Unit VIII
Site and Layout Design Guidance

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Unit Objectives

Recognize basic land use planning, landscape, site planning review, and evaluation.

Identify site planning concerns that can create, reduce, or eliminate vulnerabilities and understand the concept of "Layers of Defense."

Compare the pros and cons of barrier mitigation measures that increase stand-off or create controlled access zones.

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Unit Objectives

Identify the positive and negative aspects of mitigation approaches for entry control and vehicle access, signage, parking, loading docks, lighting, and site utilities.

Explain the basic concepts of Crime Prevention Through Environmental Design (CPTED) and its applicability to building security against terrorism.

Apply these concepts to an existing site or building and identify mitigation measures needed to reduce vulnerabilities.

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Layout and Site Design

Layout Design

Siting

Entry Control and Vehicle Access

Signage

Parking

Loading Docks

Physical Security Lighting

Site Utilities

References

FEMA Building Vulnerability Assessment Checklist, Chapter 1, page 1-46, FEMA 426

Site and Layout Design Guidance,Chapter 2, FEMA 426

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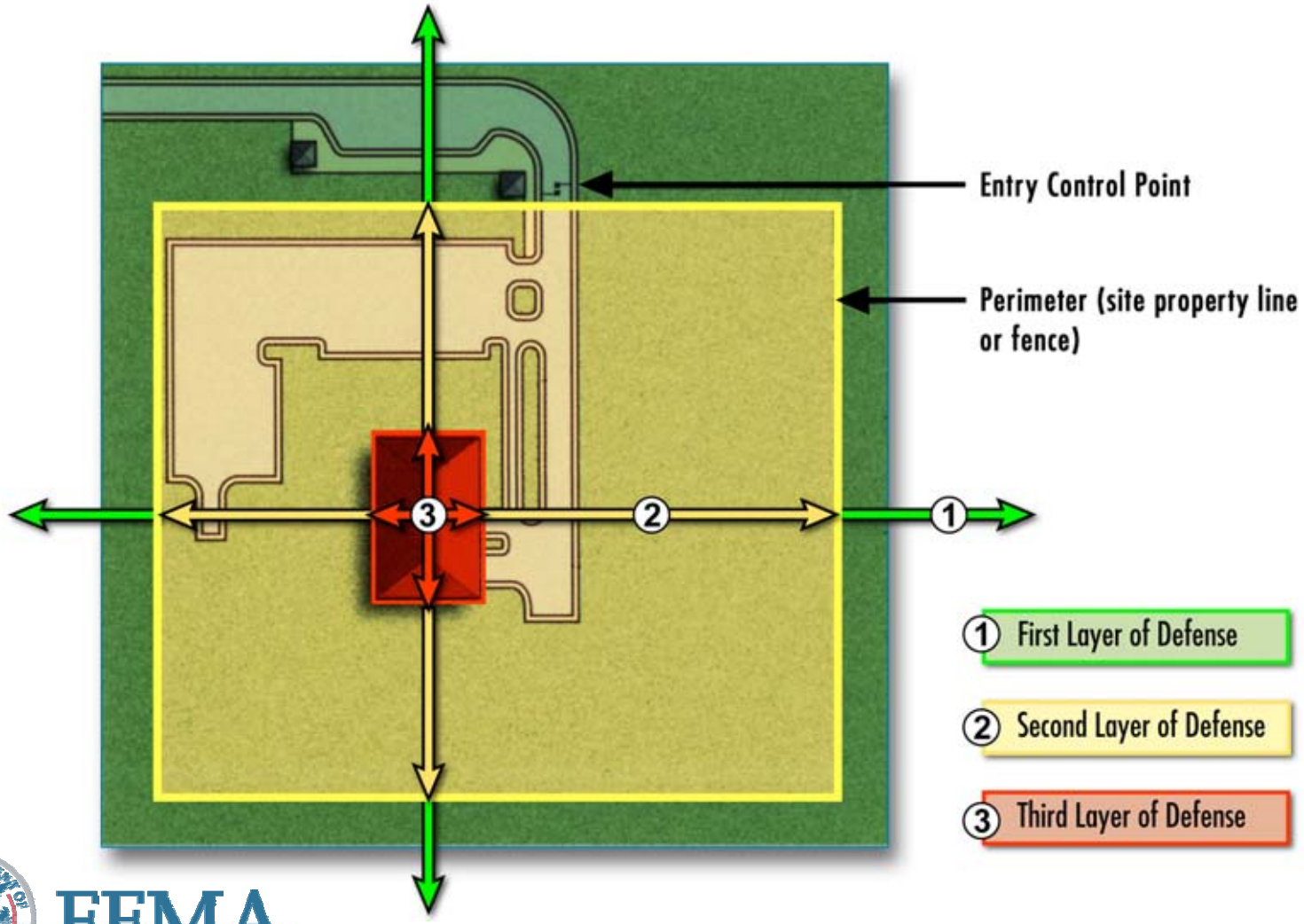
Layers of Defense



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Identify Adjacent Hazards

First Layer of Defense

Note the large fuel storage and distribution facility in the vicinity of the office building being assessed.

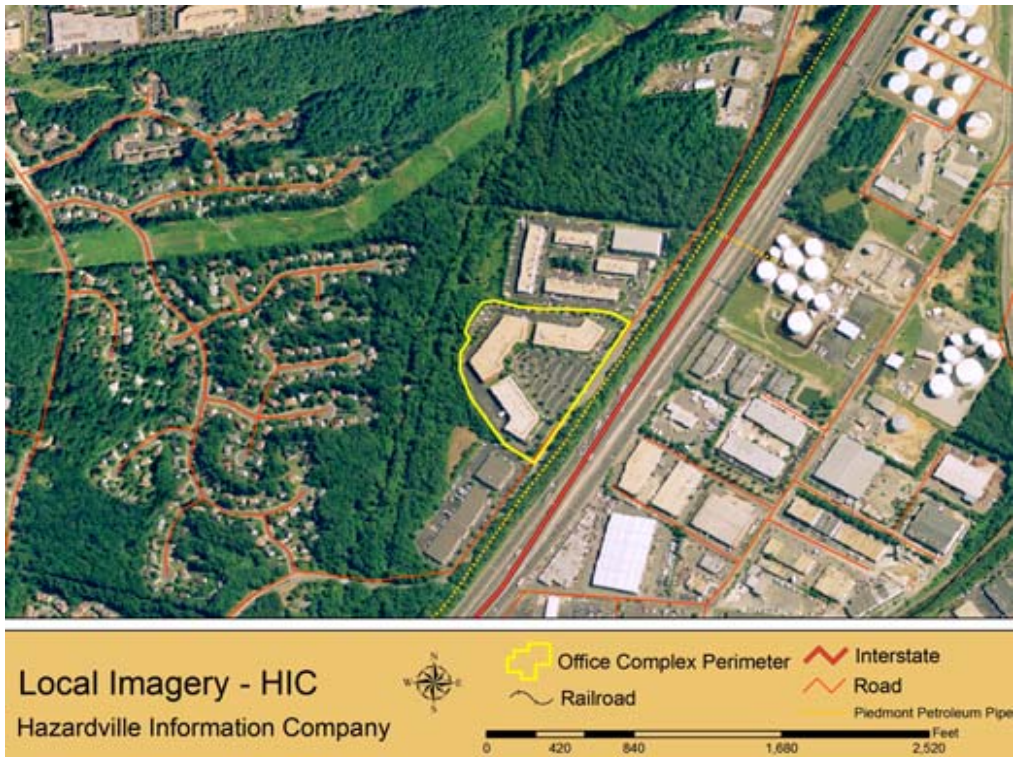

Figure 2-1: Example of Using GIS to Identify Adjacent Hazards, page 2-5

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Layout Design

First Layer of Defense

Clustered facilities

Dispersed facilities

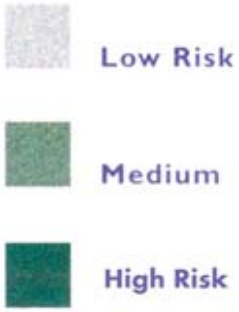

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Figure 2-2: Clustered versus dispersed, page 2-8

Layout Design

First Layer of Defense

Orientation has a significant impact on making the building visible to aggressors.

