

Effects of Industrial Infrastructure and Grayfields on Housing Vacancy

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Introduction/Literature Review

The Village of Johnson City, NY has a rich industrial heritage based on nearly a century-long history of excellence in shoe manufacturing with its powerhouse Endicott-Johnson Corporation. However, in the last forty years, it has seen its namesake company fall and leave behind a scattered set of industrial scars. In conjunction with this industrial infrastructure, the urban fabric of this great company town has seen various ripple effects from the fading industry including:

- Increased poverty
- Dilapidated housing stock
- Abandoned/zombie properties

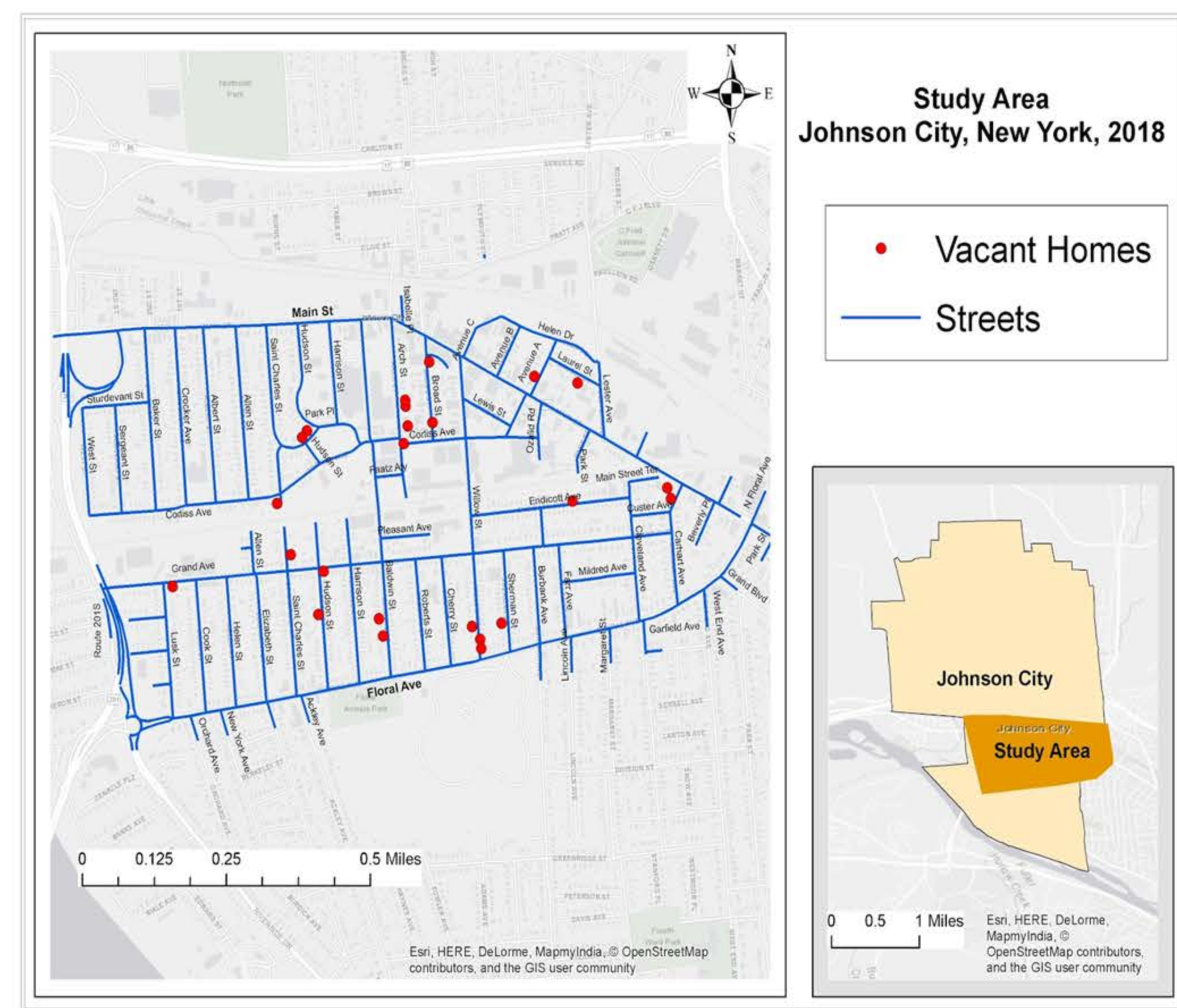
We aim to analyze any possible correlations between the trends of housing vacancy and proximity to industrial infrastructure. Abandoned properties have been linked to reduced public health and perceptions of safety. Furthermore, it encourages disinvestment in the community¹.

