

BUILDING DESIGN FOR HOMELAND SECURITY

Unit XI

Case Study



FEMA

Unit Objectives

Explain building security design issues to a building owner for consideration prior to a renovation or new construction.

Explain the identification process to arrive at the high risk asset – threat/hazard pairs.

Justify the recommended mitigation measures, explaining the benefits in reducing the risk for the high risk situations of interest.



Hazardville Information Company

Company

- Functions
- Infrastructure

Threats/Hazards

- Design Basis Threat
- Level of Protection

Vulnerabilities

- Impact
- Mitigation

Report



Hazardville Information Company (HIC)



Hazardville Information Company

IT services and support

- 130 employees

Two story building in small corporate office park

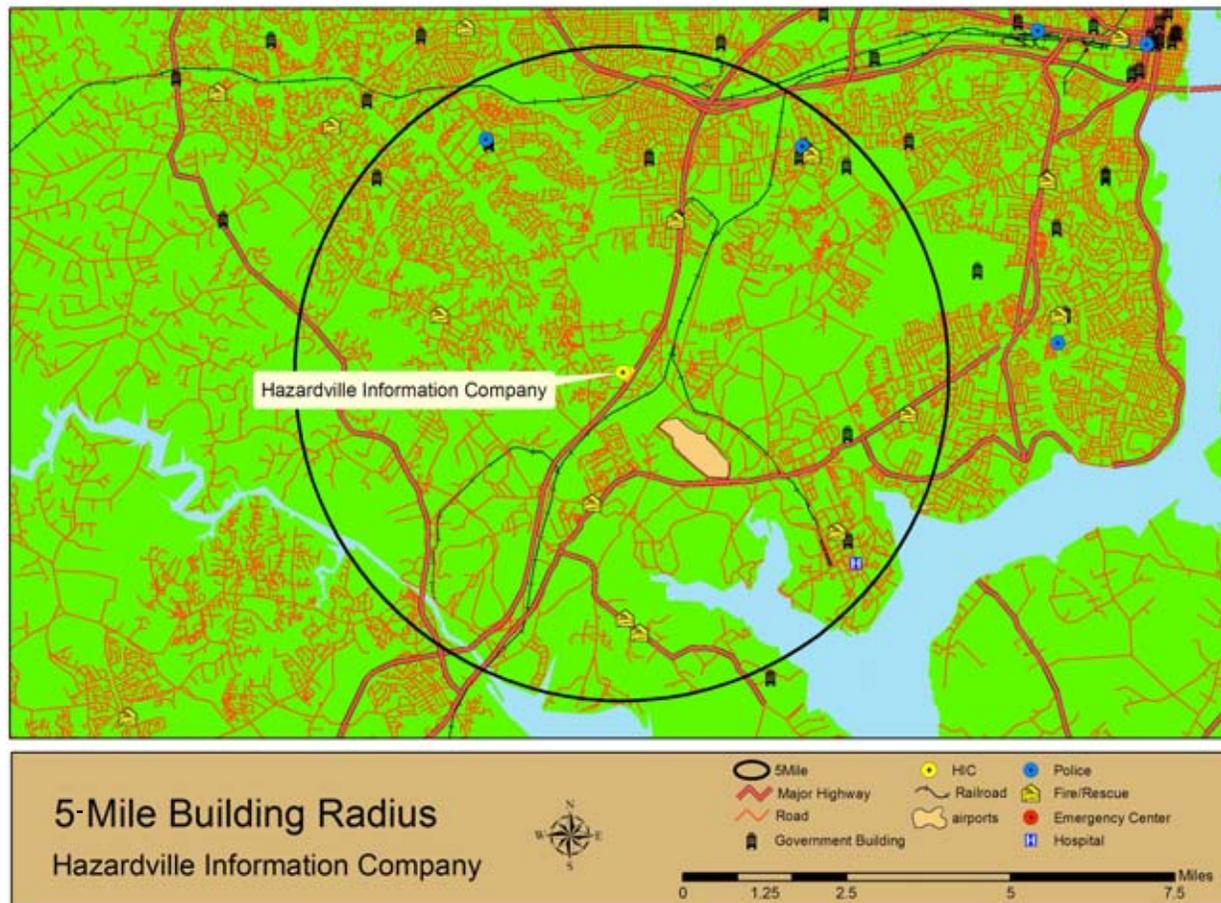
Located in suburban area of major metropolitan city

“Neighbors” include:

