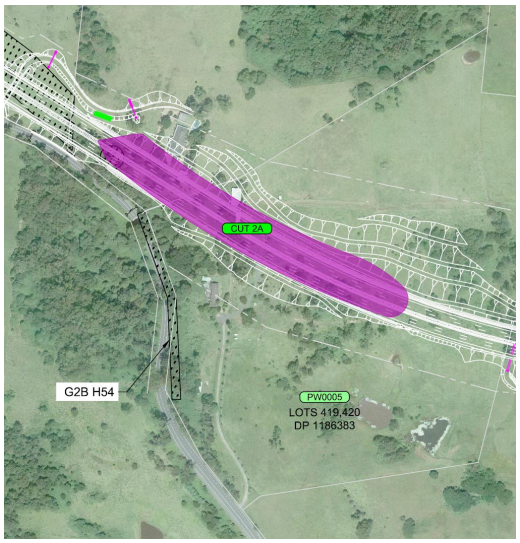
HERITAGE IMPACT ASSESSMENT

PROPOSED BLASTING CLOSE TO HERITAGE LISTED DRY STONE WALL (G2B H54) ON TOOLIJOOA RIDGE FOXGROUND AND BERRY BYPASS



Prepared for Fulton Hogan Construction

by

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1.0 Introduction

1.1 Background

An environmental assessment (EA) for the Foxground and Berry Bypass (the Project) was completed in November 2012. The EA identified a range of environmental, social and planning issues associated with the construction and operation of the Foxground and Berry Bypass and proposed measures to mitigate or manage any adverse impacts.

In June 2014, Fulton Hogan Construction (FHC) was awarded the contract for the design and construction of the Foxground and Berry Bypass. The Project consists of 11.6km of dual carriageway highway from Toolijooa Road to Kangaroo Valley Road south of Berry. During construction, FHC will require the use of explosives for excavation (blasting) to form the new road alignment through Toolijooa Ridge and the new interchange at Austral Park Road.

The Project EA identified a remnant 19th century dry stone wall (G2B H54), which is in the vicinity of a proposed blasting location. It is located on Toolijooa Ridge and is approximately 230m in length. The location of the wall is shown in Figure 1.

