a result of logs and debris being eroded from creek beds in high velocity events. The steepness of the catchment may further exacerbate this situation.

The March 21st 2011 flood event occurred after 4-5 hours of rain as a consequence of a severe East Coast Low. These intense low pressure weather systems are associated with heavy widespread rainfall leading to flash and/or major river flooding. On its website the Australian Government Bureau of Meteorology notes that

> *East Coast Lows (ECL) are intense low-pressure systems which occur on average several times each year off the eastern coast of Australia, in particular southern Queensland, NSW and eastern Victoria. Although they can occur at any time of the year, they are more common during Autumn and Winter with a maximum frequency in June. East Coast Lows will often intensify rapidly overnight making them one of the more dangerous weather systems to affect the NSW coast.* http://www.bom.gov.au/nsw/sevwx/facts/ecl.shtml

The torrential rain that fell locally in Berry (as well as in the Illawarra) during this weather event followed heavy rain over the previous week (see rainfall chart on page 5 of this submission). This flood was regarded as a 1 in 5 flood event in Berry in a Shoalhaven City Council media release dated 12th April 2011 (Issued by Robyn Sharpe, Acting Media Manager SCC). Given the implications of global warning it is only likely that such extreme weather events as this will become more frequent alongside the other extreme of drought and high winds.

It is worth noting that the storage capacity of the existing floodplain west of the highway will be reduced significantly due to the extent of the proposed earthworks. This will increase the amount of flooding by raising

flood heights which would become catastrophic should the culverts become blocked or unable to carry the volume of flood water. For example it could well cause

1. the inundation of the heritage residence and/or
2. the deterioration of its shale foundations
3. even worse, it could prevent access/egress to the property in the event of an emergency.

The RMS seems to have been unaware of this flooding problem as it has not addressed it in the figures or modelling used in the latest EA. Perhaps this has led to an underestimation of the flooding impact of the embankment proposed for the highway upgrade at the culvert CH 12800.

Whilst there have been flood studies done for Broughton Creek there don't appear to be any for the tributaries flowing into Broughton Creek so how can the RMS be certain of the adequacy of the culverts presently planned at N,O,P,Q, R and S in the EA. In Table 4.4 (see below) there is a reference to Q , the culvert which will most affects 'Glenvale' which states the need for '*a minimal water level impact desirable due to upstream property*' but there is no definition given to clarify what the RMS regards as a '*minimal water level impact'*. As the residents living in that property we would expect that the water level impact would be regarded as far more important – as far as we are concerned it is **imperative**!

Table 4-4: Proposed culvert summary

Crossing name	Design chainage (m)	Design flow (m^3/s)	Type	Size (mm)	Comments
LB	9030	2.7	Pipe	1x1500	Existing culvert drop structure
KA	9840	32	Pipe	4x1800	Goes through northern abutment of Broughton Creek bridge 1
LA	10500	N/A	Box	1x4600x3000	Oversized to provide vehicular access
N	11900	4.8	Pipe	2x1500	Three pipe segments joined by two large drop structures, to provide drainage under main carriageway and secondary roads on each side
O	12150	4.8	Pipe	2x1500	Existing pond at inlet
P	12310	4.1	Pipe	3x1500	Extend existing pipe and install two new pipes
Q	12770	48	Pipe	7x1800	A minimal water level impact is desirable due to upstream property (Existing 3x1500mm RCP)
R	13320	9.0	Pipe	2x1500	
S	13580	12.1	Pipe	2x1500	
TC	14150	0.6	Pipe	1x1500	
TA	14420	2.6	Pipe	1x1500	
TB	14560	0.7	Pipe	1x1500	
XA	17950	3.23	Pipe	1x1500	
X	18100	36.0	Pipe	4x1800	
Y	18550	33.1	Pipe	3x1800	
Z	19150	2.0	Pipe	1x1500	

On 5th December we had a meeting with Ron de Rooy (Senior Project Manager) in order to again raise these concerns with him and he advised us that he would contact the Flooding Consultant, Ben Noble, to see if he (Ben) could do some projected computer flood modelling for 'Glenvale' using either the BOM's rainfall figures for Foxground or those which we can supply from our records (1995-2012). We have also raised these concerns with RMS staff earlier on 28th and 29th Nov 2012. (...as well as on numerous occasions throughout the course of the community consultations when we have had opportunities to meet with RTA/RMS staff.)

