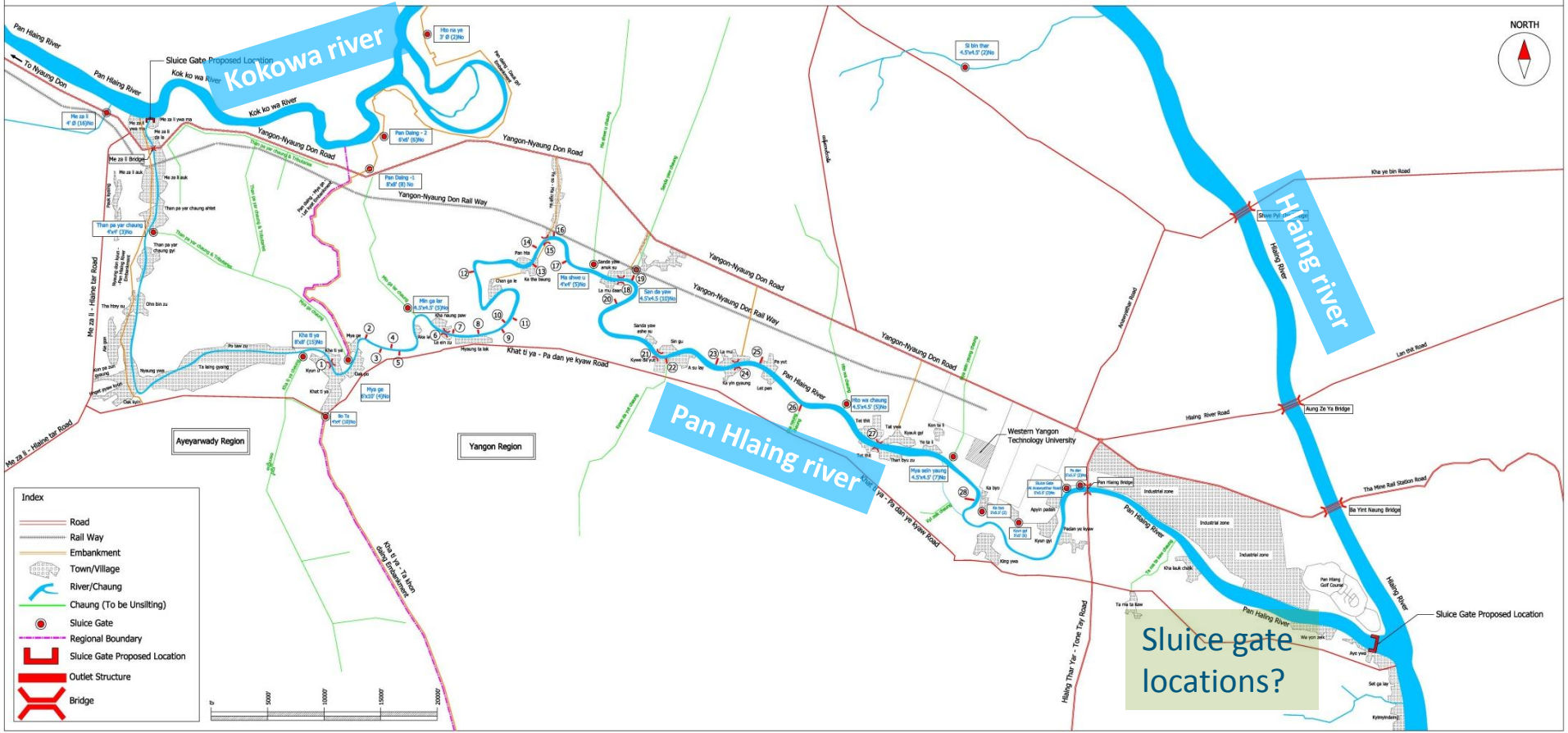
Pan Hlaing River Integrated Development Plan (PHRIDP)

