Water for as Resilient Cities Leverage Asia

strategic program integrated protective coastal zone

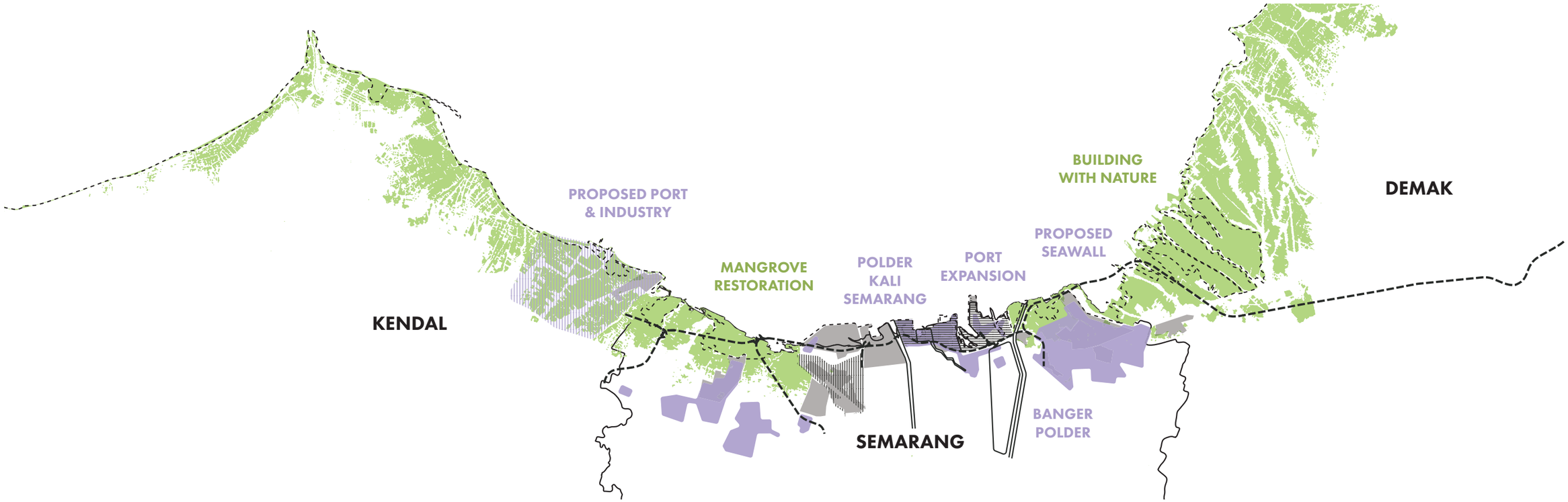
WHY A COASTAL APPROACH?

