Planning and Implementation of Bicycle Paths Connecting Colleges and Government Offices in Bengkalis Island

Marhadi Sastra, ST.,M.Sc[1a)], Mutia Lisya, ST., MT[2b)]

[1,2]*Department of Civil Engineering, Politeknik Negeri Bengkaliis*

[a)]marhadi@polbeng.ac.id
[b)] mutialisya@*polbeng*.ac.id

Abstract

Environmentally friendly mobility is an urgent need for developing areas, including Bengkalis Island. The planning and development of bicycle paths as a connection between colleges and local government offices on Bengkalis Island consider factors of efficiency, safety, and comfort. This bicycle path planning is also expected to support a healthy lifestyle and reduce pollution and traffic congestion. This research uses a qualitative descriptive approach with mapping analysis and community needs surveys. The research results show that bicycle paths are not only beneficial for students and employees but also become part of the environmentally friendly infrastructure for the wider community. Based on the survey results, it is evident that the community predominantly desires the presence of bicycle paths. After conducting a road inventory, it was found that the accessible road that can be planned for the bicycle path is from Pramuka Road to the Polytechnic State Campus of Bengkalis and the road connecting to the Bengkalis government offices, while other roads have not yet provided sufficient width. The planned bicycle path will adhere to the circular letter from the Ministry of Public Works, Directorate General of Highways No. 05/SE/Db/2021 regarding Bicycle Facility Design

Keywords: mobility**,** bicycle paths, and environmentally friendly

INTRODUCTION

Bengkalis Island has a strategic role as a center for education and government, with three main universities: Politeknik Negeri Bengkalis, STAIN Bengkalis, and STIE Syariah Bengkalis. The current number of students at Polbeng is approximately 4,000, while STAIN Bengkalis has around 3,000 students and STIE Syariah Bengkalis has about 700 students. The dominant profession of the local community is government employees.

As a center for government and education, Bengkalis Island plays a vital role in supporting economic and social growth in Bengkalis Regency. The presence of these three universities not only contributes to higher education development for the local community but also attracts students from outside the region, which in turn increases economic activities around the campuses, such as boarding houses, food stalls, and various other services.

In addition to the government sector, there is also a small portion of the community working in agriculture, trade, and fisheries. Nevertheless, other economic potentials, such as tourism and fisheries, have yet to be fully developed. Bengkalis Island has natural tourist potential, including beaches and mangrove forests, which, if well-managed, could become an additional source of income for the community.

Infrastructure development, such as transportation and public facilities, continues to be improved to support economic activities, education, and public services on the island. With its existing potential, Bengkalis Island has significant opportunities to continue growing as an important center for education, government, and economy in Riau.

The need for efficient, affordable, and environmentally friendly mobility is increasing along with the density of activities on Bengkalis Island. As an island that serves as an educational center with the presence of Politeknik

Negeri Bengkalis and several other universities, as well as government offices that provide public services, the existence of connecting bicycle paths can improve accessibility, reduce carbon emissions, and support the local government's green initiatives.

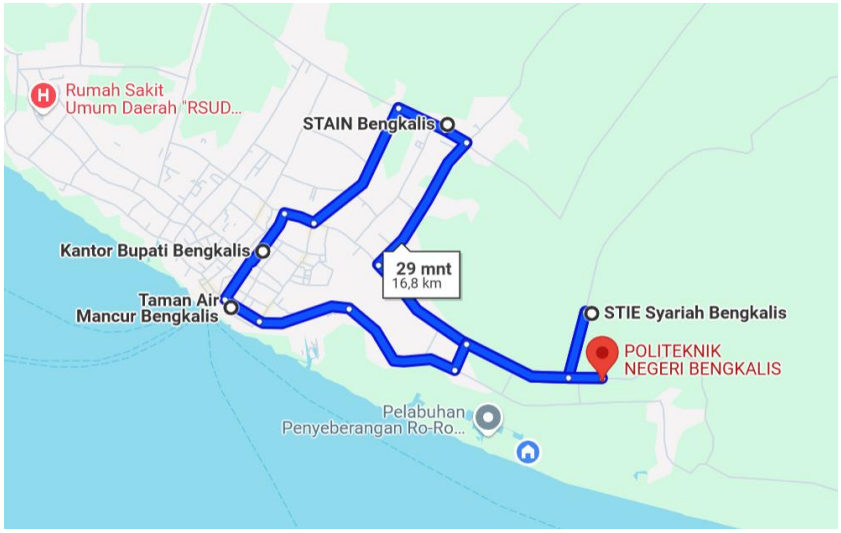

FIGURE 1. Connecting Road Between University Campuses and the Bengkalis Local Government Office

The objectives of this research are to:

1. Identify the needs and benefits of bicycle paths connecting universities and local government offices.
2. Determine the optimal routes for bicycle paths on Bengkalis Island.
3. Develop designs for bicycle paths that are safe, comfortable, and environmentally friendly.

