

Materialising Sand: Matters of New Terrain

by

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MATERIALISING SAND

MATTERS OF NEW TERRAIN

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THESIS SUPERVISOR DR. LILIAN CHEE

VOLUME 1

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As an island state without hinterland and natural resources, Singapore stockpiles emergency inventories of imported sand in response to the rising and diminishing economic demands and international geopolitics. Enormous sand dunes and desert-like landscapes emerge strategically around Singapore to uphold national security, albeit having received heavy international criticism about the city-state's unsustainable appetite. Although the immense scale at which sand is circulated about within the city-state is made discreet, these stockpiles cannot be hidden from the public eye. Given that most of our encounters with sand are either associated with the beach or with a playground, the massiveness of the dunes is unfathomable for the average Singaporean such that the socio-political and economic significance of sand cannot be grasped easily.

Juxtaposing against the state narrative of sand as a national aggregate: utilitarian to state construction, controlled and blocked off access; my thesis takes an interest in the rich human context of sand - one that is tactile and emotive. It seeks to unravel sand as a commodity that oscillates between matter and material, common-folk and state, access and containment, excess and scarcity, the surreal and the real, hygiene and filth. Set against the didactic visions of the state as the backdrop, my thesis recasts sand as a growing landscape and a spatial inventory from bottom-up. Through three sets of narratives situated in Singapore's three aggregate stockpiles - Seletar Link, Pulau Punggol Timor, Tampines Avenue 10 - they reflect three different ways in which we react and relate to sand, and how we as individuals can subvert its otherwise brutal economics. These fictions revolve around alternative tropes, myths, perceptions and our hyper-efficient culture by overlaying the state's objective processes of sand with our everyday subjective consumption and play. In doing so, it activates a critical discourse to relook our relationship with sand and our ongoing spatial separation with it as a resource; and thereby challenging the progressiveness and efficiency of the state's planning apparatus against the subjective and idiosyncratic perceptions of the people.



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ABBREVIATIONS

BCA: Building Construction Authority
 EOD: Explosive Ordnance Disposal
 ETH Zurich: Eidgenössische Technische Hochschule Zürich
 FCL: Future Cities Lab
 HDB: Housing Development Board
 JTC: Jurong Town Corporation
 MinLaw: Ministry of Law
 MND: Ministry of National Development
 MOT: Ministry of Transport
 MPA: Maritime and Port Authority
 MTI: Ministry of Trade and Industry
 PUB: Public Utility Board
 SAF: Singapore Armed Forces
 SLA: Singapore Land Authority
 TPE: Tampines Expressway
 URA: Urban Redevelopment Authority
 UN COMTRADE: United Nations Global Trade Statistics Division

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FP111. Singapore Sand Import-Export Reported to UN COMTRADE in 2010. Note the stark discrepancy between Singapore's reported imports and the source countries' report. Reference source: 1. Topalovic, Milica, Hans Hortig, and Stefanie Krautzig. n.d. 'Architecture of Territory. Sea Region. Singapore. Johor, Riau Archipelago'. Singapore: ETH Zurich DArch, FCL Singapore. 2. Figures Reported to UN COMTRADE. Reconstructed Diagramme: Lin Derong, 2017.

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ACKNOWLEDGMENTS

This thesis stems from my obsession with the sea, the beach and the aesthetics of industrial factories. As the research attempts to unfold a thesis surrounding the topic of "Sand and Play", it is necessary to break the "order-word" which has embedded deeply in my head, i.e. "Sand is always Land". I have only limited or otherwise superficial knowledge and required lots of help. Furthermore, adopting the risk to write unconventionally from a first, second and third person narrative for thesis-prep is both an exciting and scary task for me. The research process was humbling as I encountered new knowledge and people, including myself as a person along the way. As volume 1 traverses through the three sand sites beyond its spectacle, it presents the premise and foundation for my argument to relook at sand as a matter and material. I would like to extend my gratitude to the following people in particular who have helped me clarify and pushed this thesis-prep out.

Mummy, Papa and *Wai-po*. For all the love, understanding and encouragement that you have given me throughout the course albeit the turbulence that I have caused in the household during this period.

Sarah Lee Si En, Wu Yu-Chen and Hung Yu-Shan for listening to me ramble about sand and my struggles with it at weird hours, and still provided me with timely advice.

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PROVENANCE

FP102. Selected samples from author's collection.
 Row 3 to 7 images are not copyrighted. They are
 taken from Sandatlas.org. Sepp, Siim. n.d. 'Sandatlas'.
 Accessed 20 November 2017. <http://www.sandatlas.org/>.

from left to right

Row 1: Pit Sand/ River Sand/ Sea Sand/ Silty
 Sand/ Clayey Sand

Row 2: Clean Sand/ Glass Beach/ Beach Sand
 (Mica)/ Volcanic Beach Sand/ Fine Grained
 Volcanic Beach Sand

Row 3: Silica Sand/ Quartz Sand/ Granite Sand/
 White Gypsum Sand/ Continental Sand

Row 4: Volcanic Ash/ Red Volcanic Glass Sand/
 Sodalite Sand/ Lithic Sand/ Ooid Sand

Row 5: Greensand/ Epidote Sand/ Serpentine
 Sand/ Olivine/ Mixed-Carbonate-Silicate Sand

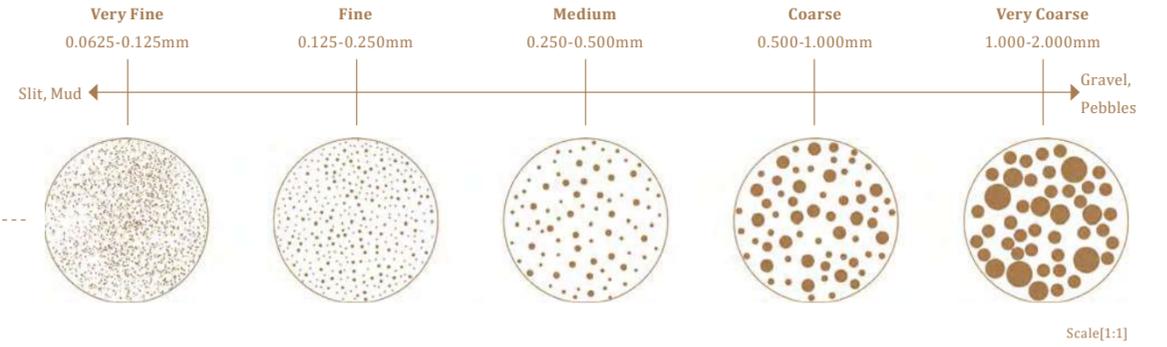
Row 6: Coral Sand/ Biogenic Coral Sand/ Garnet
 Sand/ Heavy Mineral Sand/ Pfeiffer Beach

Row 7: Bali Forams/ Dubat Desert (Quartz,
 Biogenic, Lithic Fragments)/ Gobi Dune Sand/
 Sahara Desert/ Kinetic Sand



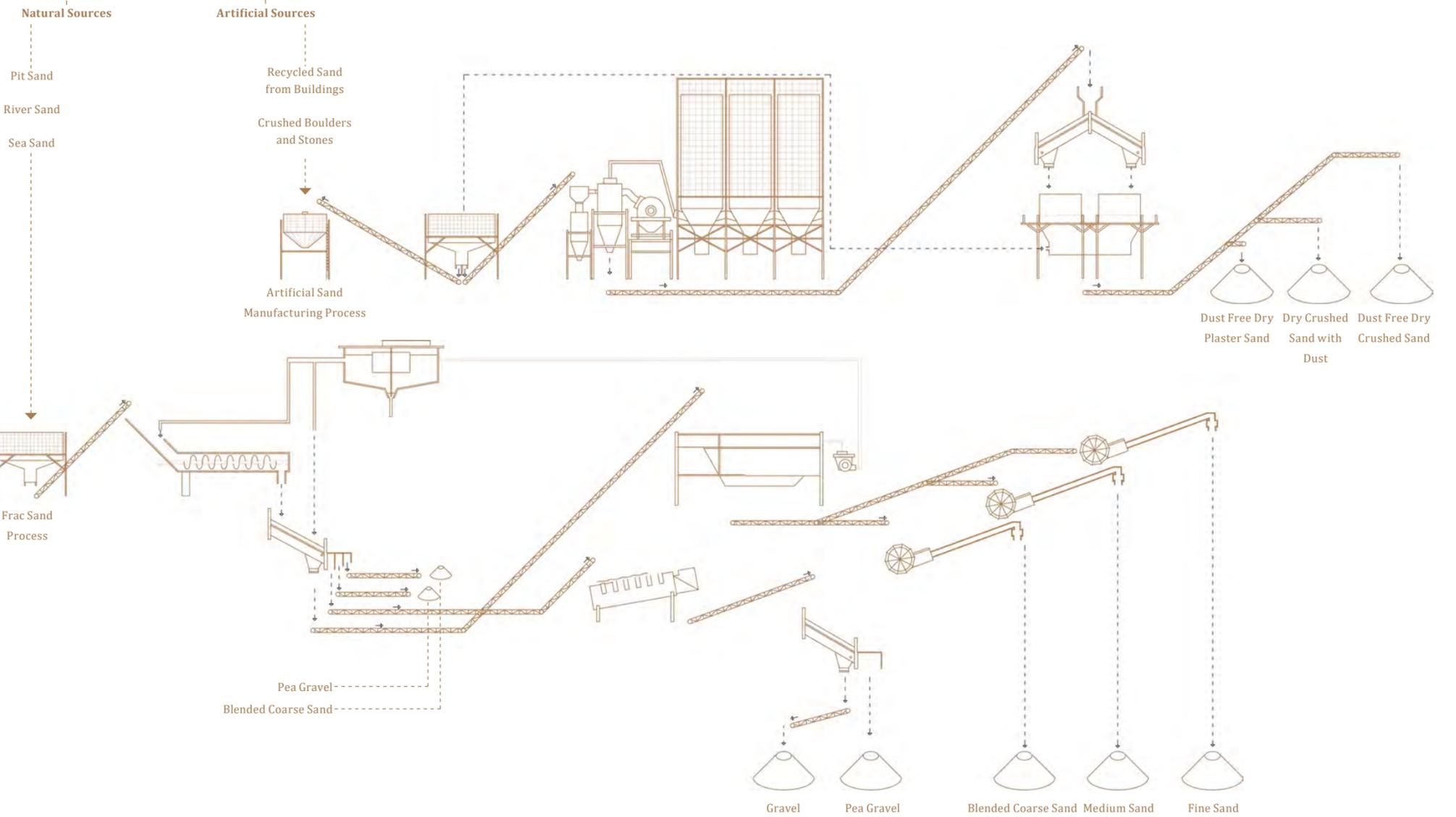
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GRAIN SIZE DISTRIBUTION

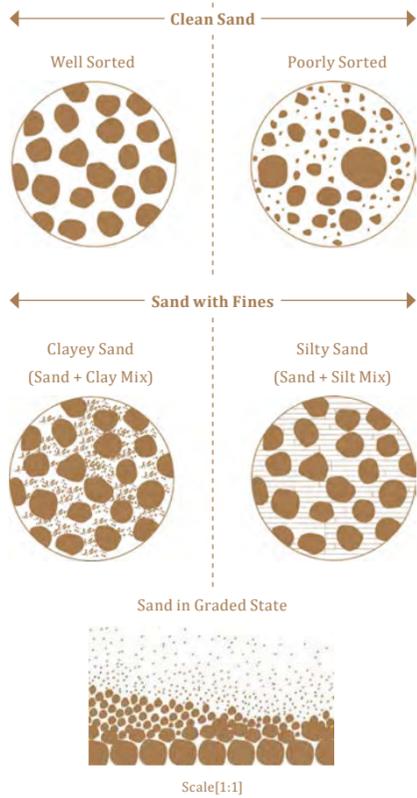


SAND TYPES

FORMATION METHOD



COMPOSITION



Shifting Top Sands - State's Sand

Sand¹, one of the most ubiquitous, yet fundamental types of matter² in the world exists from the bottom of the sea to the landscape of the Sahara Desert. Second to water, it is the most consumed natural resource on Earth and is instrumental in national development. Sand is at once seemingly mundane, yet very productive. It exists in all guises and scales and are essential in the construction of buildings, formation of land, protection of coasts, filled into children's playgrounds, and made into electronics and pharmaceutical products³. According to the IMF, the greatest consumer of sand and gravel is the cement industry and land reclamation projects by various nations.⁴

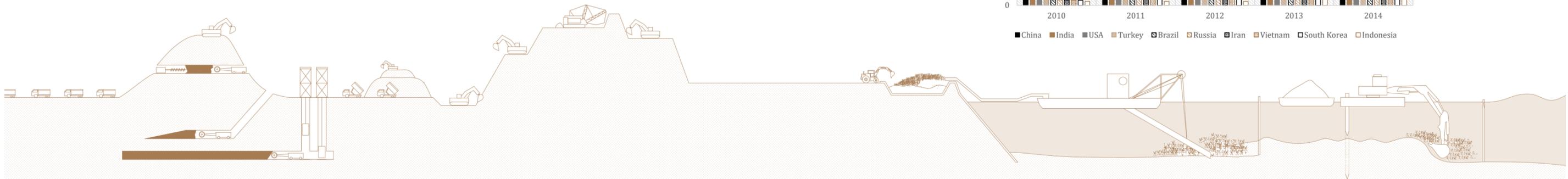
Although sand seems to be in abundance on Earth's surface found primarily in the vast desert region⁵, only certain types of sand are useful for state

consumption. Desert sand is too fine and its particles are too round to be used due to wind erosion⁶, and as a result, these do not bind and cannot be used to make concrete. Natural sand for state consumption is hence extracted from finite and non-renewable sources such as seabeds, quarries and hills⁷. As the global demand for sand increases exponentially, it has exceeded both natural renewal rates and artificial supply⁸. Sand sources are depleting fast globally. These sources have become a highly sought commodity as extracted sand circulates with international

1. Sand refers to any particle between 0.06mm to 2mm in diameters. Any particles below this are silt, and above are gravel. See Figure FP103 and Welland, Michael. 2009. 'Individuals: Birth and Character'. In *Sand: The Never-Ending Story*, 1-30. Berkeley, CA: University of California Press.
2. According to Thomas, anything that is made up of particles is a matter, whereas material intends to change matter into another form for specific uses. Thomas, Katie Lloyd. *Material Matters: Architecture and Material Practice*. Abingdon, Oxon: Routledge, 2007.
3. See Insert B, *Servant Sands* for the list of sand use.
4. Gavriletea, Marius Dan. 'Environmental Impacts of Sand Exploitation. Analysis of Sand Market'. *Sustainability* 9, no. 7 (2017): 1-26.

5. Approximately 1/3 of Earth's land surface is covered by desert. Source: NASA.
 6. Hornbostel, Caleb. *Construction Materials*, 2nd Edition. John Wiley and Sons, Inc., 1991.
 7. See figure FP105.
 8. See figure FP104 for the increase in global sand extraction, and Figure FP107 - FP108 for the increase in sand demand over the course of 5 years.
- FP104.** [Opposite] Global Top 10 Sand and Gravel Producers. Reference Source: 1. Gavriletea, Marius Dan. 2017. 'Environmental Impacts of Sand Exploitation. Analysis of Sand Market'. *Sustainability* 9 (7):1-26. <https://doi.org/10.3390/su9071118>. 2. OEC Database. 3. Statistia Database. Reconstructed Diagramme: Lin Derong, 2017.

FP105. Sand extraction from multiple sources. Left to Right: Underground Mining, Surface Mining, Hydraulic Dredging, Mechanical Dredging. Drawing: Lin Derong, 2017.



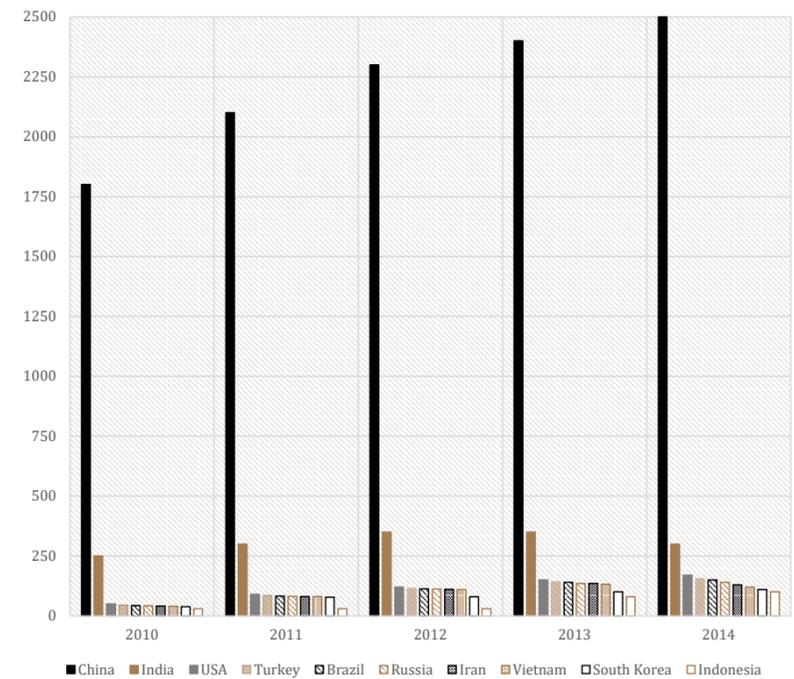
trade⁹. This is further aggravated by the rapid economic growth in Asian countries over the recent years as sand continues to be mined.¹⁰

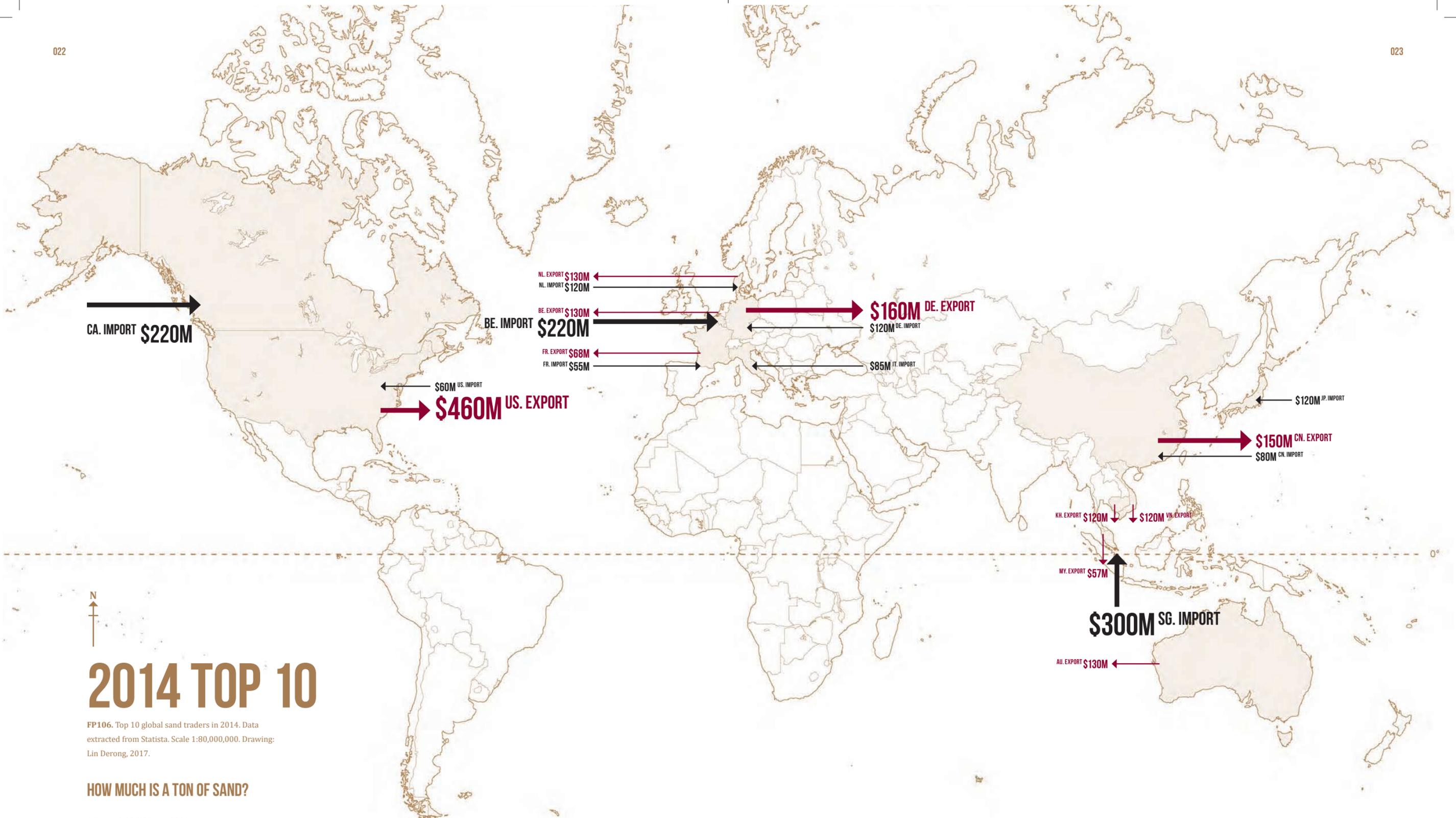
Amidst the global crisis of sand scarcity, Singapore sits at the top position in the list of global importers of sand¹¹. Sand is in high-demand for the city-state's construction projects as is widely evident the vastly and continually expanding land reclamation endeavours. In line with Singapore's economic progression as a small island state, an inane amount of sand is needed to be converted into additional land and building infrastructure – accommodating an ever-growing population and economy.

9. FP106 (overleaf) illustrates global sand trade.
10. There are several recent articles reporting on the global sand crisis. For example, Beiser, Vince. 'Sand Mining: The Global Environmental Crisis You've Never Heard of'. *The Guardian*, 27 February 2017. Owen, David. 'The World Is Running Out of Sand'. *The New Yorker*, 29 May 2017. Subramanian, Samanth. 'How Singapore Is Creating More Land for Itself'. *New York Times*, 20 April 2017, and data from UNEP and CSIRO, 2011.

11. "The city-state is known as the world's largest importer of sand for construction, as is located at the center of the sand-trade region whose radius extends to South China, Cambodia, and Myanmar. With nearly a quarter of its land area, around 140 square kilometres, added over the years, it has been estimated that three-quarters of this is "built on foreign soil." - There is No More Land, There is Only Sand* "Milica Topalovic at the Johann Jacobs Museum. See figure F108.

Production/Million of tons





2014 TOP 10

FP106. Top 10 global sand traders in 2014. Data extracted from Statista. Scale 1:80,000,000. Drawing: Lin Derong, 2017.

HOW MUCH IS A TON OF SAND?

- 1 Ton = 8.03 USD as of 2014**
- 200 tons = 1 Bungalow
- 3,000 tons = 1 Hospital
- 30,000 tons = 1km of Highway
- 12,000,000 tons = 1 Nuclear Plant

Source: Pauer, Lukas. 2013. 'Peak Sand: On the Limits of Resource Extraction Urbanisms in the Straits of Singapore'. *Critical Planning 20* (The Future):177-90.

GLOBAL TOP 10 PRODUCERS IN MILLIONS OF TONS

- | | |
|----------------------|--------------------|
| 1. CHINA 2500 | 4. TURKEY 155 |
| 2. INDIA 300 | 5. BRAZIL 150 |
| 3. USA 170 | 6. RUSSIA 140 |
| | 7. IRAN 130 |
| | 8. VIETNAM 120 |
| | 9. SOUTH KOREA 110 |
| | 10. INDONESIA 100 |

GLOBAL TOP 10 EXPORTERS IN MILLIONS OF USD

- | | |
|-----------------------|--------------------|
| 1. USA 460 | 4. AUSTRALIA 130 |
| 2. GERMANY 160 | 4. BELGIUM 130 |
| 3. CHINA 150 | 4. NETHERLANDS 130 |
| | 7. VIETNAM 120 |
| | 7. CAMBODIA 120 |
| | 9. FRANCE 68 |
| | 10. MALAYSIA 57 |

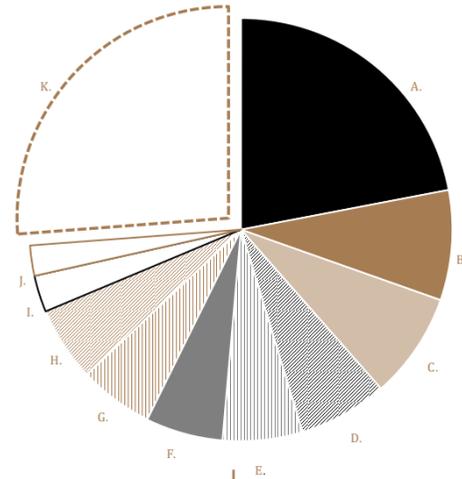
GLOBAL TOP 10 IMPORTERS IN MILLIONS OF USD

- | | |
|-------------------------|--------------------|
| 1. SINGAPORE 300 | 4. NETHERLANDS 120 |
| 2. BELGIUM 220 | 4. JAPAN 120 |
| 2. CANADA 220 | 6. GERMANY 100 |
| | 7. CHINA 80 |
| | 8. USA 60 |
| | 9. FRANCE 55 |
| | 10. ITALY 85 |

GLOBAL EXPORT

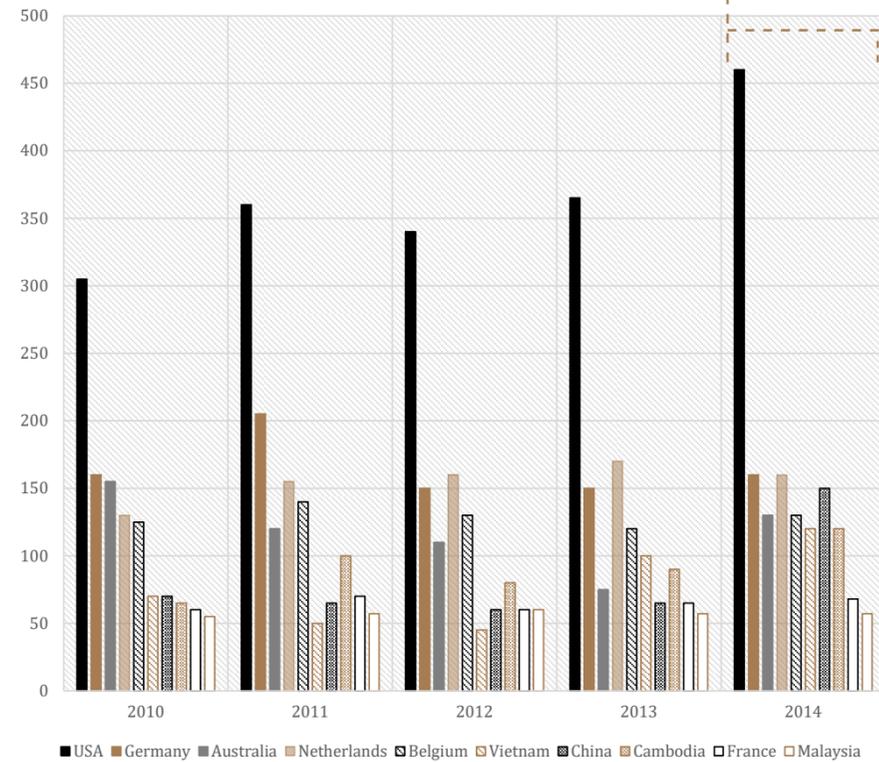


- A. USA 22.0%
- B. Germany 8.4%
- C. Netherlands 8.1%
- D. China 6.8%
- E. Belgium 6.1%
- F. Australia 5.9%
- G. Vietnam 5.7%
- H. Cambodia 5.7%
- I. France 2.8%
- J. Malaysia 2.3%
- K. Others 26.2%



% GLOBAL SHARE, 2014

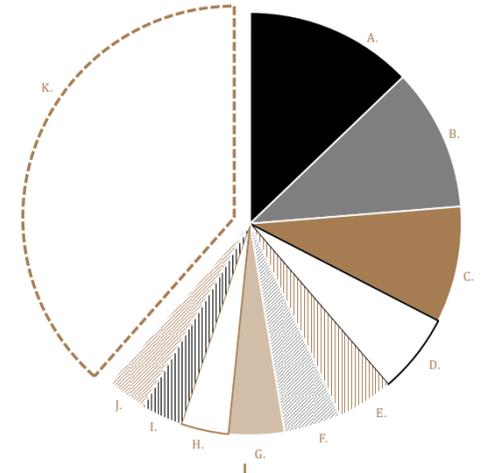
Export Value/ USD Million



GLOBAL IMPORT

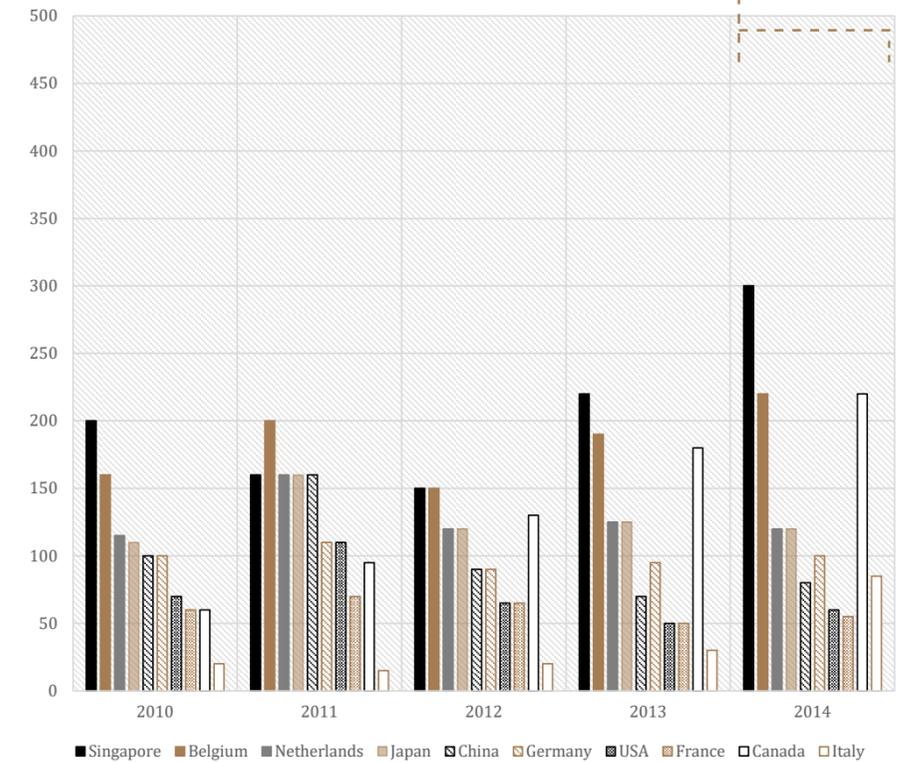


- A. Singapore 13.0%
- B. Netherlands 11.0%
- C. Belgium 9.0%
- D. Canada 6.2%
- E. Germany 4.4%
- F. USA 4.4%
- G. Japan 4.3%
- H. Italy 3.7%
- I. China 3.2%
- J. France 3.1%
- K. Others 39.0%



% GLOBAL SHARE, 2014

Import Value/ USD Million





FP107. [Previous Spread - Left] Global Top 10 Sand Exporters (In % Global Share, 2014).
Reference Source: 1. Gavriletea, Marius Dan, Ibid, 2017. 2. Figures Reported to UN COMTRADE.
Reconstructed Diagramme: Lin Derong, 2017.

