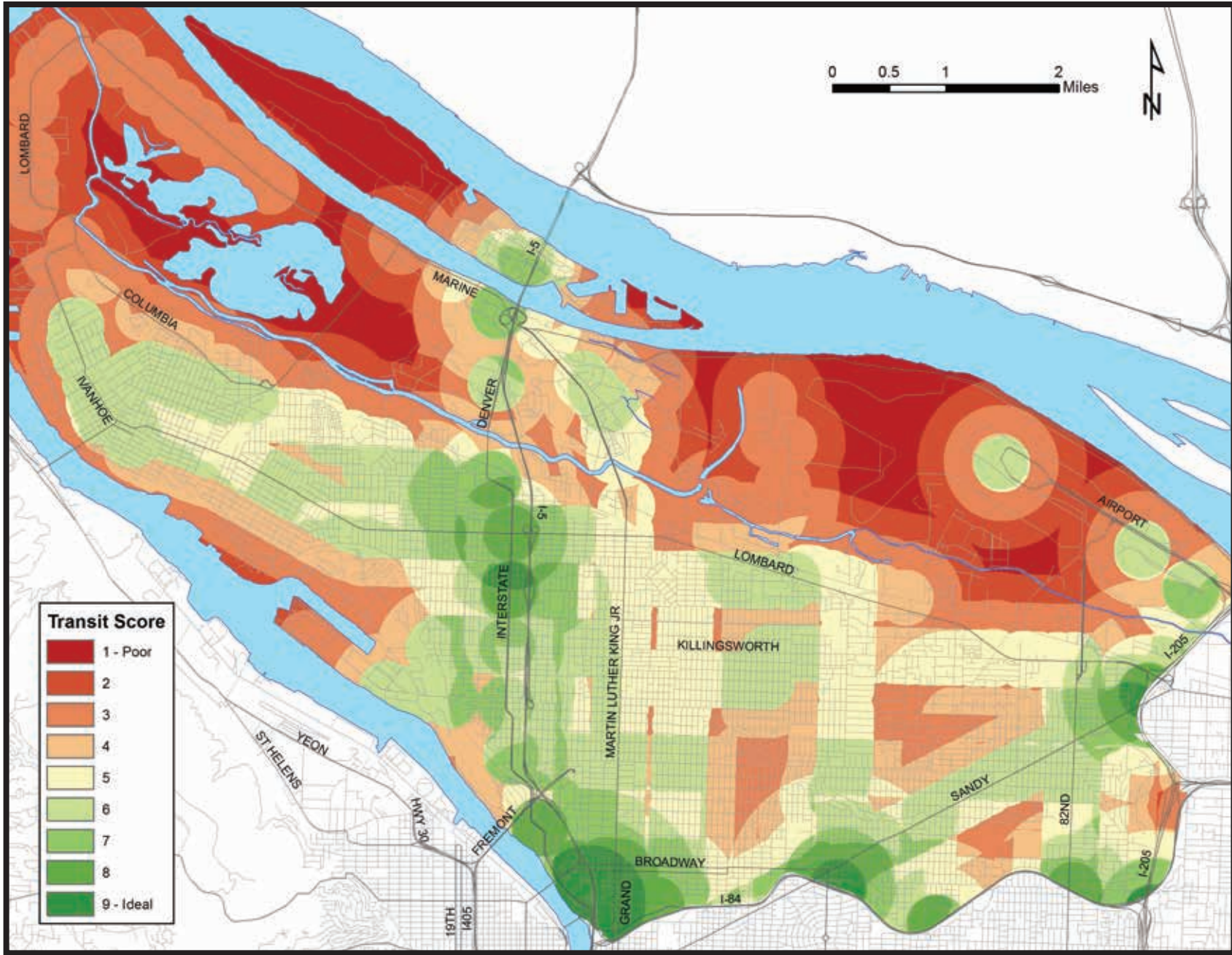


# Affordable Housing Site Suitability Analysis for North/Northeast Portland

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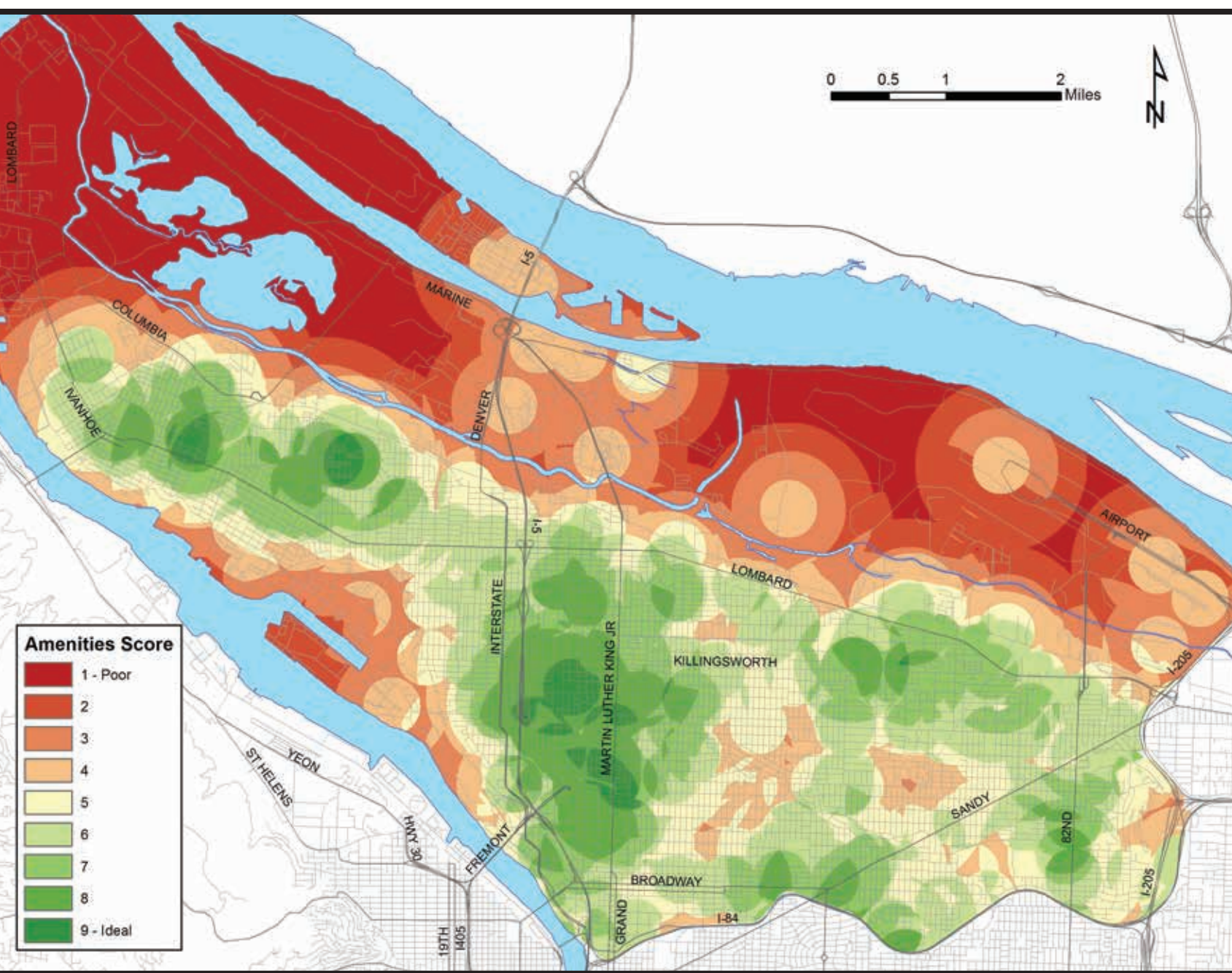
## Map 1. Transit Accessibility

This map shows the optimal areas for affordable housing development, based on proximity to public transit stops. It was created using a weighted suitability analysis based on locations of stops for the max lines, frequent bus routes, infrequent bus routes, and transit centers. We gave the highest weighting to proximity to bus stops of frequent bus lines, with a 40 percent weighting. We gave an equal weighting of 20 percent to transit centers, light rail stops, and infrequent bus stops.



