

# URBANIZATION OF SINGAPORE'S HINTERLANDS

ARCHITECTURE  
OF THE TERRITORY

RIAU ARCHIPELAGO,  
INDONESIA

FREE DIPLOMA  
MYRIAM PERRET

# ARCHIPELAGO CITY BATAM

URBANIZATION OF SINGAPORE'S  
HINTERLANDS  
BATAM THE ARCHIPELAGO CITY

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IN SINGAPORE'S HINTERLANDS

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- Futur City Laboratory as Research Context
- Singapore's Hinterlands

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- Rapid Urban Growth along the Singapore Straits
- Singapore Region: Borders and Connections throughout History
- Urban Development in the Singapore Region
- How to Describe and Design the Development of Hinterland Territories?

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- A Variety of Island Types
- Integration of the Industry in the Urban Structure
- Extension of Urban Centers towards the Coastline
- Inhabiting Small Islands: "The New Kampung" living
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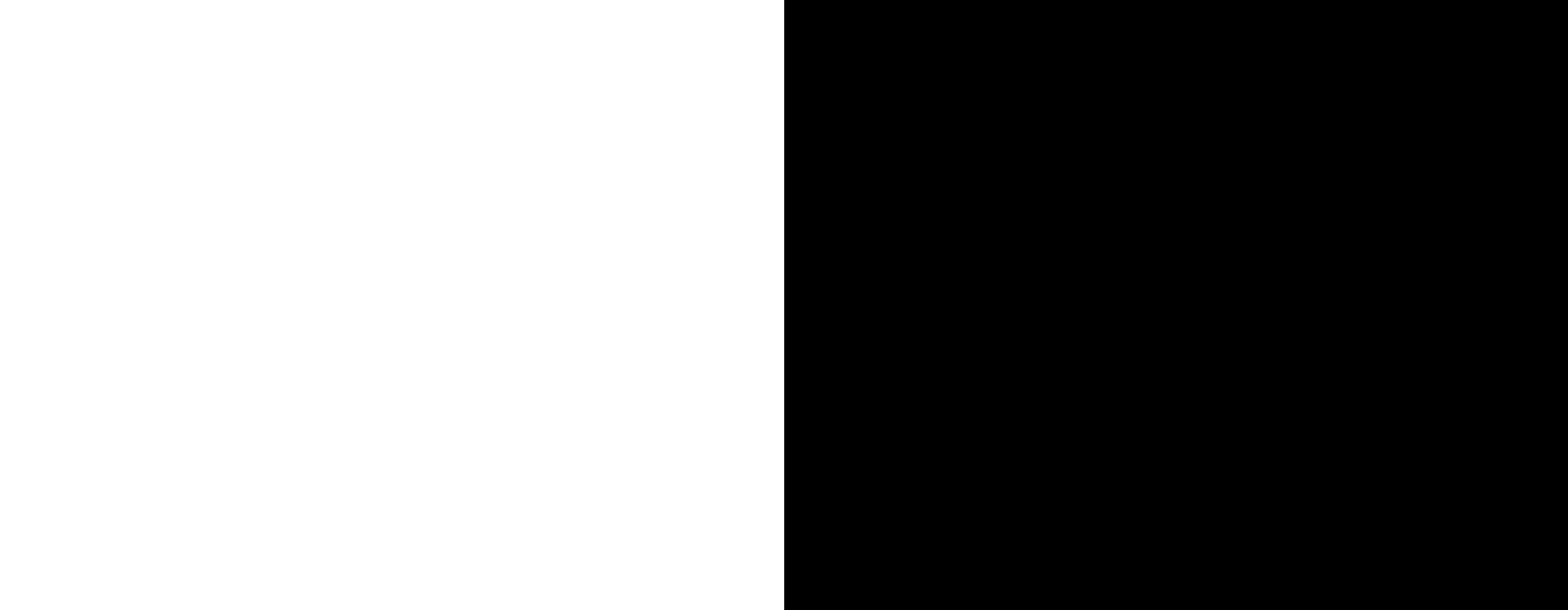
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# TERRITORIAL RESEARCH AND DESIGN IN SINGAPORE'S HINTERLANDS

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SINGAPORE'S HINTERLANDS

## FREE DIPLOMA IN ARCHITECTURE OF THE TERRITORY

The semester at the ETH Studio Basel, provided the opportunity for an insight into large-scale urban research. Topics related to processes of urbanization, which take place not only in cities but have a larger impact on territories became my principal interest. A large-scale vision and approach to urban research is becoming increasingly significant due to the rapid urban growth taking place globally. The need to secure energy, water, food and other resources for urban areas leads to a complex territorial network of dependencies. Singapore's hinterlands represent a unique case study in examining the complex territorial relationships brought by the regional impact of the global city. In order to get a better understanding of the current urban development in the Singapore region, it is necessary to investigate beyond national borders. The island city-state is clearly dependent on its proximate territories. The economic influence of Singapore reaches well beyond its political borders and constitutes the crucial force behind the development of the Indonesian province of the Riau Islands. The characteristics of the development taking place in the global city's hinterlands – the transformation of nature, rapid industrialization and large workforce migration - provokes questions and need to be carefully examined. This territory has been explored and

documented through maps, photographs, drawings and text. The research also provides specific criteria for a territorial development strategy in the selected area of the Riau Archipelago. The project's aim is to offer an alternative vision to the current territorial development processes.

### FUTURE CITIES LABORATORY AS RESEARCH CONTEXT

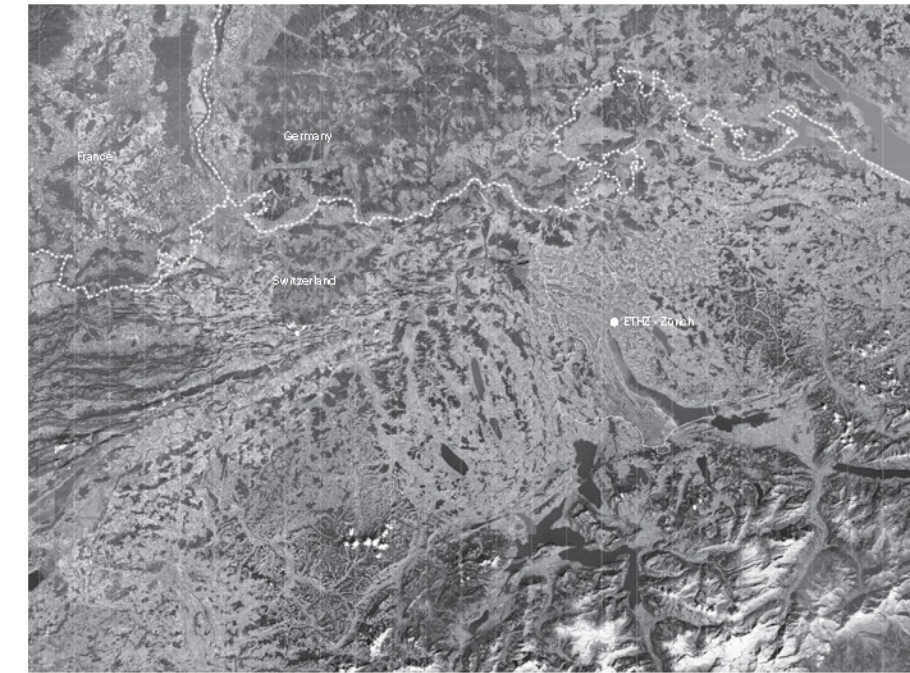
In 2010, the Future City Laboratory (FCL) was started up as the first research program of the Singapore-ETH Centre for Global Environmental Sustainability (SEC), established in collaboration between ETH Zurich (ETHZ) and Singaporean National Research Foundation (NRF). The new laboratory is concerned with the topic of sustainable urban development. FCL's research focuses on three different scales: sustainable building technologies, the city as an urban system, and the relationship between urban and rural environments. For this purpose, three new professorships have been created. Assistant Professor Milica Topalovic has been mandated to work on the territorial scale. The start of Prof. Topalovic's engagement at the Future Cities Laboratory coincides with my last year at the ETHZ. This provides me with the ideal opportunity to engage in large-scale research and design. The possibility to work in Singapore during the diploma semester, created a strong

advantage in access to information and in conducting fieldwork without restrictions. Furthermore, the direct collaboration with experts from the NUS (National University of Singapore) and the Riau Province and Batam was of great value for the work. The work in Singapore during the diploma semester was facilitated by the FCL.

### SINGAPORE'S HINTERLANDS

Cities have, throughout history, functioned as centers of political and economic power, from which the agricultural and resource-rich hinterlands were managed and controlled. The dichotomy center-periphery (rural-urban, city-countryside, etc) has laid the basis of urban culture in general. Since the beginning of the industrial revolution, new technologies, transportation modes and the opening of trade have introduced a remarkable complexity and an increase of physical distances in the relationship between cities and hinterlands. Less and less it is thought, cities rely on surrounding territories for supply and subsistence. Instead, they seem emancipated from the constraints of geography, operating in a global web of dependencies: global cities are said to have global hinterlands. These are the conditions where the access to resources and labor, and even the distance between the sites of production and consumption, are being reconsidered in their economic, political and ethical dimensions.

At first glance, the island city-state of Singapore is the city without a hinterland. Certainly it is the city whose productive territories lie beyond the national borders. The access to resources, land, drinking water, energy and labor has been profoundly important for Singapore since its independence in 1959. On the one hand, these apparent restrictions have proven to foster innovation in urban development, for which Singapore has become known. On the other hand, economical incorporation of proximate areas in Malaysia and Indonesia has remained both a necessity and a profitable opportunity. The momentous growth found at Singapore's borders – at the convergence of foreign investment with inexpensive land and labor - is marked by less transparent rules. The politics of control of flows of people and goods has imposed an urban geography of sharp differences.





# SINGAPORE STRAITS AND URBANIZATION PROCESS

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HOW TO DISCRIBE AND DESIGN THE  
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P.1617 Singapore's Skyline.  
3 km from Singapore Harbor



▲<sup>19</sup> Vessels on the Singapore Straits.  
8 km from Singapore Harbor



▲ Batam's Main Port: Batu Ampar, facing the Singapore Straits.  
23 km from Singapore Harbor



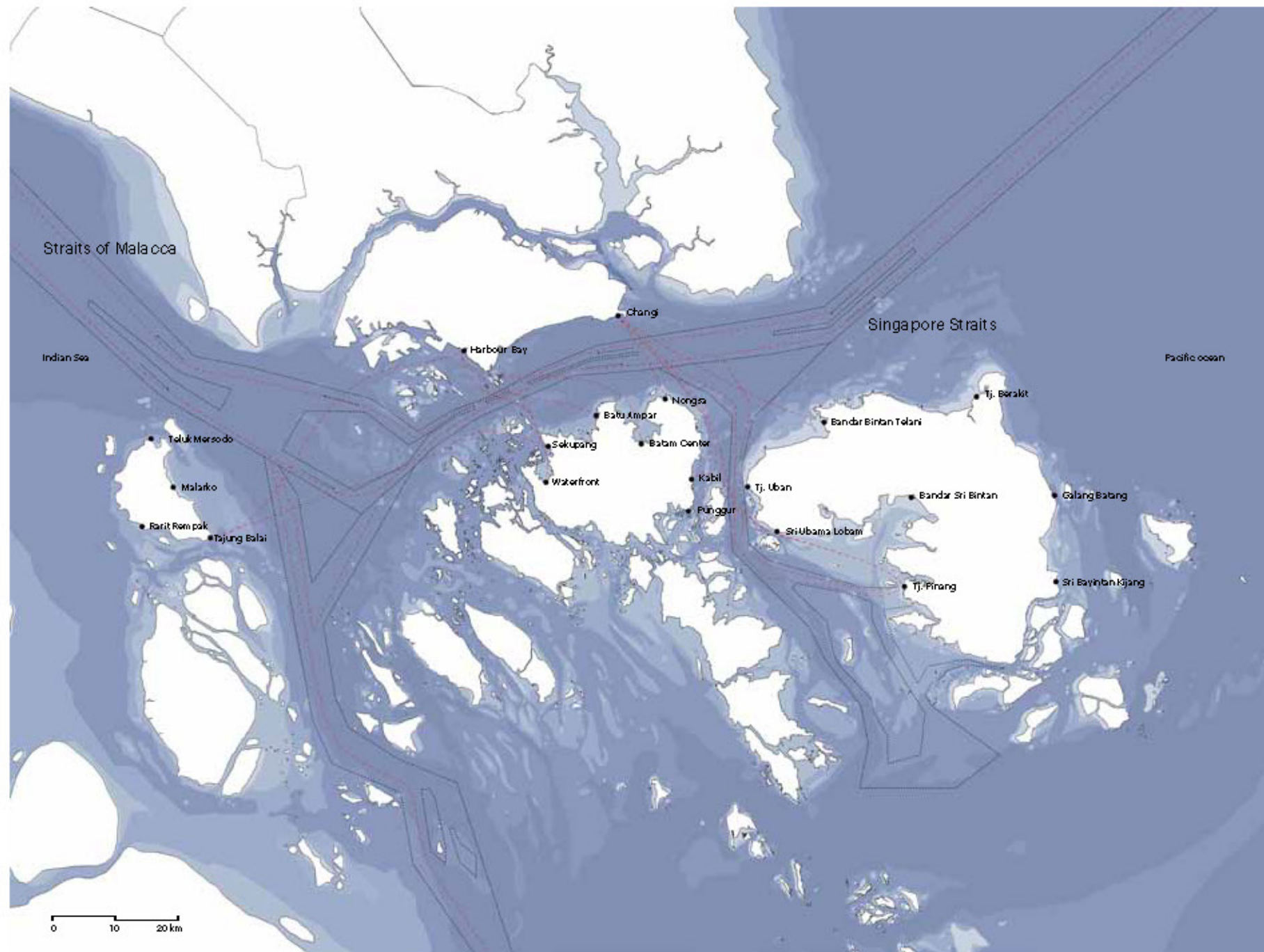


2222 Traditional Village „Kampung Tua“ in the South of Batam Island. 35 km from Singapore Harbor



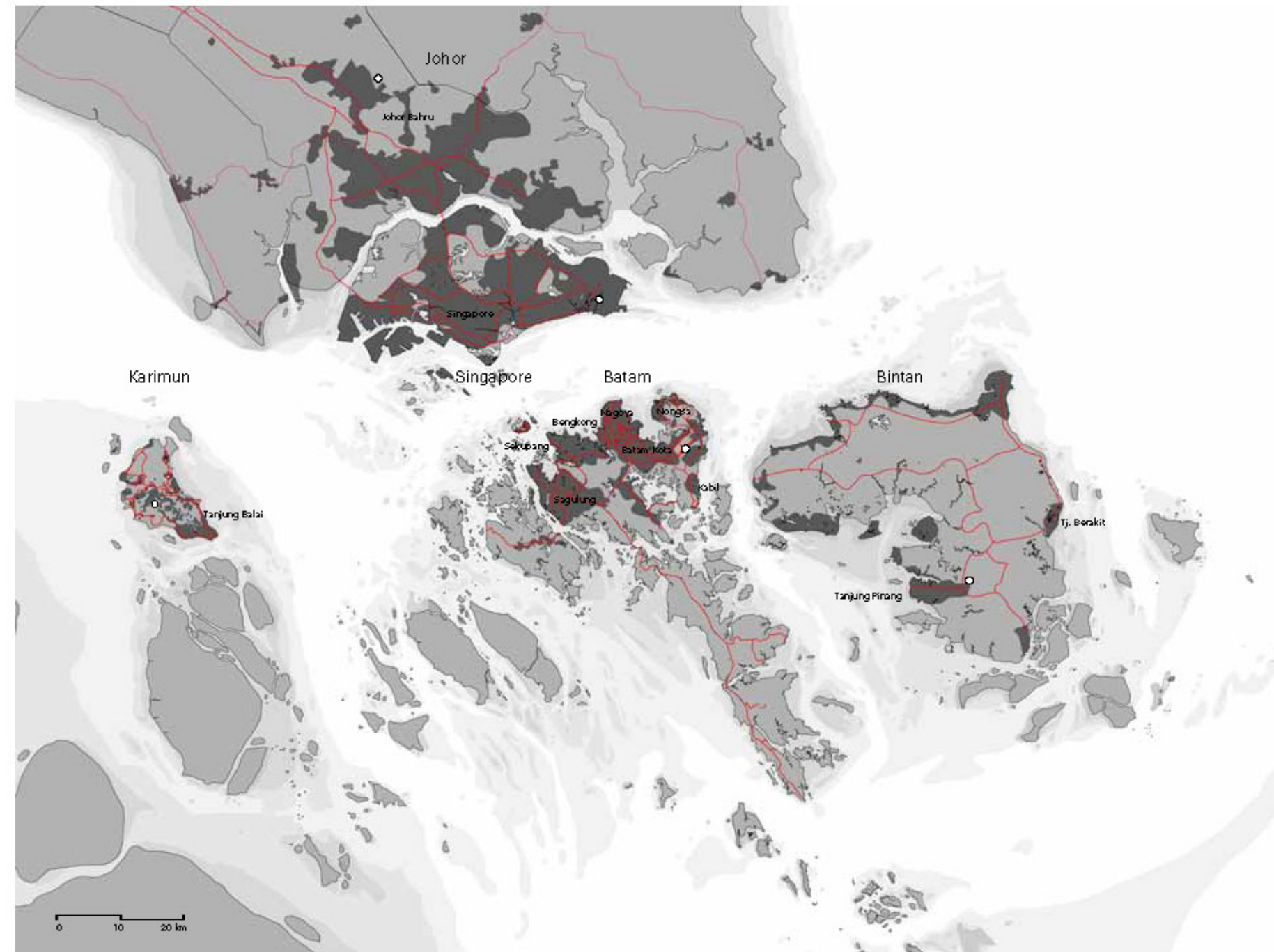
P.24-25 The Natural Landscape of the Riau Archipelago, in the South of Batam Province, 42 km from Singapore Harbor





Rapid Urban Growth along the Singapore Straits

- Built-up areas
- Airports
- Main roads



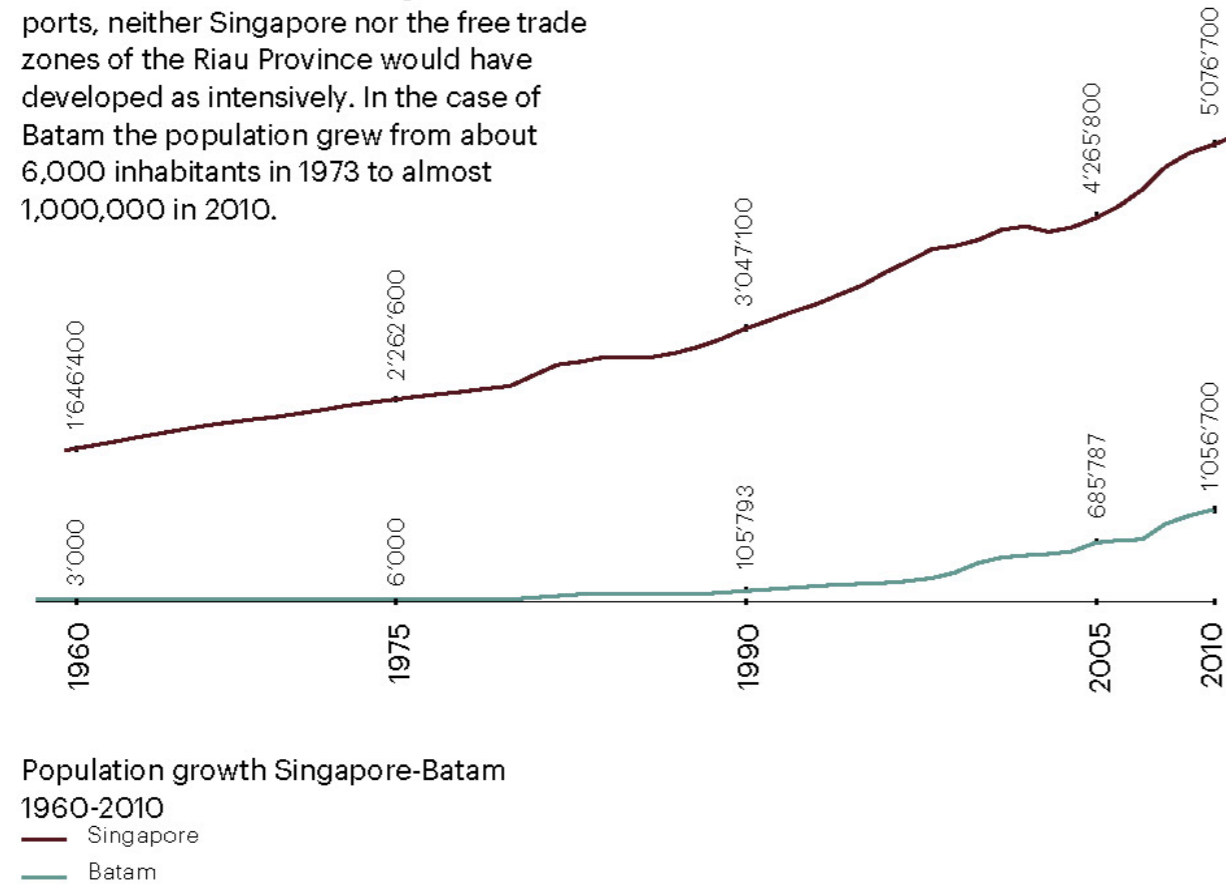
## URBANIZED SEAS OF THE SINGAPORE STRAITS



The character of the sea represents the key element for the understanding of the urbanization process in the Singapore region. The Straits of Malacca, leading into the Straits of Singapore is the connection between the Indian and the Pacific Ocean and one of the global maritime trade gateways. The strategic importance of the Singapore region thus persisted through all the power shifts. Gaining rapidly in importance since the independence, Singapore has evolved into the global trade hub in the Straits of Malacca. It now holds the position of the fourth most important port worldwide, after Panama, Suez and Shanghai. Each year about 71,500 vessels cross the Straits transporting cargo goods and oil. The intensity of shipping activities in the Straits of Malacca is clearly visible, as hundreds of cargo boats and ferries continue to pass along the horizon.

## RAPID URBAN GROWTH ALONG THE SINGAPORE STRAITS

The Straits can be compared to an intensively used highway, where all of the coastal areas adjacent to the maritime connector are urbanized as a result. From the Straits Settlements in the past, to the accelerated development of Singapore and Batam today, the sea has always triggered urbanization processes along the Straits. Without the strategic geographical position and the economical advantages of the ports, neither Singapore nor the free trade zones of the Riau Province would have developed as intensively. In the case of Batam the population grew from about 6,000 inhabitants in 1973 to almost 1,000,000 in 2010.



## SINGAPORE REGION: BORDERS AND CONNECTIONS THROUGHOUT HISTORY

The territory of the Maritime Southeast Asia, or the Malay Archipelago as it is most commonly referred to, comprises Brunei, east Malaysia, Singapore, East Timor, the Philippines and Indonesia. For centuries, the Malay Archipelago has been a unified territory. Through colonial occupation, political borders have been introduced. The first Malay empire, the thalassocratic Srivijaya, embraced the Malay Peninsula, Sumatra and parts of Java and Borneo, and reigned from the VII to XIII century. Through the appropriation of territorial waters, especially the Straits of Malacca located in the centre of the empire, the Srivijaya built a long and successful history of maritime trade with the Middle East, India, Southeast Asia and China. Srivijaya's domination of both the Straits of Malacca and the Straits of Sunda gave them control over local trade and the traffic of the maritime Silk Road. In the XV century, the relations with the Arab world brought Islam to the Malay. A power shift took place in around 1400 with the outset of the Islamic period, covering the territory of the Malay Peninsula, the Riau islands and parts of Sumatra. The Srivijayan prince and king of Singapura Parameswara was the founder of the new empire, transforming Srivijaya into Malacca. The sultan actively supported the spread of Islam by sending Muslim missionaries

throughout the Hindu archipelago. Shortly after, the fall of the Sultanate of Malacca and the Portuguese occupation in 1511 marked a crucial turning point for the area, ushering the period of colonization and parcelling of the once united territory. The religious rivalry prevented a peaceful agreement between the sultanate and the Portuguese: shortly after the occupation, a new sultanate was founded in Johor, side-by-side with the Portuguese Malacca. With the increasing European colonization of Southeast Asia, the Malay territory was becoming increasingly fragmented. Through the Anglo-Dutch Treaty of 1824, the British and the Dutch dominions were established in the north and south. In this manner, the once unified region was irrevocably fragmented, following the lines drawn by the British in 1819. The independence of Indonesia in 1945, Malaysia in 1957 and Singapore in 1963, could not renew the weakened political ties between each geopolitical entities. The fragmented territory surrounding Singapore today represents a complex and paradoxical context marked by cultural unity, the need for economic alliance, and political rivalry.



PRE-HISTORICAL PERIOD

ANCIENT KINGDOM PERIOD

The Dominant Influence of Buddhism

The Dominant Influence of Hinduism

The Dominant Influence of Islam

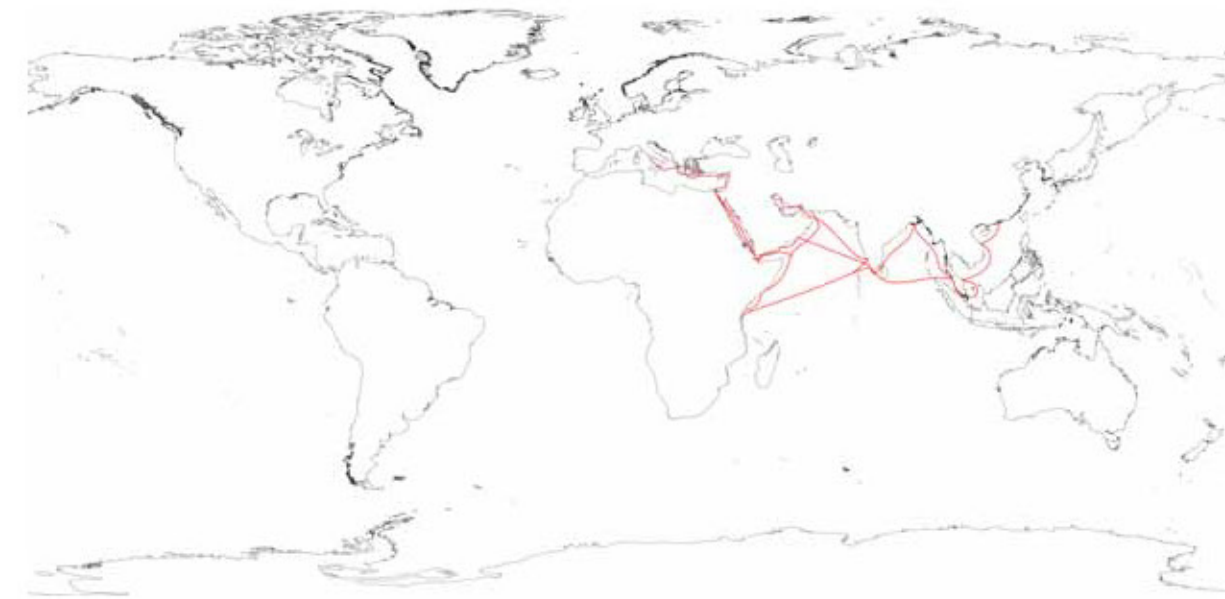
	2500 B.C.	1500 B.C.	1000 B.C.	1st Century AD	500 B.C.	750 A.D.	825 A.D.	The end of 10th Century	1137 A.D.	1292 A.D.	13th Century	1520 A.D.	1527 A.D.		
Java Man Pithecanthropus	Indigenous population of the Archipelago (Australoid, Negrito, Melanesoid, Indonesian, Austronesian)	The Sub-Mongoloid migrants	Indo-Aryan migrants from the South Asian Subcontinent of India	Indian migrants from Gujarat in Southeast India	The emergence of Buddhist Kingdom of Sriwijaya near the City of Palembang-South Sumatra	The existence of Buddhist Kingdom of Sailendrain central Java (Borobudur)	The Kingdom of Mataram and other Kingdom in central and west Java	The prominent influence of Singasari from east Java under the Raja Airlangga. Bali was under this empire	The golden Era of literary work in the Kingdom of Kediri under the Dynasty of Raja Jayabaya	The great Kingdom of Majapahit under Raja Hayam Wuruk and Prime Minister Gajah Mada	Islam was brought by the Merchants from Gujarat and Persia	The first Islamic Kingdom Raja of Hindu Demak converted to Islam	The spread of the Islamic Emporium into the entire Indonesia	The collapse of Majapahit Hindu tradition moved to Bali	Sunda Kelapa, the capital city of the Hindu of Pajajaran was conquered by Demak and the Islamic General Fatah Khan changed name to Jaya-Karta „City of Victory“



Main Port along the Straits of Malacca during the Ancient Kingdom Period: Malacca



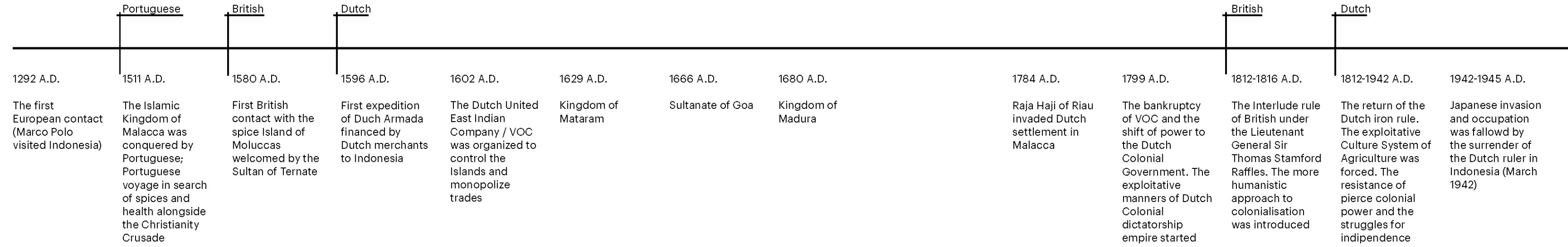
The Ancient Malay World, the Kingdom of Sriwijaya and the Sultanate of Malacca: 7-13th Century



The Maritime Silk Route: 13th Century

Maritime silk route

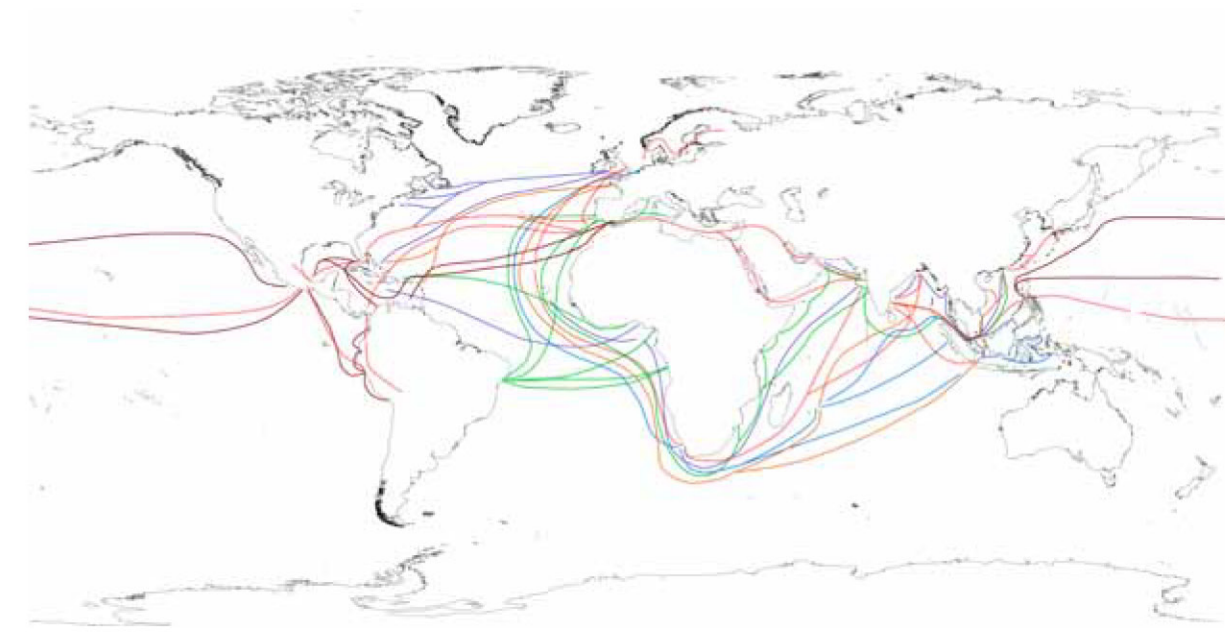
THE EUROPEAN COLONIAL AND INDEPENDENCE MOVEMENT PERIOD



0 100 200 km  
Main Port along the Straits of Malacca during the Colonial Period: The Strait Settlements



