

Introduction of Permanent Survey Mark Type 15 (SSM) Urban

Background

State Survey Marks (SSM's) have been in use in NSW for decades. They have formed an integral part of the NSW State Survey Control Network and assist in underpinning the NSW Cadastral Framework.

It is therefore vital that SSM's continue to be placed and subsequently protected throughout NSW to further develop the control network and maintain survey integrity respectively.

It recently became apparent from field operations, that a significant number of SSM's are not being installed in accordance with the Surveyor Generals Directions. In particular, the recessing of marks into the concrete substrate is either insufficient, or not happening at all. This renders the mark highly susceptible to damage in the longer term.

As a result, Land and Property Information (LPI) have recently reviewed the current approach to SSM's and investigated viable alternatives.



Example marks from, Queensland



REVIEW OF CURRENT APPROACH AND INVESTIGATION OF VIABLE ALTERNATIVES

Currently there are two types of SSM available for use by Surveyors. Both are traditional cast metal plaques, produced in a Sydney foundry. Over years of manufacture, the sand castings used to create the marks have worn significantly. This has caused the quality of the resulting marks to diminish.

An investigation into alternate forms of manufacture was carried out. Since the existing SSM's were designed and first produced, laser etching and CNC machining processes have become commonplace. Production of marks using modern technology has become more cost effective than traditional methods of manufacture such as sand casting.

When considering options for a new style of mark, it was imperative that the risks to the control network and the cadastre were considered and minimised. It was also important to ensure that any new style of mark provided as many benefits to stakeholders as possible.

LPI was confident that the current styles of SSM could be improved by:

- Reducing susceptibility to 'topping' or 'scalping' by machinery or other equipment;
- Lessening the time taken to install the marks;
- Minimising any potential slip or trip hazard;
- Reducing the number of mark styles, and
- Providing more options for the marks placement.

As part of the review, opinions of members of the profession, LPI staff and other regulatory authorities were sought, recorded and analysed.

An Invitation for Comment was released in August 2014 to members of both the Institution of Surveyors NSW (ISNSW)

and the Association of Public Authority Surveyors (APAS). Photographs of a mark currently being used in Queensland was included as an example of a mark worth considering (refer to images on page 24).

A total of 27 responses were received to the Invitation for Comment. Several surveyors mentioned other styles of marks, however no alternatives were offered that would meet the criteria LPI were looking for or that exceeded the performance of the example mark.

In summary:

- 17 respondents were supportive of adopting the example mark;
- 2 respondents were doubtful of the example mark;
- 1 respondent provided alternative solutions, and
- 7 respondents had not addressed the topic.

Given the positive response regarding the example mark, a full risk assessment and cost-benefit analysis was carried out, considered from the profession, industry and LPI perspectives.

LPI staff carried out internal testing of the example mark and concluded that it offered a better solution for immediate use than a Type 1 or 2 SSM in that there is no mark movement while the epoxy cures.

Following installation testing, the examples were removed by simulating intentional destruction and were surprisingly resilient to vandalism, particularly when fixed with epoxy.

Testing returned a significant cost savings per installation, mainly as a result of significantly faster installation time and cheaper production costs, as shown in the table below.

	Approx Install Time (mins)	Purchase Cost to Surveyors
Current SSM Types	20	\$17.50 inc GST
Example Mark	2	\$11.00 inc GST

OUTCOMES OF REVIEW PROCESS

The introduction of a new style of mark was recommended in the review.

The new 'Permanent Survey Mark Type 15 (SSM) Urban' (from here on referred to as the 'Urban SSM') comprises a 38mm 316 grade stainless steel disc and pin which can be installed in under two minutes and is ready for immediate use. The mark is similar to the style used in Queensland but has a machined centre point to aid set up with bipods and range poles.

The marks are customised for NSW and have unique numbering in line with current practices for existing SSM types. Refer to photographs right.



The new style will improve on the existing SSM types by:

- Decreasing susceptibility to 'scalping' due to its low profile;
- Significantly reducing the time taken to install the marks;
- Minimising any potential slip or trip hazard;
- Taking up less storage space and be easier to carry or transport;
- Being cheaper to produce, purchase and distribute;
- Reducing costs associated with SSM placement, and
- Providing more options for the marks placement due to the reduced size, such as in the face of walls etc. (with building owners permission).

The new Urban SSM was approved for use by the Surveyor General, Mr. Des Mooney on 10 March 2015.

INSTALLATION OF THE URBAN SSM

Equipment required for the installation of the Urban SSM includes:

- Personal protective equipment;
 - Good quality hammer drill;
 - **5mm** masonry drill bit;
 - Small claw hammer or similar;
 - Small brush;
 - Two part epoxy resin with appropriate Material Safety Data Sheet, and
 - Rag for cleaning up excess epoxy resin.
- The installation procedure is as follows:

- Ensure the area is clean and dry;
- Drill a hole in the desired location with a **5mm** masonry bit, to a minimum depth of **60mm** to allow for debris in the bottom of the hole (**Any other drill size or lesser hole depth will not result in a solid, stable mark**);
- Clean out the hole thoroughly;
- Place epoxy around the area where the disc will contact the concrete **and** down the drill hole;
- Set the mark into position with a small claw hammer, taking care to avoid bending the pin;
- Clean up any excess epoxy around the mark, and
- Prepare a sketch plan as per Surveyor Generals Direction No.2.

