

Transit-Oriented Health: A Case Study on the effects of Transit-Oriented Design on Plublic Health

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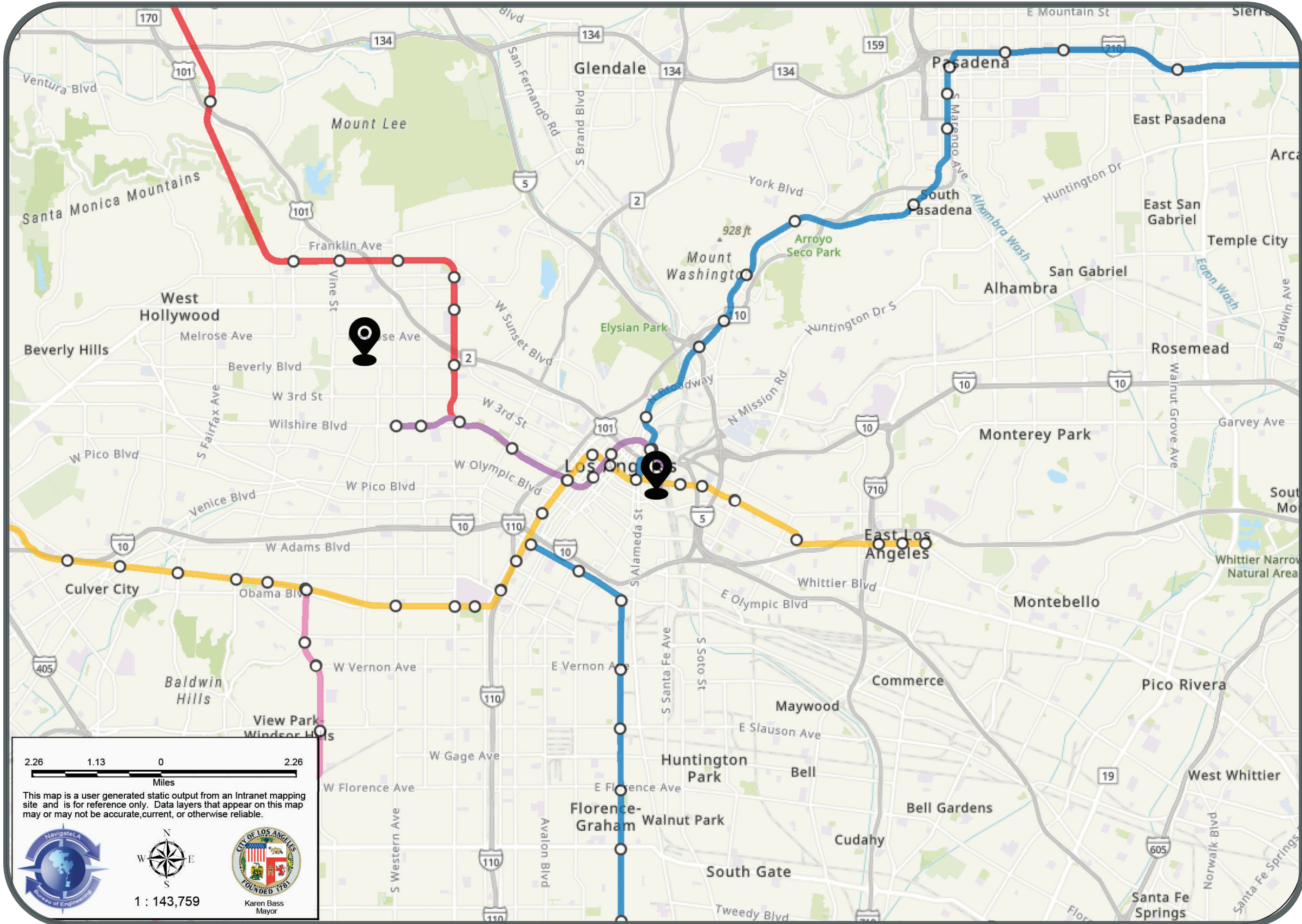
Introduction

This case study examines the relationship between transit-oriented development (TOD) and public health outcomes, focusing on how urban design influences chronic disease, respiratory health, and traffic safety. It synthesizes research from transportation, public health, and urban planning to understand how changes in the built environment shape both health benefits and potential tradeoffs associated with more walkable and transit-accessible communities.

