

Security Through Design in the Public Environment

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in partial fulfillment of the requirements for the degree of

Master of Architecture

In

Architecture

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ABSTRACT

The following thesis project is an investigation in the topic of security through design. The study sought a site and program susceptible to attack in the public environment in order to design an appropriate response to the inherent tension from those attributes. The work represents an architectural reaction to the engineered assessments and solutions that permeate the post 9/11 world. The seemingly indiscriminate deployment of bollards, planters, and jersey barriers choke the representation of openness and freedom as well as the perception of safety from contemporary cities and buildings.

My personal design approach attempts to re-present a constraint through the experience of a user to celebrate the inherent potential of that perceived limitation. The presented solution has embraced security and other 'limiting' considerations in the dialogue of design beyond base utilitarian functions. Acknowledging 'security through design' solutions in this context requires consideration of various building archetypes and particular sites as independent design variables. The vehicle for this research was found as an institute to counter terrorism located in the Washington D.C. region.

Dedication

From the bookends of my collegial career in memory of those lost, defense of the innocent, and the hope that my career bears fruit in the fight against terrorism, violence, destruction, and hate.

Acknowledgements

Dr. Emmons, Dr. Feuerstein, Melinda Becker, Don Swearingen, William Galloway, Henry Hollander for their flexibility and endurance. My family's unconditional love and support. Friends guiding me through my time in the valley. Above all the mercy of God.

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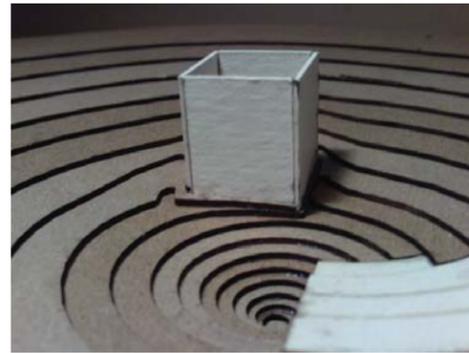
1	<i>Assassination Attempt of Qin Shi Huangdi</i>
5	<i>Assassination of Pompey</i>
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INITIAL CONCEPT SCHEMES

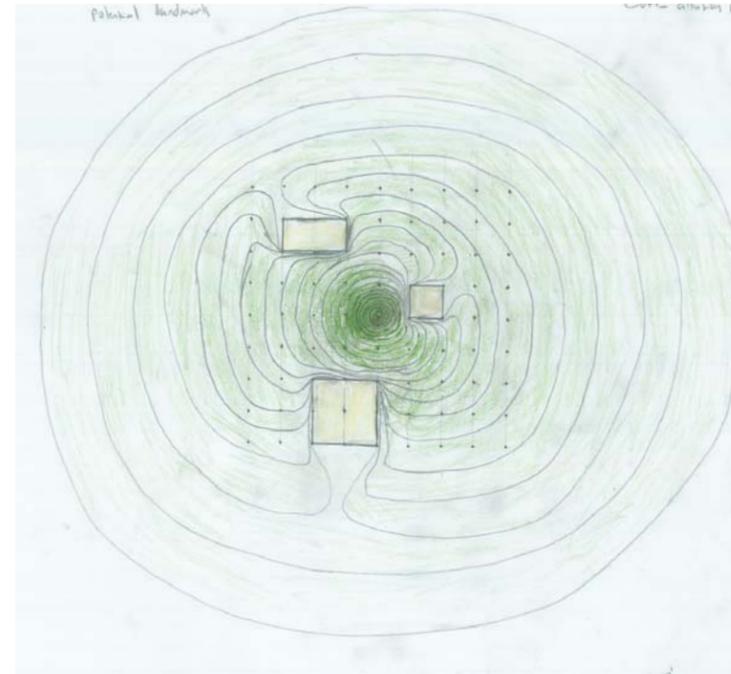
BLAST SCHEME



INSPIRATION DIAGRAM OF BLAST WAVES



DETAIL MODEL SHOT SHOWING GROUND ZERO



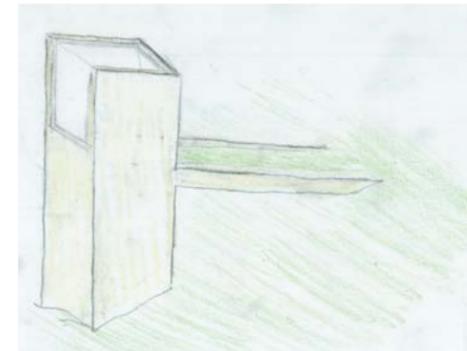
MODELED SKETCH REPRESENTATIVE EXPLOSION WITH BLAST WAVES DEFORMATION AROUND STRUCTURES WITH MINIMAL REFLECTION



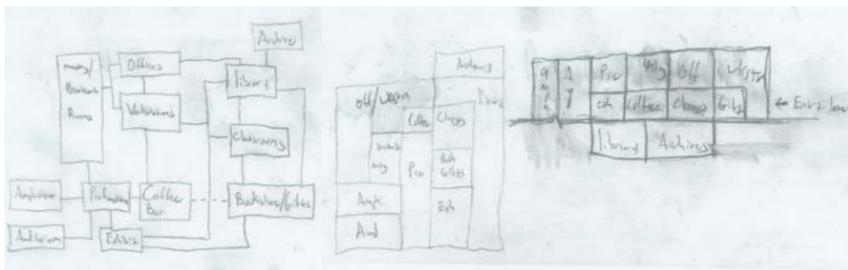
COMPARISON OF CONCAVE VS. CONVEX TOPO 'BLAST'



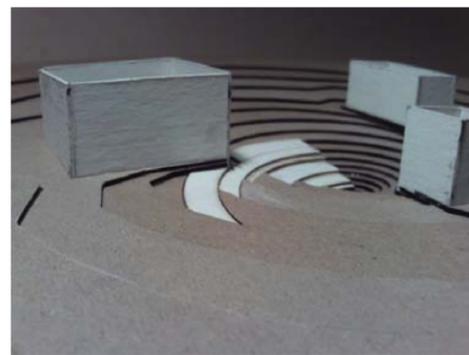
MODEL SHOT SHOWING LIGHT CANNONS, AND GRID UNDER THE SURFACE



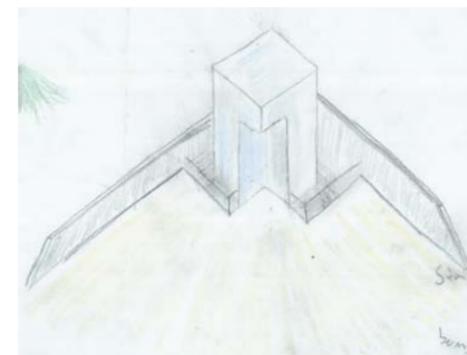
ELEMENT TO LANDSCAPE



INITIAL ADJACENCY BLOCKING AND STACKING DIAGRAM



MODEL SHOT WITH OVERVIEW OF TOPOGRAPHY, TOWER ELEMENTS, AND THE UNEARTHING OF AN AMPHITHEATER WOVEN INTO THE SURFACE



SKETCH AXON OF ENTRY PLAZA FRONTING TOWER ELEMENT

THIS SCHEME WAS BORN FROM RESEARCH INTO THE SCIENCE OF PHYSICAL PROTECTION, IN AN ATTEMPT TO BETTER UNDERSTAND THE PHYSICS OF BLAST WAVES. A SIMPLE CONCEPTUAL DIAGRAM OF HOW THESE WAVES REACT TO BARRIERS RAISED THE POSSIBILITY OF MANIFESTING THE PHENOMENON IN PHYSICAL FORM. IN THIS WAY PEOPLE COULD, IN A MANNER, SAFELY EXPERIENCE AN EXPLOSION AND HELP TO UNDERSTAND ITS INTANGIBLE PROPERTIES. TRANSLATING THE PROPAGATION OF PRESSURE WAVES AS A TOPOGRAPHIC REPRESENTATION PROVIDES AN IMMERSIVE, PHYSICAL ENVIRONMENT THAT MODELS BLAST BEHAVIOR AT A HUMAN SCALE.

THIS TRANSLATION RELATES SLOPE TO BLAST PRESSURE, WITH STEEPER INCLINES REVEALING AREAS OF INCREASED PRESSURE. THE RESULTANT DYNAMIC SURFACE COULD MAKE AN INTRIGUING GREEN ROOF PARK, RETAINING SOME OF THE SITES CURRENT USE. THE THREE ARBITRARY FORMS WERE INTRODUCED WITH DIFFERENT SIZE, ORIENTATION, AND DISTANCE RELATIVE TO THE 'BLAST INCIDENT'. THESE EASILY TRANSLATE INTO VERTICAL CIRCULATION OR LIGHT CANNON ELEMENTS. A REGULAR STRUCTURAL GRID CONSPICUOUSLY INTERACTING WITH THE SURFACE PROVIDES A CONSISTENT MEASURE THAT AIDS UNDERSTANDING.

THIS REPRESENTATION HELPS TO PROVIDE A MORE UNDERSTANDABLE SCALE AS WELL AS EXPERIMENTATION WITH THE INTRODUCTION OF ADDITIONAL ELEMENTS PLAYING THROUGH THE SURFACE.

ASSASSINATION OF POMPEY

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

B 4
C 8

JANUARY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
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- SURPRISE STABBING AS POMPEY LANDED IN EGYPT ON HIS 58TH BIRTHDAY
- ATTEMPTED TO INGRATIATE FAVOR WITH JULIUS CAESAR, IN HIS OVERTHROW OF THE ROMAN REPUBLIC. ENRAGED CAESAR INSTEAD LEADING TO HIS OVERTHROW OF THE REGIME, INSTALLING CLEOPATRA
- CAESAR HAD THE SENATE DEIFY POMPEY IN 45 BC

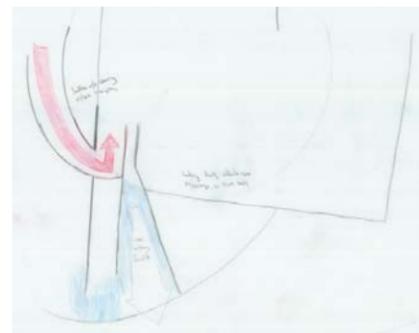
STABBING
1 KILLED



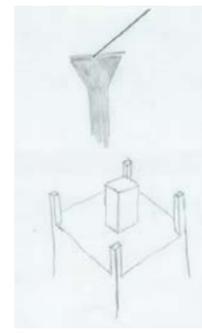
BRIDGE SCHEME



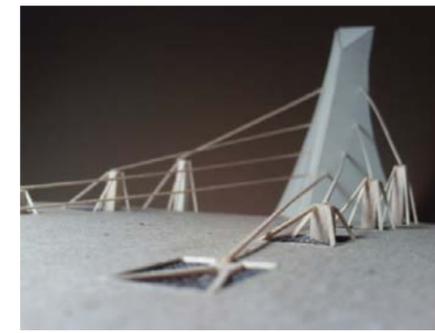
MODEL VIEW PROVIDES AN INTERESTING SECTIONAL FORCED PERSPECTIVE



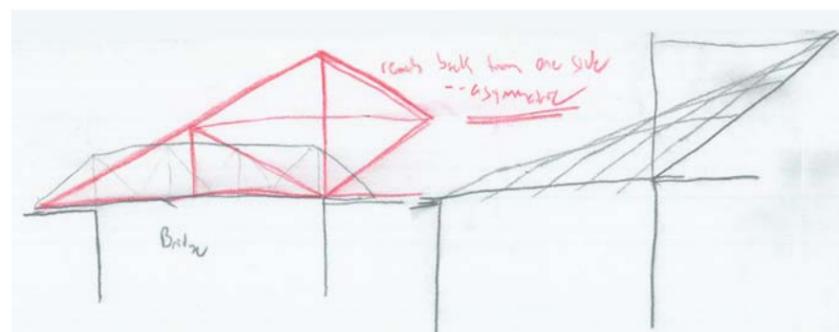
INITIAL DIAGRAM OF MULTIPLE PERSPECTIVES, SIMULATING A CATASTROPHIC ATTACK



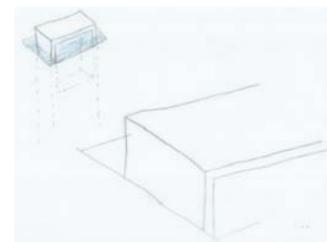
COLUMN CONNECTION DETAIL STUDIES



MODEL SHOT SHOWING A SUPPORT DETAIL AND CONNECTIONS



TRANSFORMATION SKETCH OF A TYPICAL TRUSS BRIDGE TO A STYLIZED SUSPENSION BRIDGE



COLUMN CONNECTION DETAIL STUDY, WITH SMALL POOL AND BENCH



MODEL OVERVIEW SHOWING LIGHT WELLS AND GEOMETRIC PLAY OF CABLES

FIGURES 6/7: THAILAND'S RAMA VIII BRIDGE UNDER CONSTRUCTION & COMPLETED AT NIGHT INSPIRATIONAL IMAGES. [HTTP://WWW.CANADIANCONSULTINGENGINEER.COM/NEWS/AWARD-OF-EXCELLENCE-RAMA-8-BRIDGE/1000143520/?&er=NA](http://www.canadianconsultingengineer.com/news/award-of-excellence-rama-8-bridge/1000143520/?&er=NA) USED UNDER FAIR USE, 2015



FIGURE 5: INSPIRATIONAL SUSPENSION BRIDGE IMAGE. [HTTPS://WWW.GOOGLE.COM/IMGHP?HL=EN&TAB=WI](https://www.google.com/imghp?hl=en&tab=wi) PUBLIC DOMAIN IMAGE.

FIGURE 8: INSPIRATIONAL IMAGE OF THE PUENTE ATIRANTADO BRIDGE IN MONTERREY MEXICO. [HTTPS://WWW.GOOGLE.COM/IMGHP?HL=EN&TAB=WI](https://www.google.com/imghp?hl=en&tab=wi) PUBLIC DOMAIN IMAGE.



THE BRIDGE SCHEME UTILIZED A BRIDGE AS THE LAUNCHING POINT FOR THE DESIGN. BRIDGES ARE OFTEN USED AS METAPHORS FOR RELATIONSHIPS OR LIFE EXPERIENCES AND IN THAT SENSE ARE APPROPRIATE FOR THIS SCHEME, INVESTIGATING THE EXPERIENCE OF VICTIMS AND ATTEMPTS TO EFFECTIVELY ENGAGE AND REINTEGRATE THESE INDIVIDUALS WITH SOCIETY.

THE UN HELD A SYMPOSIUM IN 2008 ON SUPPORTING VICTIMS OF TERRORISM AND THIS SCHEME DREW INSPIRATION DIRECTLY FROM THE REPORT DOCUMENTING THAT EVENT. THE REPORT HIGHLIGHTED, AMONG OTHER CONCERNS, FEELINGS OF DISENFRANCHISEMENT AND ISOLATION FROM THEIR COMMUNITY FOLLOWING THEIR VICTIMIZATION. THESE WERE MOST EFFECTIVELY COUNTERED THROUGH CONSCIOUS AND CONSPICUOUS EFFORTS FROM THE COMMUNITY TO ENGAGE THESE INDIVIDUALS. THE BRIDGE IN THIS SENSE SPANS OVER TIME TO RECONNECT THOSE SEPARATED FROM THEIR COMMUNITY/ COUNTRY BY THE SCHISM OF TERRORIST ACTIONS.

I WAS IMMEDIATELY DRAWN TO CABLE STAYED STRUCTURES IN DIAGRAMMING SUCH RECONCILIATORY EFFORTS. NUMEROUS, LIGHT, SUPPORTING ELEMENTS REACHING OUT IN TENSION FROM A CONSOLIDATED STRONGLY ANCHORED TOWER STRUCK ME AS A PARTICULARLY APT EXPRESSION.

THIS INITIAL EXPRESSION IS A DIAGRAMMATIC TOOL TO START TO ADJUST THESE IDEAS INTO ARCHITECTURAL FORM. THE CONCEPT IS BEGINNING TO PLAY WITH IDEAS OF CREATING MULTIPLE EXPERIENCES OF SPACE, MOLDING OF SURFACES, AND STRUCTURAL DETAILING THAT EXPRESSES ALTERNATE INTERPRETATIONS OF CONNECTION AND SUPPORT.

ASSASSINATION OF JULIUS CAESAR



STABBING
1 KILLED



HEALING LANDSCAPE SCHEME

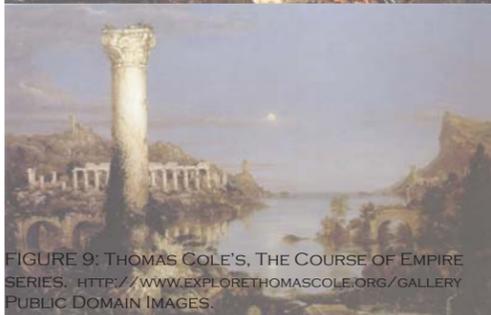
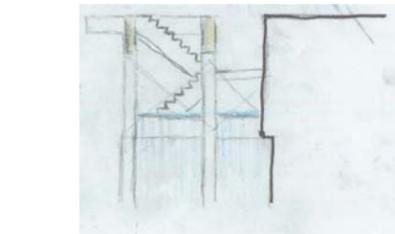
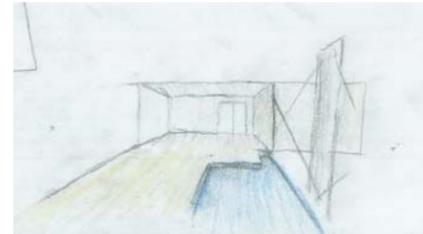


FIGURE 9: THOMAS COLE'S, THE COURSE OF EMPIRE SERIES. [HTTP://WWW.EXPLORETHOMASCOLE.ORG/GALLERY](http://www.explorethomascole.org/gallery) PUBLIC DOMAIN IMAGES.



SKETCH ELEVATION AT EXPOSED STAIR



SKETCH PERSPECTIVE FROM EXPOSED STAIR TO BUILDING



FIGURE 10: SHOWS DISJOINTED VERTICAL ELEMENTS. [HTTP://WWW.EXPLORETHOMASCOLE.ORG/GALLERY](http://www.explorethomascole.org/gallery). PUBLIC DOMAIN IMAGE.



FIGURE 11: ADAPTED USE/NATURAL ORGANIC GROWTH PATTERN SIMULATING AN ELEVATED GROUND PLANE. [HTTP://WWW.EXPLORETHOMASCOLE.ORG/GALLERY](http://www.explorethomascole.org/gallery). PUBLIC DOMAIN IMAGE.

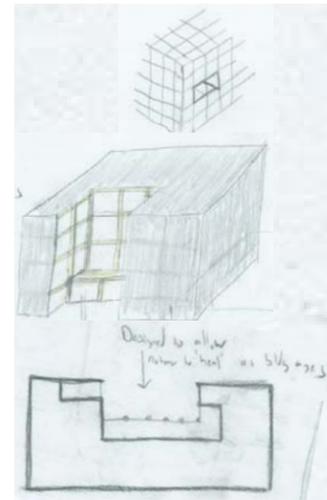
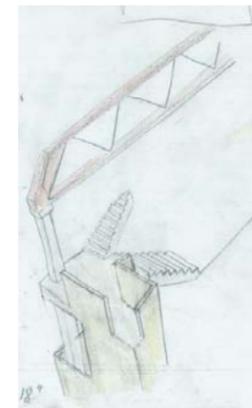


DIAGRAM SERIES, HOW A PARTIALLY FAILED STRUCTURE MIGHT DETERIORATE



INCOMPLETE MODEL SHOT SHOWING DEVELOPMENT OF STAIR TOWER AND ELEVATED REFLECTING POOL



SKETCH STUDY 'SKINNING' SKELETAL STRUCTURE



SKETCH PALIMPEST PLAN

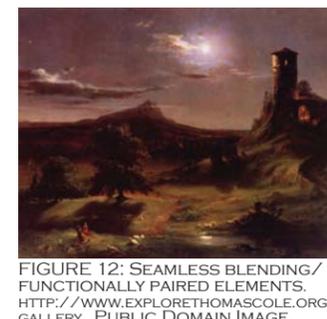


FIGURE 12: SEAMLESS BLENDING/FUNCTIONALLY PAIRED ELEMENTS. [HTTP://WWW.EXPLORETHOMASCOLE.ORG/GALLERY](http://www.explorethomascole.org/gallery). PUBLIC DOMAIN IMAGE.



FIGURE 13: INCOMPLETE ENVELOPE/ ENCLOSURE. IRREGULAR/UNPLANNED FENESTRATION. [HTTP://WWW.EXPLORETHOMASCOLE.ORG/GALLERY](http://www.explorethomascole.org/gallery). PUBLIC DOMAIN IMAGE.

THE HEALING LANDSCAPE SCHEME DREW INSPIRATION FROM AN ENVIRONMENT BORN OUT OF THE RUINS OF HUMAN CONSTRUCTION. OFTEN THE RESPONSE TO A DESTRUCTIVE ATTACK IS TO CLEAR THE AREA AND REBUILD AS IF THE EVENT NEVER TOOK PLACE. THIS MINDSET IS EMBLEMATIC OF SOCIETY'S TENDENCY TO IGNORE UNPLEASANT HISTORY, WHICH FAILS TO ACKNOWLEDGE OR AMELIORATE THE LINGERING EFFECTS IT HAS ON VICTIMS. RETAINING SOME SCARS ACKNOWLEDGES THE PLACE'S HISTORY AND THAT OF THE COMMUNITY AS A WHOLE.

THOMAS COLE'S 'COURSE OF THE EMPIRE' SERIES REVEALS THE TRANSFORMATION OF A FICTITIOUS SETTLEMENT FROM A NATURAL STATE, TO ITS GRADUAL SUPPRESSION UNDER HUMAN OCCUPATION, EVENTUAL DESTRUCTION AND SLOW NATURAL HEALING THAT CAN BE SEEN AS CYCLICAL RATHER THAN CULMINATING STEPS IN THE SERIES. THIS FIFTH WORK PICTURED IS THE LAUNCHING POINT FOR THE DESIGN. IT IS MIRRORED IN MUCH OF THE PAINTER'S OTHER WORK SHOWING A SYMBIOTIC RELATIONSHIP BETWEEN THE RUINS OF MANMADE AND NATURAL ENVIRONMENTS.

THESE PAINTINGS REVEAL INTRINSIC CHARACTERISTICS OF RUINS THAT PARADOXICALLY RELATE MORE TO A SUBLIME IMPRESSION THAN OF DEGRADATION. THIS SCHEME ATTEMPTS TO TRANSLATE THIS EXPERIENCE BY UTILIZING THESE CHARACTERISTICS IN A BLENDING OF LANDSCAPE AND BUILDING DESIGN ELEMENTS. INITIALLY THESE DESIGN VIGNETTES HAVE FOCUSED ON THE ADAPTIVE REUSE NATURAL AND ARTIFICIAL ENVIRONMENTS MAKES OF ELEMENTS FROM THE OTHER.

GUNPOWDER PLOT

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- BOMBING PLOT TARGETING ENGLAND'S HOUSES OF PARLIAMENT ATTEMPTING TO KILL PROTESTANT KING JAMES I, HIS FAMILY, AND ARISTOCRACY FOR THE EMANCIPATION OF CATHOLICS
- PLACED 36 BARRELS, (~1,800 LBS) OF GUNPOWDER IN A COAL CELLAR UNDER THE HOUSE OF LORDS
- PLOT WAS DISCOVERED & ALL 13 CONSPIRATORS & A PRIEST WHO HEARD PLOT IN CONFESSION WERE KILLED
- EMANCIPATION OF CATHOLICS WAS NOT ACHIEVED UNTIL MORE THAN 200 YEARS LATER

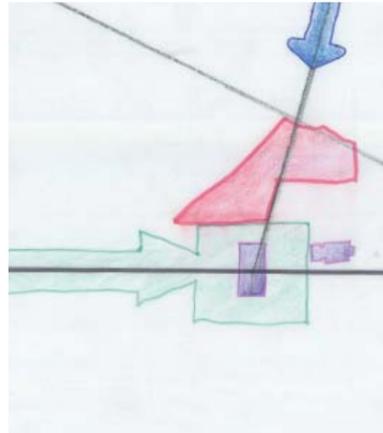
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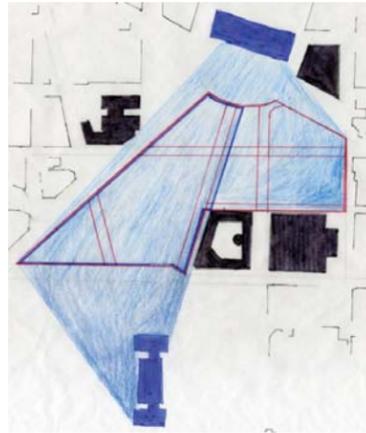
BOMBING PLOT



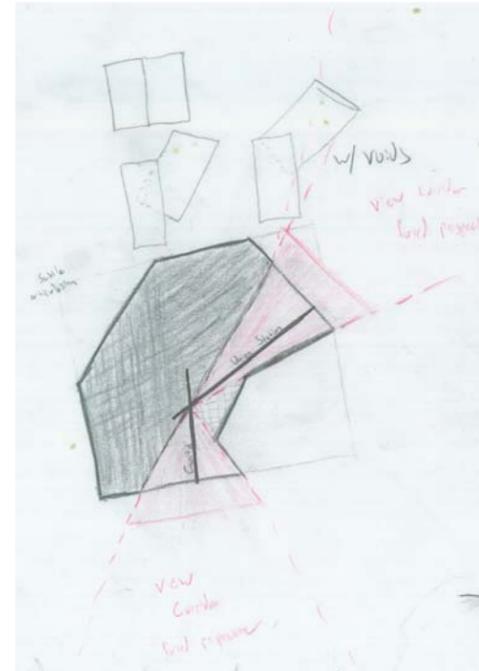
SITE GEOMETRIC SCHEME



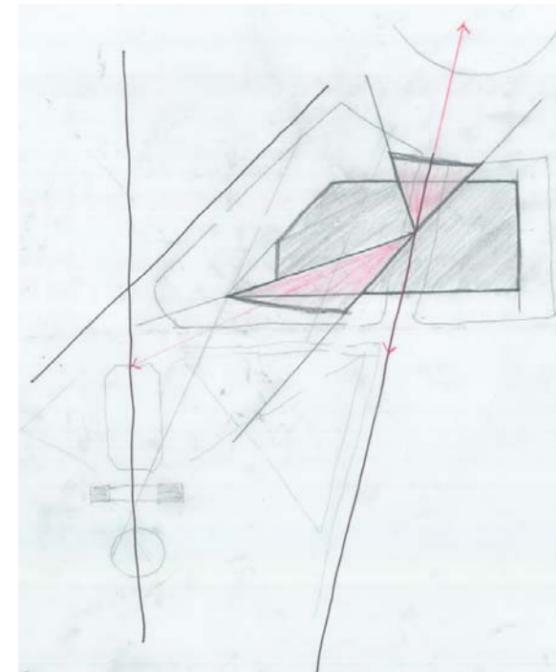
DETAIL OF OVERALL SITE DIAGRAM



DETAIL OF SITE'S VISUAL CONTEXT



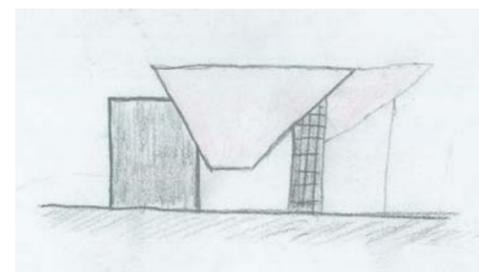
GENESIS OF GEOMETRIC PLAY WITH AXES TO GENERATE BASIC BUILDING FORM



MOLDING OF THE GEOMETRIC FORM BY THE PROMINENT AND GENERATED AXES OF CONNECTION



MODEL SHOT SHOWING THE JOINT'S DYNAMIC FLOWING THROUGH THE BASE GEOMETRIC BLOCK



INITIAL ELEVATION VIEW SHOWING THE CANOPY'S EXTENSION PRONOUNCING THE ENTRY'S



STREET LEVEL PERSPECTIVE AT UNION STATION ENTRY, INVITING PEDESTRIANS THROUGH THE INTERIOR STREET.

THE SITE GEOMETRIC SCHEME WAS DERIVED DIRECTLY FROM THE INTERPLAY OF SITE GEOMETRY AND AXIAL RELATIONSHIPS CARRIED THROUGH THE SITE. EARLY DIAGRAMS ASSUMED A DIRECT RELATIONSHIP ALONG DELAWARE AVENUE BETWEEN CONSTITUTION AVENUE AND THE CAPITOL. THE EXPERIENCE ON THE SITE, HOWEVER, CONTRADICTS ANY DIRECT RELATIONSHIP ALONG THIS ROUTE. THE GRADING AND LANDSCAPING OBSCURE THE POTENTIAL VISUAL CONNECTION, THE SYMBOLIC PROCESSION IS SULLIED BY THE RELEGATION OF SERVICE FUNCTIONS TO DELAWARE AVENUE FOR INTERVENING SPACES, AND EVEN THE ROUTE ITSELF IS BLOCKED BY VEHICLE CHECKPOINTS AND GUARD BOOTHS.

WITH THE SITE DIRECTLY FRONTING UNION STATION AND A PERCEIVED NORTH-SOUTH AXIS THROUGH THE CAPITOL GROUNDS, A CONNECTION CAN BE REINTRODUCED BETWEEN THESE INSTITUTIONS. THE SITE IS IDEALLY SITUATED TO SERVE AS A JOINT BETWEEN THESE AXES, SALVAGING THE RELATIONSHIP BETWEEN THOSE ANCHORS.

THE BODY OF THE BUILDING PROGRAM HAS BEEN REPRESENTED IN THE APPROXIMATE FORM OF THE SITE ITSELF WITH THE REDIRECTED AXES OF CONNECTION CUTTING THE BUILDING MASS. THIS INTERNAL STREET PROVIDES ORIENTATION AND DIRECTION FROM AN URBAN STANDPOINT, WHILE SIPHONING PUBLIC INTERACTION AND EXPOSURE TO THE PROGRAM OF THE BUILDING. THE EXPRESSION OF THIS REDIRECTION IS CELEBRATED IN ENTRY AWNINGS THAT EXTEND TO DRAW VISITORS INSIDE.

