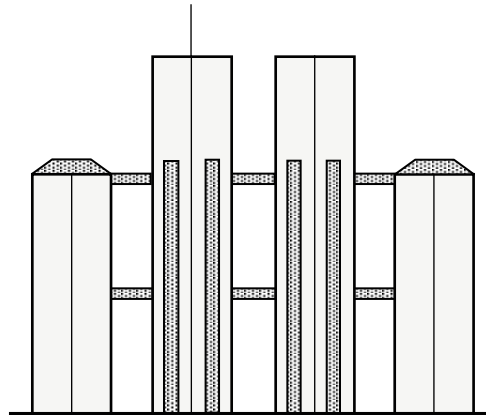


Preliminary Proposal for Rebuilding the NYC Site of the

World Trade Center

Concepts and Designs for Infrastructure and Memorials Applicable to Rebuilding at the New York WTC Site

Revision X2



Proposed (via reference that may be made to document URL)
to WTC-cognizant officials of New York and New Jersey, and to the
Lower Manhattan Development Corporation et al

by
Jeffrey R. Charles

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Introduction and Scope

- The author is not associated with an architectural firm, so this material has not been generated to solicit a prime contract to redevelop the N.Y. WTC site. The author desires to make the material available so it can be considered by those working on WTC site redevelopment. This material (by itself or in combination with other concepts) is applicable to the WTC site and possibly other sites. The author may be able to (if requested) provide additional input about WTC site redevelopment.
- Most of the concepts and designs herein were developed in the summer of 2002, but have not been detailed until now because the author was not previously aware of where to provide material for consideration by organizations that control development of the WTC site.
- The author is not aware of specifics about previous solicitation for WTC site designs and has had little exposure to other proposed designs until he saw a few proposals in news media in late December 2003. Many of the new proposals did not seem as practical or attractive (at least to the author) as the concepts and designs proposed herein (though some did have similar amenities such as indoor gardens on higher floors), so this material is being published to facilitate visibility.
- This document does not present detailed designs, but it does address a few construction details.
- This document does not address specifics about the distribution of developed resources for office and retail space, etc. It also does not address many specifics about commercial viability or local impact, due to the author's lack of first hand information about dynamics of the area.
- The author has not seen much emphasis on resistance to attack in regard to new development at the WTC site. This must be considered, and is accounted for (at least conceptually) in this document. However, security matters of a sensitive nature have been deliberately left out of this publication.
- Safety and security features herein have not been verified by test or analysis. Resources such as original WTC construction details and quality uncut video of (and prior to) collapse of the original WTC would be useful for further analysis and may lead to refinement of safety features herein.
- This document does not operate to transfer any form of intellectual property to or from any party. All rights are reserved for intellectual property herein, whether or not copyrightable or patentable.
- Some versions of this document may include a few photos and drawings of the original WTC (as indicated in the Bibliography) that are the work of other authors. Any limited part of this document that may consist of such items is considered a collective work.

High Level Issues and Concerns Specific to the N.Y.C WTC Site

- **Visibility and History**
 - Owing to the previous national landmarks at the WTC site and the site's prominence in recent history, it is fitting that the site would again be home to a landmark. Concepts herein provide landmark structures that may become even more well known than the original NYC WTC. High rise gardens occupy open areas at least two floors high around perimeter of upper floors and are overlooked by a mezzanine around the core.
- **Memorial**
 - Major elements of a fitting memorial to the 11 September 2001 attack on the U.S. and WTC should be accessible to the public at all times. The present concepts provide memorials in up to 3 locations: One on the ground and one or two in the new buildings. Each inside memorial floor could correspond to the floor that took the brunt of the 11 September attacks. For some visitors, memorials at the very site of the aircraft collisions (in all 3 dimensions, if new towers are near the footprints of previous WTC towers 1 and 2) would be a very significant memorial. One core wall on each memorial floor would have horizontal lines to denote floors of the former WTC towers, with names of victims inscribed on rows that represent the floors they were probably on during the morning of 11 September. The rows for top floors will obviously have more names.
- **Commercial Viability and Local Impact**
 - The WTC site development should fulfill local needs for office space, shopping, parking, transportation, antenna support, etc., with an eye toward correcting any shortcomings the former site may have had. The rebuilt site should be compatible with legitimate interests of neighboring organizations. This proposal does not address specifics about these issues, due to a lack of first hand information about dynamics of the area.
- **Safety and Security**
 - With the original WTC having been the subject of two terrorist attacks (one of which resulted in substantial loss of life and total destruction of the major structures), any new development of high profile on the same site may be at more than the average risk of being a target of future terrorist attacks, including those of the magnitude conducted on 11 September 2001. Major elements of this proposal are based on the assumption that any new structure of high profile constructed on the WTC site should be designed to have substantially more than the usual resistance to terrorist attack. These safety considerations place limits on the types of structures that should be considered. Structures proposed herein are based on consideration of these issues. While not visible in the illustrations, issues considered for include resistance to non-nuclear bomb attacks, air or ground collisions with related fires, and durable, redundant provision for fast evacuation. There is controversy as to whether major U.S. structures will be subjected attacks of substantial magnitude again, but the approach of this proposal is to err on the side of caution in regard to safety and security.

WTC Site Designs (of those conceived by J. Charles) Arrived at After Evaluating Commercial and Engineering Issues – Part 1: Visibility and History

- Owing to the previous existence of a national landmark at the WTC site and the site's prominence in recent history, it is fitting that the site would again be home to a national landmark.
- Concepts herein provide landmark structures that may become as well known as the original NYC WTC. Primary concepts have external structure, are not “glass boxes”.
- One of the concepts includes twin 121 floor towers that rise to a height of 1,507 feet – more than 50 feet higher than the Sears Tower in Chicago and 24 feet higher than the 1483 foot Petronas Twin Towers in Kuala Lumpur.
- The most aesthetic designs proposed herein includes three or four towers of similar external design but of two different heights, the largest embodiment having two towers with 121 floors above grade and one or two shorter 82 floor structures. (A smaller proposed embodiment has two 94 floor structures with two shorter 65 floor buildings.) Major structures in most embodiments have a substantially diagonal orientation with each other. Top floors of the shorter tower(s) have indoor gardens or arboretums surrounding (or above) the core structure. Gardens in taller towers may occupy the same level (or top) through a two-floor high open area around the core.
- Walkways connect the three or four tallest buildings at several levels, providing both efficiency and the safety of numerous escape routes. Walkways on about floor 81 connect two floor high gardens or arboretums on top floors of the shorter structures to gardens and / or memorials and observation areas on the same level of the taller structures. This interconnection between structures on a common floor level could comprise the largest continuous high rise floor level of any structures ever made.
- If the former site of WTC building 7 will not support a large tower, the number of similarly designed towers (if the towers are large) should typically be reduced to 3.

WTC Site Designs (of those conceived by J. Charles) Arrived at After Evaluating Commercial, Engineering, and Memorial Issues – Part 2: Memorial

- Major elements of a fitting memorial to the 11 September 2001 attack on the U.S. and WTC should be accessible to the public without cost at all times.
- The present concept provides memorials in 3 locations: One on the ground and two in the new buildings.
- The ground level memorial could be similar to the plaza of the original WTC, but it should have a permanent area where people can leave mementos.
- Memorials in each of the two tallest buildings occupy up to one entire floor.
 - Each memorial floor could be on the garden level (the top floor of the lower towers or the equivalent floor level of the lower towers) or correspond to the floor in each taller tower that took the brunt of the 11 September 2001 attacks. For some visitors, memorials at the very site of the aircraft collisions (in all three dimensions, if new towers are on or near footprints of the previous WTC towers 1 and 2, as in some designs) would be a very significant memorial.
 - One or two dedicated express elevators could go to memorial floors, partly to simplify some aspects of security screening. (Or one floor could serve as common memorial for both towers.)
- In designs having three or four towers with arboretums or gardens on about floor 81, the memorials could (as mentioned above) be incorporated into the garden floor(s).
 - External building structure could have a local transition (much like that at ground level on the original WTC) to facilitate relatively wide windows for gardens or memorials on higher floors.
- One core wall on each memorial floor would have figure of corresponding original WTC tower, with horizontal lines beside it to denote floors of the former WTC tower, with names of the 11 September victims inscribed on rows that represent the floors they were probably on during the morning of the attack. The rows corresponding to the upper floors of the former WTC will obviously have more names, and the names of passengers on each of the flights that struck the original WTC towers should obviously be included. The names of 1993 attack victims could also be included.

WTC Site Designs (of those conceived by J. Charles) Arrived at After Evaluating Commercial and Engineering Issues – Part 3: Commercial Viability and Local Impact

- The WTC site development should fulfill local needs for office space, shopping, parking, transportation, antenna support, etc., while also correcting any major shortcomings the former WTC may have had.
- Orienting tower structures substantially diagonal to each other provides a more open feeling for both tenants inside and those in neighboring areas outside the WTC site.
- The redeveloped site should be compatible with legitimate interests of neighboring organizations.
- Space between tall buildings should be adequate to permit at least some direct winter sunlight to reach areas immediately north of the WTC site.
- More than two high rise structures will help offset the loss of any ground space that is dedicated to memorials.

WTC Site Designs (of those conceived by J. Charles) Arrived at After Evaluating Commercial and Engineering Issues – Part 4: Security, slide 1

- With the original New York WTC having been the subject of two major terrorist attacks (one of which resulted in substantial loss of life and total destruction of the structures), any new structure of high profile should be designed with formidable resistance to attack in mind.
 - This is of paramount importance for both safety and commercial viability, since, if the new WTC were to be destroyed in an attack, it is unlikely there would be support for rebuilding landmark structures on the site a third time. Resistance to attack is essential. It is assumed herein that a high profile WTC site could become a target of even another 9/11 type attack.
- New structures of high profile must be capable of standing at least 6 hours after sustaining damage from a worst case but conceivable non-nuclear attack, with the goal of permanently preventing any form of total collapse.
 - In this document, it is assumed that a “worst case” non-military air attack would involve high speed collision and blast damage that severs external vertical support members on mid level floors at one corner and throughout one entire side of the structure, plus damage to some internal structure, plus effects of several consecutive hours of building content and fuel fires.
 - Major structures must be capable of standing indefinitely if damaged over a smaller area by aircraft or from ground level (or below ground level, as in 1993) with vehicles or other means.
 - Major military capabilities may exceed proposed design limits. Even stronger construction is needed if resistance to sustained military attack is required.
- Structures in this proposal emphasize safety issues.
 - While not visible in the illustrations, design issues considered include means to withstand significant non-nuclear attacks and air and ground collisions or attacks with related fires, and provision for redundant and durable means of fast evacuation. Other considerations include a matrix of sensors and selectable routes for ventilation and personnel mobility that can reduce the internal spread of smoke or chemical or biological agents.

