Department of Public Works and Highways

In cooperation with
Laguna Lake Development Authority

Laguna Lakeshore Expressway- Dike Project (LLEDP)

A Public- Private Partnership Project

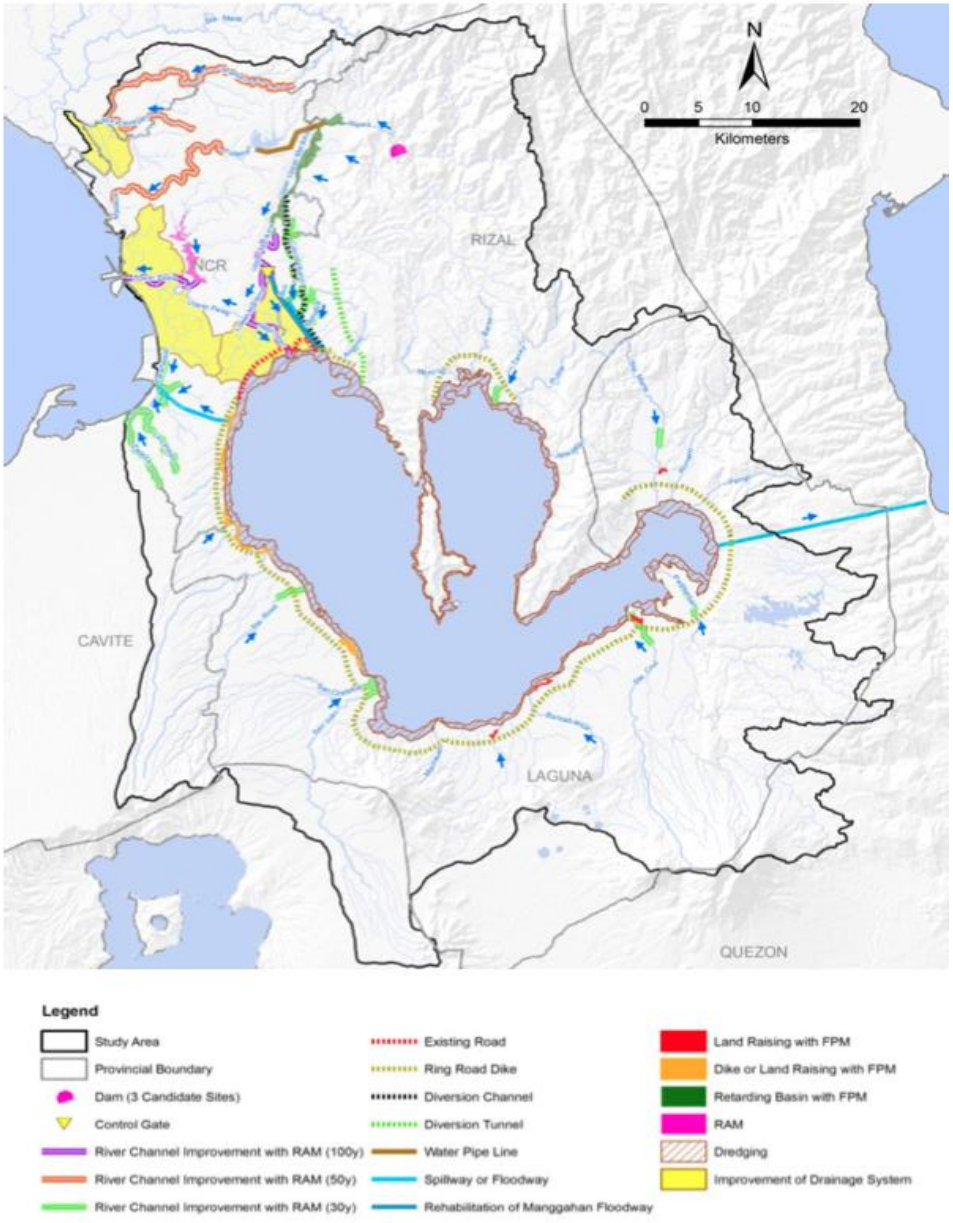
Presentation to UK Transport Solutions