This study was conducted at a turning point era in the village's history as the Binghamton University School of Pharmaceutical Sciences has just opened its campus at a former E-J site within the industrial corridor.

Methodology

- Defining Infrastructure classifications:
 - Industry: Any industrial site—working or abandoned.
 - Grayfield: Parking lots that are largely unused and occupy significant space.
 - Vacant Homes: Boarded windows or official notices of vacancy signaled potential uninhabited residential properties.
- Defining Study Area:
 - The area between Floral Ave and Main Street, Johnson City was chosen due to its industrial history.
- Data extraction:
 - Used spatial cameras to record imagery and capture the geocoordinates of vacant homes, grayfields and industry.
 - Spatial Videos were geotagged using Dr. Andrew Curtis' Contour Converter program (Kent State University) and moved to Google Earth Pro where it was tagged based on infrastructure classification as KML files.
- Statistical analysis of vacant home proximity to Industry and Grayfields in ArcMap:
 - Distance of census blocks from industrial infrastructure and grayfields were calculated along with the percent of the blocks' homes that were vacant.
 - A Global Moran's analysis was calculated to find statistical significance of block proximity to industry / grayfields and percent of home vacant per block.
- Statistical analysis of vacant home proximity to other vacant homes in ArcMap:
 - The number of vacant homes in the immediate proximity of other vacant homes was calculated using point distance set to 290 feet (1 block).
 - A Global Moran's analysis was set to calculate the statistical significance of vacant homes proximity to each other (clusters).
- Buffers:
 - Buffers were created around industrial areas and grayfields in ArcMap. The buffers were set to 290, 580, 870 feet (290 feet ≈ 1 block). Data on homes within these buffers were collected.

