e-BROCHURE REF: E-007-03-17

BELL & AVECTOR BOLLARDS

Furnitubes®

The original robust traffic calming solution

Large commercial vehicles can carry heavy payloads, often weighing up to 38 tonnes. Whilst being an efficient means of transporting large quantities of goods, lorries are a constant source of danger to pedestrians and present the threat of damage to roadside structures and street furniture. Buildings that overhang the road on the path of the vehicle are also at risk of impact and in need of protection. Unnecessary damage results in blemishes on our environment and damage repair is both costly and inconvenient. The revolutionary Bell and Avector Bollards are a simple yet effective solution to combat such problems. When positioned on the anticipated line of deviation of the vehicle, the wheel will at first rise up the bollard before deflecting away back towards the carriageway as the slope angle increases. Such is the mass and foundation of the Bell, the bollard itself remains firmly in place and structurally undamaged. From the original full Bell 100 Bollard, with its deep foundation, a further 8 versions of the Bell have been developed. The Avector is a new introduction to our traffic-calming product range, based on the principles of the Bell but with contemporary styling to suit more modern environments. The Bell and Avector offer practical traffic calming solutions, present a visual deterrent to speeding and are attractive streetscape features in their own right.

QUICK GUIDE TO PRODUCT OPTIONS AND FEATURES:

BELL RANGE

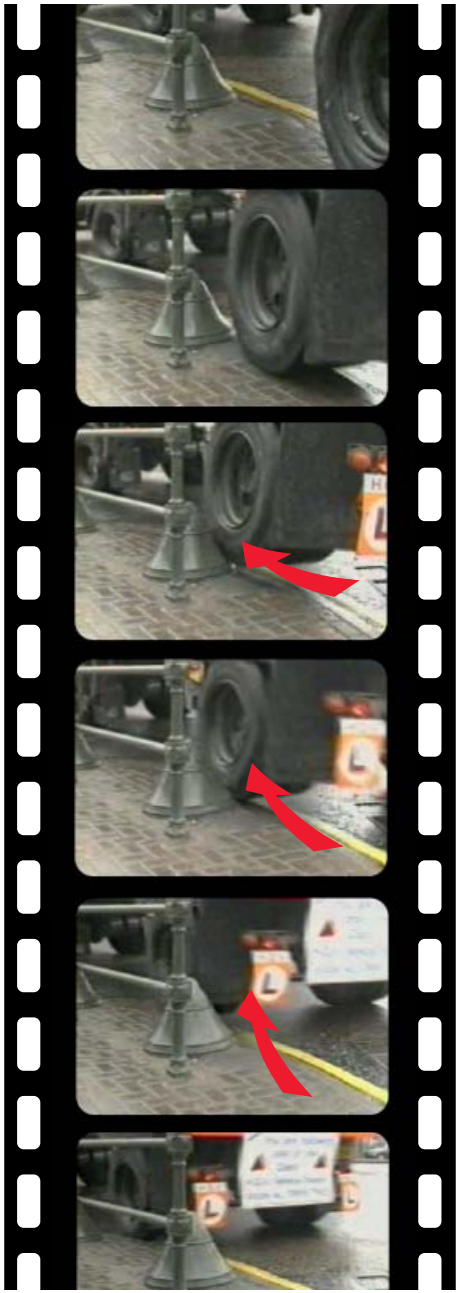
Code:	Description:	Sites / applications:
BELL 100	Full Bell, installed in a below-ground foundation	Open sites where there are no below-ground obstructions
BELL 500	Shallow-rooted decorative version of the Full Bell	Where underground obstructions prevent a full depth installation
BELL 500X	Bolt-down Bell with steel sub-frame	For use where underground obstructions (e.g. services) are present
BELL 340	3/4 version of the Full Bell	Protection of the corners of buildings and structures
BELL 120	1/2 version of the Full Bell	For placement against walls or where space is very limited
BELL 600	Kerbline Bell	For installation within the kerbline - an ideal width restrictor
BELL 138	For use with the City bollard	For sites where heightened visibilty is required
BELL 115	With an aperture for a bollard or railing posts	Heightened visibilty and integration with guardrail posts
BELL 150	With an aperture for a large post or bollard	For sites where heightened visibilty is required

AVECTOR

Code:	Description:	Sites / applications:
AVE100	Full Avector, installed in a below-ground foundation	Open sites where there are no below-ground obstructions