September 18, 2014
New World Hotel, Makati City

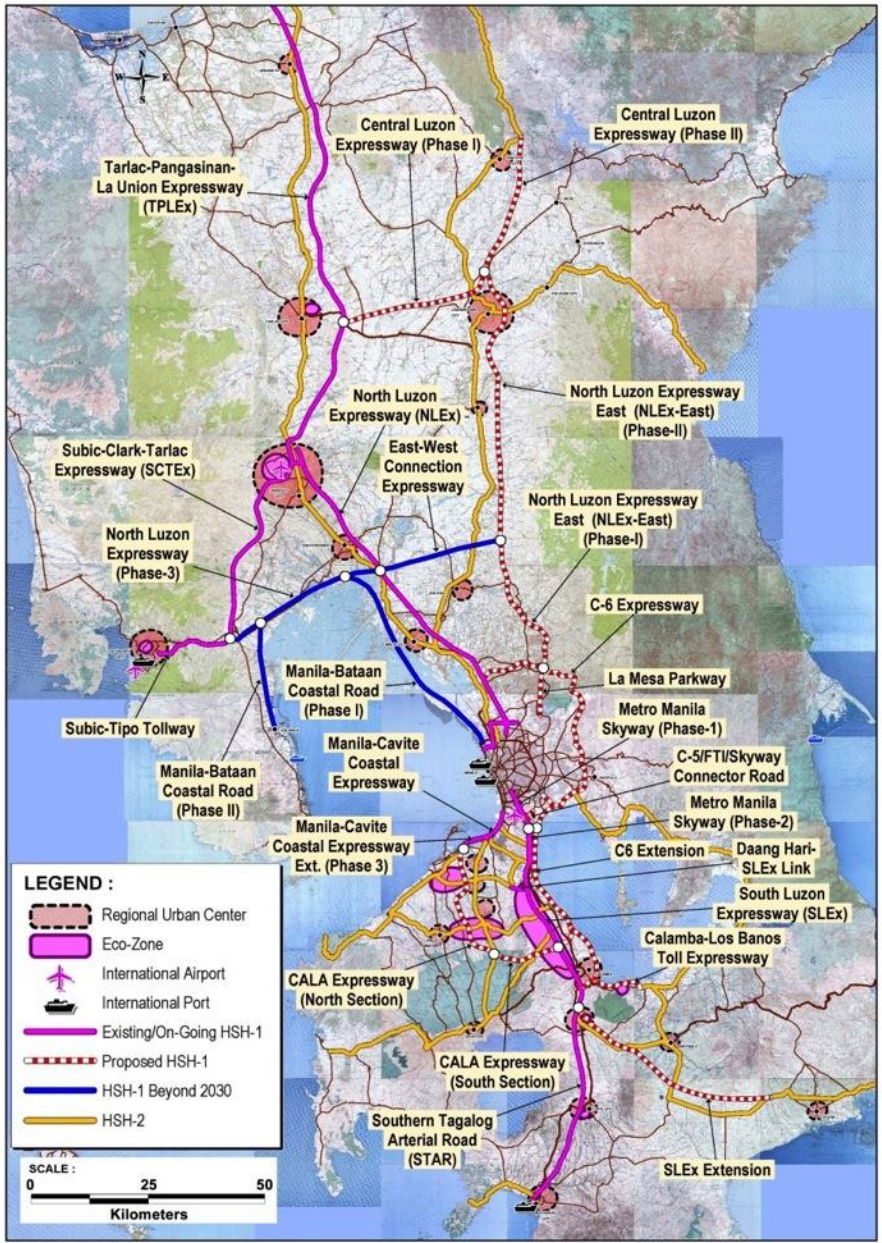
OVERVIEW OF THE PROJECT

LLEDP is consistent with both Master Plans

Master Flood Control Plan



High Standard Highway Master Plan



Proposed HSH* Network in Metro Manila and its 200km Sphere:

* *HSH-High Standard Highway*

ON-GOING : 170.79 km

Project Name	Length (km)	Proj. Cost (Php Bn)	Completion
Tarlac-Pangasinan-La Union Expressway	88.85	18.13	2018
Daang Hari-SLEx Link	4.00	2.01	2014
STAR, Lipa – Batangas , Phase II	19.74	2.32	2015
NAIA Expressway	7.15	12.32	2015
Metro Manila Skyway Stage 3	14.82	26.66	2017
Manila North Expressway and NLEx-SLEx Connector Road	26.27	28.95	2017
Plaridel By-Pass Road, Phase II	9.96	3.43	2017

NEDA BOARD APPROVED: 122.30 km

Project Name	Length (km)	Proj. Cost (Php Bn)	Completion
CALA Expressway (Cavite and Laguna Side)	44.60	35.43	2019
Central Luzon Link Expressway (CLLEx), Phase I (Tarlac-Cabanatuan, Nueva Ecija)	30.70	14.94	2017
Laguna Lakeshore Expressway Dike	47.00	122.81*	2021

PROPOSED (PRIORITY): 93.79 km

Project Name	Length (km)	Proj. Cost (Php Bn)	Completion
Metro Manila Expressway, C-6	58.09	TBD	TBD
CLLEx, Phase II (Cabanatuan-San Jose)	35.70	14.20	TBD

* *Includes P57.897 B reclamation cost.*

Background of the Project

- The urgency of the Project was heightened by the intense rains and typhoons during the monsoon season - e.g., Typhoon “Ondoy” in 2009, “Habagat” in 2012 and 2013, Typhoon “Maring” in August 2013

- Objectives:
  - To mitigate flooding in the western coastal communities along Laguna Lake, from Taguig thru Calamba to Los Banos
  - To facilitate traffic flow from Metro Manila to Laguna
  - To generate productive land
  - To optimize use of private sector resources and expertise

COMPONENTS

1. Expressway-Dike: 47 kms (2x3 Lanes)

- 500 meters away from shoreline
- Taguig to Los Banos
- 8 Interchanges
- 16 Bridges, 16 pumping stations
- Elevation 15.2 m (100-Year flood level)
- **Php 64.9 B** (at 2013 prices)

2. Reclamation: 700 hectares

- To enhance revenues for project financing
- 7 Islands (7 x 100 has)
- 450 m wide x 15.6 km long
- 100-150 meter channel
- **Php 57.9 B** (at 2013 prices)

Laguna Lakeshore Expressway Dike

1. Expressway-Dike: 47 kms (2x3 Lanes)

2. Reclamation: 700 hectares

C6 Phase 2

2. Reclamation for Property Development

1. Taguig- Los Banos

TAGUIG
BICUTAN
SUCAT
MUNTINLUPA
SAN PEDRO
BINAN-STA. ROSA
CABUYAO I
CABUYAO II
CALAMBA
LOS BANOS

Makati City
Pateros
Pasay City
Taguig City
Taytay
Teresa
Angono
Morong
Baras
Parañaque
City
Espeleta
Laguna Bay
Lawa ng Laguna
Talim Island
Pakil
General Mariano Alvarez
Biñan City
Santa Rosa City
Silang
Canlubang
Calamba City
Los Baños
S Luzon Expy
Manila East Rd
National Hwy
Pan-Philippine Hwy