FP108. [Previous Spread - Right] Global Top 10 Sand Importers (In % Global Share, 2014)
Reference Source: 1. Gavriletea, Marius Dan, Ibid, 2017. 2. Figures Reported to UN COMTRADE.
Reconstructed Diagramme: Lin Derong, 2017.

Undeterred by its lack of hinterland and natural resources, Singapore must acquire sand from overseas, similar to other natural resources - its survival is premised primarily on its performance as entrepôt within an open economy. In 1989, Singapore began trading sand with Malaysia once its local extraction sources from soil reserves, hills and sand quarries were depleted. Given our preoccupation with land scarcity and economic development, there will always be the need for constant expansion. Living by the mantra of progression and expansion, Singapore's appetite for sand will only increase.

However, in the recent years, controversies have sparked due to the negative environmental and social implications on local communities and eco-systems due to sand extraction. Several neighbouring countries such as Indonesia and Cambodia have banned sand exports to Singapore¹². Despite these sand ban impasses and controversial disputes, we continue to expand our sand sources from further neighbouring countries like Bangladesh and the Philippines at the mercy of bilateral ties and sand price fluctuations¹³. Singapore will remain vehement in her efforts towards acquiring sand because the island's very national foundations are built on the granular aggregation of sand.

12. See figure FP109, FP110 and FP111 for Singapore's sand trade with other countries.

13. See figure FP110 for sand prices plotted against amount of sand imports over the years.

FP109. Where Does Singapore Collects Her Sand? (As of 2017). Drawing: Lin Derong, 2017.

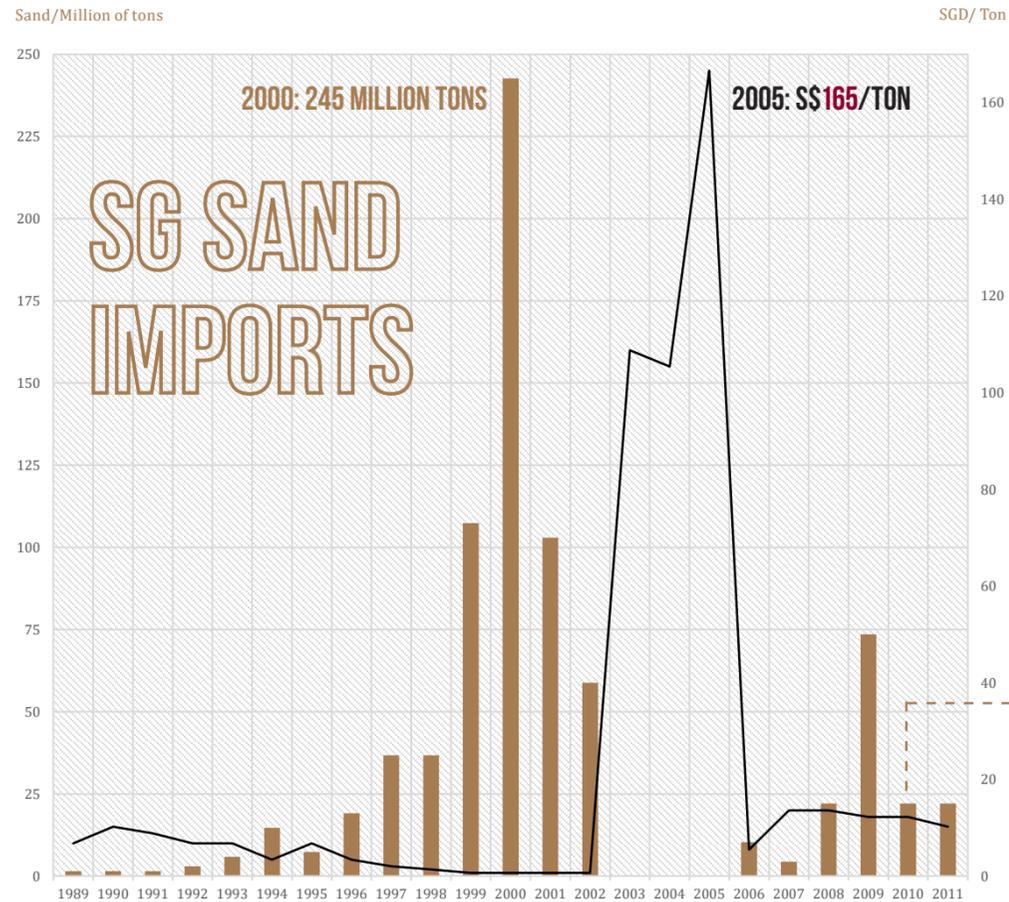
Subject to the precariousness and tensions of economic demands and international geopolitics, it is necessary for Singapore to safeguard emergency inventories of imported sand as a form of security¹⁴ in face of

14. Comaroff, Joshua. 'Built on Sand: Singapore and the New State of Risk'. Harvard Design Magazine, Wet Matter Essay, no. 39 (2014). <http://www.harvarddesignmagazine.org/issues/39/built-on-sand-singapore-and-the-new-state-of-risk>.

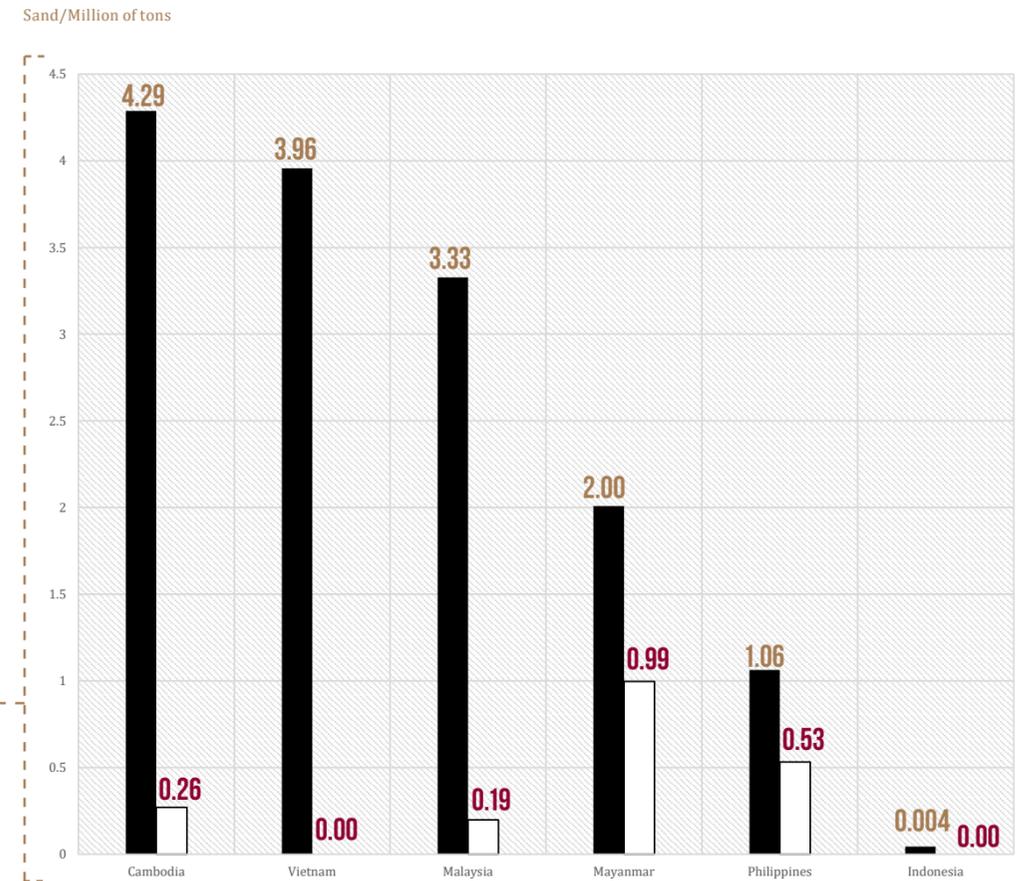
15. Seletar stockpile is on a deserted site beside Seletar Aerospace Park and Seletar Military Camp. Pulau Punggol Timor is a dedicated reclaimed island to process sand. Tampines stockpile site is adjacent to two former sand quarries: Bedok Reservoir and Tampines Quarry. Recently there is a fourth stockpile at Tuas, however, it is considered as a "surplus", these sand will all be used specifically for Tuas port reclamation project. The next few chapters will illustrate these sites in detail.

impending depletion of the global sand source. Sand is stockpiled in our island to safeguard as construction material, and they are out-of-bounds as a matter of national security. These stockpiles¹⁵ are strategically located on three sites: Seletar Link, Pulau Punggol Timor, and Tampines Avenue 10.

FP110. Singapore's Sand Imports Since 1989. These figures do not cover informal trade, but it give a sense of scale of these operations throughout the years. Reference source: 1. Topalovic, Milica, Hans Hortig, and Stefanie Krautzig. n.d. 'Architecture of Territory. Sea Region. Singapore. Johor, Riau Archipelago'. Singapore: ETH Zurich DArch, FCL Singapore. 2. Figures Reported to UN COMTRADE. Reconstructed Diagramme: Lin Derong, 2017.



FP111. Singapore Sand Import-Export Reported to UN COMTRADE in 2010. Note the stark discrepancy between Singapore's reported imports and the source countries' report. Reference source: 1. Topalovic, Milica, Hans Hortig, and Stefanie Krautzig. n.d. 'Architecture of Territory. Sea Region. Singapore. Johor, Riau Archipelago'. Singapore: ETH Zurich DArch, FCL Singapore. 2. Figures Reported to UN COMTRADE. Reconstructed Diagramme: Lin Derong, 2017.



2010 IMPORTS REPORTED TO UN COMTRADE (ABOVE)

1989

FIRST IMPORT REPORTED TO UN COMTRADE IN 1989

MALAYSIA BEGINS AS SOLE SAND IMPORTER UNTIL 2002

1997

MALAYSIA BANS

2002

MALAYSIA'S FINAL IMPORT

2003

INDONESIA BANS SEA SAND

2006

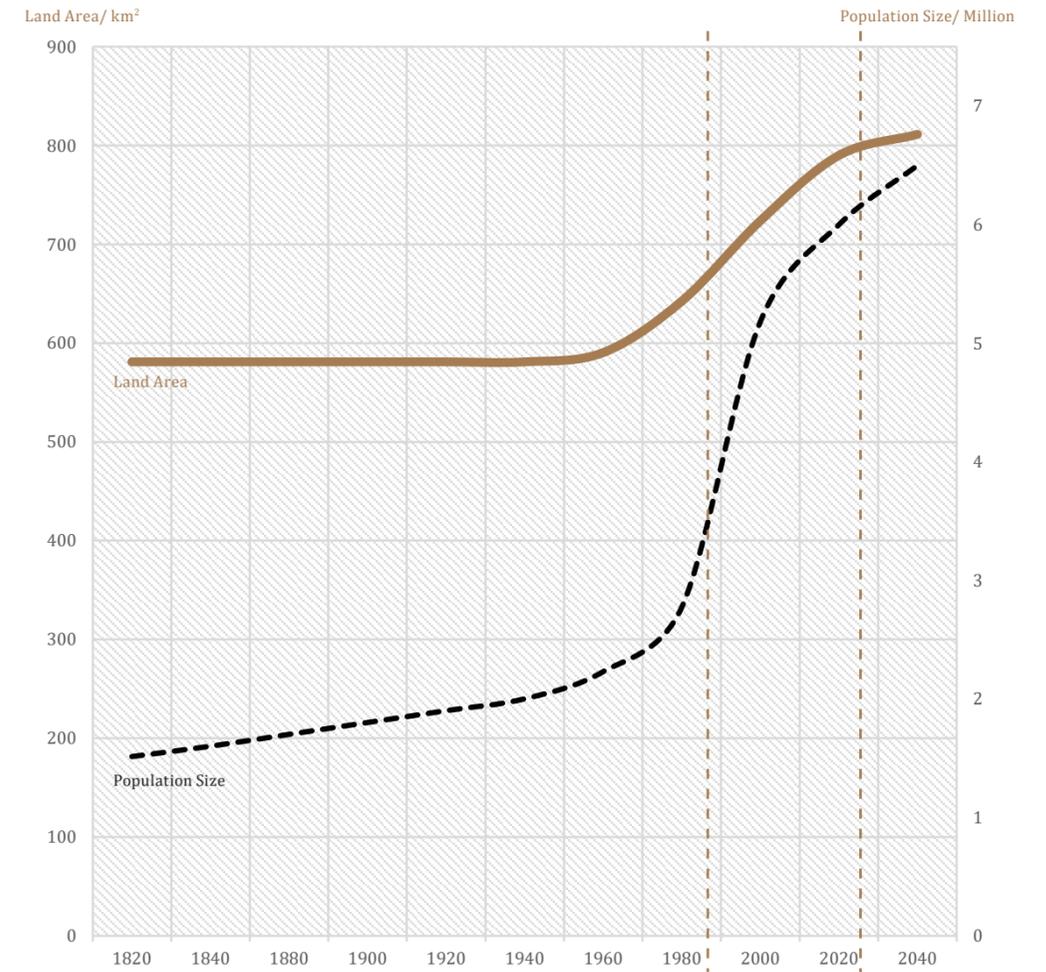
INDONESIA AS SOLE SAND IMPORTER

2007

VIETNAM BEGINS EXPORT MYANMAR BEGINS EXPORT FINAL IMPORT FROM INDONESIA

2009

CAMBODIA BANS RIVER SAND VIETNAM BANS INDONESIA BANS PHILIPPINES BEGINS EXPORT



1989 - TODAY

SAND FOR LAND## 540 MILLION TONS#

FOR POPULATION 100 KM² EXTRA

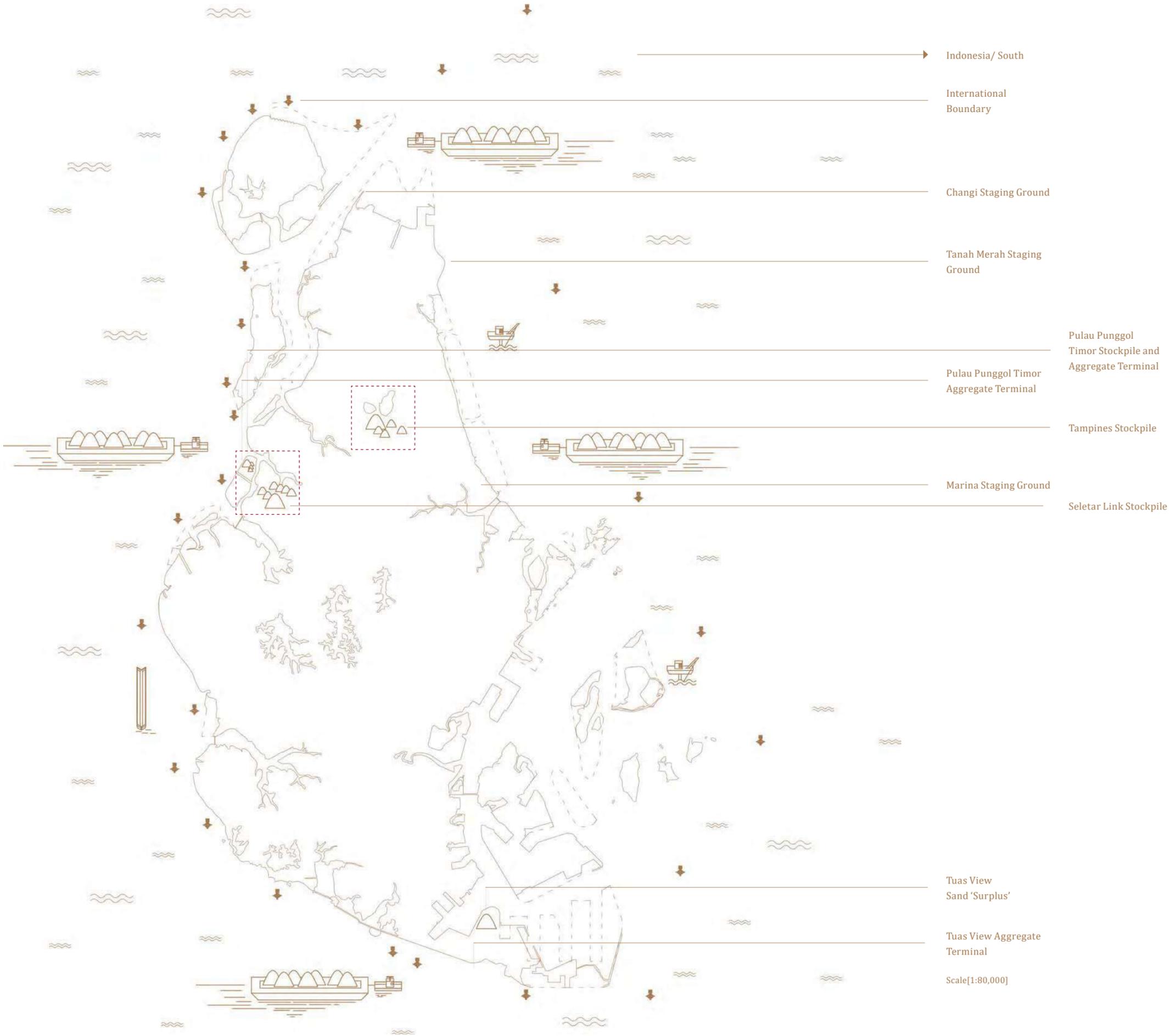
1.7 MILLION MORE

FP112. [Opposite] The Extra 25% Land since 1820. Source: FCL, ETH, 2013. Reconstructed Drawing: Lin Derong, 2017.

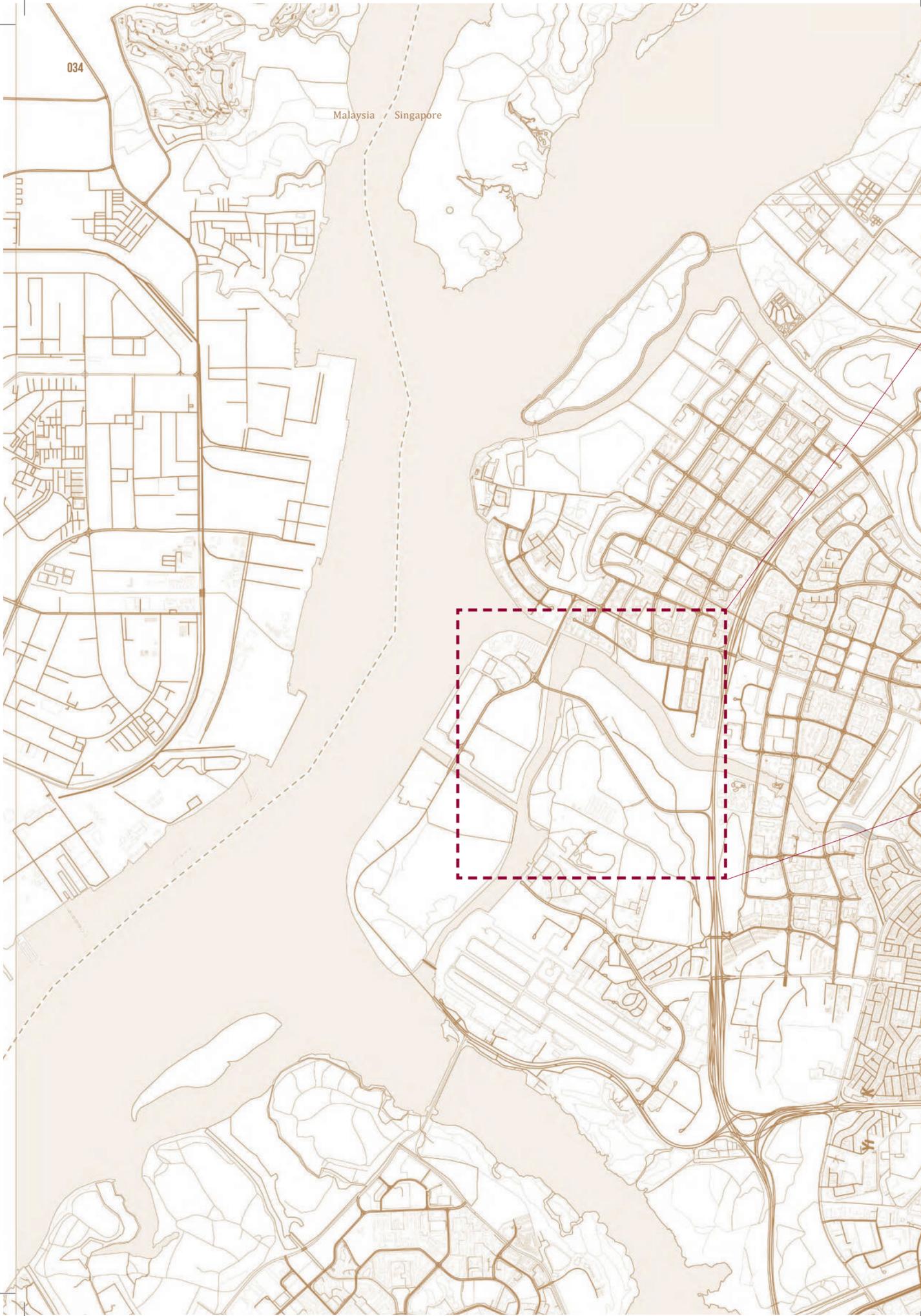
FP113. Land Area vs Population Chart since 1820. Source: FCL, ETH, 2013. Reconstructed Diagramme: Lin Derong, 2017.

#. Refer to Appendix C, figure AC08-AC09 for the approximate data on Singapore's land growth with reference to sand consumption since 1989. Land reclamation is assumed to consume the most sand as sand expenditure by the state is still undisclosed to the public as a matter of national security. ##. See Insert B 'Servant Sands' for more sand use.

SAND UP FOR SINGAPORE!



FP114. Where does Singapore receive and store her sand? Reference Source: 1. BCA. n.d. 'Aggregate Terminals'. Accessed 19 November 2017. <https://www.bca.gov.sg/AggregateTerminals/pratandtat.html>. 2. Tan, Ria. n.d. 'Builders Facing Long Wait to Dump Earth'. Wild Singapore (blog). Accessed 19 November 2017. <http://wilsingaporenews.blogspot.sg/2012/06/builders-facing-long-wait-to-dump-earth.html#.WhErgzdx2Um>. 3. MPA. 'Construction Of Temporary Jetty and Roll on Roll Off (RORO) Ramp in Tuas View Basin and At Tuas Staging Ground.' Singapore: Maritime and Port Authority of Singapore, 18 September 2017. Refer to Appendix B, figure AB02-AB05 for further details on each staging ground. Drawing: Lin Derong, 2017.

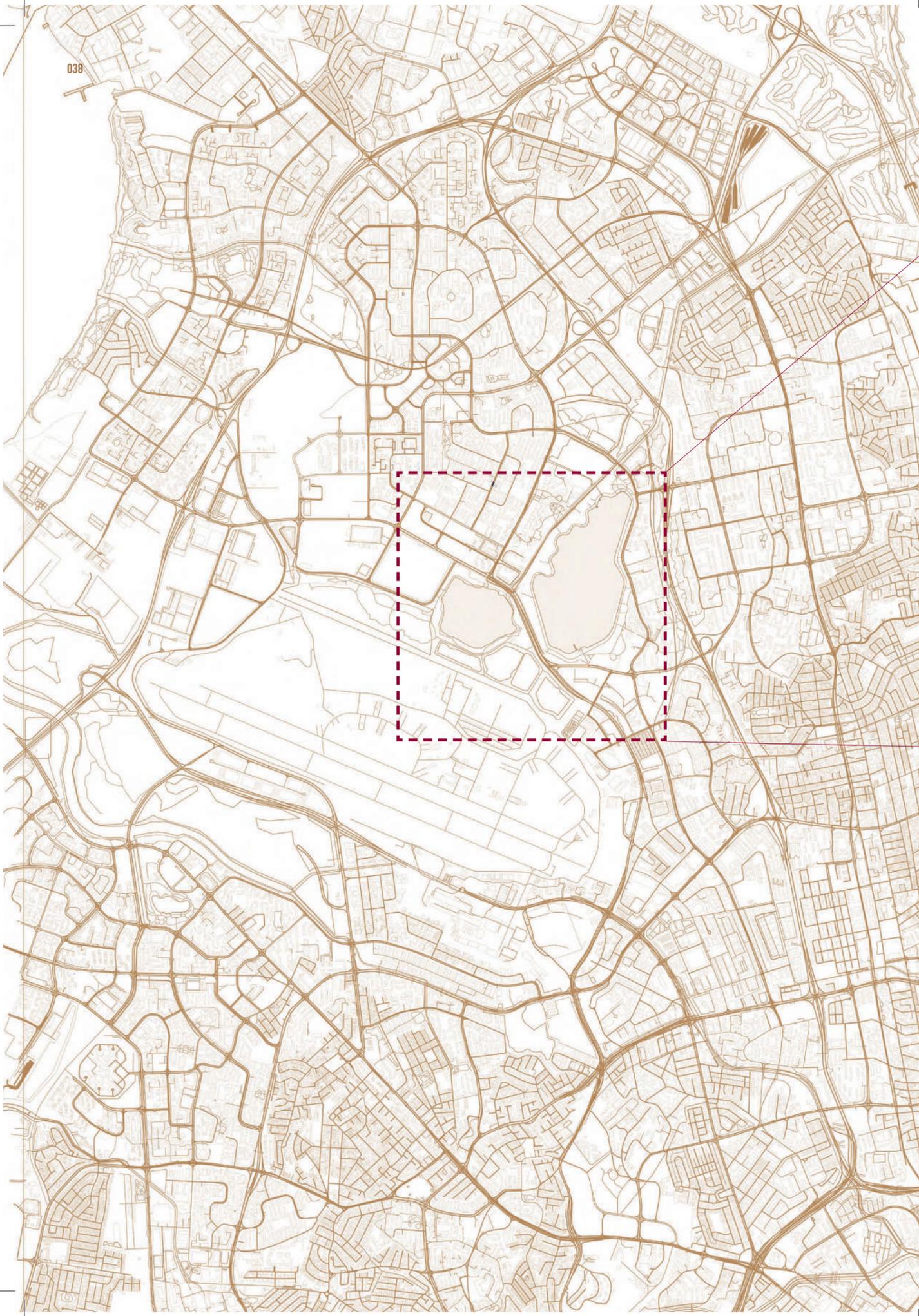


FP115. [Opposite] Northeastern Coast. Scale 1:50,000. Drawing: Lin Derong, 2017.

FP116. Link Bridges between Seletar Link, Pulau Punggol Timor and Punggol Waterfront Estate. Scale 1:20,000. Drawing: Lin Derong, 2017.

FP117. [Overleaf] 'Sand Barge Stalking'. Sand barges off Pulau Punggol Aggregate Terminal. Photograph: Lin Derong, 2017.





FP118. [Opposite] Tampines West - Paya Lebar.
Scale 1:50,000. Drawing: Lin Derong, 2017.

FP119. Tampines Stockpile Site, Tampines Quarry
and Bedok Reservoir. Scale 1:20,000 Drawing: Lin
Derong, 2017.

FP120. [Overleaf] Sorted sand stockpile at Tampines
Stockpile Site. Photograph: Lin Derong, 2017.



Shifting Top Sands - Whose Sand?

These stockpiles will continue to grow as Singapore addresses her progressive vision and safeguard sand security in times of crisis. Much of these sand demands are predominately built upon the myth of land scarcity. The term *myth* according to Loh, Thum and Chia, is a popular idea to promote our growth and ever-lasting progress.¹⁶ According to their research, the state combines facts with claims to produce a compelling narrative that places the city-state always on the threshold of an impending crisis, propelling the nation towards a developmental ideology of progress. At a land area of 805.1 km² today¹⁷, Singapore is projected to accommodate an ever-growing population of 6.9 million. Although Singapore is a small country, the island state is not land scarce. Singapore exercises strict land planning and allocation to accommodate and maximise housing, roads, industries, military training/ protection and other uses efficiently and effectively within a limited land area¹⁸. This myth of land scarcity underlines our need for more land given our small island size. It perpetuates an imperative for continued physical development albeit Singapore having reached “first-world” status. For the state, this is the very myth needed to justify our insatiable appetite for sand.

Hence, the state’s vision of developmental growth I argue is didactic. Looking at these stockpiles, the *state’s sand* embodies Singapore’s hyper-efficiency and the nation’s projected fears in light of the sand crisis. These colossal dunes form a growing landscape as demand rises and supply diminishes. Singapore’s perpetual transformations, endless growth and economic gains are without finality. These sand stockpiles reveal much about a nation’s psyche and the myriad anxieties that plague us as a small island state in the age of globalisation and neo-liberal capitalism. These revelations resurface broader issues that lie behind the sand crisis and its brutal economics.

There is currently a large discrepancy between the state’s treatment of sand and public awareness towards it. The prevailing state’s vision has recast sand as an abstracted entity for economic development. They belong to the state as *state’s sand*, and a mere means to an economic end manifested from its international geopolitics and bureaucratic state planning. Furthermore, Singapore’s sand trade implicates top national security, and its provenance tends to be smoothed over, yet the looming stockpile aggregate which dominates the physical landscape has become too expansive to be hidden from the public eye.

16. Loh, Kah Seng, Ping Tjin Thum, and Jack Chia Meng-Tat. 'Introduction: Singapore as a Mythic Nation'. In *Living with Myths in Singapore*, 1–14. Singapore: Ethos Books, 2017.

17. See appendix C, figure AC08a.

18. See MND. 'Land Use Plan', 14 August 2017. <https://www.mnd.gov.sg/landuseplan/>.

How do these state affairs then matter for the everyday Singaporean? In Sartre’s words, the sand stockpiles are practico-inert entities.¹⁹ According to him, these entities are practical and objectified. They have stopped to respond to any needs and have a negative connotation. In this case, the sand dunes in stockpiles confront us and become a spectacle observed from far – one that is out-of-bounds and incomprehensible as an open state secret.

Sand thus become an abstract entity while the state quantifies its operations through trade networks and particularises it into mere digits and managerial logic. These stockpiles hence reduce sand’s materiality and its citizen’s subjective selves into representations of efficiency, discipline and metric standards. As practico-inert entities, they do not intend to respond to any context because storage is storage, nothing more. Sand stockpiled is in a raw transient state to be made into land, buildings, and infrastructure. This counteracts against people’s understanding and experience of sand as a tactile and emotive matter. Although sand in the everyday domestic (such as sandpits) and sand in sand stockpiles have the same materiality, people’s treatment and perception of sand differ from the stockpiles that are part of the state’s vision.

People’s sand is touched, frolicked, and are caught inside shoes. They form imaginations, build stories, and contribute towards hedonistic pleasures on the beach. Sand exists concurrently on a small and intimate scale for people relative in stark difference to the state’s. This other sand is encountered as a trivial granular matter that is accessible and arguably in excess. These experiences of sand operate at an intimate scale. Sand is free to be its own material: tactile and emotive; whereas sand in the state’s stockpiles sits inertly behind guarded fences. The state’s sand is only experienced in fleeting moments when one cycles or drives past. To the people, these sand monuments are perceived as surreal spectacles in the distance, consumed from afar - in direct contradistinction with the everyday experiences and normative perceptions that people have with sand.