Maps and Figures

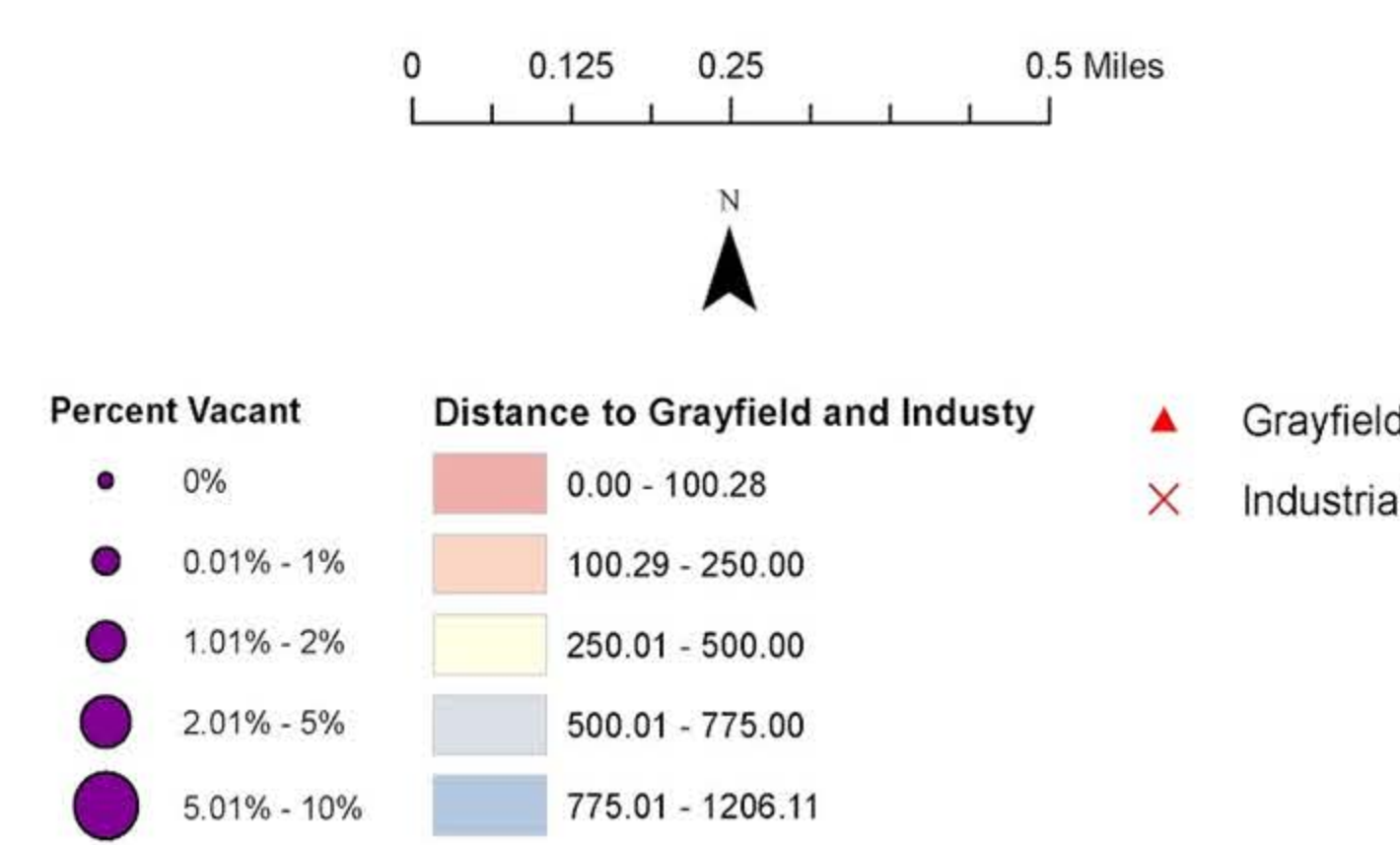