22045827 places

	Without the Project	With the Project
I. FLOOD CONTROL ECONOMIC BENEFITS		
A. Reduction in Flood Damages: Php 20.0 B, NPV		
Water level (at western shoreland, 60-year design flood)	Elev. 14.14 m (or 1.64 m above normal lake level)	Elev. 12.50 m (or kept at normal lake level)
Structures prone to flood damage	(a) 156,010 residential, (b) 1,567 commercial, (c) 3,476 industrial	All structures protected
Flood damages (Annual average value)	P 8.1 B/yr	P8.1 B/yr damage avoided (Total for 30 Years: P20.0 B, NPV)
Persons affected	~800,000 persons affected	~800,000 persons no longer affected
B. Increase in Land Value due to Flood Protection: Php 10.2 B, NPV		
Land value at flood-prone western shoreland (TOTAL AREA PROTECTED: 21.3 sq. km)	P1,000-6,000/sq. m. Total Value: P 77.1 B	P1,330-7,980/sq. m (increase of 33%) Total Value: P 102.7 B
II. EXPRESSWAY ECONOMIC BENEFITS		
A. Reduction in Vehicle Operating Cost (VOC) : Php 5.4 B, NPV		
VOC per Class 1 vehicle (car)	P10.90-12.79/km	P10.07/km
VOC per Class 2 vehicle (bus)	P29.82-30.11/km	P18.14/km
VOC per Class 1 vehicle (truck)	P33.87-39.00/km	P32.80/km
B. Savings in Travel Time: Php 8.8 B, NPV		
Travel speed	30-45 kph	80 kph
Travel time	1.33-1.98 mins/km	0.75-0.78 min/km
III. RECLAMATION ECONOMIC BENEFITS: Php 118.8 B, NPV		
Land asset created due to Reclamation		700 has of Land Asset Created, P118.8 B
Potential Asset Creation (reclamation) for LLDA		Potential ~ 1,300 has. behind the Dike

Implementing Agency

- Main Implementing Agency: DPWH

  ROW Delivery, DED Approval. Construction Supervision, Coordination with TRB for Toll Operation Certificate and Toll Rates/Adjustments, Expressway-Dike O&M Supervision

- Cooperating Agency for Reclamation: LLDA

  Grant of Authority to Reclaim, Titling of Reclaimed Land

PPP Arrangement

- **BTO for Expressway-Dike and BT for Reclamation**
- Concessionaire:
  - designs, finances and builds expressway- dike and reclamation
  - transfers expressway-dike to DPWH, and operates it as toll facility for 30 years, including flood control
  - transfers reclaimed land to LLDA, but receives title of portions of reclaimed land as contract payment per Sec. 6 of BOT Law.

Milestones and Timetable for Next Steps

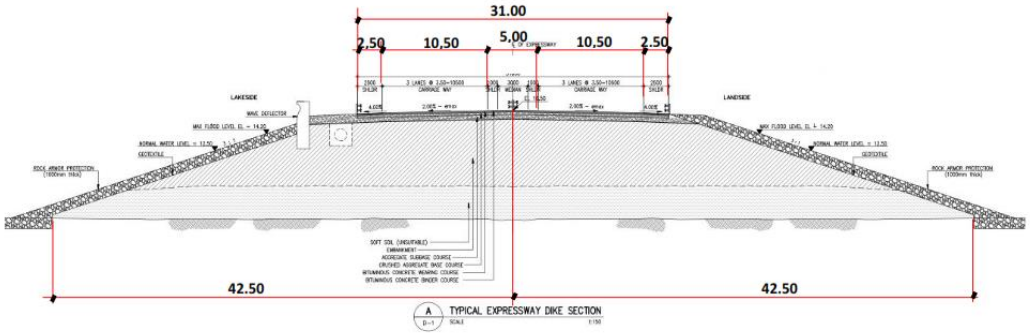
Activity	Date
Conduct of Feasibility Study	October 2013- February 2014
Review by PPP Center, NEDA, DOF	February- April 2014
NEDA-ICC Approval	21 April 2014
NEDA Board Confirmation	19 June 2014
Publication of Invitation to Pre-Qualify and Bid	03, 08, 15 August 2014
Bid Proposal Submission	06 July 2015
Notice of Award	05 August 2015
Detailed Engineering Design (By Phase)	September 2015-May 2016
Construction (By Phase)*	December 2015- December 2021
Operation and Maintenance of Expressway-Dike	2022-2051