19. Sartre, Jean-Paul. *Critique of Dialectical Reason*. London: Verso, 1991.



FP121. [Opposite] 'Hardened Ground'. Sandpit playground at Bedok Reservoir Park after a downpour. Photograph: Lin Derong, 2017.

FP122. 'Borrowing Sand'. Sandpit playground at Zheng Hua Park, Bukit Panjang. Photograph: Lin Derong, 2017.

How do Singaporeans then react to these surreal landscapes? To an extent, Singaporeans have become acclimatised to a status quo. The sand as Singaporeans know is a matter of national security and is set apart for construction of land

and buildings. Furthermore, we seem to have almost forgotten about its tactility and emotiveness amidst the convoluted conversations that have surfaced from the sand crisis. Sand as affective matter and experienced materiality has been compressed and flattened within the state's developmental narrative. As economic growth and incessant land development takes precedence²⁰, sand has been overlooked as an emotive matter.

20. See Insert D: *Disobedient Objects + Urban Tactics (Group Work on Activism and Territory)*, on how territory is argued to be governed by money while "the subjective" does not matter.

Shifting Top Sands - People's Sand

As we run out of sand, this thesis is neither a search for a consumable replacement nor an alternative treatment. The thesis takes a step back and instead re-looks at sand as an everyday matter that is tactile, subjective and emotive. It sheds light on the ground-up narrative that revolves around sand through an examination of the relationship and values understood by people through an understanding of the multiple relationships and values of sand as formed by the people, in contrast against singular narrative of the state. This produces unexpected results that push at the boundaries of state narrative and hegemony, through a differentiated sand/landscape that offers people alternative encounters and experiences.

For instance, in artist Robert Zhao's work *As We Walk on Water*, he astutely exposes his intricate relationship with sand and the sea, overlaid with his childhood memories running alongside the larger state narrative. In reaction to the strangeness of the sand stockpiles and its surreal features in the 1970s in Singapore, Zhao's work shows a building up of an aesthetic dream of getting lost in a landscape. Working with the absurdity of these desert-like landscapes in Singapore, his images conjure dramatic and evocative images of sand as an object and landscape for the viewer. It sheds light on a new perspective that sand is a cultural matter that is subjective. Sand can, therefore, be understood from an affective phenomenon as opposed to the role of sand in the instrumentalist state's narrative.

Borrowing Deleuze's explanation of the philosopher Spinoza's account of the affect, the affect is a force. It is a sense where "we get to something that is acting upon us"²¹. It is a passage into an experiential state of the body when we affect or become affected. The affective relationship between sand and people could be demonstrated through the multitude of sand uses in our everyday domestic setting and the evocation of play. This includes our associations with its poetics, our value systems of sand and functions of sand.

From the enormous dunes to individual grains, these uses of sand is embedded in the psyche of our minds. Sand is not a static matter. It brings to an awareness that we could shape something out for ourselves in the everyday use of sand. The diversity of sand's subjective definitions is difficult to capture. *Servant Sands* (Insert B) is not only an attempt to depict sand for

21. See Deleuze, Gilles; Guattari, Félix. *A Thousand Plateaus: Capitalism and Schizophrenia*. *Capitalism and Schizophrenia*. Trans. and foreword by Brian Massumi. Minneapolis and London: University of Minnesota Press, 1987. p. xvi. The original term is referred in this source: Spinoza, Benedictus de. *Complete Works*. Trans. by Samuel Shirley. Indianapolis and Cambridge: Hackett Publishing, 2002. p. 278.

its multifarious meanings and appropriations in our everyday contexts, but also an elaboration of an alternative value system that emphasises the many ways that sand can affect us through the physical encounters, tactility and playfulness that it brings. For example, playing with sand can be serious as it exposes the fundamental character of sand as materials in our daily lives²². Zooming into each grain, sand's tactility plays a role in the physical sense and our collective imagination. The grains slip through ones' fingers and takes the form of its holding container, much like a liquid; yet sand can also be aggregated into compact solids and surfaces to become sturdy enough to walk on. As a source of creativity, they are malleable, playful, messy and quite frequently a nuisance when they get blown around in the wind and get into our eyes. All of these generate an *affect* on us, which influences our behaviour in the spaces in which sand occupies.

This then reveals the contradictory value system of sand between the state and people – resulting in two different kinds of utility and productivity – either encountered objectively as state development or in subjective play to the people. However, as the affective phenomena of *people's sand* run in parallel with the *state's sand*, the boundary between both types of sand at times could be ambiguous. In the military, sand in small piles is used in the garage for maintenance and as a cleaning agent. It can doubly work as soft cushioning barriers or compact hard volumes that absorb bullet shells in live firing rifle

ranges. In Padang Pasir Klebang Melaka²³ in Malaysia, massive heaps of sand dunes from land reclamation projects around Klebang become accessible to public access as a national weekend getaway and a tourist attraction. This landscape of sand piles transform into a giant sandpit playground where visitors could frolic and take photographs with the scorching sun, wind, rain and sand dunes as the backdrop. Furthermore, in Robert Zhao's artwork and from my personal experiences documenting the national sand stockpiles, sand seems to oscillate as national spectacle and as site of emotive free play.

22. See insert B, *Servant Sands*, for a glossary of sand use in the everyday domestic. Adapted from Welland's chapter in *Sand: The Never-Ending Story*. Welland, Michael. 2009. 'Individuals: Birth and Character'. In *Sand: The Never-Ending Story*, 1–30. Berkeley, CA: University of California Press.

23. There are several online posts recommending the site as an attraction, for example: Summerkid, and Summergirl. 'Padang Pasir Klebang Melaka: White Desert in Malaysia | Malaysian Flavours'. Malaysian Flavours (blog), 7 July 2016. <http://www.malaysianflavours.com/2016/07/padang-pasir-klebang-melaka-malaysia.html>.

FP123. [Overleaf] "Toying with Sand: Artificial indoor sandpit playground at Marina Square during Christmas. Photograph: Lin Derong, 2017.





Peeping through the Fence

It was a drizzling Tuesday. I entered a hitched car, and it was going to be a long journey from my apartment at Bukit Panjang to Seletar Link. The driver asked me in bewilderment where I was heading to as the drop-off seemed to point to the middle of nowhere. I gave a sheepish smile as I said just anywhere along the road will do.

It was my first visit to the three stockpile sites, and I was equipped with a tripod sling on my back, camera in my hands, stacks of materials about the sites in my camera bag, and a pair of running shoes; all ready to conquer the terrain. I alighted in the middle of a broad and deserted street in Seletar Link, and I was immediately overwhelmed by the scale of the stockpiles the moment I stepped back out into the heat. Standing on the long and straight sidewalk, I was flanked by plateau after plateau of neatly

FP201a. 'Peeping Through - Mowing With Excavator'. Walking along Seletar Link. Photograph: Lin Derong, 2017.

FP201b. 'Peeping Through - Some Structure'. Walking along Seletar Link. Photograph: Lin Derong, 2017.

FP201c. 'Peeping Through - Long Trapezoids'. Walking along Seletar Link. Photograph: Lin Derong, 2017.

arranged sand dunes lined up monotonously behind barbed fences set in the middle of nowhere.

As I walked further north in the sultry air while scuffing soggy mud off my shoes, I spotted four petite human figures scrambling and scaling the sand dunes. Approaching closer, it became clear that they were foreign workers plucking weed sprouting out from the sand dunes painstakingly by hand. The air was still as dead, and the weather was unbearable. Under this unforgiving tropical climate, weed thrives. It struck me suddenly that sand dunes in stockpiles needed maintenance as compared to their natural counterparts in the Sahara. As this scene sits monumentally against the sunless sky, a series of other events unfold at a languid pace – a Gulfstream G550²⁴ flew past, a steady stream of tipper trucks trundled along, and two cycling enthusiasts sped past towards TPE from Coney Island²⁵.

24. A private business jet.

25. The street is part of the larger park connector route, connecting Punggol and Seletar in the vicinity. It is a popular route among cyclists given the long and straight roads.



FP202. 'Manicure'. Workers plucking weed out of sand stockpile. Seletar Link. Photograph: Lin Derong, 2017.

FP203. [Overleaf] 'Manicure 2'. Workers plucking weed out of sand stockpile. Seletar Link. Photograph: Lin Derong, 2017.







FP204. [Previous Spread] 'Nature's Revenge'.
Pulau Punggol Timor. Photograph: Lin Derong,
2017.

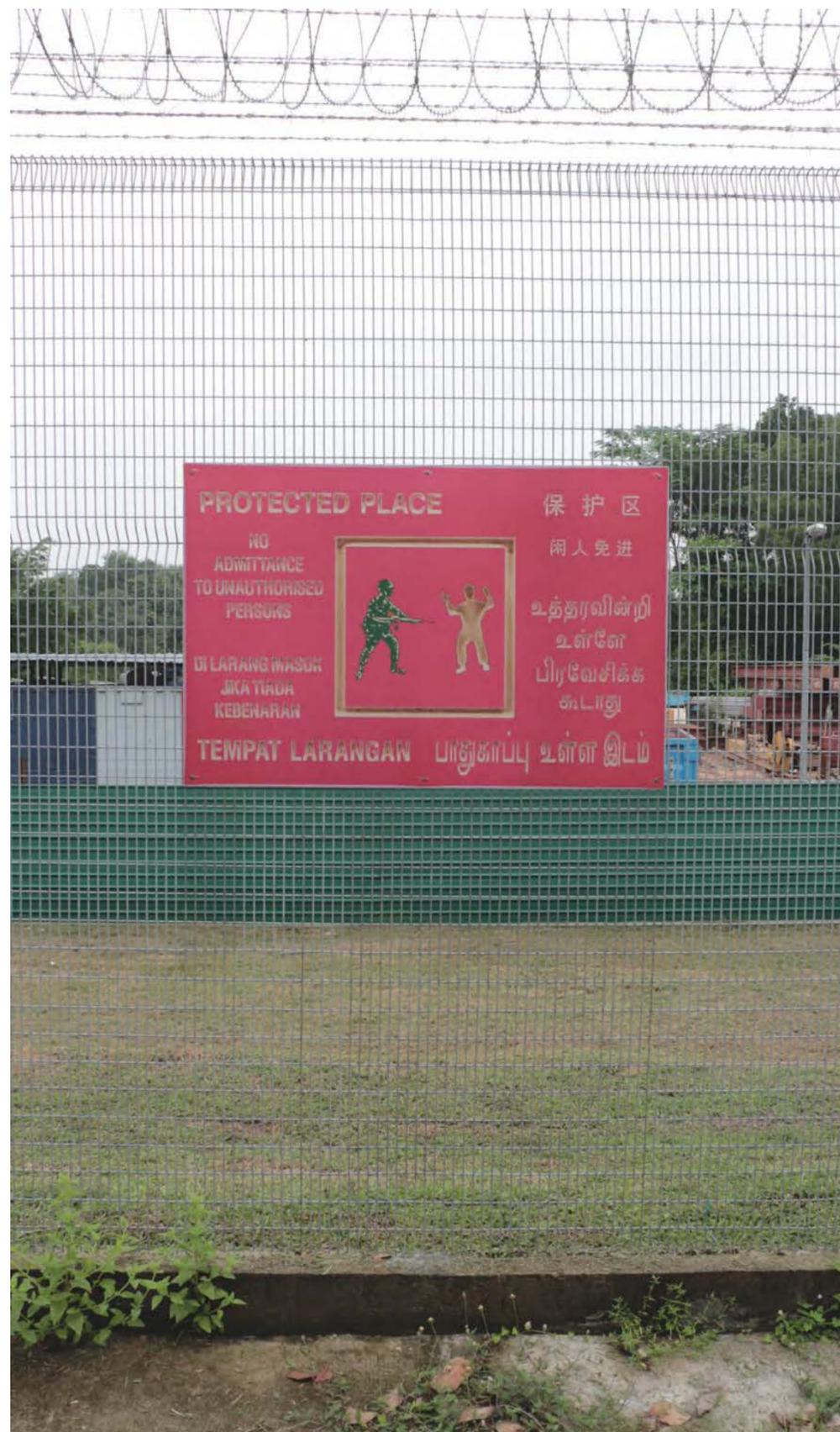
FP205. 'Scrambling Sands'. Workers plucking
weed out of sand stockpile. Pulau Punggol Timor.
Photograph: Lin Derong, 2017.

FP206. [Opposite] 'Scrambling Sands 2'. Workers
plucking weed out of sand stockpile. Pulau
Punggol Timor. Photograph: Lin Derong, 2017.

Venturing further up north, I broke into a sweat and wondered why I did not bring my bicycle. I went on snapping photographs while being worried if anyone might catch me. There were RESTRICTED signs hung up everywhere. If caught, I might be asked to delete the footages and thereby not only wasting the trip but put this project in peril. In the end, an uncle from the fence behind called out and asked for my student card. He scrutinised my well faded and expired undergraduate card while I tried asking about the stockpile and his daily routine guarding these sands. Although I didn't get much information from him, my photos were safe.

When we parted, he told me: 'maybe ask HDB for permission first next time if you want to come in and take photos.'





Drawing the Stockpile Walls

FP301. [Previous Spread] 'Sand Boundaries'
PPAT (Pulau Punggol Aggregate Terminal)
Stockpile Site 1. Photograph: Lin Derong, 2017.

FP302. 'Protected Place'. Fences along Seletar
Link. Photograph: Lin Derong, 2017.

This chapter will delineate and expand on the methods employed to set the premise for the thesis. It will juxtapose the affective encounters of sand against the state narrative through fictional narratives at the contextual periphery of the three

sand stockpile sites: Seletar Link, Pulau Punggol Timor and Tampines Avenue 10. Oscillating between sandpits and stockpiles, the research will utilise writing, film, photography, and drawing as a medium to surrogate as a site of resistance and negotiation between *state's sand* and *people's sand*.

Through adopting multiple-voices and narrative as a methodology, the thesis traverse across the three stockpile sites as we re-position these voices to produce text with spatial qualities. Through the development of three protagonists in the narratives, it will expound on the personal encounters of sand²⁶. This method is adopted in an attempt to capture the subjectivity of these affective encounters and how it is situated within the objective state narrative. This thesis will be written in three voices:

26. Rendall, Jane. 'Prologue: Pre-Positions'. In *Site-Writing: The Architecture of Art Criticism*, 1–20. London: I. B. Tauris, 2010. The methodology is adopted similar to CJ Lim's Short Stories. Lim, C.J., and Ed Liu. *Short Stories: London in Two-and-a-Half Dimensions*. London, N.Y: Routledge, 2011.

Voice 1. My personal site descriptions and observations in first person narration (in italics)

Voice 2. Situated fictive narratives

Voice 3. Evaluative and Analytical (Presented here in Provenance)

Instead of a discursive writing structure, this report is based on fictive constructs as these three voices run in parallel. The aim is to show how narratives can serve as a research framework by coordinating the abstract concepts of sand stockpiles with our lived experience and imagination of sand. Weaving facts and anecdotes to illustrate how sand is being treated, encountered and dealt with, these narratives straddle between the fictive and the "real". In each case, I suggest our disconnection with the sand stockpiles like a jig-saw puzzle that is taken out of context and one that is detached from

the landscape²⁷. By situating these narratives beside the stockpiles, we are, in Freudian's term, exploring on a 'co-existence' between *state's* and *people's sand*, and our 'ambivalence' towards the surreal stockpiles²⁸.

The thesis will tap into the narratives at an intimate scale as the three sites become spatial and atmospheric. The stockpiles sites are taken to be an architectural matter that is formed from

the "dialectical engagement of the body, physical environment and space"²⁹.

This mean that the various spatial qualities and architectural dimensions of the three site contexts and conditions – a military base (Seletar), a marina (Punggol), a heartland (Tampines) – will be articulated through the lived experiences of the protagonists with sand, as their perceptions and their actions performed in space take on a central role in the narratives. In each three cases, a corresponding specific use and materiality of sand on site will be explored: sand as precarity and risk (Seletar), sand as hedonistic pleasure (Punggol), and sand as hygienic play (Tampines). Each protagonist in the three sites will depict how they are capable of being spontaneous and playful in space while negotiating state's direction on various scales. Hence, operating within the spaces in which sand occupies, the narratives expose the muted politics of sand that is produced out of a dialectical engagement between the bodily

30. Deamer, Peggy. 'Architecture/ Agency/ Emancipation'. In *Can Architecture Be an Emancipatory Project?: Dialogues On Architecture And The Left*, by Nadir Z. Lahiji, 103–122. Zero Books, 2016.

FP303. [Overleaf] 'Higher'. Fenced boundary of Pulau Punggol Aggregate Terminal. Photograph: Lin Derong, 2017.

experiences of the individual in sand and the instrumentalist state treatment. Although these three stockpile sites may be inert, the allegorical construct of spatial relationships made between the protagonists and their interactions with sand on site allows for a 'close reading' of the role of sand in Singapore beyond the stockpiles; and also speculate new ways to occupy and relate to spaces in which sand may create. This is also in line with Deamer's argument³⁰ to look at the society as a system made up of our living experiences where spaces are *conceived* instead of imposed as "emancipatory public space" in attempt to solve the situation.

Whereas each protagonist is making subversive statements, they are simultaneously *for* economic growth and patriotic support to justify the narrative's new engagement with sand on the surface. It plays up our pre-occupation to subvert sand scarcity, wilderness, play and hedonistic pleasures. These narratives cast in a ludic tone, are based on interviews, myths, observations, archival research and my own experiences.

27. Anderson, Benedict R. O'G. 2006. *Imagined Communities: Reflections on the Origin and Spread of Nationalism*. 175. Rev. London; New York, NY; Verso.

28. This is Freud's extension of the concept of *Ambivalence* to cover *Co-existence*, which he calls "pairs of contrary component instincts" such as looking and being looked at. In page 9 of Freud, Sigmund. *Case Histories 2*. Edited by Angela Richards. UK: Penguin, 1988.

29. Adopting Hill's approach towards spatial occupation. Hill, Jonathan. 'Introduction'. In *Architecture: The Subject Is Matter*, 1–10. London: New York, 2001.

The focus is thus a shift away from the instrumentalist state to the individual subject. These stories narrate how their spatial agencies operate and affect across different scales. The methodology is thus a rhetoric to discuss sand as an everyday form of practice. Personal fragments and figments of our imagination and narratives come together to form a new ground where the real and the imaginary meet and influence each other. Furthermore, going from bottom-up as feminist geopolitics illustrates³¹, the thesis understands the operation of power which relates to the "non-state" actors and the banal realities of individuals³². Drawing from Foucault's argument³³ that state's power is intricately linked to the intimate levels of the individual, the thesis begins from the realm of the mundane every day, where it emerges different ways of thinking through architecture and thus engages with the embodied ways of knowing and seeing³⁴.

Going down the scale also takes into account the affect in which the surreal landscape of sand stockpiles generates on the individuals, which is difficult to articulate into words. This methodology would lead to an examination of collective memories and our experiences of sand. As the narratives intersect at the three stockpile sites, they expose the protagonists' struggles and open up dialogues about our attempts as Singaporeans to negotiate through the sand crisis amidst our hyper-efficient and pragmatic system.

Lastly, situated at the contextual periphery of the three stockpile sites, the narratives will also take on an activist and territorial edge. They will locate themselves in the three different types of political positions and resistance against the brutal economics of sand, extrapolated from the group work on *Activism & Territory*³⁵:

1. Outright resistance against suppression
2. Temporal resistance that works around socio-political limits and loopholes to make a statement
3. Assume oppression is firm. Personal resistance is exercised through negotiating struggles and escaping through aesthetics

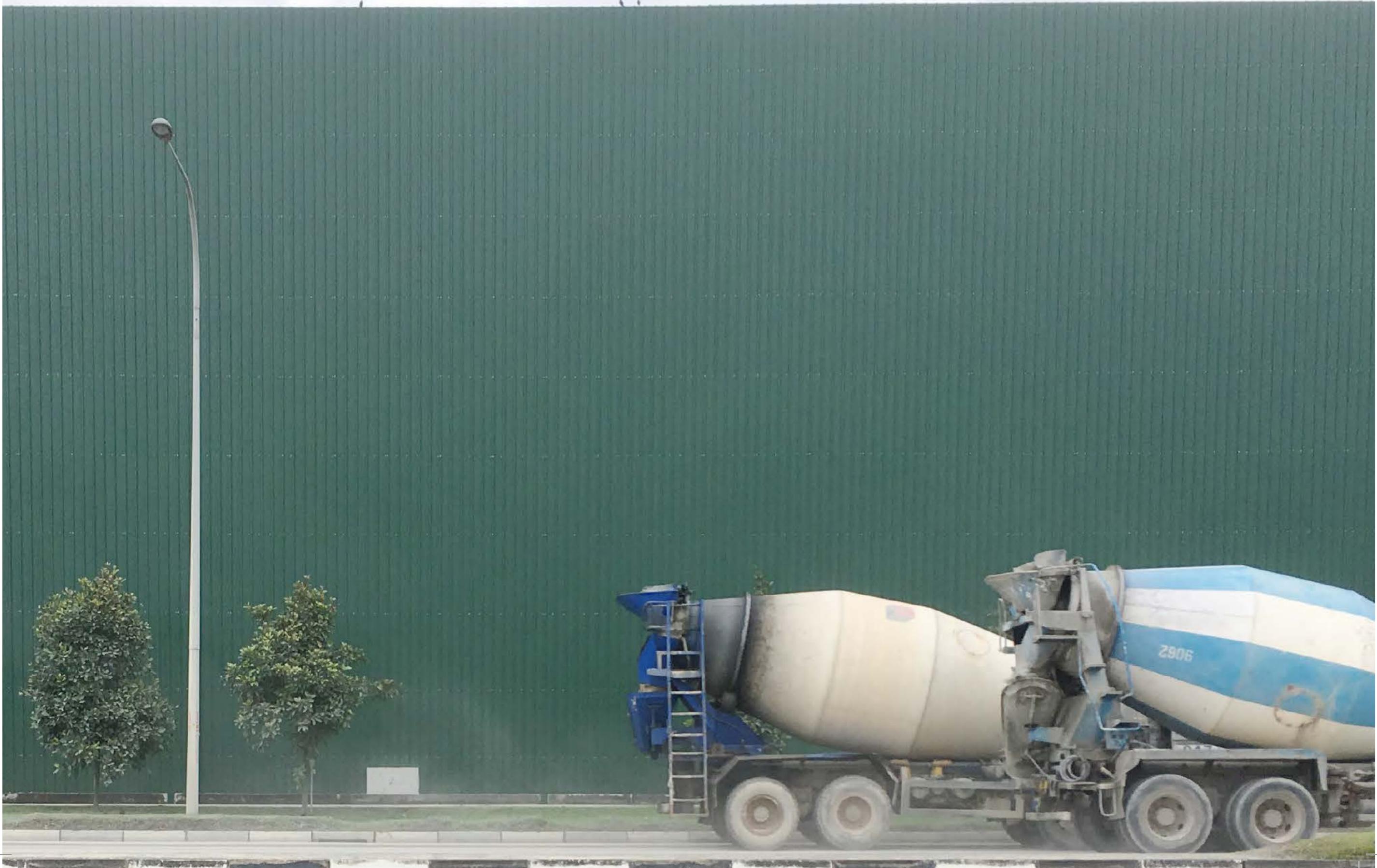
31. Hyndman, J. "Introduction: the Feminist Politics of Refugee Migration", *Gender Place and Culture* (editor of special issue) 17 (4): 453-459, 2010. And Massaro, Vanessa A., Williams, Jill, "Feminist Geopolitics", *Geography Compass* 7/8, Department of Geography, Department of Women Studies, The Pennsylvania State University, Department of Geography, Clark University: 2013, pp. 567-577

32. Sharp, J. 2000. 'Remasculinising geopolitics? Comments on gearoid O'Tuathail's critical geopolitics'. In *Political Geography* 19. 361-364.

33. Foucault, Michel. 'The Subject and Power'. *Critical Inquiry* 8, no. 4 (1982): 777-795.

34. Dowler, L. and Sharp, J. 2001. 'A feminist geopolitics?'. In *Space & Polity*. 165-176.

35. See Insert D: *Disobedient Objects + Urban Tactics (Group Work on Activism and Territory)*, on the three positions towards activism.







FP304. [Previous Spread] 'Peek-a-Boo'. Spectacular gaps between the fences. Photograph: Lin Derong, 2017.

FP305. 'Fresh Arrivals'. Behind-the-fence sand processing in Aggregate Terminal. Photograph: Lin Derong, 2017.

FP306. [Overleaf] 'Sand Up'. Loaded tipper truck exiting Pulau Punggol Aggregate Terminal, set against Punggol Waterfront Estate. Photograph: Lin Derong, 2017.





THREE TERRAINS



T1. MINESWEEPER

[1o24'28.68"N]
[103o53'08.28"E]

TPE

Towards Pulau Punggol Timor

Vehicle Garage

Seletar Aerospace Park/ North

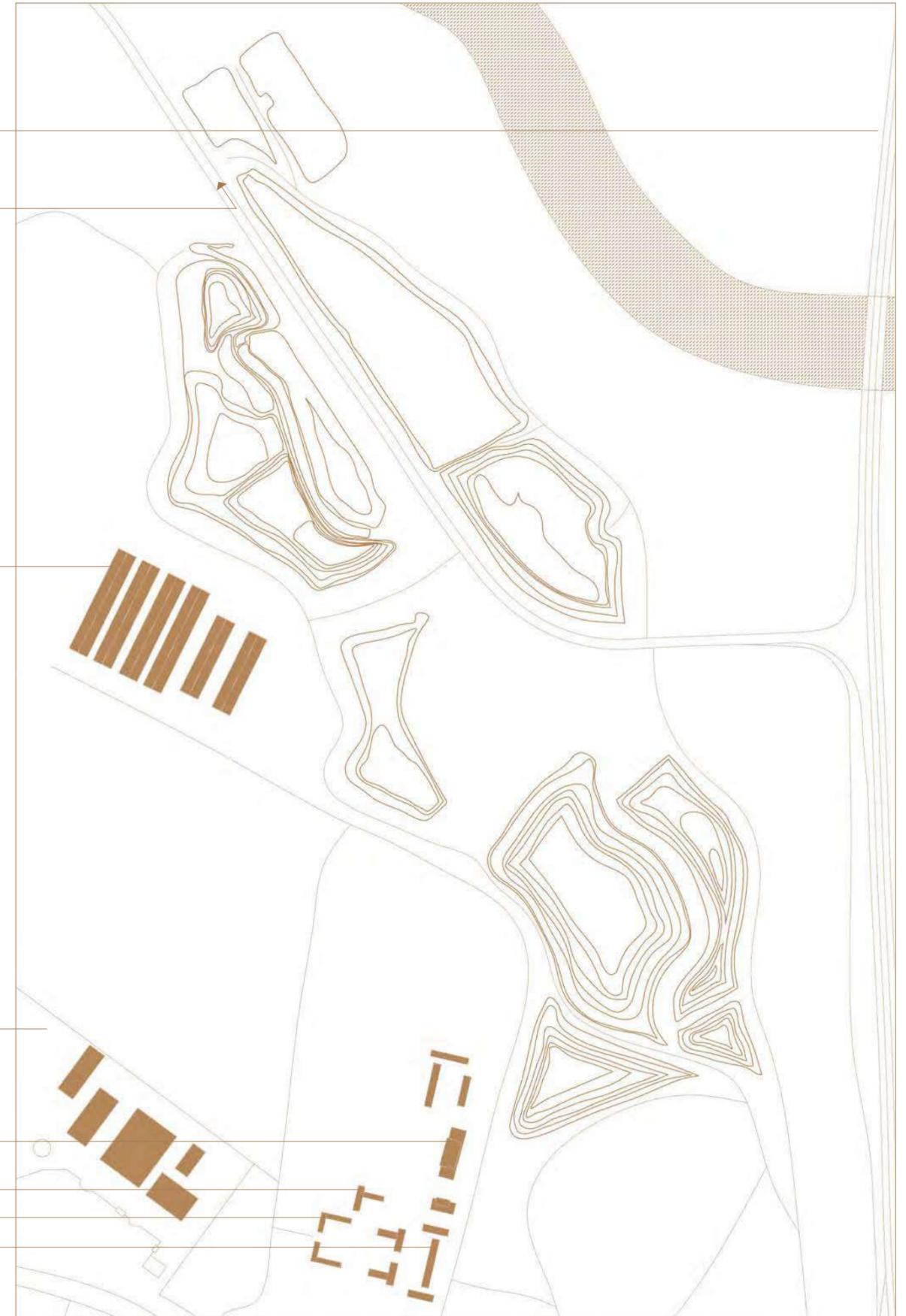
Cookhouse

EOD Training Center

Chemical Chambers

Seletar Camp Headquarters

Scale [1:7500]



FT001. [Previous Spread] 'Insert C'. Image set taken from 'Situating Sands' Pamphlet. Photographs: Lin Derong, 2017.

FT101. Seletar Link. Drawing: Lin Derong, 2017.

FT102. [Overleaf] 'Teletubbies Might Appear'. Rows of sand piles and exposed drainage pipes. Seletar Link. Photograph: Lin Derong, 2017.





36. Military lingo for weapons store

37. There are several instances in Singapore where bombshells and remnants were found in sand piles.

In these cases, the SAF will send the EOD team to dispose of these bombs. See the following articles: Chong, Melissa. 'SAF Detonates War Relic Found at Construction Site'. Today Online. 3 September 2013. [https://www.todayonline.com/saf-detonates-war-relic-found-construction-site](https://www.todayonline.com/singapore/saf-detonates-war-relic-found-construction-site).

Lim, Adrian. 'SAF Team to Dispose of Bomb Found on Barge, Singapore'. The Straits Times. 12 August 2016. [http://www.straitstimes.com/saf-team-to-dispose-of-bomb-found-on-barge](http://www.straitstimes.com/singapore/saf-team-to-dispose-of-bomb-found-on-barge).

Ng, Sharmaine. 'SAF Disposes of WW2 Bomb Found on Jurong Island, Singapore News & Top Stories - The Straits Times'. The Straits Times. 3 October 2017. [http://www.straitstimes.com/saf-detonates-war-relic-found-on-jurong-island](http://www.straitstimes.com/singapore/saf-detonates-war-relic-found-on-jurong-island).

Soezean, Martha. 'War Relic Projectile Found at Changi Coast via Land Reclamation Project | The Online Citizen'. The Online Citizen. Accessed 15 January 2018. <https://www.theonlinecitizen.com/2016/08/09/war-relic-projectile-found-at-changi-coast-via-land-reclamation-project/>.

Minesweeper

The sirens wail. Jonathan laces up his boots, picks up his helmet, and hurries down to the *Armskote*³⁶ to draw his rifle. It is mid-week and two more days to booking out. His platoon has been deployed to disarm a bombshell found in the sand stockpile³⁷ in Seletar.

Within minutes he finds himself clad in an olive blast suit, sitting uncomfortably in a five tonner with two other EOD specialists, a dog trainer and his dog, along with piles and piles of sandbags. The platoon heads towards Seletar camp where Jonathan did his EOD training a few months back. Images of the panoramic view of sand dunes during his mealtime at Seletar flash in

his head. He used to circle around the restricted perimeter during his evening runs while he was training at Seletar, always wondering what those dunes are for as they have always been a restricted area.

