Appendix 5 – Notes of one-on-one meetings with nearby residents

MEETING NOTES

12/13 APRIL 2012

Name of meeting: **Blasting consultation meetings**

Location of meetings: St Helena Road/Plantation Drive.

Date: 12/13 April 2012

Attendees: **Project team**
Mark Dowell, Bauldertsone Tunnel Project Manager (MD)
Matthew Saviana, Baulderstone Roadworks Manager (MS)
Ian Shilling, Baulderstone General Superintendent (IS)
Susan Scott, Baulderstone Community Relations Manager (SS)
Abby Smith, Baulderstone Community Relations Coordinator (AS)

AGENDA ITEMS:

Item	Description
1.	Welcome (SS)
2.	Tunnel construction, extension of hours and vibration limits (MD)

NOTES:

Item	Topic	Personnel
1	**Welcome** Welcome, introductions and an overview of what will be covered in the meeting.	Susan Scott
2	**Tunnel construction, extension of hours and vibration limits** Mark Dowell provided an overview of the tunnel construction, timeframe for construction and how controlled blasting will be undertaken in the tunnel and at the tunnel control centre. The residents were provided with information about the blasting hours and the project's proposal to extend blasting hours (currently 9am to 5pm Monday to Friday) to match construction hours (7am to 6pm Monday to Friday). Mark explained that the benefits with the extended blasting hours means there is a contingency in place to ensure two blasts per day are achieved to stay on program and ensure the tunnel does not take longer than anticipated. The benefit of this to the residents would be that the construction would be completed earlier and less inconvenience to residents. Susan Scott advised that the project will be providing residents with a letter outlining the proposal for extension of blasting hours and advised that there will be a signature box asking residents to sign if they have no objections.	Mark Dowell

	Mark outlined that one blast will occur in the morning and another prior to 6pm each day. Work will then continue through the night inside the tunnel however it will be inaudible works. Mark explained that soundproof doors will be constructed at the tunnel portals and no blasting will take place at night. Mark advised that there may also be a proposal in future to increase vibration limits which are currently set at 5mm/s. Explanation about the vibration levels will be explained at the street meeting planned for next month when the project's blasting and vibration expert will be on board to explain the technicalities of this. Residents were advised that part of St Helena Road and the intersection at the Pacific Highway will be upgraded to make it safer and there will be a number of truck movements to access the southern portal of the tunnel during construction. Residents were advised that they will be notified of any changes to traffic conditions or impacts regarding blasting or construction of the project in advance. Residents were asked for any feedback or input and if they had any questions or concerns about any of the information presented.	
	<u>Issues raised and responses – [redacted] meeting 8.30am 12/4/2012</u> **Q: Will there be ventilation stacks in the tunnel?** No, there will only be ventilation fans inside the tunnel once operational. **Q: How many blasts will it take to complete?** In excess of 100 blasts. **Q: How would vibration impact us and what is your vibration assessment?** We have limits that we must abide by and we must remain within those vibration limits. **Q: What about the noise for the blasting – will it be a big noise?** It will be approximately 100 mini blasts in the space of about 8 seconds. It will be like a dull rumble. **Q: Will the movement affect property nearby?** There should be no affect to nearby properties in relation to vibration. **Q: What hours will blasting take place?** Construction hours are 7am to 6pm Monday to Friday and 8am to 1pm Saturday. Blasting hours are currently restricted to 9am to 5pm Monday to Friday. **Q: What will happen to traffic on St Helena Road?** There will be no stopping of traffic on St Helena Road for blasting however there could be short delays during construction for other reasons. **Q: What about dust?** Small amounts of dust will be generated during blasting. **<u>Blasting hours</u>** **Q: Would traffic be stopped?** For the outer blasts at the tunnel portals, the maximum would be 15 minute	

	temporary stoppages on the Pacific Highway. **Q: Are you doing roadworks on St Helena road?** BPL are looking to upgrade a section of St Helena Road and there is currently a plan in with Byron Shire Council. **Q: Will heavy trucks come in and then leave them?** The workforce for the tunnel will come in mini buses. Concrete deliveries will be the majority of the deliveries each day plus weekly explosive deliveries. **Q: Do you need to close the road for that?** No because they are all road registered trucks. There may be some large plant that might need to be delivered under police escort due to their size, this could mean delays for a short period of time. **Q: Is there a time of day when there will be more traffic?** Only if it was a large plant movement would that occur. **Comment: With the business that we run, it is really important that we have no contamination.** **<u>Extension of hours</u>** **Q: Will there be noise through the night?** Night work in the tunnel will be inaudible and no blasting will take place at night. **Q: So they will be working at night?** Yes however there will be no noise from night works as it will be inside the tunnel. **Comment: We didn't realise they would be working at night.** There will be gates at the tunnel portals which will be soundproofed. They will remain closed during the night shift. **Q: What are the construction hours?** Construction hours are 7am to 6pm Monday to Friday and 8am to 1pm Saturday. Blasting hours are currently restricted to 9am to 5pm Monday to Friday. **Q: What is the decibel rating at night?** Zero – inaudible **Q: So there will be no noise?** This tunnel has a better design criteria and will not have any noise at night. **Q: Is it going to look like the tunnel down the road or at Tugun?** It will be different to those tunnels, there will be concrete arches layed back into the hill to provide a seamless transition into the hillside. **Q: Will there be fans in the tunnel?** There will be fans in the tunnel for ventilation and only turned on when required. **Feedback about extending blasting hours** Residents advised that they don't see it as a problem. **What is your contracted time for the tunnel?** There will be an 11 month excavation period, then there will be the lining and fit out of the tunnel so it will essentially match the project construction timeframe by the time it is all complete.	

In terms of the total stretch, is the tunnel one of the first things to be done?
Once approved, environmental controls will be the first work that is undertaken. From there, the tunnel is on the critical path and will be one of the first parts of the project to start.

With the drainage, we have a creek on the property, will creek waters be backing up?
No, the project has to measure afflux (upstream flows).

Comment: We have completed extensive rainforest regeneration on our property. That is a concern, we have planted 30,000 trees.

<u>Increase in vibration limits</u>

I thought you said there was no vibration at all?
Vibration will be minimal; there would be no impact on the foundation.

Comment:
If it doesn't go right, we would not be happy.

How do you deal with the water that comes through the hill?
The tunnel is fully lined so it will be watertight.

We get a lot of fog in the area, will the fans in the tunnel suck the fog through?
Fans are only there to ventilate the tunnel, for emergencies. They only come on when needed.

Matthew Saviana advised that he can bring some cross sections of the tunnel to them to show how it will be constructed.

Comment:
Our key concerns about dust are that we are not on town water, we are on tank water. Our water supply comes off the roof and we need to consistently have a healthy potable water supply.

- **Wants filter on water tank. SS advised it was a suggestion by RMS, not a promise.**
- **James O'Connor to contact resident.**

Main concerns:

- **Interruption to traffic on St Helena Road (export business)**
- **Dust impacts on plantation**
- **Contamination (crop, water supply, farm etc)**
- **Rainforest regeneration on property (planted 30,000 trees) – need to be looked after.**

<u>Issues raised and responses – [redacted] meeting 10am 12/4/2012</u>

Q: What sort of rise is there at the tunnel?
There will be a 4% grade at the peak of the tunnel.

Q: Will there be ventilation in the tunnel?
There will be fans but they will only come if needed.

	Q: What are you doing at the Ewingsdale interchange? The Ewingsdale interchange will be upgraded as part of the Tintenbar to Ewingsdale upgrade. **Q: Are the blasting hours 9am to 5pm?** Yes, those are the current blasting hours. **Q: Are there any toxic materials that will be used for blasting?** There won't be any toxic materials used for blasting. **Q: What will be done to protect Tinderbox Creek?** There will be a number of environmental controls that will be implemented on the project to project Tinderbox Creek. **Q: How deep down are you going to be in the tunnel?** The tunnel will be 42 metres below ground. **Comment: The project was inevitable; however we are opposed to the construction of it.** **Q: Would there be underground vibration from any activity?** Blasting will have minimal vibration impacts. **Q: Is it going to be a 12 month procedure for blasting?** Yes, the blasting will be undertaken for approximately 11 – 12 months. **Q: Where will vehicles turn around from St Helena Road/Pacific Highway intersection?** Construction vehicles will be restricted to a left in, left out arrangement and will not be able to cross the highway at that intersection for safety reasons. **Comment: The group meeting might not do a lot for us but it will be helpful for the whole community.** **Concerns:** • **Construction** • **Vibration** • **Toxic fumes or materials used**	
	Issues raised and responses – [redacted] meeting 11am 12/4/2012 **Q: Would the intention still be to blast from 9am to 5pm?** The current hours are for blasting to be contained within those hours however we are applying to extend those blasting hours from 7am to 6pm to match construction hours. **Q: When you are blasting, will that affect the transit along the road? We operate school buses from 7.45am to 8.30am and from 2.30pm to 4pm.** The traffic interruptions to St Helena Road and Pacific Highway are expected to be minimal and you will be notified well in advance of any changes. We can try and work around you as best as possible. **Q: Will there be much dust generated from blasting?** The dust expected to be generated from blasting will be minimal. **Q: How does the fan system work?** There are fans inside the tunnel which will come on when needed once	

	operational. **Q: What are the orange poles that we see on the side of St Helena Road?** They are there for locating utilities in the area. **Q: Is the tunnel the first thing that will start?** Tunnel programming is on the 'critical path' and will be one of the first things to start. **Comment: The worst thing is the traffic movements from St Helena Road and the Pacific Highway, it is so dangerous.** **Note:** Residents were satisfied with the consultation and had no objections to the work going ahead including the extension of hours. **Concerns:** • **Bus route** • **Traffic interruptions and delays on St Helena Road and Pac Hwy.** • **Maintaining bus service - Bangalow buslines** • **Maintaining bus service - Campbell's bus service**	
	Issues raised and responses – [redacted] meeting 1pm 12/4/2012 **Q: How long will it take to construct the tunnel?** Approximately 11 – 12 months for the excavation of the tunnel with two blasts per day in each tunnel. **Q: Will trucks be coming up and down St Helena Road?** There will be a slight increase in truck movements along St Helena Road but the project will manage that accordingly. **Comment: It is a really dangerous intersection at St Helena Road and Pacific Highway.** **Q: What about the radio signals, will they be affected when you blast?** There will be no affect to radio signals. **Comment: We don't mind if you start at 6am.** **Concerns:** • **Traffic on St Helena Road** • **Dangerous intersection at Pacific Highway**	Owners – Mrs Meyer
	Issues raised and responses – [redacted] meeting 2pm 12/4/2012 **Q: Is there a water tank at the tunnel control centre?** The water tank is beneath the tunnel control centre, built into the ground. **Comment: "That's understandable" (When discussing the need for the extension of blasting hours)** **Q: How far is the tunnel below the ridge?** Approximately 42 metres down. **Q: Will there be much vibration?** No, however we want to increase the vibration limits possibly in the future but if	

	that is approved, it will still be within approved limits and will have a minimal impact. **Q: When will it all start?** Construction will start approximately mid 2012 and the tunnel will be one of the first things to be constructed. **Note: Resident was generally not too concerned with the tunnel construction and extension of blasting hours. Did not raise any concerns.**	
	Issues raised and responses – [redacted] meeting 3pm 12/4/2012 **Q: When will the tunnel start?** Mid 2012 approximately. **Q: Will you start at both ends?** Construction will start predominantly at the southern portal however work will also start at the northern side of the tunnel. **Q: What about if there's water in the tunnel, will that affect my water? I have groundwater and my well is approximately 240m deep.** The groundwater should not be affected as the tunnel is not going that deep. **Q: Will there be much noise from drilling and blasting?** The noise impacts will be minimal. **Q: What about access for St Helena Road, will that be open as usual?** There will be minimal traffic disruptions on St Helena Road. **Q: Where is the basement of the tunnel control centre?** The basement of the tunnel control centre will be above the tunnel (shown on map). **Q: Do water tanks sit on top of the tunnel?** Water tanks will be below the tunnel control centre, underneath the ground. **Q: Will fuel tankers be allowed in the tunnel?** Dangerous good vehicles will not be permitted in the tunnel. **Q: When will the tunnel be open?** The tunnel will be open with the rest of the project. **Q: What happens here on the Ewingsdale side?** The northern tunnel portal will be constructed and the new highway will be constructed on the eastern side of the existing highway and will tie in with the Ewingsdale interchange. **Q: Is there two tunnels?** Yes there will be two identical tunnels constructed. **Q: Is it 11 months to complete the tunnel?** It will take 11 months to excavate the tunnel and then there will be the tunnel fit out which will take approximately another 12 months. **Q: Could vibration travel 500m?** There could be some vibration however it will be minimal.	

	Q: When is the street meeting? Street meeting will be in early May, at this stage. **Q: When will the other parts of the highway upgrade start?** Around mid 2012. **Q: Do you know when RMS will start anything?** Baulderstone have now taken over the design and construction of the project and will complete the project from start to finish. RMS will oversee the construction of the project. **Q: Where is the Bangalow compound going to be?** Bangalow compound will be off Bangalow Road. **Q: How many people will be working on the project?** Numbers of staff have not been confirmed yet. **Q: Do you work weekends?** There will be a half day on Saturdays from 8am to 1pm and no work on Sundays or public holidays. **Q: Are you concerned with blasting for residents within the 500 metre radius?** We are notifying residents within 500 metres as there may be some minor impacts for residents during the tunnel construction. **Concerns** • **Affect to groundwater/well** • **Noise** • **Access to St Helena Road** **** Action for Peter Borelli to call [redacted] ****	
	Issues raised and responses – [redacted] meeting 4pm 13/4/2012 This information provided about blasting and tunnel construction was a repeat of information that was presented at a one on one meeting in March however they were given more detail about it as follows. Residents only raised concerns about the species and plantings above and surrounding tunnel control centre – concern about growth height of plantings at street level and need to retain/enhance view to ocean. **Matthew Saviana also showed the residents the plans for their property access at the meeting. MS provided an update of plans for property adjustment and noted the plans are still not final and there will be further consultation about it.**	
	Issues raised and responses – [redacted] meeting 4pm 13/4/2012 [redacted] stopped into the [redacted] meeting briefly and advised that she will get any information that she needed from [redacted] and didn't have any issues with the blasting or tunnel construction.	
	Issues raised and responses – [redacted] meeting 9am 13/4/2012 **Q: What is the timeframe for the tunnel construction?** Tunnel construction will start in approximately mid 2012. It will take 11 months to excavate the tunnel and then there will be the tunnel fit out which will take approximately another 12 months.	

	Q: Will we still have access to the driveway if the Pacific Highway is shut down for any reason? Access to the property will always be maintained. If there is any need to temporarily close the highway, or if there are changes to your access, you will be notified at least 5 days in advance. **Q: Will we feel the blasting?** You may feel the blasting due to the close proximity, however, it the blasting will only take between 12 and 15 seconds. **Q: There is a spring at the top side of the dam on the property, will it hit the fault line and lose water from the spring/dam?** Tunnel construction and blasting should not affect the spring or dam on the property. **Q: Will residents need to be notified in advance of blasting?** Residents will be advised prior to blasting and any construction activity that may cause impacts to nearby residents. **Comment: You can put a noise/vibration monitor on property near the dust gauge if you need to.** **Comment: Construction of the tunnel is not much of an issue.** **Concerns:** • **Movement & vibration** • **Condition surveys – need to have one completed on the property** • **Owners are concerned with house damage and want to make sure their house is protected.** • **Maintain spring and dam on property** • **Access to property**	
	Issues raised and responses – [redacted] meeting 10am 13/4/2012 **Q: What are the start times for the tunnel construction?** Tunnel construction will start in approximately mid 2012. **Q: There are a lot of issues with cars speeding on St Helena Road, what will be done in terms of traffic management?** The project will manage construction traffic that will be using St Helena Road and an upgrade to a section of St Helena Road and the intersection with the Pacific Highway will make it safer. **Comment: Dust is a concern for us.** **Q: What is the timeframe to construct the tunnel?** It will take 11 months to excavate the tunnel and then there will be the tunnel fit out which will take approximately another 12 months. **Q: What will be the road height of the new road near the southern portal? (Residents are interested in whether or not they will be able to see the new road from their house and if it will be a visual impact).** Residents were advised that the information can be provided at the next meeting as the exact levels and heights will need to be checked on the drawings. **Concerns:** • **Camphors on the hill opposite their property – will they be**	

	removed? • **Dust** • **Traffic/safety St Helena Road**	
	Issues raised and responses – [redacted] **meeting 11am 13/4/2012** **Q: What kind of rock are you blasting?** It is a high strength basalt rock. **Q: How long will the whole process take for the tunnel?** It will take 11 months to excavate the tunnel and then there will be the tunnel fit out which will take approximately another 12 months. **Concerns:** • **Access in and out of property (Cannot have access restricted at any time due to medical condition).**	
	Issues raised and responses – [redacted] **11am 13/4/2012** **Q: Will there be a lot of movement coming in and out of the tunnel?** At the changeover of each shift (morning and evening) there will be two mini buses to transport workers to the tunnel portals and out again. During the day there will be concrete deliveries and occasional other deliveries and light vehicles accessing the tunnel. **Q: Is there a lot of dust generated from construction of the tunnel?** Dust generation from construction of the tunnel will be minimal. Any dust generated from the construction of the road will be managed by water carts continually wetting down the areas to ensure dust is kept to a minimum at all times. **Q: What is the effect of blasting? Will there be stopping of traffic and will we still have access to the driveway?** The traffic interruptions to St Helena Road and Pacific Highway are expected to be minimal and we don't anticipate that there will be traffic stopped for blasting at the tunnel portals. We may need to stop traffic for the blasting at the tunnel control centre, however, you will be notified well in advance. **Comment: We have a lot of farm trucks and deliveries needing to access the property throughout the day.** We can try and work around you as best as possible. **Comment: The school bus takes the kids at 8am.** **Q: If we had trucks coming in, can we travel on the access road while you blast?** We believe so, however, we still have to assess the risk and let you know. **Comment: We have a concern about water and gravel being washed down the road and into the yard and down the driveway. Residents was sealed part of St Helena Road extended over the ridge** [redacted] **for safety reasons as well.** **Q: Does everyone have to evacuate the tunnel during blasting?** Yes, all workers will need to be out of the tunnel for the blast. **Q: What route will the 10 concrete trucks come in and out of our access?**	

[redacted] it is still not certain.

Q: What other traffic will come in and out of the access to the tunnel portal?
It will only be trucks that need to access the tunnel, not too many, however, the exact amount is unknown at this stage.

Q: It's not a haul road?
No, it will not be used as a haul road.

Q: Is it 10 truck movements a day (concrete trucks) for 2 years?
At this stage, we are anticipating approximately 10 trucks of concrete will be delivered each day during tunnel construction.

Q: How long will it take to complete the tunnel?
It will take 11 months to excavate the tunnel and then there will be the tunnel fit out which will take approximately another 12 months.

Q: Which end will you be starting at?
We will start at the southern portal.

Q: What depth is the tunnel under the hill?
Approximately 42 metres.

Q: Will the upgrade to St Helena Road be done first?
Yes, the upgrade of St Helena Road will be one of the first things that is completed.

Concerns:

- **Access to houses and farm**
- **Truck movements along driveway to tunnel portal causing disturbance**
- **Dust**
- **There is a concrete water tank underneath the garage – concerned if it will crack due to vibration from blasting**
- **Gravel and water goes into driveway – wants road sealed over crest.**

Access/Driveway issues

Driveway to be constructed to 1 in 1year flood immunity
Road will be raised 2m above road level

Q: Will you use our road to get to the dam to use the water?
No, it will just have pipes running across

Access road will be raised above ground level
Road south of causeway only needs to be raised 50mm

Action and follow up:
**** Can creek crossing near house be turned into a dam? (MS to follow up with Council)**
**** Surveyors to check far back corner post of [redacted] property**
BPL to arrange this.
**** BPL would like to lease patch of land on boundary for sediment pond (temporary) – [redacted] to advise if this will be possible.**

Issues raised and responses – [redacted] meeting 3/5/2012 3.30pm

[redacted]

Q: What type of material is inside the tunnel?
Mark Dowell advised that it is hard basalt rock which is why we need to blast.

Q: Will there be impacts to St Helena Road?
Mark advised that during blasting of the tunnel control centre and tunnel portals there may be a requirement to temporarily close the road for about 10 minutes but residents will be notified in advance.

Q: Do you need an answer today if we agree or not about the increase in blasting vibration limits?
Mark Dowell advised that we will be having a street meeting and further consultation with residents and providing information sheets and letters and it voluntary to sign their agreement letters. Mark explained that the vibration limits will be as per Australian Standards.

Q: What is the expected timeframe to complete the tunnel?
Mark explained that the timeframe for the tunnel is approximately two years. Mark Dowell advised that there will be 24 hour work in the tunnel.

Comment: I don't have too many issues with increased blasting.