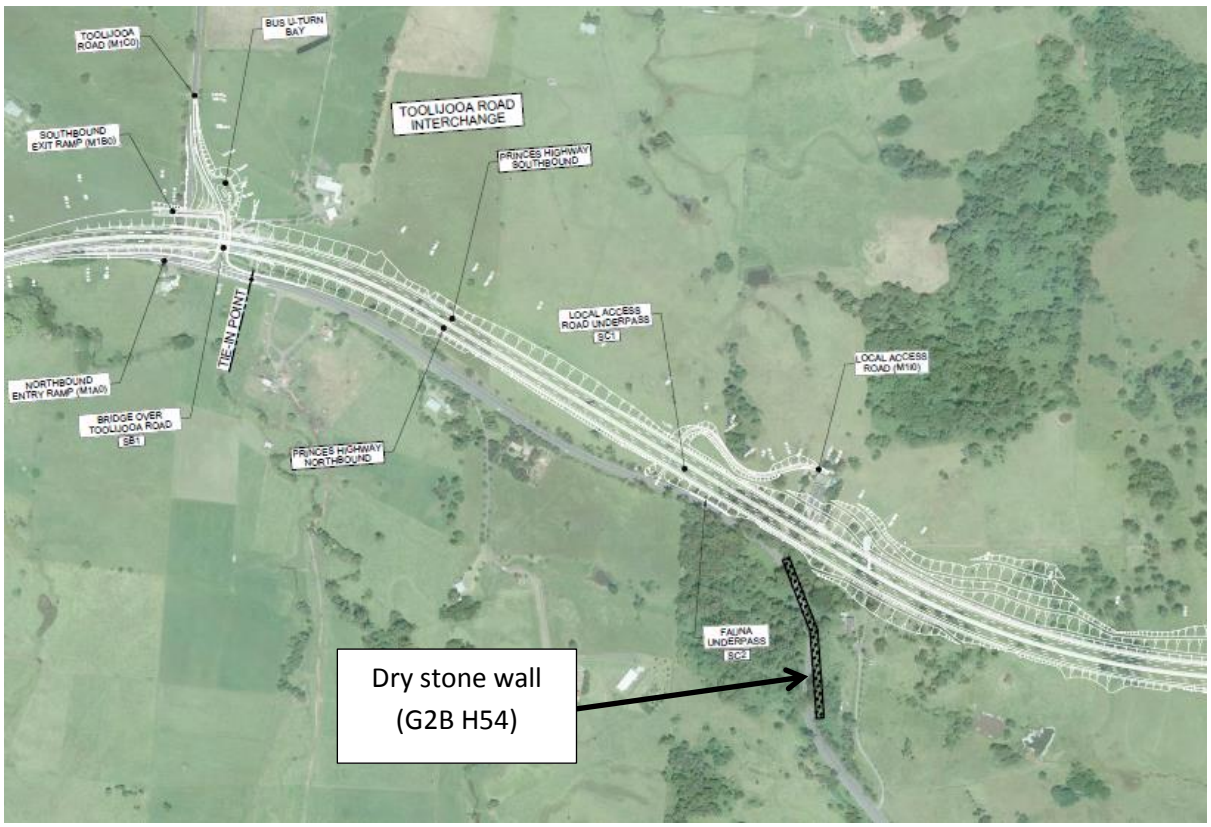


Figure 1 Dry stone wall location

1.2 Purpose of this assessment

Blasting criteria for the Project are specified within the Minister's Conditions of Approval (CoA) C10 and C11 as outlined below:

<table>
<tr><td>C10.</td><td>The Proponent shall ensure that airblast overpressure generated by blasting associated with the project does not exceed the criteria specified in Table 1 when measured at the most affected residence or other sensitive receiver.
Table 1 - Airblast overpressure criteria
<table>
<tr><td>Airblast overpressure (dB(Lin Peak))</td><td>Allowable exceedance</td></tr>
<tr><td>115</td><td>5% of total number of blasts over a 12month period</td></tr>
<tr><td>120</td><td>0%</td></tr>
</table></td></tr>
<tr><td>C11.</td><td>The Proponent shall ensure that ground vibration generated by blasting associated with the project does not exceed the criteria specified in Table 2 when measured at the most affected residence or other sensitive receiver.
Table 2 -Peak particle velocity criteria
<table>
<tr><td>Receiver</td><td>Peak particle velocity (mm/s)</td><td>Allowable exceedance</td></tr>
<tr><td rowspan="2">Residence on privately owned land</td><td>5</td><td>5% of total number of blasts over a 12 month period</td></tr>
<tr><td>10</td><td>0%</td></tr>
<tr><td>Non-Aboriginal Heritage item</td><td>3</td><td>0%</td></tr>
</table></td></tr>
</table>

FHC proposes to increase blasting criteria for the Project to levels higher than those specified under Conditions C10 and C11 as follows:

- Maximum Peak Particle Velocity Vibration level of 25mm/s; and
- Maximum Air Overpressure level of 125dBL.

FHC engaged Mayne-Wilson & Associates to evaluate the heritage value of the dry stone wall and provide a specialist advice on the potential impact of the proposed increased blasting levels on the wall. The following background documents were reviewed as part of this assessment:

- Biosis, *Foxground and Berry Bypass Archival Report* (23 September 2014)
- Navin Officer Heritage Consultants, *Foxground and Berry bypass: Princes Highway Upgrade: Volume 2 – Appendix K: Technical paper: Non-Aboriginal (historic) heritage*, (November 2012)

1.3 Methodology

MWA undertook a brief historical overview of the presence and significance of dry stone walls generally in the district, and to place this particular wall (G2B H54) in that broader context. Having completed a heritage study of nearly all the dry stone walls in the Kiama Local Government Area (LGA) between 1998 and 2000 for Kiama Council, MWA had developed a thorough understanding of

the history and nature of their construction, so had a good basis for comparing the significance of this particular wall against all others. MWA then undertook a review of the existing Statement of Significance for this wall, bearing in mind the value of other walls in the area. An important part of the evaluation was the extent to which the wall conformed to the standard 'double-dyke' or A-frame style of construction used throughout the area, and also the condition in which it was now after 140-150 years since its construction. From photographs provided, it was evident that lack of adequate maintenance and clearing of invasive vegetation by the landholder had already loosened the wall by reducing its compactive strength.