However, he is more excited about something else. He has heard that a new shooting range has recently opened beside Seletar Camp. This means that they no longer need to travel all the way to Jurong Range to disarm bombs and hence

he could end his day earlier to go for nights-out³⁸.

He sends a quick text to his girlfriend, and she told him to be careful before he arrives in Seletar

As he dismounts from the vehicle in his full gear, his feet sink into the sandy ground. At this

moment, he was reminded of the sandpit playgrounds he used to frequent when he was younger – by now they are all overgrown sandpits infested with ant hills and sand flies. If anyone were to step into those sandpits, they would experience swollen legs and searing pain, definitely not the kind of the fun one likes.

In the heat aggravated by the additional 10kg suit, droplets of sweat trickle down Jonathan's back. He and his team swiftly bring the shell back to the jeep to be disarmed in the newly opened shooting range, right beside the sand stockpile. Soon, another squad of people in civilian clothing emerge

38. Under the statutory requirement of Singapore, every Singaporean male citizen by the age of 18 years old will be conscripted into National Service for 22-24 months to – either in the army, police, or civil defence. In this narrative, the protagonist is an active and combat-fit military personnel who stays in camp during weekdays and is allowed to exit camp for 1 of the weeknights as a break.

and begin manicuring the sand stockpiles back into neat dunes. Jonathan finds it hilarious as they resemble the *Oompa Loompas* from *Willy Wonka's* Chocolate Factory.

The deployment this time is unusual because, throughout history, no shells were ever found in the stockpiles. From the looks of it, it seems like a shell dredged out during the 1960s *Konfrontasi*. It is no more than five meters long as corrosive rusts eat onto the surface of the black metallic shell. As he enters the new shooting range, kerosene smell penetrates the air in a familiar leathery and pungent scent. His team brings in the shell to disarm, but they spotted something amiss. In a split second, Johnathan and his team immediately took cover and jumped behind the trenches of sandbags.

Rounds proliferate exponentially in a second of silence. An explosion lights up in his eyes which is followed by a loud blast, spreading shockwaves across everything in its path.

FT103. [Previous Spread] 'How Much More?'. Workers clearing weed from sand piles. Seletar Link. Photograph: Lin Derong, 2017.

FT104. [Overleaf] 'Tea-Break'. Workers taking a break from manicuring sand piles. Seletar Link. Photograph: Lin Derong, 2017.







FT105. [Previous Spread - Left] 'Transport'. Tipper truck trundling along Seletar Link. Photograph: Lin Derong, 2017.

FT106. [Previous Spread - Right] '24/7 Duty'. False man managing traffic flow along Seletar Link. Photograph: Lin Derong, 2017.

FT107. 'Corridor Ridge'. Longitudinal sand dune stockpiles along Seletar Link. Photograph: Lin Derong, 2017.



Seletar

The stockpile along TPE is a series of sand ridges and dune piles located at Seletar Link; just east of Seletar military camp. The entire premise used to be known as Seletar airbase and it functioned as a military airfield for the British and Japanese army until 1971³⁹. Since the withdrawal of colonial power, the eastern end of the premise has been handed over to SAF as a military facility while the western end became a commercial airport with an upcoming Aerospace Park accessible to the public. The military camp is currently

39. Taylor, D. *Seletar: Crowning glory: The history of the RAF in Singapore*. West Sussex: Woodfield Pub., p. 18.; Urban Redevelopment Authority. 2002. (Accessed 28 October 2017). Former Royal Air Force (RAF) Seletar. Accessed 28 October 2017 from Urban Redevelopment Authority: <https://www.ur.gov.sg/uol/conservation/conservation-xml?id=FRAFS#>

FT108. 'Houses Built On Sand'. Stockpile sitting inertly against Punggol Waterfront Estate on a drizzling day. Photograph: Lin Derong, 2017.

headquarters to the Military Engineers, CBRN Defence (Chemical, Biological, Radiological and Nuclear), and EOD specialist training. The stockpile is reserved for LTA projects.

Guided along by two straight rows of white sand dunes flanking the deserted street of Seletar Link, I ventured further north by foot. About 20 minutes later, I crossed a bridge and caught myself sighting another stockpile site (or rather, an island) with contentment – Pulau Punggol Timor.



FT109. 'Maintenance'. Military vehicle garage and Seletar Stockpile.
Photograph: Lin Derong, 2017.

FT110. [Below] 'Air Park'. Seletar aerospace hangar servicing private jets.
Photograph: Lin Derong, 2017.



T2. FLYING DUTCHMAN

[1°24'58.74"N]
[103°53'36.80"E]

Marina Country Club

Punggol Dormitory

Towards Punggol
Waterfront Housing
Estate

Processing Plants

Link Bridge from
Mainland

Aggregate Terminal
(Restricted Area)

Malaysia/ North

Scale [1:7500]





FT202. 'Finally'. Link bridge between Seletar Link and Pulau Punggol Timor'. Photograph: Lin Derong, 2017.

FT203. [Overleaf] 'Great Sand, Great Wall'. Punggol Timor HDB sand stockpile against Malaysia's Pasir Gudang Port. Photograph: Lin Derong, 2017.





FT204. Pulau Punggol Timor HDB sand stockpile against an aggregate processing plant. Photograph: Lin Derong, 2017.

FT205. [Below] 'Machine'. A series of dust separators and conveyor mills in Pulau Punggol Timor. Photograph: Lin Derong, 2017.

Dear Mr & Mrs Dupont,

Are you ready to party? We warmly welcome you and your partner to usher in the New Year with us at the Flying Dutchman. As one of the Singapore's most exclusive countdown parties in the second year running, we have a massive celebration lineup of music, dance, and fireworks for the dusk-to-dawn beach festival. Network with fellow friends and expatriates as we party the night with International DJs, set against a stunning background!

*Docks open at 7 pm and embarkment closes at 9 pm
Location: 1°25'44.59"N, 103°53'53.26"E, off the coast of Punggol Waterfront.*

Please take note:

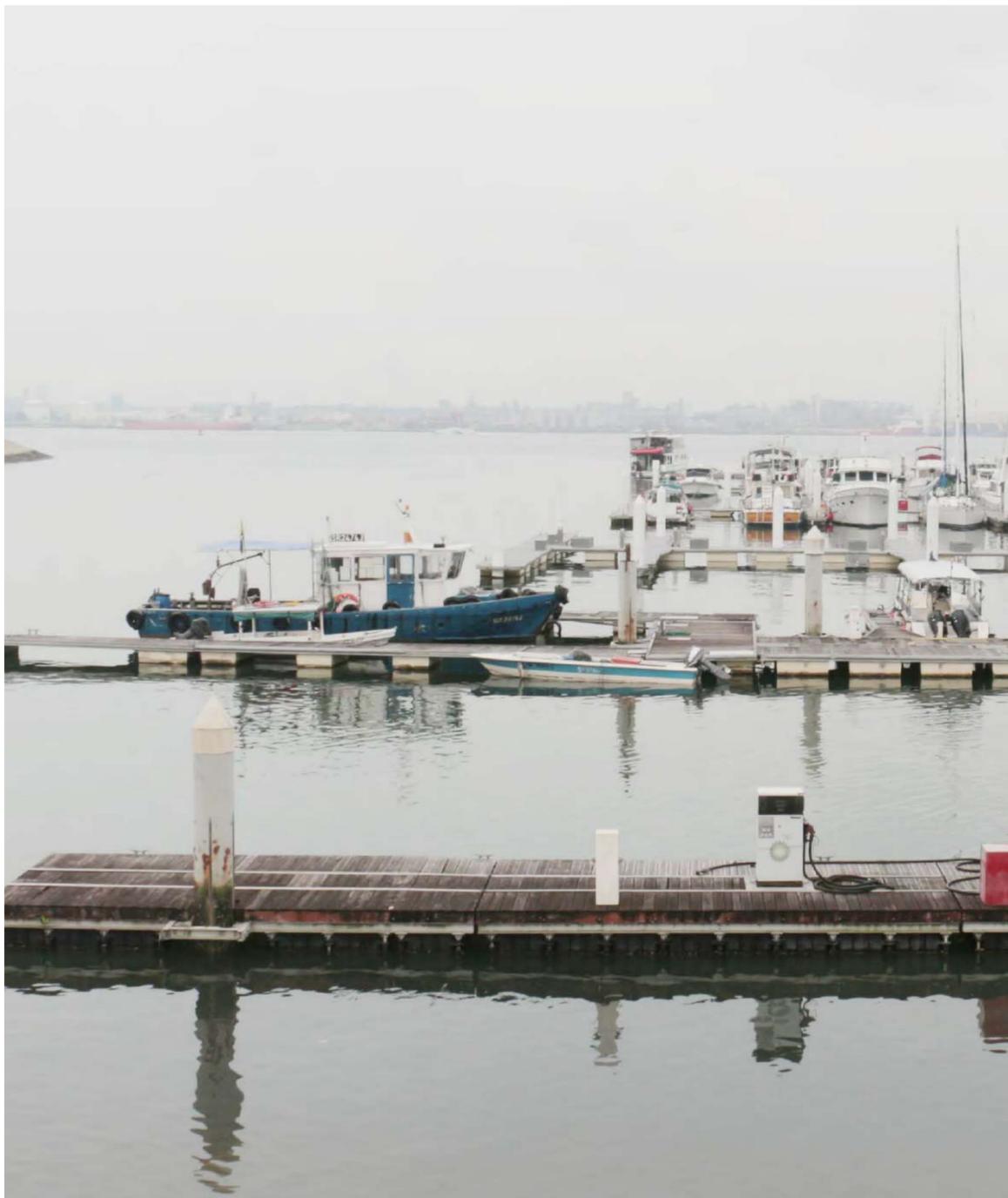
- It's a beach party! Dress lightly; no heels allowed*
- It is highly recommended that you take your private water transport*
- Ensure that you bring this ticket and the complimentary valet ticket enclosed*

There will be security checks. We recommend that you travel light to clear the docks without delay. RSVP by using the pre-paid postage and mail it out before 15th December.

See you there!

Membership N° A08814274876





FT206. [Previous Spread] 'Secret Mountain'.
Imported sand piled inside Punggol's Aggregate
Terminal. Photograph: Lin Derong, 2017.

FT207. 'Water Park'. Private yachts docked at
Marina Country Club on a gloomy day. Photograph:
Lin Derong, 2017.



Flying Dutchman⁴⁰

Mr Dupont checks his hair in the rear-view mirror quickly as he cruises along the deserted Punggol Timor Road. Beside him, sits Mrs Dupont. Her hair elegantly coiffed and dressed in a Chanel baby doll dress clad in black chiffon. The French couple has been working in Singapore for the past decade, and today, for the first time, they are invited to a party to usher in the New Year. Such private events usually are a chore for the couple as they do not like the hassle of going out after a long day of work. This time, they agreed immediately albeit the hefty price for the entrance ticket. Besides the exclusive invite and their love for beaches, they know that their favourite celebrities will be in attendance this year.

Mr Dupont found this invitation a month ago from a private Facebook group through another expat who organises exclusive activities. The name of the barge is called *Flying Dutchman*. According to her, it is a relatively new addition to the Singapore's nightlife landscape. The plan to transform a fully functioning sand barge into an offshore artificial floating beach for one night was an ambitious and a politically delicate undertaking as the sand barge is used to deliver precious sand matter into Singapore. The expat club's organiser blazed through several red-tapes from BCA and contractors to secure a spot for just that one night in the year. This, the organiser argued, would expand the tax revenue from closed-door clubs, ZoukOut, and the existing floating platform at Marina Bay into a new arena. It would also be a lot cheaper and efficient to transfer beach sands in and out of the barge once it has fully unloaded the sand delivery as compared to DBS's beach parties at Marina Bay. Besides, once the barge is out in the open sea, it is no longer bounded by the tight regiment and regulations on land. In a way, the organiser felt that there would be more leeway to plan the party as they wish. Therefore, what better venue would be

FT208. 'Hello Neighbour'. Marina Country Club piers against Malaysia's Pasir Gudang Port. Photograph: Lin Derong, 2017.

FT209. [Overleaf] Sim Chi Yin, *Artificial sand made of crushed granite on a barge* (The New York Times: 2017) Adapted image collage.

for it, than a sand barge? Within the short distance from the marina to the dock, the couple is confronted with another approaching barge. Rows and rows of gargantuan moving mountains drift by in a languid and monumental pace. Crowds on the *Flying Dutchman* assembled to one side of the barge while iPhones are flashed out as murmurings intensify. At the mountain's apex, Mr Dupont spots small moving figures mowing the sand dunes, keeping them in shape.

40. FLYING DUTCHMAN title is adopted from the mythological ghost ship that originated from the 17th century during the golden age of the Dutch East India Company. The ship is believed to be cursed to sail for eternity and if other ships sight this phantom ship, it will signal a bad omen for them. In popular culture, the ship is frequently referenced in films, theme parks and novels. Its first reference appeared in John Macdonald's document/ novel in 1790 See: MacDonald, John. *Travels in Various Parts of Europe, Asia, and Africa, during a Series of Thirty Years and Upwards*. Dublin: Printed for P. Byrne, A. Grueber, W. Jones and R. White, 1791.







As the night falls, the sand barge transforms into a scene akin to the *Pirates of the Caribbean* – plastic masts cladded with sail-cloths, timber decking with no purposes and trompe l’oeil mirrors creating a hallucinatory backdrop of the DJ stage. The designers certainly did their jobs well. Mr Dupont mused to himself whether the decoration theme is appropriate; the barge is already a pirate ship by day in light of the sand saga he read recently. However, the transformation of the barge’s open plan into a surreal mix of beach fantasy and wilderness has already absorbed Mr Dupont in. He has become one with the barge.

The ball dropped at midnight, what comes to unfold undoubtedly is a brand new experience for the couple. Bottles of alcohol with large labels were popped, and cakes are iced with skull designs. Celebrities were drunk in bottles of *Grey Goose* and wasted till the last drop. As music continues to play, bodies frolic in sand, indulging in hedonistic bodily pleasures in the dark of the night. Floating off the coast of Punggol, sand becomes excessive and luxurious just for one night.

The next moment, dawn sends shimmering rays over the placid sea. Mr Dupont finds his body half buried in sand while party hats, empty champagne glasses lie around him. His head is in throbbing pain as he blinks towards the sun with



sand in his eyes. Traces of alcohol mélange with vomit scents dimples through the air and lingers around.

Alas, all dreams come to an end. The guests gradually disappears, and the sand barge returns into a sand barge. As Mr and Mrs Dupont disembark from Marina Country Club slowly, they take one last glance at the barge from afar; astonish at how quickly the sand barge transforms back into its usual self and forgetting that last night was an unrecognisable utopia.

FT210. [Opposite] 'Regulated Waters'. Standing on Punggol coastline on a drizzling day. Photograph: Lin Derong, 2017.

FT211. 'Tow-a-barge'. A half-loaded sand barge and a tow boat against the backdrop of Malaysia's Pasir Gudang Port on a drizzling day. Photograph: Lin Derong, 2017.

Punggol

As I walked along the shifted coastlines at Punggol Waterfront Estate, vis-à-vis Malaysia's Pasir Gudang, floating barges could be spotted off the shores. In 2000, about 245 million tons of sand drifted across the Malaysian border to Singapore. ⁴¹ It was the highest imported amount ever reported to UN COMTRADE for Singapore as she accumulates resources to feed our HDB blocks, Changi, Tekong, Tuas and Jurong Island. Today, Singapore receives imported sand and granite via sand barges at the Pulau Punggol Aggregate Terminal managed by BCA on behalf of MND ⁴². Although our import amount has decreased and has become more regulated over the years, the demand for sand is still rising ⁴³. Along with other natural resources, it is necessary for Singapore to safeguard stockpiles reserves in the interior spaces of our island.

Connected to the mainland via Seletar Link Bridge, Pulau Punggol Timor locates mounds and mounds of sand and granite where the sea once was. Together with Pulau Punggol Barat, these two islands were part of

Singapore's North-eastern coastline reclamation project in 1985 – 1990 ⁴⁴. At an additional area of 685 ha, the area was initially allocated for future public housing ⁴⁵. Today, it hosts a stockpile site, processing plant and an aggregate receiving terminal armed with maximum security and enclosed with fences higher than

street lights. It is clearly a forbidden place for ordinary citizens. The island's only legal access is a wide deserted road cutting through the bordered areas, and it spots construction vehicles, occasional cars, and cycling enthusiasts – connecting them between Coney Island (also known as Pulau Serangoon), Seletar Aerospace Park and TPE.

41. See figure FP110 on page 028.
 42. See Appendix C, figure AC02 on land reclamation management
 43. See figure FP113 on page 031 on the rising demand for sand for land.

44. See figure FT212 and Appendix C, figure AC08a and AC08b on land reclamation project during 1987-2011.

45. HDB. '2009/ 2010 Annual Report'. Singapore: Housing Development Board, 2010.

FT212. New lands reclaimed during 1987-2011. Refer to Appendix C, figure AC08a and AC08b. Drawing: Lin Derong, 2017.



T3. PLAY FACTORY

[1o20'52.01"N]
[103o55'11.97"E]

Condominiums

"Secret"
Entrance Trail

Bedok Reservoir

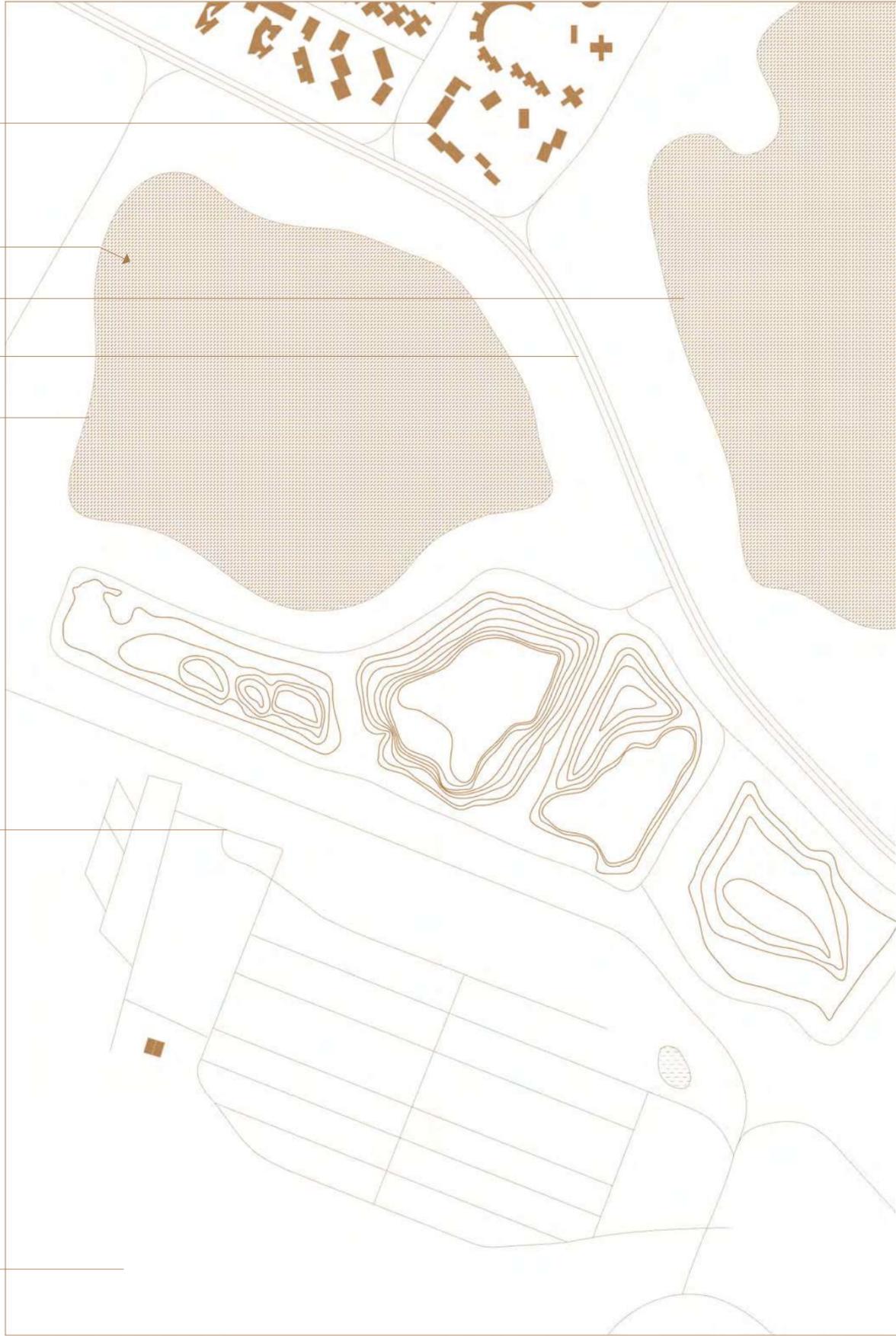
Bartley Viaduct

Tampines Quarry

Paya Lebar Air Base
(Hangars)

Malaysia/ North

Scale [1:7500]



FT301. Tampines Avenue 10. Drawing: Lin Derong, 2017.





Play Factory

The clock strikes twelve. School bell echoes through the long school corridors as throngs of students rush out of the classroom at the end of the school day. For Oliver who is attending primary three, he does not head home immediately even during non-CCA (Co-circular activities) days. The house that he returns to will be empty in the afternoon as his grandmother has recently passed away while his father has left the family. This thus leaves his mother as the sole breadwinner who works as a machinery operator and monitors sand sanitation at a theme park.

The theme park's approval was passed after parents and childhood experts have advocated for less coddling and more freedom for children to explore, problem-solve and create their own play even if it means bruises in sandpit playgrounds⁴⁶. This was also built in line with a one-stop sand processing plant that efficiently distributes sand for beaches and other playgrounds in Singapore.

46. In recent years, sandpit playgrounds are gradually coming back according to reports. See example: Cunico, Kane, and Joyce Ng. "Today's Playgrounds Get Kids to Take Risks, Fail and Toughen up". Channel NewsAsia. 7 June 2016. <https://www.channelnewsasia.com/news/singapore/today-s-playgrounds-get-kids-to-take-risks-fail-and-toughen-up-7998580>.

The newly opened theme park is not very far from Oliver's school, only 15 minutes walking distance. Oliver will always know for sure when he is reaching once he spots the enormous sand dunes from afar. Every afternoon, while waiting for his mother to end her shift, he would spend the afternoon roaming around the theme park with a unique shiny pass given to him by her. With that pass, Oliver could access the 1000 rooms on the premise, except for the processing plants which he could only look through the thick glass walls.



The main reception is elevated up six floors. As Oliver ascends, he presses his cheeks against the glass elevator wall, gazing intensely at the panoramic sand dunes which sit austere under the sunless sky and imagining himself sinking in and playing within the dunes. At times, he would speculate if the Little Prince might appear in those dunes and ask to draw him a sheep.

The void below the first floor is occupied with a sand processing plant that provides sand cleaning and sorting service for both the premise and government building agencies. Sometimes, Oliver would catch a glimpse of workers in yellow caps walking around long conveyor mills and driving bulldozers. "That must be where mummy is," he thinks to himself. The compound is packed with various machinery which Oliver could make no sense of. As a perpetual motion machine, it is the most advanced and elaborated view that he has ever seen and everything seems to be alive. Workers feed it ceaselessly with sand as small heaps of sand moves up and down from the conveyor mills, there is an enormous wheel that spans across two rivers of sand, delivering rows and rows of golden grains that glisten under the afternoon sun. At the end of one

47. Kinetic sand is sold globally as an alternative to sand play in sandpits or beaches. They are sanitised and processed from pristine sand that is able to stay in shape without any binding agent easily.

line, neatly packed bags of kinetic sand with a huge label that reads "S\$24.90/kg" emerge⁴⁷.

FT302. [Previous Spread - Left] 'Sand Drive'. Tampines stockpile along Bartley Viaduct. Photograph: Lin Derong, 2018.

FT303. [Previous Spread - Right] 'Storeroom'. Neat rows of sorted sand dunes/ trapezoids stockpiled behind guarded fences. Photograph: Lin Derong, 2017.

FT304. 'Zoom Zoom'. Split junction of Bartley Viaduct. Photograph: Lin Derong, 2017.



After having a glimpse of the processing plant below, what Oliver sees next has baffled him every time. The 500 rooms on the second floor serve as the sanitation procedure for everyone before they could enter the playground. There isn't much of a queue as it is a Tuesday afternoon: just some parents-to-be, and dogs with their owners. However, during school holidays, it could take up to 2 hours to get inside as Oliver remembers. There will be a long sink for hand washing which is followed by a series of air showers. These are vast rows of chimneys that look like onions whenever Oliver looks up. There is also a nurse stationed to help younger children clean themselves.

After passing the check, Oliver does not bother entering the sandpit. Although Oliver loved going to the sandpit playgrounds when his father was around, his mother would refrain him from playing because of his hand-foot-mouth disease a while back⁴⁸. Nonetheless, he would still watch from the outside.

At the door, an exclusive beach toy set was handed-out to every child who has passed the sanitation procedure. The toy set looks like it could be easily found at any neighbourhood stationary provision shop near where Oliver stays in an HDB estate. However, only those provided by the park could be used inside. Like any other beach toys, it comes with a primary pail and an assortment of spades, toys and other plastic mould accessories for children to play in the sandpit.

48. Cases of hand-foot-mouth diseases in Singapore is reported to be rampant among children and the main cause suggests unhygienic collective play in shared play areas, including sandpits. For example, Ministry of Health, Singapore. 'Hand, Foot and Mouth Disease'. Health Hub, 29 January 2018. Moyer, Melinda Wenner. 'Sandboxes Are Disgusting! Are You Sure You Want Your Kids Playing in Them?' Slate Magazine, 15 October 2015.

FT305. 'Granular Texture'. Composite close up images of Tampines sand stockpile. Photograph: Lin Derong, 2017.

FT306. [Overleaf] 'Highway View'. Driving up Bartley Viaduct. Photograph: Lin Derong, 2018.

The accompanying moulds come in a myriad of forms, starfish, footprints, sea shells, or anything you can relate to the beach. The assortment of various pail sizes also creates the multiple types of sandcastles. It doesn't come in many colours though, only silver and black, and it probably costs ten times more than those near his house.

He recognises some of his friends inside, but they are too concentrated with their intimacy with the material. As he watches his friends and other children digging, scooping, scraping, moulding, patting, sculpting, repairing and getting lost in the cycle of excavation, construction and destruction, their hands are adapted artistically and at the same time, like those industrial workers working below them. On the opposite side of the arena, a group of woman with big tummies performs yoga in sand under fluorescent lighting with air-purifiers scattered around, while dogs cavort and gambol around the sand track, chasing each other in the comfort and hygiene of the air-conditioned box.

When the evening draws in, the workers and children start to leave the premise while sounds of machinery gradually die down. Oliver meets his mother in the locker room while she changes out into her jeans and deposits her lab coat. As they make their way home, Oliver holds a 100g bag of kinetic sand in his hands and thinks to himself perhaps one day, he could own a sandcastle in a gigantic kingdom – just like the one he sees every day at the sand dunes.





FT307. 'Playground?'. Space reserve for future stockpile.
Photograph: Lin Derong, 2018.





Tampines

It was a Saturday afternoon when I was making my way to Tampines IKEA. Driving up Bartley viaduct via Tampines Avenue 10, one would encounter fleeting moments of sand pyramids and trapezoids that lie fenced within a large plot of land.

Five years later, I came back as a thesis student to these very sand dunes on purpose. The “Tampines Stockpile Site” comes under the HDB’s Building Technology Department Resources Management⁴⁹, as evident from the large signboard at the entrance. It has a double layered fence that protects four neat rows of clearly separated sand types: granite, gravel and sand. Around the fences stand several signs with a washed-out text that says: “Sand Supply Office” with an old seven-digit telephone number behind⁵⁰.

49. See figure FEP01 on page 136-137
50. By 2002, the digit “6” was added to fixed telephone lines, making it eight digits from the seven digits introduced in 1985.

The stockpile site nestles in the midst of Tampines heartland and is surrounded by two water features: Tampines Quarry and Bedok Reservoir. Tampines Quarry sits north of the stockpile while Bedok Reservoir is separated by Bartley Viaduct to the east. These two features used to be sand quarries owned by HDB for the East Coast Reclamation projects in

51. See Appendix C, figure AC07b.

52. ‘No More Just a Hole in the Ground’. *The Straits Times*. 13 November 1983. NewspaperSG.

53. *The Straits Times*, p. 9. Retrieved from NewspaperSG. And Public Utilities Board. (1997). Singapore’s water supply. Singapore: Author, p. 5. (Call no.: RSING 628.1095957 SIN); Two proposed reservoirs to be linked. (1980, August 18). *The Straits Times*, p. 9. Retrieved from NewspaperSG. The scheme encompassed two reservoirs, a water treatment plant and nine storm water collection stations. A dam was built across the mouth of Sungei Seletar to form the Sungei Seletar Reservoir (now called Lower Seletar Reservoir), whereas the sand quarry converted into Bedok Reservoir.

54. <https://www.pub.gov.sg/abcwaters/explore/bedokreservoir>. <http://www.straitstimes.com/singapore/lake-at-the-back>. Tampines Quarry is informally known as a hidden landscape where activities include informal gathering, fishing, biking, resting, flying drones, photography, jogging, trekking and boat racing.

FT308. [Previous Spread] ‘Singapore Desert’. Massive landscape along Bartley Viaduct. Photograph: Lin Derong, 2018.

FT309a. ‘Secret Garden’. A makeshift platform in Tampines Quarry. Photograph: Lin Derong, 2017.

FT309b. [Overleaf] Ibid.

the 1970s.⁵¹ By 1983, their sand resource had already been depleted, leaving a barren hole in the ground⁵². Bedok sand quarry was converted into a stormwater collection by PUB as part of its Sungei Seletar/Bedok Water Scheme⁵³ to meet the growing demand for fresh water. Whereas the Bedok Reservoir remained as a productive ground, Tampines Quarry fell into disuse as rainwater accumulates over the years, turning it into a lake. Although it is now surrounded by tall bushes and tucked away from main access, it is known by Tampines residents as a hidden park that hosts a trove of leisure and recreational activities⁵⁴ just like Bedok Reservoir. Piquing my interest in this “secret” landscape, I made it a point to detour to Tampines Quarry on my Tampines stockpile visit. Deviating from my “Sand Dune - Bedok Reservoir” itinerary, I walked along the stockpile site’s eastern periphery and spotted a small opening amidst

thick bushes with a tracking trail. The green sign at the entrance says 'STATE LAND; trespassers will be prosecuted'. Should I be caught, I will be fined. I reckoned that I must make this visit quick. Although there was a tracking trail, one must cut through waist-high lalangs and soggy mud to progress deeper into the quarry. Dressed in high-cut running shorts, my legs were not spared from the cuts and mosquito bites.

The quarry view unfolded before me as I climbed up a makeshift viewing platform made of a bare steel structure to set-up my tripod and camera.

The platform gave a panoramic view of the sand dunes in the stockpile, sitting inertly by the waterfront surrounded by greenery. It is somewhat hard to fathom such a "natural" and surreal landscape in the middle of our concrete jungle. Most people could not tell where my photos were taken.