0 500 1000 km  
Colonial Territories in Southeast Asia: 19th Century



p.35 The Maritime Trade Routes of the Colonials: 16-20th Century  
 — Dutch trade route  
 — Portuguese trade route  
 — French trade route  
 — English trade route  
 — Spanish trade route  
 - - - Silver trade route

POLITICAL AND ECONOMIC DEVELOPMENT PERIOD

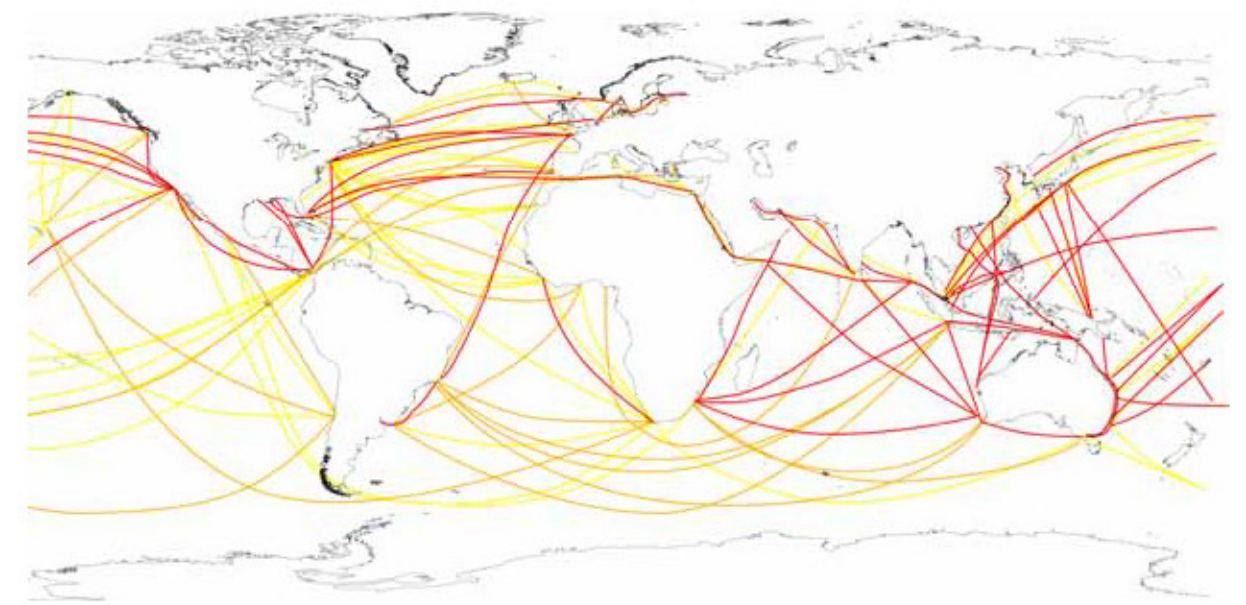
1945 A.D.	1948-1950 A.D.	1950-1966 A.D.	1966-1998 A.D.	1968-1998	1988-1999 A.D.	1999-2001 A.D.	2001-2004 A.D.
17 August The declaration of independence of Indonesia by Soekarno Hatta after 8 days of Japanese surrender from the Allies	Political and territorial integrity was called by a series of separatist movement and armed rebellions	Old Order -Politics first economy later -The theoretical and empirical search for an ideal model of consensus government -Instability of politics and fragile economy	New Order -The central state control of national economic development model -Authoritative approach to government -External Driven- Economic growth with national stability	Suharto President of Indonesia	Transitional Government; President Habibie	Presiden Abdurrahman Wahid -the outset of further impacts of economic crisis with political instability -The new radical political reform and economic restructuring	Reform order Presiden Megawati -A more democratic but less effective elected Government -The search for balanced control of power



0 100 200 km Port of Singapore: International Trade Hub



0 500 1000 km Present Political Borders of Southeast Asia



Present Trade Routes  
 100 journeys  
 1000 journeys  
 >5000 journeys

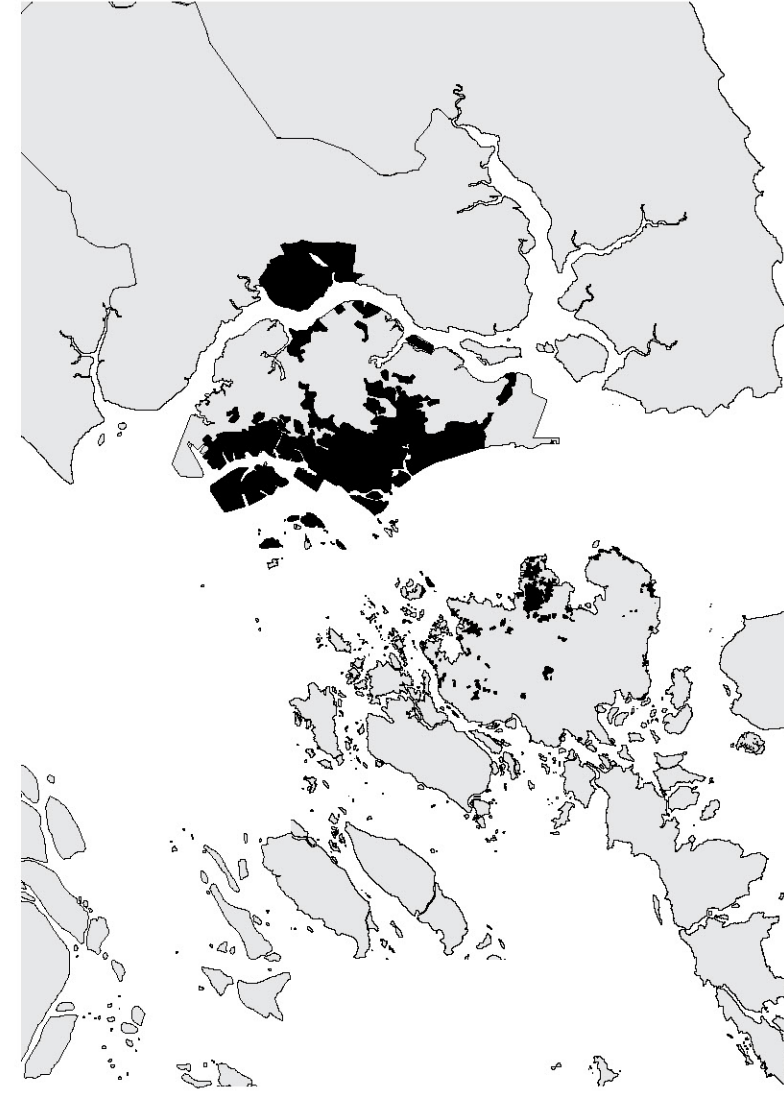
URBAN DEVELOPMENT IN THE SINGAPORE REGION



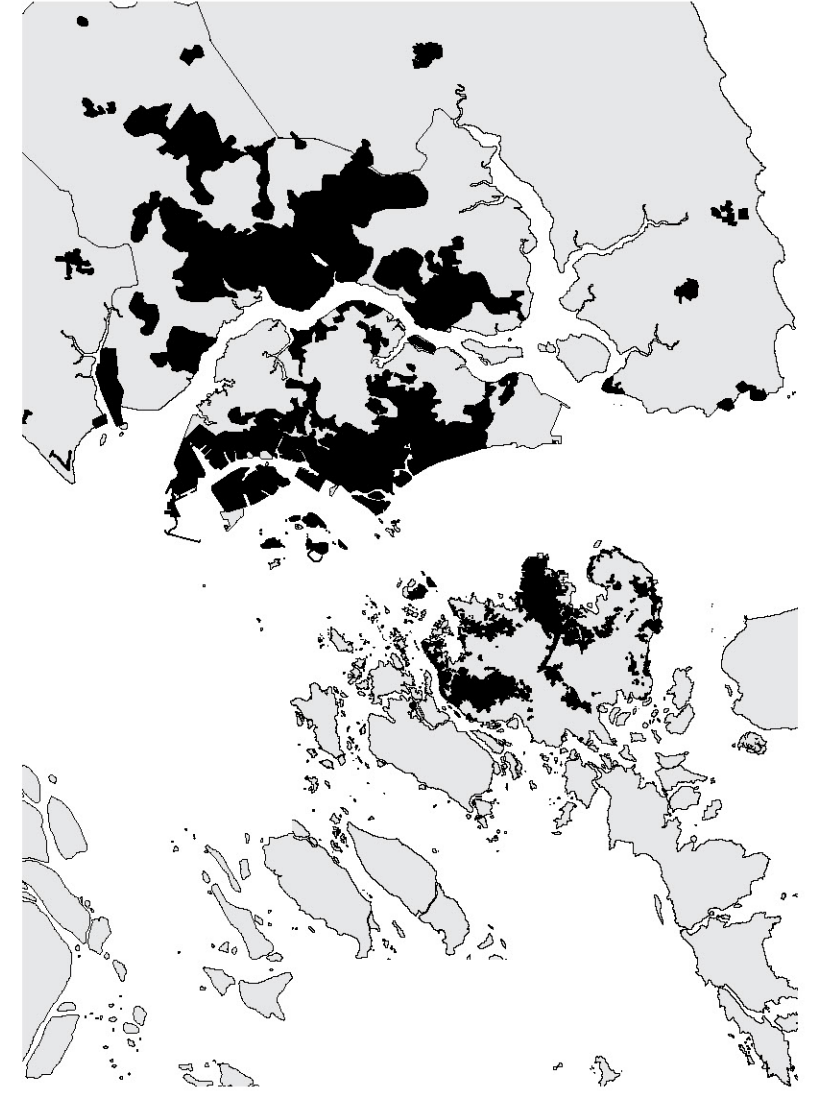
Year 1900



Year 1950



Year 1990



Year 2011

## HOW TO DESCRIBE AND DESIGN THE DEVELOPMENT OF HINTERLAND TERRITORIES?

The industrial and urban development of the Indonesian Batam island is strongly related to its strategic position along the Straits of Singapore and its proximity to the booming city-state. The analysis of the Batam Free Trade Zone in this project describes the character of the economic relation between Singapore and its productive hinterland. The characteristics of the hinterland urban development process and the emerging urban forms of the Batam island have been studied in detail. In addition, the potential of the Riau Archipelago has been described with the particular focus on topography, natural characteristics and the traditional ways of organizing this Indonesian territory. We will see how neither local values nor the connections within the wider metropolitan region of Singapore have been integrated into the development process of the archipelago so far. In order to propose a new development strategy, those qualities that set the Riau Archipelago apart from Singapore and the Johor peninsula will be used in order to create a site-specific urban vision, and increase its value as autonomous city.

## Urban Development in the Singapore Region





# PRODUCTIVE TERRITORY

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TYPE 2: INDUSTRIAL PARK

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TYPE 5: AGRICULTURE

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TYPE 6: FISHERY

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SPECIAL PRODUCTION SITES

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THESIS NO. 1



46-47 Shipyard Industry





Batamindo: Industrial Park





Tourist Resort



Informal Timber Plantation





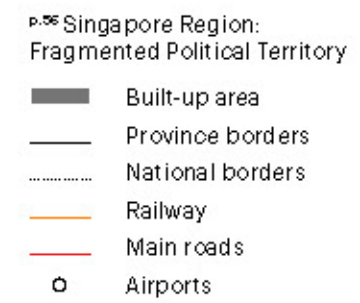
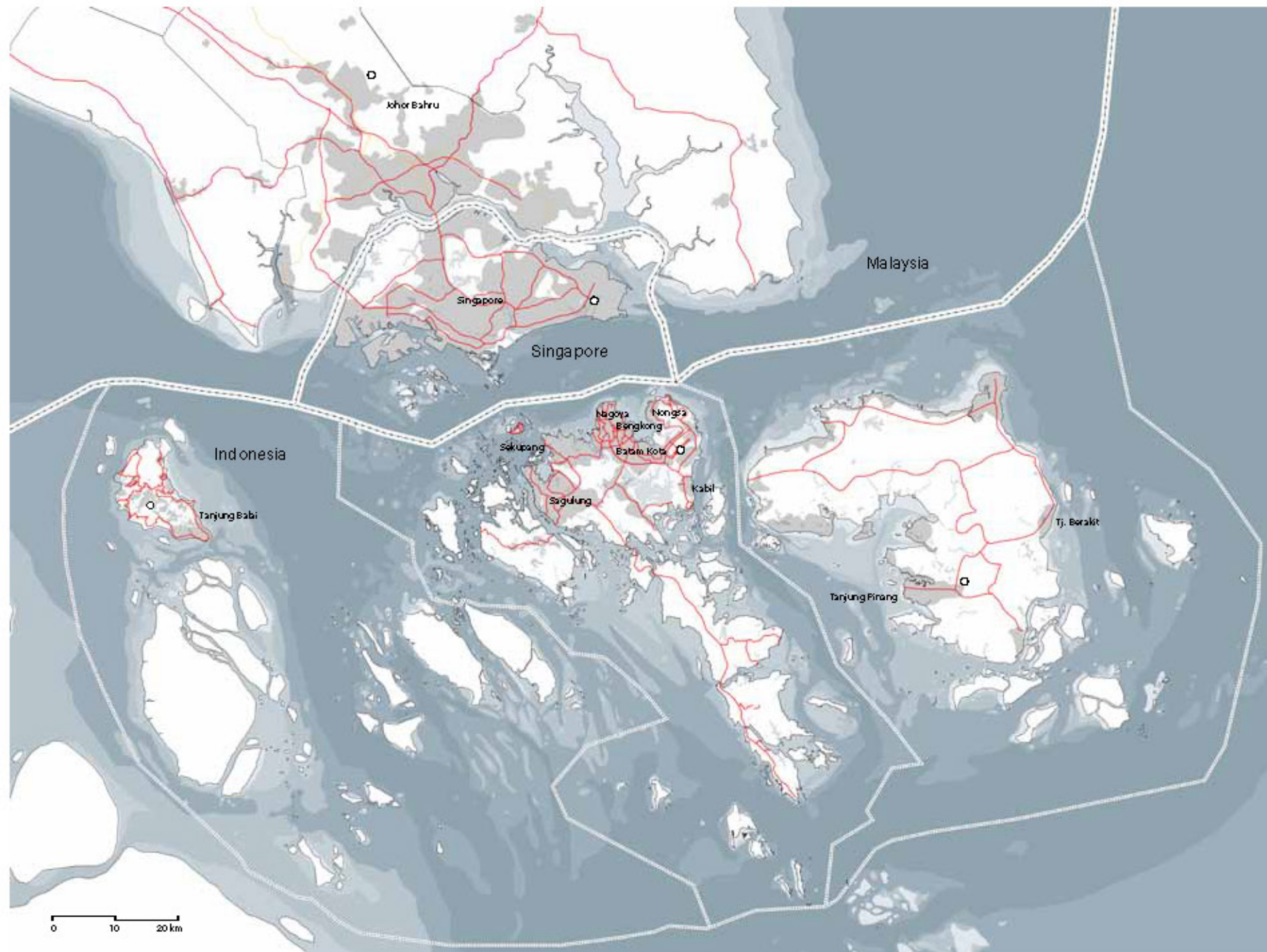
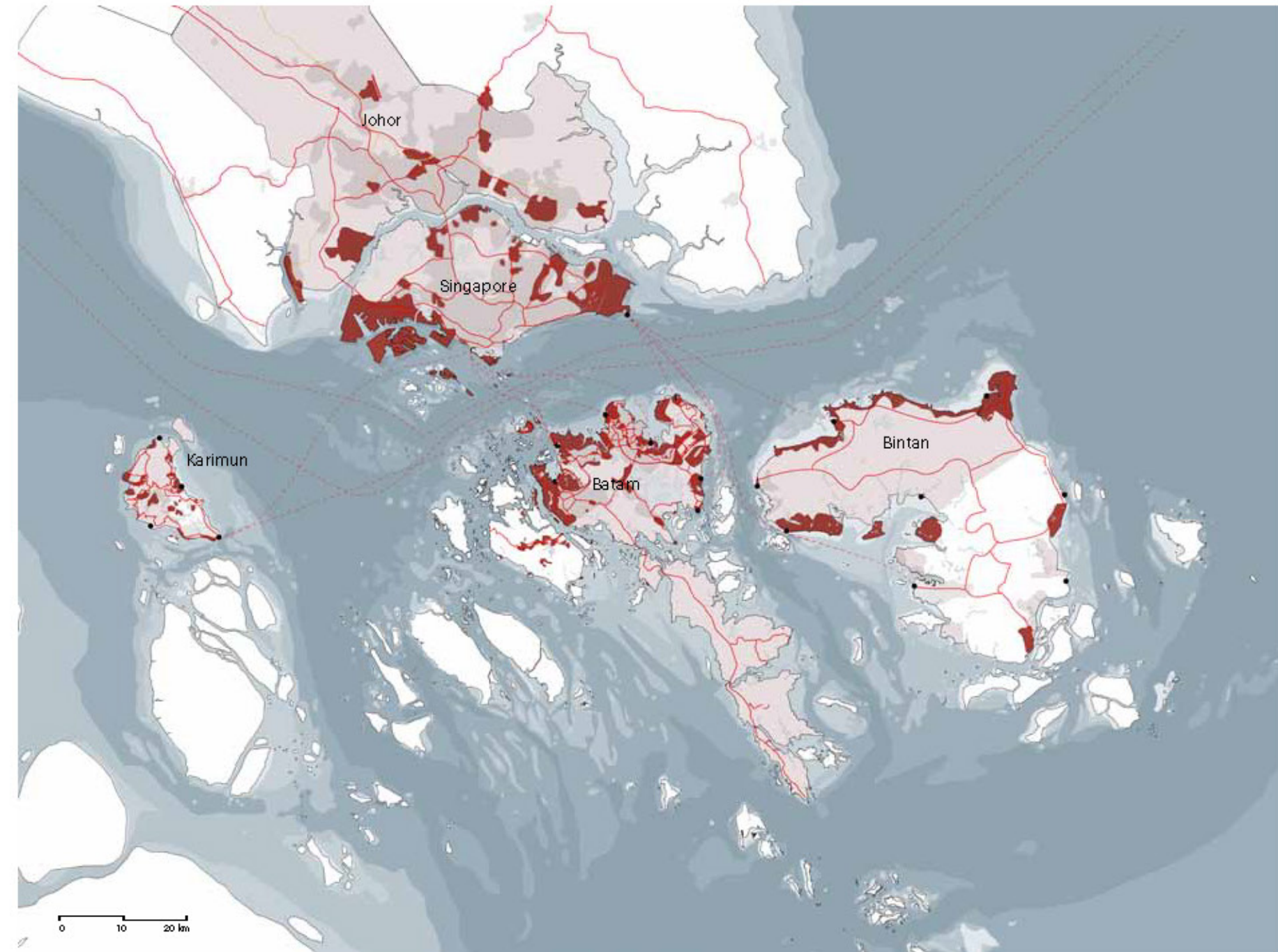


Figure 5.9 Singapore Region: Connected Productive Territory

- Built-up area
- Territories for special economic designation
- Productive zones
- Ports
- Railway
- Main roads
- Maritime routes



SINGAPORE REGION:  
FRAGMENTED POLITICAL TERRITORY

The political borders fragment the once unified territory along the Singapore Straits. Between Malaysia, Singapore and Indonesia, there are strict border controls, leading to restricted mobility for large parts of the population, especially the Indonesians. Singapore practices a strong migration control that even excludes the workers of Singapore-run factories, lying on the southern side of the Straits.

SINGAPORE REGION:  
CONNECTED PRODUCTIVE TERRITORY

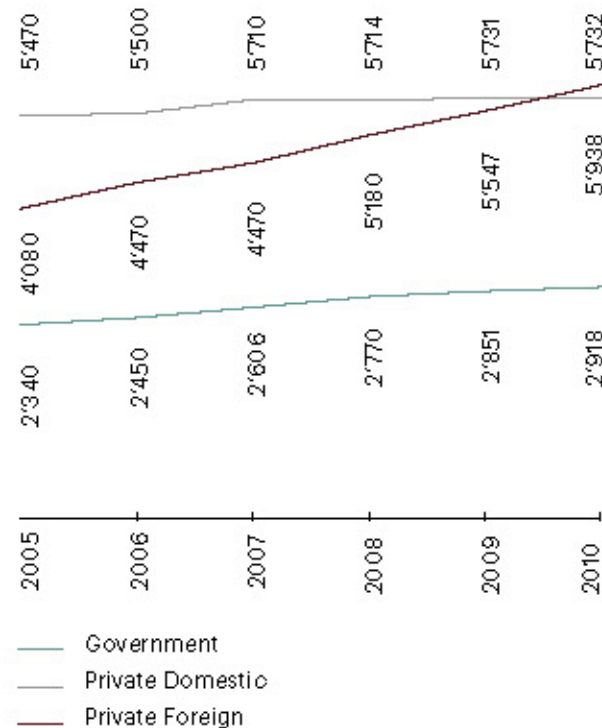
Through Singapore's economic growth, expansion of its production to the neighbouring countries became necessary. The implementation of various political solutions favouring open trade relations, such as the so-called Growth Triangle in 1989, have achieved a degree of economic unification in the politically fragmented region. The Free Trade Zones established in Johor and the Riau Province, now clearly serve the city-state of Singapore, both in terms of location and of economic hierarchy.

THE STATE OF A DEPENDENT ECONOMY

The industrialization in the Free Trade Zones are certainly linked to Singapore. Many of the industrial infrastructures and facilities

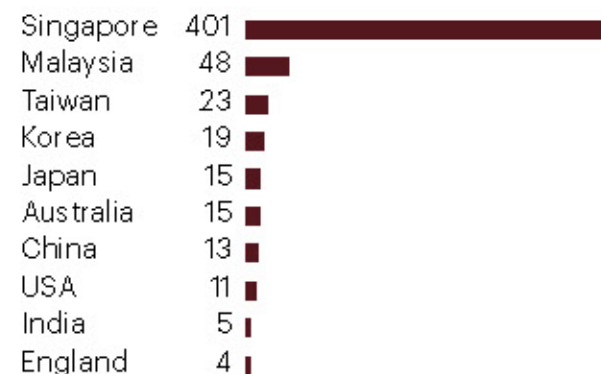
found on Batam, such as ports and shipyards, hold complementary functions to the port of Singapore. Furthermore the goods produced in Batam are shipped to Singapore, where they are assembled. This process allows companies to market their goods as being Made in Singapore, which brings an added value on the international market. It appears that external economic forces, linked with the 'maritime highway' previously discussed, represent primary forces of urbanization process in the Riau islands. A significant portion of this economy is driven by Singapore, where

Investment in million US\$ In Batam 2009



much of the investment behind the industries of Batam Island comes from. In fact, the majority of businesses in Batam are Singapore-owned.

Number of Foreign Companies by Country



FREE TRADE ZONE  
AS TERRITORIAL FORM

Owing to its strategic location, Batam economy evolved rapidly, and through several stages. Legislative definitions and boundaries for production were adjusted several times, before Batam become the Free Trade Zone that it is today. Four important stages of economic development can be identified: the modernization of agriculture (including mining activities in the 1960s), industrialization based on import substitution in the 1970s, oil-based development in the 1980s and export-led industrialization (which begun in the 1990s and now remains the most important

economic sector in Batam). Within the Free Trade Zone of Batam, foreign companies receive following advantages and incentives to produce: exemption on import and export tax, exemption on value added tax, generalized system of preferential facilities, double taxation avoidance agreement with fifty seven (57) countries and competitive investment and operation cost. Among the outcomes of the rapid development under the conditions of the Free Trade Zone, is a form of urban planning that prioritizes those land uses that encourage economic growth. The

numerous industrial sites, resulting from the process, could be described as generic spaces, which are not integrated in the urban structure. Their only aim is to serve a productive function without articulating a specific space.

THE TRIANGLE OF GROWTH

Given the major geo-political importance of the three-national region along the Straits of Malacca, Singapore, Indonesia and Malaysia have opted to strengthen their economic ties. In 1989, the Deputy Prime



Minister of Singapore, Goh Chok Tong, formulated the initial transnational economic cooperation agreement for the Triangle of Growth, or SiJoRi; the acronym for Singapore, Johor, and Riau province. Following SiJoRi's success, the area of inclusion has significantly expanded, to now include further areas of Indonesia and Malaysia, such as West Sumatra, Malacca, Negri Sembilan, and Pahang. The agreement enables the transfer of finance, knowledge, control and management systems of Singapore in exchange for labour, land and other natural resources of the adjacent territories. To enable such transfers, special economic zones (or free trade zones) were defined in Malaysia and Indonesia, bordering Singapore. In 2007 Batam, Bintan and Karimun Free Port and Trade Zone were established. The common goal for the cooperation is to strengthen the region's competitive position in Southern Asia by attracting inward investment. The benefits of the integration for all sides notwithstanding, the disparity in political and economic power in the region poses serious challenges for its development.

#### HABIBIE, FATHER OF BATAM

At first, the proximity and the visibility of the booming Singapore threatened former President Suharto (Indonesia's second president, in power from 1967 to 1998), as it represented a danger for the independence

of Indonesia. Thus he was initially concerned with installing military bases in the Riau Archipelago. The vision of transforming Batam into the economic leader of the nation began with implementing the offshore oil industry Pertamina by President Suharto. In 1998, Habibie became the president of Indonesia for a short-term replacing Mr. Suharto, who resigned his presidency after 32 years. Even though Habibie's regency lasted only one year, his impact on Batam Island earned him a reputation as being "the father of the modern Batam". Habibie's vision was to transform Batam from a "jungle where there was nothing" into the twin city of Singapore, by taking advantages of a mutual beneficial collaboration between Singapore and the Riau archipelago. In order to offer an attractive environment for Singapore's investment, Habibie invested mainly in infrastructural implementations. Since 1973, Batam's industrial and the corresponding urban growth has been managed by the central administrative body named BIDA, the Batam Industrial Development Authority, with the goal of improving the international economic competitiveness of the island. Streets and bridges, connecting the islands, have been built while Habibie was the chairman in BIDA. Those infrastructural changes on the island represented the base of the economic development on Batam.

#### DISCREPANT ECONOMICAL AND POLITICAL INFLUENCES

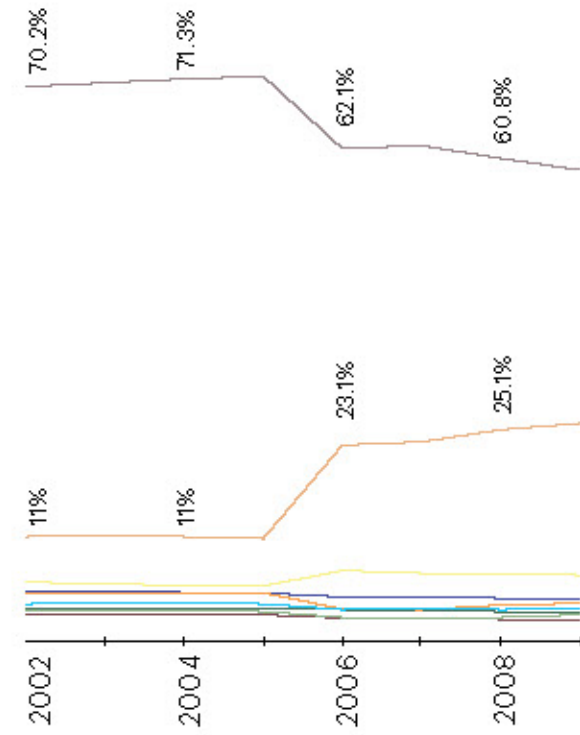
At closer examination of the regional manifestation of the Triangle of Growth, the challenges involved become apparent. The defiance most clearly evident is the predominance of economic interests over other interests in urban development. On the national level, the Riau Islands are vital for their resources and strategic location, for the regional security and territorial integrity. For example, the entire Batam industrial area and its neighbouring islands are classified as strategic industries, which must be nationally protected. Therefore an airborne battle base, an airport for military aviation, and an oceanic surveillance have been established on the island. That this area (the Riau Archipelago) is situated between the countries of Asia and Australia and the Indian and Pacific Oceans also heightens its potentially complex geo-political sensitivity (Bahrum, 2008). In this sensitive context, the development process largely catalysed through the influence of Singapore has been taking place. For example, Singaporean firms are the largest investors on the island of Batam Indonesia Free Trade Zone benefiting from its proximity, affordable land and workforce; nearly two thirds of foreign visitors here are Singaporeans on business. Since 1973, Batam's industrial growth and the corresponding urban growth has been managed by the local administrative body

named BIDA, the Batam Industrial Development Authority, with the goal of improving the international economic competitiveness of the island. In the 1970s, the rapid development of Riau province and Batam was seen as precursor of national economic growth, leading to significant migration to Riau from other parts of Indonesia. It seems however that BIDA did neither anticipate nor take account of the challenges emerging from the rapid economic rise, such as exponential population growth-from about 6,000 inhabitants in 1973 to almost 1,000,000 in 2010 – and the involved social and environmental change. Both affordable housing for the migrants and the integration of the traditional, agricultural or rural activities have been neglected. In order to keep up with the industrial development, the authorities have neglected the emerging poverty. Only in 1999 did Batam become an autonomous city. The new self-governing status generated an additional, municipal authority; The Regional Development Planning Agency of Batam City, Indonesia, responsible for urban development independent from direct economic interests. Today it is clear that the imbalance between the economical and the social components of urbanization still needs to be addressed. Important steps in this direction would be the strengthening of the municipal planning authority, as well as the radical adjustment of the existing

development strategies. The free trade zones have already been registered and described as a frequent phenomenon of influence of foreign economies such as Singapore over weakly developed countries such as Indonesia (Klein, 2000). The situation where the external economic dependency dominates the internal political environment thus forms the precondition for urban development. On the island of Batam for example, this situation is reflected in the urban plan, where industrial sites and strategic infrastructures such as ports, have become the backbones for development of housing, commerce and the rest of the urban program. Consequently, we hypothesize that the development of new urbanization strategies could strengthen both the political and economical capacity of the Riau Islands.



