



Princes Highway upgrade
Foxground and Berry bypass

Foxground and Berry bypass

'Beyond compliance' and 360 degrees of excellence

The projects senior leadership team has diligently worked on creating a culture to achieve the project vision to 'deliver a legacy built on 360 degrees of excellence'. From this vision, 'beyond compliance' was developed and each construction zone was tasked with delivering a set of environmental objectives that were beyond the standard compliance requirements.

Our team culture actively supports 'beyond compliance' innovations through the following recognition:

- 360 degrees of excellence
- R.E.A.L values and awards
- Digga Award - recognising industry leading erosion and sediment control practice on the project above and beyond the standards set out in the Blue Book.



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'Beyond compliance' goals



Foxground Goals

- Make the management of Broughton Creek a point of excellence
- Ahead of time rehabilitation, beat contract requirements by 50%
- Minimise clearing through design changes - over 2hA of native bush retained



Broughton Goals

- Contribute to the local seed bank of native plants by collecting seeds during clearing
- Salvage native orchids, ferns and grasses and re-establish on other parts of the project
- Provide timber salvaged during clearing to the community



Berry Goals

- Make Bundewallah creek a point of excellence on the project
- Assist with the community establishment of a new park
- Bridge 2 Bridge a partnership with community on a new rehabilitation project

- Contributions were made by all levels and functions of the team during construction.
- 'Beyond compliance' gave us a springboard for success and encouraged a positive attitude towards environmental management.

Foxground and Berry bypass 'Digga Award'



The 'Digga Award' quarterly recognises **individuals** and **teams** that have gone 'beyond compliance' in their area.

A point score system includes

- 5 key criteria benchmarked against expected site performance levels
- 3 areas where bonus points are available
- Of this key criteria
 - 60% relates to the planning and implementation of ERSED
 - 20% is typically dominated by response/closure of required ERSED actions.



	Zone Ratings	Scoring Schedule			
1	RMS Enviro Inspection Report Actions closed out within nominated time frame	100%	80%	60%	50%
	Points Available	5	2.5	1	0.5
2	During/Post Rainfall Checklists Completed by Zone as a ratio to rain days	3 to 1	2 to 1	1 to 1	0
	Points Available	2.5	2	1	0
3	Site/Engineer Inspections / PESCP Audits	4 / Month	3 / Month	2 / Month	1 / Month
	Points Available	2.5	2	1	0.5
4	Progressive Stabilisation Demonstrated (ie ratio of active work areas to: Number of sites being topsoiled/ seeded / hydro-mulched progressively)	>75%	>60%	>30%	<30%
	Points Available	5	4	2	0
5	Housekeeping Standard	Excellent	Good	Average	Poor
	Points Available	2.5	2	1	0
6	Demonstrated examples of "beyond compliance"	2 / Month	1 / Month	0	0
	Bonus Points Available	2.5	1	0	0
7	Positive Community interaction story	2 / Month	1 / Month	0	0
	Bonus Points Available	2	1	0	0
8	Issue of the month: TBA each month: e.g. - Mud Tracking / Dust Suppression / Noise Management / Water Treatment / Pollution Prevention	Excellent	Good	Average	Poor
	Bonus Points Available	3	2	1	0
	Total out of 25	/25	/25	/25	/25
	FINAL PERCENTAGE SCORE	%	%	%	%

Doing erosion and sediment control very well... Environmental regulator feedback:

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Our reference: SF15/35832; DOC15/432536
Contact: Michael Heinze 02 6229 7002

Mr Andrew McRae
Fulton Hogan - Project Director
Foxground and Berry bypass
PO Box 353
BERRY NSW 2535

Dear Mr McRae

30 October 2015

**Re: Foxground and Berry Bypass – Environment Protection Licence No. 20462 –
Environmental Controls**

I refer to the current Princes Highway major road upgrade project between Foxground and Berry, including the Berry Bypass, being undertaken by Fulton Hogan Construction Pty Ltd under Environment Protection Licence No. 20462.

The NSW Environment Protection Authority (EPA) has conducted inspections of the environmental controls and management measures across the 11 km project site, most recently on 19 and 20 August 2015. These inspections have been conducted with Fulton Hogan's project environmental team, led by Senior Project Environmental Manager, Mr Shannon Chisholm.