- **APPROPRIATENESS of data used for flood modelling at 'Glenvale'**

In the RMS report 7.5 Flooding – Methodology Pg 306 it states that

- *Assessment of other culvert crossings using either the Bentley Culvert master or HY-8 culvert hydraulic software packages.*

However, we are concerned that the rainfall figures which are being used for the modelling may be from the Berry records which are significantly different to the rainfall figures which we have recorded here at 'Glenvale.'
e. g. BOM rainfall records for the last major flooding event which overtopped the highway on the 21st March 2011 showed significantly less rain for Berry during the week leading up to the flood event. 'Glenvale' actually received in excess of 200mm on the day of the flood as our rain gauge overflowed because we were unable to return home due to the road closures at Berry and Gerringong.

As can be seen in the table below, the BOM rainfall record at Foxground was much closer to that which 'Glenvale' received.

	Mar 2011	Glenvale	Berry BOM		Foxground BOM
	15	**1.0**	**6.8**		**10.4**
	16	**8.0**	**0**		**0.6**
	17	**6.0**	**11.6**		**12.6**
	18	**10.0**	**2**		**13.8**
	19	**12.0**			**34.6**
	20	**180.0**			**126.6**
	21	**66.0**			**80.2**
	22	**200.0**	**275**	**4 day total (only data available)**	**205.6**
Total		**483**	**295.4**		**474**

- **CULVERT CAPACITY and flood plain capacity and ongoing maintenance schedule**

  - increased height of the highway (more than 5 metres above the existing road surface at CH 12800);

  - reduced storage capacity of the existing flood plain due to the large embankment needed to support the upgraded highway;

  - the increased length of pipes used in the proposed culvert.
    (Although Ron de Rooy didn't think that this would cause added problems related to the drag/friction since they would be smooth concrete pipes, he did concede that larger box culverts would be more efficient than circular pipes in this instance.)

Regardless of how well these culverts are designed, poor maintenance could still lead to potentially catastrophic flooding of our property. It is therefore essential that the RMS implement a high frequency maintenance schedule so as to ensure that the culverts are adequately maintained.

Pictured below - flooding of the creek looking towards existing highway from front verandah of heritage residence at 'Glenvale

In the present concept plan there are no flood studies available specific to our property, so we would like to take this opportunity to advise the RMS that, in order to quantify/support/prove the details of our concerns, we may need to employ an independent flood mitigation consultant.

If it becomes necessary for us to engage a flood consultant is the RMS willing to reimburse our costs?

The 21st March 2011 the present culvert's capacity was exceeded and the flood level overtopped the Princes Highway and came to the bottom of the Armco railing which is 300mm above the road surface. The flooding occurred for a 40 metre length along the highway above the culvert, but it is beyond our capability to calculate the volume of water that exceeded the culvert's capacity.

The present drainage (3x1.5 box culverts) is obviously unable to cope with this volume of water even though **this was not considered to be a 1 in 100 flood event**. It was counted as a 1 in 5 flood event in Berry. (Media release issued 12th April 2011 by Robyn Sharpe, Acting Media Manager Shoalhaven City Council.)

In order to determine if the flow capacity noted below for Q is accurate we need to be certain that data specific to the catchment at 'Glenvale' has been used. Only then can it be ascertained whether the 7x1.8m round pipes proposed in the concept plan are adequate to cope with the projected flow rates of a 1 in 100 year flood event.