** Stage construction, given phased approvals of detailed designs and phased ROW Delivery*

B. FUNCTION AND DESIGN CONSIDERATIONS OF THE DIKE

Design Considerations:
Dike

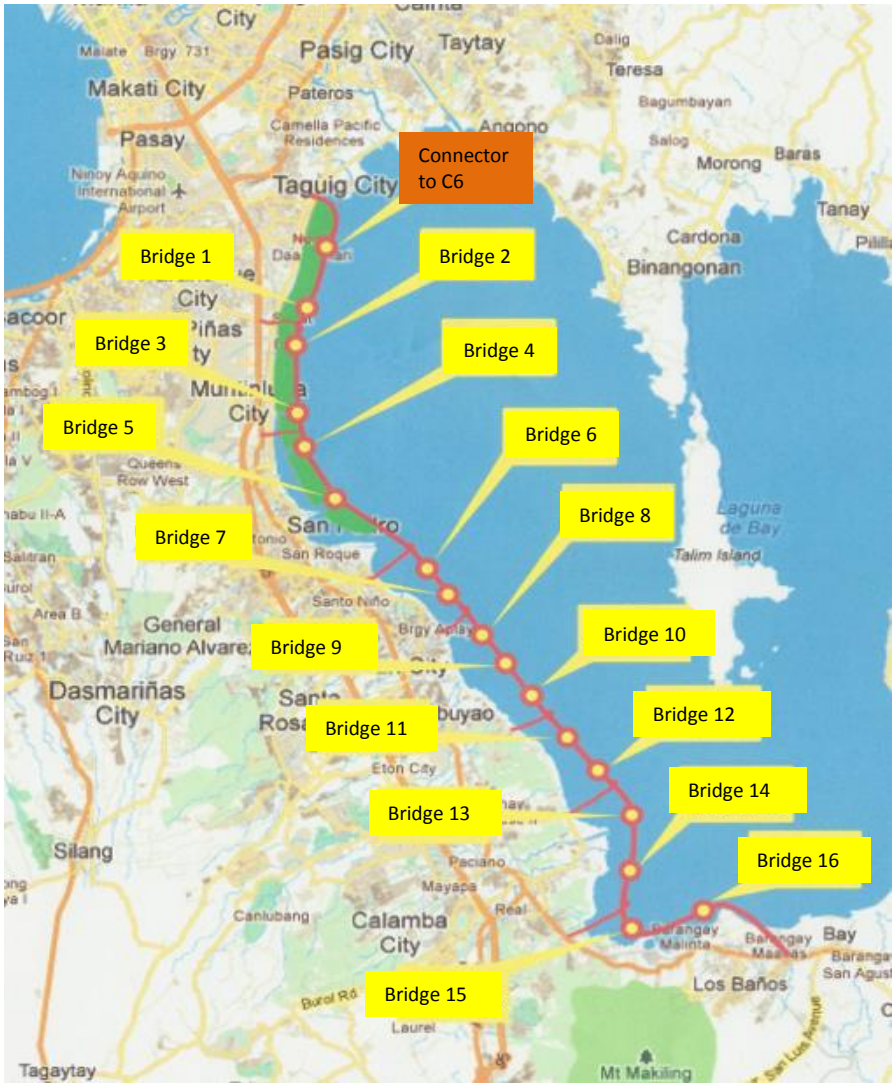
- Prevent backflow of water from the lake
  - Height is designed to contain big floods
    - maximum up to **100-year floods**
    - or lake water reaches elevation 14.2m
  - Plus one meter allowance (freeboard) for climate change and contingency




Saemangeum Seawall- Dike, South Korea

Note: Higher and safer than 60-year design flood levels used in the Metro Manila Flood Control Master Plan

