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## Beyond Housing

Karen Torres-Olguin  
*Portland State University*

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Beyond Housing

by

Karen Torres-Olguin

## Abstract

*Objective:* The suitability index, k-index, created through this will allow for a more comprehensive system for identifying adequate housing sites. Three Permanent Supportive Housing scenarios will also be assessed.

*Methods:* Research concerning PSH and spatial effects on health and life outcomes were used to build the index and to identify influential factors. ArcGIS was then used to spatially relate these factors within Portland, Oregon and assign points to specified areas.

*Results:* Areas closer to the center of Portland had the greatest concentration of high scores, while the outer city scored lower. Part of the analysis of PSH housing scenario confirmed concerns around housing site oversight and amplifies factors that the city may be able to improve.

*Conclusions:* The k-index's findings begin to create an understanding of what suitable housing locations exist in Portland and how PSH can benefit from the factors already present.

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I would also like to acknowledge and thank the community that this is for. I have been fortunate enough to work with dozens of community members in different capacities and to learn so much from them. Every day that each one of you decides to keep fighting, is a day that I am reminded of why I do this. For those of you that did not have that choice, this is also for you. It is all for you.

## Introduction

Portland, Oregon is facing a problem that is seen in most major cities across the country: homelessness. Portland's response to this crisis has been increasingly shaped by solutions that highlight the necessity of appropriate housing models, such as Permanent Supportive Housing (PSH). Permanent Supportive Housing is defined as “permanent housing with indefinite leasing or rental assistance paired with supportive services to assist homeless persons with a disability or families with an adult or child member with a disability to achieve housing stability” (U.S. Department of Housing and Urban Development, n.d.). Even as PSH is better integrated as a solution to this crisis, the physical locations of these housing sites are often overlooked.

Every other year cities conduct a Point-In-Time (PIT) count that is required by the Department of Housing and Urban Development (HUD). The count execution may take several days, but the data gathered is specifically about where people experiencing homelessness spent the night on a single night in January. Gathering this data helps cities receive federal funding as well as enables them to understand the impact of services and programs for the homeless community.

Portland's 2017 Point-In-Time count revealed information about high need communities who were unsheltered at the time. Unsheltered as defined by HUD is a person or family “with primary nighttime residence that is a public or private place not designed for or ordinarily used as a regular sleeping accommodation for human beings, including a car, park, abandoned building, bus or train station, airport or camping ground” (U.S. Department of Housing and Urban Development, 2002). PIT data highlighted the relationship between being unsheltered and having a disabling condition. Nearly 72% of the unsheltered people reported having a disabling condition (1,194 out of 1,668). Of those with a disabling condition, 44.8% have a serious mental

illness, 38% have a physical disability and 38% have a substance use disorder (Krishnan & Elliott, 2017). It is imperative that people be housed in order to be able to move forward, in order to focus on healing, as opposed to being focused on securing shelter day by day. However, this same urgency should not allow for neglect on the spatial placement of housing and its effects.

The urgency to consider housing to be much more than a physical home became apparent in Portland. The Wapato Jail site began to make waves in local news in 2016 when the Portland Business Alliance suggested using it as a shelter facility (Deja Vu on Wapato Shelter, 2018). With this initial proposal came pushback, many of the concerns centered around equitable access to amenities such as grocery stores, greenspaces and frequent bus lines. The rejection of the site became a lesson of what happens when cities aim to house and nothing more. Ignoring the impact of the physical environment leads to temporary solutions with strong implications around what a suitable environment is and sets a precedent for such actions.

While research on why PSH is beneficial to people experiencing homelessness has been done as has research on spatial effects on health, a combination of the two has not been extensive. My research aims to take existing evidence to build a suitability index, referred to as the k-index, to analyze and identify suitable PSH locations. This index and visual maps will be created using Geographic Information Systems (GIS) through ArcGIS. This research will also analyze the proposed Wapato Jail site as well as PSH projects that are underway to see how they rank within the k-index.

