

~50-foot structure

Present 40-foot stack,
Very close ~75-foot structure.

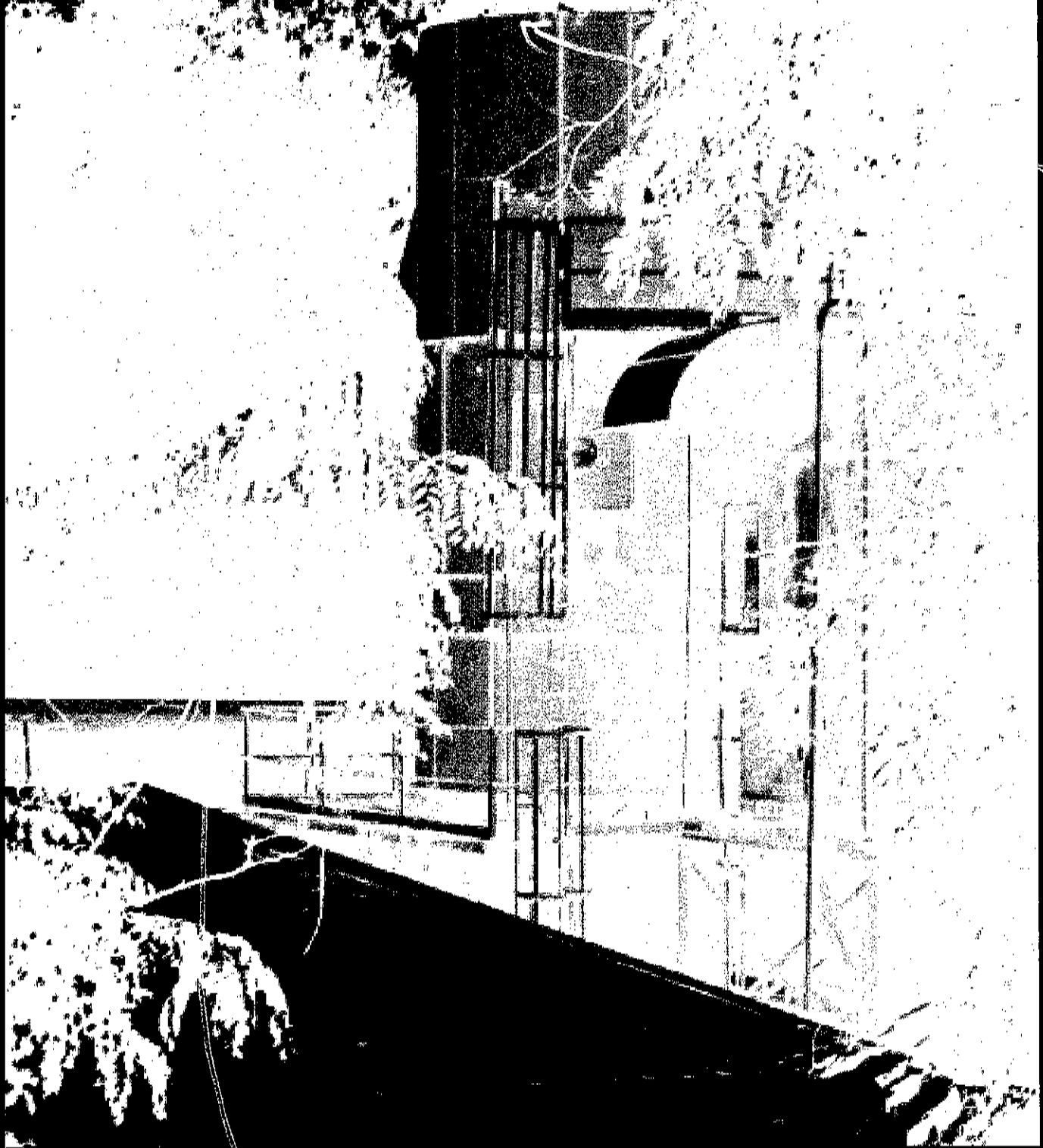


Present stack.

Approximate position
of proposed stack.