water(shed) as leverage

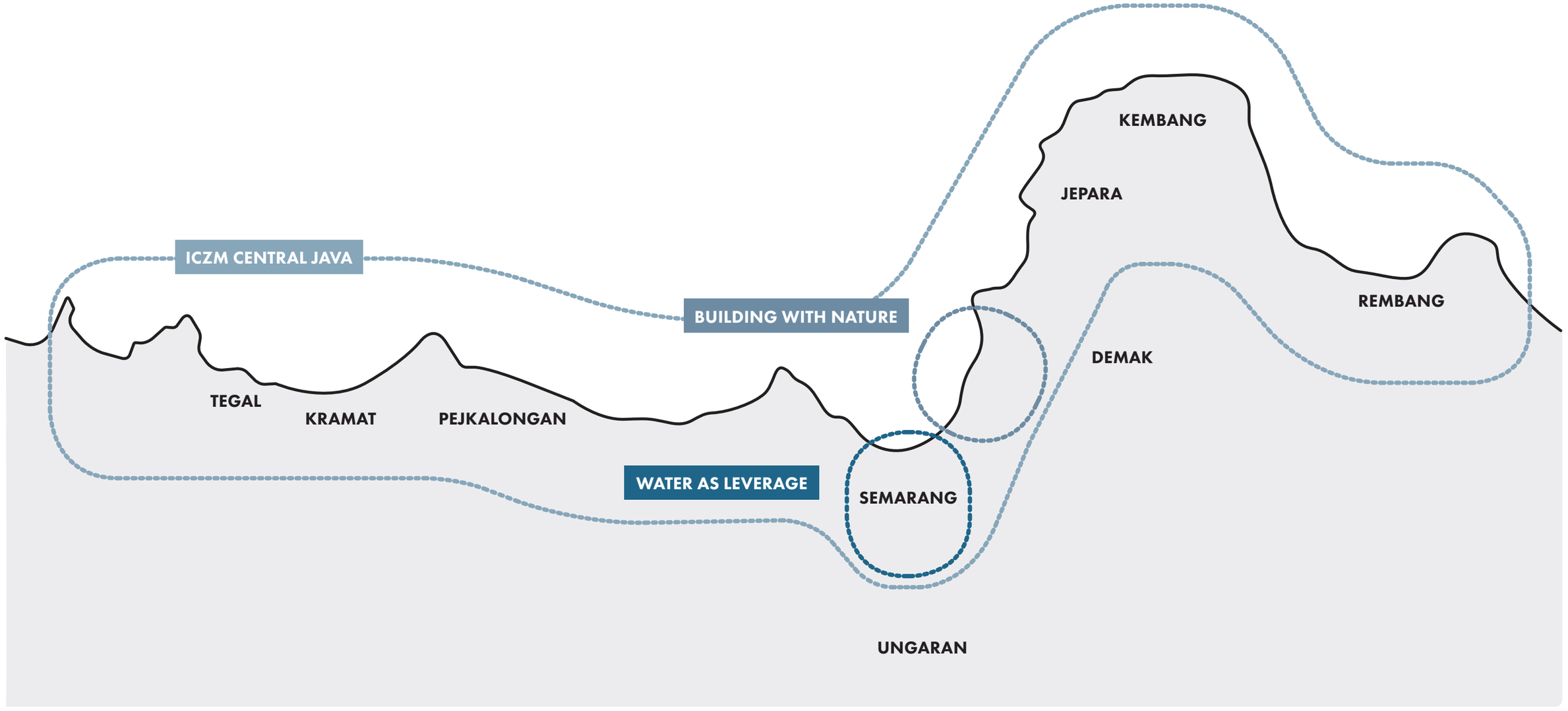
CONFLICTING USES

NATURE

INDUSTRY

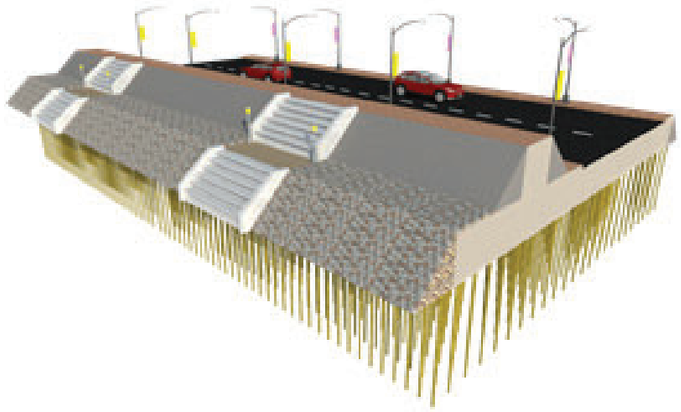


SYNERGIES WITH OTHER EFFORTS




DINAS PEKERJAAN UMUM
CAT

EXISTING PROPOSALS



SEAWALL / TOLL ROAD TO DEMAK

PORT MASTERPLAN

KENDAL PORT AND INDUSTRIAL CLUSTER

BLUE DUNES, NEW YORK

ROOM FOR THE RIVER, NETHERLANDS

EAST SIDE COASTAL RESILIENCY, NEW YORK CITY

WHAT IF WE COMBINE GREEN AND GRAY MEASURES FOR COASTAL PROTECTION?

WHAT IF WE BALANCE ECOLOGICAL RESTORATION AND ECONOMIC GROWTH THROUGH SEDIMENT?

ISLAIS HYPER-CREEK, SAN FRANCISCO

CLIMATE READY EAST BOSTON AND CHARLESTOWN, BOSTON

BLUE DUNES, NEW YORK

NO IMPACT PORT DEVELOPMENT STUDY, DELTARES

TYPHOON SHELTERS, HONG KONG

SOUTH BAY SPONGE, SOUTH SAN FRANCISCO BAY

ISLAIS HYPER-CREEK, SAN FRANCISCO

BIG U, NEW YORK CITY

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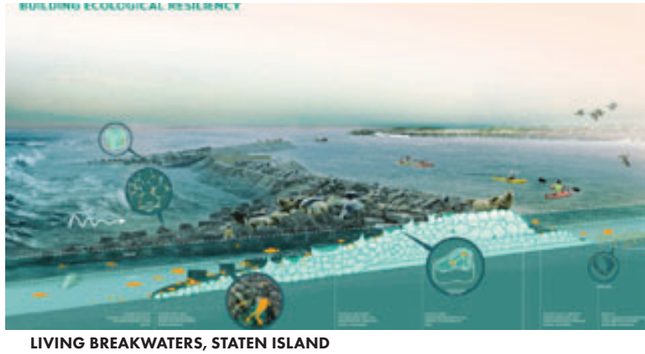
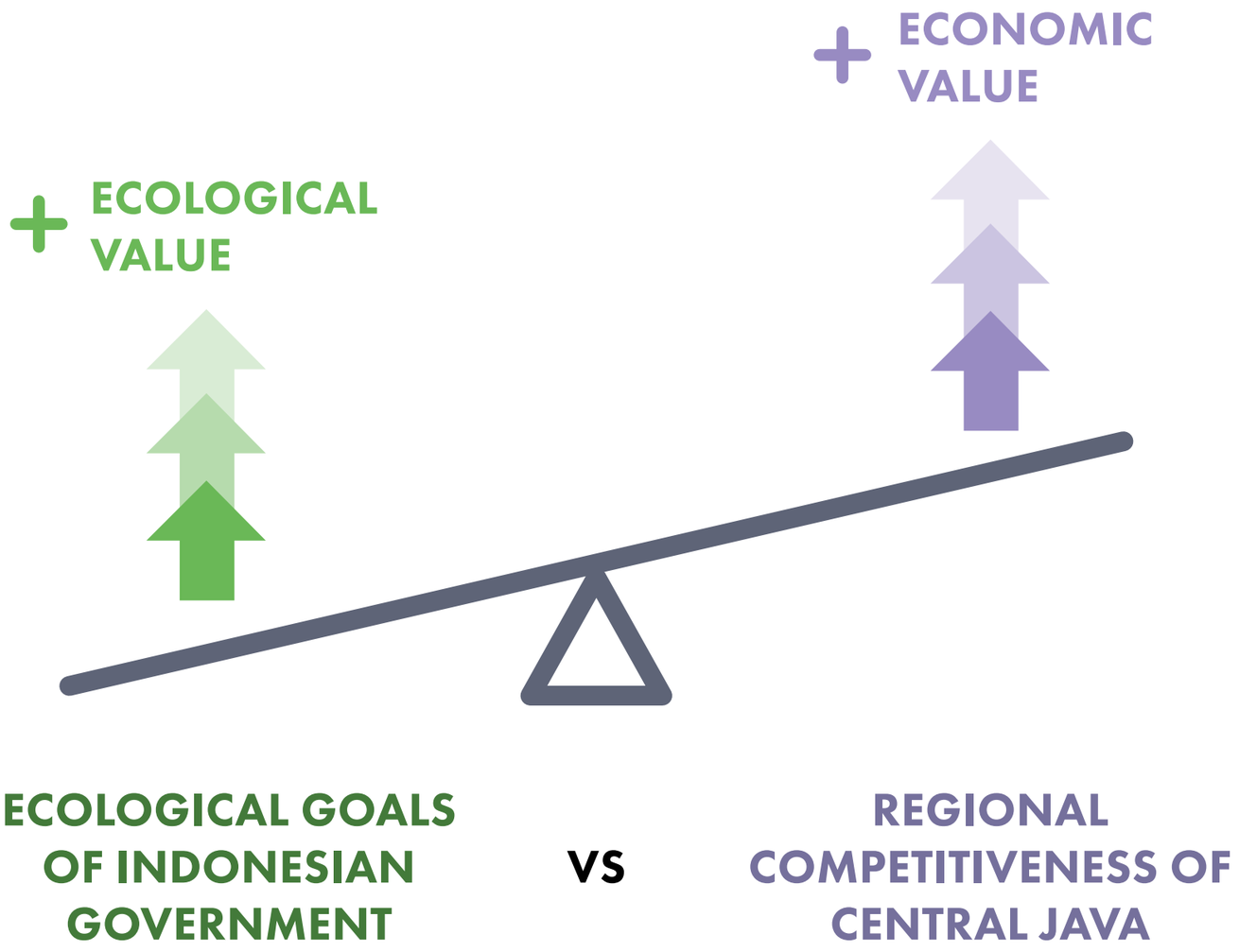
WHAT IF COSTS AND PROFITS CAN BE SHARED THROUGH A VALUE TRANSFER MECHANISM?