It is important to continue to advocate for PSH as a housing response to Portland's homeless crisis due to its efficiency. Taking relationships between housing and the built environment into consideration allows PSH to become not only one of many solutions to the homelessness crisis, but also a solution proactive to structured inequality. The 2017 PIT count

also revealed the disproportionate rates at which people of color experience homelessness, and are unsheltered when compared to the White demographic, who, although make up a bigger percentage of people experiencing homelessness, have higher rates of being sheltered (Krishnan & Elliott, 2017).

While the City of Portland has begun to take steps to create these crucial PSH opportunities, by committing to provide 2,000 new units by 2028, it is also important to consider the built environment and placement. In many cases the location of PSH replicates patterns of housing inequality as they are placed in neighborhoods that lack access to parks and access to grocery stores (Henwood, B. F., Cabassa, L. J., Craig, C. M., & Padgett, D. K., 2013). The access to amenities, economic and societal factors can influence how people experience housing and can have long term effects on their lives (Briggs, X. D. S. (Ed.). (2005). The importance of this point is what cities at times ignore for the sake of meeting housing milestones that can be positively reported back in the form of statistics. These milestones undoubtedly are important--we must house people--but we also must provide housing in an equitable manner, and to do so goes beyond just the physical housing structures.

### **Benefits of Permanent Supportive Housing**

Investment in PSH has the potential to have positive effects on not only individuals who are participating in the program, but for neighborhoods and cities. This housing type sees higher retention rates than other housing programs (Shern, D., Felton, C., Hough, R., Lehman, A., Goldfinger, S., Valencia, E., Dennis, D., Straw, R., Wood, P., 1997; Tsemberis and Eisenberg 2000). There is a significantly higher use of emergency room services associated with unstable housing among individuals with physical and mental illnesses as well as substance abuse issues, factors present in the vulnerable population that was been highlighted (Kushel, Perry, Bangsberg,

Clark & Moss, 2002). However implementing PSH has the potential to reduce the amount of money spent on emergency services (Culhane, D., Metraux S., & Hadley, T., 2002). One of the most significant advantages of PSH is the relationship between investment in the program and the decrease in homelessness. A study discovered that for every additional PSH unit per 10,000 adults, there is a 1% decrease in the total rate of chronic homelessness (Byrne, et. al., 2014).

### **Methodology**

This analysis is composed of three parts. The first step consisted of identifying factors that influence spatial relationships. Understanding these factors and how people relate to them, allowed me to construct the k-index. Finally, the index was used to analyze different sites and create a greater understanding of how other parts of the city score. This methodology is partially modeled after GIS research that sought to measure spatial indicators of health (Parenteau, M., Sawada, M., Kristjansson, E., Calhoun, M., Leclair, S., Labonté, R., Runnels, V., Musiol, A. & Herold, S., 2008).

### **Data**

Census tracts for the City of Portland were used to relate each factor to a geographic location, for this reason, data was clipped to only represent Portland. There were 11 data layers used, outlined in Table 1, each was used due to the justifications listed. The data layers focused on amenities, sociodemographic data, employment, and current usable buildable land. Many of these factors are closely related, thus deciding to place PSH near these amenities can influence the lifestyle choices of the residents of the housing site (Henwood, B. F., Cabassa, L. J., Craig, C. M., & Padgett, D. K., 2013).