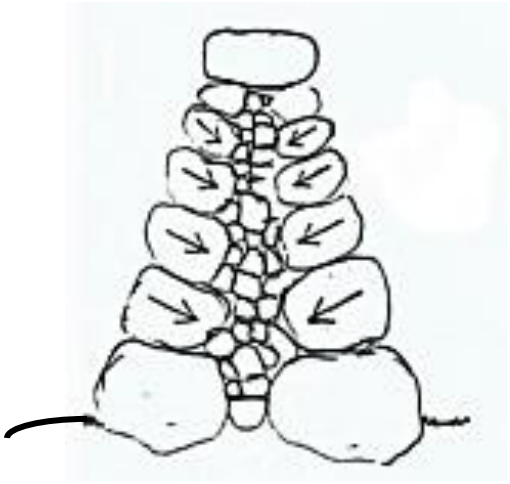
2.0 History of dry stone walls in the Kiama LGA

The construction of dry stone walls in the Kiama district became common once the initial, large land grants began to be subdivided, beginning in the late 1830s and increasing greatly in the 1840s to the 1860s. Many of those who acquired the new, modest sized lots had been tenant farmers, and others were new immigrants. Initially, the land had to be cleared before crops were grown, which at first were wheat and peas. Not only did the timber have to be cut, but the ground cleared of the latite rocks deposited from ancient volcanic explosion from nearby Mt Saddleback. Millenia of weathering had exposed and somewhat smoothed their edges, and many were covered in lichen. Tilling the land to grow wheat further exposed further quantities of rock below the surface. While at first the rocks were stacked into heaps, it was not long before they were used to build fencing, as the timber had been removed and sold off decades earlier. Fencing became urgent when rust so spoiled the wheat crops that farmers turned to dairying, and cows needed to be kept in. Stone walls were also needed for defining boundaries around and between newly subdivided allotments and along roadways, as well as for animal pens, and retaining walls.

Thomas Newing, a ploughman from Kent, who arrived in the Kiama area in 1857 soon emerged as the most skilled and dedicated builder of dry stone walls in the district. According to local historian, Robyn Florance, Newing built his first stone fence when clearing a bit of stony ground for a local farmer at Foxground in 1857. It is said that he obtained advice on the most appropriate style of construction from Mr W. Cook, of Longbrush. The fence proved such a success that the landholder had him build another. Seeing a good opening in this line, Newing was determined to master the secrets of this trade, and possibly by using tips from other immigrants, and learning from trial and error, he soon became an expert waller. Having started his wall building at Foxground, it cannot be entirely ruled out that Newing may have had some hand in the construction of this wall.

3.0 Typical walls of the Kiama district

Various construction techniques in the district had been tried earlier by convicts, but the 'double-dyke' or two skinned dry stone wall, which resembles the capital letter A – hence A-frame - was found to be the most appropriate for the type of rocks present in the district. Examples of this style are shown in Figure 2 below.



A well (re)constructed, A-Frame wall near Kiama

Figure 2 'Double-dyke' or two skinned dry stone wall

Points to note about this style are:

- The base is usually about 2/3 of the height (which seldom exceeds 2 metres)
- Large, well-set foundation stones
- Face-stones on two skins, getting smaller toward the top, and tilting down and inwards
- Tightly compacted rubble fill in the centre, and
- Large flat coping stones on the top to press it all together.

4.0 Significance assessment

The original assessment of the wall in the EA was undertaken against State Heritage Inventory (SHI) criteria. MWA has assessed the wall against the same criteria and can provide the following alternative interpretation of its significance:

Criterion (a): importance in the course, or pattern, of NSW's or the local area's cultural or natural history

The dry stone wall at G2B H54 is a typical example of 'double-dyke' walls used as boundary fences in the local area, but were functional and responsive elements rather than determining ones in the course of the local area's history, and as such do not cross the threshold into significance.

Criterion (b): strong or special association with the life or works of a person, or group of persons, of importance in the cultural or natural history of NSW or the local area; [associational value]

It has not yet been proven whether this wall was built by the master waller, Thomas Newing, although that cannot be excluded, as he is said to have built his first few walls in Foxground. However, even if so, it could be an early example, and is not sufficiently remarkable or intact for it to be reliably attributed to him. It does therefore not fulfil this criterion.

Criterion (c): importance in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW or the local area; [aesthetic value]

The wall does demonstrate, to a moderate degree, the technical achievement of a competent local waller, but it is unremarkable aesthetically. This is not assisted by it being heavily overgrown by vegetation. It does not provide a strong sculptural or visual presence in the local landscape, nor have landmark character. It only just satisfies this criterion for significance.