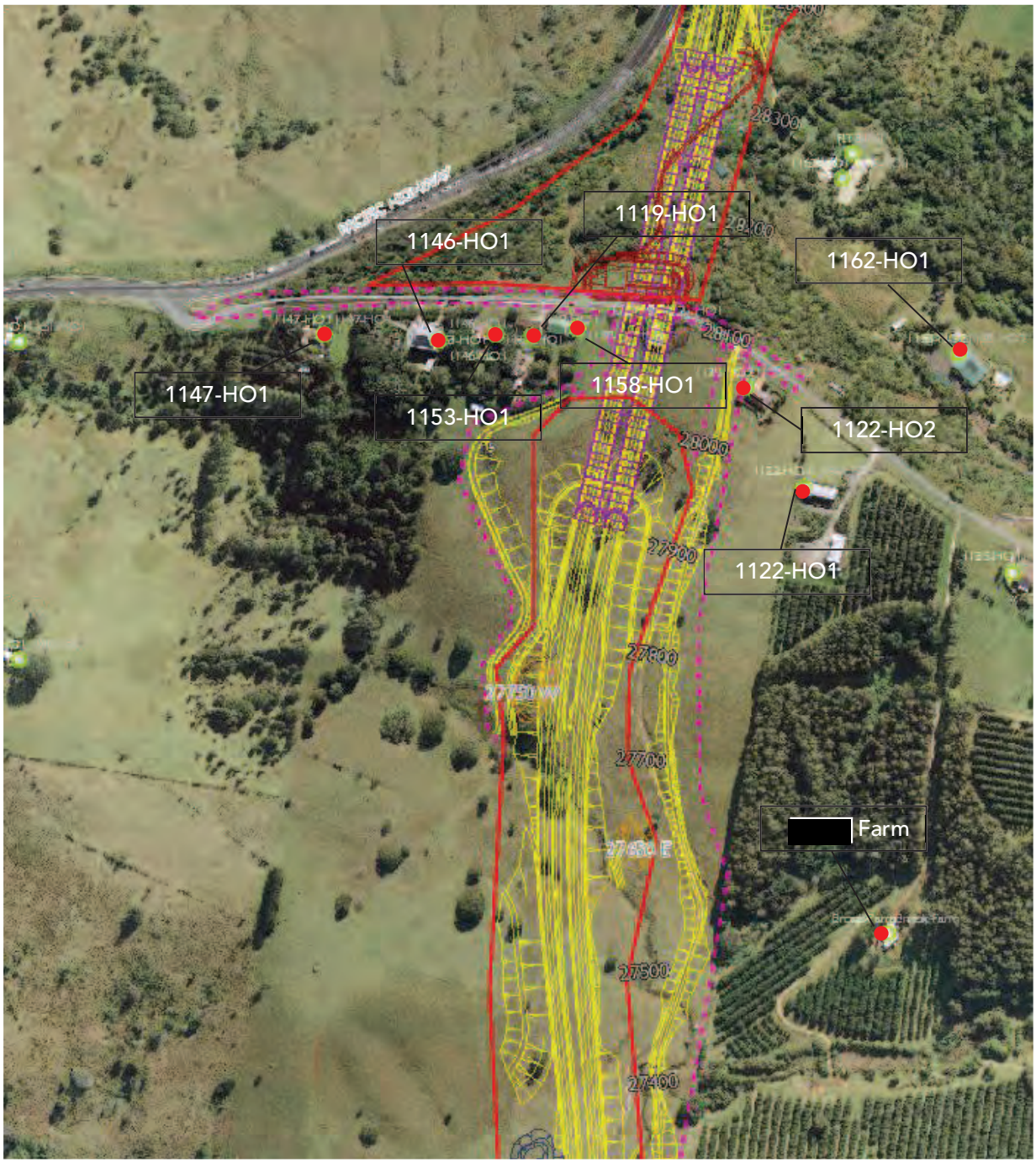
**** Action - Set up meeting with Matthew Saviana and Ian Shilling regarding [redacted] subdivision development at Ewingsdale.**

**** Action - Wants copy of presentation to provide to [redacted] once it is approved.**

Note: May come to street meeting and will let the [redacted] know.

Appendix 6 –Sensitive Noise Receivers

Receiver ID	Lot Address	DP/Lot	Minimum Distance to St Helena tunnel works (m)	Minimum Distance to St Helena tunnel control centre works (m)	Comments
1119-HO1	[redacted]	[redacted]	170	65	
1120-HO1	[redacted]	[redacted]	160	30	Located above Tunnel. NB: This structure is a cattle feeding shed, not a residence.
1120-HO2	[redacted]	[redacted]	160	92	
1122-HO1	[redacted]	[redacted]	170	200	
1146-HO1	[redacted]	[redacted]	200	151	
1153-HO1	[redacted]	[redacted]	180	93	
1162-HO1	[redacted]	[redacted]	160	35	
1122-H01	[redacted]	[redacted]	168	197	
[redacted] Farm	[redacted]	[redacted]	430	610	


1146-HO1
1119-HO1
1162-HO1
1147-HO1
1153-HO1
1158-HO1
1122-HO2
1122-HO1
Farm
28300
28100
28000
27900
27800
27700
27500
27400

Appendix 7 – Community Information Presentations

TINTENBAR TO EWINGSDALE

Information session for local residents — St Helena tunnel and tunnel control centre

21 May 2012

Agenda

- Welcome/introductions
- Overview
- Tunnel, including design and benefits
- Blasting
  - Why?
  - Potential environmental impacts, including vibration and airblast overpressure
  - Types of controlled blasting (open cut and tunnel)
  - What to expect
  - Mitigation strategies
  - Vibration measurement
  - Monitoring
- Excavation methodology
- Proposed changes — blasting hours/vibration/airblast limits
- Benefits of change
- Vibration contours
- Questions.

Overview

- The focus of this presentation is the controlled blasting for the excavation of the St Helena tunnel portals (entrances), the tunnel (north and south bound) and the tunnel control centre.
- Controlled blasting across the rest of the project will be covered separately once the design is finalised.

Artist's impression of southern tunnel portal from a road user's view.

St Helena tunnel

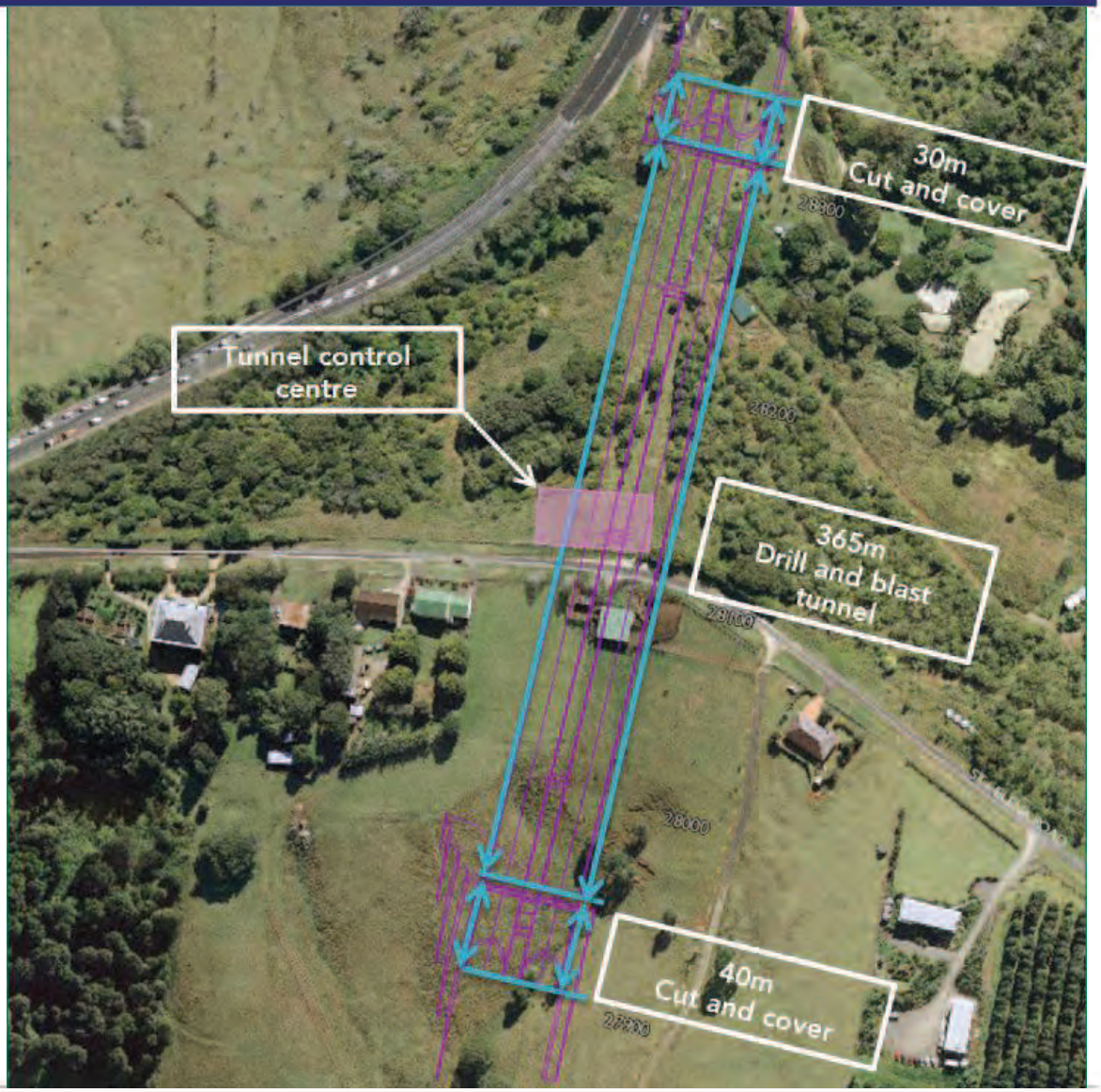
Transport Roads & Maritime Services
NSW GOVERNMENT

Key benefits:

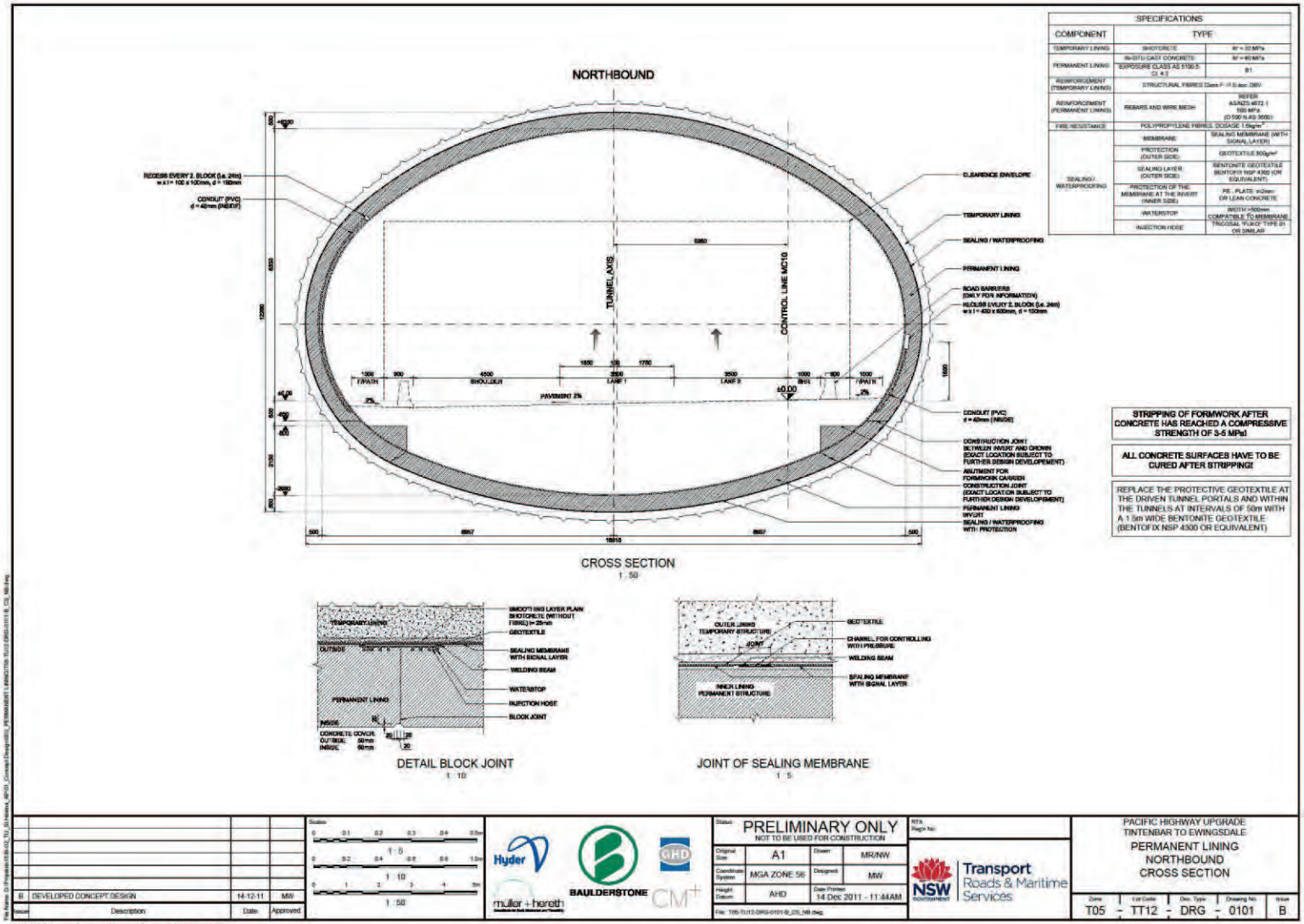
- Avoids steep grades of St Helena hill.
- Removes dangerous accident black spot.

Key features:

- 434 metres long.
- Two side-by-side tunnels.
- 19 metres high.
- Provision for three lanes south and northbound.
- Approximately 46 metres below the ridge line.



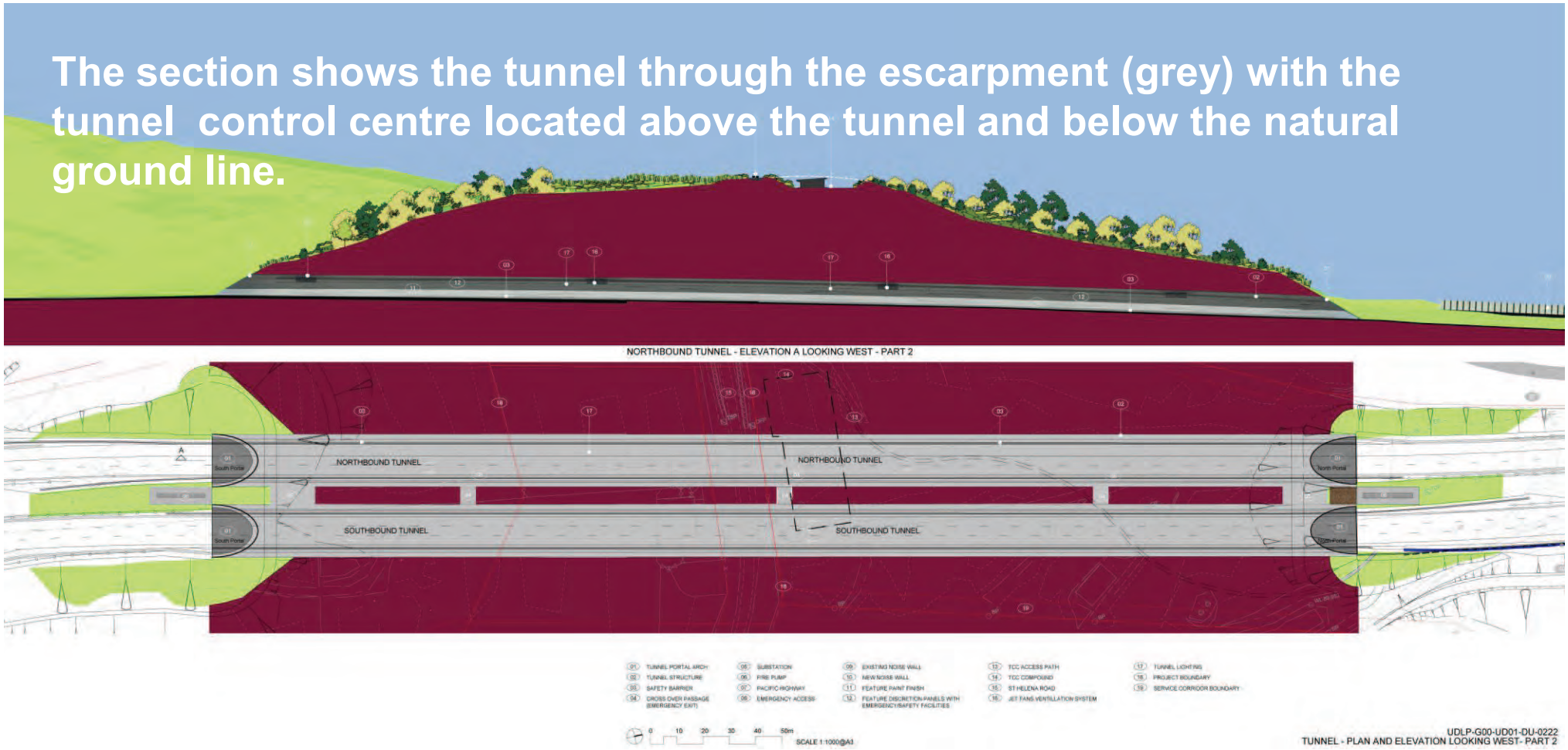
Tunnel design — cross section



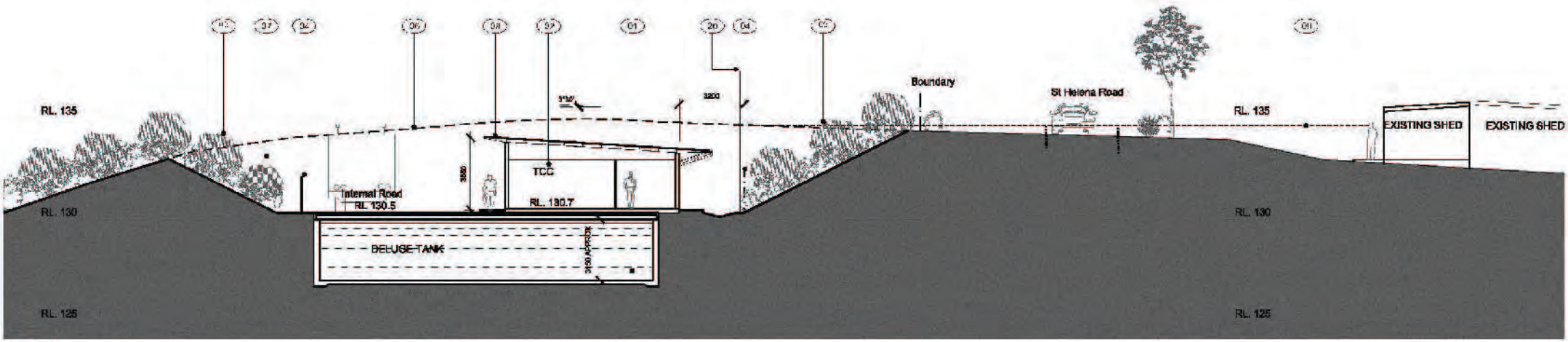
St Helena tunnel — concept plan and cross section

Transport Roads & Maritime Services
NSW GOVERNMENT

The section shows the tunnel through the escarpment (grey) with the tunnel control centre located above the tunnel and below the natural ground line.



Tunnel control centre (technical section)



SECTION A

01 DELUGE TANK VOLUME 2000L
02 TUNNEL CONTROL CENTRE
03 METAL LOUVRES/WINDOWS
04 2400mm HIGH SECURITY FENCE TO COMPOUND WITH GATES
05 DENSE LANDSCAPE PLANTING
06 NATURAL GROUND SURFACE
07 APPROX CUT AREA
08 METAL ROOF PITCH @ MIN 4°
09 SIGN LINES
10 METAL CLADDING
11 SECURITY MONITORED ENTRANCE DOOR
12 SECURITY MONITORED DOORS
13 INDUSTRIAL SECTIONAL OVERHEAD DOOR
14 PAVE LINING
15 LANDSCAPING DETAILS
16 FIRE HYDRANT/HOSE REEL
17 METAL DOWNPIPE
18 ROLLER DOORS
19 KIOSK TRANSFORMER
20 ANTENNA TO ?