Table 1  
*Data Layers, Data Sources and Justifications*

Data	Source	Justification
Grocery stores	PDX Open Data	PSH locations often lack access to healthy food. (Henwood, B. F., Cabassa, L. J., Craig, C. M., & Padgett, D. K., 2013).
Parks	PDX Open Data	Access to parks and greenspaces can have positive effects on physical and mental health. (Zhang, X., Lu, H., & Holt, J. B. (2011 & Wood, L., Hooper, P., Foster, S., & Bull, F., 2017.)
Trimet bus line and rail stop	Trimet	Lack of transportation access is a barrier to obtaining and keeping employment. (National Coalition for the Homeless., n.d.). It is assumed that this will be the main mode of transportation people will have access to.
Health clinics	Multnomah County	Participating in preventative primary care can better a person's overall health. (Henwood, B. F., Cabassa, L. J., Craig, C. M., & Padgett, D. K., 2013).
Median income	Census 2016 ACS	Median household income is a predictor of life outcomes, access to amenities and neighborhood social ties (Miles, R., & Song, Y., 2009).
Poverty rate	Census 2016 ACS	Has been linked to rates of homelessness (Early, D. W., & Olsen, E. O., 2002).
Number of crimes	Portland Police Bureau	There is a relationship between income inequality and social cohesion and crime. (Kawachi, I., Kennedy, B. P., & Wilkinson, R. G., 1999)
Employment type by education attainment requirements	Census LODES	Accounts for accessible jobs with low education attainment requirements, which tends to be a barrier for people transitioning from being homeless. (National Coalition for the Homeless., n.d.).
Usable Buildable Lands Inventory (BLI)	PDX Open Data	Data predicts development trends and development capacity. Highlights underusage of current lands/property and can serve as a guide to where PSH can be built.
Census tracts	TIGER/LINE	Used to spatially relate data layers.
Approved PSH sites and Wapato Jail	Geocoded addresses	Used to analyze approved sites using suitability index to identify strengths and weaknesses.

## Index

The index was built by creating a fishnet layer, with each unit of analysis capturing 1320 feet, or 0.25 miles. This measurement was chosen in order to accurately represent data and to be able to meaningfully analyze the three sites of interest. The layer was set over the city of

Portland, making sure to remove any units that overlapped on rivers, parks or wetlands, as no housing would be built there. The remaining number of fishnet grids used were 1770.

A detailed summary of the thirteen measures used in the index can be found in Table 2, as well as the threshold each factor met in order to earn a point on the k-index. All factors relate to the city in three ways. A 0.5-mile walking distance was used for factors that rely on walkability and proximity. A 45-minute public transit commute was chosen because this proved to be a time threshold that was both reasonable for someone to use and covered a great distance of Portland. The transit network used pulled data from a typical Monday morning commute from 6 a.m. to 10 a.m. Lastly, the remaining factors were analyzed according to the census tract within a specific fishnet grid. These factors were analyzed through spatial joins where the variables were read directly from the grid. A summary of the process can be found in the Appendix.

Table 2  
*Layers and Measures Used*

Factor	Threshold	GIS Measure
Grocery stores	Access to 1	Access via 0.5-mile walking network
Parks		
Trimet frequent bus line stop		
Trimet rail stop		
Health clinics		Access via 45-minute public transit commute
Median income	Higher than \$61,532	Census tract within fishnet grid
Percent below poverty	Lower than 16.2%	
Number of crimes	Less than or equal to 26	
Jobs not requiring high school diploma	Greater than or equal to 521	Census tract within fishnet grid
Jobs requiring high school diploma, no college	Greater than or equal to 1,344	
Access to jobs not requiring high school diploma	Greater than or equal to 11,295	Access via 45-minute public transit commute
Access to jobs requiring high school diploma, no college	Greater than or equal to 29,388	
Usable Buildable Lands Inventory (BLI)	Greater than or equal to 5.5 acres	Census tract within fishnet grid

The k-index was used to create a general understanding of how Portland scores using this system. Additionally, the k-index was used to measure three different PSH housing scenarios. The first was the original Wapato Jail site proposal. Although there is a distinction between its proposed use, shelter housing, and PSH it remained a contentious and serious consideration for over a year despite its problems with inadequate access to amenities. For this reason, it remained a compelling contrast of what it could potentially mean to focus on physical structures of housing, without taking in to account access. The other two sites were PSH approved projects: Division Street Apartments and Findley Commons, which are expected to be completed within the coming years. Division Street Apartments, created through a partnership between Central City Concern and Related Northwest, will provide 40 PSH single room occupancy units. This housing project will be composed of low barrier units to serve individuals with mental health issues and units for individuals with a severe mental illness. The second approved project, Findley Commons, created through a partnership with Do Good Multnomah, HomeFirst and St. Mark's Lutheran Church, will supply 38 PSH units (Multnomah County, 2019).