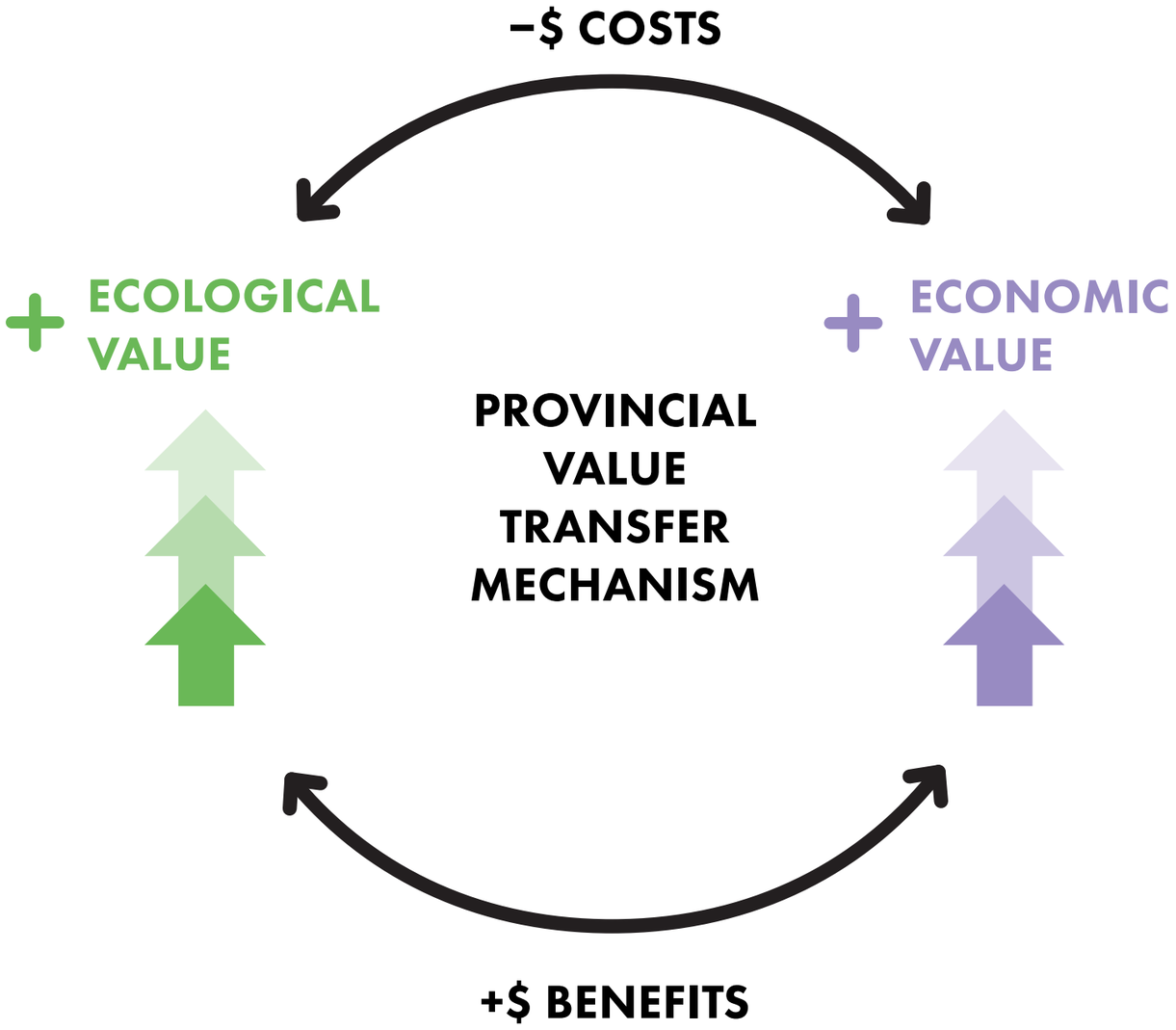


LIVING BREAKWATERS, STATEN ISLAND

NEED FOR A COASTAL BALANCE



ECOLOGICAL VALUE TRANSFER MECHANISM




Coastal Erosion
New Toll Road and Seawall
Planned Port Shelters
Flooded Area
Pump
East Flood Canal
Land Reclamation for New Industry
Toll Road


