



BRIDGE POLICY CIRCULAR BPC2007/07

VERTICAL CLEARANCES ON BRIDGES

Background

Vertical clearances at overbridges and through truss bridges have been measured and signposted on NSW bridges for a long time. With some exceptions, the minimum clearance under a bridge was signposted to only one decimal point. However, vertical clearances under an overbridge generally vary across the road under the bridge due to the grade and crossfall of the road and the profile of the underside of the overbridge.

In 1992, to meet the needs of the transport industry, RTA collected minimum clearances on all traffic lanes on classified roads with restricted vertical clearances due to the presence of overbridges, through truss bridges and some sign structures. The 'permissible clearances' on such traffic lanes were published in a book titled 'Vertical Clearances on Classified Roads'. The permissible clearance data were later populated in the Bridge Information System (BIS).

The guidelines used in the collection of clearance data in 1992 are currently still being used. There is a need for a policy to define a consistent procedure for measurement, recording, publishing and signposting of vertical clearance data at overbridges and through trusses on NSW roads.

Policy

Vertical clearances at overbridges and through trusses on the NSW road network shall be measured and signposted in accordance with this circular for:

- Measurement of actual clearances;
- Permissible clearances for public use;
- Signposting clearances on bridges;
- Exemptions by Review Committee.

Measurement of actual clearances

The vertical clearance at each affected traffic lane shall be measured in metres rounded down to two decimal places. The controlling clearance for a traffic lane is the minimum clearance available on that lane under the bridge. It is usually the lower of the clearances at the lane markings. However, there could be a lower clearance in the middle of lanes due to attachments on the bridge. Where road shoulders are available, the clearance to them shall also be measured.

Contact:	Siva Perumynar
Section:	Bridge Engineering
Telephone no:	02 8837 0857
File no:	94M3917
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The controlling clearance for a bridge is the minimum clearance available under a bridge on the trafficable part of the road carriageway. For a bridge with a single sign stating the minimum clearance, the controlling clearance shall be used to derive the Signposted Clearance.

The measured clearances for each bridge shall be recorded on a clearly labelled sketch for future reference. The sketch(es) with actual measurements shall be stored in relevant General and Regional bridge files.

Sketches BPC2007/07 - 1 to 3 are attached as proformas.

All vertical clearance measurements at bridge sites shall be re-surveyed and updated every five years.

Where any work has been done on a road or a bridge that could affect vertical clearances at a site, clearances shall be re-surveyed as soon as possible after the work has been completed. The vertical clearance data shall be updated in the Bridge Information System as soon as practicable.

Permissible clearances for public use

A safety margin shall be applied to the measured controlling clearances at a site to derive the permissible clearances for public use at the site. The safety margin shall allow for tolerances in vehicle height measurements, road surface variations due to minor road works such as patching, tolerances to measured values due to road and bridge geometry at the site and any possible serviceability deflections of the overbridge.

A minimum safety margin of 100 mm shall be deducted from the controlling clearances at each lane to derive the permissible clearances on the corresponding lanes. These clearances shall be used to advise the public of the clearances on the traffic lanes under an overbridge e.g. if the measured controlling clearance on a lane is 4.27 m, the permissible clearance for the lane shall be 4.17 m unless the site requires special consideration.

For most bridges, a safety margin of 100 mm is adequate. However, if a combination of unusual grades and road geometry exists at a site, an estimation of the controlling clearance at the site is required and additional safety margins may be required for the increased risk to the structure (refer to Appendix BPC2007/07 – 1).

If, after consideration of the facts related to a site, a higher safety margin is adopted to derive the permissible clearances for the bridge site, then the adopted safety margin and the reasons for it shall be documented and recorded in the Bridge Information System.

Signposting clearances on bridges

Vertical clearances on bridges shall be signposted in accordance with Australian Standard AS 1742.2.

- All bridges with measured minimum vertical clearances of less than 5.3 m must be signposted.
- Vertical clearances displayed on bridges shall be to one decimal place in metres as per AS 1742.2.

The clearance for display on a clearance sign on a bridge shall be derived as follows:

Step 1. The controlling (i.e. measured minimum) clearance for the bridge shall be rounded down to one decimal place in metres;

Step 2. Deduct a safety margin of 0.1 m from the clearance derived in Step 1;

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Step 3. If the bridge site requires special consideration, then ensure that the clearance calculated from Step 2 is adequate for the site.

e.g. an overbridge has a measured minimum clearance of 4.29 m on the road carriageway(s) under the bridge:

Step 1. Clearance rounded down to one decimal place = 4.2 m;

Step 2. Apply safety margin of 0.1 m = 4.2 – 0.1 = 4.1 m;

Step 3. Adequacy of 4.1 m for the site checked and confirmed as adequate.