BOSTON TEA PARTY

PROPERTY DESTRUCTION



200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- 150 MEN DESTROYED AND EMPTIED 342 CRATES OF TEA INTO BOSTON HARBOR FROM SHIPS AT GRIFFINS WHARF
- PERPETRATED TO DEMONSTRATE RESISTANCE TO ENGLISH TAXATION WITHOUT COLONIAL REPRESENTATION
- GALVANIZED SUPPORT & HELPED SPARK THE AMERICAN REVOLUTION.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

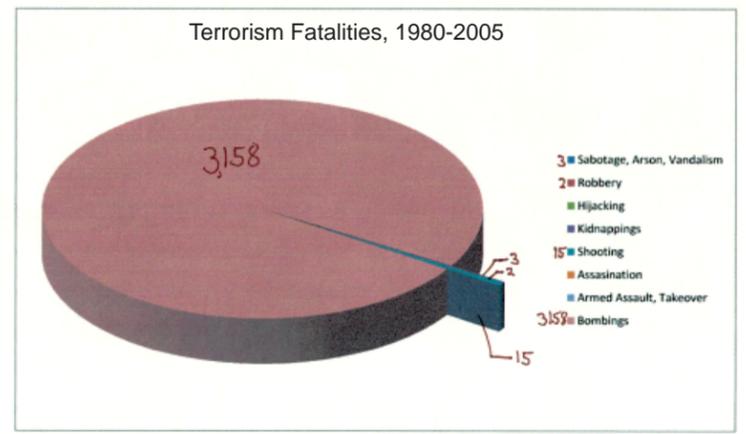
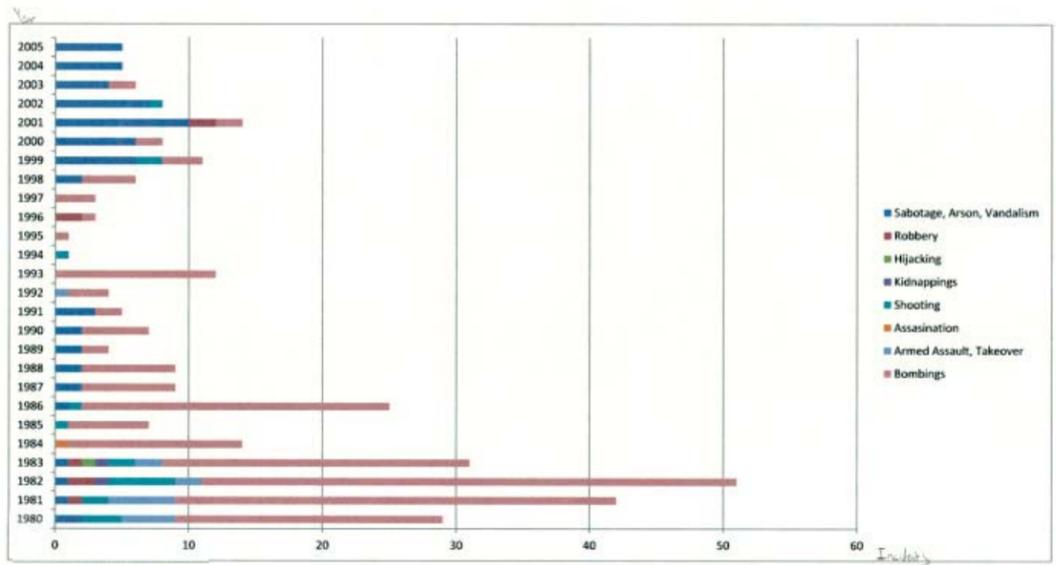
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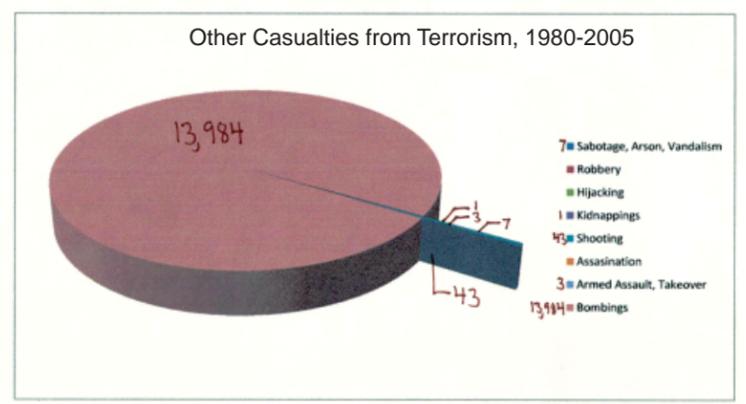
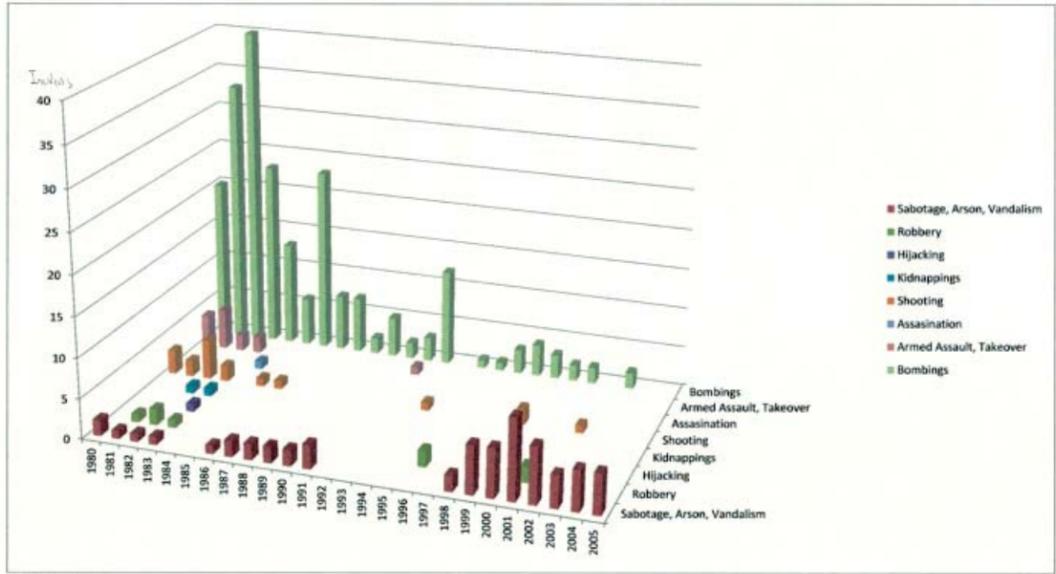
SITE ANALYSIS AND SECURITY CASE STUDIES

RESEARCH CONDUCTED INTO TERRORISM WITHIN THE UNITED STATES PROVIDED INSIGHTS INTO THE HISTORICAL PREVALENCE AND LETHALITY OF VARIOUS THREAT TYPOLOGIES. FIGURES PUBLISHED BY THE FBI COVERING 1980-2005 DOCUMENTED 320 INCIDENTS OF TERRORISM.

THIS SHOWED THE MOST COMMON FORM OF TERRORISM ATTACK IN THE US HAS BEEN BOMBINGS. WHILE THE RELATIVE FREQUENCY OF THESE ATTACKS IN RELATION TO THE NUMBER OF OVERALL INCIDENTS HAS DECREASED DRAMATICALLY, BOMBINGS REMAIN A CONSISTENT THREAT. DESPITE THE REDUCED OCCURRENCES, BOMBINGS STILL REPRESENT BY FAR THE MOST DANGEROUS TERRORISM THREAT FACED IN THE US.



*DATA SOURCE DOJ/FBI, 2005



*DATA SOURCE DOJ/FBI, 2005

WTC 1, OKLAHOMA CITY BOMBING, WTC 2 ACCOUNT FOR;
 - 3,146 OF 3,158 FATALITIES
 - 13,796 OF 13,984 OTHER CASUALTIES

3 INCIDENTS OUT OF 320 ACCOUNT FOR 99.6% FATALITIES AND 98.6% OTHER CASUALTIES

* DOJ/FBI, 2005

*DATA SOURCE DOJ/FBI, 2005
 TERRORIST INCIDENT

"A VIOLENT ACT OR AN ACT DANGEROUS TO LIFE OF HUMANS, IN VIOLATION OF THE CRIMINAL LAWS OF THE UNITED STATES, OR OF ANY STATE, TO INTIMIDATE OR COERCE A GOVERNMENT, THE CIVILIAN POPULATION, OR ANY SEGMENT THEREOF, IN FURTHERANCE OF POLITICAL OR SOCIAL OBJECTIVES."

ASSAULT ON HARPER'S FERRY

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- ATTEMPTED TO SEIZE ESTIMATED 100,000 GUNS STORED AT A FEDERAL ARMORY
- ABOLITIONIST JOHN BROWN LED ASSAULT TO INCITE A SLAVE REBELLION BY PROVIDING ARMS TO SLAVES
- 10 CONSPIRATORS WERE KILLED IN THE ATTEMPT AND 5 WERE HUNG FOLLOWING ITS FAILURE
- SLAVERY WAS ABOLISHED A FEW YEARS LATER FOLLOWING THE AMERICAN CIVIL WAR

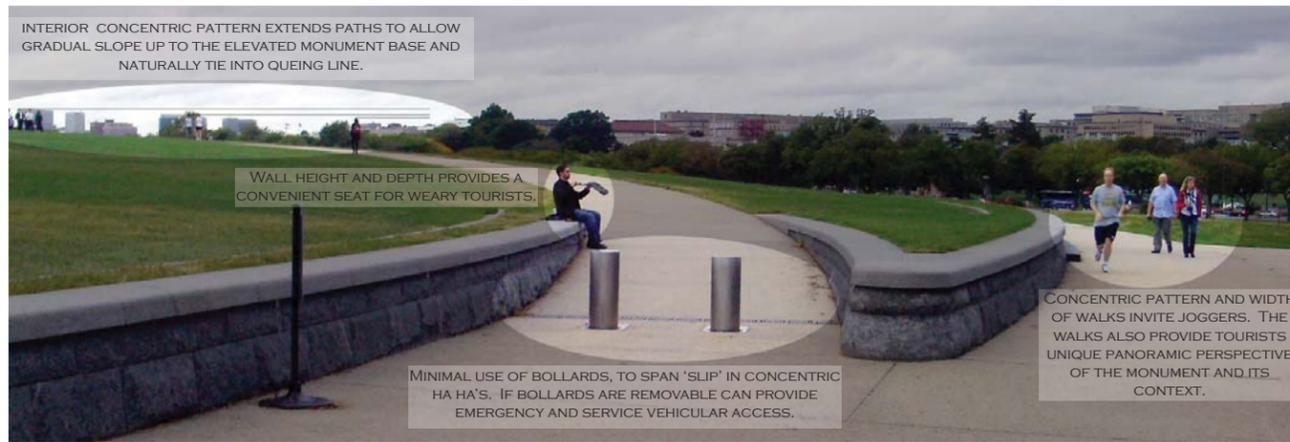
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SHOOTING ASSAULT
 4 KILLED
 9 WOUNDED

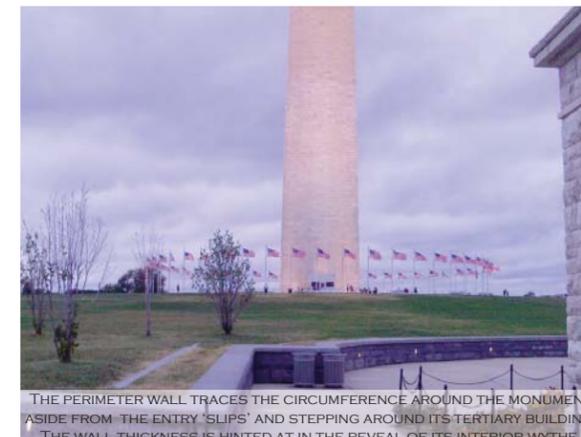




ENTRY AT 'SLIP' IN ANTI-RAM PERIMETER WALL



GRADE SURROUNDING PERIMETER WALL



USE OF HUMAN AND NATURAL ELEMENTS



THE REDESIGN OF THE WASHINGTON MONUMENT WAS INVESTIGATED AS AN EXCELLENT CASE STUDY FOR STRATEGIES OF ADDRESSING THE TENSION BETWEEN SECURITY AND ACCESS. EASILY ONE OF THE MOST ICONIC MONUMENTS AND SIGNIFICANT TOURIST ATTRACTIONS IN DC, IT REQUIRED SECURITY SOLUTIONS THAT WOULD NOT IMPEDE PUBLIC ACCESS, NOR DETRACT FROM ITS SYMBOLISM AS A MONUMENT TO FREEDOM. THE REDESIGN ACHIEVED AN EFFECTIVE DEFENSE AGAINST VEHICLE-BORNE IMPROVISED EXPLOSIVE DEVICES THROUGH A SERIES OF RESTRAINED AND WELL DESIGNED SECURITY ELEMENTS.

THE DESIGN EMPLOYED LESSONS FROM LANDSCAPE DESIGN, INCLUDING SIMPLE GRADE ADJUSTMENTS AND TRADITIONAL HA HA'S TO MINIMIZE THE VISUAL IMPACT OF SECURITY FEATURES.

WASHINGTON MONUMENT - SITE DOCUMENTATION

ASSASSINATION OF TSAR ALEXANDER II

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- BOMBING, IRONICALLY ON THE DAY ALEXANDER SIGNED A DOCUMENT GRANTING THE FIRST CONSTITUTION OF THE PEOPLE.
- THEORIZED TO HAVE BEEN ATTEMPTED IN RESPONSE TO RUSSIFICATION POLICIES AGAINST POLISH LANGUAGE, ALTHOUGH NUMEROUS GROUPS HAD PREVIOUSLY MADE ASSASSINATION ATTEMPTS
- INITIAL ATTACK ONLY INJURED SEVERAL OF ALEXANDER'S GUARDS, WHEN HE WENT TO CHECK ON THEM ANOTHER ATTACK SUCCEEDED IN KILLING ALEXANDER.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

JANUARY 1
 FEBRUARY 8
 MARCH 8
 APRIL 1
 MAY 1
 JUNE 1
 JULY 1
 AUGUST 1
 SEPTEMBER 1
 OCTOBER 1
 NOVEMBER 1
 DECEMBER 1

BOMBING
 1 KILLED
 SEVERAL WOUNDED





EXCESSIVELY SPACED BOLLARDS - PROVIDE NO PROTECTION



INSUFFICIENT HEIGHT BOLLARDS - PROVIDE LIMITED PROTECTION
- VULNERABLE TO VEHICLES WITH HIGHER GROUND CLEARANCE
- UNLIKELY TO ARREST VEHICLES PROGRESS AT BOLLARD LINE



OBVIOUS AND LIKELY SUPERFLUOUS REMEDIATION
- DETRACT FROM THE FUNCTION AND FORM OF THE 'PROTECTED SPACE'
- FAIL TO UTILIZE THE PREVIOUS EXISTING CONDITIONS TO ADVANTAGE



THE DOUBLE STARK WALLS ARE REDUNDANT FOR VEHICULAR PROTECTION AND DEPRIVE PEDESTRIAN USE OF THE INTERVENING SPACE



INSTALLATION OF PORTABLE FENCING, LIKELY INTENDED TO PREVENT PEOPLE FROM ENTERING THE FOUNTAIN, CLEARLY IS A FAILURE TO ENACT AN APPROPRIATE DESIGNED RESPONSE.



WHILE THIS RESPONSE ATTEMPTS TO CREATE A PEDESTRIAN ZONE IT IS LOCATED TOO CLOSE TO THE ROAD TO BE COMFORTABLE, EVIDENT FROM THE BENCHES LACK OF USE. UTILIZING THE TREE TRUNKS IS WELL CONSIDERED BUT LOST FROM THEIR TRIMMING HALFWAY UP THE TRUNK.



INTRODUCTION OF BOLLARDS IS AT LEAST RESTRAINED BUT MANHOLE MIGHT PROVIDE COMPROMISING ACCESS TO BOLLARDS FOOTING.



USE OF BOLLARDS RETAINS DEGREE OF OPENNESS BUT REMAIN CONSPICUOUS.



DESIGNED BOLLARDS AT ENTRY, THAT DOUBLE AS ILLUMINATION ELEMENTS AT NIGHT AND OTHER BOLLARDS MATERIAL, COLOR, AND DETAIL INTENDED TO BLEND INTO THE GROUND PAVING AND BUILDING ELEVATION RELATE AN ATTEMPT TO DESIGN BOLLARDS.



BARRIER OF CRENNELATED MASSES WITH CONNECTING METAL WORK SHOWS SOME RUDIMENTARY ATTEMPT OF COVERING BOLLARDS WITH SCULPTURAL DETAIL.



LINE OF HEAVY BENCHES SHOWS A RUDIMENTARY ATTEMPT OF SCULPTING DUAL FUNCTION ANTHRAM LINE ELEMENTS AND VARYING THEIR FORM.



PLANTER BENCH SHOWS AN INITIAL THOUGHT OF SCULPTING DUAL FUNCTION ANTHRAM LINE ELEMENTS.



INTRODUCTION OF BOULDERS BEGINS TO RECOGNIZE LANDSCAPE ELEMENTS ABILITY TO PROVIDE PROTECTION AND CONTRIBUTE TO THE EXPERIENCE OF THE PLACE WHEN NOT SET IN SUCH AN OBVIOUS UNCONSIDERED LINE.



USE OF LANDSCAPE ELEMENTS BEGINS TO MORE EFFECTIVELY INTEGRATE THE SECURITY DESIGN HOWEVER THE BOLLARDS COULD EASILY HAVE BEEN DISPENSED.



AN EXAMPLE OF HOW LANDSCAPING CAN EASILY HIDE CHANGES IN THE GROUND PLANE

WASHINGTON DC - PERIMETER SECURITY DOCUMENTATION

HAYMARKET SQUARE RIOT

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- BOMBING OF A POLICE COLUMN DISPERSING A WORKERS RALLY
- THE MAJORITY OF THOSE KILLED AND INJURED WERE HURT DUE TO THE POLICE REACTION TO THE BOMBING
- THE QUESTION OF WHO WERE THE VICTIMS AND WHO WAS AT FAULT REAMINS A CONTENTIOUS ISSUE

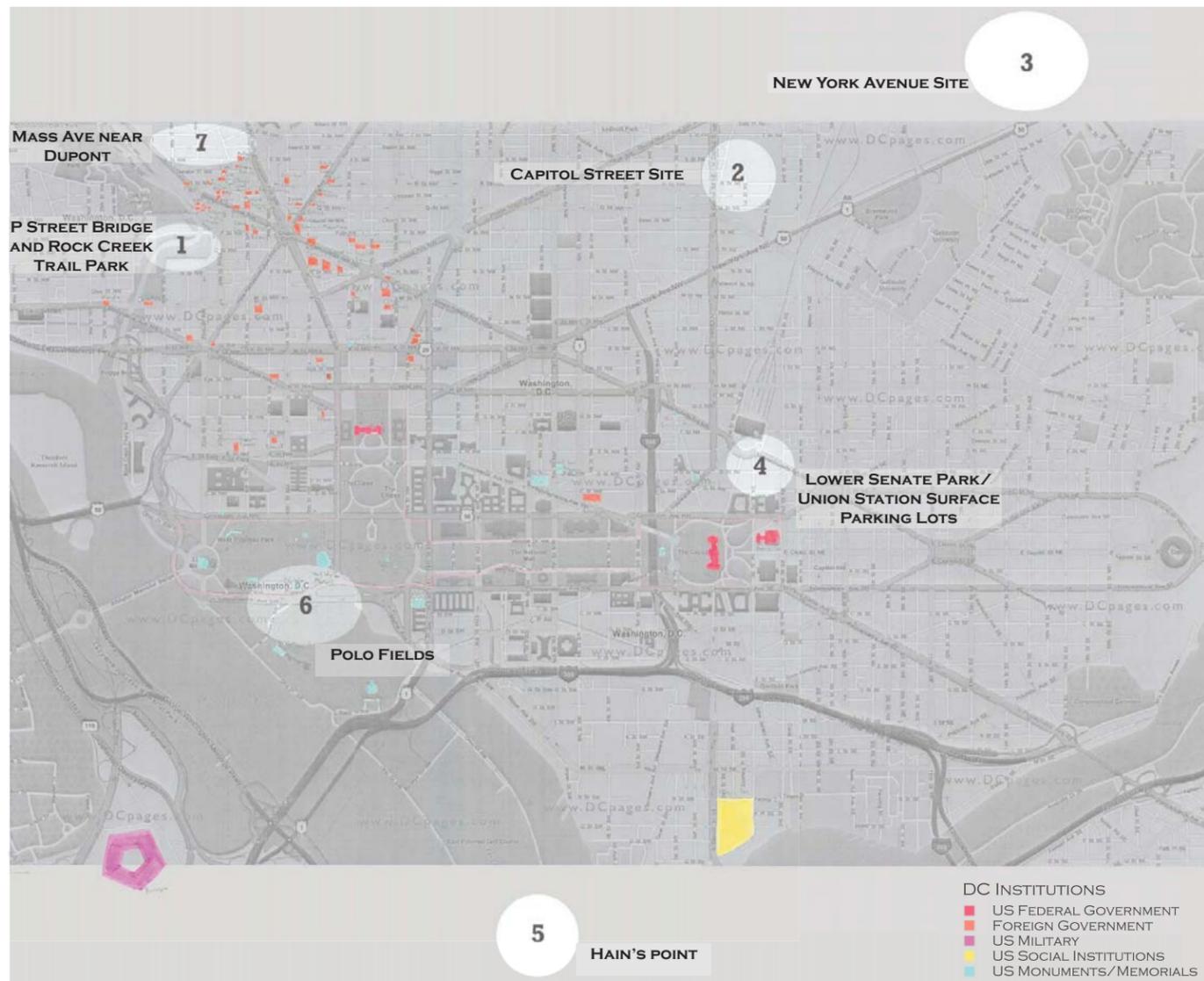
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JANUARY 1
 FEBRUARY 8
 MARCH 8
 APRIL 6
 MAY 8
 JUNE 8
 JULY 6
 AUGUST 8
 SEPTEMBER 8
 OCTOBER 6
 NOVEMBER 6
 DECEMBER 6

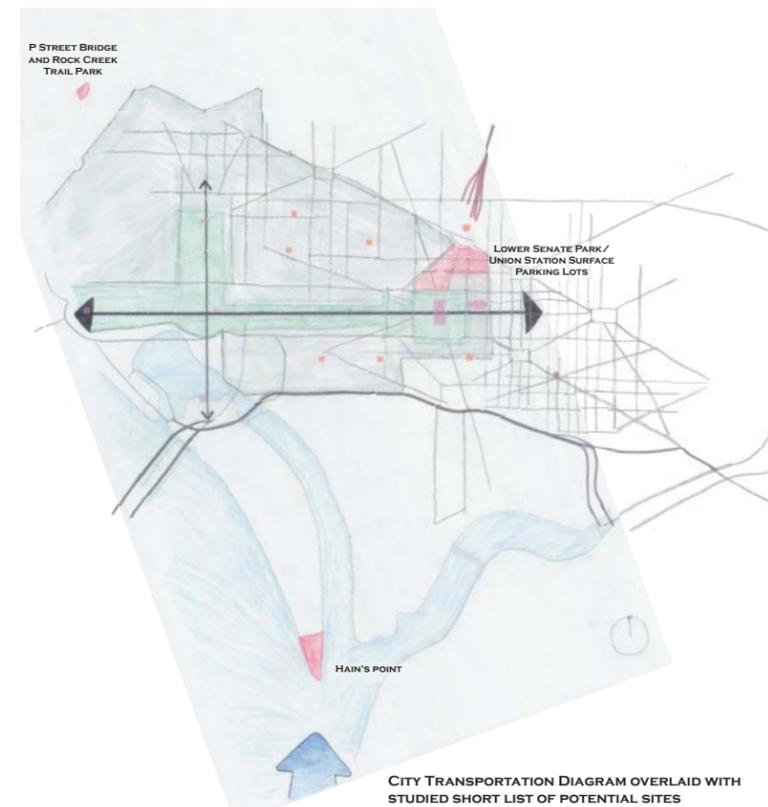
BOMBING
1 KILLED
6 INJURED

SHOOTING
6 KILLED
60 INJURED





MAPPING OF DC INSTITUTIONS WITH HIGHER PERCEIVED TERRORIST THREAT OVERLAID WITH VISITED POTENTIAL SITES



CITY TRANSPORTATION DIAGRAM OVERLAID WITH STUDIED SHORT LIST OF POTENTIAL SITES

THE SITE SELECTION PROCESS EVOLVED WITH THE PROGRAM SELECTION AND BEGAN WITH A SERIES OF DIAGRAMS OF WASHINGTON DC. ALONG WITH AN ANALYSIS OF UNDERDEVELOPED SITES THROUGHOUT THE CITY, TWO DIAGRAMS IN PARTICULAR GUIDED THE SELECTION OF POTENTIAL SITES.

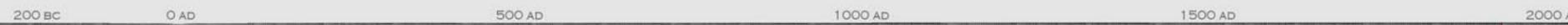
THE FIRST DIAGRAMMED DC INSTITUTIONS WITH A HIGHER PERCEIVED TERRORISM THREAT. THESE INCLUDED SEATS OF GOVERNMENT BOTH DOMESTIC AND FOREIGN, MONUMENTS, MEMORIALS, TOURIST ATTRACTIONS, AND STADIUMS.

THE SECOND CONVEYED A DIAGRAM OF THE CITY'S TRANSPORTATION NETWORK; EMPHASIZING GATEWAYS, POINTS OF ARRIVAL, AND AXES OF ORGANIZATION.

SEVEN SITES WERE SELECTED FROM THESE UNDERLAYS REPRESENTING A RANGE OF THREATS AND URBAN CONDITIONS. FOLLOWING SITE VISITS THE LIST WAS THEN NARROWED DOWN TO THREE FOR FURTHER INVESTIGATION.

POTENTIAL SITES

LOS ANGELES TIMES BOMBING



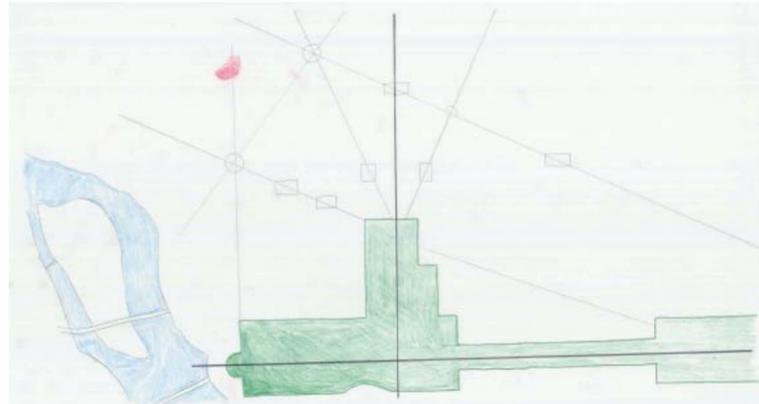
- BOMBINGS AT AN OFFICE BUILDING AND TWO RESIDENCES
- PERPETRATED IN RETALIATION FOR UNFAVORABLE REPORTING AGAINST ORGANIZED LABOR
- SERIOUSLY HURT THE POSITION OF THE AFL AND UNIONS, PARTICULARLY IN LA



BOMBING
21 KILLED
SCORES INJURED



P STREET BRIDGE AND ROCK CREEK TRAIL PARK

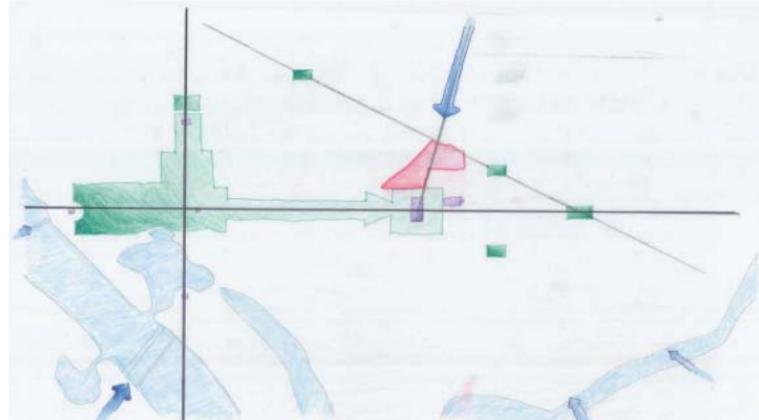


THIS SITE WAS INVESTIGATED PRIMARILY FOR ITS LOCATION AS A LINK BETWEEN EMBASSY ROW & THE DOWNTOWN AREA, UNDERSCORING THE INTERNATIONAL AIM OF THE INSTITUTE.

- PRO:
- AVAILABLE UNDEVELOPED LAND PROVIDES GREATER PLANNING FLEXIBILITY
 - SETBACK FROM STREET ALLOWS EASIER BLAST PROTECTION
 - LOWER SITE ELEVATION PROVIDES UNIQUE SECTION DESIGN POSSIBILITIES
 - PROXIMITY TO EMBASSIES FACILITATES MISSION'S INTERNATIONAL COOPERATION GOALS
 - DRAWS SOME LIFE FROM ITS LOCATION ON THE EDGE OF THE CAPITOL'S ACTIVITY CENTER

- CON:
- AVERAGE SIZE, SLIGHTLY ATYPICAL CONFIGURATION, AND LIMITED ACCESS LIMIT PLANNING FLEXIBILITY
 - SETBACK AND LOWER ELEVATION DECREASES SITE'S PRESENCE AND ABILITY TO PARTICIPATE IN THE SURROUNDING CONTEXT'S ACTIVITY
 - LOCATION ON THE EDGE OF CAPITOL'S ACTIVITY AREA, ALONG WITH ITS LIMITED PRESENCE WILL CHALLENGE THE MISSION'S PUBLIC OUTREACH COMPONENT.

LOWER SENATE PARK/ UNION STATION SURFACE PARKING LOTS



THIS SITE WAS INVESTIGATED PRIMARILY FOR ITS LOCATION DIRECTLY ADJACENT TO THE CAPITOL, AS THE NATIONAL LEGISLATIVE BODY AND UNION STATION, AS THE RAILWAYS GATEWAY TO THE CITY.

- PRO:
- AVAILABLE UNDEVELOPED LAND PROVIDES GREATER PLANNING FLEXIBILITY
 - ADJACENCY TO THE CAPITOL PROVIDES SYMBOLIC PROMINENCE AND FUNCTIONAL EFFICIENCY IN ADVOCACY AND POLICY MISSION OBJECTIVES
 - DIRECT RELATIONSHIP TO UNION STATION PROVIDES A SIGNIFICANT LINK TO THE REGIONAL AND CITY'S RAIL AND BUS TRANSPORTATION INFRASTRUCTURE
 - LOCATION AT THE HEART OF THE CAPITOL, ALLOWS PRIME OPPORTUNITY TO ENGAGE THE PUBLIC
 - LOCATION AT THE INTERSECTION OF CITY'S ROADS PROVIDES EXTENDED VIEWS FROM GREATER DISTANCES AROUND THE CITY.

- CON:
- ATYPICAL CONFIGURATION AND EXISTING ELEMENTS ON THE SITE LIMIT PLANNING FLEXIBILITY
 - SETBACK FROM STREET PRESENTS BLAST PROTECTION CHALLENGE
 - PROXIMITY TO THE CAPITOL LIKELY PRESENT UNIQUE DESIGN LIMITATIONS

HAIN'S POINT



THIS SITE WAS INVESTIGATED PRIMARILY FOR ITS PROMINENCE FROM NATIONAL AIRPORT AND THE APPROACH TO THE CITY FROM THE POTOMAC. THE LACK OF DEVELOPMENT ON EAST POTOMAC PARK INCREASES THE VISIBILITY OF THE SITE AND BUILDINGS FROM GREATER DISTANCES ACROSS INTO VIRGINIA, MARYLAND, AS WELL AS FROM THE DISTRICT.

