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D2.3.2 Feasibility and Cost-Benefit Analysis of the Alternative Route of the Kihnu-Munalaid Ferry Line

Key findings

September 2025

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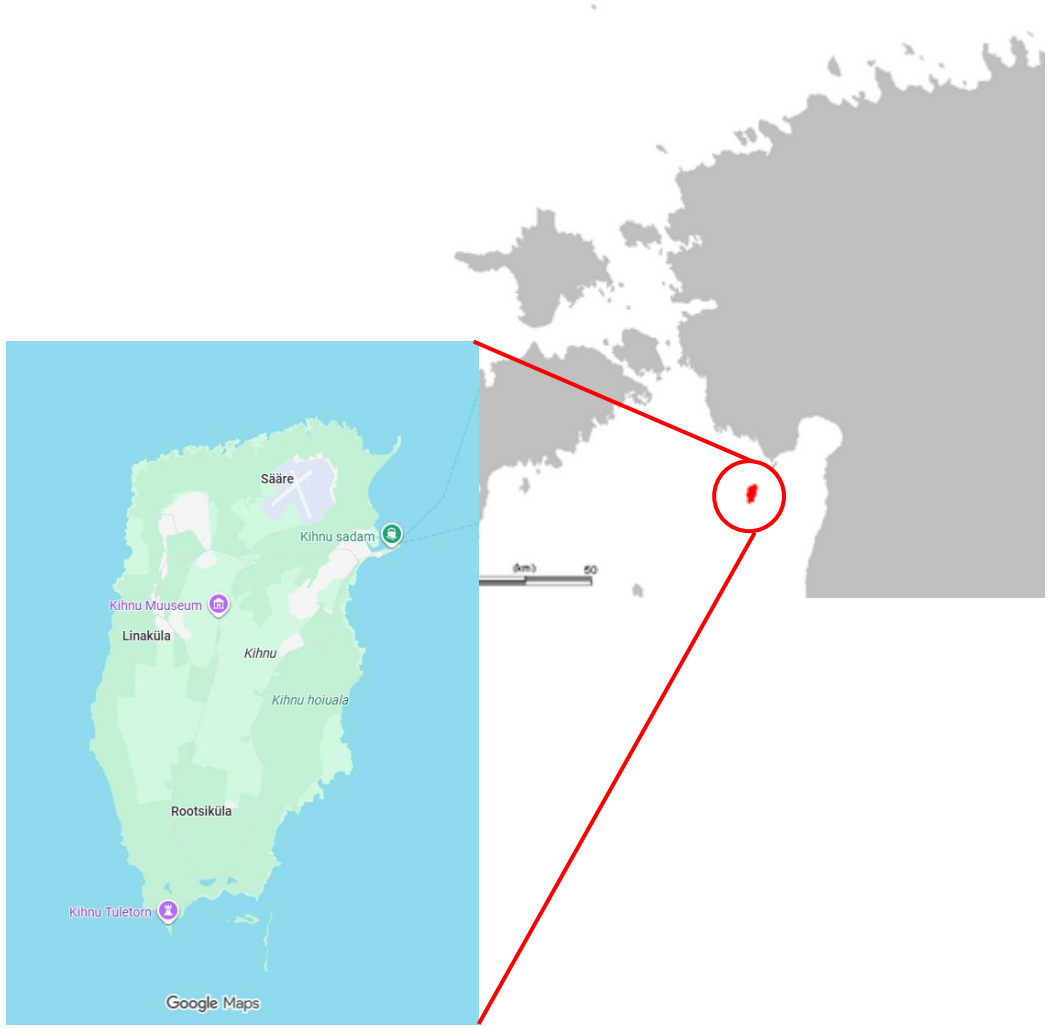
Background & Purpose

- Kihnu is Estonia's sixth-largest island with nearly 700 residents (January 2025)
- The island is connected to the mainland year-round by the ferry Kihnu Virve
- The current route is longer than the historical one due to the deeper draft of the ferry, requiring it to bypass shallow areas
- The study was commissioned to analyse the feasibility, environmental Impact, and cost-effectiveness of the alternative route via Kakra Channel



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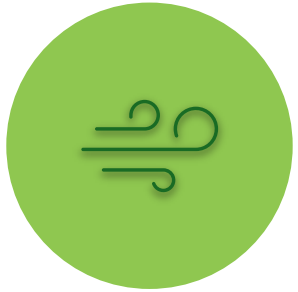
Key benefits of the alternative route



Reduces weather disruptions: the current route is exposed to open sea, causing around 20 cancelled trips per year. Alternative route would be more weather-resilient and safe

Lower fuel consumption: Estimated reduction of fuel consumption of up to 30%, i.e around 120 000 l of diesel annually

Lower CO_2 emissions: Up to 30% reduction, i.e around 300 tons less CO_2 emissions annually

Slightly faster connection: travel time would decrease by 10-15 minutes

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Drawbacks & Challenges

Major dredging required: Kakra Channel is too shallow. Safe navigation would require a channel of 60 – 100 m and ~4m deep