The EPA would like to commend Fulton Hogan on planning and implementing a high standard of sediment and erosion control at the site. We also commend construction staff who are demonstrating a strong commitment to ensuring that sediment and erosion controls at the site are implemented and properly maintained. As Fulton Hogan is aware, the site is located adjacent to a number of highly sensitive and challenging receiving environments and the EPA recognises Fulton Hogan's efforts to minimise and ameliorate the impacts of the project on both the natural environment and the local community.

In particular, the EPA has observed the following high standards of sediment and erosion control practices and procedures at the site:

- The project requires innovative sediment and erosion control planning due to the challenging nature of the construction site including being an active national highway, being subject to periods of intense rainfall, having limited area available to construct sediment and erosion controls, and being in close proximity to sensitive water bodies.
- The EPA has observed a strong connection between the sediment and erosion control principles and practices developed during the planning and the construction phases of the project. It is not uncommon for the EPA to observe that plans and procedures developed in good faith during planning stages are not implemented by staff at construction sites. The EPA has observed that importantly, Fulton Hogan has developed a range of procedures and practices to ensure that staff are aware of and committed to sediment and erosion control roles and their own responsibilities at the site.

- Procedures have been developed to ensure that sediment and erosion control is actively managed as work that may change from day to day. The procedures that have been developed to ensure that sediment and erosion control is targeted to the construction work currently undertaken at the site is clearly being implemented by staff at the site.
- We have noted the efforts by staff to ensure that areas of soil disturbance are quickly revegetated or otherwise stabilised, whether those disturbed areas are of a temporary nature, or whether the final works have been completed.
- There are well defined clean and dirty water diversion systems that have been designed and implemented to ensure that clean water is not contaminated with sediment prior to discharge to the environment.
- Given the numerous creek crossings involved in the project, the EPA has noted efforts by Fulton Hogan to ensure that any piling is carried out with forethought as to the likely impacts of not only the piles themselves, but the plant and equipment used for these operations and access across and into waterways.
- Fulton Hogan has developed procedures for departing the site after work is completed or where rain is forecast and these procedures appear to be well communicated and implemented at the site. The EPA particularly notes the efforts by the project environment team to monitor longer term weather forecasts and ensure that the site is well prepared and secured for adverse weather.

I would appreciate if you could pass this feedback on to Fulton Hogan staff involved in the project, particularly the environmental team. Should you have any queries or wish to discuss this matter, please contact me or Michael Heinze on Ph: 6229 7002.

Yours sincerely

JULIAN THOMPSON
Unit Head – South East Region
NSW Environment Protection Authority

Cc: NSW Roads & Maritime – Mr Ron de Rooy

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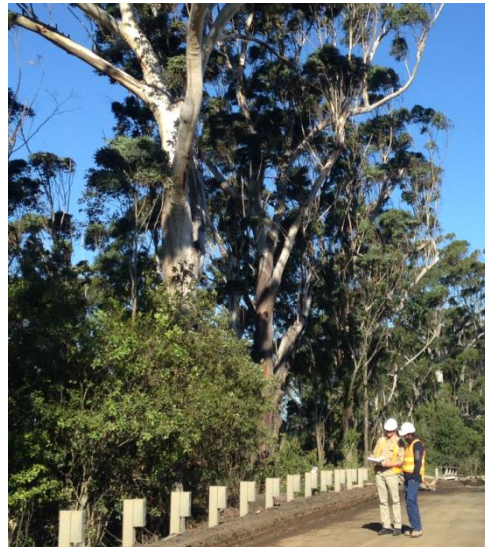
Foxground and Berry bypass

Minimising the risk footprint

We have achieved this by:



Early establishment of NO-GO zones through clear delineation and signage.



Effective planning to manage and minimise the disturbed footprint



Reducing clearing and protecting areas

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Controls during clearing



Dual sediment fences

Stumps ensure groundcover is maintained and grubbing is delayed

Cut stump clearing at waterways retains the stream banks and prevents riparian zone erosion



Earth bunds and mulch berms used on slopes to retain sediment and slow flows



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Clean water diversions before ground disturbance



Upstream diversions and clean water controls were built as one of the first activities on the project to minimise run-on waters preventing potential damage exposure and avoiding the cost of unnecessary water treatment.