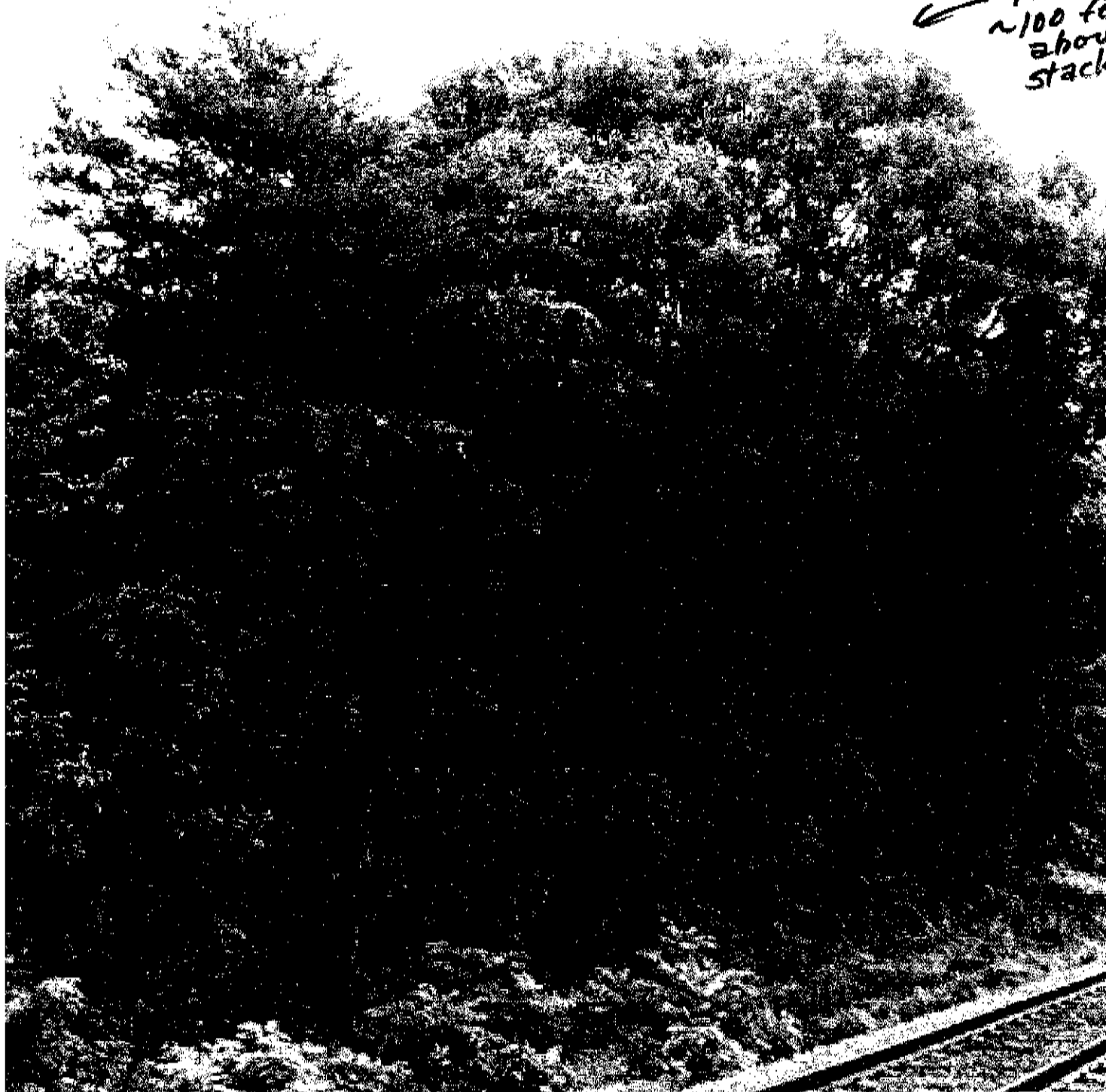
Many surrounding trees on neighbor's property

~60-foot nearby structure



Approximate location of proposed stack.

↙ trees
~100 feet
above
stack base.



Looking east from the factory. Residences are immediately beyond the trees.



