

# B11 Survey Marks Construction



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## B11 SURVEY MARKS CONSTRUCTION

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## 11.1 SURVEY INFRASTRUCTURE

### 11.1.1 WHAT IS SURVEY INFRASTRUCTURE?

Survey infrastructure includes a variety of structures, monuments, hardware and engraved markings located in the public domain (roads and footpaths), placed by Registered Land Surveyors for various purposes and as required by State Law.

They are generally known within the surveying profession as either:

- Permanent Survey Marks
- Cadastral Reference Marks.

### 11.1.2 TYPES OF SURVEY INFRASTRUCTURE

Permanent Survey Marks generally consist of a hardware fitting, set into a foundation, in one of the following forms (as prescribed in Schedule 4 of the *Surveying & Spatial Information Regulation 2017*):

- A uniquely numbered brass or stainless-steel disk, set into concrete in the kerb, gutter or footpath (Types 1, 2, 15 and 16 State Survey Marks (SSMs))
- A stainless-steel pin, lead plug or brass bolt, set into a concrete foundation under a steel cover box in the footpath or carriageway, together with a uniquely numbered plate affixed to the underside of the lid (Type 4 Urban (PM)).

The network made up of these items and their spatial positions make up the State Control Survey and also form the basis of the State's cadastral (property boundary and land titling) system, both of which are key elements of the State's infrastructure, supporting billions of dollars of investment, property rights and infrastructure projects.

Cadastral Reference Marks are generally less substantial than Permanent Survey Marks and may be found in one of several forms (as prescribed in Schedules 2 and 3 of the *Surveying & Spatial Information Regulation 2017*), including:

- A drill hole with or without a chiselled wing placed in a kerb, gutter, footpath or wall
- A non-corrodible nail with or without a chiselled wing placed in a kerb, gutter, footpath or wall
- A metal spike, galvanised iron pipe or reinforced concrete block placed below the natural surface (generally within 1m of a property boundary corner)
- A timber peg (usually placed at a boundary corner)
- Alignment pins or stones, set into the kerb, gutter or carriageway
- Any other approved mark, as outlined in the Regulations.

Cadastral Reference Marks support the State's cadastre (property boundary and land title framework) and provide legally traceable evidence of the position of property boundaries.

### 11.1.3 ACTS, REGULATIONS AND PENALTIES

All items of survey infrastructure (including Permanent Survey Marks and Cadastral Reference Marks) are protected under Section 24 of the [Surveying and Spatial Information Act 2002](#) and penalties of \$2,750 per mark may be levied for unlawful damage or destruction. In addition you may also be ordered to pay up to \$10,000 in compensation to the State for reinstatement costs and up to \$10,000 compensation to any other person towards loss or damage suffered as a consequence of the offence.

In addition to any penalty that may be imposed by the State, the City of Sydney may also levy a fee for recovery, repairs and/or replacement of destroyed marks in accordance with our [Revenue Policy](#).

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## 11.2 PROCEDURES FOR WORKING WITH SURVEY INFRASTRUCTURE

### 11.2.1 INVESTIGATION FOR SURVEY INFRASTRUCTURE

Early investigation for survey infrastructure is advised. If possible, the information should be available at the design stage of development to enable identification of possible conflicts and to prevent possible delays to the project and/or fines being imposed for illegal mark destruction.

At least four (4) weeks prior to the commencement of any works on site, the service provider must engage a Registered Surveyor to investigate the “works zone” (comprising the site itself and the adjoining public domain within five (5) metres of each side of the site frontages and all other areas where works are likely to be undertaken) for the presence of survey infrastructure.