- Offices
- Industry
- Road, Rail, Air traffic

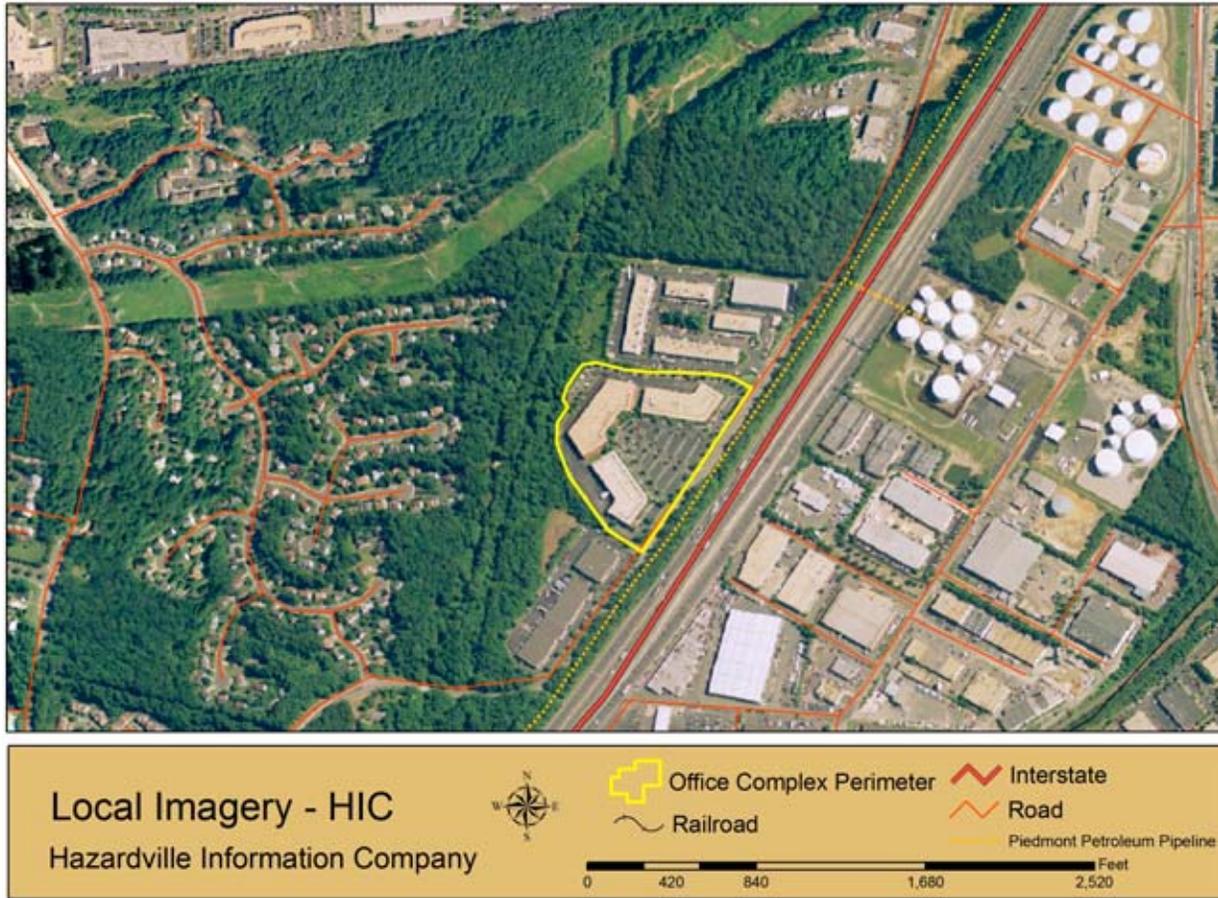


HIC 5-Mile Building Radius



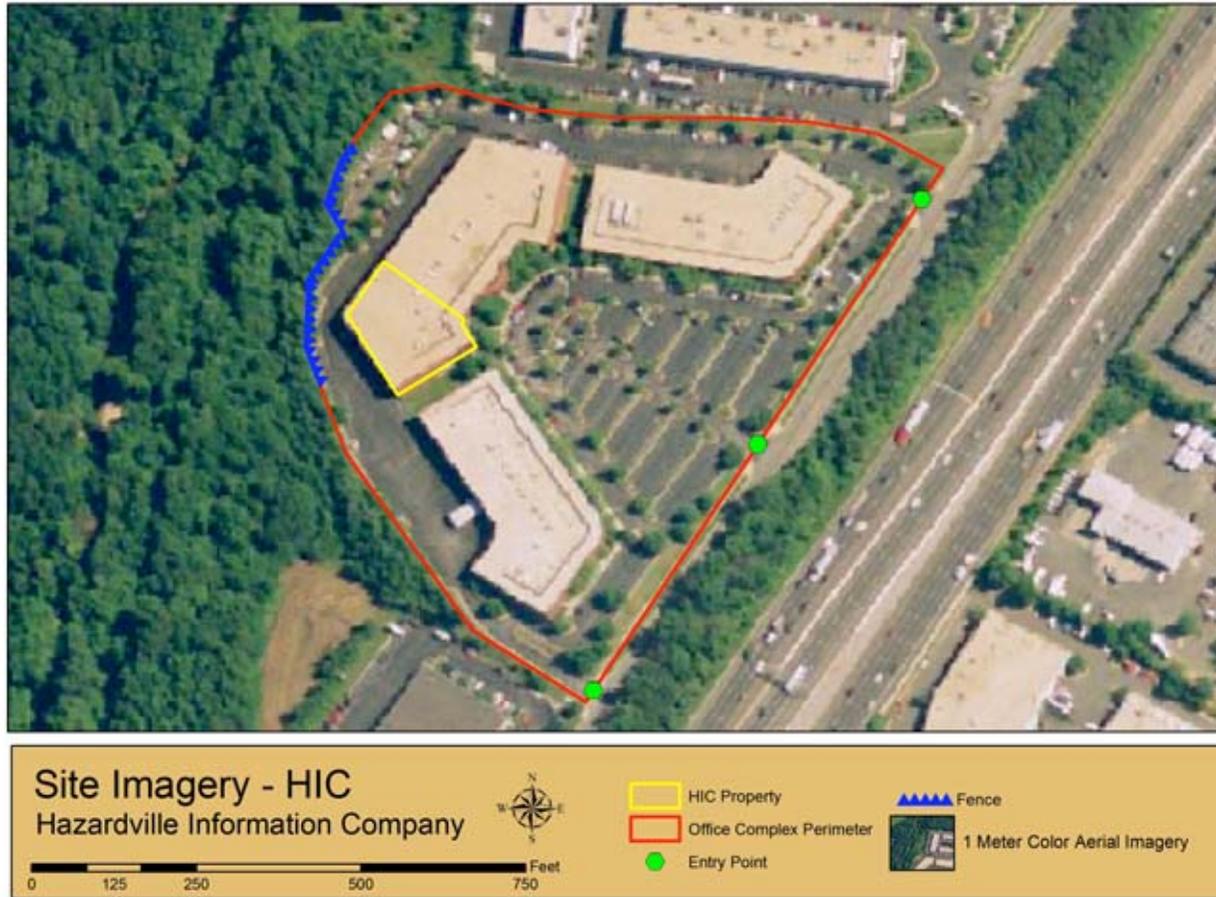
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HIC Local Imagery



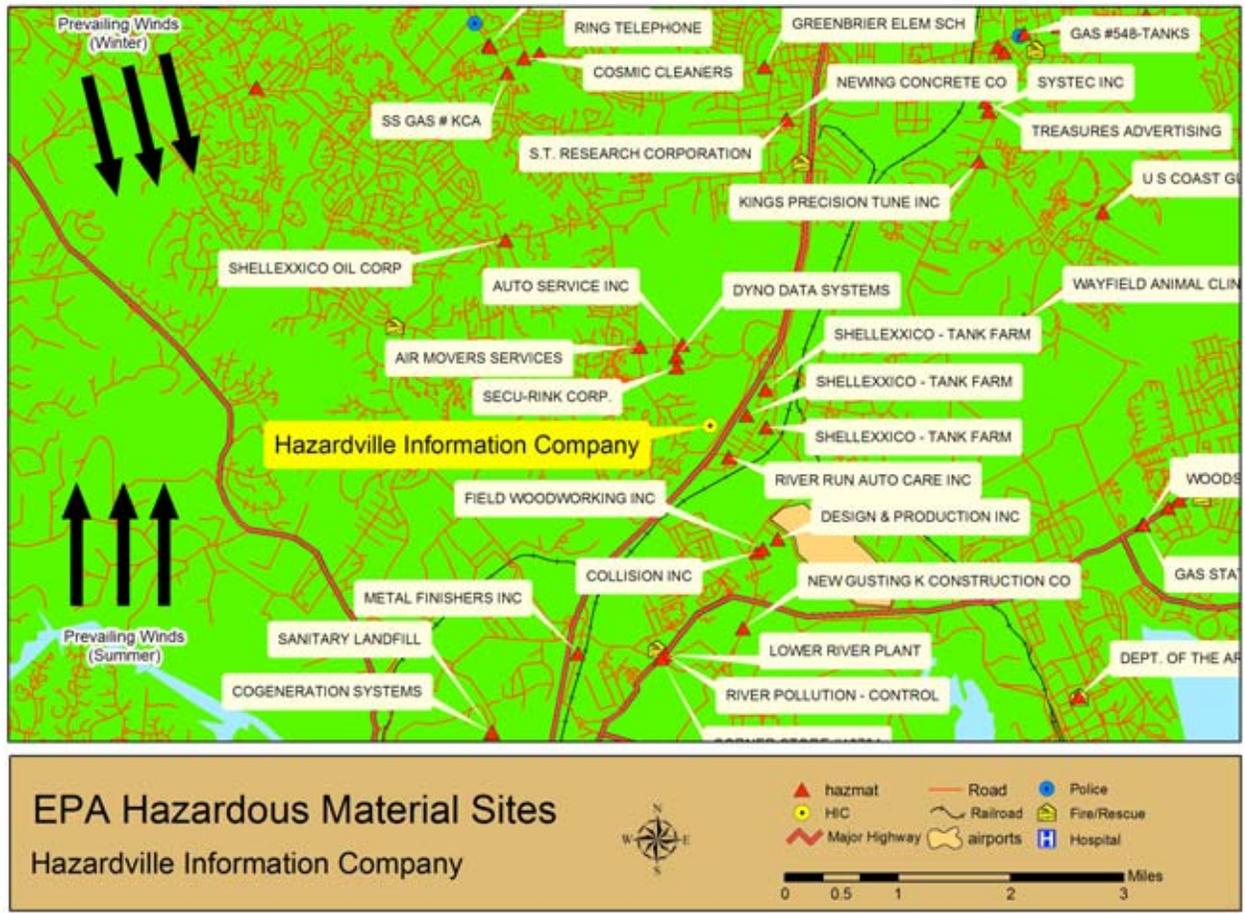
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HIC Site Imagery



