OPTIMIZING TRANSIT FOR THE LA 2028 OLYMPICS

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Research Question

Refined Research Question:

Using population metrics, what is the extent of bus, metro, and walking accessibility in relation to the 2028 LA Olympic Venues?

Sub-Questions:

1. How many people can access each venue within 10, 20, 40, and 60 minutes of walking time?
2. How many metro and bus stops are located within a 5-20 minute walking time, or by a reasonable distance to access by hotel guests/tourists?
3. How can analyzing congestion patterns in Los Angeles inform the development of a temporary walkable city infrastructure for accessing Olympic venues? Can this analysis also guide decisions about incorporating alternative transportation options and reducing vehicular traffic?

Data

Olympic Venues: Vector Feature Point data, located within LA County, looking at proximity between venue locations and public transportation access points and hotels.

Hotels: Vector Feature Point Data, utilizing hotels within proximity to key venue locations (by walking distance) we can try to look at which hotels are in locations that require ease of access to public transportation through bus and metro stops versus those that are within reasonable walking distance from Olympic venues.

US Census Tract Data: Vector Polygons, analyze population counts for each tract in relation to hotel locations and offer suggestions for public transportation options to ease congestion concerns surrounding these hot spots.

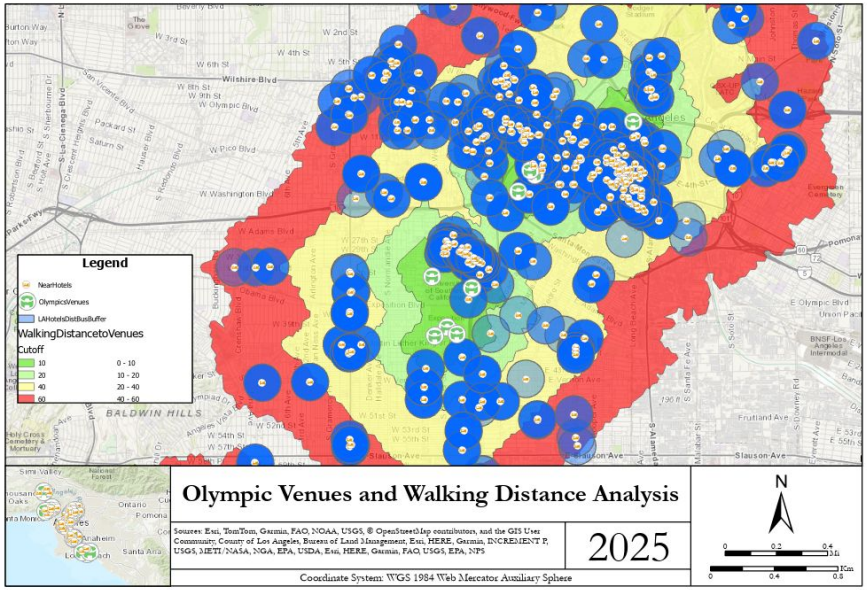
Bus and Metro Stops: Vector Point Data, we aimed to look at these access points for public transportation in order to determine if both the venues and local hotels for tourists will provide quick access to green options for transportation to these key locations and handle the pressure of future congestion (average daily ridership), and offer potential solutions to these locations if they lack the infrastructure to support eco-friendly options for transportation.

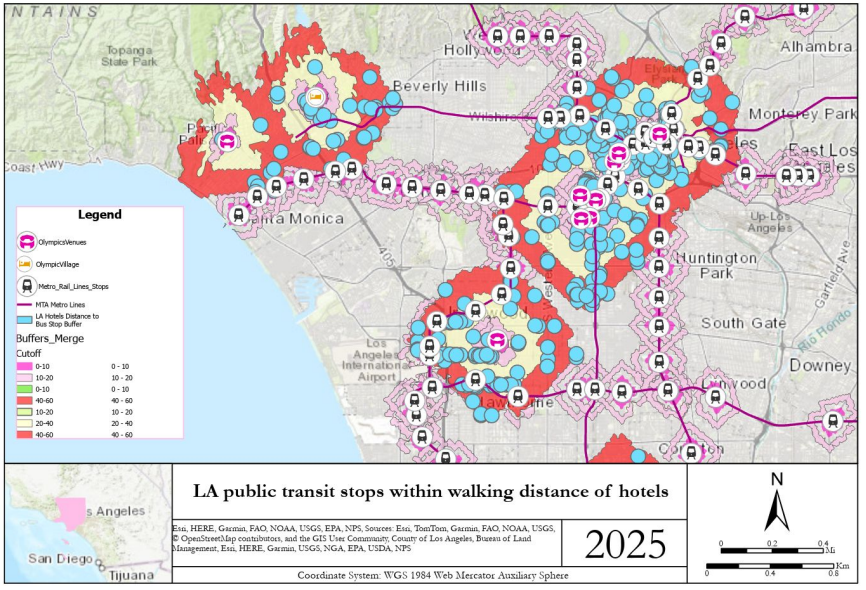
Service Area and Buffer Zones: Vector Polygon data, used to analyze walking distance from hotels and public transportation access points to see which areas are lacking necessary infrastructure or are not suitable for tourists based on their accessibility to support incoming crowds and public transportation for the masses.