WTC Site Designs (of those conceived by J. Charles) Arrived at After Evaluating Commercial and Engineering Issues – Part 4: Security, slide 2

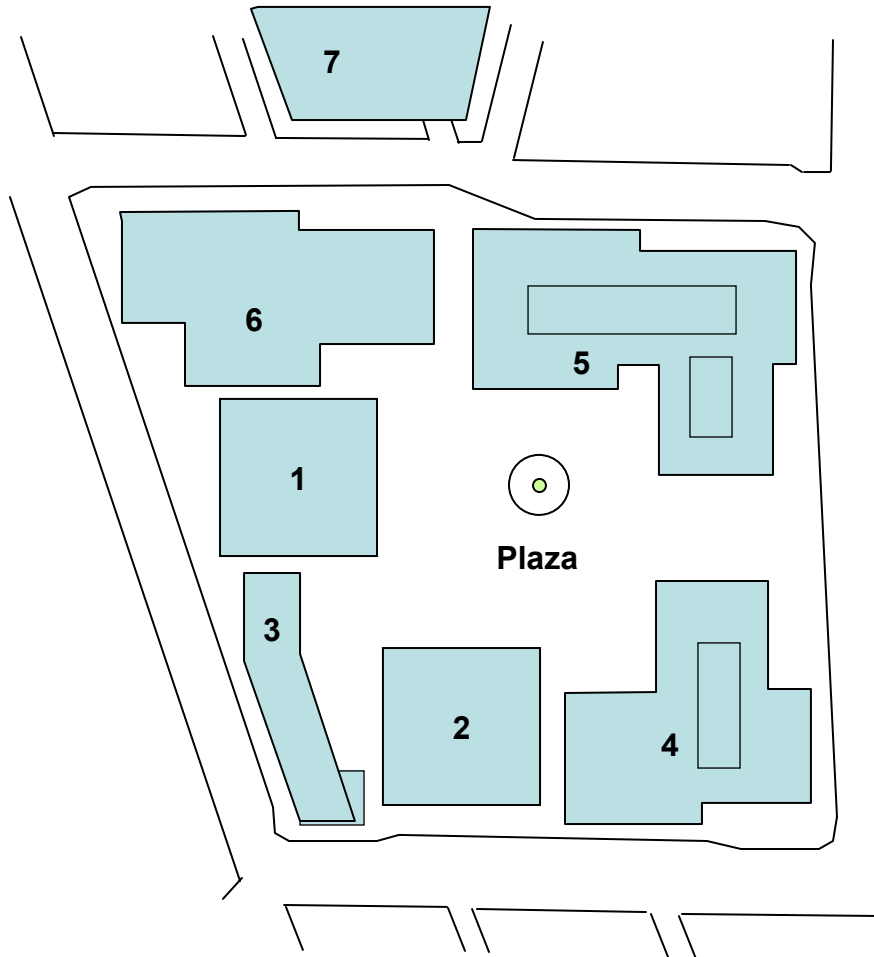
- Building structure should be designed to survive even “worst case scenario” attacks, including those involving vehicles or large aircraft.
 - Building (tower) footprint and cross section should be relatively large compared to most commercial aircraft.
 - Tallest buildings should each include an outer support structure having robust vertical members that are preferably of a hollow triangular or trapezoidal cross section and have a width of about 36 inches (wider than those of the original WTC). When vertical members of a triangular or trapezoidal shape are oriented so a corner (or narrow side) faces away from the building, they provide strength while also permitting a relatively wide view (and good ambient lighting) for building occupants, even if windows are comparatively narrow.
 - Internal steel structure must be protected by at least a common sense amount of durable fireproofing.
 - Some vertical structure members should be used between the core and outer structure of the building, even if this occasionally interrupts what would otherwise be large open areas. These vertical members and associated horizontal span structures should provide redundant support that limit horizontal propagation of a collapse (from attack damage, etc.) and thereby serve to resist or prevent total collapse of the structure even if an entire side and corner of the outer structure is interrupted on several contiguous floors. This may seem like a great deal of redundancy, but it is important to consider recent history and realize times have changed.
 - Every fourth or fifth floor should have lateral structural members that tie vertical structure members together and provide a stable free standing matrix that does not depend on smaller lateral structural members such as floor trusses. The matrix of lateral structure members on every fourth or fifth floor must serve as a header to span damaged areas and thereby limit upward propagation of any local collapse. The structure matrix must also, if possible, withstand the live and dead load of three or four floors of internal building structure and contents immediately above collapsing onto it at once, and for single floor slabs to sequentially collapse onto it from as far as nine floors above in order to limit downward propagation of a collapse.
 - Vertical structure elements must not fail even if a 10 floor high area loses horizontal support from limited collapse of surrounding horizontal structures. This is to limit propagation of any local collapse.
 - At least three of the major vertical supports at each corner of the core (and possibly other areas) must be tied together with a series of triangular structures to make them free standing vertical structures that remain standing even if local horizontal support is removed. (To resist twisting or translation of upper structure.)
 - Matrix of sensors (some wireless) including those for continuity, stress, temperature, smoke, etc., combined with real time computer readout and analysis provide fast assessment of any attack or accident damage.
 - Clearance between tallest buildings should be enough to prevent debris from partial or total collapse of one tower from bringing down adjacent towers. (The original WTC towers appeared to have adequate clearance from each other, but not enough clearance from some of the lower buildings.)

WTC Site Designs (of those conceived by J. Charles) Arrived at After Evaluating Commercial and Engineering Issues – Part 4: Security, slide 3

- **Escape routes must survive a worst case attack and facilitate evacuation**
 - Several protected stairwells are distributed over a wide area, with at least two are outside the core and on or near opposing sides or corners of the building.
 - Stairwells, etc., include stored cable ladders and fixtures that can be deployed to span damaged stairs.
 - Walkways between structures must be positioned and/or designed to prevent collapse of an upper walkway from collapsing lower ones. Some outside building structure can have ladder rungs and safety harness lugs.
 - If any attack or accident results in damage to structural members or a significant fire, the de facto operation should always be to immediately evacuate every tower and every lower structure that could be damaged by collapse of a tower.
- **Additional safety features, for implementation if risk of attack deemed high**
 - Self-contained backup power and communications for designated vertical zones of each building.
 - Storage of substantial firefighting equipment, supplies (including fire extinguishing foam) on multiple floors.
 - Critical major structural members at and below ground level can be surrounded with structural concrete and steel cylinders and/or the original low level structural members can just be made far more robust than usual.
 - Two interlaced external structures, each similar to that of the John Hancock building in Chicago.
 - Some or all floor slabs can be insulated and fireproofed 0.75 to 1.5 inch metal plates instead of concrete.
 - Long cables inside (or otherwise associated with) external vertical structure members can limit intrusion of impact damage and debris to protect the core structure. Also, thin external vertical columns or cables near building (or long vertical elements suspended outside) can help break up incoming aircraft or missiles.
 - Storing quickly deployable cranes and structural members on the roof can facilitate lowering temporary structural members to damaged areas (to be attached via prefabricated fittings on structure) to add temporary reinforcement. Crane can also deploy temporary evacuation bridges at appropriate locations or facilitate fire suppression. Smaller cranes with personnel safety cables can reach from one tower to another and provide security for personnel if they choose to work on the roof of a structure that is at risk of collapse.
 - Some embodiments may have provision for limited collapse zones that can (if collapse occurs due to egregious damage) shear off the building and thereby save the main structure. Simultaneous collapse of the structure as a whole can thereby be avoided in many situations and provide more time to rescue occupants, though rebuilding is still needed even after a partial collapse. Initial stages of evacuation can then be to simply move away from the anticipated collapse zone without necessarily changing floors. Subterranean aspects of nearby infrastructure must be designed to prevent horizontal cascade failure following local impact of debris from a limited collapse.

Reference Images: Site Plan for Original New York WTC (Left) Satellite Photo of Original WTC Site Development (Right)

(Site plan based on drawing from Architecture Week web site, Peter Skinner's World Trade Center book, and satellite photos.)



- 1 WTC – North Tower – 110 Floors
- 2 WTC – South Tower – 110 Floors
- 3 WTC – Hotel – 22 Floors
- 4 WTC – South Plaza Bldg. – 9 Floors
- 5 WTC – North Plaza Bldg. – 9 Floors
- 6 WTC – U.S. Customs
- 7 WTC – 47 Floors

1 Liberty
Plaza –
54 Floors



Space Imaging

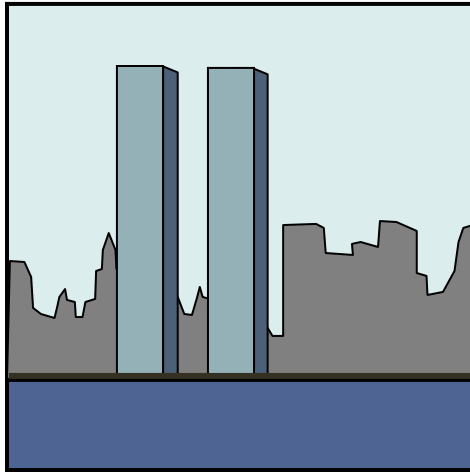
Reference Images

Upper left: Drawing of original towers 1 and 2 WTC, before construction of major WFC structures in Battery Park City.

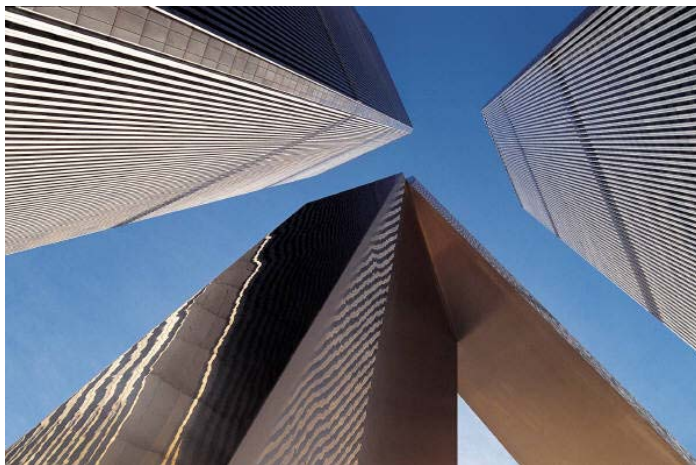
Upper right: Original Towers 1 and 2 WTC, shown after construction of major WFC structures in Battery Park City.

Lower left: Looking up at original WTC towers 1 and 2 from plaza.

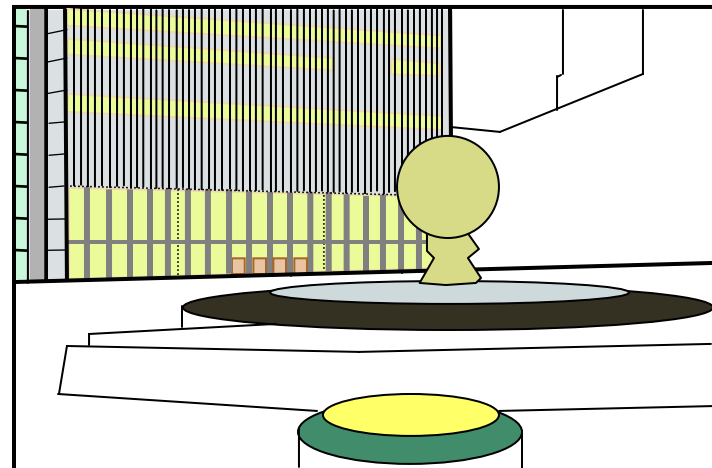
Lower Right: Simplified drawing of original N.Y. WTC plaza, with lower floors of tower 1 WTC in background.