DISTRIBUTION OF POPULATION AND PRODUCTION BY DISTRICT



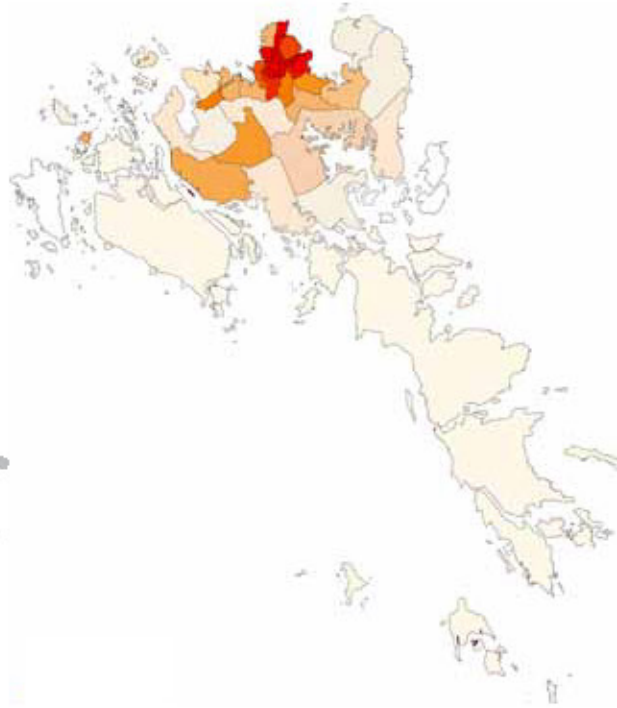
Batam Economic Structure by Year

- Industry
- Trading, Hotels
- Finance, Rental & Company Service
- Shipping and communication
- Construction
- Agriculture
- Public Services
- Mining & Dredging
- Electricity, Gas, Water

Districts and Sub-Districts of Batam Municipality



Population Density per km<sup>2</sup> and Sub-District, 2010



52.5 33'130

Number of Establishments at Manufacture Industry by District, 2009



0 95

Number of Households working at Food Crops Sector by District, 2009



0 540

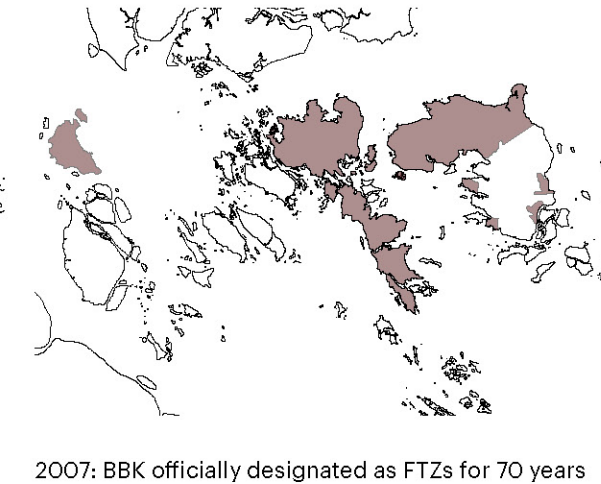
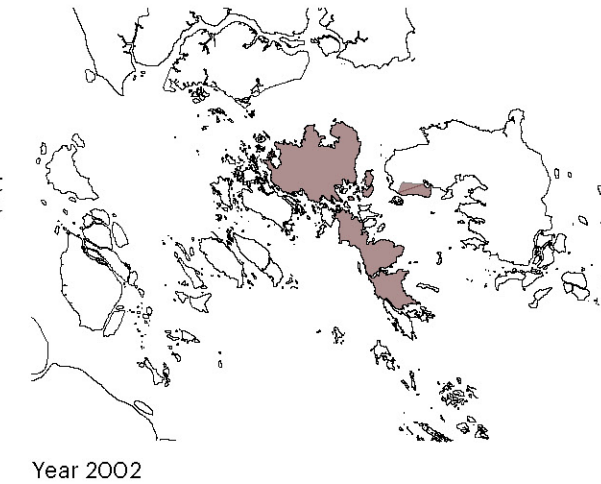
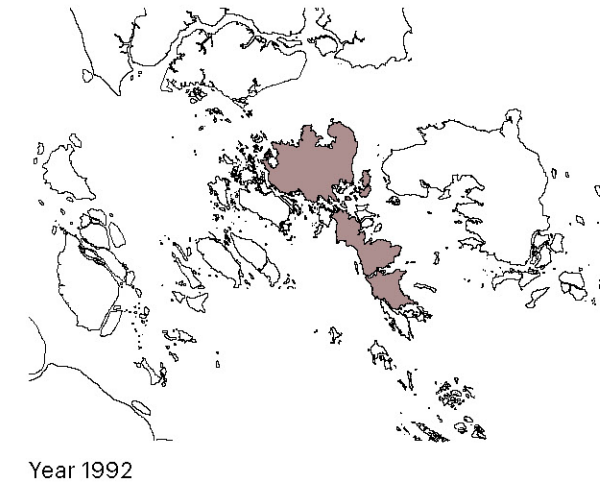
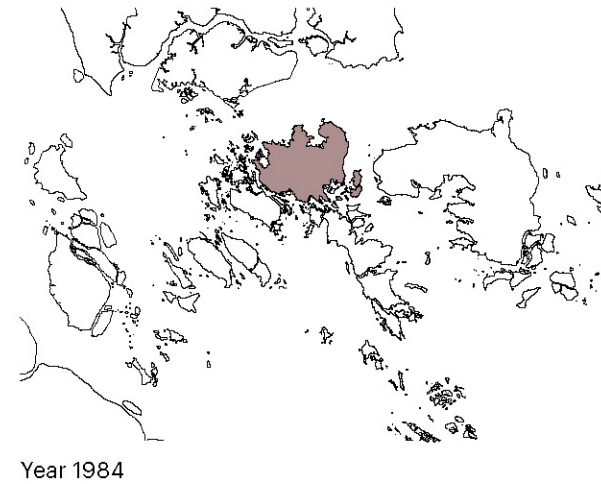
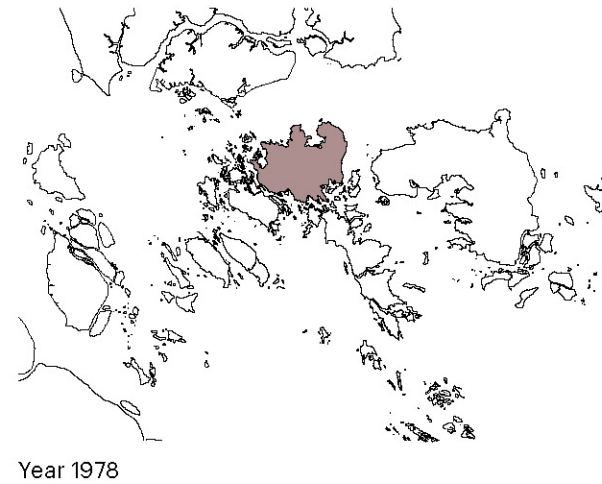
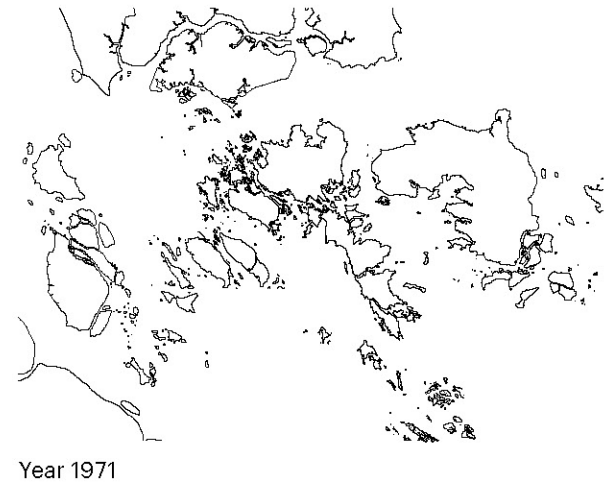
Number of Fishery Households by District, 2009



0 3'710

Chronology of Important Regulations for Batam Development and changes in Governmental status

1970 Presidential Decree No.56	1971 Presidential Decree No.74	1973 Presidential Decree No.41	1974 Presidential Decree No.33	1978 Presidential Decree No.41	1978 Presidential Decree No.45	1983 Government Regulation No.34	1984 Presidential Decree No.7	1984 Presidential Decree No.56	1992 Presidential Decree No.28	1998 Presidential Decree No.94	1999 Law No.53	2000 Government Regulation	2000 Presidential Decree No.113	2002	2002
Batam designated as a logistics base of offshore drilling operations (exploration and exploitation) of Pertamina (National Oil Company).	Instead of logistic base, Batam was designed as an industrial area and entreport center, simultaneously BPDIPB (The Agency for the Development of Batam Industrial Area) was founded.	The determination of the entire Batam island as an Industrial Area, the establishment of BIDA (Batam Industrial Development Authority) and PT Persero Batam (Bonded warehouse Authority).	The eastern part of Batam island Kabil, Batu Ampar, and Sekupang appointed as bonded zone.	The determination of the entire Batam island as a bonded zone (Special Economic Zone).	Batam island treated as a trans-shipment point and BIDA delegated rights in core-economic activities for the industrialization of Batam.	Batam status changed from a sub-distict of Belakang Padang to a municipality of Batam.	Relationship between municipal government and Batam Industrial Development defined.	Spatial expansion of Batam's industrialization and BIDA's authoritative regions including the islands of Janda Berias, Tanjung Sauh, Ngenang Kasem and Moi-moi.	Further spatial expansion of Batam industrial working area and its status as bonded zone to the island groups of Repang Galang.	The improvement to the Presidential Decree No.41,1773 concerning Batam Industrial Development Authority.	The change of status of Batam as an autonomous city with new boundaries.	Regulates the direction of the city development including the division of authority between the city Government and BIDA.	The revitalization of BIDA.	The designation of the Island of Batam from a bonded zone to a Free Trade Area.	Together with the Regency of Kepulauan Riau, Karimun, Natuna and the city of Tanjungpinang, Batam is under the territorial Authority of the new Province of Kepulauan Riau.

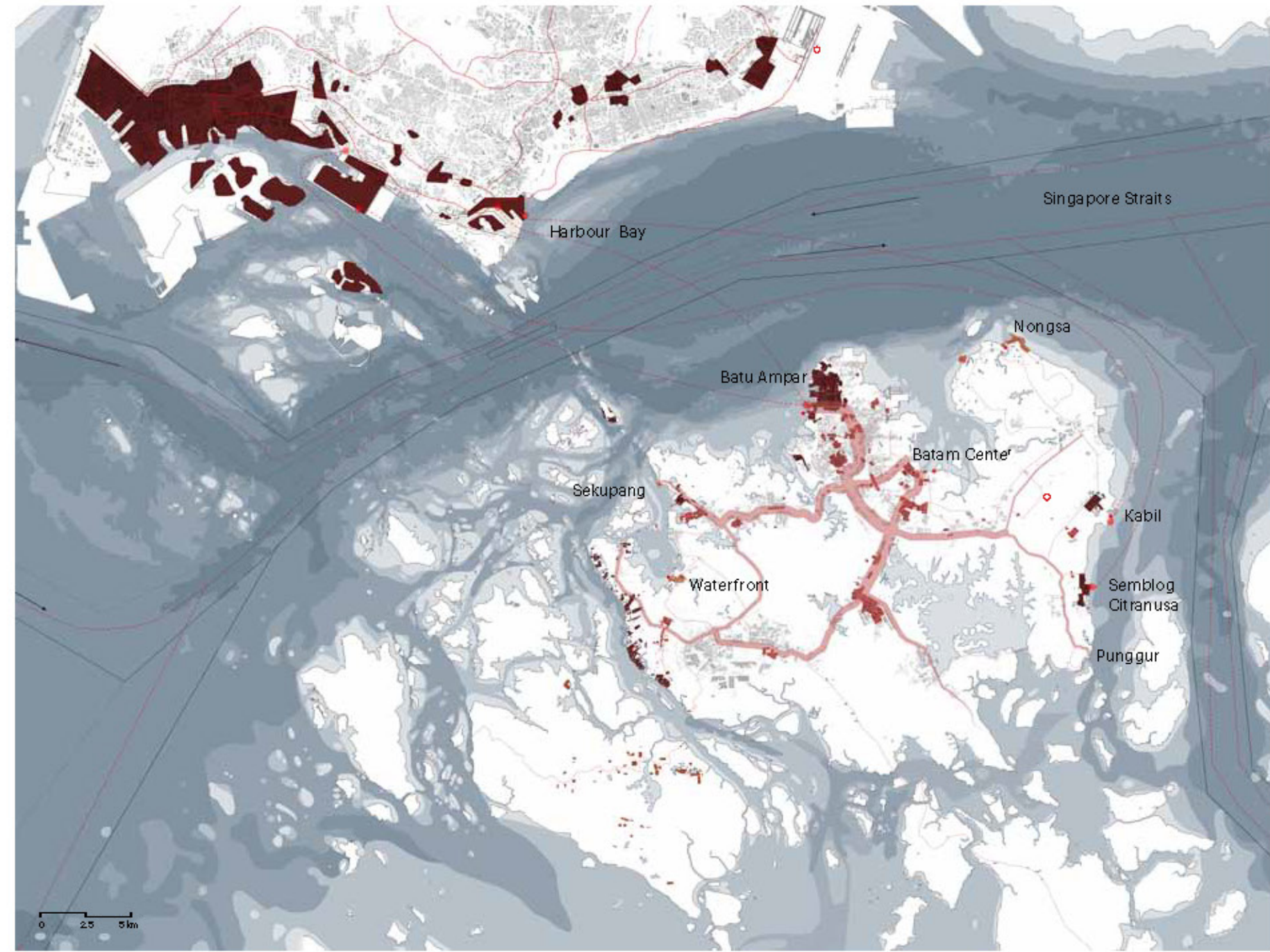


### INFRASTRUCTURE AS CATALYST OF PRODUCTION

In the Singapore Region three main types of infrastructure need to be considered. First of all there is the sea. On one hand it connects the region on a global scale, through the Singapore Straits and on the other hand it joins Singapore, Malaysia and the Riau Archipelago on a regional level. Both exchange of goods and persons are facilitated by the maritime infrastructure. The sea is highly activated, being a connecting surface rather than a separating border. The "maritime highway" is the primary attractor of industrialization in the region. The ports are the interface between the deserving sea and the serving land. Ferries leave the pier of each of the six passenger

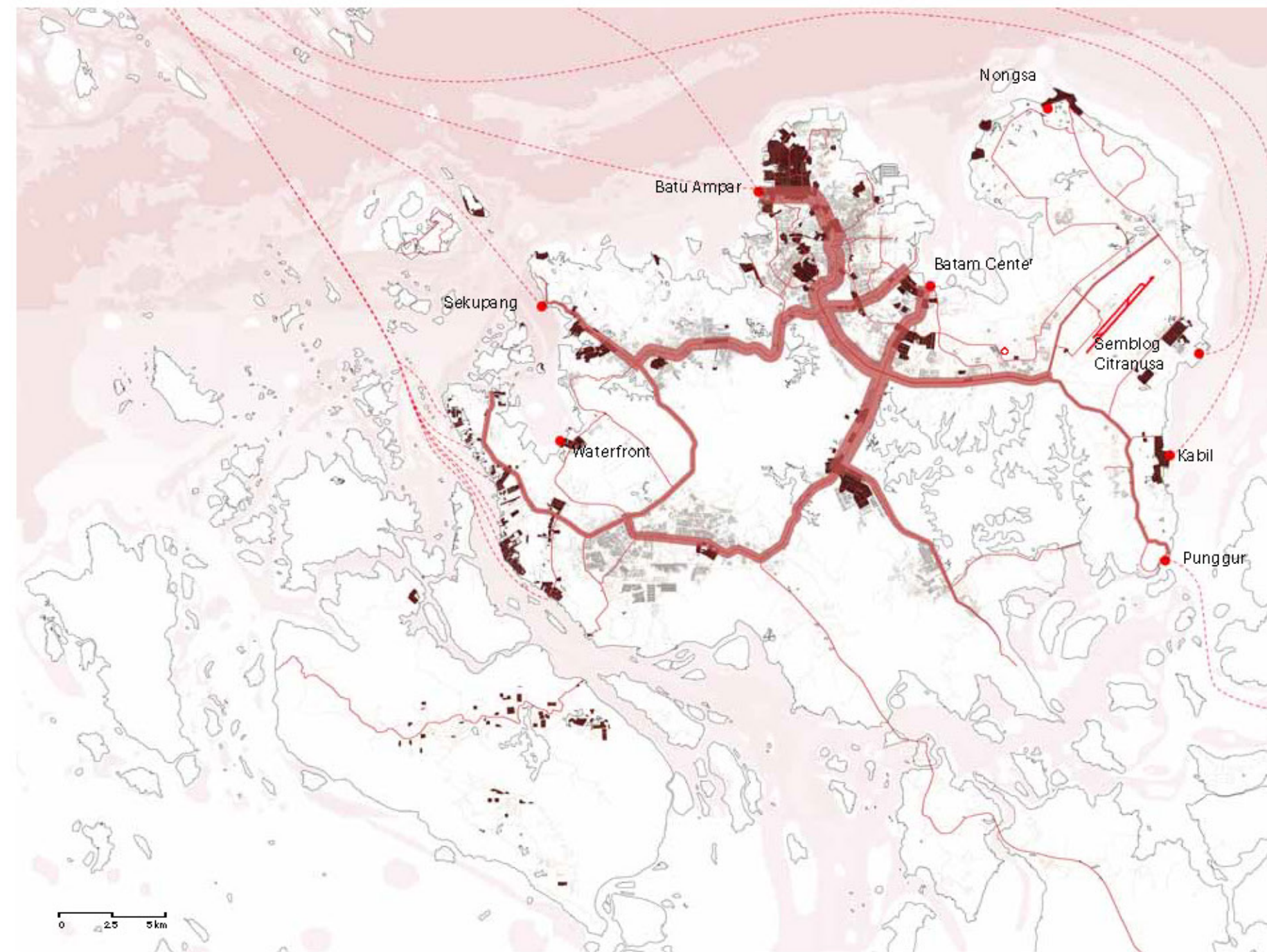
ports in Batam on an hourly basis; 59.62% of visitors to Batam are Singaporeans. Cargo ports have a major role in the region, as all the produced goods are transported from the industries by sea. The interior transfer of good is by road, well developed along the strategic axes linking up with cargo ports. By contrast, the streets of the inhabited areas are rarely paved. This fact further supports the thesis that the current development logic and priorities are strongly biased on favour of industrial production. The public transports on the island consist in a semi-official bus service. The accessibility of the coastal areas is low; they are are mainly reserved to private uses and infrastructure, the industrial sites, ports, exclusive tourist resorts and high-end housing.

- Infraestructure as Catalyst of Production
- Productive zones
  - Airports
  - Ports
  - Maritime routes
  - Sea channel
  - Intensity of road use
  - Main roads
  - Secondary roads



Infrastructure as Catalyst of Production

- Productive zones
- Airports
- Ports
- Intensity of road use
- Main roads
- Maritime routes



TUGBOAT



Length 21.5 m  
Draft 3.5 m

CONTAINER VESSEL



1,000-14,501 TEU  
Draft: 6-15.5 meters

LNG/LPG CARRIER



Liquefied Natural Gas  
10,000-266,000 GT  
Draft: 7-19 meters

GENERAL CRUDE CARRIER



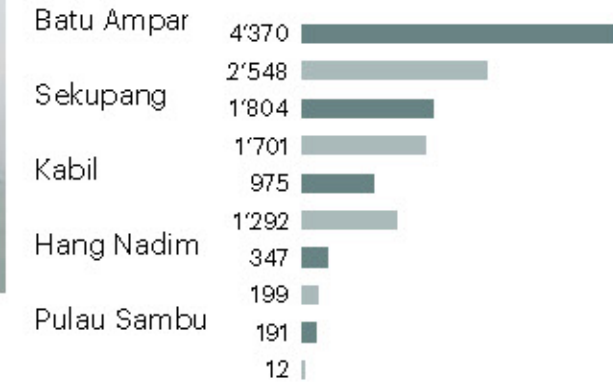
10,000-160,000 GT  
Draft: 7,9-16 meters

VLCC

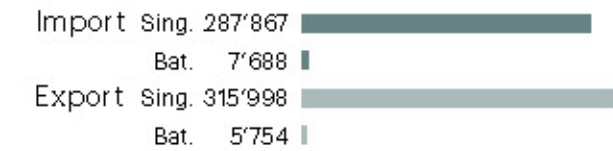


Very Large Crude Carrier  
160,000-319,999 GT  
Draft: 20 meters

Import and Export of Batam City by Port, 2009, FOB Value (Million US\$)



Comparison of Import Export Singapore-Batam 2009 (Million US\$)



BATU AMPAR, CARGO

Capacity: 35,000 DWT  
Length: 1,250 m  
Depth: 6- 12 m(14m)  
Opened: 214,000 m<sup>2</sup>  
Closed: 19,500 m<sup>2</sup>

SEKUPANG, CARGO & FERRY TERMINAL

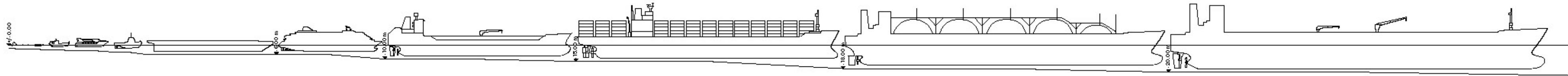
Capacity: 10,000DWT  
Length: 177 m  
Depth: 9m (12 m)  
Opened: 116,100 m<sup>2</sup>  
Closed: 42,240 m<sup>2</sup>

KABIL, CARGO

Capacity: 35,000 DWT  
Length: 420 m  
Depth: 12 m (18m)  
Opened: 100,000 m<sup>2</sup>  
Closed: 1,890 m<sup>2</sup>

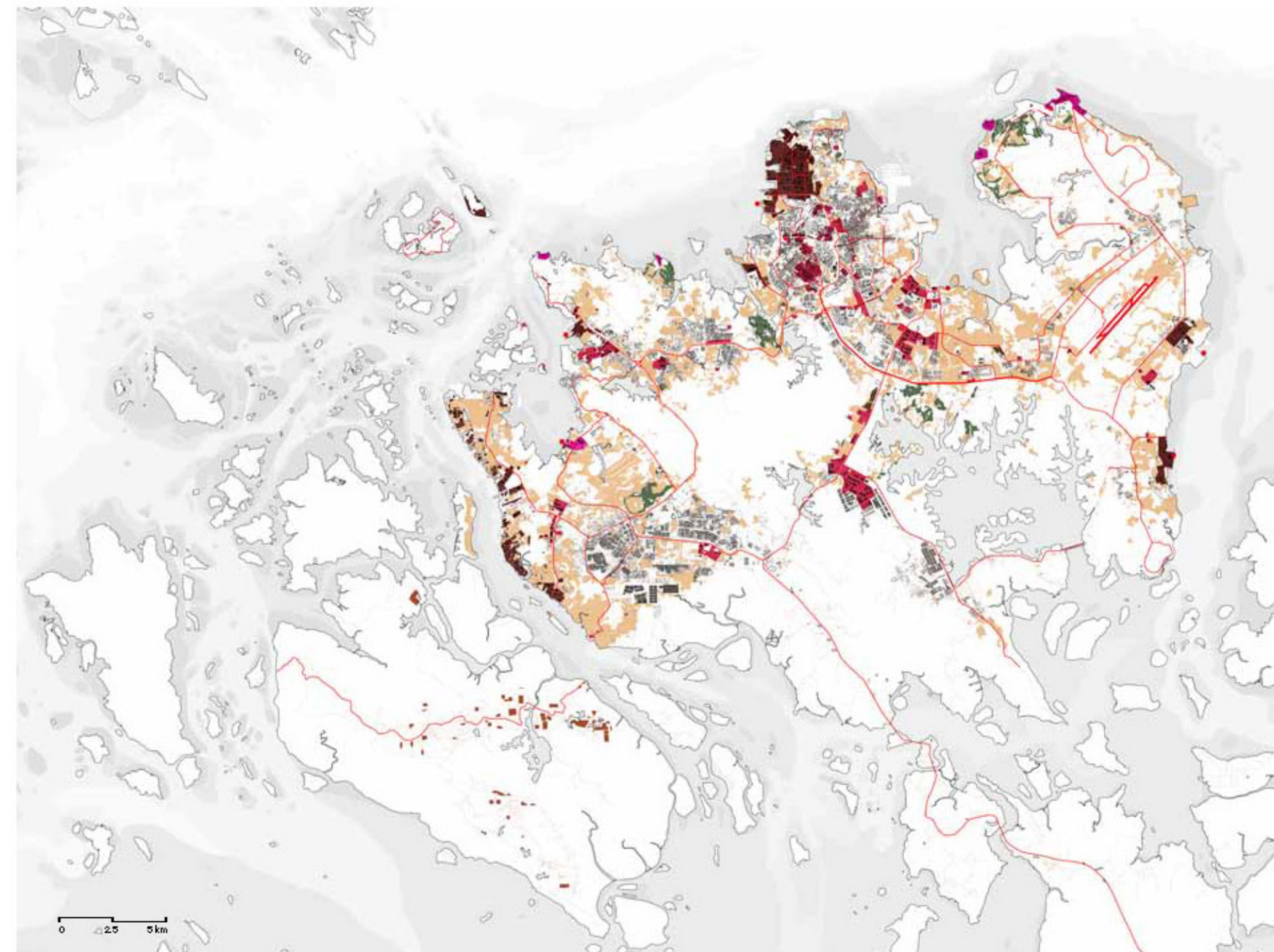
SEMBLOG CITRANUSA, CARGO (SWASTA)

Capacity: 30,000 DWT  
Length: 176 m  
Depth: 10 m  
Opened: 200,000 m<sup>2</sup>  
Closed: 10,000 m<sup>2</sup>



Production Types inside the FTZ

- Built-up area
- Tourist resorts
- Industrial park
- Shipyard and cargo
- Food production
- Golf courts
- Airports
- Ports
- Main roads
- Secondary roads



GENDER RELATED  
TYPES OF PRODUCTION

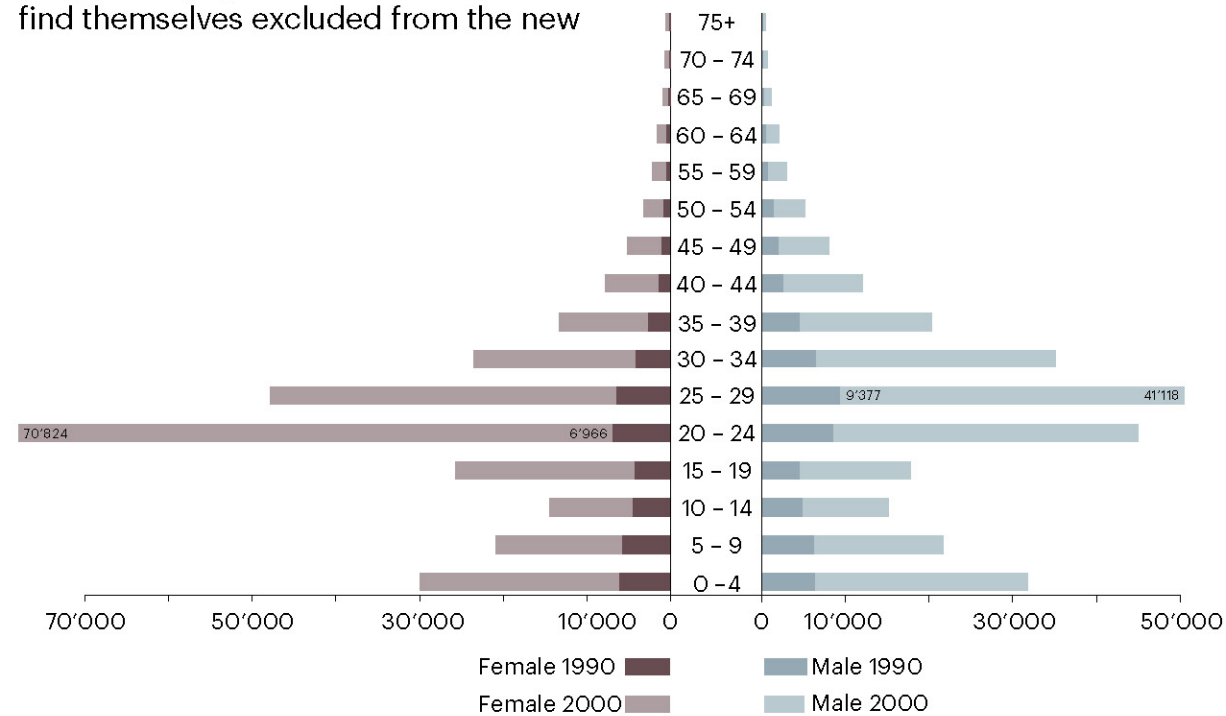
Since 1971, when Batam was first designated as industrial zone, its economy based on industry has been steadily growing. Working force was needed and provided by promoting new economic possibilities through factory work in different parts of Indonesia. The production of electronic devices is the leading sector of Batam's industry. The demand for female workers in the industrial parks is high as women are considered the most skilled for precise and repetitive work. This is a particularly important for work in the electronic factories, which demands high levels of concentration and fine motor skills. Many of the women loose their post when they pass the age of 25, as maximal efficiency is expected. The more physically demanding work in shipyard industries is mostly allocated to men. The impact of the industry on the population is clearly readable in the demographic age distribution. The number of female between 20 and 25 is surprisingly high due to the gender and age-specific types of production.

UNEVEN DISTRIBUTION OF THE  
ECONOMIC BENEFIT

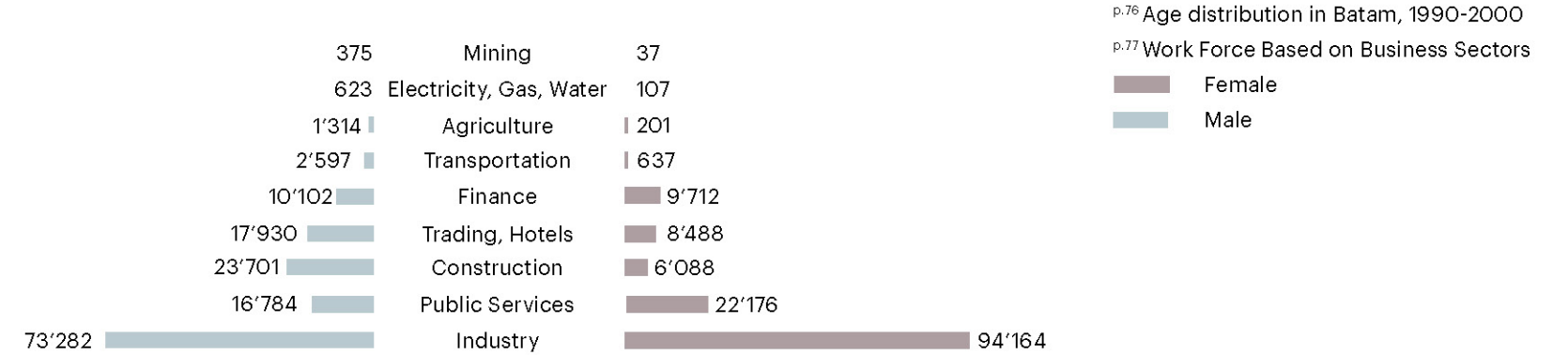
The possibility for economic growth of Batam was definitely related to its offer

of cheap labour. The minimum wage in 1995 was set on 220,000 Rp., corresponding to 22 CH Fr. per month. This low income led to critical living conditions, culminating in the expansion of informal settlements and consequently to several riots erupting as an attempt to change existing circumstances. Until 2010, the minimum wage grew up to 1,110,000Rp. per month. Even if this represents five-fold increase in salary, the rising costs of life, affected by Batam's proximity to Singapore, have to be considered, too. Few inhabitants of Batam can afford the imported goods. Especially the indigenous populations of the islands find themselves excluded from the new

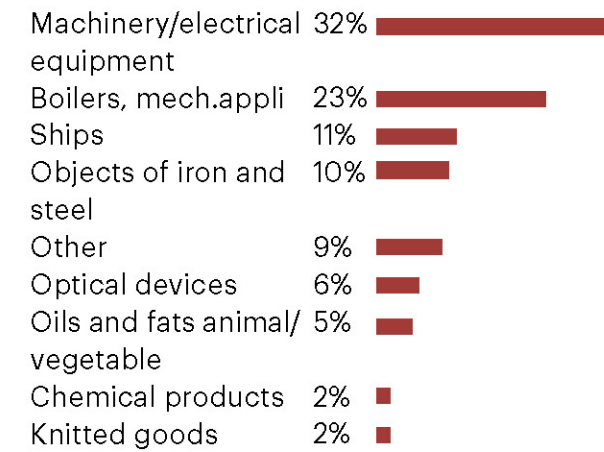
development processes. Referring to the statistics of the development of the economic sectors, it is visible that the importance of trade is growing. The industry is slowly and gradually losing in importance; yet it remains the principle player in Batam's economy. Arguably, this indicates a long-term process in which Batam's economy will shift away from the manufacturing sector to toward the service sector. This potential turn would increase the welfare of its population, too.