- TOD and walkable design are linked to increased physical activity and reduced chronic disease risk.
- Transportation-related pollution exposure is associated with respiratory health impacts such as asthma.
- Built environment features like transit access, land use mix, and connectivity influence travel behavior and health outcomes.
- Traffic safety outcomes are strongly shaped by roadway design and vehicle speeds (Vision Zero framework).
- TOD presents both health benefits and tradeoffs that vary by context and exposure conditions.

Methodology

- Reviewed literature on TOD design and health outcomes.
- Used LA Metro TOD and Joint Development guidelines as the framework.
- Analyzed selected LA Metro Joint Development TOD sites in Los Angeles.
- Applied CalEnviroScreen to assess environmental burden and vulnerability.
- Used UC Berkeley TIMS to examine traffic collisions near TOD sites.
- Synthesized literature and spatial data to evaluate TOD health impacts.



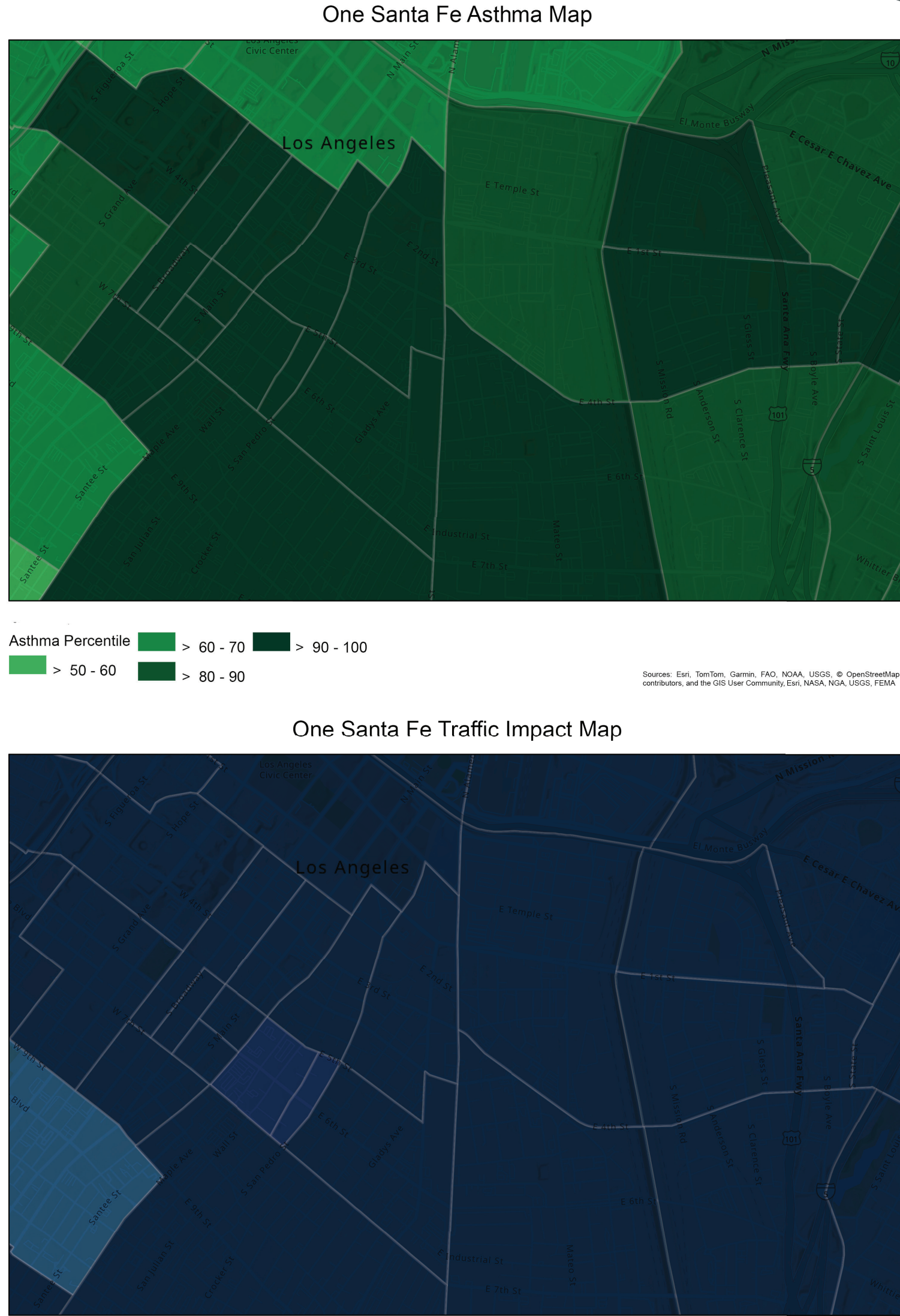
TOD Design

- TOD encourages walking, biking, and public transit use, which can increase daily physical activity and help reduce obesity, diabetes, and cardiovascular disease rates.
- TOD design guidelines prioritize walkable neighborhoods with safe sidewalks, crosswalks, lighting, and traffic-calming measures that improve pedestrian safety and reduce vehicle-related injuries.
- Mixed-use development in TOD areas allows residents to access jobs, grocery stores, parks, healthcare, and services without relying heavily on cars, improving overall accessibility and quality of life.
- Access to public transit can improve public health equity by providing mobility options for lower-income households, older adults, youth, and people without access to private vehicles.



