W2B Koala Management
Case Study

NSW GOVERNMENT | Transport Roads & Maritime Services

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Environment Manager Pacific Highway

Woolgoolga to Ballina Pacific Highway Upgrade

- Located northern NSW, Australia

- 155km in length – high speed dual carriageway 100/110km/hr

- Cost $4.356 billion funded by Commonwealth and NSW Governments.

- Being built in stages, construction commenced mid 2015, completion planned by end of 2020.

- Today's talk focusing on Koala Management in Section 10
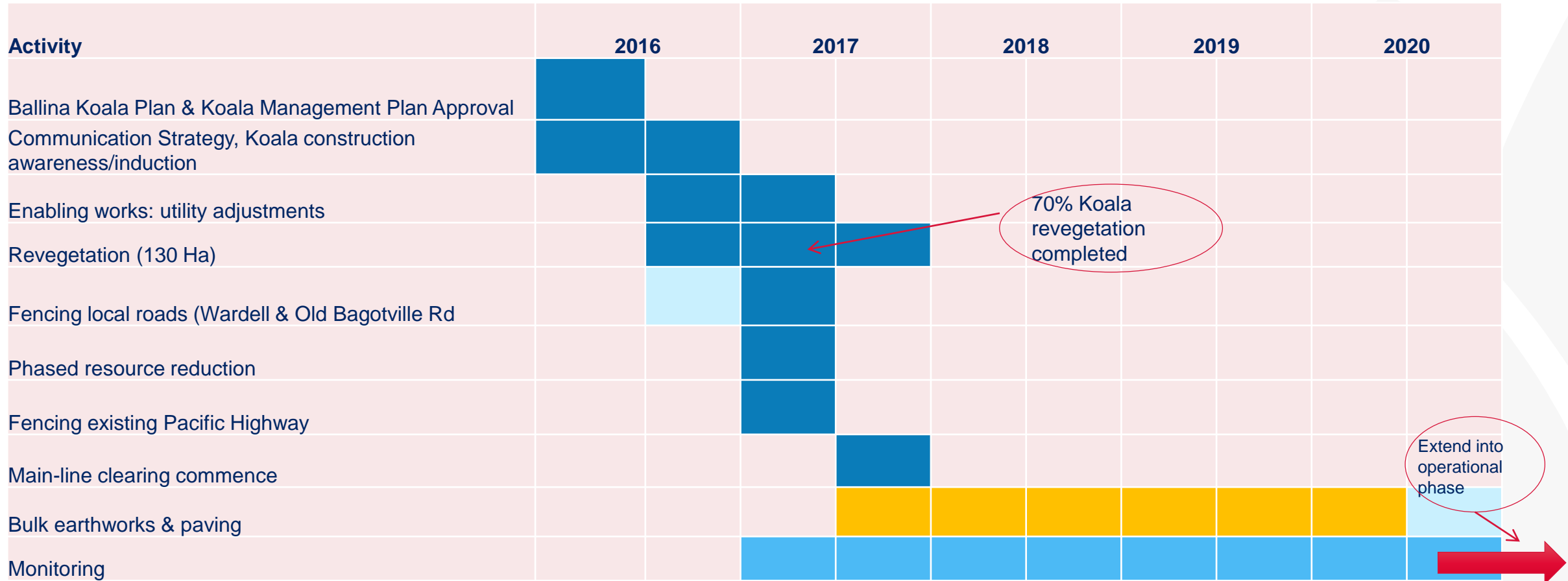
Koalas & Woolgoolga to Ballina……

Section 10

- Strict CoA requiring the preparation of Koala Management Plan

- Federal condition requiring population viability analysis (Ballina Koala Plan):

  - '*to ensure that unacceptable impact will not occur to Ballina Koala population……the Minister will only approve the Ballina Koala Plan if impacts to the Ballina Koala population are considered acceptable*

- High community, regulator and political interest

- The project team worked with numerous Koala experts, ecologists, NSW Office of the Chief Scientist, road designers and engineers as well as regulatory agencies to develop range of integrated measures to minimise impacts on the Ballina Koala population

Koala Management Program
Key Activities & Timeline

Activity		2016		2017	2018	2019	2020	
Ballina Koala Plan & Koala Management Plan Approval		■						
Communication Strategy, Koala construction awareness/induction		■	■					
Enabling works: utility adjustments			■	■				
Revegetation (130 Ha)			■	■	■			
Fencing local roads (Wardell & Old Bagotville Rd			■	■				
Phased resource reduction				■				
Fencing existing Pacific Highway				■				
Main-line clearing commence					■			
Bulk earthworks & paving					■	■	■	■
Monitoring				■	■	■	■	■

70% Koala revegetation completed

Extend into operational phase

4

Best Practice Clearing Management

Pre Clearing Surveys

- Clearing undertaken progressively.

- Clearing lots are marked up at least 24hrs before clearing commences within the identified project clearing limits.

- Pre- clearing surveys undertaken by experienced ecologists day before clearing commences.

- Search for signs of koala activity (and other fauna)

- Spot-light survey 2 hours pre-dawn before clearing commence per clearing lot (Sections 8, Section 9 and Section 10)

- Koala Detection Dog 'double-check'survey on day of clearing and undertaken per lot (Section 10).

Jet
THE KOALA DETECTION DOG

RECONECO

www.reconeco.com.au
Craig Faulkner - 0437 233 336
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Best Practice Clearing Management

Permit Systems & SAPS…getting culture right!

Systems/checklists & hold points

- Set up internal permits system to enter no-go area's needs to be *continually communicated* at all levels across site not just rely on inductions.

