Siting Transit Oriented Affordable Housing in San Francisco

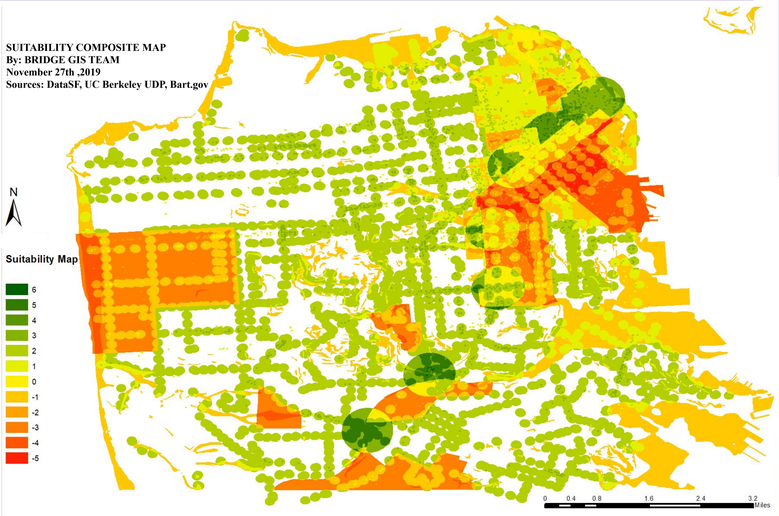
Tushar Narula, Maya Facciolo, Thomas Brawley

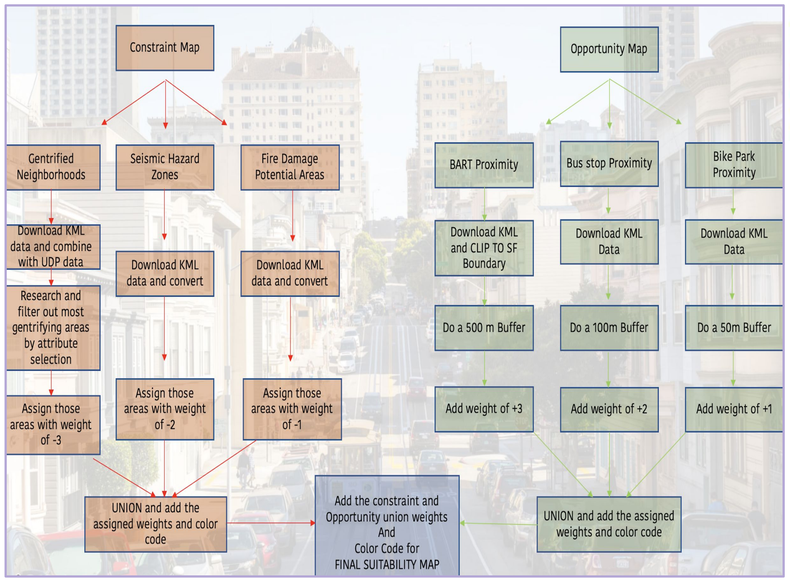
CLIENT'S PROPOSAL:

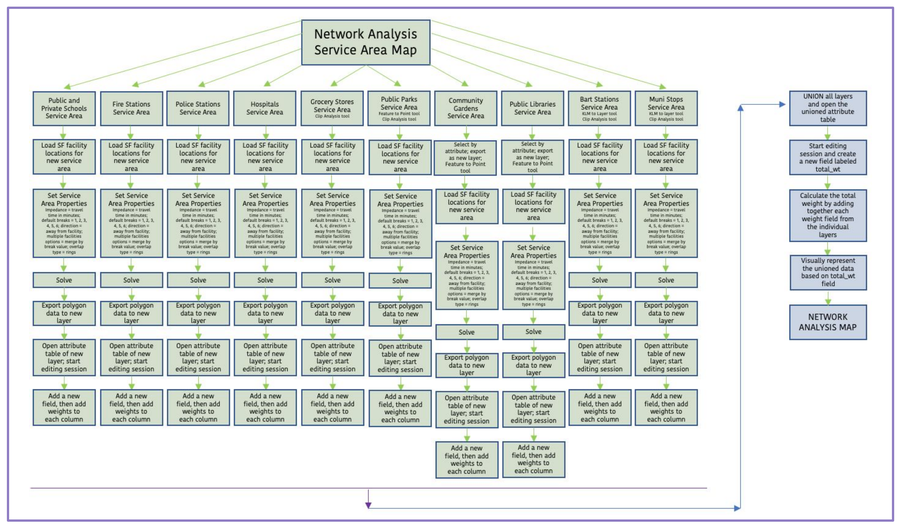
BRIDGE Housing is a real estate corporation that builds, owns and manages affordable housing in the Bay Area. Our team consulted with a BRIDGE housing employee to collaborate on a project to site buildings or lots suitable for transit-oriented affordable housing in San Francisco. We therefore decided to create a site suitability map, an analysis of essential services and a 3D TIN visualization to site a few parcels for our client.

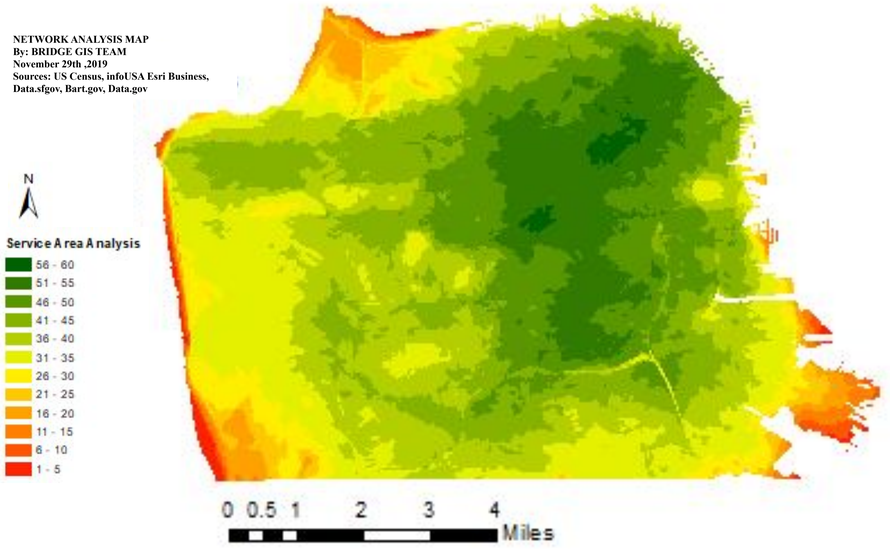
SUITABILITY MAP:

The Suitability Composite Map is a composite of two individual maps unioned together, a constraint analysis and an opportunity analysis. The constraint factors include gentrified neighborhoods, areas damaged by fire, and seismic hazard zones. The opportunity factors include Bart stations, bus stops, and bike parking. The analysis addresses important themes, such as transit, affordability, and safety from natural disasters, and also takes social factors into consideration, such as willingness to travel and convenience. To identify the most gentrifying neighborhoods in SF, we consulted various research and news reports, analysis of attribute tables, and methodology that Urban Displacement project used during the creation of the data. Each factor was given a weight according to the level of risk and relevance to the topic. In order to emphasize the importance of transit accessibility, opportunity factors were given a high weight and buffered. Darker green areas indicate the best areas in SF to site the next BRIDGE Housing development project.