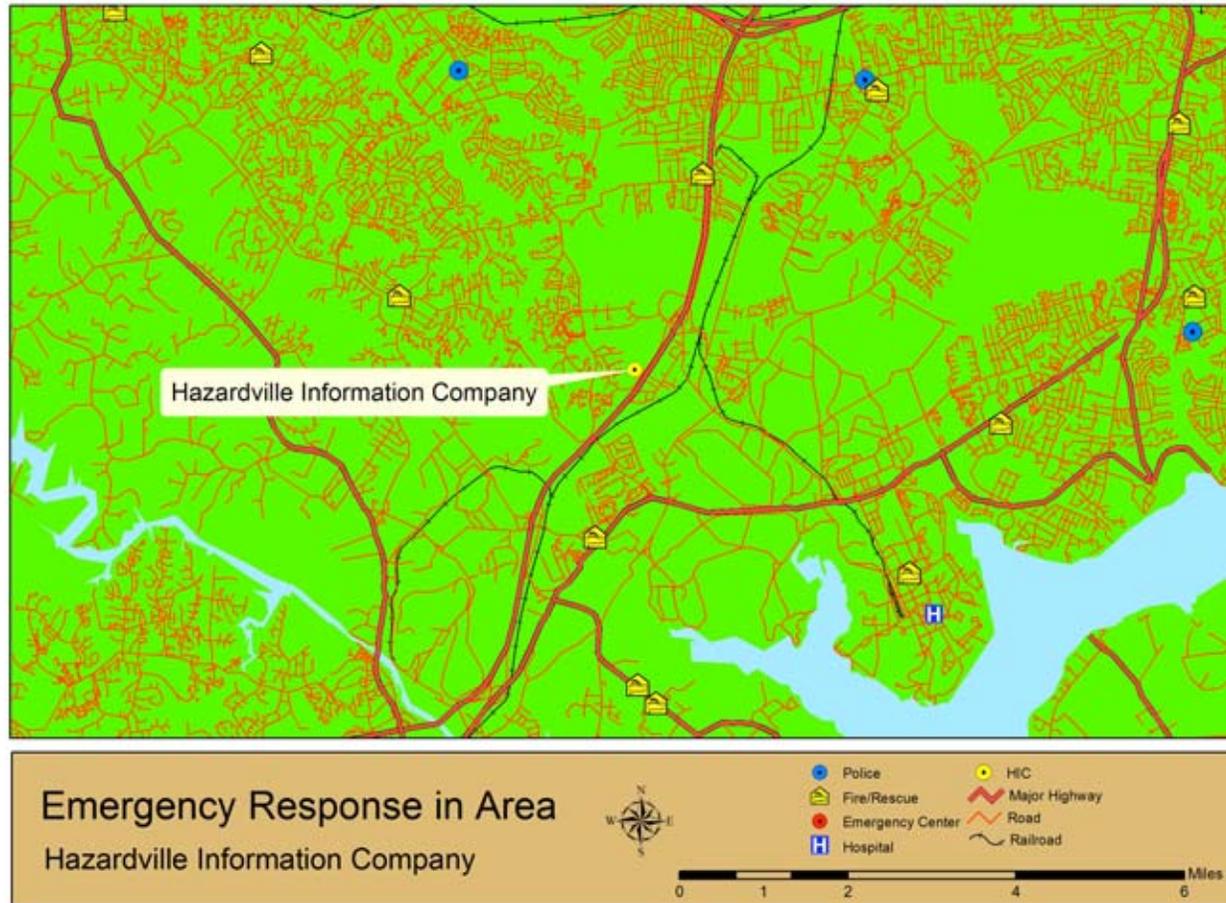
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HIC HazMat Sites



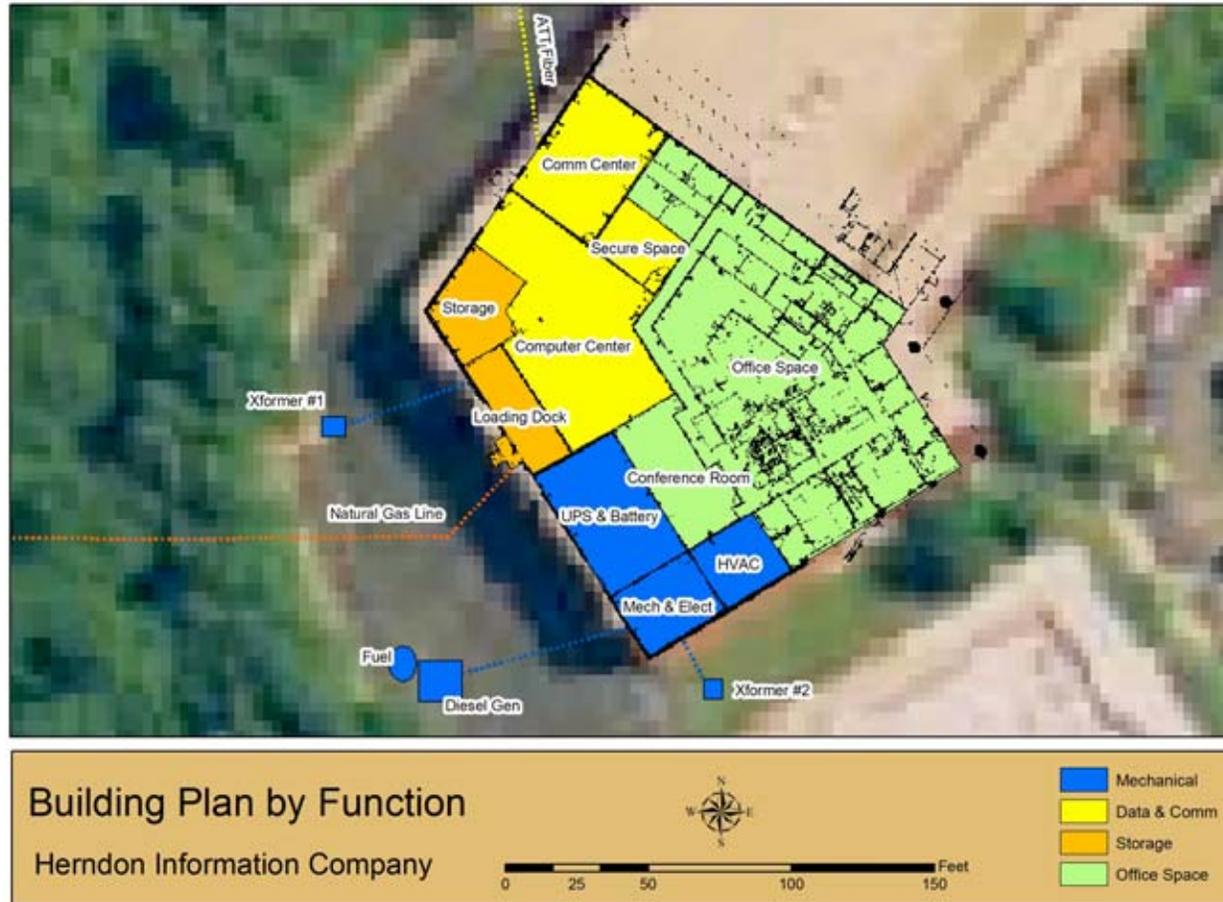
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HIC Emergency Response