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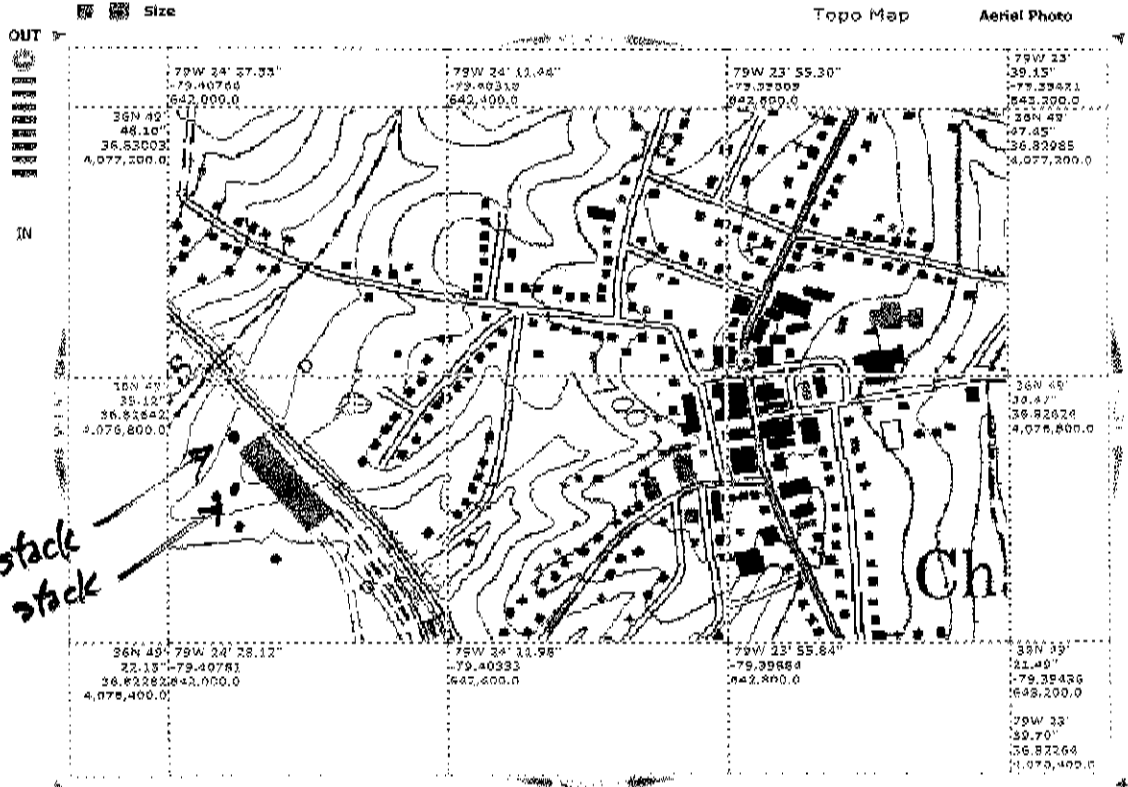
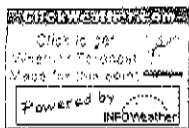


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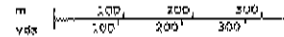