55. A Singlish lingo that expresses disappointment.

56. It has been a challenge to document and capture the surreal atmospheric landscapes of these fenced up stockpiles. I am uncertain if the camera has been successful in doing so, or perhaps other people could feel it. They all sit in specific contexts. If I zoom out, I see the fences; move to the left, I see condominiums, move to the right, and I'll see nothing but roadside trees.

57. Jamieson, William. 2015. "There's Sand in My Infinity Pool: Land Reclamation and the Rewriting of Singapore". University College London.

Some were dismissive about it and replied "chey"⁵⁵ when I said that it is in Singapore.

Although I have to admit that I cropped the images in very particular ways⁵⁶, I did not apply any filters or Photoshop edits to make them look hipster or exotic. I started out this project aiming to document "things as they are" and yet on first intuition one would not guess Singapore. Effectively our pragmatic planning of land has rendered our Singaporean landscape to be inconceivable unless the state again activates them like how they transformed Bedok Reservoir⁵⁷.

FT310. [Overleaf] 'All Natural'. Sand dunes seen from Tampines Quarry. Photograph: Lin Derong, 2017.





EPILOGUE

When a sand dune is a sand dune is a sand dune⁵⁸

Singapore's landscape is one that has changed and will continue to evolve. Throughout this thesis-prep, these stockpiled sand dunes have provided another perspective to look at Singapore as a developmental state caught in the perennial crisis of *resource scarcity*.

As I sat down to start writing this report, the challenge was to make sense out of these sand dunes in stockpiles. Through *activating* fiction as a framework, I have attempted to do so by juxtaposing the practico-inert nature of stockpiles with the subjective and tactile quality of sand. Using stories to narrate our imagination, relationship and affective encounter with sand in the context of Singapore through different stratus of the society, they form a direct critique of state's treatment of sand in Singapore as an abstract entity. Stemming from my own avocation of sand as play for the everyday Singaporeans, the disjuncture between *state's sand* and *people's sand* is further aggravated by their on-going spatial separation. This fueled me to investigate further to show the struggle in understanding sand as a national resource with its brute economics and as its everyday tactile use. These exposed the gaps – between sand that is locked in a national stockpile and sand that we experience everyday – has shown us how it is at times baffling and difficult to negotiate through. It is akin to my encounter with the four foreign workers scrambling and scaling up the sand dunes at Seletar and Punggol, manicuring weeds off the sand painstakingly by hand as the tropics take revenge on the stockpile's 'desertification'.

58. The title is adapted from studio discussions and embodies my struggle to read these stockpiles as a site given the limited information access to the provenance of these sand.

FEP01. [Overleaf] 'I'm Home'. HDB Tampines Sand Stockpile Site. Photograph: Lin Derong, 2017.

Towards a Ludic Terrain

Although the thesis-prep does not know how to bridge these gaps, the inquiry profits from the unexpected spatial implications and contradictions embedded within these gaps.

Referring back to the group work when our studio first started out on *Activism and Territory*, the narratives, situated around the three stockpile sites, capture different positions in which one could subvert through play. As resistance unfolds differently in the three sites, the three sets of spatial interventions sit right beside the stockpiles and frames the sand dunes as a landscape and as a spectacle – In Seletar, the shooting range is an overt confrontation of sand in a life-and-death situation with its utilitarian purpose as a safety barrier. The sand barge off Punggol in the second narrative is a temporary utopia, whereas the narrative at Tampines is a hyper-utilitarian and efficient theme park that quietly criticises the state sand on a daily basis through an *aestheticisation*.

The resulting series of architectural intervention on site should primarily embody the struggles as we juxtapose between *state's* and *people's sand* through a re-examination of the programmatic ecology of sand and its tactile experience as matter and material. The (dis)connection between the site context and the impending intervention as a deterritorialised state – one that is mutable, malleable and affective – would be made apparent as a point for further discourse.



THIS AREA IS
MONITORED BY
CCTV CAMERAS

 HOUSING &
DEVELOPMENT
BOARD

[Blank sign]

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APPENDIX A
Extracting Sand

[List of figures in Appendix A]

AA01. Formation Method: Underground Mining. Drawing: Lin Derong, 2017.

AA02. Formation Method: Surface Mining. Drawing: Lin Derong, 2017.

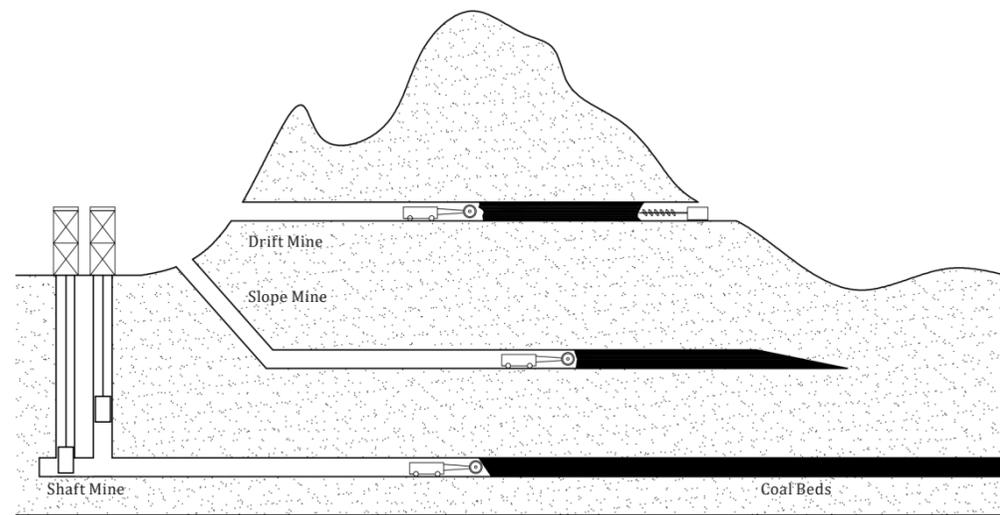
AA03. Breaking Wave & Typical Beach Profile. Reference Source: Welland, Michael. 2009. 'Moving On: Waves, Tides and Storms'. In *Sand: The Never-Ending Story*, 107-45. Berkeley, CA: University of California Press. Reconstructed Drawing: Lin Derong, 2017.

AA04. Formation Method: Mechanical Dredging. Drawing: Lin Derong, 2017.

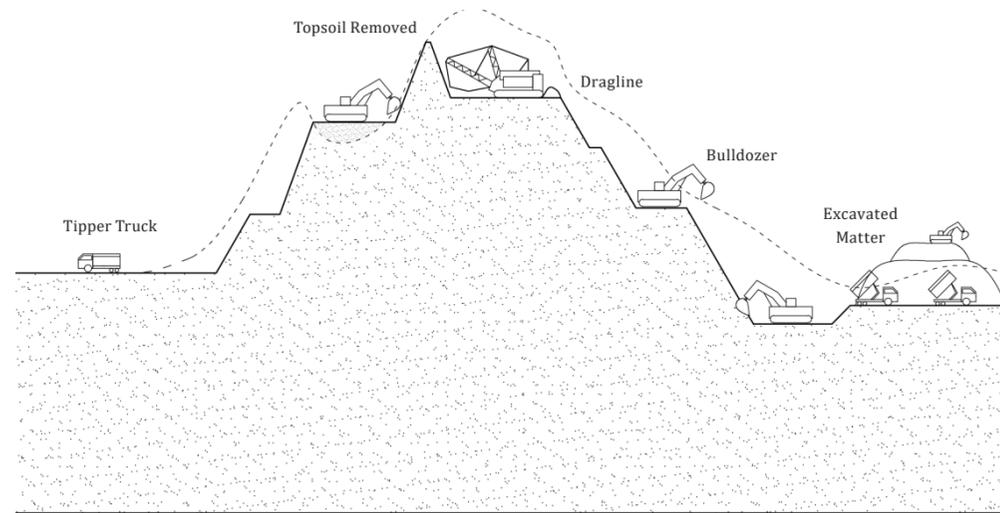
AA05. Formation Method: Hydraulic Dredging. Drawing: Lin Derong, 2017.

AA06. Formation Method: Artificial Sources. Drawing: Lin Derong, 2017.

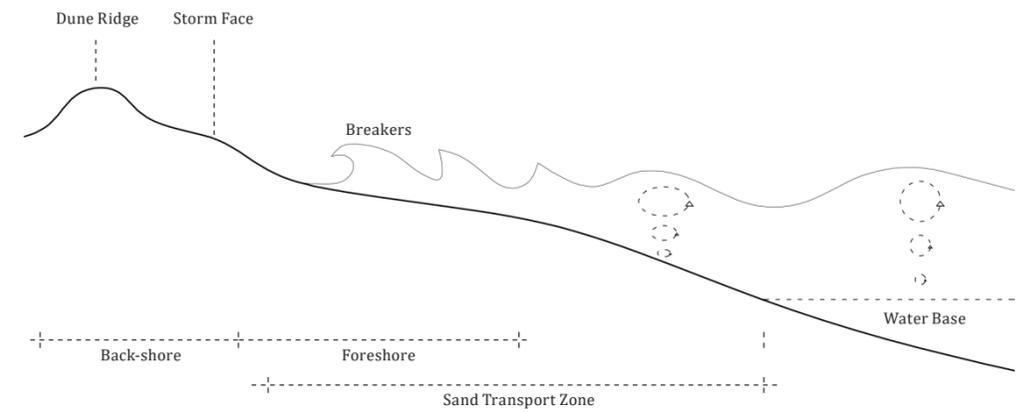
AA07. Frac Sand Plant Process. Drawing: Lin Derong, 2017.



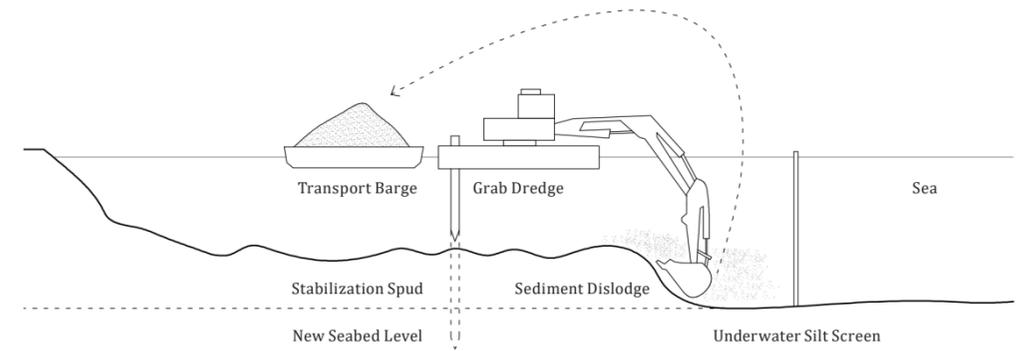
AA01. Formation Method: Underground Mining. Drawing: Lin Derong, 2017.



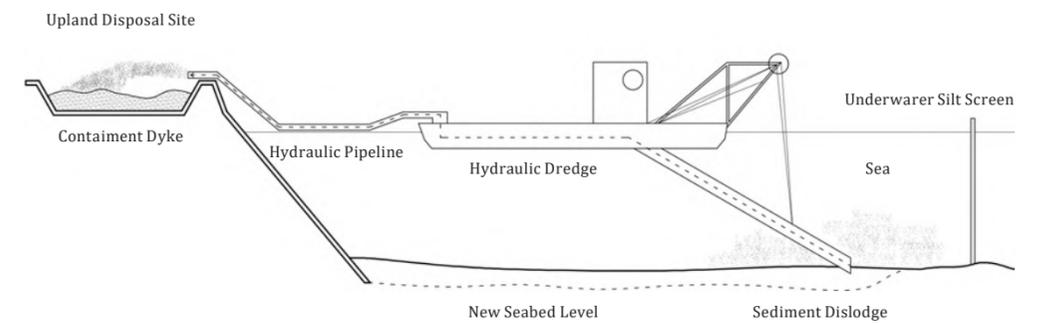
AA02. Formation Method: Surface Mining. Drawing: Lin Derong, 2017.



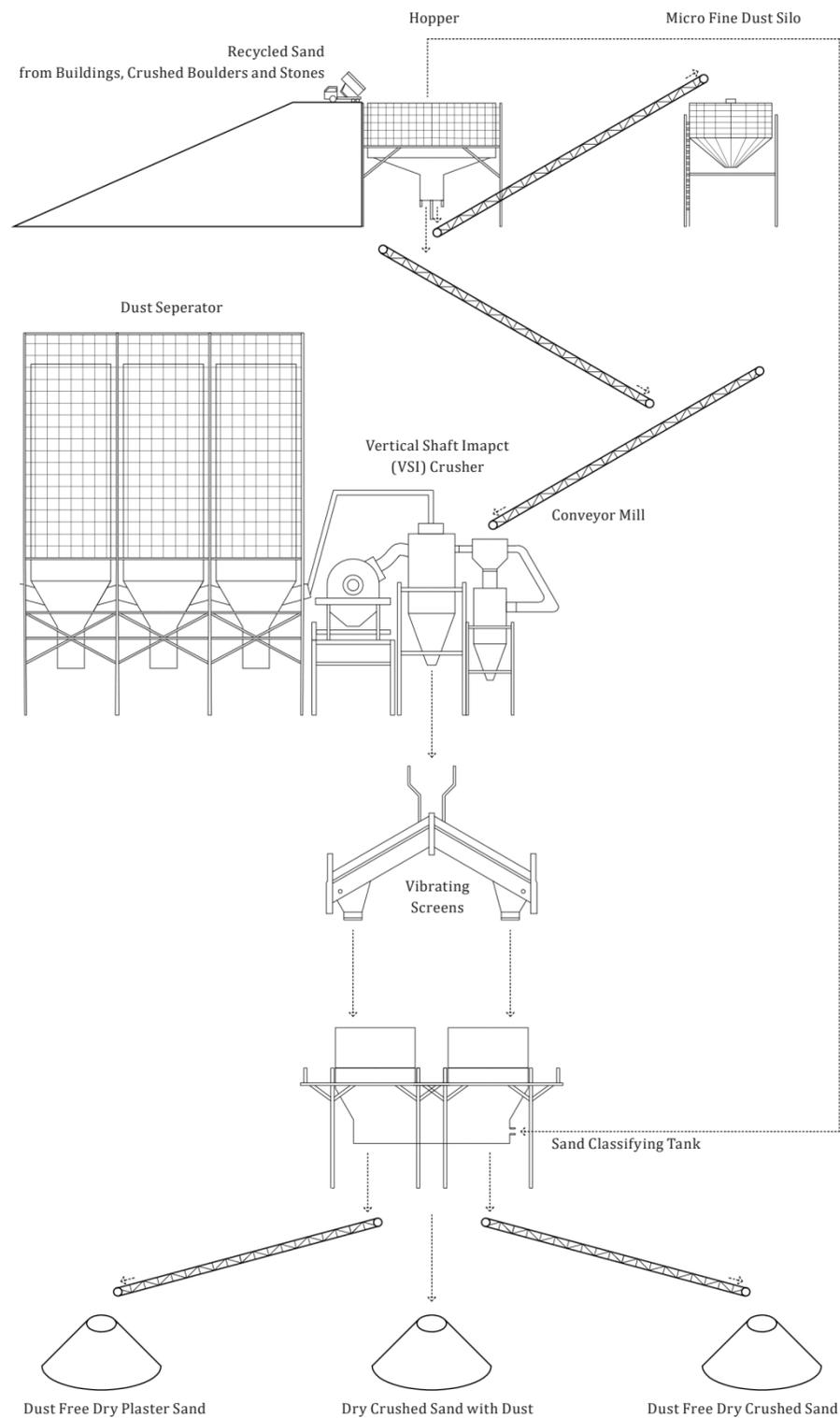
AA03. Breaking Wave & Typical Beach Profile. Reference Source: Welland, Michael. 2009. 'Moving On: Waves, Tides and Storms'. In *Sand: The Never-Ending Story*, 107-45. Berkeley, CA: University of California Press. Reconstructed Drawing: Lin Derong, 2017.



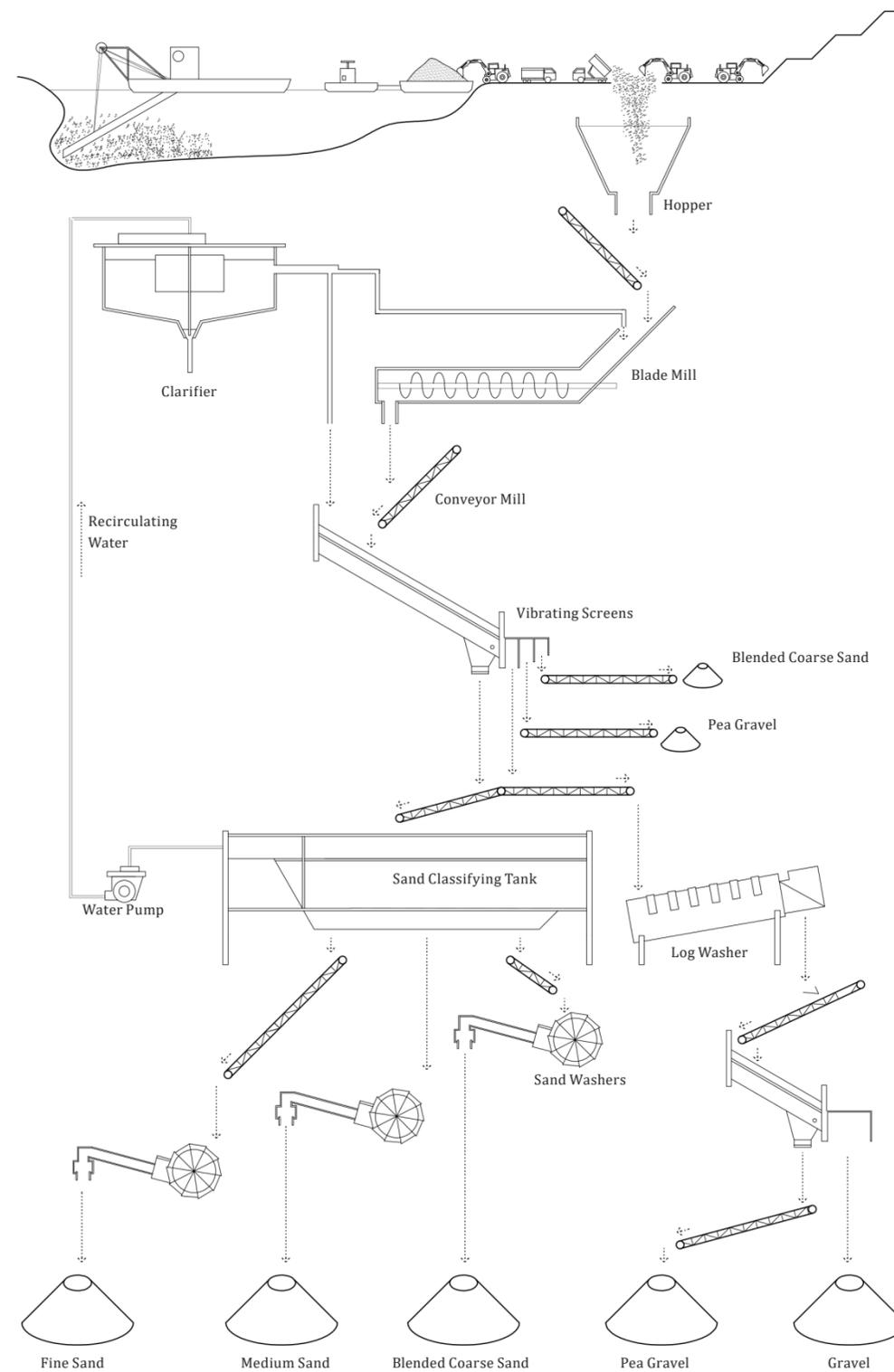
AA04. Formation Method: Mechanical Dredging. Drawing: Lin Derong, 2017.



AA05. Formation Method: Hydraulic Dredging. Drawing: Lin Derong, 2017.



AA06. Formation Method: Artificial Sources. Drawing: Lin Derong, 2017.



AA07. Frac Sand Plant Process. Drawing: Lin Derong, 2017.

APPENDIX B
Transporting & Stockpiling Sand - Satellite Views

Sand as raw resource is received at four staging grounds: Changi, Tanah Merah, Tuas and Marina. Upon arrival, they will be sorted out in a processing plant and then distributed to various sites by tipper trucks. Most tipper trucks will gather at Changi and Pulau Punggol Timor, which is managed by HDB, and take in earth for all construction projects. For offshore construction projects, sand will be loaded onto sand barges again. Sand for stockpiling will be transported to four major stockpile sites: Seletar Link, Pulau Punggol Timor, Tampines Avenue 10, and most recently in June 2017, Tuas (but it's referred to as a "surcharge" to top up extra sand for Tuas reclamation project, not stockpile).

[List of figures in Appendix B]

AB01. See FP114. Where does Singapore receive and store her sand? Reference Source: 1. BCA. n.d. 'Aggregate Terminals'. Accessed 19 November 2017. <https://www.bca.gov.sg/AggregateTerminals/pratandtat.html>. 2. Tan, Ria. n.d. 'Builders Facing Long Wait to Dump Earth'. Wild Singapore (blog). Accessed 19 November 2017. <http://wildsingaporenews.blogspot.sg/2012/06/builders-facing-long-wait-to-dump-earth.html#.WhErgzdx2Um>. 3. MPA. 'Construction Of Temporary Jetty and Roll on Roll Off (RORO) Ramp in Tuas View Basin and At Tuas Staging Ground.' Singapore: Maritime and Port Authority of Singapore, 18 September 2017. Drawing: Lin Derong, 2017.

AB02a. Changi Staging Ground. Most tipper trucks will gather at Changi, which is managed by HDB, and takes in earth from all construction projects. Combined screen capture from Google Earth by author. Accessed 25 October 2017.

AB02b. Close-up, Ibid.

AB03a. Tanah Merah Staging Ground. Combined screen capture from Google Earth by author. Accessed 25 October 2017.

AB03b. Close-up, Ibid.

AB04a. Tuas Staging Ground and Aggregate Terminal accepts only a specific high-quality grade of sand to be used immediately for land reclamation. It is also managed by BCA on behalf of MND. Combined screen capture from Google Earth by author. Accessed 25 October 2017.

AB04b. Close-up, Ibid.

AB05a. Marina Staging Ground is located at Marina Coastal Drive and Fort Road, they are run by LTA. Reserved for transport-related developments such as extensive excavation projects for new MRT lines. Combined screen capture from Google Earth by author. Accessed 25 October 2017.

AB05b. Close-up, Ibid.

AB06. Satellite view of Seletar Link Sand Stockpile Site. Combined screen capture from Google Earth by author. Accessed 25 October 2017.

AB07. Satellite view of Pulau Punggol Aggregate Terminal and Pulau Punggol Timor Sand Stockpile Site. Combined screen capture from Google Earth by author. Accessed 25 October 2017.

AB08. Satellite view of Tampines Sand Stockpile Site. Combined screen capture from Google Earth by author. Accessed 25 October 2017.

All plans, cartographic maps, satellite images are oriented in one direction unless otherwise stated.



Legend Scale[1:250,000]

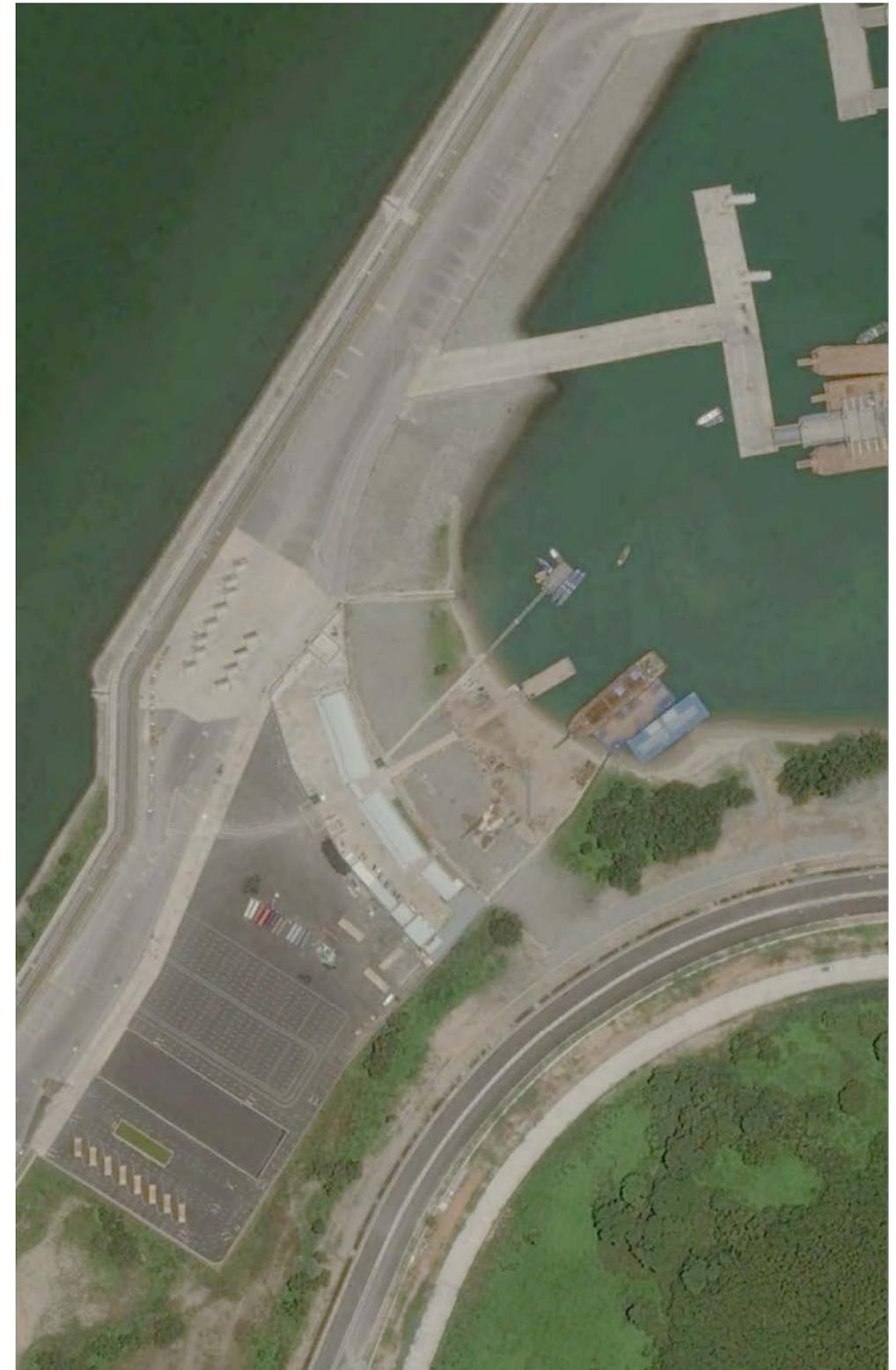
Singapore Territorial Boundary	—
Waterbody	■
Sand Banks	■



AB01. See FP114. Where does Singapore receive and store her sand?
 Reference Source: 1. BCA. n.d. 'Aggregate Terminals'. Accessed 19 November 2017. <https://www.bca.gov.sg/AggregateTerminals/pratandtat.html>. 2. Tan, Ria. n.d. 'Builders Facing Long Wait to Dump Earth'. Wild Singapore (blog). Accessed 19 November 2017. <http://wildsingaporenews.blogspot.sg/2012/06/builders-facing-long-wait-to-dump-earth.html#.WhErgzdx2Um>. 3. MPA. 'Construction Of Temporary Jetty and Roll on Roll Off (RORO) Ramp in Tuas View Basin and At Tuas Staging Ground.' Singapore: Maritime and Port Authority of Singapore, 18 September 2017.
 Drawing: Lin Derong, 2017.



AB02a. Changi Staging Ground. Combined screen capture from Google Earth by author. Accessed 25 October 2017.



AB02b. [Opposite] Close-up, Ibid.



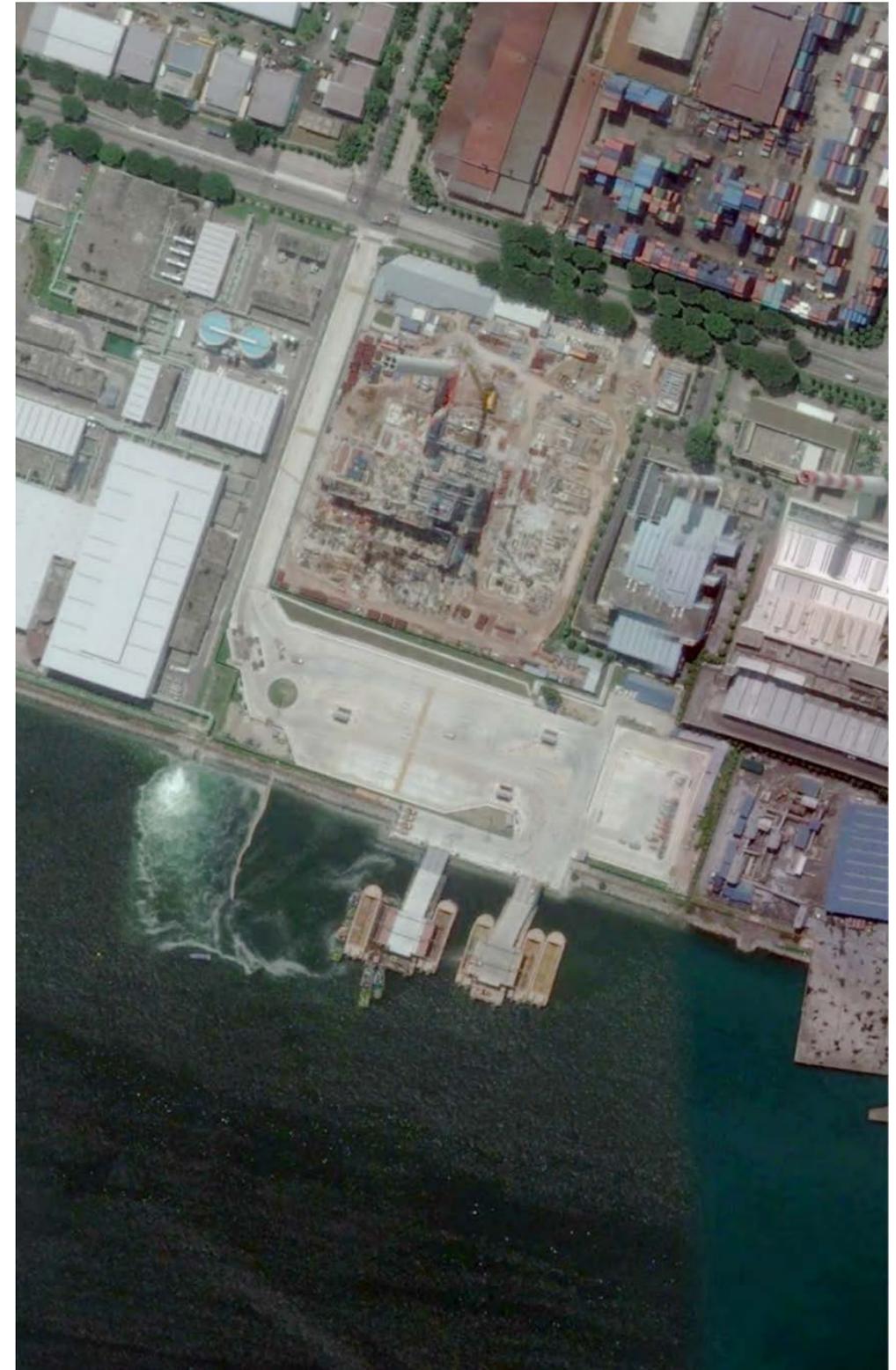
AB03a. Tanah Merah Staging Ground. Combined screen capture from Google Earth by author. Accessed 25 October 2017.