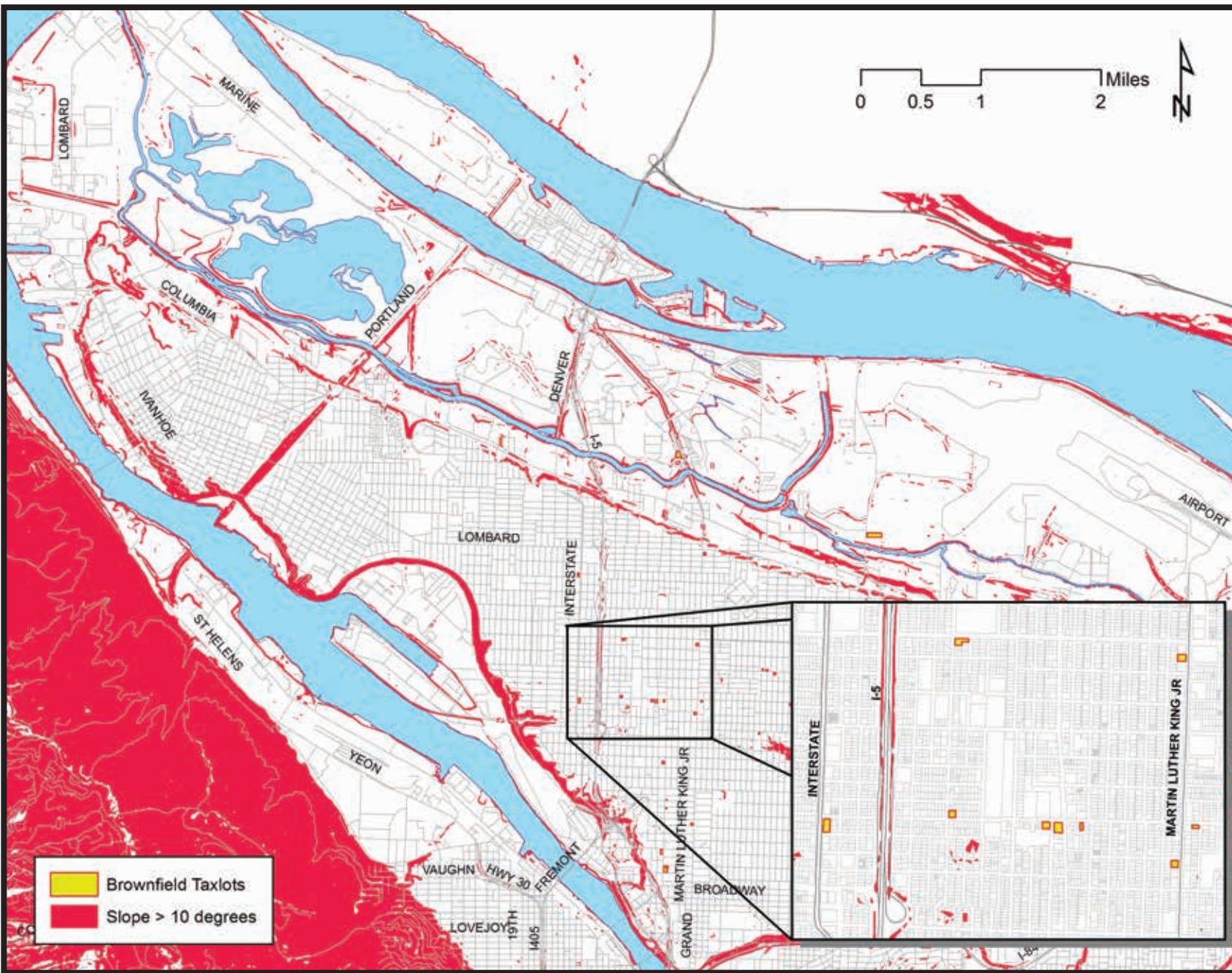
## Map 2. Accessibility to Amenities & Services