- Use of posters/reminders around site, 'dunny door directives'

- All part of Zero Harm to Koala campaign……over 8000 people inducted
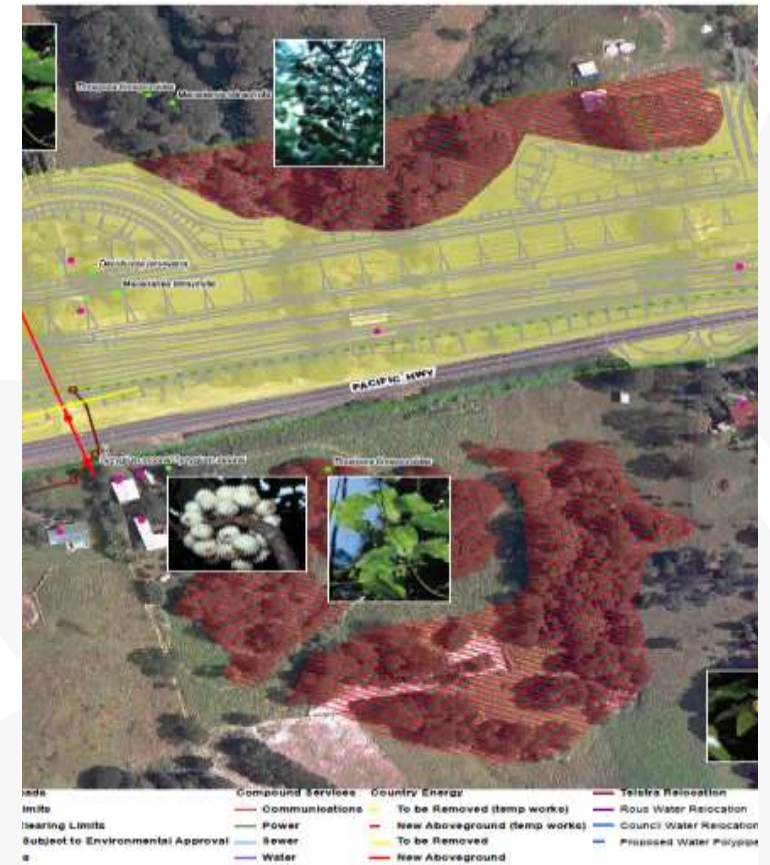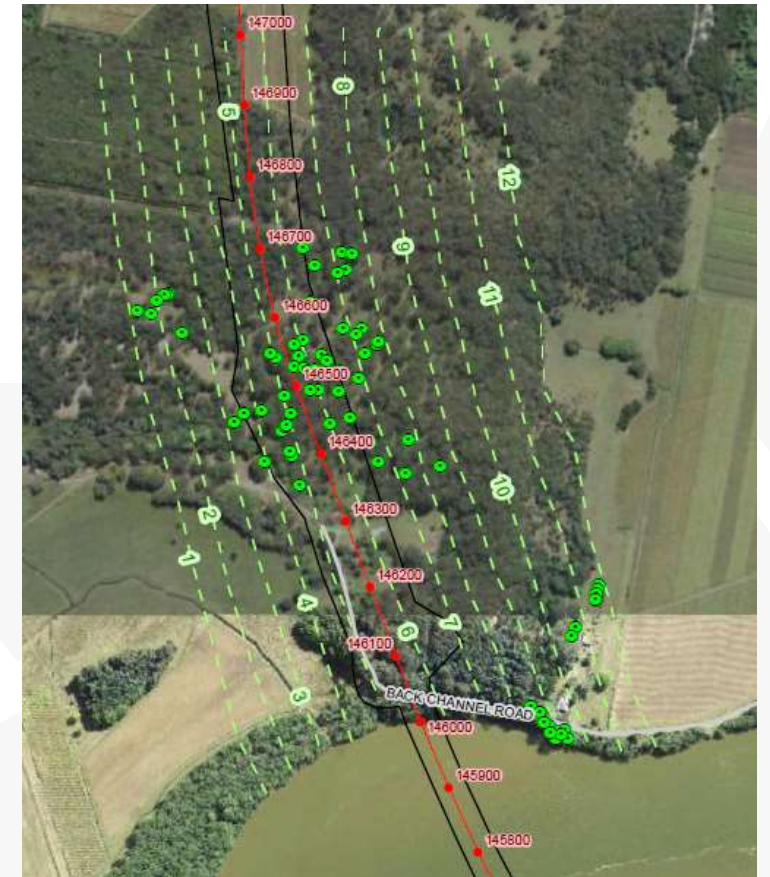
Phased Resource Reduction (PRR)

Laws Point

Two koala 'hot spot' areas within alignment: Laws Point and Wardell Road area.

Progressive collaring and ring barking of trees over 8 week period.

Consisted of 5 phases which included pre, during and post PRR Koala population surveys using transects – paired diurnal and nocturnal surveys.