- PRO:
- AVAILABLE UNDEVELOPED LAND PROVIDES GREATER PLANNING FLEXIBILITY
 - SETBACK FROM STREET ALLOWS EASIER BLAST PROTECTION
 - IDEALLY SITED FOR VIEWS FROM NATIONAL AIRPORT AS WELL AS FOR PASSENGERS ARRIVING AND DEPARTING FROM ITS FLIGHT PATHS
 - IDEALLY SITED TO ANNOUNCE THE CITY FROM ITS WATER APPROACH
 - LACK OF SURROUNDING DEVELOPMENT ALLOWS UNIQUE EXPRESSIONS AND INCREASED PRESENCE

- CON:
- PROXIMITY TO NATIONAL AIRPORT AND ITS FLIGHTLINES LIKELY WOULD CARRY HEIGHT AND LIGHT POLLUTION RESTRICTIONS
 - VERY LITTLE TRAFFIC IS BY THE WATERWAY
 - LOCATION IS "OFF THE BEATEN PATH," WITH NO RELATIONSHIP TO GOVERNMENT INSTITUTIONS, FAR REMOVED FROM THE ACTIVITY CENTER AND HAS MINIMAL EXISTING ACTIVITY
 - SITE'S RELATIVE ISOLATION CHALLENGES ITS PUBLIC OUTREACH FUNCTION AND WILL REQUIRE ADDITIONAL SUPPORT FUNCTIONS INCLUDED IN ITS PROGRAM (IE CAFETERIA, PARKING, ETC)

THE THREE PROSPECTIVE SITES WERE STUDIED, DIAGRAMMED, AND EVALUATED PRIMARILY ON THE IMPACT OF EACH SITE ON THREE CRITERIA:

- THE MISSION'S PUBLIC & LEGISLATIVE OUTREACH
- SYMBOLIC PRESENCE
- CONNECTION/ACCESS TO THE CITY'S TRANSPORTATION INFRASTRUCTURE

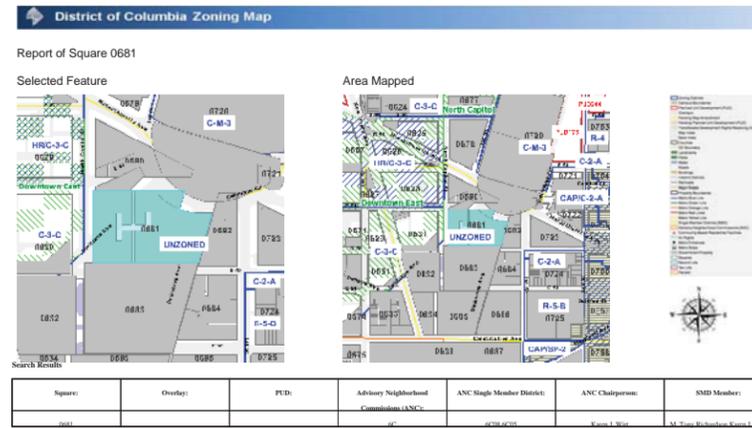
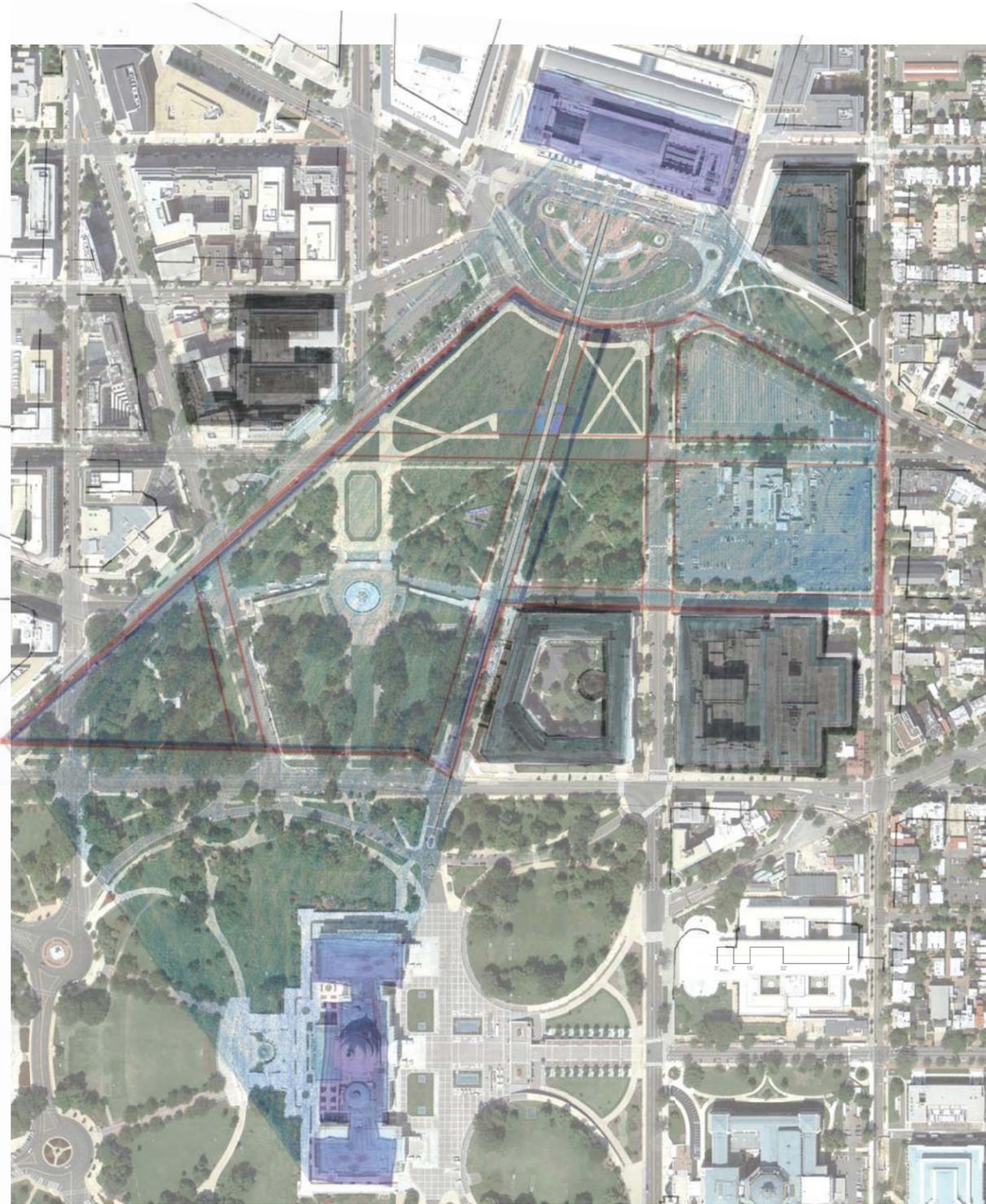
FROM THIS ANALYSIS THE LOWER SENATE PARK SITE WAS SELECTED.

POTENTIAL SITES

ASSASSINATION OF ARCHDUKE FRANZ FERDINAND



- SHOOTING AND BOMBING AMBUSH
- PERPETRATED TO ADVANCE SERBIAN NATIONALIST AGENDA OVER AUSTRO-HUNGARIAN RULE
- EVENT SPARKED WORLD WAR I WHICH CLAIMED MORE THAN 37,000,000 CASUALTIES



UNZONED & C-2-A
C-2-A
 PERMITS MATTER-OF-RIGHT LOW DENSITY DEVELOPMENT, INCLUDING OFFICE EMPLOYMENT CENTERS, SHOPPING CENTERS, MEDIUM-BULK MIXED USE CENTERS, AND HOUSING TO A MAXIMUM LOT OCCUPANCY OF 60% FOR RESIDENTIAL USE AND 100% FOR ALL OTHER USES, A MAXIMUM FAR OF 2.5 FOR RESIDENTIAL USE AND 1.5 FAR FOR OTHER PERMITTED USES, AND A MAXIMUM HEIGHT OF FIFTY (50) FEET. REAR YARD REQUIREMENTS ARE FIFTEEN (15) FEET; ONE FAMILY DETACHED DWELLINGS AND ONE FAMILY SEMI-DETACHED DWELLINGS SIDE YARD REQUIREMENTS ARE EIGHT (8) FEET.

FIGURE 14: DISTRICT OF COLUMBIA ZONING MAP AND ZONE KEY.
[HTTP://WWW.DCOZ.DC.GOV/MAIN.SHTM](http://www.dcoz.dc.gov/main.shtm)
 PUBLIC DOMAIN IMAGE AND TEXT.

FIGURE 15: DISTRICT OF COLUMBIA TOPOGRAPHIC MAP, LOWER SENATE PARK.
[HTTP://WWW.NATIONALATLAS.GOV/100TOPOS/WASHINGTON_WEST.HTML](http://www.nationalatlas.gov/100topos/washington_west.html). PUBLIC DOMAIN IMAGE.



A PORTION OF LOWER SENATE PARK IS UNZONED AND THE REST IS ZONED C-2-A. THE LIMITING BUILDING HEIGHT IN THIS ZONE IS 50' AND HAS MINIMAL SETBACKS WHICH WILL MORE THAN BE ACCOMMODATED FOR BLAST SETBACK. FOR THE PURPOSES OF THIS STUDY THE UNZONED PORTION IS ASSUMED TO HAVE AN APPROVED VARIANCE FOR DEVELOPMENT OR INCLUDED IN THE C-2-A ZONING.

THE SITE HAS MAJOR VEHICULAR ROUTES TO ITS NORTH AND WEST IN COLUMBUS CIRCLE AND LOUISIANA AVENUE, RESPECTIVELY. THE BUILDING LOCATION ON THE SITE WILL THEREFORE SEEK TO MAXIMIZE THE PHYSICAL SETBACK FROM THOSE ROADS WITHOUT DETRACTING FROM ITS VISUAL PRESENCE. THERE IS MINIMAL GRADE VARIATION ACROSS THE SITE WITH JUST A SLIGHT RISE TO THE NORTHEAST.

THE CONTEXT AROUND THE SITE IS DOMINATED BY ITS PROXIMITY AND VISUAL CONNECTION TO BOTH UNION STATION AND THE CAPITOL. ITS IMMEDIATE SURROUNDINGS ARE UNDEVELOPED WITH OFFICE/COMMERCIAL DEVELOPMENT FURTHER TO THE WEST AND RESIDENTIAL FURTHER TO THE EAST. THE CLOSEST SURROUNDING BUILDINGS WERE STUDIED FOR OPPORTUNITIES TO PICK UP ON CONTEXTUAL CONNECTIONS AND VIEW CORRIDORS WERE DIAGRAMMED TO AND FROM THE SITE.

WALL STREET BOMBING

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- BOMBING DELIVERED BY HORSE DRAWN CART FILLED WITH 100 LBS OF DYNAMITE
- REMAINS UNCERTAIN WHO PERPETRATED THE ATTACK BUT ANARCHISTS WERE SUSPECTED
- FAILED TO HALT THE ECONOMIC RISE OF THE CITY OR ITS INSTITUTIONS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

JANUARY
 FEBRUARY
 MARCH
 APRIL
 MAY
 JUNE
 JULY
 AUGUST
 SEPTEMBER
 OCTOBER
 NOVEMBER
 DECEMBER

1
 9
 0
 0

BOMBING
 33 KILLED
 400 INJURED





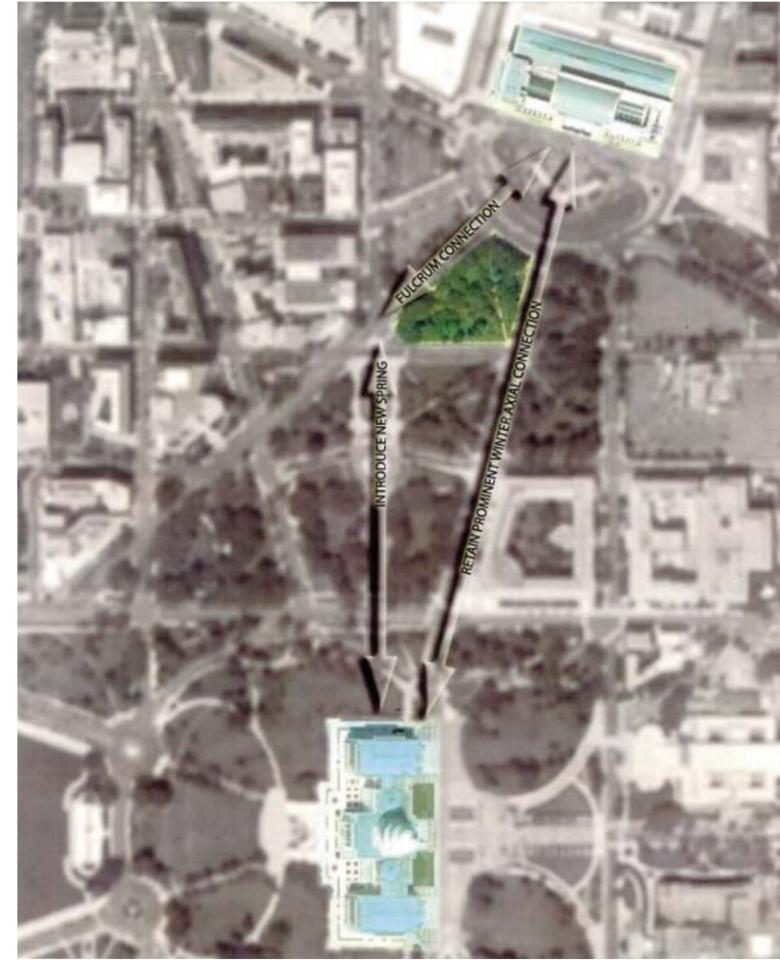
CAPITOL DOME SEASONAL VISIBILITY



LATE SUMMER PERSPECTIVE



WINTER PERSPECTIVE



DESPITE THE PARKLIKE NATURE OF LOWER SENATE PARK THE TAFT CARILLION AND CAPITOL UNDERGROUND PARKING GARAGE RESTRICT DEVELOPMENT ON THE SOUTH BLOCKS OF LOWER SENATE PARK. LOCATING AT THE EXISTING SURFACE PARKING LOTS WOULD NECESSITATE THE PROVISION OF SIGNIFICANT NEW & REPLACED PARKING.

THE GREATEST ADVANTAGE OF THE SITE IS IN THE STRENGTH OF THE VISUAL AXIS ALONG DELAWARE AVENUE WITH ITS UNIQUE RELATIONSHIP CONNECTING THE CAPITOL BUILDING AND UNION STATION. THESE CONSIDERATIONS DROVE THE SITING WITHIN LOWER SENATE PARK ON THE BLOCKS ALONG COLUMBUS CIRCLE.

SITE VISITS THROUGHOUT THE YEAR REVEALED THE STRENGTH OF THE VISUAL CONNECTION BETWEEN THE SITE'S EXISTING LANDMARK INSTITUTIONS VARIES WITH THE SEASONS. THE CONNECTION IS STRONGEST IN THE FALL AND WINTER WITHOUT THE LEAVES ON THE TREES. THE LINK WANES IN THE SPRING AND SUMMER MONTHS AS THE VIEW CORRIDOR IS OBSCURED. HOWEVER THE PERPENDICULAR AXIS TO THE CAPITOL OVER ITS UNDERGROUND PARKING WAS DISCOVERED AS AN UNDERUTILIZED VIEW CORRIDOR WHICH THE PROJECTS DEVELOPMENT SOUGHT TO ACT AS A FULCRUM CONNECTION.



16TH STREET BAPTIST CHURCH BOMBING

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- BOMBING OF AN AFRICAN AMERICAN CHURCH DURING A YOUTH SERVICE WITH 19 STICKS OF DYNAMITE
- PERPETRATED BY WHITE SUPREMACISTS REACTING TO THE INTEGRATION OF ALABAMA'S SCHOOLS
- ENGENDERED BROADER SUPPORT FOR THE CIVIL RIGHTS MOVEMENT, LEADING TO THE PASSAGE OF THE CIVIL RIGHTS ACT OF 1964 AND VOTING RIGHTS ACT OF 1965

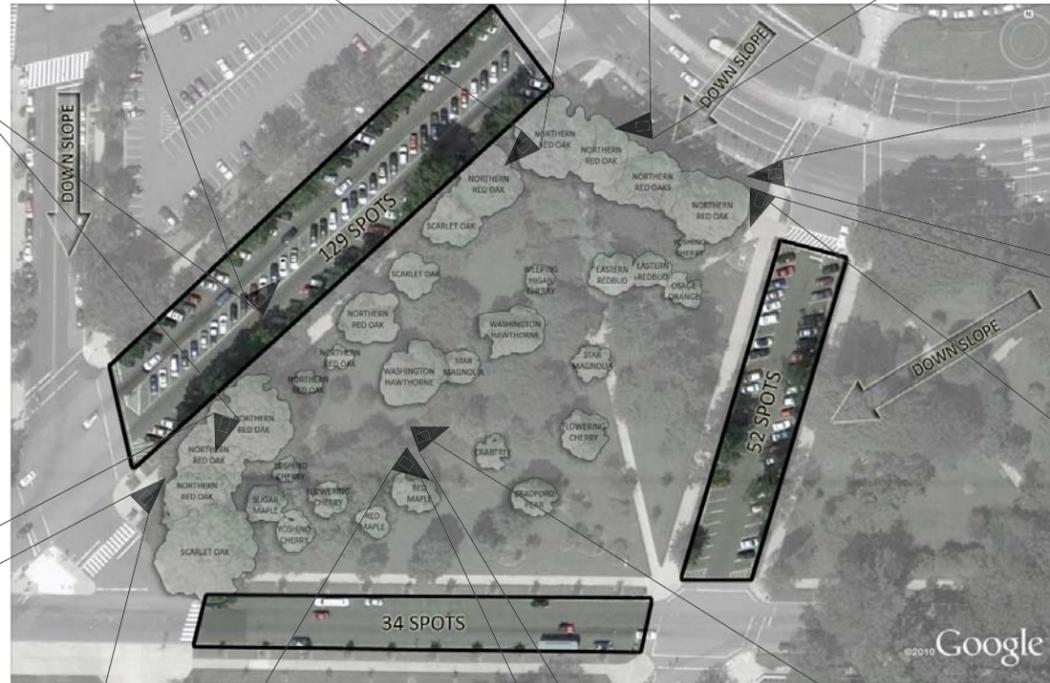
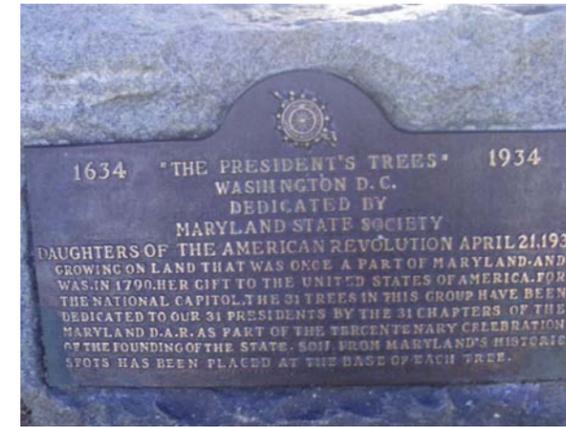
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JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

1
9
6
3

BOMBING
4 KILLED
12 INJURED





DURING SITE INVESTIGATIONS, CONSIDERABLE EFFORT WAS MADE TO DIRECT THE DESIGN'S DEVELOPMENT WITH RESPECT FOR EXISTING CONDITIONS. THE SITE COULD PRIMARILY BE DESCRIBED AS PARK-LIKE IN NATURE. 16 FLAG POLES ON EACH OF THE SITES BLOCKS PARTICIPATE IN THE SEQUENCE OF FLAGS FROM ALL 50 US STATES, TERRITORIES, AND THE DISTRICT OF COLUMBIA ALONG COLUMBUS CIRCLE. 14 DIFFERENT SPECIES OF TREES WERE FOUND ON THE SITE, IDENTIFIED FROM THEIR COMMON AND SCIENTIFIC NAMES BY PLAQUES MOUNTED ON THE TREES THROUGHOUT THE SITE.

A PLAQUE REVEALED THE HISTORIC NATURE OF A NUMBER OF THESE TREES AS "THE PRESIDENT'S TREES;" A GIFT FROM THE MARYLAND SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION IN 1934. WHILE RESEARCH FAILED TO UNEARTH WHICH TREES NUMBERED AMONG THE 31 DEDICATED IN THIS MANNER, IT WAS HYPOTHESIZED THE NORTHERN RED AND SCARLET OAKS SPACED ALONG THE SITE'S PERIMETER REPRESENTED THESE TREES. THE AGE OF GROWTH AND PLANTING PATTERN OF THESE TREES RELATES CLOSEST TO THE QUANTITY OF 31 TREES IDENTIFIED BY THE CORRESPONDING PLAQUE ON SITE.

THE VARIETY AND HISTORIC NATURE OF THE PLANTINGS ON THE SITE NECESSITATED A CONCERN TO DEVELOP A DELICATE FOOTPRINT ON THE SITE TO LIMIT THE DISTURBANCE TO THESE EXISTING CONDITIONS. THESE CONCERNS PUSHED THE AVAILABLE FOOTPRINT FOR THE BUILDING TO THE SOUTHEAST OF THE SITE WHICH RECORDED THE LOWEST QUANTITY AND LEAST MATURE TREES ON SITE.

TREE VARIETIES OBSERVED ON SITE:

- NORTHERN RED OAK
- SCARLET OAK
- FLOWERING CHERRY
- WASHINGTON HAWTHORN
- OSAGE ORANGE
- EASTERN REDBUD (JUDAS TREE)
- YOSHINO CHERRY
- WEeping HIGAN CHERRY
- STAR MAGNOLIA
- FLOWERING CHERRY
- BRADFORD PEAR
- CRABAPPLE
- RED MAPLE
- SUGAR MAPLE

BLACK SEPTEMBER

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- SERIES OF 4 ATTEMPTED PLANE HIJACKINGS (3 SUCCESSFUL) FOR HOSTAGES; OF OVER 350 TAKEN 56 WERE KEPT
- PERPETRATED TO ACHIEVE LEVERAGE TO SECURE THE RELEASE OF PRISONERS
- CONTRIBUTED TO SETTING OFF THE 'BLACK SEPTEMBER CONFLICT' AND SUBSEQUENT EXPULSION OF THOUSANDS OF PALESTINIANS TO LEBANON

JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

1
9
7
0

PLANE HIJACKINGS

1 INJURED
56 TAKEN HOSTAGE



SITE AND BUILDING DESIGN

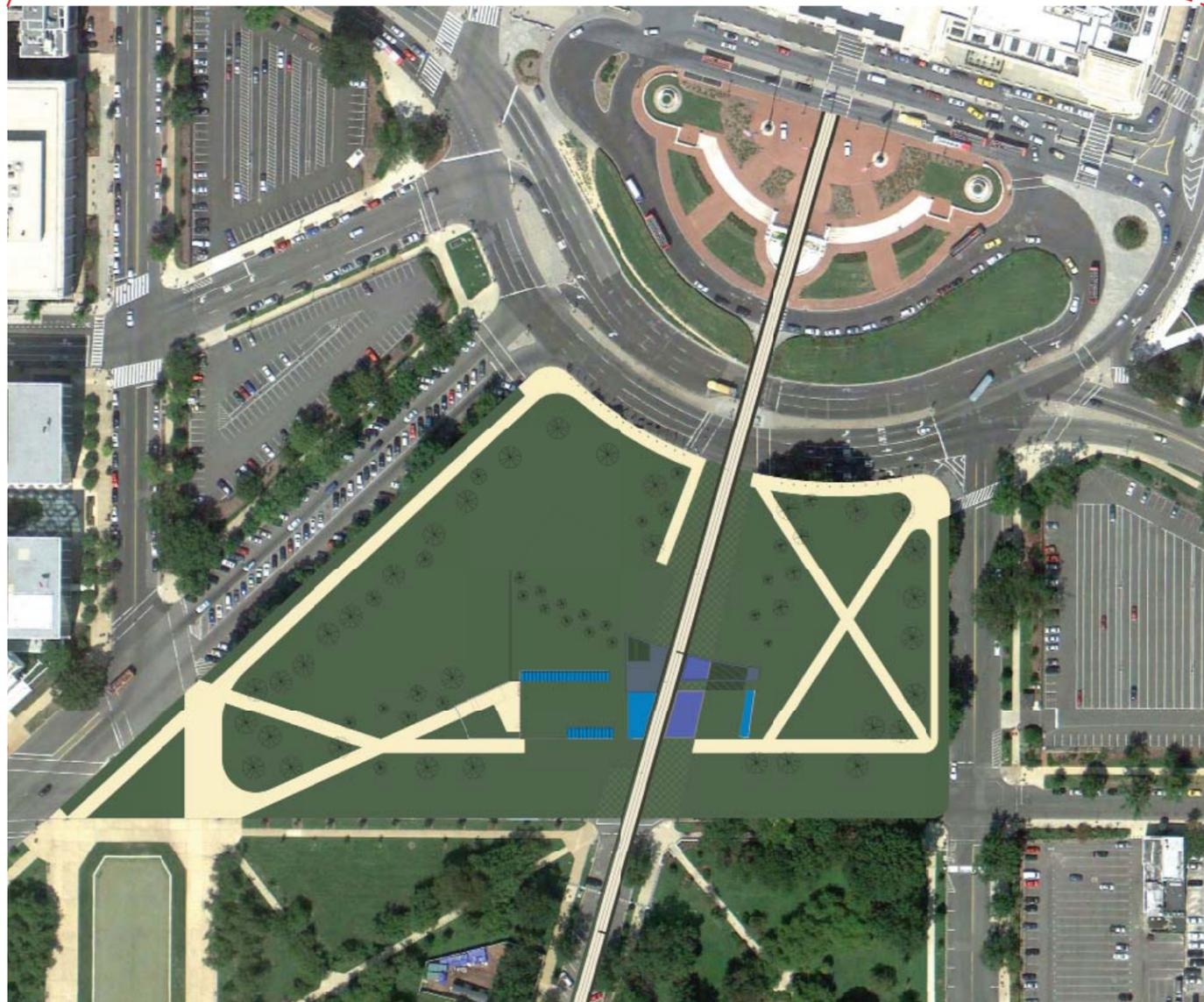
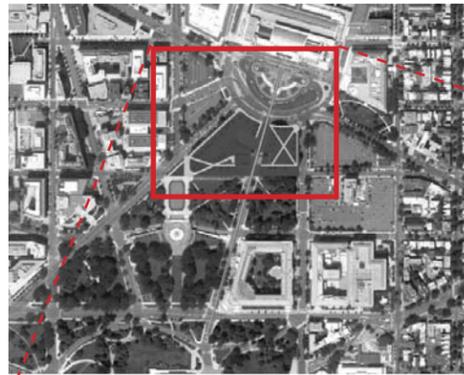
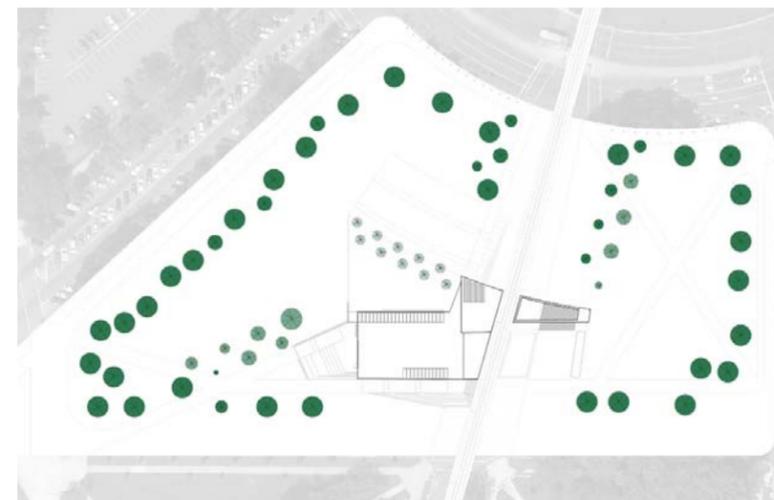


FIGURE 16: OLMSTEAD'S CAPITOL GROUNDS LANDSCAPE PLAN.
[HTTP://WWW.OLMSTED.ORG/US-CAPITOL-GROUNDS-WASHINGTON-DC.](http://www.olmsted.org/us-capitol-grounds-washington-dc)
 PUBLIC DOMAIN IMAGE.



● PRESIDENT'S TREES
 ● FUTURE PRESIDENTS TREES
 ● NON-PRESIDENTS TREES

THE TREE PLANTING DESIGN WAS DERIVED FROM TWO INFLUENCES FROM THE EXISTING CONTEXT OF THE SITE. THE FIRST WAS FROM THE "PRESIDENT'S TREES" DEDICATED BY THE MARYLAND SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION IN 1934. WHILE A NUMBER OF THESE TREES HAVE BEEN CUT DOWN IT APPEARS THAT THESE WERE PLANTED ALONG THE PERIMETER OF THE BLOCK BOUNDED BY COLUMBUS CIRCLE, LOUISIANA AVENUE, D STREET, AND DELAWARE AVENUE. THE BUILDING WAS SITED TO MINIMIZE THE NEW CONSTRUCTIONS IMPACT ON THE SURVIVING HISTORIC TREES AND THE SITE PLAN INCLUDES NEW PRESIDENTS TREES TO BE INAUGURATED FOR ALL 43 PRESIDENTS (44 IF YOU COUNT EACH OF GROVER CLEVELAND'S NON-CONSECUTIVE TERMS). THE DESIGN ALSO DEPICTS FUTURE PRESIDENTS TREES DEMONSTRATING THE INTENDED PATTERNING OF THESE TREES ON THE SITE OVER TIME. THE SECOND ELEMENT IN THE SITE'S PLANTING DESIGN WAS TAKEN FROM OLMSTEAD'S PLAN FOR THE CAPITOL GROUNDS. THE TREE PLANTING CLEARLY CLUSTERS TREES ALONG THE MAJOR SIGHTLINES TO AND FROM THE SITE AS WELL AS SLIGHTLY MORE SPARSELY ALONG THE CIRCULATION PATHS WITHIN THE SITE AND SPARINGLY THROUGHOUT THE INTERIOR.

BLOODY FRIDAY

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- SERIES OF 22 BOMBINGS WITHIN 90 MINUTES THROUGHOUT BELFAST
- PERPETRATED TO STEP UP PRESSURE AGAINST BRITISH RULE IN IRELAND
- REMOVED HOPE FOR A MEANINGFUL PACT AND PRECIPITATED ENGLISH REACTION OF OPERATION MOTORMAN WHICH SUCCESSFULLY REIMPLEMENTED BRITISH CONTROL THROUGHOUT THE CITY

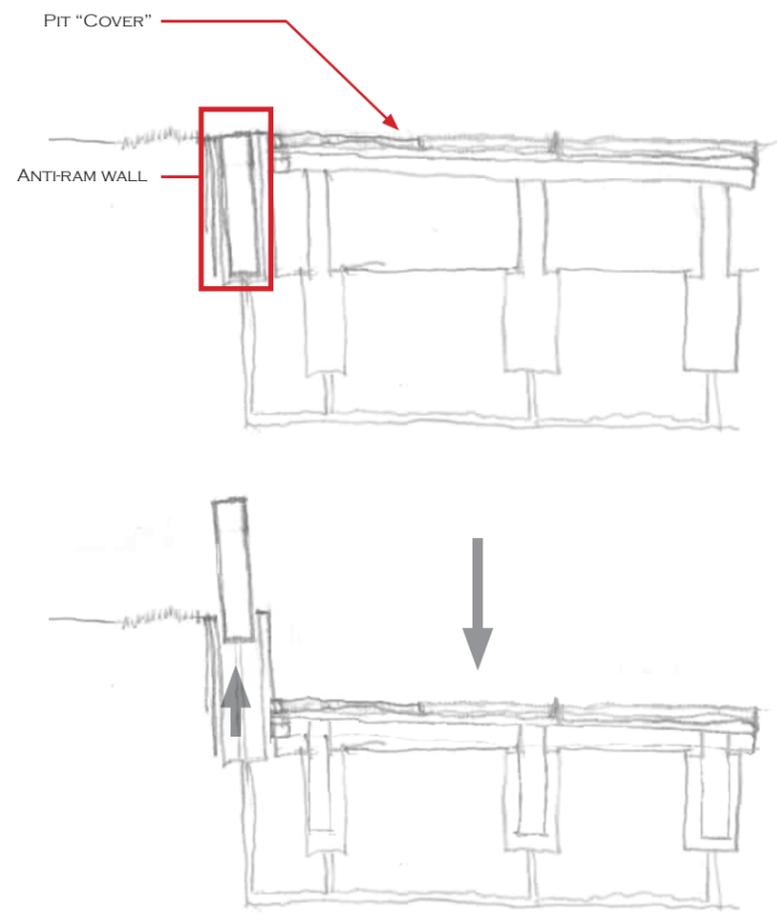
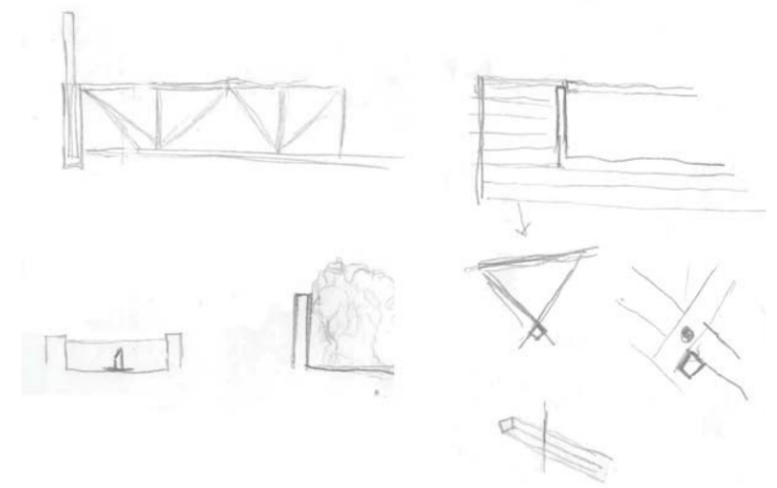
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JANUARY
 FEBRUARY
 MARCH
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 JUNE
 JULY
 AUGUST
 SEPTEMBER
 OCTOBER
 NOVEMBER
 DECEMBER

1
 9
 7
 2

BOMBINGS
 9 KILLED
 130 INJURED





TIGER PIT PERIMETER TYPICAL SECTION

THE PERIMETER SECURITY IS ACHIEVED THROUGH A DETAIL WHICH WAS DERIVED FROM A TIGER PIT TRAP. THE VEHICULAR STANDOFF LINE IS ACHIEVED THROUGH A CONTINUOUS ANTI-RAM WALL WHICH IS "BURIED" BELOW GRADE. THE TIGER PIT "COVER" IS CONTIGUOUS WITH GRADE AND SUPPORTS THE WEIGHT OF PEDESTRIANS ALLOWING THEM TO TRAVERSE UNIMPEDED. HOWEVER THE SUPPORTS OF THE PIT "COVER" WILL "FAIL" UNDER THE WEIGHT OF A VEHICLE DROPPING THE LEVEL OF GROUND INTO THE PIT AND ARRESTING THE VEHICLES INTRUSION AT THE ANTI-RAM WALL. THE WALL'S EFFECTIVENESS IS INCREASED BY THE EARTH IT RETAINS FROM ITS PROTECTED SIDE. THE TRAP CAN BE FURTHER AUGMENTED WITH RECESSED BOLLARDS IN THE WALL AND ACTIVATED BY PNEUMATIC PRESSURE TIED TO THE SUPPORTS OF THE PIT "COVER" OR REMOTELY CONTROLLED FROM A SECURITY OFFICE.