This map highlights optimal areas for affordable housing development, based on proximity to amenities and services. For amenities and services, we first merged tables for food pantries, and groceries stores that accept SNAP and WIC benefits to get one shapefile for affordable food sources. We also merged tables for health-care facilities and hospitals to get a single healthcare services layer. Next, we used Weighted Overlay to create a weighted suitability analysis based on proximity to amenities and services. Those services that would be used most frequently received the highest weightings. Weightings were assigned as follows: Food - 30%, Health - 15%, Schools - 15%, Childcare 15%, Employment Centers - 10%, Community Centers - 5%, Parks - 5%, and Libraries - 5%.



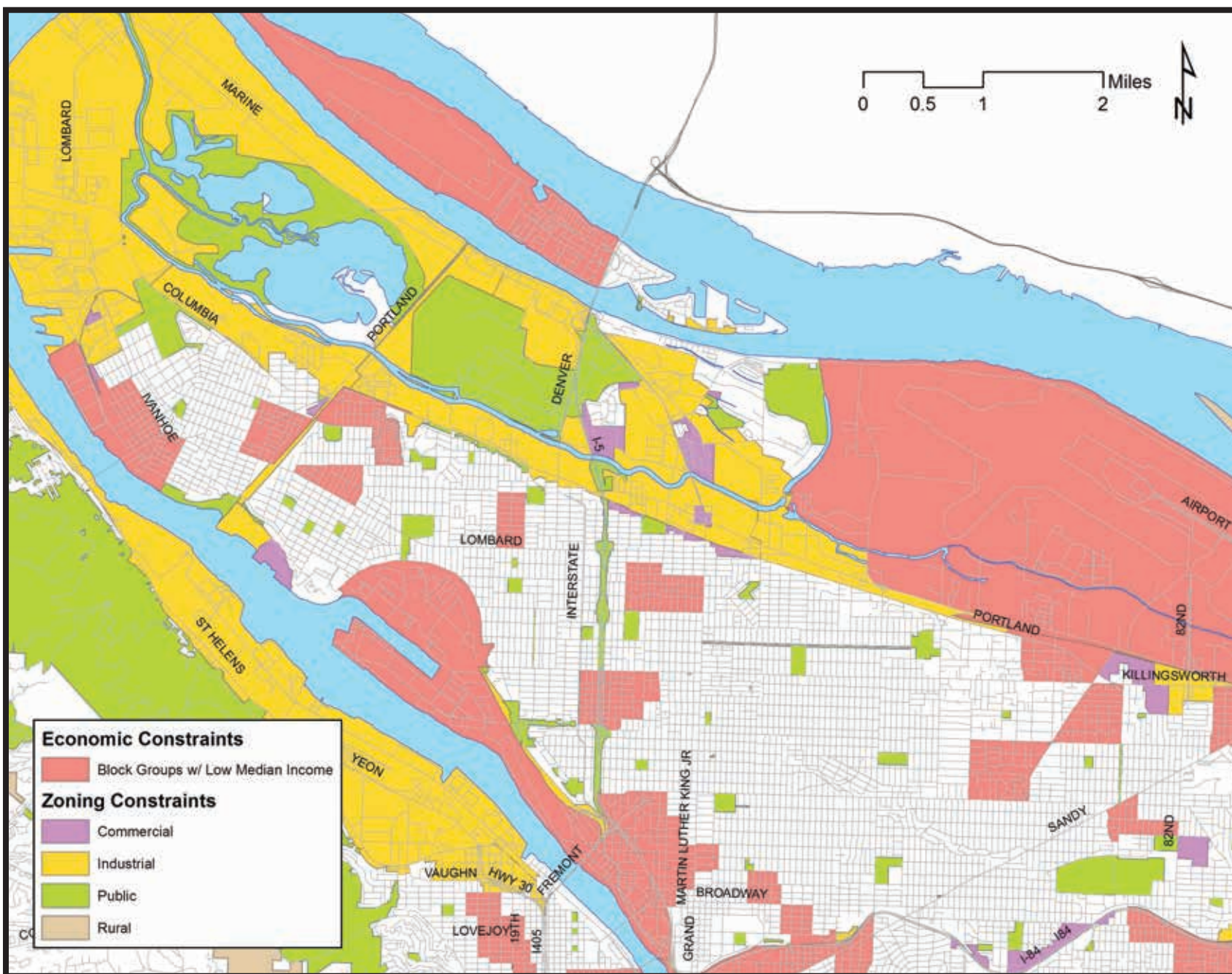
## Map 3. Environmental Constraints

A map was created with environmental constraints that deemed certain areas undevelopable for affordable housing. First, we collected data shapefiles on slope, from Portland RLIS, and toxic pollutants, from the Environmental Protection Agency (EPA). Areas with slope greater than 10 percent and tax lots that included brownfield were removed. Removing brownfields from the analysis serves the dual purpose of avoiding costly remediation requirements for affordable housing developments. We also examined Superfund sites, and toxic substance and toxic air emission sites, but none of the optimal locations identified by the weighted overlay were near these sites so these criteria were not included in the final environmental constraints map.