### **Limitations**

Although each factor is backed by research there are limitations concerning the way data layers were used. The grocery stores data layer does not account for how accessible the price is, therefore although a grocery store may be present within the set distance range, it may not be within financial reach making it seem more beneficial than it is. Another limitation arises because of the focus of the data. All areas, but especially those in outer Portland may be benefitting from amenities that are found outside of the city, which this analysis is not capturing. If the reach of the data was extended the scores may shift favorably for some fishnets. As mentioned, the transit network used for this index captured transit specifically on Monday

morning, while this may be representative of transit on weekday mornings, it is not necessarily capturing evening or weekend commutes. Lastly, although the data used is supported by research, there could be amenities that are culturally, or geographically specific that these maps may not be capturing. For this reason, community input could have been beneficial.

### **Results**

Fixed sites were not chosen in order to consider and accommodate for other factors such as county financing or current property ownership, especially when referencing BLI. However, through the final map created there are compelling patterns in the data. Additionally, the results gave further insight on the three housing scenarios of interest.

The first set of results came in the form of scores. No fishnet grid earned a perfect score of 13, the highest score was 11. Most of the high scores are concentrated near the center of the city, as seen in Figure 1. This concentration of scores is partially due to transit accessibility. Two factors focused on transit, and an additional three factors relied on a 45-minute public transit commute in order to earn points. Table 3 indicates that fishnets receiving a score of 4 had the greatest frequency followed by 7, 6 and 5. This shows that there is a concentration of scores in the middle of the index. Additionally, only four grids received the highest score, 11 and all four were grouped closely in the city center, further emphasizing this part of the city as a suitable contender for PSH. Conversely, the lowest scoring fishnets were found in outer Portland.