Bell® Bollards © P.M HARRIS 1986

 Ref: S-080-03-16



The Bell Bollard in practice

The effectiveness of the Bell bollard has been captured on video, stills from which are shown here. A lorry wheel can be seen cutting across the line of the bollard, rising up the face before being deflected back into the carriageway and away from the pavement. This and further evidence can be viewed at the following link:

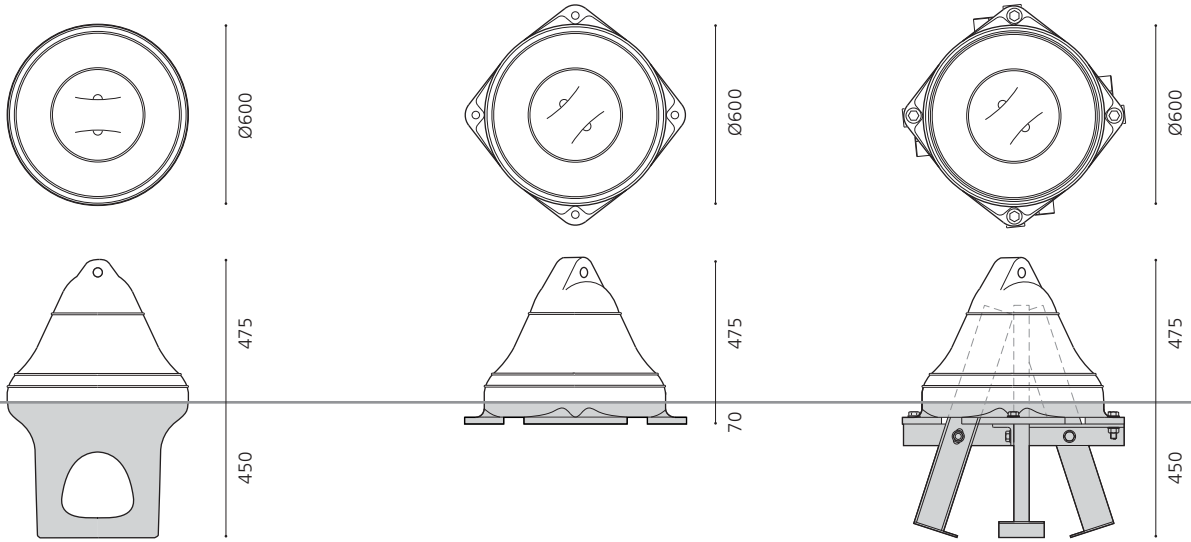
http://www.furnitubes.com/product/bell-bollard

Manufactured in heavy duty cast iron, Bell bollards provide a stable vehicular obstacle that even high-axled lorries are unable to drive over without causing irreparable damage to the underside of the vehicle. The low profile and unique shape of the bollard combined with a large foundation block renders it almost impossible for any vehicle to de-stablise or overturn a Bell installation. By comparison almost any conventional bollard, whatever the material, will almost inevitably suffer damage in the event of vehicle strike, resulting in inconvenient and often costly repairs and replacement. With the extended range now including 9 different product options to suit almost any installation scenario, Bell Bollards can assist in controlling vehicular movements and prevent them over-running their permitted route alignment, offering practical solutions for the purpose / benefit of:

- Pedestrian safety
- Prevention of damage to roadside equipment and street furniture
- Protection of buildings and structures, particularly corners and overhangs
- Localised protection of roadside kerbline
- Vehicular width restriction
- Preservation of soft verge

 Ref: S-081-02-16

BELL BOLLARD RANGE



BELL - FULL

BELL 100
Cast iron traffic bollard
Weight: 165kg

BELL - DECORATIVE

BELL 500
Cast iron traffic bollard
Weight: 115kg

BELL - BOLT-DOWN + SUB-FRAME

BELL 500X
Cast iron traffic bollard with steel sub-frame
(supplied loose for on-site assembly)
Weight: 155kg