MUNICH MASSACRE

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- JEWISH OLYMPIC TEAM TAKEN HOSTAGE IN THE OLYMPIC VILLAGE
- PERPETRATED TO ACHIEVE LEVERAGE TO SECURE THE RELEASE OF PRISONERS
- GERMAN AUTHORITIES ATTEMPTS TO RESOLVE THE SITUATION REVEALED THE LACK OF SUCH TRAINING, ULTIMATELY RESULTING IN THE DEATHS OF ALL THE HOSTAGES

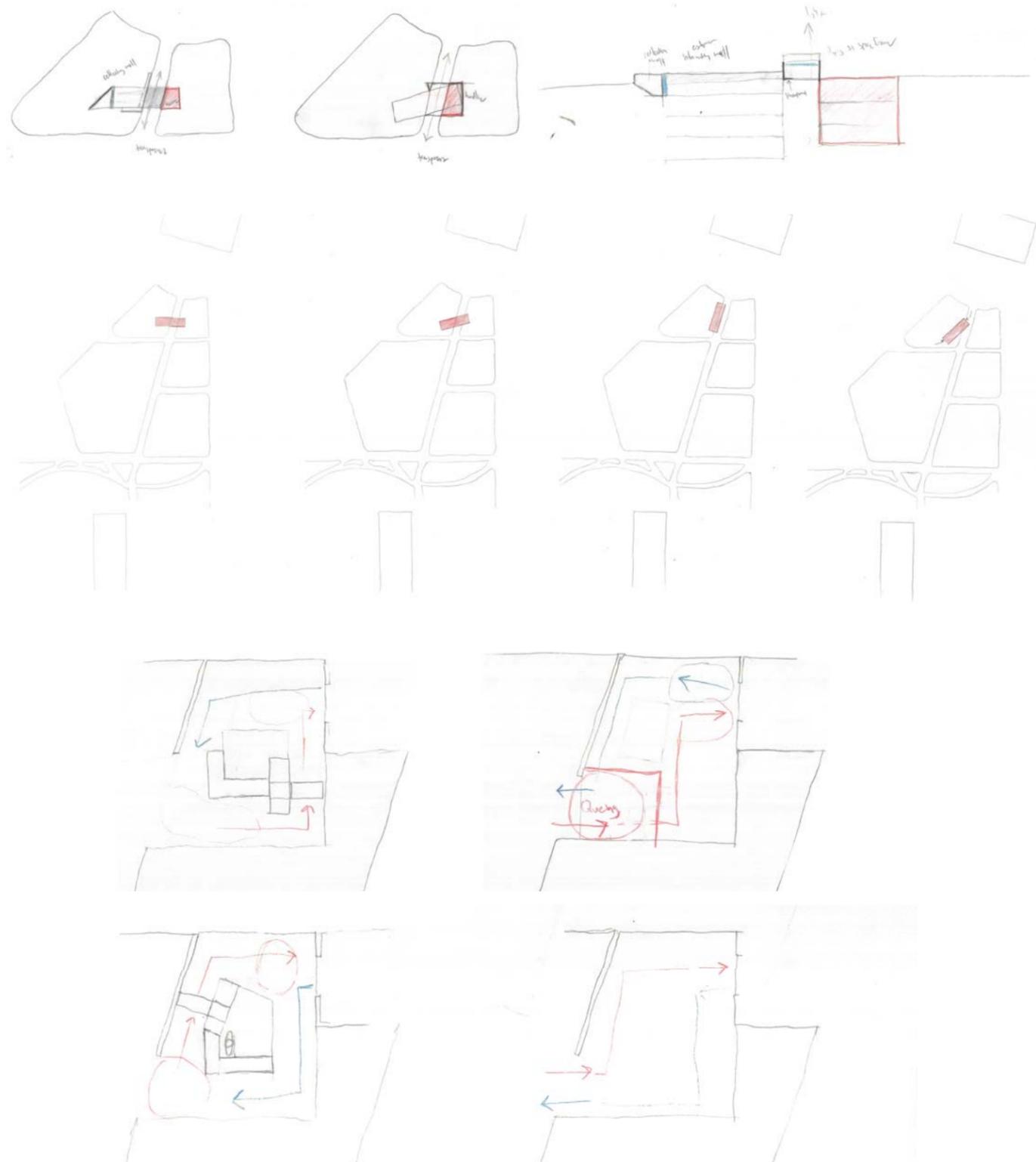
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JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

1
9
7
2

HOSTAGE SITUATION
12 KILLED





THE BUILDING PROGRAM INTEGRATING PUBLIC ACCESS WITH SECURE PRIVATE OPERATIONS NECESSITATED PARTICULAR CONCERN BE GIVEN TO CIRCULATION IN, THROUGH, AND AROUND THE BUILDING. PEDESTRIAN CIRCULATION FOR VISITORS TO THE SITE, TRANSITING THE SITE, AS WELL AS USERS OF BOTH THE PUBLIC AND PRIVATE FUNCTIONS OF THE BUILDING WERE ANALYZED IN A NUMBER OF DIAGRAMS. THE BUILDING WAS SITED TO BECOME A GATEWAY RATHER THAN A REINFORCEMENT OF THE PATH ALONG DELAWARE AVENUE. THIS ARRANGEMENT CLARIFIED A SEPARATION OF BUILDING USES, CONNECTED ACROSS THE SITE AXIS.

CIRCULATION PATTERNS WERE DIAGRAMMED AT BOTH THE SCALE OF THE SITE AS WELL AS THAT OF NODAL CONNECTIONS AT THE BUILDING ENTRY, EXIT, AND JOINT BETWEEN PRIVATE AND PUBLIC BUILDING AREAS. ULTIMATELY THESE DIAGRAMS WERE CRITICAL IN MINIMIZING REDUNDANT CIRCULATION PATHS, INCREASING THE EFFICIENCY OF THE BUILDING AND ALLOWING A GREATER MIXING OF BUILDING USERS.

ZONING CONSIDERATIONS AND RESPECT FOR THE PLANTINGS ON THE SITE, LIMITING BOTH THE BUILDING HEIGHT ABOVE GRADE AND ITS FOOTPRINT PUSHED THE MASSING OF THE BUILDING BELOW GRADE.

DUBLIN-MONAGHAN BOMBINGS

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- 4 CAR BOMBS, 1 IN MONAGHAN AND 3 WITHIN 10 MINUTES IN DUBLIN
- LARGEST LOSS OF LIFE IN A SINGLE DAY IN NORTHERN IRELAND
- RESPONSIBILITY WAS NEVER CONFIRMED
- DESPITE BEING TIMED TO COINCIDE WITH A STRIKE OF LOYALIST ULSTER WORKER'S COUNCIL, SUSPICION FELL ON THE LOYALIST ULSTER VOLUNTEER FORCE, GOALS OF THE STRIKE'S PROTEST WERE ACHIEVED.

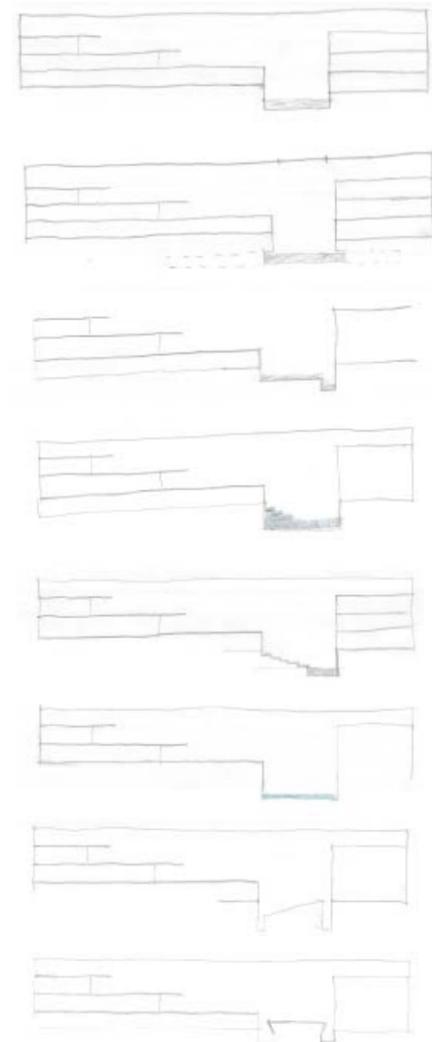
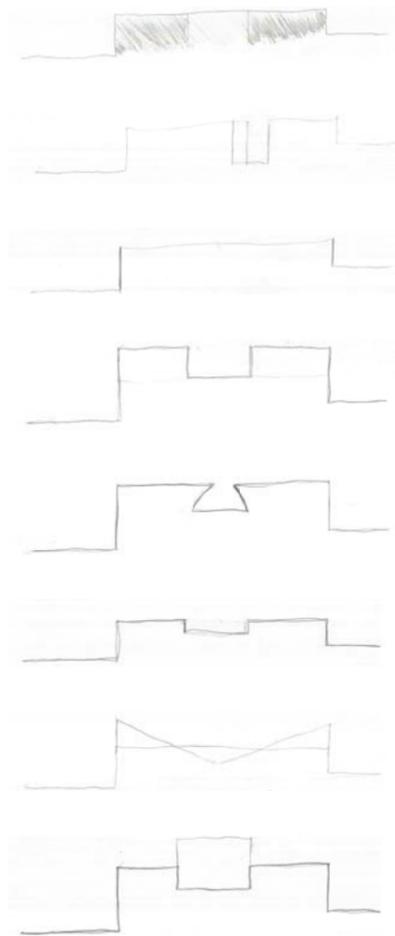
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JANUARY
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SEPTEMBER
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NOVEMBER
DECEMBER

1974

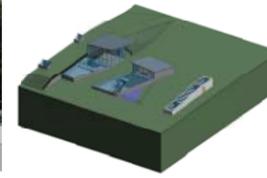
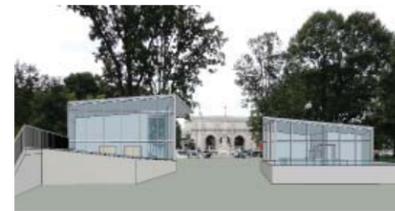
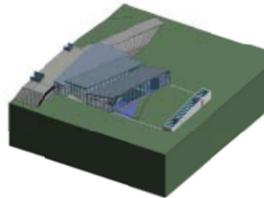
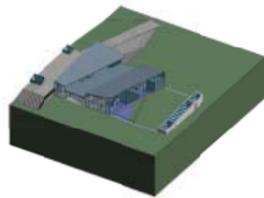
BOMBINGS
27 KILLED
HUNDREDS INJURED





THE BUILDINGS SITING, STRADLING THE AXIS CONNECTING UNION STATION AND THE CAPITOL BUILDING, IMBUEED SIGNIFICANT PROMINENCE TO THE INTERSECTION OF THE BUILDING AND THIS CONTEXTUAL AXIS. THIS AREA WAS DEVELOPED AS THE KEYSTONE OF THE PROJECT'S ORGANIZATION. THIS AREA NEEDED TO DEFER TO THE EXISTING VISTAS ACROSS THE SITE, CELEBRATE AND TAP INTO THE PEDESTRIAN ROUTE TRANSITING THE SITE, DEFINE SEPARATION OF BUILDING USES WHILE SIMULTANEOUSLY BRIDGING THE PROGRAMMATIC MASSES.

A SERIES OF STUDIES WERE DEVELOPED FOR THE MASSING OF THIS JOINT ABOVE GRADE WITH PARTICULAR CONSIDERATION FOR THE VIEW TO UNION STATION, VIEW TO THE CAPITOL, AND THE BUILDING ENTRY(S). THE NEED FOR A SEPARATION BETWEEN THE PUBLIC AND PRIVATE MASSES BELOW GRADE REQUIRED SPECIAL TREATMENT AT THE LOWEST LEVEL OF EXCAVATION TO PREVENT UNAUTHORIZED ACCESS. THIS WAS RESOLVED BY THE PROVISION OF A POOL AT THE LOWEST LEVEL, SIMULTANEOUSLY PROVIDING PHYSICAL SEPARATION, VISUAL INTEREST, AND TAPS INTO THE IMAGERY OF BRIDGING SOCIETAL GAPS BETWEEN INSTITUTIONS AND PEOPLE.



OPEC Hostage Situation

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- SHOOTING AND EXPLOSIVE HOSTAGE SITUATION OF THE OPEC MINISTERS
- PERPETRATED TO EXTORT RANSOMS, LED BY CARLOS THE JACKAL
- ULTIMATELY ALL THE HOSTAGES WERE RELEASED WITHOUT ANY RANSOM

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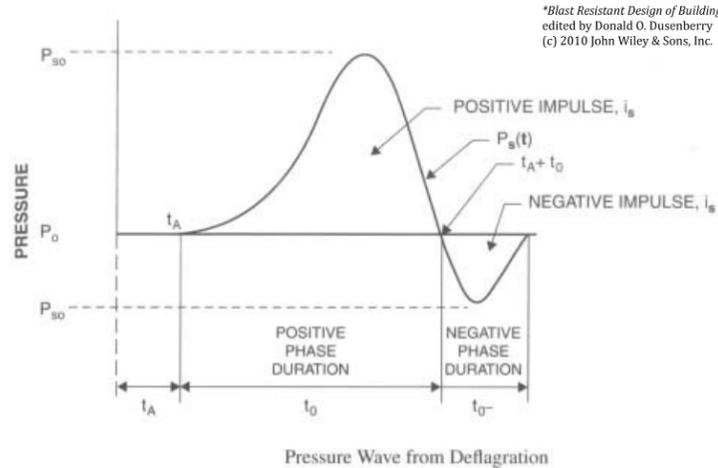
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DECEMBER

1
9
7
5

HOSTAGE SITUATION

1 INJURED
70 HOSTAGES TAKEN

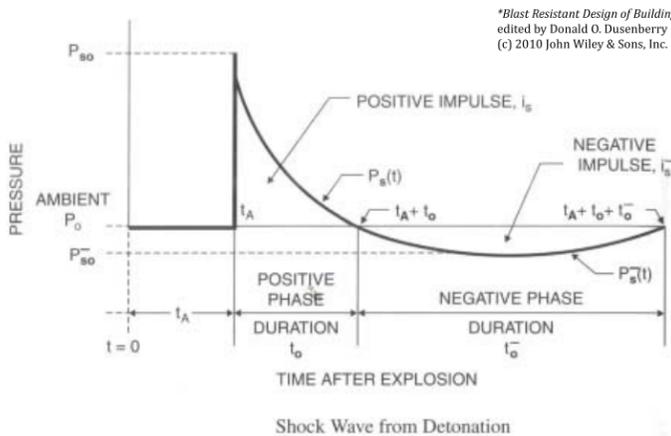




*Blast Resistant Design of Buildings, edited by Donald O. Dusenberry (c) 2010 John Wiley & Sons, Inc.

THERE ARE TWO BASIC TYPES OF EXPLOSIONS, DEFLAGRATIONS AND DETONATIONS. DEFLAGRATIONS RELEASE THEIR ENERGY RELATIVELY MORE SLOWLY AND TEND TO THEREFORE RESULT IN REDUCED PRESSURE LOADS THAN A COMPARABLE DETONATION WOULD. THESE ARE HELPFUL FOR PROPELLANTS AND ARE THEREFORE MORE COMMON IN THE MUNITIONS AND PROJECTILE REALMS.

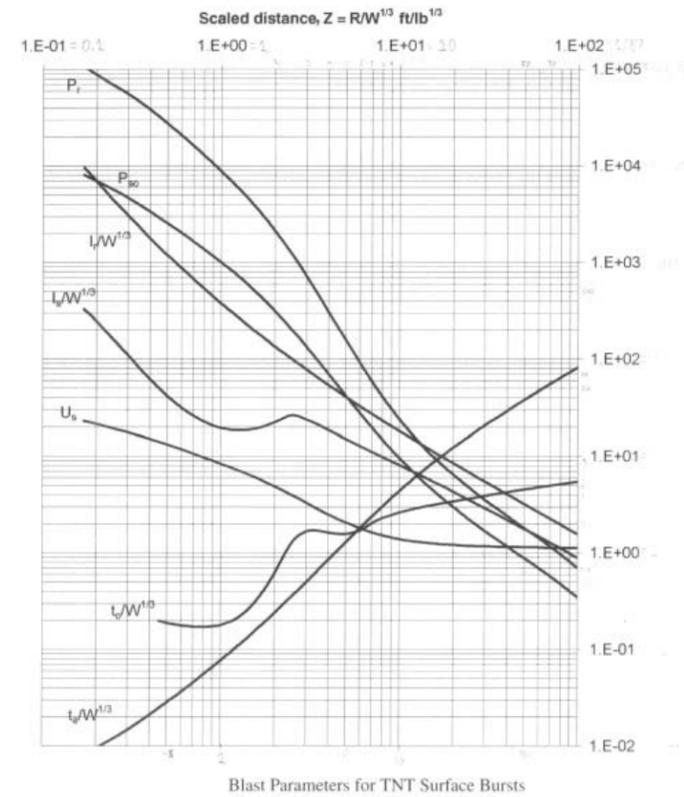
FIGURE 17: DEFLAGRATION PRESSURE CHART. DUSENBERRY, DONALD O. HANDBOOK FOR BLAST-RESISTANT DESIGN OF BUILDINGS. HOBOKEN: JOHN WILEY & SON, 2010. USED UNDER FAIR USE, 2015.



*Blast Resistant Design of Buildings, edited by Donald O. Dusenberry (c) 2010 John Wiley & Sons, Inc.

THERE ARE TWO BASIC TYPES OF EXPLOSIONS, DEFLAGRATIONS AND DETONATIONS. DETONATIONS RELEASE ALL THEIR AT ONCE RESULTING IN AN IMMEDIATE RISE IN PRESSURE THAT QUICKLY DETERIORATES AS IT PROPAGATES OUT FROM THE SOURCE. THESE ARE TYPICALLY THE INTENDED REACTION FROM TERRORISTS AND ARE THE FOCUS OF THE STUDY IN THE BLAST WALK.

FIGURE 18: DETONATION PRESSURE CHART. DUSENBERRY, DONALD O. HANDBOOK FOR BLAST-RESISTANT DESIGN OF BUILDINGS. HOBOKEN: JOHN WILEY & SON, 2010. USED UNDER FAIR USE, 2015.



*Blast Resistant Design of Buildings, edited by Donald O. Dusenberry (c) 2010 John Wiley & Sons, Inc.

FIGURE 19: BLAST PARAMETERS FOR TNT SURFACE BURSTS. DUSENBERRY, DONALD O. HANDBOOK FOR BLAST-RESISTANT DESIGN OF BUILDINGS. HOBOKEN: JOHN WILEY & SON, 2010. USED UNDER FAIR USE, 2015.

BLAST EFFECTS CAN BE COMPUTED WITH A HIGH DEGREE OF ACCURACY WHEN APPROPRIATELY SCALED AND THUS SMALLER CONTROLLED BLASTS CAN BE UTILIZED TO PREDICT THE EFFECTS OF LARGER EXPLOSIONS. THE PHYSICS BEHIND BLASTS HAS BEEN EXTENSIVELY STUDIED AND A REALISTIC COMPUTATION OF ITS EFFECTS REQUIRES SIGNIFICANT ADJUSTMENTS FOR THE VARIABLES OF THE SITE AND ITS SURROUNDINGS. OFTEN THE AMOUNT OF EFFORT NECESSARY TO RUN THOSE CALCULATIONS IS UNNECESSARY AND THERE ARE SOME SIMPLE APPROACHES THAT PROVIDE A ROUGH APPROXIMATION TO DETERMINE IF MORE PRECISE CALCULATIONS ARE APPROPRIATE OR REQUIRED. THE BLAST WALK HAS UTILIZED ONE SUCH BASIC APPROACH FOR TWO BLASTS OF DIFFERENT CHARGE WEIGHTS TO PROVIDE AN EXPERIENTIAL REPRESENTATION OF BLAST SPEED, DURATION, AND PRESSURE. BLASTS ARE TYPICALLY EXPRESSED IN UNITS OF EQUIVALENT POUNDS OF TNT REGARDLESS OF THE SOURCE MATERIAL.

BLAST WALK

ASSASSINATION OF ALDO MORO

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

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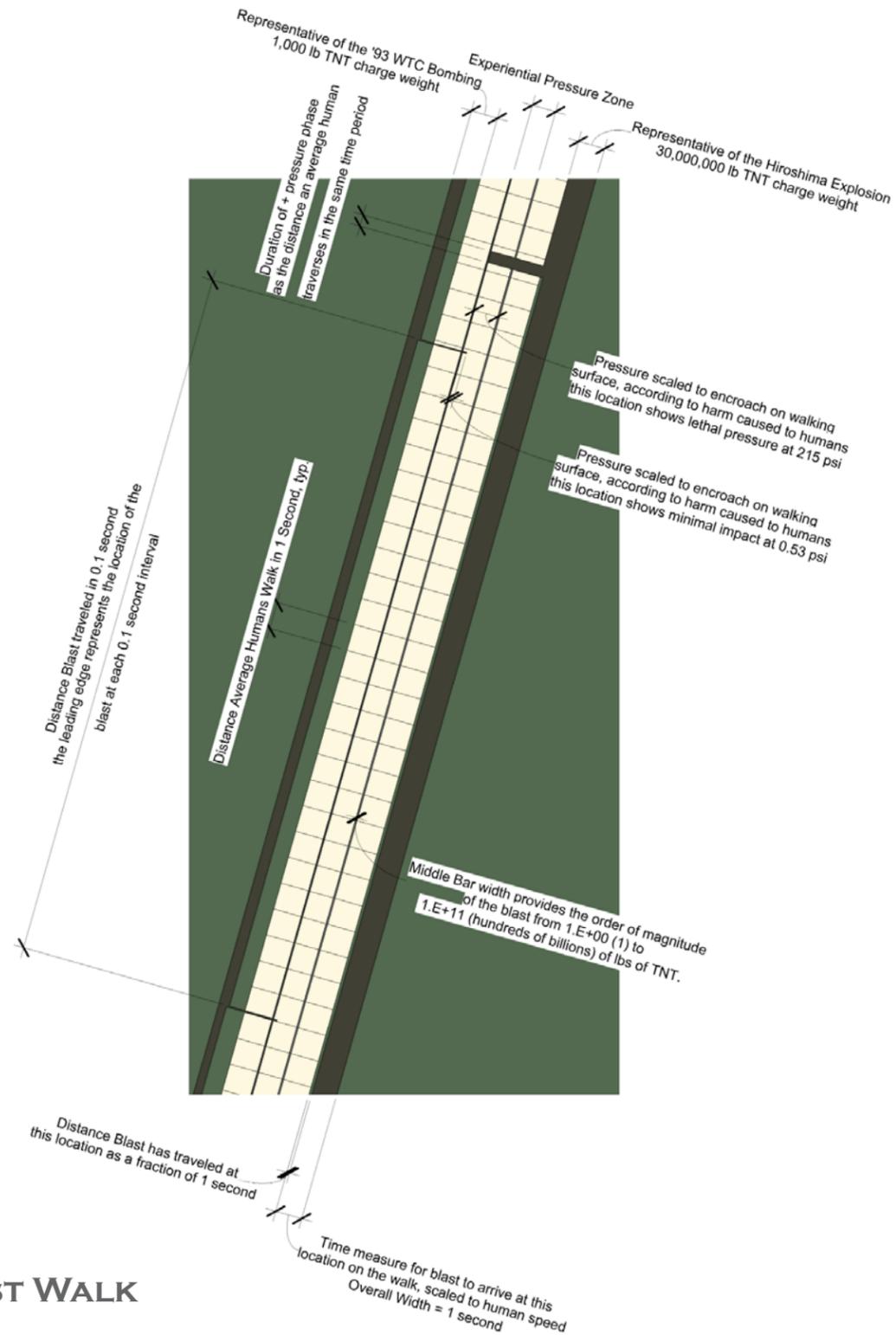
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NOVEMBER
DECEMBER

1978

- SHOOTING ASSAULT TO TAKE ITALIAN POLITICIAN ALDO MORO HOSTAGE
- PEPETRATED TO ACHIEVE LEVERAGE TO SECURE THE RELEASE OF PRISONERS & BRING ATTENTION TO THEIR CAUSE
- KILLED 5 IN THE KIDNAPPING AND AFTER 2 MONTHS KILLED MORO
- FAILED TO SECURE THE RELEASE OF ANY PRISONERS AND THE SUBSEQUENT CRACKDOWN ESSENTIALLY DISMANTLED THE GROUP

KIDNAPPING
6 KILLED





BLAST WALK

AIREY NEAVE ASSASSINATION

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

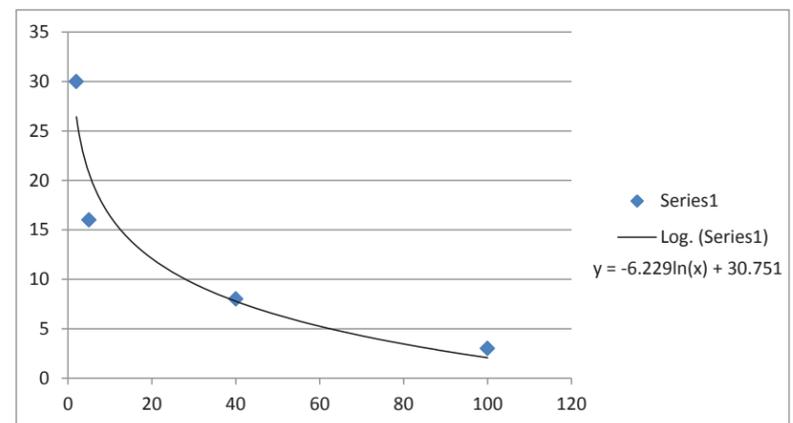
- CAR BOMBING, PLACED ON VICTIMS CAR AND DETONATED AS HE DROVE AWAY FROM OUTSIDE THE ENGLISH HOUSE OF PARLIAMENT.

- DESPITE A TERRORIST GROUP CLAIMING RESPONSIBILITY AND REINFORCED BY THE FAILURE TO PROSECUTE ANYONE, THEORIES AROUND AS TO WHO PERPETRATED THE ACT AND TO WHAT END, AS RESPONSIBILITY WAS NEVER CONFIRMED.