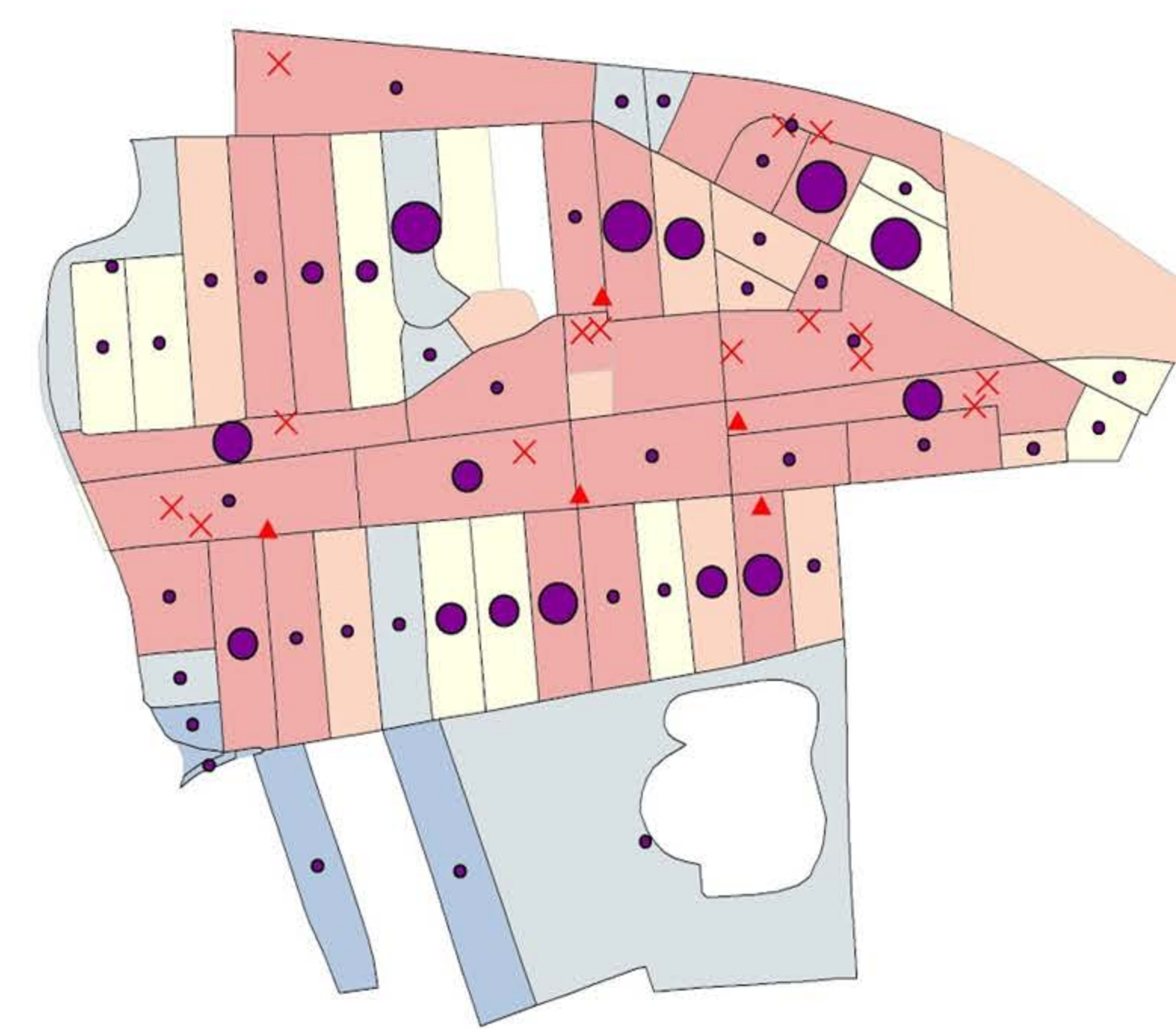