Design Considerations:
Crossing Structures (Bridges and Interchanges

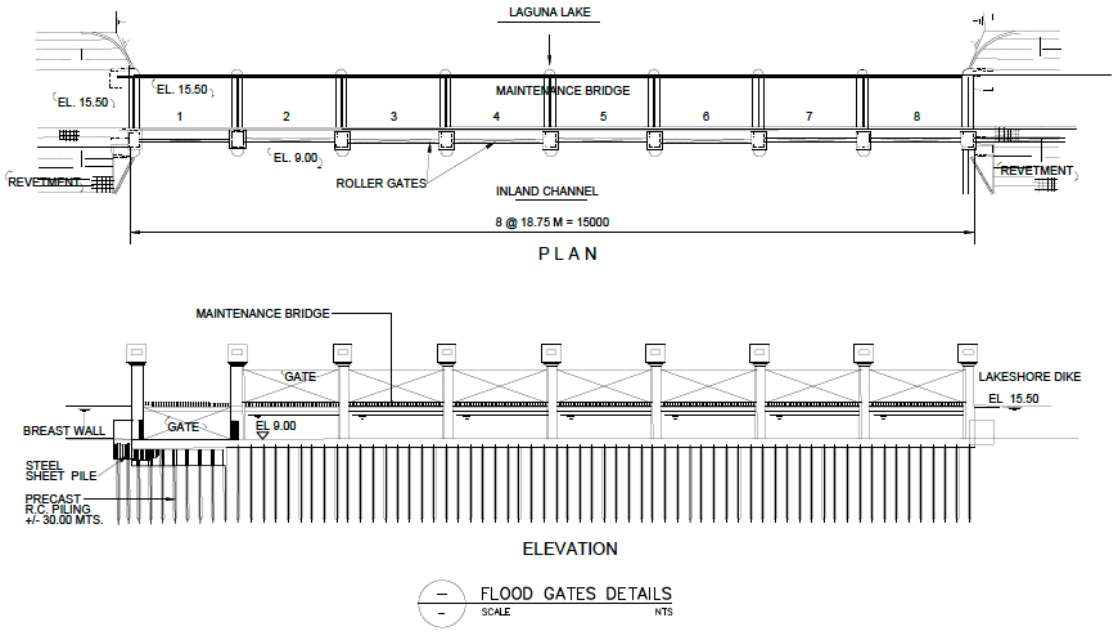


- **16 Bridges along Expressway-Dike**
  - Number, distribution, locations, and lengths of bridges **based on hydraulic simulation model** of required waterway openings to accommodate estimated river discharges:
    - Bridges are generally aligned with existing rivers inland
    - 150m or 210m in length each
  - Floodgates are located under the bridges, while pumping stations are beside the floodgates and bridges

- **8 Interchanges**
  - With Access Roads

Design Considerations: Floodgates and Pumping Stations

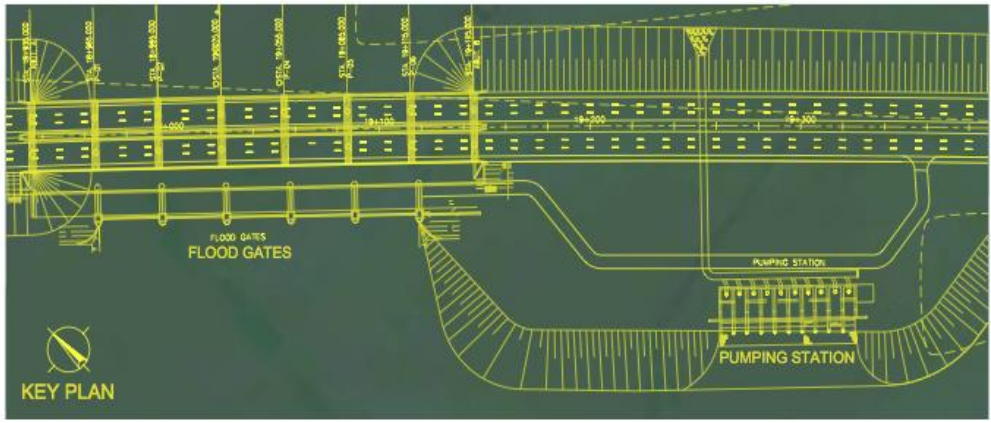
- Prevent backflow of high lakewater into shoreland
- **1 Bridge: 14-15 floodgates below**
- Operation of floodgates
  - Opened during dry season or normal weather flow or when lake is below Elev. 12.5 m
    - Allows continuous water circulation
    - Provides access for fishing vessels
  - Closed once lake rises above Elevation 12.5m to allow pumps to start operating