Aim to reduce stress on koalas and gradual adjustment to new home ranges compared to instant impact of main line clearing.
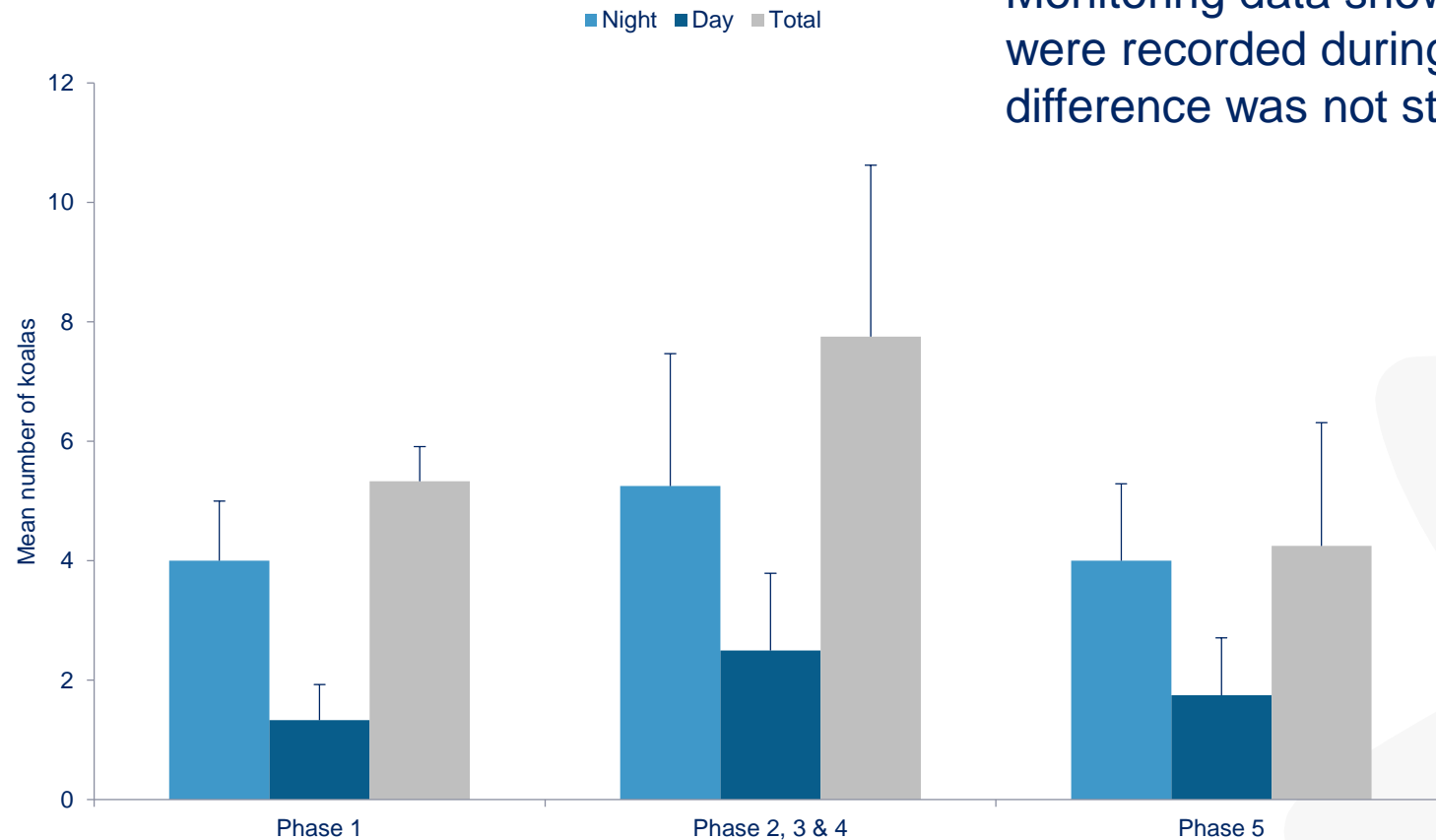
Phased Resource Reduction

Methodology:

- Phase 1 (3 weeks): Tag and map all trees to be collared/ring-barked and undertake baseline koala population surveys.

- Phase 2 to Phase 4 (weeks 4 to 10): Progressive installation of tree collars and ring-barking trees. Included combination of tree collaring & ringbarking. Included koala population survey at each phase

- Phase 4b: 3 week gap between final collaring/ring-barking and mainline clearing. Included koala population survey

- Phase 5 (weeks 13 to 16): Undertake koala population survey during actual clearing process and koala population surveys post clearing.