Enhance surveillance opportunities while minimizing views into the building.

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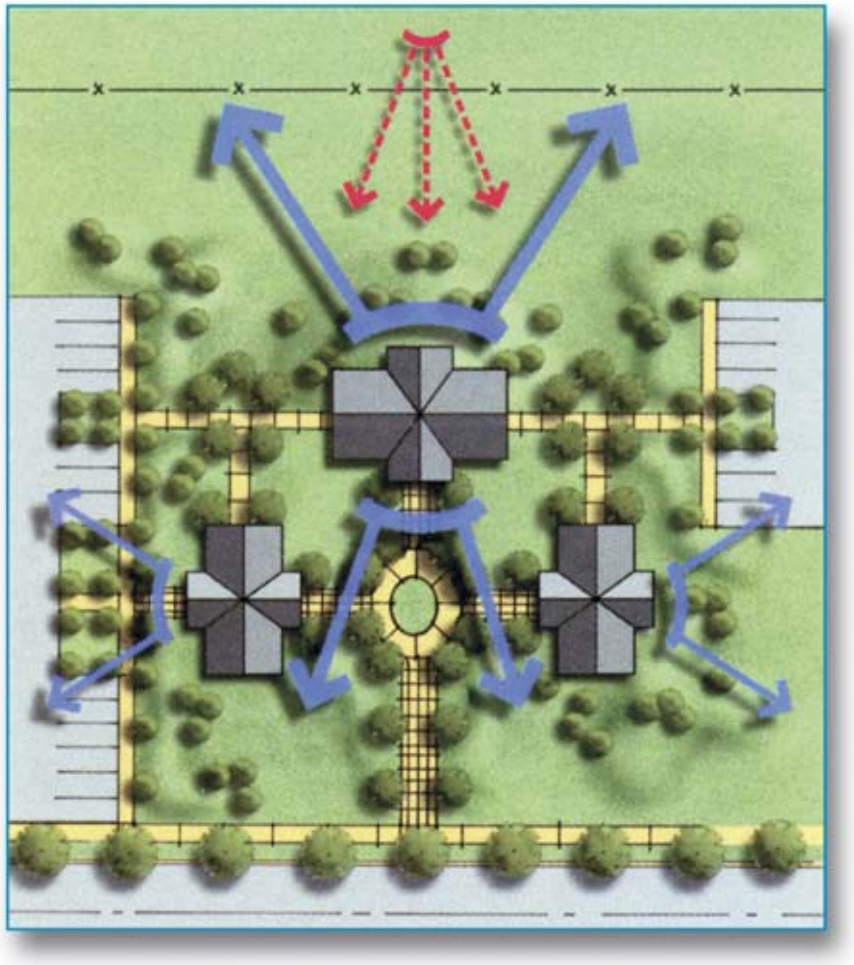