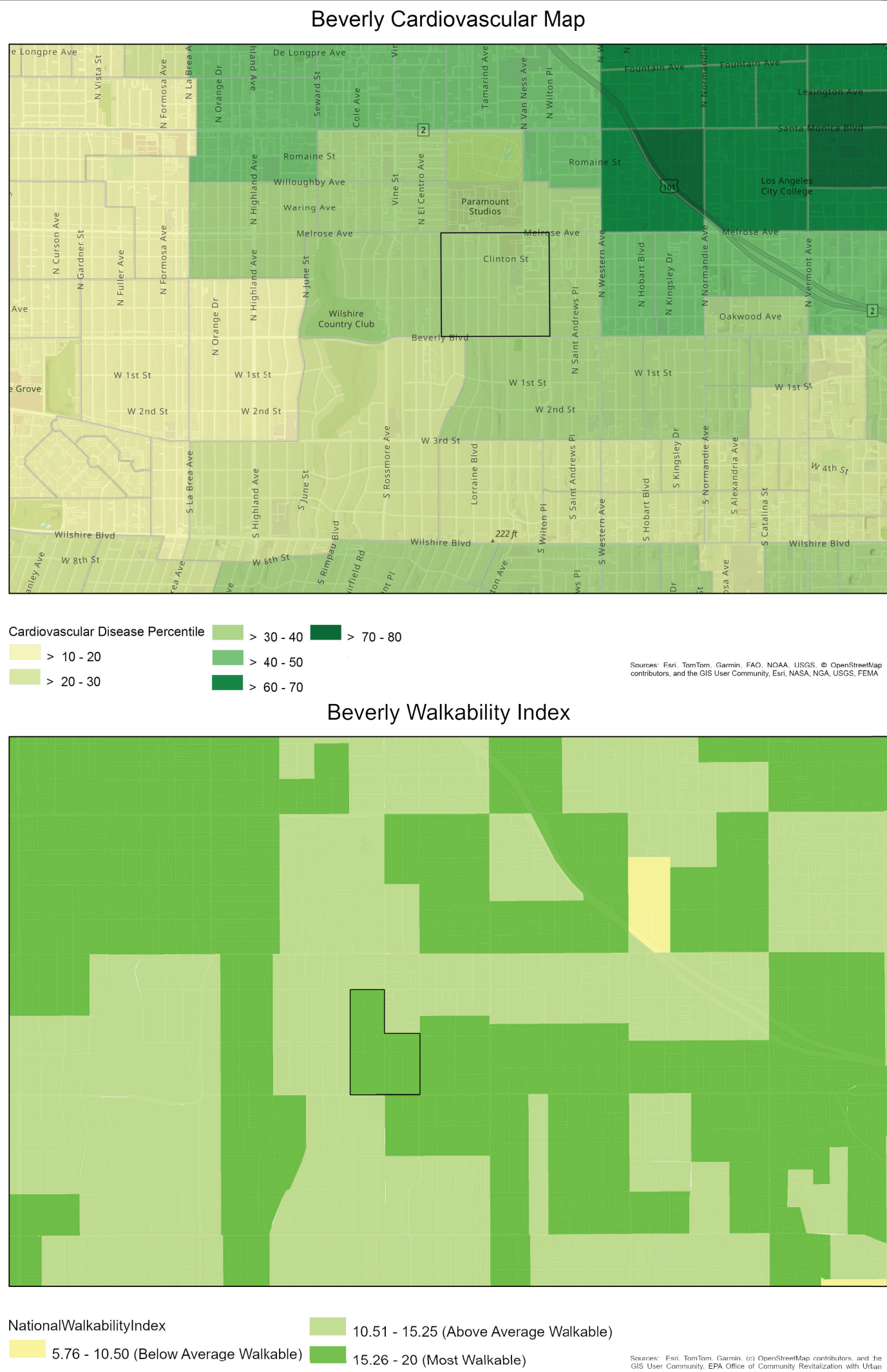
Asthma

- Transportation-related air pollution was linked to higher asthma prevalence and more severe asthma symptoms in children, especially near major roadways and high-traffic corridors.
- Transit-oriented and walkable communities can reduce vehicle miles traveled (VMT) and regional emissions by encouraging public transit use and active transportation.
- TOD can create both health benefits and tradeoffs: while walkability and transit access improve overall public health, residents and pedestrians may face greater exposure to traffic pollution if developments are located near heavily traveled roadways.