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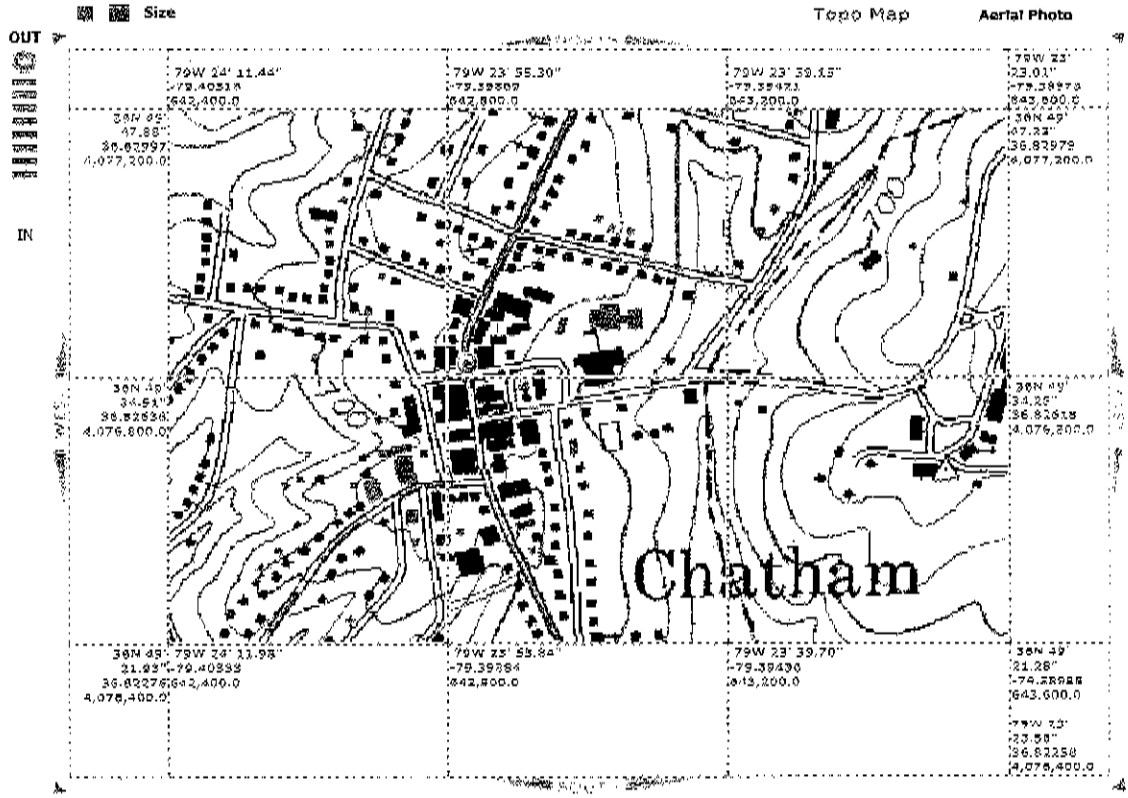
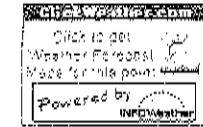
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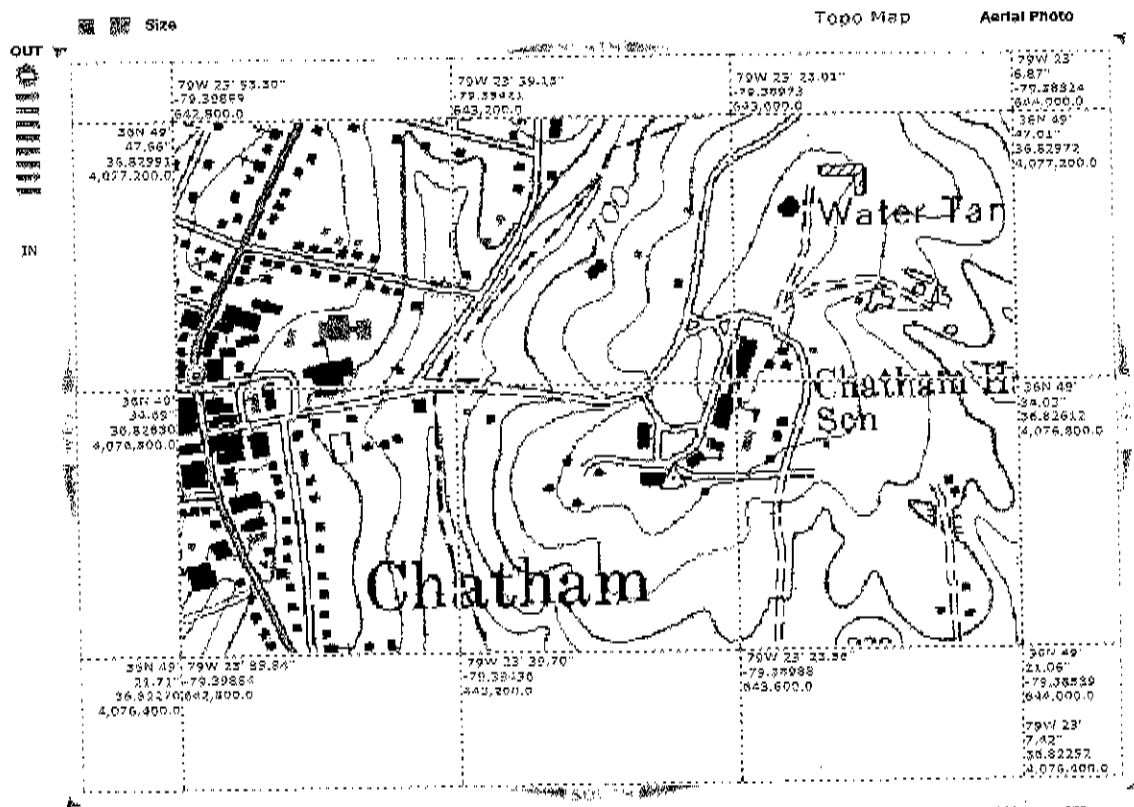