0 2 4 6 8 10m
SCALE 1:200@A3

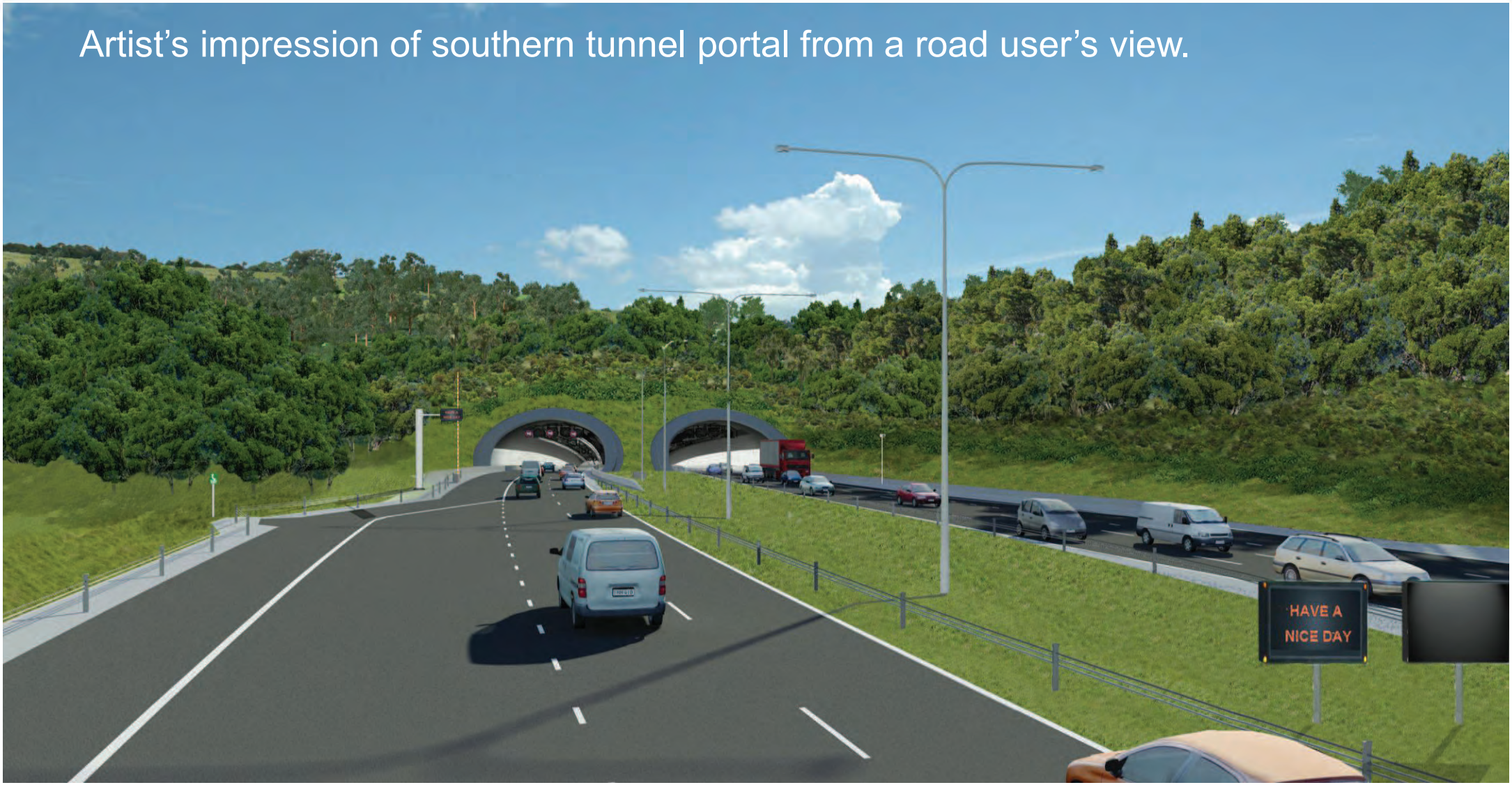
UDLP-G00-UD01-DU-0243
TUNNEL CONTROL CENTRE - SECTION + ELEVATIONS

St Helena tunnel — southern portal

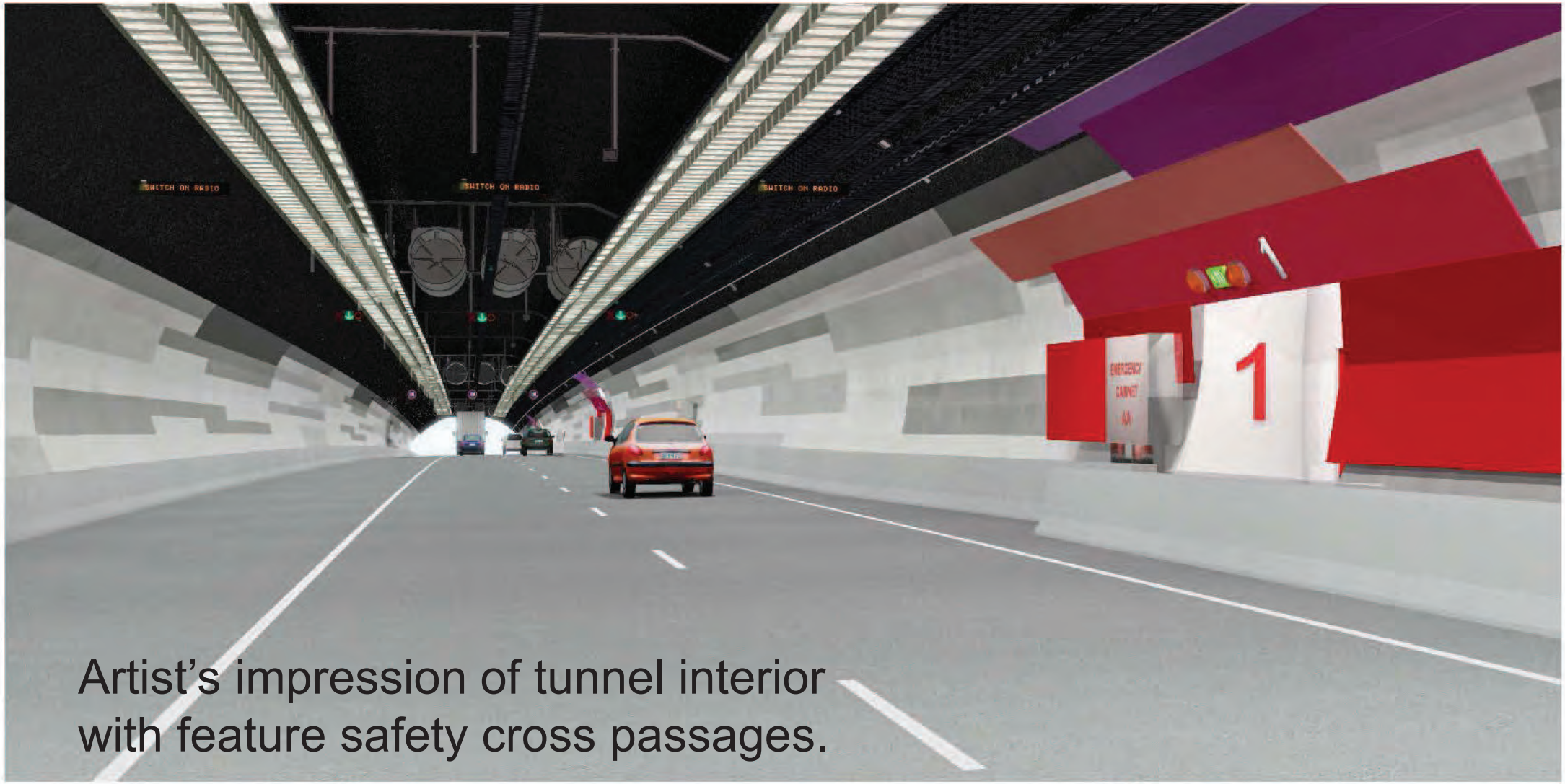
Transport Roads & Maritime Services

NSW GOVERNMENT

Artist's impression of southern tunnel portal from a road user's view.



St Helena tunnel — interior



Artist's impression of tunnel interior with feature safety cross passages.

Why do we need to blast?

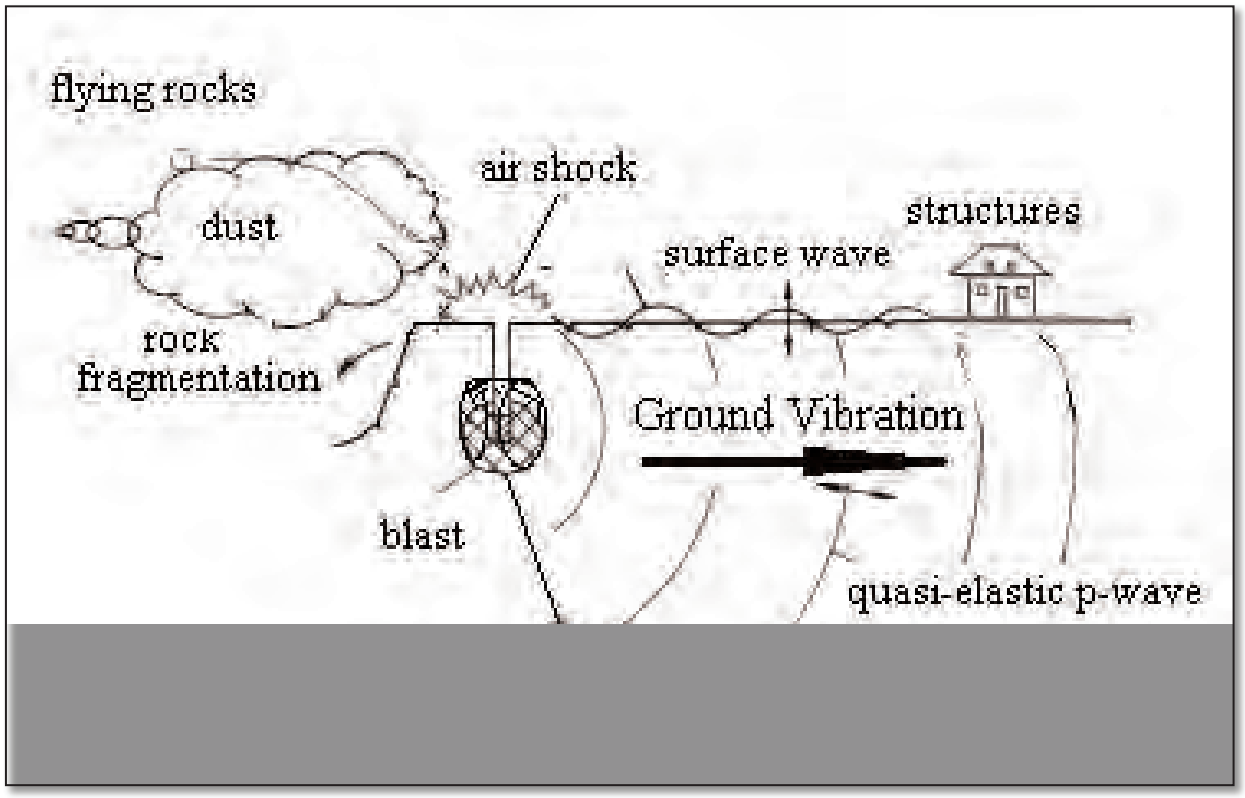
- Blasting is the controlled breaking or fracturing of rock by the initiation of an explosive material.
- The geology of St Helena hill is mainly high strength basalt.
- Mechanical excavation such as road header or rock breaker cannot be used as the basalt rock is too hard.
- Drill and blast was selected as the most appropriate method of excavation.

Installation of rock bolts

Blasting — potential environmental impacts

The following potential blasting impacts will need to be managed:

- Ground vibration i.e. shaking of the ground and objects sitting on it (e.g. structures and buildings).
- Air blast or noise.
- Overpressure (regenerated noise).
- Dust.
- Scattering of ‘fly rock’.



Potential environmental impacts of blasting

Typical controlled blast

Blasting — potential environmental impacts

- **Dust**
  - Dust and blasting fumes are produced during a blast.
  - The blast can be designed to reduce dust nuisance.
  - Blasting must not proceed when wind speed and direction are not favourable.
- **Fly rock**
  - Fly rock is dangerous if not controlled.
  - The blast must be designed so that fly rock is limited and falls only in a restricted area.
  - The topography must be considered in the blast design.
  - Blast mats will be used to control fly rock.

Blasting — potential environmental impacts

- **Vibration**
  - Vibration is transmitted through the ground as a series of waves.
  - The waves travel rapidly, gradually reducing in strength over distance.
  - Vibration arrives before noise as it travels quicker through the ground.
  - Vibration impacts will vary in different areas of the project due to the geology of the rock, weather conditions, ground water levels, location of blasting and the type/condition of property.

Human perception of vibration

- Ground vibration might shake walls, windows, and gently rattle loose objects on shelves.
- The effects are often greater inside a building than outside.
- The human body is very sensitive to vibration.
- If we are not told what is happening, even a small blast could cause us to worry.

Vibration perception

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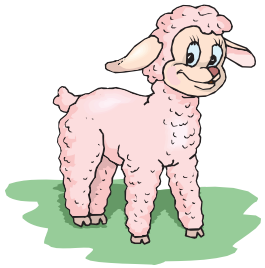
Perception is different from human comfort levels.

Vibration Level	*Degree of Perception*
Below 0.1mm/s	Not felt
0.1 mm/s	Threshold of perception
0.5 mm/s	Barely noticeable
1.0 mm/s	Noticeable
2.5 mm/s	Easily noticeable
6.0 mm/s	Strongly detectable
14 mm/s	Very strongly detectable

Displacement in perspective

Blast - 80µm



Fleece - 20µm

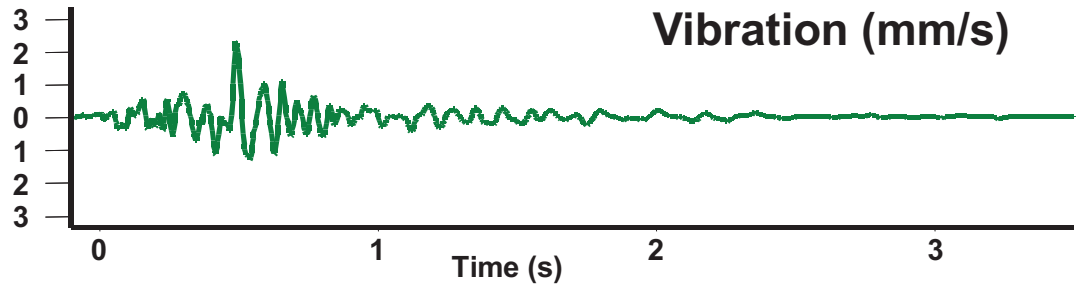
Human Hair – 30µm

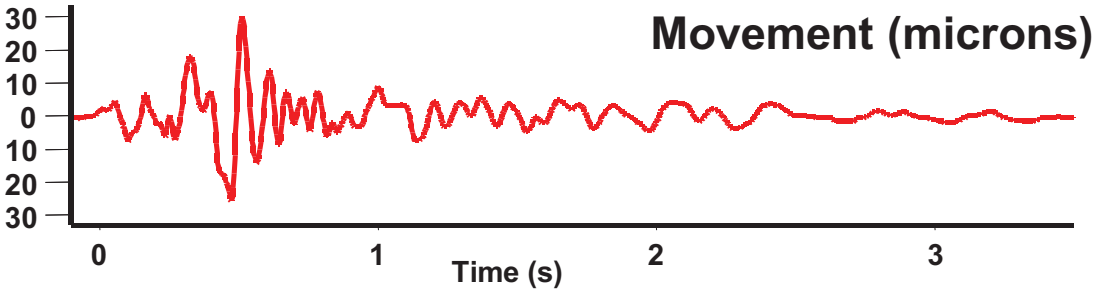
Paper - 100 µm

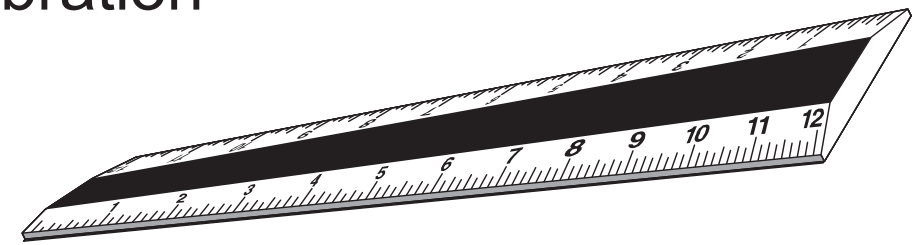
- The movement created by a typical blast is 80µm.
- This distance can be compared with the thickness of a strand of fleece at 20µm, a strand of hair at 30µm or a sheet of note paper at 100 µm.

Vibration and movement measurement

- Trial blast holes will be used to determine the vibration characteristics of the site and to ‘fine-tune’ future blast designs.
- Vibration and movement will be measured and analysed.
- The data will be used to manage vibration impacts.



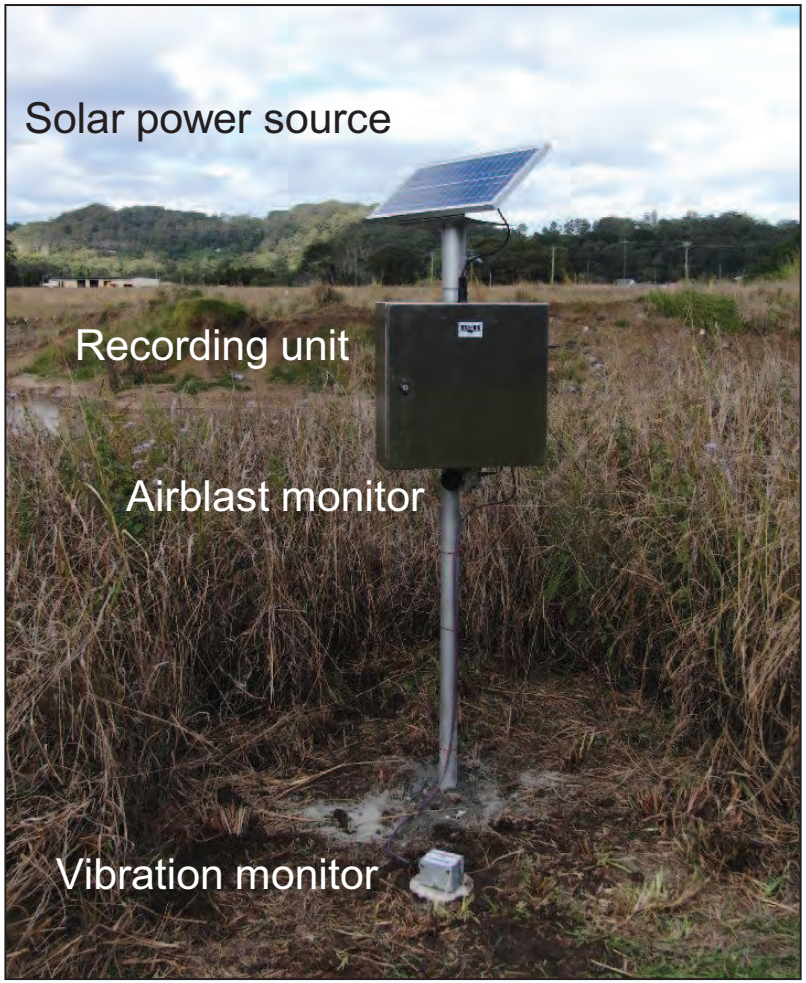




Remember holding a ruler down at one end and flicking the opposite end to see/feel it vibrate?

Monitoring blasting impacts

- Vibration, noise and airblast overpressure will be monitored regularly as part of blasting operations.
- A blast monitoring hub (similar to unit opposite) will be established to capture data.
- A vibration monitor will measure the ground vibration by measuring the movement of particles by the vibration waves in three dimensions.