Criterion (d): strong or special association with a particular community or cultural group in NSW or the local area for social, cultural or spiritual reasons; [social value]

There are no known strong of special community associations with dry stone wall G2B H54, so it does not satisfy this criterion.

Criterion (e): potential to yield information that will contribute to an understanding of NSW's or the local area's cultural or natural history; [scientific value]

This wall is entirely typical of many dry stone walls within the Kiama-Foxground district and is unlikely to yield information not readily available elsewhere within that area.

Criterion (f): possession of uncommon, rare or endangered aspects of the cultural or natural history of the local area;[rarity value]

This dry stone wall does not possess uncommon or rare aspects of the local history, although there are few as far south as Toolijooa Ridge. As it has not been maintained, and is increasingly engulfed by surrounding vegetation, its structure is slowly loosening and some sectors are falling apart. To that extent it can be said to be endangered, but there are scores of other such dry stone walls in the district in much better condition. It does not therefore satisfy that criterion.

Criterion (g): importance in demonstrating the principal characteristics of a class of NSW's or the local area's cultural or natural places or environments; [representative value]

The dry stone wall at G2B H54 has been constructed using the 'double' dyke technique, which is characteristic of the Kiama and Foxground walls. It is also of moderate local importance, and in combination can be said to satisfy this criterion.

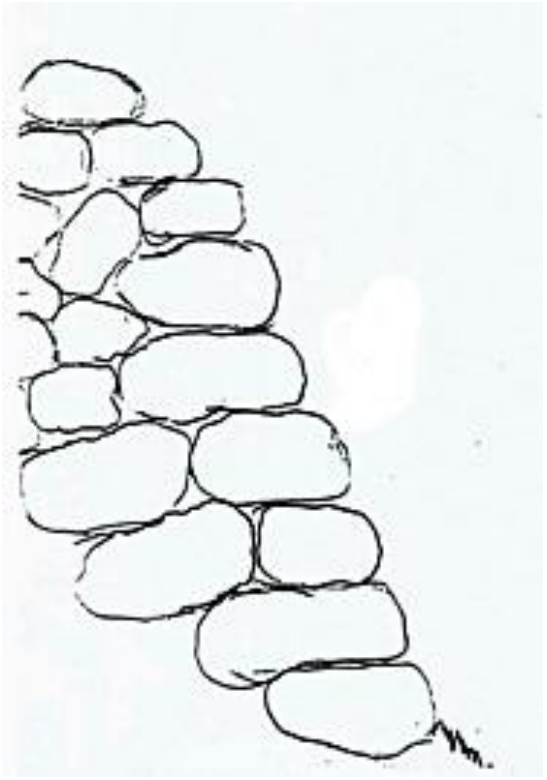
Integrity/ Intactness

The wall has varying degrees of intactness, ranging from about 85 per cent to about 30 per cent, but is deteriorating through neglect and overgrowing vegetation. Even so, it retains its integrity essentially as a long, boundary – and part retaining - wall. The images in Figure 3 below demonstrate the shape and current condition of the wall.

These show use of the A frame technique, but some loss of coping stones. It is reasonably intact

This shows poorly selected and fitted basaltic stones, resulting in some collapse, to which adjacent vegetation is contributing

These basaltic rocks are harder to fit than weathered latite and have not been well graded; nor do they tilt inwards.



This is the recommended technique for walls along a steep slope, with stepped and overlapped large foundation and coping stones, all leaning a little back into the slope.

This sector of the wall generally follows the principles described in the sketch opposite, serving both as a boundary and retaining wall, although soil may have washed down from upslope and accumulated, adding to pressure.

Figure 3 Images showing the shape and current condition of the dry stone wall

As can be seen from these images, the wall is already in a partially dilapidated condition with only a few small sections retaining its original A-frame construction. This is due to a number of factors:

- Loss of some or a lot of the coping stones which were placed on top of the original wall to provide the pressure that was intended to hold the two 'skins' (double dyke) together
- Intrusive vegetation, particularly lantana, the branches of which have grown between both the side stones and the internal rubble stones and through swelling, loosening their binding
- Storms and heavy rainfall causing the underlying ground to become temporarily soggy and allow some shifting of the heavy blocks at the base, and consequently up through the skins of the wall.
- Neglect of the landholder/s to maintain the wall, especially the coping stones, and the invasive vegetation
- Only moderate skill sets by the waller himself; and
- The awkward shape of some the basaltic rocks which made tight fitting together (cohesion) quite difficult.

