

Hostile Vehicle Mitigation on City Streets

Guidelines for Private Property Owners

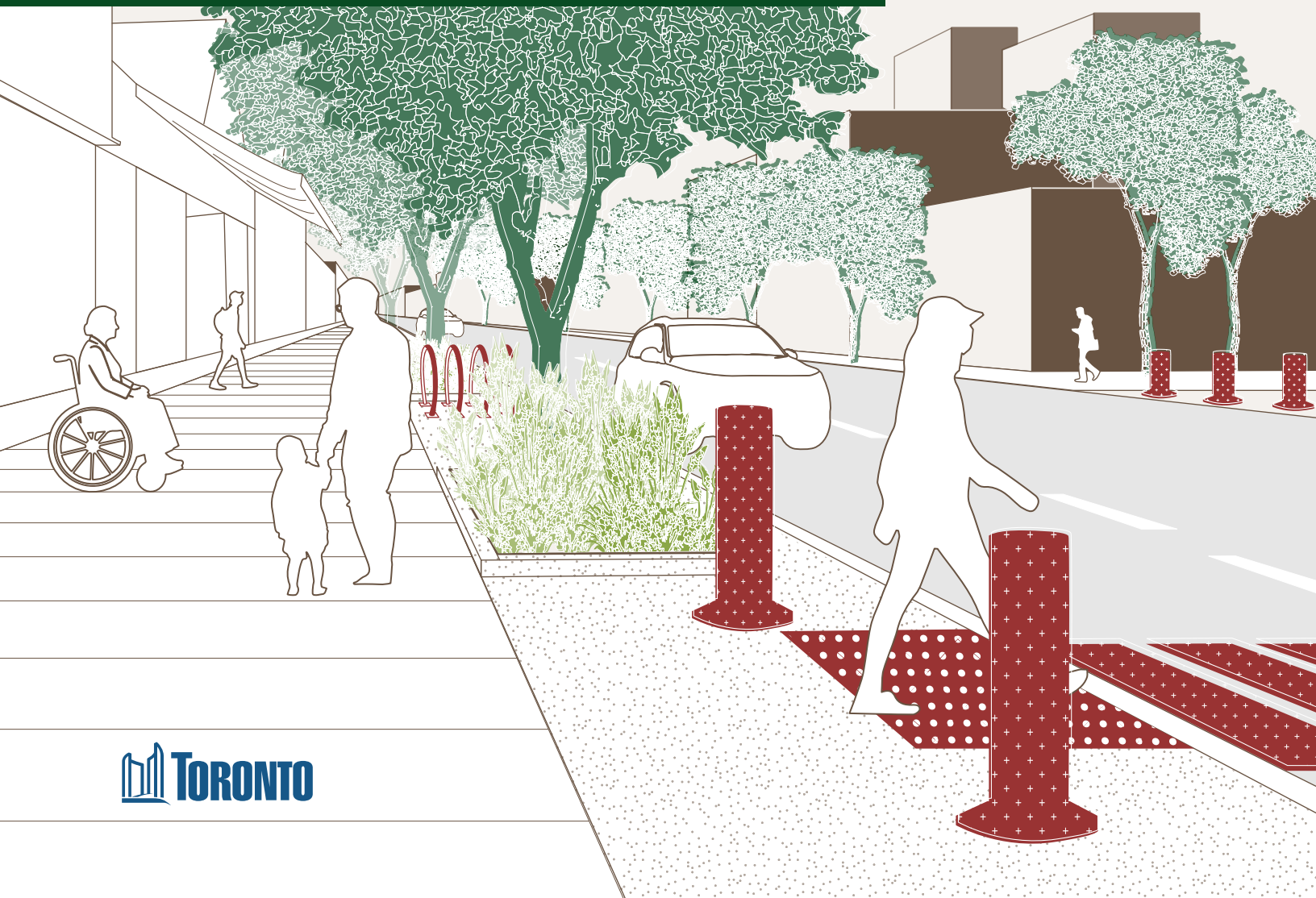


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About This Document

Purpose and Applicability

Recent events have led some organizations and property owners to consider physical security upgrades to protect their buildings and outdoor spaces. One type of threat involves vehicles being used as a weapon to cause harm to people or property. For properties at high risk of this threat, the use of physical barriers – known as Hostile Vehicle Mitigation (HVM) – may be justified. These guidelines apply to proposed HVM installations on public lands by private property owners within the City of Toronto (“the City”). They are intended for property owners with a security need to protect their property from hostile vehicle threats and are seeking to install permanent HVM measures that encroach into the public right-of-way (ROW). Protection against errant or accidental vehicle impacts is outside the scope of this document.

Where the use of private property alone is insufficient to achieve effective protection against hostile vehicle threats, permit applications for HVM encroachments into the public ROW will be considered. Property owners seeking permission for HVM-related encroachments should consult this document prior to applying for permits. It outlines the key steps involved and identifies the qualified professionals needed to support an application for an HVM encroachment and construction permit. The guidelines are also relevant to security directors, operations managers, property management companies, and their design professionals. They outline the City’s expectations for HVM design, technical requirements, and the permitting process for encroachments in the public ROW.

The City emphasizes that property owners are responsible for the ongoing security of their sites, including determining when HVM is needed through a security risk assessment, obtaining all required permits and approvals, and ensuring long-term maintenance of any installed measures. While the primary focus is on the HVM encroachment and construction permit process, other approvals (such as tree, heritage, or building permits) may also apply depending on the project scope.

Structure

This document is designed to help property owners and design professionals navigate the HVM encroachment and construction permit process. It provides guidance on understanding HVM concepts, assessing security needs, selecting appropriate barrier systems, and completing the City's construction permit application procedures.

The document is organized in three chapters:

Chapter 1:

Understanding HVM in the Public Realm

- This chapter is written for a general audience, including property owners and facility managers.
- It introduces HVM concepts, outlines when and why barriers may be needed, and summarizes the process to apply for an HVM encroachment in the public ROW.
- It also defines the roles and responsibilities of the City and the property owner.

Chapter 2:

Design Requirements for HVM in the Public Right-of-Way

- Targeted at design professionals, Chapter 2 describes the City's technical expectations for HVM projects in the public ROW.
- It outlines key standards, policies, and guidelines that apply to both the Threat, Vulnerability, and Risk Assessment (TVRA) and the design of HVM. This includes technical requirements related to accessibility, streetscape integration, emergency access, and operations and maintenance.

Chapter 3:

Context-Sensitive Design Guidance and Precedents

- This chapter illustrates how HVM can be effectively integrated into public spaces through representative design conditions.
- It provides graphical examples and planning considerations to help designers incorporate the technical requirements of Chapter 2 into context-sensitive solutions for their properties.

Supplemental materials, including application forms and frequently asked questions, are provided at the end of the document.

1. Understanding HVM in the Public Realm

What is HVM?

Hostile Vehicle Mitigation (HVM) refers to physical features designed to deter, delay, or stop vehicles from reaching a specific location. Common HVM measures include crash-rated bollards, reinforced walls, and hardened street furniture. Because HVM measures can permanently alter the streetscape and influence *pedestrian* movement, product selection should be guided by a comprehensive security strategy tailored to the site's unique risks and context. The need for HVM is identified through a *Threat, Vulnerability, and Risk Assessment (TVRA)*, which evaluates the security risk for a given property and outlines mitigation options that result in an appropriate level of protection.

Effective HVM solutions should be developed by qualified professionals through a holistic design process that integrates security with accessibility, streetscape quality, and operational needs. They must be supported by evidence of a *credible threat* and carefully balance protective function with the day-to-day use and character of public space.

What is the Public Right-of-Way (ROW)?

The *public ROW* includes streets, sidewalks, boulevards, and laneways – spaces shared by pedestrians, cyclists, drivers, and emergency services. It supports a wide range of civic, operational, and social functions, making it an essential public resource. As such, private HVM encroachment into the public ROW can only be considered where a clear need is demonstrated and where placement on private property alone is shown to be insufficient.

Where use of the public ROW is unavoidable, any HVM design must be carefully integrated to:

- Preserve accessible pedestrian movement,
- Avoid damaging or obstructing infrastructure or services, and
- Align with City design policies and operational needs.

Pedestrian



In this document, “pedestrian” refers to all individuals traveling on foot within the public right-of-way, including those using mobility devices or visual aids. This definition ensures that accessibility considerations are fully integrated into all references to pedestrian movement, safety, and experience throughout the document.

What is a TVRA?

A Threat, Vulnerability, and Risk Assessment (TVRA) is a formal security assessment used to identify risks at a particular site and evaluate its need for mitigation. TVRAs may address a wide range of potential threats, or they may be specific to HVM. They are the industry-standard method for understanding whether HVM is appropriate and what level of protection is required.

In the context of HVM, the TVRA is used to determine whether a credible vehicle threat exists and, if so, to define key design criteria including the type and size of threat vehicle. TVRA results are used to guide barrier placement, product selection, and therefore whether installation in any part of the public ROW is needed. Because a TVRA often draws on threat intelligence, technical expertise, and professional judgment, it must be prepared by a **Qualified Security Consultant**.

The City of Toronto requires that all proposed HVM installations in the public ROW be supported by a TVRA. Proponents must include a completed TVRA with their HVM Permit application for review.

Qualified Security Consultant



A Qualified Security Consultant preparing a TVRA must have either:

- 10 years experience conducting *security risk assessments* or designing HVM and using ISO 31000, or
- 5 years experience in either area and hold at least one of the following designations: *ASIS PSP, CPP*, or be a Licensed Professional Engineer recognized by a government jurisdiction such as a province, state, or country (e.g. P.Eng., PE).

The City's Role

The City of Toronto supports the use of HVM in the public ROW only where:

- A credible threat exists, confirmed through a TVRA, and
- Use of private property alone has been demonstrated to be insufficient to achieve effective protection.

In these cases, proposed HVM measures must be carefully designed to minimize disruption to the **public realm**. They must be well-integrated into the streetscape and comply with City policies on accessibility, streetscape design, emergency access, and public realm functionality. These considerations are assessed through the City's encroachment and construction permit application process. In the context of HVM encroachments in the public ROW, this document refers to the encroachment and construction permit as the HVM Permit for simplicity and consistency.

In addition to the HVM Permit, the City will also prepare an **Encroachment Agreement (EA)**, which formalizes the terms and conditions under which the encroachment is allowed. The EA is prepared concurrently with the HVM Permit and must be signed prior to installation.

The City will review any additional permit applications as may be required and submitted by the applicant, depending on site conditions, such as tree permits, heritage permits, or building permits. Approvals obtained by the applicant from utility owners or owners of underground infrastructure, where the project may conflict with existing utilities or underground systems, will be retained by the City for records. Additionally, reviews by Toronto Fire Services may be necessary where HVM is placed in potential conflict with fire routes. While this document references other approvals where relevant, its primary focus is the HVM Permit application process. The City requires specific information to support HVM Permit applications, which are detailed in the following sections.

Property Owner Responsibilities

Property owners proposing HVM measures in the public ROW are responsible for submitting a complete HVM Permit application. The application must be developed in consultation with security consultants and landscape architects. Depending on the project, other qualified professionals such as engineers, heritage consultants and accessibility specialists may also need to be consulted.

In addition to submitting a complete application, the property owner is responsible for:

- Securing all necessary prerequisite permits and approvals (e.g., tree, heritage, or building permits), in addition to the HVM Permit.
- Maintaining the HVM throughout its lifespan including routine inspections, repairs, and ensuring the operability of movable or retractable systems, if applicable.
- Meeting the City's service standards for clearing snow and maintaining turf in areas where the HVM prevents the City from conducting standard operations.
- Ongoing compliance with all applicable City bylaws, standards, and standard maintenance expectations.

Preparing an Application for HVM in the Public ROW

This section outlines the general steps that a property owner or applicant must take to prepare an application for an HVM Permit. While every site and threat may be different, the City's application process verifies that HVM measures in the public ROW are only proposed where necessary, are designed effectively, and comply with relevant City policies and regulations. All documentation specified in the following steps should be completed and submitted at the same time.

Step 1: Determine If HVM is Needed

Before proposing any HVM measures in the public ROW, the property owner or applicant should assess whether HVM is required and appropriate for their site. This must be done through a TVRA, prepared by a Qualified Security Consultant.

The TVRA will assess the security risk, evaluate vulnerabilities, and identify appropriate mitigation options. Additionally, a TVRA Cover Sheet following the template provided at the end of these Guidelines should be completed by the Qualified Security Consultant and submitted with the TVRA as part of the application package.