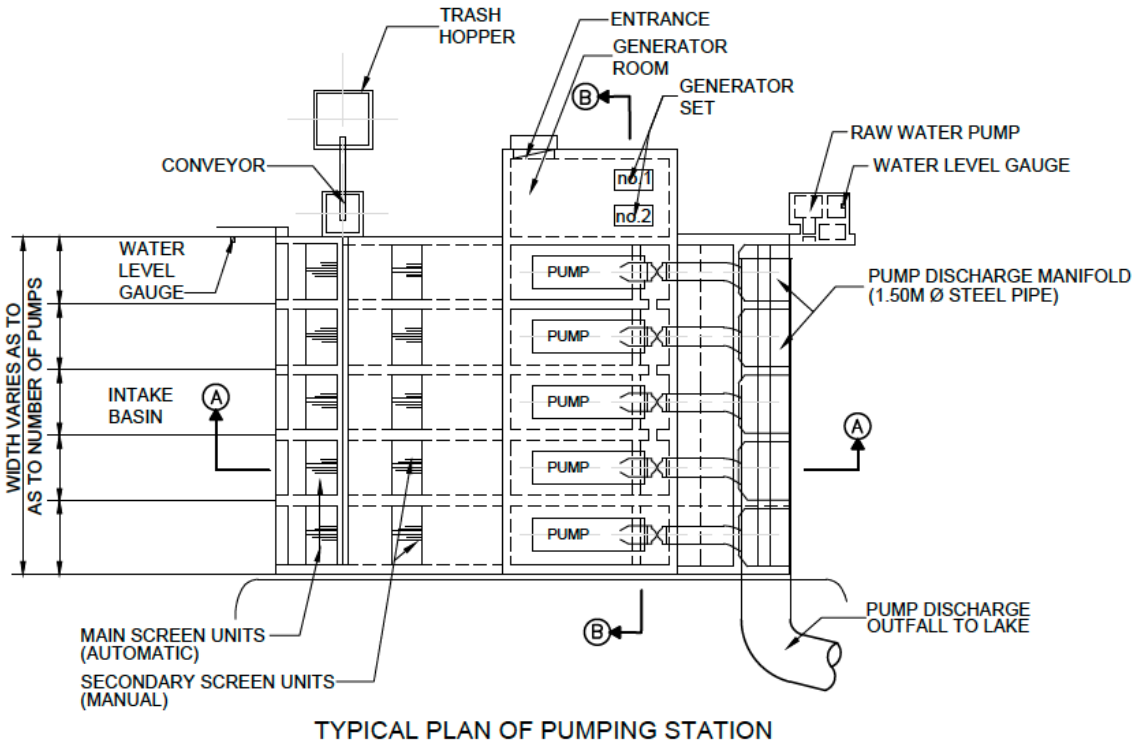
Saemangeum Seawall- Dike, South Korea

Design Considerations: Pumps

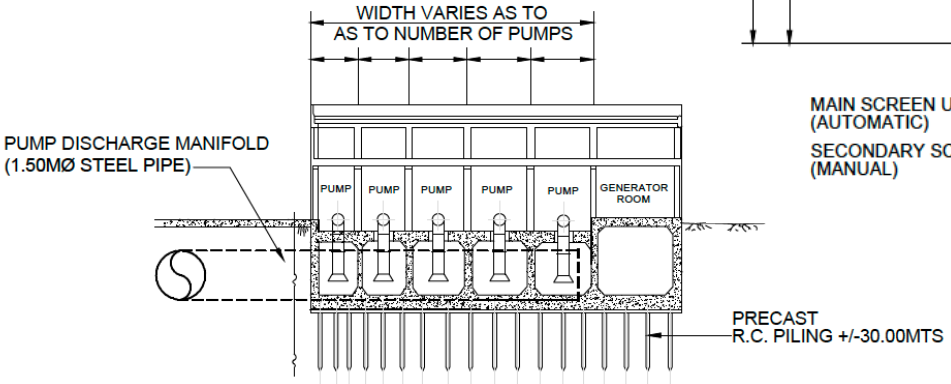
- **1 Bridge: 1 Pumping Station**
  - 1 station: average of 10 pumps



- Pumps shall start to operate when floodgates are closed (at Elev 12.5 m) to bring down level of inland channel to below Elev 12.5m
- *May start at lower elevation (11.5m) during typhoons and heavy rains*