METHODS

This research uses a descriptive qualitative approach with data collection methods through:

1. **Surveys:** Collecting data from students, government employees, and local residents to understand preferences and needs related to bicycle paths. This is done through questionnaires distributed to students and government employees to obtain their preferences and requirements regarding bicycle paths.
2. **Route Mapping:** Utilizing GIS technology to determine the best routes between the locations of universities and government offices. Route mapping is conducted through field surveys while considering the existing road conditions for bicycle paths.
3. **Safety Analysis:** Analyzing vulnerable points along the route and designing paths that minimize the risk of accidents. After identifying the bicycle path routes, a review of the safety risks for cyclists in relation to other road users is conducted.

RESULTS AND DISCUSSION

The research shows that well-planned bicycle paths not only enhance accessibility but also support environmental sustainability. This program has the potential to reduce carbon emissions by up to 10% per year among students and employees using the paths. Community outreach and support are crucial for the implementation of this program to minimize vandalism and strengthen support for environmentally friendly transportation modes.

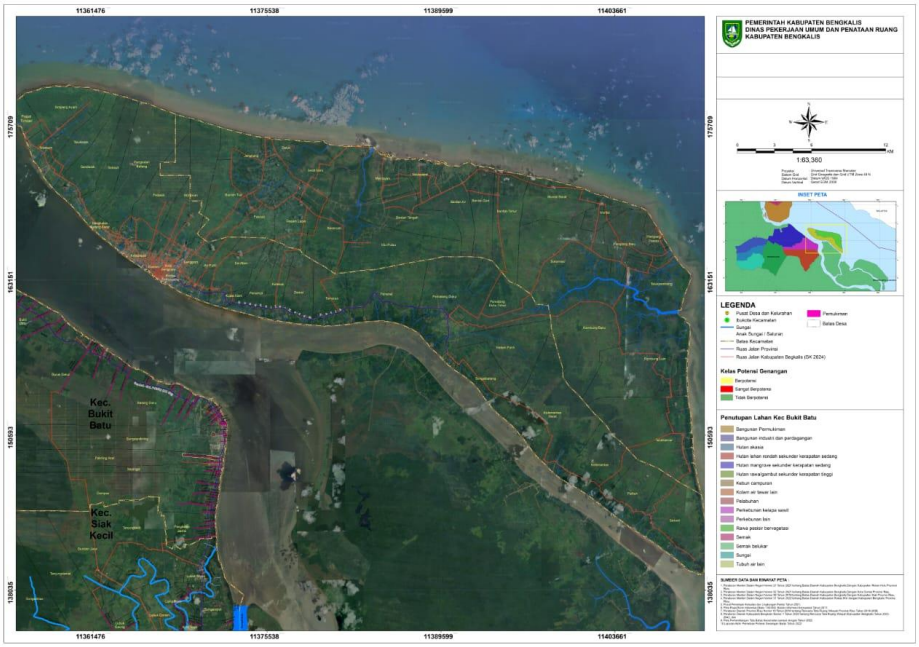

FIGURE 2. Map Of Roads On Bengkalis Island to Support Bicycle Lanes

Surveys show that more than 70% of respondents among students and government employees support the development of bicycle lanes. The most prioritized factor is safety, followed by comfort and speed of access to destinations. The dominant age group wanting bicycle lanes is between 20-40 years old, predominantly male. Among students, there is a higher desire for bicycle lanes, while government employees follow behind. This is because government employees have more activities that require quicker access to their workplace, with the majority living a considerable distance from their offices. In contrast, students predominantly reside near the campus, which encourages them to use bicycles more than government employees.

The proposed route connects the Bengkalis State Polytechnic on Jl. Bathin Alam – Jl. Pramuka with the Regent's Office on Jl. Jendral Ahmad Yani and Jl. Antara. This route passes through strategic points such as office centers and residential areas, making it easier for the community to use it. The resulting map shows a route that is 16.8 km long, passing through areas with relatively moderate traffic.

