Site Suitability: Opportunities for Transit-Oriented Infill in Oakland, CA

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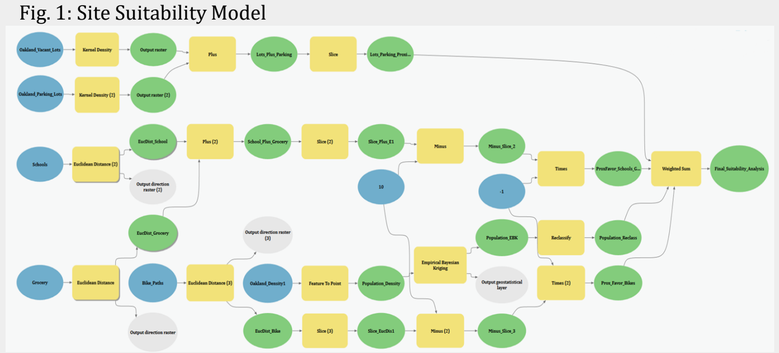
Abstract

The BART Board of Directors adopted the Transit-Oriented Development (TOD) Performance Policy Measures and Targets on 01 December 2016. Central to this planning document is the target of increasing housing units near BART stations by 84% by 2040 (155,800 new units). In addition to producing residential units on BART property, urban infill opportunity sites in the form of vacant lots and surface parking lots exist within close proximity to BART stations. Urban infill is described as the process of developing vacant or under-used parcels within existing urban areas. Successful infill is characterized by overall residential densities that promote walkable access to transit, grocery stores, and schools. Concentrating housing near transit allows cities to accommodate growth while mitigating the associated congestion and environmental impacts. For our project, we created a site suitability model with the goal of locating favorable sites for potential urban infill in Oakland, California. The criteria used to assess favorability of station areas were population density and proximity from infill sites to BART stations, grocery stores, schools, and bicycle paths.

Methodology

- **BART Stations**: Data retreived from the Department of Transportation.
- **Vacant Lots/Parking Lots**: Data retrieved from Alameda County Assessor's Office Secured Tax Roll of 2017/2018. All lots were then geocoded by address and clipped to a ¼ mile buffer around the BART Stations layer. Lot density was calculated using the Kernel Density tool, "vacant" and "parking" datasets were summed using the Plus tool and divided into 10 categories using the Slice tool.
- **Population Density**: Data retrieved from US Census Tract. A feature class of points was created using the Feature to Point tool. Density was interpolated using the Empirical Bayesian Kriging method and reclassified into 10 categories using the Reclassify tool.
- **Grocery and Schools**: Grocery stores were located using Google Earth. The .kml file was exported into ArcGIS then converted using the KML to Layer tool. Schools data were retrieved from the Oakland Unified School District and all addresses were then geocoded. For each dataset, Euclidean distance was calculated using the Euclidean Distance tool. The datasets were combined using the Plus tool and divided into 10 categories. Values were reorganized to favor proximity using the Minus and Times tools.
- **Bike Pathways**: Data retrieved from Alameda County Open Data Portal. The proximity favoring methodology used in the previous step was repeated.
- The results produced above were fed into the Weighted Sum tool using equal weights, producing an output representing suitable locations for transit-oriented infill.

