



CREATING SAFE ENVIRONMENTS

INTEGRATING PLANNING, DESIGN AND
PHYSICAL SECURITY



LEARNING OBJECTIVES



1. To learn approaches and value in assembling a **multi-disciplinary team of experts** when planning with security in mind.
2. To emerge with a baseline level of knowledge so that planners can effectively **engage security practitioners** into teams and projects.
3. To understand the **risk assessment process** used throughout the security industry.
4. To become familiarized with the principles of **CPTED—Crime Prevention Through Environmental Design**.
5. To understand how security procedures can be used on a **temporary basis until more thorough** infrastructure measures can be planned and installed.

ABOUT AE WORKS



Integrated Services Taming Project Complexities



ARCHITECTURE

ENGINEERING

**PLANNING +
STRATEGY**

**SECURITY RISK
MANAGEMENT**

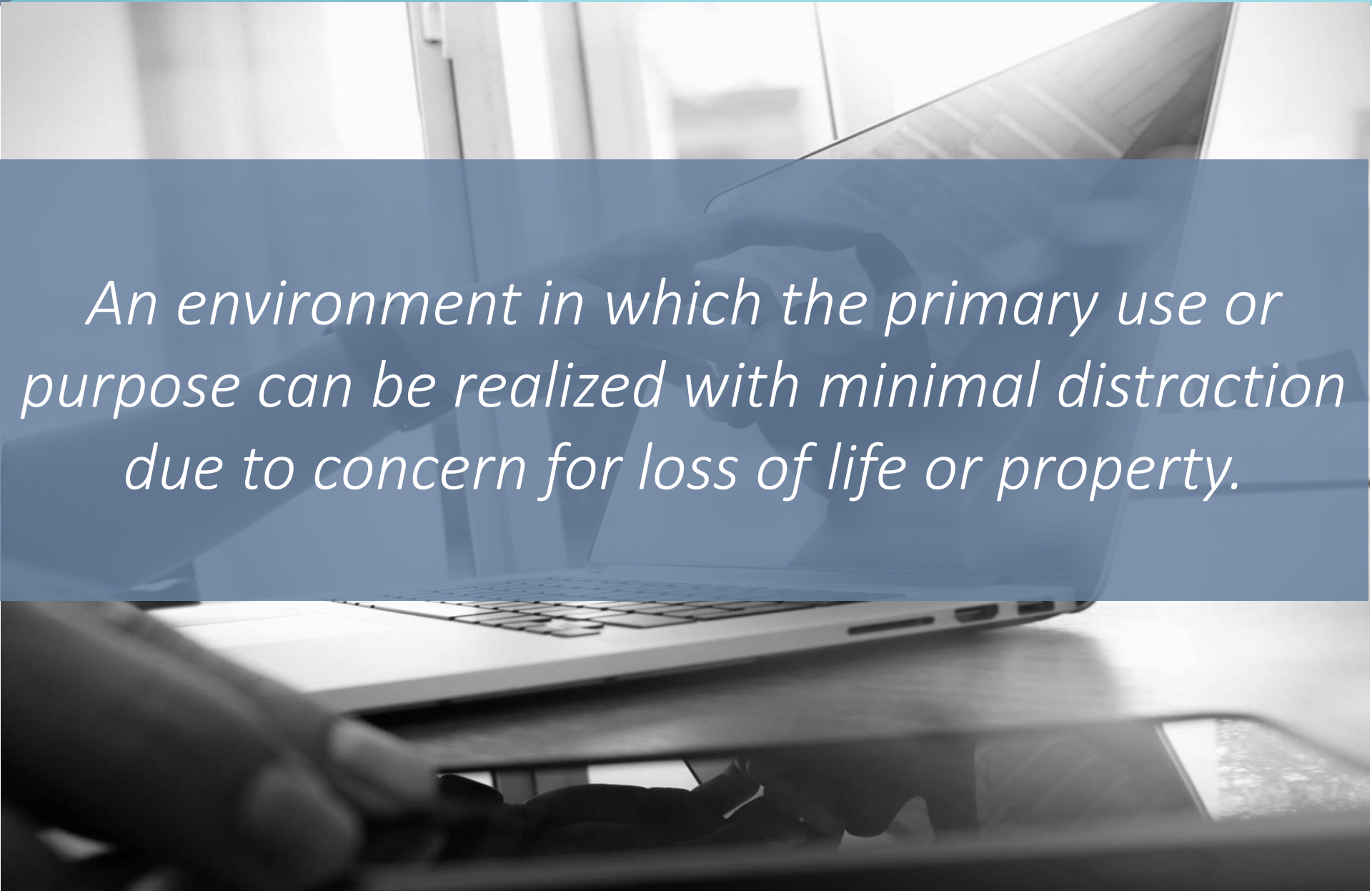
**PROJECT
SERVICES**

AGENDA



- 1 What is a safe environment?
- 2 Safe environment planning:
A Multi-Disciplinary Approach
- 3 Safe environment design
- 4 Security?
- 5 Design
- 6 Planning
- 7 Randoms
- 8 Q&A

WHAT IS A SAFE ENVIRONMENT?



An environment in which the primary use or purpose can be realized with minimal distraction due to concern for loss of life or property.

