

**DEVELOPING TRANSJATIM BUS STOPS MAPS IN MOJOKERTO CITY FOR
URBAN MOBILITY INFORMATION**

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ABSTRACT

Accurate and accessible public transportation information is essential for improving urban mobility, particularly in rapidly growing secondary cities such as Mojokerto, Indonesia. This study presents the development of a digital map that visualizes the distribution of TransJatim bus stops across Mojokerto City. The objective was to enhance the availability of transport information for the public and support sustainable mobility planning. A participatory methodology was implemented, starts with the collection of official route and stop data from the provincial government's online platform. These data were validated through field surveys, which recorded geographical coordinates and visual documentation of bus stop locations. The verified data were imported into a geographic information system for spatial visualization and cartographic design. The resulting draft map was presented to local stakeholders, including the city transportation department and bus operators, for feedback and validation. The final product consists of a digital and printable spatial map illustrating TransJatim's service network in Mojokerto. This map can serve as a tool for public dissemination and future transportation planning. The project demonstrates the effectiveness of integrating geospatial tools with community and institutional collaboration in improving urban transport communication.

Keywords: bus stops; digital mapping; geographic information system; public transportation; transjatim

INTRODUCTION

Mass transportation systems, particularly bus-based networks, serve as a vital component in supporting urban and peri-urban mobility in Indonesia. One of the strategic initiatives by the Government of East Java Province to enhance regional accessibility and mobility efficiency is the development of the TransJatim public bus service. Launched in 2022, TransJatim has since expanded its coverage, now including Mojokerto City as one of its service areas. As of 2025, two primary corridors serve the city: Corridor II (Porong Terminal – Mojokerto via Sidoarjo) and Corridor III (Mojokerto Terminal – Gresik via Krian and Menganti). These corridors form the backbone of intercity mobility, offering efficient travel time and affordable costs for commuters.

Operationally, TransJatim has demonstrated remarkable performance in Mojokerto. During the Christmas and New Year holiday season of 2024/2025, a 50% increase in passenger volume was recorded at Mojokerto Terminal, especially on the Mojokerto–Gresik and Mojokerto–Surabaya routes (Tugujatim, 2025). This surge reflects the growing reliance of the local population on public transportation. Furthermore, the occupancy rate consistently ranges between 95% and 100%, especially during weekends, positioning TransJatim as one of the most utilized public services in the region (DetikJatim, 2024).

Despite this success, several critical issues remain unresolved. Firstly, the distribution of TransJatim bus stops in Mojokerto is not yet visualized in a structured, map-based format. Most available information is disseminated in descriptive or verbal formats through social media or printed brochures. Secondly, this stop-related information has not been widely distributed, limiting public awareness, especially among new users. Thirdly, there is currently no integrated map displaying the routes and stop locations of TransJatim, which hampers the public's ability to plan efficient travel and undermines spatial understanding of the transport system.

The absence of a reliable, visualized mapping system represents a serious limitation in fostering transportation literacy and user orientation. Geographic Information System (GIS)-based mapping has been shown to improve transportation planning, accessibility, and decision-making (Luis et al., 2021; Bafdal et al., 2014). A study by Setiyowati et al. (2021) also emphasized that participatory mapping can drive active engagement and result in navigation systems that reflect local user needs and spatial realities.

To address these challenges, this community engagement initiative aims to develop a comprehensive map showing the distribution of TransJatim bus stops and service routes in Mojokerto City, both in digital and printed formats. The mapping will be conducted through field observations and focus group discussions (FGDs) involving stakeholders such as the Department of Transportation, TransJatim operators, and local community representatives. The final output will be a spatial map containing accurate bus stop coordinates and updated route information.

The resulting map is intended to serve as a reliable and publicly accessible information resource, particularly for regular users and prospective new passengers. Additionally, it will function as a planning tool to support data-driven transportation strategies, aligned with sustainable mobility and inclusive infrastructure development policies (Silvitiani et al., 2018). Ultimately, this initiative contributes to establishing a more efficient, equitable, and integrated urban transport system in Mojokerto and its surrounding areas.

METHOD

This community service activity was conducted using a structured, participatory mapping approach that emphasized stakeholder involvement and spatial data accuracy. The methodology comprised four major phases: initial identification, data collection, mapping, and validation.

Preliminary Identification

The initial step involved gathering baseline information on the TransJatim service network, particularly in Mojokerto City. This included identifying active corridors, designated routes, and official bus stops operating under Corridor II (Porong–Mojokerto) and Corridor III (Mojokerto–Gresik). Data were acquired from the official TransJatim web portal managed by the East Java Provincial Government’s Digital Service System (Majadigi), which provides updated stop locations, route sequences, and operational maps (Majadigi, 2025).

In addition to secondary data collection, a field survey was conducted to capture the geographic coordinates (GPS) of each bus stop within Mojokerto City. Surveyors also carried out photographic documentation to assess stop conditions, signage visibility, and accessibility for users. These activities align with participatory geospatial practices often applied in transportation planning (Hanantatur et al., 2022; Luis et al., 2021).

