

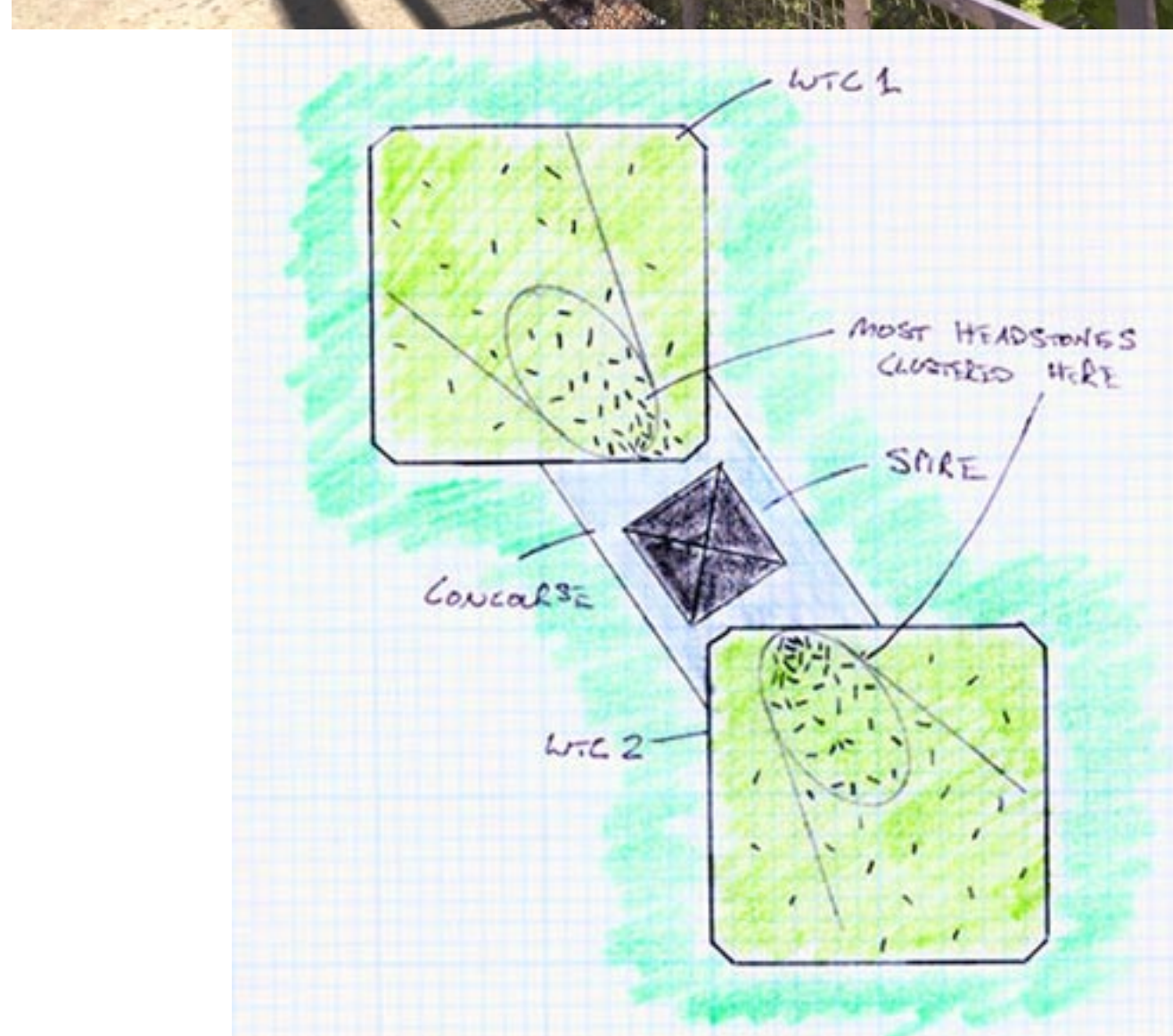
# Infinite Spire & Fallen Headstones



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## Legend

- [1][5] footprints with headstones scattered in apparently random pattern around spire
- [2] wooded areas for contemplation, may also be used for small gatherings
- [3] assembly areas for families and loved ones
- [4] infinite spire : tomb at ground level, appears infinitely tall when viewed from footprints
- [6] replica of ramp to pit : main entrance and tribute to rescuers and volunteers
- [7] replica of 1993 WTC Memorial
- [8] Fritz Koenig's Sphere