AB03b. [Opposite] Close-up, Ibid.



AB04a. Tuas Staging Ground and Aggregate Terminal accepts only a specific high-quality grade of sand to be used immediately for land reclamation. It is also managed by BCA on behalf of MND. Combined screen capture from Google Earth by author. Accessed 25 October 2017.

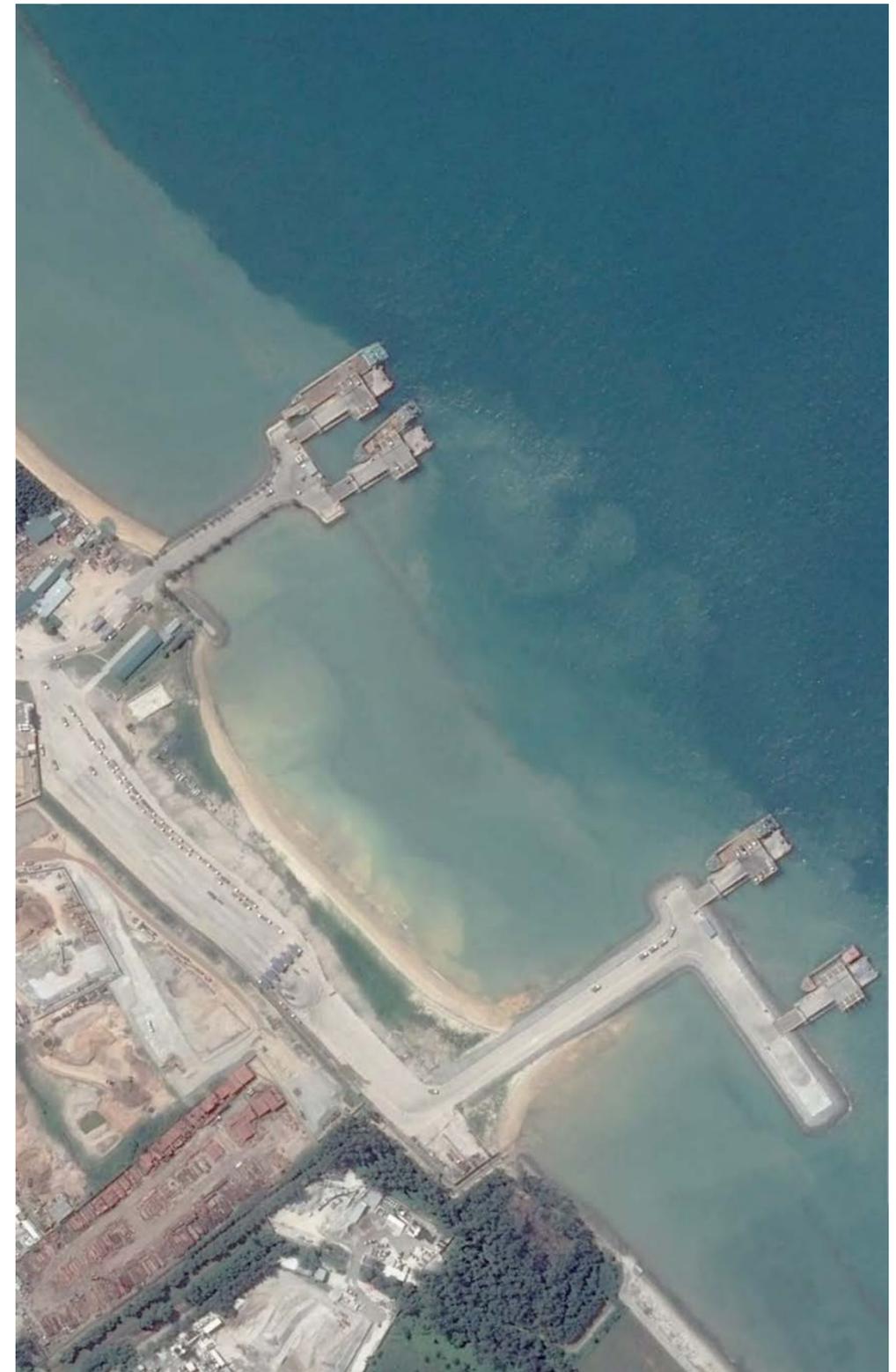


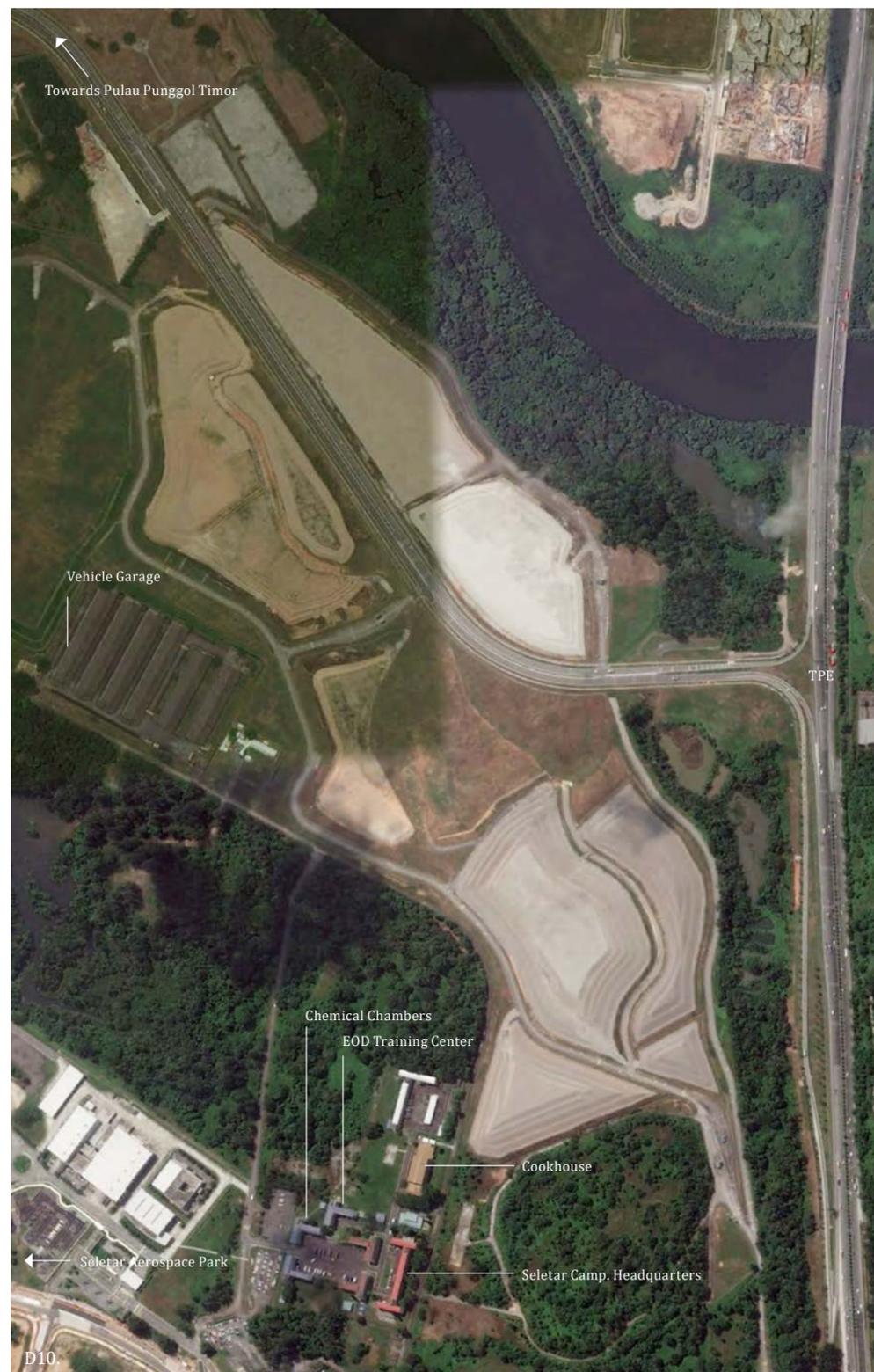
AB04b. [Opposite] Close-up, Ibid.



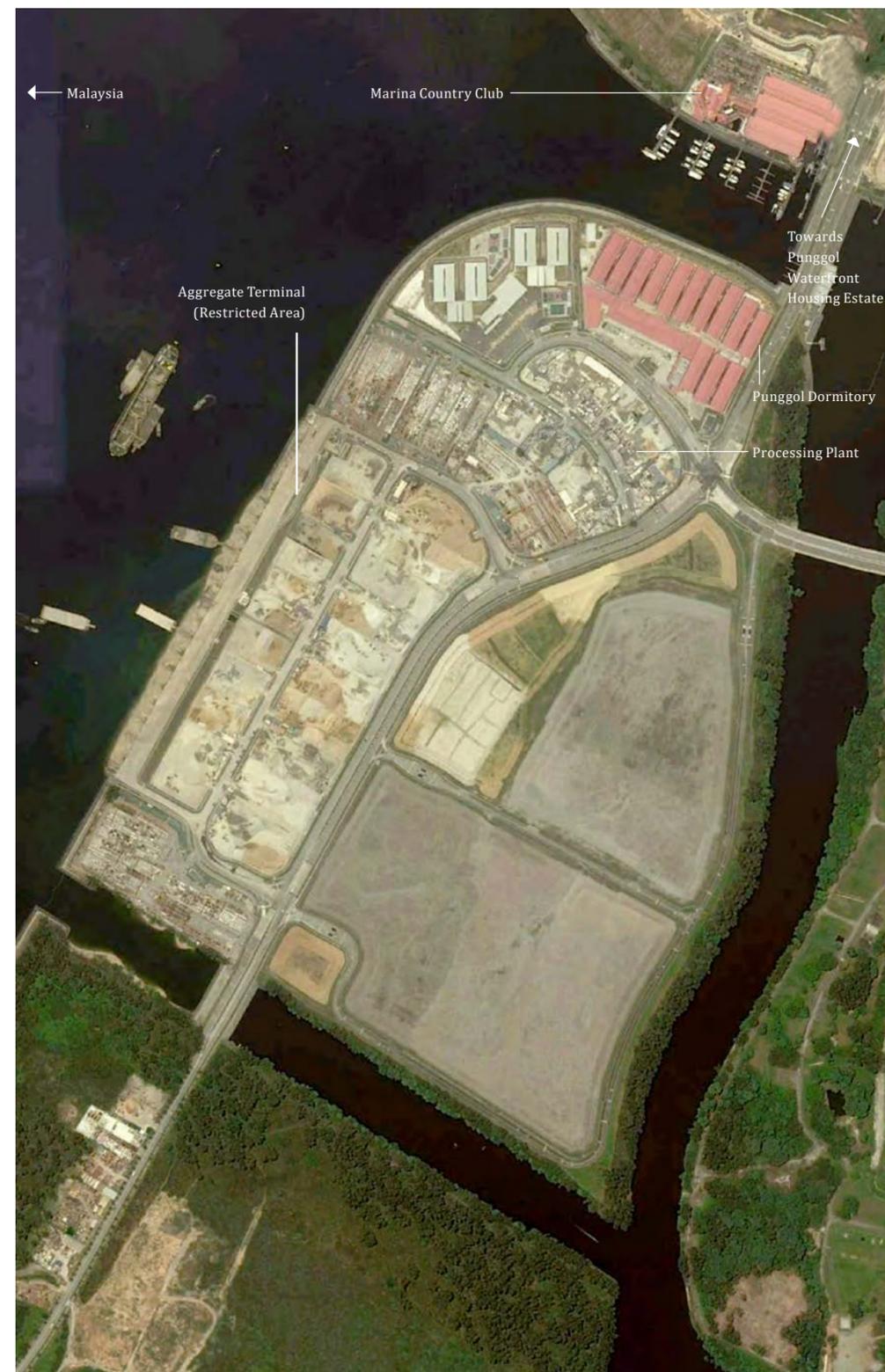
AB05a. Marina Staging Ground is located at Marina Coastal Drive and Fort Road, they are run by LTA. Reserved for transport-related developments such as extensive excavation projects for new MRT lines. Combined screen capture from Google Earth by author. Accessed 25 October 2017.

AB05b. [Opposite] Close-up, Ibid.





AB06. Satellite view of Seletar Link Sand Stockpile Site. Combined screen capture from Google Earth by author. Accessed 25 October 2017.



AB07. Satellite view of Pulau Punggol Aggregate Terminal and Pulau Punggol Timor Sand Stockpile Site. Combined screen capture from Google Earth by author. Accessed 25 October 2017.



AB08. Satellite view of Tampines Sand Stockpile Site. Combined screen capture from Google Earth by author. Accessed 25 October 2017.

APPENDIX C Sand for Land for Population

[List of figures in Appendix C]

AC01. Land Reclamation: Technique used for Tuas in 1988. Referenced Source: Chia, Lin Sien, Habibullah Khan, and L. M. Chou. 1988. 'The Coastal Environmental Profile of Singapore'. Manila: International Center for Living Aquatic Resources Management on behalf of the Association of Southeast Asian Nations/United States Coastal Resources Management Project. Reconstructed Drawing: Lin Derong, 2017.

AC02. Land Reclamation: Administrative Process in Singapore. Source: FCL, ETH, 2013. Reconstructed Diagramme: Lin Derong, 2017.

Figure **AC03 - AC09b** maps Singapore's land transformations. **They are reconstructed in 1:250,000 scale, based on two sources.**

1. Topalovic, Milica, Hans Hortig, and Stefanie Krautzig. n.d. 'Architecture of Territor. Sea Region. Singapore. Johor, Riau Archipelago'. Singapore: ETH Zurich DArch, FCL Singapore.

2. Koninck, Rodolphe de, Julie Drolet, and Marc Girard. 2008. *Singapore: An Atlas of Perpetual Territorial Transformation*. Singapore: NUS Press.

AC03. Singapore Land-Sea Area - Pre-1820. Reconstructed Drawing: Lin Derong, 2017.

AC04. Singapore Land-Sea Area - 2050 Projection. Reconstructed Drawing: Lin Derong, 2017.

AC05a. Singapore Land-Sea Area - 1820-1958 Colonial Shores. Reconstructed Drawing: Lin Derong, 2017.

AC05b. 1820 - 1958, New Land.

AC06a. Singapore Land-Sea Area - 1958-1974 National Woes and Housing. Reconstructed Drawing: Lin Derong, 2017.

AC06b. 1958-1974, New Land.

AC07a. Singapore Land-Sea Area - 1974-1987 Global City. Reconstructed Drawing: Lin Derong, 2017.

AC07b. 1974-1987, New Land.

AC08a. Singapore Land-Sea Area - 1987 - 2011 Towards a Greater Global Hub. Reconstructed Drawing: Lin Derong, 2017.

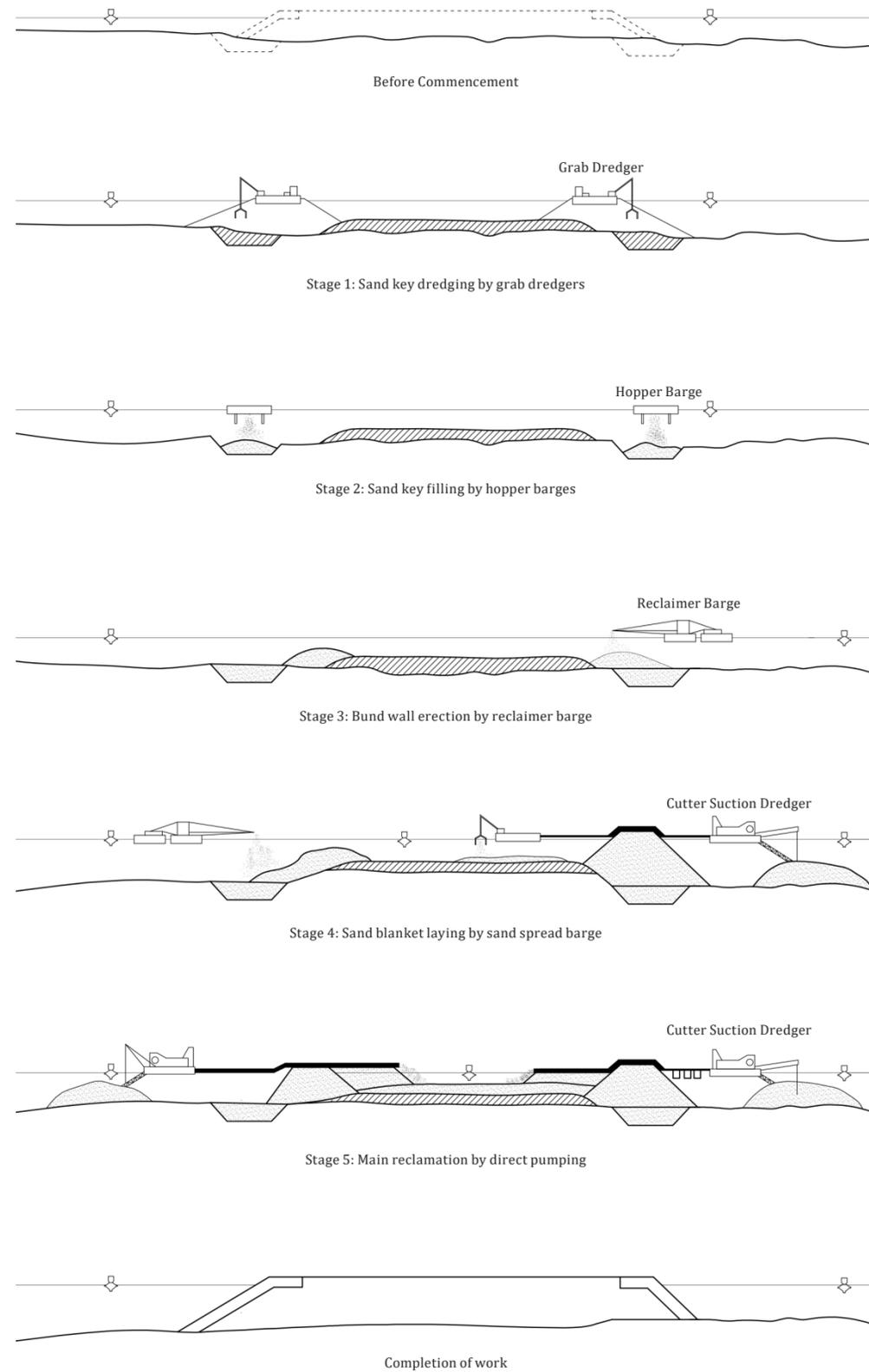
AC08b. 1987 - 2011, New Land.

AC09a. Singapore Land-Sea Area - 2011 - 2050 Projective Coastline: Pushing limits. Reconstructed Drawing: Lin Derong, 2017.

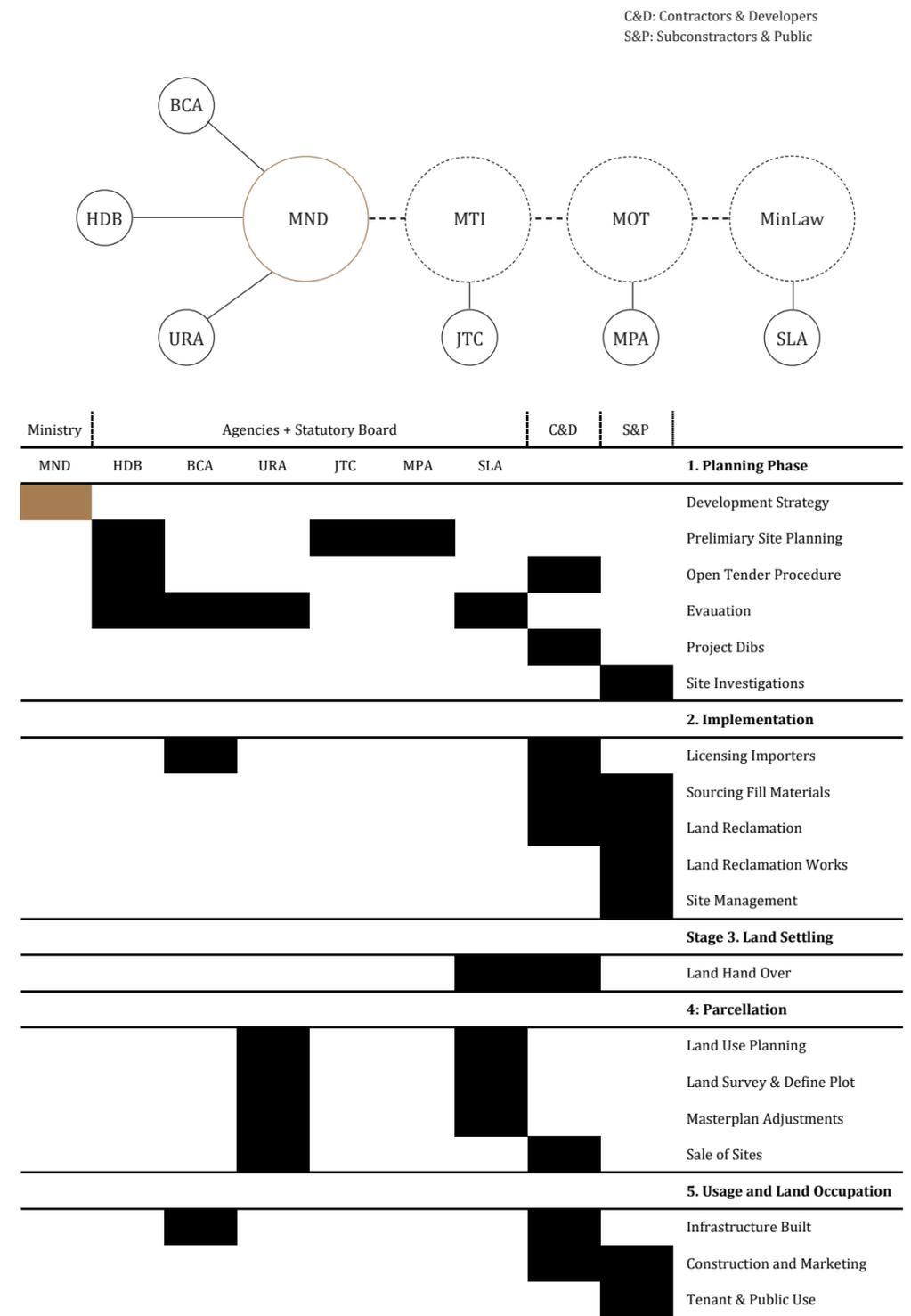
AC09b. 2011 - 2050, New Land.

All plans, cartographic maps, satellite images are oriented in one direction unless otherwise stated.





AC01. Land Reclamation: Technique used for Tuas in 1988. Referenced Source: Chia, Lin Sien, Habibullah Khan, and L. M. Chou. 1988. 'The Coastal Environmental Profile of Singapore'. Manila: International Center for Living Aquatic Resources Management on behalf of the Association of Southeast Asian Nations/United States Coastal Resources Management Project. Reconstructed Drawing: Lin Derong, 2017.



AC02. Land Reclamation: Administrative Process in Singapore. Source: FCL, ETH, 2013. Reconstructed Diagramme: Lin Derong, 2017. The hierarchical structure of the previous colonial society was replaced by a paternalistic one party system. Figure in the opposite page depicts network of government agencies, subsidiary boards and ministries involved in sand trade and land reclamation. Broken loosely down into the administrative procedures behind the actual physical reclamation, MND seems to be managing the entire process - stringing the ministries, statutory boards and private contractors together.

Legend Scale[1:250,000]

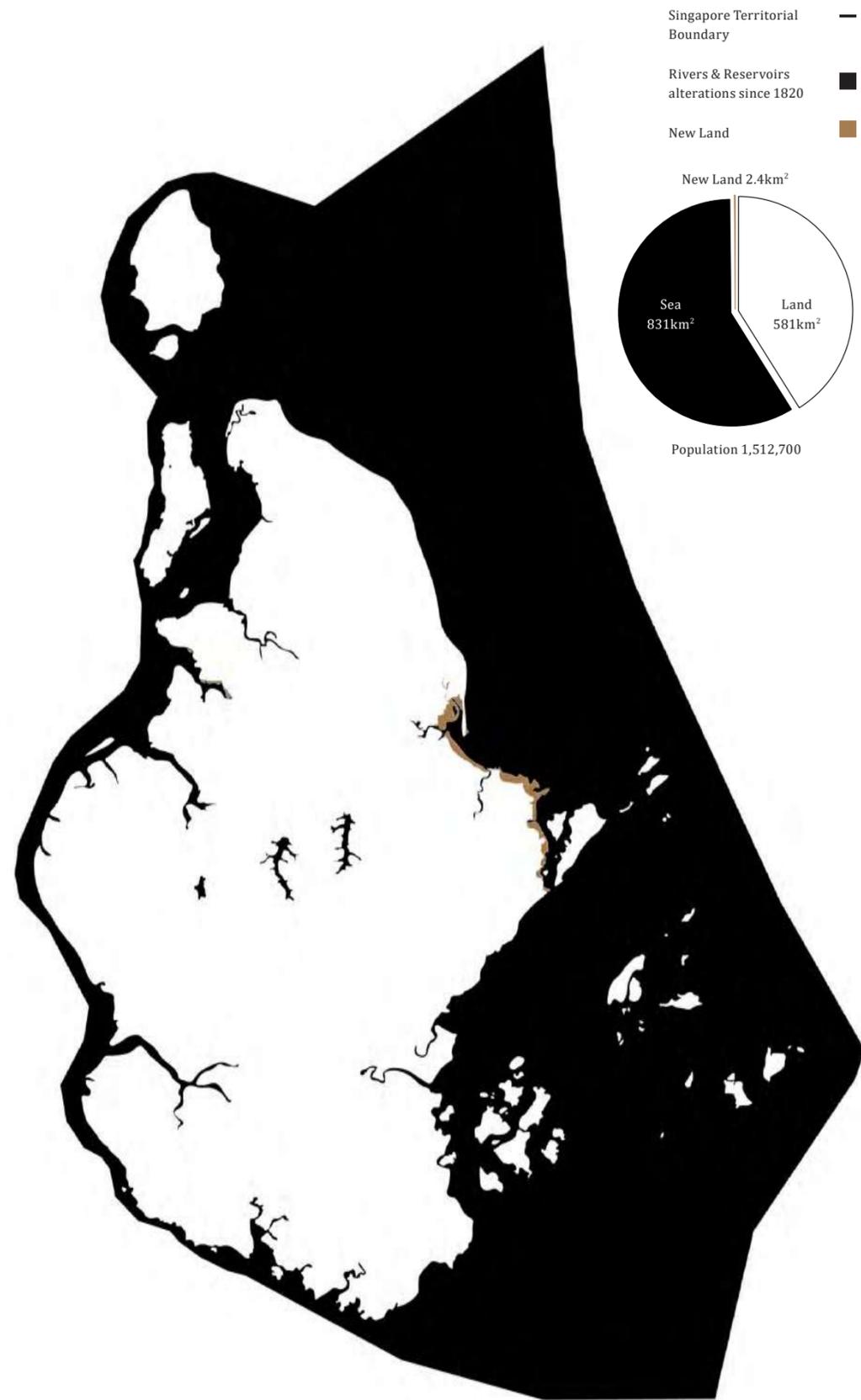
- Sea
- Land



AC03. Singapore Land-Sea Area - Pre-1820. Reconstructed Drawing: Lin Derong, 2017.

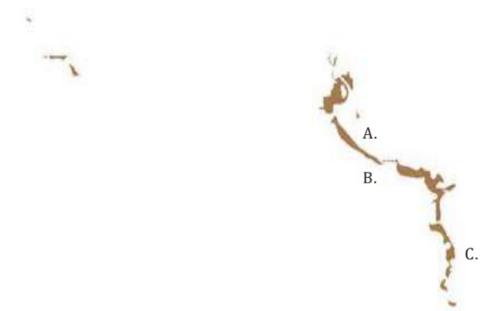


AC04. Singapore Land-Sea Area - 2050 Projection. Reconstructed Drawing: Lin Derong, 2017.

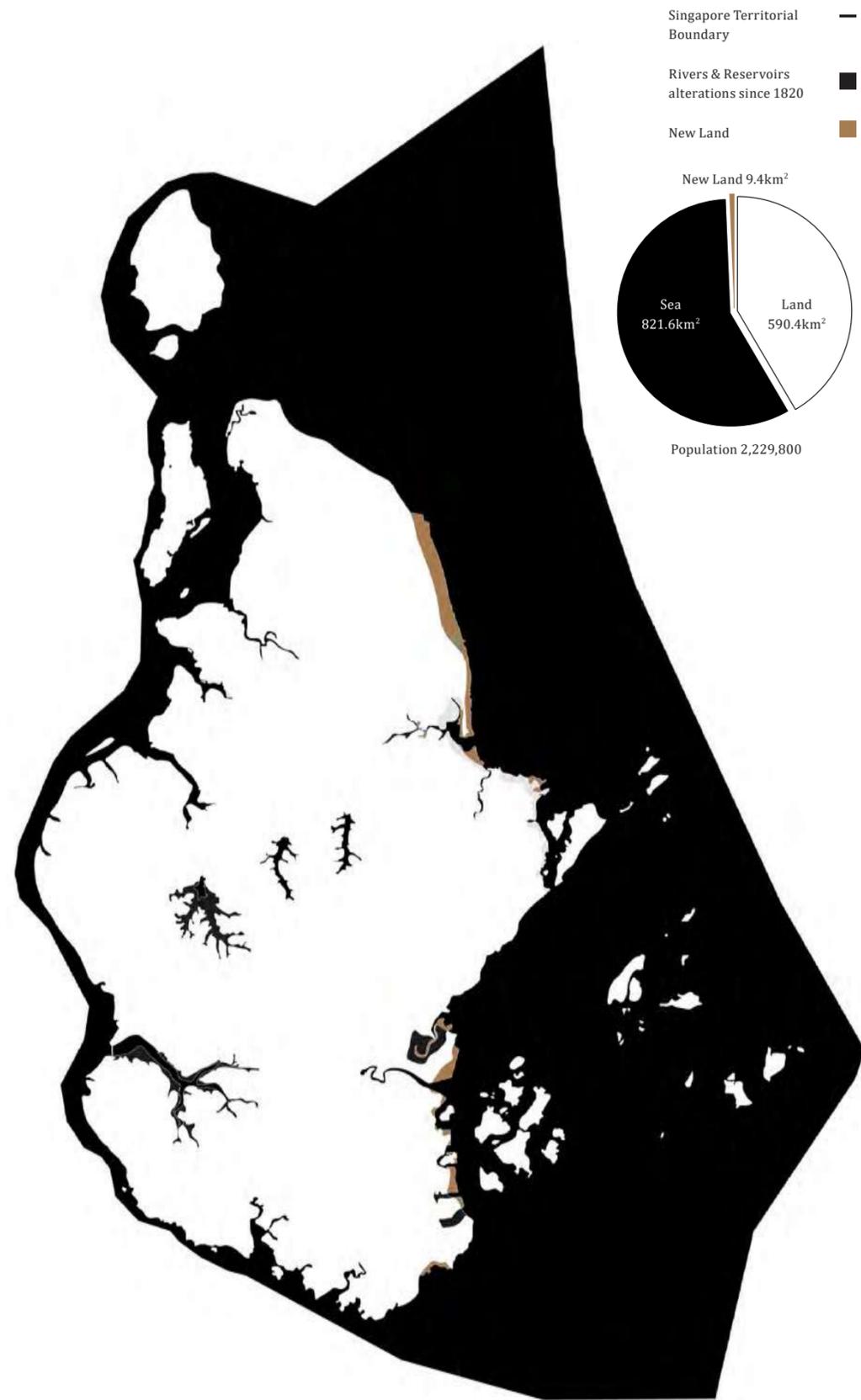


AC05a. Singapore Land-Sea Area - 1820-1958 Colonial Shores. Reconstructed Drawing: Lin Derong, 2017.

