Summary report: Trial of sawn bluestone pitchers for laneway construction

Purpose of trial

Moreland has a large volume of bluestone lanes that have been constructed using the traditional un-bound method. This trial explores an innovation that aims to address the challenges and issues described below, while relating some of the positives. Note, the list below isn't a definitive assessment of bluestone construction, rather, it is a subset of particular issues that are explored in this trial.

Positives:

- Excellent wearing course of bluestone
- Retention of visual character

Challenges or deficiencies.

- Shortage of skills using un-bound techniques
- Weight of individual pitchers, presenting manual handling challenges for construction
- Subsidence in the clay base over time
- Rough and uneven finished surface of chiselled bluestone provides a poor pedestrian surface

Description of trial

Bluestone pitchers were saw-cut into 3 sections, providing 3 pavers. Two of the pavers had one rough face and one smooth face. The third paver had two smooth faces. For all 3 pavers, their perimeter, or edge retained the irregular bluestone pitcher shape.

These cut stones could then be laid as pavers on a concrete base.

The hypothesis being tested in this trial comprises a number of points:

- Availability it appropriate skills. Labour for laying pavers is easier to source than for laying bluestone pitchers
- Cost. It is cheaper to lay sawn bluestone pitchers, than full bluestone pitchers
- Retention of visual character.
- Performance of road base.
- Options for improved pedestrian access.

Methodology

A 15m long section of lane off Younger Street, to the rear of 11 – 13 Bell Street, Coburg was selected for the trial. The lane was reconstructed using 3 variations:

1. Entire width was laid smooth side up
2. Three central stones were laid smooth side up and the rest rough side up
3. Entire width was laid rough side up

All sections were laid on a concrete base.

All sections were laid in the traditional pattern (central drainage course, with "raking stretcher bond" pattern either side).

All sections were mortared as per Council's current specification for bluestone reconstruction.

Trial findings

CUTTING BLUESTONES

Prior to construction, Council needed to cut stones to the required specification.

One supplier was found that could meet Council's specification. They were located in Port Fairy and quoted $17 per cut. Transport back to Melbourne was included in this price, but Council would be required to transport the stones to the contractor's facility. This option was deemed cost prohibitive.

A mechanical engineering contractor was then engaged to design a machine to cut stones to Council specification. The expected cost of this option was $5 to $6 per cut. A customised saw cutting machine and paletting system was developed, and cutting trial implemented.

We had hoped to get 3 pavers from each stone, with an approximate thicknesses of 65mm – 75mm. We found that, due to the irregular shape of the bluestones, the best consistent result was 2 pavers (being the outer cuts), comprising specified thickness, and one smooth/ one rough face. The middle cut had two smooth faces, but varied in thickness. Also, to keep the two outer pavers to specification in terms of thickness, the inner paver's faces were often not parallel.

Below is an example of an outer section (one rough face, one smooth face):

TRIAL AREA ONE

In Trial Area 1 all pavers were laid smooth side up. The finished product is shown below.

Observations:

- As the pavers retained the irregular perimeter, the smooth surface isn't that noticeable from a distance (eg. if driving past a lane)
- The smooth surface provides an improved pedestrian surface. The grouting and irregular perimeter of each paver would still present challenges for some higher needs traffic.
- The smoother surface makes it easier for cars to drive a bit quicker, which is not considered a good outcome.

Conclusion:

Use of the smooth face of the bluestone presents some great opportunities, with minimal change to the appearance of the lane. However, constructing the entire width of the lane in this manner is not considered the best outcome. Option two is considered more favourable.

TRIAL AREA TWO

In Trial Area Two all pavers were laid rough side up, with the central 3 pavers laid smooth side up. The finished product is shown below.

Observations:

- There is an initial colour difference (as can be seen in the photo) between the rough, aged surface, and the fresh saw cut smooth surface. This will dull and match over time, but is noticeable upon construction.
- The central smoothed paved section provides a good surface for pedestrians, bikes, and other similar traffic.
- As per option 1 above, the grouting and irregular perimeter of each paver would still present challenges for some higher needs traffic.
- The central smoothed paved section provides an improved drainage surface, minimising water pooling.