Note that certain security solutions recommended by the TVRA may not require an HVM Permit, such as:

- Surveillance cameras
- Security personnel
- Operational changes for crowd control (e.g., revised queueing or exit routes)
- Public awareness or signage strategies
- Crime Prevention Through Environmental Design principles

Although these security measures may be helpful deterrents, they will not stop a vehicle. Therefore, if the TVRA confirms that a credible vehicle threat exists and that physical HVM barriers are necessary, the applicant may proceed.

Key Professional Involved (Step 1)

- Qualified Security Consultant

Application Documents Produced (Step 1)

- Threat, Vulnerability, and Risk Assessment (TVRA)
- City's standard TVRA Cover Sheet

Step 2: Determine Whether HVM Can Be Accommodated on Private Property

If the TVRA determines that HVM is needed, the next step is determining where the barriers can and should be installed.

Applicants are expected to prioritize installing HVM on private property. Use of the public ROW will only be considered if the applicant can clearly demonstrate that their security need cannot be met without encroaching onto public space.

This decision should be made with input from the Qualified Security Consultant and other relevant design consultants as applicable to the site conditions (e.g., landscape architect, civil engineer, accessibility and building and fire code consultant). Before concluding that HVM cannot be fully sited on private property, it is important to review whether minor modifications or accommodations to the private site (e.g., relocation of landscaping, adjustments to walkways) could make full siting feasible.

The main output produced during this step will be a Justification Letter produced by one or more relevant consultants indicating why HVM cannot be fully sited on private property.

If the consultant(s) recommend that HVM is installed in the public ROW, continue assembling the application in Step 3. The Justification Letter may be refined and finalized as the design progresses.

Key Professional Involved (Step 2)

- Qualified Security Consultant and/or HVM consultant
- Building and fire code consultant, landscape architect, civil engineer, or other relevant consultant as applicable to site conditions

Application Documents Produced (Step 2)

- Justification letter explaining why HVM cannot be fully sited on private property

Step 3: Design the HVM and Select Appropriate Product(s)

Once justification for HVM in the public ROW is established, the applicant's consultant team should develop a comprehensive HVM design. This includes:

- Performing a *Vehicle Dynamics Assessment (VDA)*.
- Evaluating for proper spacing, siting, foundation depth, and visibility.
- Selecting appropriate HVM barriers (e.g., crash-rated street furniture, crash-rated bollards, engineered HVM solutions). Non-rated features serving as *visual deterrents*, such as surface mounted bike racks, signage, and shrubbery, may be permissible in certain areas of the site. However, since these do not physically stop a vehicle, their use should be guided by the TVRA and VDA.
- Designing to ensure compliance with all applicable codes, accessibility requirements, emergency access, and maintenance expectations (refer to Chapter 2).

A Full Member of the Ontario Association of Landscape Architects (OALA) ("Landscape Architect") is required for all applications to lead the preparation of the landscape site plan and coordinate the integration of HVM elements within the public realm. The Landscape Architect's responsibilities include demonstrating how the HVM design interacts with existing streetscape features, addressing below-grade impacts, and assisting the applicant in ensuring compliance with City policies related to trees, heritage, and streetscape design.

Depending on site conditions, arborists, accessibility consultants, and heritage consultants may be needed to ensure the HVM scheme complies with the relevant legislation, and City regulations and policies.

When the proposed design drawings are complete and the proposed product data is assembled, proceed to Step 4.

Key Professional Involved (Step 3)

- Qualified Security Consultant and/or HVM consultant
- Landscape Architect
- Building and fire code consultant, civil engineer, or other relevant consultants as applicable to site

Application Documents Produced (Step 3)

- Drawing set (e.g., site plans, sections and detail drawings)
- Crash test certificates for HVM products
- HVM product data sheets
- Site photographs showing existing conditions
- As applicable: arborist report, heritage impact assessment, accessibility impact assessment
- Construction cost estimate (optional)

Procurement Tips

When selecting the right product, applicants are advised to carefully consider procurement challenges as part of the decision-making process in design. Many *certified products* involve long lead times, especially if sourced internationally. Early planning can help avoid construction delays, reduce costs, and better align the selected product with site conditions.

To support an efficient process:

- Avoid sole-sourcing where feasible – comparing products can improve pricing and flexibility.
- Start collecting documentation early – including crash test certifications, product data sheets, and any stamped drawings.
- Verify certifications carefully – ensure they are issued by a recognized third-party and align with internationally accepted standards (e.g., IWA-14, ASTM F2656, PAS 68, ISO 22343-1).

Watch out:

Some non-certified products may use vague or misleading language that implies certification without meeting formal testing standards. Including these products in your HVM scheme is not advised and an HVM Permit may not be granted. An HVM consultant may be able to help evaluate product claims and provide guidance during procurement to ensure that only appropriate, certified products are selected.

What is a Vehicle Dynamics Assessment (VDA)?

A VDA is an engineering review that quantifies the critical approach paths, speeds, and angles of a potential vehicle attack to guide HVM placement and selection.

Factors such as initial velocity, approach direction, and road configuration affect the vehicle's impact velocity. The graphic illustrates different scenarios – including direct and curved paths and traffic calming features – that influence HVM selection.

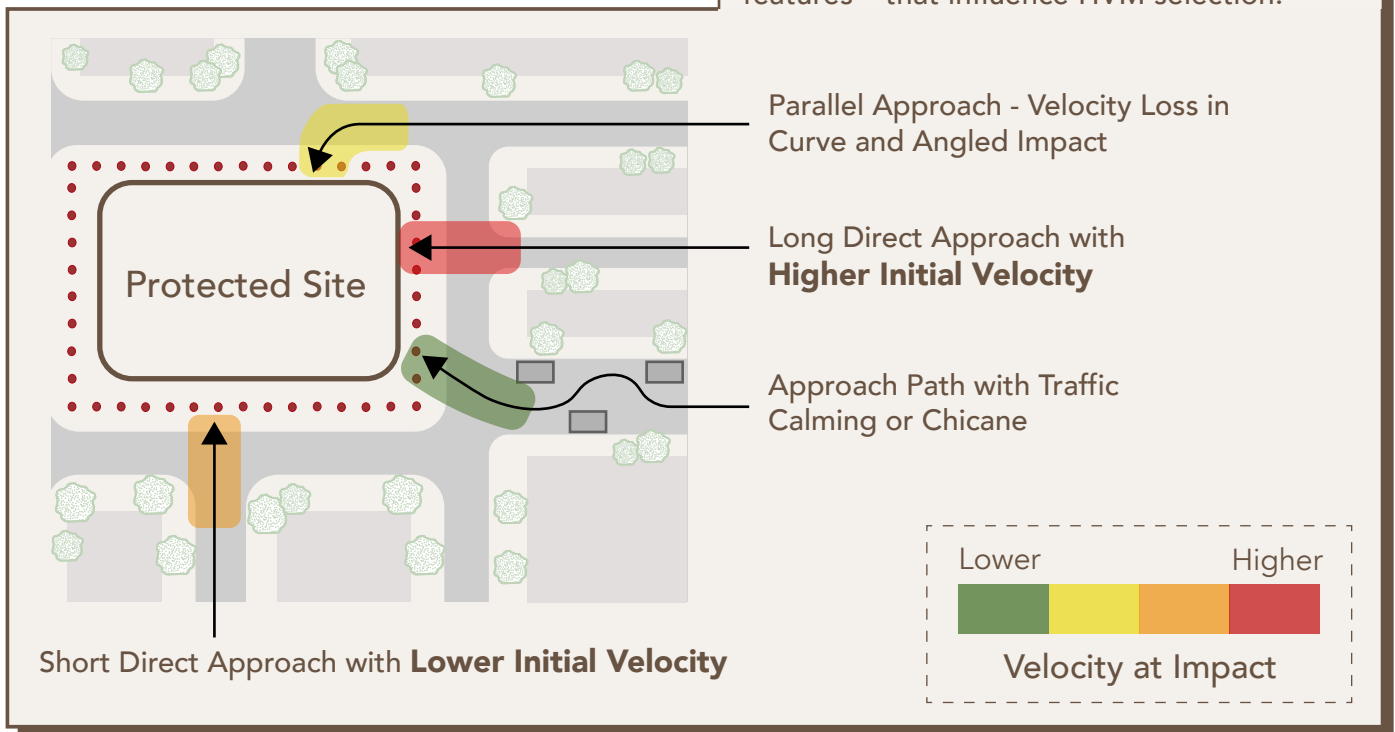


Figure 1. Illustrative VDA concept – protected perimeter and potential vehicle approaches

Step 4: Apply for Prerequisite Approvals from Affected Parties

If the proposed design affects other City infrastructure, an EA will not be issued until the applicant has obtained approval from all affected parties. The final HVM Permit application must reflect any design changes required as part of the prerequisite approvals. Therefore, prior to submitting an HVM Permit application, the applicant is strongly encouraged to coordinate with the affected parties for review and approval.

Depending on the design and location, this may include:

- **Toronto Fire Services (TFS):** If the HVM affects fire routes, hydrants, or Fire Department Connections (FDCs). TFS can be contacted at tfsinspections@toronto.ca for guidance and review.
- **Toronto Public Utilities Coordinating Committee (TPUCC):** Review and approval is generally required if HVM construction requires excavation or otherwise impacts existing utilities. Refer to the [City's Municipal Consent Requirements](#) for more information on when TPUCC coordination is required.
- **Toronto Transit Commission (TTC):** If work is near transit shelters, tracks, tunnels or other infrastructure. Refer to the [TTC's Developer's Guide](#) for more information on when TTC review is required.
- **The City's Heritage Planning Unit:** If the site or adjacent property is included on the City's Heritage Register or is designated under Parts IV or V of the Ontario Heritage Act. Contact Heritage Planning at heritageplanning@toronto.ca for more information.
- **Tree Injury/Removal Permit Application:** If work will take place within a tree protection zone of a tree. Refer to the [City's How to Apply for a Tree or Ravine Permit](#) webpage for more information.

Note: The arborist engaged during Step 3 can provide direction on when a tree injury/removal permit may be required.

Fees may apply for each review. Applicants should contact the relevant reviewing parties directly to understand applicable fees and how to make any required payments.

Documentation of the applicable approval and/or permit should be submitted as part of the HVM Permit application.

Recommended Professionals (Step 4)

- Arborist
- Subsurface utility engineer
- Heritage consultant

Application Documents Produced (Step 4)

As applicable:

- Tree Injury/Removal Permit
- TPUCC approval
- TTC approval
- Heritage Permit

Step 5: Prepare Operational and Maintenance Plans

HVM Permit applications must include documentation showing how the proposed measures and affected streetscape will be maintained by the property owner.

Each proposed HVM measure in the application requires submission of at least one of the following:

- **Operations & Maintenance (O&M) Manual:** Submit as provided by HVM manufacturer for all products proposed in the application. Testing requirements must be included for *removable/operable HVM*. If the product does not have an O&M Manual, request information from the manufacturer about expected maintenance and testing and submit documentation of the correspondence.
- **Maintenance & Testing Plan (MTP):** Required only if a manufacturer O&M Manual is not available or applicable (e.g., *engineered solution*). The MTP must describe how the HVM will be maintained and tested, including frequency, servicing methods, and replacement strategies for any custom or non-standard components.

By submitting these documents, the applicant acknowledges they will maintain and test all HVM elements according to the applicable O&M Manual or MTP.

Depending on the site and HVM design, documentation requirements may also include:

- **Right-of-Way Maintenance Plan (ROWMP):** If clearances anywhere along the sidewalk are less than 1.5 m, City winter services will not be possible. In this case, the private property owner will be responsible for maintenance of the affected sidewalk, and a ROWMP is required. The ROWMP must clearly outline the responsible party, the frequency of maintenance, and the method of snow and ice clearing/removal to meet the City's service standards. When HVM is located within landscaped or planted areas, the ROWMP should also include responsibilities for ongoing maintenance of these areas (e.g., mowing, watering, pruning) as appropriate.
- **Site Access Procedure:** For proposed removable/operable HVM, provide a document with information on how HVM can be removed by emergency responders (e.g., Toronto Paramedic Services) if there is a need to access the site (e.g., security contact details, key box location, etc.). This document may also be required in Step 4, if undergoing a TFS review.

These plans are key to ensuring the HVM and affected ROW remains functional and safely maintained without burdening City operations.