Table 4-3: PRM design flow estimates for major transverse drainage infrastructure

Catch ID	Waterway	Design chainage	Catchment area	1 year ARI	5 year ARI	10 year ARI	50 year ARI	100 year ARI
			(ha)			(m^3/s)		
N	Unnamed Ephemeral	11900	7	1.0	2.3	2.9	4.2	4.8
O	Unnamed Ephemeral	12150	7	1.0	2.3	2.9	4.2	4.8
P	Unnamed Ephemeral	12310	6	0.8	1.9	2.4	3.5	4.1
Q	Unnamed Ephemeral	12770	108	8.4	21	27	41	48
R	Unnamed Ephemeral	13320	15	1.7	4.2	5.3	7.8	9.0
S	Unnamed Ephemeral	13580	21	2.3	5.6	7.1	11	12
TC	Unnamed Ephemeral	14150	1	0.12	0.29	0.34	0.51	0.6
TA	Unnamed Ephemeral	14420	3	0.5	1.2	1.6	2.3	2.6
TB*	Unnamed Ephemeral	14500	1	0.15	0.36	0.45	0.64	0.73
T	Broughton Mill/ Connollys Creek	16000	4286	146	383	497	775	896**
W	Town Creek	17450	85	7.0	17.8	22.6	34.2	39.5
XA	Duck Pond ephemeral	17950	4.4	0.6	1.6	1.7	2.8	3.2
X	Tributary to Hitchcocks Lane Creek	18100	75	6.5	16.3	20.7	31.2	36.0
Y	Hitchcocks Lane Creek	18550	68	6.0	15.0	1.1	28.7	33.1
Z	Unnamed Ephemeral	19150	4	0.6	1.5	1.8	2.6	3.0

*Catchment TB has not been shown on **Figure 4-2** for clarity reasons
**TUFLOW 100yr ARI flow of 958m^3/s at Broughton Mill Creek has been used in the hydraulic impact analysis

- **RISK**

As you can well understand, a miscalculation based on incorrect data could possibly result in the flooding of the 2 dwellings upstream from the culvert - a result that would be disastrous for the residents. Likewise the insurance implications for all concerned may be considerable as premiums may rise and worse, insurance may be denied.

Such compensation would be compounded by any loss or damage of machinery sheds, farm equipment, fences and garages for the 2 households on the property. Furthermore, the cost of repairs to 'Glenvale' farm residence (a building some 160 years old) may be considerable given the difficulty sourcing compatible materials of the period, it being an early colonial building with shale foundations.

- **HISTORIC SIGNIFICANCE of 'Glenvale'**

Glenvale dairy farm complex is a Heritage item under the Shoalhaven Local Environment Plan (1985) and is significant as a Berry tenant cottage and the residence and out building together with the working farm contribute to maintaining the Berry pastoral landscape which has also been identified as having State significance in NSW in the Shoalhaven Heritage study and furthermore the Illawarra Regional strategy requires planning authorities to protect these landscapes given their importance to agricultural sustainability.

Although its significance is noted in Appendix 7.8 of the concept plan, there has been no mention of the impact to the residence in the event of flooding in the EA.

				a	b	c	d	e	f	g	
G2B H45	*Glenvale* homestead, former Berry Estate tenant farm (A371 Princes Highway. Broughton)	Former Berry Estate tenant farm, homestead includes vertical slab construction.	Local					✓	✓	✓	The *Glenvale* homestead is a locally rare and representative example of a mid-nineteenth century slab house from a Berry Estate tenant farm. It is characteristic of a Scottish style of house layout and it has the potential to contribute, through archaeological survey/excavation to an understanding of organisation and operation of the Berry Estate as well as the living conditions and social status of tenant farmers.

- **UNDERPASS OPTION**

During our visits to the RMS office in Berry we have discussed (with Ron de Rooy) the idea of an extra, vehicle size, culvert under the highway as an added security and safety measure. Such an underpass would serve as an emergency flood overflow measure as long as it could be as high as possible but lower than the floor level of the lowest house at 'Glenvale' (at approximately the height of the present highway).