FEMA

HIC Functional Layout



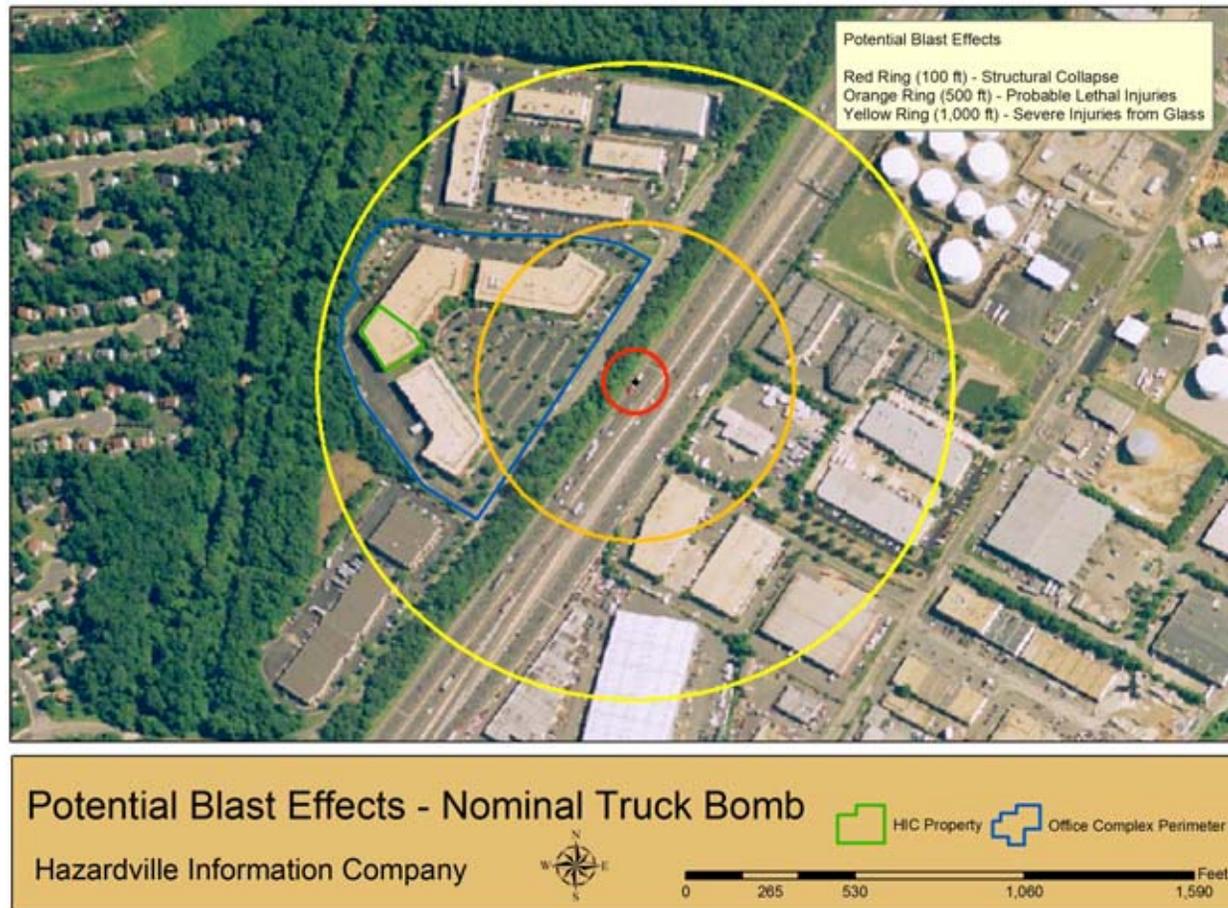
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HIC Car Bomb Blast Effects



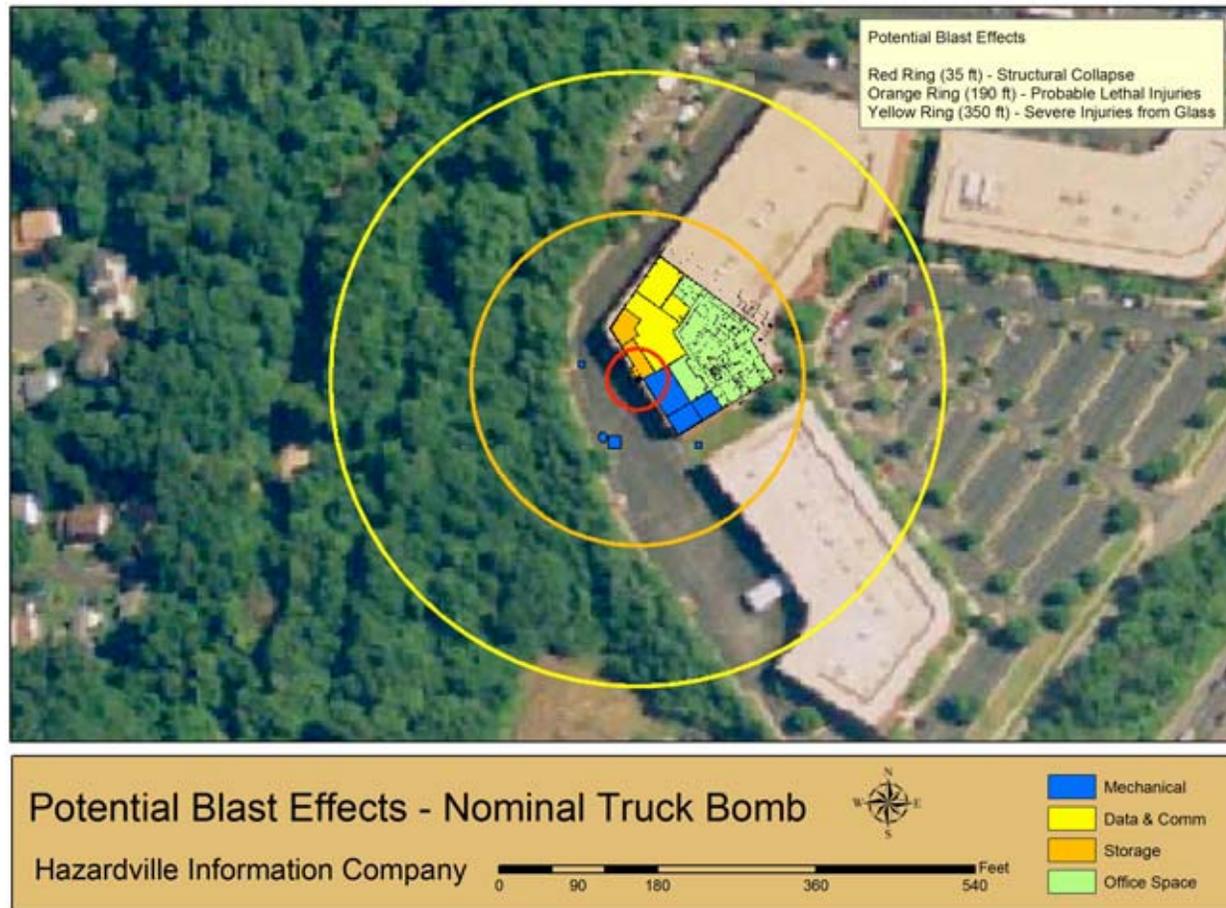
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HIC Truck Bomb Blast Effects