Ecological Restoration
Concentrated New Industry in Targeted Polder Areas
Mangrove & Fisheries Park
Sidogemah
Purwosari
Semulan
Trimulyo
Terboyo Wetan
3
INTEGRATED PROTECTIVE COASTAL ZONE
Elevated Toll Road with Eco-tourism Island
Sediment Capture and River Diversion
Harbor Breakwaters with Sediment Capture
Water Treatment Plant
Retention
Reclamation
Cluster Reorganization
1a
WATER-NEUTRAL INDUSTRY
Passenger Terminal
Container Terminal
Tambaklorok
General Cargo Zone
East Flood Canal
Retention and Filtration
Harbor Dredging
Kamijen
2
RESILIENT KAMPUNGS
Retention Pool
Logistic Zone

integrated protective coastal zone program objectives

WATER
1 Minimize tidal flooding (rob)
2 Reduce impact of coastal storm flooding

ENVIRONMENTAL
3 Restore shoreline
4 Restore ecological greenbelt
5 Increase sedimentation along the coast

SOCIAL
6 Create a connected and accessible waterfront
7 Education, recreation, spiritual (grave of imam)
8 Enhance social cohesion and collaboration

ECONOMIC
9 Protect and enhance livelihoods of coastal communities
10 Revive near and offshore fisheries
11 Promote sustainable industrial growth along the coast
12 Promote sustainable communities and new developments
13 Protect critical economic infrastructure (port, rail, airport)

GOVERNANCE
14 Integrated plan and vision for coastal zone at metropolitan level

COMPONENTS

1. INTEGRATED VISION

Convene stakeholders to formulate and implement an integrated vision and plan for a protective and productive coastal zone across Semarang, Kendal and Demak, balancing urban development (industrial and port) and ecological restoration to enhance coastal protection, while creating additional benefits in terms of eco-tourism, fisheries, and carbon sequestration.

2. ECOLOGICAL VALUE TRANSFER MECHANISM

Mechanism between urban land and ecological restoration zones along the coast. Costs in gray infrastructure for coastal protection and revenue from development is shared between municipalities in order to commit to an integrated approach. Revenues would not only be directed to maintenance, but also to greenbelt restoration and to neighboring communities to compensate for damage caused by extraction.

ENABLING ENVIRONMENT

INSTITUTIONAL / LEGAL FRAMEWORK

Land Use Vision for industrial development and reclamation with regard to distribution and use of water and sediment

Ecological Value Determination: Commitment of a quantified ecological value along the coast in order to establish a transfer quota.

Land ownership: Cooperation of land owners and stakeholders along the coast via a committed and operational forum.

Mangrove conservation and restoration in line with the Presidential greenbelt law and the National Mangrove Strategy.

Economic activities monitoring: Regulate fisheries to prevent overfishing, and industries to prevent unsustainable practices.

ENABLING ENVIRONMENT

STEPS BY GOVERNMENT

1. Establish a cross-municipal entity for the oversight of land use coordination and planning.

2. Develop a method for accounting of ecological value and industrial development-port capacity.

3. Develop incentives for compliance.

OUTCOMES, VALUE, RISKS

SHORT TERM | MEDIUM TERM | LONG TERM

EXPECTED OUTCOMES

In the short term, a coordinated and planning process across the municipalities will be established. Strategies regarding coastal protection, sediment supply, groundwater extraction and economic growth will be identified and will guide the creation of a preferred coastal vision. Implementation of the coastal balance pilot in Genuk/Sayung area will make Semarang a global leader in achieving resilience through integrated coastal solutions, while urban and rural communities benefit from ecotourism facilities and revived fisheries.

In the medium term, a successful project in Tanjung Emas Port will establish Semarang's position as a leading economic center in Central Java and will attract investment for subsequent coastal projects and restoration efforts. The costs for maintaining breakwaters and dredging operations will have been reduced due to local reuse of sediment for the protective soft foreshore.

In the long term, comprehensive ecological restorations in designated areas and sustainable protective systems of urban coastal areas will be implemented. There will be reduction in polder and dyke maintenance and up-keeping.

ADDED VALUE FOR ACTORS

BAPPEDA Demak, Semarang, and Central Java – Develop Spatial strategies and land use coordination
BBWS – Enhance drainage & waterways management
BPJT (Toll Road Authority) – Develop viable, profitable and sustainable toll road schemes

KEMENKOMAR – Develop tools for synchronization of policies in maritime affairs
PELINDO III – Safeguard operations and ensure long-term viability of the Tanjung Emas port

DKB Demak, and Central Java – Enhance coastal ecological services and community capacity building
PUPR-SDA – Develop tools for water systems
Ministry of Industries (Kementerian Perindustrian) – Develop and plan for coordination of Industrial Development with ecological restoration