Recommended Professionals (Step 5)

As applicable:

- HVM manufacturer/supplier
- Landscaping service provider

Application Documents Produced (Step 5):

All applications:

- Manufacturer's O&M Manuals and/or Maintenance & Testing Plan for each proposed HVM measure

As applicable:

- Right-of-Way Maintenance Plan
- Site Access Procedure

Step 6: Compile and Submit Final Application

In addition to the documents noted in Steps 1-5, applicants will need to complete the City's standard HVM Permit Application Self-Assessment Form and [Permit Application for Construction/ Encroachments](#).

Once all assessments, coordination, and design work are complete, the applicant should compile and submit their HVM Permit application with all supporting documents noted in Steps 1-6. Submissions should be made by email to the appropriate district based on the location of the proposed HVM encroachment:

District	Email
Etobicoke	tprowey@toronto.ca
North York	tprowny@toronto.ca
Scarborough	rowscarborough@toronto.ca
Toronto East York	trarow@toronto.ca

Once the application is submitted, the City of Toronto's Transportation Services Division will start the review process. This involves coordination with multiple internal City divisions and external reviewers.

The City will check that:

- All required documents have been submitted
- City policy requirements are met (e.g., Accessibility for Ontarians with Disabilities Act (AODA), Toronto Municipal Codes (TMCs), Ontario Heritage Act (OHA))
- Design considerations have been addressed (e.g., utility conflicts, accessibility, sightlines)
- The proposed HVM responds to a credible threat as identified in the TVRA
- The necessary maintenance plans are in place

Applicants may be contacted during the City's review to provide:

- Missing documents
- Clarifications on drawings or HVM product data
- Design modifications to address policy conflicts or City review comments

If revisions are required, applicants may need to resubmit revised documents for further review.

Application Documents Produced (Step 6)

- HVM Permit Application Self-Assessment Form
- Permit Application for Construction / Encroachments

Submitting a Password-Protected TVRA?



Applicants may choose to password-protect their TVRA due to its sensitive security content. If doing so, please provide the password to the City at the time of application; it can be emailed separately.

Post-Permit Requirements – Coordination for Construction

Once the HVM Permit is granted, the applicant must apply for and receive the necessary [Right of Way Construction Permits](#) prior to commencing any construction activities to install HVM elements within the public ROW.

As a condition of the HVM Permit, the applicant or their representative (e.g., contractor) is required to:

- Apply to the City’s Road Disruption Activity Reporting System (RoDARS) to initiate construction coordination.
- Contact Work Zone Coordination to schedule and obtain approvals for any occupation of the public ROW during construction.
- Submit the following documents as part of the RoDARS application (typically prepared by a contractor engaged by the owner):
 - o A Traffic Management Plan (TMP) that outlines measures to maintain safe and efficient traffic flow during construction, including impacts to vehicles, pedestrians, and cyclists.
 - o Sidewalk Closure Notices or pedestrian detour plans, where applicable, in accordance with the City’s pedestrian and accessibility standards.

The timing and phasing of construction must be coordinated to minimize disruption to adjacent uses and City operations. Applicants are responsible for complying with all applicable requirements under the City’s Street Occupation Permits, including permit fees, timelines, and public notification requirements.

2. Design Requirements for HVM in the Public Right-of-Way

This chapter outlines the technical expectations for HVM Permit applications. It includes guidance on required documentation, design standards, and key policy considerations.

It is intended primarily for a design team of consultants preparing submission materials, such as security consultants, engineers, architects, landscape architects, and accessibility specialists. The goal is to provide clear expectations while supporting creative, context-sensitive design solutions.

Chapter 2 is organized into four key sections:

- **Minimum Technical Requirements** - Outlines relevant bylaws, standards, and codes by design discipline to set the technical expectations for the HVM design and highlight key sections of relevant codes, policies and standards.
- **Minimum Requirements for Drawing Sets** Details the drawings and documentation applicants must include in their submission, based on the technical requirements and the City's needs for a thorough review.
- **Referenced Policies, Standards and External Guidance** – Provides a list of referenced policies and standards, with hyperlinks to official sources for easy access to these documents.
- **Other Resources** – Contains hyperlinks to industry standards and guidance documents related to HVM planning and design that may be useful for applicants and consultants.

While the guidance in this chapter is intended to cover most typical conditions, applicants and their consultants are responsible for ensuring that all applicable legislative requirements, policies, codes, and standards are met. Some site-specific conditions may trigger additional requirements beyond those provided in this document.

Multidisciplinary HVM Design Process

A thoughtful HVM design requires a fully coordinated multi-disciplinary approach, sometimes with many consultants involved. Following the *TVRA* and *VDA*, HVM consultants typically start the design by developing a conceptual HVM layout. The design is then progressed by a Landscape Architect, in close consultation with the HVM consultant. Engagement with other designers and consultants is dependent on the site-specific conditions, commonly including a civil engineer, building and fire code consultant, accessibility specialist and wayfinding specialists.



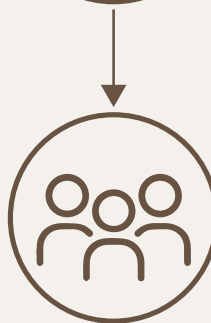
HVM Consultant

Develops initial conceptual HVM layout based on *TVRA* and *VDA*



Landscape Architect

Advances design integration with streetscape and public realm considerations



Multidisciplinary Coordination

Engagement with civil engineers, building and fire code consultants, accessibility specialists, and others based on site conditions

Minimum Technical Requirements

This section highlights the minimum requirements in the form of legislation, design and testing standards, and guidelines that apply to HVM design in the public realm. The requirements are organized by topic to reflect key design aspects and considerations.

Security Need and Justification

A TVRA is required as part of the HVM Permit application. It should be prepared in accordance with principles within [ISO 31000 Risk Management Guidelines](#) or an equivalent recognized standard for conducting a **security risk assessment**. TVRAs must be prepared and signed by a **Qualified Security Consultant** and should include:

- Identification of the specific **threat(s)** being mitigated, including the evaluation of the threat credibility,
- Description of the asset(s) or people requiring protection,
- A vulnerability and risk evaluation, that demonstrates which risks require remediation,
- A Vehicle Dynamics Assessment (VDA) analyzing likely approach paths and speeds, and
- A summary of alternate mitigation measures that were considered (e.g., surveillance, Crime Prevention Through Environmental Design, traffic management).

The TVRA must provide a clear rationale for the necessity of HVM barriers and align proposed protection levels with the assessed risk. All applications proposing HVM in the **public ROW** must also include a Justification Letter explaining why HVM measures cannot be installed on private property, detailing the specific property limitations or constraints. Where applicable, the letter should reference supporting documentation such as the TVRA, site plans, or engineering reports to demonstrate the rationale behind the proposed use of the public ROW. This helps the City assess whether HVM installation in the public ROW is necessary and justified. The design team should determine the most appropriate author, which may or may not be the Qualified Security Consultant.

HVM Product Selection and Design

Certified HVM products must meet impact testing standards such as *ASTM F2656*, *ISO 22343-1*, *IWA 14-1*, or *PAS 68* as verified by an independent testing agency. These standards provide penetration ratings that indicate the product's ability to stop or slow a vehicle under specified conditions, including vehicle type, mass and impact velocity.

HVM measures must be designed with an appropriate penetration rating, determined by the HVM consultant and supported by TVRA and VDA findings. The design team should reference recognized standards to ensure the selected product rating aligns with the identified threat scenario – including vehicle type, speed, and mass – and accommodates the available setback.

Engineered HVM solutions, such as custom planters or hardscaping, must be designed by a licensed Professional Engineer using appropriate methods (e.g. impact analysis).

Proof of rating must be submitted with the application; examples include:

- A manufacturer-provided crash test report,
- A manufacturer provided certificate naming the proposed product and rating, signed by a third-party testing agency, or
- An impact analysis calculation report signed and sealed by a licensed Professional Engineer.

Due to the specialty of HVM analysis, consultants from outside of Ontario may be utilized. However, in accordance with the Professional Engineers Act, it is expected a Professional Engineer licensed in Ontario will be required to take responsible charge for **engineered solutions**. For HVM measures not requiring engineering, a Full Member of the Ontario Association of Landscape Architects (OALA) may act as the coordinating professional for the overall drawing package submission.

Accessibility Requirements

All HVM installations must comply with the Accessibility for Ontarians with Disabilities Act (AODA) and should meet the Toronto Accessibility Design Guidelines (TADG) where feasible. AODA establishes the legal minimum standards for accessibility in public spaces, while TADG reflects the City's commitment to best practices in universal design and equitable access.

AODA's Integrated Accessibility Standards Regulation (IASR) requires a continuous *clearway* of at least 1.5 metres, except where existing physical or site constraints make it impracticable to achieve this width, as described under IASR §80.31. IASR also allows 1.2 metres to serve as a turning space where an exterior path connect with a curb ramp, and 0.85 metres as a minimum clear opening at gates, or bollard arrangements that serve as entrances to a path of travel.

Certified HVM products typically require a clear spacing of approximately 1.2 metres, which does not meet the standard TADG and AODA requirements for minimum pedestrian clearway widths. Such configurations should therefore only be proposed where justifiable under IASR §80.31, and where a reduced spacing is required to achieve the certified performance necessary to mitigate the threat identified in the site-specific TVRA and VDA.

Additionally, 1.2-metre spacing may be considered only where:

- There are no other feasible mitigation options, such as locating HVM on private property;
- Operational adjustments (e.g., staggered exiting times from a building) have been explored; and
- The design incorporates accessibility mitigation strategies that maximize usability despite the constrained spacing (refer to Chapter 3 for examples).

The City will assess such proposals on a case-by-case basis to determine whether an exception to the minimum clearway width is justified under IASR and that accessibility impacts have been minimized and mitigated to the greatest extent possible.



Photo 1. Multi-functional seating element that is cane detectable and demonstrates high colour contrast between the seat and paving.



Photo 2. Certified bollards along a roadway consistently spaced with high colour contrast and reflective band to improve visibility for all users in a variety of lighting conditions

Product Selection Tips to Maximize Clear Opening

















- **Maximize spacing in product selection:** Some manufacturer products provide less than 1.2 m clear spacing. Source products that meet the full 1.2 m or work with suppliers who can adjust their designs.
- **Decorative sleeves and finishes:** Select decorative sleeves or architectural finishes with the smallest possible outside diameter to maintain the maximum available clear opening width, or widths within the clearway.

The table below summarizes the accessibility considerations most commonly applicable to HVM installations, and is not intended to be an exhaustive summary of TADG and AODA requirements.

Key Accessibility Considerations for HVM in the Public Right-of-Way

Category	Requirement Summary
Pedestrian Clearway Width	<ul style="list-style-type: none"> • TADG: 2.1 m minimum for arterials and collectors; 1.8 m minimum (2.1 m preferred) for local streets with low vehicle speeds and volumes. • AODA: 1.5 m required continuous clearway, with min. 0.85 m between bollards at entrances. • Certified HVM spacing of 1.2 m may be considered only when justified by the security need as supported by a TVRA/VDA, and where no other mitigations are feasible.
Alignment	<ul style="list-style-type: none"> • Locate HVM elements perpendicular to the path of travel. • Avoid diagonal, irregular, staggered or overlapping alignments that reduce navigability or create visual confusion.
Tactile Walking Surface Indicators	<ul style="list-style-type: none"> • Must not be blocked by HVM elements. • Ensure tactile surfaces remain centred in clear spacing between HVM elements.
Guidance Tactile Walking Surface Indicators	<ul style="list-style-type: none"> • Guidance TWSIs are appropriate at the following locations: <ul style="list-style-type: none"> • Transit stops, train stations, subway or light rail transit platforms, large open spaces (e.g., public squares) and in the door areas of expansive open areas. • Refer to Canadian National Institute for the Blind's (CNIB) Clearing our Path guidelines on Guidance Tactile Walking Surface Indicators, in addition to TADG
Cane Detectability	<ul style="list-style-type: none"> • HVM elements must be detectable at or below 680 mm from the ground. • Protrusions must not exceed 100 mm without detectable base support. • Avoid elements with large under-clearance unless a base or detectable surface is provided. • Refer to CNIB Clearing our Path guidelines on Protruding Objects and Other Obstacles for requirements, in addition to TADG.
Surface Transitions	<ul style="list-style-type: none"> • Elevation changes must not be greater than 13 mm and must be bevelled with a maximum slope of 1:2. • Avoid trip hazards at joints or transitions between materials.
Colour Contrast	<ul style="list-style-type: none"> • Colour/brightness contrast of key elements in the built environment should be at least 50 percent. Colour/brightness contrast is measured through light reflectance values (LRV) and comparing the adjacent colours' LRV as defined in the TADG. • Ensure visibility of HVM elements in snow (avoid exclusively white elements or reflective finishes). • Avoid combinations that may be confused with traffic signals or regulatory signage, such as red, green, or yellow • Where colour contrast cannot be achieved due to inherent material properties (e.g., Stainless steel bollards installed on a concrete surface), apply a high-contrast band around the bollard at the base and near the top for visibility. Examples of colours that contrast well with stainless steel are high visibility orange, safety yellow, or brick red and occasionally black. Due to the reflectivity of stainless steel, it is important to consider the surroundings when selecting a colour choice.
Spacing at Pick-Up/Drop-Off and Parking	<ul style="list-style-type: none"> • Maintain 1.5 m clear between HVM elements at vehicle loading areas unless a narrower spacing is justified by the security need and supported by a TVRA/VDA. • Install HVM elements only at depressed curbs and consider removable products where needed for accessibility or maintenance access.