Microsoft Office Clip Art (processed)

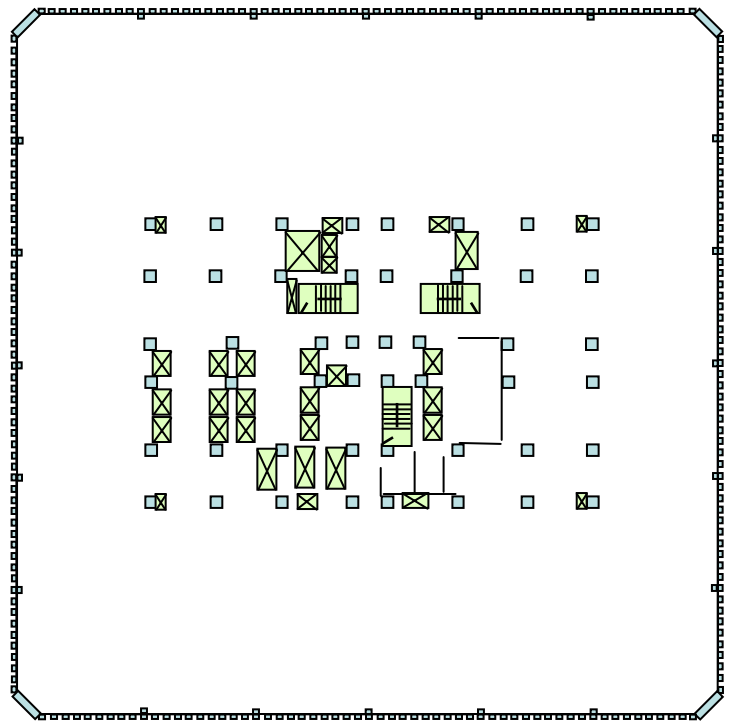


MS Office Clip Art

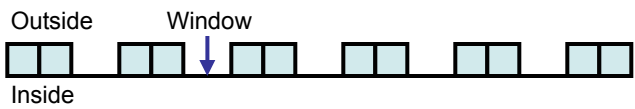


Basic structure and mobility elements for typical upper floor of original WTC tower (left); Basic structure and mobility elements of an upper floor in proposed new WTC towers (right)

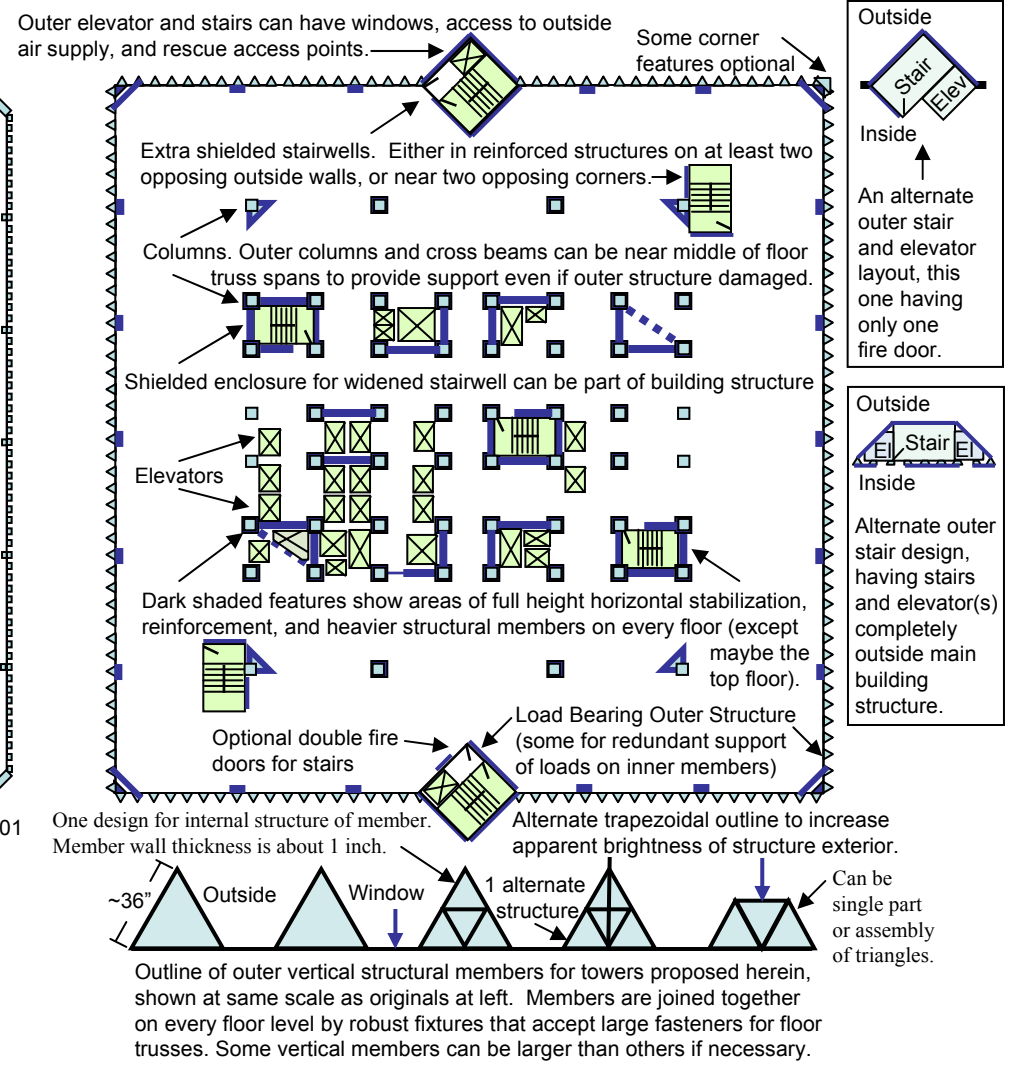
Plan for tallest of proposed towers assumes elevator layout similar to that of original towers 1 and 2 WTC, though fewer elevators may be needed if outer walkways are implemented. Proposed design has extra stairs outside the core area, either on two opposing outside walls or relatively near two corners.



Floor plan based on drawing in ARUP WTC Briefing 2, of 26 September 2001



Outline of outer vertical structural members for upper floors of original towers 1 and 2 WTC.



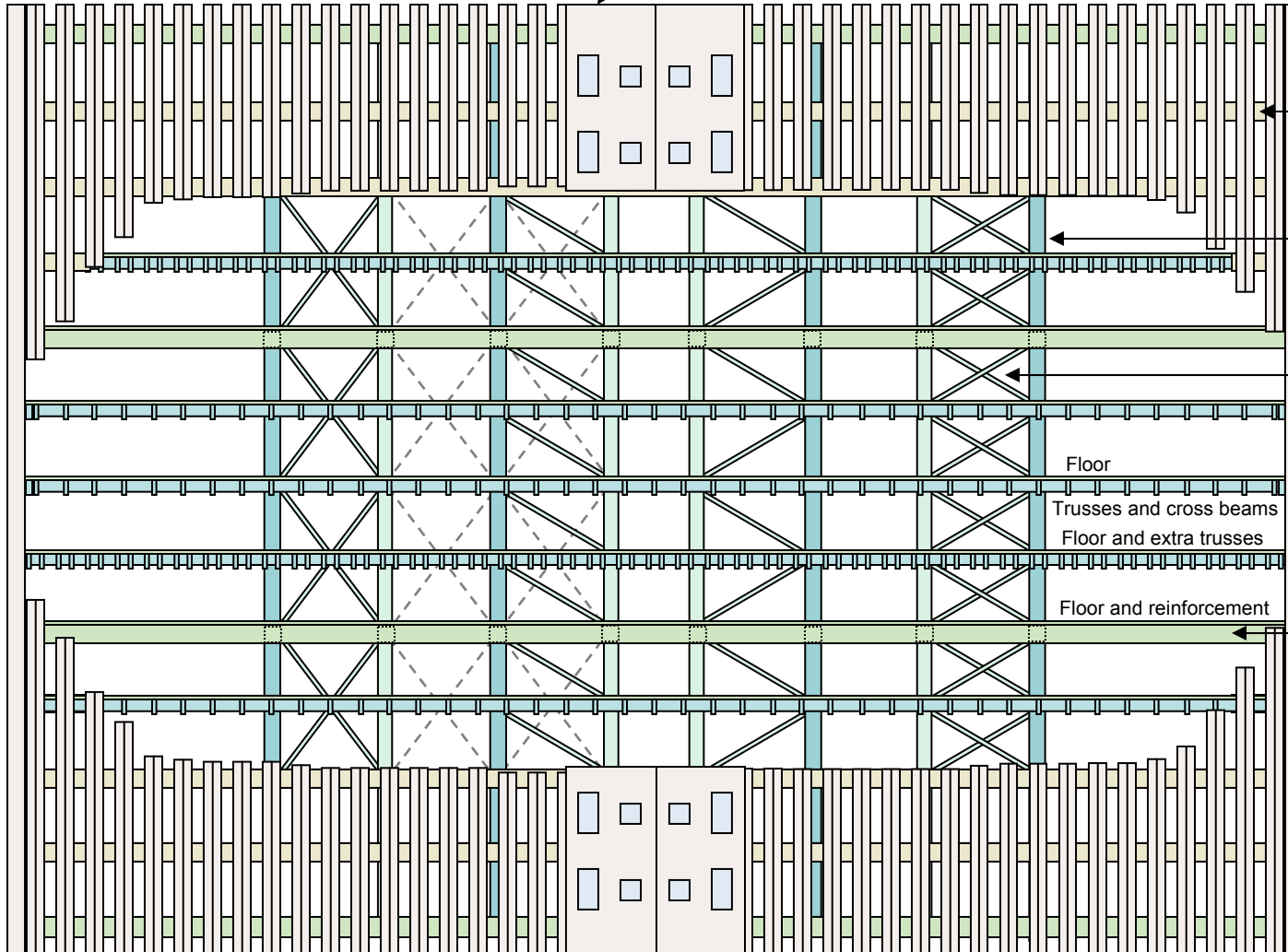
Outline of outer vertical structural members for towers proposed herein, shown at same scale as originals at left. Members are joined together on every floor level by robust fixtures that accept large fasteners for floor trusses. Some vertical members can be larger than others if necessary.

Basic structure elements of proposed new WTC towers

(Cut-away side view of several floors) Shown design has extra stairs outside the core area, on two opposing outside walls.

Broken diagonal lines show reinforcement that can interconnect large areas of the core. Up to entire core can be diagonally interconnected if necessary.

Outer stairs and elevator(s) in self-supporting, shielded and inside-insulated structure with windows. Shown version has stairs toward outside. Large windows are near center in version having elevator toward outside.



Outer vertical structure may have triangular, trapezoidal, other, shape.

Robust truss hanger fixtures also provide stability for outer vertical structure members.

Inner vertical structure. Dark shaded columns indicate some rows that may have extra columns outside the core area.