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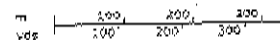


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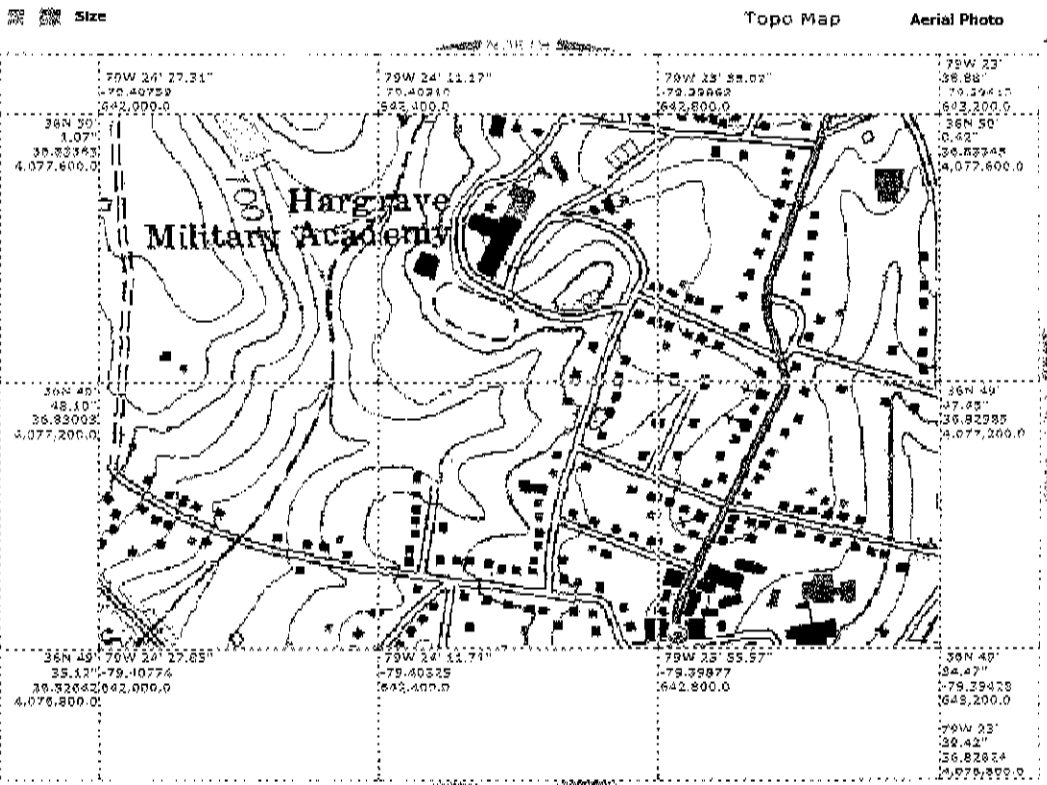
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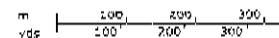