After some discussion of the options and height plans with Ron de Rooy it seems that it could be plausible to build a vehicular sized underpass just to the south of the culvert planned at CH 12825 because the highway is 7.326 metres above the creek at the culvert. This allows adequate height within the embankment for the 3 metres required to allow access for a small truck as well as the fill cover required; however, these specifications will need to be verified by the engineers.

There are other underpasses planned e.g. at CH 9450, CH 10500 and CH 15100 which meet similar criteria.

Besides providing an emergency flood overflow, this underpass would also offer a left-in and left-out movement for both the 'Glenvale' and 'Gembrook' residents (3 households) when travelling both north and south on the upgraded highway without increasing the unprotected entries onto or exits off of the highway. (See diagram page 9)

This culvert could also include the fauna underpass already planned at this location.

Section 7.9 pg 444 it states that

> *Agricultural and rural residential properties located along the on-line upgrade sections of the project would have their direct access to the highway maintained but restricted to left-in left-out movements (as discussed in **Section 7.1.3**). The potential impacts of this change on travel times are discussed in **Section 7.9** and **Section 7.10**.*
>
> *For some agricultural and rural residential properties located along the on-line upgrade sections of the project, where road safety standards (such as sight distances) cannot be met at the current access point, the access would need to be relocated and the driveway extended accordingly. Opportunities to consolidate multiple property accesses to one access point to the project would also be explored by RMS with the affected landowners as part of detailed design. The exception to this would be at the following locations:*
>
> - *For properties located south of the Austral Park Road interchange, the current direct access to the highway would be removed as the design could not safely maintain this access. Instead, access to these properties would be provided via the extended and upgraded Austral Park Road, which would connect to the Austral Park Road interchange.*
> - *For properties located north-west and south-east of the northern interchange for Berry, a consolidated access driveway would be provided to connect these properties to the retained section of the highway south of the interchange.*