AGENDA

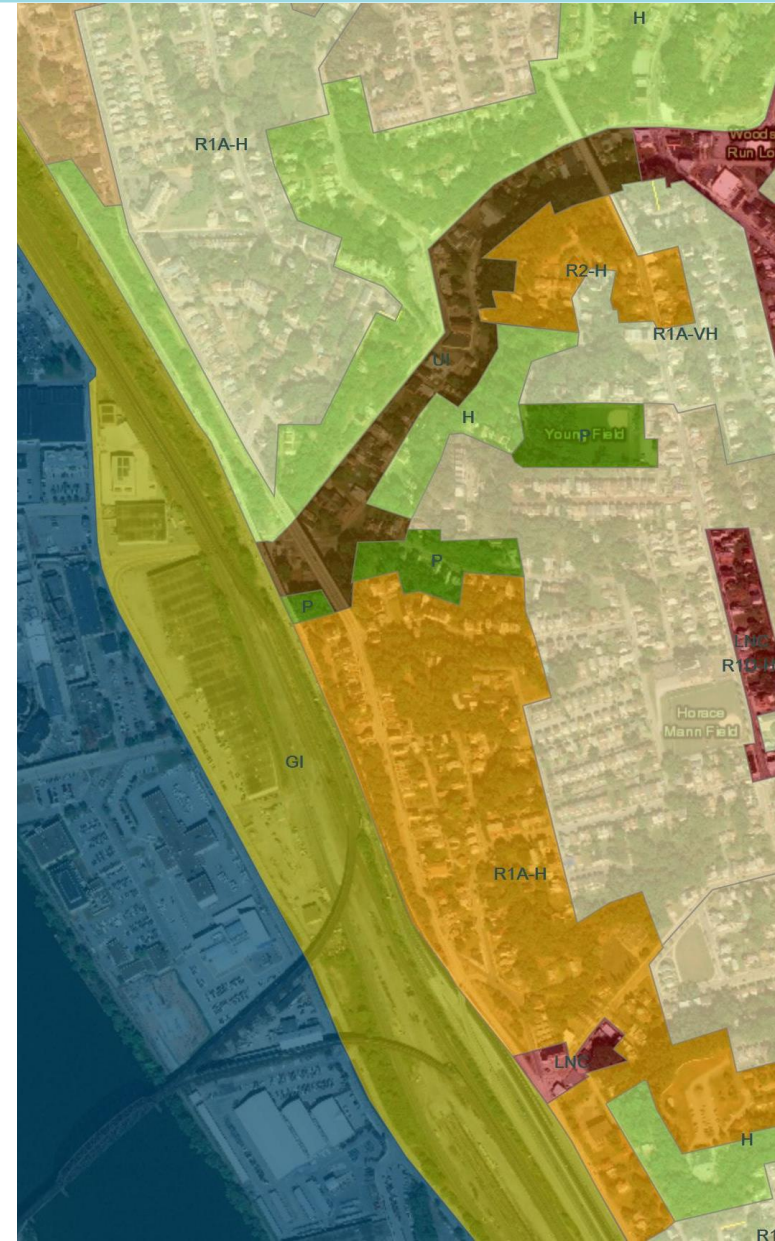


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SAFE ENVIRONMENT PLANNING



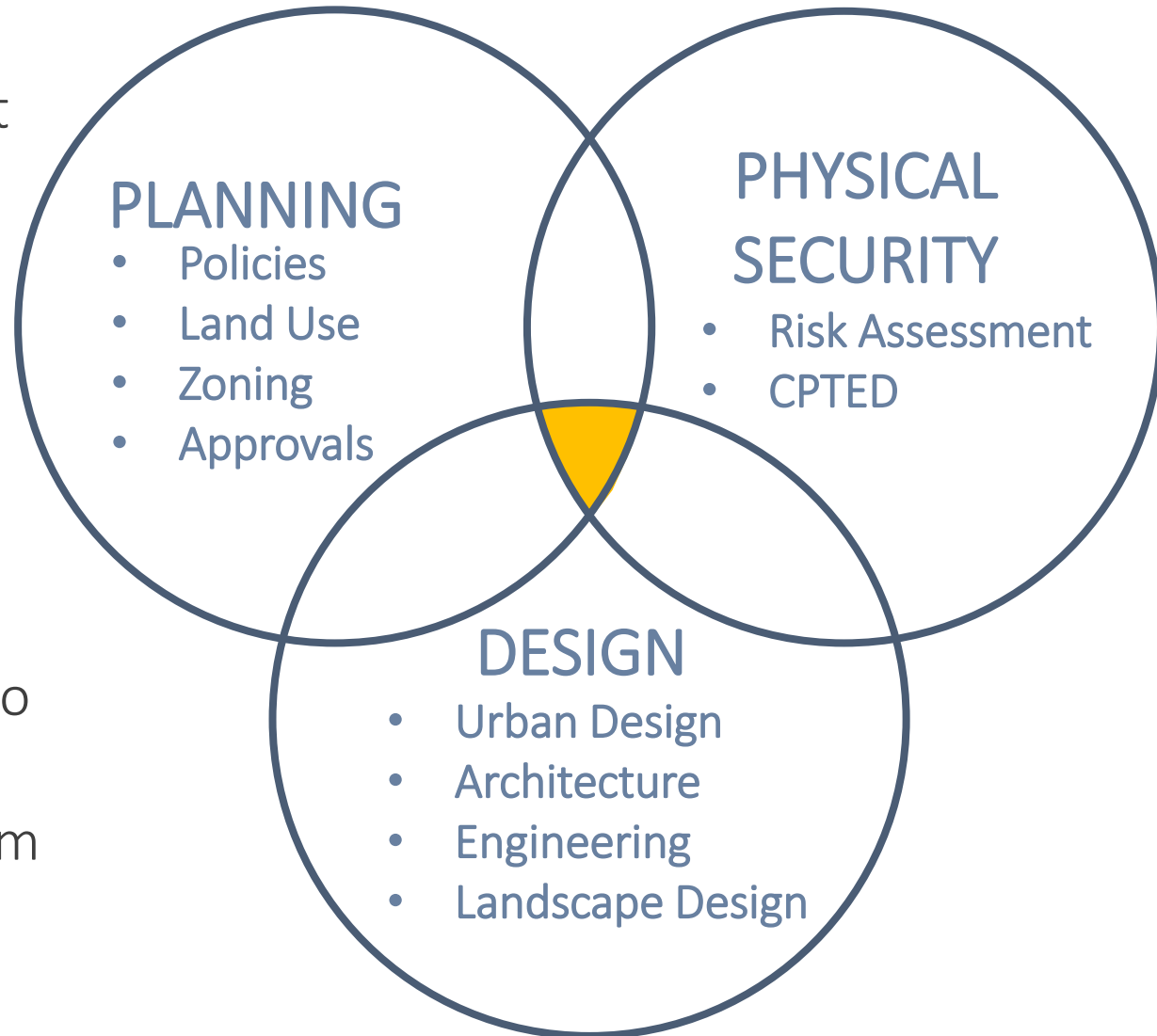
- Typical Planning Considerations
 - Often driven by others/generalities
 - Context/Community/Location
 - Controls, i.e. Zoning, Land Use, Overlays, etc.
 - Review of similar projects in terms of location or land use
 - Community feedback/politics
- Observations
 - Basic municipal approvals and influential community conversation are concluding.
 - Security often neglected until permitting/ licensing/ occupancy.



SAFE ENVIRONMENT PLANNING



- A Multi-Disciplinary approach is the most effective approach:
 - Cost effective
 - Truly integrated
 - Less obtrusive
 - Design balanced
 - More credible
 - Sustainable
- It is never too early to engage on the conceptual ideas from each discipline



SAFE ENVIRONMENT PLANNING



- Why does this matter?
 - Relevant reviews by municipal planners
 - Better engagement of consultants and knowing when they are necessary
 - Better urban design plans
 - Inform applicants or clients of security integration into new or existing places



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CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED)

Manipulate the built environment in order to reduce the incidence and/or fear of crime

- **Jane Jacobs (1960s)** – Death and Life of Great American Cities
 - Urban planning at the time was actually increasing crime in cities
- **C. Ray Jeffery (1970s)** – Crime Prevention Through Environmental Design
 - CPTED
 - Opportunity, motivation, risk, history
- **Oscar Newman (1970s)** – Defensible Spaces
 - See and be seen, culture of intervention
- **Wilson and Kelling (1980s)** – “broken windows theory”
 - Maintenance

SAFE ENVIRONMENT DESIGN



CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED)

Natural Access Control

- Spatial definition
- Minimize entry possibilities
- Locate entries strategically

Natural Surveillance

- Clear fields of view
- Window positioning
- Break areas
- Lighting

Territorial Reinforcement

- Builds off of the previous two concepts
- Legitimate users of a space have a sense of ownership and become active participants in security

Maintenance

- Shrubs growing over windows
- Dilapidated fences
- Broken Windows theory



Passive Measures

- Safes, vaults, reinforced walls
- Door hardware
- Cameras
- Lighting
- CPTED access control and surveillance

