Laguna Lakeshore Expressway - Dike Project (LLEDP)

Innovations to Finance the Philippine’s Biggest Tollroad cum Flood Control Dike Project

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Undersecretary for Planning and PPP, DPWH

IBTTA Annual Meeting
The Economics of the World’s Transportation System - Fuel for Thought
September 1, 2015
Philippines and the Economy

Basic Profile
- 7,107 islands
- 300,000 sqkm.
- Capital: Manila
- GDP (2014): $ 285 billion
- Population: 100 million
- Size of Labor Force: 41.3 million
- Exchange rate: Php 45/$

Source: Philippine Statistics Authority, World Bank
PH’s Two-pronged problems

Economic Development Challenges

• Traffic congestion necessitates transport infrastructure solutions

• Concentrated area of economic growth provides opportunity to develop new centers of growth

Natural Disasters and Climate Change Issues

• Vulnerability for flooding due to typhoons and monsoons require flood control projects and other disaster-resilient infrastructure
Laguna de Bay (Laguna Lake)

- PH’s biggest lake
- Cradles to:
  - 6 provinces
  - 12 cities
  - 49 municipalities
  - 2,656 barangays
  - estimated
  - 14 million people
- Surrounded by Metro Manila and Region IV-A
### Metro Manila’s Share to GDP
National Capital Region (NCR)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>37%</td>
</tr>
<tr>
<td>Land Area</td>
<td>0.2%</td>
</tr>
<tr>
<td>Pop</td>
<td>13%</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>$8,100</td>
</tr>
<tr>
<td>vs. Per Capita in PH</td>
<td>$2,850</td>
</tr>
</tbody>
</table>

Metro Manila is directly beside Laguna Lake.
Areas around Laguna Lake account for 53% of national economy and 27% of Population
Background of the Project

• The urgency of the Project was heightened by the intense rains and typhoons during the monsoon season

  – Abnormal (neck-deep) and prolonged rise in the level of lake water
  – Wrought considerable damage to property
  – Interrupted transportation, business, education, and institutional operations in affected communities
  – Necessitated Local Government Units to declare a state of calamity in a number of occasions

• The President, on August 22, 2013 visited affected communities and ordered urgent study and implementation
Background of the Project

• Technical Assistance: United States Agency for International Development (USAID) through Advancing Philippine Competitiveness Project (COMPETE)
  – Provided urgent Feasibility Study for the Project

• Objectives:
  1. To mitigate flooding in the western coastal communities along Laguna Lake (from Taguig thru Calamba to Los Banos)
  2. To facilitate traffic flow from expand road network to develop more centers of growth
  3. To optimize use of private sector resources and expertise
LLEDP is consistent with both Master Plans

Master Flood Control Plan (World Bank)  High Standard Highway Master Plan (JICA)
Master Plan for Flood Management in Metro Manila and Surrounding Areas

Based on river basins:
Pasig-Marikina River Basin and Laguna Lake Basin.

<table>
<thead>
<tr>
<th>Name of Project</th>
<th>Est. Cost (P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pasig-Marikina River Improvement and Dam Construction</td>
<td>198.4 B</td>
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<tr>
<td>Meycauayan River Improvement</td>
<td>14.0 B</td>
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<tr>
<td>Malabon-Tullahan River Improvement</td>
<td>21.6 B</td>
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<tr>
<td>South Parañaque-Las Piñas River Improvement</td>
<td>17.3 B</td>
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<tr>
<td>East Mangahan Floodway (Cainta &amp; Taytay River Improvement)</td>
<td>25.9 B</td>
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<tr>
<td>West Laguna Lakeshore Land Raising</td>
<td>25.2 B</td>
</tr>
<tr>
<td>Land Raising for Small Cities around Laguna Lakeshore</td>
<td>7.2 B</td>
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<td>Improvement of the Inflow Rivers to Laguna Lake</td>
<td>0.6 B</td>
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<td>Manila Core Area Drainage Improvement</td>
<td>27.3 B</td>
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<tr>
<td>West Mangahan Area Drainage Improvement</td>
<td>5.5 B</td>
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<tr>
<td>Valenzuela-Obando-Meycauayan (VOM) Improvement</td>
<td>8.6 B</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>351.7 B</strong></td>
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</tbody>
</table>

Based on river basins:
Pasig-Marikina River Basin and Laguna Lake Basin.