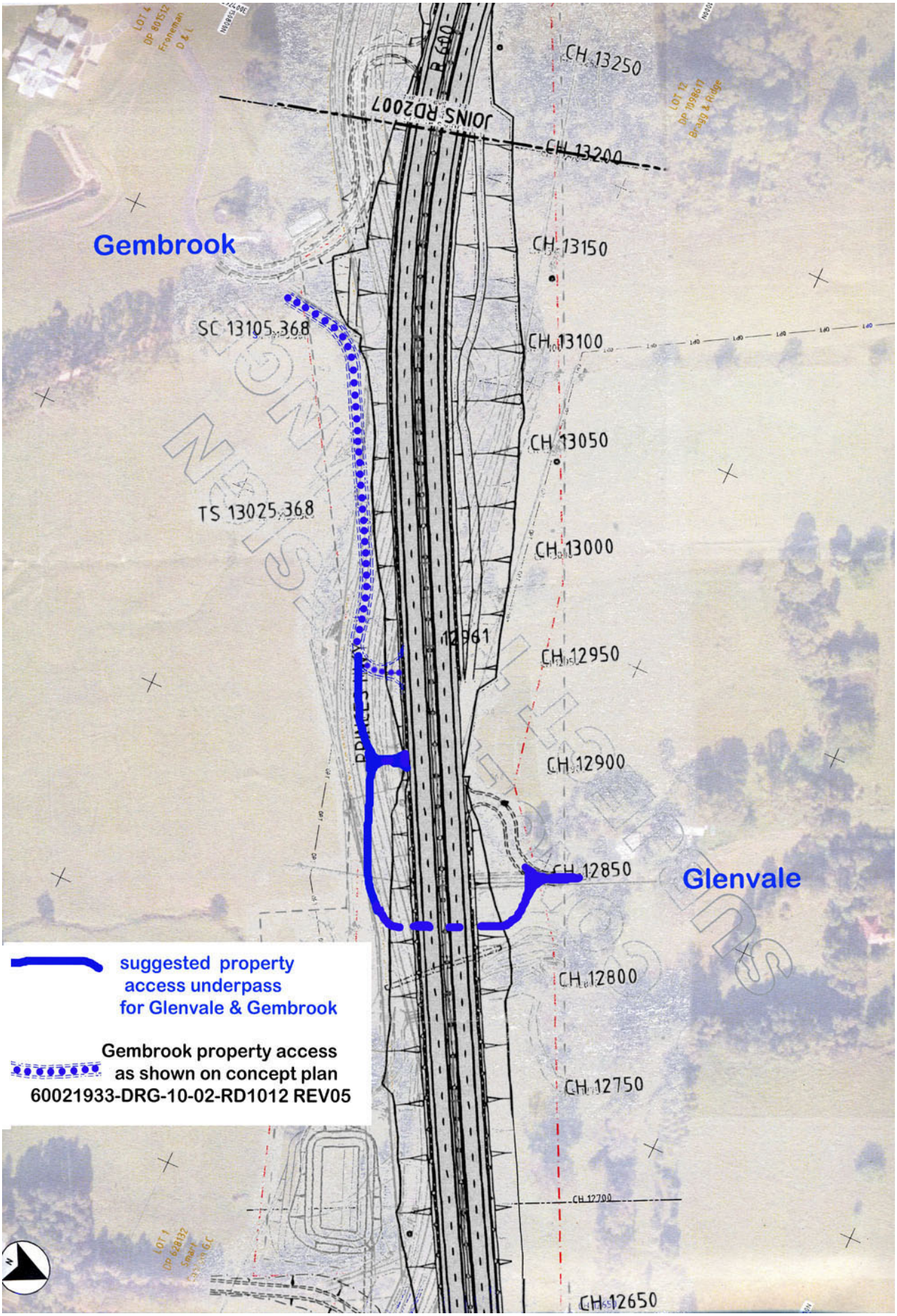
So this infers that RMS is willing to consider opportunities to consolidate multiple property accesses to one access point for affected landholders. As the RMS own 'Gembrook' there's an opportunity to investigate the topography to see if the alternate suggested above via the underpass is possible. If it is, it would benefit the 3 households at 'Glenvale' and 'Gembrook' without increasing the unprotected entries onto or exits off of the highway as in the present concept plan.

We believe that the previous proposed access to/from 'Gembrook' at CH 12950 was relocated further south because of the conflict with the merger of Austral Park Lane at CH12800. Perhaps the original plan could now be reconsidered, given that Austral Park Lane now merges with the highway further north at CH12400 and the truck stop has been abandoned. This northern access option as shown on the previous concept plan 60021933-DRG-10-02-RD1012 REV05 may also prove to be more cost effective given the majority of the access could be designed to make use of the current highway.

- **Land value**
  Better access may make both properties more attractive to potential buyers in the future.

- **Emergency Vehicle U-turn facility**
  The potential vehicle underpass could also serve as an emergency vehicle U-turn facility.

As shown in the diagram below, our suggested alternative access for 'Gembrook' also offers advantages over the one shown in the current RMS concept plan because sight distance is improved and it would allow left-in and left-out movements both north and south. It also places the Gembrook access along a straight stretch of road rather than in the middle of a sweeping curve at the end of a cutting.