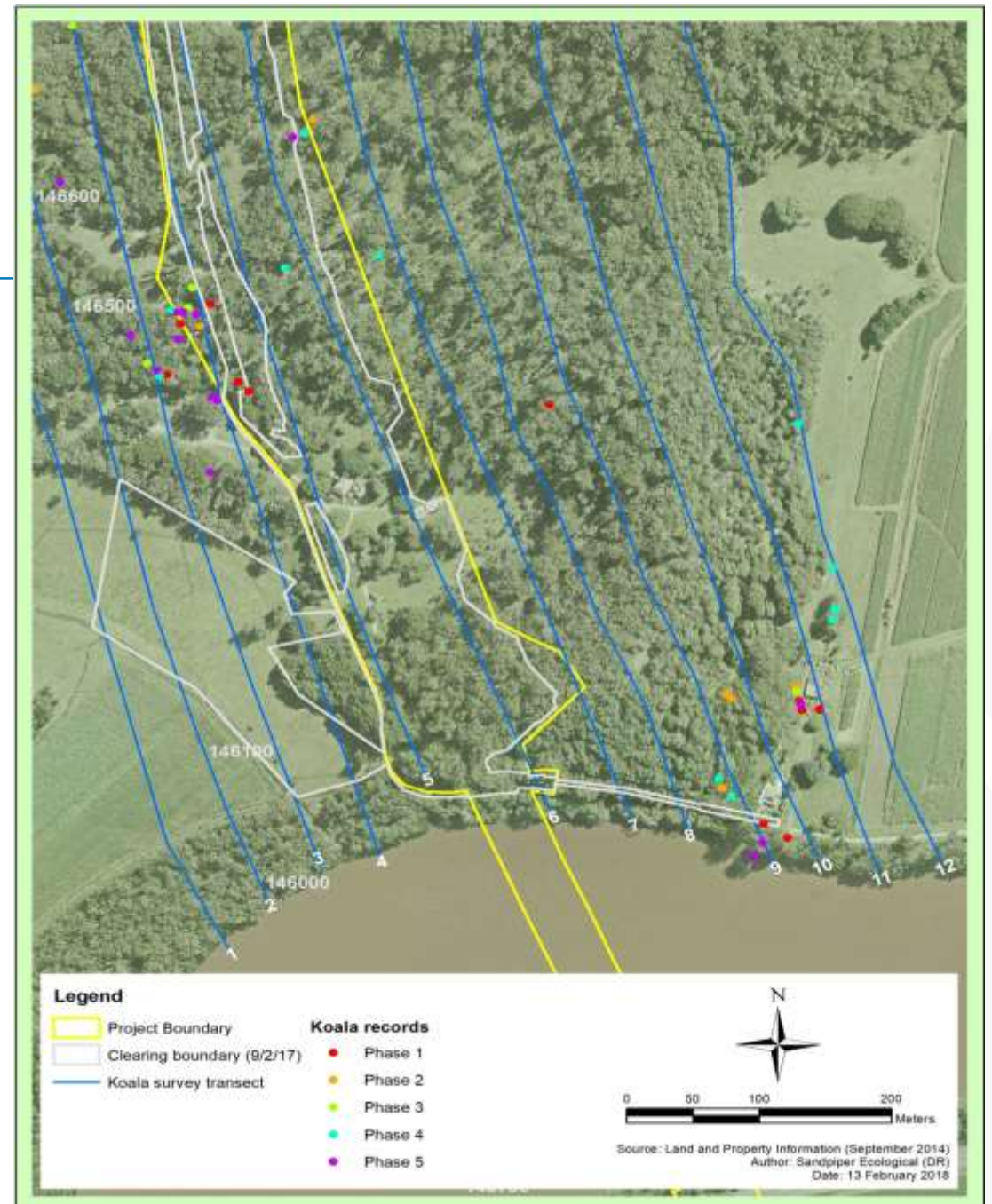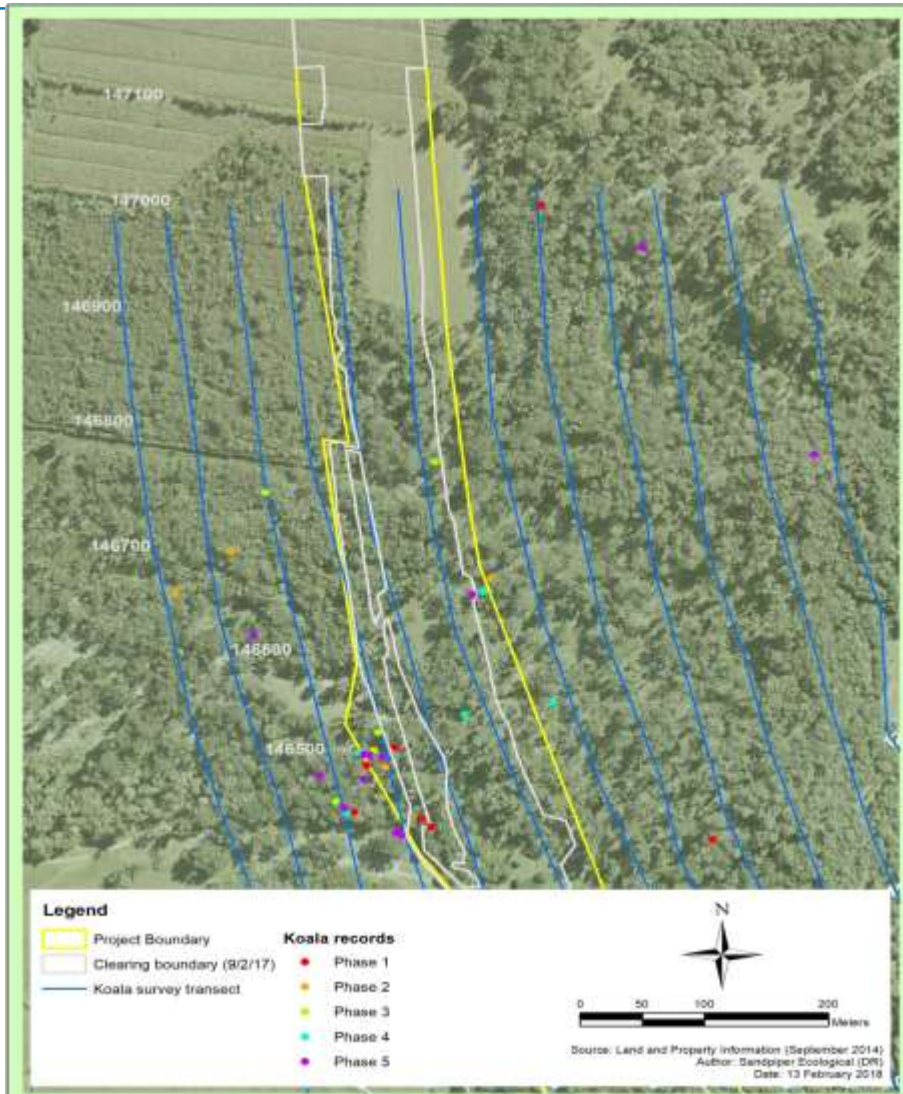- Camera monitoring of select collared trees.

Phased Resource Reduction

## Results Koala Population Transect Monitoring (Laws Point)

Monitoring data showed that (on average) fewer koalas were recorded during phase 5 than phase 1 but the difference was not statistically significant (P>0.05).