Data Collection

To ensure the reliability of spatial and administrative data, this project involved collaboration with the Mojokerto City Department of Transportation and TransJatim operator units. Interviews and coordination meetings were conducted to verify route consistency, changes in stop positions, and operational schedules. These stakeholders also facilitated community insights and local feedback on accessibility gaps and unserved areas—critical elements in community-based spatial planning (Syamsiar et al., 2024).

Map Construction

The map development process employed open-source and professional GIS platforms, namely QGIS and ArcGIS, for spatial processing, georeferencing, and map layout design. These tools were used to process survey data, digitize stop locations, overlay corridor paths, and generate high-resolution output maps. The methodology followed geospatial cartography standards based on the Regulation of the Head of Geospatial Information Agency (BIG) No. 3/2016 regarding technical specifications for village maps (Hanantatur et al., 2022; Luis et al., 2021). This GIS-based approach is widely validated in community mapping literature for improving visualization, accuracy, and map usability (Adeswastoto et al., 2022; Setiyowati et al., 2021).

Validation and Revision

To ensure the accuracy and usefulness of the final map products, a validation session was held involving key stakeholders, including representatives from the Mojokerto City Department of Transportation, TransJatim operational staff, and relevant community members. During this session, participants reviewed the draft digital maps, confirmed the coordinates and naming of each stop, and provided suggestions for revisions. This participatory validation phase ensures contextual relevance and fosters a sense of ownership among local stakeholders (Bafdal et al., 2014; Luis et al., 2021). The final output of this methodology is a comprehensive digital and printed map of TransJatim bus stop distribution and route coverage within Mojokerto City. The map is designed to be publicly accessible and suitable for policy integration, urban planning, and mobility advocacy efforts.

RESULTS AND DISCUSSION

The implementation of this community service activity began with a Focus Group Discussion (FGD) held in collaboration with the Mojokerto City Department of Transportation and the TransJatim operator. This initial session served as a platform to gather insights, confirm the official TransJatim stop locations within Mojokerto, and discuss relevant operational considerations for route mapping and visualization. Stakeholder engagement at this early stage ensured data accuracy, institutional alignment, and local relevance—an essential component in participatory cartographic initiatives (Setiyowati et al., 2021; Luis et al., 2021).

Base Map Preparation

The first technical stage of map development involved the creation of a base map, which served as the spatial reference for plotting bus stops and routes. This base map included administrative boundaries of Mojokerto City, major road networks, and relevant urban landmarks. These layers were obtained from open government data sources and formatted using the QGIS platform, which allows efficient layering and styling of geospatial information (Adeswastoto et al., 2022).



Figure 1. FGDs Preparation

Bus Stop Location Analysis

Spatial data related to bus stop locations were collected from field observations and further confirmed via institutional data from the TransJatim website and digital transport databases. The location data were recorded as geographic coordinates (latitude and longitude) and also structured as shapefiles (.shp), which are commonly used in GIS for vector-based geospatial features.

Each stop's metadata included the stop name, corridor type (II or III), and service direction. This dataset formed the backbone for spatial visualizations and further spatial analysis, such as distance between stops, clustering, and coverage estimation. The use of location-based stop data has been proven effective in evaluating public transport accessibility and user experience (Vuk, 2005; Guo, 2011).



Figure 2. Suvey Activities

Data Import and Visualization in QGIS

The data points were then imported into QGIS using the Delimited Text Layer function, allowing accurate mapping of the collected coordinate data. Each bus stop was visualized using point symbols with customized styles to differentiate corridors and directions. Labels were applied to each stop to enhance user understanding and map interpretability.

Further styling adjustments—such as color coding, symbol sizing, and label placement—were implemented to produce a clean, professional map layout. Following this, a new print layout was created using QGIS's built-in layout manager, where elements such as title, legend, scale bar, and map frames were added. The final maps were exported in both digital formats (PDF and PNG) and prepared for large-format printing for public display.

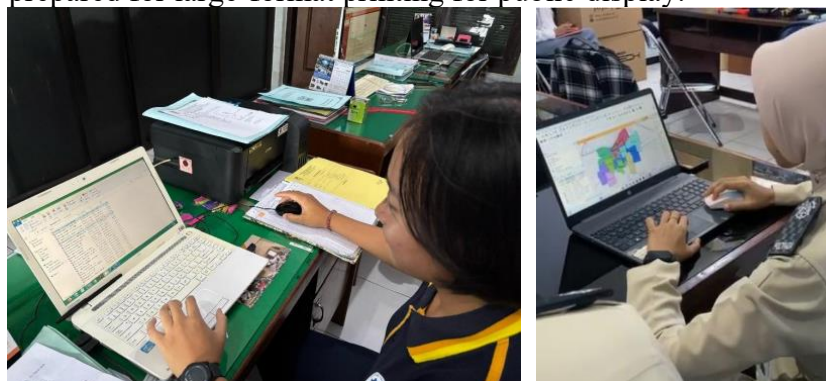


Figure 3. Inputing Data

Validation and Stakeholder Review

Once the initial map was completed, it was presented in a second FGD session involving the Mojokerto Department of Transportation, TransJatim operators, and representatives of user groups. During the session, participants reviewed the map layout, assessed the accuracy of each stop location, and provided feedback on any missing elements or inconsistencies.