- A. Kallang Basin
- B. Beach Road Strip
- C. Telok Ayer Basin & King's Dock



AC05b. 1820 - 1958, New Land.

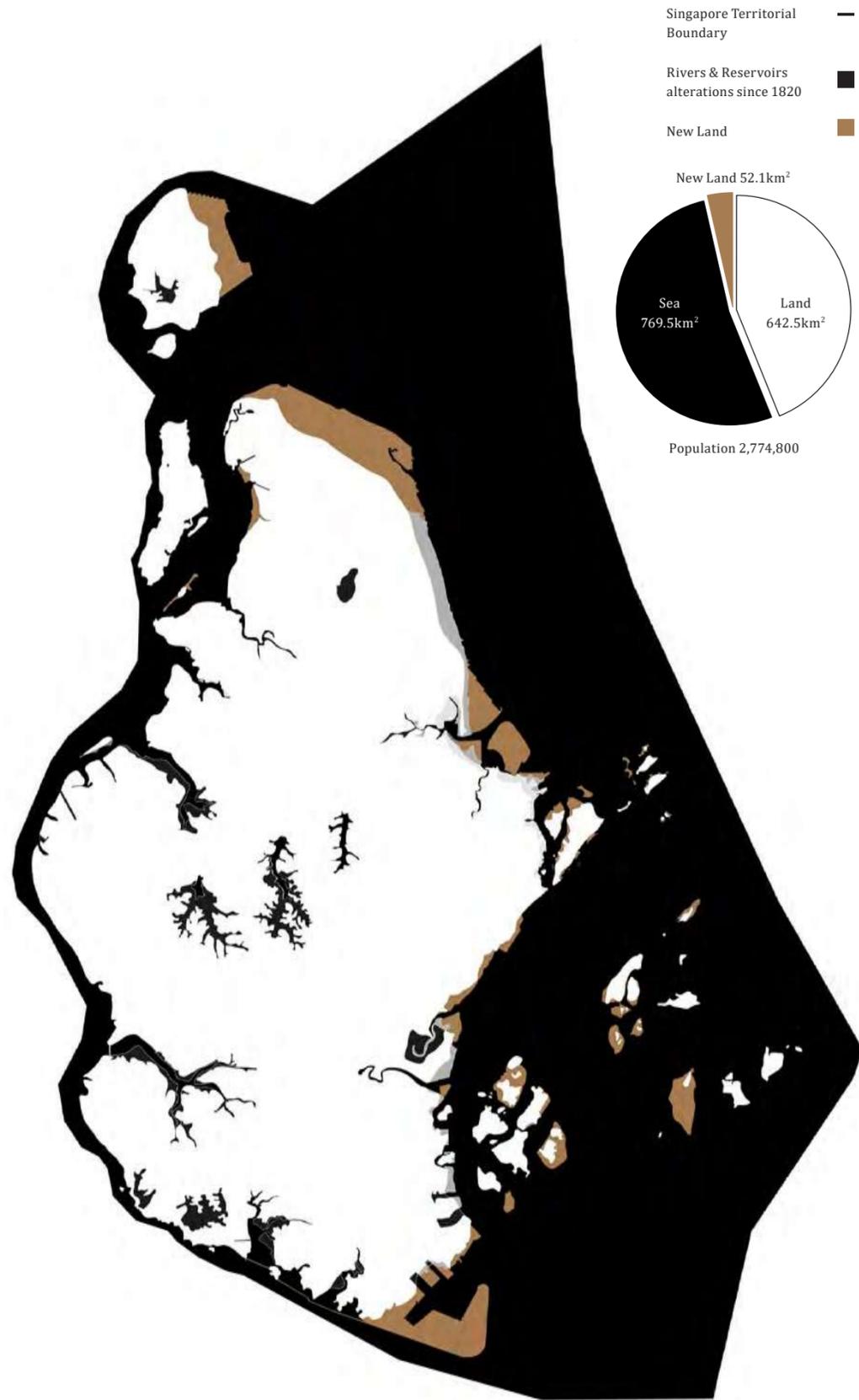


AC06a. Singapore Land-Sea Area - 1958-1974 National Woes and Housing. Reconstructed Drawing: Lin Derong, 2017.

- A. Marine Parade
- B. East Coast
- C. Marina Center
- D. Jurong Industrial Waterfront



AC06b. 1958-1974, New Land.



AC07a. Singapore Land-Sea Area - 1974-1987 Global City. Reconstructed Drawing: Lin Derong, 2017.



AC07b. 1974-1987, New Land.



AC08a. Singapore Land-Sea Area - 1987 - 2011 Towards a Greater Global Hub. Reconstructed Drawing: Lin Derong, 2017.



AC08b. 1987 - 2011, New Land.



AC09a. Singapore Land-Sea Area - 2011 - 2050. Projective Coastline: Pushing limits. Reconstructed Drawing: Lin Derong, 2017.



AC09b. 2011 - 2050, New Land.

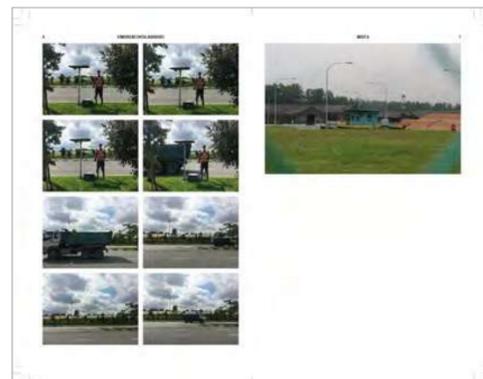
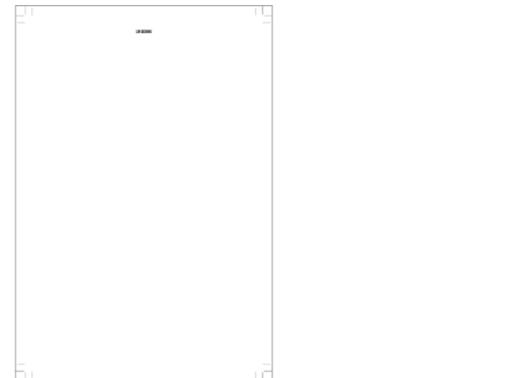
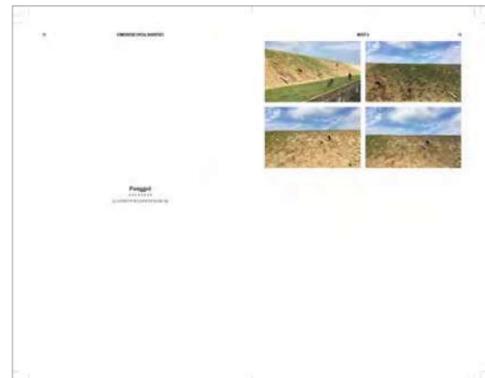
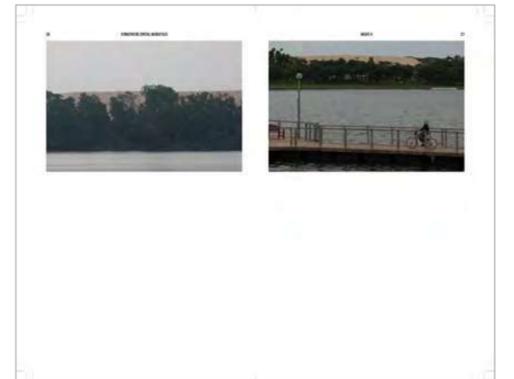
INSERT A
Scrambling Sands: Spatial Atmospheric Narratives (Film Accompaniment)



IA01. Insert A. Dimension: 60 x 245mm, pamphlet booklet.

IA02. IA03. [Overleaf] Insert A contents: Selected film stills. Film stills and Layout: Lin Derong, 2017-2018.

Overleaf spread is an abstracted content (first draft) from the insert. First presented on interim 3, 24 November 2017.



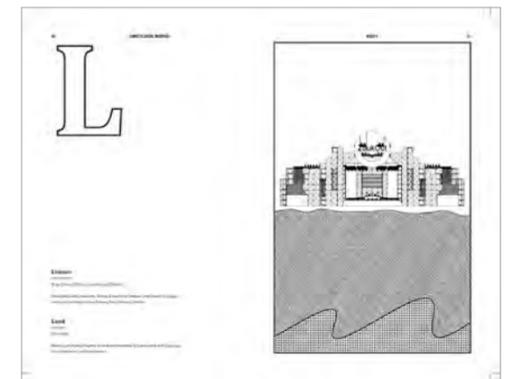
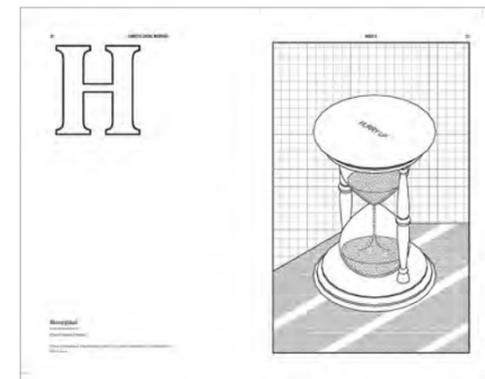
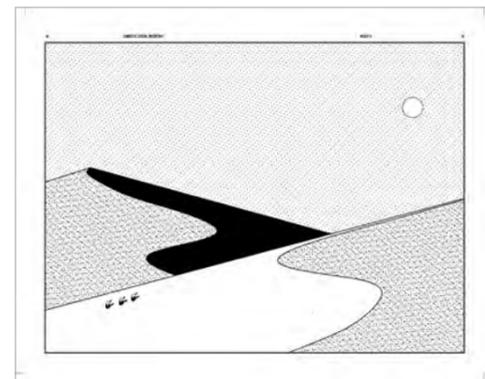
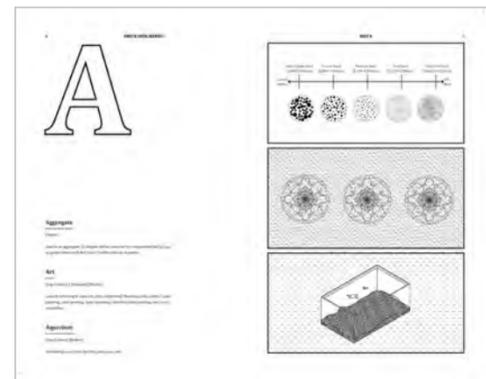
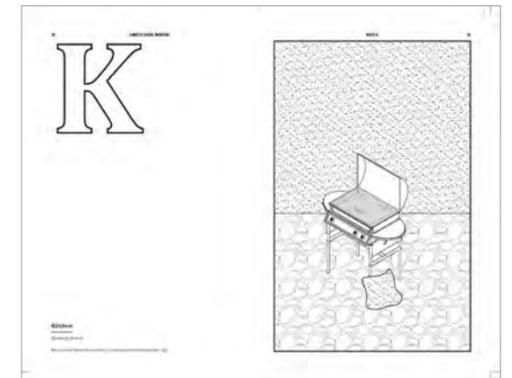
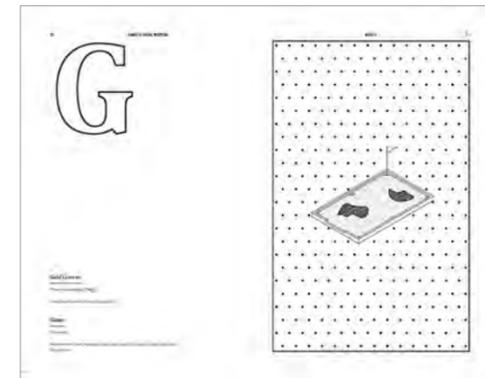
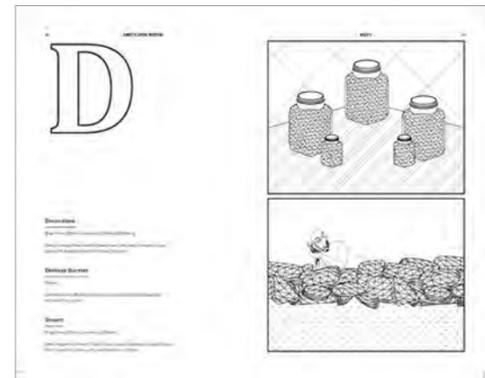
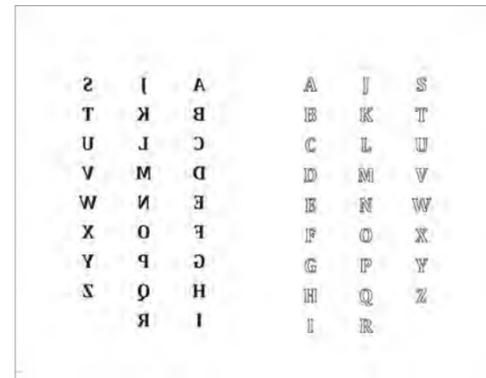
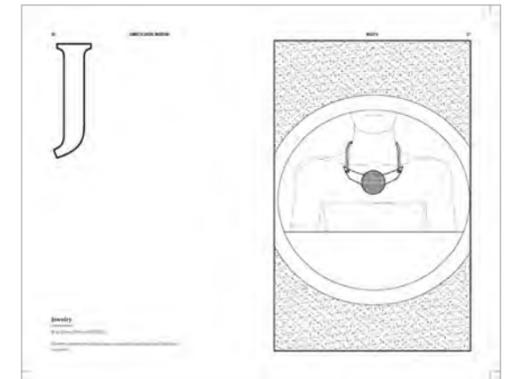
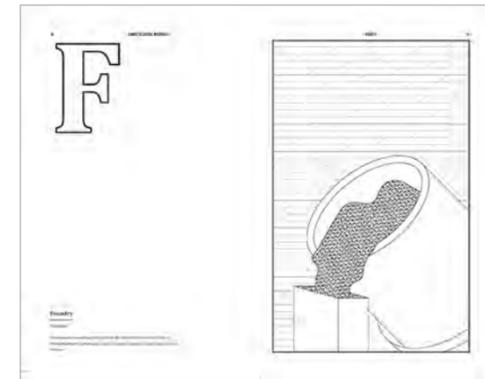
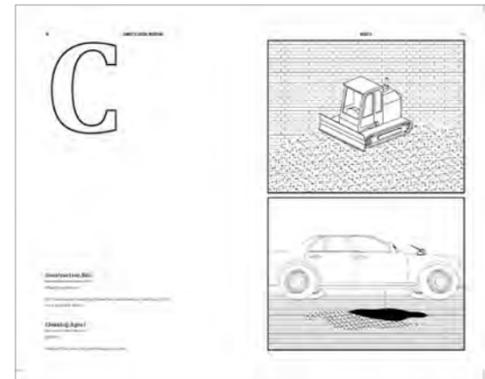
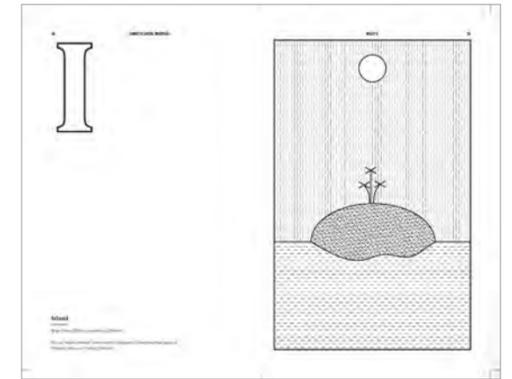
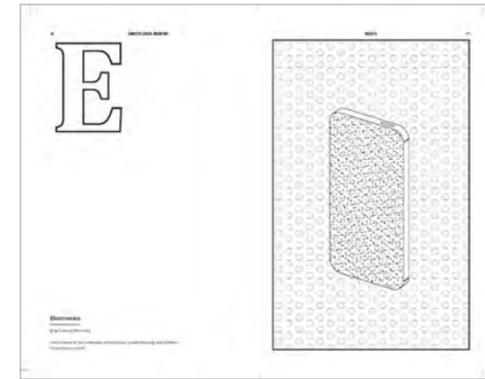
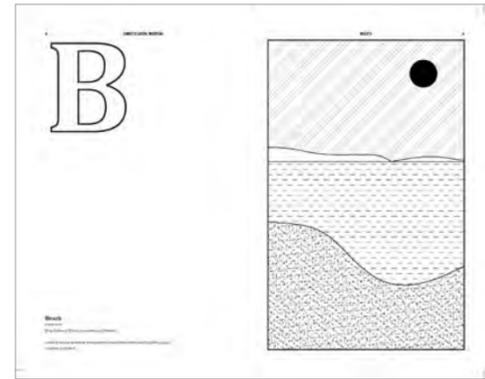
INSERT B
 Servant Sands: Domestic Spatial Inventory

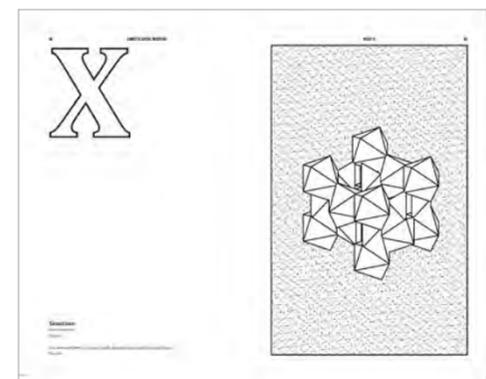
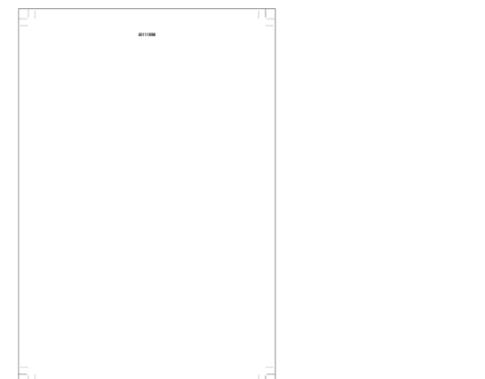
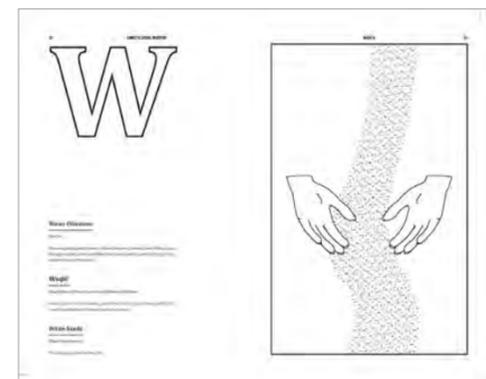
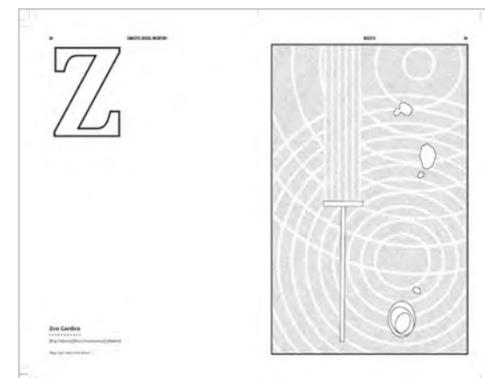
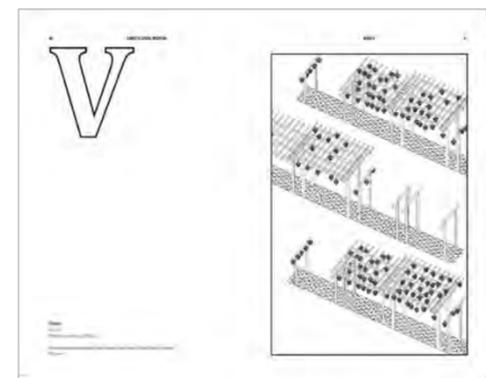
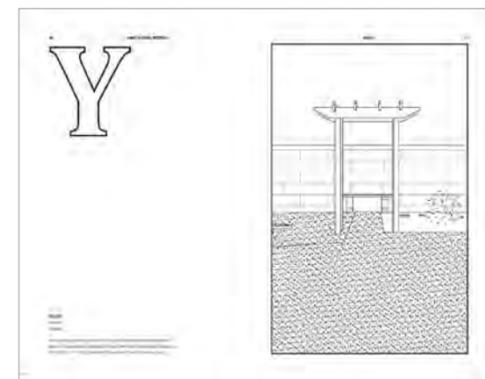
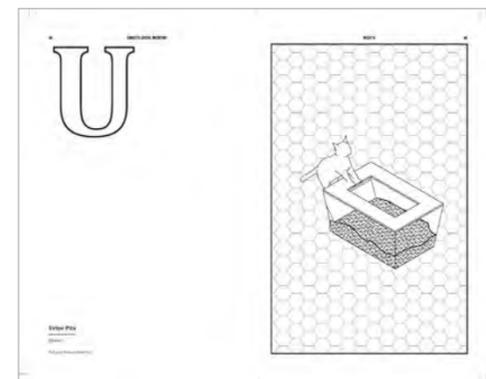
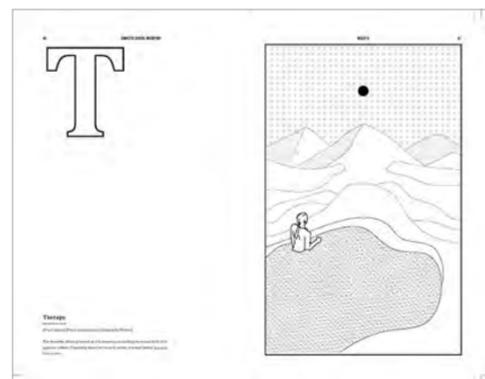
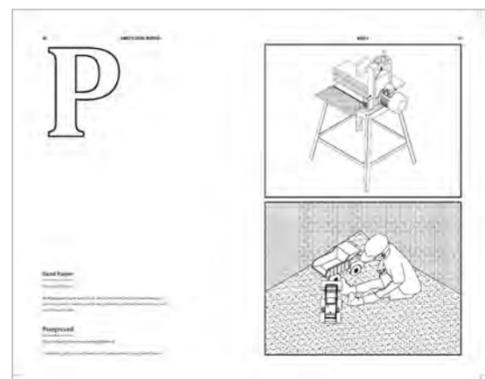
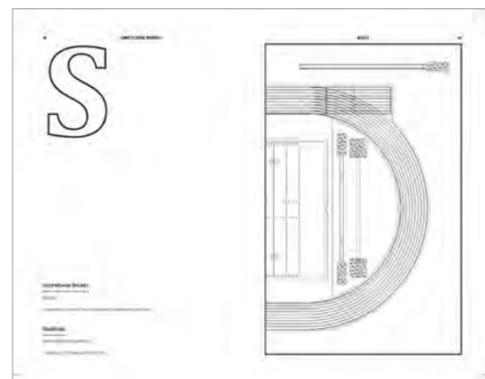
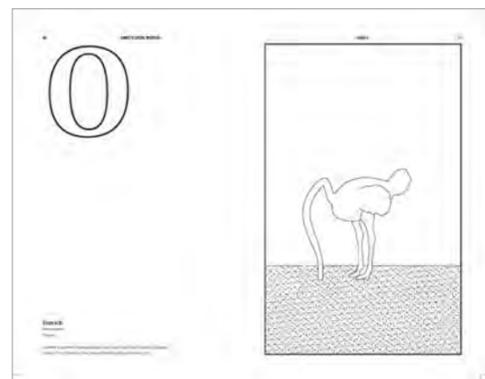
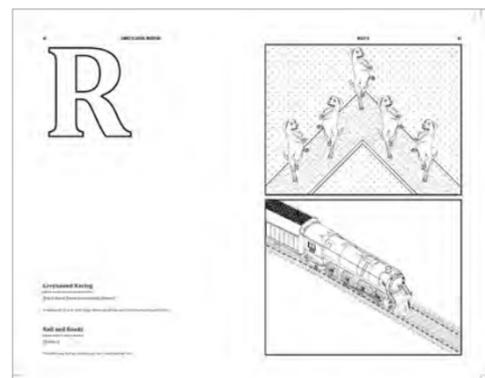
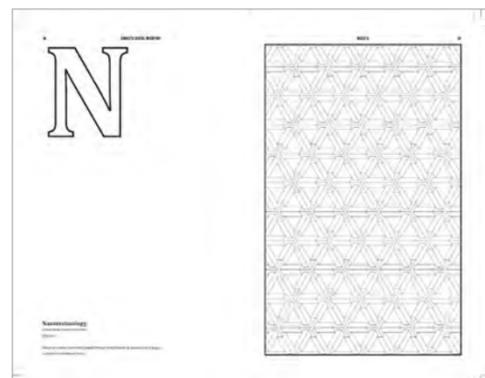
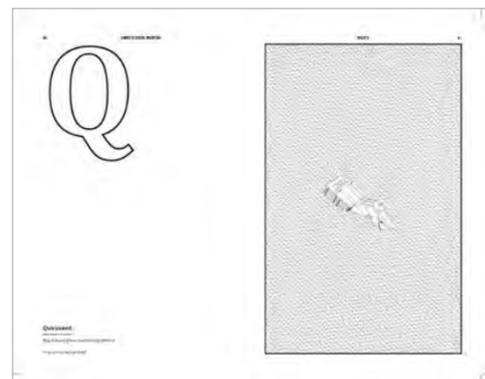
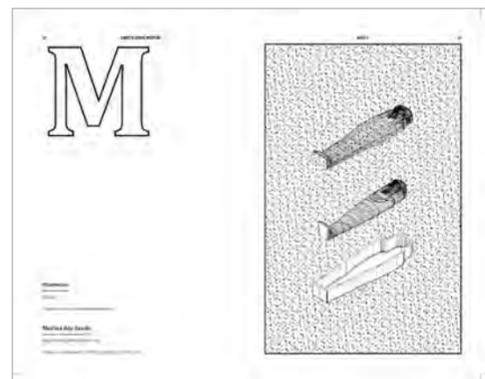


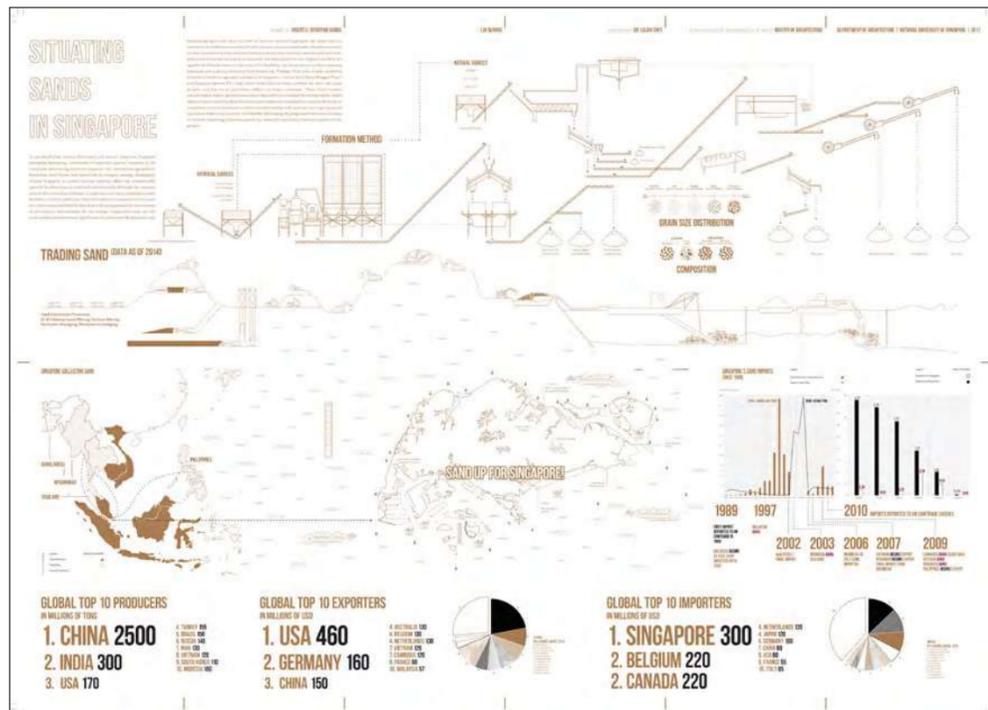
IB01. Insert B. Dimension: 60 x 245mm, pamphlet booklet.

IB02. IB03. IB04. IB05. [Overleaf] Insert B contents: A-Z glossary of sand uses in the domestic everyday. Drawings & Layout: Lin Derong, 2017-2018.

Overleaf spread is an abstracted content from the insert. First presented on interim 3, 24 November 2017.





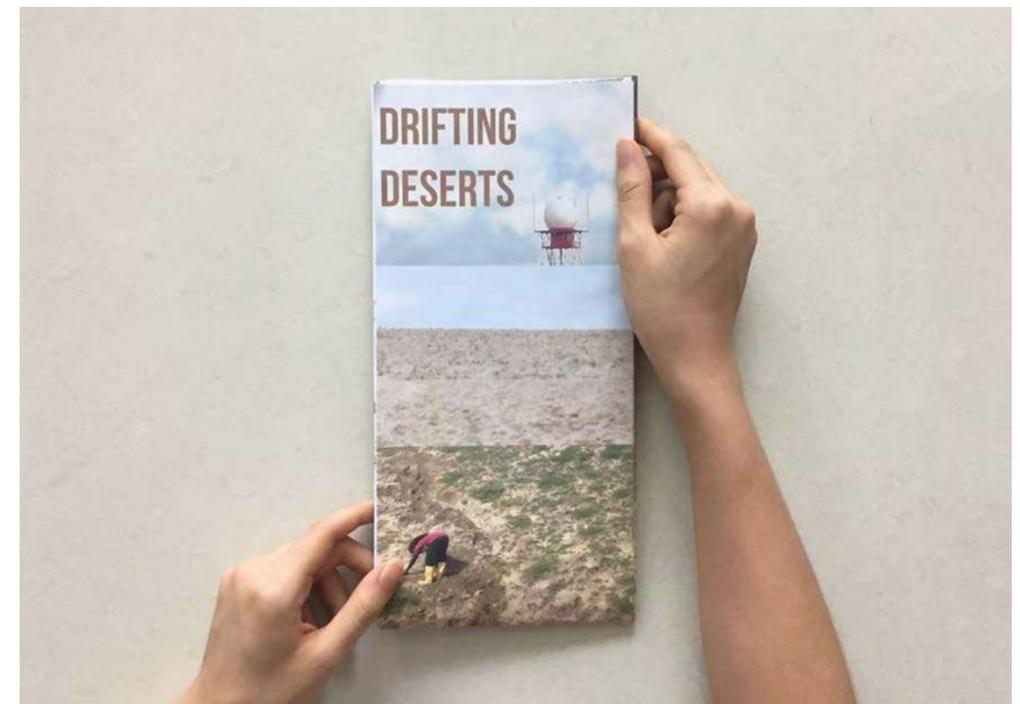


IC01a. [Above] IC01b. [Below] Individual research work departed from group research. Dimension: 594 x 841mm, map fold.