Figure 2-3: Lines of Sight, page 2-8

Siting

First Layer of Defense

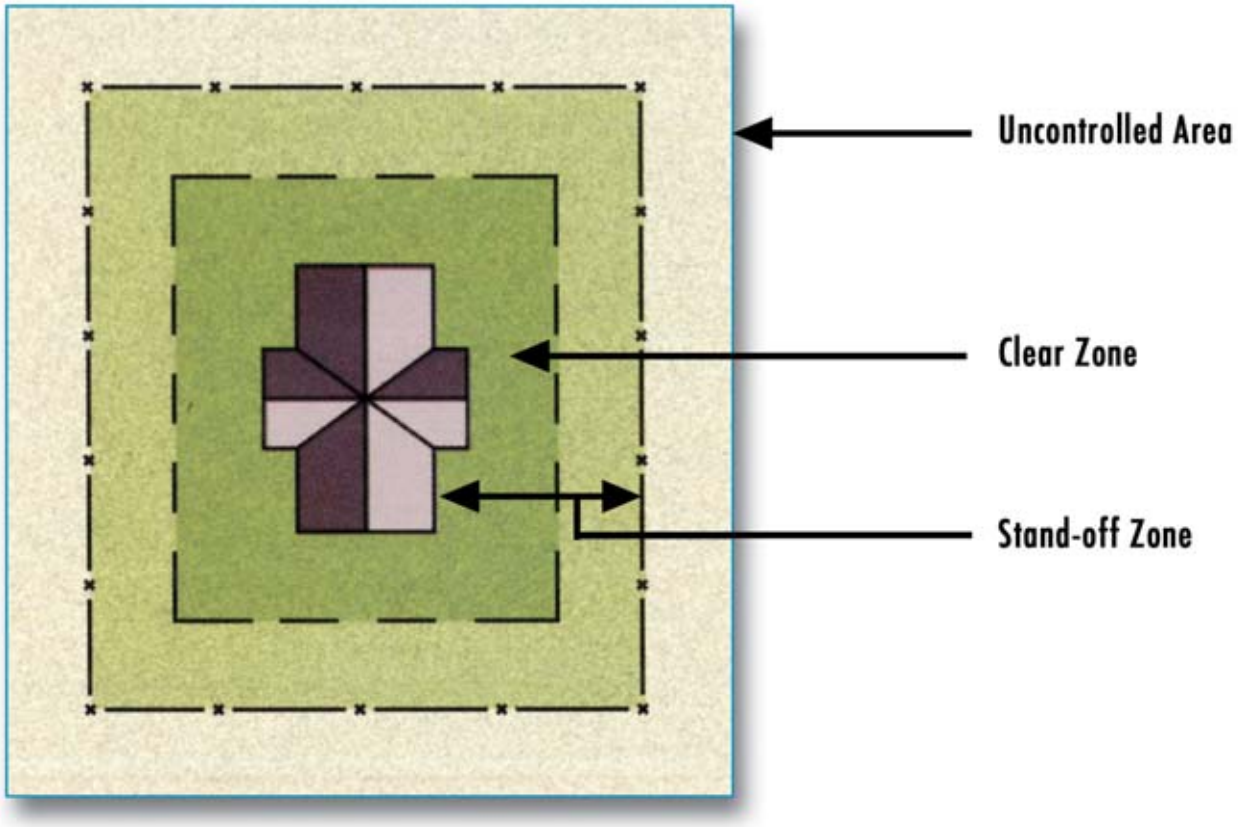

Figure 2-7: Clear Zone with Unobstructed Views, page 2-21

Siting

First Layer of Defense

Stand-off Distance

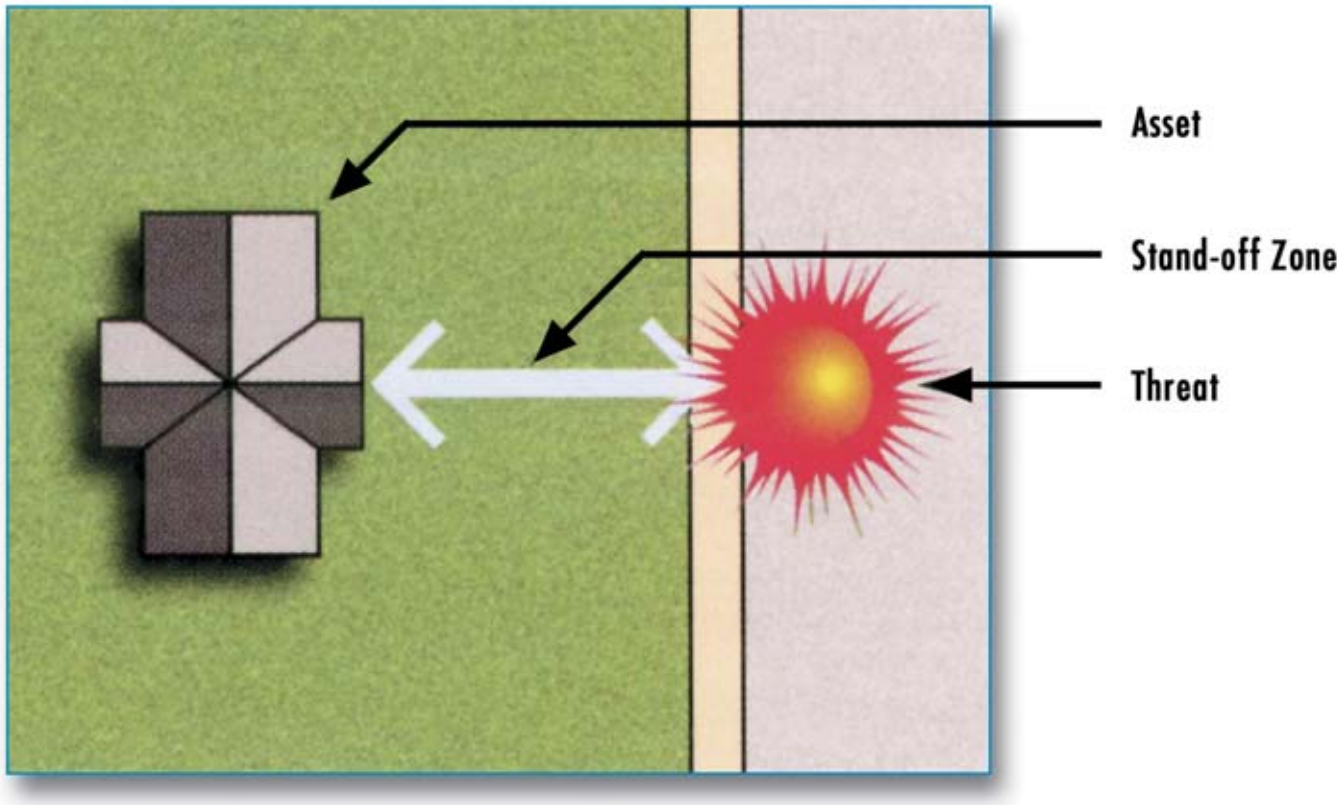

Figure 2-8: Concept of Stand-off Distance, page 2-22

Siting

First Layer of Defense

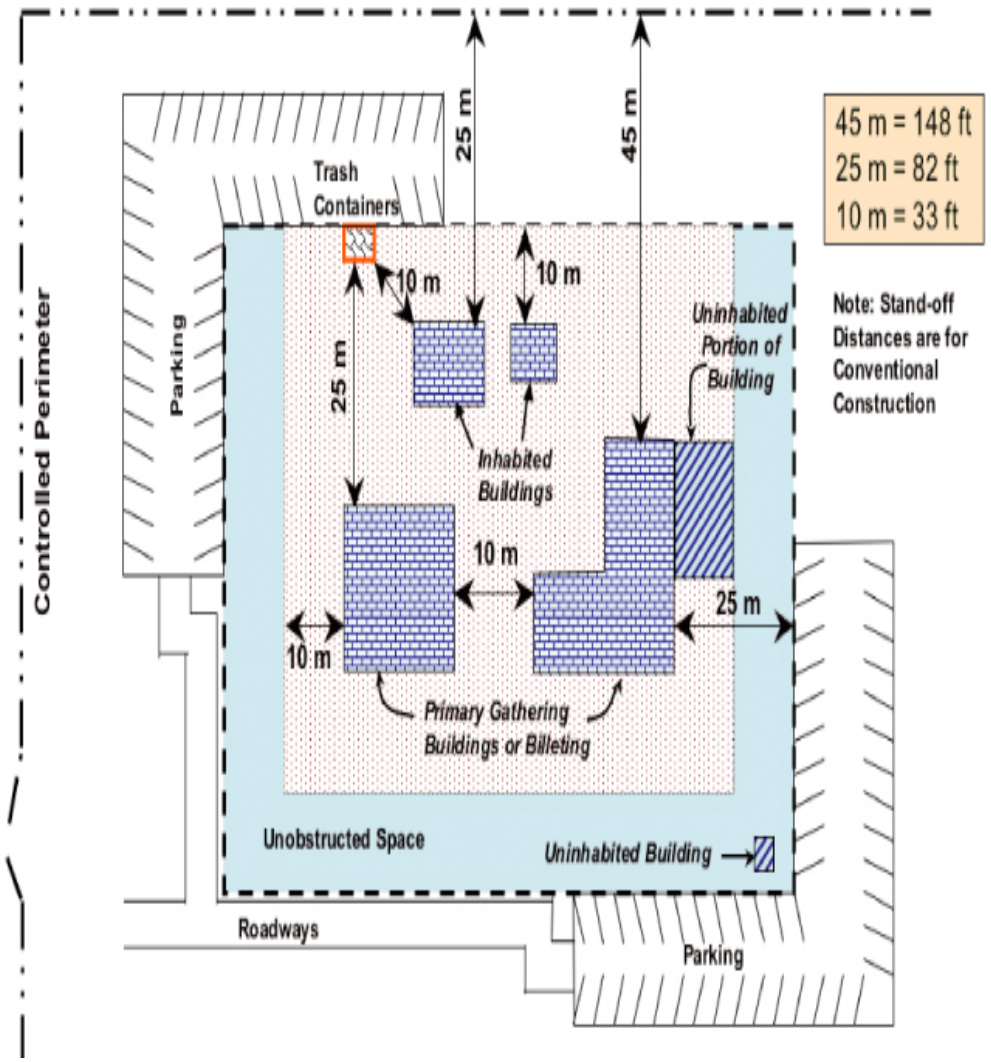

Figure 2-9: Stand-off distance and building separation, page 2-23

Siting

First Layer of Defense

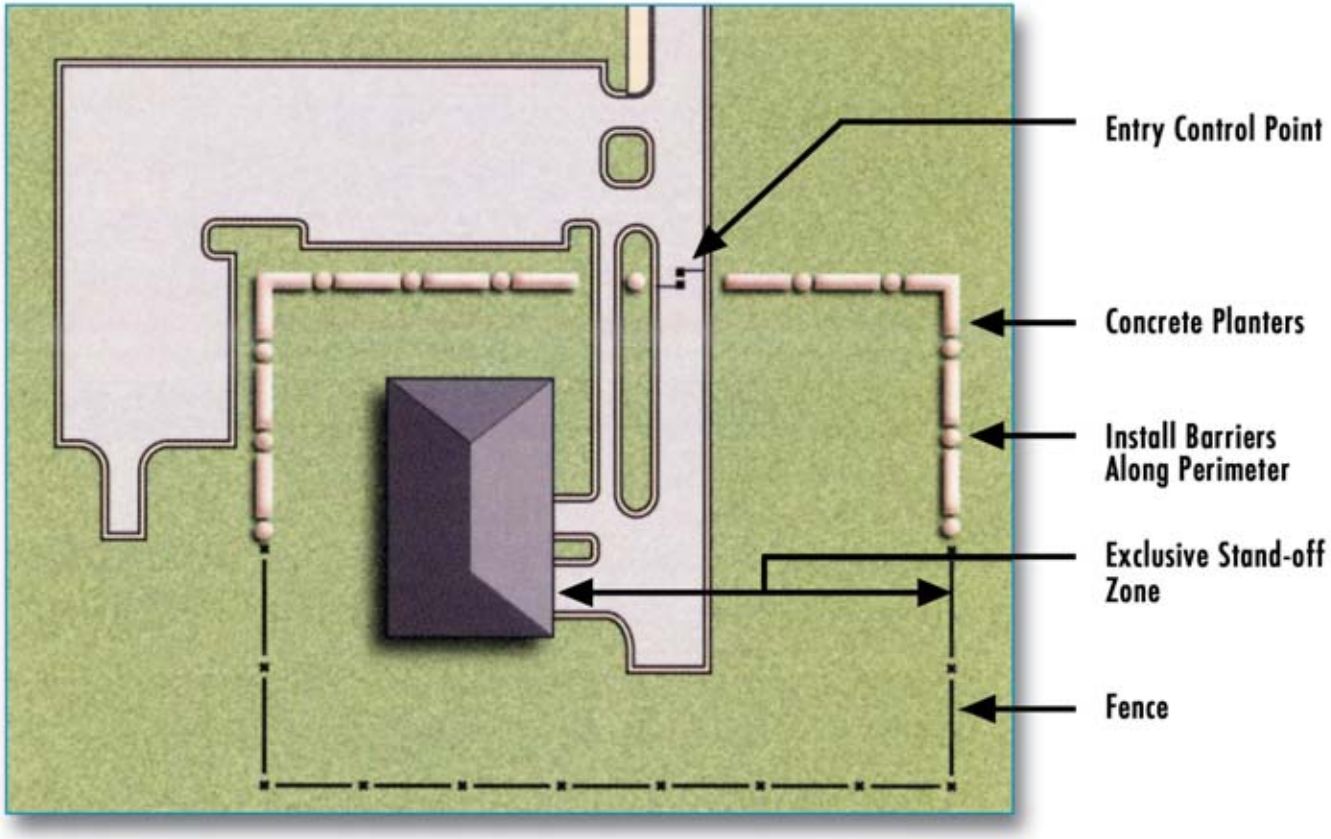

