1. Institutional setting

The need for an immediate response by cities amidst the pandemic, The Mayor of Greater Amman Municipality (GAM) held an emergency meeting in April to form a Covid19 Taskforce in-charge of developing a rapid response by documenting all the tasks and services that were operational during the lockdown of the city, and how we can enhance the accessibility for critical urban services for all citizens.

This taskforce took all measures to evaluate the overall condition of the city under curfew, and the most important urban phenomenon was reachability to urban services on foot by citizens in neighborhoods. This phenomenon sparked the need to develop through evidence-based digital tools reachability maps with the help of GAM's GIS department in order to identify the weak areas in the city that needs immediate intervention to provide services for its residents.

2. Starting point/Project goal

The biggest challenge was to produce a methodology to develop these reachability maps scientifically through GIS then enhance the accuracy by factoring Topography into the tool itself later.

Another challenge was connected to the accuracy of all available datasets and how it can be used to reflect the current urban trends since GIS layers gets updated periodically.

Ultimately, this fast response led to the activation of various areas in the city that needed provisions to urban services and paved the way for the enhancement of future urban policies by GAM.

3. Approach

The maps were created using a toolkit developed by the City Form Lab for Urban Network Analysis (UNA), this ArcGIS toolbox can be used to compute five types of graph analysis measures on spatial networks: Reach; Gravity; Betweenness; Closeness; and Straightness. Redundancy Tools additionally calculate the Redundancy Index, Redundant Paths, and the Way-finding Index.

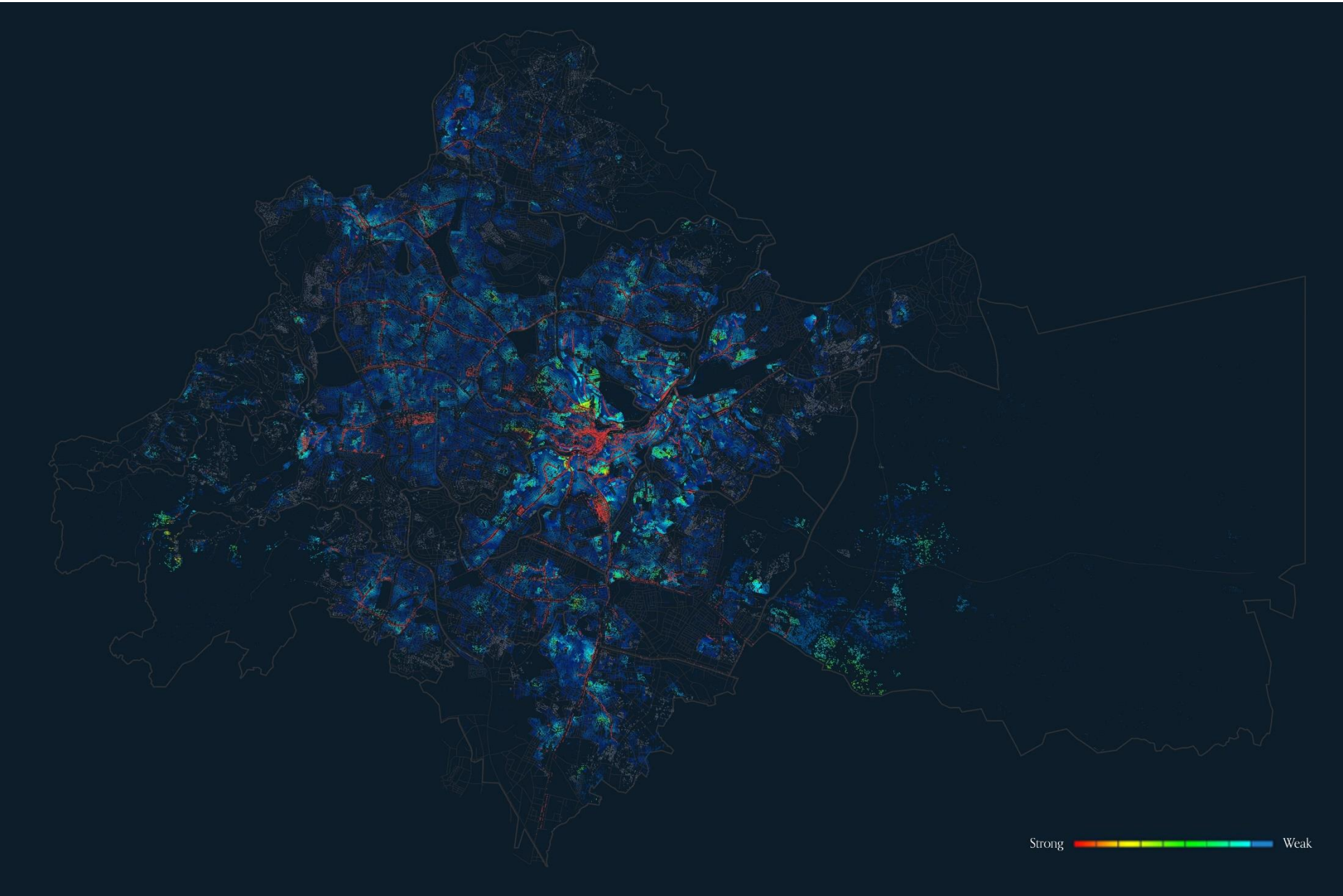
The gravity type index captures both the attraction of the destinations as well as the spatial impedance of travel required to reach those destinations in a combined measure of accessibility.

To explain this further, consider two homes nearby a grocery store. The first home is located 200 meters away, while the second home is 100 meters away from the store. Even though both homes have the same number destinations available (one store) and the destinations are identical in weight, the gravity index would consider the closer home to be more accessible than the further home.

In our analysis, we focused on gravity index and managed to develop five Gravity maps for the city with a radius of 600 meters for urban services within neighborhoods.

4. Outputs

Greater Amman Municipality



5. Lessons learnt

- Access to urban services need to be monitored carefully in all cities when an extreme event take place like a pandemic or a natural disaster.
- We can simulate the reachability of any city for its critical urban services by utilizing advanced tools to help us later in developing quicker responses towards extreme events or give accurate predictions to economic growth based on the urban fabric of cities.
- Part of the resiliency of any city is the ability to predict various urban trends due to its physical form and infrastructure then provide enough incentives to upgrade economy and introduce new nodes for development.
- Veridical urban policies can be easily created through evidence, community involvement. and /or shared experiences from similar cities contributing to a paradigm shift in urban planning and urban design trends, climate change mitigation, and the overall approach to priorities in all urban strategies.

6. Follow up

Can the layout of the city facilitate equitable access to services, enhance mobility and public health?

How the form of its neighborhood affect the economic performance of services and its livability?