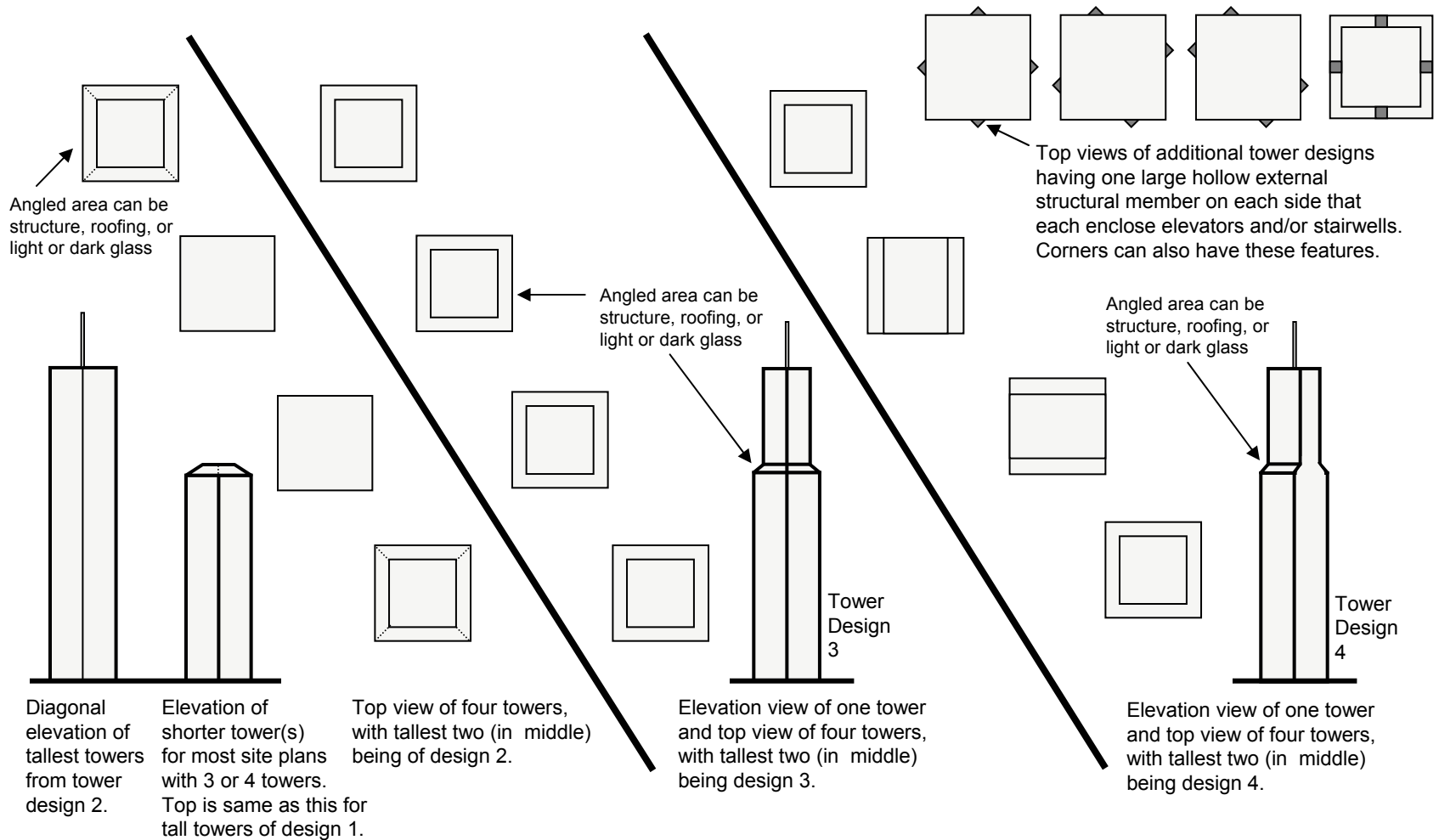
Reinforcement between some vertical structure members in building core permit groups of vertical members to be free standing structures and provide part of shield for inner stairs. Some different arrangements are shown for illustrative purposes.

Strong horizontal box and I-beam reinforcement (some beams in triangular pattern) between inner and outer vertical structure members on every fourth floor. Horizontal structure acts as header over any damaged areas and withstands impact from any limited internal collapse of floor slabs and related structure.

Simplified WTC Site Plan – Basic Top And Elevation Views of Proposed Building Profiles

(Illustrations in this presentation show specifics for only the tallest of the structures on the site.)

Towers of design 2 appear similar to original towers 1 and 2 WTC, except towers of design 2 have high rise walkways between buildings, triangular or trapezoidal external vertical members, optional wider windows on floors 81-82, and externally visible elements of safety features.

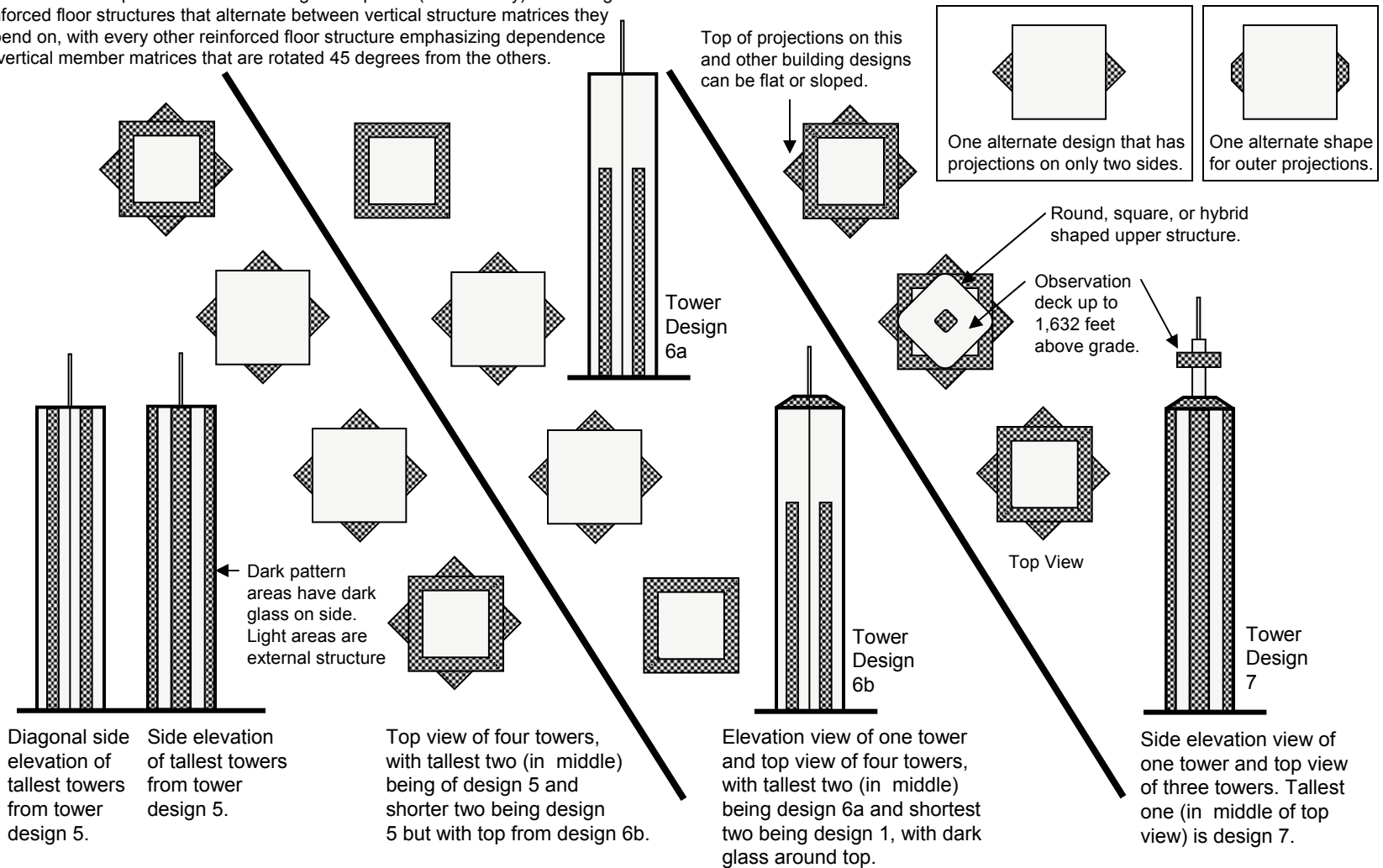


Simplified WTC Site Plan – Basic Top And Elevation Views of Proposed Building Profiles

(Illustrations in this presentation show specifics for only the tallest of the structures on the site.)

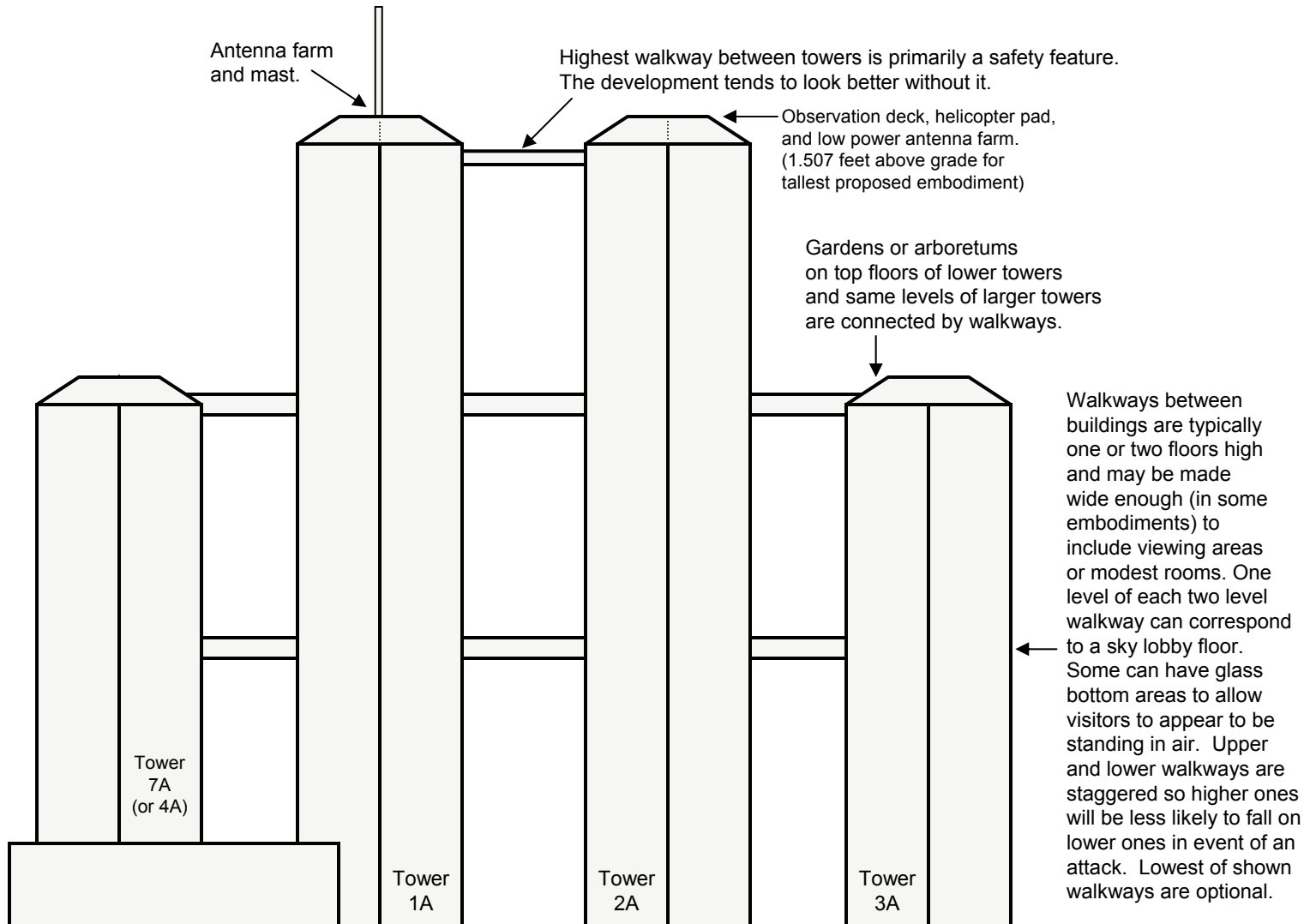
Different building designs or elements of building designs can be interchanged.