Active Measures

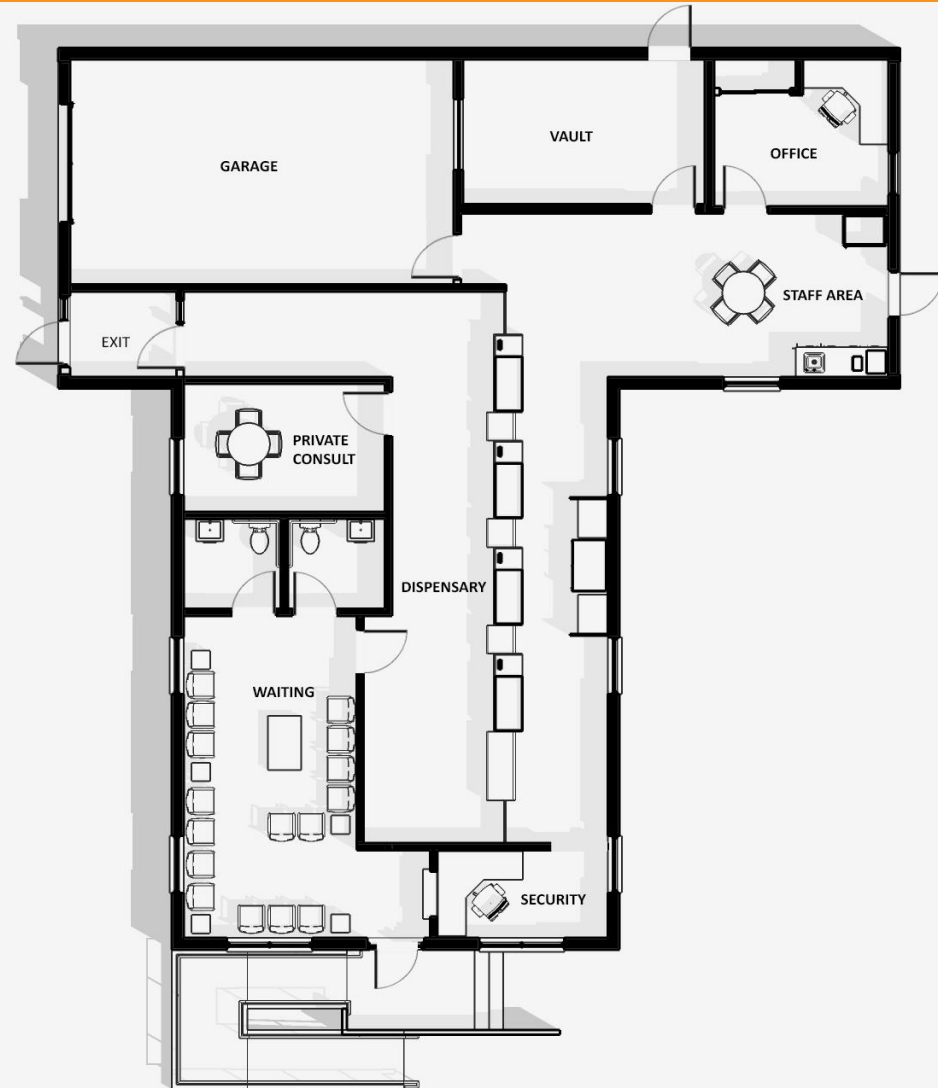
- Guards
- Cameras
- Alarms
- CPTED territorial reinforcement

EXERCISE



Risk – burglary and robbery

- * Take some time and identify some PASSIVE measures that can increase the security of the building

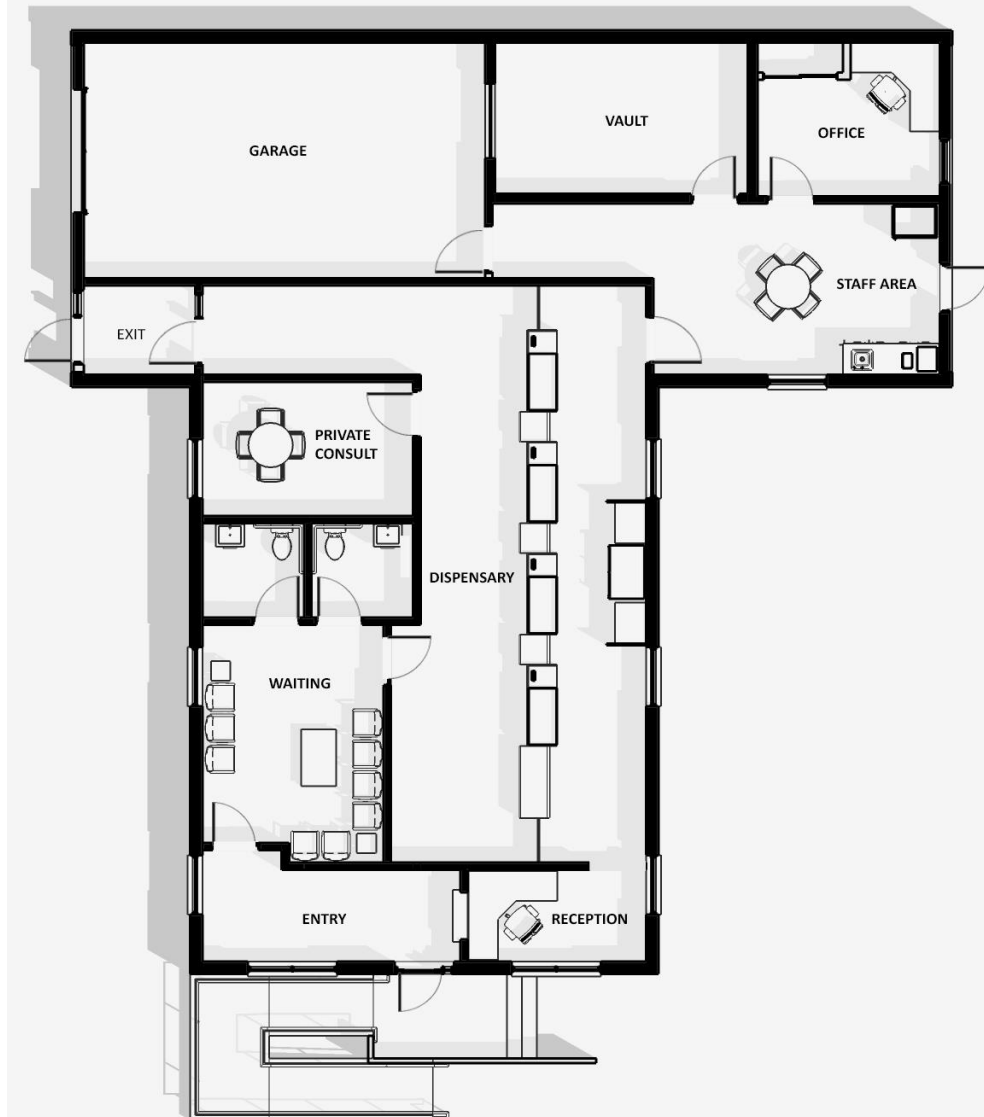


EXERCISE



Risk – burglary and robbery

- Remove the vault exterior door
- Add wall and door between dispensary area and staff area
- Add a door between entrance and waiting area
- (Not drawn) Have one bathroom open to dispensary area only