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HIC Truck Bomb Blast Effects



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HIC Building Data

Infrastructure

Structural

- 2 Story steel frame with brick façade
- Annealed glass

Mechanical

- HVAC
- Gas
- Fire Systems

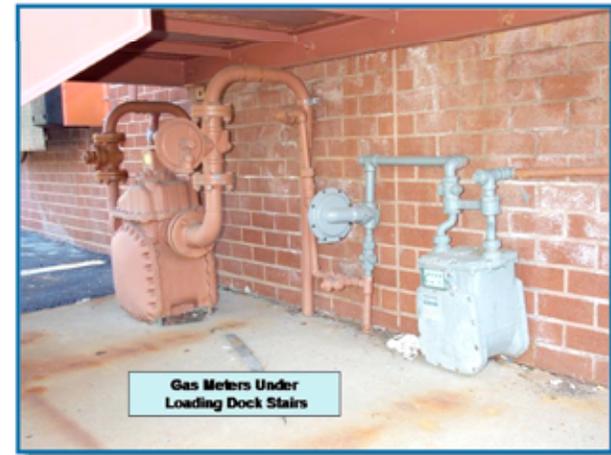
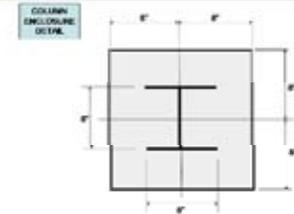
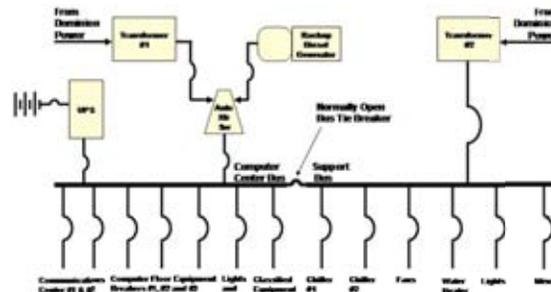
Electrical