## INFINITY

Infinity is a potent concept, a metaphor for death, for eternity, for the future, for the human mind. The focus of our memorial is a tall metallic spire that appears to rise to an infinite height when viewed from nearby. Shaped by trigonometric equations to project the illusion of infinite height, the spire appears to be impossibly tall but delicate. Like Arthur C Clarke's monolith, it reminds us that our future is potentially boundless. Yet it also warns us that this future is fragile. ([right] night view of spire as seen looking up from footprint)



## CHAOS

This optimistic image is contrasted against the reality of what happened here, and against the darker side of human nature. The spire is surrounded by fields of headstones that appear to have fallen from the sky like leaves (see images B-2 and B-3 to left). Placed at apparently random locations and angles, the headstones recall the randomness and brutality of the attacks. Each headstone, made from WTC structural steel or aircraft aluminum, remembers the life, death and actions of a person. Each headstone is warped slightly, bent but not broken, as if it had withstood some tremendous force. As a group, the headstones project an image of the collapse of the towers. The headstones are also a warning, that we live in an era in which we are dwarfed by our inventions, inventions that can fail or be turned upon us with devastating consequences.

## THE INTERSECTION OF ART AND SCIENCE

$$w(h) = 2z \left( \frac{x + \sin^{-1} \left( \frac{h}{d_{\text{tower}}} \right) \left( \frac{1}{2 \times \tan^{-1} \left( \frac{h}{d_{\text{tower}}} \right)} \right)}{2 \times \cos \left( \tan^{-1} \left( \frac{h}{d_{\text{tower}}} \right) \right)} \right)$$

$$\text{spotlight } (d, \theta) = \left( \frac{w(h)}{2} + \frac{h}{\tan \left( \frac{\pi}{2} - 2 \times \tan^{-1} \left( \frac{h}{d_{\text{tower}}} \right) \right)} \right) \left( \frac{\pi}{2} - 2 \times \tan^{-1} \left( \frac{h}{d_{\text{tower}}} \right) \right)$$

The dimensions, shape and visual effect of the memorial are determined by mathematics. The spire, headstones and lighting are all generated by just three equations. One equation generates the shape of the spire, another the arrangement of the headstones. A third equation places and aims the spotlights so that, at night, the spire reflects these beams vertically to create an effect similar to the Tribute in Light. Despite the economy of these equations, the shapes and patterns they generate convey a potent message about what happened on this site and about its meaning for future generations. The memorial is both science and art. Building it will require the participation of people from many disciplines, from the arts to physics.

## LOOKING UP - A PHYSICAL MEMORY

Our memorial seeks to create a physical memory of September 11th. The superhuman scale of the site is contrasted against the lilliputian scale of the people who once worked there. Visitors, most of whom witnessed the attacks from a distance, are confronted with the enormous scale and violence of what happened on this ground. Yet the memorial also reminds visitors of the incredible bravery of the people who stayed behind, dwarfed by the terror that surrounded them. Far from diminishing their acts, this contrast reminds us that people willingly stayed to rescue people from skyscrapers over a quarter mile tall. The memorial confronts us with what happened, but it is also an awe-inspiring and uplifting place, a reminder that we are capable of great things, both individually and as a civilization.

## WALKING DOWN - THE SURVIVORS' EXPERIENCE

When we began our design for this memorial in early 2002, we envisioned the spire as a hollow structure with a vast interior space nearly as large as the spire itself. This void provides narrative impact to remind people of the towers' scale, in terms of their size and history.



Visitors experience the interior of the spire from a high altitude, as they step from an elevator onto a ramp. This ramp rings the walls from a height of 1000 feet or more, down to the base of the spire, creating an experience that is at once vast and claustrophobic. Visitors would step off the elevator to see people walking down, seemingly forever.