The investigation must consult all relevant Deposited Plans on public record and include all existing:

- i) Cadastral Reference Marks (boundary or reference marks) as defined in Schedules 2 and 3 of the Surveying and Spatial Information Regulation 2017
- ii) Permanent Survey Marks as defined in Schedule 4 of the Surveying and Spatial Information Regulation 2017
- iii) City of Sydney alignment marks (a brass bolt, or a lead plug holding a brass tack, covered by a cast iron box and used to define the alignment of a street), whether or not it is registered as a Permanent Survey Mark in the Survey Control Information Management System operated by NSW Spatial Services.
- iv) Walls, buildings or other survey monuments shown on Deposited Plans on the public record.

At the conclusion of the investigation and at least two (2) weeks prior to the commencement of any works on site, the following documentation (in digital or hard copy format) must be supplied to the City’s Surveyors:

- i) A copy of a current detail survey plan clearly showing the extents of the “works zone” and all survey infrastructure within clearly shown in red; OR
- ii) A line plan prepared and signed by a Registered Surveyor clearly showing property boundaries, the extents of the “works zone” and all survey infrastructure within clearly shown in red.

This documentation shall be supplied together with a letter, signed by a Registered Surveyor, stating either:

- i) That all existing survey infrastructure has been accurately identified on the plan and collected to sufficient accuracy to enable preparation of a Plan of Survey Information or to recover the marks if necessary; OR
- ii) That there is no survey infrastructure within the “works zone”.

An exemption from this requirement will be permitted where this information has already been obtained and supplied to the service provider by the City’s Surveyors.



### 11.2.2 PRESERVATION OF SURVEY INFRASTRUCTURE

Under Section 24 of the *Surveying and Spatial Information Act 2002*, it is an offence to remove, damage, destroy, displace, obliterate or deface any survey mark unless authorised to do so by the Surveyor-General. Accordingly, all works within the “works zone” must, where possible, ensure the preservation of existing survey infrastructure, undisturbed and in its original state.

Where survey infrastructure has been identified in the “works zone” and may be destroyed or disturbed by the proposed works, the service provider must engage a Registered Surveyor to ensure that:

- i) For all Permanent Survey Marks, City of Sydney alignment marks and Cadastral Reference Marks, that all requirements of *Surveyor-General's Direction No.11 – Preservation of Survey Infrastructure* are complied with, including obtaining all relevant approvals and complying with those procedures that are appropriate to the project.
- ii) In addition to this, for all City of Sydney Permanent Survey Marks and alignment marks, at least 14 days prior to the commencement of any works in the public domain within one (1) metre of a City of Sydney alignment mark, contact must be made with the City's Surveyors ([surveyors@cityofsydney.nsw.gov.au](mailto:surveyors@cityofsydney.nsw.gov.au)). If a mark cannot be retained undisturbed and in its original position, then the City's Surveyors will determine an acceptable replacement method, including whether the Contractor or the City will undertake the replacement work, in whole or in part. A fee must be paid to the City for any work it undertakes in relation to the replacement of any such alignment mark removed, damaged or disturbed, in accordance with the City of Sydney's schedule of Fees and Charges.

At the completion of works, all documentation required by an approval granted under *Surveyor-General's Directions No. 11 – Preservation of Survey Infrastructure* is to be submitted to the Surveyor-General (and/or registered at NSW Land Registry Services) and a copy of the same submitted to the City's Surveyors in one of the following forms:

- i) A written statement prepared by a Registered Surveyor verifying that all requirements under the *Surveyor-General's Direction No.11 – Preservation of Survey Infrastructure* have been met and that all required documentation (sketch plan, proof of position documents, etc.) has been forwarded to the appropriate authority, together with copies of said documentation
- ii) A registered copy of any Plan of Survey Information Only (or any other Deposited Plan) prepared to satisfy an approval by the Surveyor-General to remove survey marks
- iii) A letter, signed by a Registered Surveyor stating that all survey infrastructure within the designated zone has been retained undisturbed.