Average number of koalas (± SD) recorded at night and day in each monitoring phase.
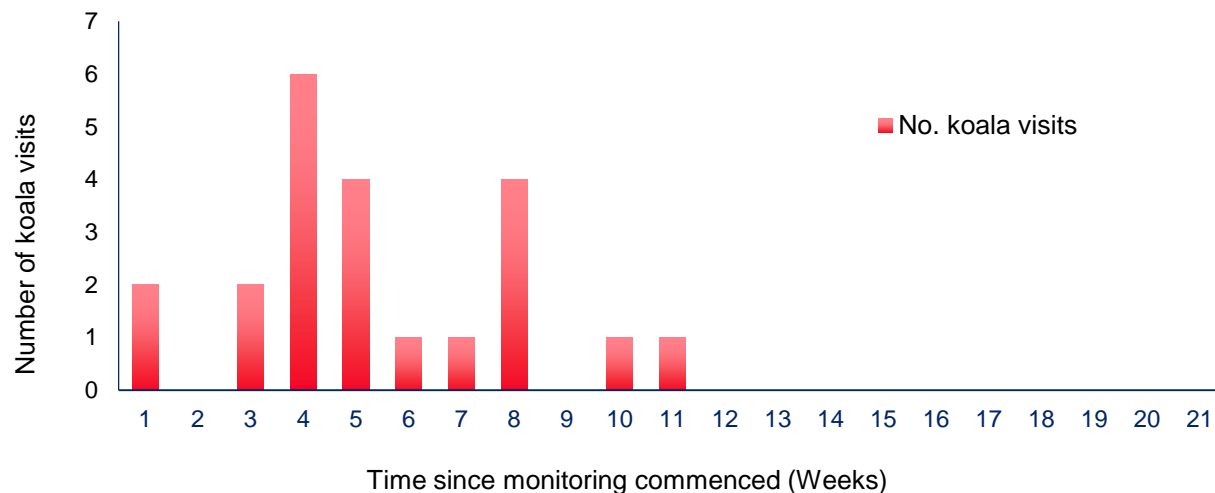
Phased Resource Reduction

Distribution of koala records across each of the
5 phases of the PRR program at the Laws Point

Phased Resource Reduction: Camera Monitoring
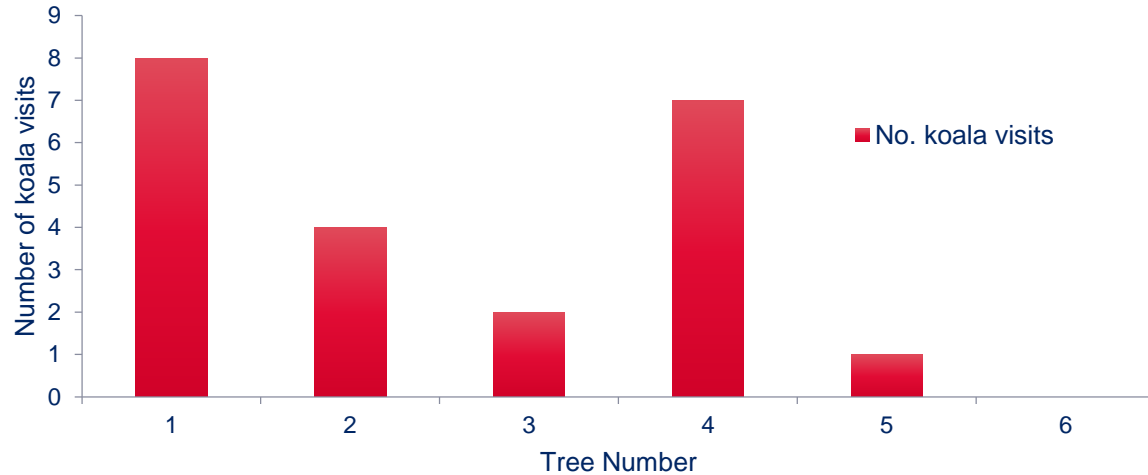
Number of koala visits to six collared feed- trees monitored with infra-red cameras. Each visit to a tree >60mins apart was scored separately even if by same individual.

Visits by koala to collared feed trees over the 21 week monitoring period. Data represent individual visits not individual koalas and visits were scored separately if they occurred >60 minutes apart.

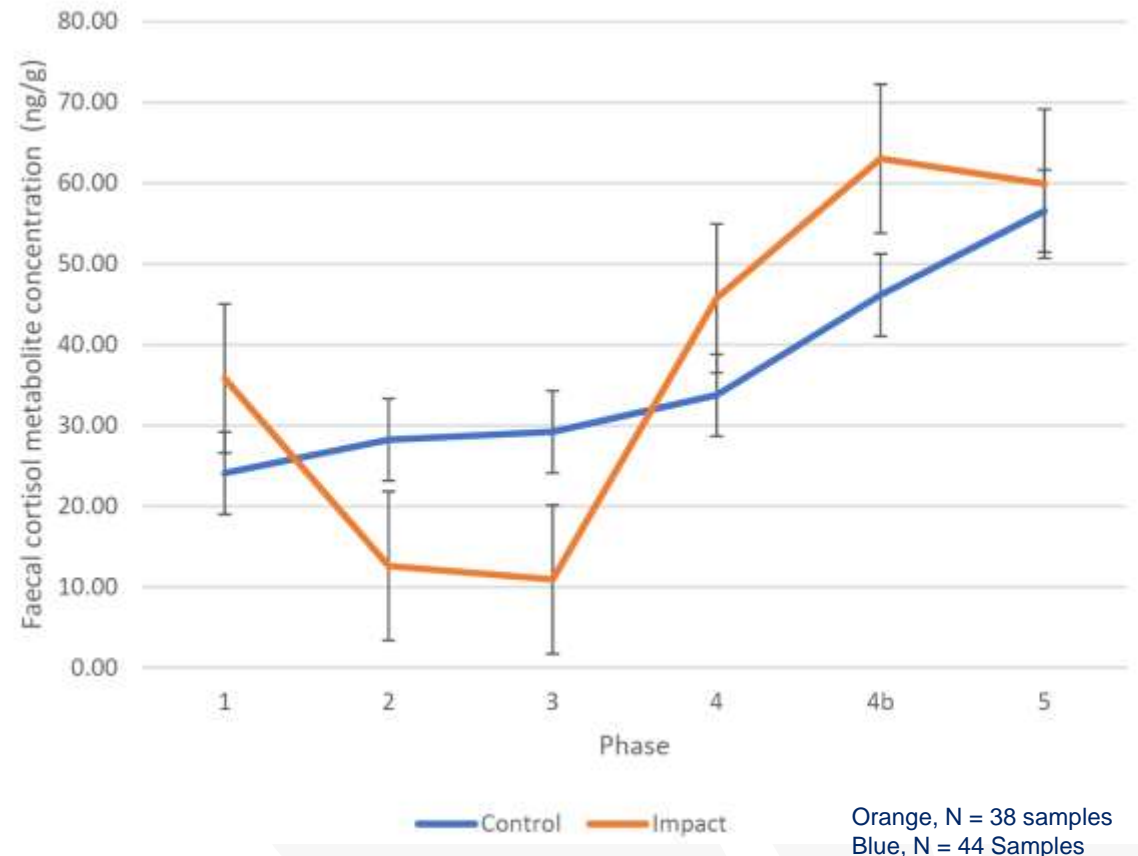# Cortisol Study & Phased Resource Reduction