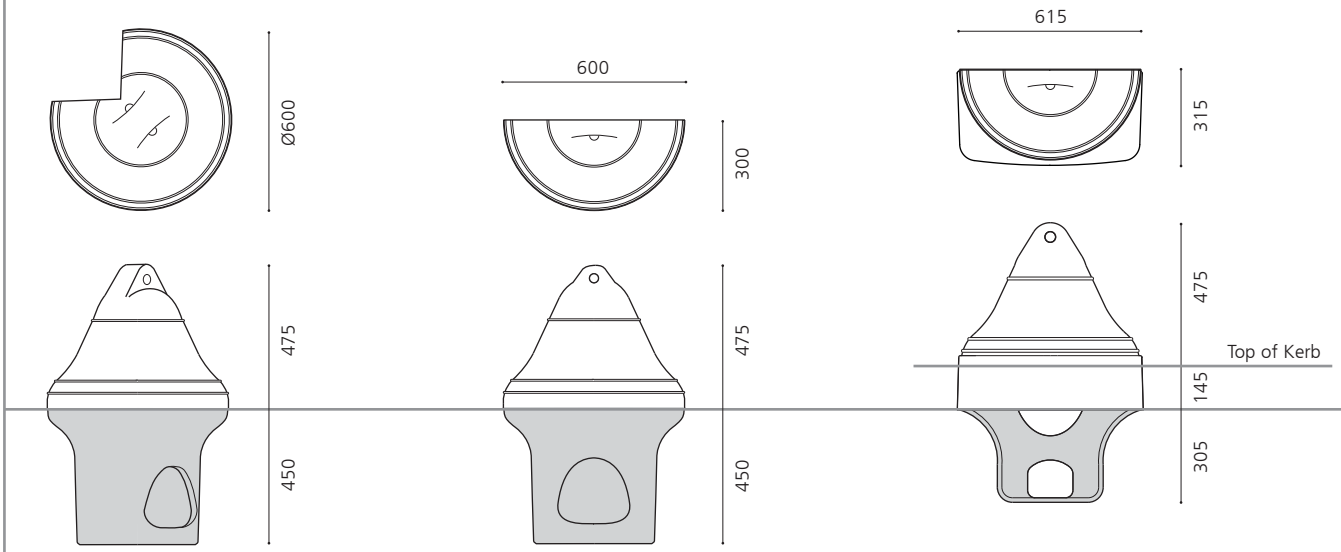
BELL 100 - the original Bell - is designed for open sites where there are no obstructions to a full depth installation, and is typically used on pavements that are vulnerable to being mounted by vehicles, and also for width restriction purposes.

The shallow-rooted BELL 500 is designed for use where there are continuous underground obstructions, and is ideal for use on decked structures such as bridges.

The BELL 500X is designed for locations with known underground services, concrete reinforcement or other obstrcutions. The legs of the sub-frame can be aligned so the bollard bridges over service runs etc.

 Ref: S-082-03-16

BELL BOLLARD RANGE



BELL - THREE QUARTER

BELL 340
Cast iron traffic bollard
Weight: 125kg

BELL - HALF

BELL 120
Cast iron traffic bollard
Weight: 120kg

BELL - KERBLINE

BELL 600
Cast iron traffic bollard
Weight: 80kg

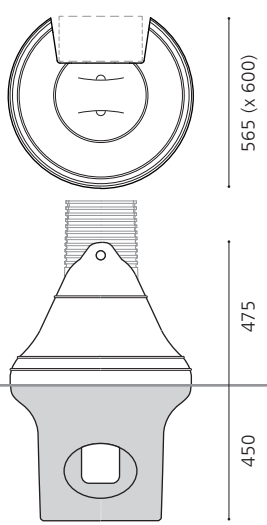
The 3/4 Bell is designed to protect the corners of buildings and other structures. The bollard is placed up close to the wall and requires free access to the full depth of the root for a permanent robust installation.

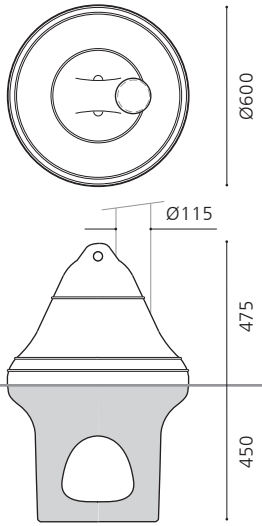
The 1/2 Bell is designed for placement against walls or in situations where there is insuffficent space to install a full Bell, for example where there is limited pavement width to the rear.

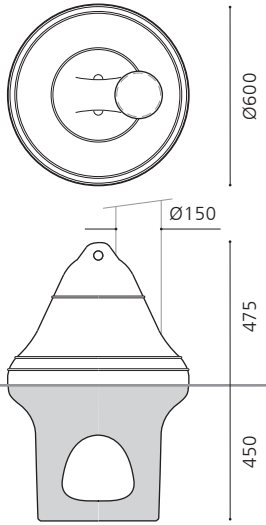
The Bell 600 - the latest addition to the Bell range - is designed for placement within a straight-faced (conservation-type) kerbline. It is ideal for vehicular width restriction purposes.