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Sediment controls constructed as a priority

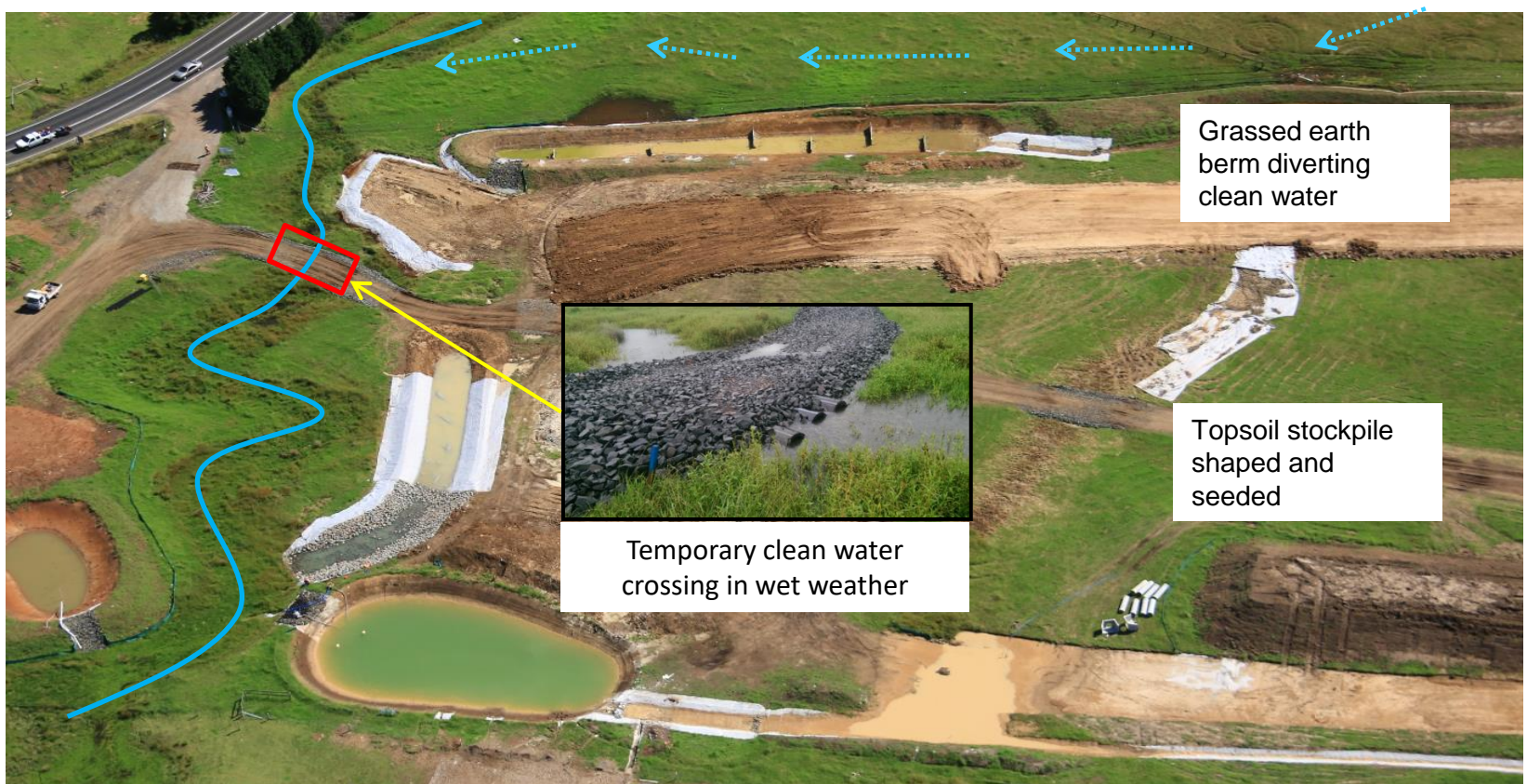


- Sediment basins and controls were built before earthworks started
- Careful planning ensured we would only disturb what was necessary to build the sediment basins and install sediment controls.
- This enabled cross drainage, haul road and earthworks to start

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Setting up the catchment (clean and dirty water separation)

Photo of a typical catchment set up prior to culvert construction and earthworks. Clean water flow was protected and maintained while a large diversion was built offline and stabilised site access was established. Maximum ground cover was retained and all parts of the disturbed site were diverted to basins commissioned.



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Prioritising clean flow passage via cross drainage design

- Culvert construction with clean water flows diverted following the progressive erosion and sediment control plan.
- Transverse drainage



Foxground and Berry bypass Creek works – A point of excellence Temporary bridges over the class 1 waterways.