TYPICAL PLAN OF PUMPING STATION



Design Considerations: Expressway-Dike Alignment

*Expressway-Dike alignment is **at least 500m away** from the shoreline*

Perspective	Considerations
Engineering	• Provide **smooth alignment** for a high speed highway (vs. irregular shape of the shoreline)
Environmental	• Provide a channel between the shoreline and the dike which will **maintain the fish spawning areas** required by LLDA
Socio-economic	• **Minimize displacement of communities** along the shoreland (vs. onshore alignment) • Enable **continuous livelihood activities** among fisherfolks
Project Financing	• Allow for reclamation component west of the dike necessary **to enhance revenues for project financing**

Design Considerations:
Inland Channels

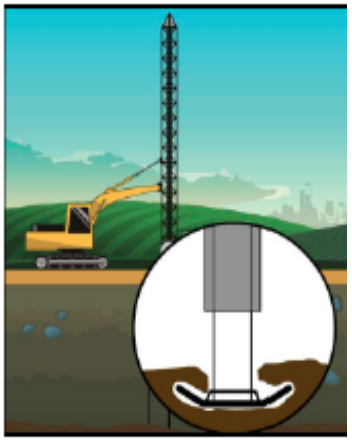
- **100- 150m channel** between shoreland and reclamation areas
- **200- 250m channel** between reclamation areas

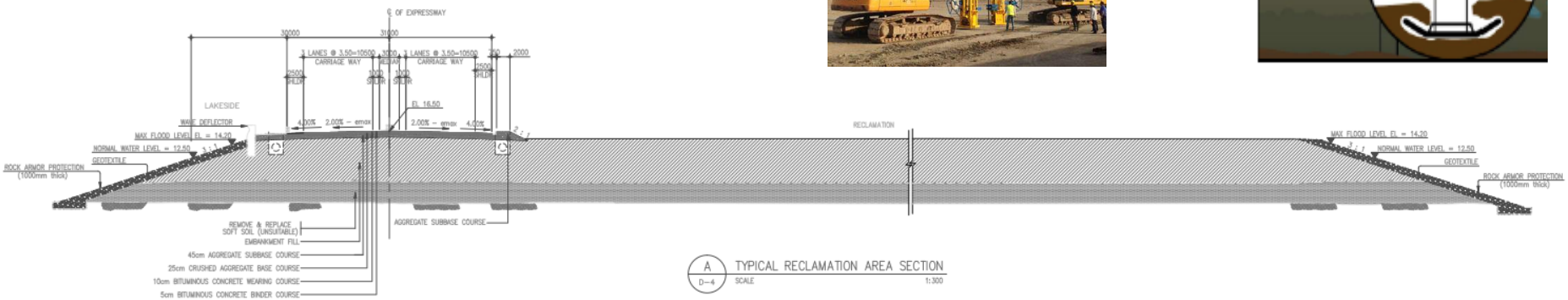
Perspective	Considerations	Considerations
Engineering/Hydraulic	• Serve as regulation/ retention pond • Temporarily store flood waters from inland to optimize pump operation	• Extension of existing inland rivers, providing for smooth flow of river waters draining into the lake
Socio-Economic / Environmental	• Opportunity to improve water circulation and increase level of dissolved oxygen to support aquatic life (with the desilting of channel)	• Provides access to the lake for fisherfolks during dry season
Business Economics	• Provide greater flexibility in master planning of the reclaimed area as prime property and enhance its marketability	

Design Considerations: Reclamation

- Rawland reclamation can be staged starting 4th Qtr of 2015 until 2019
- Installation of Vertical “Wick Drains” technology to accelerate consolidation of reclamation area, which will take 1 year before horizontal development
- Horizontal development (roads, major drainage, water supply) can start 1 year after the consolidation process
  - Can also be staged to synchronize with rawland and consolidation process

Vertical “Wick Drains”





Next Steps

- PPP Center Transaction Advisors through the Project Development and Monitoring Facility (PDMF)
- Investors' Forum
- Pre-Qualification of Potential Bidders

Thank you very much.