The walls of the spire would hold exhibits and artifacts of the towers' history, including space for the hundreds of WTC tenant companies dating back to the buildings' construction. Such exhibits could be organized by floor number, and would provide a resounding reminder of how much life and vitality was lost.

Walking down, visitors would recall the fire stairs and the survivors' long walk to safety. The survivors would be listed by name on each floor, a reminder of the tens of thousands of people who escaped that day. This space could also be used for a ceremony in which people would retrace the survivors' walk to safety.

## HONORING HEROES

The headstones individually commemorate all who died in the attacks. Headstones of uniformed and civilian heroes would also describe their actions, affiliation and, if known, would list the names of the people they rescued. Although in aggregate the headstones are arranged randomly, the heroes' headstones may be clustered in small groups near their closest comrades to recognize their close bonds and kinship.

## THE MEMORIAL IN THE FUTURE

The superposition of the themes of grace and chaos will convey an important message to future generations. Like Schrodinger's cat, the memorial is simultaneously alive and dead, uplifting and funereal. It reminds the viewer that our future is potentially boundless, but indeterminate.

We live in a world of technology on a superhuman scale. Science fiction has become reality. Our power to invent, to reshape the world, and even to change our own biology is becoming almost godlike. With this power we can do great things, but with it also comes the danger that through accident, malice, or unintended consequences, we may also destroy ourselves.

In this context, the memorial seeks to capture this duality of human nature, our incredible capacity to invent, and sadly, to destroy. A visitor to the site would look up to see an image of what we can do, and would look down to see an omen of what may happen if we fail to recognize and overcome this danger.

The memorial reminds us that only people can imagine infinity, and that as magnificent as our inventions may be, we are fragile beings.