Eight corner concept of most of these designs will permit (if necessary) interlacing reinforced floor structures that alternate between vertical structure matrices they depend on, with every other reinforced floor structure emphasizing dependence on vertical member matrices that are rotated 45 degrees from the others.



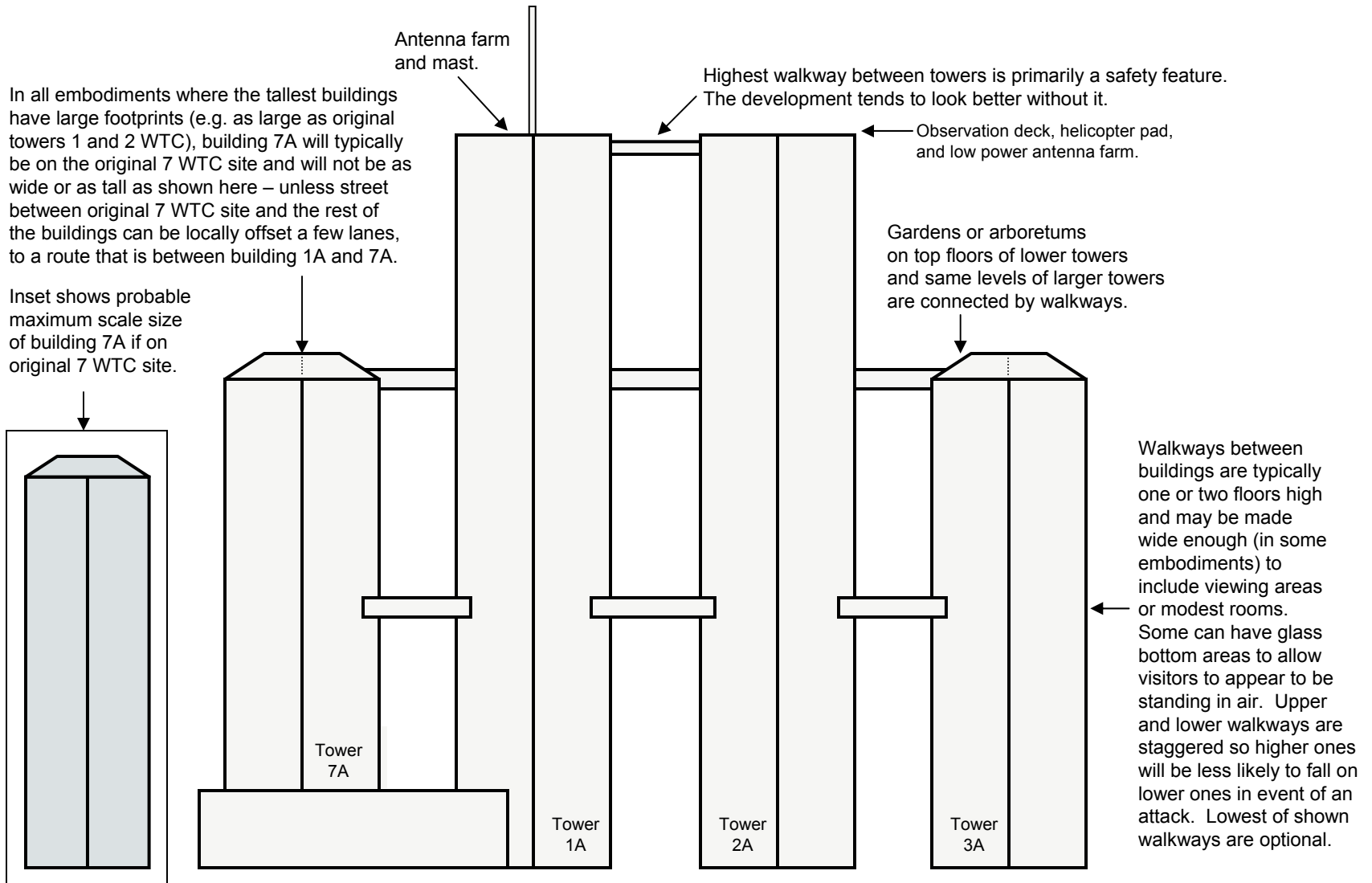
Simplified WTC Site Plan – Basic Diagonal Elevations of Major Structures, Design 1

Design that would (according to the author) be among the most aesthetic. Minor structures shown for illustrative purposes only. (Illustrations in this presentation show specifics only for the tallest of the structures on the site.)



Simplified WTC Site Plan – Basic Diagonal Elevations of Major Structures, Design 2

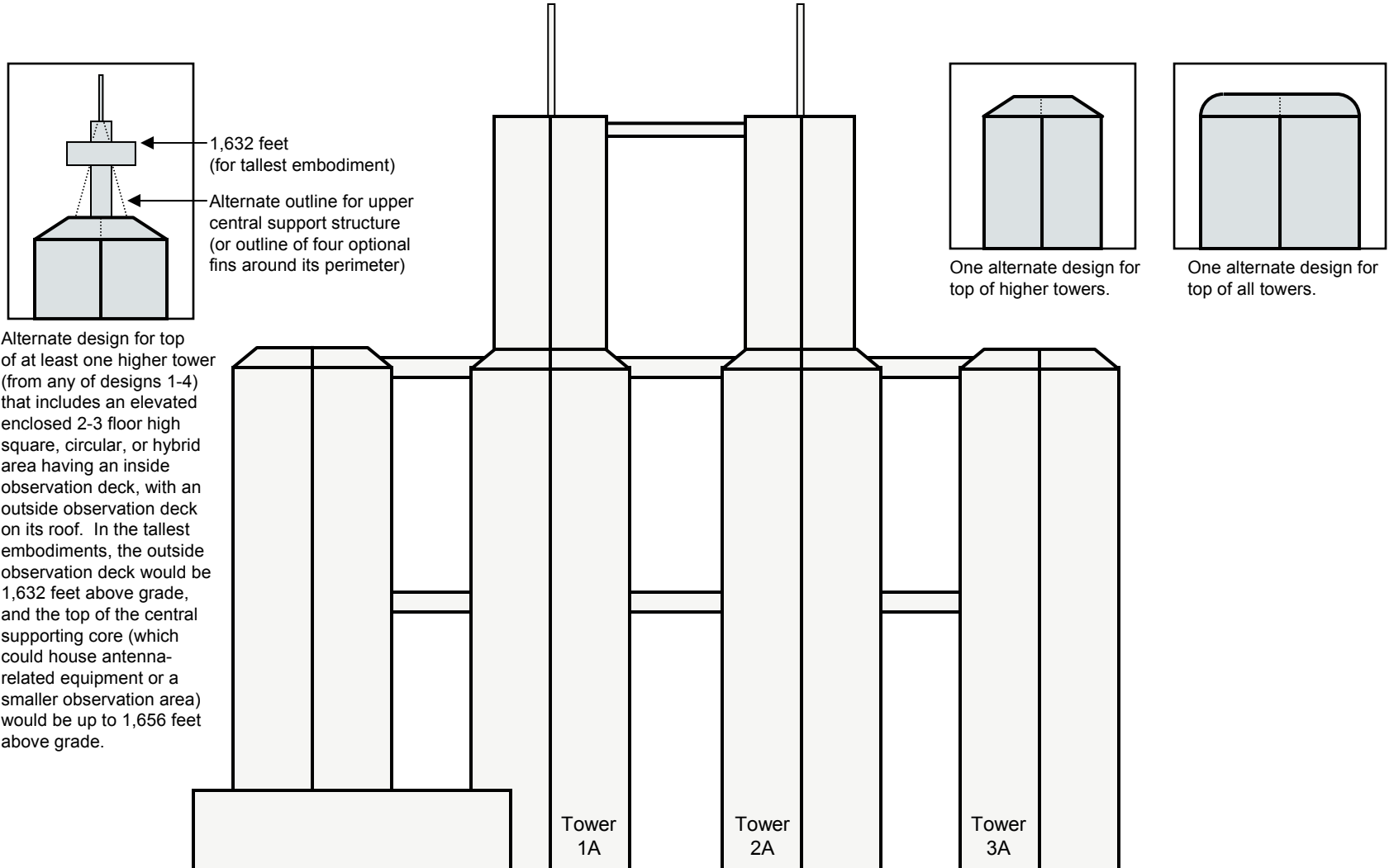
Design 1, with larger buildings that are closer together. Minor structures shown for illustrative purposes only.
 (Illustrations in this presentation show specifics only for the tallest of the structures on the site.)



Simplified WTC Site Plan – Basic Diagonal Elevations of Major Structures, Design 3

Minor structures shown for illustrative purposes only.

(Illustrations in this presentation show specifics only for the tallest of the structures on the site.)

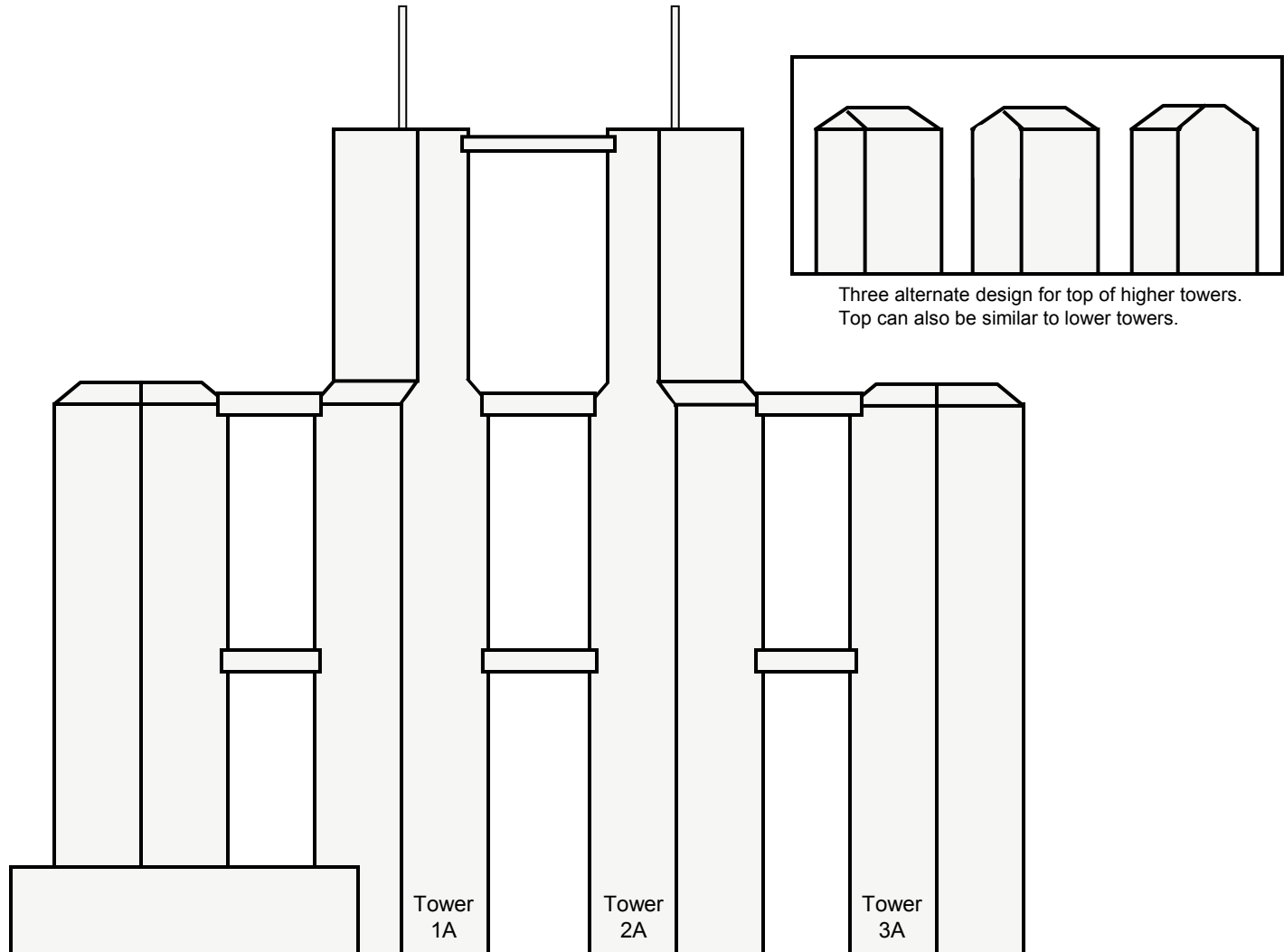


Alternate design for top of at least one higher tower (from any of designs 1-4) that includes an elevated enclosed 2-3 floor high square, circular, or hybrid area having an inside observation deck, with an outside observation deck on its roof. In the tallest embodiments, the outside observation deck would be 1,632 feet above grade, and the top of the central supporting core (which could house antenna-related equipment or a smaller observation area) would be up to 1,656 feet above grade.