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Figure 2-11: Application of perimeter barrier elements, page 2-28

Entry Control/Vehicular Access

Prevent unauthorized access

- Avoid traffic queuing
- Rejection routes
- Search area out of traffic flow

Traffic calming

- Avoid high speed approaches
- Commercial vehicle gate

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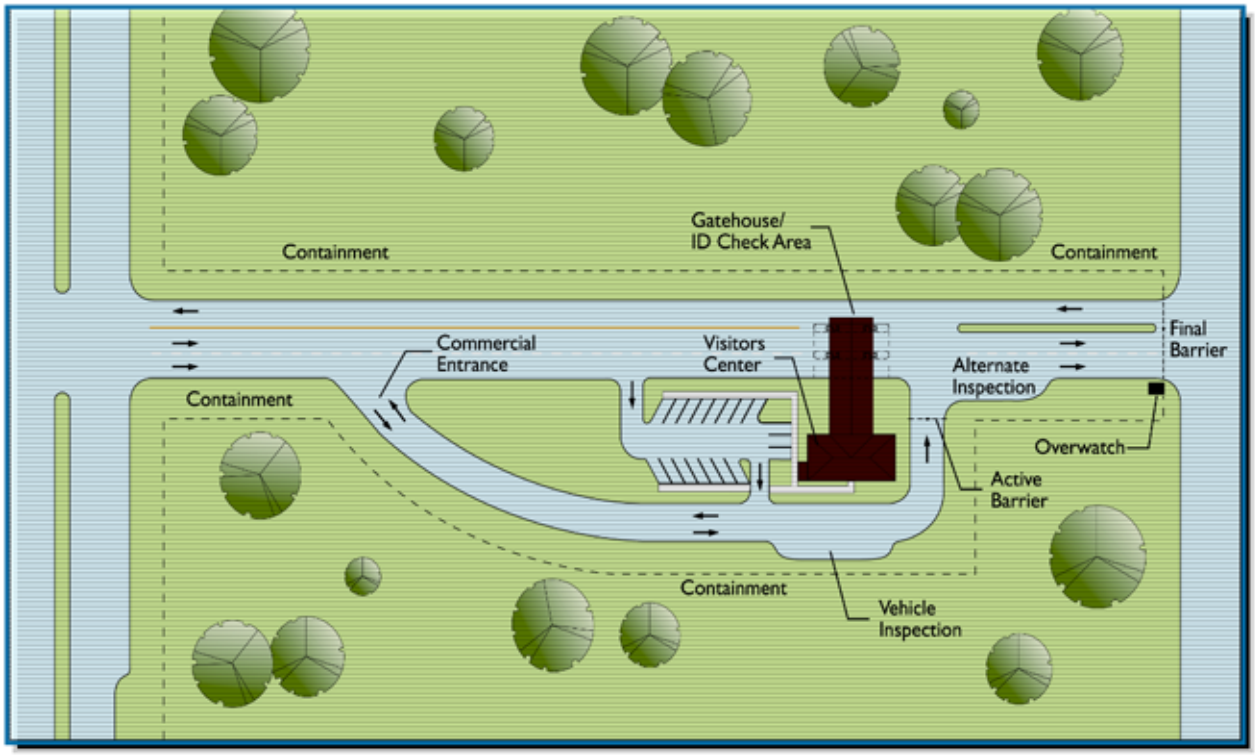
Entry Control/Vehicular Access and Roadway Design

First Layer of Defense



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Site Access and Entry Control