Gembrook
Glenvale
JOINS RD2007
CH 13250
CH 13200
CH 13150
CH 13100
CH 13050
CH 13000
CH 12950
CH 12900
CH 12850
CH 12800
CH 12750
CH 12700
CH 12650
SC 13105.368
TS 13025.368
12961
suggested property access underpass for Glenvale & Gembrook
Gembrook property access as shown on concept plan 60021933-DRG-10-02-RD1012 REV05

OTHER ISSUES

- **MAINTENANCE of boundary and fauna fencing**

  - Fencing and fauna funnel fencing

If the RMS is to be responsible for the maintenance of the highway boundary fence, there is a possible conflict between the wildlife fence and the boundary fence in flood prone areas. If the wild life fence is in the flood zone there would be a **severe risk of it being swept into the culvert and restricting (or blocking) flow**. The boundary fence needs to be separate from the wildlife chain wire fencing which needs to be installed above flood level. This applies to the 3 wildlife crossings at 'Glenvale'.

- **ACCESS**

- Access at 'Glenvale' needs to provide for articulated vehicles (semi trailers and truck and dog) as the property is still a working farm;

- Emergency access into the bush (near present speed camera) at CH 13400.
  There's an opportunity for emergency access on the cut and fill line CH 13450 adjacent to the north bound carriageway. It is needed by both
  1. Emergency Fire brigade in the event of bush fire
  2. the maintenance crews servicing the Eastern Gas pipeline

- The access to 'Glenvale'(as illustrated in the diagram below from Pg 83 in Chapter 4) shows positive changes such as the increased radius of entry into the property, extra sight distance, level gradient of road surface and extra shoulder width (acting as a deceleration lane). Hopefully these changes will outweigh concerns relating to turning left straight into oncoming traffic flows travelling at 100kph (or more) without a designated acceleration lane. Hopefully driver courtesy will prevail to ensure our safety.

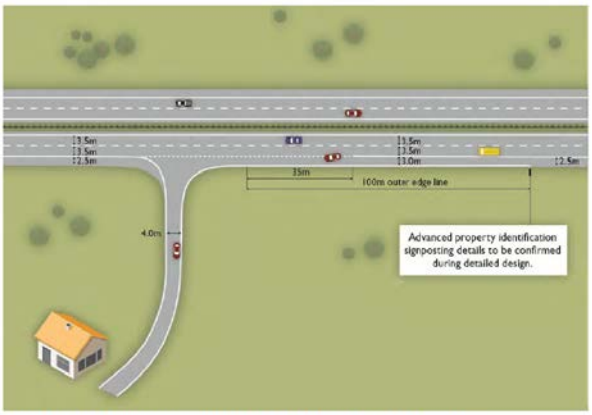


Figure 4-15 Typical rural property access (lengths shown are indicative only)

- Although the flyover animation was educational and very helpful in showing us our travel routes as proposed in the EA, our access was unfortunately omitted. This was both worrying and disappointing - especially since it was only discovered by staff when they were trying to reassure us of the improvements at our access!

- The negative aspect of many accesses is the extra mileage & time added to each journey. The RMS state that for each trip will add a maximum travel distance of 3.2km (see Figure 7.6 below from Appendix D - 95). However, over the course of a year the extra mileage 310 days x 3.2kms = 992kms per year which is the equivalent of a trip to the Gold Coast. The extra mileage would also increase the wear and tear on vehicles and increase the time required by courier drivers delivering parcels etc.

- An added concern is for parents dropping off/picking up children at the bus pick up bay in Tindalls Lane because the extra travel distance and time involved and the added stress this may cause.

From	Properties north of Tindalls Lane to Austral Park Road interchange accessed via northbound carriageway.
To	Princes Highway southbound.
Traffic circulation	Requires northbound travel on the Princes Highway and u-turn at Austral Park Road interchange.
Maximum additional travel (typical conditions)	3.2 km (2.9 minutes).

From	Properties south of Austral Park Road to Tindalls Lane accessed via southbound carriageway.
To	Princes Highway northbound
Traffic circulation	Requires southbound travel on the Princes Highway and u-turn at Tindalls Lane interchange or via Austral Park Road interchange.
Maximum additional travel (typical conditions)	2.9 km (2.8 minutes).