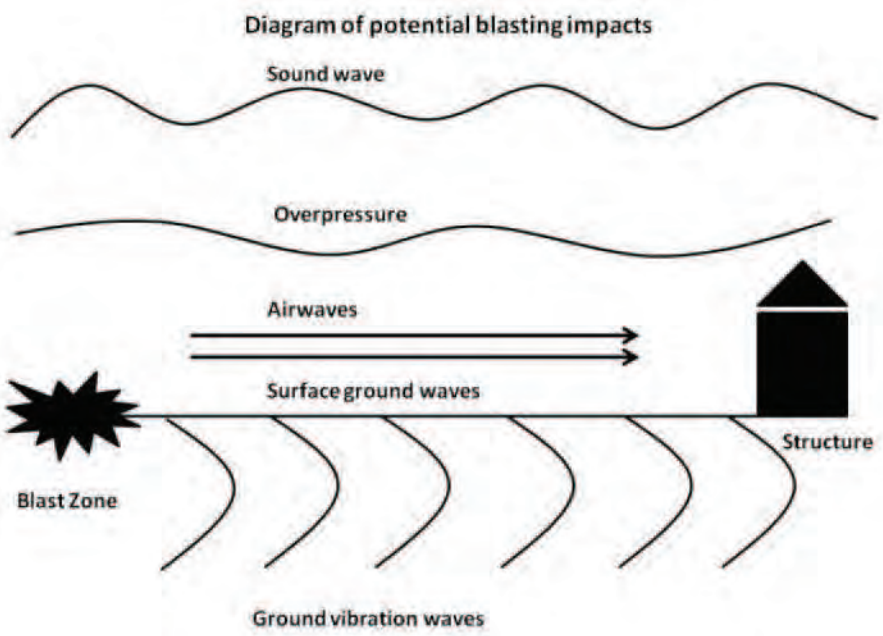


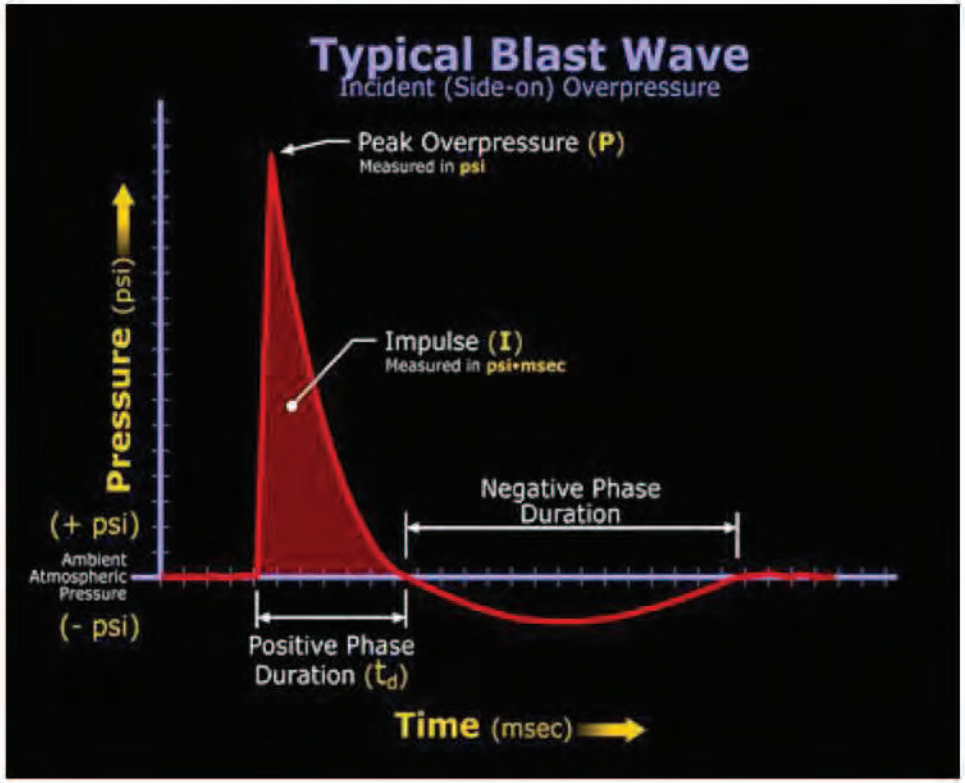
Typical blast monitoring hub

Airblast overpressure

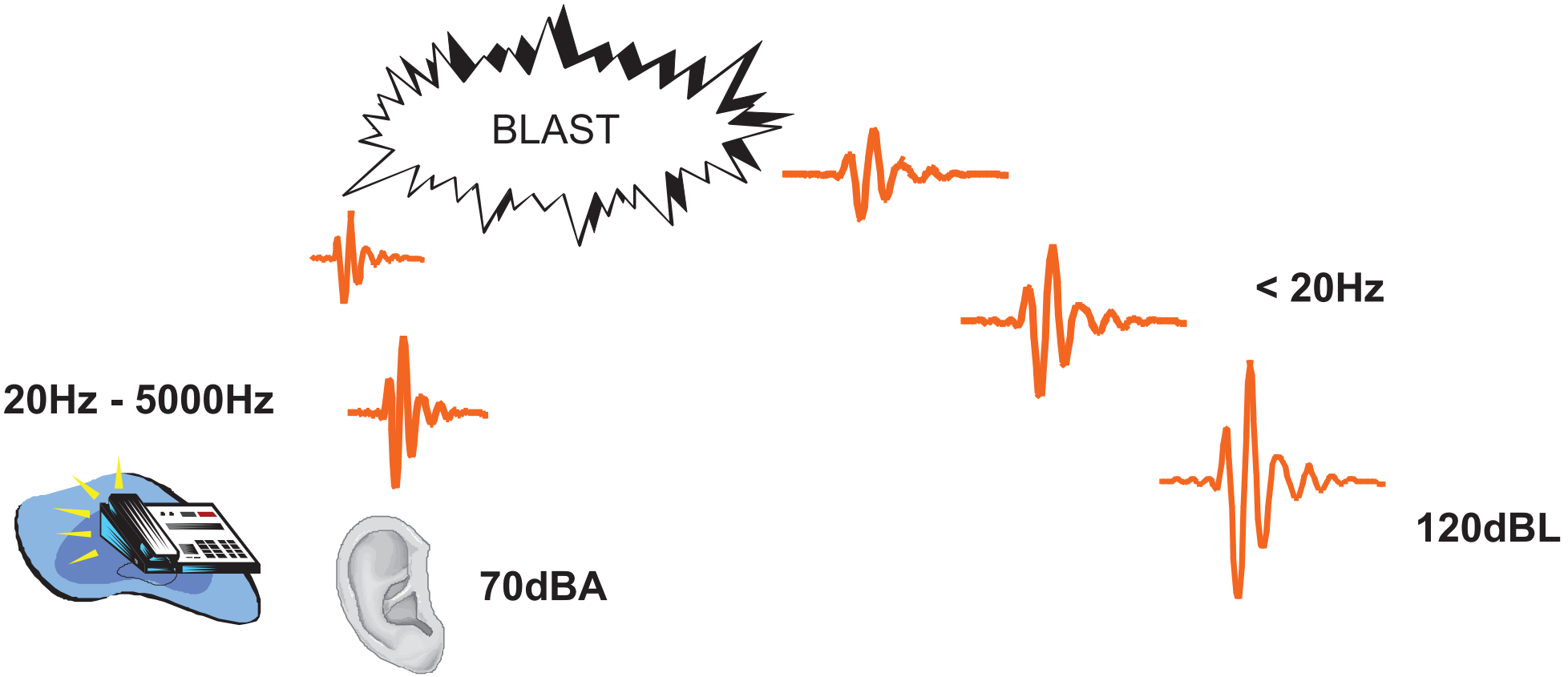
- **Airblast overpressure (or airblast level)** is the energy transmitted from the blast site within the atmosphere in the form of pressure waves.
- As these waves pass a given position, the pressure of the air rises very rapidly then falls more slowly then returns to the ambient value after a number of oscillations.
- The pressure wave consists of both audible (noise) and inaudible (concussion) energy.
- The maximum excess pressure in this wave is known as the peak air overpressure, generally measured in decibels using the linear frequency-weighting.

Airblast overpressure





Overpressure and noise

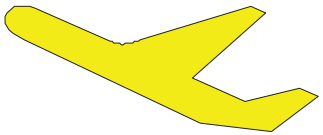


Overpressure levels similar to blasting

Wind

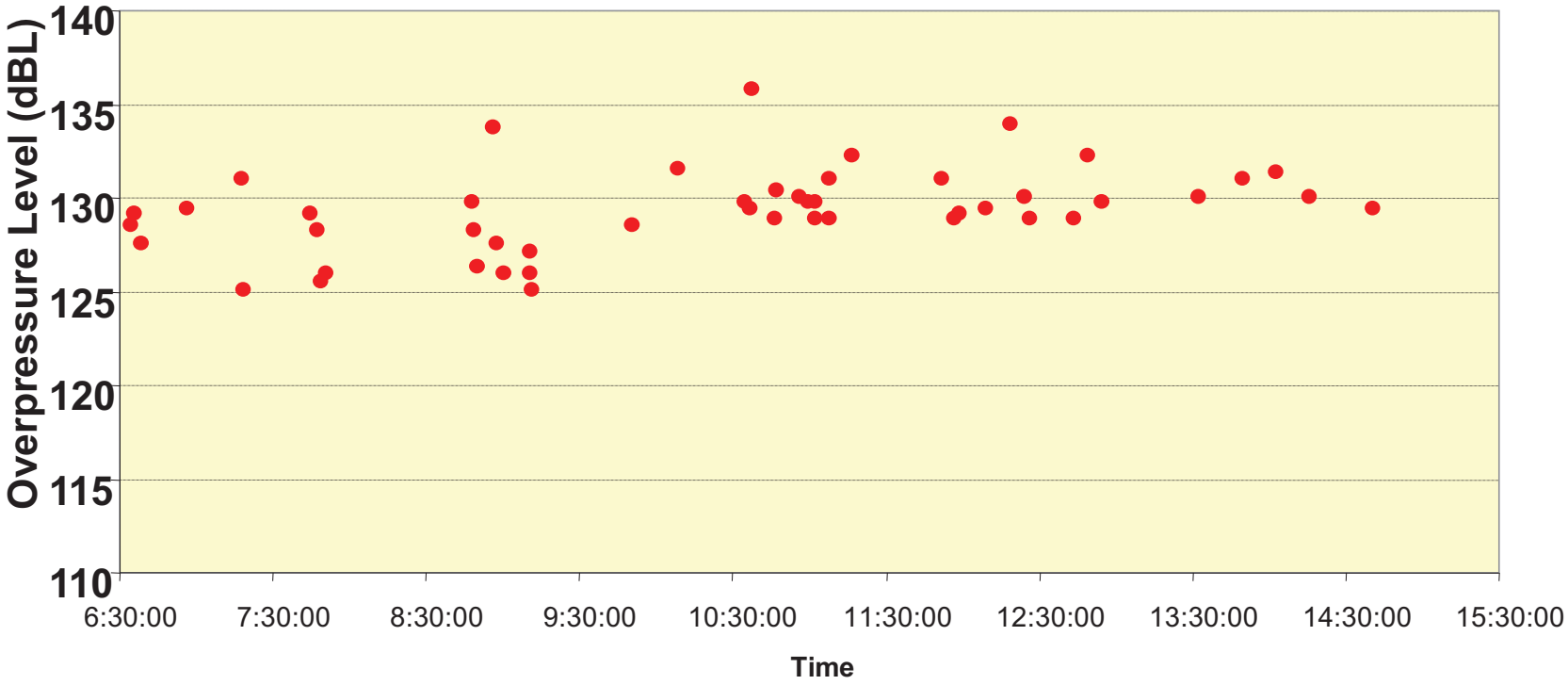
Trucks

Thunder



Aircraft

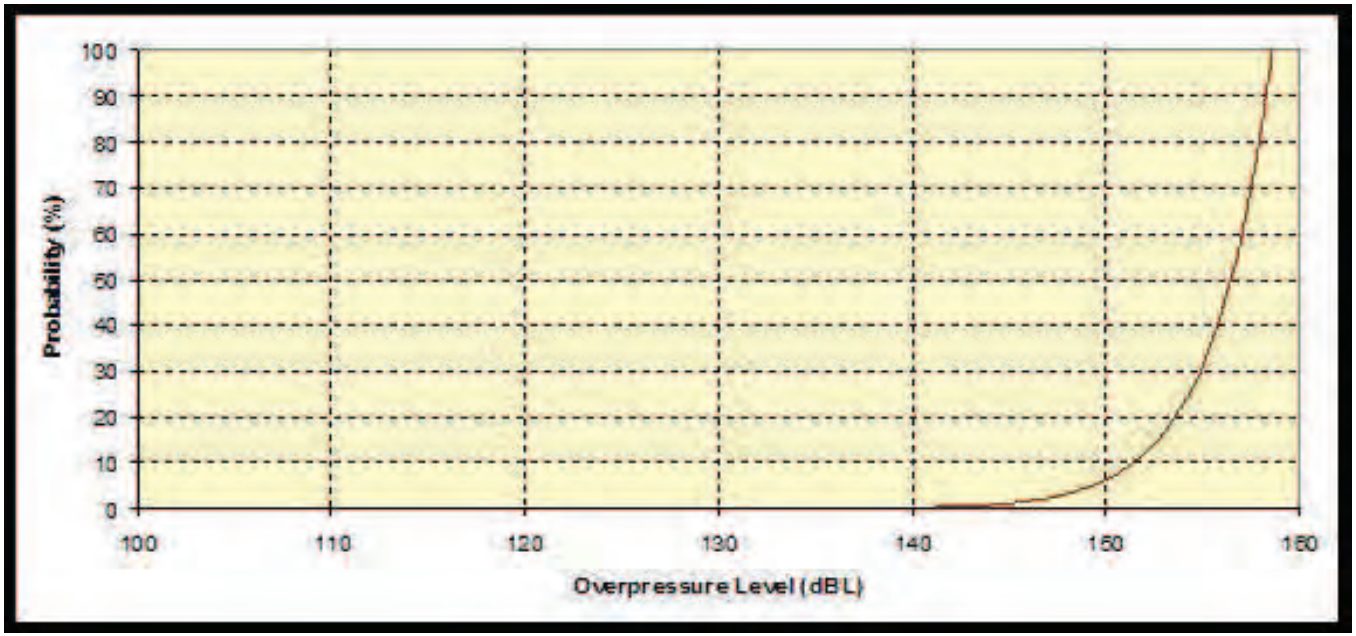
Overpressure levels from wind



Wind effects

Wind category (km per hour)	Description	Expected overpressure level (dBL)
Light winds (<20 kph)	Light winds. Wind felt on face, leaves rustle.	<118 dBL
Moderate* winds (20 to 30 kph) *Av. annual winds at Byron Bay weather station at 3pm daily (23.5kph)	Raises dust and loose paper; small branches move in wind.	119 to 126 dBL
Fresh winds (30 to 40 kph)	Small trees begin to sway; small waves form on inland water.	127 to 131 dBL
Strong winds (40 to 50 kph)	Large branches in motion.	132 to 135 dBL

Glass damage from overpressure



Windows unlikely to crack at an overpressure level of 140dBL.

5 windows in 100 will crack at an overpressure level of 150dBL.

50 windows in 100 will crack at an overpressure level of 155dBL.

Vibration, airblast overpressure and noise data

- Vibration, air blast overpressure and noise levels will be accurately monitored at several locations during each blast.
- The location of the monitoring will be chosen based on expert advice.
- The locations may be adjusted for different blasts.
- The results of monitoring will be included in reports that will be available on the project website.
- If we have exceeded the limits, we will inform you and tell you what we will do differently next time.

Monitoring locations

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Controlled blasting

- Two types of controlled blasting are required to break up 155,000m³ of high strength basalt rock during tunnel construction through St Helena hill — open cut and tunnel blasting.
- Open cut blasting will be used to break up the rock at the tunnel portals (entrances) and the tunnel control centre (submerged below top of St Helena hill) and will involve a maximum of one controlled blast event per day.
- Once the portals are created, controlled tunnel blasting will be carried out behind noise suppression barriers up to three times per day in both tunnels. Each blast event will take approximately 10 seconds to complete.
- Instantaneous blasts will occur in the separate tunnels (northbound/southbound) within a few seconds of each other.

Controlled tunnel blasting

Controlled open cut blasting — what to expect

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Controlled open cut blasting

- Temporary closure of access locations to local roads, and property accesses (residents will be notified in advance).
- Rolling stoppage of traffic on the Pacific Highway.
- Roadside variable message signs will notify road users of the blast activities on a daily basis.
- Temporary closure of St Helena Road for up to 10 minutes (emergency access will be maintained).
- Road closures will be coordinated to ensure that they have minimal impact on the local community.
- Siren to notify imminent blast.

Controlled open cut blasting — what to expect

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Will I need to relocate?

- For safety reasons, some residents may be asked to remain indoors or be temporarily relocated during controlled open cut blasting.
- There will be NO need for evacuations for tunnel blasting.
- The community relations team will contact affected residents in advance.

Pet and animal care

- It is advisable to keep smaller pets inside the house or shed during blasting for their safety and well being.
- Animals in paddocks should be checked before and after blasting.

Controlled blasting — mitigation strategies

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Our approach

- We will ensure ‘no surprises’.
- We will notify residents (via letterbox drop) prior to the start of tunnel construction.
- We will letterbox drop weekly progress updates to affected residents to advise the upcoming work program.
- 1800 882 787 (24/7 toll free).
- We *won’t* notify residents before each blast event within tunnel; a siren will sound.

Controlled blasting — mitigation strategies

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Our methodology

- Undertake property condition inspections and provide written report to property owner/s.
- Restrict blasting hours to approved construction hours.
- Clear site, restrict access and close roads, as necessary.
- Carefully design each blast and conduct trial blasts.
- Use blast mats.
- Avoid blasting during adverse weather conditions.
- Measure and monitor vibration and air blast overpressure and noise.
- Undertake prompt damage inspection and agree follow–up.

Tunnel construction methodology

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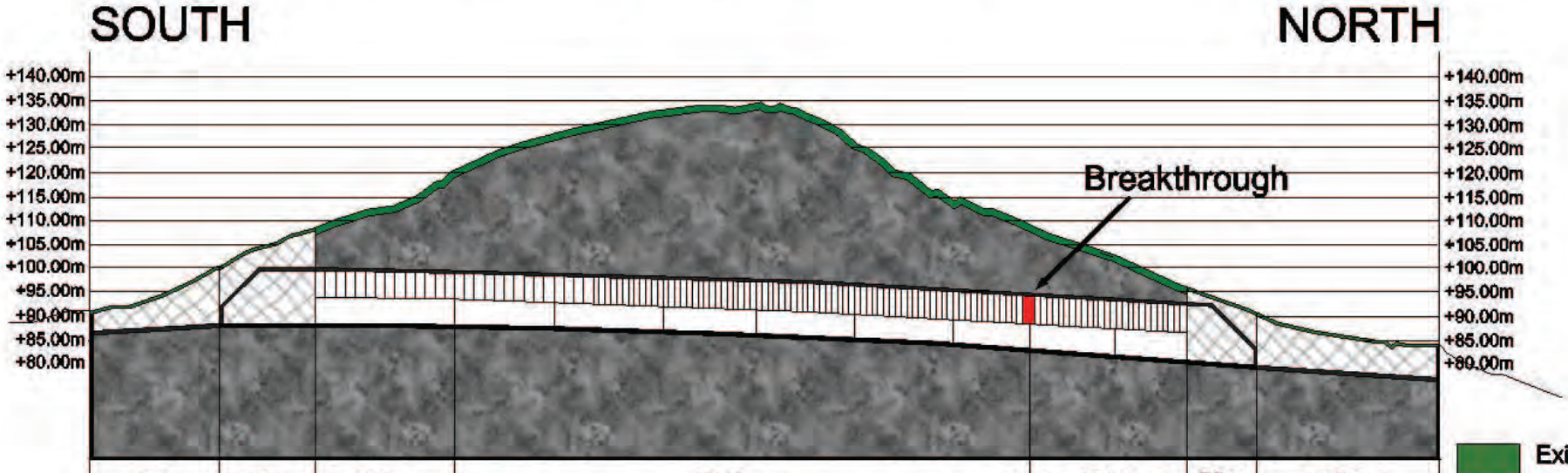
ST HELENA TUNNEL CONSTRUCTION SCHEDULE



	60m	40m	60m	245m	60m	30m	90m
Section:	Roadworks	SP	Initial	Main construction		NP	Roadworks
Work hours:	7:00am to 6:00pm			24 hour construction		7:00am to 6:00pm	
Audible hours:	←			7:00am to 6:00pm			→
Inaudible hours:	N/A			6:00pm to 7:00am		N/A	
Blasting hours:	←			9am to 5pm Weekdays and 9am to 1pm Saturday			→
Noise shed:	NO			YES		NO	
Duration*:	1	1	2	9		0.5†	1.5†

Existing surface
Basalt
Excavated underground
Excavated from surface

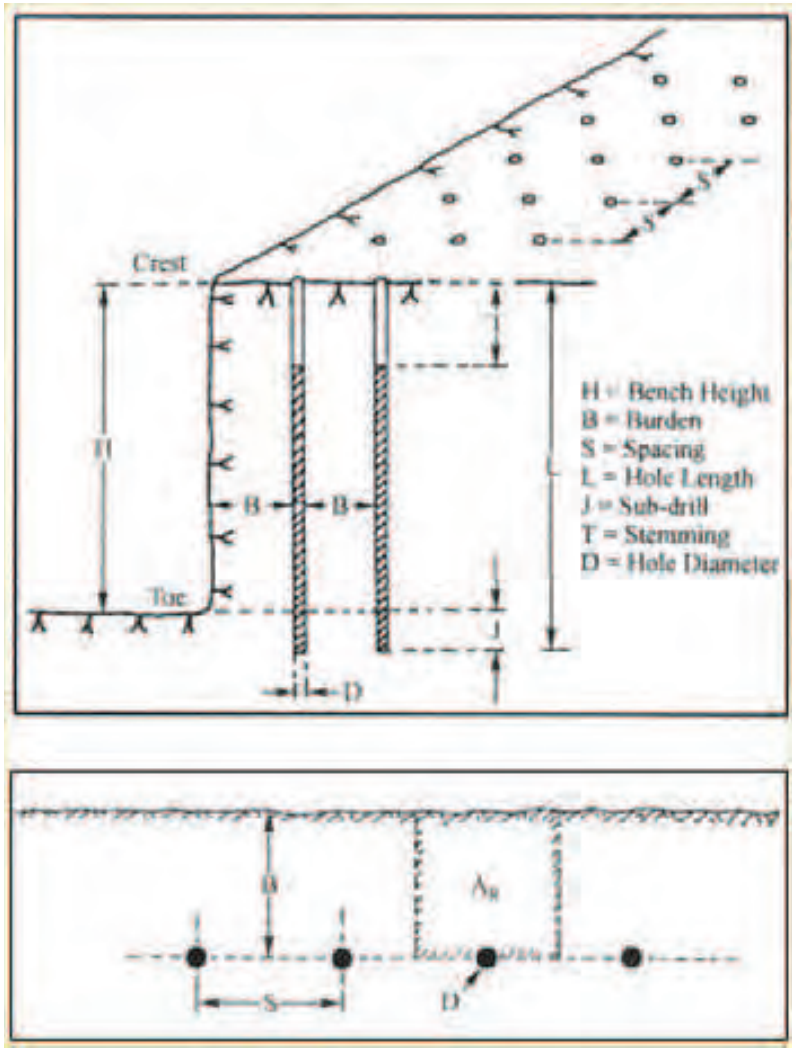
*All durations in calendar months
†Concurrent with Southern works

Direction of construction

Excavation methodology — controlled open cut blasting

- A method of surface blasting (e.g. trench blasting, quarrying or bench blasting) using holes typically drilled vertically into the ground.
- Both portals will be progressively excavated using open cut drill and blast in benches of approximately 3m in depth.
- Topsoil will be removed to expose the underlying rock which will then be trimmed conventionally using rock breakers.
- The first series of holes will be drilled vertically and charged with explosives. After the blast has been completed the broken material will be loaded away by excavator and truck to expose the lower bench.
- Process will be repeated until portal and tunnel face are exposed.