The validation process confirmed that the spatial layout of both Corridor II and Corridor III, including all operational stops, was accurately represented in the map. Suggestions from stakeholders led to minor adjustments in labeling and symbol size, which were then incorporated into the final version.



Figure 4. Validation Process

Benefits and Applications of the Final Map

The resulting TransJatim route and stop map for Mojokerto City serves multiple important functions. Firstly, it provides the public with a clear, visual navigation tool that improves route planning, enhances user confidence, and encourages higher ridership—a pattern supported by studies on transport map availability and user perception (Guo, 2011; Krygsman et al., 2004).

Secondly, the map offers value to urban transport planners and policy makers. It provides a data-driven reference for identifying service coverage gaps, proposing new routes, or optimizing existing corridors. Maps such as these have been instrumental in regional mobility evaluations and transport equity assessments (Cebollada, 2009). Moreover, the availability of digital formats ensures integration with mobile apps, online journey planners, and local information portals. These platforms contribute to smart city development and enhance transport inclusion, especially for marginalized or newly urbanized populations (Silvitiani et al., 2018).

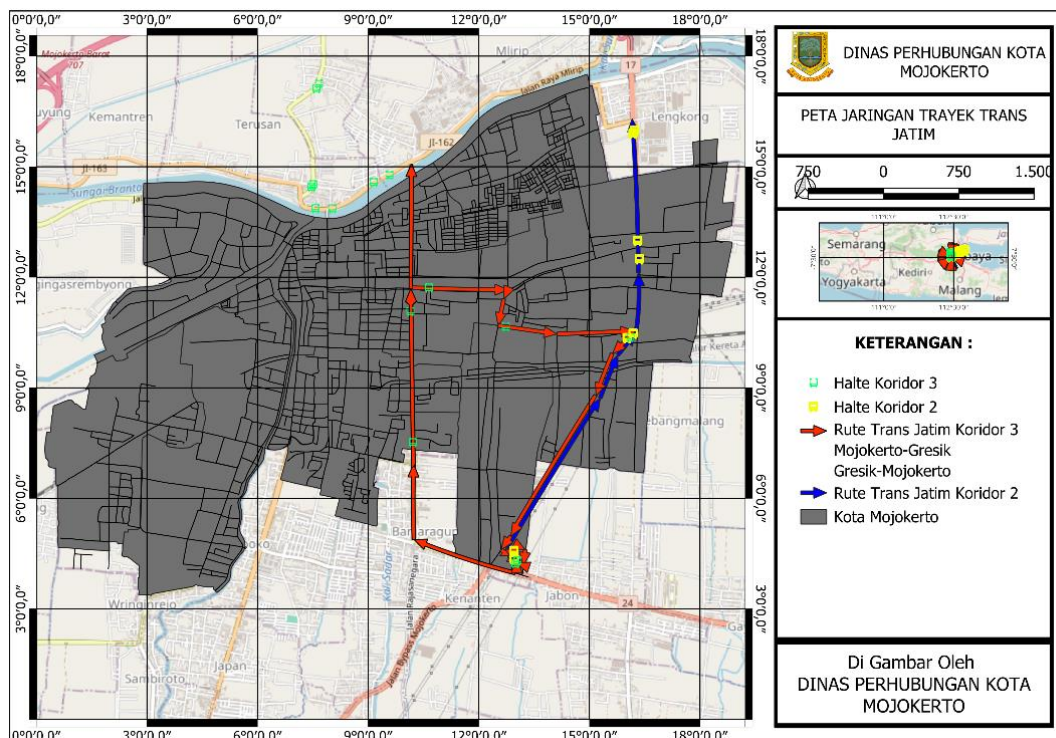


Figure 5. Digital Map of TransJatim Bus Stops

CONCLUSION

This community service initiative successfully produced a comprehensive spatial map identifying the location and distribution of TransJatim bus stops within Mojokerto City. Through a participatory approach involving field observations, stakeholder focus group discussions, and GIS-based cartographic techniques, the project has demonstrated the feasibility and utility of integrating local knowledge with digital mapping tools. The active involvement of the Mojokerto City Department of Transportation and TransJatim operators, combined with the support and feedback from the local community, played a pivotal role in ensuring the accuracy and contextual relevance of the final outputs. This collaborative model not only improved data validation but also strengthened institutional and public ownership of the resulting geospatial products.

The final map, which visually details both stop locations and route corridors, has significant potential for further development. It can be transformed into posters, pamphlets, mobile-accessible formats, or integrated into digital platforms to enhance public awareness and usability. Such applications will help bridge the information gap for current and prospective TransJatim users, thereby promoting greater public reliance on sustainable, efficient public transportation. Moreover, the success of this initiative highlights the importance of community-based mapping as a tool for urban transport planning, especially in second-tier cities where spatial information systems remain underdeveloped. Future efforts can build upon this foundation to continuously improve multimodal connectivity, data transparency, and inclusive mobility for all residents.

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