First Layer of Defense

Entrance

Exit

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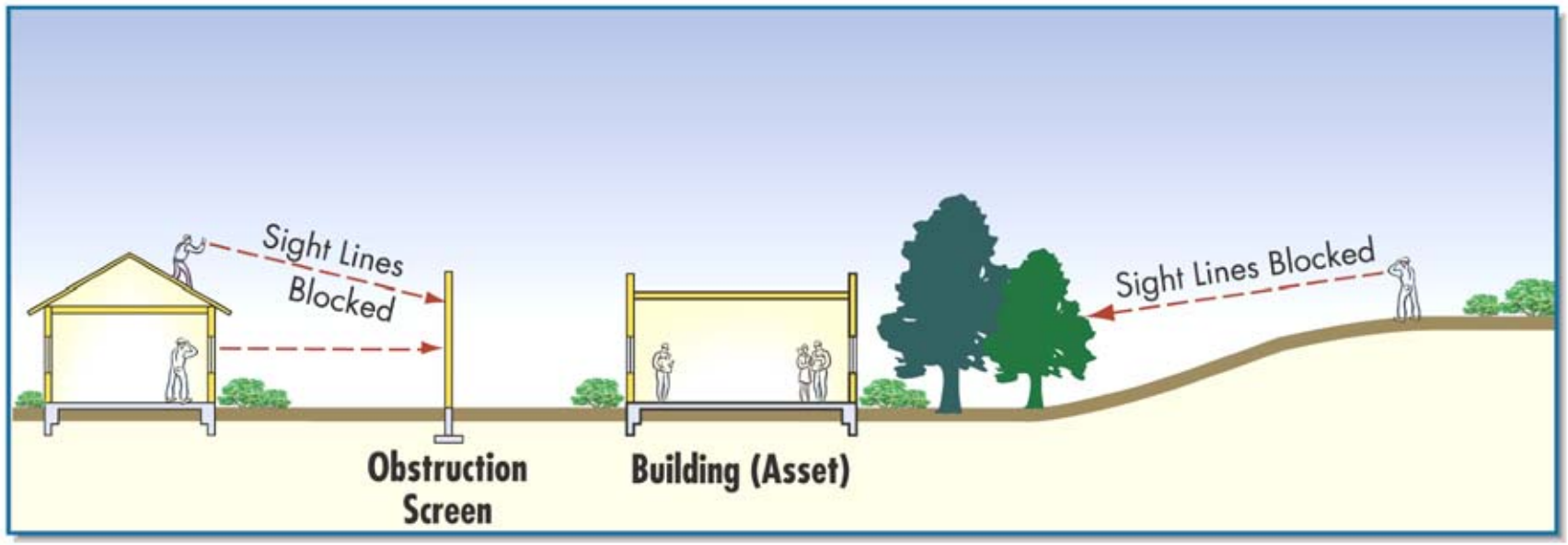
Building Siting and View Relationships

First Layer of Defense

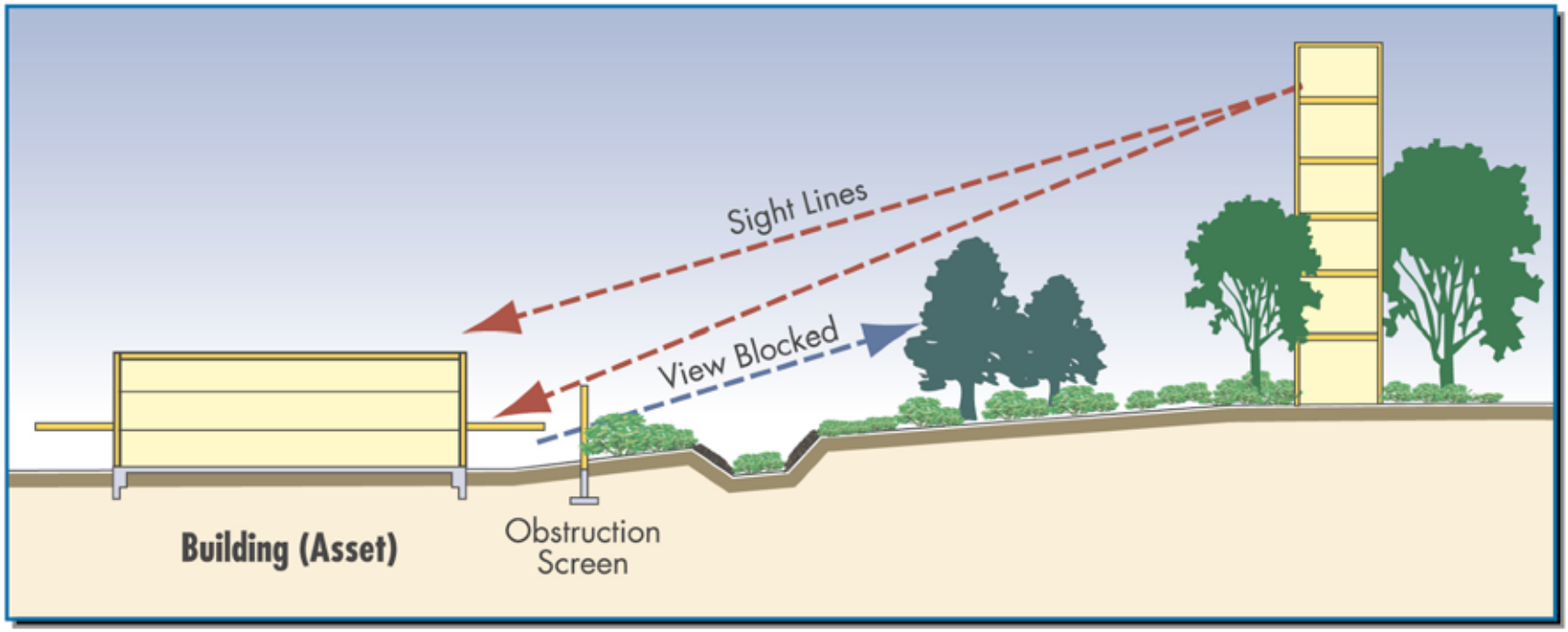


Blocking Sight Lines

Figure 2-5: Blocking of Site Lines, page 2-20

Building Siting and View Relationships

First Layer of Defense



Blocking Sight Lines and Establishing Clear Zones

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Figure 2-6: Improper Building Siting, page 2-21