Figure 1  
Map of K-Index Scores

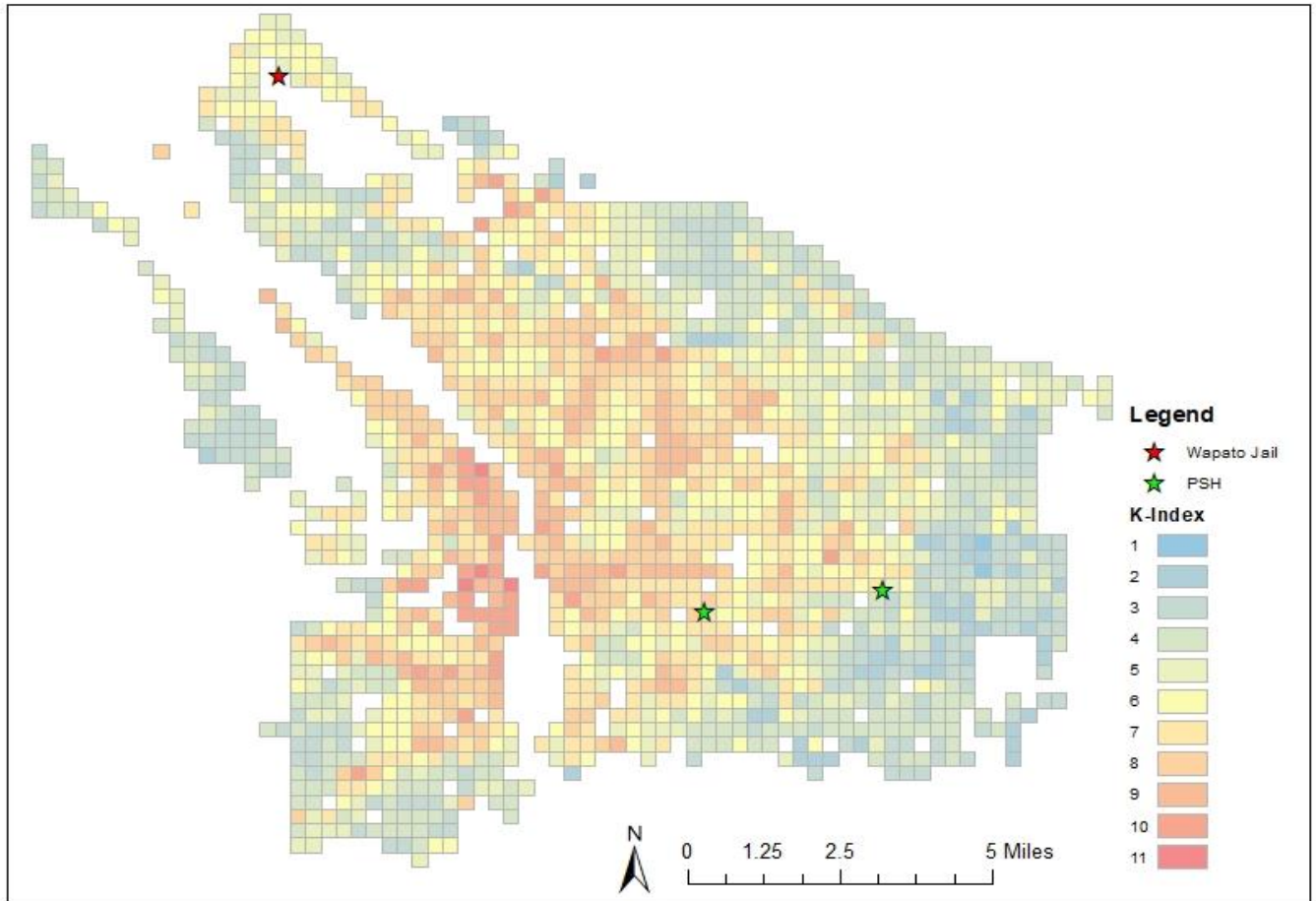


Table 3  
Scores and Frequency

Score	Frequency
1	0.11%
2	3.33%
3	13.11%
4	17.46%
5	14.4%
6	15.59%
7	16.61%
8	11.19%
9	8.89%
10	2.1%
11	0.23%
12	0%
13	0%

There was also additional information revealed about what factors fishnet tracts were more likely to receive points for. Table 4 shows the rate of each factor from highest to lowest. Understanding the frequency for each factor gives greater insight on specific factors the city may consider increasing. However, it also begins to help us understand how access to some factors may be considered more important when deciding on a site for PSH. The frequency of each factor additionally further emphasizes how although two grids may receive the same score, they may be for vastly different reasons.

Table 4  
*Factors and Frequency of Earning Points*

Factor	Frequency
Access to health clinics	85%
Number of crimes	72.83%
Percent below poverty	58.59%
Access to jobs not requiring high school diploma	52.15%
Parks	50.07%
Access to jobs requiring high school diploma, no college	49.95%
Median income	46.60%
Usable Buildable Lands Inventory (BLI)	34%
Trimet frequent bus line stop	33.33%
Grocery stores	25.31%
Jobs requiring high school diploma, no college	24.92%
Jobs not requiring high school diploma	24.58%
Trimet rail stop	6.38%

Wapato as shown in Figure 2a is located on a fishnet grid without any data, this is due to the fact that the majority of the grid was composed of wetlands, which were one of the land types that were taken out in order to provide more accurate data. However, the closest fishnet grid to the location was used as reference. Wapato scored 5, below the median score of 5.5. This site earned points on meeting the thresholds for health clinics, percent below poverty, number of crimes, jobs not requiring a high school diploma, and jobs requiring a high school diploma but