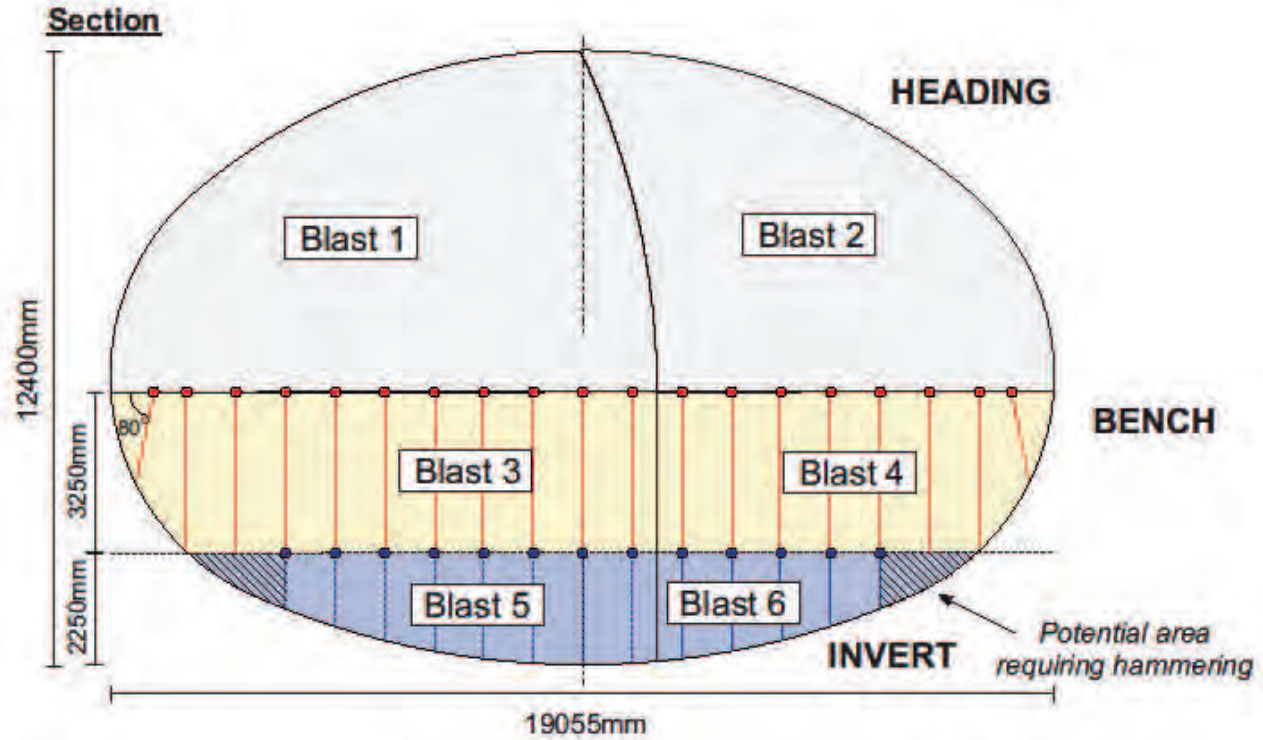
Controlled open cut blasting



Excavation methodology — controlled tunnel blasting

- Tunnel blasting will commence once the tunnel portal has been exposed.
- The excavation process will require the drilling of a number of holes in a pre-determined pattern in the tunnel face.
- Due to the size of the tunnel, the excavation face will be split into six sections, comprising two top headings, two bench blasts and two invert blasts.
- Each blast will require between 100 and 140 holes that will be charged with explosives.
- Groups of holes will be detonated at different times over a 10-15 seconds period.

Tunnel blasting sequence



Excavation methodology — controlled tunnel blasting

- Involves drilling a series of production holes (approximately 45mm in diameter) in a predetermined pattern in the tunnel face to assist the blast and reduce ground vibration.
- For each blast there may be in excess of 100 holes drilled.
- Blasting holes are set off in a predetermined pattern to break the rock.
- Blasted material is ‘mucked out’ from the rock face by specialised underground loaders and trucks.

Mucking (removal of blast material)

Excavation methodology — controlled tunnel blasting

- The delay period between each group detonation will range between 50 milliseconds and 15 seconds.
- The amount of explosive that is initiated at one instant (known as the Maximum Instantaneous Charge or MIC) determines the amount of vibration created by the blast.
- The MIC can be adjusted by controlling the number of holes on each detonator delay and by optimizing the length of each drilled round.
- Just prior to blasting, the tunnel personnel will be evacuated and a siren will identify that the blast is about to take place.
- When all personnel have been accounted for the blast will be detonated.

Excavation methodology — controlled tunnel blasting

- After detonation, time is allowed for the blasting fumes to disperse and the dust to settle.
- The broken rock is then removed by underground loader and truck to a stockpile close to the tunnel portal.
- The tunnel is then supported after each blast by a layer of sprayed concrete or shotcrete and rockbolts.
- The amount of support is determined by the geotechnical engineer, based on the actual conditions encountered.
- Once the support has been installed, the new section of rock face can be drilled.
- The process is repeated until excavation is completed.

Excavation methodology — controlled tunnel blasting

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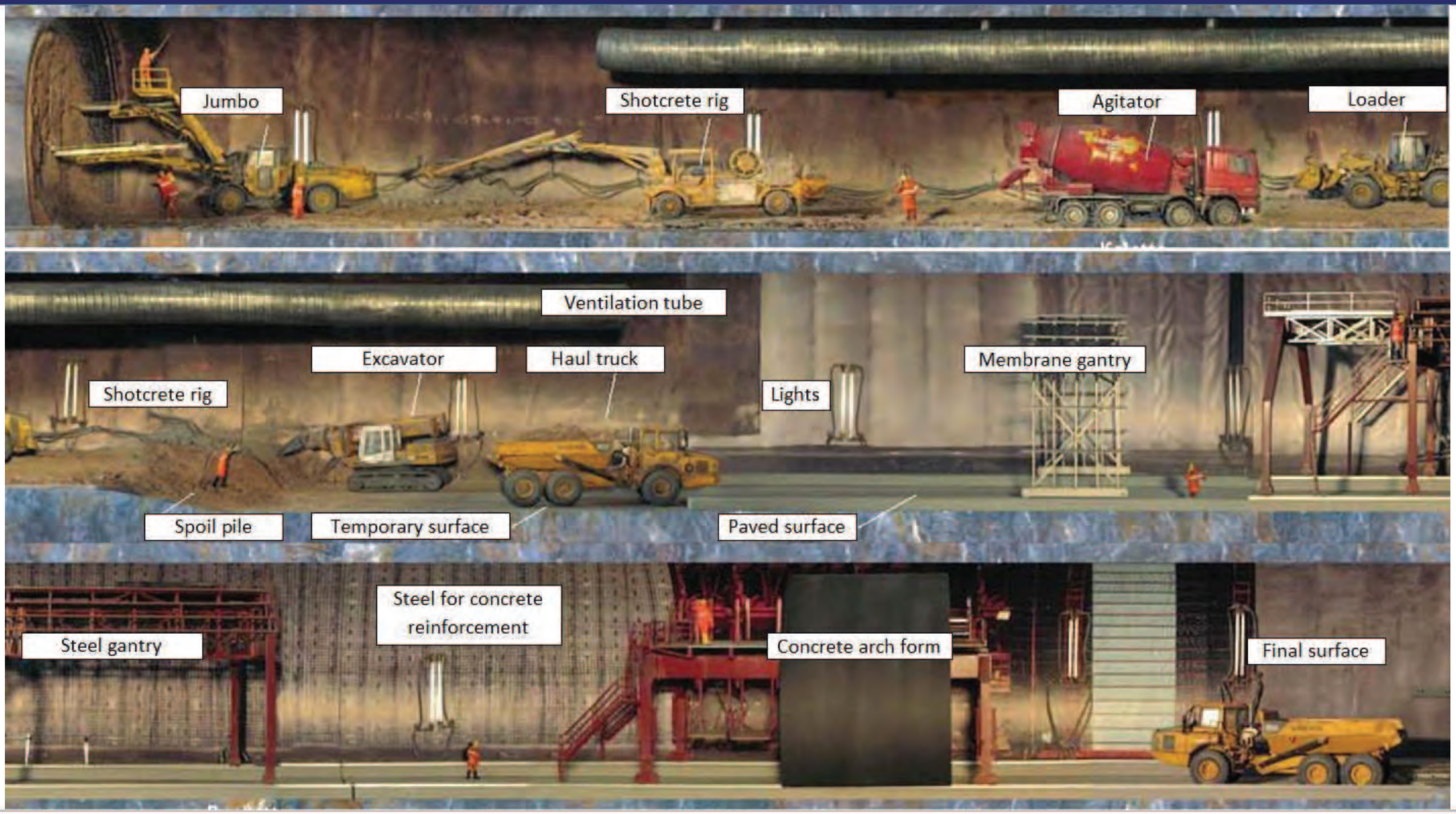

Working hours

- Tunnelling process requires a continuous work cycle to charge and blast, muck out, support and drill.
- We are planning to work in the tunnel for 24hrs per day starting on Mondays at 7:00am. The working week will finish at 1:00pm on Saturday afternoon.
- The work carried out during the night shift will include mucking, rock bolting, shotcreting, drilling and charging up. No blasting will be done on night shift.
- At each of the tunnel portals, a noise shed will be constructed.
- All night shift activities will be completed within the tunnel and will be inaudible due to the noise sheds.

Tunnel excavation cycle

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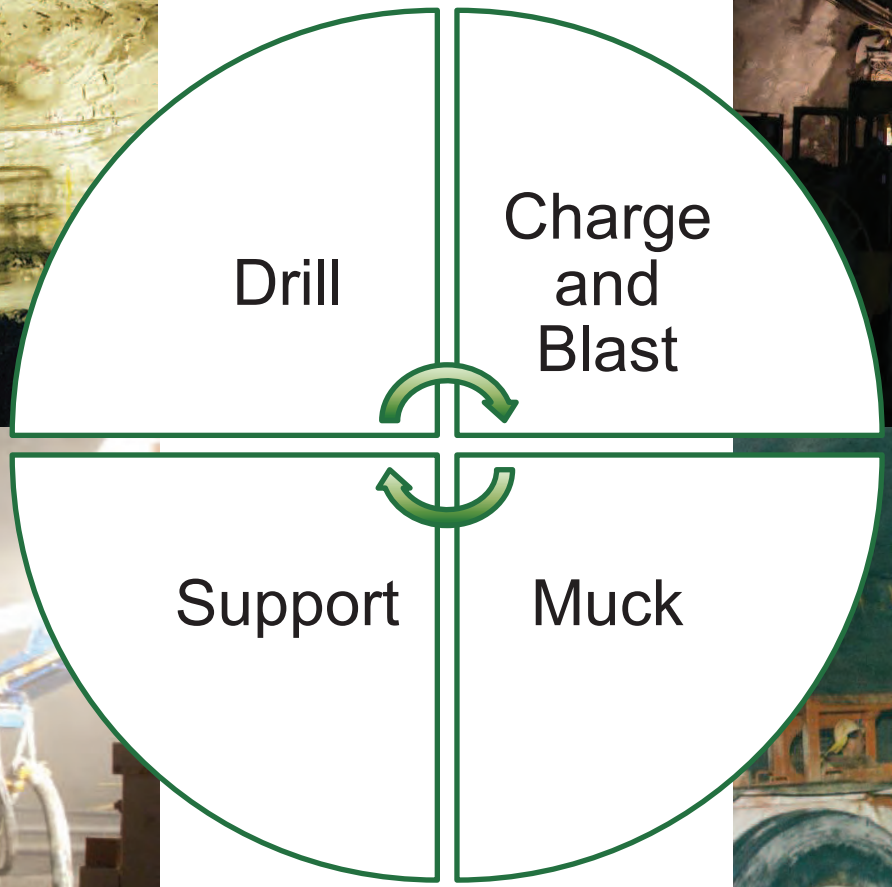

Blasting cycle — current and proposed

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Note: T
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Sourcin
clearer
version.

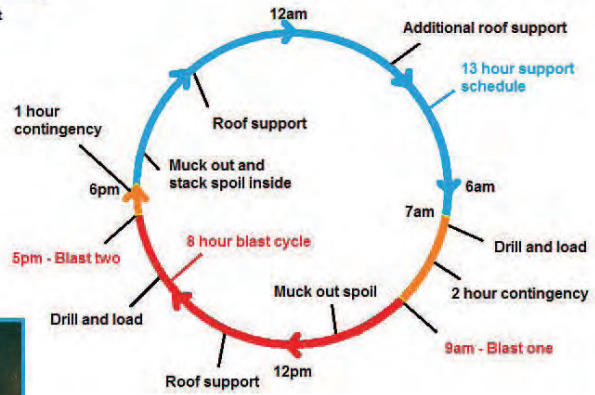
Installing rock bolts to provide roof support

4

Additional roof support - shotcrete

5

Optimised
24 Hour Schedule



Drilling blast holes

1

Mucking out spoil

3

Loading explosives into drill holes

2

Legend

- 8 hour blasting cycle
- 13 hour support cycle
- 3 hours additional contingency

Blasting hours — current and proposed

An increase in blasting hours is proposed for work at the St Helena tunnel to align with approved construction hours.

Approved blasting hours	Proposed blasting hours	Approved construction hours
9am–5pm Monday to Friday	7am–6pm Monday to Friday	7am–6pm Monday to Friday
9am–1pm Saturday	9am–1pm Saturday	9am–1pm Saturday

Benefits of change

- Tunnel blasting will be completed in the shortest possible time.
- Delays caused by missed blasts will be minimised.
- The tunnel will be completed without significant increases to the overall duration of the blasting operation.
- Allows greater flexibility to the timing of the blasts each day.

Vibration limits — current and proposed

- Current approved vibration limit is 5mm/s^{-1} for 95% of blasts and never to exceed 10mm/s.
- We propose to increase the vibration limit to 15mm/s.
- The increased limit would be well below the Australian standard for cosmetic (property) damage and the German standards (DIN4150).

Approved Peak Particle Velocity (mms^{-1})	Proposed Peak Particle Velocity (mms^{-1})	Australian Standard AS2187.2 (2006) Table J4.4.2.1 (cosmetic damage)
5 mm/s 5% of total number of blasts over a 12 month period Never to exceed 10 mm/s	15 mm/s 5% of total number of blasts over a 12 month period Never to exceed 20 mm/s	50 mm/s at 4 Hz to 15 Hz

Australian Standards AS2187.2 (2006)

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TABLE J4.4.2.1

TRANSIENT VIBRATION GUIDE VALUES FOR COSMETIC DAMAGE (BS 7385-2)

Line	Type of building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structure. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

NOTES:

1 Values referred to are at the base of the building.

2 For line 2, at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.

Australian Standards AS2187.2 (2006)

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TABLE J4.5(B)

RECOMMENDED GROUND VIBRATION LIMITS FOR CONTROL OF DAMAGE TO STRUCTURES (see Note)

Category	Type of blasting operations	Peak component particle velocity (mm/s)
Other structures or architectural elements that include masonry, plaster and plasterboard in their construction	All blasting	Frequency-dependent damage limit criteria Tables J4.4.2.1 and J4.4.4.1
Unoccupied structures of reinforced concrete or steel construction	All blasting	100 mm/s maximum unless agreement is reached with the owner that a higher limit may apply
Service structures, such as pipelines, powerlines and cables	All blasting	Limit to be determined by structural design methodology

NOTE: Tables J4.5(A) and J4.5(B) do not cover high-rise buildings, buildings with long-span floors, specialist structures such as reservoirs, dams and hospitals, or buildings housing scientific equipment sensitive to vibration. These require special considerations, which may necessitate taking additional measurements on the structure itself, to detect any magnification of ground vibrations that might occur within the structure. Particular attention should be given to the response of suspended floors.

Increased vibration — benefits of change

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Open cut portals

The increase in overpressure and vibration limits will reduce:

- Total number of blasts required.
- Potentially reduce the construction time.

Tunnel control centre

The increase in overpressure and vibration limits will reduce:

- Total number of blasts required.
- Total number of road closures along St Helena Road.
- Overall construction time.
- Requirement to use noisy and prolonged hydraulic hammering.

Increased vibration — benefits of change

The tunnel

The increase in overpressure and vibration limits and the increase in blasting hours will reduce:

- Total number of blasts required.
- Overall construction time.

Canopy tubes

Airblast overpressure — comparison of limits

- The current approved airblast overpressure limit is 115dB(Lin Peak) for 95% of blasts, never to exceed 120dB(Lin Peak).
- The proposed limit is 125 dB(Lin Peak).

Overpressure	Effects
146 dB(L)	• Structural damage known to occur at this level. • 10 x greater pressure difference than proposed limit.
140 dB(L)	• Aural pain experienced in humans. • Improbable damage to glass.
133 dB(L)	• Australian and overseas research has not seen cosmetic damage at this level. • Recommended level to prevent structural/architectural damage. • Wind speed greater than 40km/h.
125 dB(L)	• **Proposed airblast overpressure limit, never to exceed 130 dB(L)** • Similar pressure difference to a 18km/h wind. • No known physical effects to humans or structures.
115 dB(L)	• **Current approved limit** for airblast overpressure (5% allowable exceedence of total number of blasts over a 12 month period but never to exceed limit of 120 dB(L))

Limits for blasting

Compliance conditions are imposed on the blasting to protect:

- Structural integrity of the surrounding buildings or infrastructure adjacent to the blasting area.
- Protection of the adjacent structures from superficial damage, such as cracking of plaster, flaking of paint

Human comfort

- Limits which are appropriate for protection of human comfort prevent superficial damage.
- Limits which are appropriate for protection of superficial damage are well below those relevant for limiting structural damage.