Standard industry practice is steel pipes and clean rock. The temporary bridges are 'next level' controls that provide permanent fish passage and reduce impacts on the stream bed.



Water quality was maintained during temporary bridge construction using temporary sheet piles, dual silt curtains and pumps to create negative pressure always drawing water into the curtains.

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Stabilised access points and reducing mud tracking



Stabilised site access points were built from clean crushed rock with rumble grids and wheel wash bays were installed at site gates.

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Reducing air quality impacts (dust management)



Fulton Hogan Dust bloc emulsion is applied to earthworks areas to reduce dust and prevent sediment mobilisation during rainfall events and site shutdown periods.



High pressure misting cannons and irrigation systems are effective at controlling dust at crushing compounds

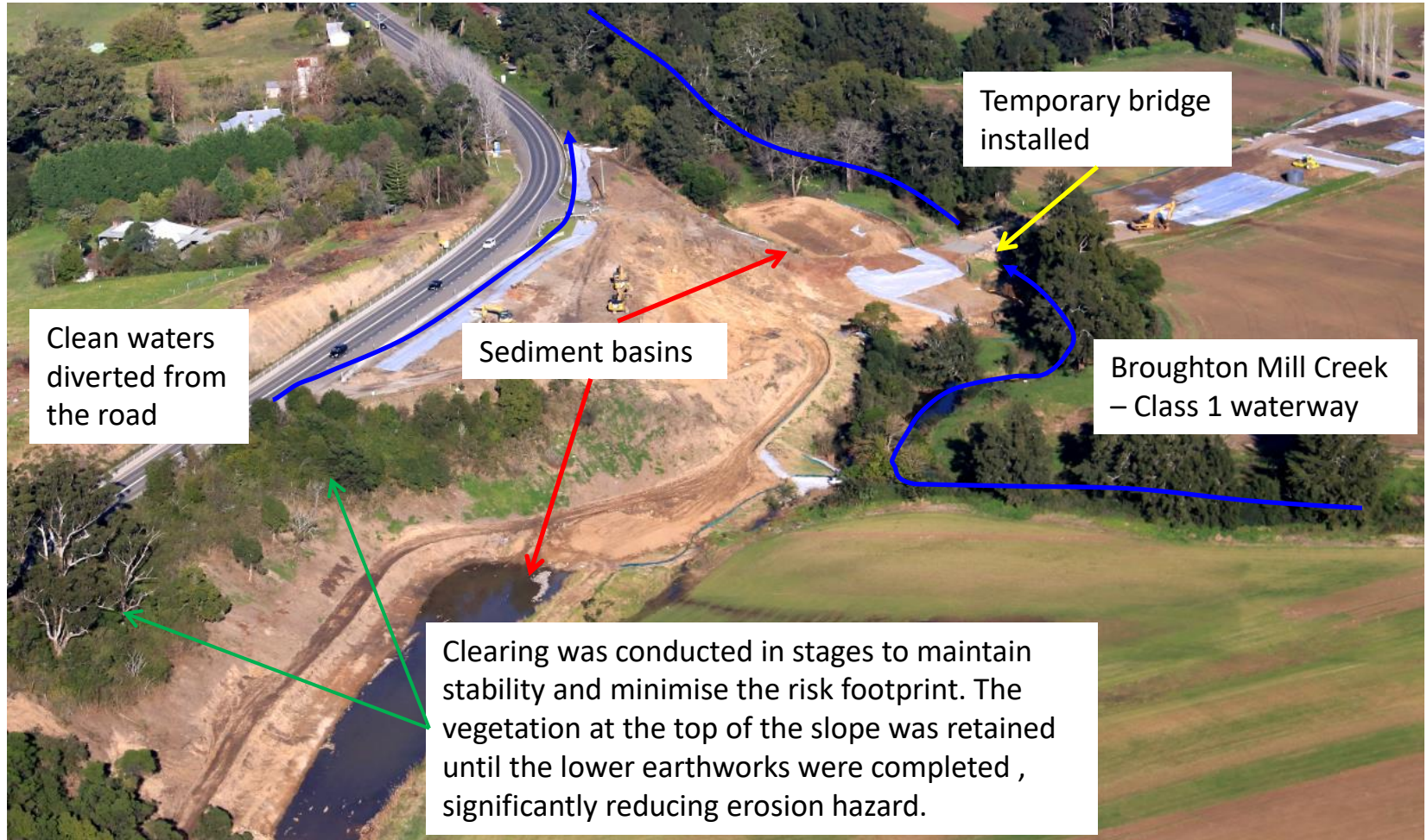


Embankments are stabilised with spray on polymer and cover crop seed to reduce dust and sediment runoff without the waste and the unnecessary cost of disposal fabrics.