Colour Contrast: for Distinguishing HVM Elements from Their Surrounding

Recommended Colour Combinations		Colours to Avoid - Low Contrast		Colours to Avoid - Colour Blindness
 Blue/White	 Brown/White	 Red/Black	 Violet/Black	 Red/Green
 Red/White	 Orange/Black	 White/Grey	 Yellow/Grey	 Blue/Green
 Dark Purple/White	 Yellow/Black	 White/Light Blue	 Yellow/White	
 Dark Green/White	 White/Black			

A chroma meter can be used to measure the colour contrast of HVM elements on site.

These recommendations and instructions for using a light meter to determine colour contrast are informed by the CNIB's Clearing Our Path guidelines on Colour and Brightness Contrast.

When selecting colours, applicants should also consider aesthetics: coordinate with the surrounding streetscape and any applicable BIA colour palette to ensure that HVM elements are visually consistent with their context while still maintaining required accessibility contrast.

Streetscape Requirements

Installations must respect minimum setbacks from hydrants, utilities, bus shelters, and curb cuts in accordance with Toronto Municipal Code (TMC) Chapter 743, the Complete Streets Guidelines, and other applicable City policies and standards, including but not limited to:

- Vibrant Streets Guidelines
- Streetscape Manual User Guide

Where a site is located within an established Business Improvement Area (BIA) additional design and placement considerations may apply, such as:

- Product selection and construction details that support BIA streetscape objectives
- Ensuring streetscape continuity and pedestrian comfort
- Coordination with BIAs early in the design process where specific guidelines exist

Applicants can refer to the [Toronto Maps](#) website to identify which designated areas their site is located in.

All HVM Permit applications require a landscape site plan and supporting technical details that are prepared by a Landscape Architect who is a Full Member of the OALA. The site plan must demonstrate the proposed arrangement, materiality, and extent of impacts between the HVM and existing streetscape elements, including both above-grade features and below-grade utilities or constraints.

Heritage Requirements

Approvals under the Ontario Heritage Act (OHA) may be required before submitting an HVM Permit application when proposing HVM measures on a property that is:

- Designated under Part IV of the OHA, or
- Located within a Heritage Conservation District (Part V of the OHA).

Properties adjacent to designated or listed heritage properties do not themselves trigger OHA approvals, but additional design measures may be required to mitigate visual or contextual impacts.

If the proposed HVM measures could potentially affect heritage attributes, before finalizing and submitting an HVM Permit application, applicants should:

- Review the [City's Heritage Register](#) to confirm whether their site or adjacent properties are listed or designated.
- Engage a qualified heritage consultant to assess potential impacts on heritage attributes and recommend strategies for sensitive integration of proposed HVM measures.
- Consult relevant [Heritage Conservation District \(HCD\) plans](#) to understand applicable design guidelines, and review HCD study reports for additional context.
- Coordinate with the City's Heritage Planning unit (heritageplanning@toronto.ca) to confirm whether a Heritage Permit is required and to review proposed HVM designs, including for properties adjacent to designated or listed heritage properties.

Additionally, the following general guidance should be considered in addition to site-specific heritage requirements:

- Selecting products and finishes that preserve or complement the heritage attributes and visual character of designated properties, HCDs, or streetscapes.
- Minimizing physical and visual disruption to heritage attributes while maintaining continuity of the historic streetscape.
- Coordinating with heritage consultants and other professionals (e.g., arborists, landscape architects) where heritage attributes interface with proposed HVM measures and other features of the public realm.

Tree Protection & Restoration

If HVM construction necessitates work in a tree protection zone, prior to submitting an HVM Permit application, a Tree Injury or Removal Permit is required in accordance with TMC Chapter 813. Submissions must include an arborist report and tree protection plan prepared by a qualified arborist. Where significant impacts are anticipated, a landscape restoration plan prepared by a Landscape Architect may also be required.

Only in rare and exceptional circumstances will the HVM need dictate removal of a mature tree. Designers are encouraged to consider utilizing existing mature trees as *physical deterrents* or shifting the *protected perimeter* to avoid the tree(s).

Street Furniture Coordination

Wherever feasible, HVM designs must be integrated with existing transit shelters and street furniture, rather than proposing they be relocated or removed. Applicants are encouraged to consider multi-functional HVM elements (e.g., integrated seating, lighting, or signage) to reduce public realm clutter – refer to Chapter 3 for further guidance.

Applicants must clearly identify on site plans which street furniture (if any) is proposed for removal or relocation. Refer to the Minimum Requirements for Drawing Sets section for more details.

When proposed HVM conflicts with existing street furniture, applicants should be aware of the following coordination requirements:

- Relocation of transit shelters should be avoided wherever possible, as these are often constrained by spatial, accessibility, and transit operational limitations.
- If a TVRA strongly justifies the relocation of a transit shelter and no feasible alternative exists, the applicant must consult with the City and the relevant transit agency (e.g., TTC) early in the process, prior to submitting their HVM Permit application. Applicants should be aware that relocation, if approved, may result in significant additional costs and longer review timelines.
- The City will require:
 - At least six (6) weeks notice in advance of construction if powered elements (e.g., bus shelters, digital information pillars) require temporary or permanent removal.
 - A minimum of two (2) weeks notice for the removal of non-powered elements (e.g., litter/recycling bins, benches, poster structures, newspaper corrals).

The City of Toronto manages a coordinated Street Furniture Program to oversee the installation, maintenance, and removal of street furniture elements within the public realm. Applicants are encouraged to consult the City's Vibrant Streets Guidelines, which include information on street furniture standards and coordination procedures. For more details, refer to the City's Vibrant Streets – Street Furniture Design & Policy Guidelines.

Engineering and Utility Requirements

HVM installations must be reviewed to ensure they do not compromise the design intent or functionality of existing infrastructure or engineering features within the public ROW. Examples of such features include sidewalks, curbs, catch basins, maintenance holes, streetlight or signal pole foundations, and utility chambers.

Where HVM will be installed near an intersection, driveway, access/fire route, or crosswalk, the application must clearly show these proposed changes to existing conditions through the addition of sightline plans, visibility analysis and turning paths, as appropriate. Include consideration for elevation, height and size of HVM obstructions to sightlines.

All HVM installations with subsurface components, such as foundations, must consider existing underground utility infrastructure.

- Prior to applying for an HVM Permit, the design must be circulated to **Toronto Public Utilities Coordinating Committee (TPUCC)** for review of potential conflicts and achieve a no conflict review status from all utility owners. Locates must be completed via Ontario One Call prior to excavation. Refer to the City's Municipal Consent Requirements for more information on when TPUCC coordination is required as well as for information on minimum clearances around existing utility infrastructure.
- When within 60 metres vicinity to a Toronto Transit Commission (TTC) infrastructure, the owner must submit an application to the TTC to assess impact. Refer to the TTC's Developer's Guide for more information on how to initiate a TTC technical review.

What is a Visibility Analysis?

A visibility analysis assesses sightlines and clear zones to ensure that HVM elements do not obstruct views critical for pedestrian and vehicular safety. This typically involves diagrams or studies showing how the placement, height, and size of barriers affect lines of sight at intersections, crosswalks, driveways, and fire routes. It is recommended to consult a qualified traffic engineer or civil engineer to conduct or review this assessment.

Emergency Services and Safety

Part 11 of the Ontario Building Code (OBC) sets out requirements for renovations of existing buildings. The performance level of a building subject to proposed construction must be evaluated as per Subsection 11.4.2. As per Sentence 11.4.1.1.(1), "The performance level of a building after construction shall not be less than the performance level of the building prior to construction".

It is the responsibility of the applicant to evaluate the impact of proposed HVM on nearby buildings, and to ensure that the performance level of those buildings is not reduced as a result of the proposed HVM.

HVM placement must conform with all relevant requirements of the OBC, including maintenance of:

- Egress routes from adjacent buildings,
- Firefighter access to adjacent buildings,
- Access to fire department connections at adjacent buildings, and
- Access to nearby hydrants.

In general, placement of HVM within exit discharge routes should be avoided. However, it is noted that in some cases it may be necessary to place barriers in front of exterior exit doors; for example: to incorporate HVM within the private property, for properties that have a credible threat to the building frontage, or to accommodate existing ROW obstructions.

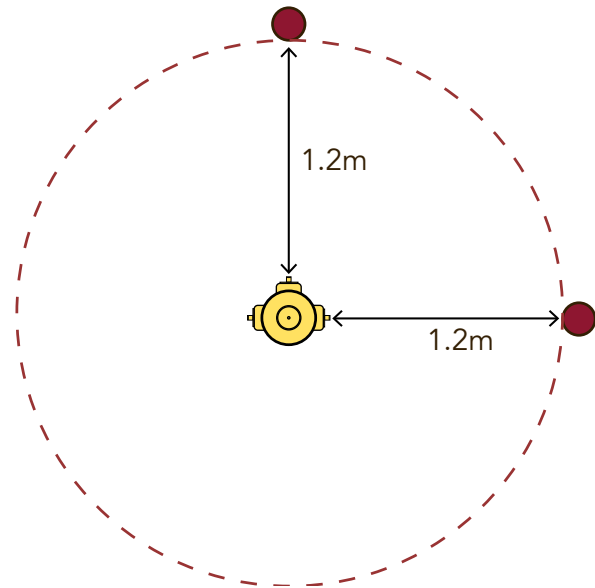


Figure 2. HVM placement near hydrants considering hose pressurisation

The United Kingdom's National Protective Security Authority (Centre for the Protection of National Infrastructure), a recognized leader in research on HVM in the public realm, collaborated on a study with the UK's Department for Transport that demonstrates, where bollards are placed in front of doors, impacts to pedestrian flow are minimized when:

- Bollards are located at least 3 metres from the building frontage,
- The bollard array is extended beyond the width of the door, to allow for crowds to diffuse, and
- The number of bollards in the path of egress is minimized. To design HVM where required in front of doors, a bollard should be placed at the centre of the door and then work outwards.

Refer to the UK Department for Transport's Traffic Advisory Leaflet 01/16 for more information on this study (see Other HVM Resources section).

The project's building code consultant or other responsible party should coordinate with the HVM consultants to develop the most effective protection scheme that maintains compliance with the OBC.

Site plans must highlight any existing fire routes near proposed HVM installations or those that may be obstructed, and include turning envelopes for fire truck apparatus in accordance with the City's Curb Radii Guidelines. Site plans should be reviewed by a licenced engineer, licenced architect, or registered building practitioner. Compliance of existing fire routes with municipal requirements, including TMC Chapter 880, must be maintained.

The Ontario Fire Code requires existing approved fire routes to remain unobstructed. If this is unavoidable, removable or operable HVM may be used, subject to approval by Toronto Fire Services (TFS), or the fire route may be altered to avoid obstruction. In all cases where proposed HVM would impact existing fire routes, it is recommended to consult with TFS regarding the most appropriate course of action. Review and approval of a site plan or, where required, an alternative solution proposal may be required.

Furthermore, a Site Access Procedures document must be submitted as part of the HVM Permit application and must reflect the TFS-approved plan. Site Access Procedures should include a site plan showing property access routes and locations of HVM, as well as a means by which the HVM can be disabled or removed to allow for access during an emergency (e.g. security contact details, operational procedures, key location, etc.).