- Cortisol stress hormone that can be measured in koala scats.

- Working with University of Sydney to undertake analysis of koala scats to detect changes in cortisol levels over time as construction activities progress.

- Objective/Scientific study will compare against control sites within the same koala population.

- Scats collected across the 5 phases of PRR

- Records kept of koala health, location, weather, sex (where possible)

Cortisol Study & Phased Resource Reduction

Results

- No statistically significant difference in the change of cortisol concentrations between control and impact sites for each phase.

- Due to low DNA yield from koala scats collected in the field, individual identification of koalas was not possible and so all findings are at the population level.

- An upward trend in cortisol concentrations was evident across both impact and control sites. Drivers of this trend could not be determined.

Orange, N = 38 samples
Blue, N = 44 Samples

Phased Resource Reduction

Outcomes and Recommendations

The program was successful in stopping koalas from accessing trees in the limits of clearing, with the one unforeseen exception of an adult female and joey accessing a collared tree via a fallen tree.

Monitoring data showed that (on average) fewer koalas were recorded during phase 5 than phase 1 but the difference was not statistically significant ($P>0.05$).

Collaring of feed trees was not a suitable way to change koala habitat use in the short-term. Repeated visitation to collared trees indicated that they remained attractive to koalas.

If applied as the primary treatment, ring-barking has merit as a means of changing koala habitat use. For ring-barking to be effective it should be applied in such a way as to cause gradual dieback over a period of several months.

Phased Resource Reduction

Outcomes and Recommendations

Nocturnal surveys were more successful in detecting koalas than daytime surveys, although it was often more difficult to sex individuals and assess health at night

The combination of koala population surveys and cortisol metabolite concentration analysis provide an effective means of monitoring the effect of PRR on koalas, noting that further monitoring work is ongoing

Collaring and ring-barking trees does not negate the need for robust pre-clearing surveys that include as a minimum pre-dawn spotlighting and post-dawn pre-clearing surveys
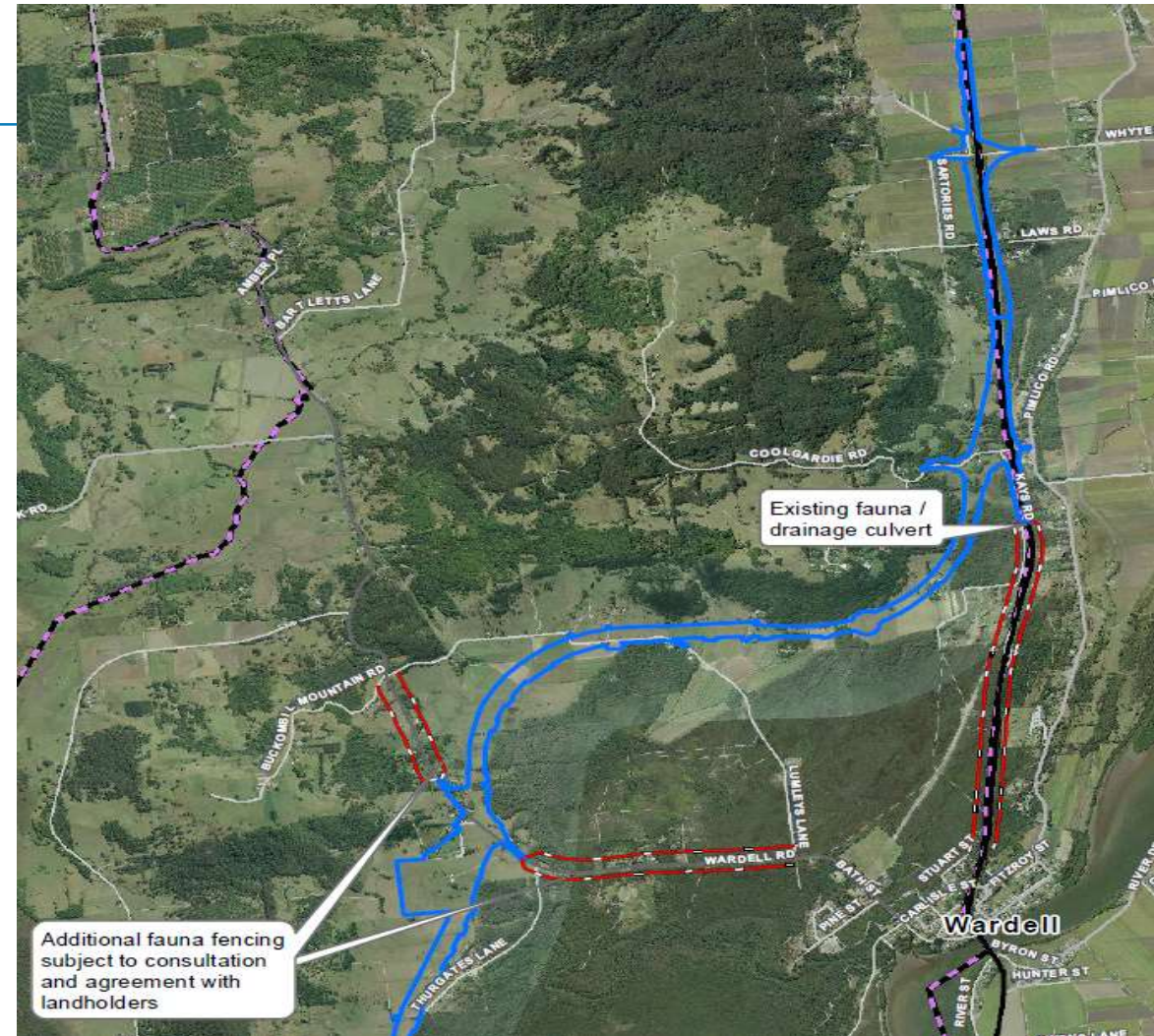
Revegetation Koala Habitat