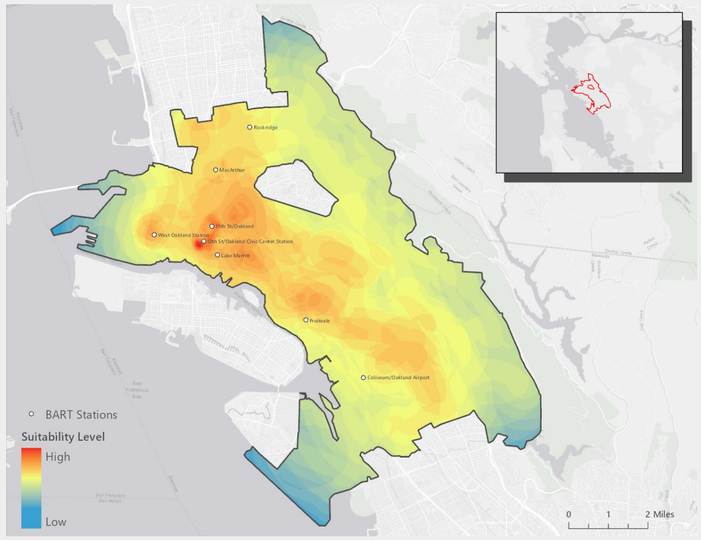
Fig. 1: Site Suitability Model



Site Suitability

City of Oakland

Fig. 2: City Wide Suitability



Low Suitability

Coliseum/Oakland Airport Station Area

Fig. 2a: Statistical Results

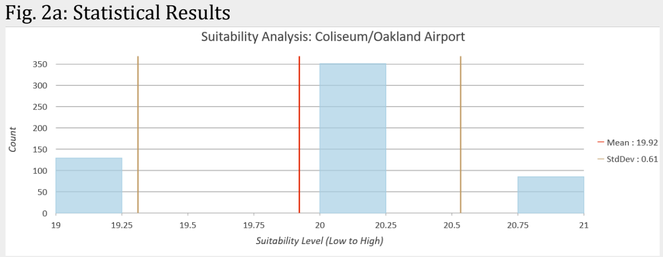
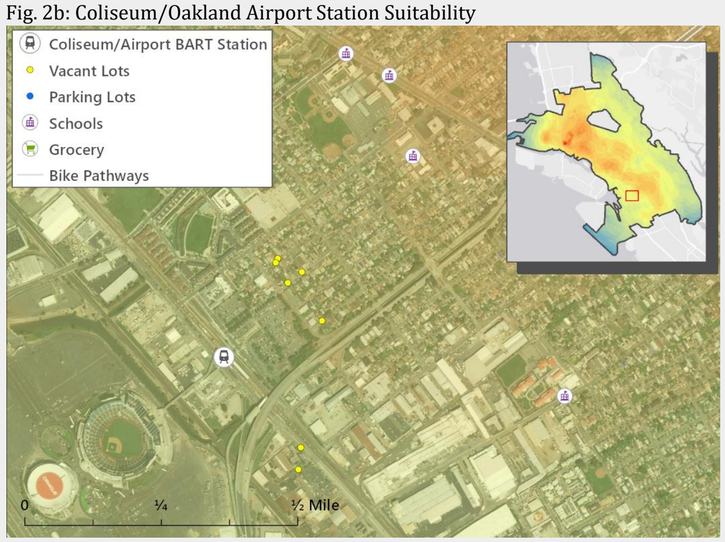


Fig. 2b: Coliseum/Oakland Airport Station Suitability



High Suitability

12th Street Station Area

Fig. 3: Statistical Results

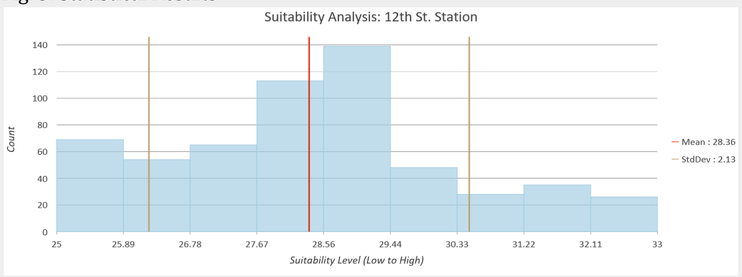
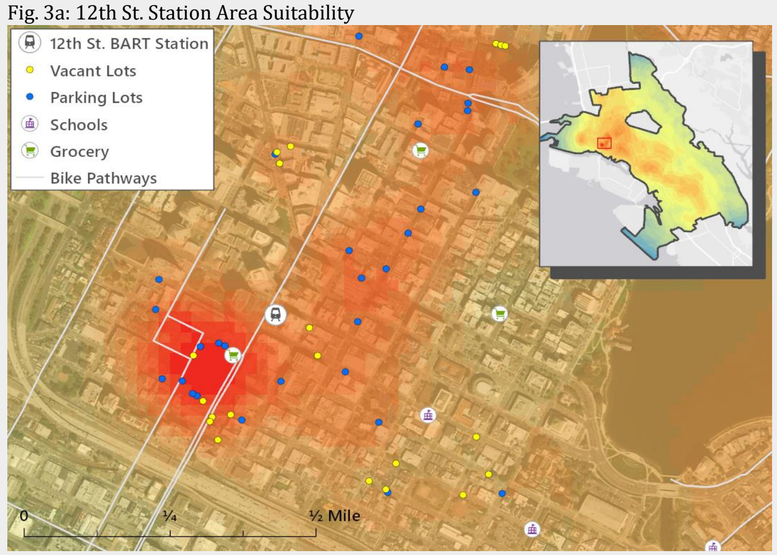
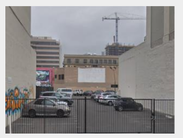


Fig. 3a: 12th St. Station Area Suitability



BART/12th St.
Oakland City
Center



376 14th St.
Oakland, CA
94612

Grocery Store
901-933 Broadway
Oakland, CA 94607

Lincoln Elementary
225 11th St,
Oakland, CA 94607

Results

The 12th Street Station Area produced the highest weighted sum mean value and was thus deemed to be the most suitable for transit-oriented infill based on the defined criteria. The research could be expanded upon by adding cost weighting from infill sites to surrounding amenities. Additionally, the success of completed TOD projects could be assessed by measuring positive changes in BART ridership, job growth, and the commute to work mode-share, as well as determining the residential density, diversity of uses, and the ratio of affordable housing units within the complete TOD.

References:

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