Retractable systems must include a manual override to permit retraction in the event of a power failure. Additionally, depending on site conditions, the design of retractable systems may warrant safety features such as drop-arms or signal lights to minimize risks of premature entry while barriers are in motion.

Maintenance and Operations

Property owners are responsible for ongoing inspection, maintenance, and repair of their HVM encroachments in accordance with the terms of their **Encroachment Agreement**. City staff will not perform routine maintenance on privately owned HVM elements, and unresolved damage or deterioration may result in the City requiring removal at the owner's expense.

Maintenance of HVM varies depending on the type. General clean-up in and around the HVM will be needed. In addition to vegetation pruning and watering, planter beds and seat walls will require paint touch-ups, potential crack repair or other typical cleaning and repairs associated with hardscaping. Fixed bollards may need painting touch-ups, shroud replacement for dents, and potentially resealing the waterproof barrier at the base.

Removable/operable HVM requires regular testing including in extreme weather and emergency operations, repair and replacement of parts, and cleaning of dust, dirt and debris within the pit to maintain drainage. Some manufacturers offer paid maintenance plans, which may be helpful in keeping operable HVM in good condition for a longer lifespan.

The complete list of application submission requirements related to maintenance are outlined within Step 5 of Chapter 1; see Preparing an Application for HVM in the Public ROW. Further details on requirements for each are provided in this section.

All HVM measures proposed in the application must be covered either by a manufacturer's O&M Manual or by the MTP. A single MTP may address multiple HVM types if applicable. At a minimum, the O&M Manual or MTP should address:

- Inspection frequency and methods
- Routine cleaning and servicing
- Testing protocols for removable/operable HVM
- Long-term replacement and sourcing strategies for any custom or non-standard components that are not readily available "off the shelf" (e.g., decorative shrouds, specialty coatings, housings, integrated lighting or art features)

For purchased products (e.g., crash-rated bollards), the manufacturer-provided O&M Manual is expected to meet this requirement. However, if manufacturer-provided information is limited or not available, the applicant must submit an MTP. The MTP should address the items noted above and describe how the owner will ensure upkeep of HVM elements and components through the life of the Encroachment Agreement. An MTP is expected to be submitted for engineered solutions (e.g., impact-resistant designs for planters, sculptures), for which there is no manufacturer. An MTP may also be submitted to supplement manufacturer-provided information if the O&M Manual does not address all items noted above.

The Right-of-Way Maintenance Plan (ROWMP) is required when the HVM installation disrupts the City's ability to provide its usual services for the ROW, resulting in additional maintenance responsibilities for the applicant. Whereas the O&M Manual and MTP address maintenance of the HVM measures themselves, the ROWMP should address how the applicant will maintain the ROW, including at minimum:

- Winter maintenance tasks (e.g., snow and ice clearing, de-icing) and frequency required for any areas within the ROW where HVM reduces clear access to less than 1.5 metres
- Other maintenance and seasonal needs (e.g., repair of pavers, mowing), as applicable
- Responsible party/parties for performing the maintenance tasks (e.g., property owner, a contractor, etc.)
- Confirmation that maintenance will meet the terms of the Encroachment Agreement

Minimum Requirements for Drawing Sets

All HVM Permit applications must include a complete and clearly annotated drawing set, including site plans, detail drawings, elevations and sections. The drawing set allows reviewers to evaluate the siting, context, dimensions, and installation method of the proposed HVM elements, and to identify any conflicts with existing infrastructure, streetscape features, or accessibility requirements.

Drawing sets should be prepared by qualified design professionals, and landscaping components must be prepared by a Landscape Architect (OALA). Structural, civil work or custom elements must be stamped and signed by a licensed Professional Engineer (P.Eng.) where applicable.

The drawing set must include the following elements.

General Drawing Conventions

- All measurements must be in metric units
- A north arrow or compass orientation must be shown on all plans
- A legend identifying all symbols, shading, hatching, and linework
- Benchmark locations complete with descriptions and geodetic elevation references
- A topographic survey base plan showing accurate surface grades and existing conditions

Site Plan and Drawing Requirements

The drawing set must clearly illustrate the proposed HVM elements in plan, section, elevation, and detail as appropriate. Drawings should include the following information, as applicable, with relevant sections, elevations, and details referenced and called out on the site plan where appropriate:

- Proposed HVM product type, placement, spacing, and installation method (e.g., surface-mounted, embedded)

- Labelled existing site features and infrastructure, including:
 - Buildings and entrances
 - Footing depths
 - Street furniture
 - Pedestrian clearways
 - Hydrants, Fire Department Connections (FDCs), and fire routes
 - Utilities (above and below grade), vaults, transformers
 - Tree trunks (with diameter at 1.4 m above grade, as measured by an arborist or obtained from Open Data), and minimum Tree Protection Zone (TPZ) circles.
 - Tree pits, soil vaults, or other soil cell technologies where present.
 - Curb cuts, sidewalk ramps, crosswalks, driveways, street intersections
- Surface materials (concrete, asphalt, paving stone, etc.) around the HVM installation
- HVM product form, materials, dimensions, colours/finishes, and manufacturer/product name
- Street names, including public and private lanes, adjacent to the installation
- Site boundaries, including existing and proposed property lines
- Easements, where applicable
- Distances from HVM to property lines and building footprints
- Elevation references for adjacent buildings (e.g., Finished Floor Elevation)
- A Clearway Plan, clearly dimensioning HVM spacing, unobstructed pedestrian clearances and showing any proposed protrusions
- Sight triangles / daylight triangles showing motorists' sightlines at intersection
- Sidewalk slopes and grading around the proposed HVM

Supporting Information and Coordination

- Cross-check drawing information using Toronto Maps or other City-provided GIS platforms to identify on the site plan and verify whether:
 - The site is within a Business Improvement Area (BIA)
 - The site lies within a Heritage Conservation District (HCD)
 - There are any heritage-registered properties along the public ROW
- Include site photographs taken from relevant angles to confirm existing conditions and highlight any surface features proposed for removal or relocation. Ensure these features are accurately reflected in the drawings.

Custom or Engineered Components

- If the proposed HVM is engineered through impact analysis, includes non-standard footings, custom mounting assemblies, rebar layouts, or any structural deviation from catalogue products:
 - Clearly detail these in drawings
 - Ensure the drawings are signed and sealed by a Professional Engineer licensed in Ontario
 - Provide documentation (e.g., crash testing benchmarking or load calculations) to validate performance compliance

Failure to provide a complete and legible drawing set may result in delays to application processing or requests for resubmission. Refer to Chapter 3 for further examples of typical layouts and integration strategies.

Referenced Policies, Standards and External Guidance

Accessibility:

- [Toronto Accessibility Design Guidelines \(TADG\)](#)
- [Accessibility for Ontarians with Disabilities Act \(AODA\)](#)
- [Integrated Accessibility Standards Regulation \(IASR\)](#)
- [CNIB Clearing our Path: Guidance Tactile Walking Surface Indicators](#)
- [CNIB Clearing our Path: Protruding Objects and Other Obstacles](#)
- [CNIB Clearing Our Path: Colour and Brightness Contrast](#)

Public Realm design:

- [Complete Streets Guidelines](#)
- [Streetscape Manual User Guide](#)
- [Vibrant Streets Guidelines](#)
- [Toronto Municipal Code Chapter 743](#)
- [Toronto Municipal Code Chapter 813](#)
- [Tree Protection Policy and Specifications for Construction Near Trees](#)

Civil Engineering design:

- [Curb Radii Guideline](#)
- [Municipal Consent Requirements \(MCR\)](#)
- [TTC's Developer's Guide](#)

Emergency Services access:

- [Toronto Municipal Code Chapter 880](#)
- [Ontario Building Code](#)
- [Ontario Fire Code](#)

Other HVM Resources

The following industry standards and guidance documents may be helpful when planning, designing, or reviewing HVM measures:

- [Cybersecurity and Infrastructure Security Agency \(CISA\) – Vehicle Ramming Attack Mitigation Guide \(USA\)](#)
- [National Protective Security Authority \(NPSA\) – Public Realm Design Guide for Hostile Vehicle Mitigation \(UK\)](#)
- [National Protective Security Authority \(NPSA\) – Vehicle Security Barriers at Event Venues \(UK\)](#)
- [Ontario Traffic Council \(OTC\) – Hostile Vehicle Mitigation Guideline](#)
- [Australia-New Zealand Counter-Terrorism Committee – Hostile Vehicle Guidelines for Crowded Places](#)
- [UK Department for Transport - Traffic Advisory Leaflet 02/13 – Bollards and Pedestrian Movement](#)
- [UK Department for Transport - Traffic Advisory Leaflet 01/16 – The Influence of Bollards on Pedestrian Evacuation Flow](#)

3. Context-Sensitive Design Guidance and Precedents

Placement

This chapter offers HVM design guidance for typical conditions and can be used as a reference by design teams. It provides both general direction for HVM placement in the public right-of-way and more specific guidance for common contexts such as intersections and mid-block crossings. The “General” section outlines core siting principles and considerations that apply across all conditions, while the subsequent sections provide additional direction tailored to the unique requirements of intersections and pedestrian crossings.

General:

Where a *credible threat* to public safety exists, the HVM design may be required to deviate from accessibility standards. The following guidance is provided to inform and support a coordinated approach to implementing HVM in the *public realm* for various conditions. A successful strategy should prioritize safety for the most vulnerable user while minimizing impacts on accessibility in the *public ROW*.

- Where space allows, HVM elements must be located on private property to reduce encroachment into the public ROW and maintain a clear *pedestrian* path.
- Guided by the *TVRA*, prioritize protection at high-pedestrian areas (e.g., main entrances) and minimize disruption to movement patterns.
- Where a *TVRA* identifies the need for HVM to cross a pedestrian clearway:
 - o Align elements in a single line, perpendicular to the path of travel
 - o Maintain consistent spacing between elements
 - o Avoid overlapping or staggered placements, which can introduce visual clutter and obstruct pedestrian circulation or emergency egress

- At transit stops, ensure HVM placement allows sufficient clearance for passenger access to buses and for buses to deploy accessibility ramps.
- Maintain a minimum clearance of 0.45 metres from the curb face when siting HVM. Where bike lanes are present, ensure HVM placement does not encroach into the cycling facility or create pinch points.
- Where HVM is in the boulevard, use low plantings (<0.5 metres mature height) to improve visual deterrence and streetscape character. See Chapter 1 for owner responsibilities and ROW maintenance under the *Encroachment Agreement*, including winter maintenance responsibility.

Bollard Layout and Pedestrian Flow

When placing HVM across pedestrian zones, especially at building exits or high-traffic areas, extend arrays beyond the exit width and place bollards perpendicular to the path of travel.