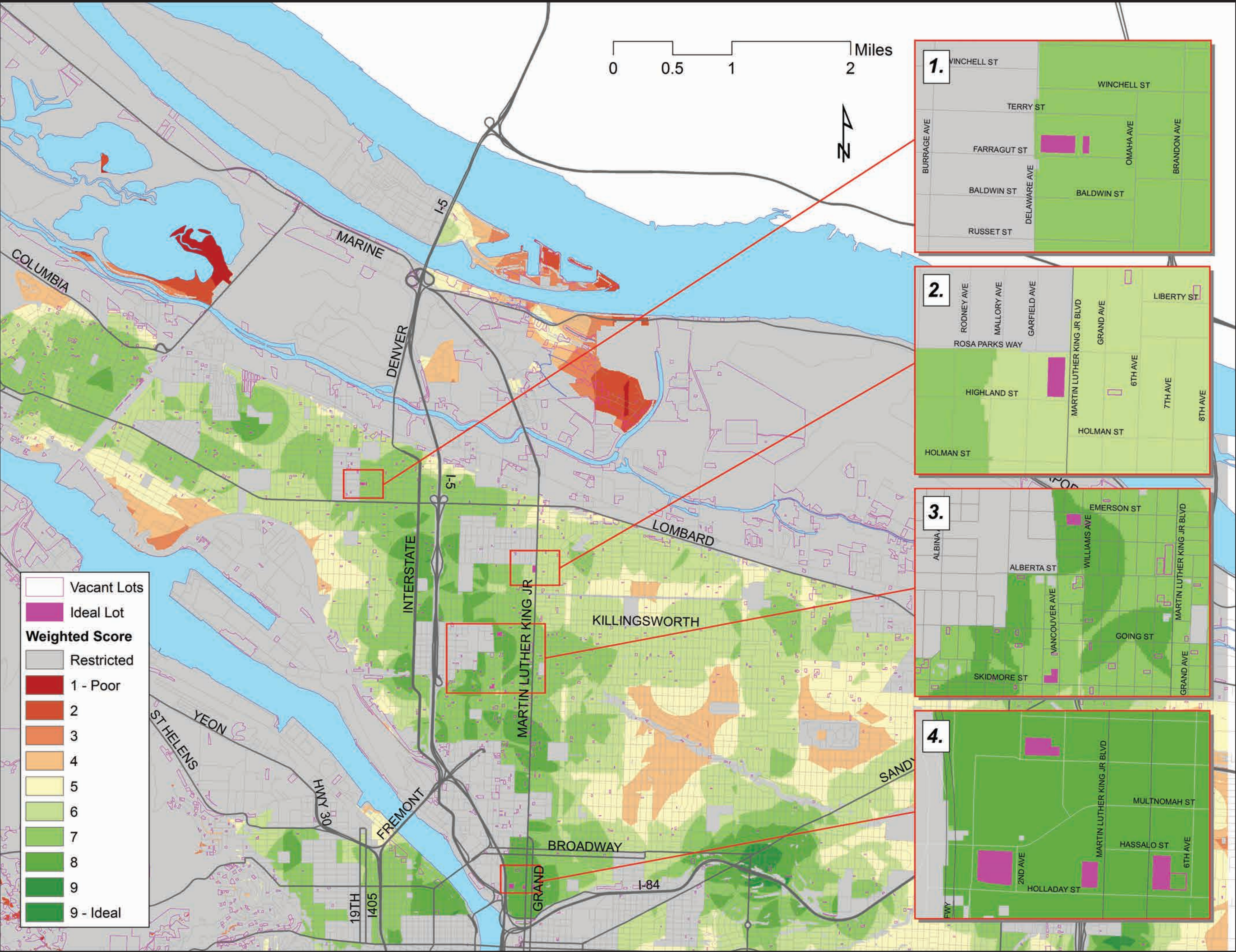


## Map 4. Economic & Development Constraints

Another aspect of our analysis included identifying economic and development constraints. In order to determine areas of concentrated poverty, we used 2014 American Community Survey (ACS) five year estimates, which we joined to census block group data to symbolize median family income for those block groups. In order to avoid developing affordable housing in areas of concentrated poverty, we identified and removed census block groups that were in the bottom quartile of median family income from our final analysis. We also removed all tax lots that were not zoned mixed-use, multi-family residential of single family residential. This map shows the areas of economic and developmental constraints, which were removed for the final suitability analysis.



## Final Suitability Analysis



## Methods

This analysis entailed the creation of a GIS site suitability analysis for affordable housing developments in Northeast Portland. It was created with the City of Portland, and Housing Bureau policies in mind; investments in affordable housing should be aimed at increasing opportunities and decreasing the disproportionate burden of pollution on low-income families. The optimal locations for affordable housing developments therefore should be close to: transportation, amenities and services, and located away from high concentrations of poverty and pollution.

First, criteria for the site suitability analysis was determined. We considered proximity to public transit a high priority, and collected data on bus stops, light rail stops, and transit centers. Second, we developed a list of amenities and services, based on the Housing Bureau's Opportunity Analysis, that are "necessary to satisfy essential needs, advance well-being and achieve full potential", and to which low-income residents often have less access. The services we determined that should be near any optimal affordable housing location include: schools, libraries, community centers, parks, healthy food, healthcare, and employment training centers. We gathered GIS shapefiles from Portland RLIS for transit, schools, libraries, community centers, hospitals, and parks. Then we developed a list of other services that would be particularly useful for low-income families: food pantries, child care, including