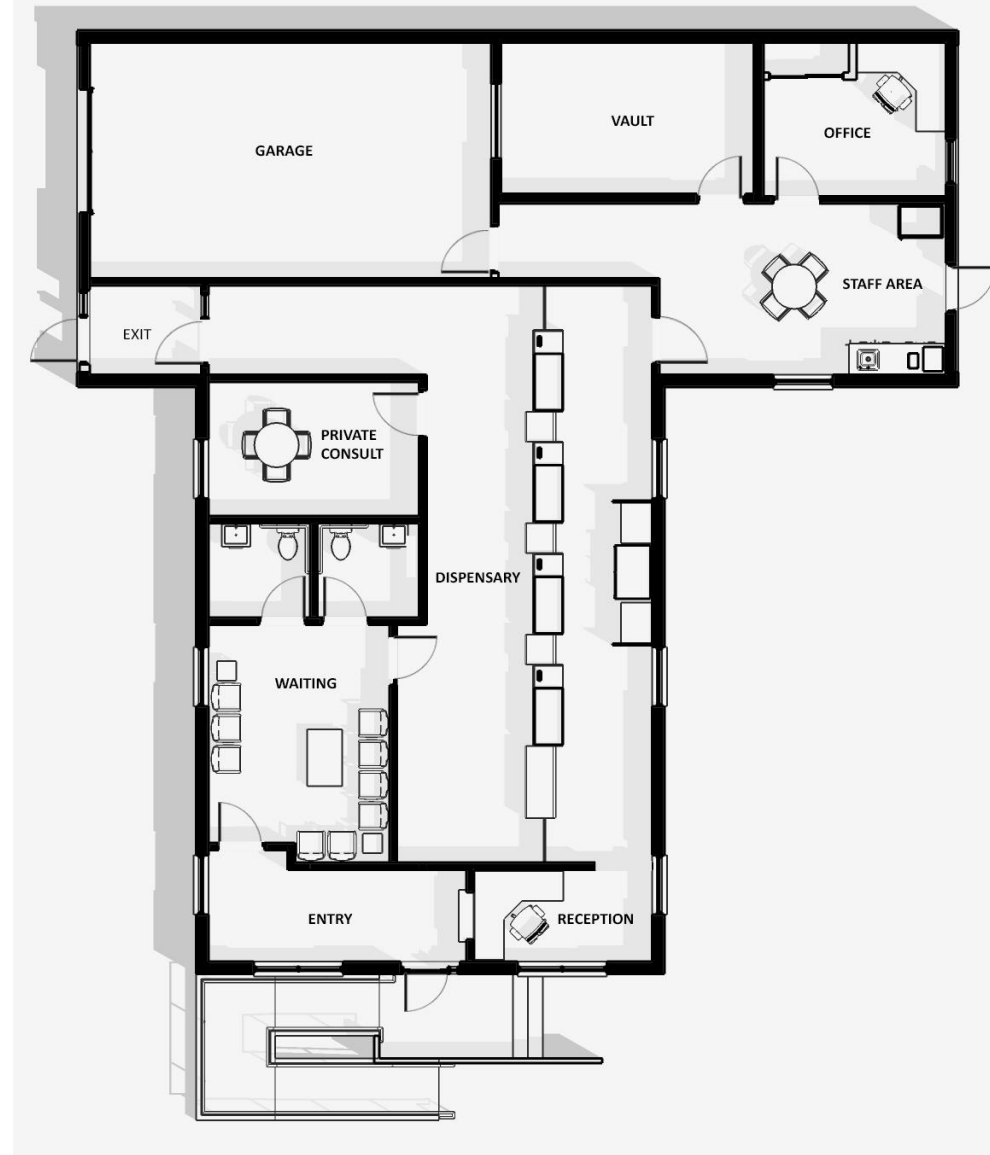


EXERCISE



Risk – burglary and robbery

- * Take some time and identify some ACTIVE measures that can increase the security of the building

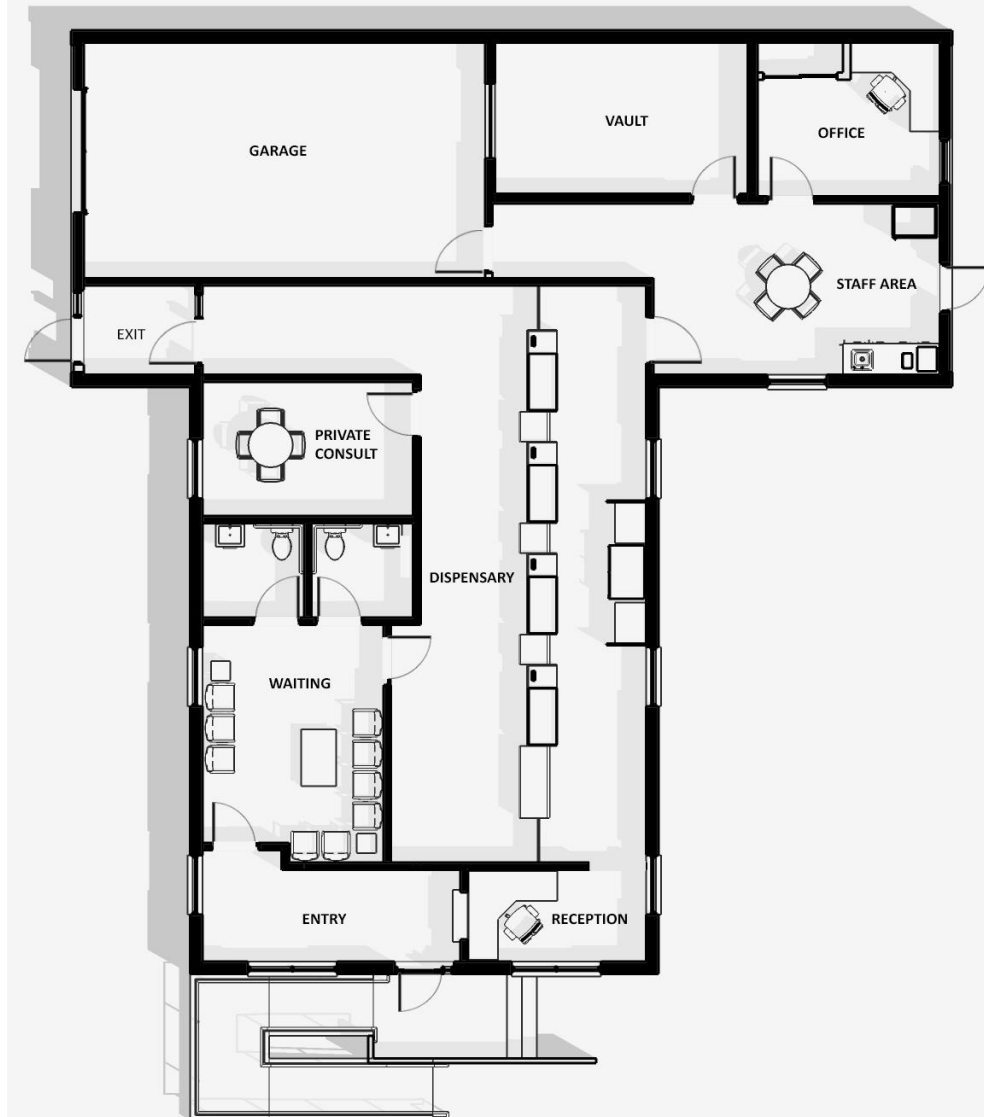


EXERCISE



Risk – burglary and robbery

- Alarms, cameras, electronic access control
 - Zone the vault and garage separately from the dispensary
- Hire an armed guard instead of a receptionist
- Coordinate for periodic police patrol during off hours



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SECURITY

A security camera is mounted on a wall, pointing towards a modern office interior. The office features a staircase with blue railings, large windows, and a bright, open space. The camera is a black, cylindrical model with a lens and some mounting hardware visible.

What is Security?