Simplified WTC Site Plan – Basic Diagonal Elevations of Major Structures, Design 4

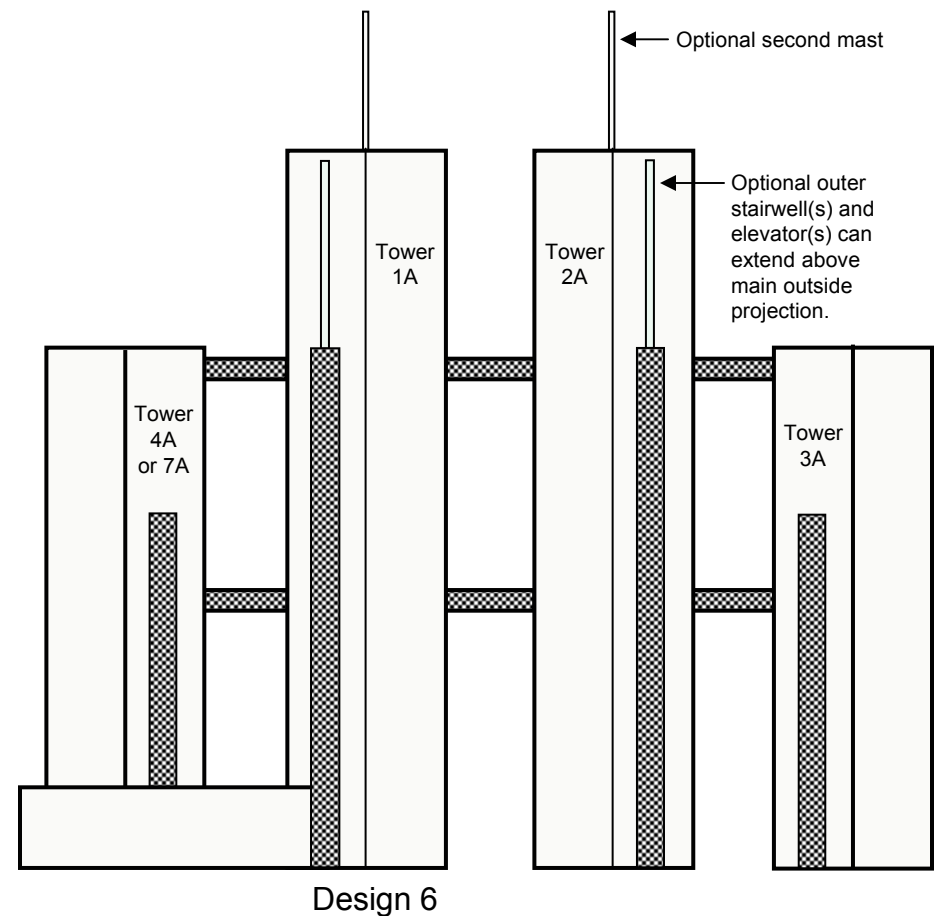
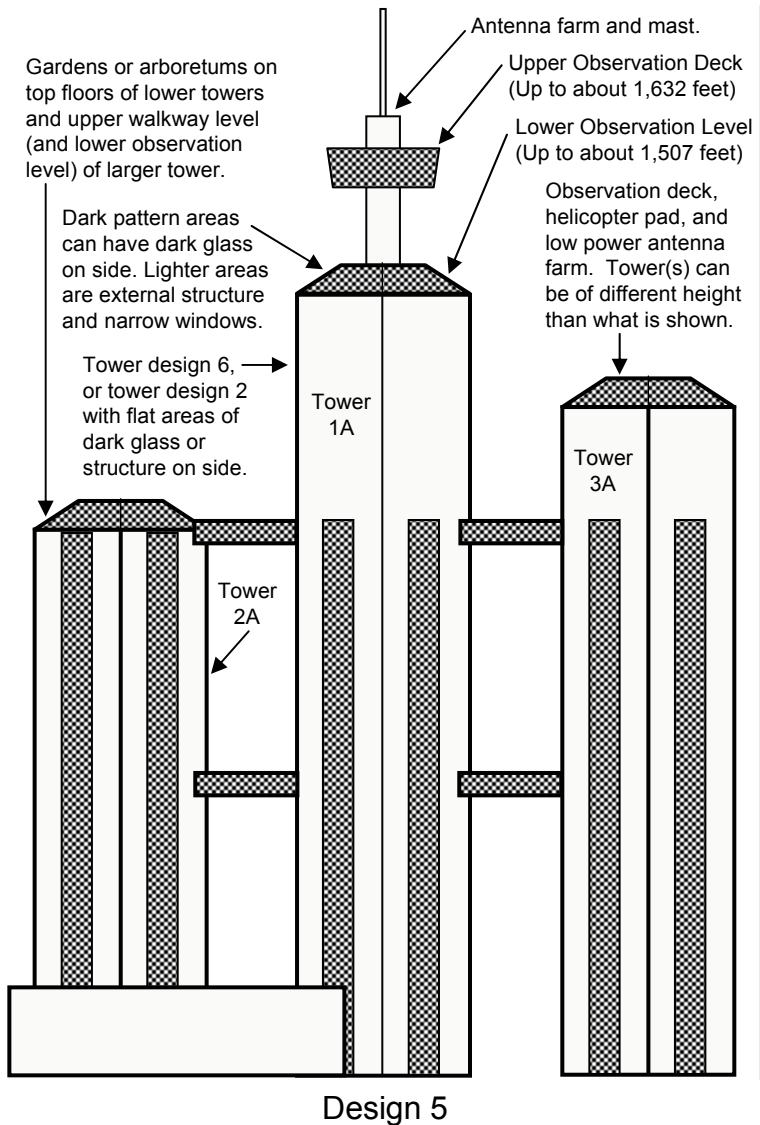
Minor structures shown for illustrative purposes only.

(Illustrations in this presentation show specifics only for the tallest of the structures on the site.)



Simplified WTC Site Plan – Basic Diagonal Elevations of Major Structures, Designs 5-6

Three tower embodiment shown. Minor structures shown for illustrative purposes only. Different building designs or elements of building designs can be interchanged. (Illustrations in this presentation show specifics only for the tallest of the structures on the site.)



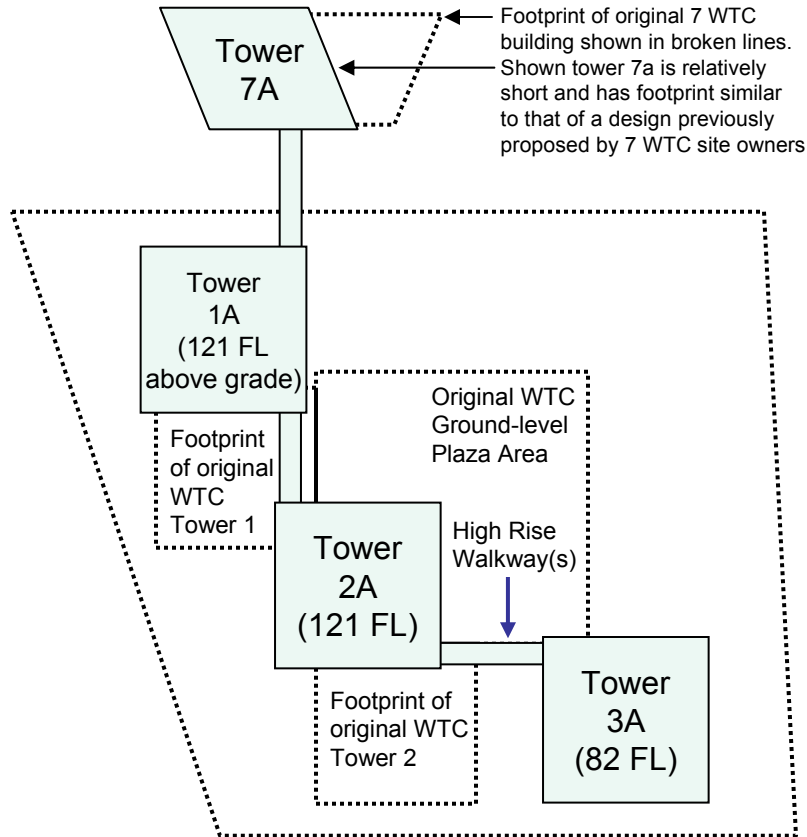
(Structure group design 7 (oriented to site concept 3 or 6a) is shown on cover page)

Simplified WTC Site Plan – Concepts 1 and 2

Large Buildings: Three or four 208 to 235 foot square towers; Tallest two are 92 to 121 floors, shortest are 63 to 82. These and most other site designs assume that it will not be possible to build a full size tower on the former WTC 7 site.