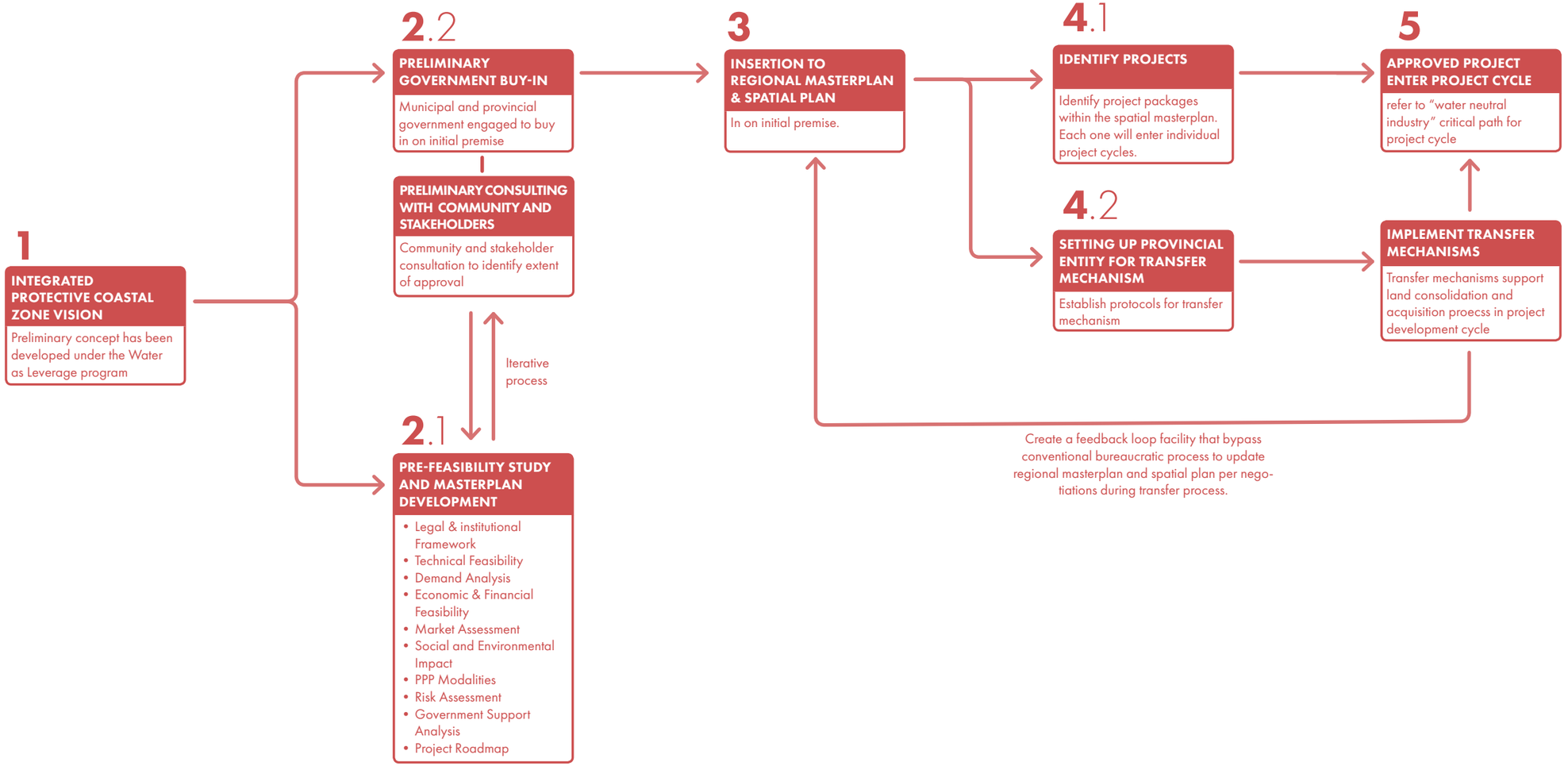
PROGRAM RISKS

Unwillingness of local government stakeholders to participate. Establish strong commitment at the Provincial and National level, along with rigorous analysis of value and cost sharing across stakeholder municipalities.

Land acquisition costs become too high for local government. Use creative incentives such as Transfer of Development Rights.

CRITICAL PATHWAYS

The critical pathway diagram describes the process of creating an integrated protective coastal zone vision as well as the ecological transfer mechanism to consolidate land into a coordinated land use plan. For project level critical pathway, refer to critical pathway in Water-Neutral Industries chapter.



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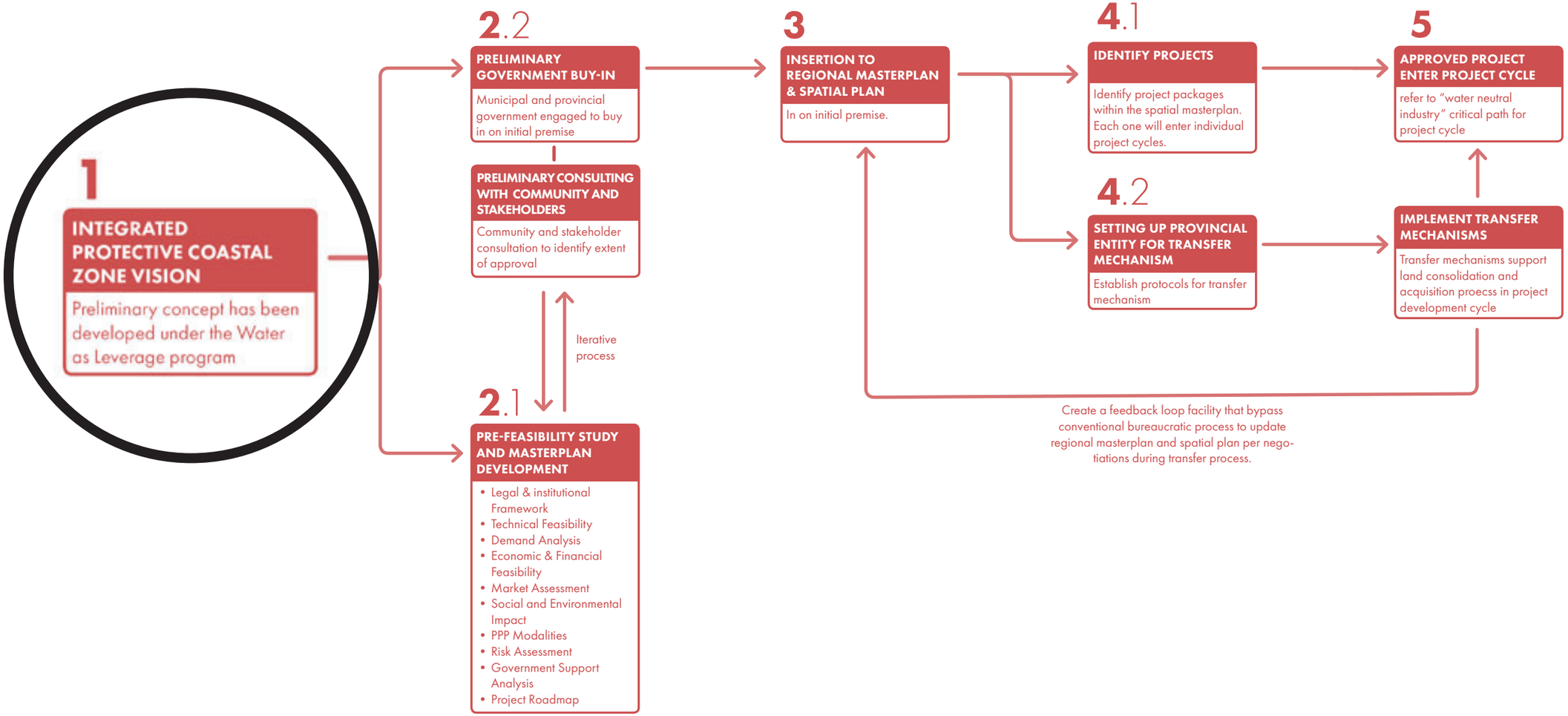