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DECEMBER

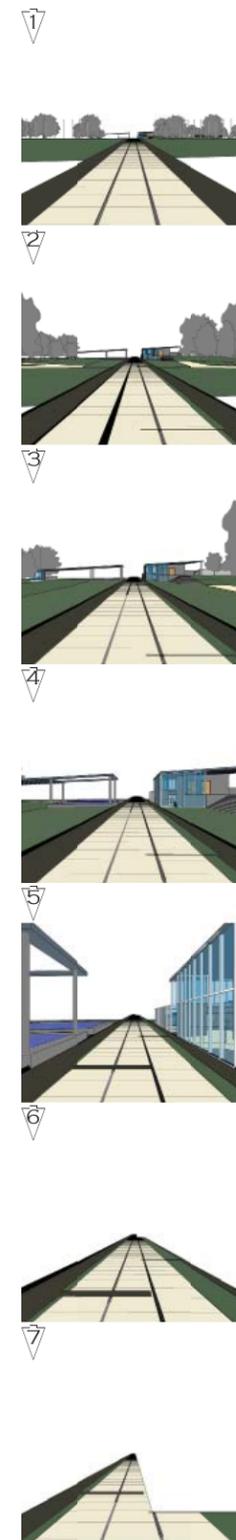
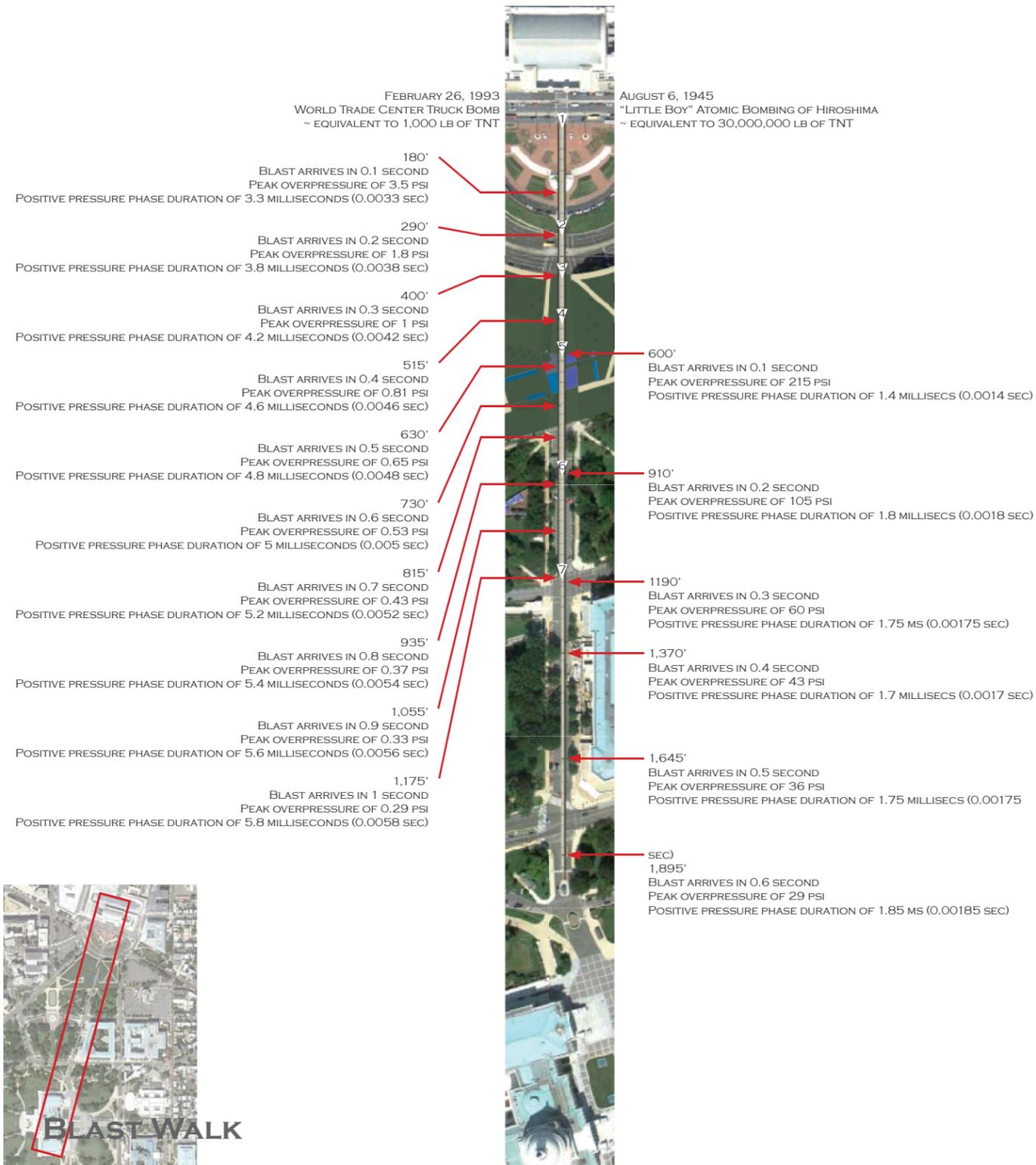
1
9
7
9

BOMBING
1 KILLED



- 2 PSI - WINDOWS FAIL
- 5 PSI - EAR DRUM DAMAGE/RUPTURE CAN OCCUR
- 20 PSI - TYMPANIC MEMBRANE RUPTURE (GAS FILLED ORGANS PARTICULARLY SENSITIVE)
- 40 PSI - LUNGS CAN COLLAPSE
- 100 PSI - CAN BE FATAL
- 2,000 PSI - DISINTEGRATION OF A HUMAN POSSIBLE
- 5,000 PSI - NO TRACE OF A PERSON WILL REMAIN

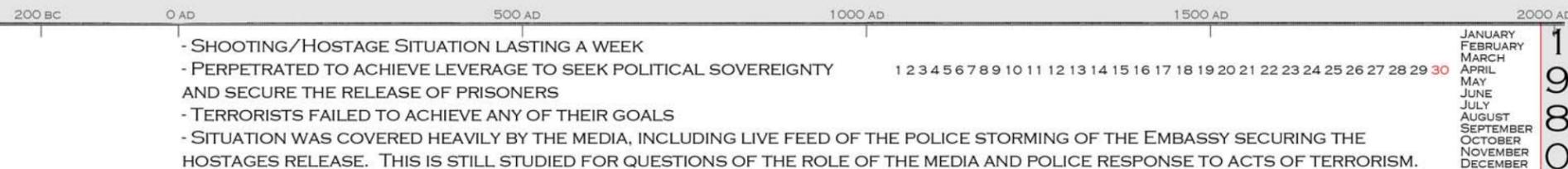
THE BLAST WALK'S 'EXPERIENTIAL PRESSURE ZONE' HAS THE MARKERS FROM EACH EXPLOSION'S MARKED LOCATIONS (EACH 0.1 OF A SECOND) ENCROACH INTO THE WALK TO REPRESENT THE OVERPRESSURE AT THAT LOCATION/TIME OF THE BLAST. THAT MARKER REDUCES THE TYPICAL WALKING SURFACE AREA AT THAT LOCATION WHICH RELATES THE PRESSURE EXPERIENCED BY THE HUMAN BODY AT THAT LOCATION. THESE DISTANCE VALUES HAVE BEEN DERIVED FROM A FORMULA RELATING DISTANCE REMAINING (IN INCHES) AND PRESSURE (IN PSI) FROM 4 SET POINTS RELATING COMPRESSION AT THE SCALE OF THE HUMAN BODY AND THE COMPARABLE IMPACTS TO HUMANS AT VARIOUS PRESSURES. 2 PSI IS A COMMON MEASURE FOR BLASTS AS GLASS WINDOWS WILL FAIL AT THIS BLAST PRESSURE AND WHILE CERTAINLY FELT, THE PRESSURE WILL NOT TYPICALLY CAUSE SIGNIFICANT HARM TO HUMANS. COMPARABLY 30" IS MORE THAN SUFFICIENT FOR HUMANS TO TRAVERSE BUT NOT WITHOUT FEELING SOMEWHAT CONSTRICTED OR AT LEAST FEEL THE ENCROACHMENT IN THEIR PERSONAL SPACE. AT BLAST PRESSURES AS LOW AS 5 PSI, THE EAR CAN SUSTAIN DAMAGE OR RUPTURE. ACCORDINGLY WHILE 16" IS LESS THAN AN AVERAGE PERSON'S BODY WIDTH AN OPENING OF THAT SIZE WOULD STILL BE PASSABLE. AT BLAST PRESSURES OF 40 PSI A PERSON SUSTAINS SIGNIFICANT DAMAGE AND THEIR LUNGS COLLAPSE, WHILE AN 8" OPENING IS NEARLY INSUFFICIENT TO TRAVERSE IN ANY MANNER. FINALLY BLAST PRESSURES OF 100 PSI ARE TYPICALLY FATAL AND 3" IS COMPLETELY IMPASSABLE. THESE SET VALUES WERE RELATED IN THE SCATTERPLOT AT LEFT AND A BEST FIT LOGARITHMIC EQUATION PROVIDED THE RELATIONSHIPS FOR ALL OTHER PRESSURE AND DISTANCE VALUES.



THE BLAST WALK PROVIDES AN EXPERIENTIAL REPRESENTATION OF TWO LARGE EXPLOSIONS; THE 1993 TRUCK BOMBING OF THE WORLD TRADE CENTER AND THE 1945 ATOMIC BOMBING OF HIROSHIMA. THESE EXAMPLES PORTRAY RELATIVE EFFECTS OF BLASTS WITH A CHARGE WEIGHT OF 1,000 LBS AND 30,000,000 LBS OF TNT, RESPECTIVELY. BOTH REPRESENTATIONS ARE APPROXIMATIONS TO A RELATIVE CHARGE WEIGHT, WHICH NEGLECT THE EFFECTS OF REFLECTION OFF THE GROUND PLANE, THE CHARACTERISTICS OF THE SURROUNDING ENVIRONMENT, AND NUCLEAR BLAST PHYSICS (IN THE CASE OF THE HIROSHIMA BOMBING). HOWEVER THIS REPRESENTATION SHOULD PROVIDE A CLEAR REPRESENTATION OF THE CRITICAL EFFECT DISTANCE FROM THE EXPLOSION HAS ON THE AMOUNT OF DAMAGE A GIVEN BLAST CAN INFLICT.

THE BLAST MARKERS SET IN THE GROUND PLANE ARE INDICATED AT INTERVALS OF 0.1 SECONDS FROM GROUND ZERO, SET AT THE CENTER POINT OF COLUMBUS CIRCLE AT THE ENTRANCE OF UNION STATION, THE POINT OF ARRIVAL FOR MANY VISITORS. IN ADDITION TO THE ARRIVAL TIME OF THE BLAST WAVE, THE MARKERS RELATE THE DISTANCE FROM THE BLAST ORIGIN, THE PEAK OVERPRESSURE, AND THE TIME LAPSE DURATION OF THE POSITIVE PRESSURE WAVE AT THAT LOCATION. THE RADIUS OF THESE HYPOTHETICAL EXPLOSIONS ARE MARKED ALONG THE NEARLY HALF MILE PATH BETWEEN UNION STATION AND THE CAPITOL.

IRANIAN EMBASSY TO BRITAIN HOSTAGE SITUATION



- SHOOTING/HOSTAGE SITUATION LASTING A WEEK
- PERPETRATED TO ACHIEVE LEVERAGE TO SEEK POLITICAL SOVEREIGNTY AND SECURE THE RELEASE OF PRISONERS
- TERRORISTS FAILED TO ACHIEVE ANY OF THEIR GOALS
- SITUATION WAS COVERED HEAVILY BY THE MEDIA, INCLUDING LIVE FEED OF THE POLICE STORMING OF THE EMBASSY SECURING THE HOSTAGES RELEASE. THIS IS STILL STUDIED FOR QUESTIONS OF THE ROLE OF THE MEDIA AND POLICE RESPONSE TO ACTS OF TERRORISM.

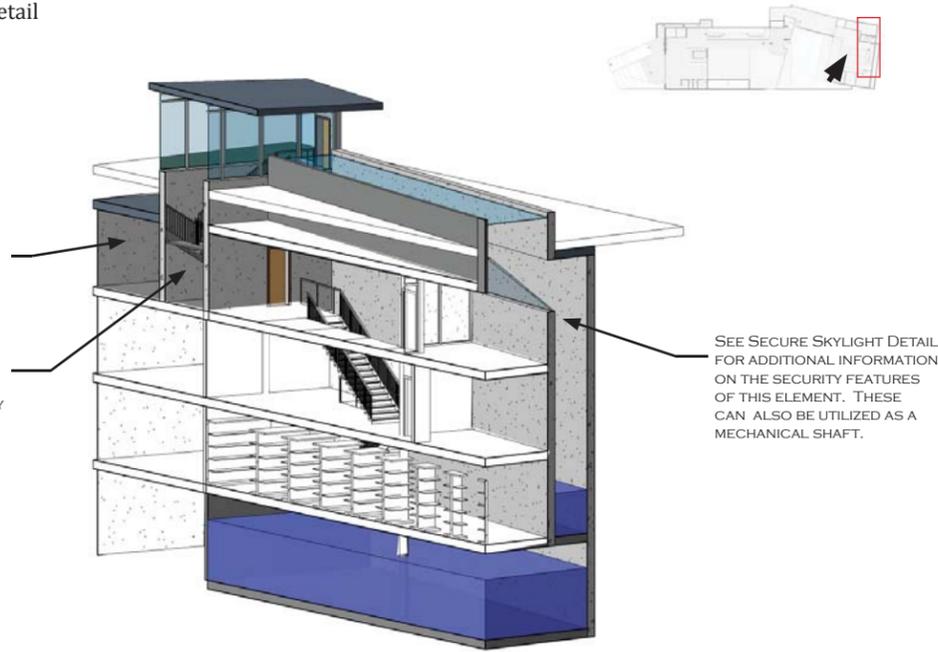
HOSTAGE SITUATION
1 KILLED
25 HOSTAGES TAKEN



Security Detail

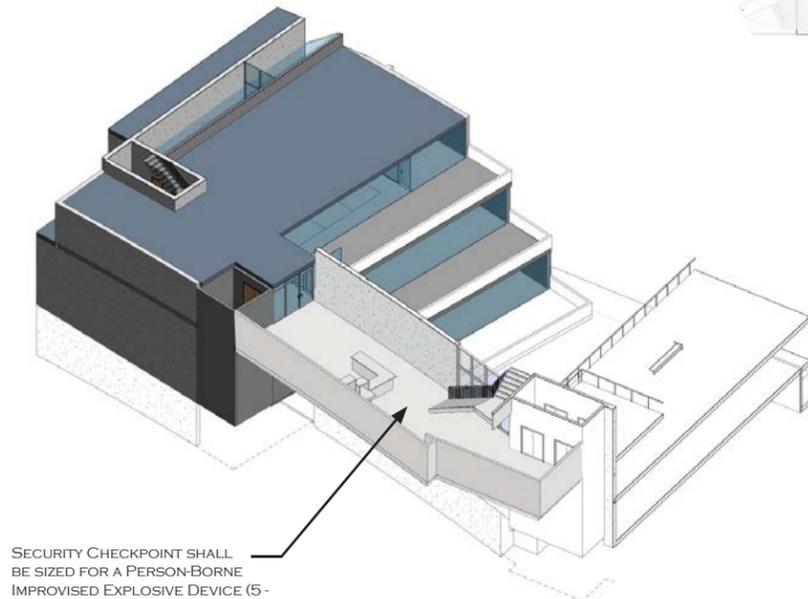
MECHANICAL EQUIPMENT INCLUDES SENSORS AND FILTERS TO DETECT AND PROTECT AGAINST CHEMICAL, BIOLOGICAL, OR RADIOLOGICAL THREATS FROM ENTERING THROUGH THE MECHANICAL OUTSIDE AIR INTAKE.

EMERGENCY EGRESS STAIRS PROVIDES A SEPARATE MEANS OF ESCAPE SHOULD A FORCED-ENTRY ATTEMPT BE MADE THROUGH THE SECURITY CHECKPOINT



SEE SECURE SKYLIGHT DETAIL FOR ADDITIONAL INFORMATION ON THE SECURITY FEATURES OF THIS ELEMENT. THESE CAN ALSO BE UTILIZED AS A MECHANICAL SHAFT.

Security Hardline



SECURITY CHECKPOINT SHALL BE SIZED FOR A PERSON-BORNE IMPROVISED EXPLOSIVE DEVICE (5-40 LB). USE OF PRESSURE OPENING LOUVER DAMPERS WILL REDUCE EFFECTIVE BLAST LOADING.

THE BUILDING'S HARDLINE CONTAINS THE INSTITUTE'S OFFICE FUNCTIONS IN THE BUILDING'S EAST WING. THE BRIDGE CONNECTION BETWEEN THE BUILDING'S WINGS SERVES AS THE SECURITY CHECKPOINT. THIS SPACE PROVIDES THE SOLE ACCESS TO THE SECURE SPACE AND FUNCTIONS TO SCREEN ITS ENTRANTS. THE CHECKPOINT IS DESIGNED TO WITHSTAND A PERSON-BORNE EXPLOSION, LARGELY LIMITING ITS IMPACT TO THIS AREA.

THE BUILDING IS PROTECTED FROM CHEMICAL, BIOLOGICAL, OR RADIOLOGICAL THREATS FROM ITS MECHANICAL SYSTEMS. THE OUTSIDE AIR INTAKE SYSTEM CONTAINS SENSORS TO DETECT AIR-BORNE THREATS AND FILTERS TO REMEDIATE THEIR EFFECT.

THE FIRE EGRESS STAIRS ALSO SERVE AS AN EMERGENCY ESCAPE ROUTE SHOULD A FORCED ENTRY ATTEMPT BE MADE THROUGH THE CHECKPOINT.

HYDE PARK AND REGENT'S PARK BOMBINGS

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- TWO 10 LB GELIGNITE BOMBINGS PACKED WITH NAILS
- REGENT'S PARK BOMB WAS PLACED UNDER THE GRANDSTAND OF A FREE MILITARY BAND CONCERT.
- HYDE PARK CAR BOMB WAS TIMED TO DETONATE AT THE PASSING OF THE GUARDS EN ROUTE TO THE CHANGING OF THE GUARD CEREMONY AT BUCKINGHAM PALACE.

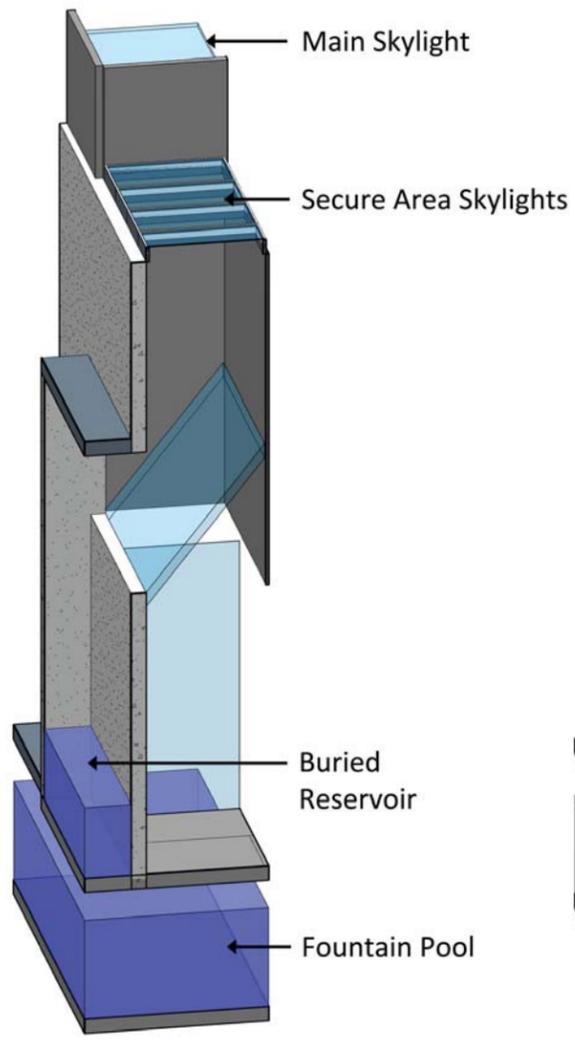
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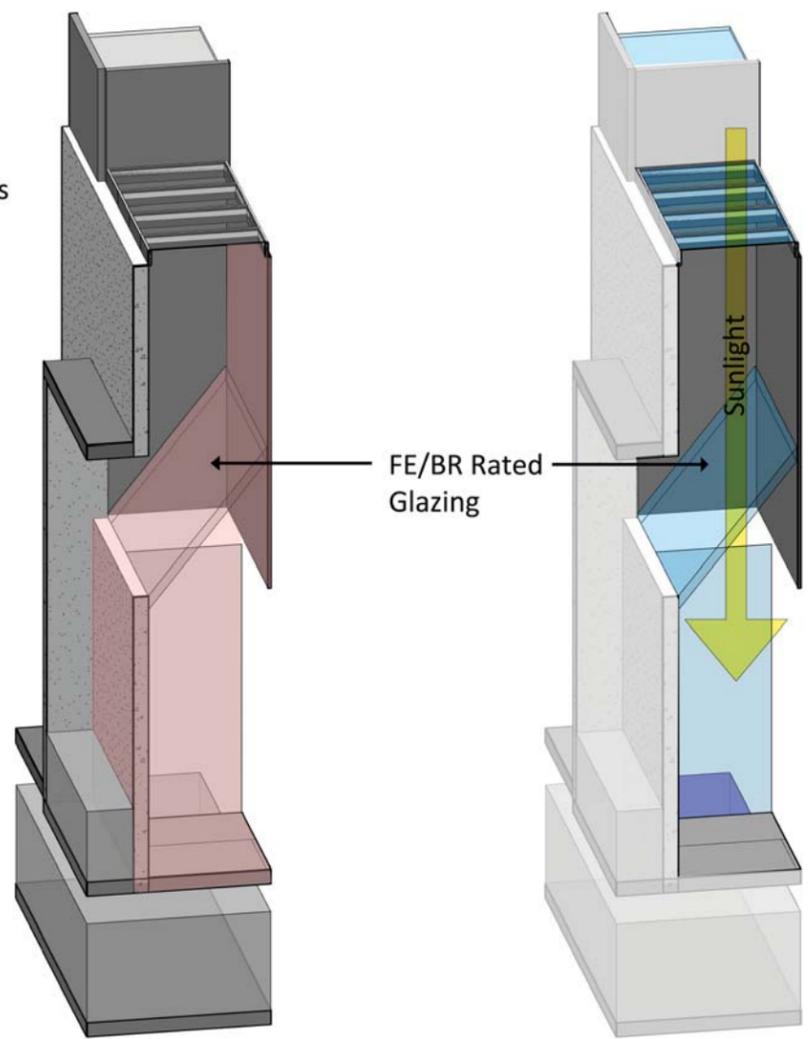
1
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8
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BOMBING
11 KILLED
50 INJURED

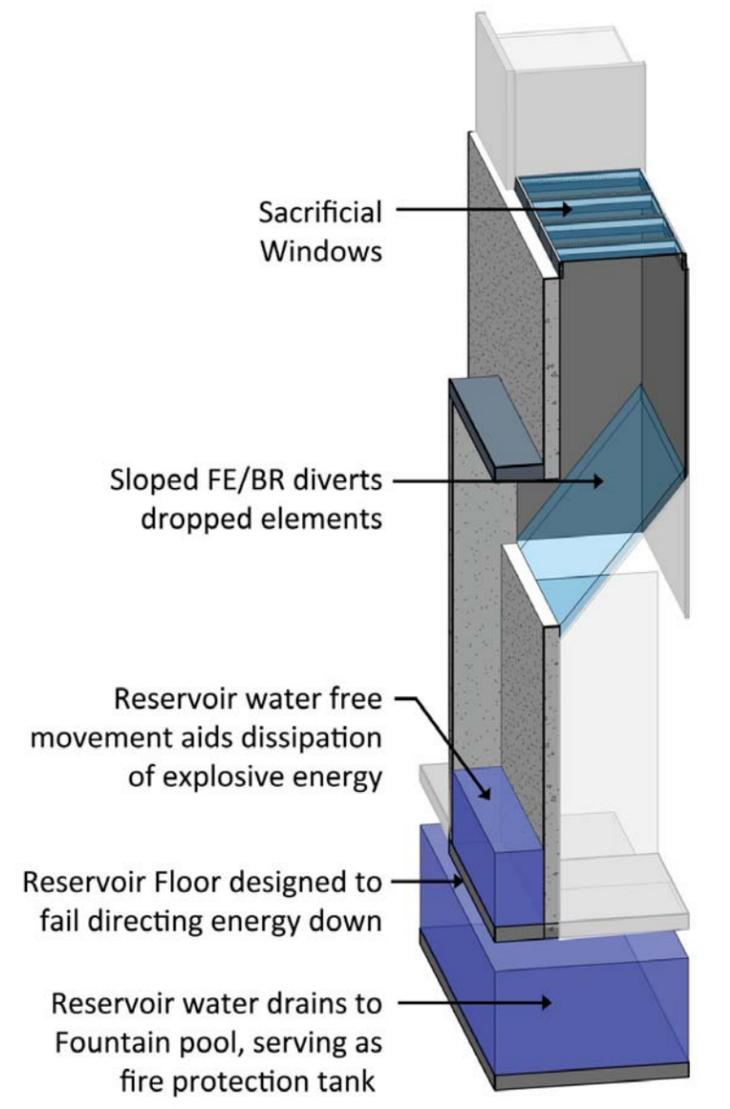




Hardline Enclosure



Skylight



Designed Security

THE SKYLIGHT DETAIL SOUGHT TO MAXIMIZE THE AMOUNT AND DEPTH OF NATURAL LIGHT PENETRATION INTO THE BUILDING, WHILE DENYING ACCESS FROM PERSON-BORNE IMPROVISED EMPLOSIVE DEVICES. THE WINDOWS ON THE GROUND PLANE ARE DIRECTLY ACCESSIBLE AND THEREFORE REPRESENTED A POTENTIAL SECURITY VULNERABILITY THAT NEEDED TO BE ADDRESSED.

THE SKYLIGHTS PROVIDE A VERTICAL SHAFT FOR LIGHT TO PENETRATE DIRECTLY INTO THE BUILDING WHILE PUSHING THE HORIZONTAL CLOSURE OF THE BUILDINGS HARDLINE BELOW THE LEVEL OF PUBLIC ACCESS. THE DETAIL WAS DEVELOPED AS A HYPOTHETICAL APPROACH TO COUNTER A BACKPACK, BRIEFCASE, HAND-HELD EXPLOSIVE BOMBING THROUGH THE SKYLIGHTS. THE EFFECTS OF AN EXPLOSION ARE AMPLIFIED IN AN ENCLOSED SPACE AND THEREFORE A MEANS OF ABSORBING OR RELEASING THE EXPLOSION WAS NEEDED BEYOND SIMPLY REDIRECTING IT FROM OCCUPIED SPACES. THIS DETAIL SERVED TO ILLUSTRATE A FEW THEORIES IN UTILIZING WATER TO REDUCE THE RELATIVE IMPACT OF AN EXPLOSION. THE FREE MOVEMENT OF THE WATER REACTING TO THE BLAST WILL CONVERT SOME OF THE BLAST ENERGY INTO HARMLESS WATER PROJECTILES. IT WAS THEORIZED THAT THE STRENGTH OF THE BLAST WAVE IS DIMINISHED WHEN TRANSITING BETWEEN STATES OF MATTER AND ADDITIONAL ENERGY WOULD BE ABSORBED IN THE EXPLOSION CONVERTING WATER TO A GAS STATE. RECOGNIZING THESE EFFECTS WON'T BALANCE THAT OF THE BLAST, THE RESERVOIR'S FLOOR IS DESIGNED TO FAIL FIRST, DIRECTING THE BLAST AWAY FROM OCCUPIED SPACE AND STRUCTURAL BUILDING SUPPORTS. THE SKYLIGHT RESERVOIRS ALSO SERVE AS STORAGE TANKS FOR HOT WATER, RAIN WATER CATCHMENT, AND SITE IRRIGATION.

BOLOGNA MASSACRE

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- BOMBING OF A RAIL STATION WITH A HOMEMADE TNT SUITCASE BOMB
- SOME THEORIZE THE BOMB WAS PLANTED BY A RIGHT WING TERRORIST GROUP TO BE BLAMED ON THE LEFT TO UNDERMINE THE COMMUNIST PARTY THERE
- GOVERNMENT INVESTIGATION AND RESPONSE WAS CONSIDERED AT BEST INCOMPETENT AND AT WORST POLITICALLY MOTIVATED.

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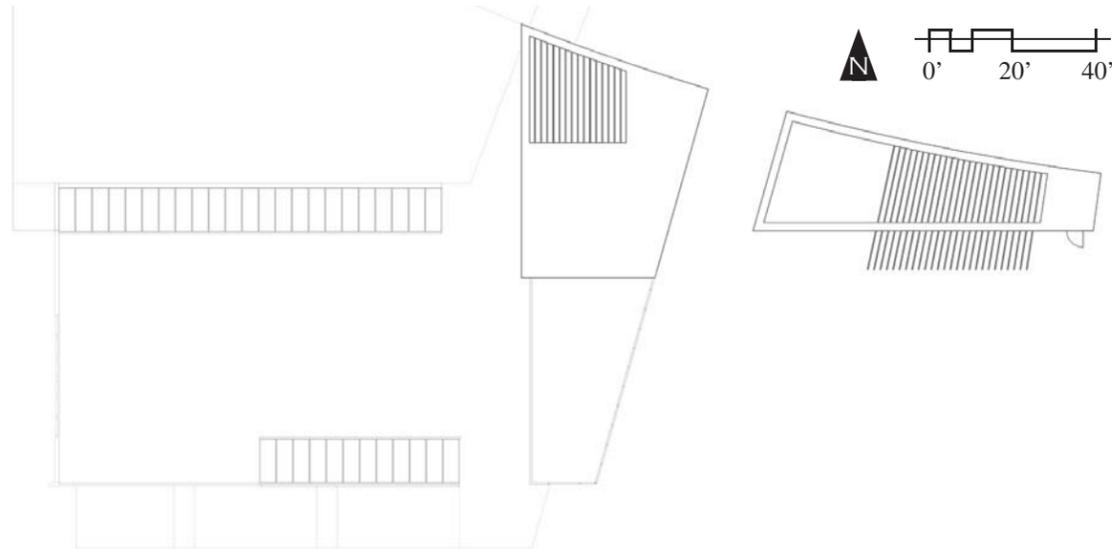
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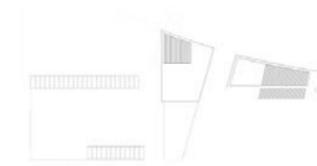
BOMBING
85 KILLED
200 INJURED



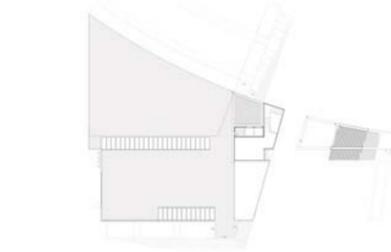
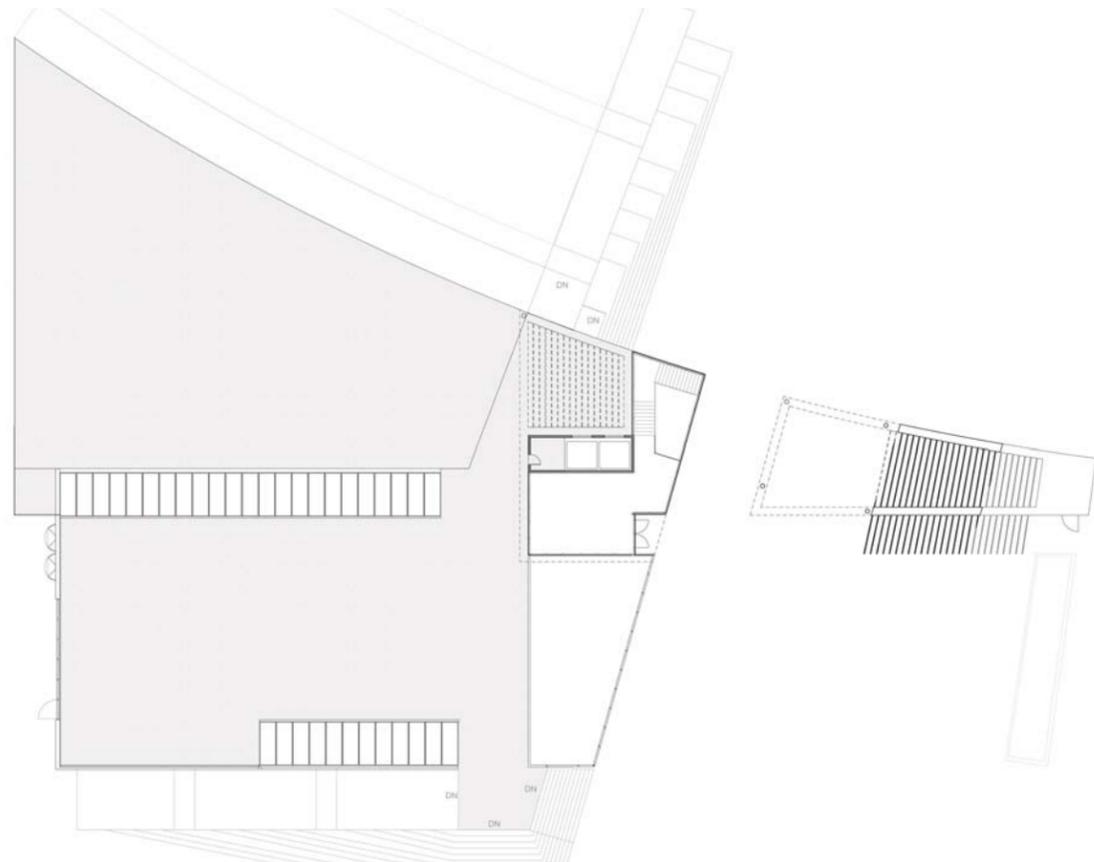
UPPER ROOF
GRADE + 1.5



UPPER ROOF
GRADE + 1.5



PLATFORM LEVEL
GRADE + 1



GROUND LEVEL
GRADE



PROMENADE LEVEL
GRADE - 0.5



B2 LEVEL
GRADE - 1.5



B3 LEVEL
GRADE - 2.5



B4 LEVEL
GRADE - 3.5



POOL LEVEL
GRADE - 4.5



PLATFORM LEVEL
GRADE + 1

THE UPPER ROOF NOT ONLY PROVIDES SHADE AND WEATHER PROTECTION FOR THE GRADE LEVEL BUT REINFORCES THE UNITY OF THE OVERALL BUILDING. THE BUILDING'S WEST (PUBLIC) WING IS ORGANIZED RECTILINEARLY WHILE THE EAST (PRIVATE) WING IS ORGANIZED ALONG THE RADIALS OF THE HYPOTHETICAL BLAST WALK'S GROUND ZERO AT UNION STATION. THIS PERSPECTIVE SHIFT REFLECTS THE EXPERIENCE OF THOSE IMPACTED BY INCIDENTS OF TERRORISM. THE ORDER AND REGULARITY OF INDIVIDUAL'S AND SOCIETY'S LIVES CAN BE DISTORTED BY SUCH EVENTS SO THEIR ROUTINES, PERSPECTIVES, AND HOPES CAN BE RESHAPED BY THAT SINGULAR EVENT. THE BUILDING SEEKS TO BRIDGE THE GAP BETWEEN THESE SYSTEMS WITH SENSITIVITY TO THE UNIQUE NEEDS OF INDIVIDUALS IMPACTED BY TERRORISM, MAINTAINING CIVILIZATION'S ORDER AND VALUES, AND HELPING TO REINTEGRATE SOCIETY AS A WHOLE. THE ROOF IS FORMED IN A PLAN WITH THE ORGANIZING GEOMETRIES OF BOTH SYSTEMS. WITH A DISCONTINUITY WHICH, DEFERS TO THE AXIAL CONNECTION FROM UNION STATION TO THE CAPITOL. IN SECTION HOWEVER THE CONTINUITY OF THE ROOF'S FORM IS CONSPICUOUSLY REVEALED EMPHASIZING THE MARRIAGE OF THE BUILDINGS DISPARATE SYSTEMS.