Consequence (Asset)

X

Probability (Threat)

X

Vulnerability

=

Risk



ASSETS

- People
- Mission critical equipment and systems
- Mission critical support systems
- Other equipment

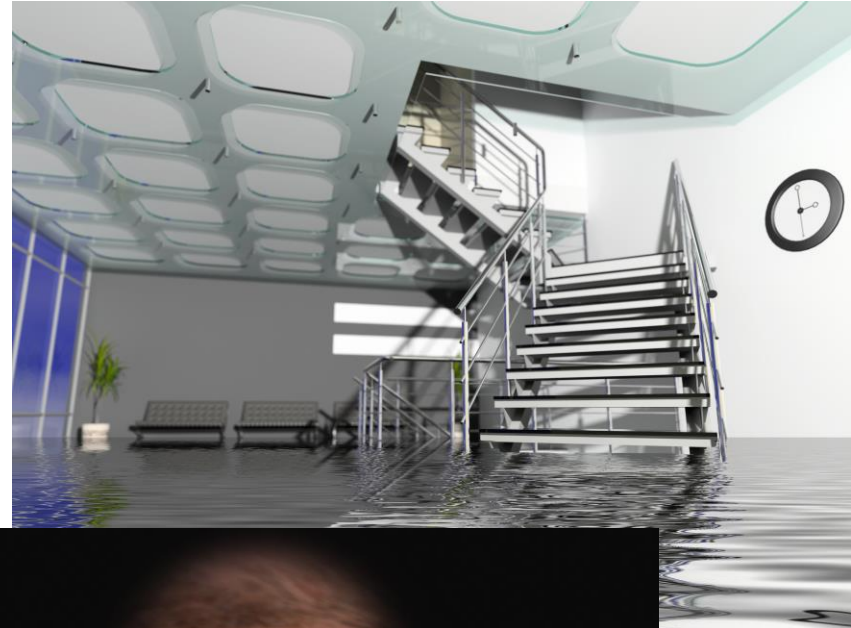
CRITICALITY

- Mission failure
- Mission degraded
- Inconvenience



THREAT

- Anything that can have a negative impact on operations
- Natural – floods, winds, landslides, etc.
- Man made – inadvertent vs intentional
 - Inadvertent – power failure, water outage, hard drive crash
 - Intentional – criminal and terrorist



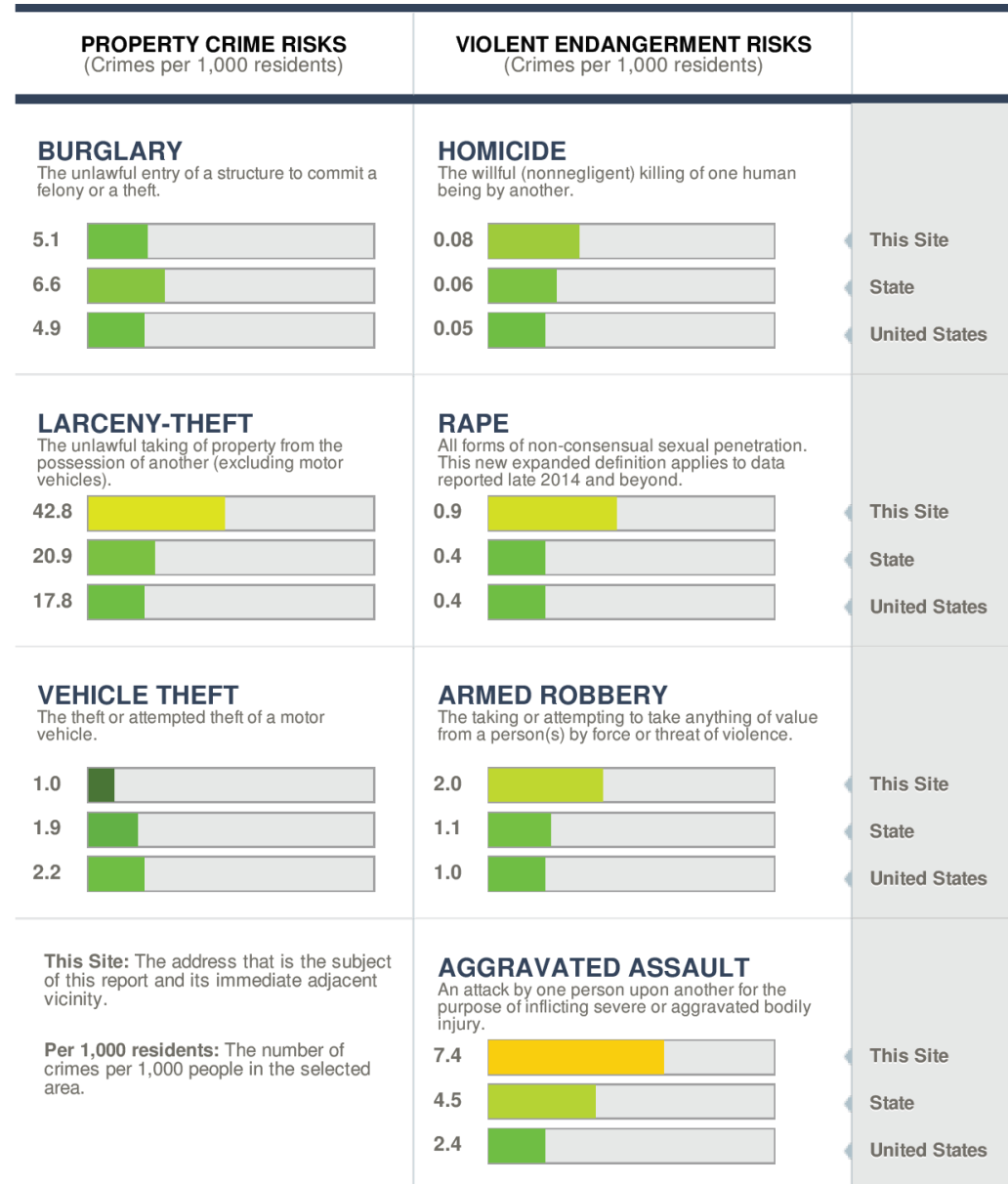


THREATS

- Ordinary decent crime (ODC): theft, burglary, assault
 - Statistics and trends allow for mostly accurate prediction
 - Statistics provide a partial picture
 - Reasoning provides the rest
- Terrorism: bombings, workplace shootings
 - Statistics are meaningless
 - Certain events can be an indicator
 - Targeting likelihood is best from a design perspective



- ODC – statistics are readily available
- Predictions are possible
- This is a crime report for a 3 mile radius centered on a Veteran's Affairs hospital
 - Rape and assault are explainable by the proximity to a college.
 - Theft is somewhat explainable, but requires further analysis
 - There is no explanation for the elevated level of armed robbery





- Terrorism is not predictable. That's why it works.
- Best possible course of action is to assess facility's likelihood of attack.
- One method is the KSM methodology (Norman)



- The target fits the strategic objectives of the organization.
- Mass casualties are possible.
- The target will attract the media and is on “media friendly” ground (visually accessible).
- The target is of economic importance or represents an economically important sector of the economy.
- The target is of cultural importance to the constituent community of the victims and where possible is also culturally important to the terrorist organization’s constituent community.
- The target is vulnerable.
- There is a high probability of success of the planned attack scenario.
- A successful attack against this target could result in increased recruiting and fund-raising for the terrorist organization.



- Vulnerability
 - Protection is needed – a threat is present and the hazard can affect the asset
 - Current protection is not present or inadequate
- This is the only variable in the risk equation that can be manipulated
 - Passive and Active measures
 - CPTED
- But what about deterrence?
 - Deterrence is manipulating the perceived vulnerability of an asset. It does not stop crime.
 - Determined adversary will likely not be deterred.



DETERMINING VULNERABILITY

- Create asset-threat pairs
- Accidental damage/ vandalism
 - POP – vulnerable. Not locked up. In the same closet as brooms and mops.
 - Plotter – vulnerable. Not in a secure room.
- Flooding
 - POP– vulnerable. Connects in the basement which takes water when the stormdrains back up
 - Plotter – not vulnerable. On 3rd floor.
- Theft
 - POP – vulnerable. Not locked up.
 - Plotter – not vulnerable. Weighs 500 lbs. Cannot be moved stealthily.