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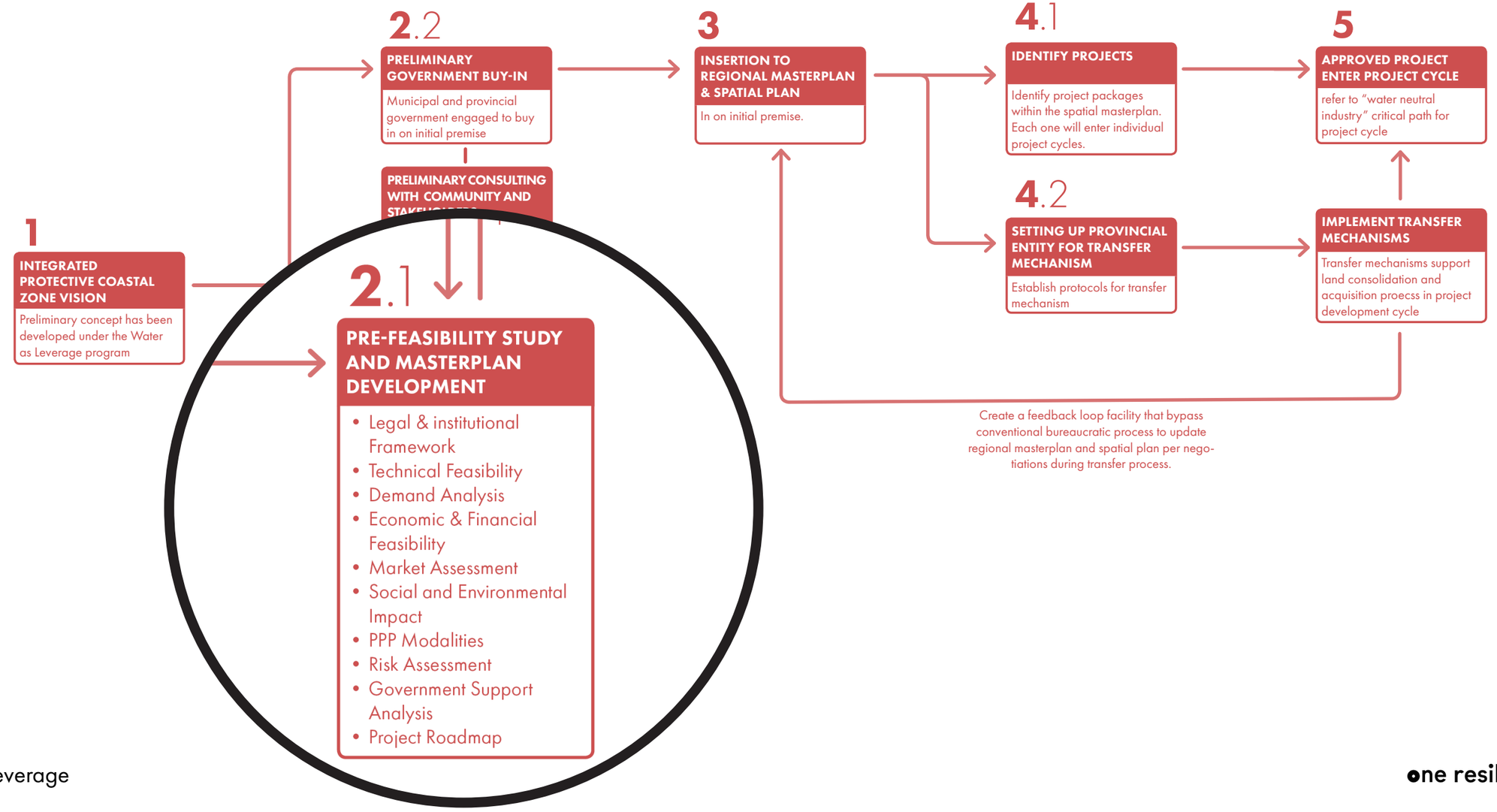