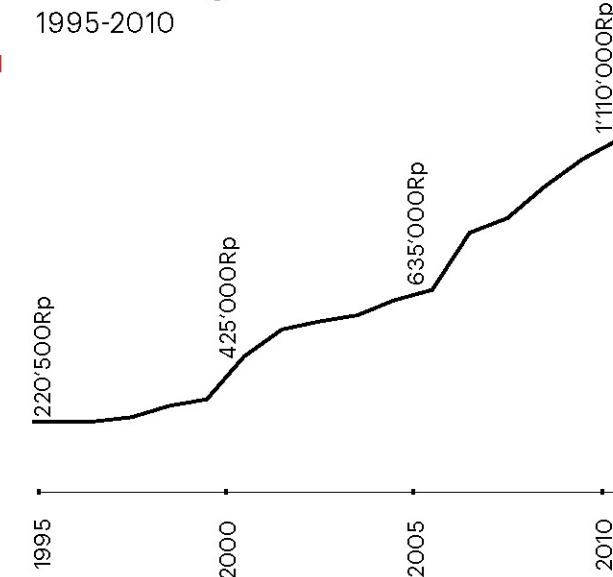
Work Force Based on Business Sectors



Exported goods per categories 2009



Minimum Wage Batam  
1995-2010



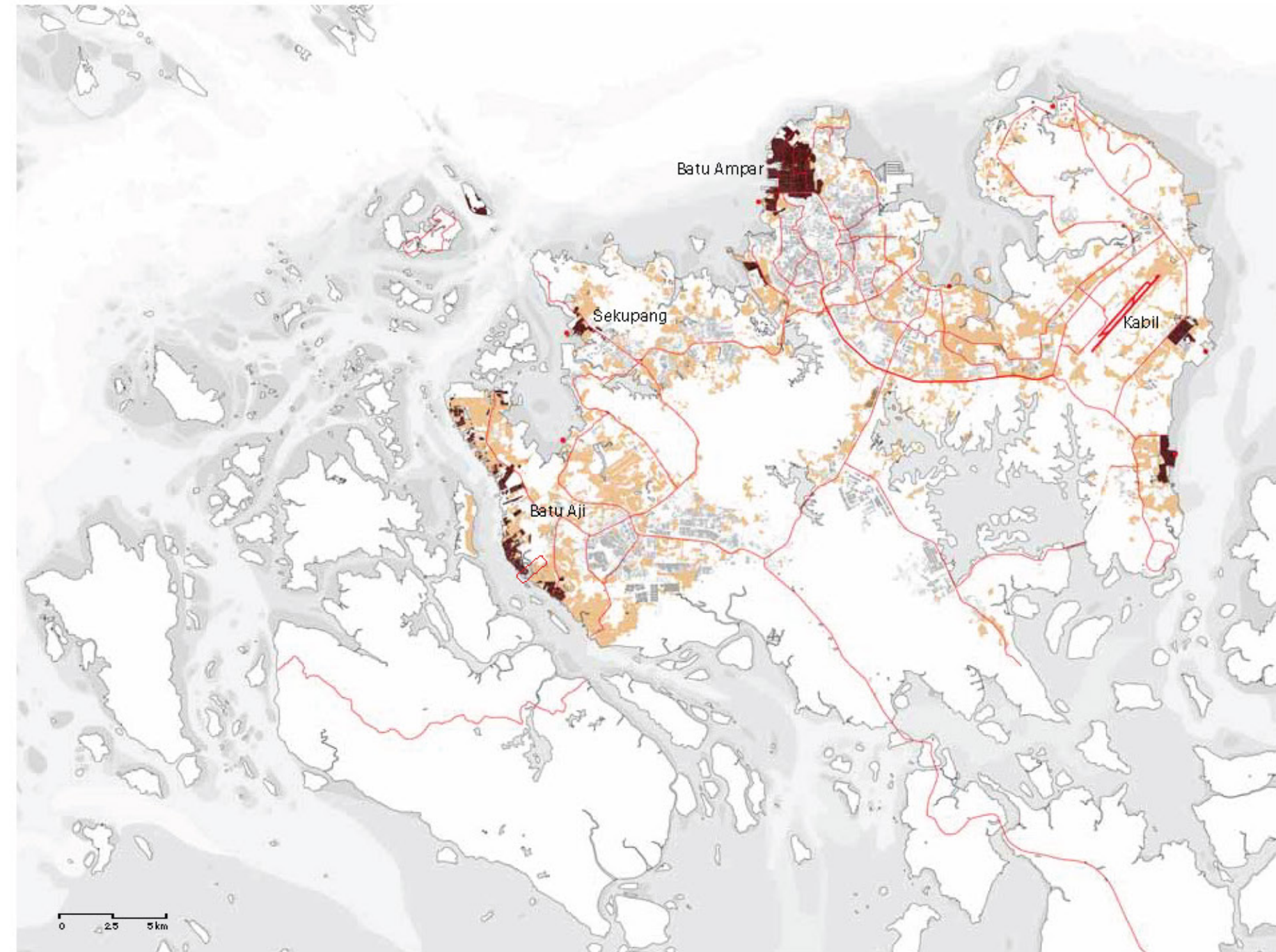
TYPE 1: SHIPYARD INDUSTRY

The fifty eight (58) shipyard sites of Batam occupy and transform long stretches of the coastal land. They are used for repairing and constructing vessels for international companies. Dry Doc, from the United Arab Emirates is the largest company in ship production on the island. The industrialized waterfronts are privatized and inaccessible to the public. The shipyard industries are built on large stretches of land cleared from vegetation or on artificially reclaimed land. Huge masses of land are displaced in order to gain direct access to the deep waters. Consequently, areas that once hosted

mangrove forests have been transformed in a violent and irreversible manner.



- Shipyard and cargo
- Airports
- Ports
- Main roads
- Secondary roads





## TYOLOGY OF INDUSTRIAL PARKS

Industrial parks are areas designated for industrial use hosting different companies within the Free Trade Zone. They are often gated and detached from urban areas in order to offer security to the allocated companies and reduce the impact on environment and society. The aggregation of companies within an industrial park allows for the reduction of costs for infrastructure. In turn, the integrated infrastructures of the parks, such as the reliable water and the energy supplies, attract new businesses. The exclusion the industrial parks from urban centres manifests as the exclusion of workers and work place from the public life.



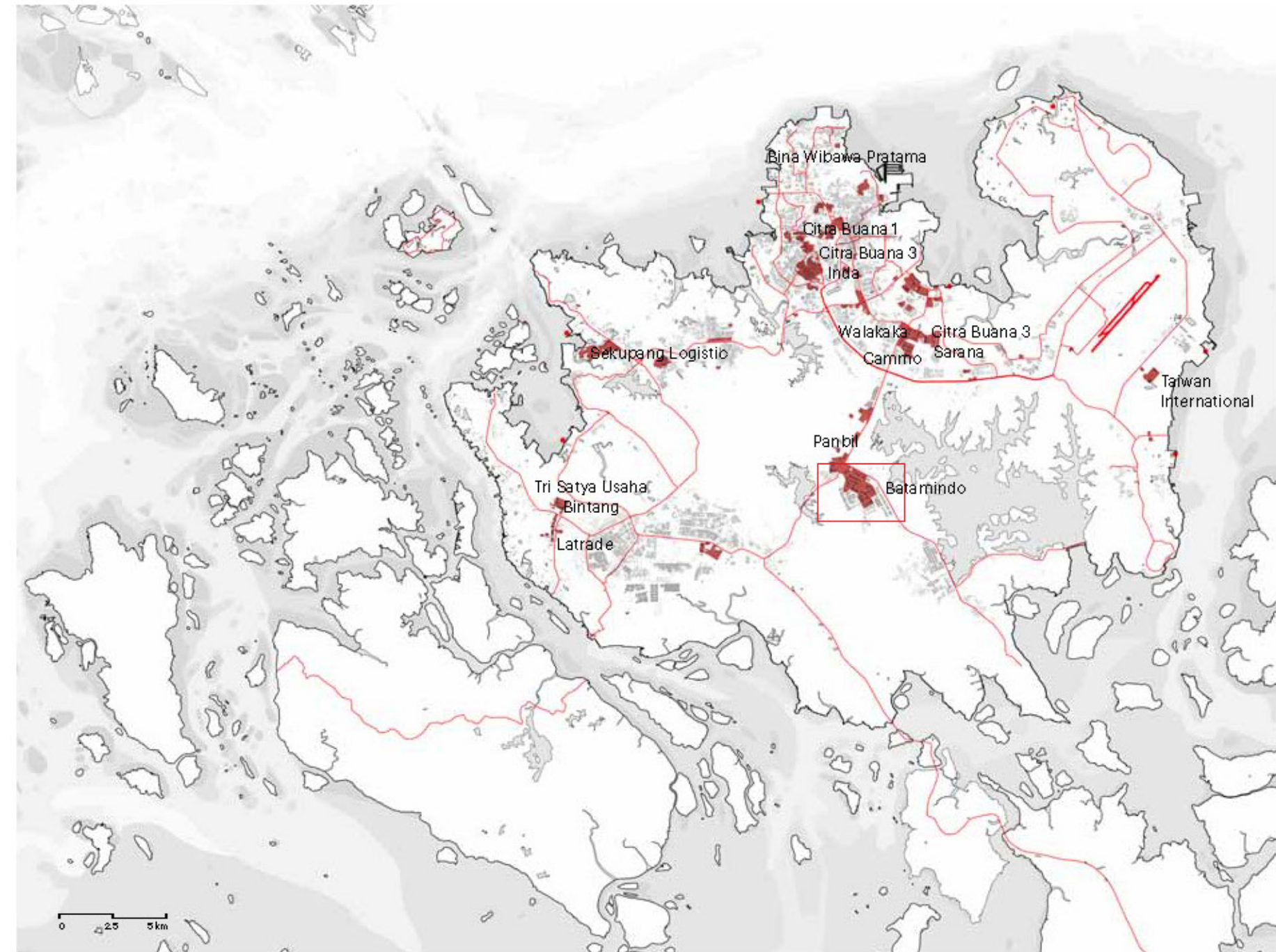
## TYPE 2: INDUSTRIAL PARK

Twenty seven (27) industrial parks are located on Batam Island. Their infrastructure is well developed in order to attract foreign investment. Batamindo industrial park for example, has its, own energy and water supply, as well as a commercial area, on site. The availability of these infrastructures, together with the lack of affordable housing in Batam led to an extensive development of informal housing areas and informal manufacturing, often in direct proximity of the industrial parks. In Batamindo and other large parks, dormitories are offered as a housing option for the workers. As the majority of the workforce in the electronic firms consists of unmarried young woman, dormitories are seen as a convenient housing solution for clean and safe living. On the other hand, numerous restrictions limit the freedom of the inhabitants, and dictate a particular lifestyle on the premises of the industrial parks; for example, only singles are allowed to live in there.



Figure 80 Two faces of industrial development: Inside Batamindo Industrial Park, Batam Island.  
 Figure 81 A illegal houses (rumah liar), where many of Batamindo's workers live.

- Figure 81 Industrial Park
- Industrial park
  - Airports
  - Ports
  - Main roads
  - Secondary roads



### TYPE 3: TOURIST RESORTS

Mainly located along or in the proximity to the coast, the tourist resorts have only a small impact on Batam Island. On one hand, Batam's tourism is predominantly related to business, thus Batam city features many centrally located hotel for short term stay. On the other hand, Batam also has the reputation as the 'men's paradise', attracting male Singaporeans over weekends. Even though Batam has the third-largest amount of visitors in Indonesia (after Bali and Jakarta), the lengths of stays are generally limited to two to three days. The neighbouring island of Bintan and its tourist sector have a more favourable perception in Singapore. In effect, Batam and Bintan, both municipalities of the Riau

province, are competing instead of sustaining each others' economic activity. The tourism related to golfing occupies larger areas, having greater impact on the islands than the beach resort. For example, the stagnant waters used as an aesthetic element and a barrier in golf courses, often facilitate the propagation of mosquitos carrying of the malaria and dengue fever.

Singaporean	59.62%	<div style="width: 59.62%;"></div>
Others	15.73%	<div style="width: 15.73%;"></div>
Malaysian	12.81%	<div style="width: 12.81%;"></div>
Korean	4.46%	<div style="width: 4.46%;"></div>
Indian	2.40%	<div style="width: 2.40%;"></div>
Japan	2.33%	<div style="width: 2.33%;"></div>
China	1.46%	<div style="width: 1.46%;"></div>
English	1.19%	<div style="width: 1.19%;"></div>



- Legend:
- Tourist resorts
- Golf courts
- Airports
- Ports
- Main roads
- Secondary roads
- Comparison of Foreign Countries Visits to Batam Island by Nation 2010



#### TYPE 4: EMPTY LAND



Large tracts of land are cleared of vegetation and hills are cut in order to prepare the sites for development. The resulting empty land, stays in latent condition for years, prepared for future development. The altered red-earth landscapes dominate the perception of Batam island. The fertile tropical land seems transformed into a bleeding desert that often remains unused for years.

Empty Land  
Empty land



P.86-87 Typical Section of the Coastline showing the Relation of Industry and the Shore.



**PRODUCTION AREAS OUTSIDE BATAM  
FREE TRADE ZONE**

In the archipelago, many economic activities take place independently from the Free Trade Zone, and remain uncharted or even illegal. It appears for example that smuggling was for a long time a remunerative business in the Riau Archipelago. Traditional economies such as fishing and agriculture can now also be considered as unregulated. On strategically located islands, especially those near to the Straits, special services for shipping such as fuel terminals are offered. As a consequence of these observations, a hypothesis can be made that the Free Trade Zone is not present a static border to production in the area of Batam.

**TYPE 5: AGRICULTURE**



The tropical climate allows cultivation of various fruits and vegetables in the Riau Archipelago. While most of the agricultural

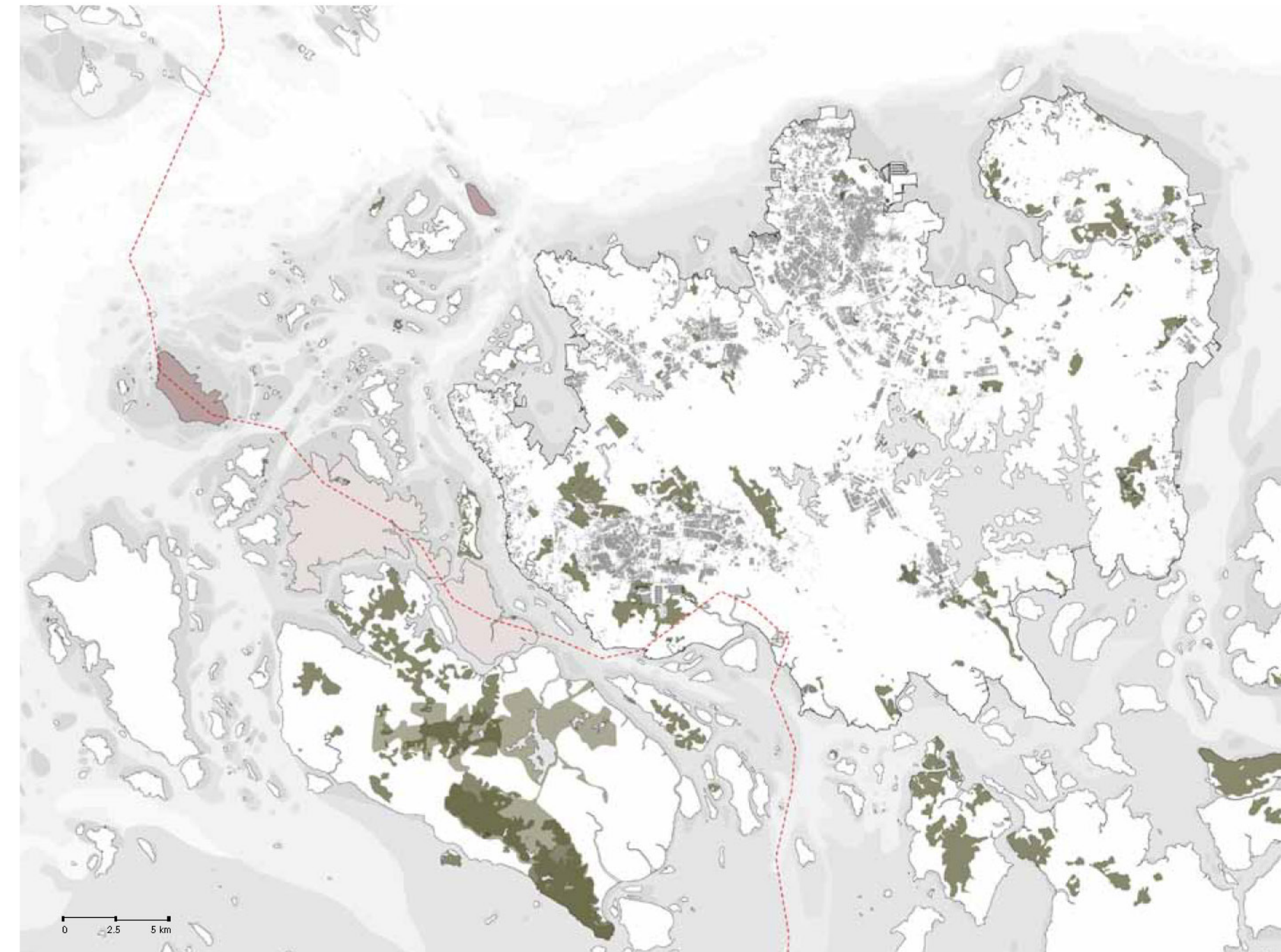
activities on Batam, respectively on Galang and Rempang, are practiced on land that has been occupied illegally, the outputs are certainly vital to the regional population. But Batam is also active in large-scale production in the sector of agriculture. On Pulau Bulan for example, pig, crocodiles and orchids are produced especially for Singapore with as many as 1500 pigs being shipped daily from Bulan to Singapore.

**TYPE 6: FISHERY**



Fishing remains central to the livelihood of the indigenous inhabitants of the archipelago. The fishing activities can be classified into three types: the tribal, the modern and the commercial. The mobile and seasonal tribal fishing takes place mainly along the coast and serves as self-subsistence of the indigenous population. The fish supply of the main Island of Batam is guaranteed by the modern fishing. The Dutch implemented a

- p.89 Production Areas Outside Batam FTZ
- Agriculture
  - Special production sites
  - Gas pipeline



law that assigned all the coastal areas of Batam within 3 miles to the indigenous population. This regulation has, of course been neglected by the land and water use by the industrial activities within the Free Trade Zone.

Singaporean fish traders, who buy the fish directly on the sea, largely control the commercial fishing prices. The fish and other sea creatures, bought from Malay fisherman can be sold for up to five times the price in Singapore. The fishing boats are a constant visual element in the archipelago, offering a picturesque image of the once traditional lifestyle. The romantic image obscures the unfavourable position of indigenous population in regional economy.

#### SPECIAL PRODUCTION SITES



Indonesia and the Riau Archipelago are known for the resources of oil, gas, bauxite,

tin, price, metals, coal, peat, rubber palm oil and logs, which are increasingly exploited for export and domestic use. Long pipelines leading from Sumatra and other parts of Indonesia across Batam and the Straits, supply Singapore with gas. The pipeline crosses Batam Island and three other islands of Batam municipality, with great security measures applied. The counter of the gas flow from Indonesia to Singapore is located on Pemking Island. The economic activities in Batam started with offshore oil exploitation by the company Pertamina. The state owned company built an oil and gas storage and fuel terminal on Sambu, one of the islands closest to the Straits.

The productive territories of Batam are in a strong dependence on Singapore.

The industry is strongly related to terrestrial and maritime infrastructure, especially the Singapore Straits. Thus there exists a strong relation between industry and coastline, as the sea surface is part of the maritime infrastructure.

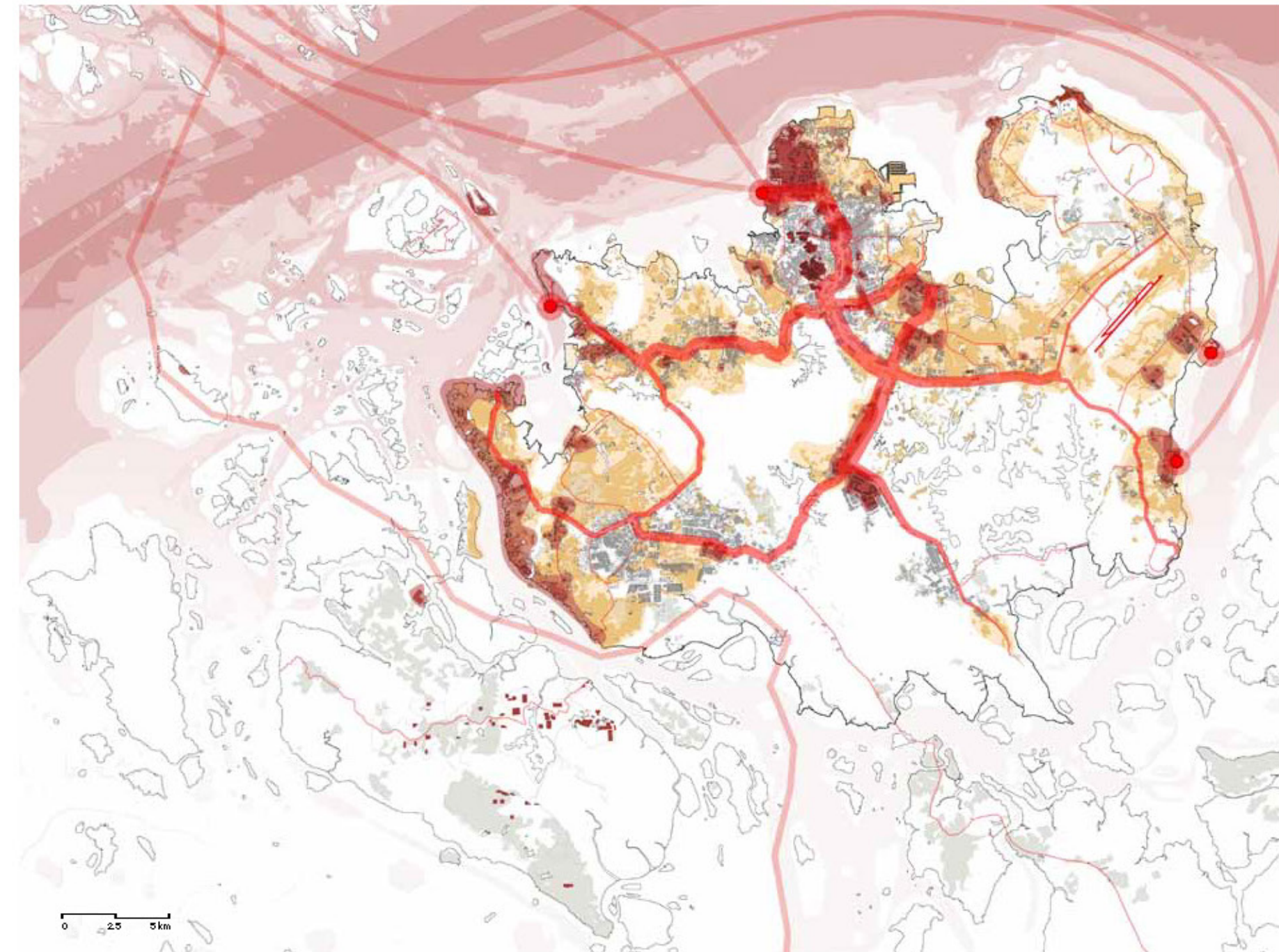
The industry is oriented toward the Singapore Straits in order to maintain the proximity and rationalize the transportation efforts.

Industrial sites attract the development of informal housing due to different reasons such as: highly developed infrastructure, proximity to the work place, possibility of small manufacturing or other business.

The Free trade zone seems not to be a limit for production in the Batam region.

Productive Territory along the Straits

- Water depth >30 m
- Empty land
- Production sites
- Agriculture
- Airports
- Ports
- Intensity of road use
- Main roads
- Secondary roads
- Gas pipeline







# URBAN TERRITORY

P. 112  
SINGAPORE REGION:  
A METROPOLITAN TERRITORY

P. 112  
URBAN GROWTH DUE TO  
NATIONAL MIGRATION

P. 114  
LOW-DENSITY URBANIZATION

P. 118  
URBAN CENTRALITY

P. 122  
HOUSING IN  
THE BACKYARD OF INDUSTRY

P. 124  
TOPOGRAPHY AS  
NATURAL BORDER OF URBAN GROWTH

P. 126  
NATURE PROTECTION AS BORDER OF URBAN  
GROWTH

P. 128  
HOUSING TYPES

P. 130  
TYPE 1:  
INFORMAL HOUSING (RUMAH LIAR).

P. 131  
TYPE 2:  
KSB (KAVLING SIAP BANGUN)

P. 132  
TYPE 3:  
DEVELOPER HOUSING

P. 133  
TYPE 4:  
SHOPHOUSES (RUKO)

P. 136  
TYPE 5: TRADITIONAL HOUSING

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TRANSFORMING INDIGENOUS HABITAT

P. 142  
THESIS NO. 2

Typical Street View





100 Typical street View: Bengkong



103 Shophouse in Construction on Latent Land





104 Unused Shopping Mall



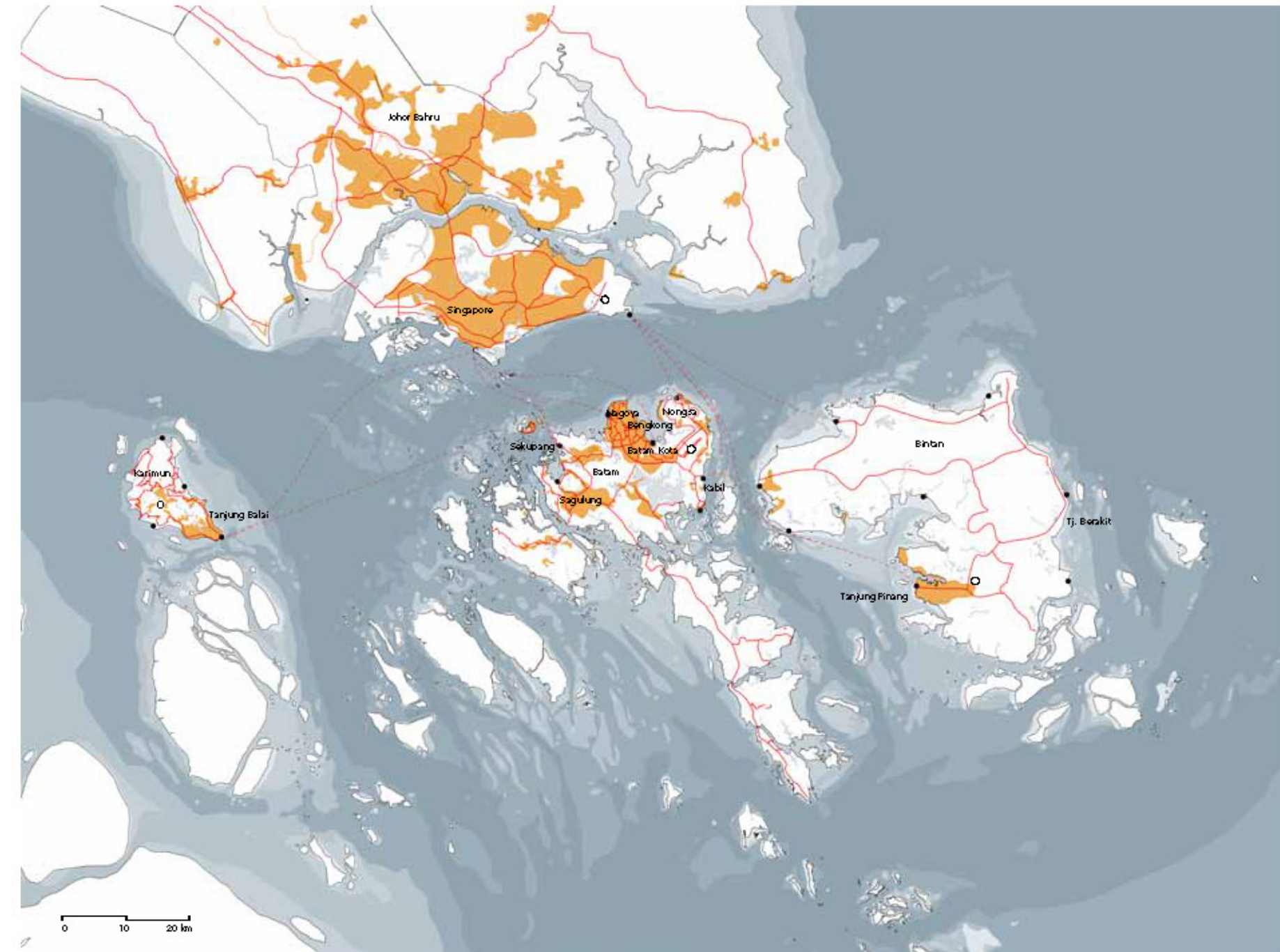
107 Traditional Sea Based Housing





▲<sup>m</sup> Singapore Region: A Tri-National Metropolis

- Built-up area
- Ports
- Railway
- Main roads
- - - Maritime routes





**SINGAPORE REGION:  
A TRI-NATIONAL METROPOLIS?**

As a consequence to the industrialization process, a rapid population growth took place in the Singapore Region, and the city-state expanded its economy to the neighbouring lands forming a tri-national metropolitan region. In contrast to the economic flows, the flows of people within the metropolitan region are more strictly regulated and restricted. While the existing infrastructural connections between Malaysia, Singapore and Indonesia allow for high paced commuter traffic, the borders function as semi-permeable apparatuses, where Singaporeans seem to hold the power to control the cross-border mobility and exchange.

**URBAN GROWTH DUE TO  
NATIONAL MIGRATION**

The rising economy on Batam led to an increasing demand for cheap labour on the island. The work opportunities have attracted people from different parts of Indonesia. Many inhabitants of Sumatra and Java come to Batam in the hope of a better life, and with the intention of supporting their families back home. Most migrant workers come from poor rural areas, and often have a preference for rural way of life. Arriving to Batam, they are confronted with a different reality. The unexpectedly high living costs complicate the realisation of

their plans and of supporting their families. The migration led to a rapid urbanization of Batam, which has been difficult to plan. The government is concerned about the lack of working places and opportunities, and the rising unemployment in recent years, combined with the constant population increase.