Urban Design

Second Layer of Defense

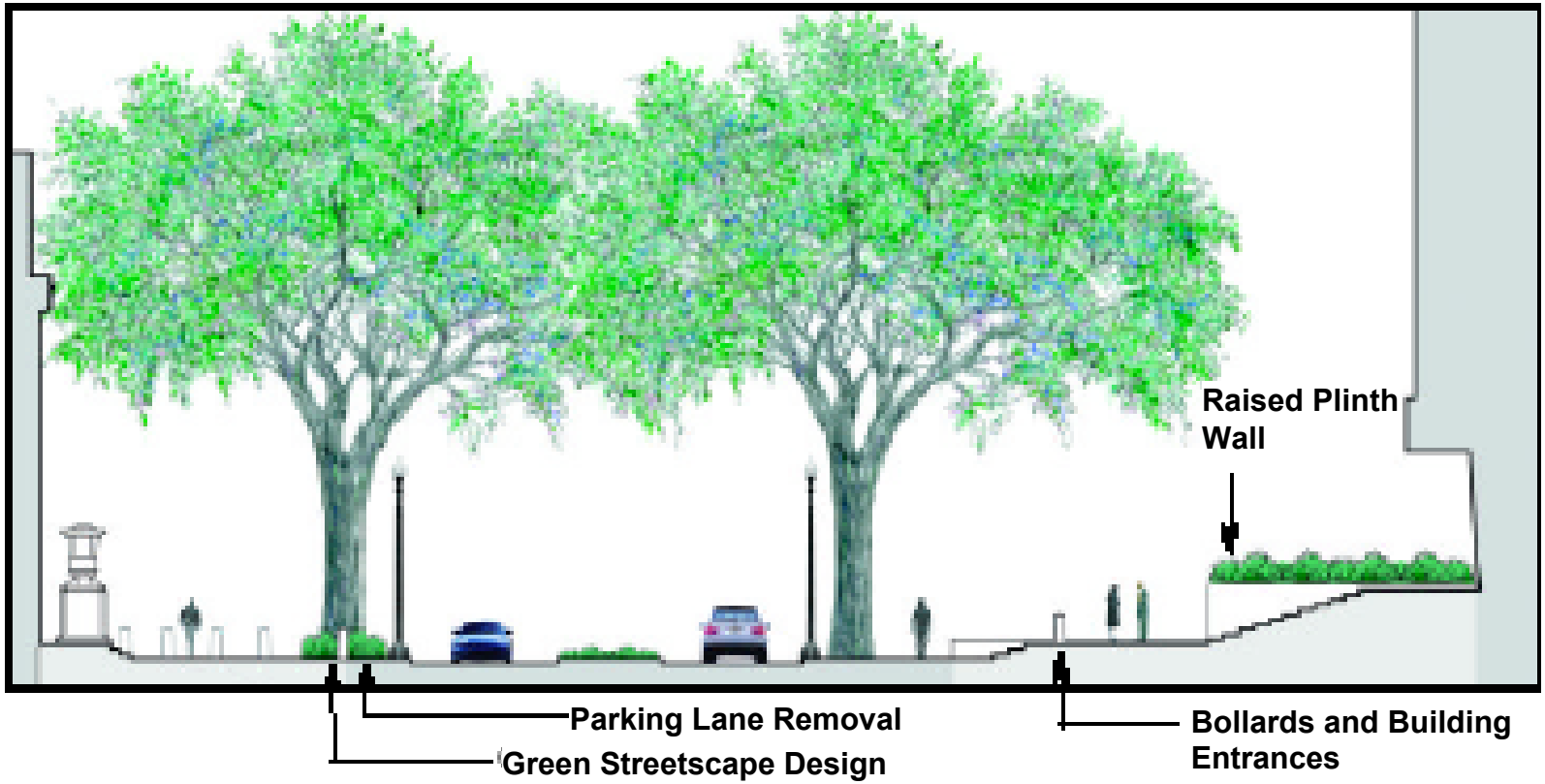

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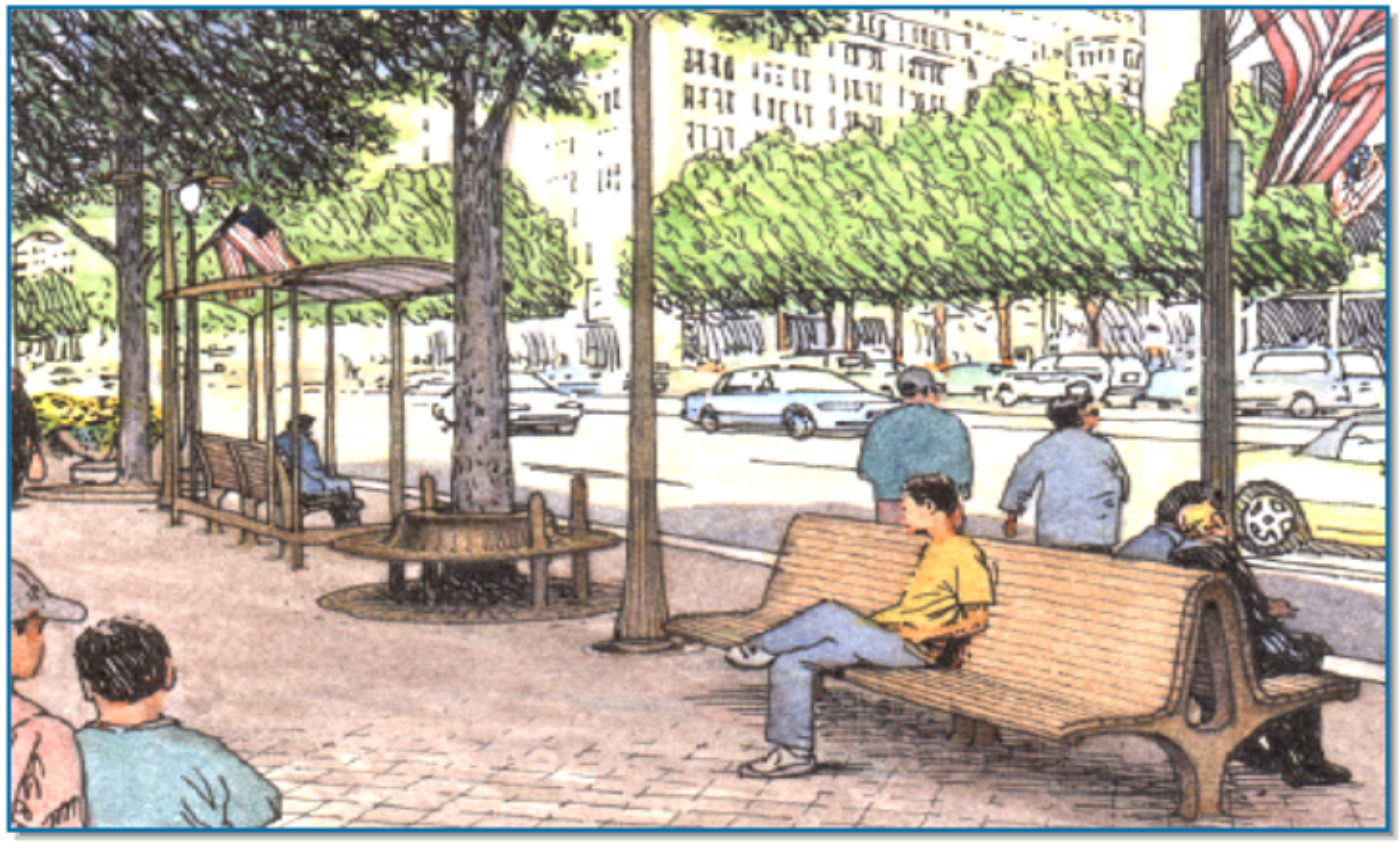
Figure 2-4: Streetscape Security Elements, page 2-18