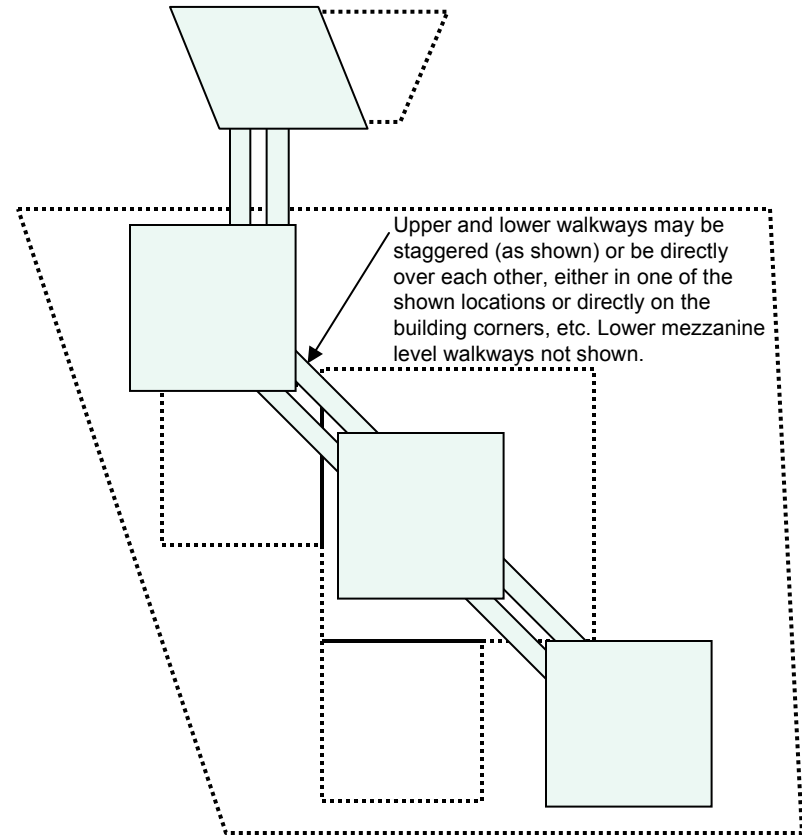
(Outline of nearest major streets and footprints of Original WTC Buildings 1, 2, and 7 are shown in broken lines.)

(Illustrations in this presentation show specifics for only the tallest of the structures on the site.)



Site Concept 1

(Tower 3A (and others) can be moved closer to center in this and other site concepts.)



Concept 2

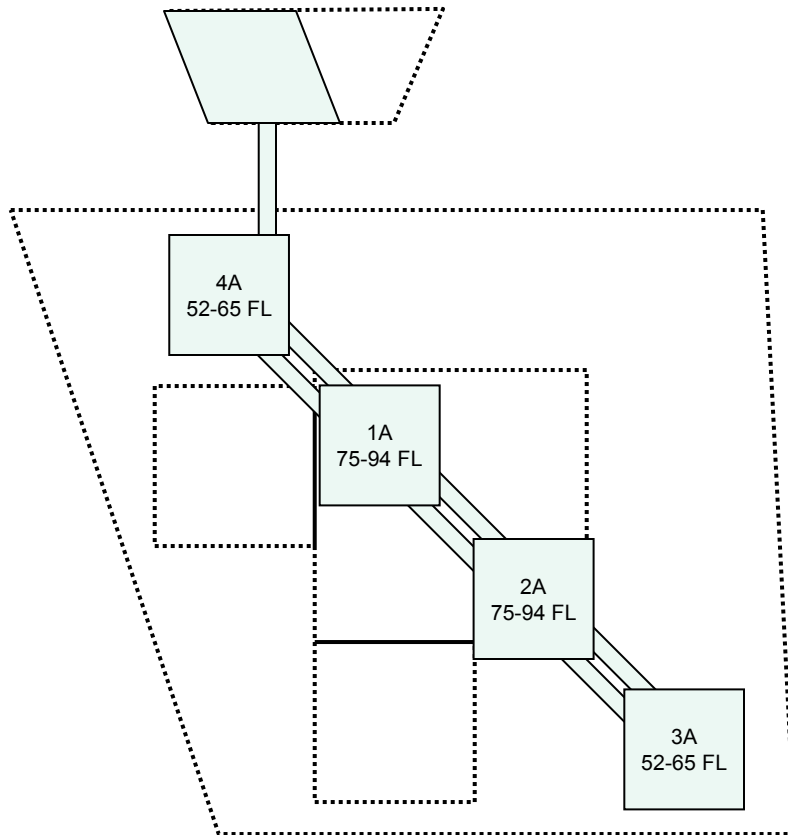
Leaves footprints of original towers 1 and 2 WTC open. Original tower footprints can be used for ground level memorials or rooftop memorials and gardens on top of lower (typically less than 30 floor) structures.

Simplified WTC Site Plan – Concepts 3 and 4

Smaller Buildings: Four 160 to 170 foot square towers; Tallest two are 75 to 94 floors, shortest two are 52 to 65 floors.
(Outline of nearest major streets and footprints of Original WTC Buildings 1, 2, and 7 are shown in broken lines.)

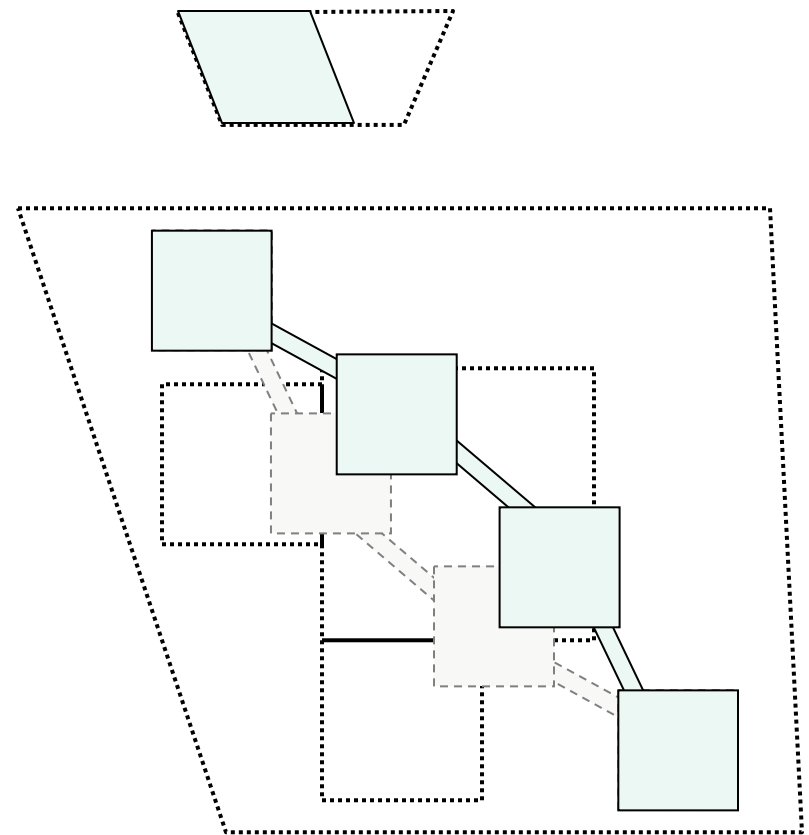
(Illustrations in this presentation show specifics for only the tallest of the structures on the site.)

Elements of different site, building, and building feature concepts can be combined for additional flexibility.



Concept 3

Leaves footprints of original towers 1 and 2 WTC completely open.

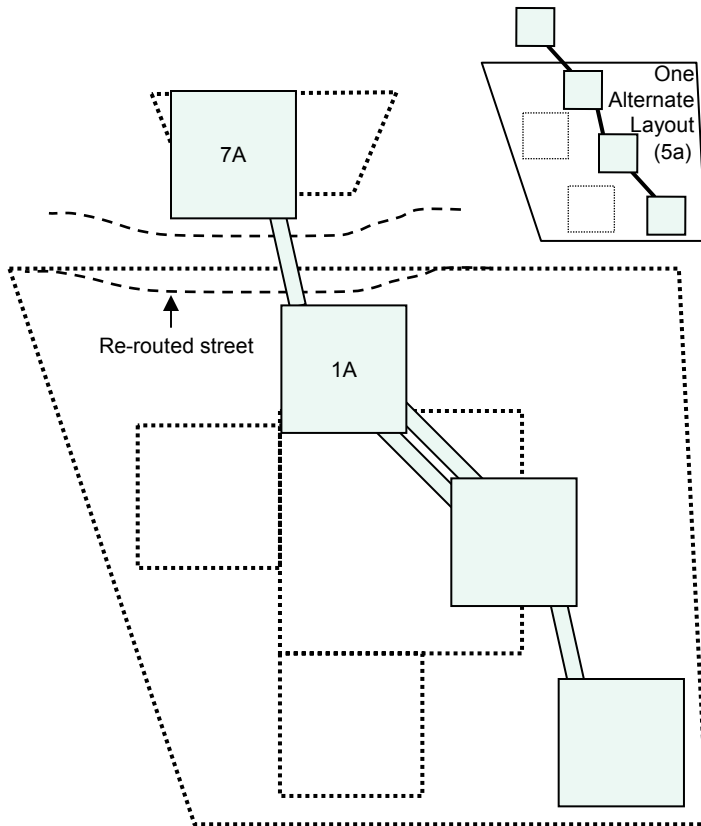


Concept 4

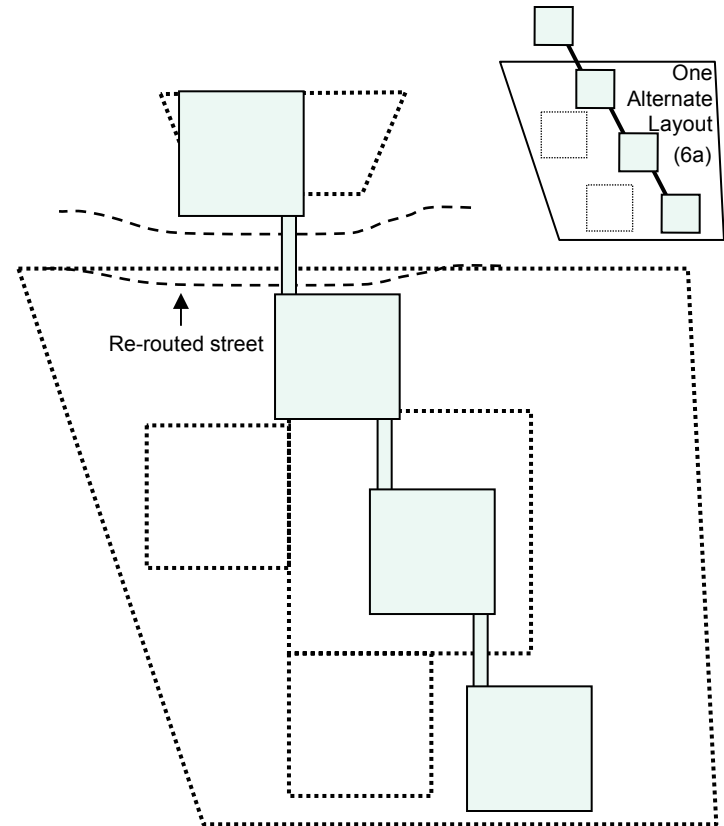
Leaves footprints of original towers 1 and 2 WTC completely open. Lightly shaded area in dashed outline shows alternate locations for taller towers that would partially intrude on footprint of previous towers.

Simplified WTC Site Plan – Concepts 5 and 6

Concepts 5 and 6 involve rerouting one street to pass between buildings 1A and 7A, unless tower 7A is made narrower.
(Outline of nearest major streets and footprints of Original WTC Buildings 1, 2, and 7 are shown in broken lines.)
(Illustrations in this presentation show specifics for only the tallest of the structures on the site.)