Ira wants to become a business woman in order to improve the situation in her homevillage  
Age: 27 years  
Origin: West Sumatra Solok  
Parents work: Farmers  
Work: Administration assistant



Sebastian works as an IT Engineer at Dry Docks World. He worked in the same company over 11 years and is planning to stay in Batam  
Age: 42 years  
Origin: North Sumatra Medan



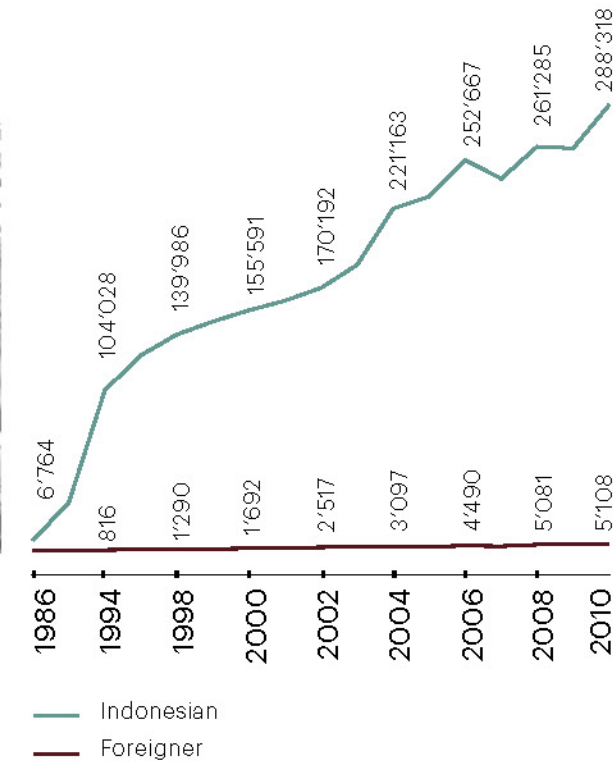
Imelda Bernadeth lives and works in informal settlements as she is too old to work in the industry. Her 9 year old

daughter lives in a boarding school.  
Age: 41 years  
Origin: North Sumatra Like Toga  
Parent's work: Father; government  
Work: illegal shop



Hendro could find a possibility to stay in the Industrial Park but still feels more related to Lombok than to Batam.  
Age: 73 Years  
Origin: Lembogan  
Work: Cook in the Batamindo Industrial Park

**Workforce Growth Indonesian-Foreigner  
1986-2010**

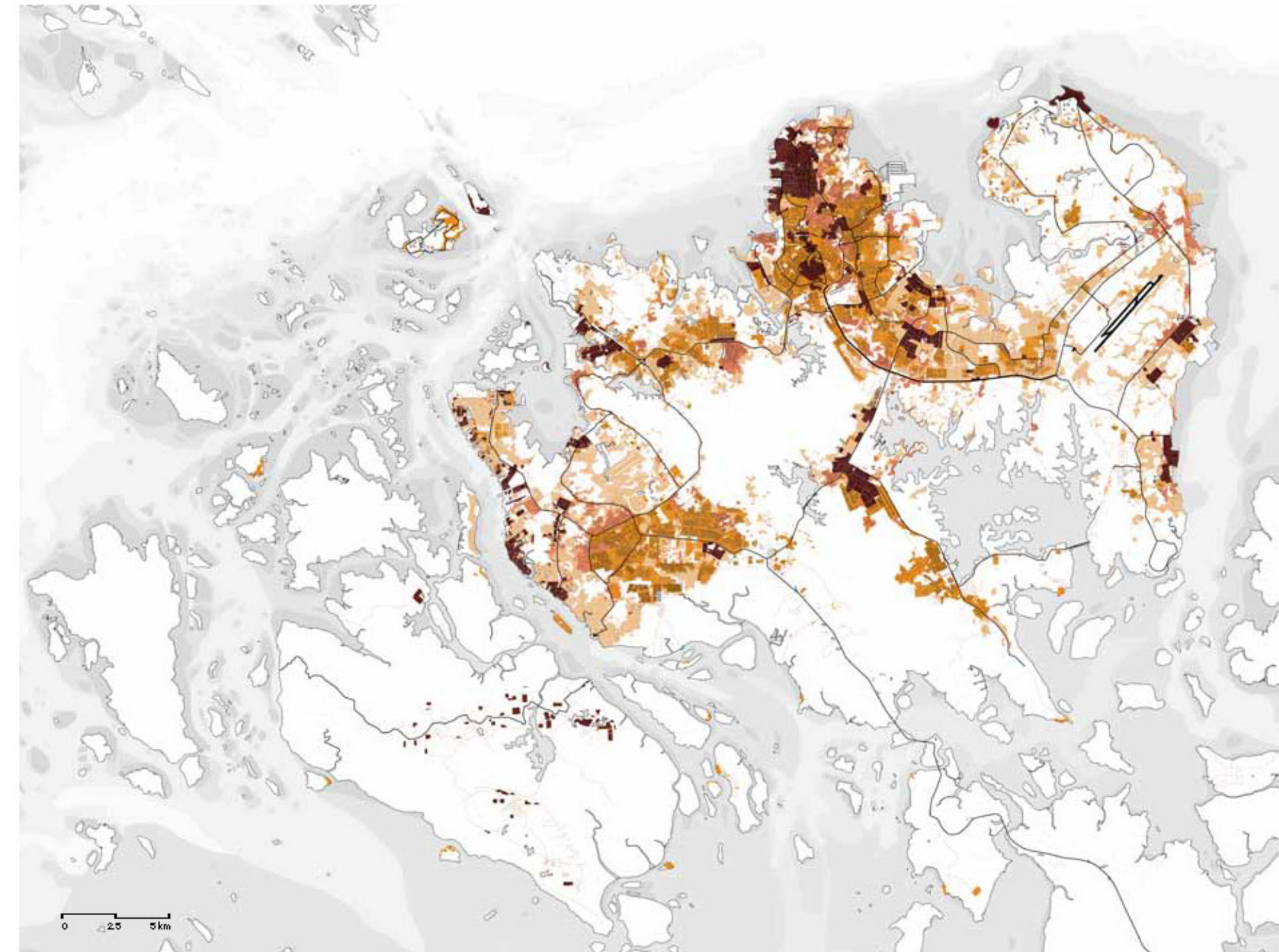


## LOW-DENSITY URBANIZATION

The rapid population growth led to a largely uncontrollable urbanization process. Its spatial consequences are manifested in the inefficient land use. Batam is built up in a continuous low rise and low-density pattern that is perceived as a homogeneous urban carpet. Certainly, the challenge of managing and planning a city that has been characterized by a population growth of 3000% over 30 years has been enormous. At the same time, the government's planning policies clearly focused on the economic development, neglecting the social needs and public interests in the process. Consequently, large areas of low-density housing, formal or informal, as well as latent land, dominate the urban landscape of the island. Spatial differentiation and efficient land use have not yet been achieved.

115 Total Built-up Area on Batam

- Industry
- Informal housing
- Latent land
- Formal housing
- Main roads





## URBAN CENTRALITY

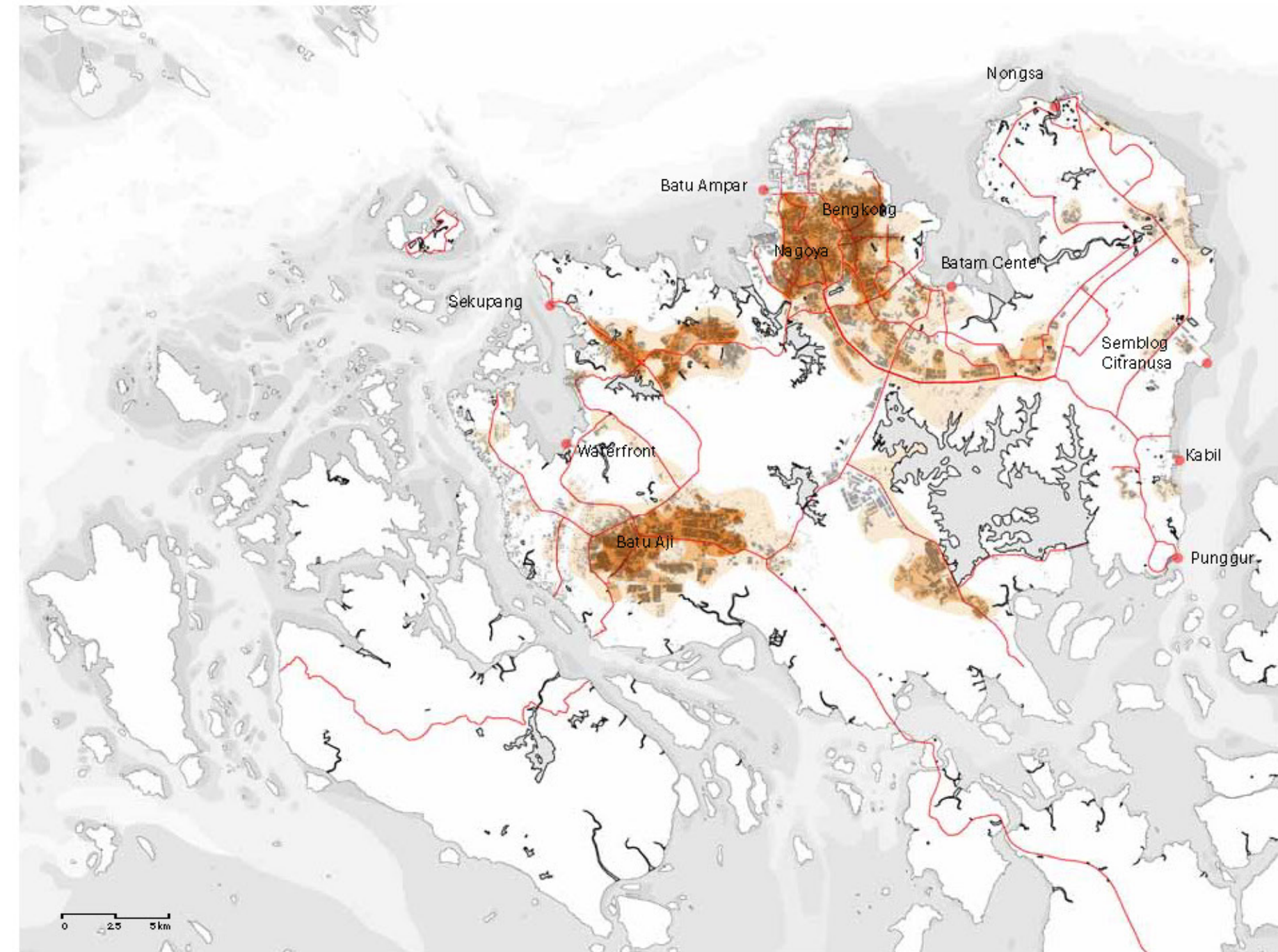


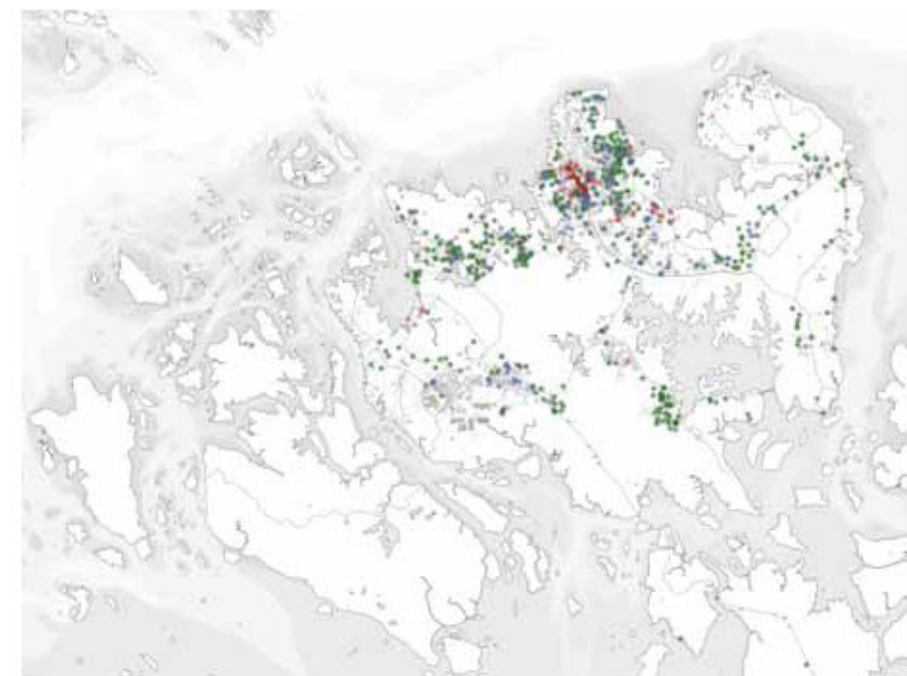
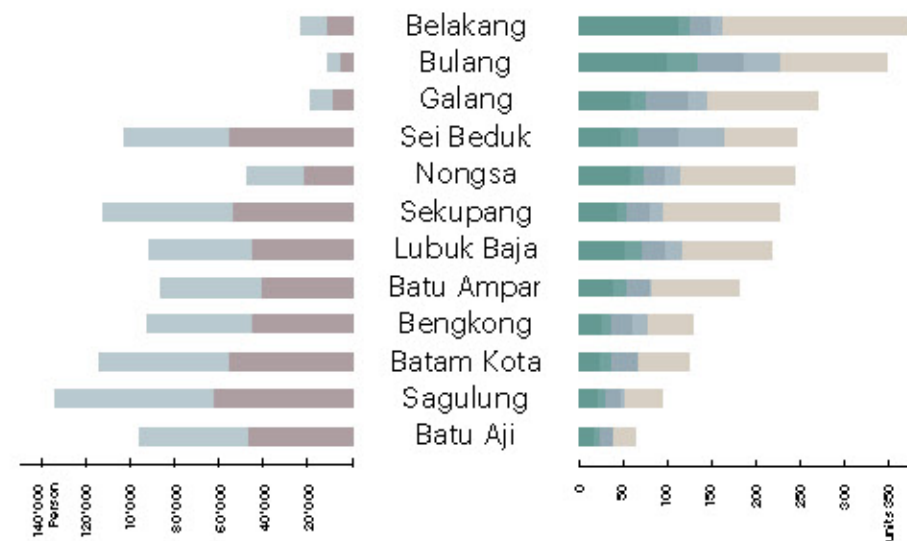
the urban layout, as the denser urban patterns concentrate along the main traffic axes. The streets cross the island, but the coast is mainly accessible for private uses, predominantly industries. The dead-end roads that reach the coastline have not been connected so far. A further indicator for a weak social connection between Singapore and Batam lays in the weak relations between the city centres and the ports. Even though the passenger ports are highly developed, they are detached from the urban fabric, and their surrounding areas remain unused.

The vector of the current urban growth is pointing inland, and the new extensions are detached both from the sea and the coastline. As we observed in the previous chapter, the industrial sites are regularly related to the sea and the shore, due to their need for water access and their relations to Singapore. Thus the detachment of the urban centres from the sea and the coastline could be interpreted as a form of spatial segregation formed through the opposition of local and foreign interests on the island. While goods are meant to cross the borders in both directions, passengers are subject to more complex restrictions. Further, the importance of the main roads is visible in

## Urban Cores Disconnected from the Coastline

- Low density
- Formal housing
- Areas with mixed urban program
- Main roads





P.120 The Port of Waterfront Disconnected from the City



P.121 Number of People by District

- Female
- Male

P.121 Number of Public Services by District

- Kindergarden+Elementary school
- Junior+High school
- Health Facilities
- Pharmacies
- Places of worship

P.121 Public Facilities

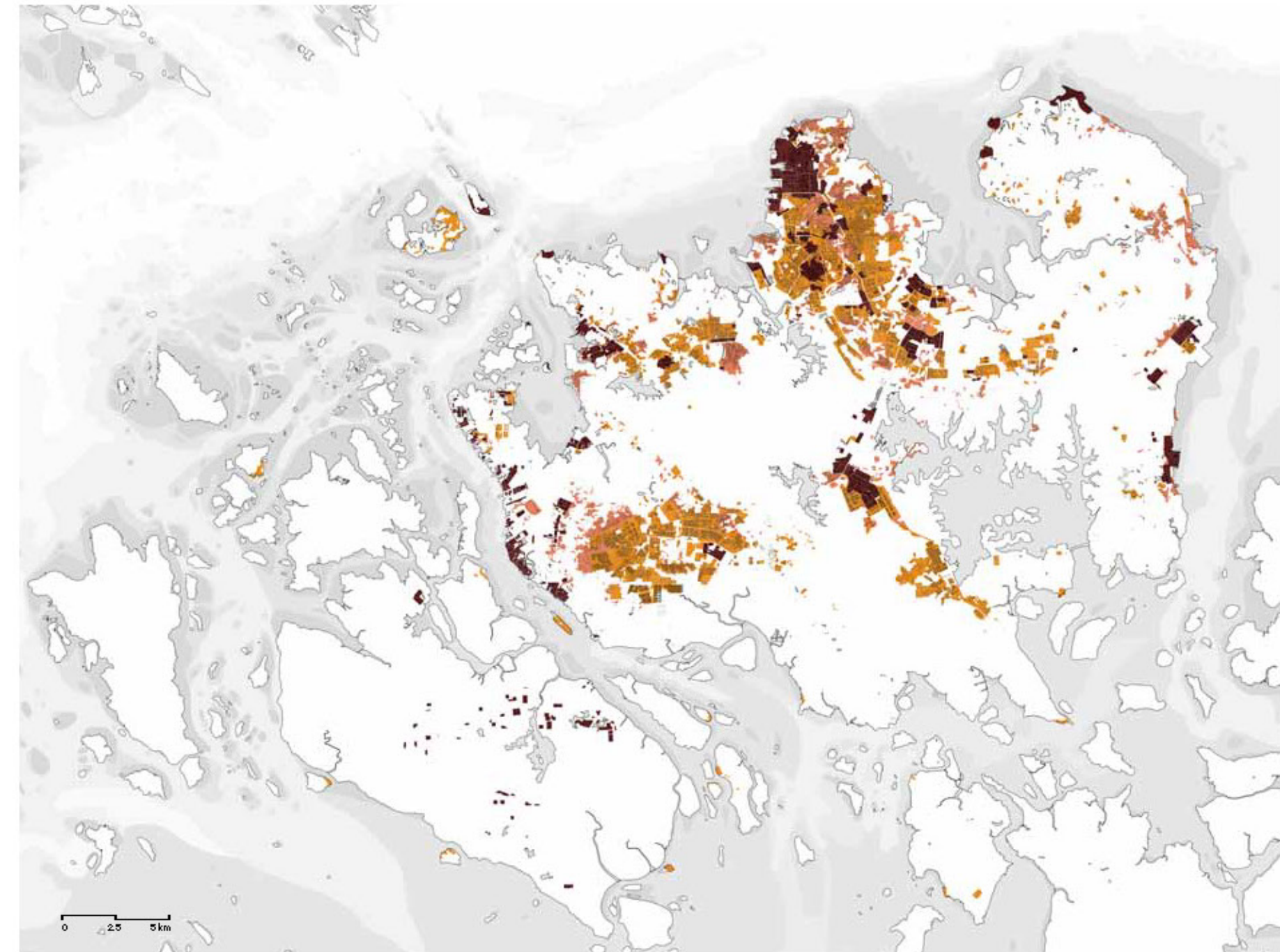
- Commerce
- Health and education facilities
- Places of worship

## HOUSING IN THE BACKYARD OF INDUSTRY

Housing development on Batam not only follows the process of industrialization, it actually has a subordinate position in the emerging urban hierarchy. As the planning authorities have always been emphasising economic growth and therefore reserving strategic locations for industrial development, cities have evolved in the “backyards” of industries, in the leftover space, as it were.

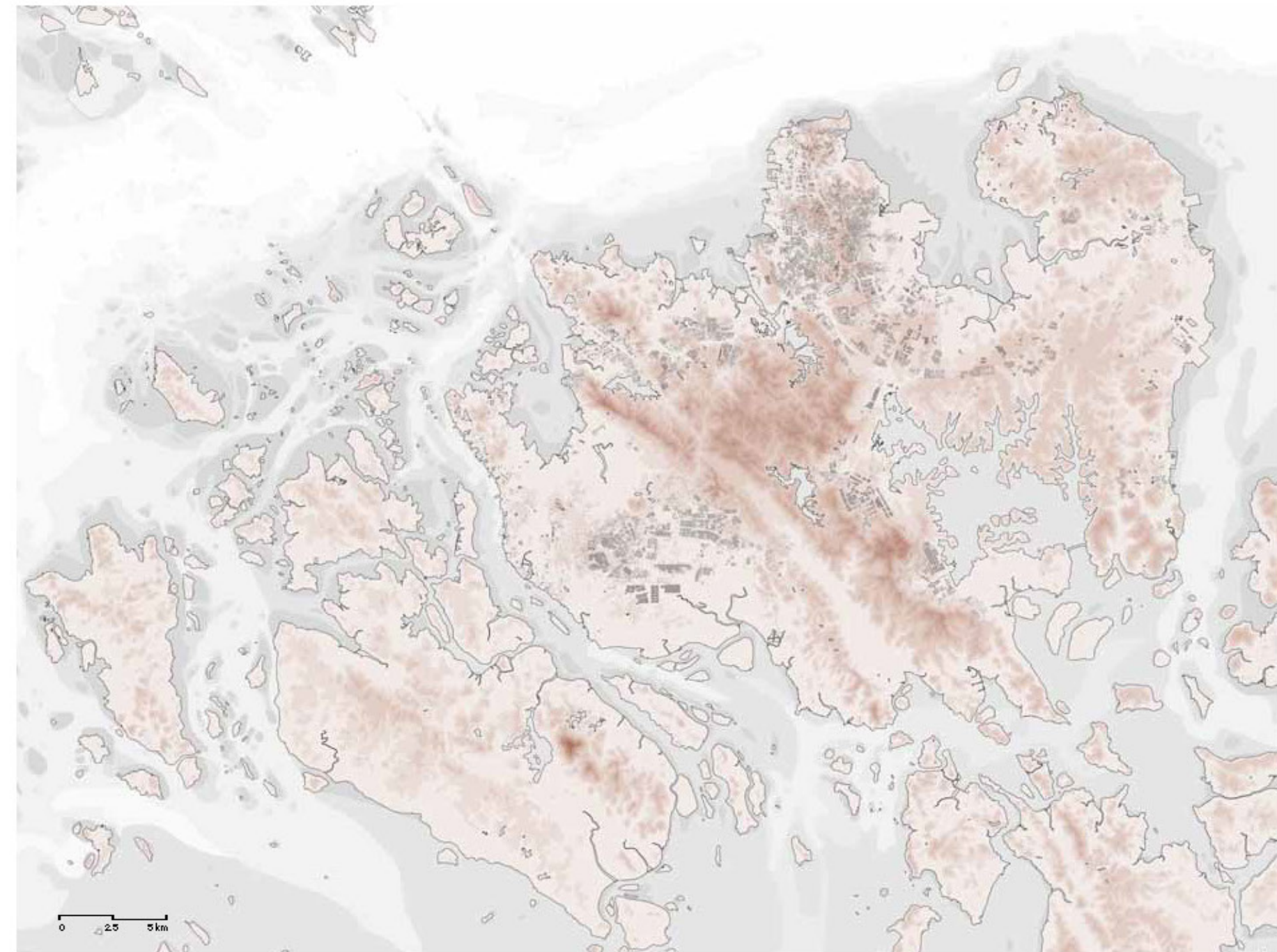
Constructed Areas

- Industry
- Informal housing
- Formal housing



TOPOGRAPHY AS  
NATURAL BORDER OF URBAN GROWTH

The topography draws a limit to urbanization. The majority of the built structures have developed between 2 and 10 meters above sea level. Exceptionally, informal settlements are located higher, up to 45 meters.

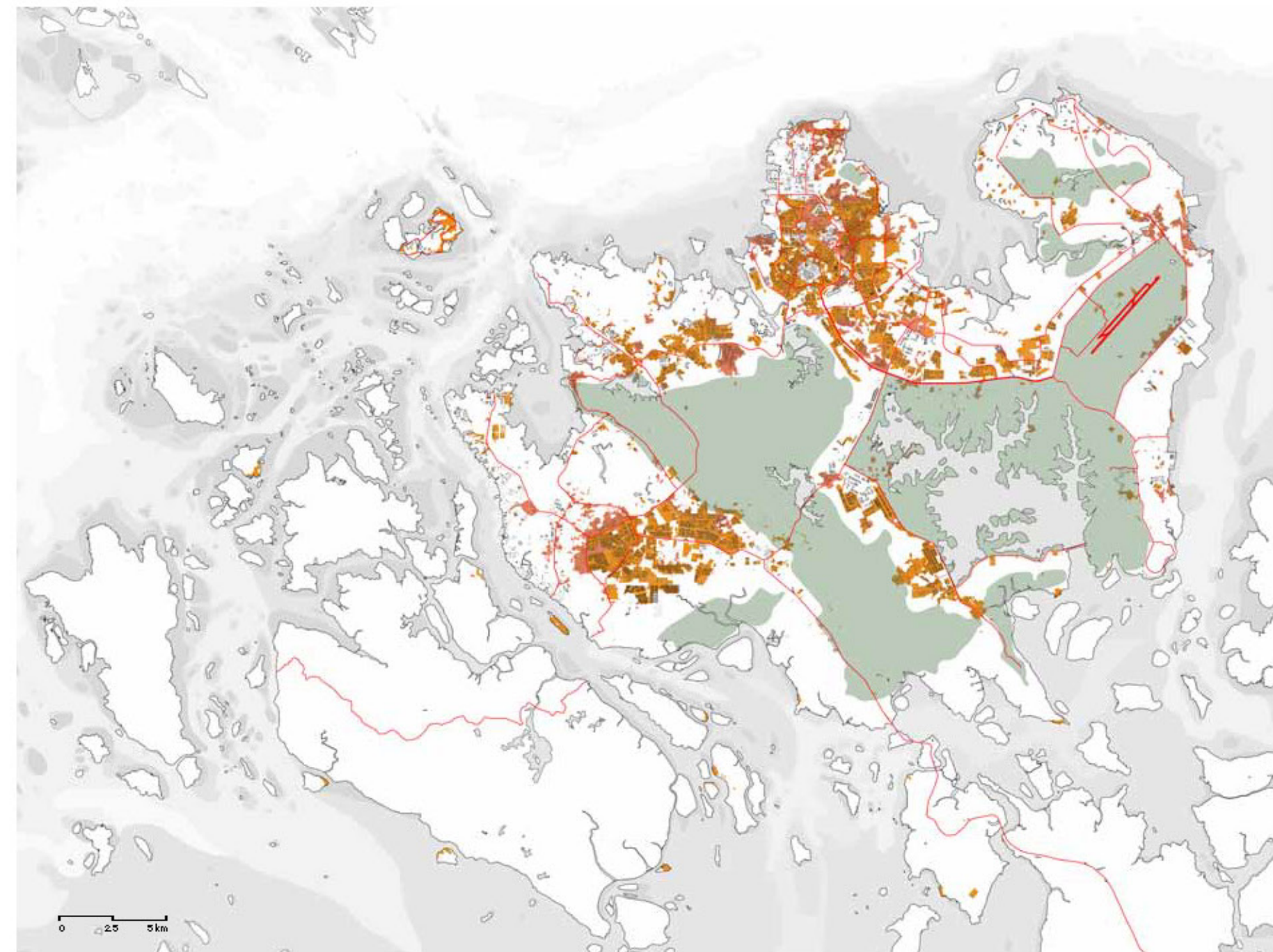


## NATURE PROTECTION AREAS AS LIMITS TO URBAN GROWTH

Nature protection areas have been created at higher topographic elevations. Those zones are gated and thus inaccessible to the public. At the same time they form a border for urban development. Informal settlements present an exception, and can be found in the nature protection areas too, where small-scale agriculture can be practiced.

p.127 Nature Protection Areas

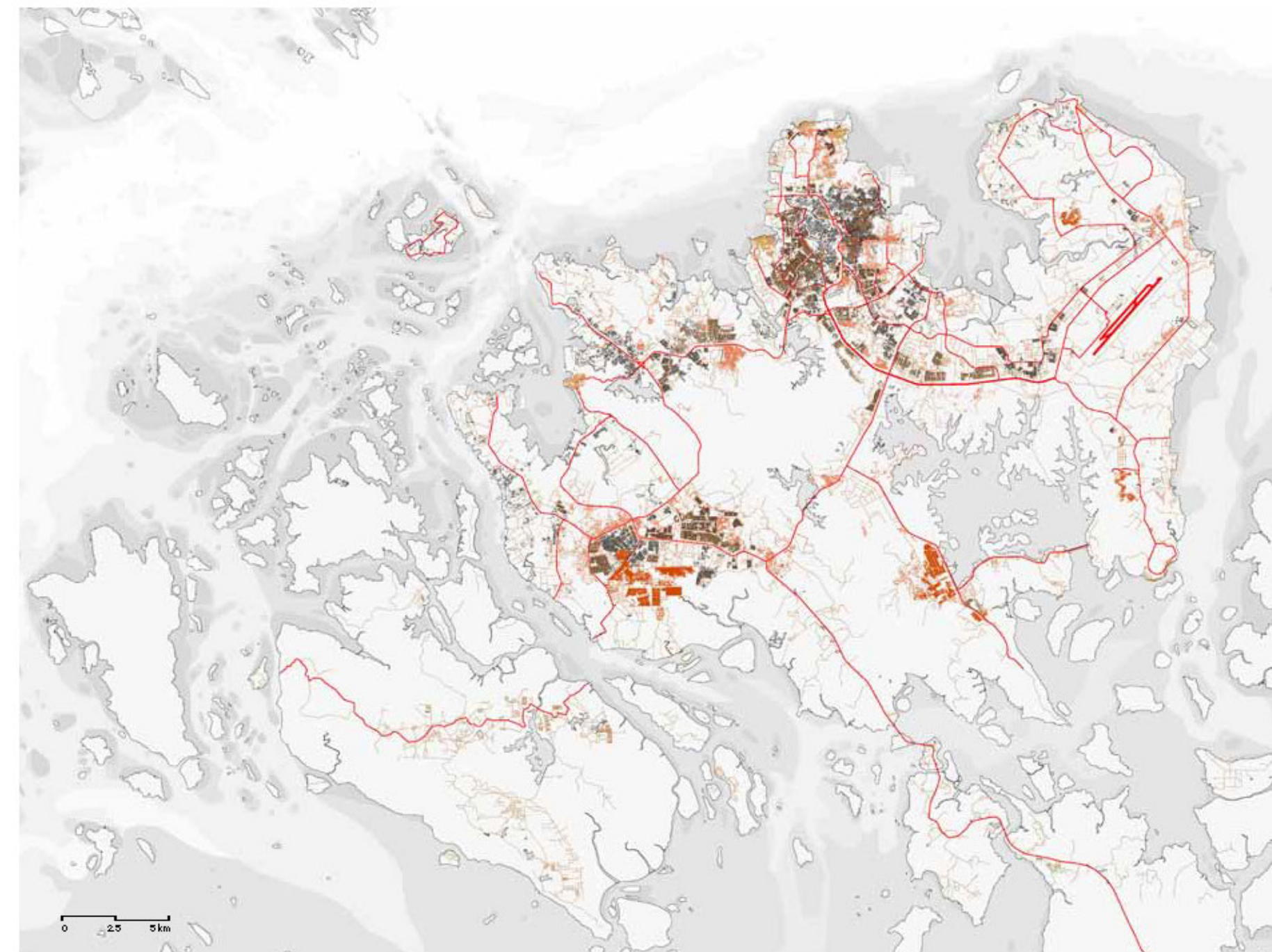
- Reservoir
- Nature protection





## HOUSING TYPES

The main issue concerning housing on Batam is certainly the lack of affordable housing. Numerous informal settlements are spread throughout the island. The government has recognized the problem and has been searching for alternatives, such as the KSB and the RUSUN housing models. However, no stable solution to this issue has emerged yet. The developer housing types on Batam remind of developer architecture anywhere in the world, rather than offering architecture responsive to local conditions. No site-specific or climate adapted housing proposals exists in the region, except for the vernacular villages, the Kampung.



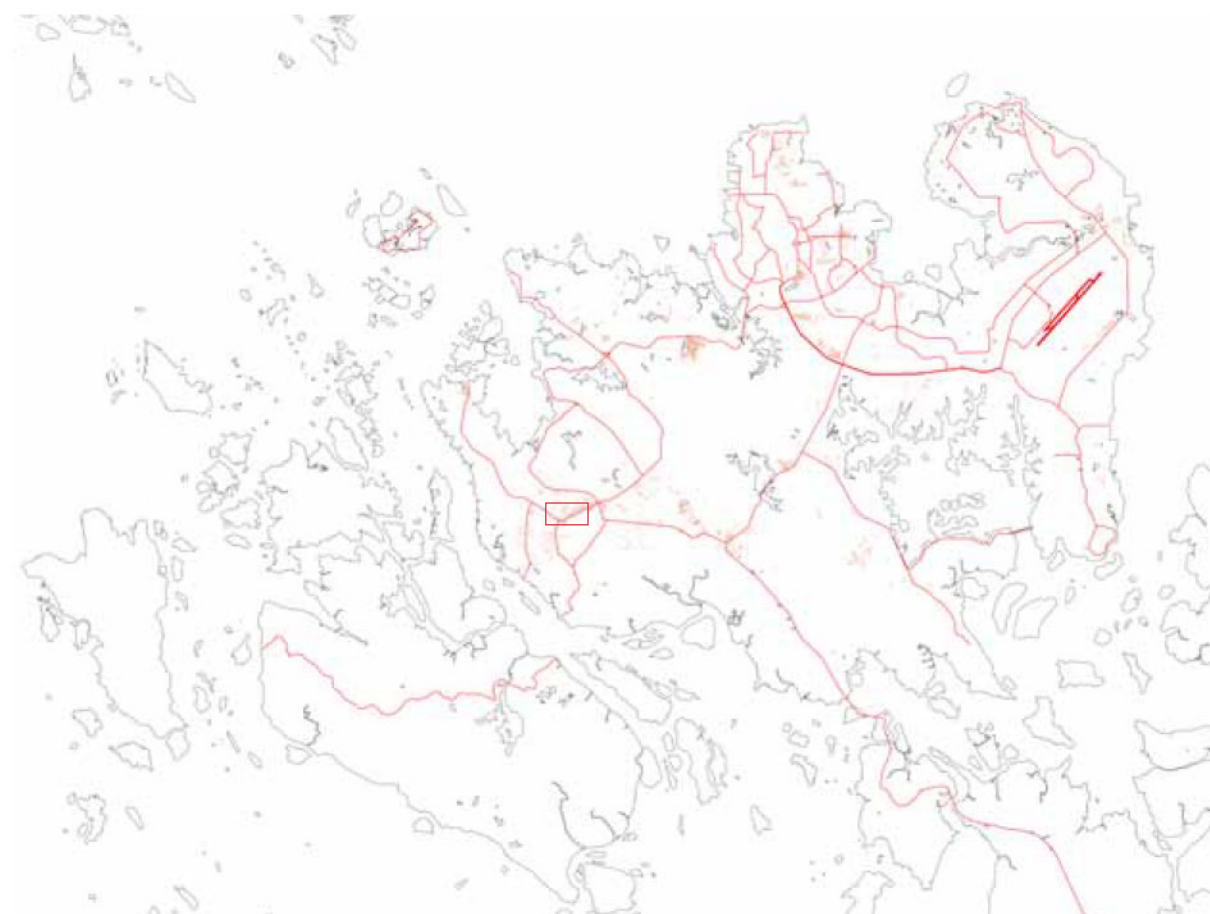
TYPE 1:  
INFORMAL HOUSING (RUMAH LIAR).