130 Ha being revegetated.. Converting old cane land and grazing lands to koala habitat

- Detailed revegetation strategy prepared

- Linking fauna movement corridors on regional scale

- Using site specific information soil types/testing, typography, species selection and local seed provenance to give highest chance of success.

- Engaged specialist revegetation contractor with including three year maintenance period.

Implementation of 'Closed' System

- Use of grids at interchange locations to create closed system.

- Permanent fencing progressively installed on new alignment as connectivity structures are built

- Installation of fauna fencing on adjacent local roads and existing Pacific Highway ahead of clearing commencing

- 26 fauna connectivity structures across 14km.

Existing fauna / drainage culvert

Additional fauna fencing subject to consultation and agreement with landholders

Old Bagotville Road Fencing

Section 10: Additional Fencing

Temporary Floppy Top Koala Exclusion Fence
Speed Bump
Koala Escape Structure

Installed prior to phased resource reduction occurring at Laws Point.
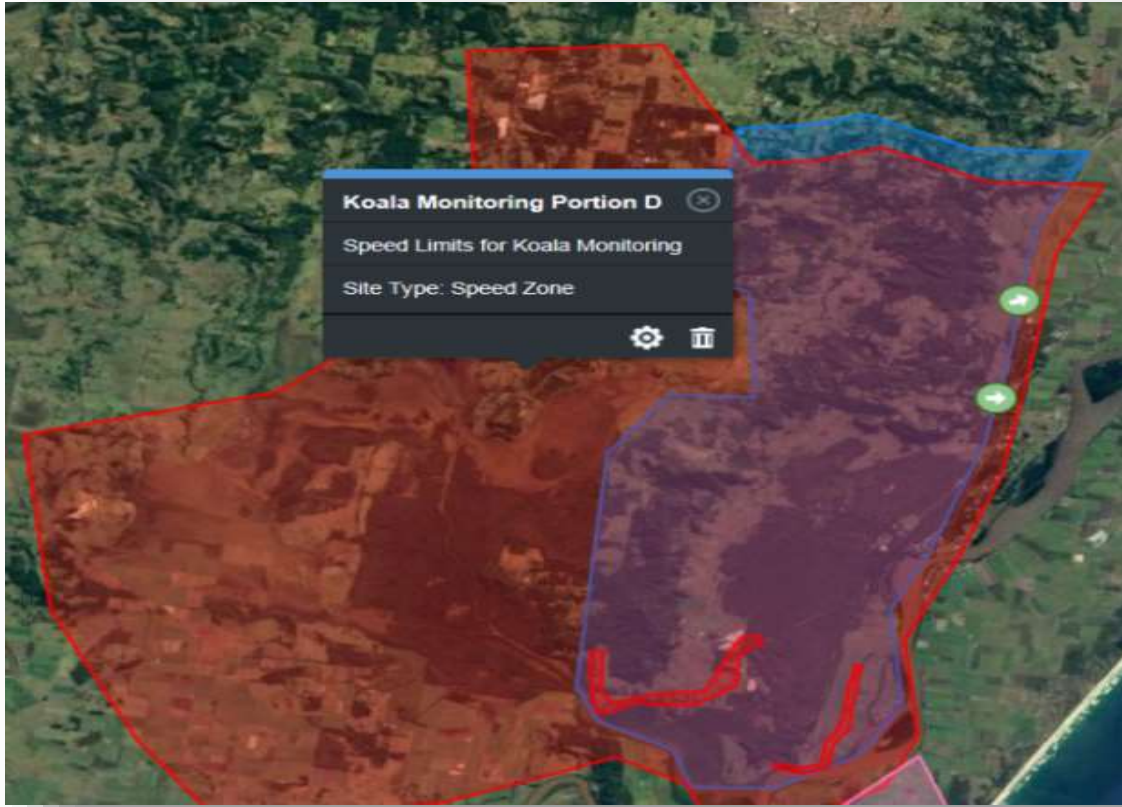
Predator Control

Prior to phased resource reduction occurring.

- Using experienced & licensed 'trapper'

- Working with JALI LALC, Ballina Shire Council and Local Land Services as an integrated approach.