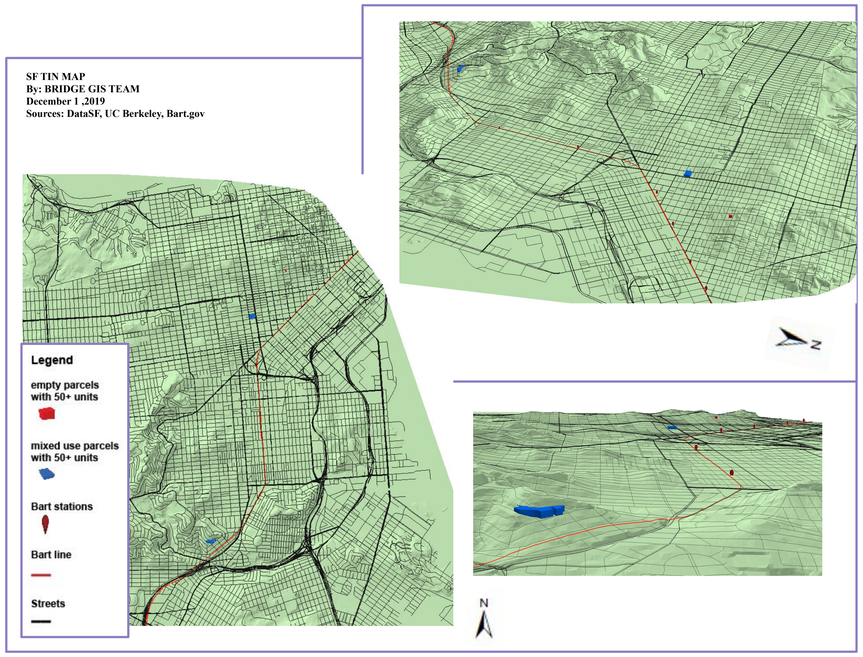


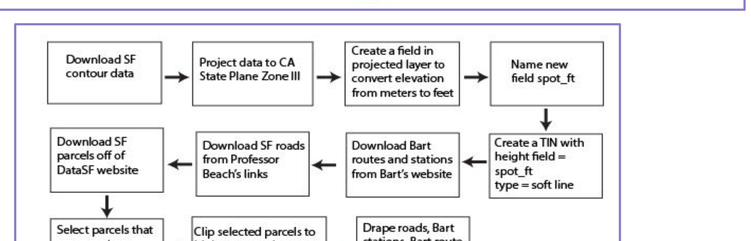
SERVICE AREA NETWORK MAP:

The Network Analysis Map combines the service areas of ten amenities in SF that BRIDGE GIS team identifies as important factors to site our next affordable housing development. These amenities include grocery stores, hospitals, muni stops, bart stations, public libraries, community gardens, parks, fire stations, police stations, and both public and private schools. All data was converted to point data location format in ArcMap, laid on top of a basemap of SF, clipped to the boundaries of the city, visualized as ten individual service area maps, weighted to represent distance from each amenity point location, and then unioned together to create the Network Analysis Map. This final network map indicates optimal locations to build an affordable housing development, denoted in dark green and ranked as having the best accessibility to the amenities, based on the composite service areas of the chosen ten factors.

TRIANGULATED IRREGULAR NETWORK MAPS:

Using the suitability and service area network map, exact parcels were identified that would be optimal for siting our next development. We distinguished which buildings were vacant or mixed use and had over 50 units, which was an important requirement from our client at BRIDGE Housing.
Contour data was publicly available off of the datasf.gov website to create a TIN of the city. We also draped streets, major roads and the Bart route onto our TIN to provide a spatial reference to the proximity between our proposed development sites and transportation accessibility.
The Northernmost parcel, extruded in red, is a vacant site that is zoned for over 50 units. The Southern blue buildings are both mixed use for 75 units and over 200 units. The zoning data was based off of the data found from the DataSF website.





Concluding Findings:

After making a suitability map and conducting a network analysis to determine opportune zones for low-income transit-oriented housing, our team found a few ideal zones and parcels for a BRIDGE Housing development project. Locations in East San Francisco and close Bart stations hold the most promise for a successful project, as shown in the TIN map. Specifically, we suggest the locations denoted in red and blue. We propose that steps are taken to promote more construction of this type to combat vehicle congestion and encourage social equity.

Acknowledgments:

Project dedicated to BRIDGE Housing. Thank you to ARUP for the consultations on project development.