DETERMINATION OF FUTURE METRO ROUTE ALTERNATIVES FOR ISTANBUL USING GIS

WEBSITE SUGGESTIONS REFERENCES

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Aim & Scope of the Project

The aim of the project is to create new metro route alternatives that can alleviate Istanbul's traffic problems and integrate with existing stations, using various collected data and selected spatial algorithms, in line with sustainable development goals and in accordance with the determined scope and legal and project-based constraints.

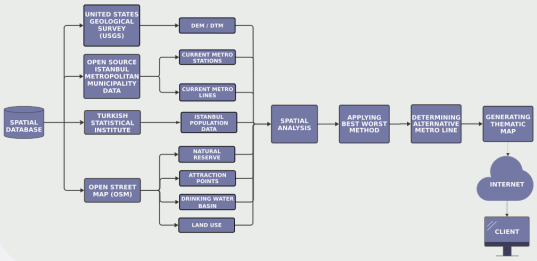
Definition of The Problem

Istanbul's rapid urbanization and increasing population have intensified the need for an efficient metro system to reduce traffic congestion and improve accessibility. This project focuses on using GIS to propose sustainable and optimized metro route alternatives.

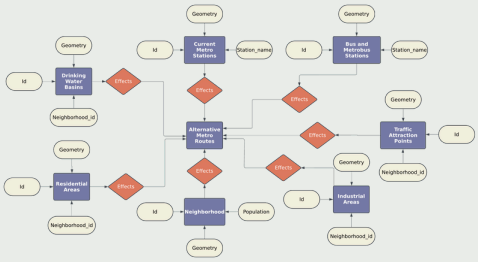
Constraints

Expropriation Law No. 2942
Law No. 2363 on the Protection of Cultural and Natural Assets
Forestry Law and legislation on protected areas
Regulation on Environmental impact assessment
Water Law and groundwater protection legislation
Using open source data and open source software

System Architecture



Conceptual Design



Standards

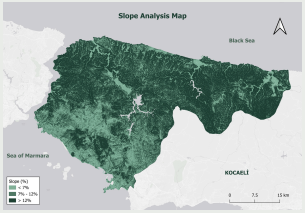
- OGC
- ISO
- TUCBS

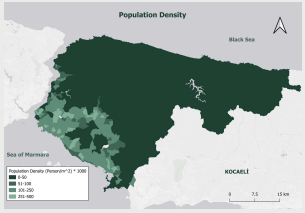
Ethics

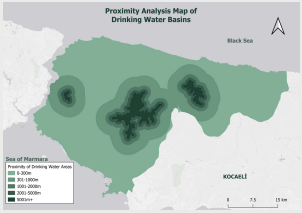
- Transparency
- Sustainability
- Equity

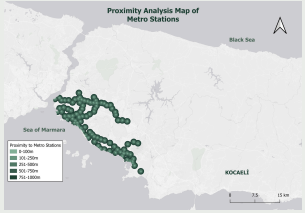
SDG's

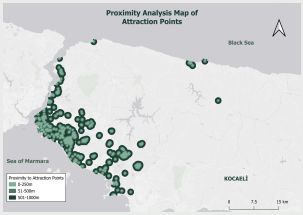
Analysis

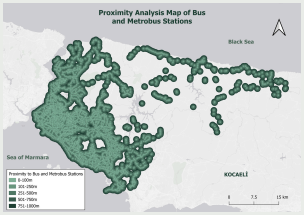


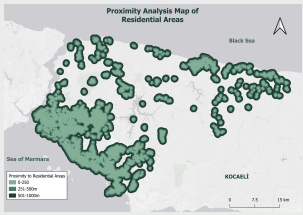


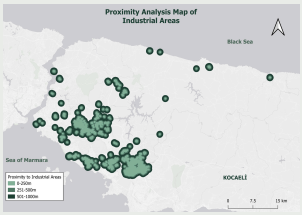












Method

Best Worst Method involves selecting the best and worst criteria, scoring their importance and inferiority, and calculating weights. Here, based on the literature research the best criteria was selected as integration with other transportation, and the worst criteria was selected as proximity to drinking water basins.

BWM Weights

PRIMARY CRITERIA (C_j)	WEIGHTS (W_j)	ξL^*
INTEGRATION WITH OTHER TRANSPORTATIONS	0.38	3.21
PROXIMITY TO ATTRACTION POINTS	0.12	
PROXIMITY TO INDUSTRIAL AREAS	0.09	
PROXIMITY TO RESIDENTAL AREAS	0.16	
PROXIMITY TO DRINKING WATER BASIN	0.03	
POPULATION DENSITY	0.15	
SLOPE	0.07	

Conclusion

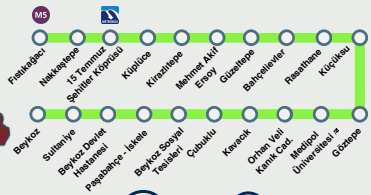
This study utilized the Best Worst Method (BWM) integrated with Geographic Information Systems to propose optimal metro routes for Istanbul. Criteria such as population density, transportation integration, proximity to attraction points, were weighted using BWM. Weighted thematic maps were combined to produce a Metro Station Suitability Map, guiding the placement of metro stations.

M15 - KURTKÖY - ESENYALI

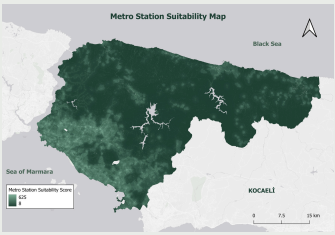
Length of Line 25 km

Travel Time 27 min

M16 - FISTIKAĞACI - BEYKOZ



Length of Line 18 km

Travel Time 42 min

Resulting Map