Map 1.



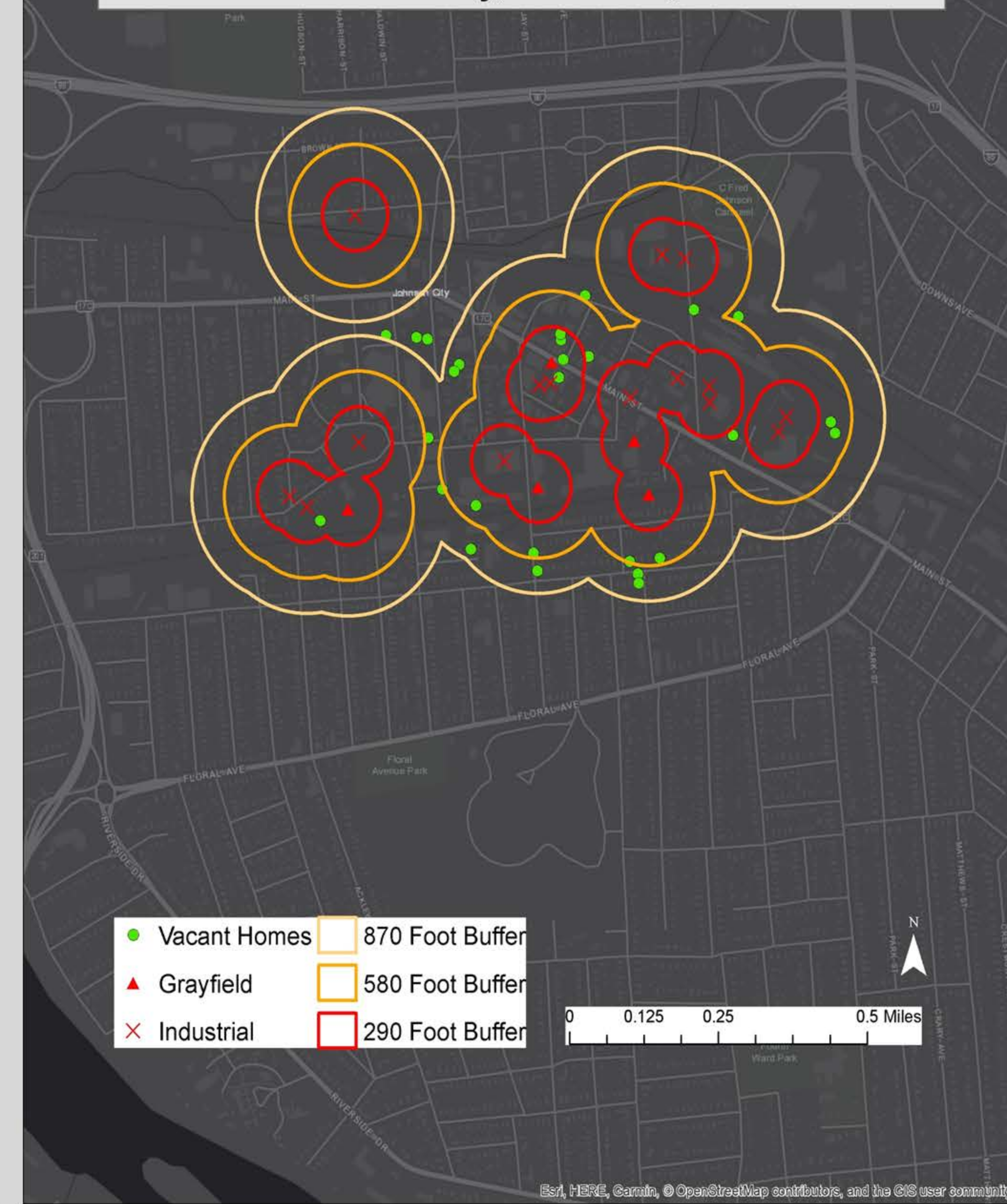
Images: Abandoned properties captured by spatial cameras in the Johnson City study area.

Expected vs. Actual Prevalence of Vacant Homes By Census Block, Johnson City, New York, 2018



Map 2. Blocks' distance to industrial infrastructure/grayfields affect the expected prevalence of vacant homes. The closer the blocks are, the more vacant homes would be expected. The size of the purple dots indicate how many vacant homes were in each block.