Urban Design

Second Layer of Defense



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Urban Design

Second Layer of Defense

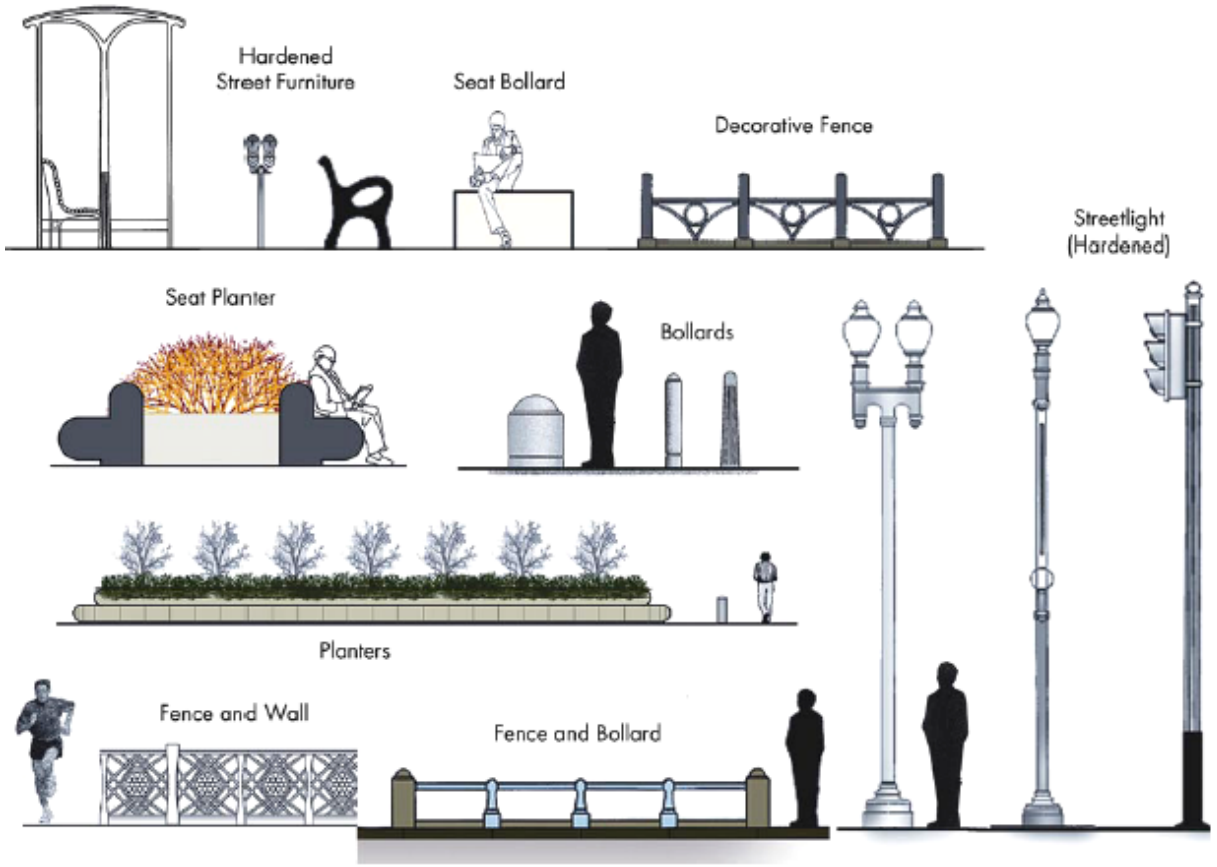

Figure 2-4: Streetscape Security Elements, page 2-17

Urban Design

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Bollard Applications

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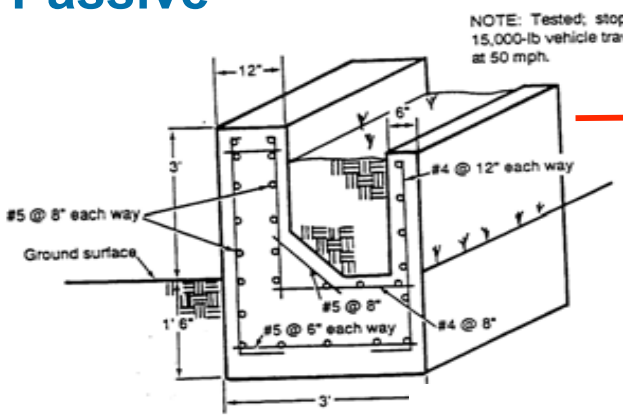
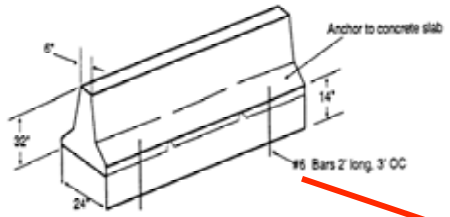
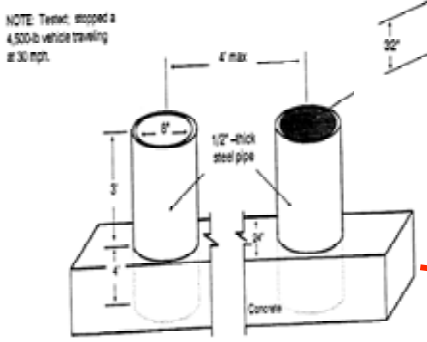
Physical Protective Barriers

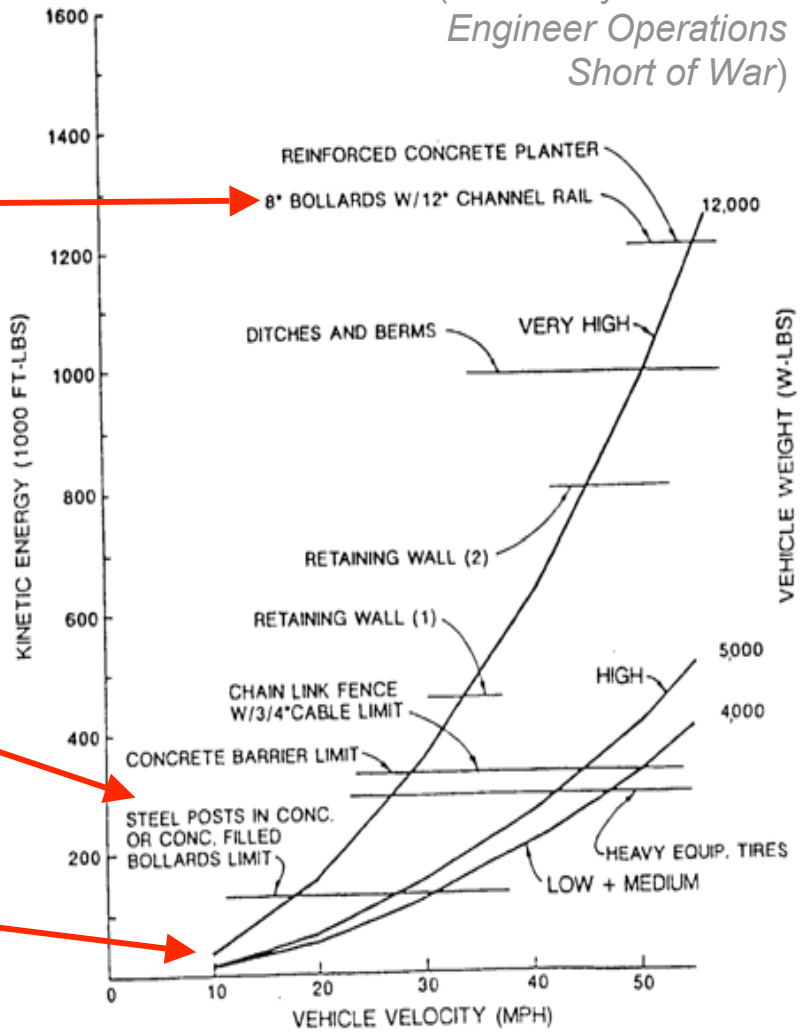
(U.S. Army FM 5-114 *Engineer Operations Short of War*)

Passive









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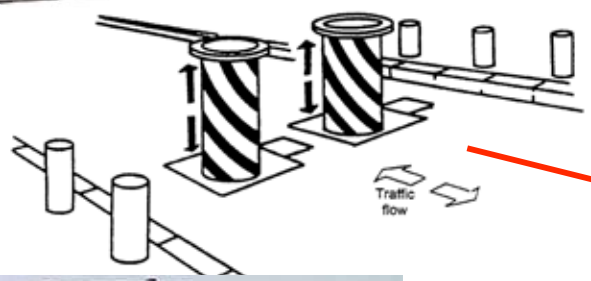
Physical Protective Barriers

(U.S. Army FM 5-114 *Engineer Operations Short of War*)