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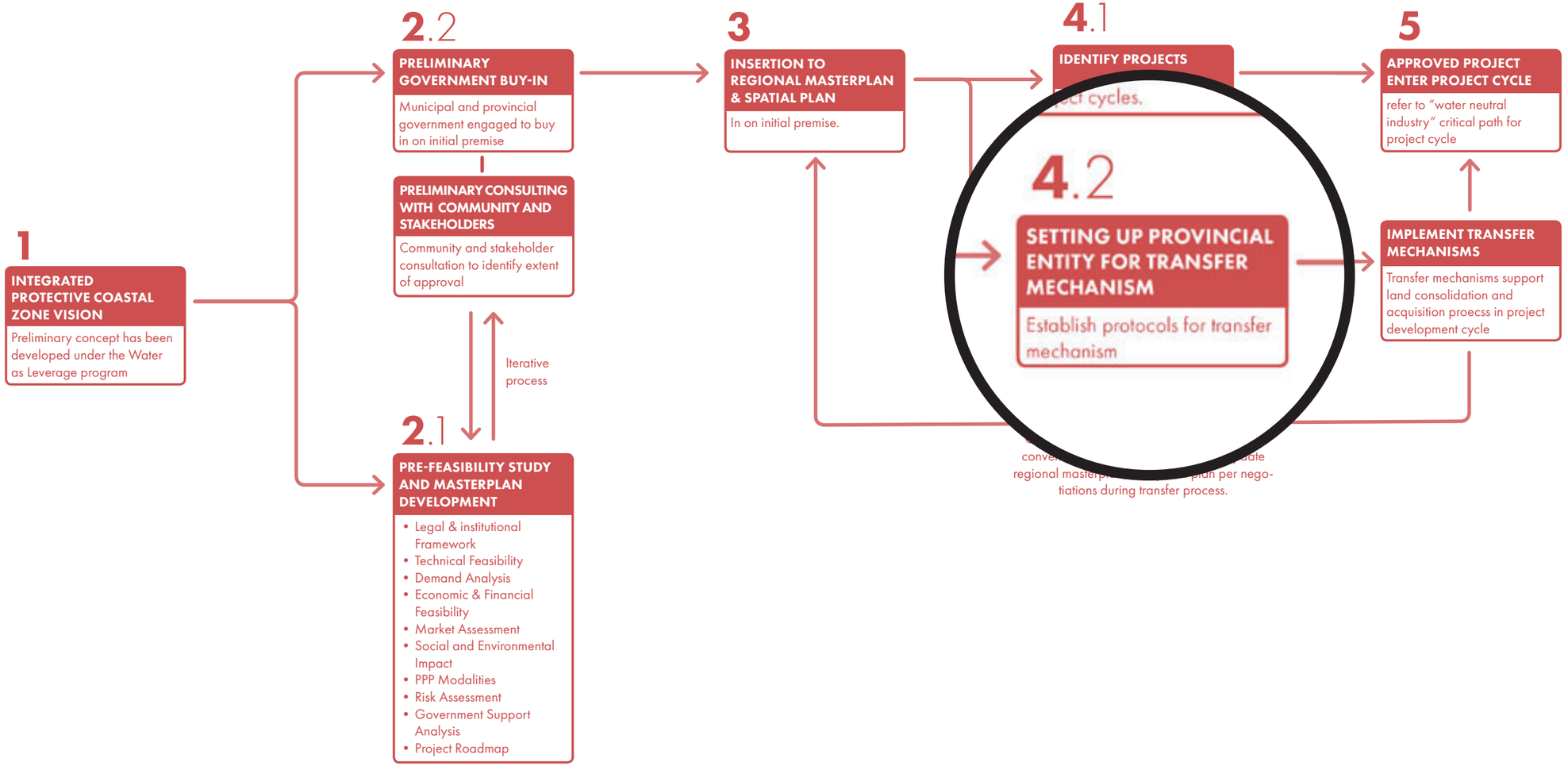


SEQUENCING

SHORT TERM | MEDIUM TERM | LONG TERM

COASTAL BALANCE PILOT GENUK/SAYUNG AREA

PROJECT 01

Project that combines hard infrastructure with soft mangrove foreshores through the modification of the current toll road to Demak proposal. The project aims to provide coastal protection, redirect and manage sediment supply, enhance the livelihood of communities and provide opportunities for local and regional economic growth. Tangible measures include the modification of the planned toll road to include an elevated section with an ecotourism island, that enables sediment capture and mangrove restoration. To better connect with Demak, components include a large Mangrove and Fisheries Park.

SYNERGY AND COORDINATION WITH PILOT WATER-NEUTRAL INDUSTRY IN GENUK

FUTURE-READY PORT

PROJECT 02

Tanjung Emas Port masterplan update with expansion of operations, breakwaters with sediment capture areas to create soft (mangrove) foreshores, facilities modernization, drainage strategies, flood protection strategies, and more cost-effective dredging strategies due to local reuse of sediment instead of offshore transport of sediment.