THE GREEN ROOF IS INTENDED TO BE OCCUPIED AND SUPPORTS FUNCTIONS RANGING FROM THE INFORMALITY OF A PARK SETTING OR VIEWING PLATFORM TO THE FORMALITY OF AMPHITHEATER PERFORMANCES OR USE AS AN EXTERIOR BALLROOM.

RANGOON BOMBING

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- 1 OF 3 BOMBS DETONATED IN A FAILED ASSASSINATION ATTEMPT ON SOUTH KOREAN PRESIDENT CHUN DOO HWAN

- PERPETRATED BY NORTH KOREAN AGENTS AT THE TOMB OF ASSASSINATED BURMESE LEADER THANKIN AUNG SANG, WHO NEGOTIATED THE COUNTRY'S INDEPENDENCE FOLLOWING NONVIOLENT MEANS.

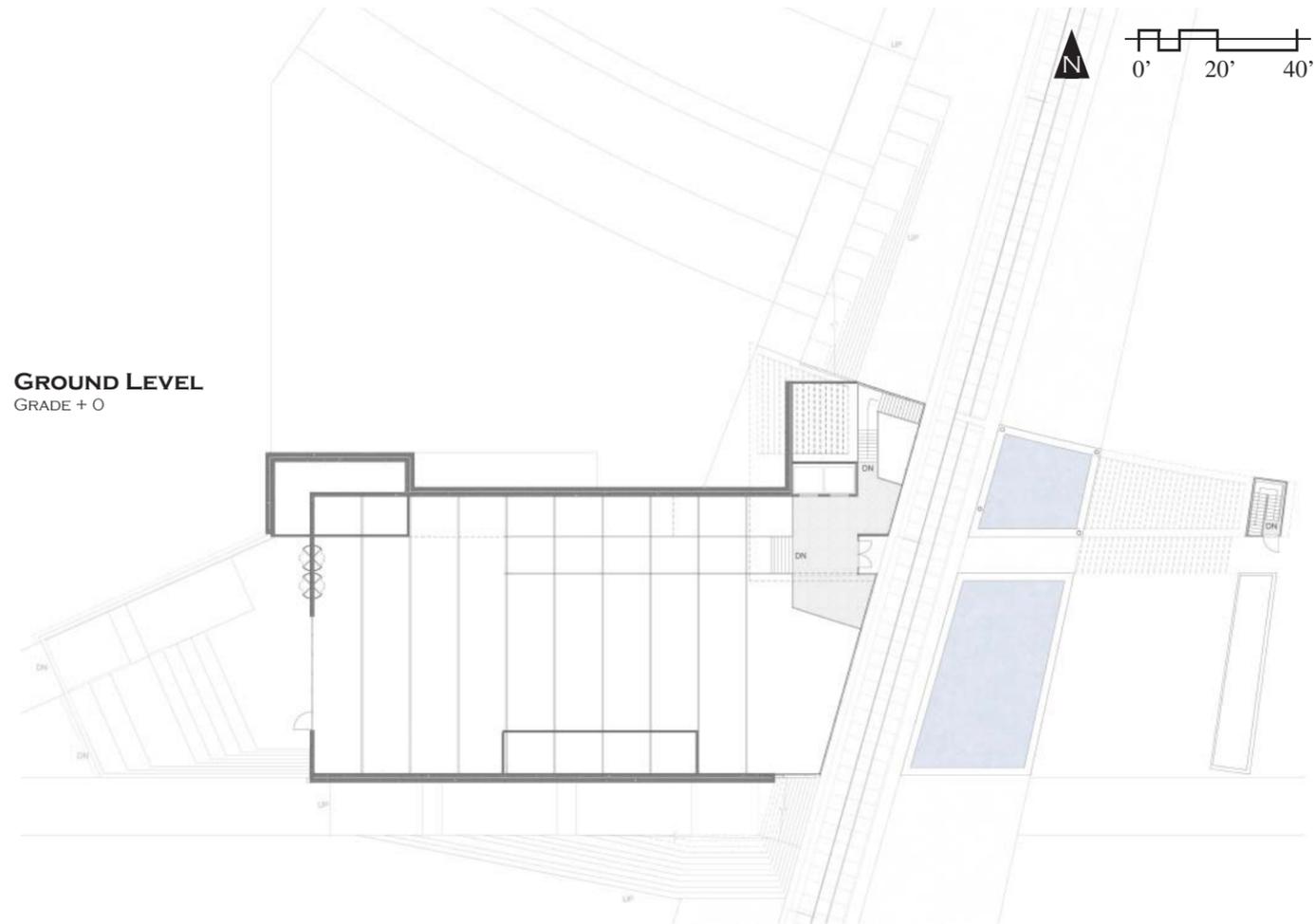
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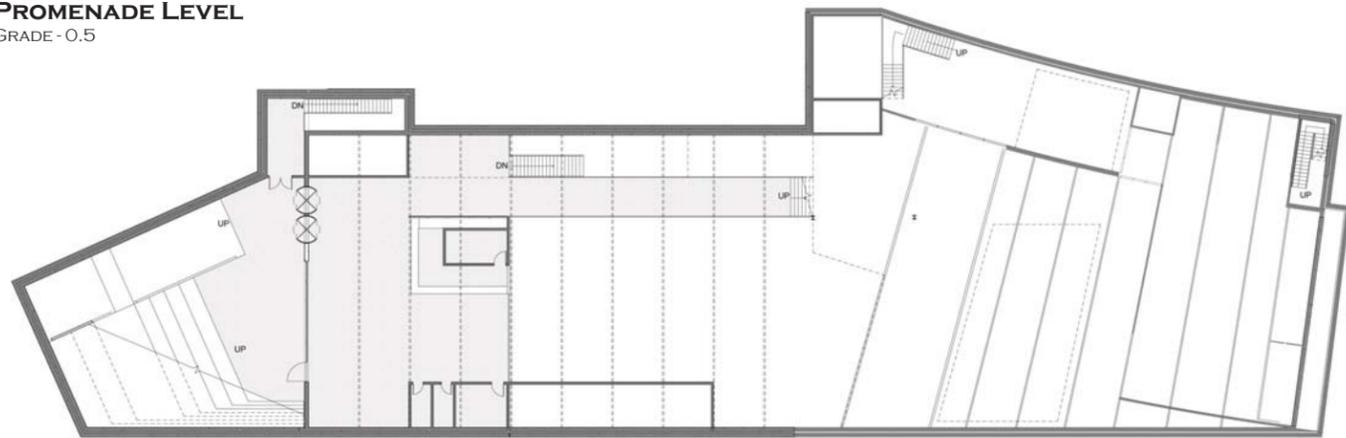
BOMBING
21 KILLED
46 INJURED





GROUND LEVEL
GRADE + 0

PROMENADE LEVEL
GRADE - 0.5



UPPER ROOF
GRADE + 1.5

PLATFORM LEVEL
GRADE + 1

GROUND LEVEL
GRADE

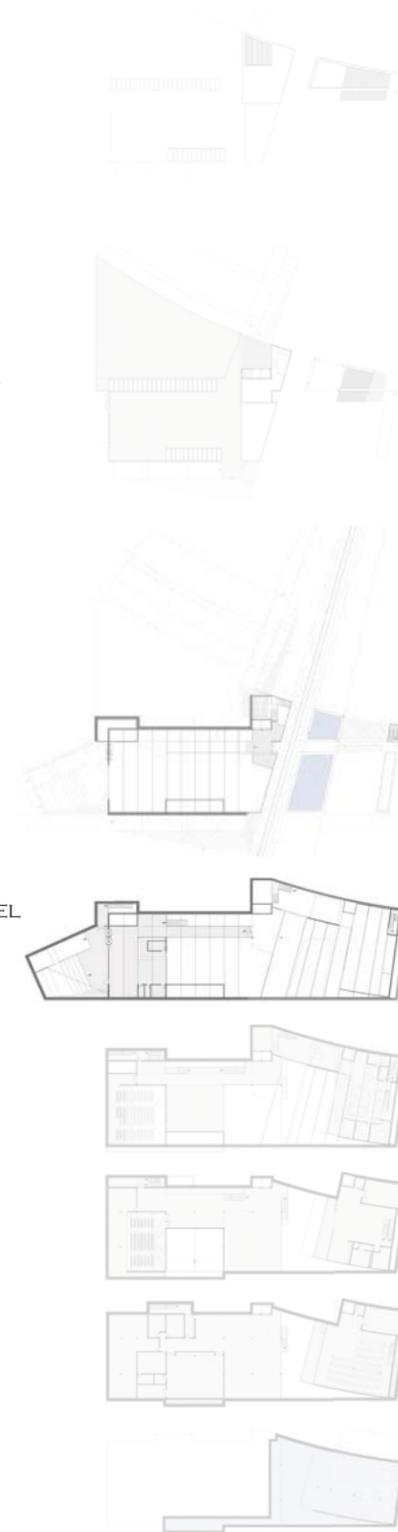
PROMENADE LEVEL
GRADE - 0.5

B2 LEVEL
GRADE - 1.5

B3 LEVEL
GRADE - 2.5

B4 LEVEL
GRADE - 3.5

POOL LEVEL
GRADE - 4.5



THE GROUND LEVEL PRIMARILY REMAINS AS EXTERIOR PUBLIC SPACE, INTERRUPTED BY A SERIES OF PAVILIONS MARKING THE BUILDING BELOW, AND ACTING TO PROVIDE ENTRY FOR LIGHT, AIR, AND PEOPLE. THE PUBLIC WING IS BURIED LESS DEEPLY, PARTICIPATING IN THE LANDSCAPE, ANNOUNCING ITS PRESENCE, AND PROVIDING ACCESS. WHILE THE PRIVATE WING IS FULLY SUBMERGED, MINIMALLY REVEALED THROUGH ITS SKYLIGHTS DISGUISED UNDER SMALL REFLECTING POOLS, EGRESS PAVILION, AND IN THE GEOMETRY OF THE CANOPY STRUCTURE.

THE MAIN ENTRANCE IS LOCATED AT GRADE LEVEL, DIRECTLY OFF THE BLAST WALK PEDESTRIAN THOROUGHFARE. THE WESTERN ENTRANCE IS ON THE PROMENADE LEVEL, 1/2 LEVEL DOWN FROM GRADE AND ACCESSED BY MONUMENTAL STAIRS. THIS CREATES ANOTHER SMALL AMPHITHEATER SPACE WHICH CAN BE UTILIZED FOR SMALL EXTERIOR PERFORMANCES, TALKS, OR EVEN OVERFLOW RETAIL SPACE.

THE PROMENADE LEVEL CONNECTS THE BUILDINGS ENTRIES ACROSS A BRIDGE WALKWAY OVERLOOKING THE EXHIBITION SPACES AND TIERS BELOW. THE INSTITUTE/MUSEUM'S GIFT SHOP IS LOCATED ON THIS LEVEL, TAPPING INTO THE CIRCULATION FLOWS HORIZONTALLY BETWEEN THE BUILDINGS ENTRIES AND VERTICAL TERMINUS FROM THE PUBLIC WING.

BRIGHTON BOMBING

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- SEMTEX BOMBING OF THE CONSERVATIVE PARTY CONFERENCE AT THE BRIGHTON GRAND HOTEL

- PERPETRATED IN AN ATTEMPT TO ASSASSINATE PRIME MINISTER MARGARET THATCHER AND HER CABINET AND IN RESPONSE TO THE PRESENCE OF BRITISH TROOPS IN NORTHERN IRELAND.

- ACTIVE BRITISH OPERATIONS REMAINED IN NORTHERN IRELAND UNTIL 2007 WELL AFTER THE 1998 GOOD FRIDAY AGREEMENT

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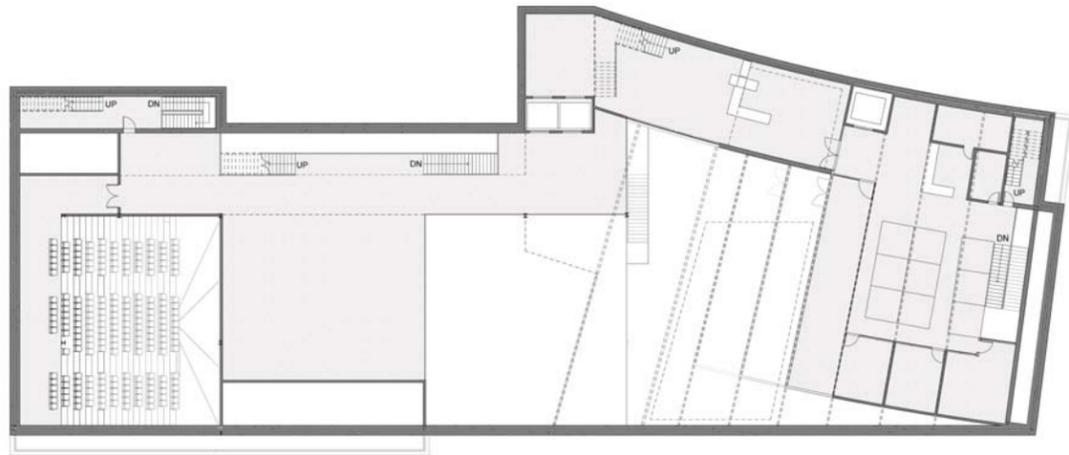
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BOMBING
5 KILLED
34 INJURED

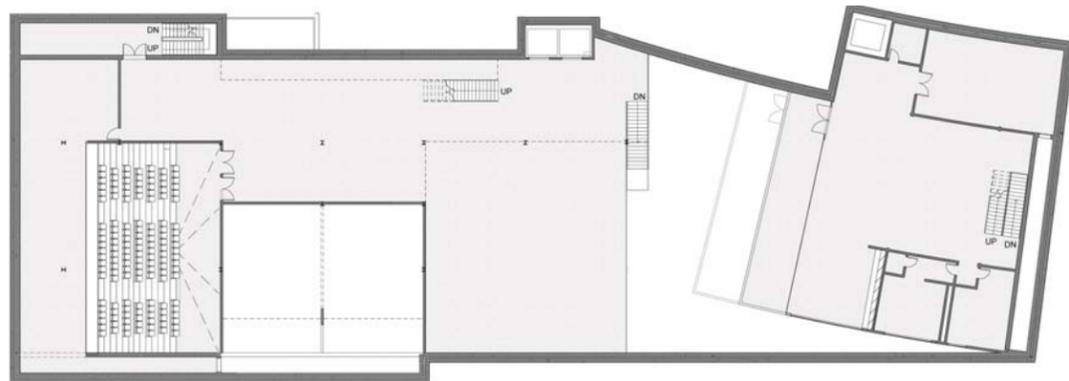




B2 LEVEL
GRADE - 1.5



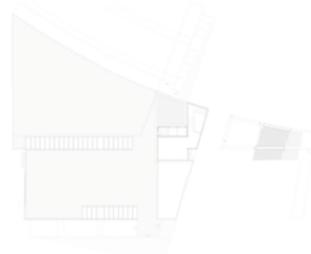
B3 LEVEL
GRADE - 2.5



UPPER ROOF
GRADE + 1.5



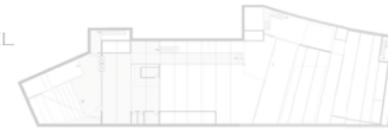
PLATFORM LEVEL
GRADE + 1



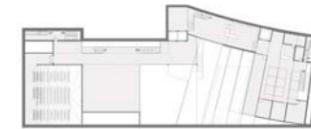
GROUND LEVEL
GRADE



PROMENADE LEVEL
GRADE - 0.5



B2 LEVEL
GRADE - 1.5



B3 LEVEL
GRADE - 2.5



B4 LEVEL
GRADE - 3.5



POOL LEVEL
GRADE - 4.5



THE OPEN TIER SPACES ON THE PUBLIC SIDE OF LEVELS B2-B4 SERVE AS THE EXHIBITION FLOORS OF THE MUSEUM. THESE SPACES VISIBLE FROM ABOVE INVITE VISITORS DEEPER INTO THE BUILDING FOR A MORE IMMERSIVE EXPERIENCE OF THE EXHIBITIONS ON DISPLAY. THE OPEN EXHIBIT SPACES ALSO SERVE TO EXPAND THE PRE-FUNCTION SPACE AVAILABLE AT THE INSTITUTE'S FORMAL PUBLIC OUTREACH COMPONENTS; AUDITORIUM, CONFERENCE CENTER, AND CLASSROOM/TRAINING SPACES. THE AUDITORIUM'S STADIUM SEATING DESCENDS FROM THE B2 TO THE B3 LEVELS, REFLECTING THE TIERS OPENING TO THE BUILDINGS CENTER. THE AREA BEHIND THE AUDITORIUM PROVIDES THE PUBLIC WING'S MECHANICAL ROOM.

THE B2 LEVEL PROVIDES THE SOLE LINK BETWEEN THE BUILDING'S PUBLIC AND PRIVATE WINGS. THIS LEVEL ALSO HOUSES THE INSTITUTE'S RECEPTION, OFFICES, AND CONFERENCE ROOMS. THE B3 LEVEL PROVIDES OPEN COLLABORATION/MULTI-PURPOSE SPACE.

ENNISKILLEN BOMBING

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- PERPETRATED ON REMEMBRANCE DAY, WHEN ENGLAND HONORS THOSE KILLED IN WWI & WWII

- OFTEN SEEN AS A WATERSHED EVENT IN THE LOSS OF PUBLIC SYMPATHY FOR THE IRA

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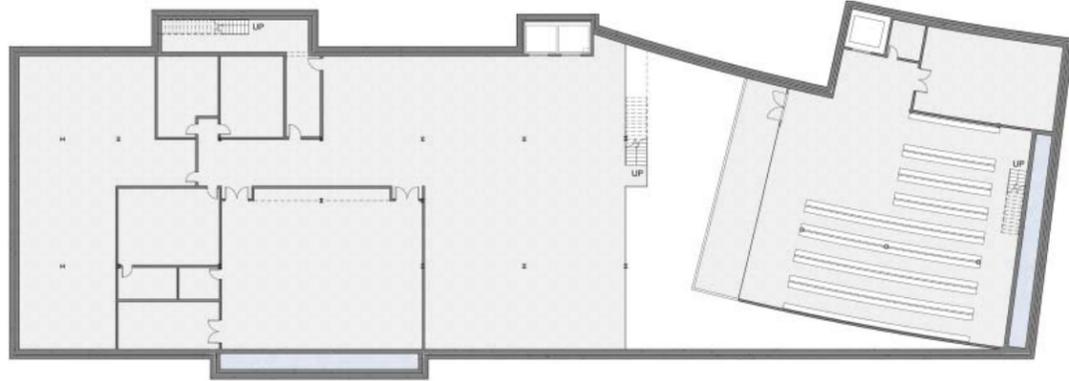
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BOMBING
11 KILLED
63 INJURED

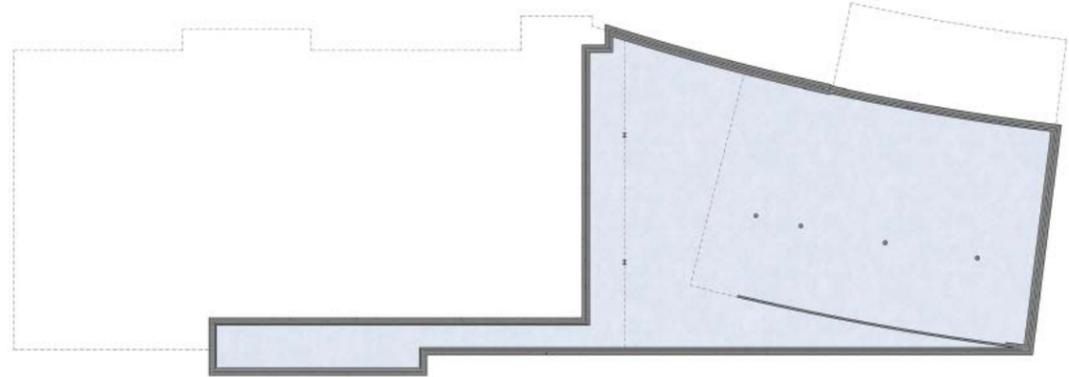




B4 LEVEL
GRADE - 3.5



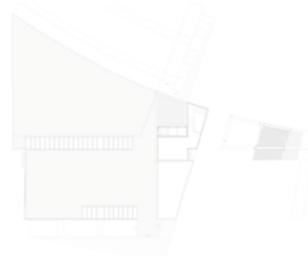
POOL LEVEL
GRADE - 4.5



UPPER ROOF
GRADE + 1.5



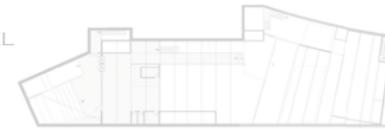
PLATFORM LEVEL
GRADE + 1



GROUND LEVEL
GRADE



PROMENADE LEVEL
GRADE - 0.5



B2 LEVEL
GRADE - 1.5



B3 LEVEL
GRADE - 2.5



B4 LEVEL
GRADE - 3.5



POOL LEVEL
GRADE - 4.5



ON THE PUBLIC WING THE CLASS/ TRAINING ROOM AND DOUBLE HEIGHT CONFERENCE CENTER ARE ACCESSED ON THE B4 LEVEL, WITH UTILITY/STORAGE OCCUPYING THE REMAINING AREA UNDER THE AUDITORIUM. AS WITH THE UPPER LEVELS, THE TIER SPACE IS GIVEN TO EXHIBITION SPACE.

THE B4 LEVEL IN THE PRIVATE WING HOUSES THE INSTITUTE'S LIBRARY, ARCHIVES, AND RESEARCH SPACES. IT IS ENVISIONED THE INSTITUTE WOULD EMPLOY A MIX OF FULL TIME EMPLOYEES AND OFFER FELLOWSHIPS/GRANTS FOR PROMINENT RESEARCHERS, WHOSE PUBLISHED WORK WOULD THEN BE HOUSED IN THE LIBRARY AND ARCHIVES.

THE POOL LEVEL SERVES AS AN AESTHETIC ELEMENT FOR THE BUILDING'S ATRIUM AS WELL AS FIRE SUPPRESSION RESERVOIR TANK AND CATCHMENT FROM THE SKYLIGHT RESERVOIRS AND COULD BE PARTITIONED AS SUPPLEMENTAL STORAGE TANKS FOR HOT WATER, RAIN WATER CATCHMENT, OR SITE IRRIGATION.

PAN AM FLIGHT 103 BOMBING

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- BOMBING OF PAN AM FLIGHT 103 FROM LONDON TO NEW YORK KILLING EVERYONE ON BOARD AND 11 PEOPLE ON THE GROUND IN LOCKERBIE
- BELIEVED TO HAVE BEEN A REVENGE ATTACK ON THE WEST, SANCTIONED BY HEADS OF SEVERAL ARAB NATIONS, IRAN & LIBYA SPECIFICALLY
- EXPLOSION OF DEBRIS REGISTERED A 1.6 ON THE RICHTER SCALE

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1
9
8
8

BOMBING
270 KILLED



SECTIONALLY EACH TIER OPENS UP TO THE CENTRAL ATRIUM WITH PROGRAMMATIC ELEMENTS CONTAINED IN THE AREA BELOW EACH TIER. THE OPEN SPACES ARE EASILY UNDERSTOOD AS PUBLIC, THE ENCLOSED DOUBLE-HEIGHT SPACES AS SEMI-PRIVATE, AND OTHER ENCLOSED AREAS ENTIRELY PRIVATE.



WORLD TRADE CENTER BOMBING

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- TRUCK BOMBING AND CYANIDE GAS ATTACK ON THE NORTH TOWER OF NEW YORK'S WORLD TRADE CENTER
- PERPETRATED TO DEMAND AN END TO US DIPLOMATIC RELATIONS WITH ISRAEL
- THE ATTACK INTENDED TO COLLAPSE THE NORTH TOWER INTO THE SOUTH TOWER & POISON THE AIR, HOWEVER THE BUILDING REMAINED STANDING AND THE POISON BURNED IN THE EXPLOSION.
- IMPROVEMENTS TO THE BUILDING DRAWN FROM LESSONS OF THIS ATTACK ARE CREDITED WITH SAVING HUNDREDS OF LIVES

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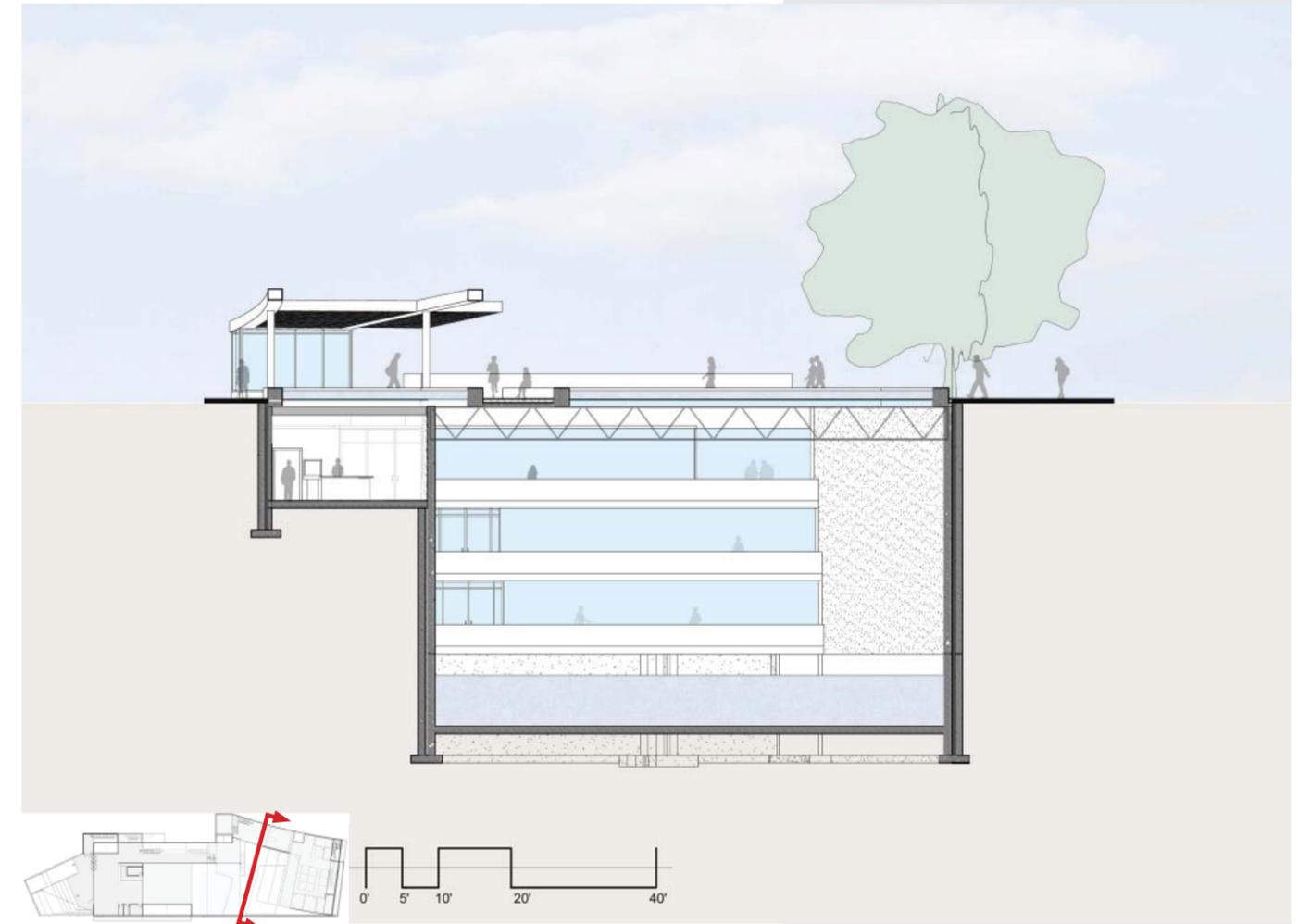
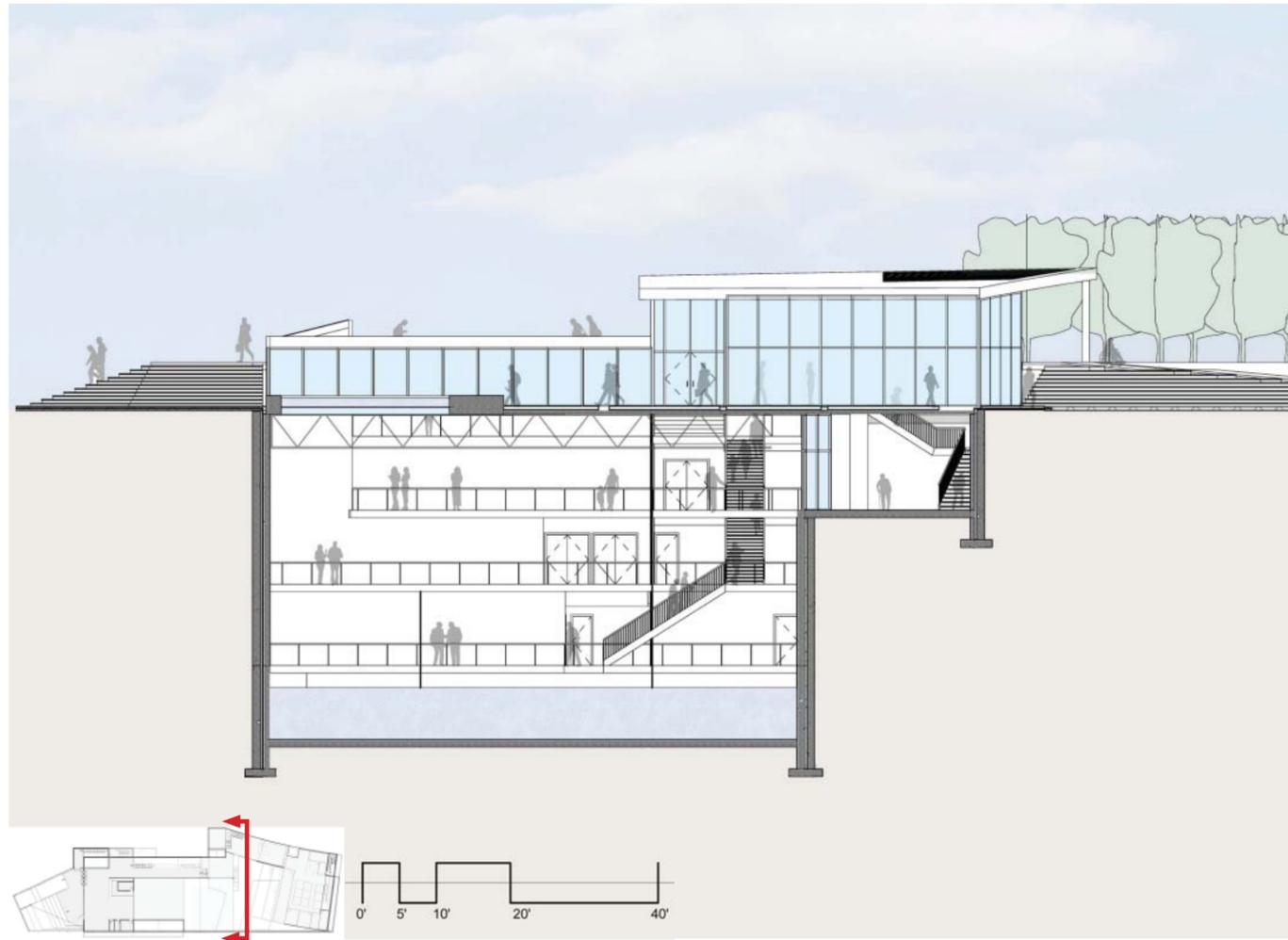
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9
11
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BOMBING
6 KILLED
HUNDREDS INJURED



WHILE CLEARLY RELATED THE ORGANIZATION OF THE BUILDING'S TWO WINGS REVEAL SLIGHT DIFFERENCES EMPHASIZING THEIR RESPECTIVE PUBLIC OR PRIVATE CHARACTER. THESE CAN BE SEEN IN THE DETAILING OF THE RAILING (VISUALLY OPEN/SOLID), INTERACTION WITH THE GROUND PLANE, AND RELATIVE CLOSURE OF THE TIER SPACES.