Clearance for display on clearance sign = 4.1 m.

An example of calculating a signposted clearance is given in Table BPC2007/07 – 1.

Table BPC2007/07 - 1 – Example clearances for public use and signposting

Measured Minimum Vertical Clearance (m)	Permissible Vertical Clearance (m)	Signposted Vertical Clearance (m)	Comments
3.50	3.40	3.4	
3.51	3.41	3.4	
3.52	3.42	3.4	
3.53	3.43	3.4	
3.54	3.44	3.4	
3.55	3.45	3.4	
3.56	3.46	3.4	
3.57	3.47	3.4	
3.58	3.48	3.4	Recommended clearance for signposting. However, the signposted clearance can be posted as 3.5 m after the Review Committee approves that the risk with 80-90 mm safety margin is acceptable for the lane and/or bridge
3.59	3.49	3.4	
3.60	3.50	3.5	
3.61	3.51	3.5	
3.62	3.52	3.5	

More than one sign may be required for some bridges to clearly indicate the clearances available over critical lanes.

Signposting of lanes may be considered in the following cases:

- A multi-lane through truss with knee bracings (refer to Figure BPC2007/07 – 1).

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- A low clearance bridge where the controlling minimum clearance for the road under the bridge in a specific direction of travel is exceeded in other lanes with the same direction of traffic, by at least 0.2 m in the signposted clearance.



Figure 2007/07 - I - A multi-lane through truss with knee bracings

Exemptions by Review Committee

Provision is given for exemptions from this policy at a specific site through a review process by an expert Review Committee. The Review Committee shall include the Regional Bridge Maintenance Planner, Senior Bridge Engineer (Technology & Practice) and Regional RSTM Manager.

After the consideration of facts relevant to a specific site, judgement of risks and assessment of community costs, the Review Committee may recommend greater clearances for public use and display on signs than that permitted under this policy. However, the minimum safety margin on controlling measured clearances at any site shall not be less than 80 mm.

When the Review Committee reviews vertical clearances at a site, the recommendations of the committee shall be documented and recorded in the Bridge Information System.

Action

Measurement and signposting of vertical clearances to bridges on NSW's road network shall be in accordance with this policy.

Effective date: 6/08/2007
Approved: **Wije Ariyaratne**
Principal Bridge Engineer

Contact: Siva Perumynar
Section: Bridge Engineering
Telephone no: 02 8837 0857
File no: 94M3917
Circular Number: BPC2007/07

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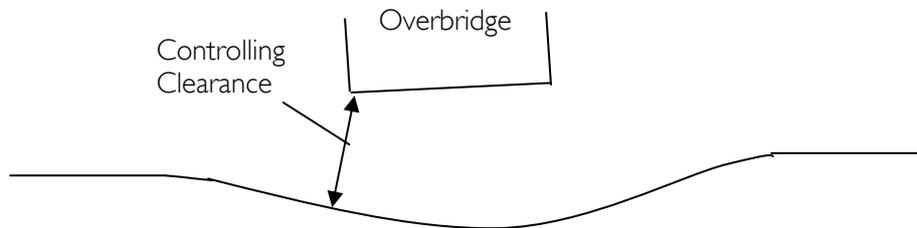
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Contact: Siva Perumynar
Section: Bridge Engineering
Telephone no: 02 8837 0857
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Appendix BPC2007/07 - I

A case for consideration of a higher safety margin (> 100 mm) on a measured controlling vertical clearance.



Sectional view along the road under the bridge

Notes:

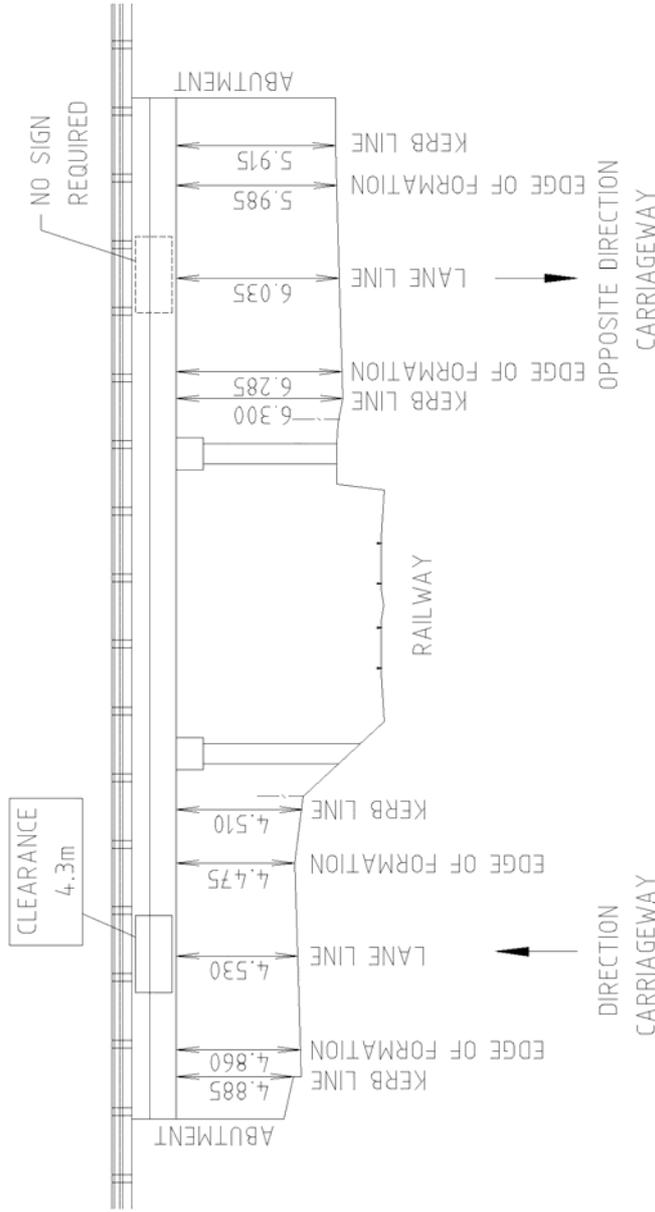
1. The base line of a long vehicle could be higher than the level of the point controlling the height of the road surface depending on the combination of road geometry and the long vehicle's configuration.
2. The geometry of the cross-section along the critical line along the length of the overbridge could cause additional complexities needing consideration.
3. The railway overbridge at Granville over Parramatta Road (Bridge No 317) is an example of such a case.

Contact:	Siva Perumynar
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Sketch BPC2007/07 - I

CLEARANCES TO ROAD NAME BRIDGE OVER RAILWAY NAME

BRIDGE No:



ROAD No:
ROAD NAME:

AT:

LINK:

DATE:

XXkm FROM LOCATION:

XXkm TO LOCATION:

NOTES:

ELEVATION LOOKING DIRECTION - (NOT TO SCALE)
ACTUAL MINIMUM VERTICAL CLEARANCES SHOWN

SIGNATURES

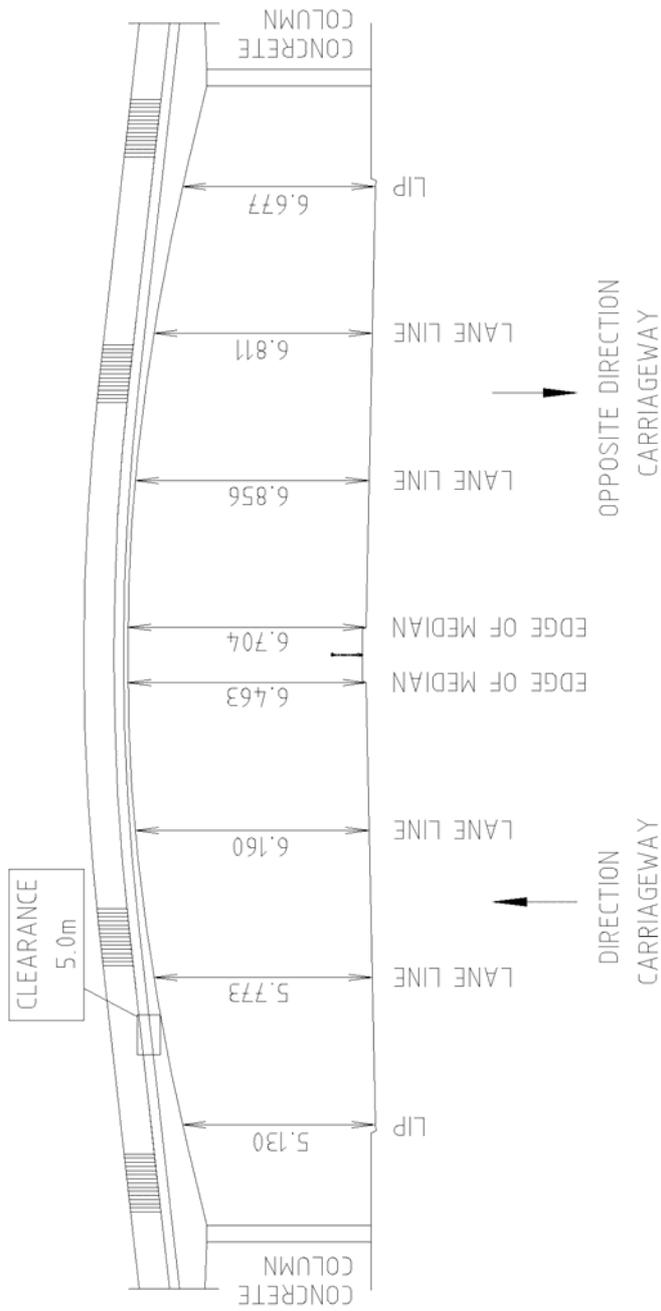
Contact:
Section:
Telephone no:
File no:
Circular Number:

