

January 2021

Remix x Transit Center Methodology

Summary of increased frequency methodology

- 1) Imported the existing system as of December 2020
- 2) Calculated 40% of the estimated budget
- 3) Filtered to only the lines that run at a 15-minute headway at 12pm on a weekday
- 4) Downloaded lines as "Before"
- 5) Highlighted lines that as of December 2020 operate at 30-45 minute headways
- 6) Increased weekday headways to 15 minutes on lines in Step 5 until hitting the budget calculated in Step 2
- 7) Downloaded lines as "After"

How does Jane work?

The Jane travel-time isochrone shows how far a person can travel to or from a specific point within a given time frame. Jane's travel distance is represented by four colors. Each represents how far she can travel in different time segments at different times on a weekday, Saturday, or Sunday. Her travel includes a combination of walking (at a walk speed of approximately 3 miles per hour) and taking transit. Transit choices are based on the lines currently shown on the map, including potential transfers

Jane's travel is based on 1/2 the headway at the given time before "riding" the bus. If a transfer is taken, we assume that Jane must again wait for half the headway of the next line. This methodology only uses "Pattern A" from the lines on your map.

How does Remix generate walksheds?

To produce frequency-based (“average”) travel time isochrones with walksheds for Remix maps, we follow a similar approach to many open source implementations. This involves merging a transit network (defined in a Remix map) with the local pedestrian network (which includes the streets a traveler might walk to catch the bus or make a transfer) and searching the combined network to compute travel times to all points in the network.

Our methodology can be summarized as follows:

1. Produce an [OpenStreetMap](#)-based pedestrian network containing only [ways](#) (streets/walkways/trails etc.) that pedestrians would use.
2. When a user places Jane on a Remix map, merge the transit network with the local pedestrian network into a single network.
3. Traverse the resulting network to compute travel times and produce shapes to visualize the isochrones.

Processing OpenStreetMap data

To construct the pedestrian network we want from raw OSM data, we first filter out OSM ways that a pedestrian would normally not traverse such as highways, private roads, streets that explicitly do not have pedestrian access (OSM tag `foot=no`) and streets that are under construction. Additionally, we treat all streets as 2-way, regardless of their designation in OSM.

Constructing the Joint Transit + Pedestrian network

Once we have our 2 networks (pedestrian and transit), we merge them into a single network in 2 steps:

- Insert every transit stop into the local pedestrian network by finding the single nearest street and snapping it to the closest point on that street.
- To capture the expected wait time for a rider to catch a bus, we assign a weight of half the headway to every transit stop each bus visits.

Producing Isochrone Visuals

To produce a visualization of the isochrone for each requested cutoff, we find every location and transit stop from the network that is reachable within the cutoff time. We then connect the points using an [alphashape](#). The resulting shape for each cutoff is visualized in Remix.