Hostile vehicle mitigation (HVM)

1. INTRODUCTION TO VEHICLE BORNE THREATS

The threats range from vandalism to sophisticated or aggressive attack by determined criminals or terrorists.

- vehicles offer a convenient method to deliver a bomb, known as a vehicle borne improvised explosive device (VBIED)
- a vehicle can also be used as a weapon to ram and damage infrastructure or to injure and kill people

2. VBIEDs

The effects from a VBIED include the blast, fireball, primary, and secondary fragmentation and ground shock. Blast stand-off (the distance between the explosive and the asset) is the single most important factor in determining the extent of damage that can be caused. This is site specific, it is important to maximise the blast stand-off distance.

There are five main attack types when using a Vehicle Borne Improvised Explosive Device (VBIED):

Parked	A VBIED may be parked close to an asset that is the terrorist's target. The blast effects are far greater when the VBIED is closer to the asset.
Encroachment	A hostile vehicle may be able to exploit gaps in perimeter protection, or tailgate a legitimate vehicle through a single layer Vehicle Access Control Point (VACP). Alternatively a hostile can tamper with an active vehicle security barrier to open it in advance of an attack.
Penetrative	A vehicle may be used to weaken and/or breach a building or physical perimeter. A penetrative attack could result in an IED detonating inside a weakened structure.
Deception	A hostile vehicle may be modified to replicate a legitimate vehicle (i.e. "Trojan horse" vehicle), be an ex-fleet vehicle or the occupant(s) of a vehicle may use pretence to gain site access.
Duress	A security officer could be forced to open a vehicle access control point (VACP) or a legitimate driver could be forced to take an IED within their vehicle in to a vulnerable location.

3. VEHICLE AS A WEAPON (VAW)

A vehicle by itself can also be used with hostile intent to breach a perimeter, ram and damage infrastructure, or as a weapon to injure and kill people. This is referred to as a 'vehicle as a weapon' attack. The use of VAW has been used by terrorists to target crowded places. A broad range of vehicles can cause significant loss of life and serious injury.

4. MITIGATING A VEHICLE BORNE ATTACK

Threats from vehicles can be mitigated by installing physical measures (including blending into the landscape or streetscape) which may be passive (static) or active (security controlled). These measures can be installed either on a permanent or temporary basis. All such measures should meet appropriate standards in terms of their vehicle impact performance, design and installation. This will depend on the operational requirements applicable to the site.

4.1 Hostile Vehicle Mitigation (HVM) and Vehicle Security Barriers (VSBs)

HVM uses a blend of traffic calming measures to potentially slow down hostile vehicles and vehicle security barriers to stop those hostile vehicles progressing further. There are a variety of HVM and VSB options to assist reduce or mitigate the threat from vehicles.

These include:

- total traffic exclusion from an area, using VSBs
- traffic exclusion using VSBs, but with screening of all vehicles entering the area (with suitable VACP, preferably two layers of active VSB to prevent vehicle tailgating)
- traffic inclusion/free flow within an area but with all critical/vulnerable assets within that area protected with VSBs
- temporary/supplementary barriers installed at times of heightened threat or when a secure event is present in the area

4.2 The range of Vehicle Security Barriers includes:

- bollards (active retractable and passive static)
- gates
- planters and strengthened street furniture such as seating

4.3 Landscaping options include:

Ditches, bunds and berms.

The best form of HVM is total traffic exclusion from an area, which should be enforced by appropriately rated and correctly installed VSBs. A deployment of VSBs that restricts traffic (vehicles, pedestrians or both) requires an Anti-Terrorism Traffic Regulation Order (ATTRO) which is recommended to the traffic authority by the Chief Officer of Police.

Installing a static VSB system at a suitable standoff distance from a site will negate deception and duress styles of attack. It can also mitigate tampering and tailgating, which are forms of an encroachment attack.

If frequent vehicle access is required into a site then active solutions should be considered. Manual barriers require subsequent resourcing in terms of staffing and automated barriers require both proactive maintenance and reactive callout procedures. These solutions are generally more expensive and less secure than a static security barrier system for the reasons outlined above.

If sites are occasionally accessed by vehicles, then it may be more cost effective to use plant-removable barrier systems (for example a socketed bollard) rather than installing fully automated active.

5. TEMPORARY OPTIONS

5.1 Temporary VSBs

Modular wall units portal and gate units that can be interlinked to provide a surface mounted (gravity/free standing) or pinned solutions. Some systems can have pedestrian fences mounted on them to give dual purpose protection. Sites or police forces can rent VSBs on a temporary basis. To access these assets you should consult with your local CTSA.

5.2 Vehicles as a barrier

Following an appropriate **risk assessment,** you may consider the use of a vehicle as a barrier as possible mitigation against a vehicle as a weapon (VAW) attack. This should only be utilised following **advice from a SECCO or CTSA.** Such a deployment may impact upon the safety of the event e.g. emergency access, crowd flow rates, evacuation routes and the safety and security of the vehicle drivers must also be considered.

6. CONTINGENCY BARRIER SCHEMES

Repeated renting of temporary barriers is expensive; sites should therefore consider a contingency barrier scheme. These are typically pre-installed gated VSBs in the relevant areas, which can be closed just prior to the event or pre-installed foundation sockets in to which passive or active VSBs are slotted. This avoids the loss of lane availability during the installation of temporary barriers on the days/nights prior to an event, which can bring benefits to the communities and transport authorities.

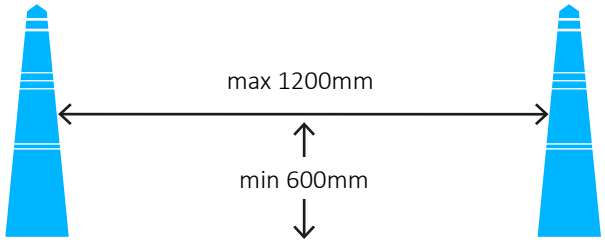
7. STANDARDS AND TESTING

The impact test standards for VSBs are IWA14–1 and PAS68, both of which include a range of test vehicles

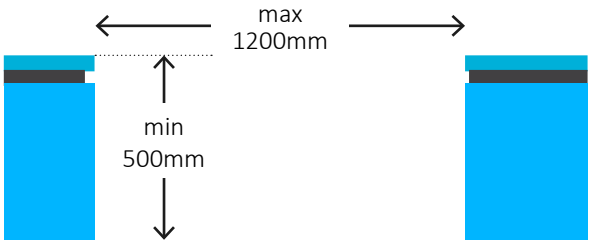
ranging from 1.5t cars, through 2.5t 4x4s, 3.5t vans, 7.2/7.5t trucks to 30t trucks. The results of the tests are classified in terms of how far the vehicle penetrated beyond the VSBs. This “penetration distance” is crucial, particularly when sites have limited standoff between the VSB and asset. Temporary barriers tend to displace more than permanently installed VSBs, as they do not have the benefit of a structural foundation.

Not all sites require protection from the largest or fastest vehicle-borne threats as the local topography or threat assessment may preclude them. Police CTSAs or skilled security consultants including the Register of Security Engineers and Specialists (RSES) with access to CPNI materials can assess the maximum impact speeds, by carrying out a vehicle dynamics assessment; these should be used to scope the most suitable VSBs, and/or quantify the residual risks.

TECHNICAL REQUIREMENTS



The maximum clear distance between adjacent VSB must be no greater than 1200mm, this distance must be measured between structural elements at a height of 600mm above ground level.



The minimum height for vertical fixed structure is 500 mm. An increased height of 900 mm will make the measures more conspicuous

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