Level of Significance

Dry stone wall G2B H54 satisfies the criteria to be determined as having moderate local significance.

5.0 Assessment of impact

Figure 4 indicates the section of the Princes Highway that is to be cut, by means of blasting and hammering (shaded purple), and the relationship of the dry stone wall G2B H54 to it. The wall is at about 45 degrees from the proposed blasting area, and the closest part of the wall is 18 metres away from it. The wall then veers southward along a country road to an angle of about 60 degrees.

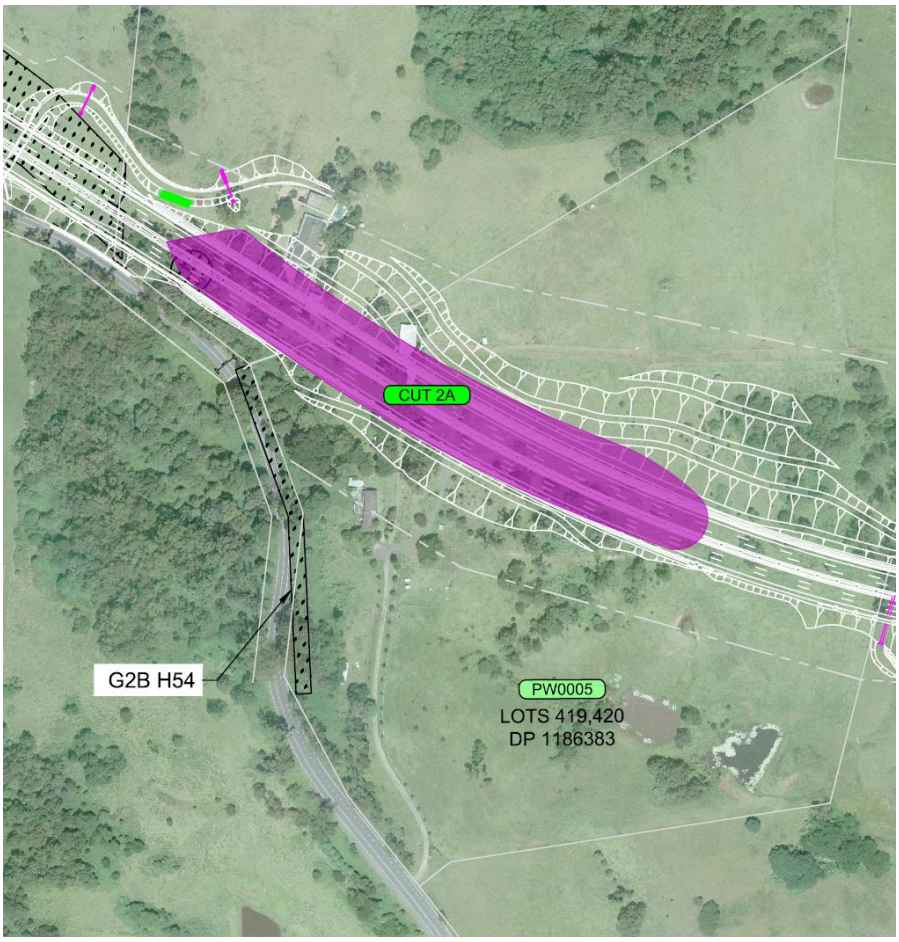


Figure 4 Dry stone wall location in relation to blasting area

It appears only a small, partially dilapidated portion of the wall will be affected by blasting operations. MWA understand that a structural engineer's report has been prepared for the wall and that it indicates low probability of displacement of the stones or collapse of the wall as the result of increased blasting criteria.

Given the existing condition of wall and its very moderate degree of local significance, it is MWA's opinion that there would be no serious loss of heritage significance in an unlikely scenario of a partial collapse of the wall or displacement of the stones.

6.0 Conclusions and Recommendations

MWA concludes that, given the existing dilapidated condition of the wall and its very moderate degree of local significance, there would be no serious loss of heritage significance as the result of increased blasting criteria. Furthermore, in an unlikely event of stone displacement or partial collapse it can be readily rebuilt to its pre-blasting condition.

MWA recommends that the following mitigation measures be employed during blasting operations:

- Undertake trial blasts to determine future vibration levels near the wall
- Undertake detailed photographic recording of the current condition of the wall in the area likely to be affected by increased blasting criteria, and
- Undertake an inspection of the affected section of the wall before and after each blast to monitor the effects of blasting on the wall.