BEARs (Spoiler)

Lets begin with a somewhat easier task: given an integer d, we need to find out whether the sheriff can keep the BEARs at least at a distance d from the warehouse. In other words, can the sheriff block streets in such way that the BEARs woudn't be able to enter any intersection strictly bounded by a square with vertices at $(\pm d,\ \pm d)$. Let K be the set of intersections within this square (excluding intersections on edges and vertices).

Let A be the set of intersections such that if the BEARs start in an intersection in A they will be able to reach an intersection in K no matter what the sheriff will do. We can express A as the minimal set of intersections such that any intersection S is in set A if at least one of the following holds:

(1) S is in K;

(2) there is a main street segment from S leading to an intersection in A;

(3) at least two of the neighbouring intersections are in A.

Note that because of (3), A will always be a rectangle.

We can construct the set A iteratively. Lets begin with $A = K$. Then for every main street that has at least one intersection in A, we extend A so that it would include all intersections in that main street. We do this until there are no main streets to add.

Now, if the intersection (a, b) is in A, the BEARs will reach an intersection in K.

We can now use bisection to find the maximum value of d for which the BEARs won't be able to reach K.

We construct the set A in $O\left(N^2\right)$, thus we solve the task in $O\left(N^2\ log\ max\left\{|A|, |B|\right\}\right)$.