 Ref: S-083-02-16

BELL BOLLARD RANGE







BELL - CITY

BELL 138
Cast iron traffic bollard
(City bollard not included - order separately)
Weight: 145kg

BELL - FULL / 115 POST

BELL 115
Cast iron traffic bollard with 115mm dia hole
(Post / railing post not included - order separately)
Weight: 155kg

BELL - FULL / 150 POST

BELL 150
Cast iron traffic bollard with 150mm dia hole
(Tall bollard not included - order separately)
Weight: 125kg

The Bell 138 is shaped to accommodate a City cast iron bollard to the rear of the product to improve visibilty of the traffic calming solution. This product is most commonly used in situations where there is no raised kerb to mark the carriageway edge.

The Bell 115 has a vertical hole for placement of a 115mm dia circular bollard or post (to aid visibility) or a 115mm dia railing post (to offer protection to the railings on the vulnerable ends of runs).

The Bell 150 has a vertical hole for placement of a 150mm dia circular bollard (such as the Capital as shown above) to improve visibility of the Bell for both drivers and pedestrians.

 Ref: S-084-02-16

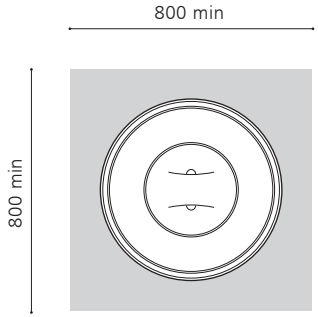
General specification

All products in the Bell Bollard range are manufactured in cast iron and supplied in a primed finish as standard. We recommend that top coats are applied on site after installation.

Installation details

Bell Bollards require a suitable foundation if they are to perform their design function of displacing vehicular wheels and presenting a fixed obstacle. Shown below is the minimum requirement for the concrete foundation block for the Bell 100 bollard in a typical carriageway installation in normal ground conditions. Particular attention should be paid to the following:

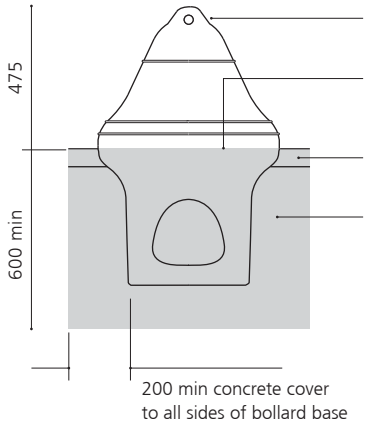
- Set the bollard at a depth so the ground level indicator line is at the finished paving level. For sloped sites the line should be at the finished level on the vehicular side of the bollard.
- Ensure concrete penetrates through the below-ground apertures into the internal void of the bollard at least to the ground level.
- Set the bollard true plumb, including on sloped sites.



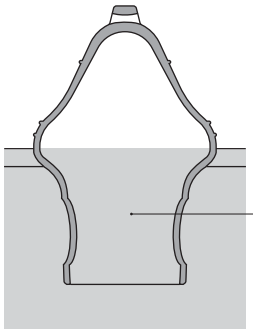
BELL 100 minimum installation requirements

Foundations for other Bell Bollards should have minimum offsets from the faces of the products as shown for the Bell 100. The professional advice of a highway / civil engineer should be sought if there are any queries regarding the ground conditions or doubts over the suitablity of the foundation.

PLAN VIEW



SECTIONAL ELEVATION



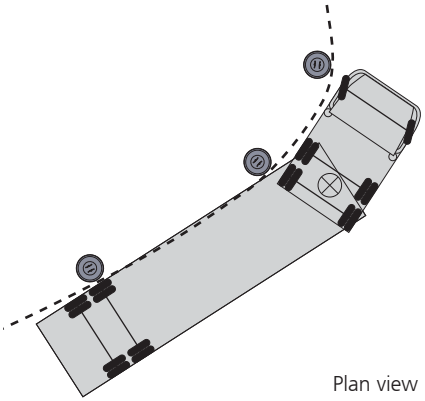
SECTION

Example applications

Shown here are diagrams of schematic site layouts utilising Bell bollards in various traffic calming scenarios. Selecting the most suitable model to use in your scheme will depend largely on the site-specific ground conditions into which the bollard will be installed, and any other constraints that the site may present. We recommend that the site is assessed and set out by a qualified highways engineer, with the placement of individual bollards taking account of vehicular sweep paths, to be determined with the aid of vehicular tracking software if necessary. A pre-construction safety audit may also be advisable in order to assess any issues such as visibility of the proposed Bell products, from both a driver and pedestrian points of view. Whatever constraints the site presents, one of the 9 product options will almost certainly fulfill the requirement. If not, then we are happy to consider bespoke solutions tailored to your scheme.