### 11.2.3 WORKING NEAR SURVEY INFRASTRUCTURE

Due to the nature of survey infrastructure and its sensitivity to disturbance, works must be undertaken near any item of survey infrastructure with caution and every effort made to prevent disturbance. Accordingly, the following clearances must be adhered to when excavating or operating plant:

500mm when operating pneumatic tools (jackhammers, vibrating plates, and the like)

1000mm when operating mechanical excavators.

## 11.3 MATERIALS

### 11.3.1 PERMANENT SURVEY MARKS

#### 11.3.1.1 PERMANENT SURVEY MARK COVER BOXES

Permanent survey mark cover boxes are installed over a sub-surface mark to preserve it from damage or deterioration due to traffic loading, impact, weathering and other causes of degradation. They may be exposed to heavy traffic loads including repetitive bus and truck movements and therefore need to be solid, yet remain easy to open with a hammer and cold chisel.

The acceptable design of a cover box is generally flexible and the location (carriageway versus footway) will dictate the standard required; however, the following specifications must be met (see Diagram 8.1.1):

- The axle holding the lid to the frame should be made of stainless steel to inhibit rusting and must be strong enough to avoid bending under the expected traffic loads.
- The seat on which the lid will rest must be solid enough to withstand the expected traffic loads (carriageway or footway). For lids installed in the carriageway, a minimum of 10mm contact is to be provided all round between the underside of the lid and the frame seat, to prevent the lid sinking into the frame.
- The fit should be reasonably loose to prevent the unit seizing shut. A gap of 2mm to 3mm between the lid and the frame should be allowed for on all sides when in the closed position.
- The top of the lid must sit flush with the top of the frame in the closed position. The lid must have a pattern applied to reduce slip and have "SURVEY" or "COS SURVEY" or similar stamped on the upper face.
- The base of the unit must have a 20mm to 30mm flange to aid stability.
- A lip should be incorporated at the back of the hinge to reduce ingress of dirt.
- A 25mm to 30mm wide slot should be provided in both the base and the lid to enable the unit to be opened with a hammer and cold chisel.
- The internal opening of the unit is to be a minimum of 150mm x 150mm.
- Allowance must be made to enable the fixing of a standard permanent mark number plate (approx. 95mm x 20mm) to the underside of the lid with the following specifications:
  - Two 6.5mm drilled holes at 76mm centres, to a depth of 15mm.
  - Both holes tapped to 6.5mm metric gauge to maximum depth possible.

Existing cover boxes are of various ages and sizes. The three most common sizes (in terms of height) are 70mm, 100mm and 120mm. It is imperative that like be replaced with like where possible to avoid damage to the mark foundations. For marks that don't match these three sizes, the use of steel packing (in either 5mm or 10mm increments as necessary) or bricks is permitted to ensure that the final surface level of the box matches the surrounding road or footpath level.

#### 11.3.1.2 PERMANENT SURVEY MARK COVER BOX SUPPLIERS

Any service pit lid manufacturer who can meet the above specifications will be deemed an acceptable supplier.

For cover boxes that are to be installed in the footway and will not be subject to high volume vehicle loading, suitable cover boxes may be obtained from the NSW Spatial Services offices at Level 14 of the McKell Building, 2-24 Rawson Place, Haymarket, NSW 2000.

## 11.4 CONSTRUCTION AND INSTALLATION OF PERMANENT SURVEY MARKS

This section provides guidelines for the replacement of Permanent Survey Mark cover boxes and for the construction of new Permanent Survey Mark foundations. Each mark consists of:

- A suitable foundation material, such as a discrete concrete block, a concrete slab or bedrock
- A lead plug, brass bolt or stainless-steel pin set into this foundation
- A steel cover box centred over the plug, bolt or pin
- A brass number plate affixed to the underside of the cover box lid.

In the course of undertaking any works on a Permanent Survey Mark, it is critical that:

- The bolt or pin and foundation is not disturbed
- The number plate remains with the pin (i.e. it is removed from the old box and installed on the new one).