- Primary
- Back-up

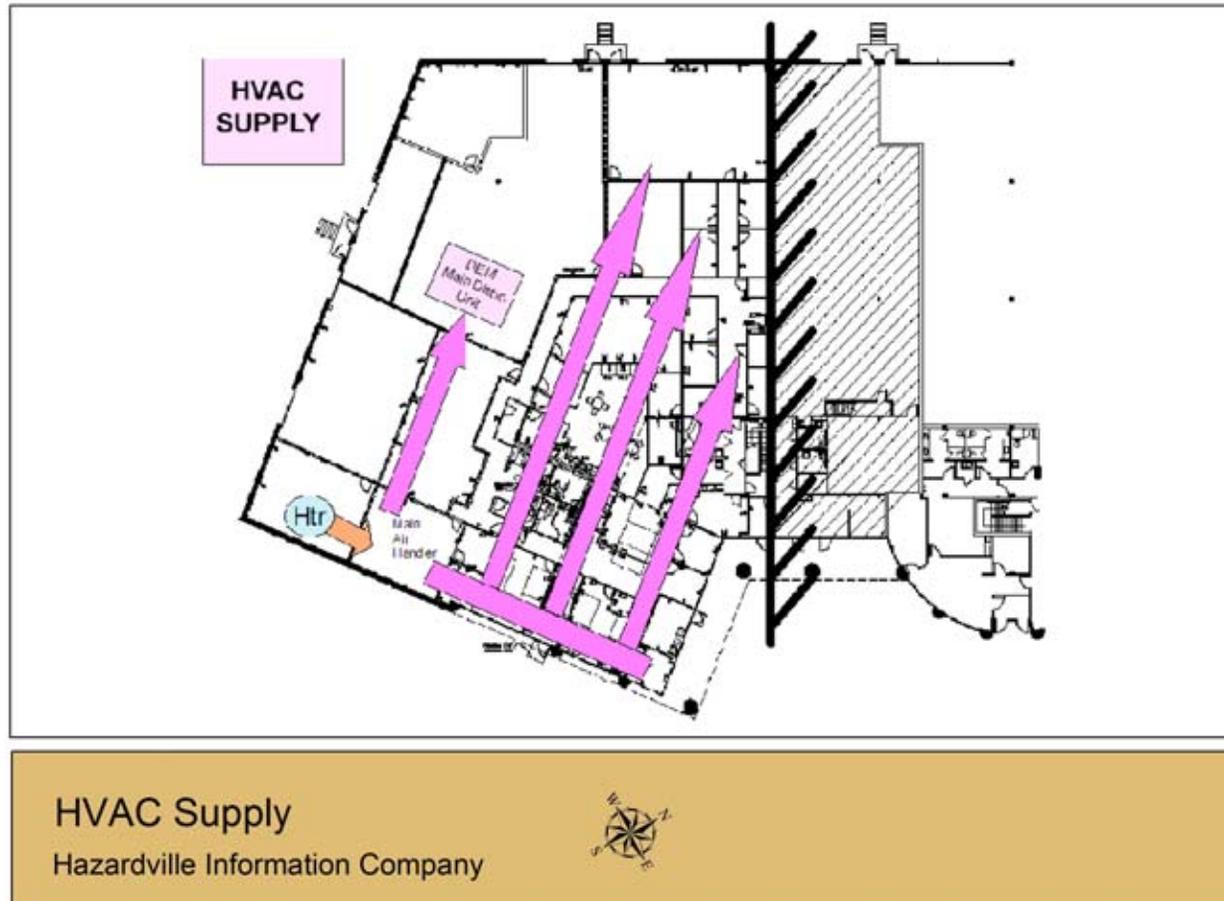
IT

- Data Center
- Telecom

Physical Security

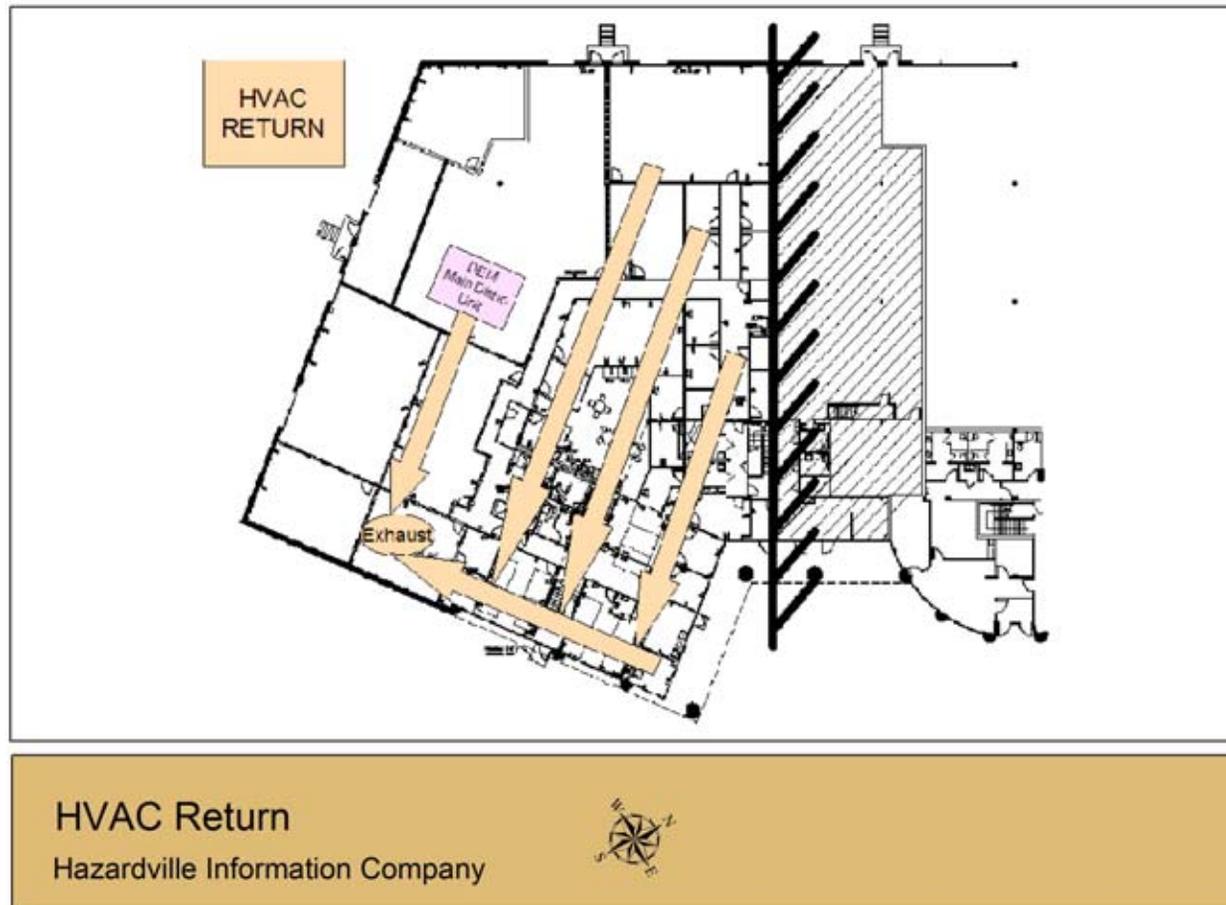


HIC Mechanical Systems



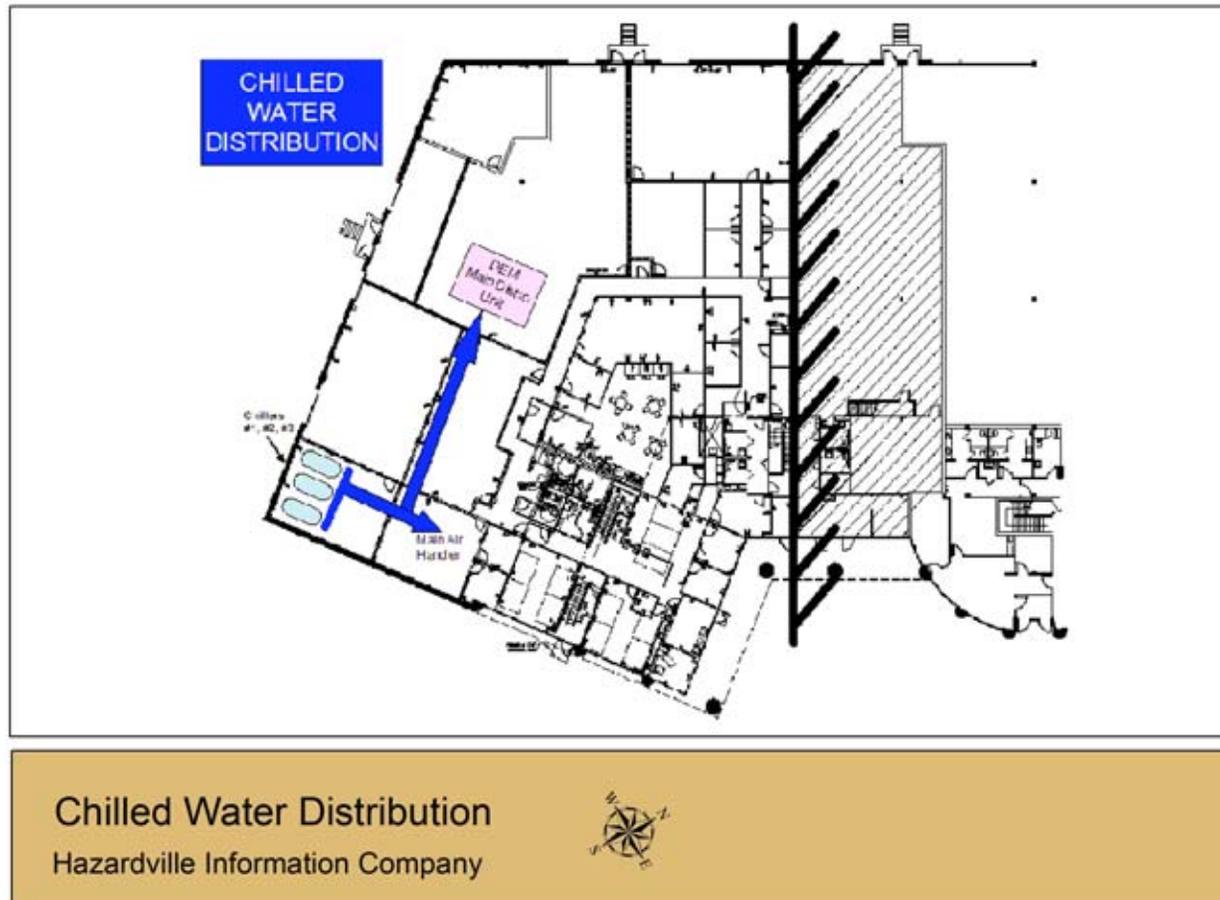
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HIC Mechanical Systems