Vehicular over-run prevention

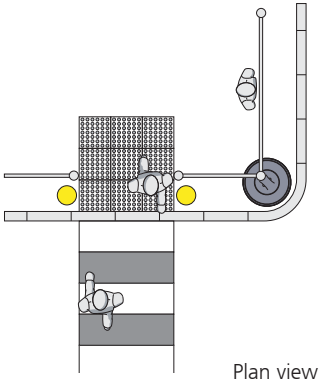
Long wheelbase vehicles in particular are prone to over-running kerblines. Positioning Bells on a designed alignment and at suitable spacings relative to the road edge will prevent vehicles from over-running the carriageway edge. The Bell 100 is the most effective product for this application.



Plan view

Pedestrian protection

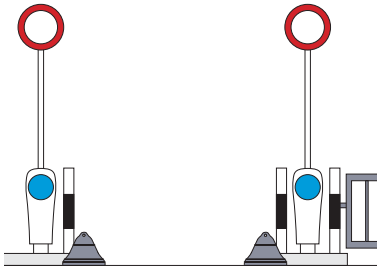
Most standard guardrail solutions are designed to prevent pedestrian access onto the carriageway, but on their own do not offer effective resistance to vehicles that drive off the carriageway. Adding Bell bollards such as the Bell 115 into the scheme design can significantly improve pedestian safety by deflecting wheels away from the pavement and provide an immovable vehicular obstacle



Plan view

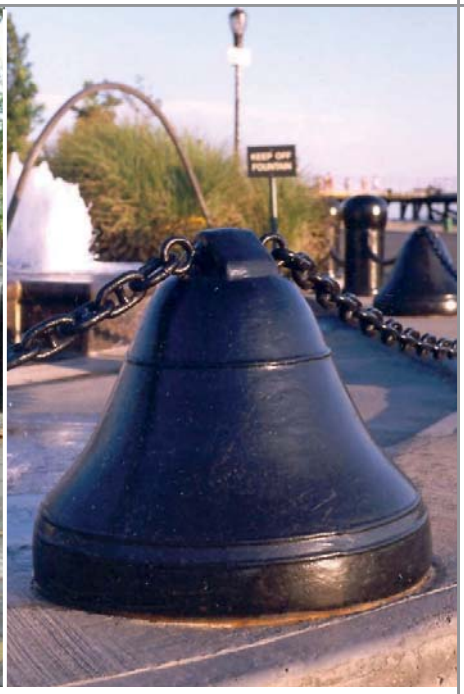
Vehicular width restriction

Conventional width restrictors such as steel or timber posts are vulnerable to damage and can be readily displaced by oversize vehicles. By comparison, the lower level and much stronger form of Bell bollards offer far greater resistance to oversize vehicular access. The Bell 100 and Bell 600 models are ideal for width restriction purposes, often used in conjunction with higher visibilty traffic signage equipment.



Elevation

 Ref: S-086-02-16



Tried-and-tested throughout the UK

Since its introduction nearly thirty years ago, the Bell Bollard has become a proven means of traffic calming, having been successfully used on many hundreds of schemes across the UK. The effectiveness of the Bell is now widely recognised as a tried-and-tested solution available to highways engineers. Listed below are just a small selection of local authority and private development schemes where the Bell has been successfully employed.

- **London-wide**
  Full Bell (BELL 100) bollards are used extensivley on the trunk road network by Transport for London and on local roads by all boroughs
- **National Theatre, South Bank, London**
  Numerous Full Bell (BELL 100) and Decorative Bell (BELL 500) bollards have been used to restrict the movement of vehicles around the site
- **Stowe House, Buckinghamshire**
  Full Bell (BELL 100) bollards have been used at entrances to the National Trust property to protect soft verges from vehicular over-run
- **National Indoor Arena, Birmingham**
  3/4 Bell (BELL 340) bollards are employed to protect vulnerable corners of buildings from damage by delivery vehicles

 Ref: S-087-03-16

International appeal

Following the continued success of the Bell bollards range used in highways safety and protection schemes in the UK, products have also been supplied to a number of high-profile international locations, including:

- **New York City, USA**
  Full Bell (BELL 100) bollards have been used on Manhattan's streets as a permanent and cost effective solution to block vehicular access.
- **Macau, Special Administrative Region of China**
  Full Bell (BELL 100) bollards have been employed as part of pedestrian safety improvement schemes in the city centre district and along the seafront.
- **Singapore**
  Full Bell (BELL 100) bollards have been installed at the historic Anderson Bridge across the Singapore River, linking Downtown Singapore with the City Hall area. The bollards are placed to ensure large vehicles are suitably aligned on their approach to the bridge, and also to protect pedestrians on the adjacent pavements.