Figure 7.6: Access constraints - Tindalls Lane to Austral Park Road
(Source: AECOM, based on data from Gabites Porter Consultants sub-area TRACKS model)

- **NOISE**

What noise mitigation measures are planned for the rented house at 'Glenvale' so as to ensure that
- the noise levels are within acceptable levels
- the amenity of its rural situation is preserved

Failure to achieve acceptable noise mitigation may lead to difficulties renting the house in the future.

- **WATER QUALITY**

  During the construction phase water from dam and tanks is likely to be affected due to extra dust and particulates because both households at 'Glenvale' rely on spring fed dams and/or tanks for drinking water and farm usage.

  We are also aware that the increase in traffic volume anticipated in the future will further compound this problem, so any short term measures may also help the residents in the long term.

- **FAUNA CROSSINGS**

  These seem to have been well placed and thoroughly thought out; (though we do feel that the crossings along creeks are more likely to be effective than those on the ridge line). Both we and the residents east of the highway to the fauna crossing near CH 12800 have for some years have been working towards revegetating the creek banks and fencing it off from stock where possible in an effort to enhancing the natural wildlife corridor already evident along this creek.

  As perhaps the largest privately owned areas of bushland affected by this upgrade, 'Glenvale' is also unique in its contribution towards the conservation of native flora and fauna through the ongoing establishment of wildlife corridors which travel through 'Glenvale' and the remnant bush on the adjacent properties to the forested plateaus above Foxground.

- **LAND USE**

  Whilst we are relieved to see that the property's bushland has largely been left intact we hope that the large portion of land severed from the northern part of the 'Glenvale' will not be left as a neglected island but will be put to some useful agricultural purpose by being incorporated into an adjacent property or revegetated with native local flora species. In this way the environmental amenity of the area will be assured as will the habitat opportunities for local fauna.

  In 7.6.4 Environmental management measures (pg 356-357) it is encouraging to read that the RMS aim to "*Re-establish pasture grasses and rural fencing to top of embankment slopes*" as part of the mitigation measures *"to avoid, minimise or manage landscape character and visual amenity impacts"* (Table 7-59).

- **HERITAGE AND PASTORALE LANDSCAPE**

  We can only stress that 'Glenvale' farm complex is a Heritage item under the Shoalhaven Local Environment Plan (1985). As such it is significant as a Berry tenant cottage and both the residence and out building together with the working farm contributes to maintaining the Berry pastoral landscape which has also been identified as having State significance in NSW in the Shoalhaven Heritage study. Furthermore, the Illawarra Regional strategy requires planning authorities to protect these landscapes given their importance to agricultural sustainability.
  (Refer RMS Appendix K – part 2, pages- 81- 85 where information is listed on 'Glenvale'.)

TO SUM UP

One of the real advantages of community consultation is the opportunity given for residents to supply 'local knowledge'. To date, this has ensured that all of the major issues have been covered and reviewed by both local residents and RMS staff during the many community forums and consultation meetings held.

This is commendable as it all works towards achieving the best possible outcome for this major piece of infrastructure in our area, the consequence of which is something that every local will live with for the rest of their lives, whereas commuters/tourists will only experience it as they drive through the area and RMS staff may be able to walk away at the end of the project.

It is commendable that RMS has attempted to consult with the community in order to resolve the many issues of concern for residents, however, I'm sure that you would appreciate that our concerns are specific to our own property and its continued use as a working farm, its agricultural sustainability and the ongoing protection of its contribution to the area's cultural heritage. 'Glenvale' farm and its place in the pastoral landscape is an integral part of that cultural heritage and as such warrants protection.

We have not yet had any reply from the flood consultant Ben Noble regarding the flood modelling based on site specific information of 'Glenvale' which was discussed with Ron de Rooy on 5th Dec. In reply to our concern, Ron has assured us that this will be done.

Surely the onus is on the designer to be aware of **all** possible adverse effects and to check as necessary to ensure that a satisfactory outcome is obtained.

Yours sincerely
Phill Bragg and Carolyn Ridge