Total area: 4,354 km²
Total Population: 17.1 M
Expressway-Dike
1. Taguig- Los Banos

- 47 kms (2x3 lanes)
- At least 500m away from shoreline
- 8 Interchanges
- 16 Bridges, 16 pumping stations
- Elevation 15.2 m (100-Year flood level)
- $1.6 B (at 2015 prices)
Main Dilemma

• Given the limited budget of the government in infrastructure development in relation to the total requirement of the goals of the nation,

  – How does the government finance major socially important and economically strategic public infrastructure (such as the LLEDP)?
Public-Private Partnership for Infrastructure Development

• President Aquino’s strategy to accelerate infra development

“Our solution: Public-Private Partnerships... From these PPPs, our economy will grow and every Filipino will be the beneficiary. There are many sectors that could benefit from this...”

President Benigno Aquino III

(SONA July 2010)
PH's Excess Liquidity of Private Sector: Widening Savings-Investments (S-I) Gap

Savings and Investments as % of GDP

$102 B

Savings

$54 B = Excess Liquidity in 2014

Investments

$48 B

<table>
<thead>
<tr>
<th>Year</th>
<th>Savings</th>
<th>Investments</th>
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<tbody>
<tr>
<td>1991</td>
<td>$48 B</td>
<td></td>
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<td>1992</td>
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Savings and Investments: 1991-2014
Infrastructure Funding Modalities of Economically Important Projects

<table>
<thead>
<tr>
<th>PPP</th>
<th>Pure Government / ODA</th>
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<tbody>
<tr>
<td>Risk management and allocation</td>
<td>Risk management and allocation. Government: regulatory risk, equity for viability gap funding/subsidy</td>
</tr>
<tr>
<td>Examples: Power projects, water (O&amp;M), major ports (MICT, South Harbor), ICT</td>
<td>All government</td>
</tr>
<tr>
<td>Toll roads, light rails, airport terminals Social infra (hospitals, schools, prison, housing), tourism facilities</td>
<td>Non-toll roads and bridges, irrigation, minor seaports and airports, flood control</td>
</tr>
</tbody>
</table>

Examples: Power projects, water (O&M), major ports (MICT, South Harbor), ICT

Commercially Interesting, BUT with RISKS that must be shared/minimized

No or low commercial viability
Financing Solution

• Utilize PPP Mode
• Leverage on the financial, technical and managerial resources of the private sector to ensure
  – Quality
  – Efficiency
• Pass-on design and implementation risks to the private sector
• But how exactly?
  – Since each project has its own unique risk and reward profile, that must be addressed uniquely
Risk-Reward Trade-off

**Risks**

- Dike will not hold during heavy typhoons/floods: LOSS OF LIVES, BUSINESSES, ASSETS
- Market/Traffic Risk
- Cost: $1.6 B

**Rewards**

- Gov’t acquires Right of Way
- Franchise for Toll Revenues
- Subsidy?

**Benefit:**

Toll revenue at full capacity will only cover 50-60% of investment cost.
Subsidy for PPP?

The government can give the project subsidy, or Viability Gap Funding (VGF)
- but the amount is significant, almost 50%
- government could have just done it

The financial subsidy does NOT match the high risks associated with the flood control component and the corresponding responsibilities and accountabilities of the private sector operator

The Private Sector needs more than subsidy to absorb risk of Project and invests more in overall quality of Project
PPP Financing Solution: add 700 hectares of reclamation project as LLEDP component

• Add a component that has upside-opportunities that will MATCH the downside risks of flood control, with minimum cost to Government

• FEATURE 1: Land
  – Give Land to the Concessionaire
  – Land, if developed properly, can become very expensive, especially by the Lakeshore (can multiply x4-x6 in 10 years)

• FEATURE 2: Authority to Create Land (Reclaim) within Lake
  – Government does not have land, but has the power to authorize reclamation and transfer the titles to the domestic private sector