Concept 5

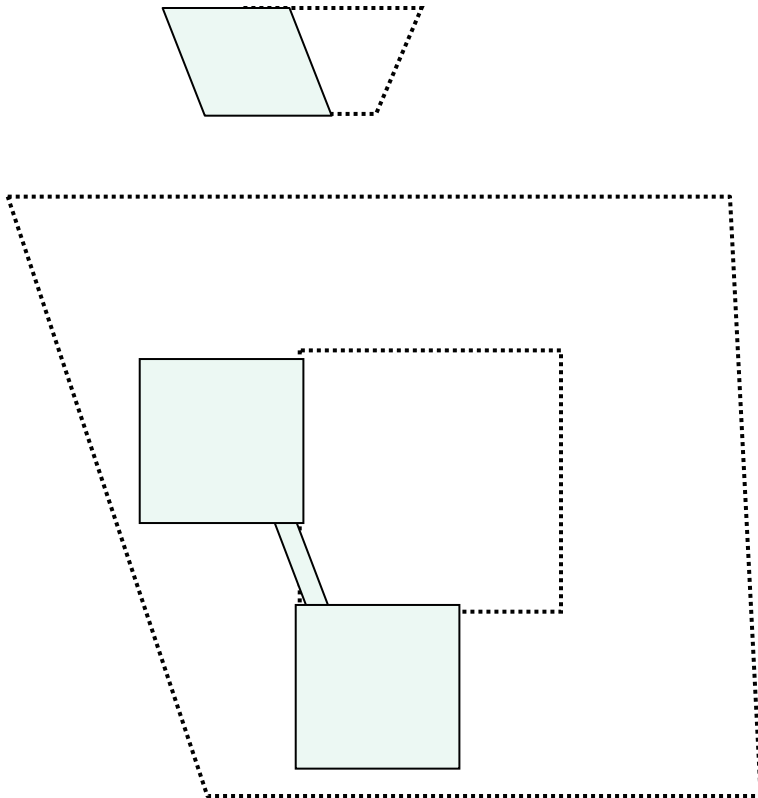


Concept 6

(shown without high rise walkways, though high rise walkways may be implemented)

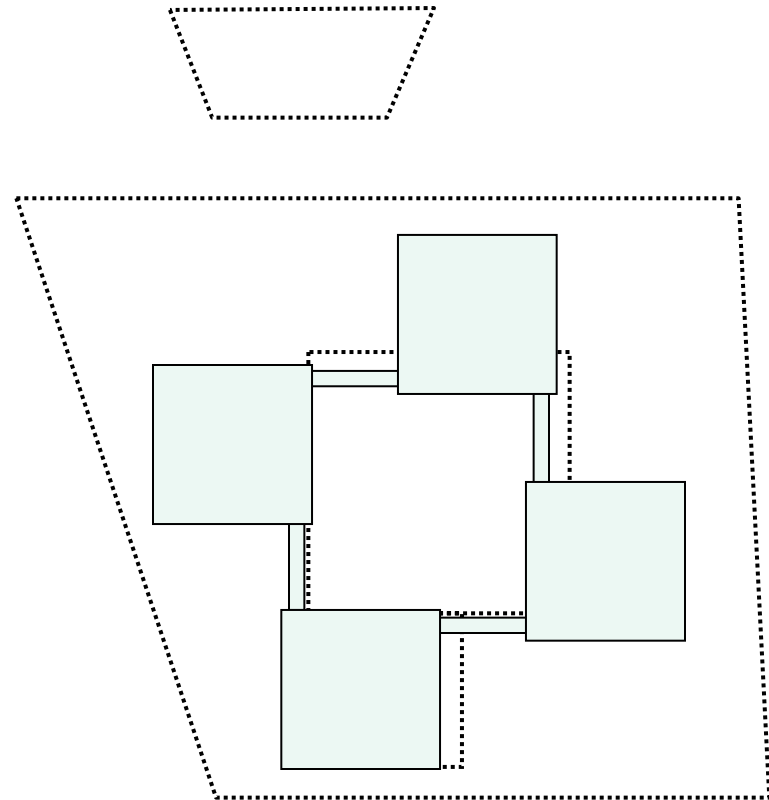
Simplified WTC Site Plan – Concepts 7 and 8

Concept 7: Twin towers on footprints of original 1 and 2 WTC towers, but with safety features and high rise walkways.
Concept 8: Four 208 to 235 foot square towers; Tallest two are 92 to 121 floors, shortest are 63 to 82. Compact layout.
(Outline of nearest major streets and footprints of Original WTC Buildings 1, 2, and 7 are shown in broken lines.)
(Illustrations in this presentation show specifics for only the tallest of the structures on the site.)



Concept 7

Indoor memorials could be on floors that correspond to the floor of the September 11 2001 air collision for each original building.
Towers can be 110 floors (as originals) or other heights.

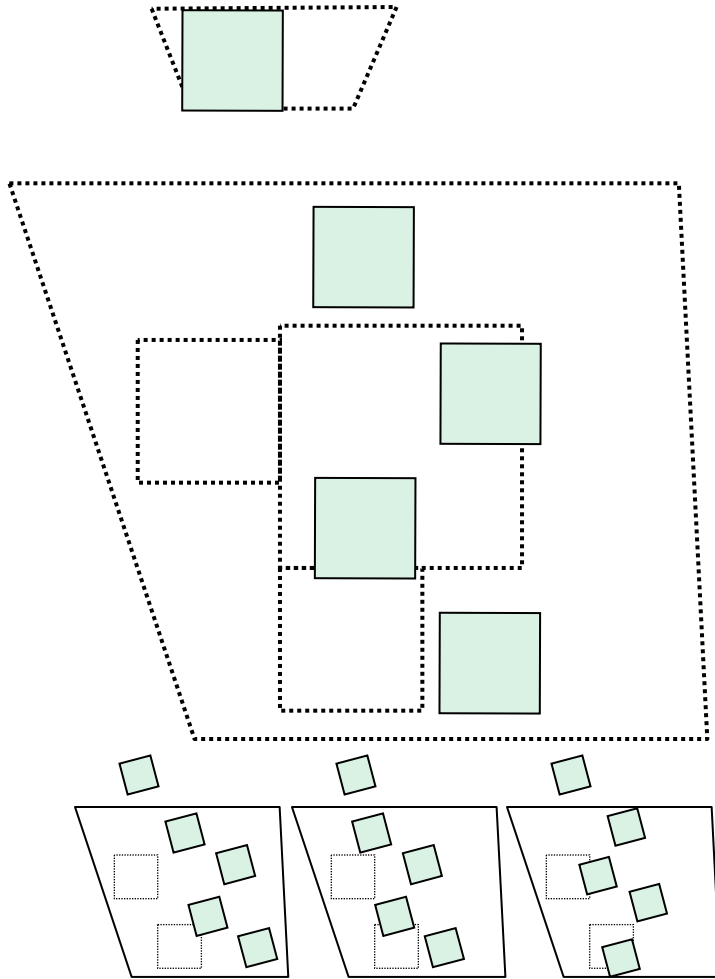


Concept 8

(In this and other concepts, all towers could instead be the same height.)

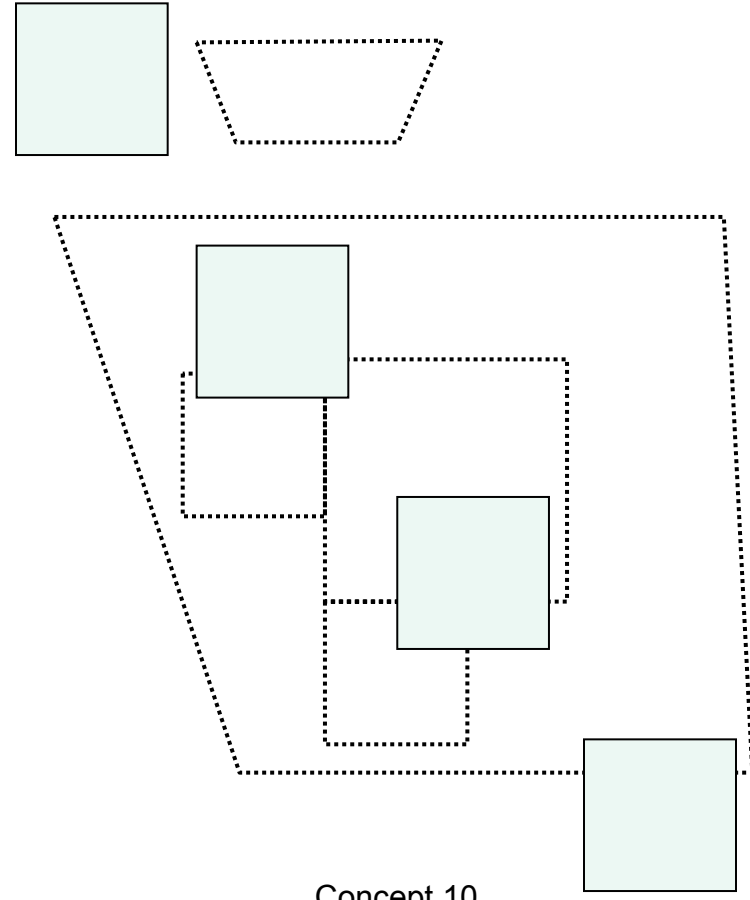
Simplified WTC Site Plan – Concepts 9 and 10

Concept 9 has up to 5 similar towers. Concept 10 (shown for size reference) is for an original development of very large buildings that may not be feasible for the NYC WTC site due to interference with existing structures. (Outline of nearest major streets and footprints of Original WTC Buildings 1, 2, and 7 are shown in broken lines.) (Illustrations in this presentation show specifics for only the tallest of the structures on the site.)



Concept 9 ^ 3 Alternate Layouts ^

(shown without high rise walkways, though high rise walkways may be implemented)



Concept 10

(shown without high rise walkways, though high rise walkways may be implemented)

Bibliography

- Introduction for this bibliography:
 - Some versions of Jeffrey R. Charles' World Trade Center building and site design document may include reference photos or drawings of the original WTC site that are the work of other authors. In such cases, all such material is indicated in the document and shown in the bibliography below. Some reference drawings or photos (satellite photos of the original WTC site, for example) may appear at many web sites or in more than one printed publication. In this case, the source having the best version of the reference (or from which legitimate use permission, if necessary, is most easily obtained) is shown in this bibliography.
- References:
 - Drawing of original WTC Site (if used): Architecture Week Web Site. When this drawing is not included, it may (along with satellite photos, etc.) be a substantial source of the information about locations of streets and original WTC buildings that was used to generate an independent drawing of the original site. **
 - Satellite photo of original WTC Site (if used): Architecture Week web site, Great Buildings web site; World Trade Center book, the giants that defied the sky, by Peter Skinner, credits: "Space Imaging". *
 - Drawing of Typical floor in WTC (if used): ARUP WTC Briefing 2, 26 September 2001. When this drawing is not included, it may be a substantial source of the information about locations of elevators and stairwells in the original WTC towers that was used to generate an independent drawing of a floor in the original WTC.**
 - Twilight picture of original WTC before construction of major Battery Park City structures (if used): Architecture Week / Great Buildings web site. **
 - Night picture of original WTC before construction of some major Battery Park City structures (if used): MS Office clip art, or (as noted) other purchased images sources.**
 - Daytime picture of original WTC after construction of major Battery Park City structures (if used): Architecture Week / Great Buildings web site. **
 - Evening picture of original WTC after Battery Park City structures built (if used): Microsoft Office clip art.*
 - Looking up at original towers 1 and 2 WTC from nearby (if used): Microsoft Office Clip Art *
 - Looking up at original towers 1 and 2 WTC from east side of central plaza (if used): Planet KV web site. **
 - Picture of original WTC plaza (if used): Architecture Week / Great Buildings web site. **
 - Some information about construction of original WTC inferred from video and photos taken on 11 Sep. 2001 and from various technical papers.
- * Indicates reference item may be included in this document. Copyrights are by the respective authors.
- ** Indicates reference item is not included in this document.