During the installation procedure, please ensure that you use appropriate personal protective equipment along with any applicable Material Safety Data Sheets.

MARK SPECIFICATIONS

Full specifications are found in Surveyor Generals Direction No.1 (also shown below).

PURCHASE OF MARK HARDWARE

The Urban SSM will be available from all LPI authorised mark issue distributors as well as LPI SCIMS Division in Sydney:

LPI SCIMS DIVISION

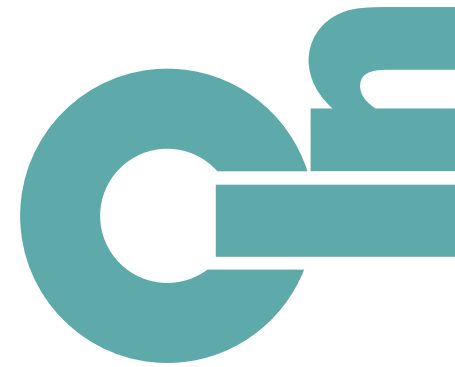
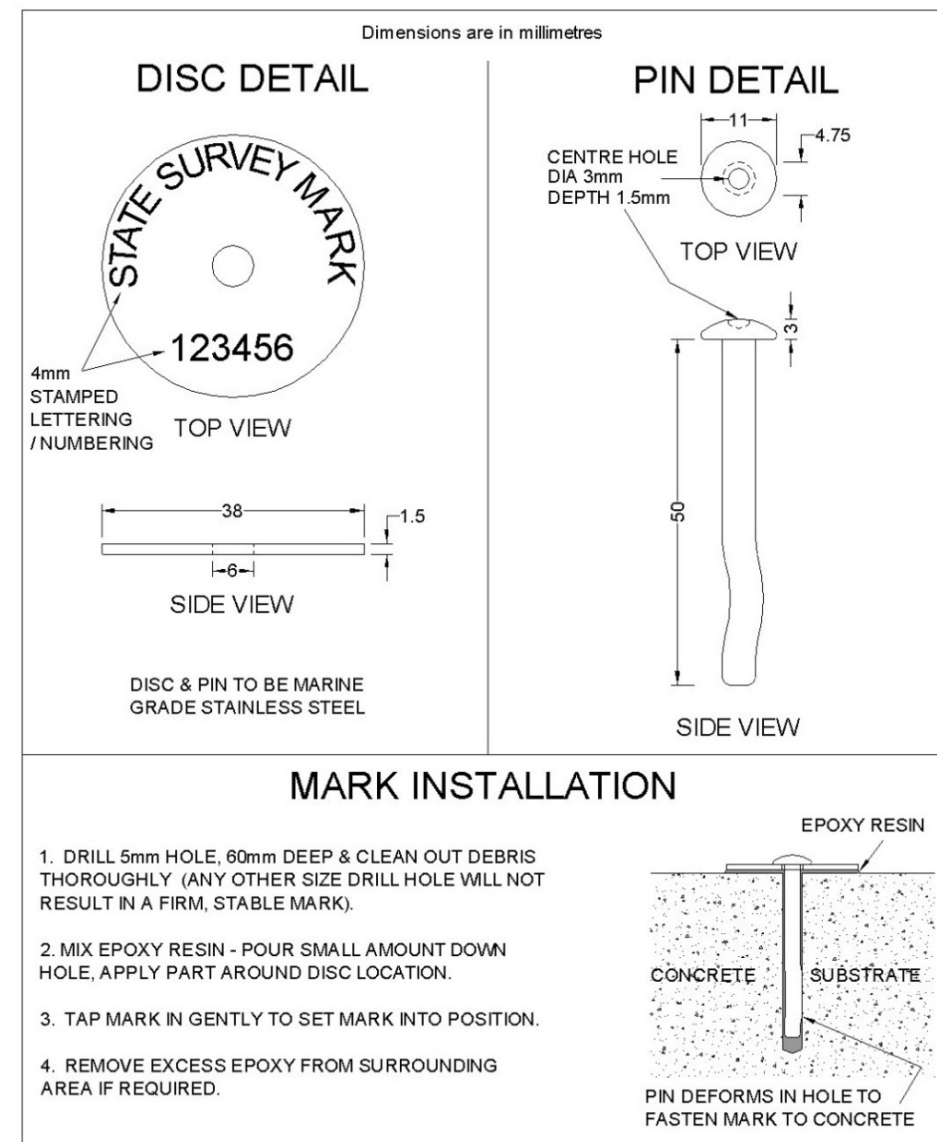
02 8258 7500
SCIMS@lpi.nsw.gov.au

FURTHER INFORMATION

For further information (other than mark orders) regarding the introduction of the Urban SSM please contact:

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Private James Nicholas Murray, pictured in his uniform

Gallipoli mapmaker: James Nicholas Murray's 'untold story' uncovered in Small Queensland town.

<http://www.abc.net.au/news/2015-01-26/anzac-james-nicholas-murrays-untold-story-discovered-in-emerald/6042422>



An Australian War Memorial photo of Russell's Top

“Turks give this place a great doing with shells and bombs. Several killed and wounded. Had I been in dugout I occupied a few days ago, after it was dinner time, I would have had my head blown off.”

Private James Nicholas Murray - diary entry from October 27, 1915



James Nicholas Murray's map of Russell's Top in Gallipoli