Siva Perumynar
Bridge Engineering
02 8837 0857
94M3917
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Sketch BPC2007/07 - 2

CLEARANCES TO PEDESTRIAN BRIDGE OVER ROAD NAME

BRIDGE No:



ELEVATION LOOKING DIRECTION - (NOT TO SCALE)
ACTUAL MINIMUM VERTICAL CLEARANCES SHOWN

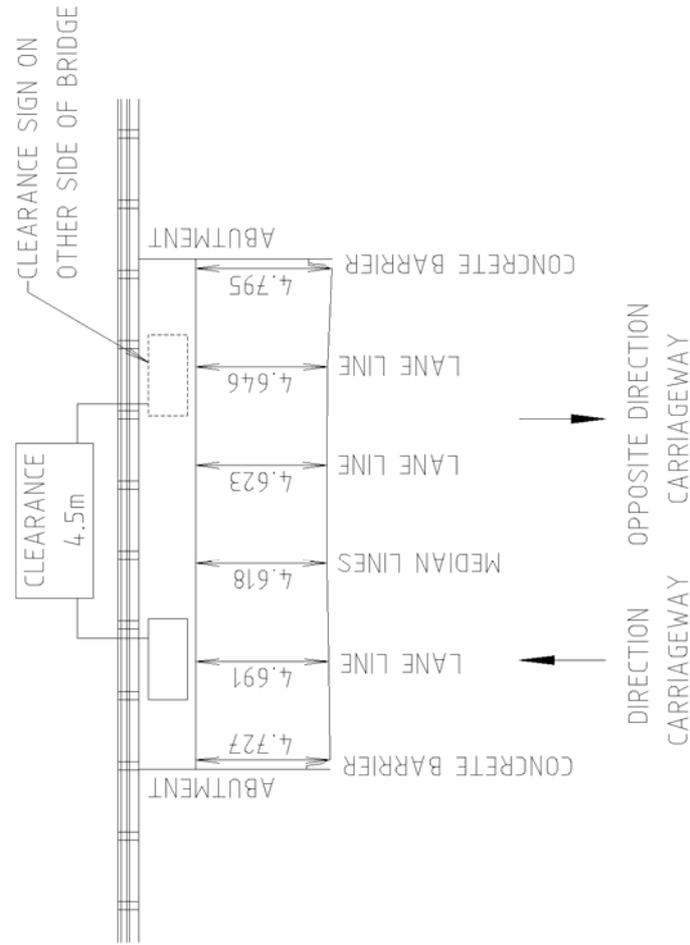
ROAD No:
ROAD NAME:
AT:
LINK:
DATE:
XXkm FROM LOCATION:
XXkm TO LOCATION:
NOTES:

SIGNATURES

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Sketch BPC2007/07 - 3

CLEARANCES TO RAILWAY BRIDGE ON RAILWAY NAME OVER ROAD NAME



ELEVATION LOOKING DIRECTION - (NOT TO SCALE)
ACTUAL MINIMUM VERTICAL CLEARANCES SHOWN

BRIDGE No:

ROAD No:
ROAD NAME:
AT:
LINK:
DATE:
XXkm FROM LOCATION:
XXkm TO LOCATION:
NOTES:

SIGNATURES

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