Rumah liar, meaning 'wild houses' is the Indonesian expression for informal housing. They develop mostly near to infrastructures, as they do not have access to services such as clean water, electricity and sewage systems. These simple constructions offer shelter to nearly 20% of Batam's population. The social structures in informal settlements seem to be highly developed, and based on ethnic and familial relations. Informal villages offer a mix of urban programs, such as small manufacture,



mosques and schools that often complement the neighbouring urban or industrial areas.



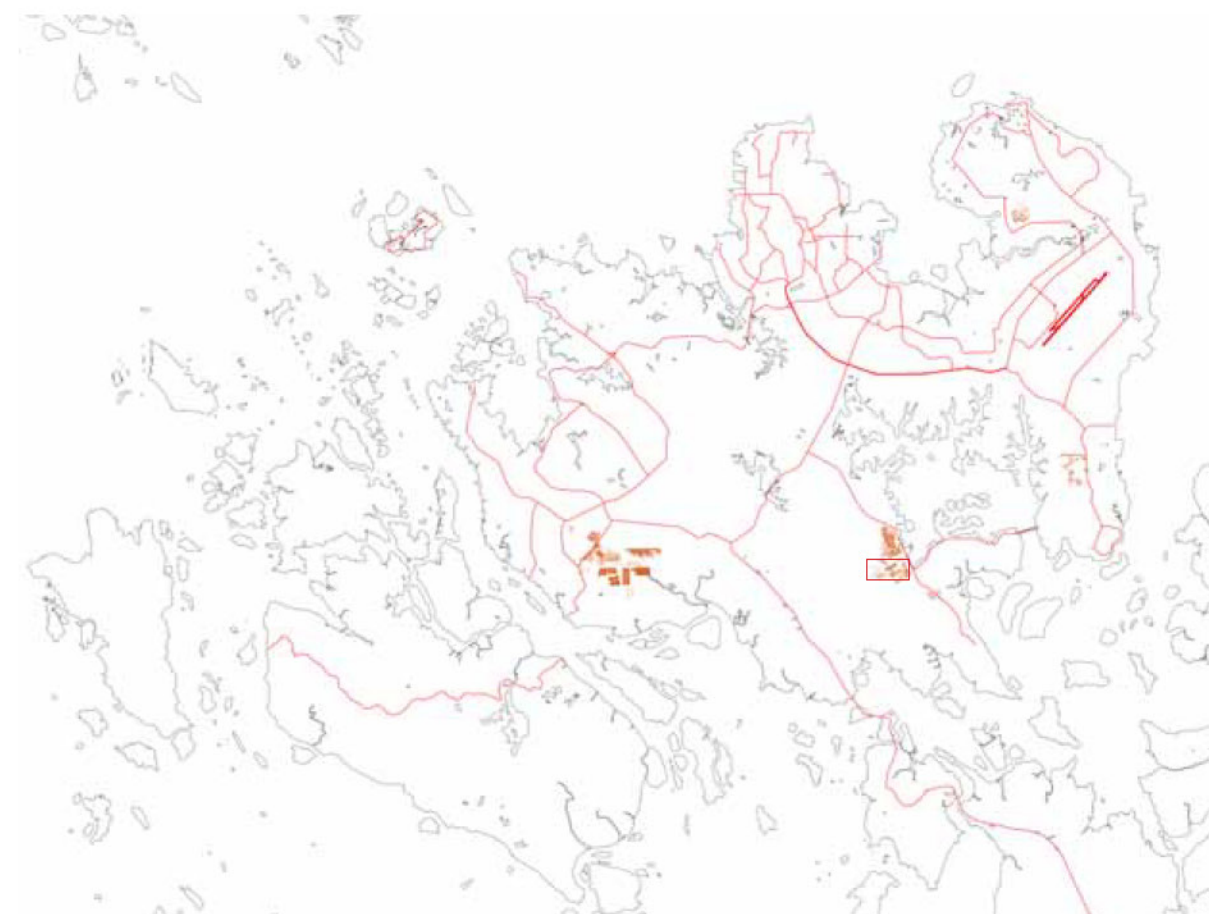
TYPE 2:  
KSB (KAVLING SIAP BANGUN)



KSB (Kavling Siap Bangun) means "lot ready to build". In this type of housing development, also known as the "site and services", the government usually provides the lots while the construction lies in the hands of the inhabitants. The government also provides basic infrastructures and paves access roads. Costs for buildings in KSB villages can vary greatly. However, even the low-cost KSB houses are much more expensive than their counterparts in illegal settlements. The plots are set out in a grid, for rational distribution of water and



electricity. By contrast, the sewage and waste management are usually not provided. The location of the KSB



settlements on Batam is peripheral, far from the workplaces and on the edges of the urban area.

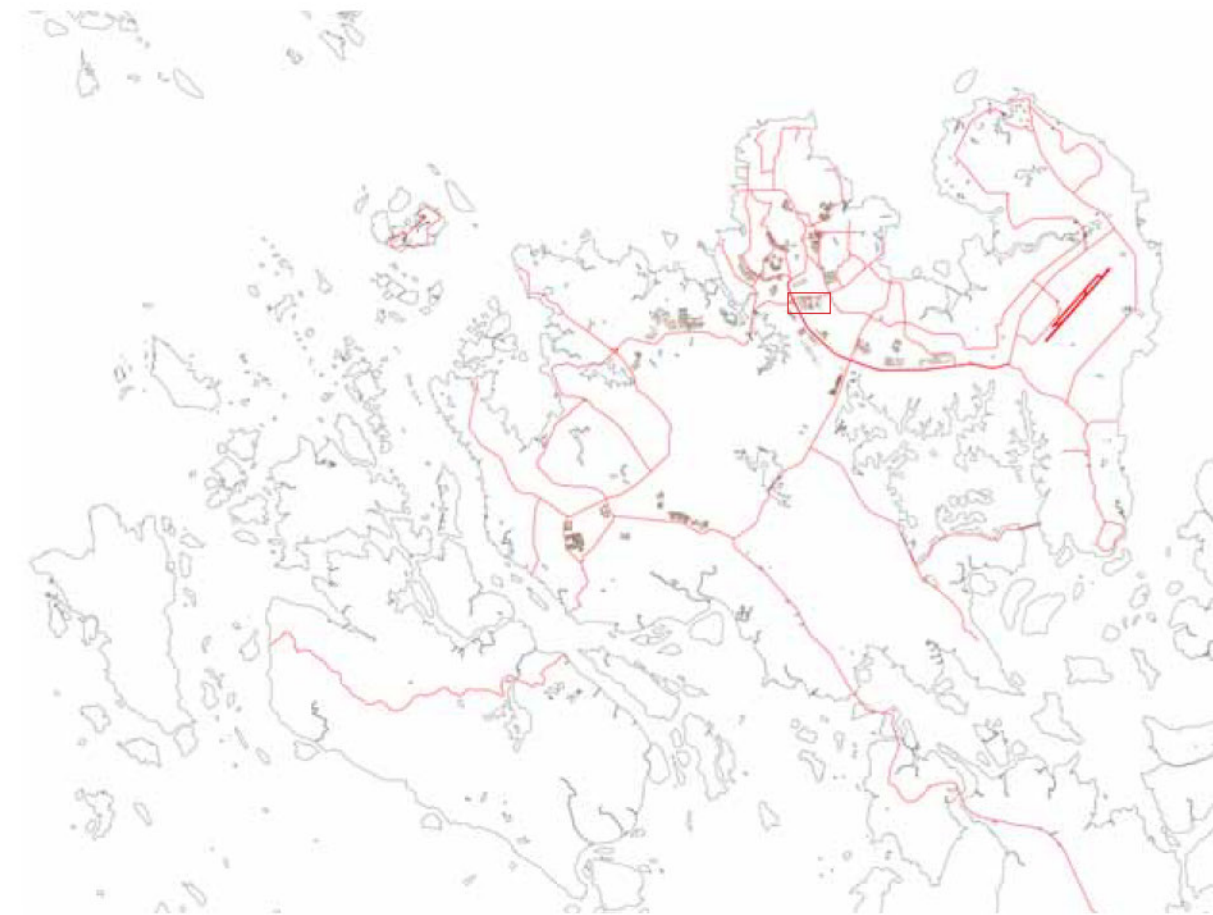
TYPE 3:  
DEVELOPER HOUSING



The neighbourhoods of the developers housing remind of gated communities, although the entrance is usually not guarded, but serves a more symbolical purpose. Within the compounds, the row houses, single-family houses, and occasionally shop houses, are usually surrounded by gardens and are accessible by car. Houses belong mostly in the middle to upper social segment, and can vary greatly in quality and size. It appears also



that this type of housing reveals a gap between the supply and the demand on Batam island. Several housing projects

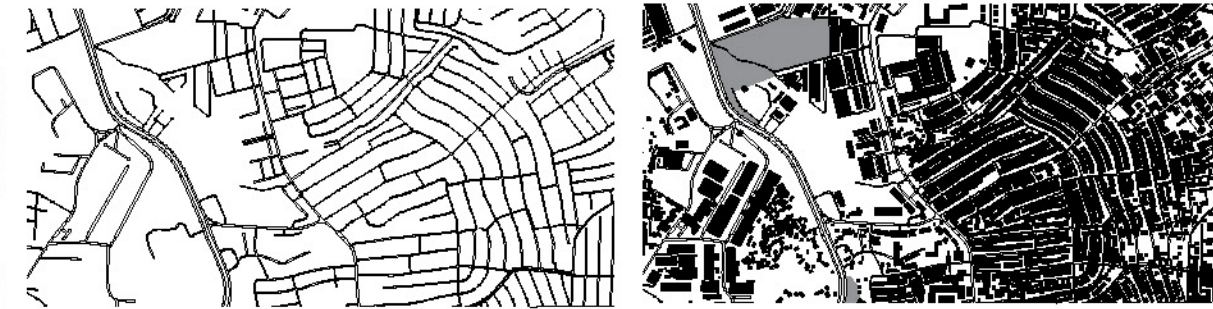
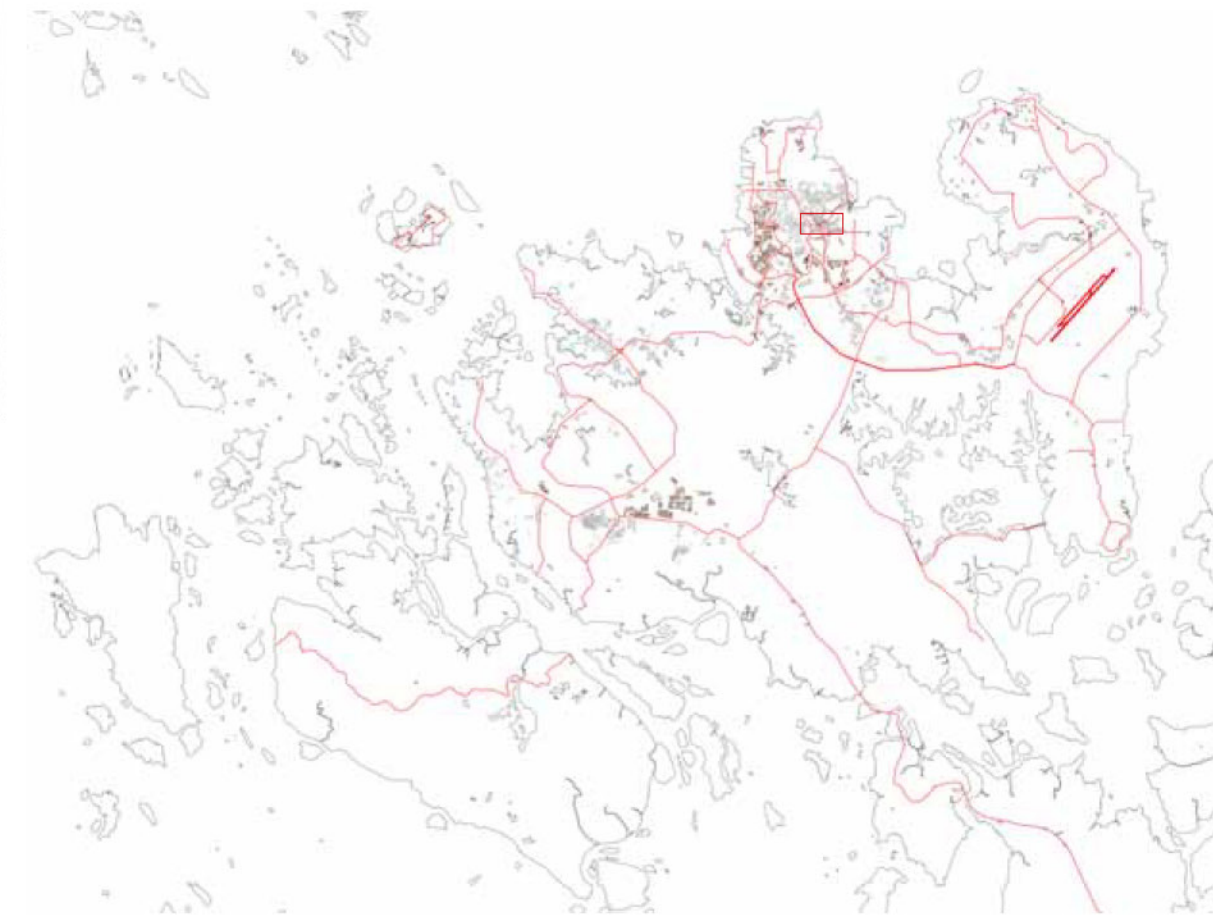


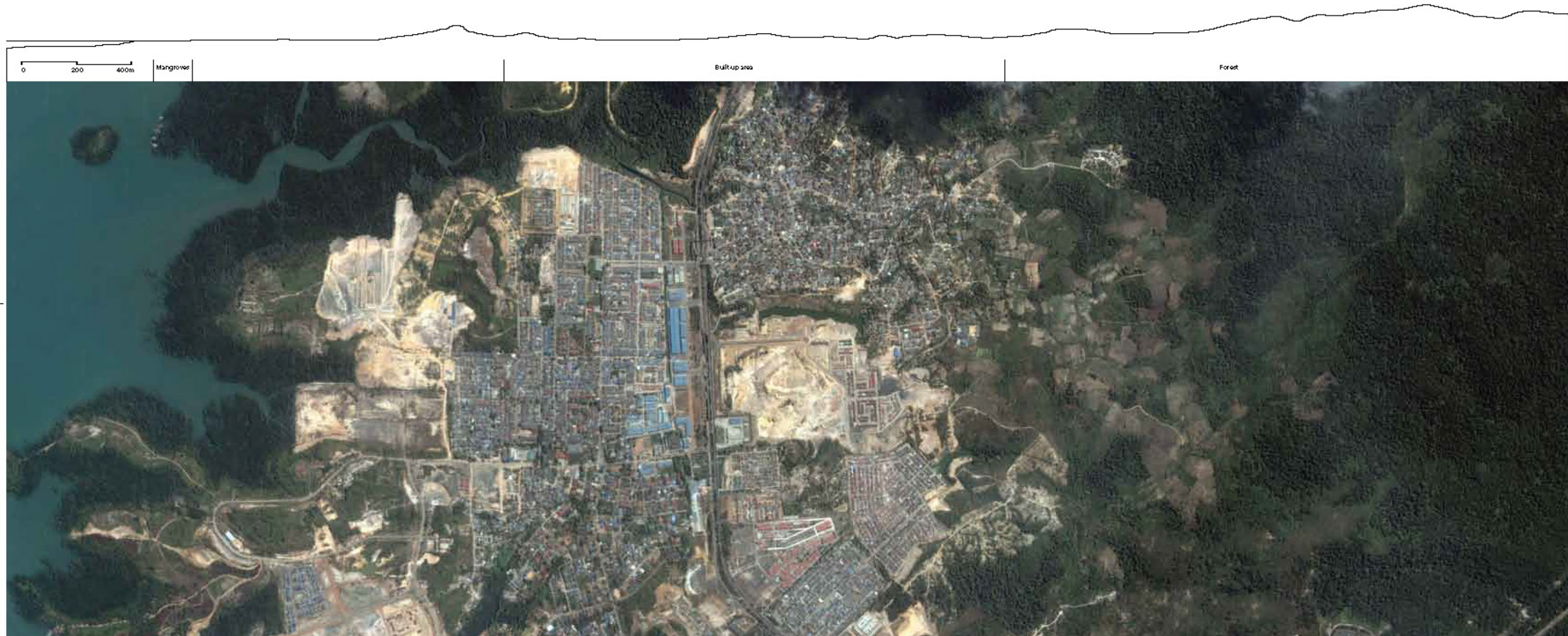
have been abandoned during construction, as no buyers could be found.

TYPE 4:  
SHOP HOUSES (RUKO)



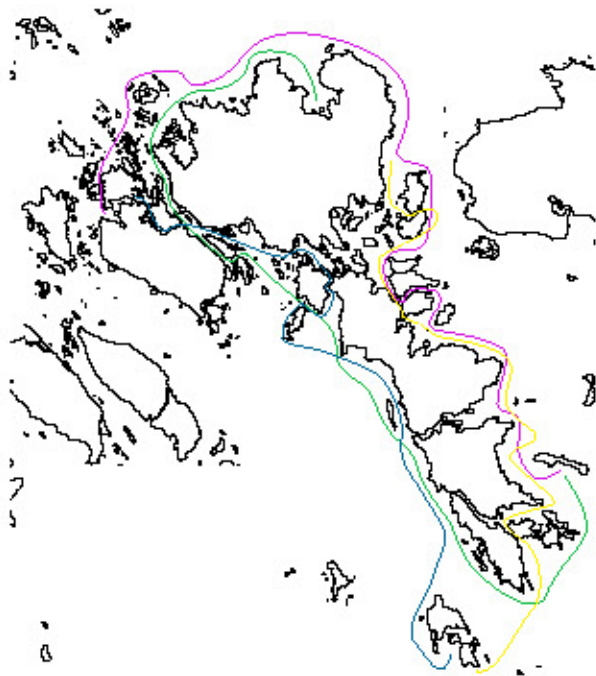
The so-called "rukos" are mostly found in open urban areas, but sporadically in combination with other housing types. They are always well connected to the main roads, and are built by investors. They usually host shops in the first floor and dwellings second and third floors, and usually form commercial streets in their respective neighbourhoods. Water, electricity, sewage and waste disposal facilities are well developed in the shop-house areas.





## TYPE 5: TRADITIONAL HOUSING

A reversed picture is offered in analysing the traditional villages. The traditional Malay constructions, the so-called "Kampung Tua," (the old village) are scattered all over the Riau Archipelago. The indigenous Malay or the so-called "Orang Laut," (the people of the sea) are fishermen, and engage in small-scale agriculture. Their settlements are always located at the interface between the sea and the land, with stilt houses standing on the coast in shallow water. Three types of indigenous settlements or dwellings can be differentiated; the nomadic canoe dwelling, the semi-mobile sea dwelling, and the permanent model of housing on the coast. Even if their



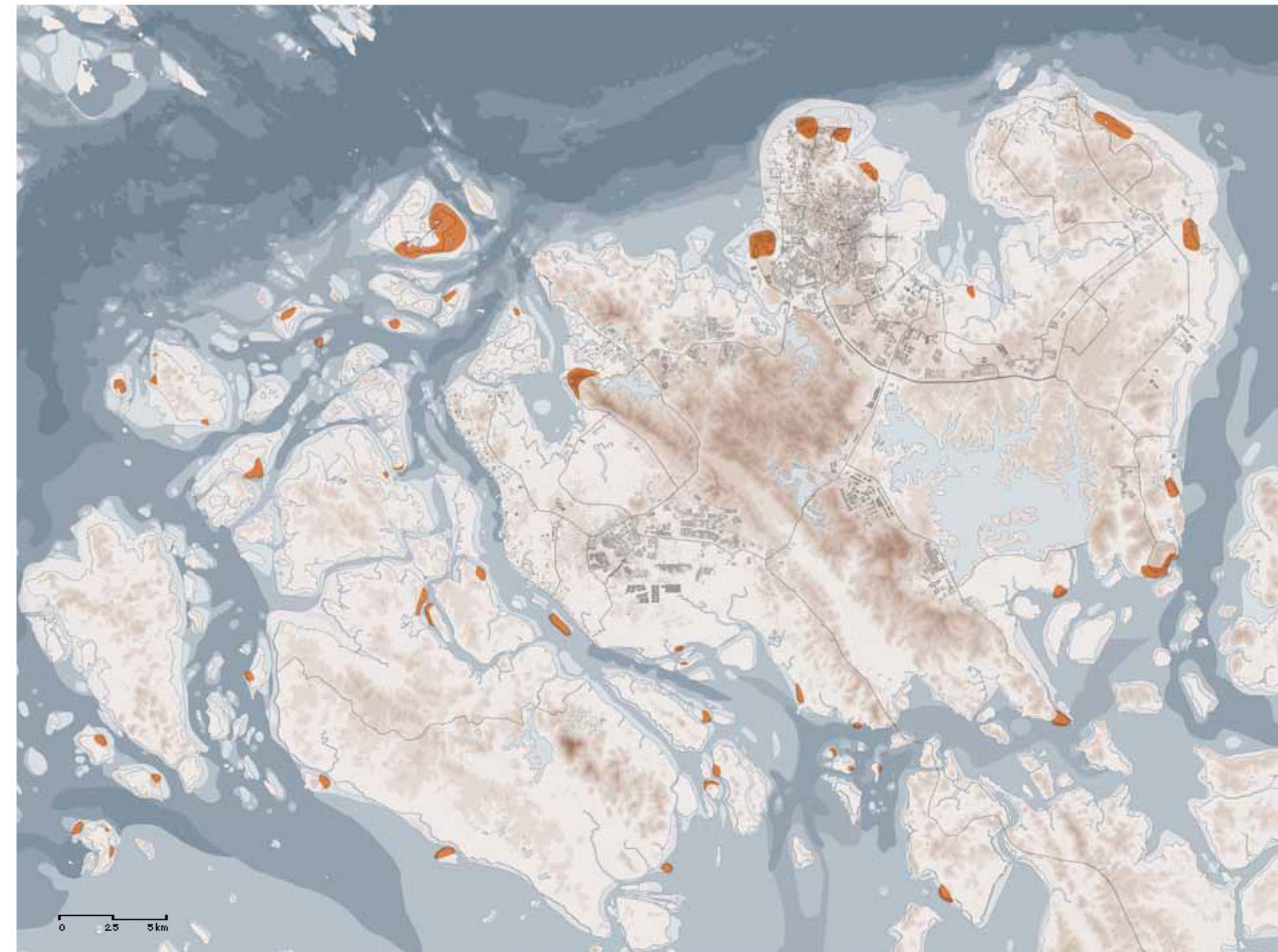
constructions are slightly different, they are all oriented toward the sea and strongly connected with its resources. The movement and all forms of exchange among the inhabitants happen on the water. With their architecture and the entire way of life, the indigenous Malay have adapted to the specific balance between the sea and the land.

The tribal Malay, the "Suku Laut", (the sea people) or more commonly known as the sea gypsies, usually move amidst the unpopulated islands of the archipelago. Entire families share a canoe as their home. Their trajectories are related to the seasonal winds, that influencing the sea currents and the fish stocks. The Suku Laut are the poorest and the most disrespected group among the indigenous inhabitants. Perhaps this is why they exhibit a strong ethnic identity, offering mutual assistance among their own kinship members and maintaining their cultural boundaries. Governmental attempts to settle the nomadic tribes have all failed.

The "Rumah-Rumah Terapung" are sea-based houses built like a pontoon with four strong and adjustable chains hooked on the seabed. Those houses have the ability to float on the water, moving on the sea surface and following the movement of the tides. Floating houses that can serve as fishing boats are also built. They can move individually or assemble with others on the coast.

## 137 Traditional Housing: Kampungs

- Traditional housing
- Main roads
- Secondary roads
- Route of the Sea People
- South seasonal route
- East seasonal route
- North seasonal route
- West seasonal route





The most defused and therefore the most common indigenous settlements, the “Kampungs” are located on the coast. The vernacular stilt constructions, start from the coastline and extend far into the water. The water topography becomes the limit to the expansion of these settlements. The houses are mainly accessible by water, which represents the main infrastructure for these settlements. The Kampungs often feature a main port, located on the very edge between the shallow and the deep waters. Thus even larger boats can exchange their goods and passengers. The shallow waters further give the opportunity for fishing, while the movement of the tides cleans the shore.

Although the social and economic structure of Kampungs presents a system in itself, the connections existing among the islands are even more relevant. The archipelago works as a network of specific functions and identities. Different islands trade with each other; different levels of

schools are found on different islands. School boats enable children to travel to their classes from a very young age.



p.139 Pulau Sarang See Network



p.138 Pulau Sarang

- Mosque
- Primary school
- Public building
- Hospital
- Cemetery



TRANSFORMING INDIGENOUS HABITAT



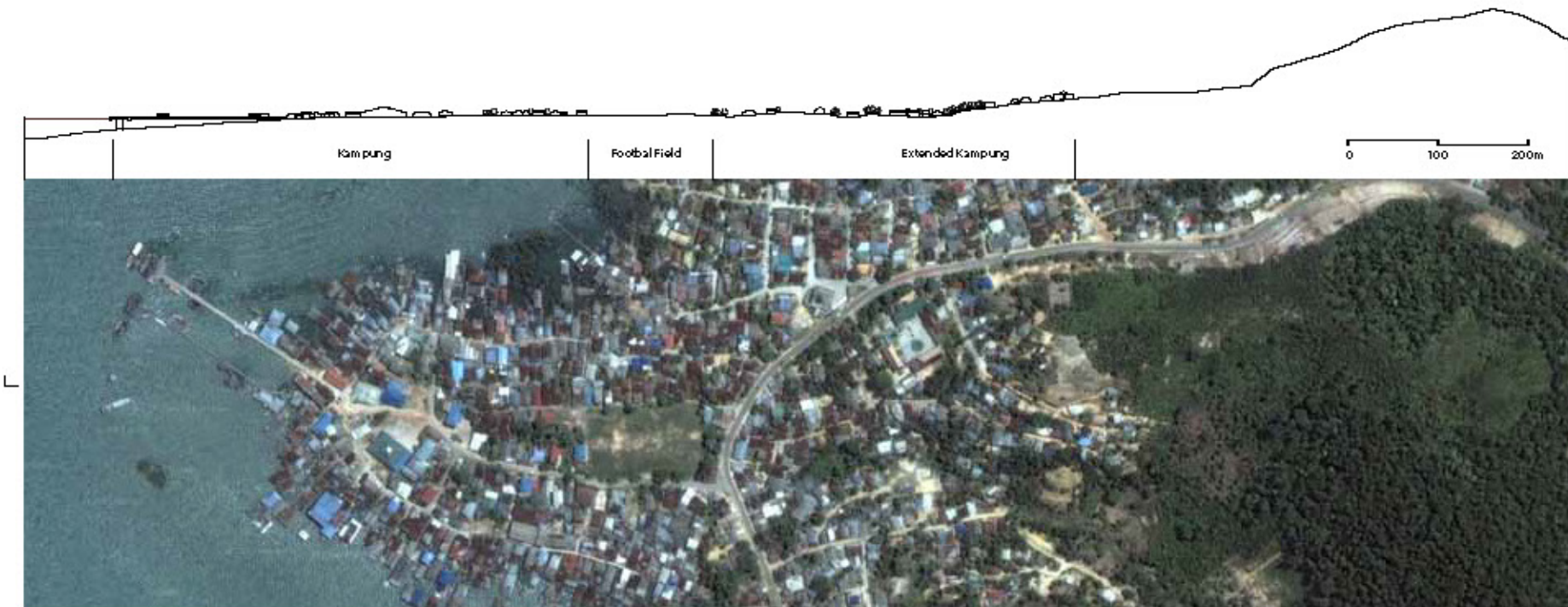
The Riau Archipelago is marked by a certain duality. Nature and indigenous ways of life stand in contrast to the expanding industrial and commercial landscapes. The

indigenous Malay population forms the majority on the 3,200 islands of the Riau Province, even if migrants now predominate on the island of Batam. The urbanization of Riau Islands has so far excluded the agricultural sector, and thus the traditional economy of the indigenous population. The work opportunities in the free trade zones have been inaccessible for the indigenous Malay, and their small commerce has been marginalised. Since the creation of the bounded zone on Batam in 1978, the gap between the industrializing area and the traditional areas grew. While the trade activities within the bounded zone are largely legal and subject to taxation, beyond the bounded zone they are usually informal.

Several indigenous settlements have been displaced or even destroyed by the development pressure. But some of the kampung tua became integrated into the urbanised area of Batam Island, and have even expanded inland, away from the coastline. A mix of the traditional and the informal housing emerged.



▲140 Kampung Buluh facing Shipyard Industry  
▲141 Extended Kampung



## THESIS NO. 2

The rapid population growth due to national migration led to an uncontrolled, unbalanced and inefficient land use. The cities develop detached from the coastline and maritime infrastructure. Current housing development is located in the back of industry.

The topography is a natural limit to urban growth on Batam Island.

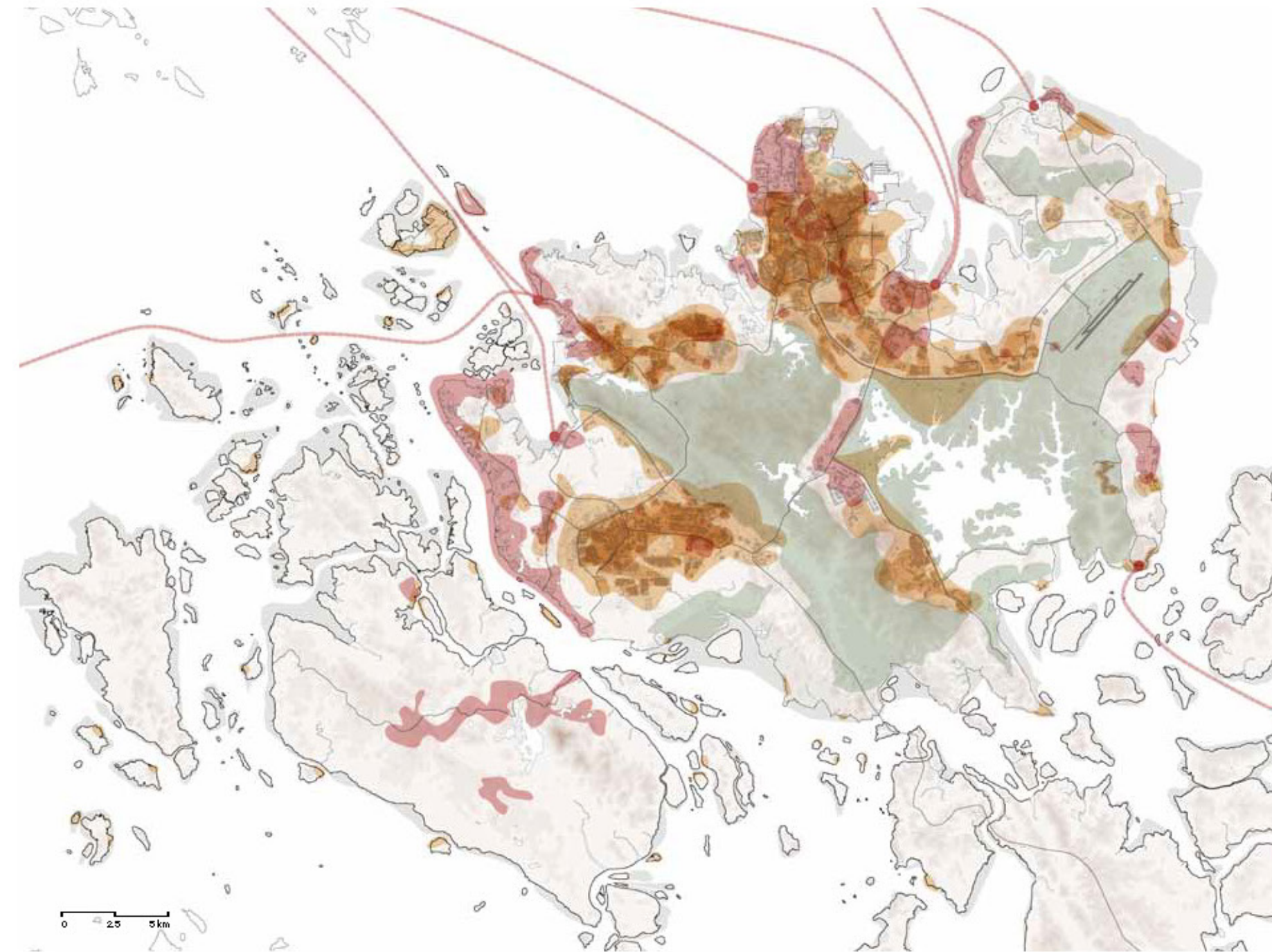
Nature protection areas are political limits to urban development. The traditional housing is always oriented toward the sea. An inverted logic is observable between the current and the traditional logic of settlements.