Compliance with 5mm/s

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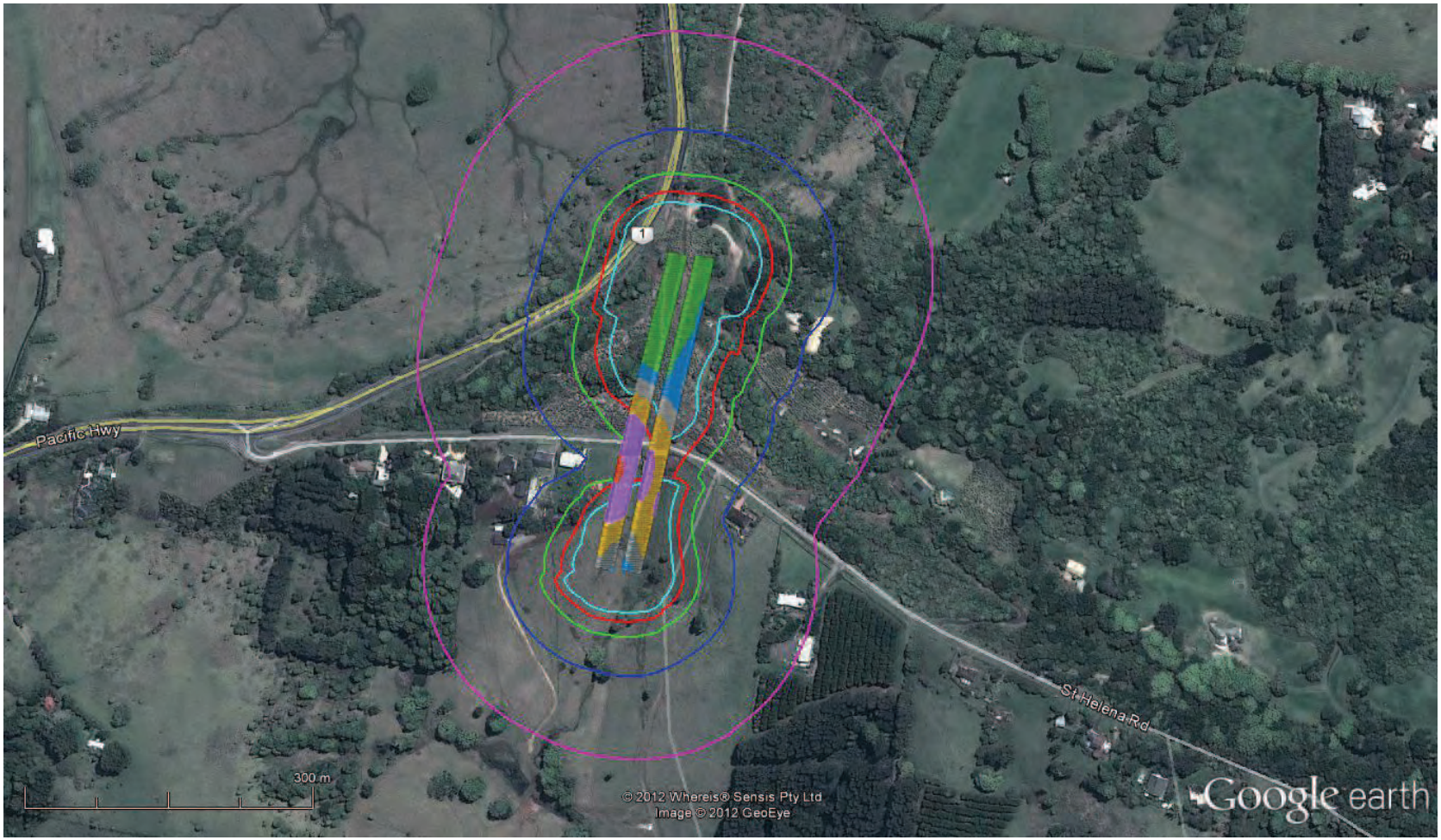
Explosive Quantities

<1 kilogram	1%
Between 1 and 2 kilograms	18%
Between 2 and 3 kilograms	23%
Between 3 and 4 kilograms	14%
Between 4 and 5 kilograms	12%
>5 kilograms	32%

LEGEND

- Expected 20mm/s Vibration Contour
- Expected 15mm/s Vibration Contour
- Expected 10mm/s Vibration Contour
- Expected 5mm/s Vibration Contour
- Expected 2mm/s Vibration Contour



Compliance with 15mm/s

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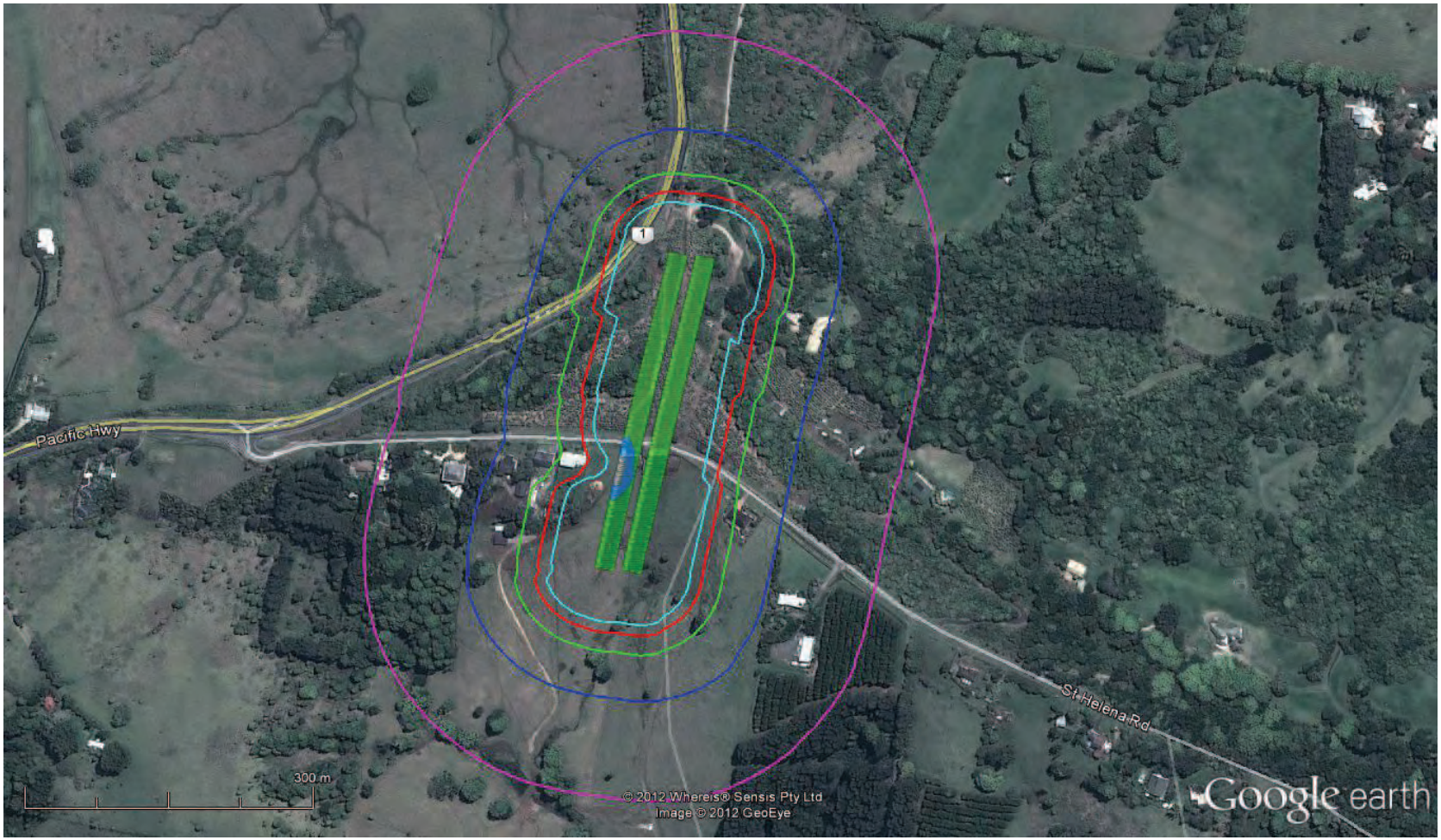
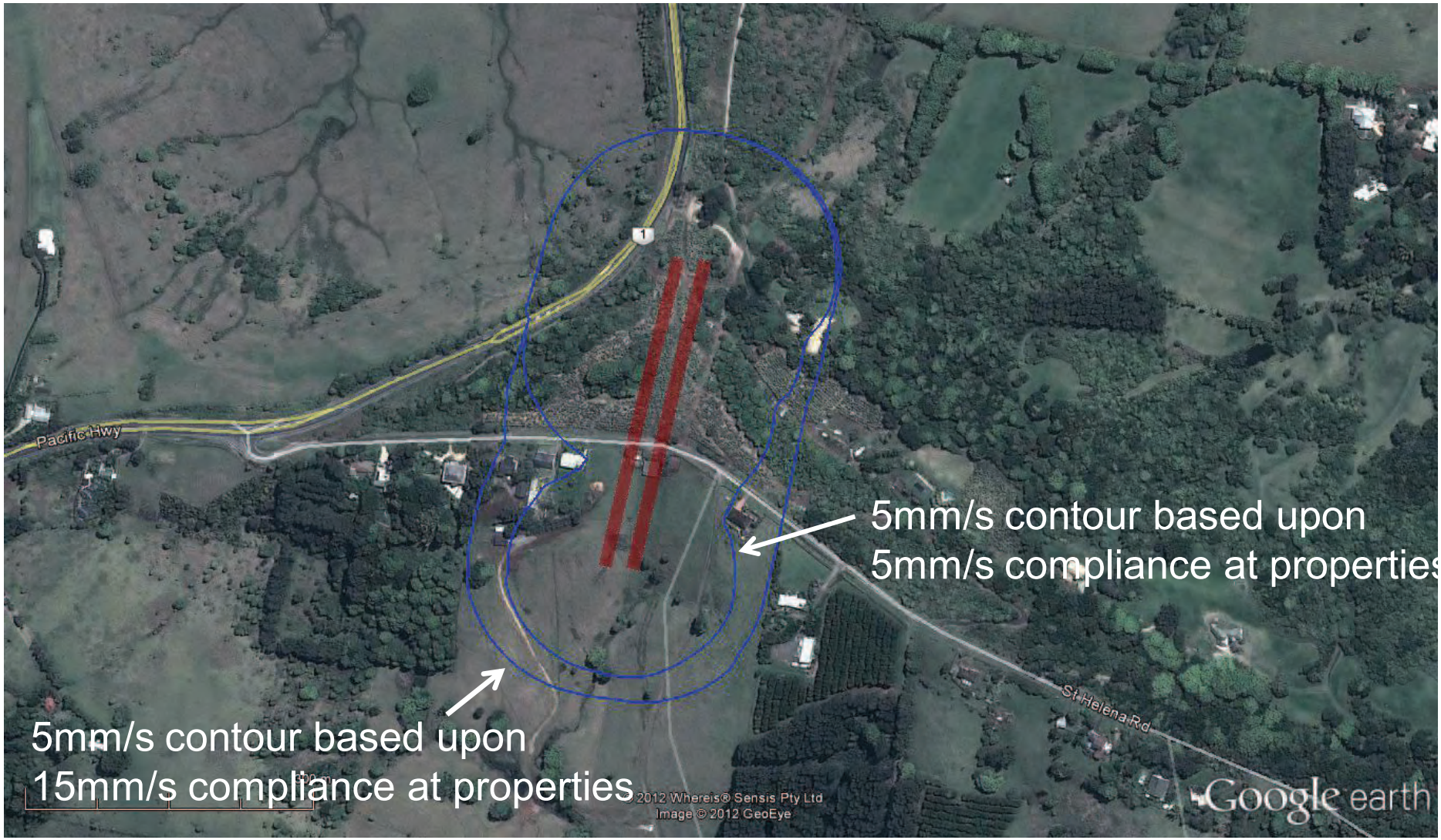
Explosive Quantities	
<1 kilogram	0%
Between 1 and 2 kilograms	0%
Between 2 and 3 kilograms	0%
Between 3 and 4 kilograms	1%
Between 4 and 5 kilograms	5%
>5 kilograms	94%

LEGEND

- Expected 20mm/s Vibration Contour
- Expected 15mm/s Vibration Contour
- Expected 10mm/s Vibration Contour
- Expected 5mm/s Vibration Contour
- Expected 2mm/s Vibration Contour



Comparison of compliance with 5 &15mm/s



Combined benefits — summary

It is anticipated that the following benefits will result from the proposal to increase blasting hours of work, vibration and overpressure limits:

- **80% less rock breaking** — reducing the duration of noise and vibration that residents will be exposed to.
- **15% less drilling** — reducing the duration of noise and vibration that residents will be exposed to.
- **40% fewer blasts**.
- **50% fewer rolling stoppages of the Pacific Highway** reducing traffic delays.
- **50% fewer closures of St Helena Rd** reducing traffic stoppages and delays.

Where to from here?

- Face–to–face meetings with *all* residents within 500m radius of tunnel to distribute and discuss **letter of voluntary non-objection** to **increase blasting hours** to align with approved construction hours.
- Distribute **letter of voluntary consent to increase vibration and airblast overpressure** limits at same face–to–face meetings *only* to those residents who will be impacted by the increase.
- **Signed letters voluntarily returned** to Baulderstone via reply paid envelopes.
- **Submission to Department of Planning and Infrastructure** seeking approval for proposed changes.

MEETING NOTES

21 MAY 2012

Name of meeting: **St Helena Road street meeting — Tunnel Construction, Blasting & Vibration**

Location of meeting: [redacted]

Date: 21 May 2012 **Time:** 5.30pm – 8.49pm

Attendees: **Project staff:**

Peter Borrelli (RMS Senior Project Manager and Representative for the Contract)
Vince Newton (Baulderstone Project Director)
David Packer (Baulderstone Construction Manager)
Mark Dowell (Baulderstone Tunnel Manager)
John Heilig (Tintenbar to Ewingsdale blasting consultant)
Susan Scott (Baulderstone Community Relations Manager)
Matthew Saviana (Baulderstone Roadworks Manager)
Ian Shilling (Baulderstone General Superintendent)
James O'Connor (RMS Assistant Resident Engineer)
Abby Wallace (Baulderstone Community Relations Coordinator)

Residents: (17attendees)

[redacted]

AGENDA ITEMS:

Item	Description
1.	Welcome and introductions (SS)
2.	Overview
3.	Tunnel, including design and benefits
4.	Blasting
5.	Why?

6.	Potential environmental impacts, including vibration and airblast overpressure
7.	Types of controlled blasting (open cut and tunnel)
8.	What to expect
9.	Mitigation strategies
10.	Vibration measurement
11.	Monitoring
12.	Excavation methodology
13.	Proposed changes — blasting hours/vibration/airblast limits
14.	Benefits of change
15.	Vibration contours
16.	Questions.

NOTES:

Item	Topic	Personnel
	Welcome Community Relations Manager, Susan Scott, welcomed attendees, introduced the project team in attendance and outlined the agenda for the session. Note: The content regarding the above mentioned agenda is covered in the presentation.	SS
	Question / comments from residents *(not for publication):* **Question [redacted] Where you say it is 'cut and cover' – does that mean it is the entrance to the tunnel?** Dave Packer advised that yes the 'cut and cover' sections were at the entrance to the tunnels and primarily describes the method of construction. **Question [redacted]: At the entrance to the tunnel it looked like there was a little road coming off to the side. What is that?** Dave Packer explained that it wasn't a road coming off to the side, but rather emergency breakdown bay before you enter the tunnel. **Question [redacted] Is that (image) correct? Will the tunnel be three lanes in both directions?** Peter Borrelli explained that the tunnel has been designed for the provision of three lanes in both directions. There w ll be three lanes southbound through the tunnel, including a third climbing lane that will be constructed on the southbound approach to the tunnel from the Ewingsdale interchange and two lanes northbound, including a wider shoulder that can be converted to a third lane in the future. With the design for the tunnel it is not easily possible to widen the tunnel in the future and hence provision needed to be made now. **Question [redacted] Are the fans noisy inside the tunnel?** Peter Borrelli explained that the fans will only operate in an incident i.e. fire etc. **Question [redacted] Is there access from one tunnel to the other and is that access permanently open?** Dave Packer advised that there is permanent emergency access between the tunnels located every 120m (three in total) with a weighted sliding door which is easily opened during emergencies. Peter Borrelli added that in the unlikely event that there was an accident e.g. fire in tunnel, pedestrians who have exited their vehicles could use the exits to cross over safely into the other non-incident tunnel and exit that way. **Question [redacted] Will they be open all the time and will there be pedestrians walking through there? For example, hitchhikers?** Peter Borrelli advised that the doors are alarmed and monitored and there will be CCTV cameras monitoring if anyone touches the door and an alarm is set off. **Question [redacted] Where is the exhaust from the tunnel released?** Dave Packer explained that the tunnel is short enough and of sufficient cross section to self-ventilate. Susan Scott added that there won't be 'ventilation stacks'. **Question [redacted] Are there provisions for three lanes because one (tunnel) will be busier than the other?** Peter Borrelli explained that the third lane southbound is in place as a climbing lane initially, and a third lane may be opened northbound in the future when traffic volumes warrant it.	

Peter also explained that we have made the provision for the third lane now as it is very difficult to add lanes later.
David Packer added that the space for three lanes must be created now, because this type of tunnel (fully tanked tunnel) would be cost prohibitive to widen in the future.

Question [redacted] What is the maximum dimension of the tunnel?
Dave Packer explained that it is 19 metres in width and 12 metres in height.

Question [redacted] Can you water it down? (The blast overburden so as not to produce as much dust).
Mark Dowell advised that a little water to dampen it is OK, but too much can affect the blast.

Question [redacted] Does the blasting disrupt rock layers in the ground?
Mark Dowell responded 'no, because it all moves together".

Question [redacted] I'm just thinking of things like underground concrete tanks?
John Heilig explained that it's different. For example, in the recent Christchurch earthquake the ground moved 0.6 – 1 metre, compared to 100 μm, or the thickness of a sheet of paper, which is what we are talking about here.

Question: So you can hear thunder, aircraft etc. Can you hear overpressure?
Mark Dowell advised that you cannot hear overpressure as the frequency is so low it cannot be picked up by the human ear.

Question [redacted] What is the TCC?
Mark Dowell advised that (the acronym) stands for the Tunnel Control Centre.

Question [redacted] Can you explain where the emergency access will be (reference to 'emergency access will be maintained at all times')?
Dave Packer advised that blasting activities can be stopped to provide emergency access e.g. to let an ambulance get through along St Helena Road.

Question [redacted] What about livestock?
Mark Dowell advised that livestock may be disturbed in the first couple of blasts, but then they would settle down once they became accustomed to it. The project team will discuss the potential impacts on livestock with individual affected property owners before each outdoor controlled blast.

Comment [redacted] We have different cattle coming in and out of our property so if you are blasting regularly it is likely to be new animals in the cattle yards every couple of days.
Peter Borrelli advised that is what we need to talk to property owners about so we can manage all of those things together.

Comment [redacted] And you couldn't get any closer to the blasting at the tunnel where the stock yards are.

Question [redacted] Will there be a letter from the head of RMS and the Minister which indicates that if there is a damage issue, there is an agreement to make good?
Peter Borrelli advised that there would be a letter outlining agreement to undertake repairs, if the damage was found to be caused by the project.

Question [redacted] Who will sign the letter?
Peter Borrelli advised that letter to undertake repairs would be signed by the Baulderstone Project Director as well as a blasting fact sheet provided on RMS standard letter head.

Question [redacted] Would this be an insurance claim?
Peter Borrelli advised that the project insurance company would manage it depending on the size of the claim and the extent of the damage. RMS has a Principal Arranged

	Insurer, but it's unlikely to become an insurance matter. **Question [redacted] What happens if Baulderstone goes broke?** Peter Borrelli explained that Baulderstone is a very large construction company and a top tier contractor Who has undergone financial assessment (as part of the tendering process) and has provided a large security as part of the project contract. **Comment [redacted] I think we would feel much more comfortable if that letter came from the Government.** Peter Borrelli advised that this is the arrangement on all RMS projects. Peter Borrelli further cautioned about being too negative and creating unnecessary fear and added that there is no expectation of damage, and if any at all it will not be significant. Dave Packer added that Baulderstone Pty Ltd is owned by Lend Lease which is a large international company. **Question [redacted] With two houses very close to the project, both have underground concrete water tanks. The tanks will need to be inspected prior to the start of construction. I think this process needs to be addressed. How will you address this? If there is a leak in a water tank, it might be difficult for them [property owners] to relate that damage to the project.** Vince Newton advised that Baulderstone will have individual conversations with property owners to organise appropriate inspections. We are arranging a structural engineer to carry out a structural inspection of all properties in this area. This is in addition to the pre-condition survey that has already been carried out and will include the underground water tanks. Vince Newton explained that we want to know about these things now so we can organise inspections. Peter Borrelli added that pre–condition surveys of properties have been completed and you will have a report that documents the condition of property. If we have missed anything please let us know so we can correct that. **Comment [redacted] We have raised that [the concrete water tanks] quite a few times but they were missed on the property condition report. We do keep bringing it up, because we don't know who is dealing with it. One of the property owners [redacted] is in Sydney.** Peter Borrelli advised that it is an action. Please let us (RMS) or the Community Relations team know and we will look into it. Let us know if there is anything that we may have missed. **Question: Does the rock get taken away from here or does it get used on the road?** Dave Packer advised that it will get crushed and used during construction of the new highway. **Question [redacted] Where does the rock get crushed?** Dave Packer explained that it won't be crushed in the immediate vicinity of the tunnel; it will be further south down towards the Tinderbox valley. It has to be 250m from the nearest resident. **Question [redacted] Does that mean that people will be woken up at night and not be able to get to sleep again [referring to 24 hour tunnelling]?** Mark Dowell explained that there will be soundproof doors that will close on either end of the tunnel and evening shifts will come in and the door will close and they won't open again until the morning. **Question [redacted] I understand that but is there going to be any noise in this area when people will be sleeping?** Susan Scott added that night works will be inaudible. **Question [redacted] Are those set times part of your contract?** Mark Dowell explained that they are part of the Ministers Conditions of Approval for the project.	

Question [redacted] What is the very outside line? The purple one [referring to the slide presentation].
John Heilig advised that line indicates the vibration contour at 5mm/s.

Question: Didn't you say that at times it could get to 25mm/s?
John Heilig explained that the vibration in the immediate vicinity of the blast will be higher but that the vibration at the nearest residences will not exceed the allowable limits.
Peter Borrelli added that limits are set at 5mm/s and can never exceed 10mm/s. 95% of our blasts will be below that. The way it is set up is that we can never exceed 10mm/s. Although it is 15mm/s the blasts are always set at less than that so we are sure to never go above that level / limit.
If an increase was approved to 15mm/s, it would never exceed 20mm/s.

Question [redacted] In the last few slides, you talked about evacuations. If that was to happen would that be for—hours or days? And are you saying some people would stay indoors and some would leave?
Dave Packer advised that trial blasts need to be undertaken to measure how the rock behaves so the blasting models can be verified. As a preliminary precaution, we would ask the people in close proximity to the blast location to stay indoors.

There are two distinct types of blasting. The first is controlled open cut blasting which will include the tunnel portals and the tunnel control centre on the surface. Then we have the controlled tunnel blasting where the charges will be smaller, with the bulk of the blasting being underground tunnel blasting. The first initial process is where we need to take extra precautions.

Susan Scott added that the open cut blasting is similar to the blasting shown in the videos in the presentation tonight.

Question [redacted] What level of blasting did you do at the hospital [directed at John Heilig]?
John Heilig advised that it was a smaller scale but the limit there was 25mm/s. It was very hard rock and when the redevelopment was going on, there were hospitals on three sides and we had the option to drill and blast or use a hydraulic hammer and they chose drill and blast because it was over and done with a lot quicker. John added that you will certainly feel blasting but it will not damage your property.