Consequence (Asset)

X

Probability (Threat)

X

Vulnerability

=

Risk

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- 4 What is Security?
- 5 How do we apply this in Design?**
- 6 Planning
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The background of the slide features a photograph of a white security camera mounted on a wall. The camera is angled downwards and to the right. The wall has a textured, slightly mottled appearance. A dark blue semi-transparent rectangular overlay covers the lower half of the image, providing a background for the text.

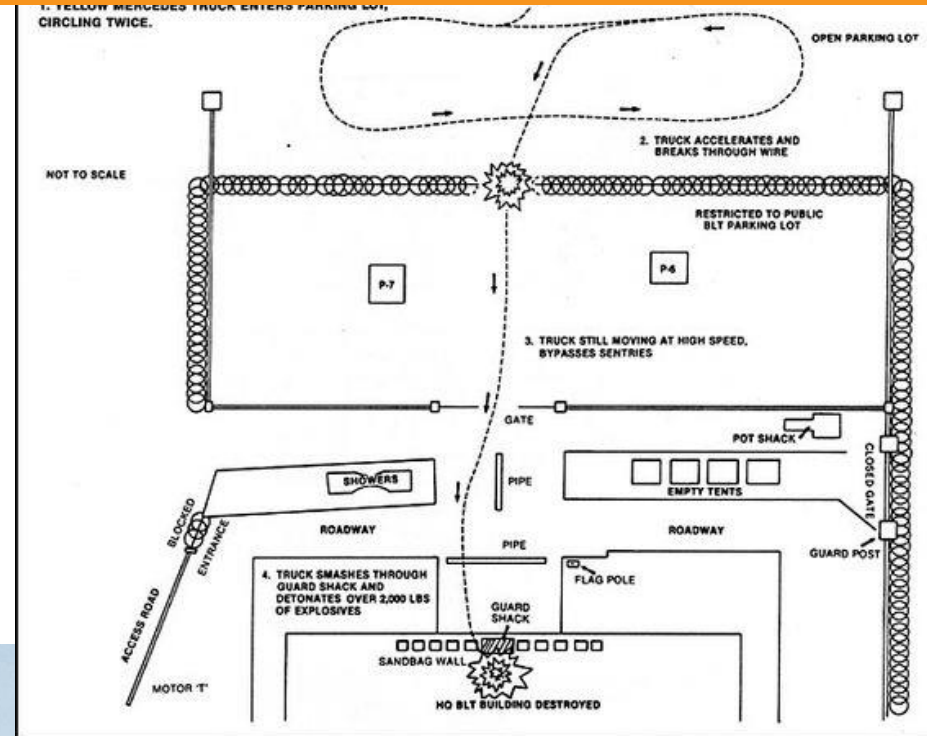
How do we apply this in
Design?

SAFE ENVIRONMENT DESIGN



ASCARI 1983 BEIRUT BARRACKS

- PETN with butane enhancement carried on concrete bed to direct blast upwards
- Crashed through multiple barriers and penetrated building envelope
- Explosion lifted all floors from support columns before total collapse (4 story building)
- 241 victims killed

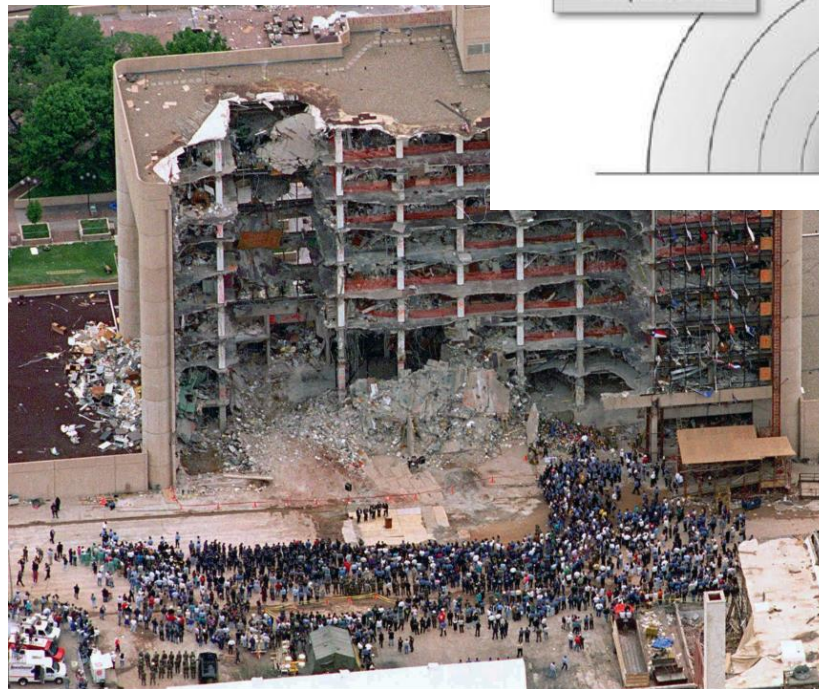
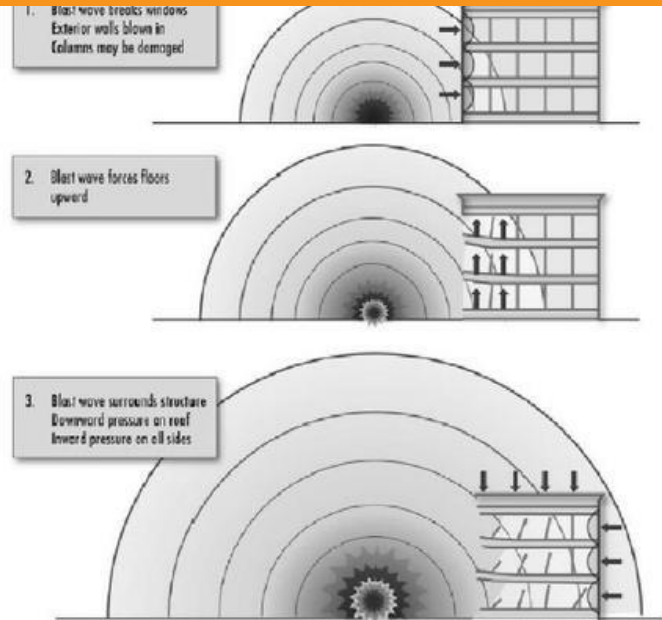


SAFE ENVIRONMENT DESIGN



TIMOTHY MCVEIGH 1995 MURRAH BUILDING

- 5,000 lbs of ammonium nitrate and nitromethane
- Delivered in a Ryder rental
- Mixed at a rest stop
- 168 killed, 680 injured