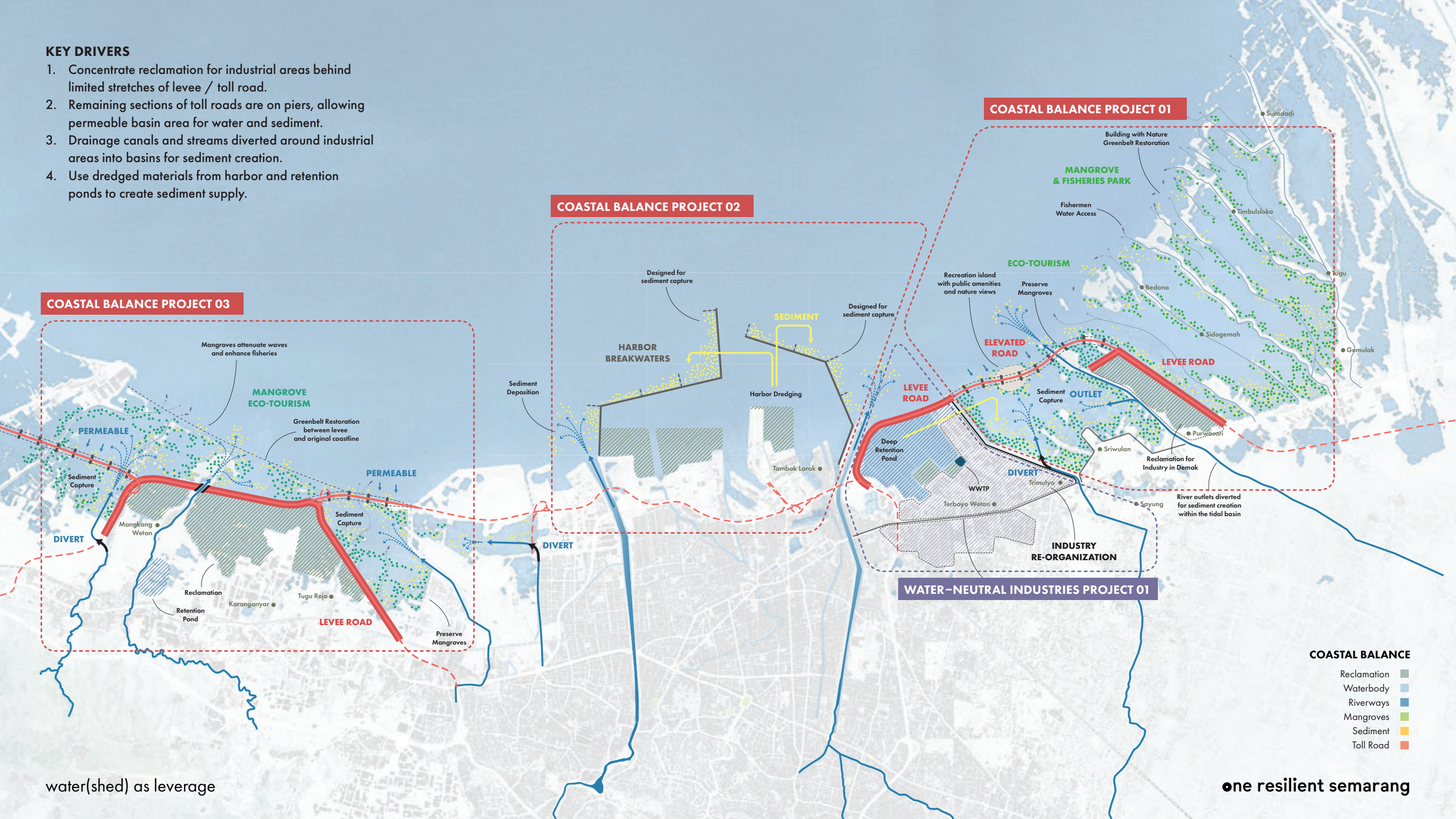
WEST SEMARANG SOFT SHORELINE INFRASTRUCTURE

PROJECT 03

Cross-boundary project with combination of hard and soft coastal protection measures that links logistical and ecological efforts between West Semarang and Kendal. Due to the longer time frame this projects allows for adequate planning and testing of alternative approaches to coastal protection that include green measures.

KEY DRIVERS

1. Concentrate reclamation for industrial areas behind limited stretches of levee / toll road.
2. Remaining sections of toll roads are on piers, allowing permeable basin area for water and sediment.
3. Drainage canals and streams diverted around industrial areas into basins for sediment creation.
4. Use dredged materials from harbor and retention ponds to create sediment supply.



water(shed) as leverage

one resilient semarang

coastal balance pilot in genuk/sayung


ALREADY PROPOSED IN OTHER PROJECTS
1 Proposed Toll Road as Seawall (keep as proposed for 2.5 km)
9 Levee structure along the east bank of the river 3.2 km (Water–Neutral Industries Project 01)
4 Reclamation Area for New Industry 200 ha (Water–Neutral Industries Project 03)
PROPOSED COMPONENTS
2 Elevated Toll Road 4km
3 Waterway Diversion (2 rivers)
5 Levee structure in front of Sriwulan 3km
6 Mangrove & Fisheries Park 2000 ha (10% mangroves)
6a Eco-Tourism destination Tomb of KH. Abdullah Mudzakir
6b Sediment Capture Area 750 ha
7 Eco-tourism Island 40 ha
8 Sediment transport during maintenance dredging of retention pond (Water–Neutral Industries Project 01)
MANGROVE & FISHERIES PARK
ECO-TOURISM
6a
ELEVATED TOLL ROAD
2
LEVEE TOLL ROAD
1
DIVERT
6b
OUTLET
3
4
5
6
7
8
9
Timbulslako
Tugu
Bedono
Sidogemah
Gemulak
Purwosari
Sriwulan
Sayung
Water –Neutral Industries Pilot Project Area
RIVERS AND DRAINS
water(shed) as leverage
one resilient semarang

PROJECT COMPONENTS AND SCOPE

1. LAND DEVELOPMENT
Development of industrial and urban land. 200 Ha of new polder system in Demak and also improvements of land parcels along the coastal road (Jalan Pantura).

- Reorganization of land use and re-parcelization of targeted areas
- Reclamation
- Land Acquisition/Land Consolidation
- Integration of public amenities and parks

2. CIVIL IMPROVEMENTS/WATERWAY DIVERSION
Integrated flood protection; Upgraded infrastructure of re-acquisitioned industrial clusters

- Construction of a polder system and toll road/sea dyke modification
- Diversion of river flows to improve sediment capture

3. GREENBELT RESTORATION
Construction of mangrove parks and sediment capture systems along with public amenities.

- Mangrove park
- Nature-based sediment capture systems combined with breakwaters and sea dykes
- Integration of public amenities such as boardwalks, jetties and recreational facilities

4. SOFT COSTS
Initial and ongoing cost items

- Pre-feasibility Study
- Design and Engineering
- Financing
- Institutional Reorganization and Development
- Management (long-term)
- Operations and Maintenance (long-term)
- Public advocacy and engagement

BENEFITS

CLIMATE AND ENVIRONMENTAL IMPACT

1. Coastal Resilience / Improved adaptive capacity to Sea Level Rise
2. Protected and enhanced local biodiversity i.e. improved marine habitat and food security through reconstruction of mangrove ecosystem and coastal greenbelt
3. Carbon capture from ecological preservation and mangrove restoration of eroded coastline
4. Reduced coastal erosion with sediment capture and greenbelt restoration in Genuk and Sayung for up to 66 bird species and 28 mangrove species

ECONOMIC IMPACT

1. Reduced flooding risks leads to reduced operational disruption of a major logistical corridor of Jalan Pantura
2. Increased bio-stock - wild fish up to 3500 tonnes/yr, wild shrimp up to 1500 tonnes/yr and raw materials from mangroves
3. Eco-tourism activities generate local revenues for surrounding businesses and village business units
4. Avoided cost of pumping operations in previously designed polder system
5. Toll road connectivity to land development can improve concession viability and revenue from tarrifs
6. Optimized land use leads to potential higher value development and investments in industrial operations

SOCIAL AND INSTITUTIONAL IMPACT

1. Improving and securing the livelihoods of existing fishing communities in Semarang and Demak
2. Securing cultural heritage and social values of historic communities along the coast of Demak
3. Land redevelopment can improve living conditions of existing villages and therefore improving quality of health and life
4. Improved coastal governance process through ecological transfer process