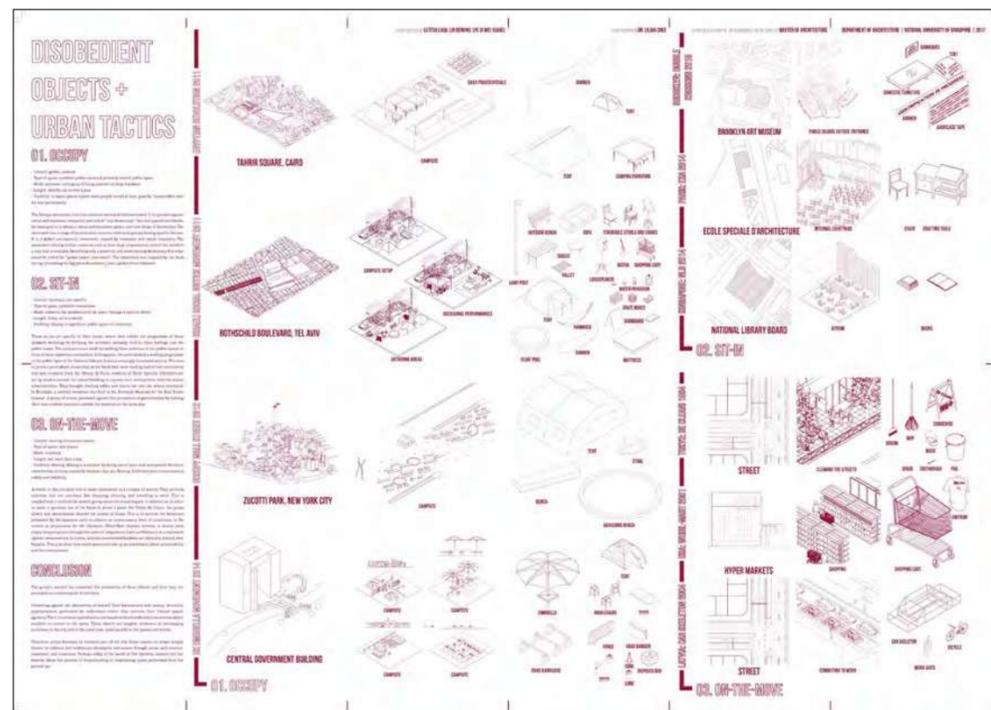
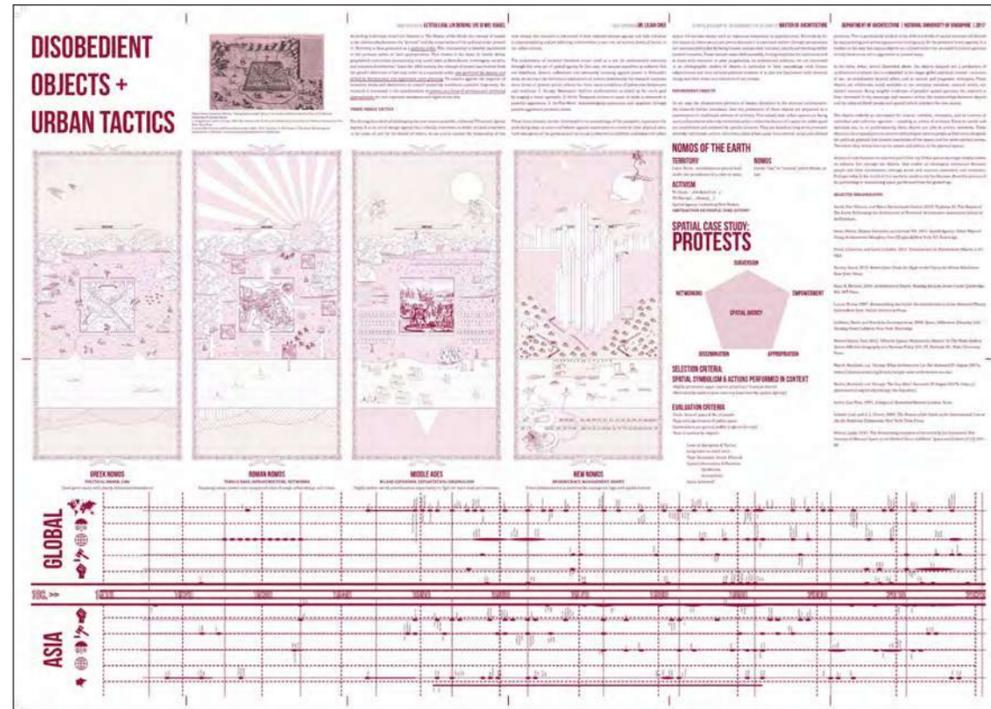
IC02. [Opposite] Individual thesis prep document.

INSERT C

Situating Sands: State Narrative on Sand Circulation and Consumption



First draft presented on interim 3, 24 November 2017.

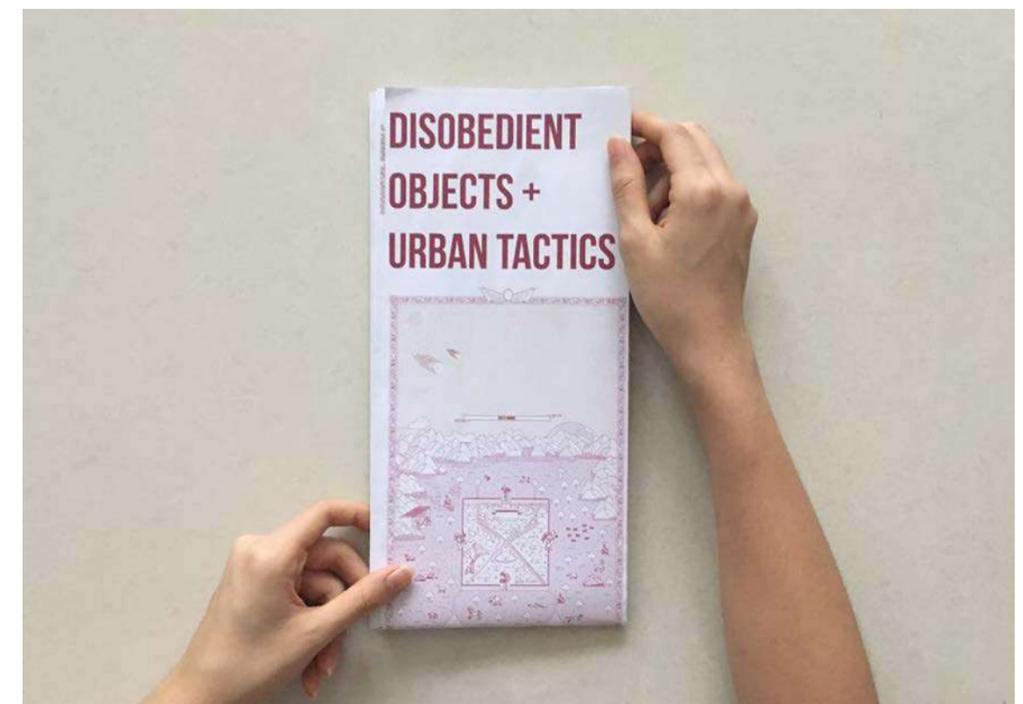


ID01a. [Above] ID01b. [Below] Group research work.
Dimension: 594 x 841mm, map fold.

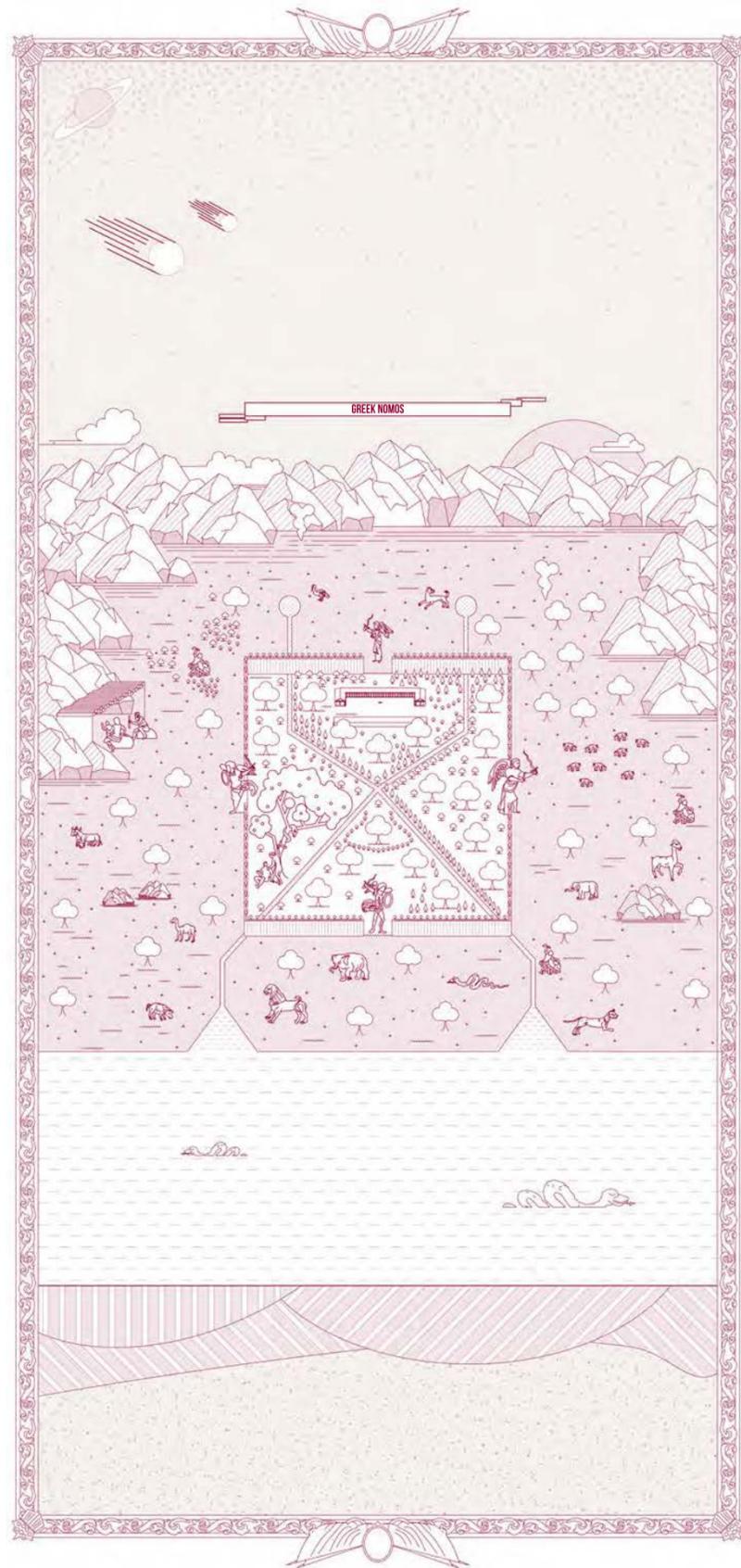
ID02. [Opposite] Group document.

INSERT D

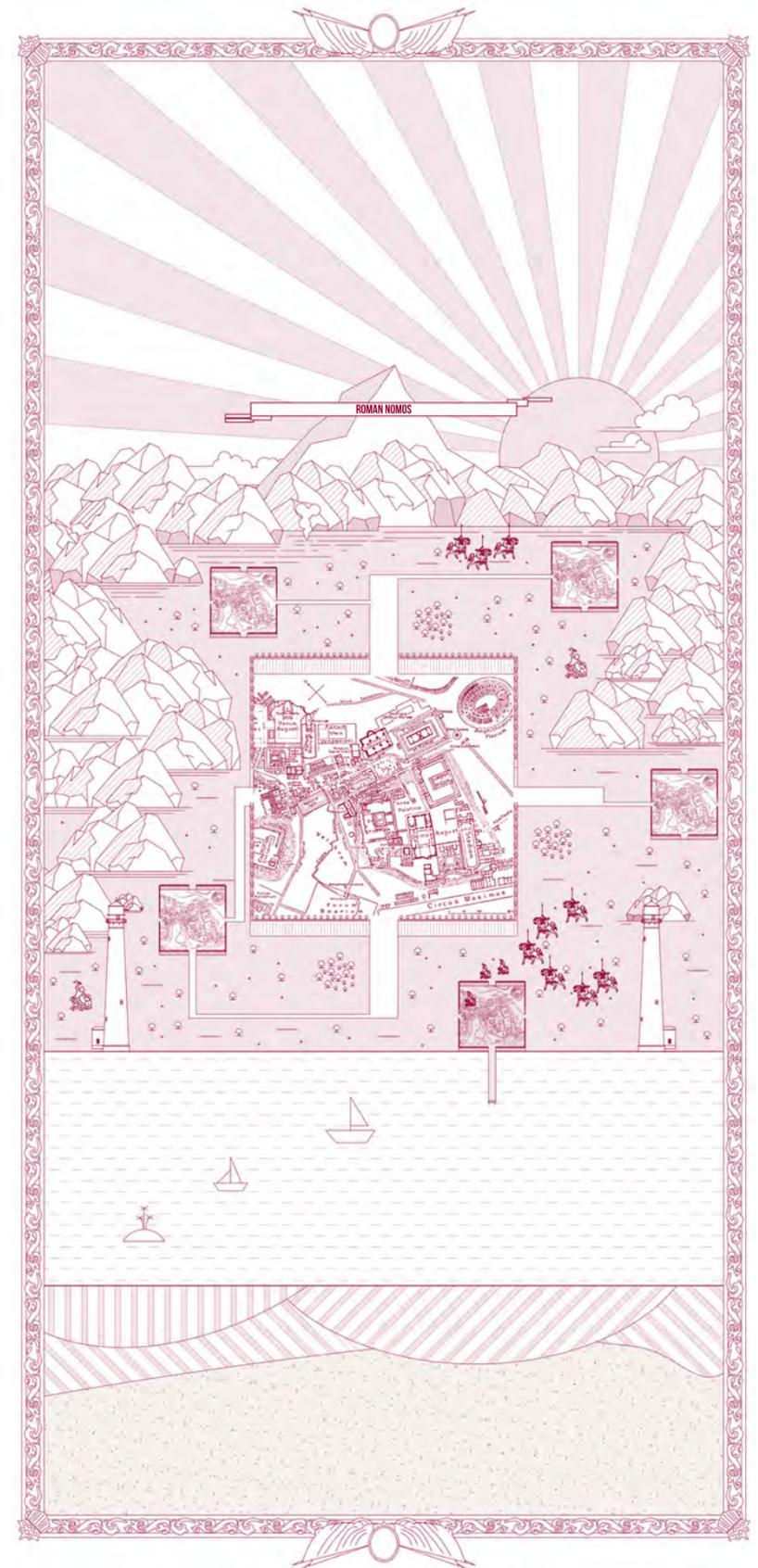
Disobedient Objects + Urban Tactics (Group Research on *Activism and Territory*)



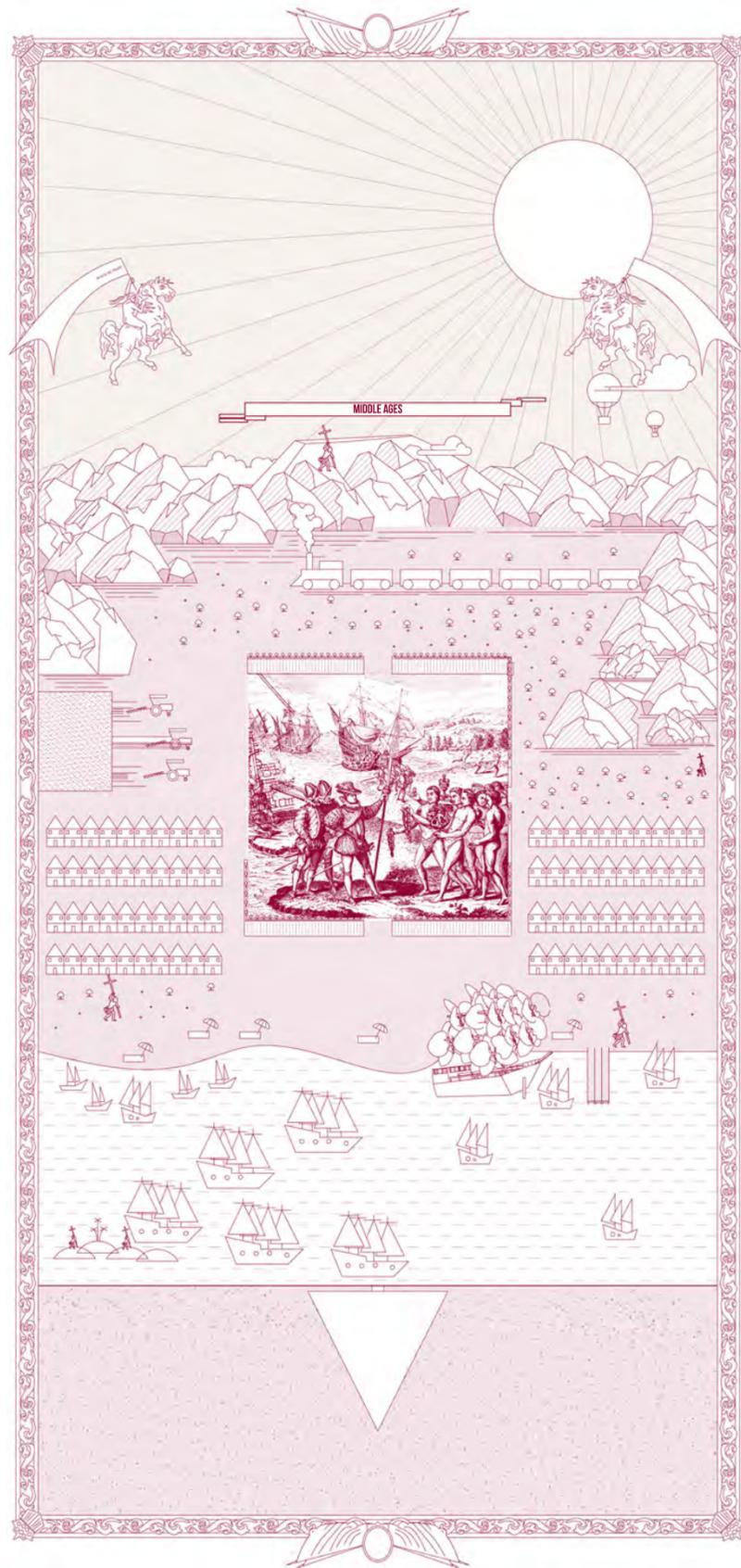
Next two spreads are abstracted contents from the insert. First presented on interim 3, 24 November 2017.



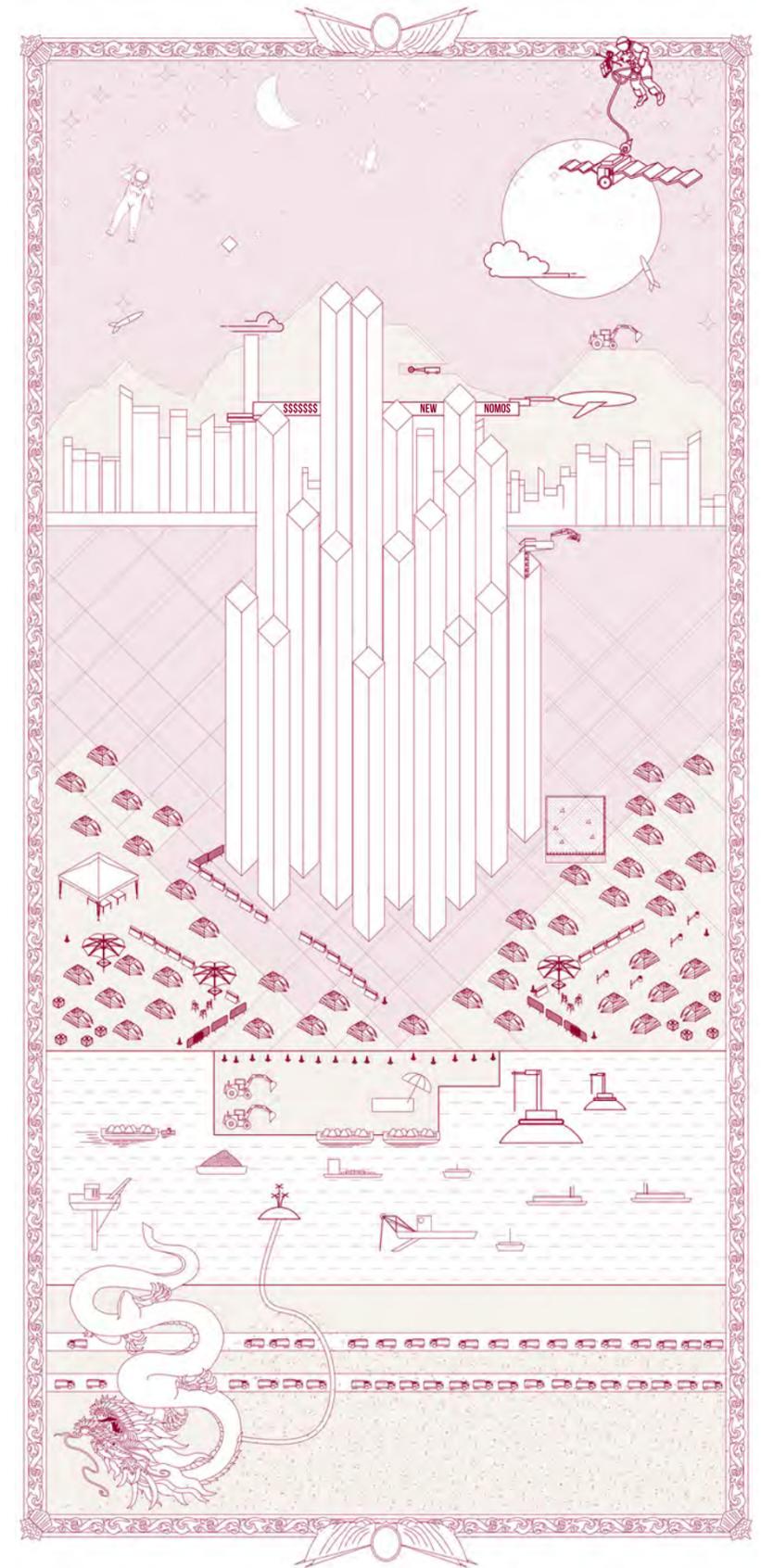
ID03.



ID04.



ID05.



ID06.

TERRITORY AS NOMOS

According to German jurist Carl Schmitt in *The Nomos of the Earth*, the concept of nomos is the relationship between the “ground” and the construction of the political order around it ¹. Territory is thus grounded as a political order. This relationship is thereby manifested in the primary action of land appropriation. This nomos is the basis to clearly define geopolitical institutions (community, city, state) such as boundaries, sovereignty, security and resource distribution.²

Since the 18th century, the concept of nomos has evolved from the Greek’s definition of law and order to a capitalist order, one governed by money, and stifled by bureaucracy and oppressive state planning. To counter against the negation of humanist ideals and abstraction of oneself caused by neoliberal capitalist hegemony, the research is interested in the manifestation of protest as a form of activism and territorial appropriation for anti-capitalist resistance and rights to the city.

THREE URBAN TACTICS

The driving force behind challenging the new nomos would be, as Jeremy Till coined, Spatial Agency. It is an act of design agency that critically intervenes in wider societal structures in the name of, and for the benefit of others. As we aim to capture the temporality of this new nomos, the research is interested in how subjects, who are left out, do not fit in or oppressed under the specific authoritative structure, assume agency and take initiative in conceptualizing and/or effecting interventions in our city on various levels of tactics in the urban context.

The architecture of territory therefore recast itself as a site for architectural invention through this very act of spatial agency. In this case, we assume ourselves as subjects that are rebellious, dissent, subversive and constantly resisting against power in Foucault’s term. As we trace the territorial implications of protest movements, the research examines three forms of protest which reflects the three main conditions of subversive behaviours and reactions:

1. Occupy Movement: Upfront confrontation to stand up for one’s goal by staging a visual spectacle
2. Sit-In: Temporal actions and reappropriations in space to make a statement in peaceful aggression
3. On-The-Move: Acknowledging oppression and negotiate through passive aggressive personal means

The first condition is illustrated using the case of the Global Occupy Movement. As an international socio-political movement, it protest against social and economic inequality and demand for democracy. As a global anti-austerity movement caused by economic and social inequality, its goal is to advance social and economic justice and new forms of democracy. The movement intrudes symbolic spaces such as financial/political centres by disrupting the efficiency and spatial order against the authorities by large masses. Further propagated by extensive coverage from both new and mass media, they create highly visible urban spectacles to make their voices heard.

The second condition is illustrated by the Sit-In movement as a subversive but temporal protest. They negotiate around the political limits and are specific to their locale; where they exhibit

the programme of these important institutional buildings by seeping its programmes out into the public realm. In Singapore, parents held a one-month reading programme of a banned children book depicting homosexual families in the public foyer at the National Library. As a seemingly innocuous activity, this as resistance that was triggered by a censorship ban implicating controversy on the oppressive state control, traditional Asian family values and LGBT civil rights. In Paris, students from Ecole Speciale d’Architecture conducted studios by themselves in the school’s courtyard by bringing drafting tables and chairs out physically to express their unhappiness with the change of pedagogical direction: it was changed drastically from a design school to a technical school, and tutors who don’t fit in the new system were fired. In Brooklyn, a group of artists protested against the promotion of gentrification by hosting their own cocktail reception outside the museum where another cocktail reception was held for the Real Estate Summit.

The third condition is a protest that is mobile. It makes a statement as a critique of the society by disrupting everyday rituals and being unexpectedly out of place. They perform activities that are mundane such as shopping, cleaning, and commuting – while wearing a uniform. In Tokyo Be Clean!, the group meticulously cleaned the streets of Ginza in a languid pace. This is to satirize the behaviours promoted by the Japanese state to achieve an absurd level of cleanliness in the streets towards the Olympics. Whirl-Mart deploys activists to slowly push empty shopping carts through the aisles of Walmart as a statement against consumerism. In Latvia, activists constructed bamboo car skeletons around their bicycles to show how much space cars take up as a statement about sustainability

[Previous 2 Spreads]

ID03. Greek Nomos: Political Order, Law. (Good governance with clearly delineated boundaries). Drawing: Lin Derong, 2017.

ID04. Roman Nomos: Tabula Rasa, Infrastructure, Networks. (Imposing roman power onto conquered cities through urban design and rituals). Drawing: Lin Derong, 2017.

ID05. Middle Ages: Land Expansion, Exploitation, Colonialism. (Highly mobile world provides more opportunity to fight for more land and resources). Drawing: Lin Derong, 2017.

ID06. New Nomos: Bureaucracy, Management, Money. (From *Lebensraum* to a construct by managerial logic and capital interest). Drawing: Lin Derong, 2017.

and the environment. These passive-aggressive protests are fleeting moments on a daily basis as a form of personal resistance and negotiation to co-exist with the oppression.

These three threads, further illustrated in the second page of the pamphlet, represents the underlying ways to react and behave against oppression in context to their physical sites. Such emergence of the personal and the social is observed to infiltrate and adapt into urban spaces via various means such as ingenious temporary re-appropriation. Particularly for this research, these means are potent because it is exercised neither through permanence nor monumentality, but by being elusive, unexpected, transient, stealth and working within limited resources. These include make-shift assembly, finding loopholes for infiltration and at times with intention or pure pragmatism. As architecture students, we are interested in an ethnographic studies of objects in particular to their assemblage with human subjectivities and their cultural-political contexts. It is also our fascination with material things and their order as a reflection of our *nomos*.

DISOBEDIENT OBJECTS

As we map the idiosyncratic portraits of human dynamics to the external environment, the research further postulates how the production of these objects are projected as a counterpoint to traditional notions of territory. This entails how urban spaces are being used and produced whereby individual and/or collective desires of a space for public good are conditioned and coloured by specific contexts. They are based on long-term processes whereby individuals and/or collectives claim urban space from diverse social and cultural positions. This is particularly

evident in the different kinds of spatial residues left behind by manipulating and activating space on varying scale for the protester's own agenda. It is evident in the way that spatial objects are utilized within the protester's limited agencies to help them voice out in aggressive to passive ways.

In the three urban tactics illustrated above, the objects mapped are a production of architectural artefacts that is embedded in the larger global and local context – as traces of use, as attachments beyond affect, and as tactical and pragmatic strategies. These objects are oftentimes easily available in the everyday mundane, sourced within our limited resource. Being tangible evidences of peoples' spatial agencies, the research is thus interested in the meanings and nuances within the relationships between objects and the subjects (both people and spatial) which counters the new *nomos*.

The objects embody an instrument for dissent, rebellion, resistance, and an exercise of individual and collective agencies – standing as values of activism. From its tactile and mundane use, to its performativity, these objects are alibi to protest moments. They manifests as dual function. In Umbrella Movement, the umbrellas shields from water spouts and tear gas. These objects are the very vestiges of resistance. Similarly the trolley becomes the home outside the home, as home becomes a dangerous place. The trolley takes a refuge and a nomadic state. These objects in their spatial context extend reach and give voice to people as they work alongside the political, physical and climatic limitations of the spaces and the socio-cultural norms. Therefore, they reveal clues to the nature and politics of the physical spaces.

Protest events do not happen in isolation. All these connects to form a larger network. For instance, the NLB situation links itself to larger issue that relates to Pink Dot, HDB housing rights and Global LGBT issues. Actions in turn becomes an inherent part of the city. Urban spaces no longer simply frames its subjects, but through the objects, they enable an ideological interaction between people and their environment through action and reaction, movement and resistance. Perhaps today in the world of free markets, modern city has become about the process of de-politicizing or neutralising space, performed from the ground-up.

Lin Derong
Isabel Lye
Letitia Liaw

NOTES

1. Schmitt, Carl, and G. L. Ulmen. *The Nomos of the Earth in the International Law of the Jus Publicum Europaeum*. New York: Telos Press, 2003.

2. Aureli, Pier Vittorio, and Maria Sheherazade Guidici. 'Diploma 14. The Nomos of The Earth. Rethinking the Architecture of Territory'. Architecture Association School of Architecture, 2016 2015.

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- '400 Gather Outside National Library for Reading Event in Response to NLB's Removal of Three Books'. The Straits Times, 13 July 2014. <http://www.straitstimes.com/singapore/400-gather-outside-national-library-for-reading-event-in-response-to-nlbs-removal-of-three>.

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