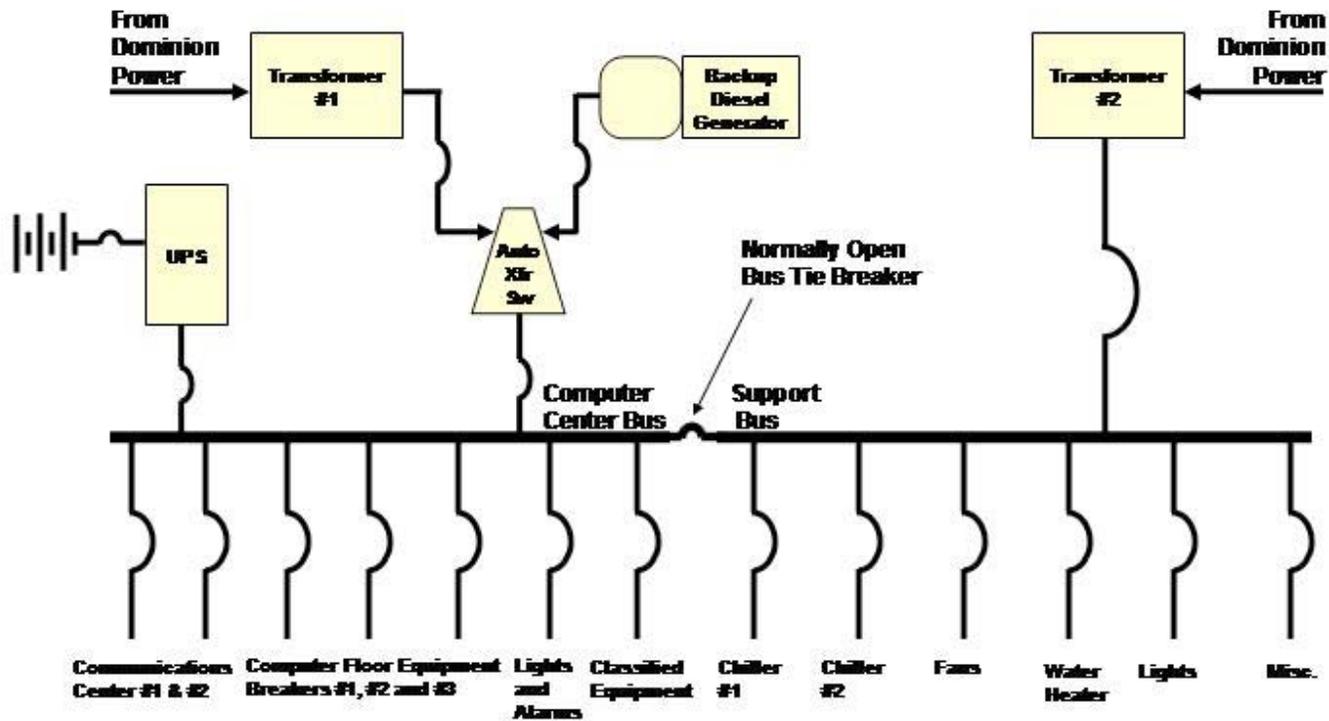
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HIC Mechanical Systems



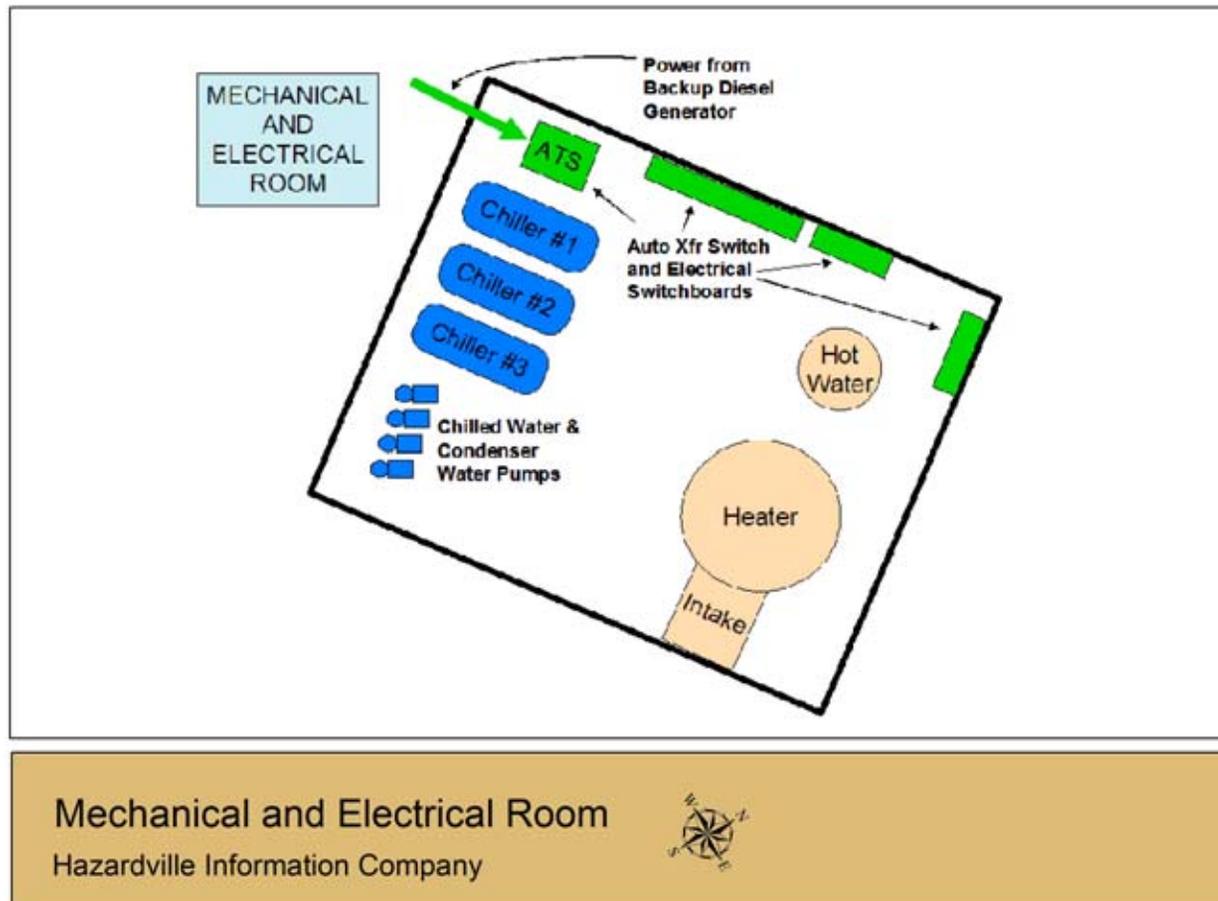
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HIC Electrical Systems



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HIC Mechanical and Electrical Room

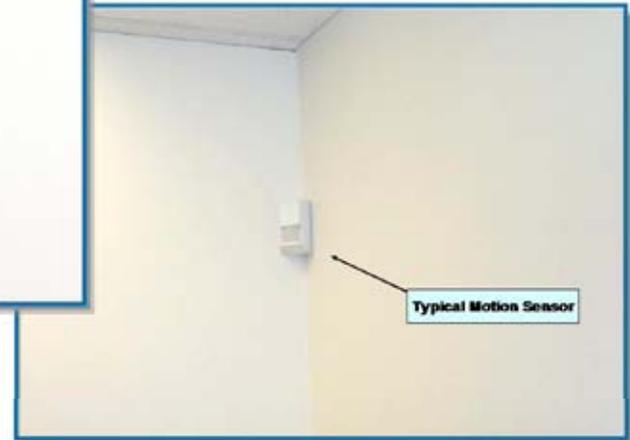


Mechanical and Electrical Room
Hazardville Information Company



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HIC Physical Security



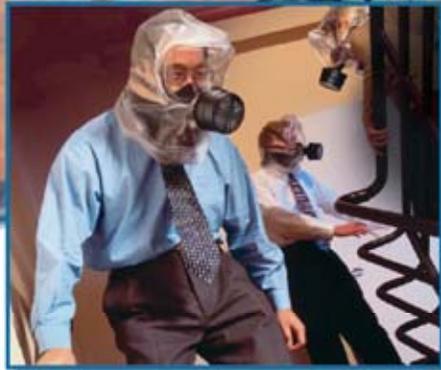
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HIC IT