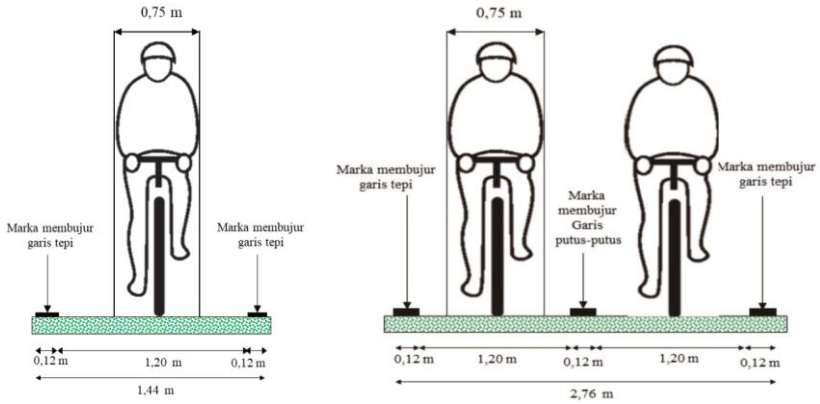

FIGURE 3. Minimum width of a single bike lane and double bike lanes

Existing condition of access roads to support bike lanes.

FIGURE 4. Road to STIE campus

FIGURE 5. Pramuka Street to Polbeng campus

FIGURE 6. Bantan - Senggoro Road to STAIN Bengkalis campus

The bike lanes are designed with a minimum width of 1.44 meters for one direction and 2.76 meters to accommodate two-way traffic, and are equipped with signage and physical barriers to ensure the safety of cyclists. Every 1 km, there are rest points equipped with seating and bike parking. Based on the existing road data above, the new proposed bike lanes can be planned for Pramuka Road leading to the Bengkalis State Polytechnic campus and the road between the local government offices in Bengkalis. Meanwhile, for other access roads, the width is currently inadequate, requiring road widening first, as it may disrupt motor vehicle users and pose a potential accident risk between motor vehicle drivers and cyclists.

On Pramuka Road and the connecting road where bike lanes can be planned, vulnerable points that intersect with the highway should be equipped with traffic signs and crosswalks to slow down motor vehicles. This route should also be equipped with CCTV at several strategic points to enhance user safety

FIGURE 7. shows the bike lanes on Pramuka Road and Bathin Alam Road

FIGURE 8. shows the bike lanes on Antara Road

CONCLUSIONS

The development of bike lanes connecting universities and government offices in Bengkalis Island provides significant benefits in supporting efficient and environmentally-friendly mobility. Careful planning involving various stakeholders is necessary to ensure that these lanes function optimally. The main recommendation is to conduct technical planning for bike lanes and expand them to cover more strategic locations on Bengkalis Island.

The development of bike lanes on Bengkalis Island has great potential in supporting environmentally-friendly mobility, especially in areas connecting universities and government offices. Survey results indicate that bike lanes are viable to be constructed in several areas, such as Pramuka Road leading to the Bengkalis State Polytechnic and the connecting road to the local government office complex, while other areas still require road width enhancement. By adhering to the standards set by the Directorate of Highways, this bike lane planning is expected to not only accommodate the needs of students and employees but also enrich environmentally-friendly infrastructure for the

broader community, support a healthy lifestyle, reduce pollution, and help alleviate traffic congestion in Bengkalis Island for decades to come

ACKNOWLEDGMENTS

This research is funded by the PNBP of Bengkalis State Polytechnic through the research and community service center for the fiscal year 2024.

REFERENCES

[1] Badan Pusat Statistik (BPS) Kabupaten Bengkalis. 2022. Statistik Transportasi Bengkalis.
[2] Dinas Perhubungan Kabupaten Bengkalis. 2023. Program dan Kebijakan Transportasi Hijau.
[3] Direktorat Jenderal Bina Marga. (2021). *Surat Edaran Kementerian Pekerjaan Umum, Direktorat Bina Marga Nomor 05/SE/Db/2021 tentang Perancangan Fasilitas Sepeda*. Jakarta: Kementerian Pekerjaan Umum dan Perumahan Rakyat.
[4] Googlemap.com diakses September 2024
[5] Ministry of Transportation of Indonesia. (2020). *Guidelines for Sustainable Urban Mobility in Indonesian Cities*. Jakarta: Ministry of Transportation.
[6] Pucher, J., & Buehler, R. (2012). *City Cycling*. Cambridge, MA: MIT Press.
[7] Susanto, D., et al. (2023). "Efektivitas Jalur Sepeda dalam Mengurangi Emisi Karbon di Daerah Perkotaan." *Jurnal Transportasi Ramah Lingkungan*, 8(2), 45-62.