In the traditional way of inhabiting the territory, the sea topography becomes the border of growth.

The traditional settlements form an interlinked network across the archipelago.

p.143 Thesis Map: Urban Territory

- Housing
- Industry
- Nature protection
- Areas of tide variation







# FRONTIER OF URBANIZATION

P. 158  
SINGAPORE REGION:  
THE ARCHIPELAGO

P. 158  
ARCHIPELAGO AS TERRITORIAL FORM

P. 160  
QUIET TERRITORY  
IN THE BACK OF URBANIZATION

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NATURAL AND CULTURAL  
RESOURCES OF THE ARCHIPELAGO

P. 162  
LAND PRODUCTION STRATEGY  
CUT AND FILL

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RESERVED AREAS

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MANGROVE FORESTS

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THESIS NO. 3





p.150-151 Land Reclamation for Shipyard Industry







154 Mangrove Forest along an Estuary





## SINGAPORE REGION: THE ARCHIPELAGO

The Riau Archipelago can be recognized as a specific and unique territory whose topography, and natural, cultural qualities set it apart from Singapore and the Johor peninsula, where natural areas are entirely urbanized and operate as strategically located voids. In the archipelago, the sea surface mediates between the different islands. In the local context of the Riau, the movement and exchange of goods and people among the islands is dynamic, both legal and illegal. The sea gives individual identities and specific roles for different islands, while at the same time linking them together in a network.

### ARCHIPELAGO AS TERRITORIAL FORM

At first glance, the Riau Archipelago is a picturesque island landscape where few villages scattered along the coastline seem to leave just a weak trace in the natural setting. This archipelago is also a social space, where indigenous cultures used to develop along the edges between the land and the sea. But most interestingly for this project, the Riau Archipelago can be recognized as a specific and unique territory whose topography, and natural and cultural qualities set it apart from Singapore and the Johor peninsula. Until now, these potentials have not been engaged in the area's planning and development.

The archipelago presently functions as borderland of urbanisation, a process that seems largely contained within the boundaries of the free trade zone. However, the urban growth of Bintan, Karimun and especially Batam, puts pressure on the surrounding islands. They function as productive hinterlands, supplying the Free Trade Zone with food, construction materials and other resources. In our view, this largely monocentric development pattern around Batam does not benefit from the specific potentials of the archipelago and needs to be critically examined. Alternatively, the archipelago can be approached as a unified territory, where diverse and specific qualities of the islands can be reinforced and linked together. As such, the perception of the archipelago as a dynamic network of islands has created a basis for research and design.

159 Singapore Region, the Archipelago  
Vegetation





## THE QUIET TERRITORY IN THE BACKGROUND OF URBANIZATION



The tropical landscape has experienced an enormous transformation, following the onset of industrialization and the urbanisation processes in the early 1990s. In the north of the island, the landscape has been transformed completely, while it is still preserved in the southern part of the archipelago. The shallower waters located further away from the Straits, serve as a sort of a buffer to urbanization.

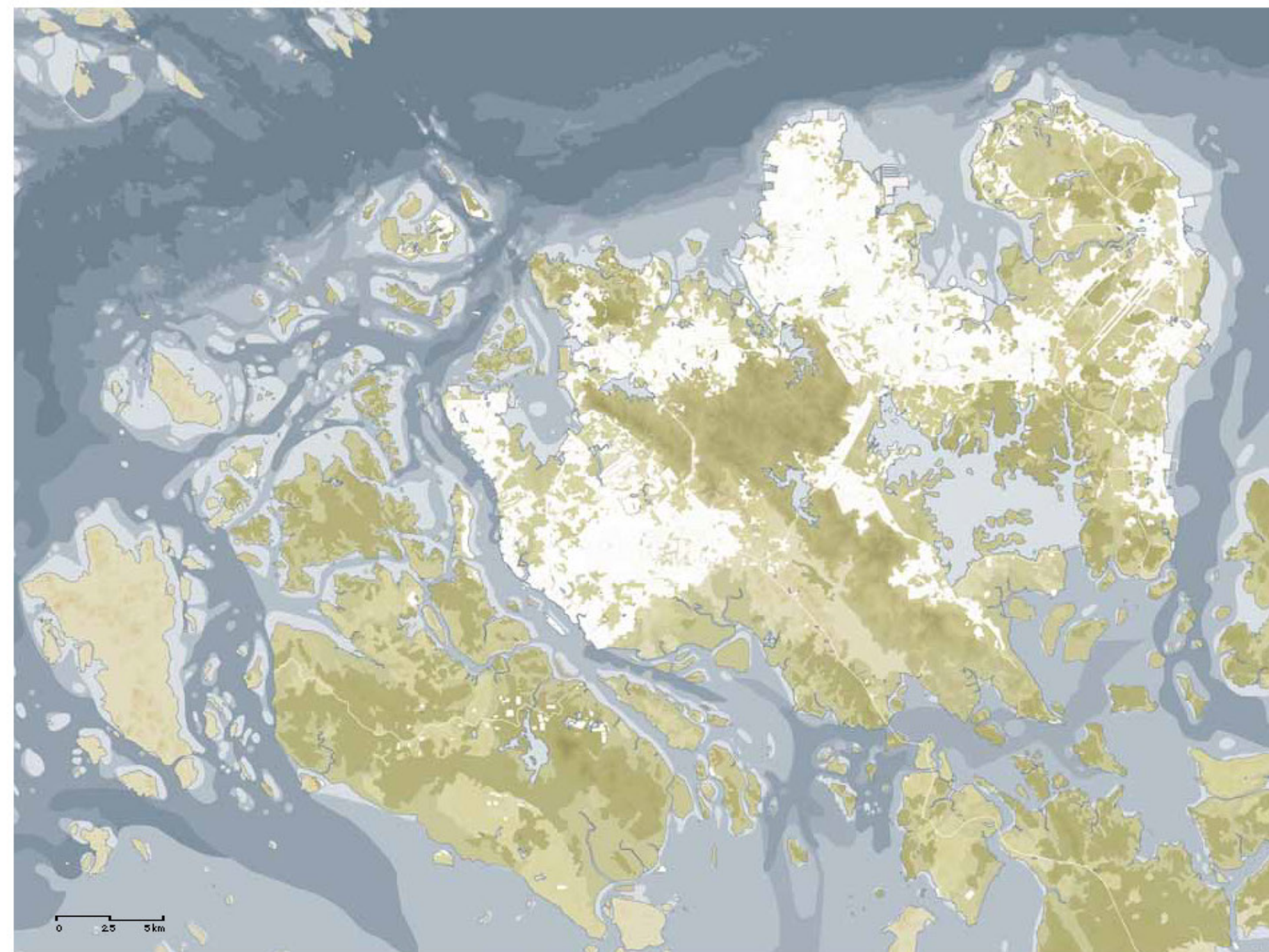
## NATURAL AND CULTURAL RESOURCES OF THE ARCHIPELAGO

It is not difficult to see and describe the Riau Archipelago as a paradisiacal landscape. There are more than three thousand islands in the archipelago, most of them covered by mangrove forests and palm trees. Many exotic fruits, including

coconut, dragon fruit and papaya are cultivated here. The wealth of the sea is precious, too. Fish, crab and mussels have formed the daily alimentation of the local population, and are increasingly used for export. Coral reefs of the Riau Archipelago are already becoming an element of attraction for tourism. The ecosystem relating mangrove-forested coasts with maritime habitat is of vital importance for the area.

## 161 Quiet Territory in the Background of Industry

■ Vegetation

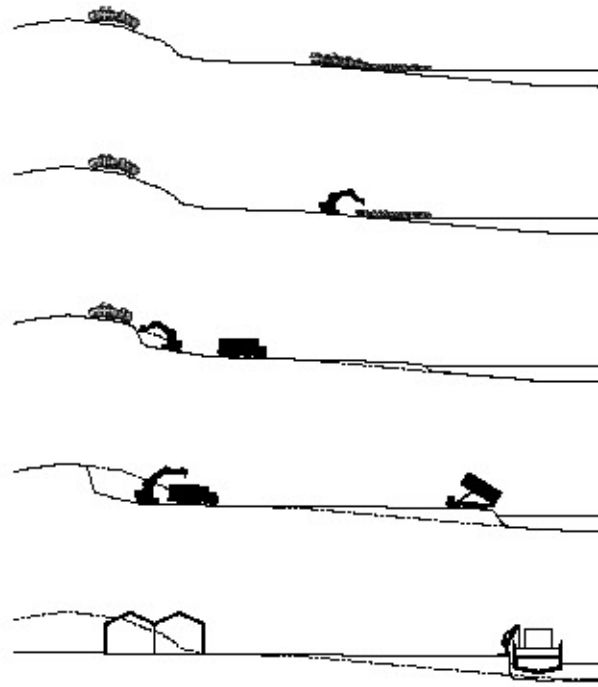


LAND PRODUCTION STRATEGY:  
CUT AND FILL

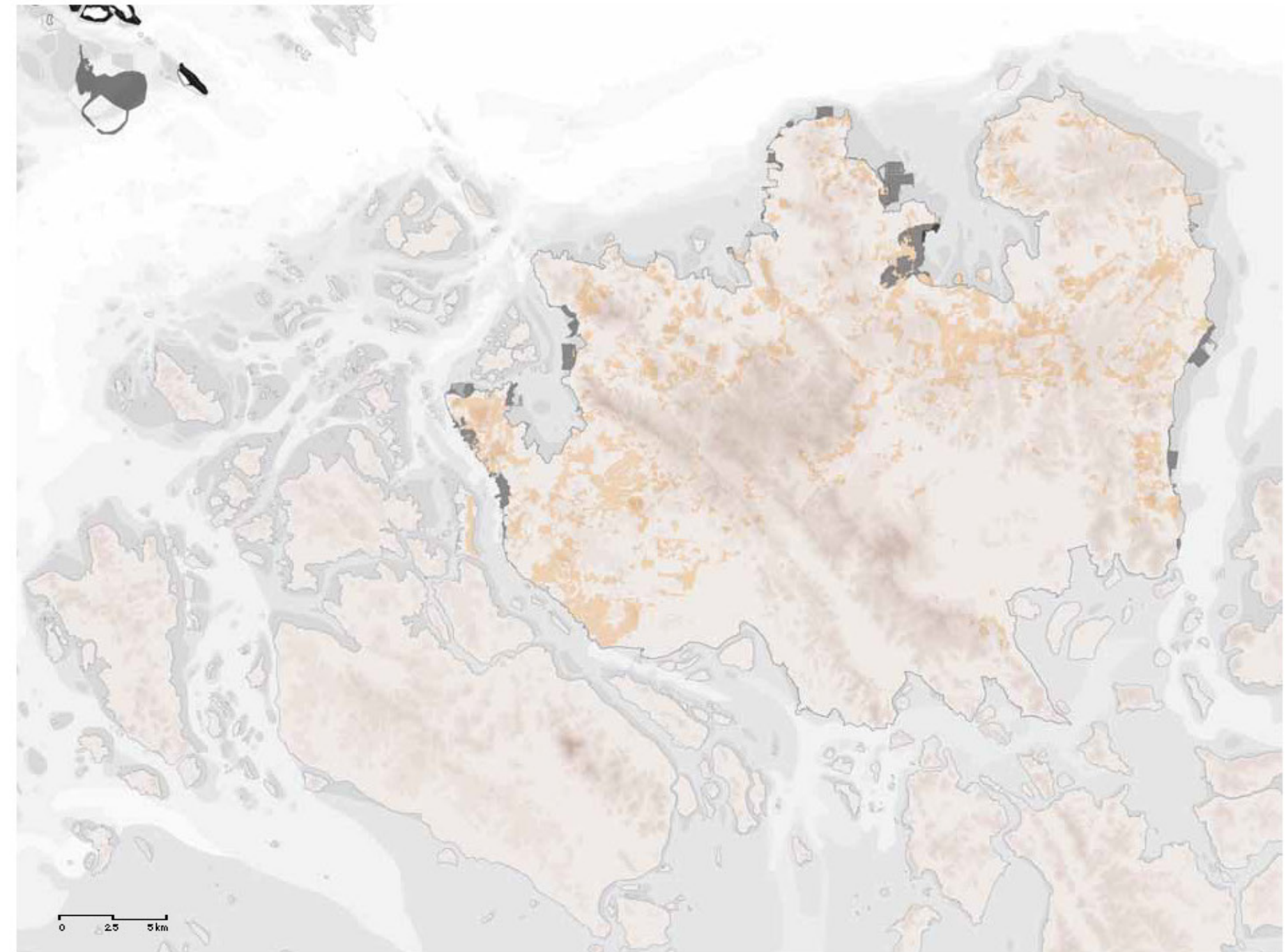


The status of Batam City as a Free Trade Zone has increased its pace of development. In order to enlarge the land surface, the technique of cutting hills, dredging and underwater mining is used. Several other maritime countries such as Singapore, Hong Kong and Japan use this radical procedures, too. The reclamation of land has an alarming impact; it destabilises the land morphology often causing landslides, and it affect the balance of the ecosystem. On land, cutting of hills for backfill material leads to severe erosions and sedimentation that causes flooding and deterioration of the water quality. The tidal waves hit the shore harder, without shock absorbing mechanism of the natural sea floor. This leads to more intensive abrasion and eventual destabilization of the coastal areas. The reclaimed areas have destroyed countless hectares of mangroves forest and

coral reefs. The fish stock has diminished, causing a reduction of 75% of fish catches in the areas where land reclamation occurred. The land reclamation has undesirable effects on topographic, environmental and social environment. Alternative solutions regarding the land use need to be explored.



162 Land Reclamation  
 Reclaimed land  
 Latent land  
 162 Schematic Section: Cut and Fill





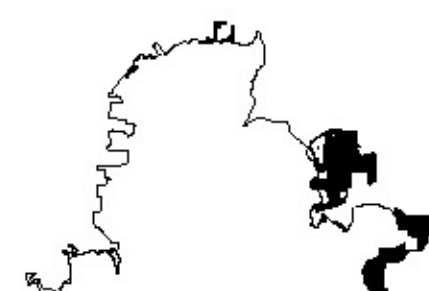
Before 2006



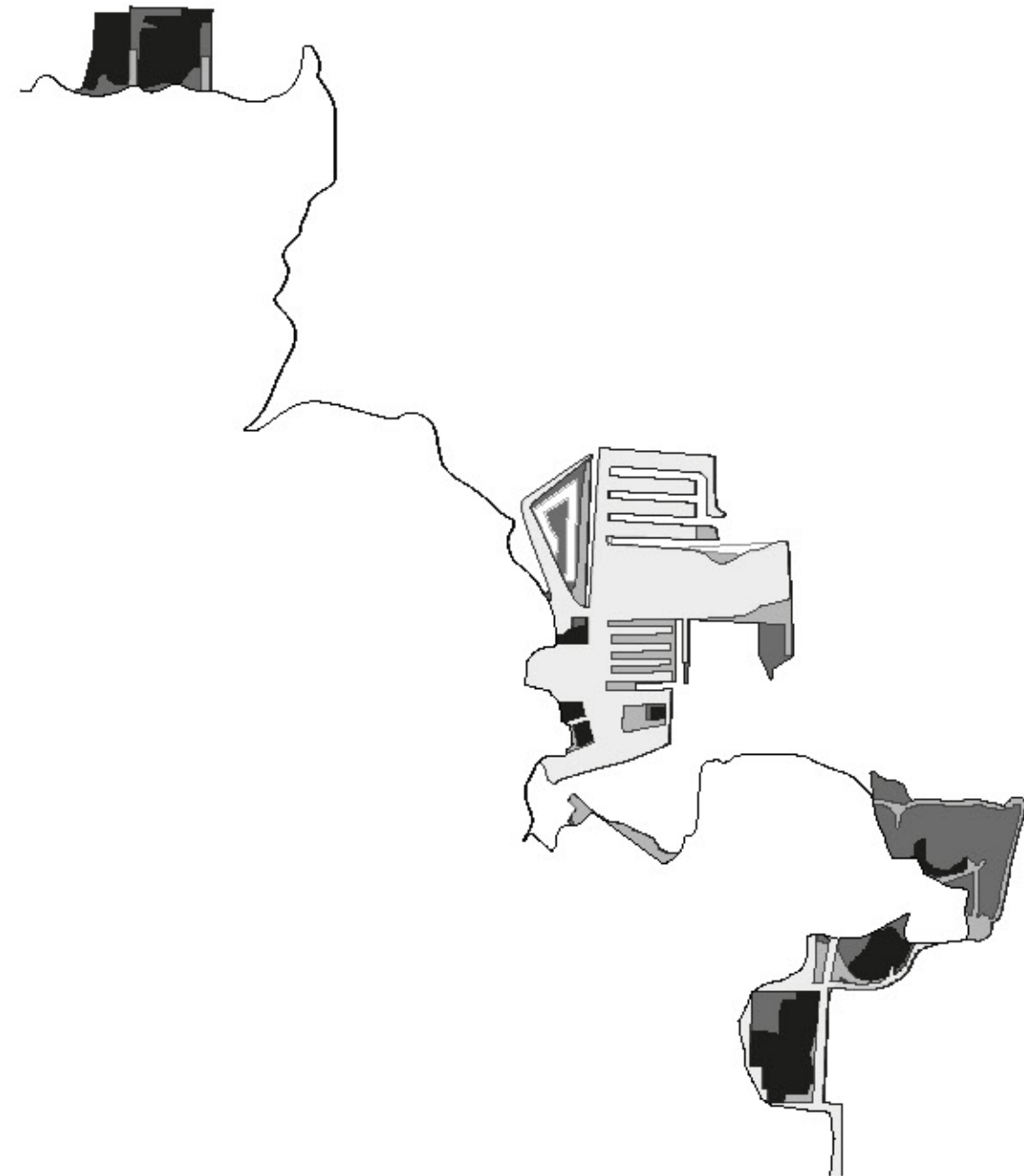
06.03.2006



18.07.2006



22.02.2008



Evolution: 2006-2009

## RESERVED AREAS



Batam has installed six reservoirs in order to guarantee the fresh water supply on the island. The areas surrounding those water tanks are designated as nature protection areas, protecting the entire watersheds from construction and pollution. Damming estuaries, a procedure that has been used on all rivers in Singapore, creates the reservoirs. The Duriangkang reservoir is by far the largest water tank in Batam Island with a capacity of 3,000 litres per second. Even if large housing areas are not jet connected to the water pipeline system, the supply can be guaranteed as trucks are now transporting and selling water to the different neighbourhoods. Referring to indications of the BIFZA, Batam is expecting to have a shortage of freshwater in the near future. Plans of importing water from Bintan are being considered. As we known, the water supply in Singapore is deeply dependent on its neighbouring

countries. As water is the primary condition for urban development, its importance and value as a commodity will gain enormously in a near future. Furthermore, the area around the airport is reserved as infrastructural surface.

### 167 Reserved Areas

- Nature protection
- Reservoir

Duriangkang:  
Capacity: 3.000lt/sec  
Planing: 3.000lt/sec  
Installed: 1.250lt/sec

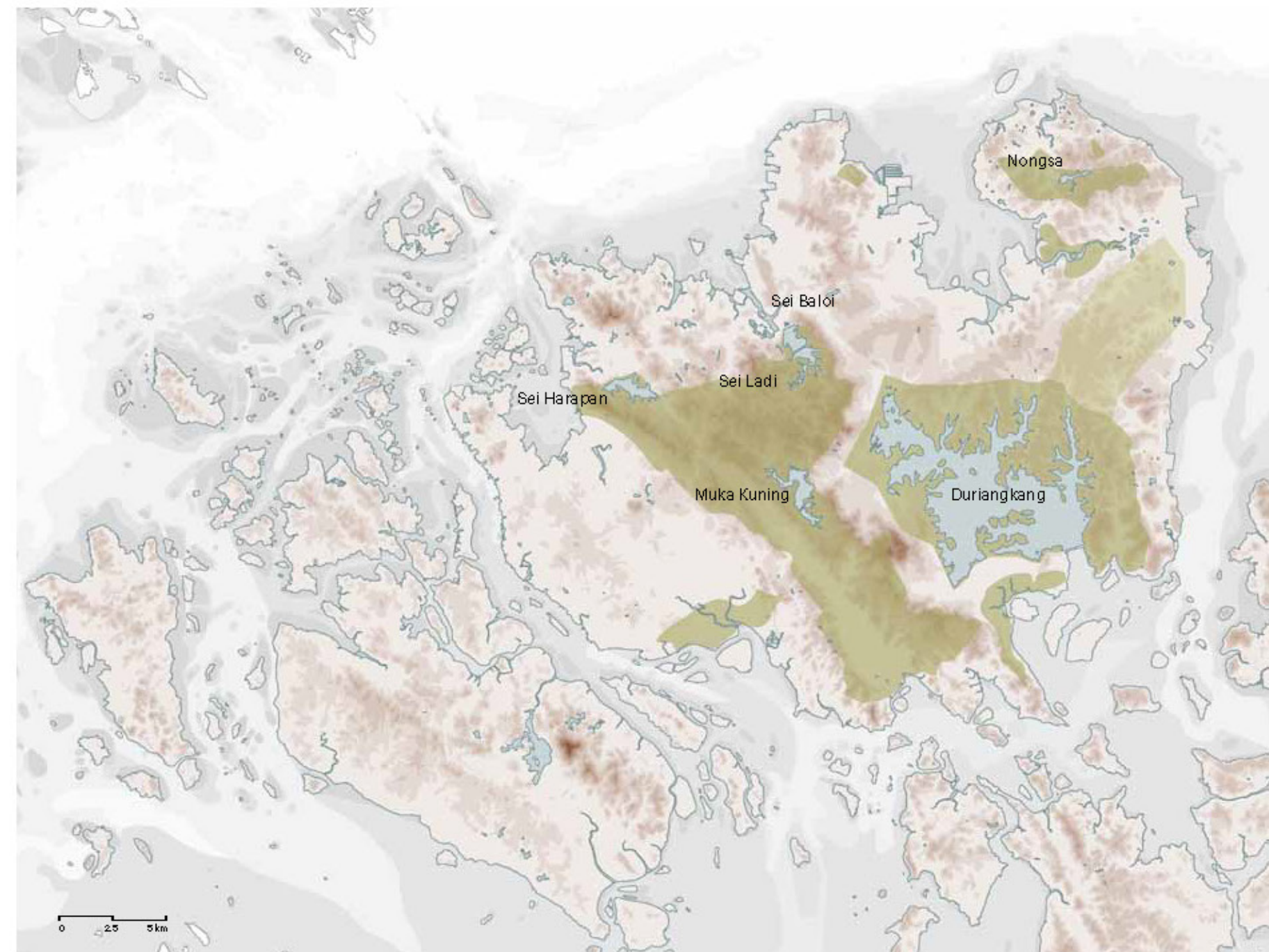
Muka Kuning:  
Capacity: 310lt/sec  
Planing: 310lt/sec  
Installed: 310lt/sec

Sei Ladi:  
Capacity: 240lt/sec  
Planing: 240lt/sec  
Installed: 240lt/sec

Sei Harapan:  
Capacity: 210lt/sec  
Planing: 210lt/sec  
Installed: 210lt/sec

Sei Baloi:  
Capacity: 30lt/sec  
Planing: 30lt/sec  
Installed: 30lt/sec

Nongsa:  
Capacity: 60lt/sec  
Planing: 60lt/sec  
Installed: 60lt/sec



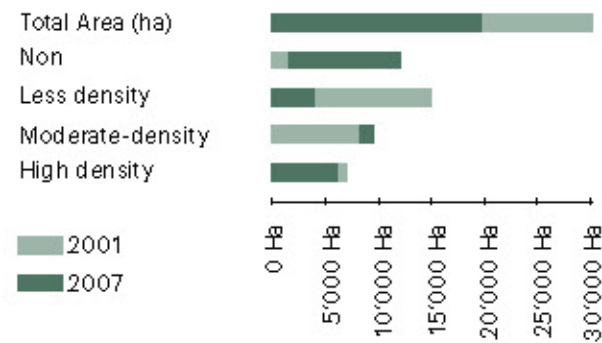
## MANGROVE FORESTS



Due to the specific topography of the Riau Archipelago, mangroves form the most prominent forested areas in the region. The capacity of living in a saline environment locates the mangroves on the shore and in brackish waters along estuaries. Mangroves have several physical functions such as maintaining the stability of the coastal line, protecting the coastal area from abrasion and intrusion and processing the waist. Their biological functions consist in nursery and spawning grounds for fishes, shrimps and other water organisms, nesting ground for birds and natural habitat for many kinds of biotic. Mangrove can even be seen as economic potential. They can be used as firewood, salt processing instruments, embankment and building material. The

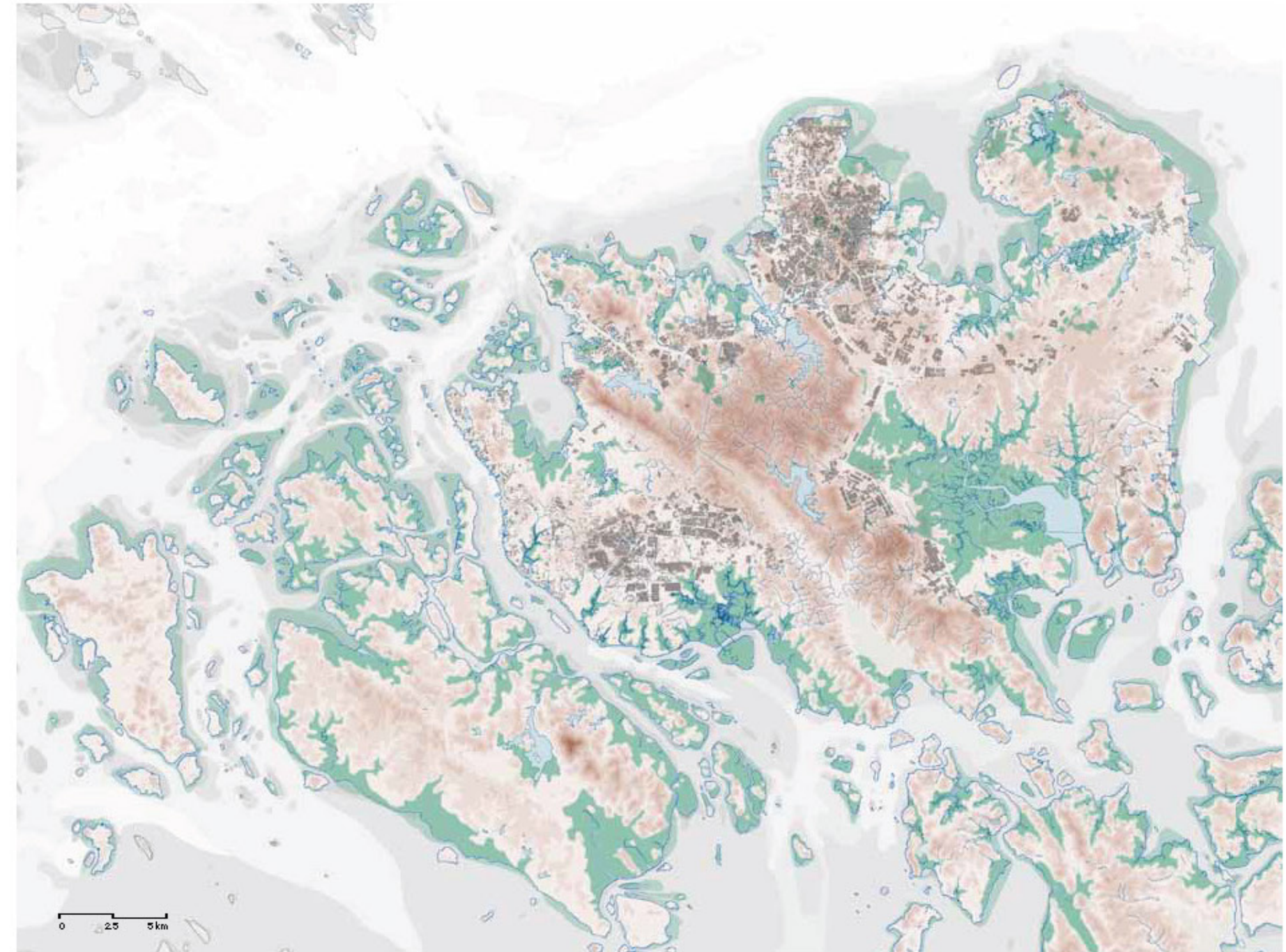
mangrove forests are part of the Indonesian law No.41 of forestry. This legislation dictates that 1/3 of all the Indonesian islands needs to be forested and at least 10% of the coastal areas have to remain vegetated with mangroves. Due to the rapid industrial and urban growth on Batam, the mangrove forest decreased of almost 32% in six years. The rich ecosystem remains endangered because of the major development pressure on its coastal areas.

Evolution of Mangrove's Forest in Ha 2001-2007



169 Mangrove Forest along the Shore and Estuaries

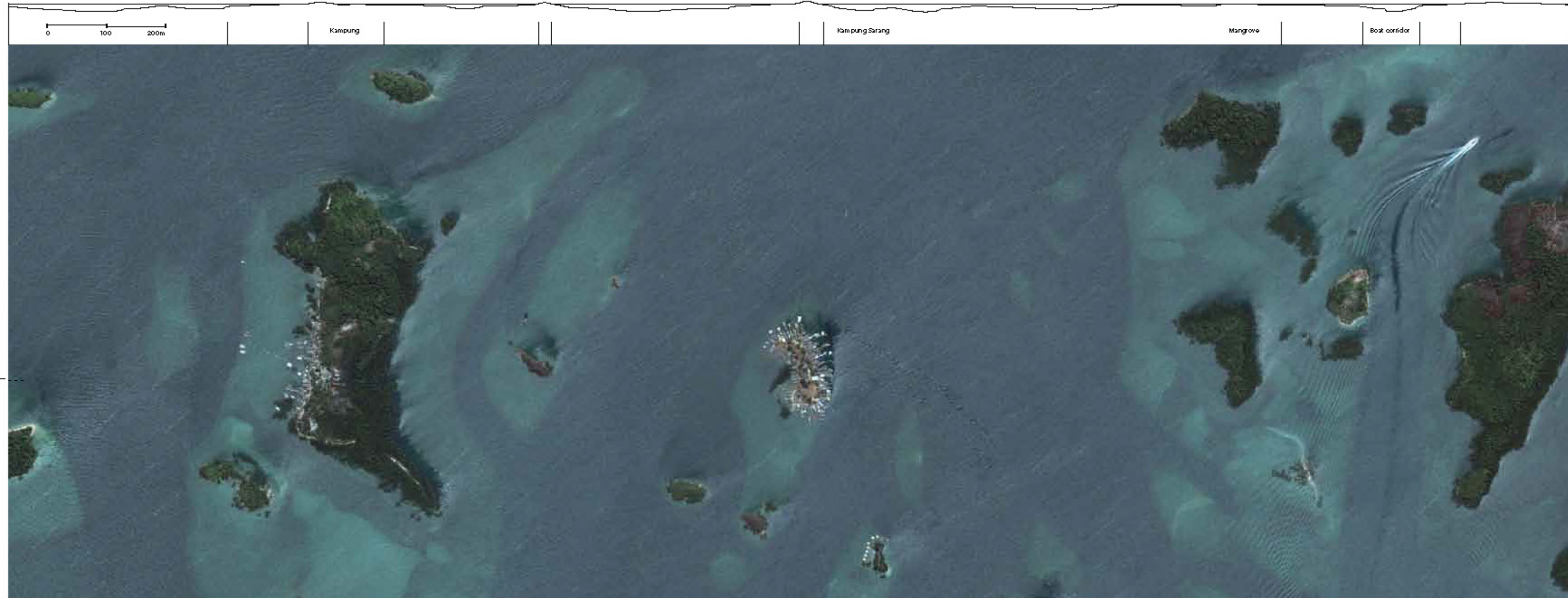
- Mangrove forest
- Reservoir
- River





p.170-171 Mangroves Endangered by the Urban Development





### THESIS NO. 3

The spatial condition of the archipelago sets Riau Islands apart from Johor and Singapore, and therefore offers a specific potential.