SAFE ENVIRONMENT DESIGN



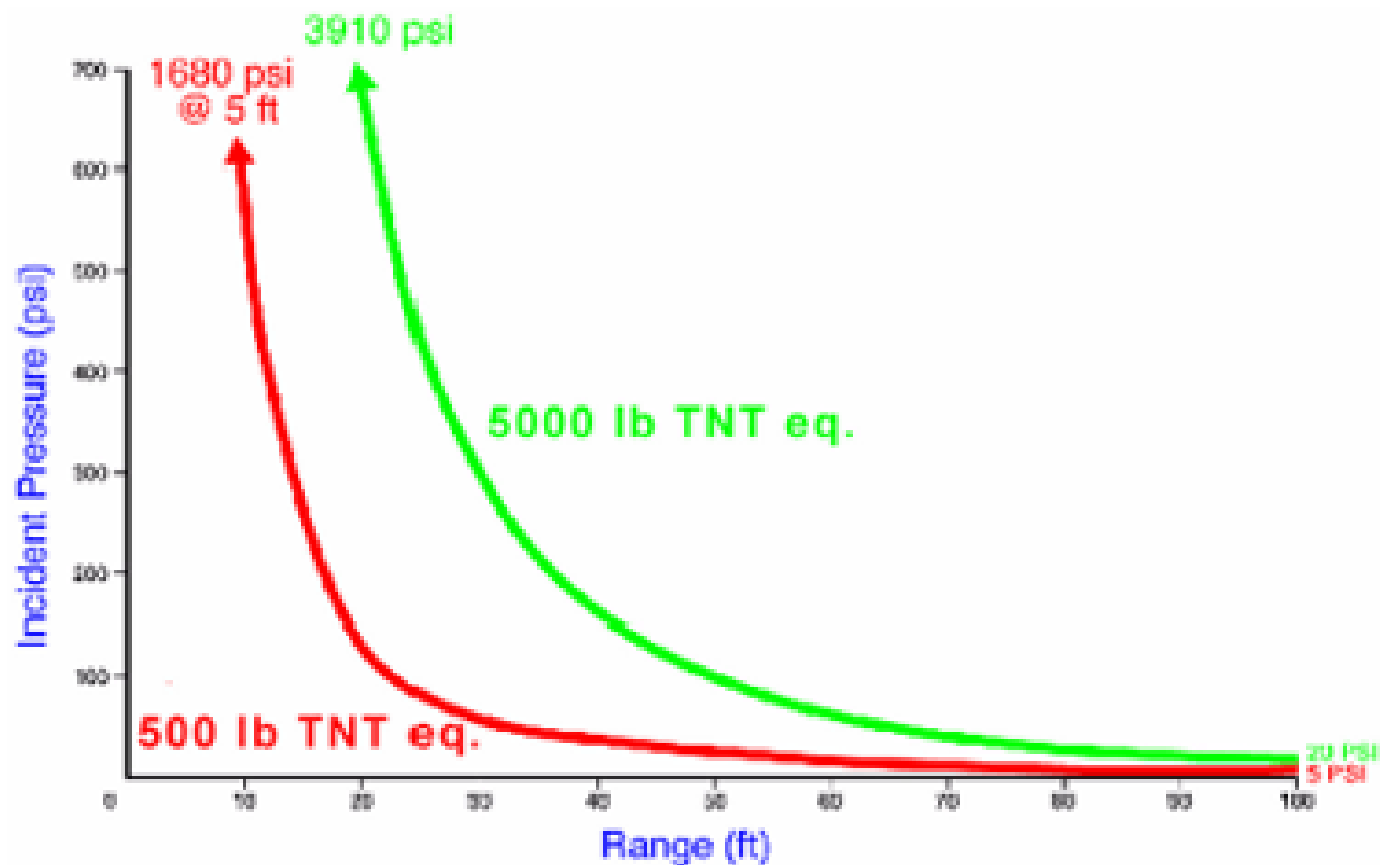
WHAT DID WE LEARN?

- **Assets** – high value, high consequence
- **Threat** – vehicle bomb, determined adversary - high
- **Vulnerability** – buildings are vulnerable to structural failure when bombs are detonated nearby - high
- **Risk** – high

SAFE ENVIRONMENT DESIGN



WHAT DID WE DO?





WHAT DID WE DO?

- **Assets** – can't manipulate
- **Threat** – can't manipulate
- **Vulnerability**
 - Distance – reduce blast pressure on structure
 - Barriers – enforce distance
 - Structural blast mitigation – reduce effects of pressure

CASE STUDY



KHOBAR TOWERS BACKGROUND

Built in 1979 by the Saudis

Was mostly unoccupied until 1990/ 1991

- Little maintenance
- Not modernized

Risk assessment performed in early 1996 as follow on to a 1995 assessment

Measures implemented (partial list)

- Improved vehicular access control
- Placement of jersey barriers around perimeter
- Removal of vegetation from perimeter fence

Measures not implemented

- Acquisition of additional land in a civilian-owned parking lot adjacent to the perimeter and approximately 80 feet from two apartment buildings in the compound
- Installation of anti-fragmentation film on windows



KHOBAR TOWERS - INCIDENT

Detection

- Approximately 10PM, sentries noticed a tanker truck park close to the edge of the parking lot. The vehicle driver was picked up by a car which left at a high rate of speed

Evacuation

- Sentry supervisor notified the OPS center of the threat and requested evacuation order over the PA system
- Sentry supervisor then immediately began banging on doors, issuing evacuation order. In 2 ½ min, the first 3 floors were evacuated, with the bulk of personnel in stairwells moving down

Explosion

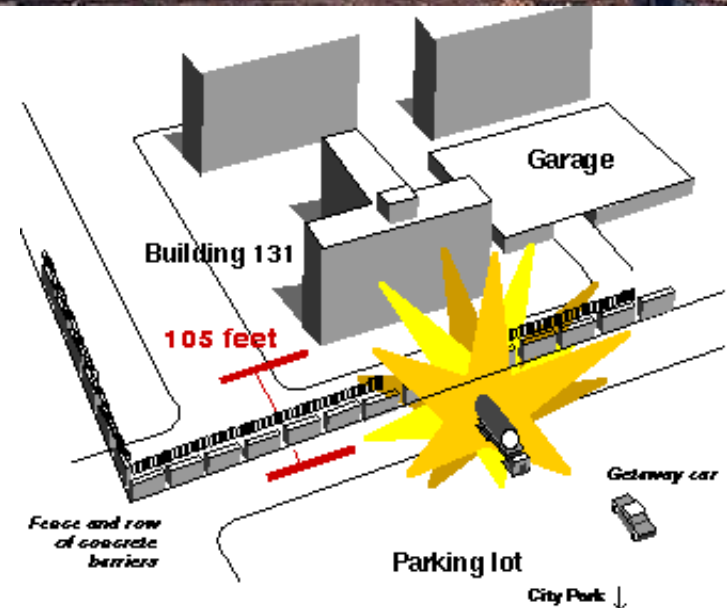
- 15 killed inside building, 4 killed outside building
- Hundreds injured primarily by glass fragmentation spall
- PA system evacuation order not issued

CASE STUDY



1996 KHOBAR TOWERS

- 5,000 lbs of plastic explosive – later analysis revealed a blast force of approximately 20,000 pounds of TNT
- Configured as shaped charge in a fuel tanker truck
- 19 Killed, 498 wounded





KHOBAR TOWERS – EFFECTS OF PLANNING

Detection

- Detection enabled by both positioning of sentries and removal of vegetation from perimeter

Evacuation

- Training on seriousness of evacuation led to personnel actually following evac order
- Failure to have process in place for rapidly issuing evac order led to PA not being used

Explosion

- Installation of jersey barriers interfered with blast wave propagation
- Anti-vehicle measures forced the attackers to chose the parking lot which increased standoff distance
- Failure to install anti-fragmentation film left many people injured