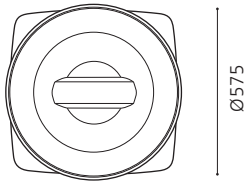
 Ref: S-088-02-16

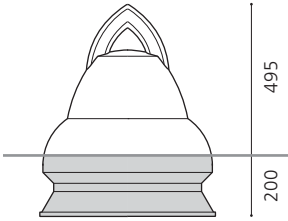
AVECTOR BOLLARD

Traffic calming with contemporary styling

The Avector bollard is the latest addition to Furnitubes' range of traffic calming bollards. Where conventional bollards are often overturned or damaged by vehicles that drift onto the pavement, especially on the corner of roads, the Avector is designed to withstand the impact of a vehicle's wheel and deflect it back into the highway. The Avector offers practical solutions for the purpose / benefit of:

- Pedestrian safety
- Prevention of damage to roadside equipment and street furniture
- Protection of buildings and structures, particularly corners
- Localised protection of roadside kerbline
- Vehicular width restriction
- Preservation of soft verge





AVECTOR

AVE 100
Cast iron traffic bollard
Weight: 90kg

 Ref: S-089-02-16

General specification

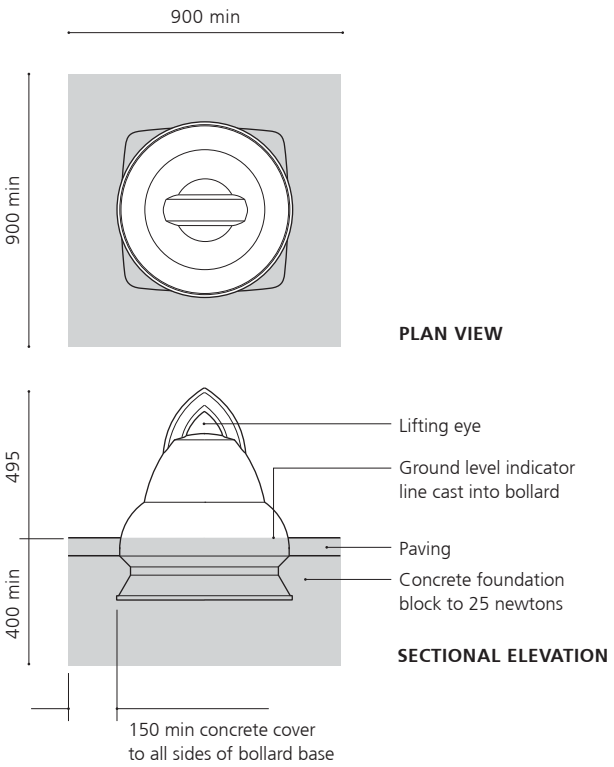
The Avector bollard is manufactured in cast iron and supplied in a primed finish as standard. We recommend that top coats are applied on site after installation.

The professional advice of a highways / civil engineer should be sought if there are any queries regarding the ground conditions or doubts over the suitablity of the foundation.

Installation details

Avector bollards require a suitable foundation if they are to perform their design function of displacing vehicular wheels and presenting a fixed obstacle. Shown below is the minimum requirement for the concrete foundation block in a typical carriageway installation in normal ground conditions. Particular attention should be paid to the following:

- Set the bollard at a depth so the ground level indicator line is at finished paving level. For sloped sites the line should be at the finished level on the vehicular side of the bollard.
- Ensure concrete is well consolidated into the v-shape below-ground profile on the bollard sides.
- Set the bollard true plumb, including on sloped sites.



 Ref: S-090-02-16

View or download other product e-brochures at the following link:
www.furnitubes.com/brochures

Furnitubes®

3rd Floor, Meridian House, Royal Hill, Greenwich
LONDON SE10 8RD
T: +44 (0)20 8378 3200
F: +44 (0)20 8378 3250
sales@furnitubes.com
www.furnitubes.com