• FEATURE 3: Big Enough to match Cost and Risks of Project
  – The Study computed it to be 700 hectares for Private Sector to fully finance the project and accept the risks
Risk-Reward Trade-off

**RISKS**

- Dike: will not hold during heavy typhoons/floods: LOSS OF LIVES, BUSINESSES, ASSETS
- Toll: Market/Traffic Risk

**COST:** $1.6 B

**RECLAMATION COST:** $1.4 B

**REWARDS**

- Gov’t acquires Right of Way
- Franchise for Toll Revenues
- 700 hectares of reclamation project for real estate development with significant price increase opportunity

**BENEFIT:** Reclamation Project Revenues can fully finance the project. Toll revenues are gravy for O&M
2. Reclamation for Property Development

- **2. RECLAMATION COMPONENT: 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
  - **Cost: $1.4 B** (at 2015 prices)
TAGUIG
BICUTAN
SUCAT
MUNTINLUPA
SAN PEDRO
STA. ROSA
CABUYAO I
CABUYAO II
CALAMBA
LOS BANOS

1. Taguig - Los Banos

2. Reclamation for Property Development

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)
   - $ 1.6 B (at 2015 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
   - $ 1.4 B (at 2015 prices)
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

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

### Design Considerations:

#### Expressway-Dike Alignment

**Perspective Considerations**

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>• Provide <strong>smooth alignment</strong> for a high speed highway (vs. irregular shape of the shoreline)</td>
</tr>
<tr>
<td>Environmental</td>
<td>• Provide a channel between the shoreline and the dike which will <strong>maintain the fish spawning areas</strong> required by LLDA</td>
</tr>
<tr>
<td>Socio-economic</td>
<td>• <strong>Minimize displacement of communities</strong> along the shoreland (vs. onshore alignment)</td>
</tr>
<tr>
<td></td>
<td>• Enable <strong>continuous livelihood activities</strong> among fisherfolks</td>
</tr>
<tr>
<td>Project Financing</td>
<td>• Allow for reclamation component west of the dike necessary <strong>to enhance revenues for project financing</strong></td>
</tr>
</tbody>
</table>
# Design Considerations: Inland Channels

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

• Flood Control
  • Protection of Lives and Properties
  • Increased Real Estate Value
  • Embankment structure will enhance aquatic habitat in the lake

• Expressway
  • Reduced travel time
  • Reduced travel costs
  • Easing Manila South Road, SLEX, and integrates with C6 to decongest Manila, alternative to EDSA in connecting SLEX and NLEX

• Reclamation
  • Prime Land Asset Created Value
  • Ease Metro Congestion due to expansion of business areas

• Employment: 403,613 jobs (OR 32,140,584 man-days)
LLEDP as the biggest approved PPP

You may have already heard of our largest PPP project—the Laguna Lakeshore Expressway Dike... This is a project that will yield numerous benefits.

First: flooding in nearby areas will lessen...
Second: the water of Laguna Lake will be cleaner.
Third: Less traffic. An expressway will be built on top of the dike...

With the cooperation of the private sector, the only obligations we have in this project are for the right-of-way; and a portion of the reclaimed land will serve as payment for the highest bidder. Because of this, we will get what we need, while spending less in the process.

President Benigno Aquino III
(SONA July 2014)
PPP Arrangement

• **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

• **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.
Pre-qualification of prospective bidders – Feb. 27, 2015.

Three Consortiums were qualified:
1. Team Trident
2. San Miguel Corporations
3. Alloy MTD-PAVI Consortium

Submission of Bids – November 2015

Notice of Award – Start 2016
Construction Period – 2016-2021
Operation Period – 2022-2051
Summary

- Philippines has great potentials, but subject to calamities
- Private sector has
  - significant excess funds
  - access to technical and managerial resources
- Government has limited funds but has
  - power to conduct integrated flood control and highway planning
  - Grant of authority to reclamation and titling of reclaimed land for disposition to the private sector

- The LLEDP will expand economic potentials of the country, protect communities from calamities, and leverage the resources and capabilities of the government and the private sector together
Thank you very much.