ASSASSINATION OF JUVENAL HABYARIMANA/GENOCIDE IN RWANDA

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- MISSILE ATTACK ON RWANDAN PRESIDENTIAL PLANE KILLED 12
- PERPETRATORS REMAIN UNKNOWN
- THE RESPONSE FROM THE GOVERNMENT AND HUTU MAJORITY WAS GENOCIDAL ACTION AGAINST THE COUNTRY'S MINORITY TUTSI'S
- WITHIN 13 WEEKS AT LEAST 500,000 & PERHAPS OVER 1,000,000 WERE KILLED

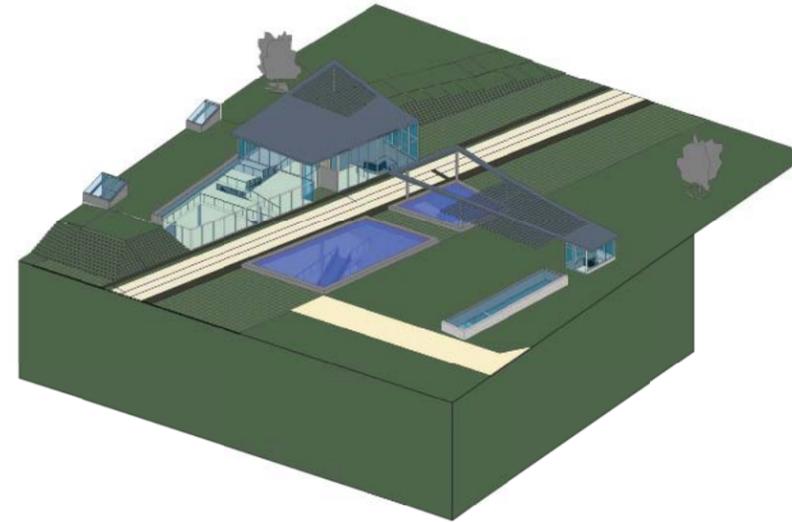
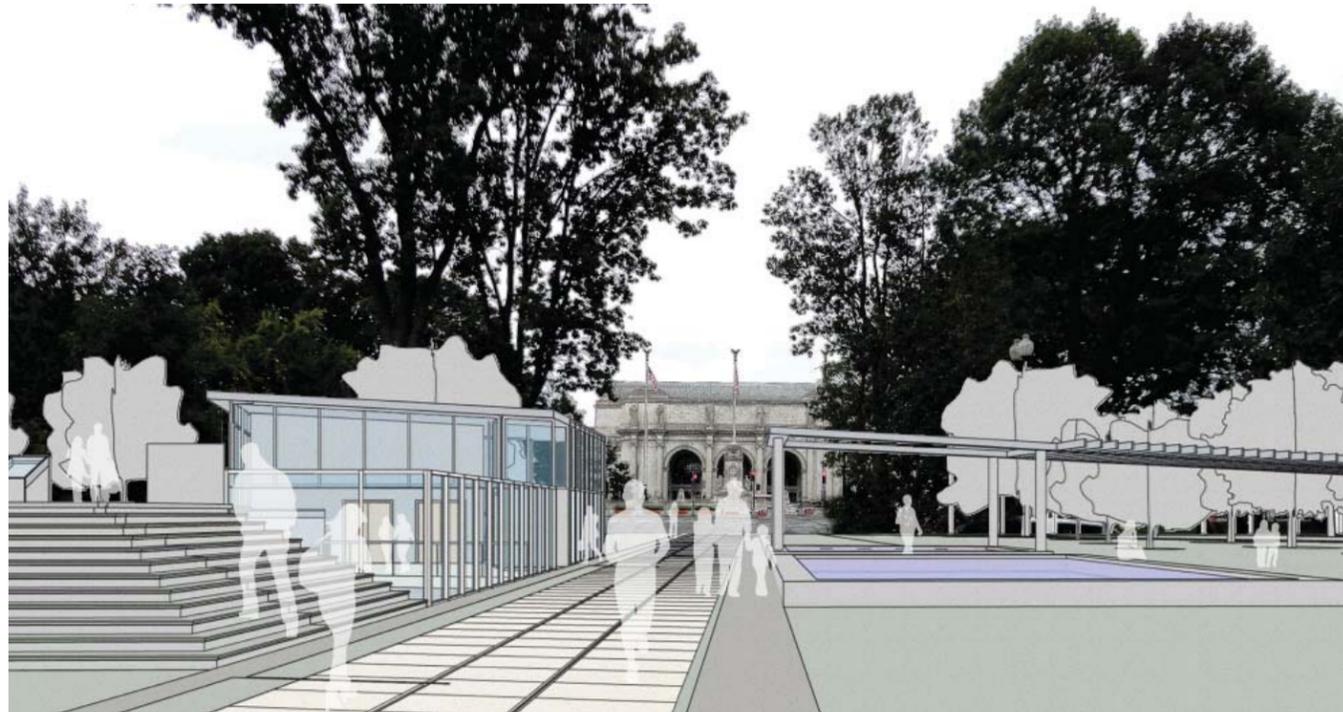
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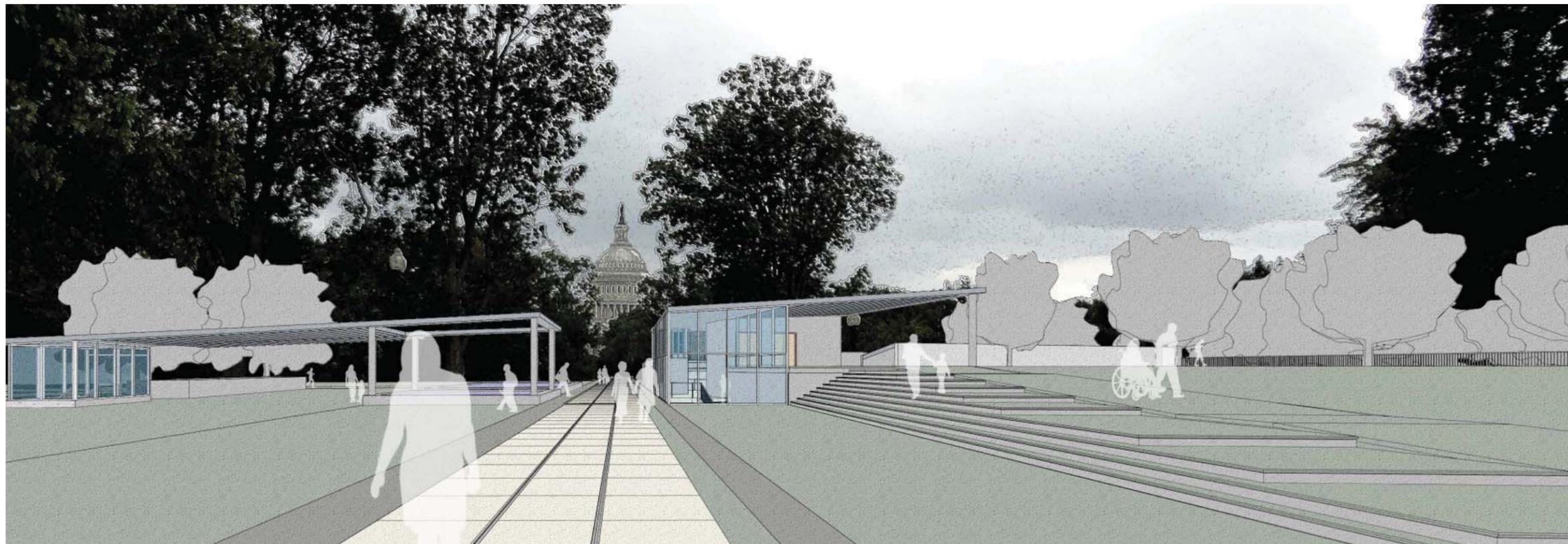
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GENOCIDAL CAMPAIGN
AT LEAST 500,000 KILLED





THE BUILDING'S FORM OPENS UP ALONG THE AXIAL CONNECTION BETWEEN UNION STATION AND THE CAPITOL, IN DEFERENCE TO THESE LANDMARKS. THE BLAST WALK SERVES AS AN ITEM OF INTEREST FOR TOURISTS AND JOGGERS; PROVIDING A CONNECTION TO THESE INSTITUTIONS THAT CELEBRATES RATHER THAN DETRACTS FROM THEIR PROMINENCE. THE GRADE LEVEL FEATURES OF THE BUILDING WERE DESIGNED TO EVOKE GARDEN PAVILIONS. THESE ELEMENTS PROVIDE VIEWING PLATFORMS, PLACES TO HOST FORMAL EVENTS, AND MOMENTS OF RETREAT IN BETWEEN. WITH INTENSIVE GREEN ROOF COVERING THE MAJORITY OF THE BUILDING THE BUILDING GROWS OUT THE LANDSCAPE. THE BUILDING PARTICIPATES IN THE LANDSCAPE BLENDING NATURAL AND BUILT COMPONENTS. GRADE CHANGES AND HILLS ARE BLENDED WITH, RAMPS, STAIRS, AMPHITHEATERS, AND PLATFORMS BLURRING THE LINE BETWEEN BUILT AND NATURAL ENVIRONMENTS.



LUXOR MASSACRE

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- ASSAULT WITH GUNS & KNIVES ON TOURISTS SIGHT-SEEING AT QUEEN HATSHEPSUT'S TEMPLE
- PERPETRATED IN REACTION TO THE PERCEIVED WESTERNIZATION OF EGYPT
- THE TERRORISTS BRUTALLY KILLED AND MUTILATED THE VICITIMS BODIES
- SIGNIFICANTLY DAMAGED THE COUNTRY'S TOURISM INDUSTRY, TAKING YEARS TO RECOVER

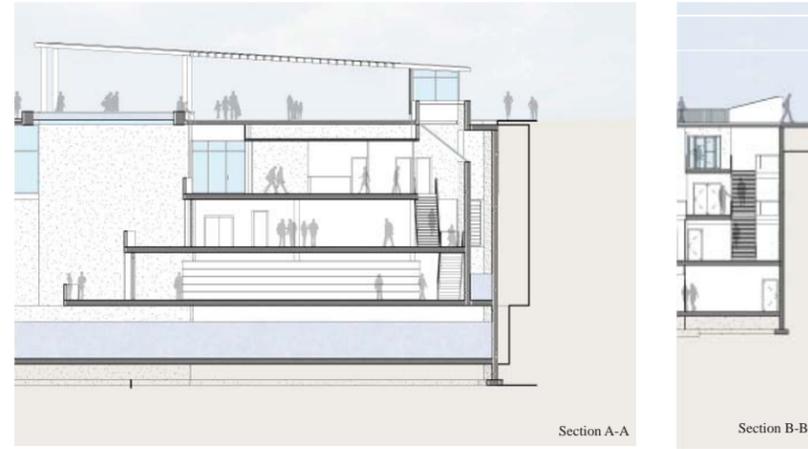
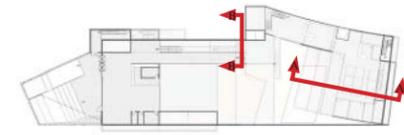
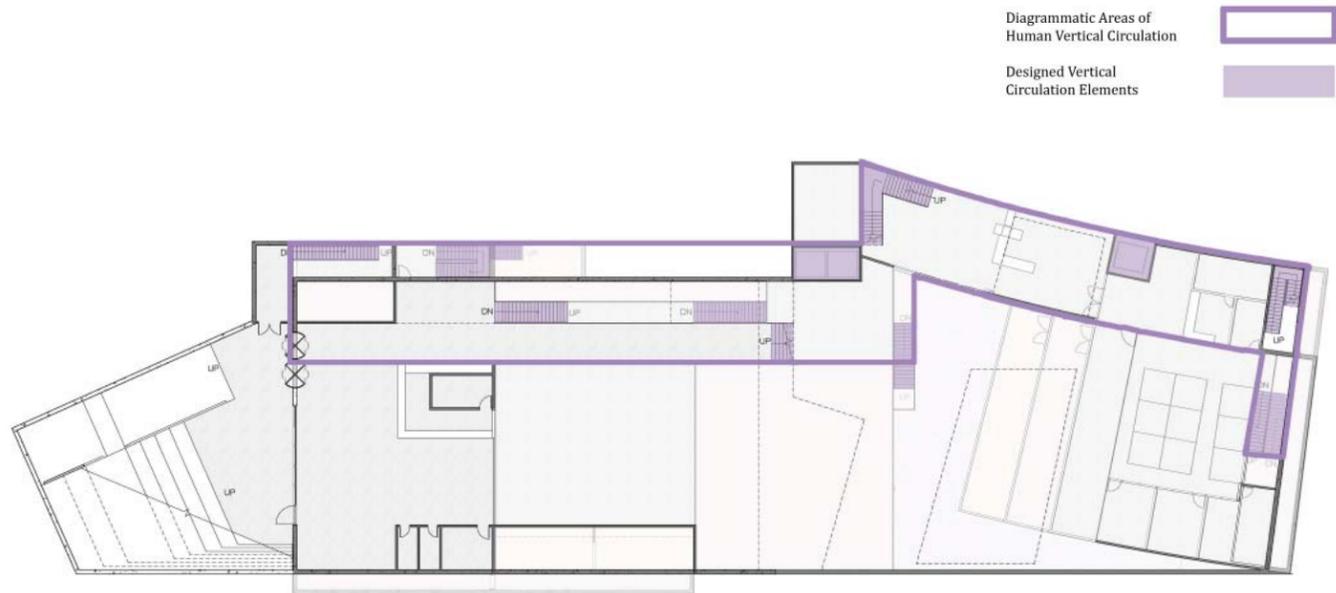
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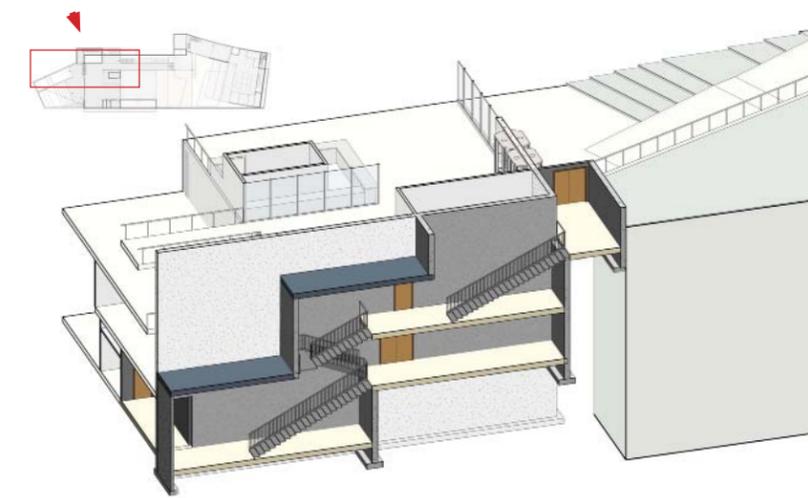
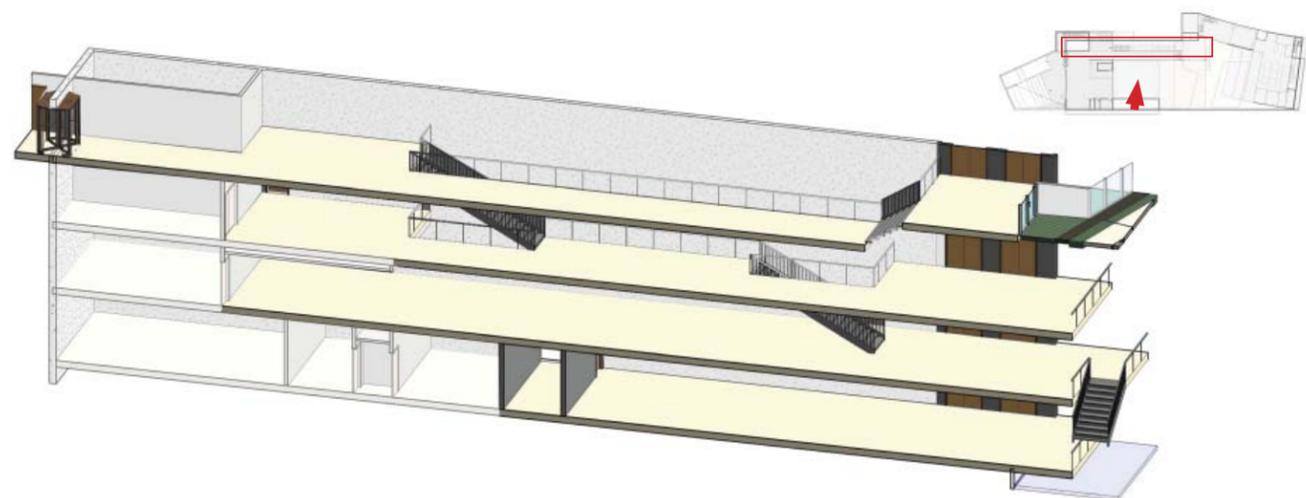
ARMED ASSAULT
56 KILLED





THE BUILDING CIRCULATION IS ORGANIZED ALONG THE NORTH AND EAST EDGES OF THE BUILDING FOOTPRINT. BY PROVIDING A SINGLE LOADED CIRCULATION SYSTEM, THE BUILDING FOOTPRINT CAN BE NARROWED WHILE MAINTAINING LARGE UNDIVIDED PROGRAMMATIC AREAS. THIS ALSO ENERGIZES THE SPACES DIRECTLY OFF THE CIRCULATION ROUTES MORE EFFECTIVELY BY KEEPING THE ATTENTION OF VISITORS UNDIVIDED. BUILDING USERS ARE CONSTANTLY ARRIVING AT NEW PROGRAMMATIC AREAS RATHER THAN PASSING BETWEEN THEM.

THE BUILDING'S MAIN ENTRANCE IS OFF THE BLAST WALK ON THE GROUND LEVEL AND SERVES BOTH WINGS OF THE BUILDING. FROM THE MAIN ENTRANCE PUBLIC VISITORS PROCEED STRAIGHT ACROSS THE PROMENADE WALK AFFORDING A VIEW OF THE TIERS DESCENDING BELOW AND CONNECTING TO THE GIFT SHOP. THE PROMENADE ALSO CONNECTS TO THE BUILDING'S SECONDARY ENTRANCE WHICH REORIENTS VISITORS TO THE FULCRUM CONNECTION FROM UNION STATION TO THE CAPITOL THROUGH UPPER SENATE PARK. CIRCULATION THROUGH THE WEST WING PROCESSES ALONG THE NORTHERN EDGE OF THE BUILDING DESCENDING AT THE EDGE OF EACH SUCCESSIVE PLATFORM LEVEL. CIRCULATION TO THE EAST WING DESCENDS TO THE B2 LEVEL AND CROSSES THE BRIDGE CONNECTION TO THE PRIVATE WING. BOTH WINGS ARE SERVED BY ELEVATORS PROVIDING HANDICAP ACCESSIBILITY AS WELL AS EMERGENCY EGRESS STAIRS.



9-11

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- 4 PLANE HIJACKINGS AND PILOTED CRASHES ALONG THE US EASTERN SEABOARD
- PERPETRATED IN RESPONSE TO US SUPPORT OF ISRAEL & PRESENCE OF US TROOPS ABROAD
- PLANES WERE CRASHED INTO THE PENTAGON, THE NORTH WORLD TRADE CENTER TOWER, THE SOUTH WTC TOWER, & A RURAL PENNSYLVANIA FIELD
- US RESPONSE INITIATED A GLOBAL WAR ON TERROR & TOPPLED AFGHANISTAN'S GOVERNMENT

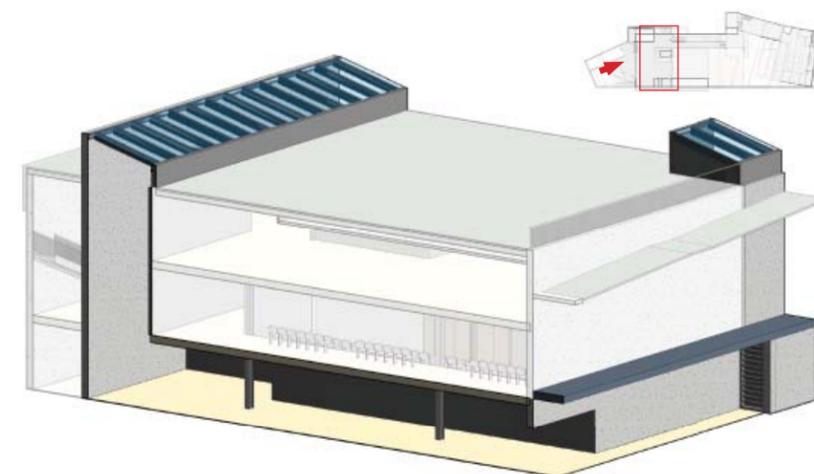
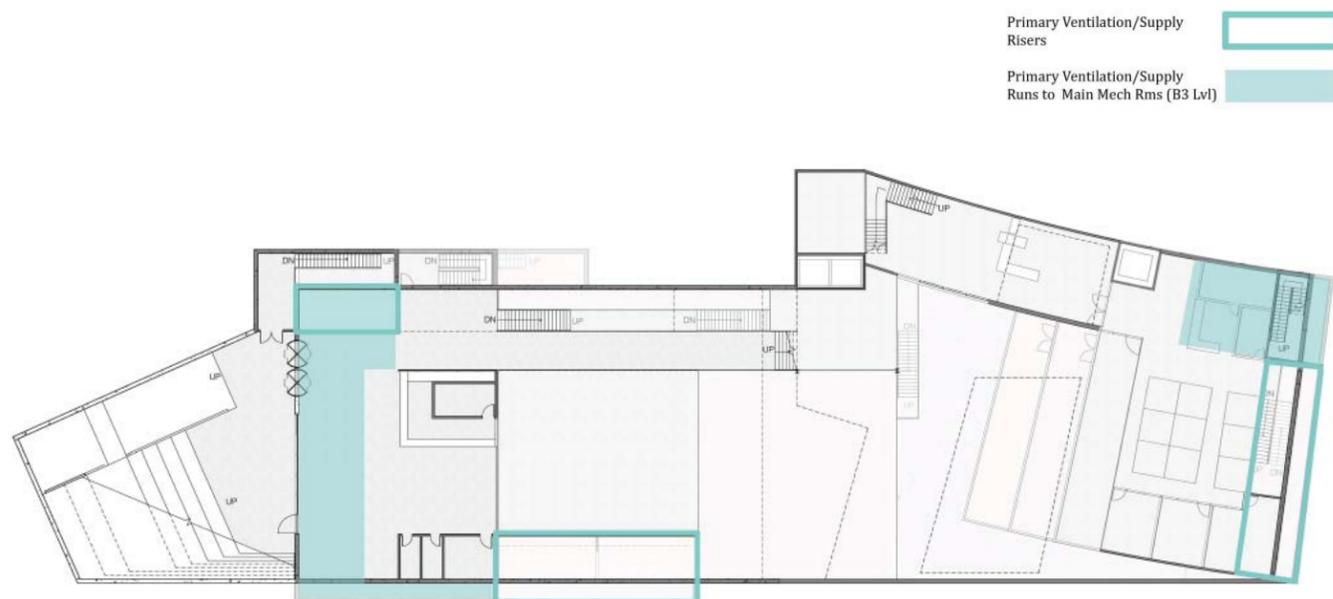
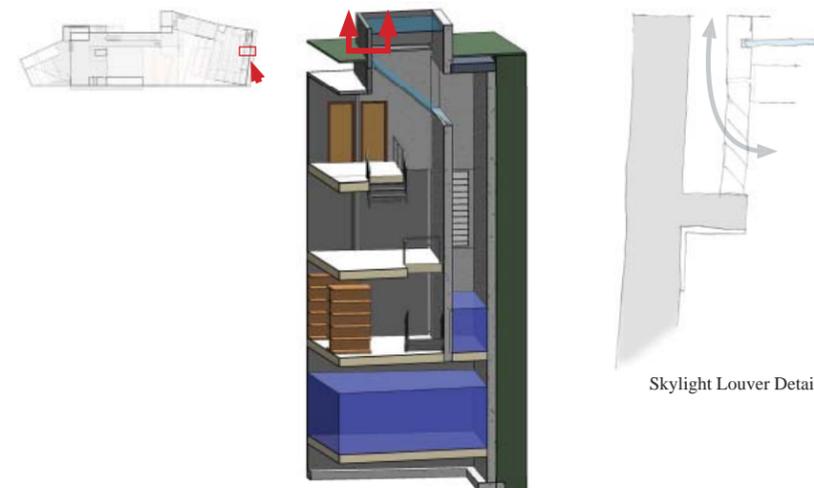
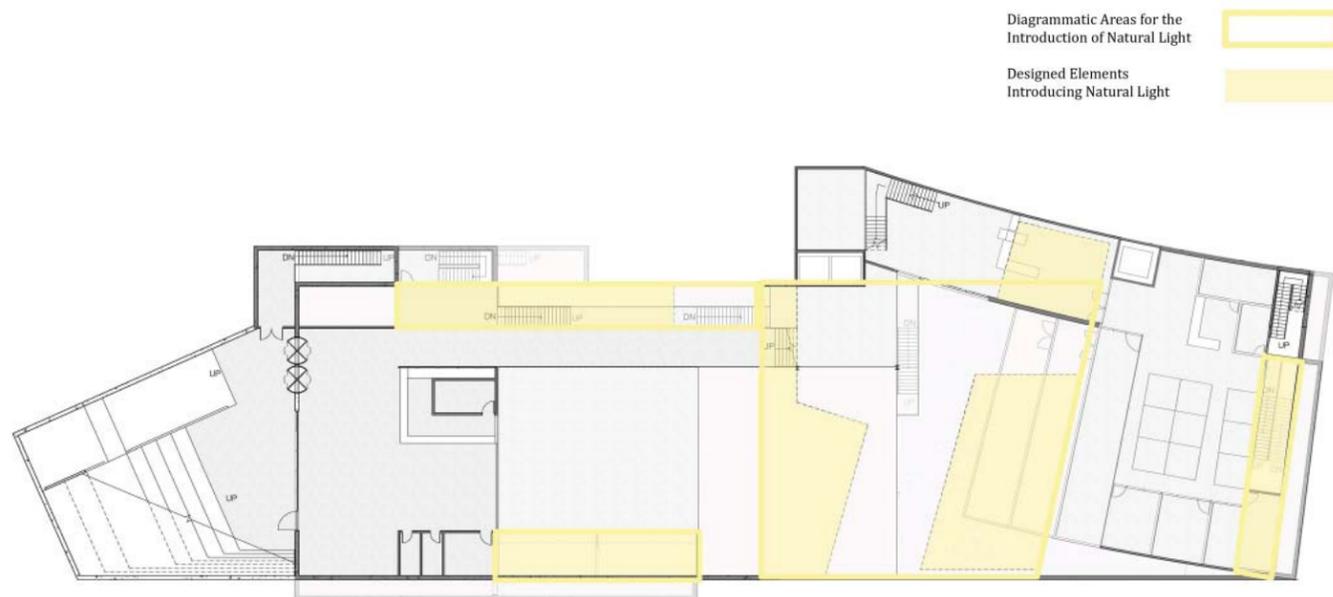
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JANUARY
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2001

PLANE HIJACKINGS
3,000 KILLED
6,000 INJURED





BUILDING BELOW GRADE INTRODUCES ADDITIONAL CHALLENGES IN INTRODUCING NATURAL LIGHT AND PROVIDING SUFFICIENT VENTILATION. THESE CHALLENGES COMPOUND AS THE BUILDING AREA BECOMES LESS SQUARE AND THE DEEPER THE BUILDING PENETRATES BELOW GRADE.

THE DESIGN SOUGHT TO MAXIMIZE THE EFFICIENCY OF SLAB PENETRATES BY ROUTING BUILDING CIRCULATION, NATURAL LIGHTING, AND VENTILATION TOGETHER AS MUCH AS POSSIBLE. THESE PAIRED OPENINGS WERE ORGANIZED ALONG THE NORTH AND EAST EDGES OF THE BUILDING FOOTPRINT. THIS ORIENTATION MAXIMIZES THE PENETRATION OF NATURAL LIGHT WASHING DOWN THE BUILDING THROUGH THE VERTICAL VOIDS REQUIRED FOR CIRCULATION.

ADDITIONAL SKYLIGHTS WERE PROVIDED IN THE CENTER OF THE BUILDING ABOVE SPACES THAT AREN'T FULLY ENCLOSED. THIS BRIGHTENS THE CENTRAL OPEN SPACE, LENDS THE BUILDING MORE OF A LIGHT AND OPEN FEELING, AND ALLOWS GREATER LIGHT PENETRATION THROUGHOUT THE BUILDING. AN ADDITIONAL ROW OF SKYLIGHTS WERE PROVIDED ALONG THE SOUTH EDGE OF THE BUILDING TO PROVIDE NATURAL LIGHT TO THE FULLY ENCLOSED CONFERENCE CENTER.

THE MECHANICAL SPACES WERE LOCATED TOWARDS THE BOTTOM AND BACKS OF THE TIERS, WHICH WOULD RECEIVE THE LEAST AMOUNT OF NATURAL LIGHT, YET STILL CAN HAVE LOUVERED ACCESS TO THE SKYLIGHTS AS OPEN AIR SHAFTS.