For more detailed guidance, refer to:

[TAL 01/16 – Influence of Bollards on Pedestrian Evacuation Flow](#)

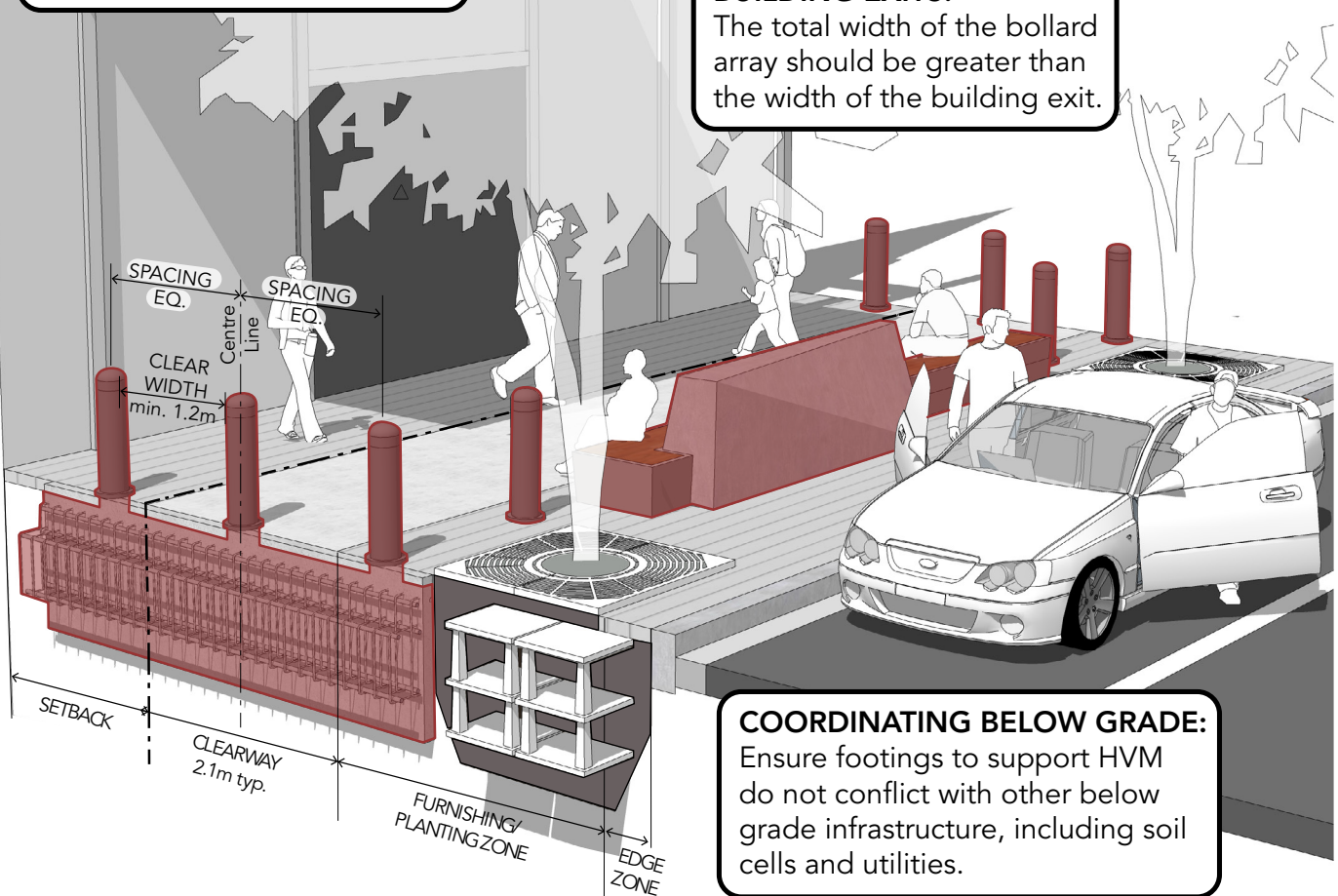
This technical advisory document, prepared by the UK Department for Transport, provides empirical data on how various bollard layouts impact pedestrian flow and evacuation efficiency.

CLEARWAY CROSSING:

If TVRA and VDA necessitate, place one bollard in the centre of the clearway and then space outwards from there.

BUILDING EXITS:

The total width of the bollard array should be greater than the width of the building exit.

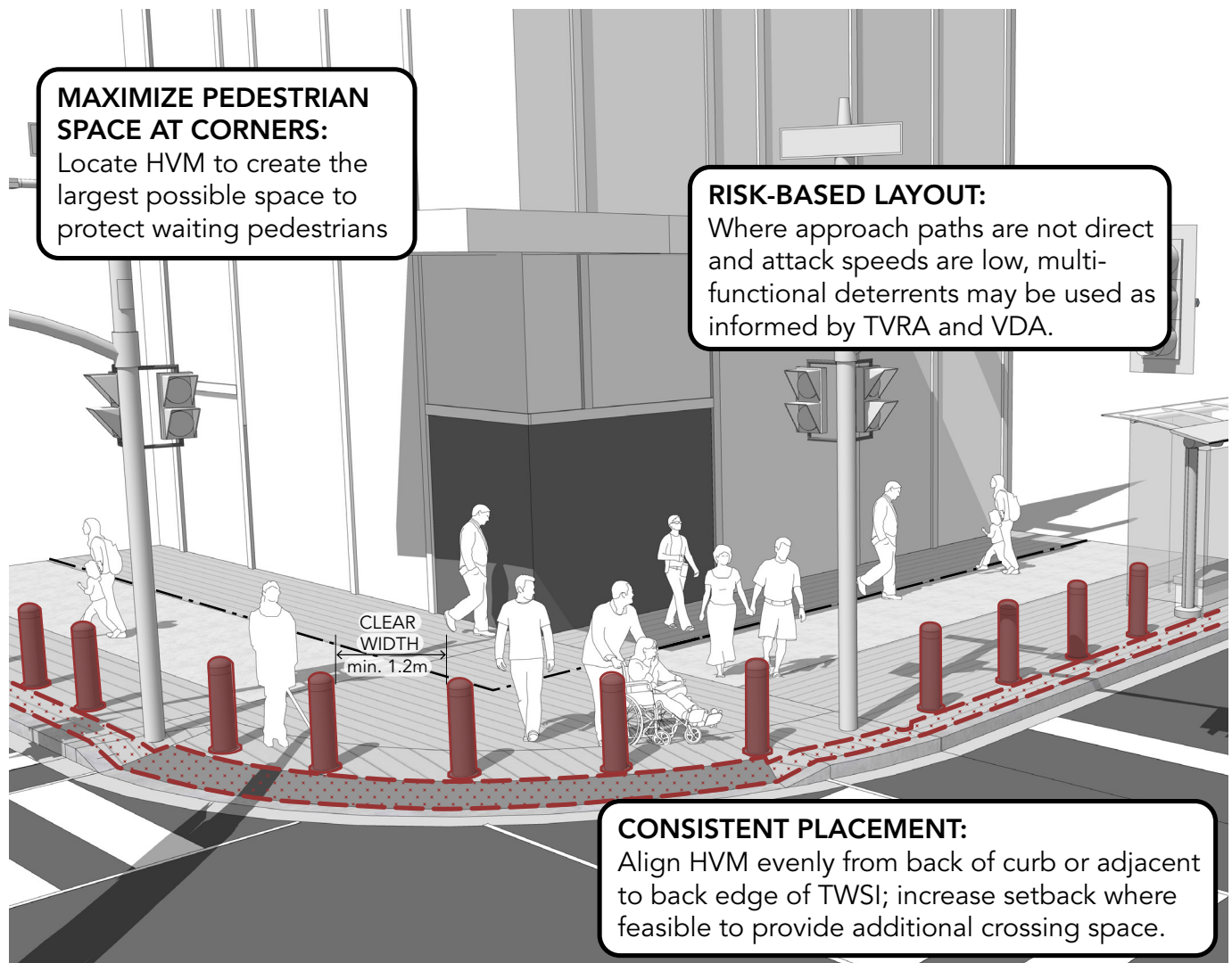


COORDINATING BELOW GRADE:

Ensure footings to support HVM do not conflict with other below grade infrastructure, including soil cells and utilities.

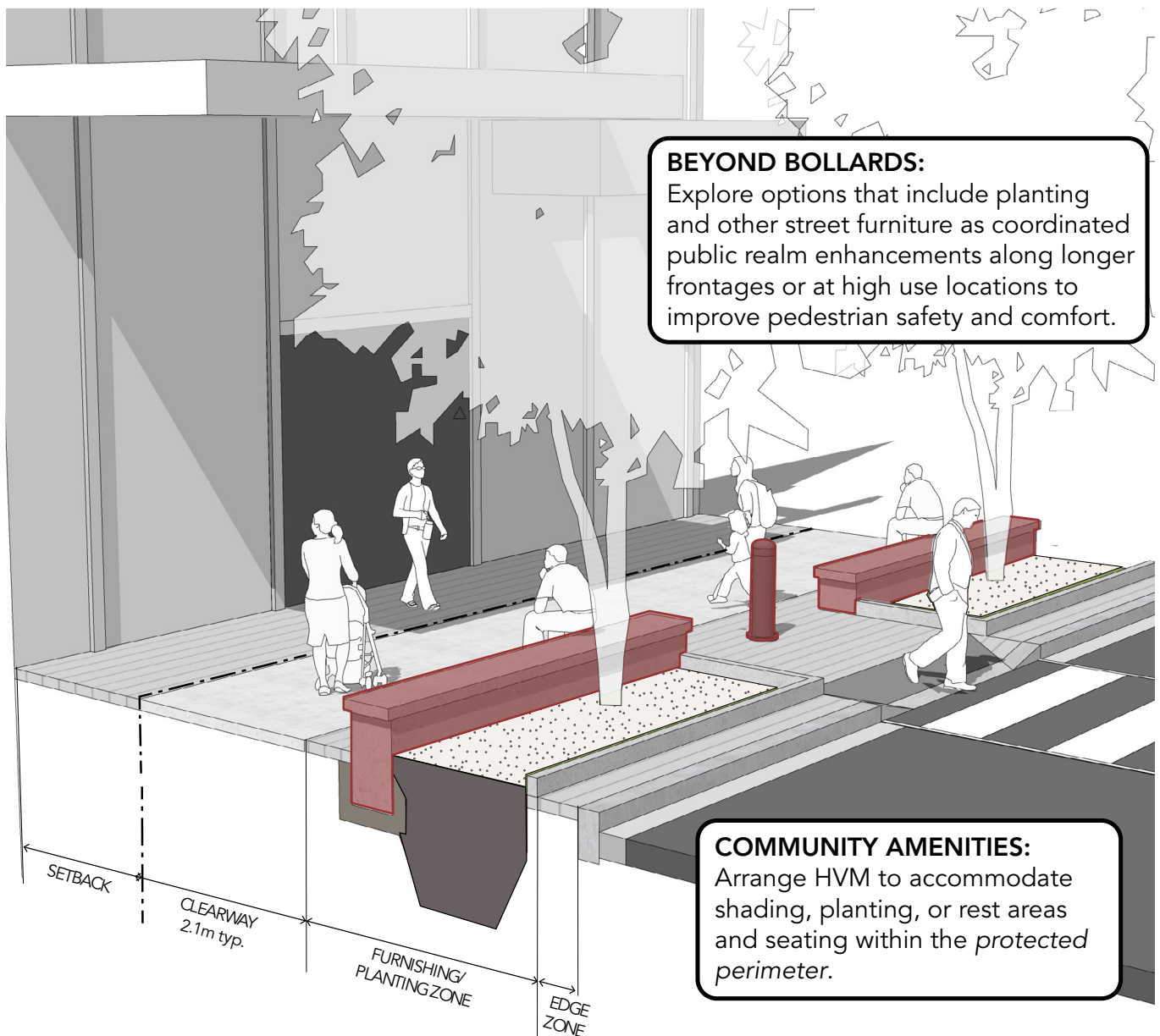
At Intersection:

- Align HVM to preserve clear pedestrian movement at curb ramps and crosswalks:
 - For depressed curb crossings: Consistently space HVM around the entire corner pedestrian zone.
 - For curb ramp crossings: Place an HVM element at the centre of the curb ramp and consistently space additional elements to protect remaining pedestrian zone.
- Locate HVM a consistent minimum of 0.45 metres from curb edge to maximize protected area for pedestrians waiting at intersections. Where HVM conflicts with Tactile Walking Surface Indicator (TWSI) locations, locate HVM immediately behind TWSI and maintain consistent spacing between HVM elements.
- In some contexts – particularly at intersections with high pedestrian volumes – additional setback may be required to reduce congestion at crossings and to ensure safe clearance for vulnerable road users (e.g., people using mobility devices). Design should be sensitive to local conditions and balance pedestrian safety and flow with protective objectives.
- Consider locations of traffic signal poles and other vertical elements at intersections when siting HVM to minimize obstructions to pedestrian movement and maintain required sight triangles to support pedestrian safety and driver awareness.



At mid-block pedestrian crossings:

- Consistently space HVM perpendicular to path of travel to facilitate clear pedestrian movement at crossings.
- Consider the use of multi-functional HVM (e.g. crash-rated planters, benches, etc.) with bollards to provide additional amenity (such as rest stops) and enhance public realm character near crossings.
- All HVM placements must maintain required sight triangles to support pedestrian safety and driver awareness.



Types of HVM

Where HVM is required to cross the public pedestrian clearway, bollards are preferred over other options due to their compact footprint and ability to maintain consistent clear spacing.

- Select the narrowest product that meets the required *crash rating*, and exclude or minimize decorative finishes or shrouds.
- Avoid irregular-shaped objects, protruding features or sharp edges within the clearway that could pose a hazard or obstruct mobility.

Outside the clearway, additional types of HVM should be considered to provide visual interest and reflect the character and context of the site.

- For larger sites, consider the use of multi-functional HVM in addition to bollards to contribute to a coordinated protection strategy while enhancing the public realm or adding public amenities.

Design Thoughtfully to Realize the Investment

Certified products will only offer effective protection if they are sited appropriately. An expensive, high-rated bollard installed in the wrong location may offer less protection than a more modest barrier that has been thoughtfully placed to align with the attack path and site vulnerabilities.