Conclusion:

Use of the smooth face of the bluestone presents some great opportunities, with minimal change to the appearance of the lane. Creating a smoother section as per this trial would be recommended were:

- There is a desire to improve pedestrian use of a lane
- There is a desire to improve surface drainage

TRIAL AREA THREE

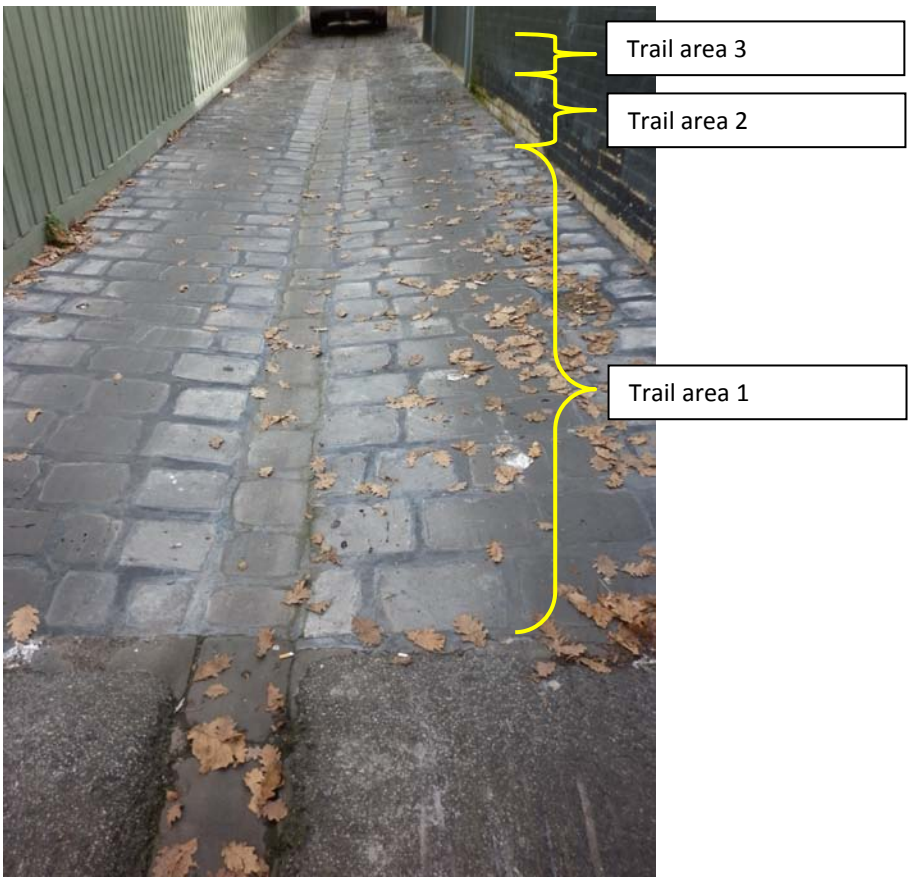
In Trial Area 3 all pavers were laid rough side up. The finished product is shown below.

Observations:

- The mortar colour used in this is trial was not to specification
- All other aspects of this trail generated a result that is consistent with Council's specification for construction using full bluestone pitchers.

Conclusions

Below is a photo of the entire trial area.



Observations:

- The pavers were easier to handle and quicker to lay that full sized bluestones. Also, less excavation is required that with full bluestones, meaning less time and less waste product.
- It would be possible to lay the pavers closer together than full sized stones, without specialist labour. This means an appearance that is similar to traditional un-bound methods could be achieved.
- There is no visual difference between a full bluestone, and a cut bluestone paver (laid rough side up) once the construction is complete.
- The performance of the road base from an engineering perspective can only be measured over time. However observations from this trial are that the construction could easily be implemented to specification. Also, as the pavers are narrower than full stone, there is the option of thickening the sub base, using the same amount of excavation in Council's current specification for full pitchers.

Recommendations

If construction on a concrete base is recommended for future treatments, the use of cut bluestone pavers is an option that would be favourable it many circumstances. The following are recommended if this method is o be further utilised:

- Council develop two standard specifications :
    - Full width laid rough side up
    - Central, three paver wide section, laid smooth side up.
- The specified gap between pavers be reduced from a maximum of 25mmm, to "touching at least one point".