head start programs, affordable health care, including community health clinics, and grocery stores that accept Supplemental Nutrition Assistance Program (SNAP) and Women Infant and Children (WIC) benefits, and Employment services; these data were downloaded from the Coalition for a Livable Future, and then geocoded into ArcGIS. Other shapefiles were downloaded from Portland RLIS for reference and geocoding including: tax lots, census block groups, streets, major arterials, slope, and zoning.

We chose to look at all of North & Northeast Portland as the study area, extending from St Johns on the west to I 205 on the east, and bordered by I 84 to the south. Once all the data were collected and geocoded, we created two weighted suitability analyses, one for transit accessibility and one for amenities & services accessibility. We then eliminated areas deemed unsuitable for development based on environmental, economic & other development constraints.

First, we calculated Euclidean distance for all the data points of the transit, amenities, and services shapefiles. Next, we reclassified the Euclidean Distance rasters on a scale of zero to nine, with nine representing the closest distance to the identified service, which was within either a quarter or half mile radius depending on the service. We determined that a quarter mile radius would be optimal for services used every day such as: grocery stores and food pantries, child care, and transit stops. The one exception was transit centers, to which we gave a half mile radius since we assumed people would be willing to travel farther for transit centers that have a broader range of coverage across the region. For important services that would be used less frequently, we decided a half mile radius would be optimal: libraries, community centers, parks, and employment centers. We then conducted two separate weighted suitability analyses using the Weighted Overlay Tool, one for Transit Accessibility and one for Accessibility to Amenities and Services (See Maps 1 and 2). Once the optimal areas for development were identified, we removed any tax lots that should be precluded from development due to environmental, economic, and development constraints (See Maps 3 and 4). All of these data were then combined into a Final Suitability Analysis Map, which was used to identify optimal tax lots.