Question [redacted] : So nothing as much as a crack in the concrete?
John Heilig advised "No, I've never non-intentionally damaged a structure".

Question [redacted] So what happened at the Lane Cove tunnel?
Mark Dowell advised that they were developing an off ramp that came across quite a low junction and there were issues with the bolting and roof support. Mark advised that it was the coming together of different elements that caused that tunnel to collapse.

Vince Newton explained that they weren't tunnelling through rock for that section of the Lane Cove tunnel.

Question [redacted] What happened at the Canberra hospital?
John Heilig explained that blasting at Canberra was an implosion. They were demolishing a building. We are trying to contain the energy. They would have had almost no vibration; it would have been overpressure.

Question [redacted] Have you ever damaged a building?
John Heilig explained that we did damage a building intentionally once where the vibration was set at 75mm/s.

Question [redacted] Did I hear somewhere that this type of tunnel construction hasn't been done before in Australia?
Mark Dowell explained that the St Helena tunnels are big tunnels but we have certainly done similar tunnels in Australia. In Melbourne they have done a similar size excavation. They don't come along that often and the preferred method is using a roadheader.

	Dave Packer added that the Airport Link tunnels in Brisbane were very large tunnels and they used roadheaders, not the drill and blast method. **Comment[redacted] Just get the job rolling.** **Question[redacted] By increasing the hours of blasting, how much do you decrease the time of the actual project?** Mark Dowell explained that it will be approximately 1 – 1½ months. There are lots of different effects and it depends on the geology as to how well we proceed. **Comment[redacted] We would like to know where the rock crushing machine will be located. In terms of noise for residents — breaking up rocks sounds pretty noisy.** Mark Dowell explained that there will be rock hammering at the tunnel portals and tunnel control centre. **Comment[redacted] is talking about rock crushing operations on the project [not rock hammering].** Dave Packer explained that rock crushing won't occur in the immediate vicinity of the tunnel. It will be in the Tinderbox Valley vicinity. Operations must be at least 250 metres from residents and 200 metres from waterways. With modern day crushers it is so much quicker and less noisy and we put them in locations where we can comply with the conditions and where they have minimal impacts. **Question[redacted] Do you have an idea where you will put them?** Peter Borrelli advised that it is not in our interest to put them in a place where there are impacts to people. Dave Packer added that it is about finding a balance and in an area with the least impact. **Comment[redacted] If you have to be 200 metres from waterways, it will be hard.** **Question[redacted] What kind of surface will you be putting on the road from here to Bangalow?** Peter Borrelli explained that it is a concrete surface. **Comment[redacted] I was talking to my son who lives in Queensland near a highway with a concrete surface and he explained that the noise is unbearable. He said that whoever did the road up there said "too bad it's done".** Peter Borrelli explained that RMS has done a lot of noise modelling for this project and will comply with and meet all the noise obligations for the project. **Comment[redacted] Why are they hammering the concrete on the highway near Ballina and near Yelgun?** Peter Borrelli explained that they are replacing some seals at Ballina and at Yelgun to Chinderah it is maintenance — there has been some soft soil settlement and the concrete is being replaced and reinstated. **Comment[redacted] If you put a concrete road down here, we will get all the noise with the southerlies.** **Comment[redacted] At the start of the project – we had no clue at all that the tunnel was going to go through here [St Helena]. In the discussions with Arup and Peter Borrelli's predecessor from the RTA, we were told that we were getting an asphalt road. If you look at the diagram in the presentation it is an asphalt road.** Peter Borrelli explained that the diagram is an artist's impression. The pavement is concrete. **Comment[redacted] We were led to believe that wasn't going to happen and we have some major issues we would like resolved.** **Comment[redacted] We have concerns about the use of St Helena Road and**	

	the truck movements planned. We want truck movements clearly defined. How many per day, coming in and out and what time of the day? Dave Packer explained that on average it is about 60 trucks per day plus small / light vehicles. **Question: [redacted] Is that 60 trucks plus light vehicles or 60 truck movements?** Dave Packer advised that on average it will be approximately 60 per day but we will have to clarify. I would assume that is 60 in and 60 out but we will need to follow up with you to make sure. *Clarification – there will be an average of 60 trucks per day, which equates to one truck in and out every 10 minutes. In addition, there will be approximately 60 light vehicle movements every day, which again equates to an average of 1 light vehicle in and out every 10 minutes. It is also noted that the project team is implementing several measures to minimise the vehicle use of this access, such as ferrying the tunnel workers in / out using buses (i.e. minimising use of private vehicles) and fast tracking the construction of Byron Creek bridge to provide an alternative access from the south.* **Comment [redacted] We were told that our vehicle access movements would remain the same. We use trucks and operate buses. Will we still be able to turn right onto the highway?** Yes, you'll be able to turn right onto the highway. It's different for us as a company — unless it's a designated intersection, we will be using it as a left in/left out for the safety of our workers and the community. **Question [redacted] We want to know where you are going to turn around if you are only doing a left in, left out arrangement?** Dave packer explained that the project won't be changing access for residents; these rules will only apply for project staff. *Clarification – there will be no change to existing conditions for the residents. Any construction traffic that exits left from St Helena Road onto the highway and needs to turn around, will do so at Coolamon Scenic Drive lookout, which has enough space to accommodate this (and existing traffic turn provision). This is considered to be a much safer option.* **Comment [redacted] Kids catch the school bus at the top of Coolamon Scenic Drive, is that where you will be turning around?** Dave Packer advised that there is a detailed traffic plan, however, he would clarify this situation. Consultation is currently ongoing with local bus/school bus companies to ensure there is no impact on the existing operation of these services or to the safety of school children. **Comment [redacted] We need to know just exactly what is going on as we are subject to contracts and need to be able to inform the Department of Transport.** Peter Borrelli advised that we are not changing any traffic arrangements for residents. Baulderstone may need to talk to you about safe pick up points. We will maintain access at all times. **Question [redacted] Will there be a speed limit on the road, during construction?** Peter Borrelli advised that yes there will be a speed limit during construction. **Comment [redacted] Cars are doing 100km/h on the crest here.** Dave Packer advised that Baulderstone will continue to talk to the police and have them add this road to the list to watch, however there will be no guarantees. We've had meetings with the police and we are more than happy to advise police about this road. This issue was raised with Sergeant Dave Carter from Ballina Highway Police on 23 May. Sergeant Carter advised that	

	the local residents should contact Ballina police station direct to express their concerns. Under existing police procedures this will trigger some additional police/patrols and surveillance in this area. **Comment [redacted] St Helena road is the Byron Bay bypass. Widening the road and then stopping the work just before the crest is not safe. Can you widen beyond the crest for safety reasons?** Dave Packer advised that Baulderstone have not provided council with the details of the road upgrade yet. Baulderstone will seek feedback from Council before we do anything and will certainly take that on board. Vince Newton explained that a road safety audit will be done on the design. This looks at things like site distance/signage etc. *Clarification – the option of extending the road past the crest was considered during the initial planning phase, but was not adopted. This was due to concerns that upgrading the road in this area would compound the problem due to vehicles travelling at an increased speed, and furthermore was not functionally required to build the highway upgrade. The proposed upgrade of the road between the tunnel access points and St Helena road will include a full detail design which will consider and address the safety issues raised and which will be reviewed and approved by RMS. It is envisaged that these issues will best be addressed using signage and reduced speed limits. Once complete, the upgrade will also undergo a full Road Safety Audit by a qualified Traffic Engineer to ensure that the road is safe for all users.* **Comment [redacted] GPS is diverting people onto St Helena Road, the same as at Grafton. We get huge caravans and they have nowhere to go.** **Comment [redacted] They will come down here and then stop.** Dave Packer advised that it [St Helena Road] will be a fully designed scheme, including a traffic safety audit. Peter Borrelli also added that once the highway is upgraded the bulk of the current highway traffic (i.e. not local traffic) will be travelling on the upgraded highway and will not have the opportunity to make such a trip. **Question [redacted] Are you able to clear the Bana grass on the side of the highway?** Peter Borrelli advised that there will be no issue with clearing this Bana grass. *Clarification – we have no problem in trimming and maintaining this grass for the duration of the project works. Susan / Ian Shilling to arrange site visit with appropriate residents to view extent of slashing to be carried out.* **Question [redacted] : When is the speed limit going to be lowered on St Helena Road? You need a sign that says: wildlife area – people live here! When will it be done?** Peter Borrelli explained that during the project construction we will have construction speed limits in place (typically 40km/h) and after we open up we will put a new speed limit up. From discussions with Council, we are not sure if it will be 50km/h or 60km/h limit. We are still working through these things and talking to Council. It most likely will be 60km/h as it is not an urban area. In Bangalow where there is a greater density of houses, and hence there is a lower speed limit of 50km. Speed limits should be self-regulating i.e. if you put a speed limit in an area that people won't obey because they can can't see an immediate need for it, it doesn't work. We have to be consistent in our application of speed limits around the state. It is very easy to focus on the negative. The alternative is if the road wasn't	

	sealed or widened you would have exactly what you have now. There are pluses and minuses; it's how we manage it. **Comment [redacted] The speed is unbearable.** Peter Borrelli advised that he understood you are getting a lot of traffic because people use it as a back route to Byron Bay. Once the highway upgrade is completed and if you are travelling on the Pacific Highway you will have to make a deliberate decision to get off at Bangalow or Ewingsdale interchanges to access St Helena Road. Traffic on St Helena road will then be local traffic and users will be familiar with that route to get into Byron Bay. **Question [redacted] If there are no hiccups with the process, how soon will you start? August–September?** Dave Packer explained that we are still going through the environmental approval process. The design is progressing very well and there are approximately 120 designers currently working on the project. Some early packages are now starting to be ready for construction and fencing work will start in the next three weeks or so. At tender time, there are a number of environmental criteria that are set, including a series of sub–plans and a high level of detail needs to be provided such as how we control dust and noise. These plans will be issued to Department of Planning and Infrastructure (DoPI) in the coming weeks, and once DoPI are satisfied with the documentation, we will get the approval to start. **Comment [redacted] In relation to the tunnel control centre blasting, we are concerned about dust. People on this road have tank water and contamination of water supply is an issue and is critical.** Dave Packer advised that the videos shown don't give a very good idea of dust management. We will be managing the dust at the source using a variety of dust control measures. **Question [redacted] Will you use dust mats?** Dave Packer explained that we use blast mats or overburden (wetted down) to stop any fly rock. These measures can also considerably reduce the amount of dust generated. **Question [redacted] In relation to the water filtration system, how do you stop massive amounts of dust settling on roofs?** Dave Packer advised that we will be managing the dust in accordance with the Environmental Dust Management Sub–Plan for the project and there is no expectation for large amounts of dust to be settling on roofs. **Question [redacted] In relation to the road surface, I've been led to believe that there are various grades of concrete road surfacing including noise suppressed types of roads. I am interested in finding out what the road surface will be?** Peter Borrelli advised that with the concrete pavement there is a certain finish on the concrete for safety reasons. There are extremely tight controls on paving. We understand the noise concerns, however, we need to use a concrete pavement that gives surface texture for skid resistance for road safety reasons. There are tight controls over paving and finishing and we need to comply with the noise level requirements set for the project.	

	Question [redacted] Is there a similar road texture [that's been used] anywhere around here? Peter Borrelli explained that the section of the Pacific Highway near Tandy's Lane would be similar. **Comment [redacted] I take your point about noise protection, however, our property has been treated for noise and it makes no difference at all. There are 40 properties in this area. You said that the type of treatment depends on density of the population. Aren't 40 houses enough to qualify for low noise pavement?** Peter Borrelli explained that noise treatment 'at residence' or 'at road' falls under what we call "reasonable and feasible". Where houses aren't clustered in a significant density, and are typically located individually at distance from the road, you get a better result and a greater noise reduction by doing an 'at residence' treatment. **Comment [redacted] That's not good enough.** **Question [redacted] What happened at the Alstonville bypass?** Peter Borrelli explained that he is not sure about the Alstonville bypass as it is not a Pacific Highway project. He explained that a range of experienced engineers work on the noise modelling to inform design 'up front' and RMS usually finds that modelling is well below the approved levels. Over the years there has been a different approach now adopted. Many years ago RMS would construct the road and then deal with the noise afterwards. Now RMS undertakes noise mitigation prior to construction so people get the benefit early. On Pacific Highway projects, we install mitigation measures early, and then we open the new road and measure the results and usually find that we are under the levels. We also undertake post-construction noise modelling to confirm our earlier noise modelling predictions. I have checked with previous RTA staff and looked back through the records and the environmental documents for the project and no one has advised that a low noise pavement commitment was made nor was I able to find any record. In fact, this issue of the low noise pavement requested was raised prior to the project being approved, and the comments of a number of the residents here tonight are well documented in the representations report for the project. I would be happy after the meeting to sit down with you and step you through that documentation. Our criteria is to comply with noise criteria and noise guidelines. **Question [redacted] Are we likely to be affected by echoes at the tunnel portals? Will there be noise emanating from the tunnel?** Peter Borrelli explained that the noise modelling that has been completed takes into account many things including the terrain, the noise source, if there is a mound or cutting, and the line of sight, for example. In relation to noise emanating from the tunnel, we won't be constructing anything until it is all worked out. At the end of the project we come back and monitor noise and find out if there are any exceedences. If there are, then we have to revisit our noise modelling and assessment work. We work with individuals for noise attenuation e.g. some residents want to retain views and don't want noise mounds. The noise levels have to comply with noise guidelines.	

	Question [redacted] Is there much noise at the opening of the tunnel? Peter Borrelli explained that yes there will be noise which has been considered in the model; however, the tunnel is in a considerable cutting. Peter added that he's not saying that you won't hear the highway. **Question [redacted] Why were the seals on the Ballina bypass being replaced so soon?** Peter Borrelli explained that sealing has no effect on noise. Concrete has seals because of the cuts in concrete. **Comment [redacted] In relation to the noise issues, I know as a fact that we were told that because this is a green fields route, it would be built to the best possible standard with the low noise surface. I had conversations with RTA and Arup.** **That is a conversation that we have had for seven years. That was a sweetener and we were told it would be low noise paving because the road was going through our valley.** **Comment [redacted] And it makes it very difficult for us. And you are asking us, the community to speed up the progress by giving permission to increase blasting hours of work and vibration limits.** Peter Borrelli explained that he has gone back and checked documents and nobody said the road paving would be low noise. The key things are that the noise levels cannot exceed 50dB once the highway is open to traffic. It doesn't make any difference what the surface is; we have to comply with these noise levels. **Comment [redacted] There is no documentation, and no one was writing down all the questions that we asked.** **People in this valley have been here for a very long time. It was always peaceful and now that will change.** **Our valuer has told me that there has already been a report done by Renzo Tonin on a property at Knockrow, and I can get a copy of that report.** **From what I was told, the modelling was proved wrong; some of the modelling for houses has been wrong by up to 4dB.** Peter Borrelli explained that Arup did the initial noise modelling for the concept design, RTA has since done more modelling, and Baulderstone and Hyder are doing more detailed design modelling. **Comment [redacted] There was a drill rig being used in the paddock during noise modelling. We are currently discussing this with Baulderstone.** Peter Borrelli explained that if there is an issue we'll look at it. **Question [redacted] You talk about concrete – how are you going to make that less noisy?** Peter Borrelli explained that basically when you pour the concrete there are things that you can do to it for skid resistance e.g. we use hessian drag and a transverse grooving machine, which all assist with skid resistance. Controlling the depth of the micro and macro texture controls the noise. **Question: Is it right that you have treated properties that are 500 metres away?** Peter Borrelli explained that all property treatments have been completed to meet the criteria regardless of their distance away from the road. As a rule the	

	further away the property is from the edge of the road, the lower will be its noise. **Question [redacted] What are the noise criteria? We have friends who live in Phoenix Park [around Tintenbar area] and they can hear the noise [from the Ballina bypass] and they are much further away [from the highway] than we are.** Peter Borrelli explained that the noise criteria are the same for all road projects and are set by the NSW government. The noise level criteria has been documented in the Environmental Assessment for the project. **Question [redacted] Why did the Alstonville bypass have their window thickness set at 10mm and ours is for 6mm?** Peter Borrelli explained that he is not sure of specifics of Alstonville. He explained that they might have been treating for higher noise levels. Thicker glass means that we sometimes have to replace the whole window. James O'Connor explained that most of the noise comes through the walls of the house and you can only thicken the glass on windows to a certain extent. The difference between thinner and thicker glass is a couple of decibels. Peter Borrelli added that we would be more than happy to come and have a look at your [redacted] house again if there was a problem there. **Comment [redacted] It depends on the structure of the house as to how successful the noise attenuation will be.** Peter Borrelli added that on other projects when there have been timber framed houses, for example, we have looked at what the most appropriate treatment is for that particular house, and what the particular noise reduction was we needed to achieve. This is done in consultation with property owners to find the treatment that is best for that particular property. **Comment [redacted] I have had phone calls from a lady at Talofa. She wants to be included in the discussion. She is 700 metres from new highway and RMS has told her that her house is not directly affected. You don't hear people complaining about the stone mastic asphalt (SMA) pavement, but you hear people complaining about the concrete [pavement] all the time. We were told that it would be a low noise pavement and built to the best standard. The cost that you will save from doing the tunnel in a shorter amount of time — can you put that money toward the low noise pavement for the section 2km from Bangalow to the tunnel portal?** **Comment [redacted] I think you should do the decent thing and do it at the beginning.** Peter Borrelli advised that he will take that as a comment. **Comment: We've been fighting for this for eight years.** **Comment [redacted] I hope you don't plant hundreds of trees.** Peter Borrelli explained that he is happy afterwards to keep discussing this issue, James and I are happy to talk about specific noise levels. Be careful of what you get told. There will be a very detailed presentation about noise levels later in the project so we can answer all these questions. **Comment [redacted] We have had advice that we should keep pursuing this.** **Comment [redacted] We will keep to what we were promised and we**	

	are not getting. **Comment [redacted] I just don't want to see things happening retrospectively. This road has been happening to us for seven years. We thought the road surface was decided, and we are not noisy like they are in Ewingsdale and we think now it's not too late and we really want to come to a mutually agreeable outcome.** **Question [redacted] What happens if we don't get signatures – do you still go to the Minister with your application [for increase vibration and overpressure limits and blasting hours]?** Peter Borrelli explained that we will still go to the Minister and we will document the consultation that has been done with residents and the feedback received. At the end of the day the Department of Planning and Infrastructure will make a decision as to whether they agree to change the limits for the project or not. **Comment [redacted] You can understand why we are sceptical.** **Comment [redacted] We would really appreciate knowing when the noise monitoring will be going on. We would like to be informed.** **Comment [redacted] We were told about the noise monitoring but we didn't tell [redacted] and it doesn't often happen that there was a chainsaw happening every day, but there was when the noise monitoring was occurring.** Peter Borrelli explained that we are able to identify if there is a mower or similar in the noise data. James O'Connor added that the noise monitoring is completed over a long period. There is a log and an average is calculated over seven days. Peter Borrelli added that if it rains or there is heavy wind, that data would not be used. We only use data that is credible. **Question [redacted] Why can't you blast when there is heavy wind?** Peter Borrelli explained that overpressure levels would be too great because wind causes overpressure as well. It would be a cumulative effect of overpressure if it is windy as well. **Question [redacted] You said there are Ministerial conditions. Why are they set at that level?** Peter Borrelli explained that they are a set of generic conditions and not specific to any individual project. **Comment [redacted] I'd like to thank you all for the time you have put into this. We lost our house to Main Roads 38 years ago, and back then we did not have any of these opportunities to talk to them. We had to do it all through a solicitor and had to fight for everything.** **I lived up here for six weeks when some RTA people came up here saying they were doing a survey for a new highway. You have put a lot of time into it to talk to people and everybody really appreciates it in the long run.** Peter Borrelli thanked everyone [redacted] for the opportunity to discuss the project with residents, and extended an offer for anyone to contact him or the community team to discuss further any queries they might have.	
	Meeting closed at 8.49pm.	

MEETING NOTES

23 MAY 2012

Name of meeting: **Community Information Session #5 (sessions 1 and 2)**
Bangalow interchange and St Helena tunnel construction

Location of meeting: Bangalow A & I Hall

Date: 23 May 2012 **Time:** 12.00pm–2:48pm (28 attendees)
5.40pm–7:40pm (14 attendees)

Attendees: **Project staff:**
Peter Borrelli, RMS Senior Project Manager (PB)
John Heilig, Principal, Heilig & Partners Pty Ltd (JH)
David Packer, Baulderstone Construction Manager (DP)
Mark Dowell, Baulderstone Tunnel Manager (MD)
Susan Scott, Baulderstone Community Relations Manager (SS)
Kevin Sweeney, Baulderstone Engineering Manager (KS) (Midday session)
Ian Shilling, Baulderstone General Superintendent (IS) (Midday session)
Abby Smith, Baulderstone Community Relations Coordinator (AS).