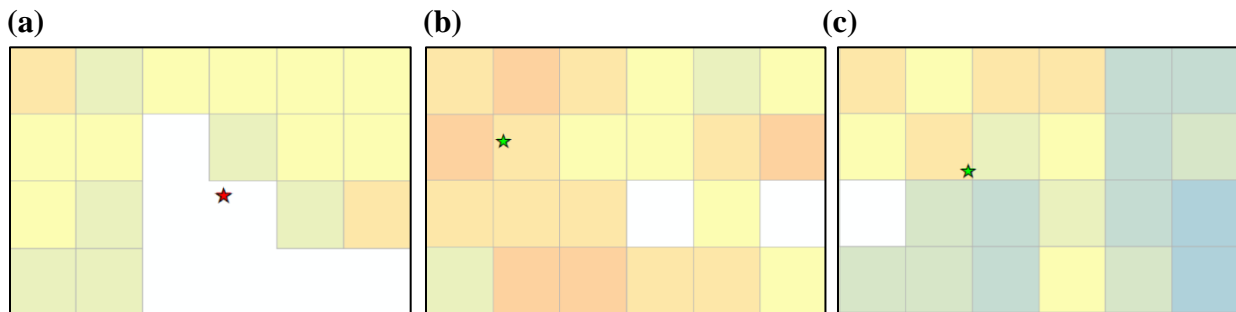
no college. It is important to note however that Wapato is in a part of the city that is not widely lived in, but instead has high employment opportunities. For these reasons meeting the threshold for percent below poverty, number of crimes and employment may be explained by this.

Additionally, looking at what Wapato did not receive points for, validates the concerns that were raised when its initial suggested use was discussed.

Findley Commons, shown in Figure 2b, earned several points for amenity-based factors, unlike Wapato. This site earned seven points for having access to grocery stores, parks, and Trimet frequent bus line stops. It also scored points for meeting the threshold for median income, percent below poverty, jobs not requiring a high school diploma and access to jobs requiring a high school diploma, but no college. Its overall score was 7, above the average score.

Division Street Apartments, shown in Figure 2c, also scored seven. It earned points for access to parks, Trimet frequent bus line stops as well as meeting the threshold for median income, percent below poverty, access to jobs not requiring a high school diploma and access to jobs requiring a high school diploma and no college. Lastly, the site earned a point for having 5.5 or more acres of usable BLI. While this site earned the same number of points as Findley Commons, the map shows that the surrounding fishnets scored considerably lower than seven.

Figure 2  
Map Displaying Housing Scenarios and Scores



**Conclusion**

The findings of this research emphasize the importance of considering the physical location of Permanent Supportive Housing. The k-index can be extended to include other factors as research increases. Additionally, it can be used at different geographic scales, as it may be needed. While PSH has increasingly been a response to the current homelessness crisis in Portland, there are considerations that must be taken into account as we begin to implement these programs. This research essentially shows two extremes in housing situations. The mapping of Wapato represents more than Wapato, but a reminder of what a focus on housing people without understanding housing placement can potentially mean. The mapping of Findley Commons and Division Street Apartments shows how it is possible to provide access to housing and important amenities. The use of ArcGIS to create this index and visuals show that understanding place and the visualization of these relationships can be implemented. But more importantly, that these suitable locations exist and should be used to create suitable housing opportunities.



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## Appendix

The Network Analyst tool was used for factors that relied on the transit. The analysis was conducted as “Closest Facility”. The “Facilities” were the points of interests and the “Incidents” were the centroids of the fishnet grids. The “Route Results” were then joined “Incidents”. “Incidents” were joined to fishnet grid polygons, were a new field with the variable name was added. Additionally, time was converted in to the appropriate measure, minutes.

The Network Analyst tool was also used to factors that relied on a walking network. For this analysis network buffers were created around the points of interests, if these were polygons centroids were used. For this analysis “New Service Area” was used. “Facilities” were also loaded as the points of interest. A spatial join to the grid centroids was done, and a new field was added that represented the number within the set distance.

The remaining features were mainly read directly from grids and census tracts. Each was joined to the fishnet grid to be able to do so through a spatial join.