High estimated cost: Including environmental assessments and preparatory work 4 – 9 million €

Long payback period: 27 years (60m channel) or 40 years (100m channel), which exceeds the remaining useful life of the current ferry

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Potential high environmental risks: Channel passes through a Natura2000 protection area, habitat of seals and birds. Dredging could cause irreversible damage to these habitats

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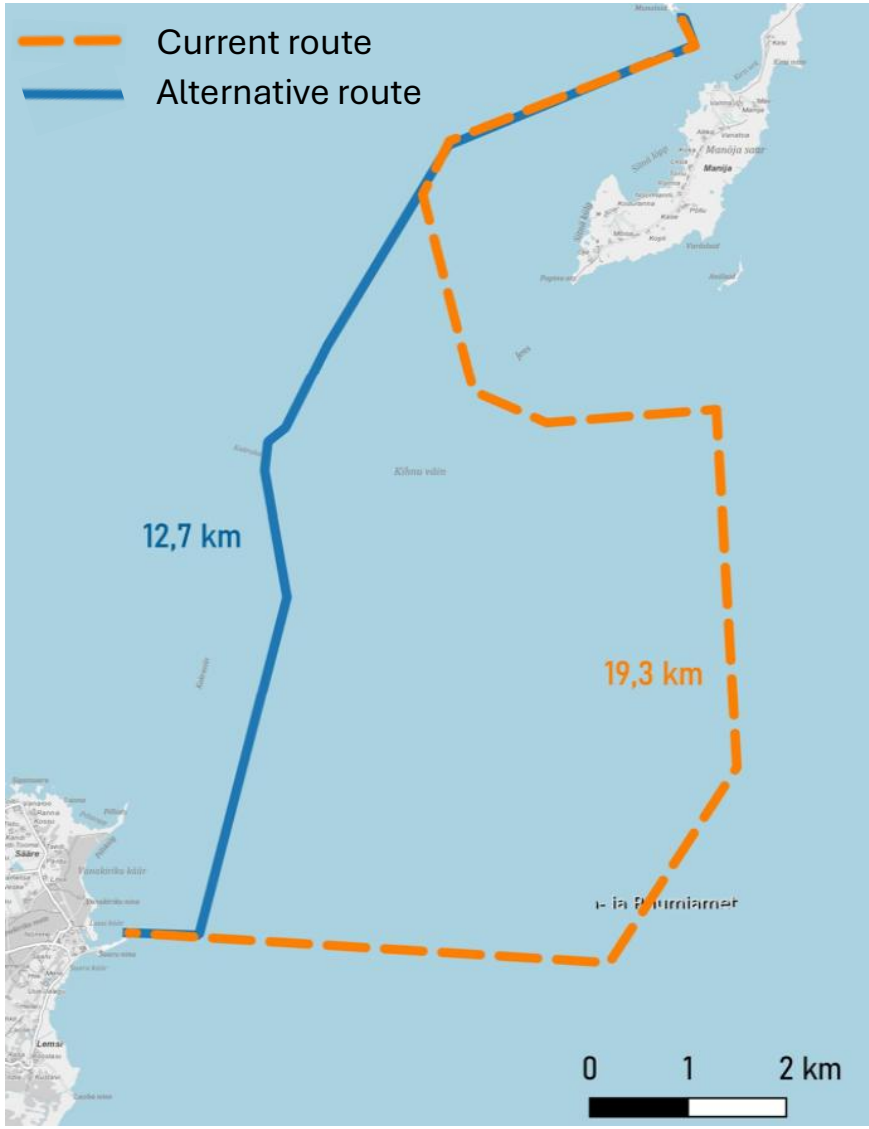
Current vs alternative route

	Current route	Alternative route
Distance	19,3 km	12,7 km
Travel Time	1h 5min	50-55 min
Fuel use (annual)	375 000 – 425 000 l	263 000 – 298 000 l
CO_2 emissions	989 – 1121 t/year	693 – 786 t/year (-30%)
Investment needed	-	4,1 – 9,2 million €
Payback period	-	27 – 40 years
Environmental impact	-	High, potentially irreversible



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Conclusion

- The payback period of the alternative route will be an average of 27 or 40 years, depending on the width of the canal (60 or 100 m), which exceeds the remaining useful life of the ferry Kihnu Virve (about 20 years). The question also arises whether the ship-route should be designed based on the ship or the other way around.
- **Taking into account the long payback period and potential negative environmental impact, it is advisable to find other alternatives to reduce the environmental footprint** (replacement of the ship's engines, partial electrification, commissioning of a smaller vessel intended for passenger transport in parallel with Kihnu Virve, etc.) than dredging the Kakra canal.
- *However, if there is a wish to continue with the project, the next step should be to apply for a permit for the special use of water and together with it, an environmental impact assessment of the dredging of the Kakra canal should be carried out, including basic studies (at least Natura 2000 assessment, birdlife, marine mammals, fish and fisheries, seabed geology, noise and vibration, seabed biota, underwater archaeology).*

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*The full report can be downloaded **here** (in Estonian only)*

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