## Background

Housing prices for the City of Portland have risen dramatically in recent years. Over the past five years, average rent for a two-bedroom apartment in Portland has increased 35% to \$1,472 per month, with overall average rent increasing 8-9% in the past year alone. Housing affordability has become a critical issue for many Portland residents, but low income communities and communities of color in Northeast Portland have been especially hard hit as the market increase in housing costs exacerbate pressures of gentrification and displacement these communities have already been facing.

Since the 1950s, an enormous amount of public and private investments has reshaped much of North and Northeast Portland. These developments, including the construction of Emanuel Hospital, the Memorial Coliseum, and Albina Planning, along with the consequent steep increase in neighborhood housing prices, have had the negative consequence of involuntary displacement of many of the area's residents. Communities of color, and particularly African Americans, have been disproportionately affected by gentrification in North and Northeast Portland, with 10,000 leaving the inner city from 2000 to 2010.

The City of Portland has recognized the need for investment in affordable housing. The Housing Bureau has recently allocated 20 million dollars to develop affordable housing within the Interstate Corridor Urban Renewal Area in North & Northeast Portland, some of which will go towards housing those who have been displaced by past city policies. Some new affordable housing developments are already underway, but the city is currently in search of other sites for affordable housing development within the Northeast Portland area.

Many factors should be considered when locating sites for affordable housing developments. The Portland Housing Bureau recognizes that access to amenities and services such as healthy food, quality education, and transportation are essential to success for well-being and success of all Portland residents, yet low income families and communities of color are often forced by the housing market to live in areas without many of these services. Access to reliable public transit is of particular importance to low income families who might otherwise lack transportation to meet their daily needs. The City of Portland also recognizes that living in areas with high concentrations of poverty limits the opportunities available for low income people, and therefore adopted a "Location Policy" that avoids city funding for affordable housing in "Impact Areas" where 50% or more of residents earn less than 50% median family income. Lastly, since low income communities are often exposed to a disproportionate burden from industrial and toxic waste pollution, it was deemed important to take an environmental justice lens in examining potential environmental health hazards posed at certain sites.

## Results

For the Final Suitability Analysis map, we first created a map that shows the most optimal areas for development based on accessibility to all services. The weighted overlays for transit and amenities and services were combined into a third weighted overlay, giving 50 percent weighting to transit and 50 percent to amenities and services. Finally, the economic and zoning constraints, together with environmental constraints were rasterized, and overlaid as restricted areas against our final site suitability map. The product of this analyses revealed what, we assumed, would be the most optimal areas for affordable housing development.

Suitability scores were transposed into tax lots using Zonal Statistics and joined to the tax lot table. First, we selected with structured query language (SQL) those vacant tax lots that had scores greater than seven and were owned by the city. Later, we expanded that to include private owners with high-scoring vacant lots. We then examined potential tax lots individually. We identified several vacant lots that had established development plans in place, and were therefore eliminated from the final list of recommended sites. One of the development plans, on NE 2nd and Wasco, is for subsidized affordable housing; this further validated the criteria we developed to identify affordable housing locations based on the City of Portland's goals.

The final assessment resulted in seven optimal tax lots for affordable housing, shown in the insets of the final suitability analysis. Four of these lots are publicly owned, which could facilitate affordable housing development; these lots are located on NE Rosa Parks & MLK (Inset 2), and on NE Holladay and 2nd, MLK, and Grand (Inset 4). The lots on NE Delaware & Farragut (Inset 1), and NE Skidmore & Vancouver (Inset 3) are owned by Churches. The remaining lot, on NE Emerson & Williams, is owned by Salvation Army. All seven of these lots would be feasible from a development standpoint, and provide convenient access to opportunities and services for families in need.

## References & Data Sources

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