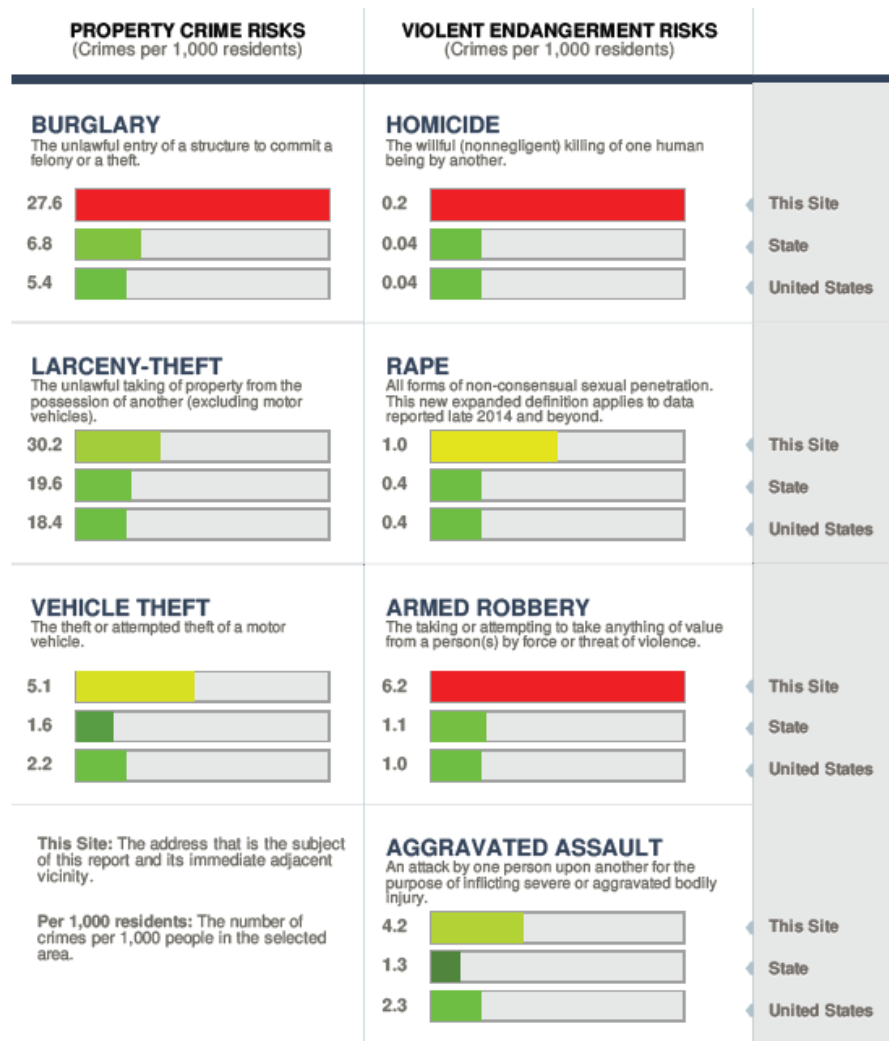
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How do we apply this?



Threats

- Murder
- Robbery
- Rape
- Assault
- Burglary
- Theft
- Vehicle theft





Threats

- Violent crime
- Burglary

Vulnerabilities

- Violence in parking lot
 - Lack of detection capability
 - Open access
- Violence in patient spaces
 - Lack of detection capability
 - Unlocked doors
 - Open access



Threats

- Violent crime
- Burglary

Vulnerabilities

- Burglary of storage areas
 - Lack of detection capability
 - Open access
- Burglary of patient property
 - Lack of detection capability
 - Open access



Mitigation

- Violence in parking lot
 - Lack of detection capability
 - Improve camera coverage
 - Install emergency call boxes
 - Improve lighting
- Open access
 - Install fence and gates



Mitigation

- Violence in patient spaces
 - Lack of detection capability
 - Install panic buttons
 - Improve camera coverage of building entrances and exits
- Unlocked doors
 - Install electronic access control
 - Restrict public access to one door
- Open access
 - Build fence and gates



Mitigation

- Burglary of storage areas
 - Lack of detection capability
 - Install alarms
 - Install cameras
- Open access
 - Install electronic access control
 - Build fence and gates





Threats

- Not many
 - Slightly elevated
 - Rape
 - Theft

PROPERTY CRIME RISKS (Crimes per 1,000 residents)	VIOLENT ENDANGERMENT RISKS (Crimes per 1,000 residents)	
BURGLARY The unlawful entry of a structure to commit a felony or a theft.	HOMICIDE The willful (nonnegligent) killing of one human being by another.	
6.5	0.0	◀ This Site
6.8	0.04	◀ State
5.4	0.04	◀ United States
LARCENY-THEFT The unlawful taking of property from the possession of another (excluding motor vehicles).	RAPE All forms of non-consensual sexual penetration. This new expanded definition applies to data reported late 2014 and beyond.	
31.5	0.6	◀ This Site
19.6	0.4	◀ State
18.4	0.4	◀ United States
VEHICLE THEFT The theft or attempted theft of a motor vehicle.	ARMED ROBBERY The taking or attempting to take anything of value from a person(s) by force or threat of violence.	
1.0	0.4	◀ This Site
1.6	1.1	◀ State
2.2	1.0	◀ United States
This Site: The address that is the subject of this report and its immediate adjacent vicinity. Per 1,000 residents: The number of crimes per 1,000 people in the selected area.	AGGRAVATED ASSAULT An attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury.	
	0.8	◀ This Site
	1.3	◀ State
	2.3	◀ United States

Threats

- Rape
- Theft

Vulnerabilities

- Rape in parking lot
 - Lack of detection capability
- Theft of unattended patient property
 - Lack of detection capability
- Theft of hospital property
 - Patients can move freely between public areas and restricted areas



Mitigation

- Rape in parking lot
 - Lack of detection capability
 - Install call boxes
 - Improve camera coverage
 - Have security escort people to parking lots after hours



Mitigation

- Theft of unattended patient property
 - Lack of detection capability
 - Improve camera coverage of public areas
 - Encourage staff to pick up unattended property and turn it in to dispatch



Mitigation

- Theft of hospital property
 - Install electronic access control
 - Clearly define the “public” vs “private” space



Mitigation

- What are we not going to do?
 - Install a fence around the perimeter



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Practical Application

SAFE ENVIRONMENT PLANNING



BUILD YOUR BUSINESS CASE IN TERMS OF THE RISK EQUATION

- Assets and criticality – these come from the users and organization leadership
 - Criticality includes mission impact and cost
- Threats
 - Some users will be able to give a portion of the threat data
 - Crime data
 - External support – Police, Emergency Manager, consultants
- Vulnerability
 - External support – Police, Emergency Manager, consultants
- Risk = Consequence (Asset) X Probability (Threat) X Vulnerability



UNDERSTAND RISK

Develop passive environmental measures

- Value of passive measures – little maintenance required
- When properly designed, passive measures reduce the number of active measures needed
- Fill gaps with active measures
 - Staff
 - Cameras
 - Alarms

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BETTER THAN NOTHING VS GOOD ENOUGH



BETTER THAN NOTHING VS GOOD ENOUGH





- A Multi-Disciplinary Approach that integrates Security design early in the planning process yields the following outcomes:
- Cost/Economics – Changes driven by requirements early in the process are less expensive and disruptive. The security overlay is especially important during site selection and master planning.
- Balancing Safety, Functionality, and Aesthetics - Balance CPTED with achievement of the design vision for the project.
- Sophistication From the Start – Integration allows for more sophisticated, appropriate, and relevant security measures.
- Increased Credibility with Reviewing Agencies – Using forethought and presenting holistic solutions makes sense for communities.
- Appropriate Integration with Public Policy – Respond to zoning and other regulatory impacts early in the site design/conceptual design process so these considerations ‘fit’ each other.
- Futureproofing– Thinking through security design early provides insights for future planning, in the case of an organization, campus, district, or development.

A background image showing a person's hands holding a smartphone over a laptop. The laptop screen displays a bar chart. The image is overlaid with a semi-transparent blue rectangle.

Questions?

THANK YOU!



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