That's why before a product is installed, the TVRA and VDA are essential to inform the HVM design:

- Where barriers should be placed;
- What combination of solutions is needed;
- How the layout and spacing affect both protection and public use.

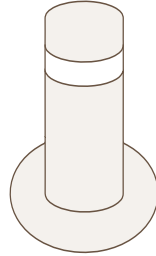
Applicants are encouraged to work closely with their *Qualified Security Consultant* and design professionals to ensure the HVM design addresses the identified site-specific risks and conditions.

Taking this risk-based, multidisciplinary approach will verify the investment made in HVM products makes the site meaningfully more secure.

Certified HVM Products

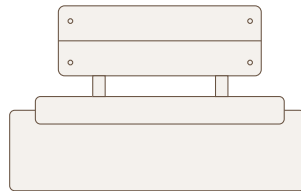
Off-the-shelf products that have been crash-tested to resist specific impact levels and address clearly defined credible vehicle threats.

Bollards



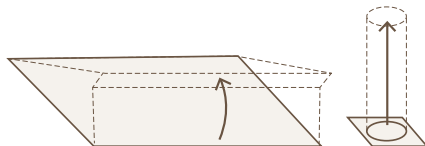
Most applications will include the use of certified bollards. Bollards provide effective protection for a variety of conditions and applications and can take a variety of forms to suit the character and aesthetic of the site. Certified bollards can be integrated, or hidden, in features such as bike racks, benches, planters, or trash bins.

Protective Benches and Seating Elements



When combined with engineered footings and using appropriate materials and heights, seating elements can provide places for people to rest with a consideration for protection.

Rising Barriers



Occasionally, operable barriers may be necessary for restricting vehicle access. Some applications may only require deployment during heightened risks, such as special events or festivals, and therefore most days they remain concealed within the sidewalk.

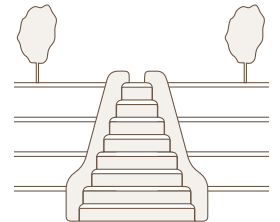
Multi-functional Deterrents

Elements that may not be certified for specific applications but may offer some level of physical protection or visual deterrence and site amenity.

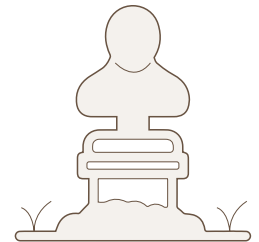
Raised Planters / Wall



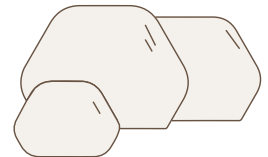
Terraced Landscape



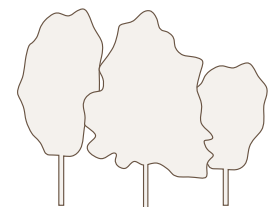
Public Art/Sculpture



Stone Features



Mature Trees



Context-sensitive Solutions

- HVM installation in the public ROW should respond to the surrounding urban context. Use products that are visually discrete or that fit the character and design aesthetic of the larger area, especially within Business Improvement Areas (BIA) or Heritage Conservation Districts (HCD) where specific design guidelines may apply.
- Where supported by the TVRA and VDA, applicants may consider combining certified HVM products with *physical deterrents*, such as large planters and mature trees, to achieve protection while supporting streetscape integration.
- Where supported by the TVRA and VDA, incorporate existing or new street furniture (e.g., benches, shrubbery, lighting) into the HVM design in areas that do not require rated products, in order to provide visual or physical deterrence and maintain visual cohesion.

Align HVM Type with Rating

- Use *certified products* where there are direct, higher-speed approach paths (e.g., intersections). Deterrents may be used in areas where approach paths result in low-speed impacts, provided they do not substitute certified protection where it is required.
- It is difficult to make general statements about the level of protection offered by non-rated elements because their effectiveness is dependent on multiple variables such as the element's type, size, shape and material, as well as the nature of the vehicle impact and how the element responds – whether by overturning, sliding or crushing. As a very rough guide, features that have the following characteristics may offer some protection, but they cannot be applied without engineering evaluation; the HVM consultant or a Professional Engineer must provide a design.
 - At least 600 mm tall,
 - Inset within the ground/sidewalk by at least 150 mm, and
 - Weigh at least 2300 kg.
- Visual deterrent elements may be acceptable in discrete locations to help bridge gaps in protection that might exist due to existing site conflicts such as underground utilities. Where possible, they should be used where speeds are low, for example along parallel approach paths rather than perpendicular, or where the presence of street parking may help reduce risks.
 - Visual deterrents should be used knowing that physical protection is not provided.

Appendices



Cost Estimating

Property owners should consider costs associated with product selection. Certified products are typically proprietary designs, which can be expensive. Additionally, often times a very limited number of suppliers have products that suit the unique site conditions and functional needs of each property, making competitive procurement challenging. Operable HVM require ongoing maintenance plans for the lifetime of the product, and although small in comparison, fixed solutions may require sleeve replacement or repair.

Estimated Budgetary Costs for Certified and Engineered HVM Products

HVM Product Category	Unit Count / Section Dimension	Material Cost	Installation Cost	Cost Range (Based on Estimate Accuracy Range -30% to +50%)	Maintenance Cost Budget Estimate (per year)
Certified Products					
Certified bollard with standard foundation	1 no.	\$10,700	\$2,200	\$9,100 - \$19,400	\$1,640
Certified bollard with shallow foundation	1 no.	\$8,900	\$1,600	\$7,400 - \$15,800	\$1,640
Certified Operable bollard	1 no.	\$20,000	\$5,000	\$17,500 - \$37,500	\$2,120
Protective Planter	1 no.	\$9,000	\$1,600	\$7,500 - \$16,100	\$2,700
Protective Seat/Bench	1 no.	\$3,500	\$1,600	\$3,100 - \$6,600	\$1,500
Engineered Solutions					
Freestanding Wall	1m long wall (1.3m H)	\$900	\$1,400	\$1,700 - \$3,500	\$710
Raised Planter (with Concrete Bed)	3m x 2m x 1.1m (LxWxH) section	\$3,700	\$6,500	\$7,200 - \$15,300	\$2,700

Estimated Budgetary Costs for Optional Add-Ons for Certified Products

Add-on Materials cost for Certified Bollard	Unit Count / Section Dimension	Material Cost	Cost Range (Based on Estimate Accuracy Range -30% to +50%)
Custom Shroud	1 no.	\$2,000	\$1,500 - \$3,100
Custom Colour	1 no.	\$1,200	\$900 - \$1,900
Premium Materials Bollard	1 no.	\$4,000	\$2,900 - \$6,100
Illuminated Top Cap Bollard	1 no.	\$3,200	\$2,300 - \$4,900

1. The cost estimate is classified as a Class 5 Rough Order of Magnitude (ROM) according to the standards of the Association for the Advancement of Cost Engineering. The accuracy range has been determined to be -30% and +50%.
2. The base date of estimate is Q2 2025, with prices shown in Canadian Dollars.
3. The dimensions and quantities included in this estimate are based on typical reference values and conceptual design assumptions. They are intended for preliminary budgeting purposes only. Property owners should request quotes for their sites.
4. All unit rates are from online suppliers' quote and previous project data. The relevant installation or placement cost are included.
5. Cost Range estimate for Certified Products include shipping costs, assuming the products are shipped from a location in North America. Add-on material costs represent the extra cost in addition to the cost of the certified product.
6. All indirect costs, such as but not limited to mobilization, site access and site security are excluded. Contractor's profit & overhead, risk contingency and client soft costs are excluded.
7. The maintenance cost of bollard generally includes regular inspection, cleaning, corrosion prevention, foundation and stability checking and winter maintenance.
8. The maintenance cost of planter wall generally includes inspection, cleaning, vegetation control and foundation and stability checking.
9. The maintenance costs of operable bollards includes general inspection, maintenance and testing of mechanical components in addition to the maintenance activities described in item (7).

Frequently Asked Questions

1. Do I need to install HVM for my site?

HVM should only be proposed where a credible threat has been identified and documented through a Threat, Vulnerability, and Risk Assessment (TVRA). Before proposing installation in the public right-of-way (ROW), applicants must first demonstrate that placement on private property or lands is not feasible.

2. Can I install HVM in the public right-of-way?

Only under specific conditions. The City of Toronto will only consider installations in the public ROW if private property options are demonstrably infeasible. A Justification Letter and additional documentation (e.g., TVRA) are required.

3. What is a TVRA, and when is it required?

A Threat, Vulnerability, and Risk Assessment (TVRA) is a formal document prepared by a qualified security consultant (see FAQ #4) to assess the risk of hostile vehicle attacks. It is required for all applications and must explain both the need for HVM and the proposed mitigation approach. Construction and design details do not need to be provided within the TVRA; these are required to be provided in the applicant's drawing set.

4. What qualifies as a "Qualified Security Consultant" for preparing a TVRA?

A Qualified Security Consultant must have:

- 10 years' experience conducting security risk assessment or designing HVM, or
- 5 years' experience in either area and hold a relevant designation (e.g., ASIS Physical Security Professional (PSP) or Certified Protection Professional (CPP), or be a Licensed Professional Engineer, or hold an equivalent engineering license recognized in another jurisdiction).

It is the responsibility of the property owner/ applicant to verify the consultant's qualifications.

5. Can I use decorative or non-certified elements like planters or benches as HVM?

Decorative or non-certified elements, such as boulders, trees and certain surface-mounted planter pots, may be considered only as part of a broader HVM strategy that is informed by a TVRA and VDA. These elements alone are not designed to stop a vehicle attack, but they can contribute to visual and sometimes physical deterrence.

All non-certified features must also meet the other requirements of this document, including accessibility, streetscape integration, and operational considerations.

6. What if my proposed HVM layout conflicts with existing street furniture, trees, or utilities?

Revise your design to avoid such conflicts, or, if justified by the TVRA, request relocation in your application. Note that conflicts with utilities must be reviewed with TPUC before submitting your HVM encroachment application; consulting a Civil Engineer is recommended. For HVM elements within a tree protection zone, a tree injury permit from Urban Forestry may be required – please consult a qualified arborist prior to completing design, as recommended in this document.

7. Who is responsible for maintaining HVM?

The property owner is responsible for all maintenance in accordance with terms of the Encroachment Agreement. The property owner is also responsible for maintenance of landscaped or planted areas in which the HVM is placed and for snow and ice removal in areas where the clearance in the pedestrian clearway is reduced below 1.5 m. In these cases, a Right-of-Way Maintenance Plan must be submitted and approved as part of the application. Other documentation required to be submitted include Maintenance & Testing Plans or manufacturer's O&M Manuals.

Glossary of Terms

Accessibility & Public Realm

Furnishing Zone: The area of a sidewalk typically used for street furniture (e.g., benches, trees, bike racks). This zone serves as a buffer between pedestrian movement and vehicular traffic.

Pedestrian: In this document, “pedestrian” refers to all individuals traveling on foot within the public right-of-way, including those using mobility devices (e.g., wheelchairs, walkers) or visual aids (e.g., white canes). This definition ensures that accessibility considerations are fully integrated into all references to pedestrian movement, safety, and experience throughout the document.

Pedestrian Clearway, or “Clearway”: The unobstructed portion of a sidewalk reserved for pedestrian movement.

Public Realm: The publicly accessible spaces in the city, including streets, sidewalks, plazas, and parks, where HVM measures must be context-sensitive and maintain pedestrian comfort and aesthetics.

City Policies, Codes & Committees

Encroachment Agreement (EA): A legal agreement between the City and a property owner permitting the placement of a structure (e.g., HVM) within the public right-of-way. This agreement outlines the terms and conditions under which the encroachment is allowed. The EA usually remains valid until the encroachment is removed by the property owner or as may be required by the City.

Public ROW (Right-of-Way): Public land (typically sidewalks, roads, and boulevards) under the jurisdiction of the City.

TPUCC (Toronto Public Utilities Coordinating Committee): A committee that reviews applications affecting underground infrastructure in the City of Toronto.

HVM Types

Certified Product: A HVM product (e.g. bollard or barrier) that has been crash-tested and verified to meet established standards such as ASTM, PAS, or IWA.

Crash Rating: A formal designation indicating a barrier’s tested ability to stop a vehicle of a certain weight, speed, and penetration distance. Typically determined using standards like ASTM F2656, PAS 68, or IWA 14-1.