MOSCOW THEATER HOSTAGE CRISIS

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

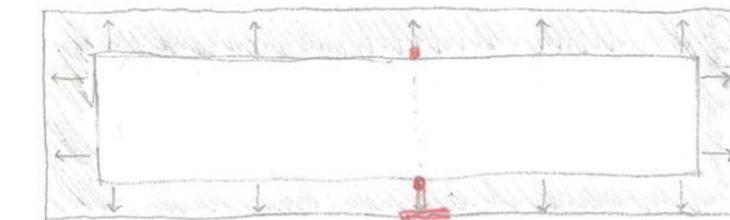
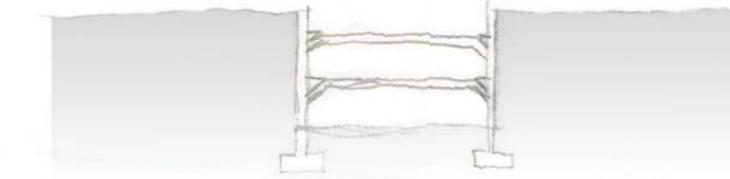
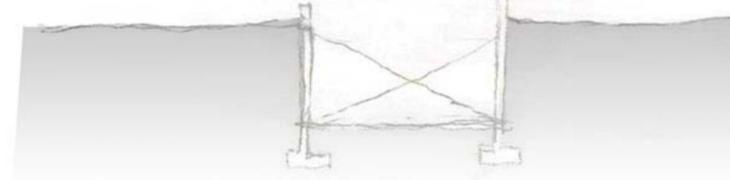
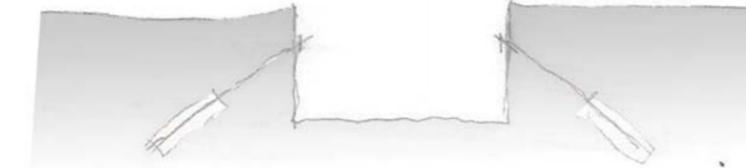
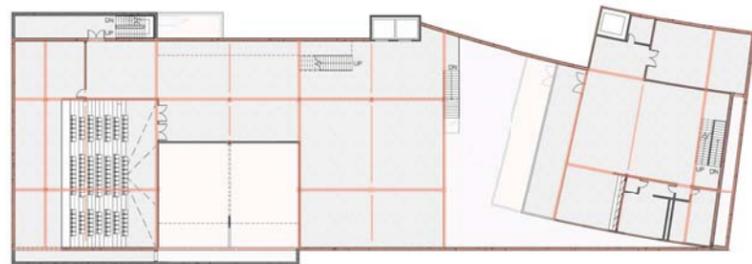
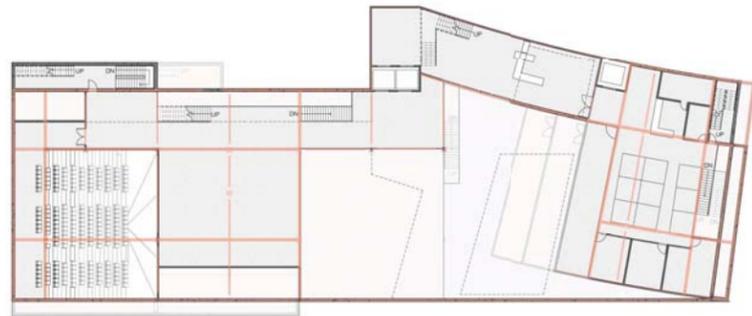
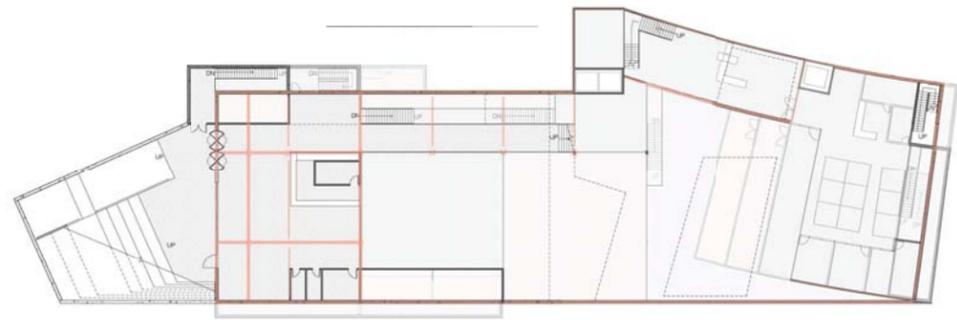
- HOSTAGE SITUATION USING MINES, SUICIDE VESTS, AND GUNS AT THE HOUSE OF CULTURE IN MOSCOW, LASTING FOR 3 DAYS
- PERPETRATED TO DEMAND THE WITHDRAWAL OF RUSSIAN TROOPS FROM CHECHNYA
- THE RESCUE ATTEMPTED TO USE AN ANESTHETIC GAS WHICH, WHILE IT HAD A LIMITED EFFECT DURING THE RESCUE, ACTUALLY KILLED 120 OF THE RESCUED HOSTAGES ITSELF.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

HOSTAGE SITUATION
122 KILLED
HUNDREDS INJURED
900 HOSTAGES TAKEN





THE STRUCTURAL SYSTEM OF THE BUILDING WAS DEVELOPED OBSERVING CONSTRUCTION TECHNIQUES FOR EXCAVATION IN URBAN CENTERS AROUND WASHINGTON DC. THE PREDOMINANT METHOD OBSERVED UTILIZED TIE-BACK EXCAVATION TECHNIQUES, WHICH MAXIMIZES AVAILABLE SPACE IN THE EXCAVATED AREA. THE STRUCTURAL DESIGN FOCUSED ON RESISTING THE LATERAL LOADS INTRODUCED BY BUILDING BELOW GRADE. STRUCTURAL REDUNDANCY WAS INTRODUCED IN THE RETAINING WALLS BY BOTH MAINTAINING THE TIE-BACK ANCHORS AS WELL AS USING THE BUILDING FLOORPLATES THEMSELVES AS CROSS BRACING BETWEEN THE EXTERIOR WALLS. THE COLUMNAR SUPPORTS, PARTICULARLY THOSE AROUND THE PERIMETER AID IN DISTRIBUTING THE LATERAL LOAD ALONG THE VERTICAL DEPTH OF THE BUILDING.

THE LATERAL LOADS ARE REDUCED BY THE INTRODUCTION OF A DOUBLE EXTERIOR WALL SYSTEM FOCUSED ON RELIEVING HYDROSTATIC PRESSURE. THE OUTER WALL IS NOT TREATED TO RESIST WATER PENETRATION AND ALLOWS THE WATER THROUGH TO THE VOID BETWEEN THE EXTERIOR WYTHES. THE PENETRATING WATER THEN CAN BE TREATED AND COLLECTED IN THE POOL AT THE BUILDING'S LOWEST LEVEL OR SLOPED TO DRAIN AWAY FROM THE BUILDING BACK INTO THE EARTH.

MADRID BOMBINGS

200 BC 0 AD 500 AD 1000 AD 1500 AD 2000 AD

- SERIES OF COORDINATED BACKPACK BOMBINGS OF THE MADRID TRAIN SYSTEM
- IT REMAINS UNCLEAR EXACTLY WHO PERPETRATED THE ATTACK OR TO WHAT END
- GOVERNMENT REACTION IMMEDIATELY BLAMING THE ATTACKS ON A DOMESTIC SEPARATIST GROUP RIGHT BEFORE NATIONAL ELECTIONS DESPITE EVIDENCE TO THE CONTRARY RESULTED IN THEIR SWEEPING ELECTORAL DEFEAT AND CHANGE OF THE RULING PARTY.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

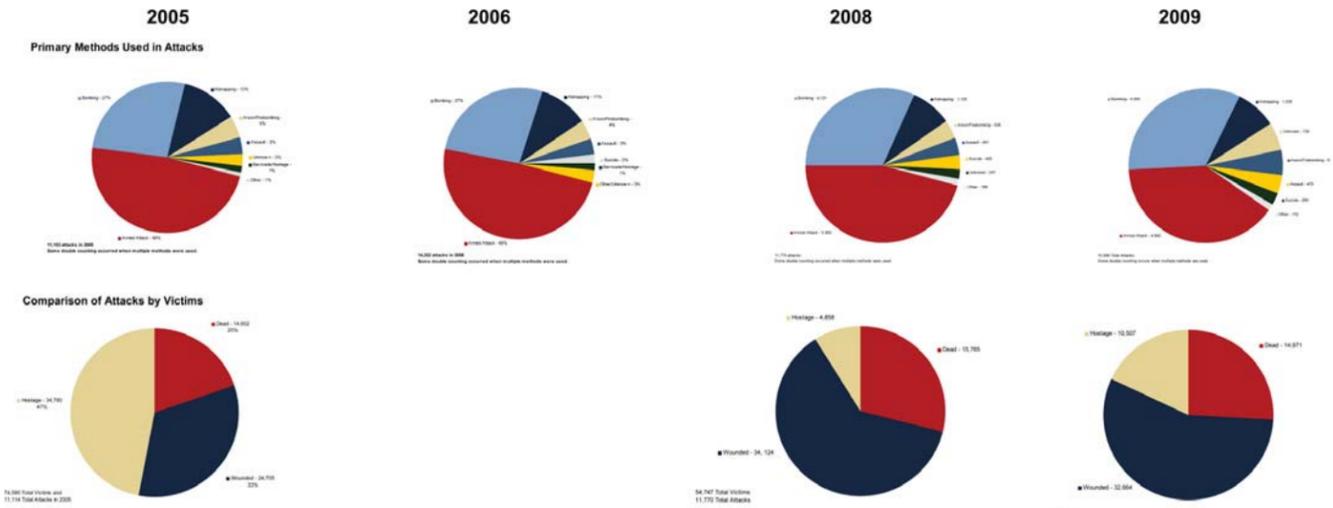
2004

BOMBING
192 KILLED
OVER 2,000 INJURED



APPENDIX: SELECTED PROCESS WORK

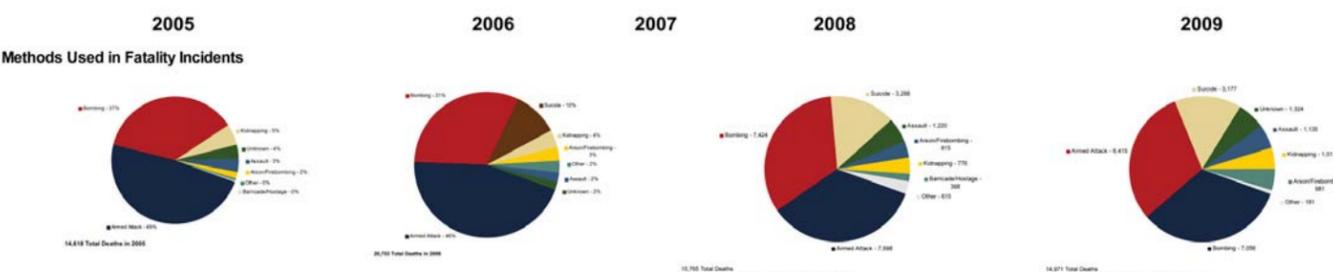
Attack Methods and Casualties



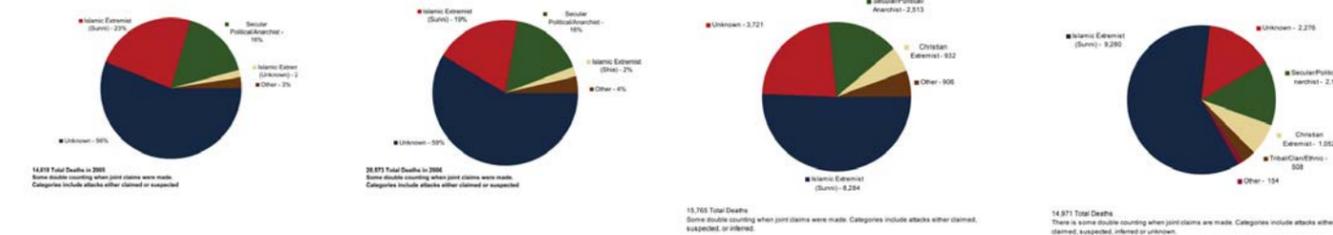
Mortality Rate of Attacks



Fatality Trends 2005-2009



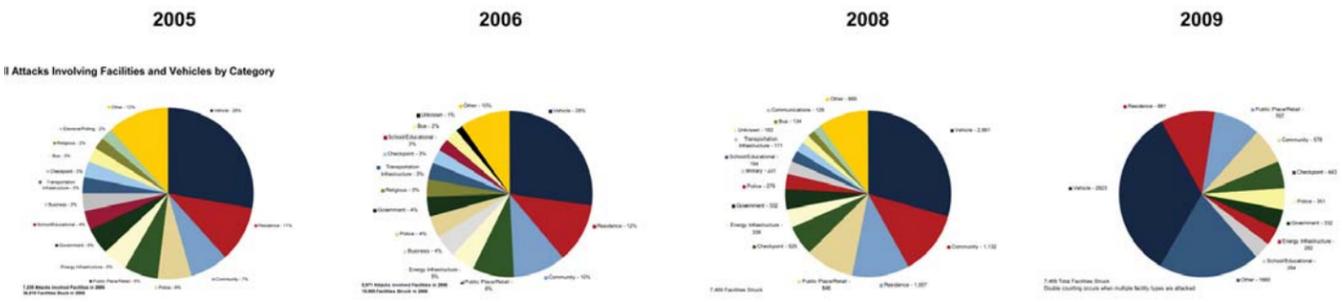
Fatalities by Perpetrator Category



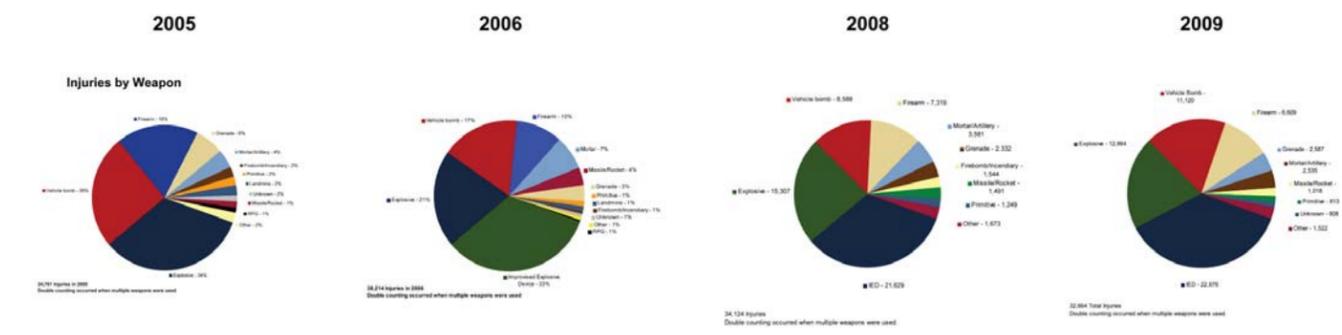
Fatalities by Victim Category



Targeted Building Facilities



Weapons Injuring Victims



US Fatalities



US Fatalities as a Share of Total Fatalities

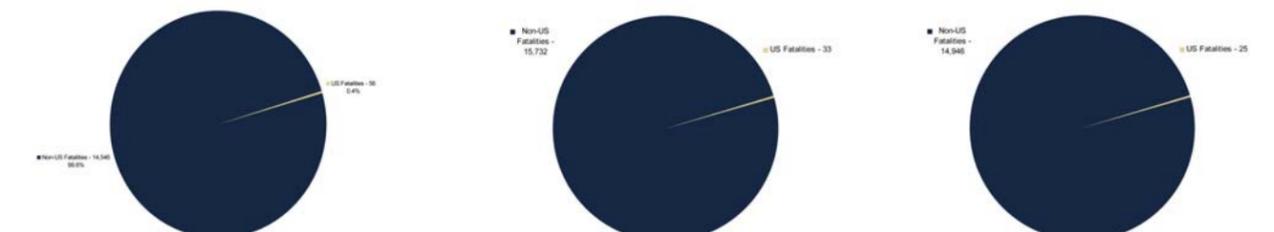
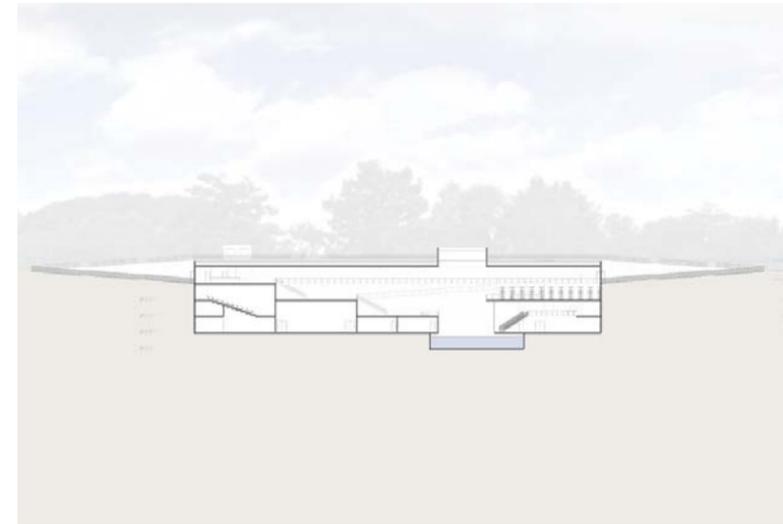
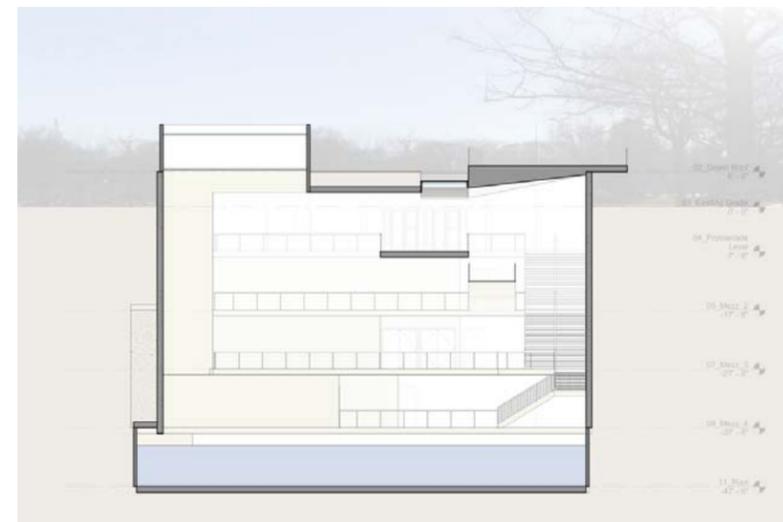
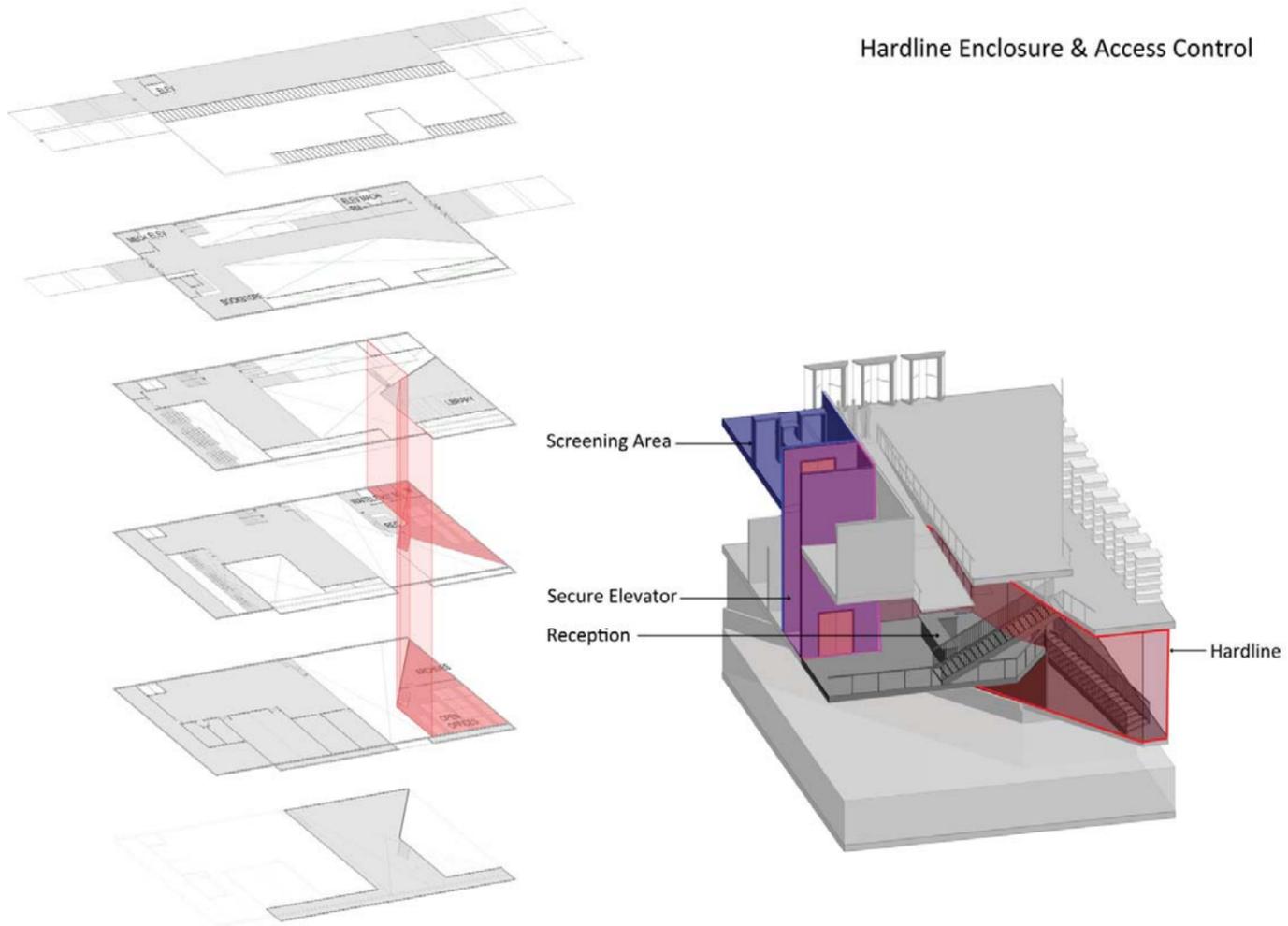
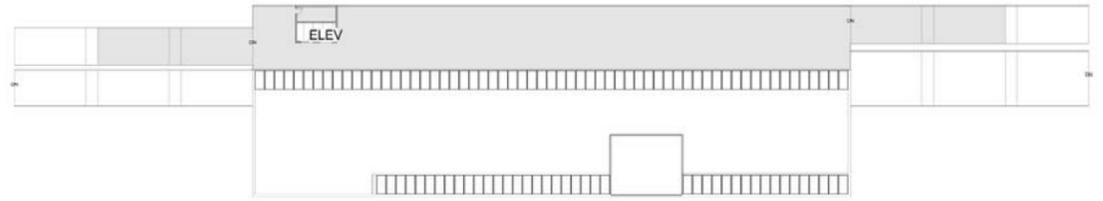


FIGURE 20: 2005-2009 TERRORISM ATTACKS (LEFT & RIGHT PAGES). <http://www.nctc.gov/reports/2005-2009>. PUBLIC DOMAIN IMAGES.

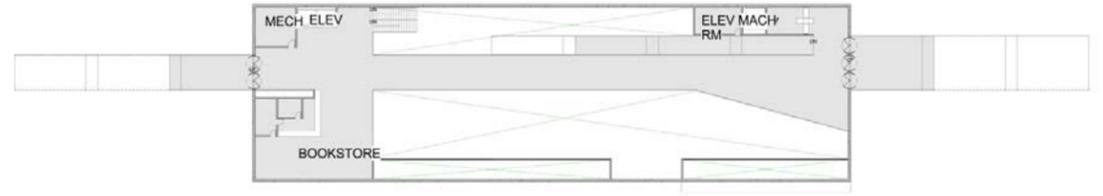


Hardline Enclosure & Access Control

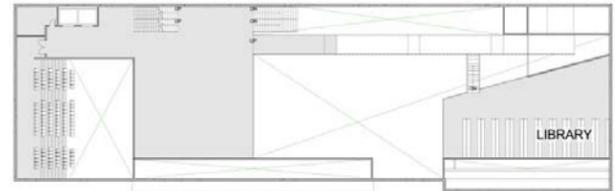




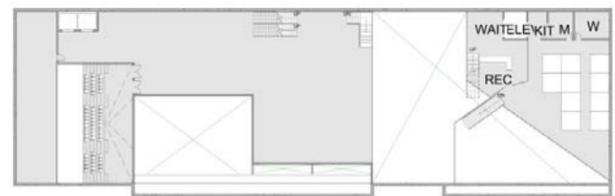
GREEN ROOF



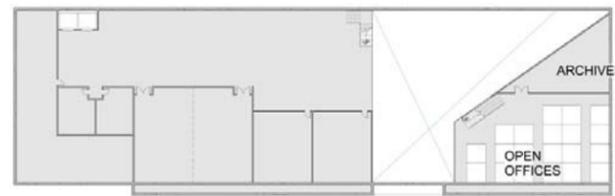
PROMENADE LEVEL



B2 LEVEL



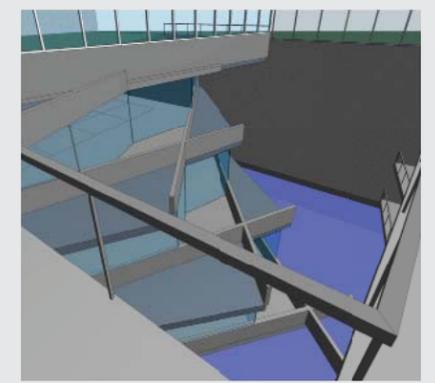
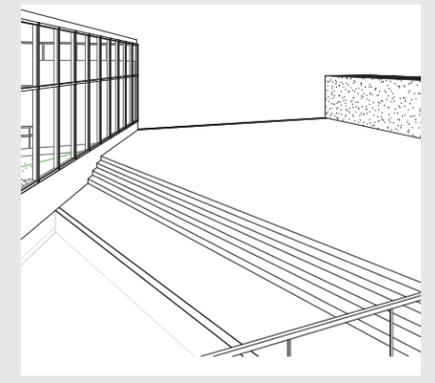
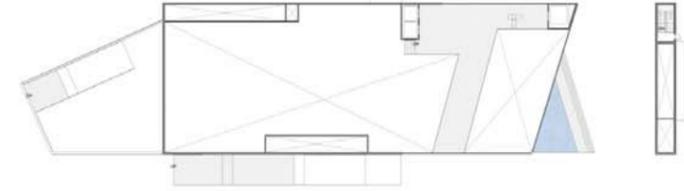
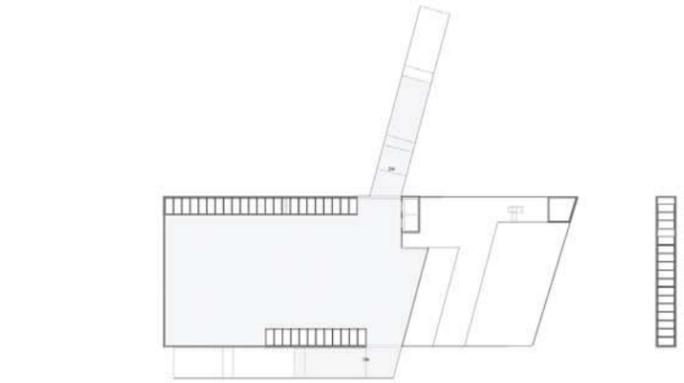
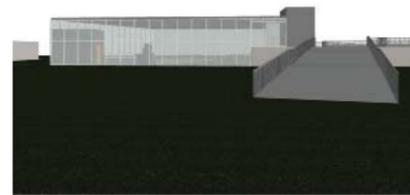
B3 LEVEL

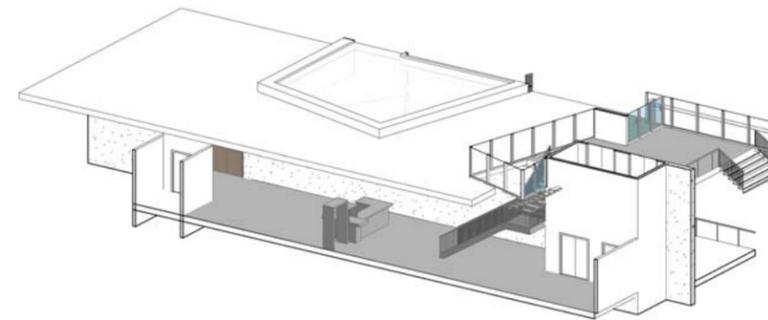
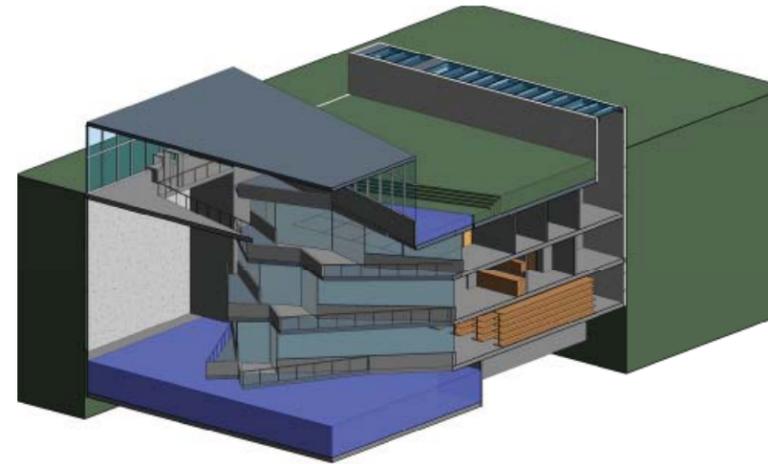
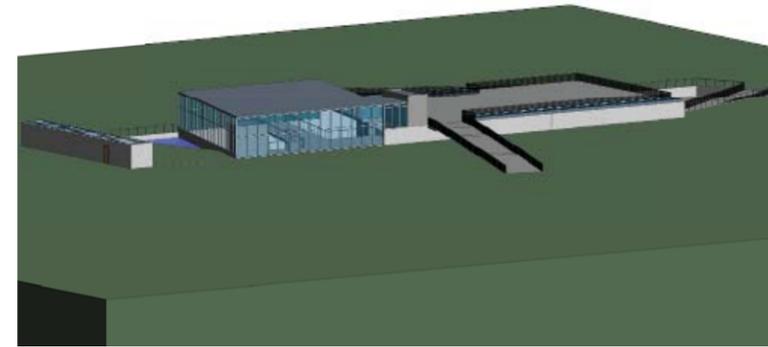
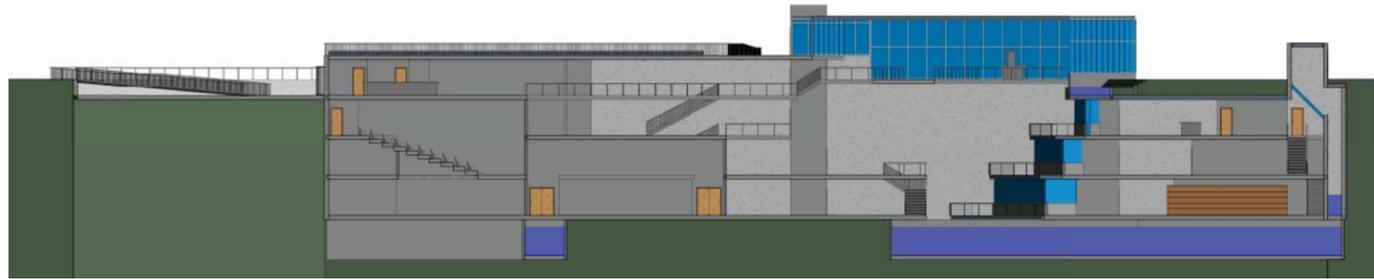


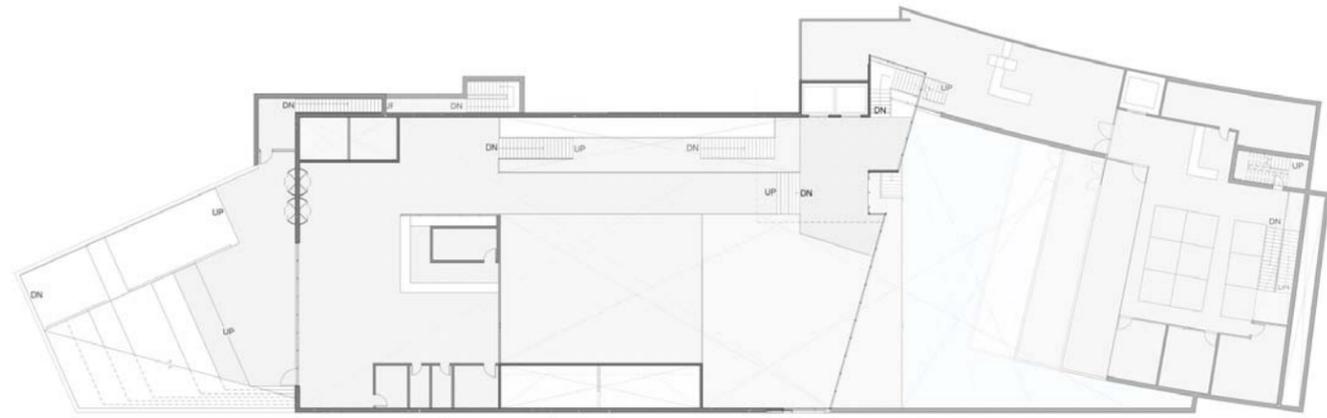
B4 LEVEL



FOUNTAIN LEVEL
77







FULL SIZE INSTALLATION BUILT FOR THE THESIS DEFENSE OF A "BLAST WALK" REPRESENTING THE EFFECTS OF A SUITCASE BOMBING

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FIGURE 2: Michelangelo Buonarroti's Florentian Fortifications

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FIGURE 3: Great Wall of China

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FIGURE 8: Inspirational image of the Puente Atirantado Bridge in Monterrey Mexico

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FIGURE 10: Shows disjointed vertical elements

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DCOZ. *District of Columbia Zoning Map, "Report of Square 0681"*. Retrieved ~November 22, 2010 from,

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FIGURE 15: District of Columbia topographic map, Lower Senate Park

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FIGURE 17: Deflagration Pressure Chart

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National Counterterrorism Center. Retrieved ~December 2010 from,

[http://www.nctc.gov/Reports 2005-2009](http://www.nctc.gov/Reports%202005-2009)

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