- RMS focus is land in and adjacent to Section 10 alignment.

- Follow up monitoring….

In Vehicle Management Systems (IVMS)

- W2B project introduced geo-boundaries in the IVMS systems
- Further speed restrictions to certain hot-spots to reduce potential road strikes

Local Driver Behaviour….

Vehicle Activated Koala Warning Signs

Koala roadkill hotspots near the new highway alignment

- Typical application of fauna fencing is a challenge with local roads as many driveways and low vertical alignments

- Working with Ballina Shire Council, RMS Traffic Safety Officers, FoK and EPA to target areas of koala road kill and influence driver behaviour to reduce risk of koala road strikes.

Integrated GIS to manage risk

Web based system

- Incorporates detailed information collected during EIS and Threatened Species Management Plans.

- Includes clearing boundary adjustments from consistency reviews and utility adjustments

- Regularly updated. Replaces paper based sensitive area plans

- Secure login and web based access

- Extremely useful for project team /site inspections

- Developed app for recording threatened spp on project
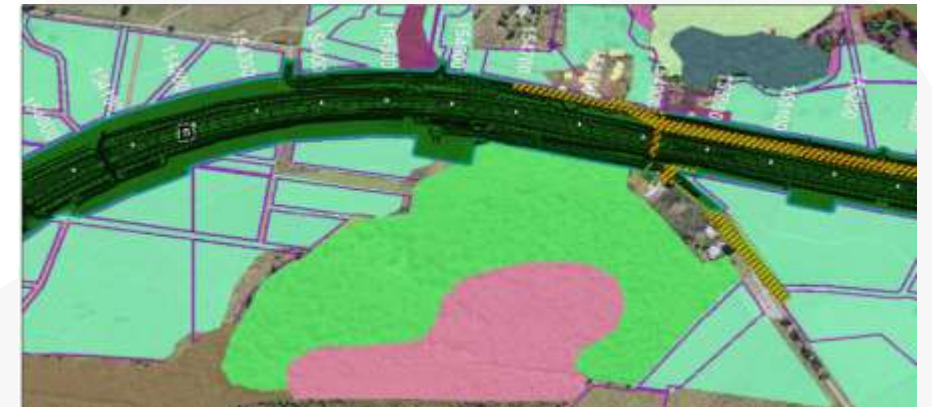
Stakeholder Engagement: Managing Risks

Relationship building

- Build relationships with key stakeholders including Friends of the Koala
- Ensure stakeholders are kept informed in a timely and transparent manner
- Manage feedback in a respectful way
- Monitor and evaluate feedback to measure progress and review delivery as appropriate
- Define how stakeholders can participate and how their input will be used

Education / Awareness

- Raise awareness of koala movements, particularly during breeding season
- Investigate and accurately report on road strikes
- Educate about temporary and permanent management measures including:
  - Clearing procedure
  - 'Zero harm' campaign
  - Traffic changes in and out of road work zones
 - Predator control
  - Crossing structures

Reputation management

- Build community and stakeholder confidence in Roads and Maritime's approach
- Proactively identify and manage risks/issues
- Proactively and strategically manage media
- Challenging the way we work and drive innovation
- Demonstrate an understanding of community concerns and values

Monitoring………..

- Koala population monitoring use power analysis to determine confidence of predicted population size

- Performance targets in line with PVA predictions

- Koala road kill monitoring in fenced areas

- Use of connectivity structures

- Use of revegetation areas

- Genetic analysis (scats) identify changes in population structure/movements
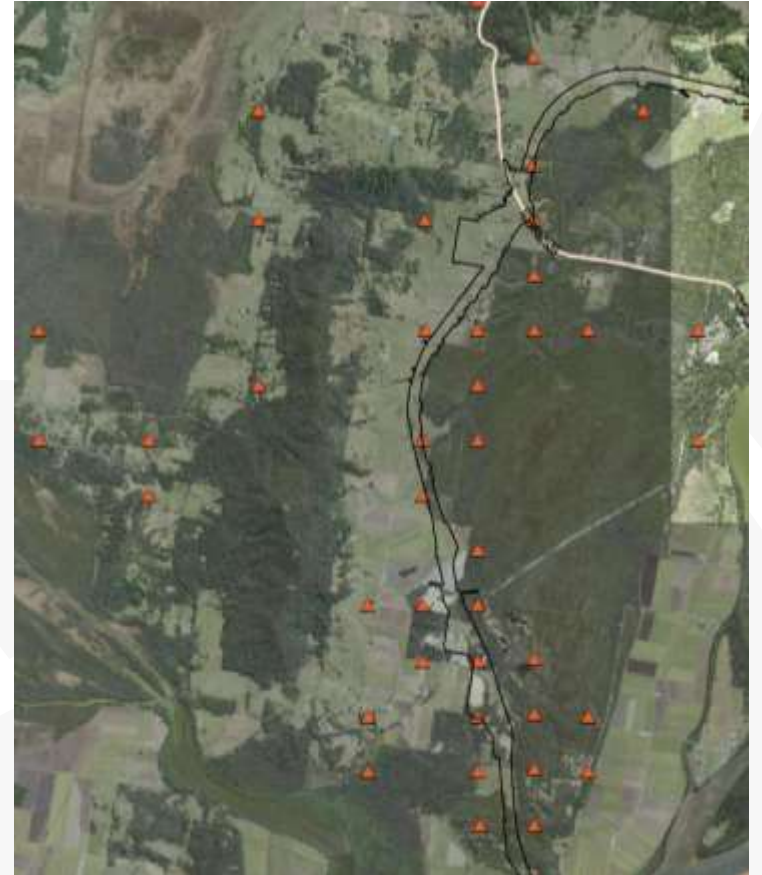
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THANK YOU !