Engineered Solution: A custom-designed HVM installation, often used when certified products cannot be applied due to space or site constraints. May also be an adaptation to a certified product. Not crash-tested. Requires validation by a professional engineer.

Protected Perimeter: A continuous boundary of HVM measures that may include certified or engineered vehicle barriers to prevent unauthorized vehicle entry. HVM measures in a protected perimeter should be selected to mitigate the relevant vehicle threat.

HVM (Hostile Vehicle Mitigation): A range of physical and design measures implemented to protect people and property from vehicle-borne threats, including intentional ramming attacks (see VAW).

Physical Deterrent: A security element that physically prevents or slows down vehicular intrusion but is not certified or engineered for a specific threat. E.g. Large planters or mature trees.

Removable / Operable HVM: HVM products (e.g., retractable bollard or swing gate) that can be manually or electronically retracted or removed to allow temporary access, especially for emergency vehicles.

Visual Deterrent: Elements that signal security presence or discourage opportunistic hostile behaviour without providing a specified level of physical resistance (e.g., signage, decorative posts, shrubbery).

Risk & Security Analysis

ASIS International (ASIS): A global professional organization for security professionals, providing standards, certification, and educational resources to advance security management and practices.

CPP (Certified Protection Professional): A professional certification offered by ASIS International that recognizes mastery in security management, including design, operations, and risk assessment for both physical and organizational security.

PSP (Physical Security Professional): A professional certification offered by ASIS International that recognizes expertise in physical security risk assessment, design, and implementation of security measures.

Security Risk Assessment: See TVRA.

Threat: Any potential source of harm or adverse event that could negatively impact people, property, or operations. In the context of this document, a threat typically involves a vehicle being used intentionally to cause injury, damage, or disruption, such as through ramming (see VAW), unauthorized access, or delivering an explosive device (see VBIED).

Credible Threat: A hostile vehicle attack scenario that is considered both plausible and relevant to the site context. Credibility may be supported by precedent events and local site characteristics. Within these Guidelines, a credible threat is one that has been identified and validated through a TVRA, demonstrating that the risk is sufficiently reasonable and consequential to justify mitigation measures such as HVM.

TVRA (Threat, Vulnerability, and Risk Assessment): A risk-based evaluation of the likelihood and potential consequences of an attack at a specific site. Often used to inform the need for HVM. In the context of this document, installation of HVM measures must mitigate site-specific risk(s) of a potential credible hostile vehicle threat, as identified through a TVRA.

Vehicle Dynamics Assessment (VDA) or Vehicle Vector Analysis (VVA): An engineering review that quantifies the critical approach paths, speeds, and angles of a potential vehicle attack to guide HVM placement and specification.

Qualified Security Consultant (preparing TVRA): A Qualified Security Consultant must have either: (A) 10 years' experience conducting security risk assessments or designing HVM, or (B) 5 years' experience in either area and hold a relevant designation (e.g., ASIS PSP, CPP, or be a licensed Professional Engineer).

Threat Types

VAW (Vehicle as a Weapon): A type of attack in which a vehicle is deliberately used to harm people or property, typically by ramming into crowds or property.

VBIED (Vehicle-Borne Improvised Explosive Device): A vehicle used to deliver and detonate an improvised explosive device. VBIED attacks may target buildings, public spaces, or infrastructure.

Barrier Types & Technical Standards

ASTM F2656: The primary U.S. standard for crash testing of vehicle security barriers. It defines test vehicles, speeds, impact angles, and penetration criteria. Replaced DoS K-ratings.

ISO 22343-1: The new global standard for crash-rated barriers. Harmonizes previous standards (ASTM, PAS 68, IWA 14-1). Defines impact conditions and performance classes.

IWA 14-1: The former international standard issued by the International Workshop Agreement. Widely used before ISO 22343-1. Now considered superseded.

K-Rating (DoS Rating): Legacy rating system (e.g., K4, K8, K12) from the U.S. Department of State (DoS). No longer supported or updated. Replaced by ASTM F2656.

PAS 68: A former British standard for vehicle impact testing. Often used across Europe and Commonwealth countries. Now withdrawn in favor of ISO 22343-1.

HVM Permit Application Self-Assessment Form

To facilitate an efficient review process, HVM Permit applicants are strongly encouraged to complete and submit the below form with their application. The information may instead be submitted in an applicant-prepared form, provided that all items listed below are clearly addressed. Refer to the City's *Hostile Vehicle Mitigation on City Streets Guidelines for Private Property Owners* document for more information regarding the items in the form.

Question / Applicant Response	Select One
<p>1. Is it feasible to install HVM on private property?</p> <p>If yes, public ROW encroachment is not permitted. Please do not proceed with application. If no, you must provide a Justification Letter.</p>	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No, and I have attached a Justification Letter.</p>
<p>2. The proposed HVM impacts existing approved fire routes.</p> <p>If yes or unsure, contact Toronto Fire Services (TFS) at tfsinspections@toronto.ca for approval. It is strongly encouraged to obtain TFS approval before finalizing the HVM Permit application.</p>	<p><input type="checkbox"/> Yes, and I have record of TFS approval (attach proof*), or understand that I must obtain it before an HVM Permit can be granted.</p> <p><input type="checkbox"/> No</p>
<p>3. The proposed HVM requires work within a Tree Protection Zone or may otherwise result in the injury or removal of a tree.</p> <p>If yes or unsure, consultation with an arborist prior to finalizing the HVM Permit application is strongly encouraged. You may be required to obtain a Permit to Injure or Remove Trees under the City of Toronto's Tree Protection Bylaws.</p>	<p><input type="checkbox"/> Yes, and I have obtained a Permit to Injure or Remove Trees (attach proof*), or understand that I must obtain it before an HVM Permit can be granted.</p> <p><input type="checkbox"/> No</p>
<p>4. The proposed HVM requires the installation of below-grade components (e.g., footings).</p> <p>If yes, you must obtain Toronto Public Utilities Coordinating Committee (TPUCC) clearance. It is strongly encouraged that clearance is obtained prior to finalizing the HVM Permit application.</p>	<p><input type="checkbox"/> Yes, and I have obtained TPUCC clearance (attach proof*), or understand that I must obtain it before an HVM Permit can be granted.</p> <p><input type="checkbox"/> No</p>
<p>5. The proposed HVM requires the installation of below-grade components and is within 60 metres of a TTC tunnel or other underground structure.</p> <p>If yes, TTC Technical Review may be required. It is strongly encouraged to obtain TTC approval prior to finalizing the HVM Permit application.</p>	<p><input type="checkbox"/> Yes, and I have received TTC approval (attach proof*), or understand that I must obtain it before an HVM Permit can be granted.</p> <p><input type="checkbox"/> No</p>

Question / Applicant Response	Select One
<p>6. The proposed HVM reduces the clear width anywhere along the pedestrian clearway to less than 1.5 m, and/or is located within a planted or landscaped area.</p> <p>If yes, you agree to accept right-of-way maintenance responsibility for the encroachment area and must submit a Right-of-Way Maintenance Plan with your application.</p>	<p><input type="checkbox"/> Yes, and I understand I will be responsible for right-of-way maintenance and will submit a Right-of-Way Maintenance Plan with my application.</p> <p><input type="checkbox"/> No</p>
<p>7. The proposed HVM is located in a Heritage Conservation District or is associated with a Heritage Property and requires a permit.</p> <p>Consult with a heritage consultant or with the City’s Heritage Planning unit (heritageplanning@toronto.ca) to understand permitting requirements. It is strongly encouraged that Heritage Permits are obtained prior to finalizing the HVM Permit application, if applicable.</p>	<p><input type="checkbox"/> Yes, and I have obtained a Heritage Permit (attach proof*), or understand that I must obtain it before an HVM Permit can be granted.</p> <p><input type="checkbox"/> No</p>
<p>8. The proposed HVM contains engineering details, such as reinforcing steel details or foundation design details, and/or includes modifications to a manufactured product.</p>	<p><input type="checkbox"/> Yes, and drawings depicting these details have been signed and sealed by a Professional Engineer licensed in Ontario.</p> <p><input type="checkbox"/> No</p>

* The City will not re-review or re-approve these prior permits during the HVM Permit review process. Applicants are solely responsible for ensuring that all prerequisite approvals remain valid and current for the final design submitted. Any changes to the design after obtaining these prerequisite approvals may require the applicant to secure updated approvals from the relevant authorities.

TVRA Cover Sheet

A Threat, Vulnerability, & Risk Assessment (TVRA) report is required to be submitted with all applications. The Qualified Security Consultant must provide the following information, either by completing this form or by submitting an equivalent consultant-prepared cover sheet that clearly addresses all of the items listed below. Use of this template is encouraged to support brevity and consistency in review. In the 'Reference to TVRA' column, identify the exact section number and/or page(s) in the TVRA where this information can be found.

Professional responsible for preparing the enclosed TVRA

I, the undersigned, confirm that I meet the definition of a Qualified Security Consultant as outlined in the City of Toronto's Hostile Vehicle Mitigation on City Streets - Guidelines for Private Property Owners. I possess the necessary experience and expertise to assess security risks and prepare this Threat, Vulnerability, and Risk Assessment.

I understand that knowingly making a false declaration may result in rejection of this application, disqualification from future submissions, and/or referral to the appropriate regulatory body.

Name		Credentials (e.g. PSP, P.Eng.)	
Firm/Organization		Signature	
Years of Experience		Date	

(The City reserves the right to request supporting documentation at its sole discretion.)

Question	Response / Selection	Reference to TVRA
1. What type(s) of threat are you seeking to mitigate? (Check all that apply)	<input type="checkbox"/> Vehicle-As-A-Weapon (VAW) <input type="checkbox"/> Vehicle-Borne Improvised Explosive Device (VBIED) <input type="checkbox"/> Other: _____	[e.g. Section 2.1 - Threat Scenarios]
2. Which alternative mitigation options have been evaluated and excluded? Provide a brief explanation and reference the relevant analysis.	(Applicant to fill in)	[e.g. Section 3.3 - Alternatives Assessment]
3. What asset(s), people, or areas are being protected? Provide a clear description. (e.g., pedestrians walking on the sidewalk, patrons exiting the building and gathering on private property)	(Applicant to fill in)	[e.g. Section 2.2 - Consequence Assessment]
4. Have you completed a Vehicle Dynamics Assessment (VDA)? (Typically only applies if the threat being mitigated is a VAW)	<input type="checkbox"/> Yes <input type="checkbox"/> No	[e.g. Appendix 1 VDA Report]
5. What type of HVM measure are you proposing? (Check one or more)	<input type="checkbox"/> Certified Product, and I have attached crash test certificates by a third-party testing agency. <input type="checkbox"/> Engineered Product, and I have attached stamped drawings (P.Eng.). <input type="checkbox"/> Other, and I have attached relevant product data.	[e.g. Section 4.1 - Proposed Mitigation Measures]

Disclaimer

The City reserves the right to review, accept, or reject any application based on its compliance with applicable policies, technical requirements, and public interest considerations. Adherence to these Guidelines does not guarantee approval of any specific Hostile Vehicle Mitigation (HVM) application.

These Guidelines are intended to provide guidance on the planning, design, and approval process for HVM installations in the public right-of-way within the City of Toronto. They do not constitute legal or engineering advice and should not be interpreted as replacing applicable laws, by-laws, codes, or professional standards.

These Guidelines reflect the current policies, procedures, and standards of the City of Toronto as of the date of publication. They are subject to change without notice. Applicants are responsible for confirming that they are working with the most recent version of the Guidelines and for ensuring compliance with any updates to relevant legislation or City requirements.

References to HVM products, manufacturers, or suppliers within this document are for illustrative purposes only and do not imply endorsement by the City of Toronto. Given the evolving nature of the marketplace, the City does not guarantee the ongoing availability, suitability, cost or performance of any specific product or provider listed or described herein.

The issuance of a permit by the City does not constitute a review, validation, or approval of the effectiveness of any HVM design, the selection of HVM products, or the adequacy of installation methods. Responsibility for the appropriate selection, specification, and installation of HVM measures rests entirely with the applicant and their qualified consultants.

In the event of any conflict between the content of these Guidelines and applicable law, including the Toronto Municipal Code, Ontario Building Code, or Accessibility for Ontarians with Disabilities Act (AODA), the applicable law shall prevail.

Hostile Vehicle Mitigation on City Streets

Guidelines for Private Property Owners

October 2025

Version 1.0