Vacant Homes Proximity to Industry and Grayfields Johnson City, New York, 2018



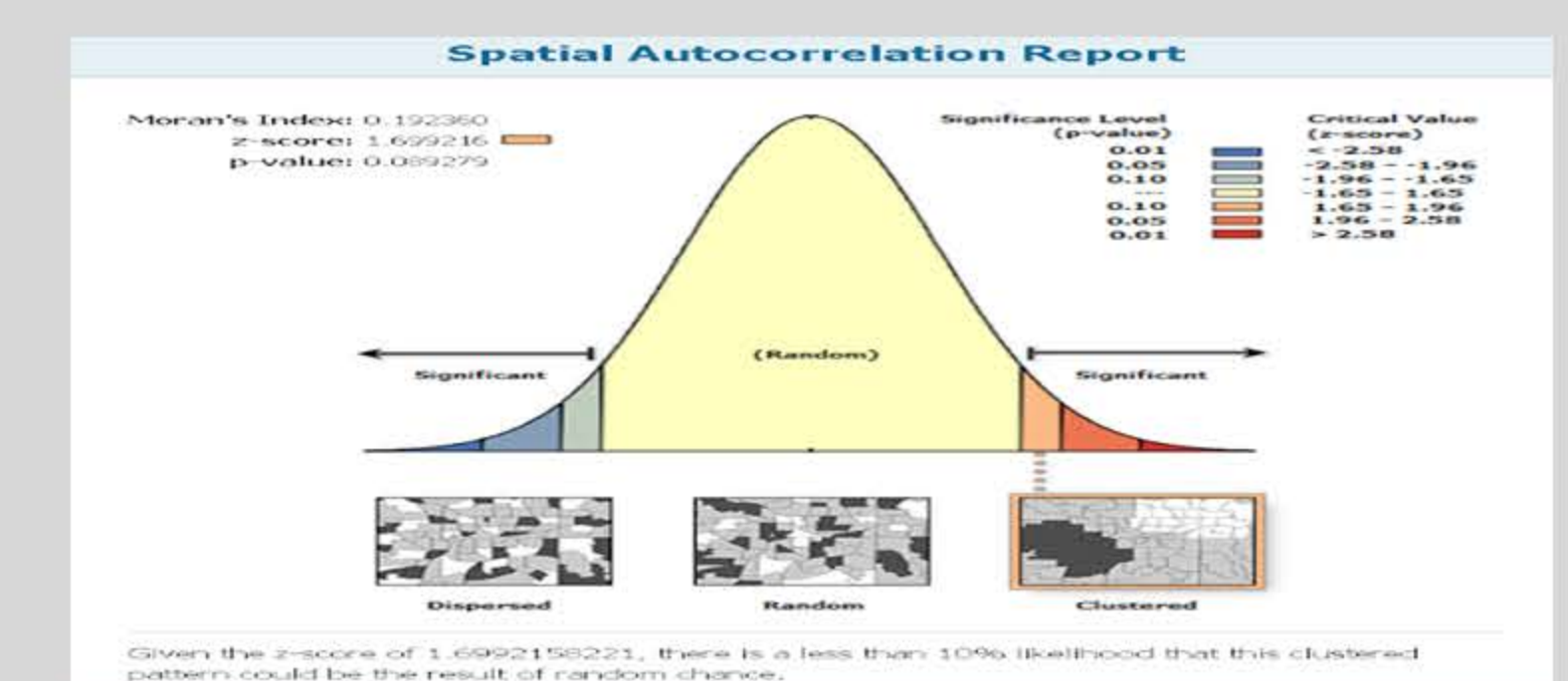
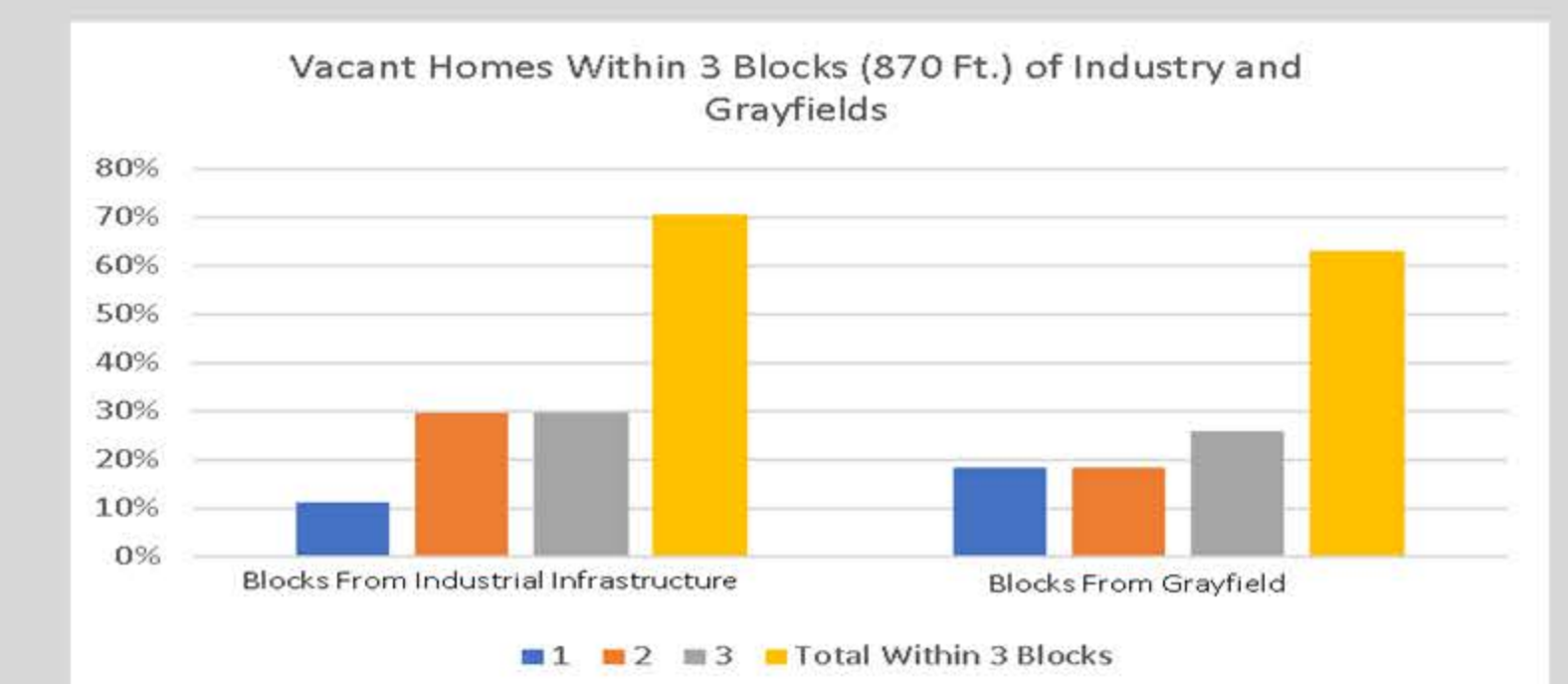
Map 3.