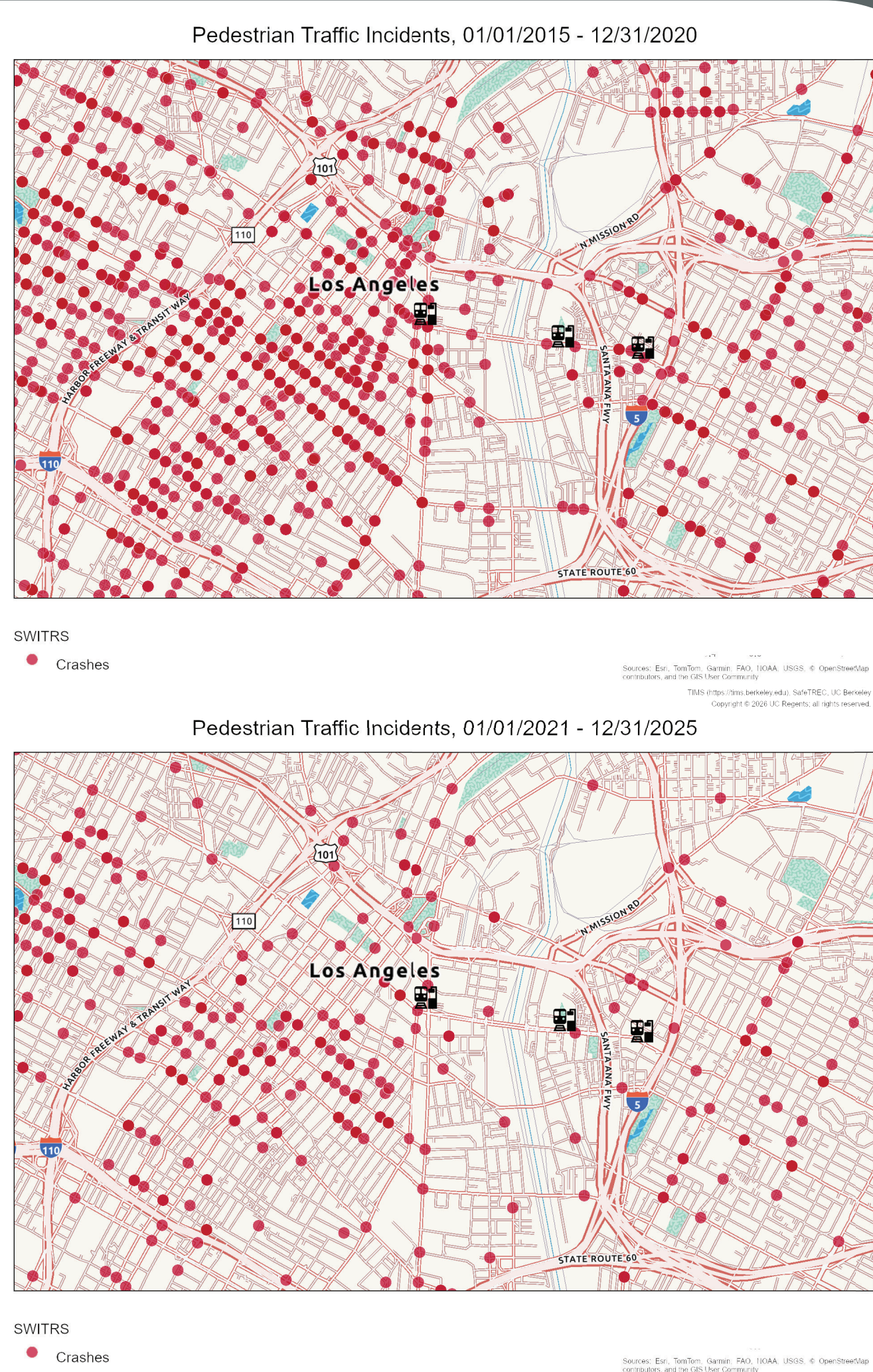
Cardiovascular

- TOD and walkable neighborhoods are associated with lower cardiovascular disease risk through increased physical activity and reduced car dependence.
- Built environment factors like land use mix and transit access support active transportation, which contributes to better cardiovascular health outcomes.
- Cardiovascular disease patterns are shaped by built environment factors that vary across space rather than having uniform effects.
- Relationship between proximity to transit systems and greater cardiovascular disease risks.
- Overall, more transit-accessible and less auto-dependent environments tend to support healthier cardiovascular outcomes by encouraging active travel behavior.



Traffic Incidents

- Traffic injuries and fatalities are strongly linked to roadway design, traffic speed, and vehicle-dominated street environments.
- Vision Zero research shows crashes are systemic, with higher risk in environments prioritizing speed over pedestrian and cyclist safety.
- Traffic-calming strategies are associated with fewer and less severe crashes.
- Lower vehicle speeds significantly reduce pedestrian fatality risk by improving crash survivability.
- Vision Zero outcomes vary, but effectiveness improves when paired with strong enforcement and integrated transportation and land use planning.



Discussion

Asthma

While TODs can reduce vehicle miles traveled (VMT) by promoting active transportation and transit use, they may also increase exposure to traffic-related air pollution in high-density, transit-adjacent corridors, potentially elevating asthma risk for nearby residents and pedestrians.

Cardiovascular

Mixed-use development can encourage active transportation by increasing walkability, which is associated with lower cardiovascular disease risk factors. However, proximity to high-traffic transit corridors may increase exposure to traffic-related air pollution, which can negatively affect cardiovascular health.

Traffic Calming

Traffic calming measures improve walkability by reducing vehicle speeds and creating safer street environments. Lower speeds and safer crossings are associated with reduced pedestrian injuries and overall crash severity.



Recommendations

- Add a portion to the design guidelines on public health outcomes and recommendations
- Add preventative and protective measures for TOD design in high-density typologies
- Some of the data was too broad and could not accurately represent the singular development or project.
- Some of the data was not completely up to date (mostly traffic counts and levels of service)