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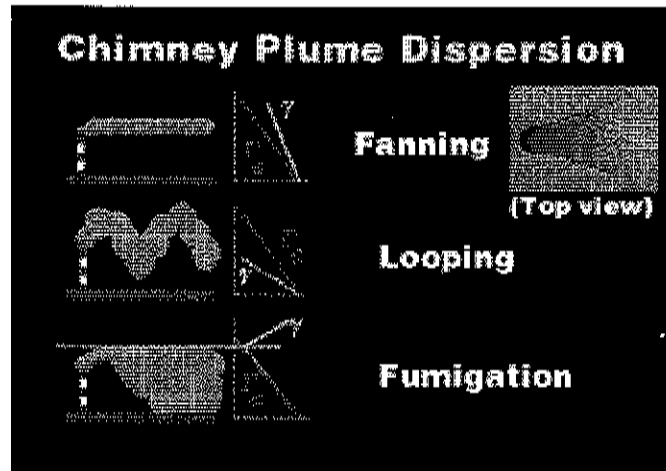
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Chimney Plume Dispersion

In the stable atmosphere case (producing a fanning plume), there is horizontal dispersion at a right angle to the wind due to turbulence and diffusion. In the vertical, dispersion is suppressed by the stability of the atmosphere, so pollution does not spread toward the ground. This results in very low pollution concentrations at the ground.

In unstable air, the plume will whip up and down as the atmosphere mixes around (whenever an air parcel goes up, there must be air going down someplace else to maintain continuity, and the plume follows these air currents). This gives the plume the appearance that it is looping around.

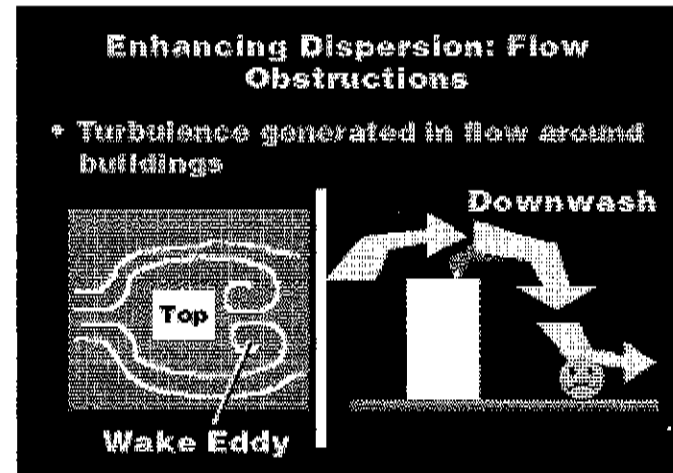
An inversion aloft will trap pollutants underneath it, since the stable inversion prevents vertical dispersion. Pollution released underneath the inversion layer will fumigate the mixed layer. Note that if the smokestack was high enough to release the pollution within the inversion layer, the plume would fan because the plume occurs within stable air.



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Enhancing Dispersion: Flow Obstructions

- The turbulent wake behind a building helps mix pollutants to the ground that might not have been there normally, in a stable atmosphere.
- Downwash is especially bad when there are pollution sources on the top of the building.
- It is important to get the pollution emitted high enough above the building so that it does not get caught in the downwash and get carried down to the ground

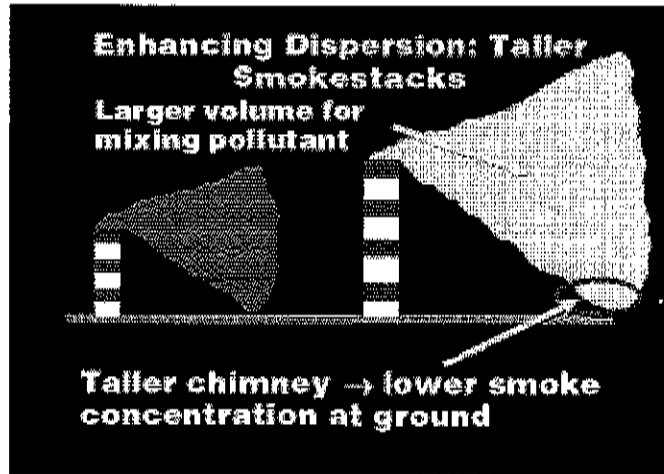


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Enhancing Dispersion with Smokestacks

Pollution emitted from a taller stack has to travel a longer distance to get to the ground, so it will become more dilute.

Also, it may be possible for taller stacks to get above low-level inversions....



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