Active



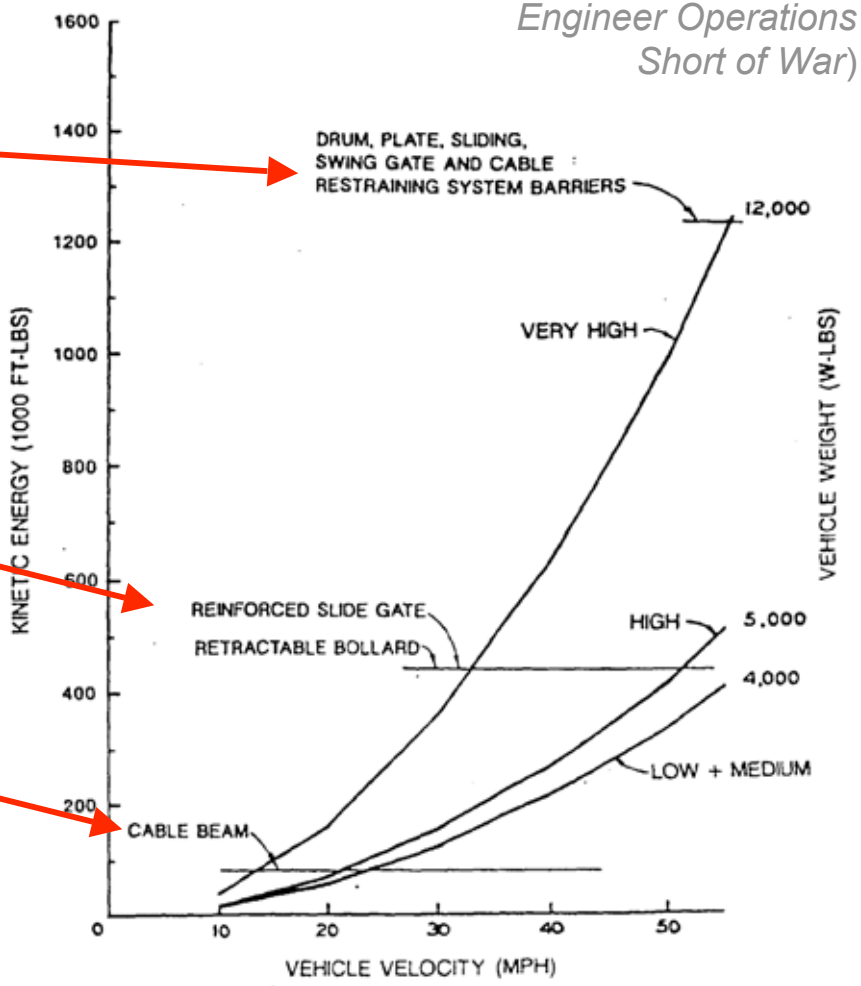


Figure 3–9. Vehicle Barrier Kinetic Energy Capacities (Active Barriers).

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Passive Vehicle Barrier Application

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Active Vehicle Barrier

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Active Vehicle Barrier Application

World Bank

Washington, DC

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Temporary Active Vehicle Barriers

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Signage

Additional information

Place warning signs where required by law to enforce restricted areas

Variable message signs

Demarcate controlled perimeter and jurisdiction

Limit

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Parking

Maintain stand-off distance

Restrict parking and access between buildings

Consider one-way circulation in parking lots

Locate parking within view of occupied buildings

Restrict parking underneath buildings

Well-lit, with security presence, emergency communications, and/or CCTV

Apply progressive collapse hardening to columns when parking garage is in the building

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Parking

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Loading Docks/Service Access

Ensure separation from critical systems and utility service entrances.

Avoid driving trucks into or under building.

Provide clear signage.

Large truck carrying large bomb could go relatively unnoticed unless access control performed a significant distance from loading dock.

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Loading Dock Example

Physical Security Lighting

High-mast lighting at entry control points

Continuous lighting

- Glare projection
- Controlled lighting (avoid glare)
- Closed circuit television (CCTV)

Standby lighting

Movable lighting

Emergency lighting

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Site Utilities

Underground versus overhead

Concealed versus exposed

Protected/secure versus accessible

Separate service paths

Redundant following different path

Looped versus radial distribution

Don’t forget communications

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Site Utilities

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Site Utilities

Utility plant accessibility

Tankage

Secure utility penetrations

Public address system/call boxes

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CPTED

Crime Prevention Through Environmental Design

Territoriality (using buildings, fences, pavement, signs, and landscaping to express ownership)

Natural surveillance (placing physical features, activities, and people to maximize visibility)

Access control (the judicial placement of entrances, exits, fencing, landscaping, and lighting)

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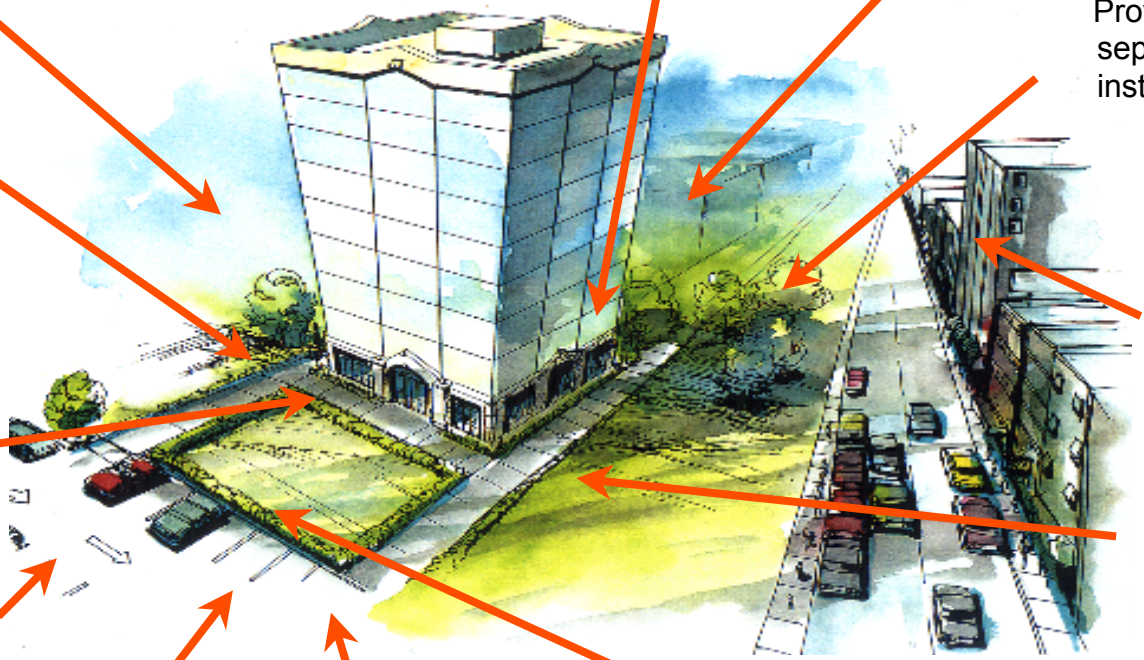
Summary of Site Mitigation Measures



Locate assets stored on site but outside of the facility within view of occupied rooms in the facility

Eliminate potential hiding places near facility, provide an unobstructed view around facility

Site facility within view of other occupied facilities on the installation

Provide minimum facility separation from installation boundaries

Eliminate parking beneath facilities

Locate trash bins as far from facility as possible

Locate facility away from natural or man-made vantage points

Minimize exterior signage or other indications of asset locations

Secure access to power/heat plants, gas mains, water supplies, and electrical service

Locate parking to obtain stand-off from facility

Illuminate building exteriors or sites where exposed assets are located

Minimize vehicle access points

Eliminate lines of approach perpendicular to the building

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TM 5-853 / AFMAN 32-1071

Unit VIII Case Study Activity

Site and Layout Design Guidance

Background

FEMA 426, Building Vulnerability Assessment Checklist: screening tool for preliminary design vulnerability assessment

Requirements: Vulnerability Rating Approach

Assign sections of the checklist to qualified group members

Refer to HIC case study and GIS portfolio, and answer worksheet questions

Review results to identify site and layout vulnerabilities and possible mitigation measures

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