The territory is violently transformed by means of cutting hills, dredging and underwater mining.

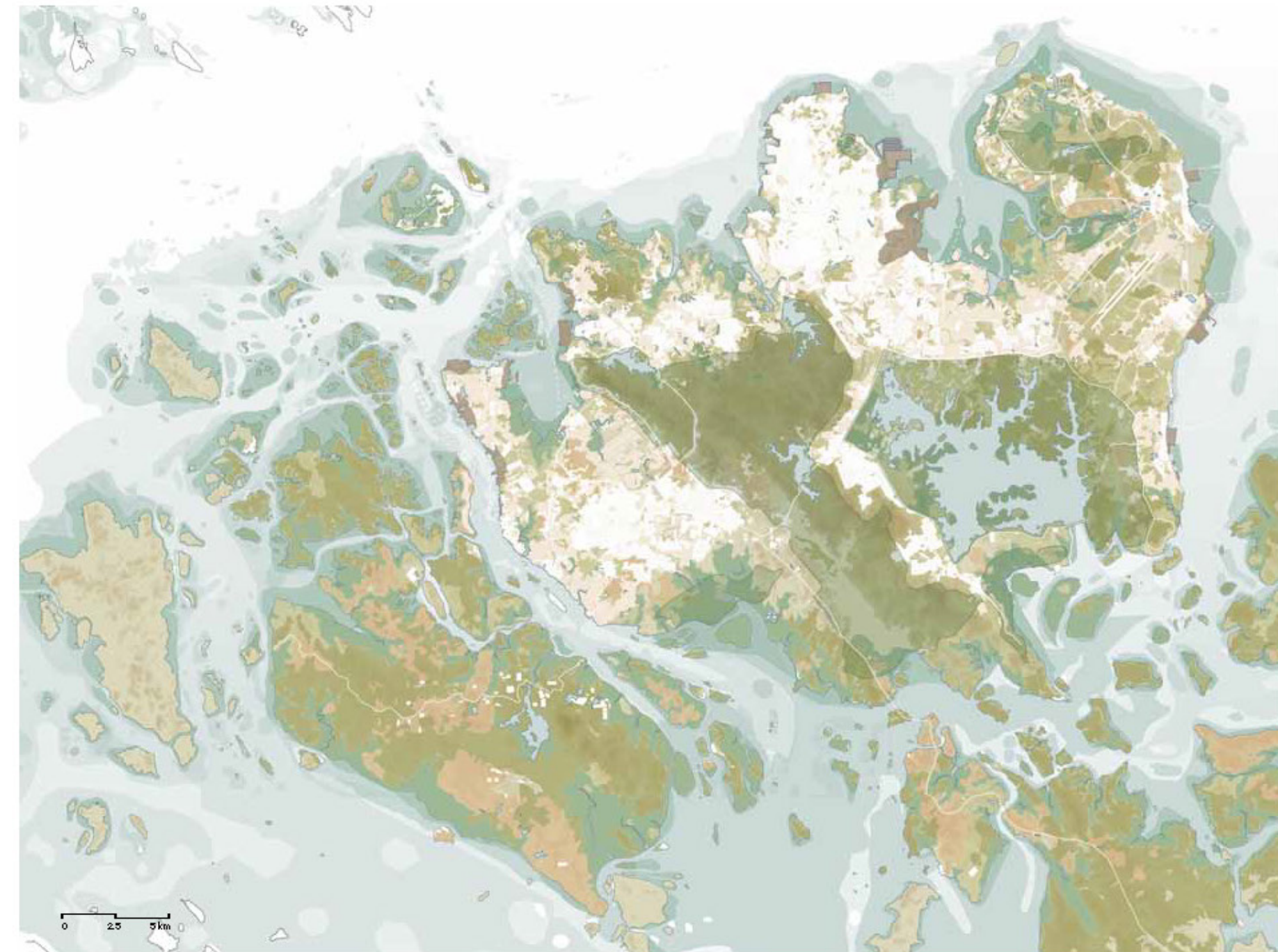
The capacity of the reservoirs represents a limit for the urban growth. As water is the primary condition for urban development, its importance as sellable resource will gain enormously on value in a near future.

Estuaries and coastal areas are hosting the precious natural resources of mangroves, which stands under pressure due to the rapid urban development.

The specific topography of the territory with its tides and shallow waters, is offering a typical environment for mangroves. The mangroves are internationally considered as essential plant for the balance of our ecosystem and could be used for economic gains.

175 Thesis Map: Frontier Territory

- Reservoir
- Mangrove forest
- Nature protection
- Forest
- Reclaimed land
- Latent land
- Agriculture







# THE ARCHIPELAGO CITY

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THE DUALITY OF THE TERRITORY

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HINTERLAND VS. ARCHIPELAGO

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LINKING NATURE PROTECTION WITH PUBLIC  
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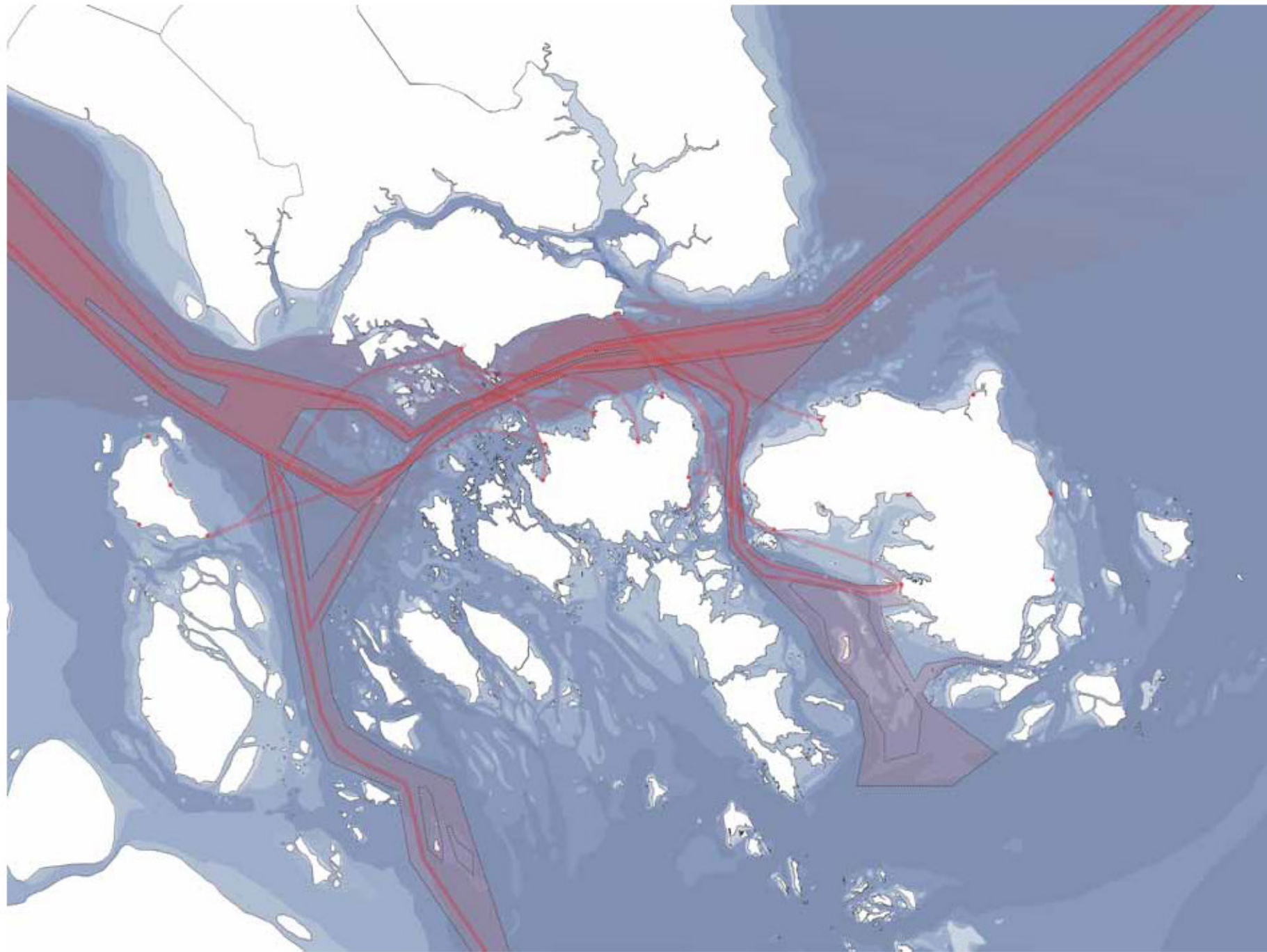
P.198  
MANGROVE EXPANSION IN ADDITION TO  
PROTECTION

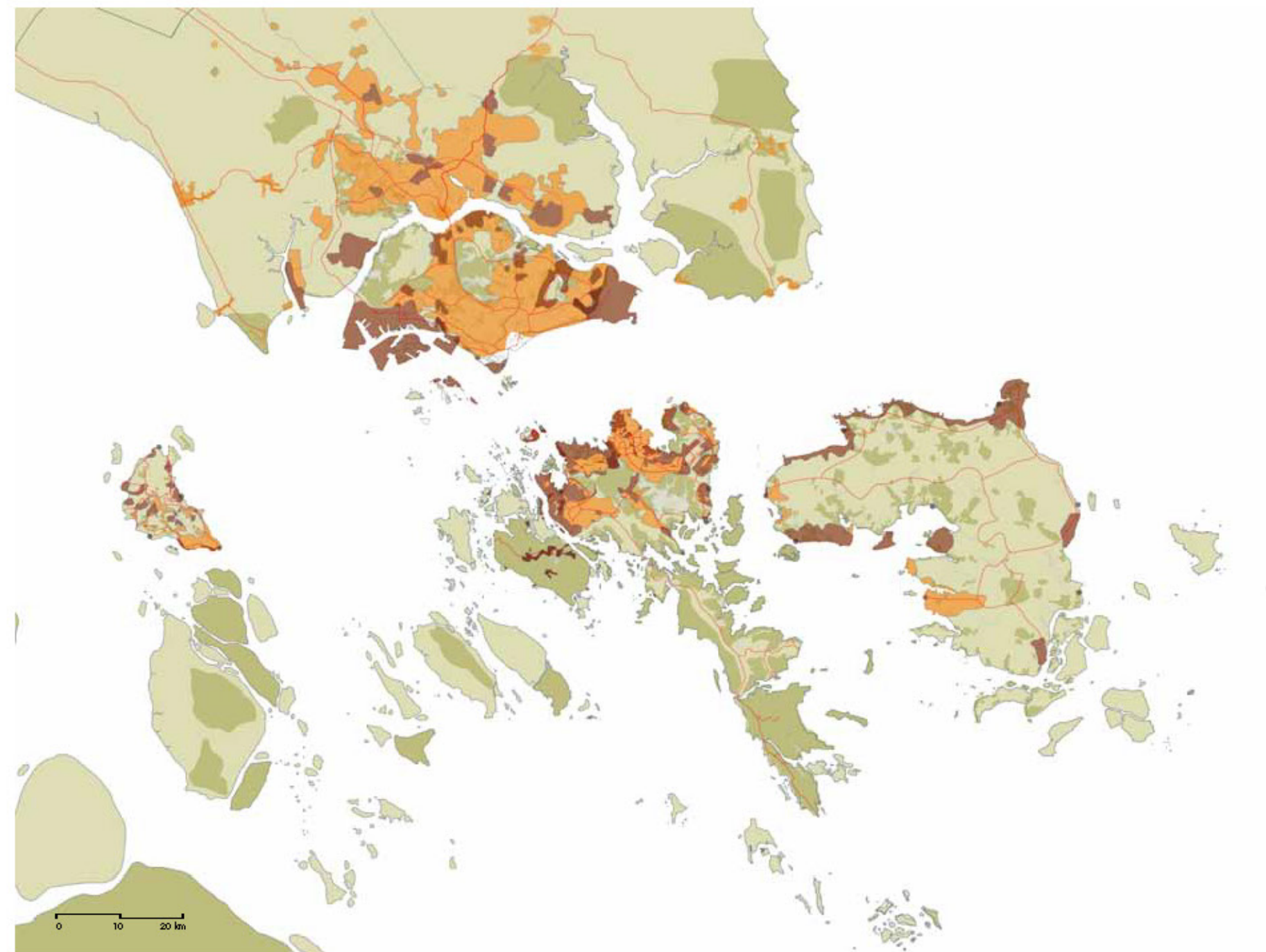
P.198  
BEYOND THE ARCHIPELAGO CITY











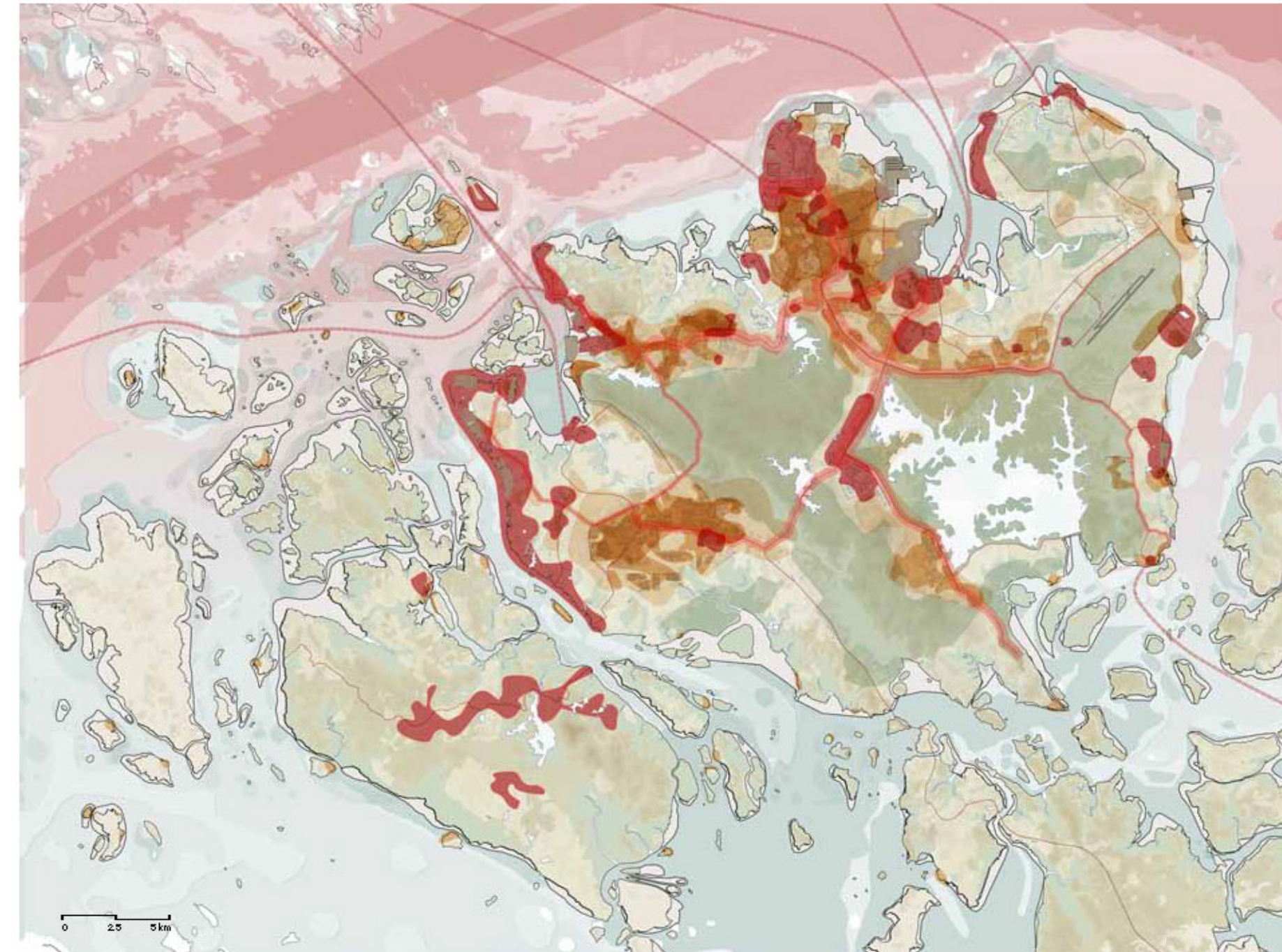
## THE DUALITY OF THE TERRITORY

In the closer analysis of the territory of the Singapore Straits the duality of sea and land can be observed. Toward the Straits, a strong industrialization and urbanization process is taking place. The areas of the free trade zones are the ones primarily affected by these transformations, while in the southern parts of the Riau Archipelago natural qualities and traditional settlements seem to be largely preserved. Consequently, the project focuses the duality of an urbanized and a quiet sea.

### URBAN TRANSFORMATION: HINTERLAND VS. ARCHIPELAGO

Throughout the analysis the duality of the territory can be observed on the Batam Island too. The urbanization forces caused by the Singapore Straits affect primarily the northern part of the Batam municipality. While the industrialization of the area is largely contained within the Free Trade Zone, the potentials of the Archipelago have so far been neglected. The quality and the importance of large quiet and natural areas lying in background of the growing towns, seems to be underestimated.

191 The Duality of the Territory on Batam





## GUIDELINES FOR THE NEW URBANIZATION STRATEGY

In order to avoid unilateral planning, focussing exclusively on economic growth at the cost of local livelihood, a balance between the economical and the social components of urbanization needs to be created in Batam. We hypothesize that the development of independent urbanization strategies could strengthen the political, economical and social capacity of the region. Therefore guidelines concerning the city development, infrastructure, industry and the quiet territories are put forward in this chapter.

### THE ARCHIPELAGO CITY ALONG THE SINGAPORE STRAITS



Thus Archipelago City maintains the proximity to the Singapore Straits the primary engine of the urban development in the area. Considering that Batam has five

times the length of Singapore's coastline, and about 500 times the number of islands, the main potential of the Batam Municipality, and more broadly the Riau Province, can be found in the unique topography. The natural condition of the archipelago sets Riau apart from the Malaysian Peninsula and from the island form of Singapore. The vision for the new Archipelago City emphasises the site-specific qualities and experiences of traditional settlements and ways of life in order to arrive at independent and sustainable concepts for future developments.

196 Proposal for an urban densification Strategy



## THE ARCHIPELAGO CITY ALONG THE STRAITS

### POTENTIAL OF DENSIFICATION ALONG THE STRAITS

While the vector of the current urbanisation strategies are pointing to the southern part of Batam, using the bridges installed by Habibie, we propose a densification of the urban structure along the straits. This could be achieved through a variety of housing typologies.

### A VARIETY OF ISLAND TYPES



Within the Archipelago City, each island could develop its specificity, enriching the archipelago as a whole. Therefore activities such as tourism, leisure, new public functions, special forms of housing or cemeteries can be located on different islands along the Straits. Even industrial production can be imagined, to complement the productive islands of Singapore.

## INTEGRATION OF THE INDUSTRY IN THE URBAN STRUCTURE

As observed, the industrial parks are usually detached from the urban structure and the urban centres. The integration of industrial parks into the urban structures would be beneficial; the housing could develop in proximity to the working places and commuting distances could be reduced. Furthermore, the existing commercial and public facilities of the parks and their strong infrastructures could benefit the surrounding urban neighbourhoods too. In the long term, together with the gradual transformation of Batam's economy toward the service sector, a transformation scenario for industrial parks can be foreseen, were the parks can become new public, office and commercial areas, and the large industrial buildings can be converted for new uses.

### EXTENSION OF URBAN CENTERS TOWARDS THE COASTLINE



At present, surprisingly, the highly developed passenger ports on Batam stand completely detached from urban structures and urban centers on the island. Thus, the proposal is to integrate them into the urban structure, by using them as focal points for the development of new urban centres. If this coastal infrastructure was used for the future development of Batam City, the exchange and the correlation among the different of islands, even an urbanistic relationship to the Straits and to Singapore, could be achieved. Consequently the region could function as a unified network of different urban entities instead of a collection of strongly separated centres.

### INHABITING SMALL ISLANDS: "THE NEW KAMPUNG" LIVING

Considering the detrimental effects of the large-scale land reclamation campaigns on Batam, we propose that this procedure should be limited only to industrial purposes, and should not be used in new housing developments. The traditional way of inhabiting the area discloses an alternative of coastal living, namely the construction on the water. Consequently the Archipelago City could include new neighbourhoods built on the islands facing the Singapore Straits. In reinterpreting the traditional Kampung and taking advantage of the shallow waters, more site-specific settlements could be developed and land surface could be won.



THE ARCHIPELAGO INFRASTRUCTURE:  
THE BALANCE BETWEEN  
THE LAND AND THE MARITIME NETWORK

PUBLIC MARITIME INFRASTRUCTURE

The public maritime infrastructure needs to be improved or even developed in order to strengthen the tie between the new centralities developing around the ports and the numerous islands of the archipelago.

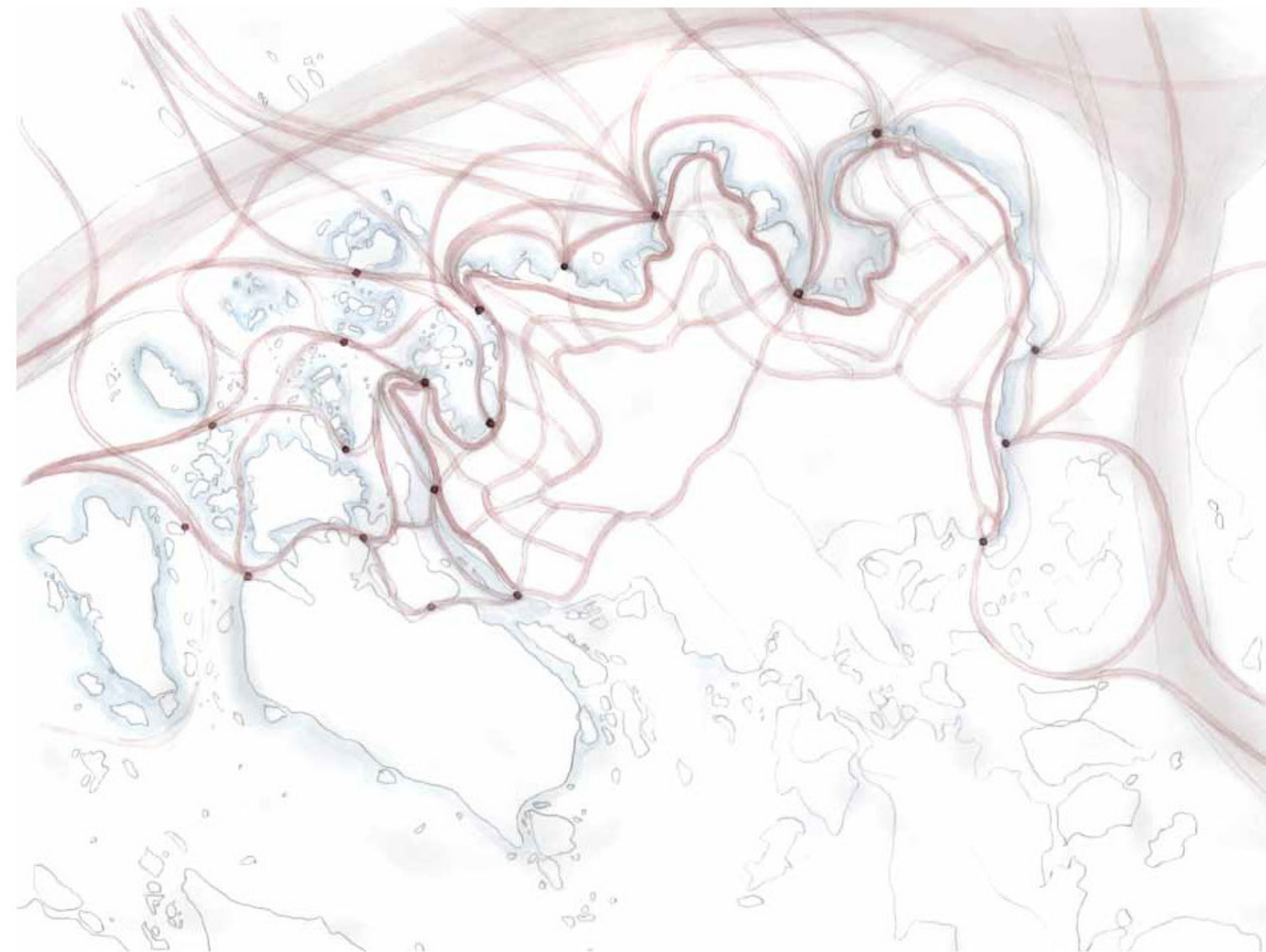
The implementation of public transport on the sea would facilitate the living in the archipelago by creating a network between the new neighbourhoods.

COMPLETION OF THE INFRASTRUCTURAL  
NETWORK



Infrastructure is an instrument that allows to densify and concentrate the urban structures along the Straits. Currently the

public has almost no access the coastline. The coastal sites are reserved for industries, private housing development and the protected mangrove forest. Only a few streets and paths on Batam actually lead the coast. In order to facilitate the development of housing near the sea and to adjust the balance of priority of land use between social and economic interests, a coastal road could be built to complete the street network.



## THE ARCHIPELAGO NATURE

### LINKING NATURE PROTECTION WITH PUBLIC PARKS



Water reservoirs and river estuaries need to be protected and preserved in order to guarantee the stability of the land, the healthy balance between the maritime and terrestrial ecosystems, as well as the quality of the water in Batam. Currently, water reservoirs are treated as strategic resources, and completely inaccessible to public. In the future, they could be reinterpreted and used simultaneously as public parks. Education programs could further sensitize the population to the fragility and the value of the water sources. This strategy would not only have an ecological but also the social effect, as no public parks are offered to Batam's population so far.

## MANGROVE EXPANSION IN ADDITION TO PROTECTION

Mangrove forests present a valuable element both for the physiognomy of the coastline and for the maritime ecosystem, and need to be protected. However, possibilities for economical use of mangrove areas should not be underestimated. In the traditional approach, they have been used for firewood and construction material, while in the modern sense, they could be used as surfaces of CO2 compensation for industries, created to balance their impact. Therefore an expansion instead of a simple protection of the mangrove forests in the swamp areas is proposed.

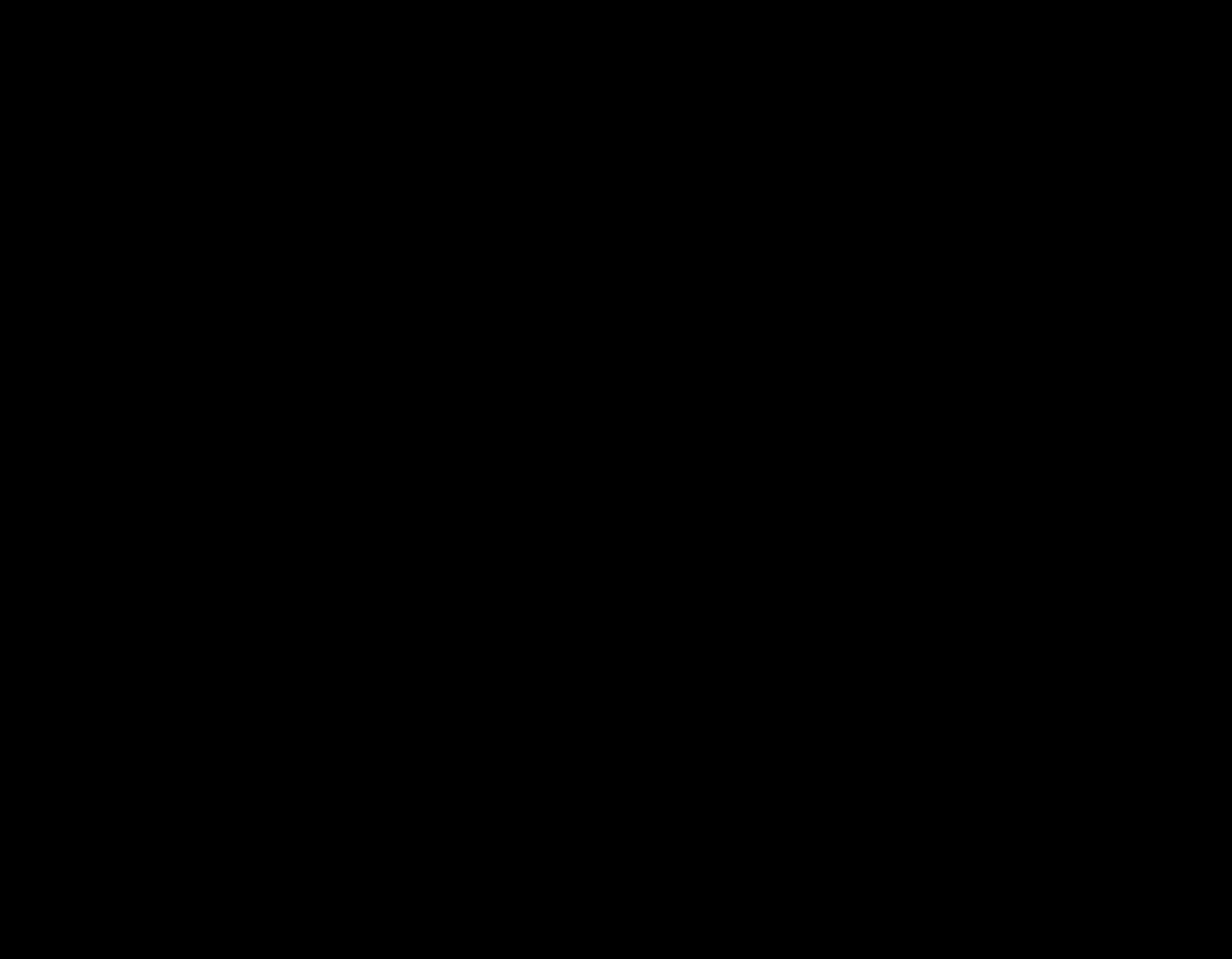
### BEYOND THE ARCHIPELAGO CITY

By densifying and guiding the urban development to the northern region of Batam Municipality and the Riau Province, it becomes possible to decelerate, or even to halt, for the time being, the transformation of the quiet South. Thus, the natural paradise of the Riau Archipelago can be preserved and enjoyed by the population and visitors.









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## SOURCES:

Maps:

The Author redrawn all the maps. The  
Regional Development Planning Agency of  
Batam City provided the base dataset. GIS  
data's, dwg files and PDF's have been  
combined and interpreted.

As the maps did not always correspond to  
each other and were often older versions,  
google earth and google map has been  
used as a reference in order to get a current  
view of the territory.

The Sea Topography has been drawn by  
Martin Garcia, Magnus Nickl on the base of  
nautical charts provided by the United

Kingdom Hydrographical Office.

The Maps on page 64-65 have been drawn  
by Tobias Wullschleger visualising data's  
from Batam in Figures, 2010. Damien  
Romanens and Stephane Grandgirard have  
drawing sections and other graphics, based  
on google maps.

Pictures:

If not mentioned differently, Stephane  
Grandgirard and Myriam Perret took the  
pictures.  
P. 182-183 Unknown author  
P. 162 Picture shot by Livio de Maria

Statistics:

The graphs base all either on information  
from the document Batam in Figures, 2010  
or from presentations of the local  
governmen, such as; Presentation for  
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