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Difficult catchment management

After clearing, the earthworks program for this steep, high risk area on top of Broughton Mill Creek was modified to control the risk. Resources were diverted into this catchment so bulk earthworks could be completed in four weeks instead of the programmed three months to take advantage of favourable weather.



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Erosion control via progressive stabilisation

- Topsoil placement is bought forward in the program with the site hydromulch truck stabilising works as we go
- Landscaping well in advance of the program enhances the environment, site aesthetics and further stabilises completed work.



Progressive stabilisation



Early landscaping



Fill 8 clearly demonstrates each layer of hydromulch in the constructed fill.

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Erosion control via progressive stabilisation

The project recognises that the most effective way to reduce impacts on the environment is early and effective progressive rehabilitation of earthworks. We are constantly seeking to reduce the projects risk footprint.



Progressive stabilisation with vegetated batters at Cut 6 during earthworks and drainage phase.



Fully stable batters at Cut 6 as pavement and finishing works are performed.

Foxground and Berry bypass Creek works – A point of excellence Bundewallah Creek diversion and rehabilitation



Bundewallah Creek restoration was completed using environmentally sensitive methods replicating natural stream function. Biodegradable matting and salvaged plants were used instead of rip rap rock. The pioneering use of a temporary water filled 'aqua dam' helped the team contain and divert clean water flows during creek work.



Downstream works featured pools and riffles and natural elements such as salvaged plants to enhance the waterway during the initial diversion, enabling bridge piling and construction to progress.

Foxground and Berry bypass Creek works – A point of excellence Bundewallah Creek diversion and rehabilitation



- Our 'beyond compliance' goals at Bundewallah Creek is a point of excellence on the project.
- A major creek redesign was required to facilitate bridge works at Bundewallah creek which saw us replicate the natural stream function and build new habitats for Australian Bass and platypus who call the creek home.

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Sediment basin design and management



- All basins are designed with fore bays to trap coarse sediment and reduce basin desilting and maintenance costs.
- Preloading of gypsum is a common method employed prior to rainfall



Foxground and Berry bypass Sediment basin treatment

The four methodologies are used for basin flocculation:



Foxground and Berry bypass Sediment basin discharges

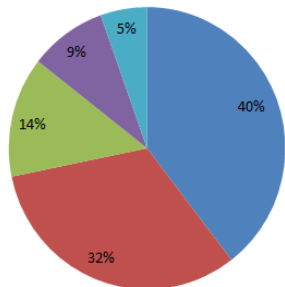
With about 800 releases from site basins, the average discharge quality has been 9 mg/L.

Due to preloading and proactive application of gypsum at the back end of wet weather events, 86% of discharges have occurred in the first 3 days after wet weather.



Day of Discharge

Day 1 Day 2 Day 3 Day 4 Day 5



High quality treated water is discharged via a 100mm siphon, before going through a pipe under the light vehicle track from a sediment basin just south of Toolijooa Ridge.

Foxground and Berry bypass Beyond Compliance – Innovations



Geofabric is rolled out over the highway and retrieved after each Moxy crosses leaving the pavement free of sediment.



Wind socks have been installed as a visual indicator of wind direction and speed. These useful tools help field staff during earthworks operations and their awareness to increase dust mitigation measures.



'Fish fences' are used to prevent aquatic fauna entering pump suction zones when working in waterways.



Portable hose dissipaters are used, replacing the need for sandbags and geofabric when discharging basins

Other Innovations:

- A project landfarm was built to reduce the projects contaminated waste to landfill. This was built to process materials from oil spills, relying on bacterial action to break down hydrocarbons.
- Floc Sheds have been constructed and trialled for rainfall activated displacement of liquid gypsum into the sediment basin.
- Temporary plumbing was installed to capture and reuse pH impacted curing water on bridges over sensitive creeks.

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Innovation – High Efficiency Sediment Basin Trial

As part of the project we will be trialling an alternative flocculent and high efficiency sediment basin. With EPA support we will trial this design in the NSW setting and the knowledge gained will help shape the future design of sediment basins in NSW.