AGENDA ITEMS:

Item	Description
1.	Welcome and introductions (SS)
2.	Bangalow interchange update (PB)
3.	Environment update (DP)
4.	Construction update — general (DP)
5.	Bangalow compound site establishment (DP)
6.	St Helena tunnel construction (MD & JH)
7.	Community involvement (SS)
8.	Informal discussion

NOTES:

Item	Topic	Personnel
1	**Welcome** Community Relations Manager, Susan Scott, welcomed attendees, introduced the project team in attendance and outlined the agenda for the session.	SS
2	**Bangalow interchange update** Peter Borrelli provided background information about the Bangalow interchange, consultation to date and the options considered by the working party. Peter summarised the comments and feedback received and the main issues that were raised during consultation. He explained the decision determined by the working party to recommend the adoption option 3 with access to Bangalow and the key features of the revised concept design and next steps. **Questions and comments — 23 May (session 1)** **Question: I'm a resident of Clover Hill estate and one aspect that concerns me about the revised design is that when the gates were in place to be used for emergency access, the traffic coming off the highway would [have] been under the direction of the highway patrol. It seems to me that [in the revised design] the loop to the roundabout from the northbound carriageway is very short compared with what is there at the moment. It seems that the new road will be significantly elevated and I'm concerned about the safety on that roundabout and the potential noise of traffic that is doing 100km/h and coming into the roundabout at high speed when the traffic on the roundabout is doing 50km/h.** Peter Borrelli explained that there might have been some misunderstanding. The gates [in previous option] were always going to operate under a fully automated system that would only open in an emergency and would be closed the rest of the time. However, during consultation, the community indicated that they preferred access to and from Bangalow all of the time. The length of the northbound off load ramp into the roundabout is currently subject to detailed design. It will be designed to a full freeway standard so that people can decelerate from 110km/h on the Pacific Highway to 50km/h at the roundabout and will allow vehicles sufficient distance to slow down safely. Out of all the options from the working party, there has been no change to the alignment (horizontally and vertically) of the highway upgrade and the height has not changed. The landscaped earth mound is high in that area to assist with noise reduction and the project team is aware of the noise concerns and these will be addressed in a future specific community information session on operational noise. **Question: In regards to the signposting, being a resident from Teven, one of the concerns with the Ballina bypass was that Alstonville would show on the signage at the Ross Lane interchange and direct people through Teven which would defeat the purpose of having the Ballina bypass and**	PB

	the Alstonville bypass. In regards to Bangalow, a suggestion is that by removing Lismore on all the signage for the highway upgrade it would deter motorists from using Bangalow as a thoroughfare to get to Lismore. Peter Borrelli explained that as part of the signposting scheme to be developed for the project that will be addressed. The comment is understood, however we will need to consult with the community and businesses about the signposting. **Question: Can the old bridge that will be removed at Bangalow be reused? Kyogle would dearly love this infrastructure.** Peter Borrelli explained that the cost of recovery and transport would most likely be prohibitive. The bridge has been designed for a particular span and design standard loading and from experience it doesn't usually work out to be feasible to transport it to another location. **Comment: I think it's a sad outcome. It's a huge expense to the community to address the concerns of Bangalow residents and [the expense] is being born by the rest of the community.** Peter Borrelli explained that he will take the comment on board. He explained that another point in the report for the Bangalow interchange concerns heavy traffic going through Bangalow. RMS did a traffic survey on a busy day and monitored the time and number of plates, especially heavy vehicles, and found a lot more people actually get off the highway to visit Bangalow as a destination rather than to pass straight through. **Question: What time of day did you do that survey? We notice that most heavy vehicles come through at night.** Peter Borrelli explained the survey was conducted during the daytime between 7am and 6pm on a Friday. **Question: [With reference to the southern end of the new noise mound at Bangalow] Where the new highway will be constructed, just south of where the noise mound ends, will the existing trees be retained?** Peter Borrelli explained that he would need to look at the plan [not artist's impression] with the community member at the end of the session. Trees will be removed to construct the noise mound, however we will re-landscape. Peter noted that we couldn't [instantly] replace vegetation that has grown over many years, but we'll replant and it will over time return to its current density. *End of questions or comments for session 1* **Questions and comments – 23 May (session 2)** **Question: If you've changed the roundabout [at Bangalow], do you have to collect more noise data?** Peter Borrelli said the noise modelling would be redone, however, the new design would reduce noise, and the existing noise mitigation measures, e.g. noise mound would remain. The roundabout is now further away from Bangalow.	

	Question: How much lower is the roundabout now? Peter Borrelli explained that it is approximately 5 metres lower. **Comment: It would be good to have a higher noise mound between the tennis club and the old highway.** Peter Borrelli explained that RMS can look at that, however, the only thing that limits the design there is the space available. The higher the mound, the more space is needed for it's width at the base. Peter advised that RMS can take that on board. There might be some spare spoil material that could be used. **Question: Travelling from north to south, how will motorists get into Bangalow?** Peter Borrelli explained that if you are travelling from Tweed Heads, for example, there will be no change to how you currently access Bangalow ie, get off at Ewingsdale and follow the existing highway. **Question: What impact will the new design have for trucks?** Peter Borrelli explained that RMS doesn't believe this will create any more truck movements into Bangalow. In the long term, truck movements coming into Lismore through Bangalow will decrease. With the Ballina bypass and Alstonville bypasses in place, it will be quicker to travel to Lismore by staying on the upgraded Pacific Highway rather than driving through Bangalow to get to Lismore. Once the Tintenbar to Ewingsdale project is finished, we expect that the trend will continue that way and it will make greater sense for motorists to stay on the new highway. Some motorists may still have a preference to go through Bangalow, however, RMS will use signage to advise motorists to stay on the upgraded Pacific Highway and travel down to Ballina bypass and take the Bruxner Highway to get to Lismore. **Question: In regards to the dangerous goods trucks that can't go through the tunnel, are any dangerous goods allowed to be carried on B-doubles? And is the turning circle on Bangalow Road [adequate] to access the southbound on ramp to get back on the Pacific Highway?** Peter Borrelli explained that it will be designed for B-doubles so that in the event of an incident, heavy traffic can be diverted onto the old highway, if necessary. The southbound on ramp at Bangalow will be designed for B-double access, as well. **Question: Would Bangalow Road need to be redesignated to cater for B-doubles?** Peter Borrelli explained that if it is to be used as an alternate access in case of an emergency he doesn't believe it would be, however, Peter advised that he would follow up to clarify. **Question: If you are coming southbound from Brisbane and you want to get to Bangalow, it appears there is no way to access Bangalow from the**	

	new highway? Peter Borrelli explained that vehicles will need to get off the highway at the Ewingsdale interchange and use the old highway to get to Bangalow. **Comment: In regard to the Ewingsdale interchange — how long have you been working on this plan? St Helena hill is the highest land [elevation] in the shire and there are accidents there all the time. The intersection at the top of the hill is really dangerous. If the road went further south, near Newrybar and Brooklet, it would be better. Do the people of Bangalow know that traffic will be coming into Bangalow?** Peter Borrelli explained that if you are coming from the north and travelling south over the top of St Helena hill, there will be no change to the traffic arrangement. Motorists will only get off at the Ewingsdale interchange if they want to travel to Byron Bay or Bangalow. There will be a significant reduction in [through] traffic going over St Helena hill. **Question: So all the traffic going to Bangalow and Lismore will be using the Ewingsdale interchange?** Peter Borrelli explained that with the construction of the new Pacific Highway and the tunnel through St Helena hill, it will be easier for motorists to stay on the upgraded Pacific Highway. Signposting for Lismore will advise motorists to stay on the Pacific Highway until the Bruxner Highway, south of Ballina. **Comment: It just doesn't sit right with me.** **Question: Do you have a time saving estimate for traffic using the new Pacific Highway and Bruxner Highway to access Lismore as opposed to going over St Helena and into Bangalow and Lismore? Will the old section of the highway have a reduced speed limit?** Peter Borrelli explained that community feedback indicated people want to stay on the highway. There are fuel savings with doing this and it is a smoother, flatter grade and is more efficient for heavy vehicles. The exact time saving isn't certain at this stage. **Comment: It is a psychological thing. When you are going 100km/h you will want to keep going at that speed and hence will stay on the highway.** *End of questions or comments for session 2*	
	Environment update David Packer explained that the Construction Environment Management Plan (CEMP) and all related sub plans will be submitted to RMS for approval by end May. David also advised that the Bangalow site compound assessment has been approved by Department of Planning and Infrastructure and construction of the compound will commence shortly. **Questions and comments — 23 May (session 1)** *No questions or comments for session 1.*	DP

	Questions and comments — 23 May (session 2) *No questions or comments for session 2.*	
	Construction update — general David Packer provided an update on the planned construction activities over the next three months, including: - • Property relocation / demolition works; • Site compound establishment (Bangalow) to commence this week; • Boundary fence installation; • Property adjustment works; • Service relocation works; • Traffic management implementation; and • Main construction works currently targeted to commence in mid July. **Questions and comments — 23 May (session 1)** *No questions and comments for session 1.* **Questions and comments — 23 May (session 2)** **Question: Where are you going to put the batch plants?** David Packer explained that the project team is still working through the batch plant locations. We have recently awarded a contract for the supply of offsite concrete to Holcim (Australia) Pty Ltd (local plants available in the area including Ewingsdale Road). There are two types of batch plants, one is a wet mix batch plant and the other is a dry mix batch plant for bridges and drainage works, for example. As a project, we have arranged for structural concrete to come from offsite. The wet mix batch plant will be used for paving operations, however, paving won't be commencing until approximately April - June 2013, depending on progress and the weather. The project team is working through quarry suppliers at the moment and pursuing a number of options and we will have further clarification about the batch plants in the near future. **Q: What happened to the batch plant at Ross Lane that was used for the Ballina bypass?** David Packer explained that it has been removed by the Ballina Bypass Alliance and the equipment probably taken to another project. *End of questions and comments for session 2.*	DP
	Bangalow compound site establishment David Packer advised that the site establishment for the Bangalow compound will commence later this week and provided details about facilities within the main project compound, including: - • Project construction office; • RMS office;	DP

- Community information centre;
- Vehicle parking;
- Workers' amenities (lunch rooms, toilet blocks, change rooms);
- Materials storage / laydown area;
- Workshop;
- Geotechnical testing laboratories.

Questions and comments – 23 May (session 1)

Question: I'm concerned about the work that will go on in the workshop at the Bangalow site compound? How much and what type of work will be undertaken?

David Packer advised that there are two ways to run a workshop; you can either have a large or minor workshop facility. We have a minor facility at the Bangalow site compound. Major plant will be serviced in designated areas on the project and some will be moved off site for servicing. The Bangalow site compound will have small shipping containers for the workshop involving only minor works.

Question: The car parking areas at the Bangalow compound are quite significant. I'm concerned about street lighting, and illumination — what is the general usage of the compound? Where the work is restricted to construction hours, will the compound also be restricted to those hours?

David Packer explained that the project team can work outside of construction hours, as long as the work is inaudible. There is no intention to put major lighting up at the compound, however, if any lighting shines into nearby properties please let us know and we can rectify that very quickly.

Peter Borrelli added that the workshops won't operate after hours. It is predominantly an office environment with staff in light vehicles accessing the compound.

Question: What about the compound at Ewingsdale?

Peter Borrelli explained that with the Bangalow Compound all approved, the compound at Ewingsdale won't be as substantial as the main compound at Bangalow.

Question: That hill at the Bangalow compound site has quite a slope on it. How far up the hill are you going or are you cutting into the hill?

David Packer explained that we are looking to minimise earthworks as much as possible. The storage area at the bottom is at the flattest area and the storage area at the top of the hill may not be used straight away. It was part of the approval of the site as a contingency and we'll only construct if we need to, later on.

Question: What are the plans for rehabilitation of the Bangalow compound at the end of the project?

David Packer explained that the intent is to re-establish the site to its original

	condition at the completion of the works. We'll keep the topsoil and put it back after project completion and revegetate to restore it to grazing land. *End of questions or comments for session 1.* **Questions and comments – 23 May (session 2).** *No questions and comments for session 2.*	
	St Helena tunnel construction David Packer, Mark Dowell and John Heilig presented the St Helena tunnel construction presentation and provided an overview of the tunnel, including: - • Design and benefits; • Blasting methodology; • Potential environmental impacts, including vibration and airblast overpressure; • Types of controlled blasting (open cut and tunnel); • What to expect; • Mitigation strategies; • Vibration measurement; • Monitoring; and • Proposed changes (blasting hours / vibration / airblast limits) — need / impacts / benefits. **Questions and comments – 23 May (session 1)** **Question: Is the tunnel going to have three lanes in each direction?** David Packer explained that the tunnel has been designed for three lanes [in both tunnels] as it is a tanked design and extra lanes can't be added in the future. Peter Borelli added that the third southbound lane will operate immediately as a climbing lane, and the third northbound lane will be built as a shoulder that can be opened up as an additional lane in the future when traffic needs require it. **Comment: That particular area around the St Helena tunnel is a grazing area and will be a challenge from a landscaping point of view.** Kevin Sweeney explained the aim on this project is to re-introduce native species. What you see now is pasture land in that area, however, when the project is finished it will be a lowland rainforest with native species. **Question: In the event that one of the tunnels is closed for maintenance, is it possible to have a crossover to access both sides?** Peter Borrelli confirmed that there are crossover locations within the tunnel that will be used for pedestrian access only in an emergency. In a major emergency the old highway would most likely be used as a detour with traffic diverted at Ewingsdale and Bangalow. There are also median cross-over's either side of the tunnel for emergency services access. **Question: RMS estimates that there will be more traffic going over St Helena hill on the old highway. Is there any funding to cater for an upgrade of St Helena hill?**	DP, MD & JH

	Peter Borrelli explained that he is not aware of figures that show more traffic will use the old highway. Once the new highway opens and if traffic had to be switched back onto the old highway due to a significant incident or some planned activity in the tunnel, the volume of traffic on the old Pacific Highway would be similar to current volumes on the existing Pacific Highway and this would only generally be for a short period of time. **Question: Is it similar type of rock in the tunnel that is shown in the videos in the presentation tonight?** John Heilig confirmed that it is a similar type of rock. **Question: What distance are you talking about from the blast area at the St Helena tunnel that the effects would be noticed?** John Heilig explained that somebody within 50m to 100m would perceive it. The scale of blasting would be adjusted to meet approved limits at the nearest sensitive receiver. The vibration limits are always worked out to the nearest sensitive receiver. **Question: How does blasting compare to the noise of a B-double truck?** John Heilig explained that a B-double truck operates at a very different frequency, and so the two are very different. **Question: I'm wondering why you decided to start from the southern side of the tunnel and how you are going to gain access to the tunnel given that there is no current road access?** Mark Dowell explained that the project team looked at both tunnel portals to determine access; however, to the north there is a 40 metre fill area which would need to be constructed first and hence would make the access less practical. David Packer added that originally at tender time, the project team looked at starting the tunnel from the northern side, however, purely for safety reasons, we made a call to commence operations from the southern side. Access to the southern portal will be from St Helena Road initially and then once the new highway meets up with the southern portal, access will be from the site to the southern tunnel portal. **Question: Will the two tunnels be connected internally?** Mark Dowell explained that there are three pedestrian cross passages that meet up inside the tunnel. These are only for emergencies and all doors will be alarmed and monitored by CCTV. **Question: There is a section of the works shown in the presentation where it says 24 hour construction? Are you intending to work 24 hours a day in the tunnel?** David Packer explained work would occur inside the tunnel 24 hours a day within a fully lined acoustic structure, 40m below ground and behind a noise shed at the entrance to the tunnel.	

	The concrete agitators will come in during the day and the concrete is 'put to sleep' for a period of time and then re-activated to spray through shotcrete rigs during the night shift. It is quite common for tunnelling operations to be carried out in 24 hour cycles. Mark Dowell added that night works will be inaudible and there will be no blasting during nightshifts. **Question: How many months will it take to complete the tunnel?** David Packer explained that it will take around nine months just for the tunnel excavation works, however, the geology of the rock encountered will determine how fast the tunnelling can progress. There will be approximately two months exterior work at the beginning to create the vertical face of the portals during day shifts, before tunnelling can commence. **Question: I presume any spoil during the 24 hour work shift will be taken away during normal daylight hours?** David Packer explained that there needs to be a certain sizeable area inside the tunnel to store the spoil during nightshift and it will be removed during the day shift. He explained that it is fairly standard protocol on construction projects that you don't take deliveries in or out during nightshift. There is a lot of thought that goes into these operations to minimise impacts on local residents. **Question: Where will the spoil go and how far will it be taken?** David Packer explained that the project team is still working through that at the moment. It depends on the chemical composition of rock as to where it will go, because the rock will be re-used in different areas of the project. David Packer advised that there is not enough rock in the local quarries to supply the amount of rock that the project needs. The rock will be moved out of the tunnel to local stockpile areas and used for a number of different operations on the project. We're still finalising the crushing locations for the project. **Question: Couldn't the need for extended blasting hours or increased blasting vibration limits for the St Helena tunnel have been anticipated at the Environmental Assessment stage of the project? Why would something like this be introduced after the approvals are in place?** David Packer explained that the Conditions of Approval are fairly standard across all projects. It is accepted practice that during detailed design, the project team submits a modification report and the onus is on us to demonstrate the benefits of such a proposed change. **Question: So you are consulting with the community about this?** "Yes", explained David Packer, but the revised blasting hours would only be for the St Helena tunnel, not across the whole project. **Question: If that approval didn't come from the community, would you still seek the approval from the authorities?** David Packer explained that at the moment we are consulting with people in the	

	St Helena area to explain the proposal, the impacts and the benefits. The record of the community consultation and feedback will be submitted with the application to the Department of Planning and Infrastructure. We will continue consultation with the community about these potential changes. David also explained that the onus is definitely on the project team to demonstrate to the department that there are benefits to the community and every application is considered on a case by case basis. Peter Borrelli added that since the early stages of the project and the Environmental Assessment, detailed geotechnical investigation has been undertaken that provides more detailed information. The general blasting conditions are based on traditional highway blasting conditions. It's about delivering the job with substantially reduced impacts to the community, and doing so on a greater level of data and design. Dave Packer added that standard blasting hours are based on reducing impacts on traffic and residents in built up areas, but we don't have these issues in the tunnel. Mark Dowell explained that the proposal to increase blasting hours is only for the St Helena tunnel, not for the rest of the project. **Question: What about rock hammering associated with the tunnel, tunnel control centre and tunnel portals and the sound issues with this? How much of the rock hammering can be heard at the surface and will it affect the Ewingsdale residential area?** David Packer said we understand how offensive rock hammering can be and we can be smart about the way we work. John Heilig added that rock hammering can be perceived in two ways — you can feel it through vibration and you can hear it through generated noise. When Heilig and Partners worked on the Herston Hospital redevelopment in Brisbane where there were five rock hammers operating in between five wards all day long, after months of rock hammering everyone involved was convinced that drill and blast was the best option. We had a blasting approval limit of 25mm/s and that was in close proximity to wards, patients, medical equipment and operating theatres. We have an approved blasting limit of 5mm/s on this project. **Question: I wasn't questioning if blasting is the preferred option. I'm asking what is the effect of the rock hammering that you *will* have to undertake at the tunnel portals and tunnel control centre? We haven't seen any noise contours to show how far that rock hammering noise will spread.** David Packer explained that we will have rock hammering across the whole job, and one of our strategies will be to mitigate it as much as possible. We will need to cover the rest of the project at a future community information session. **Comment: I am also thinking of the impact on Arundel hill and Bangalow.**	

	Question: Is the project fully funded and what is the completion date for the project? Peter Borrelli explained that the project is fully funded with a completion date target of mid 2014 (weather permitting). *End of questions and comments for session 1.* **Questions and comments – 23 May (session 2).** **Question: Who actually gives the final approval for the application for increased blasting limits?** David Packer explained that the project is subject to the Ministers Conditions of Approval and the Department of Planning and Infrastructure (DoPI) oversees the conditions. The application will be submitted to DoPI asking them to approve the changes to the approved conditions for this project. **Question: Once you are in the tunnel, from a risk management point of view, what is the biggest risk?** David Packer explained that working in tunnels is a high risk activity. There are two main risks — securing the exposed rock roof, so for safety reasons, no one is permitted to work under an unsupported roof. Secondly, in any enclosed space, there is a danger between workers and plant. We have systems in place to reduce the risk. For example, trucks and machines such as concrete agitators have dual cabins so operators don't need to reverse in the dark tunnel. **Question: What is the gradient inside the tunnel?** Peter Borrelli explained that it is at 4.5%. *No questions and comments for session 2.*	
	Where to from here? Susan Scott explained that there will be ongoing meetings with residents within 500 metres radius of the tunnel to distribute letters outlining the proposed changes and then a submission to Department of Planning and Infrastructure seeking approval for proposed changes. **Questions and comments – 23 May (session 1).** *No questions and comments for session 1.* **Questions and comments – 23 May (session 2).** **Comment: Thank you for an excellent presentation.** *End of questions and comments for session 2.*	SS
6	**Conclusion** Susan Scott thanked everyone for their attendance and input and invited them to remain for discussion with the project team. **Session 1:** Formal presentations finished at approximately 2:48pm; discussion	

	groups concluded at approximately 3:15pm. **Session 2:** Formal presentations finished at approximately 7:40pm; discussion groups concluded at approximately 7:55pm. ** Copy of PowerPoint presentation and video from session one are available on the RMS website.	