Hypotheses

- Hypothesis 1: There will be more vacant properties near vacant and functional industrial infrastructure.
- Null 1: The prevalence of vacant properties will be evenly distributed regardless of existing industrial infrastructure.
- Hypothesis 2: Abandoned homes will be located in clusters.
- Null 2: Location of abandoned homes will have no effect on other abandoned homes.

Results/Findings

- With a P-value of .189, we can not reject the null hypothesis that there is no statistically significant correlation between housing vacancy (n=27) and proximity to industrial areas and gray fields.
 - 70% of vacant homes fell within 3 block radius of industrial infrastructure and 63% of vacant homes fell within 3 blocks of grayfields.
- Census blocks that we hypothesized having higher prevalence of vacant housing based on closer proximity to industrial infrastructure/gray fields, *did not* have more vacant residential units.
- Vacant homes tended to be clustered near other vacant homes (P=.044).



Conclusions

- While we did not find any statistically significant correlation between vacant homes and proximity to industrial infrastructure at this scale, there can potentially be a more significant correlation on a larger scale.
- Our findings on clustering could support that vacant home encourage more vacancy in close proximity.
- The vacant status of the 27 detected homes could potentially be more attributed to a wider agglomeration of factors such as:
 - Decline of small businesses
 - Heightened student populations
 - Increased renter-occupied housing

Possible Future Research

- Further research could include:
- Analysis of demographic data.
 - Distinguishing between functional and abandoned industrial infrastructure.
 - Utilize public research such as JC Redevelopment Story Map.
 - <https://jc-redevelopment.binghamton.edu/>

¹ Carvin, E., Branas, C., Keddem, S., Sellman, J., & Cannuscio, C. (2012). More Than Just An Eyesore: Local Insights And Solutions on Vacant Land And Urban Health. Journal of Urban Health, 90(3), 412-426. doi:10.1007/s11524-012-9782-7