### 11.4.1 REPLACEMENT OF LID (EXISTING MARK TO BE RETAINED)

The Contractor will be expected to:

- Obtain all relevant authorisations, permits and DBYD search and the like necessary to complete the task at each location.
- Procure replacement cover boxes that meet the supplied specifications.
- Check that the numberplate specified in the brief matches the installed numberplate and report any discrepancies to the City's Surveyors.
- Replace lids and make good surrounds in all surfaces, including but not limited to bitumen, concrete and granite.
- Ensure lids are seated on a concrete base to ensure stability and prevent ingress of dirt and the like.
- Ensure that the upper surface of installed lids is level with the surrounding surface to prevent trip hazards.
- Ensure lids are centred over each mark, so that when the box is opened, the mark below remains accessible.
- Ensure lids are rotated so that the hinge side of the box is nearest to oncoming traffic.
- Remove the brass numberplate from the old box and affix it on the underside of the new box. The contractor should use existing screws where possible or new screws will be supplied by the City's Surveyors on request.
- Remove and dispose of existing lids and spoil.
- Report to the City's Surveyors after each day's work with the following information:
  - List of marks successfully replaced.
  - Any problems encountered (e.g. bolt or pin missing, numberplate mismatch with supplied information)
- Make good any defects at own expense.

### 11.4.2 CONSTRUCTION OF NEW PERMANENT SURVEY MARKS

The Contractor will be expected to:

- Obtain all relevant authorisations, permits and DBYD search and the like necessary to complete the task at each location.
- Procure cover boxes that meet the supplied specifications.
- Install footings or foundations that meet the supplied specifications.
- Install lids and make good surrounds in all surfaces, including but not limited to bitumen, concrete and granite.
- Ensure lids are seated on a concrete base to ensure stability and prevent ingress of dirt and the like.
- Ensure that the upper surface of installed lids is level with the surrounding surface to prevent trip hazards.

- Ensure lids are centred over marked set out point (locations to be marked and identified appropriately by the City's Surveyors).
- Ensure lids are rotated so that the hinge side of the box is nearest to oncoming traffic.
- Remove and dispose of spoil.
- Report to the City's Surveyors after each day's work with the following information:
  - List of lids successfully installed.
  - Any problems encountered.
- Make good any defects at own expense.

### 11.4.3 RAISING A COVER BOX OVER AN EXISTING MARK

The Contractor will be expected to:

- Obtain all relevant authorisations, permits and DBYD search and the like necessary to complete the task at each location.
- Procure cover boxes that meet the supplied specifications, or if the existing cover box is deemed functional, remove this and set aside for re-use. The numberplate on the underside of the lid is a unique identifier and must remain with the same mark. If a lid needs to be replaced, unscrew the numberplate from the old box and fit it to the underside of the new one.
- Hand excavate to the concrete block containing the survey mark, taking care that the block and pin remain undisturbed.
- Place a vertical 150mm diameter plastic pipe on the concrete block so that the survey mark is in the centre of the pipe.
- Concrete or grout the outside of the plastic pipe to the concrete block.
- Fill the hole (but not the pipe) with road base or a similar buffer course up to the underside of the cover box and tamp firmly to ensure minimal settling under traffic loading.
- Trim the top of the pipe to approximately 10mm above the upper surface of the buffer course (or underside of the cover box).
- Install lids and make good surrounds in all surfaces, including but not limited to bitumen, concrete and granite.
- Ensure lids are seated on a concrete base to ensure stability and prevent ingress of dirt and the like.
- Ensure that the upper surface of installed lids is level with the surrounding surface to prevent trip hazards.
- Ensure lids are rotated so that the hinge side of the box is nearest to oncoming traffic.
- Remove and dispose of spoil.
- Report to City Surveyors after each day's work with the following information:
  - List of lids successfully installed.
  - Any problems encountered.
- Make good any defects at own expense.

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## CONTACTS

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