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HIC Emergency Response



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Threats/Hazards

Threats include:

Terrorism

- No direct threat to HIC
- Government, military, industry in the area

Intelligence Collection

Crime

- High threat in metro area, lower in suburbs

HAZMAT

- Many facilities nearby
 - Fuel farm and pipeline
 - Interstate highway
 - Rail line

Natural Hazards

- Hurricanes – Infrequent
- Tornadoes – Almost every Spring
- Earthquakes – Infrequent
- Lightning - Frequent



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Design Basis Threat

Explosive Blast: Car Bomb 250 lb TNT equivalent. Truck Bomb 5,000 lb TNT equivalent (Murrah Federal Building class weapon)

Chemical: Large quantity gasoline spill and toxic plume from the adjacent tank farm, small quantity (tanker truck and rail car size) spills of HazMat materials (chlorine)

Biological: Anthrax delivered by mail or in packages, smallpox distributed by spray mechanism mounted on truck or aircraft in metropolitan area

Radiological: Small “dirty” Bomb detonation within the 10-mile radius of the HIC building



Level of Protection

GSA Interagency Security Criteria

Level II Building – between 11-150 employees; 2,500 to 80,000 sq ft

- Perimeter Security
- Entry Security
- Interior Security
- Administrative Procedures
- Blast/Setback Standards



Levels of Protection

DoD Antiterrorism Standards

Level of Protection	Potential Structural Damage	Potential Door and Glazing Hazards	Potential Injury
Low	Damage – unrepairable. Major deformation of non-structural elements and secondary structural members and minor deformation of primary structural members, but progressive collapse is unlikely.	Glazing will break, but fall within 1 meter of the wall or otherwise not present a significant fragment hazard. Doors may fail, but they will rebound out of their frames, presenting minimal hazards.	Majority of personnel suffer significant injuries. There may be a few (<10 percent) fatalities.

Adapted from Table 4-1, DoD Minimum Antiterrorism Standards for New Buildings, page 4-9, FEMA 426



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Levels of Protection

DoD Antiterrorism Standards

Location	Building Category	Stand-off Distance or Separation Requirements			
		Applicable Level of Protection	Conventional Construction Stand-off Distance	Effective Stand-off Distance	Applicable Explosives Weight
Controlled Perimeter or Parking and Roadways without a Controlled Perimeter	Inhabited Building	Very Low	25 M	10 M	Approx. 250 lbs
			82 ft	33 ft	

Adapted from Table 4-1, DoD Minimum Antiterrorism Standards for New Buildings, page 4-9, FEMA 426



Level of Protection

UFC 4-010-01 APPENDIX B DoD MINIMUM ANTITERRORISM STANDARDS FOR NEW AND EXISTING BUILDINGS	
Standard 1	Minimum Stand-off Distances
Standard 2	Unobstructed Space
Standard 3	Drive-Up/Drop-Off Areas
Standard 4	Access Roads
Standard 5	Parking Beneath Buildings or on Rooftops
Standard 6	Progressive Collapse Avoidance
Standard 7	Structural Isolation
Standard 8	Building Overhangs
Standard 9	Exterior Masonry Walls
Standard 10	Windows, Skylights, and Glazed Doors
Standard 11	Building Entrance Layout
Standard 12	Exterior Doors



Level of Protection (continued)

UFC 4-010-01 APPENDIX B DoD MINIMUM ANTITERRORISM STANDARDS FOR NEW AND EXISTING BUILDINGS	
Standard 13	Mailrooms
Standard 14	Roof Access
Standard 15	Overhead Mounted Architectural Features
Standard 16	Air Intakes
Standard 17	Mailroom Ventilation
Standard 18	Emergency Air Distribution Shutoff
Standard 19	Utility Distribution and Installation
Standard 20	Equipment Bracing
Standard 21	Under Building Access
Standard 22	Mass Notification



Unit XI Case Study Activity

Finalization and Presentation of Group Results

Purpose

- Groups finalize their assessments
- Decide on high priority risk concerns
- Determine appropriate mitigation measures
- Present findings to class

Requirements

Based on findings from previous 10 activities, complete the worksheet table

Prepare to present conclusions and justify decisions to class in a 5- to 7-minute presentation



Vulnerability/Mitigation

Car Bomb Blast/Site

Protect front entrance from car bomb blast – 82 foot stand-off

- Use planters, plinth walls, landscaping
- FRF film on windows or replace with laminated glass
- Consider closing in overhang area

Truck Bomb/Site

Protect rear parking area from truck bomb

- Use chain link gate, vehicle pop barriers, pre-screening away from building



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Vulnerability/Mitigation

Chemical/Mechanical-HVAC

Install emergency shut down switch, protect outside air intake

Evaluate carbon filters for chlorine type spills

Upgrade filters to MERV 11 to remove gasoline plume and other particulates

Biological/Mechanical-HVAC

Evaluate UVGI

Evaluate a standalone mailroom on separate HVAC zone

Radiological/Site

Install emergency shut down switch on HVAC

Upgrade filters to MERV 11 to remove radioactive particulates



Vulnerability/Mitigation

Other Significant Vulnerabilities/Mitigations

Blast/Site

Separate front lobby from interior office space with security door if primary mail entry point is the lobby area

Distribute internal functions for redundancy

Evaluate other utility connections/distribution capability for redundant feed to the building

Blast/Structural and Building

Strengthen overhead anchorage elements

- Heaters



Vulnerability/Mitigation

Blast or Armed Attack/Mechanical

Fire sprinklers

- Install enunciator panel and go to zones, dual stage in data center, clean agents versus water

Chill water

- Install backup piping to primary air handling units

Install exhaust fan in UPS room (lead acid batteries)

Place bollards around or relocate natural gas meters

Blast or Armed Attack/Electrical

Primary Bus

- Separate Computer Center Bus from Support Bus

Place bollards or fencing around transformers

Increase size of generator fuel tank



Vulnerability/Mitigation

Cyber Attack and Blast/IT Systems

Store backup tapes/data at least 10 miles away

Identify alternate telecom carrier circuits and availability

Conduct full extended load test of emergency power/UPS system

Blast and Armed Attack/Physical Security

Raise height of rear perimeter fencing

Evaluate installing a small Security Operations Center and increase monitoring/awareness of exterior

Upgrade CCTV system to digital and DVR and install additional cameras to view front parking, lobby, and loading dock



Vulnerability/Mitigation

Blast and CBR/Emergency Operations/Disaster Recovery

Install mass notification system

Post shelter and evacuation procedures

Identify rally point at site away from building

Use computer data center for shelter-in-place

Acquire personal protective evacuation hoods