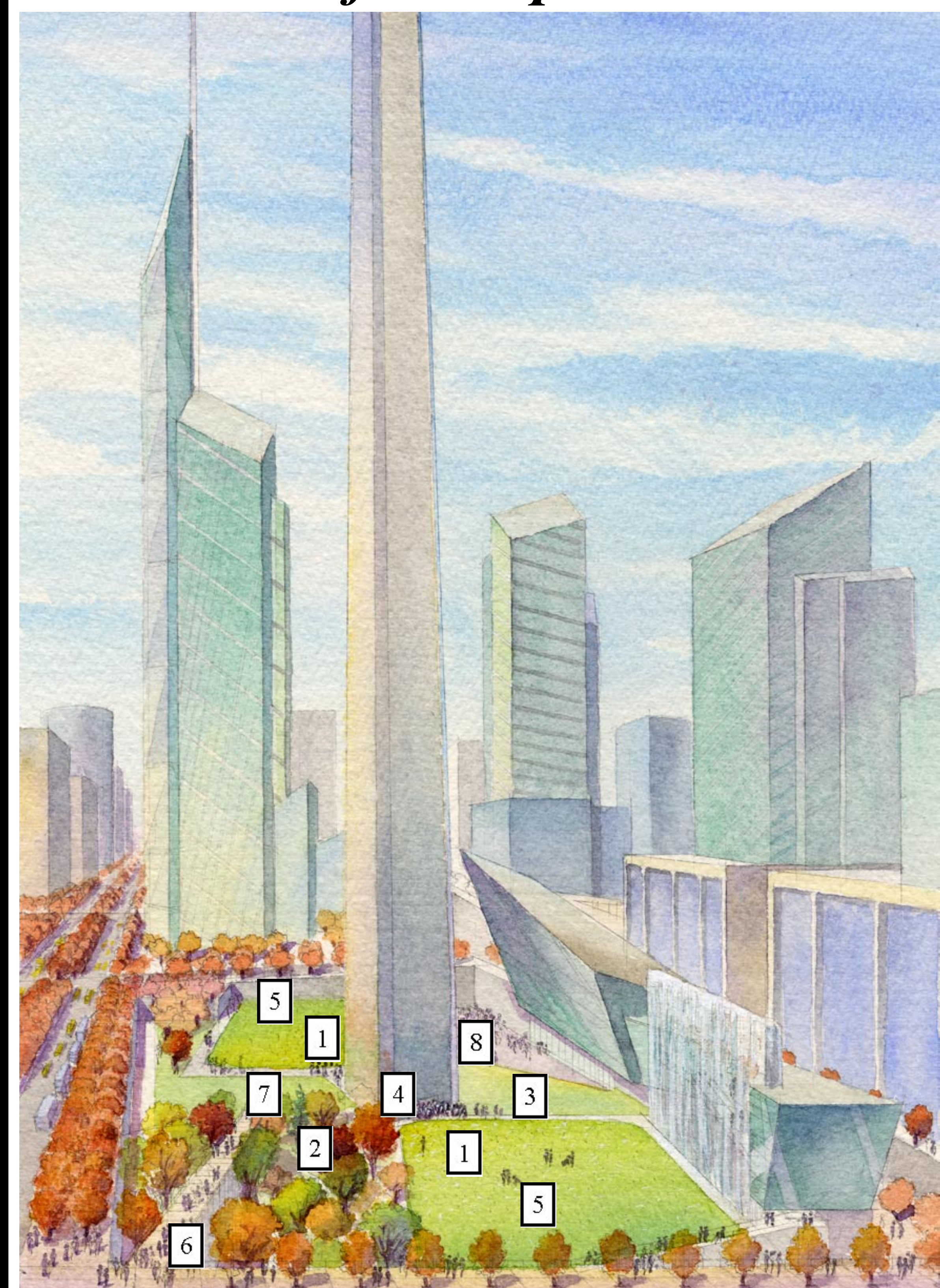


Figure B-1 [above] Aerial view of the site from approx 250ft above street level, notice the slightly convex shape of the spire. The walls are vertical at ground level and slope slightly inward (about 1.25 degrees) with increasing height. Viewed from the footprint, this projects the illusion of vertical walls rising to an infinite vanishing point.

Figure B-2 [upper right] View of the south footprint, as seen from the main entrance ramp. This view overlooks the wooded area in the southwest quadrant of the site. The spire and south footprint are visible in the background. The ramp is a replica of that used during rescue and recovery efforts, and is a tribute to the rescue workers and volunteers. The waterfall is visible in background.

Figure B-3 [lower right] Early concept sketch drawn in late 2002 shows relationship of the spire and headstones (surrounding details omitted as site plan was not known yet)



The infinite spire projects the illusion of vertical walls rising to a vanishing point overhead when viewed from nearby. The spire's slightly convex shape is generated by projecting sightlines from a point on the ground to an imaginary building that is infinitely tall. These sightlines to the imaginary building are then mapped in polar coordinates and compressed just slightly to project them onto a finite shape that can be built. The resulting structure may be scaled as needed to conform to physical and economic constraints as its absolute height is less important than the effect it projects (though it should be tall relative to nearby buildings). We considered heights ranging from 300 meters (984') to 900 meters (2952') in our preliminary studies, and used a 600 meter (1968') high by 25 meter (82') wide reference design for the drawings and renderings. The structure may be unoccupied or may house a museum (see Section E) depending on construction methods, budget and the final site plan in terms of cultural facilities.

[left] A daylight view of the infinite spire as seen from one of the footprints. When viewed from nearby, the spire appears to rise vertically to an infinite vanishing point.

[above] Watercolor painting of the site as seen from the southwest with waterfall and cultural building in background



[left] Closeup view of headstone. Each headstone is placed at a random location and orientation, and is warped slightly, as if it withstood a tremendous force. WTC victims' headstones are made from structural steel from the former towers. The airline victims' headstones are made of aircraft aluminum.



[center] Preliminary wide angle rendering of spire seen from WTC1 footprint. The tomb is located in the passageway through the spire. The Sphere and waterfall are visible in the background. Headstones are visible in the foreground.

[right] Light of Remembrance : a view of the spire looking east across the Hudson River at twilight. The spire's shape doubles as a mirror that reflects spot beams to form a giant vertical beam that will be visible from great distances. This effect will be similar to the Tribute in Light, except that the spire will be brightly lit by dozens of beams converging upon it from the surrounding area, and will in turn reflect these beams to form one vertical beam that shines brightly into the sky and clouds above. The spire's extreme height and brilliant texture will also fill the void in the center of the site and make the memorial visible day or night throughout the New York area.