Analysis Framework

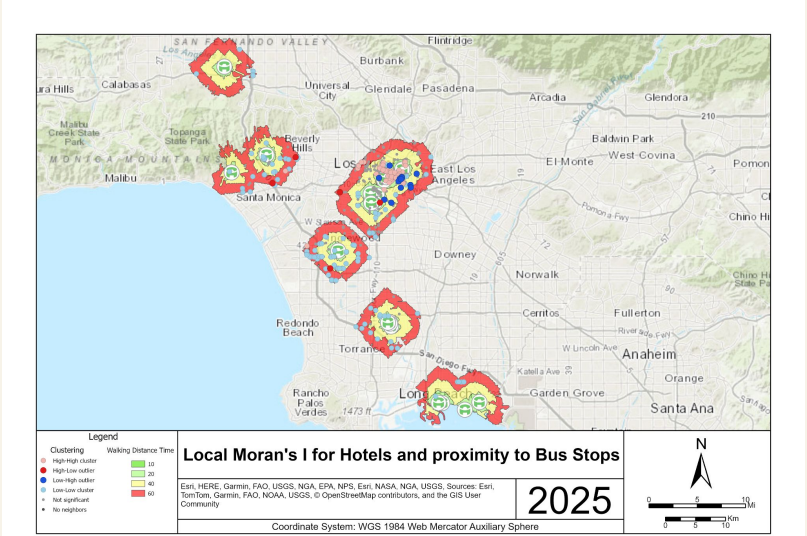
- We chose to determine how many hotels there were within a reasonable walking distance of 10, 20, 40, and 60 minutes. We selected these thresholds as the estimate the distance people would be willing to travel on foot from hotel accommodations to the venues. We also hold the assumption that the hotels closer to the venues will be more popular for LA 2028 games tourism and that hotels beyond an hours walking distance will not have significant pedestrian traffic due to unwillingness to commute by foot for longer than an hour.
- We used Local Moran's I analysis using inverse distance weighting on the hotels of interest (those within an hour's walking distance of the olympic venues) and number of bus stops in a .25 mi buffer region around the individual hotels to determine which the extent of bus stop access each one has as well as assess the degree of spatial autocorrelation. This allows us to provide recommendations to the LA county metro system about which hotels may require additional bus stops based on which are designated as Low-Low and Low-High within the 20-60 minute walking ranges, as we hold the assumption that pedestrians will become increasingly unwilling to walk and thus more dependent on bus stop access at beyond a 20 minute walking distance threshold.

Result Interpretation





Local Moran's I Result



R^2 = .85

- Strong HH and LL outliers represent spatial autocorrelation with public transportation accessibility
- Hotels clustering with similarity in relation to number of public transportation access points
- Use as potential points to address, such as LL or LH areas in higher walking times for board members and city planners when discussing future infrastructure changes
- Leverage HH clusters as areas that could be promoted to tourists
- LL clusters in red outer rings indicate hotels that have both poor bus accessibility and high walking times to closest Olympic venues

Variable	Coef	t-stat	p-val
Walking Time to Venue	-0.0153	-22.57	0
Intercept	3.0144	136.04	0

GLR Results

Results Cont.

Population analysis:

To conduct a population analysis, we used Los Angeles County Census Tract data and created a buffer merging all of our service area analysis layers.

- We then created two queries: one that included census tracts completely within the buffer zone, of which there were 121, and a second query that found census tracts with a midpoint in the buffer zone, of which there were 809. We then found the unique value field in the attribute tables, joined the tables, and calculated the sum of the population.
- Considering the census tracts were only partially in the buffer zone for the second query (because we used the midpoint), we divided the sum by 2, then added the population of the census tracts that were entirely in the buffer zone.

This calculation gave us a **total population of 1,180,871** of California residents who would have adequate access to an Olympic venue or a transit station to reach their destination.

Hotel data:

We used the select by location tool to select hotel points in our merged buffer zones. Out of 7,202 hotels in our dataset, **3,162 are within a 5-20 minute walking distance to a venue or a transit stop.** We were able to sum the number of available beds for these hotels, which is **335,356**, assuming a 1:1 ratio and full capacity.

Challenges

- Our original plan to look at multi-modal travel more comprehensively became too much to reasonably synthesize into a single project.

- The 2028 Olympic Games aim to ban cars and rely on public transport. In their efforts to do this, there are 28 proposed transit projects to increase accessibility (sources : LA Metro 28x28 and NYT 2028 Transport Article). Data about these new routes and stops are not available, and we were unable to incorporate them into our analysis. However, it is worth noting that the total population that could be accommodated would also be larger with the increased routes network.

- Our hotel dataset had some limitations; it was last edited in March 2023, and since then, there may have been an increase in the number of hotels we cannot account for. Furthermore, our total sum of 335,356 assumes a 1:1 ratio, with one person per bed, and does not consider whether people will share beds/rooms. Our hotel dataset also does not include alternative lodging options such as Airbnb or VRBO listings.

- Analyzing spatial data for the entirety of LA was too broad in scope, so we had to refine our analysis further.

- Incoming tourism number estimates aren't available and are only predicted, so our population assessments are based only on current residents and do not reflect what the actual population will be due to games-related travel.

Future Work

- Our findings can be used to create suggestions for public transit improvements and overall access to Olympic venues. For example, we can suggest bus route expansions, increase bus frequency to accommodate the projected influx of visitors, and identify new locations that would be ideal for new stops or stations.

- Modelling estimates of expected incoming tourist numbers and hotel bookings data could be used to identify which regions will be most affected by pedestrian and bus traffic. Using these predictions LA county can analyze whether the current bus stop and route infrastructure are sufficient to service the areas that will host the most tourists and residents combined.

- Further suggestions could include analyzing high congestion areas and closing them off to traffic, and alternatively creating a pedestrian-friendly, walkable environment. This could help model urban planning strategies for short or long-term use.

- Research could involve population growth modeling and the integration of real-time traffic and transit data to improve the accuracy of predictions and support the development of temporary and long-term transportation and infrastructure solutions.

- Integrating the popularity and date of each event and the distribution of events hosted at each venue can further optimize traffic and population estimates.