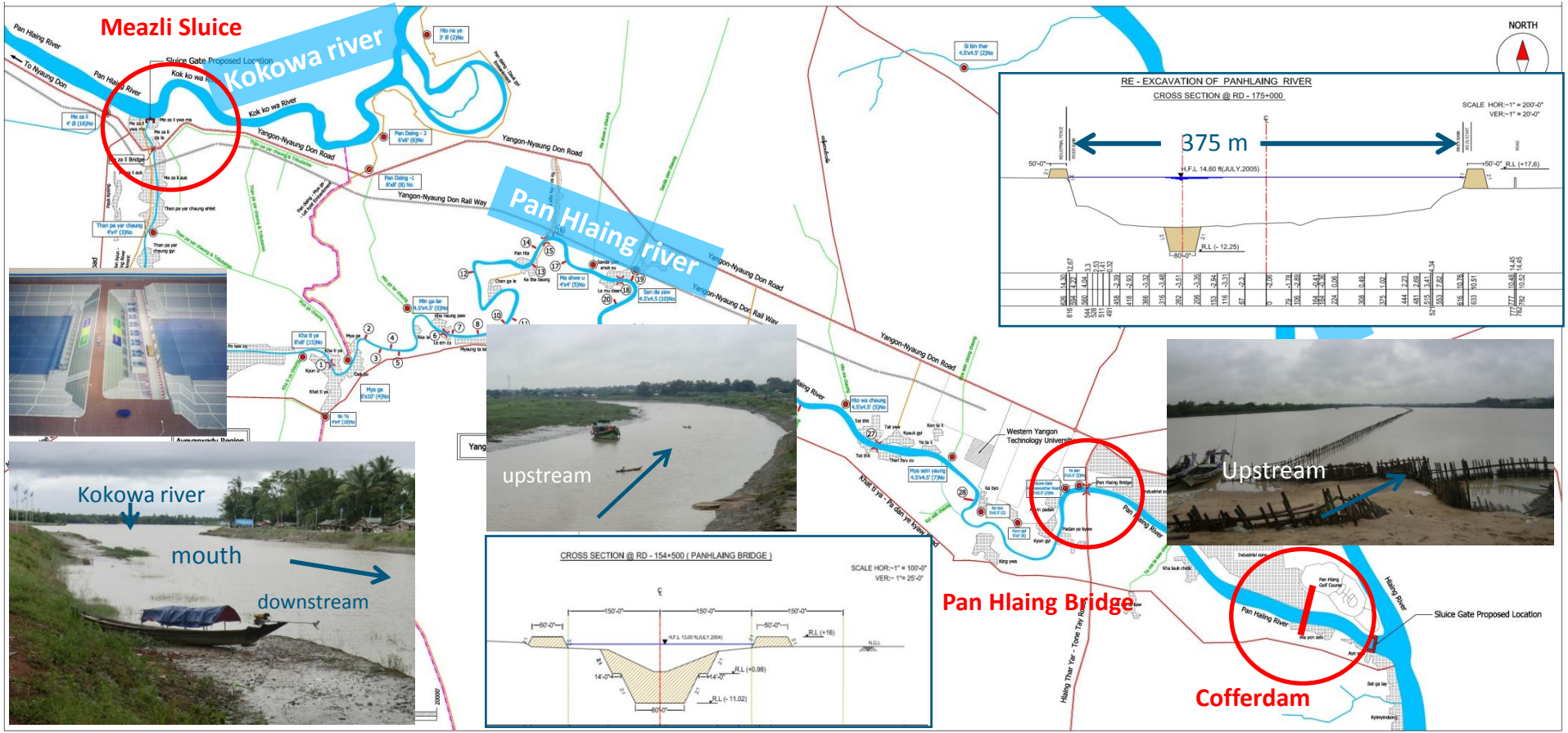
World Water Day, Myanmar

Aung Thura Hein
21 February 2017
Open

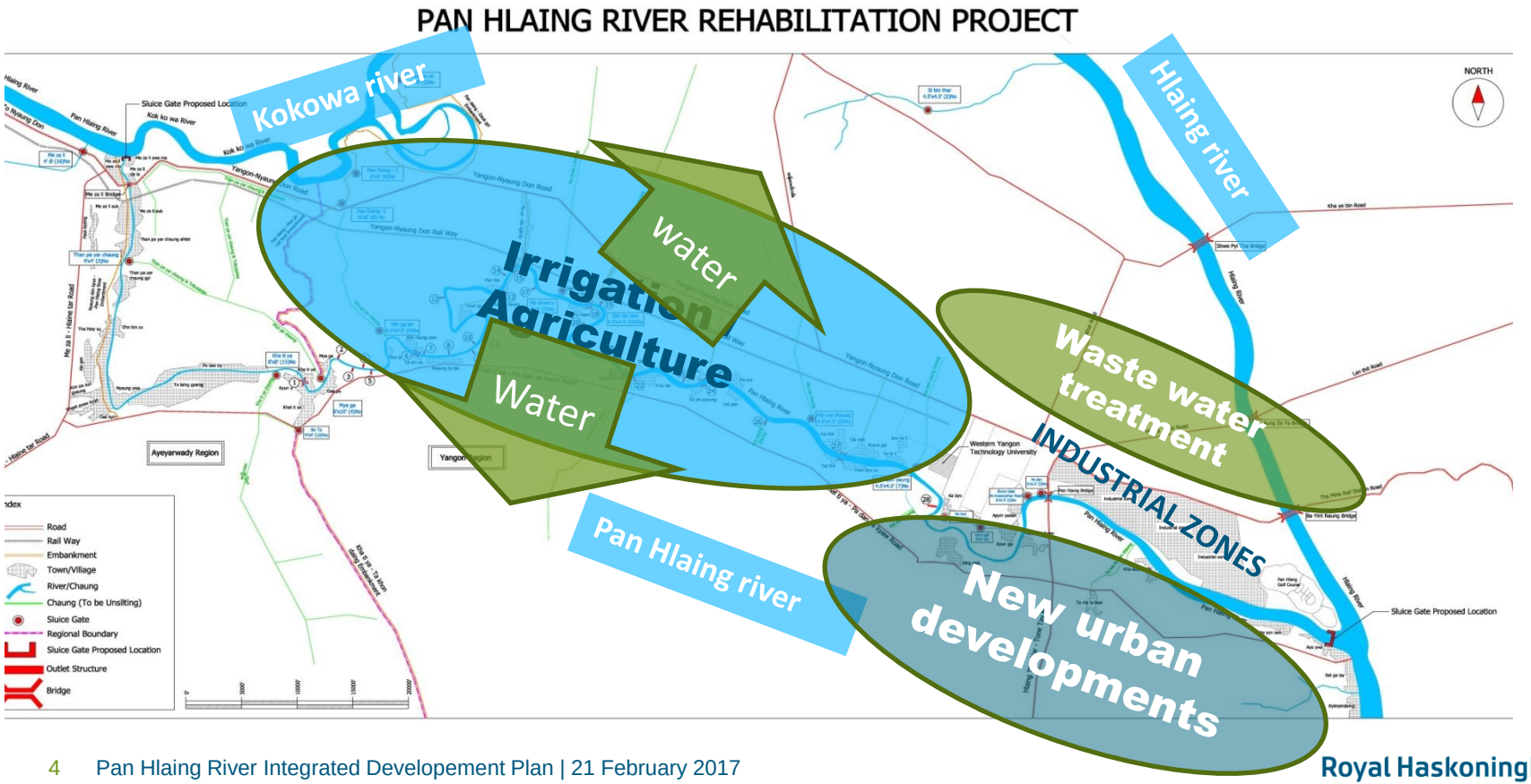
PAN HLAING RIVER REHABILITATION PROJECT



Pan Hlaing River Overview



Interest and Future Developments



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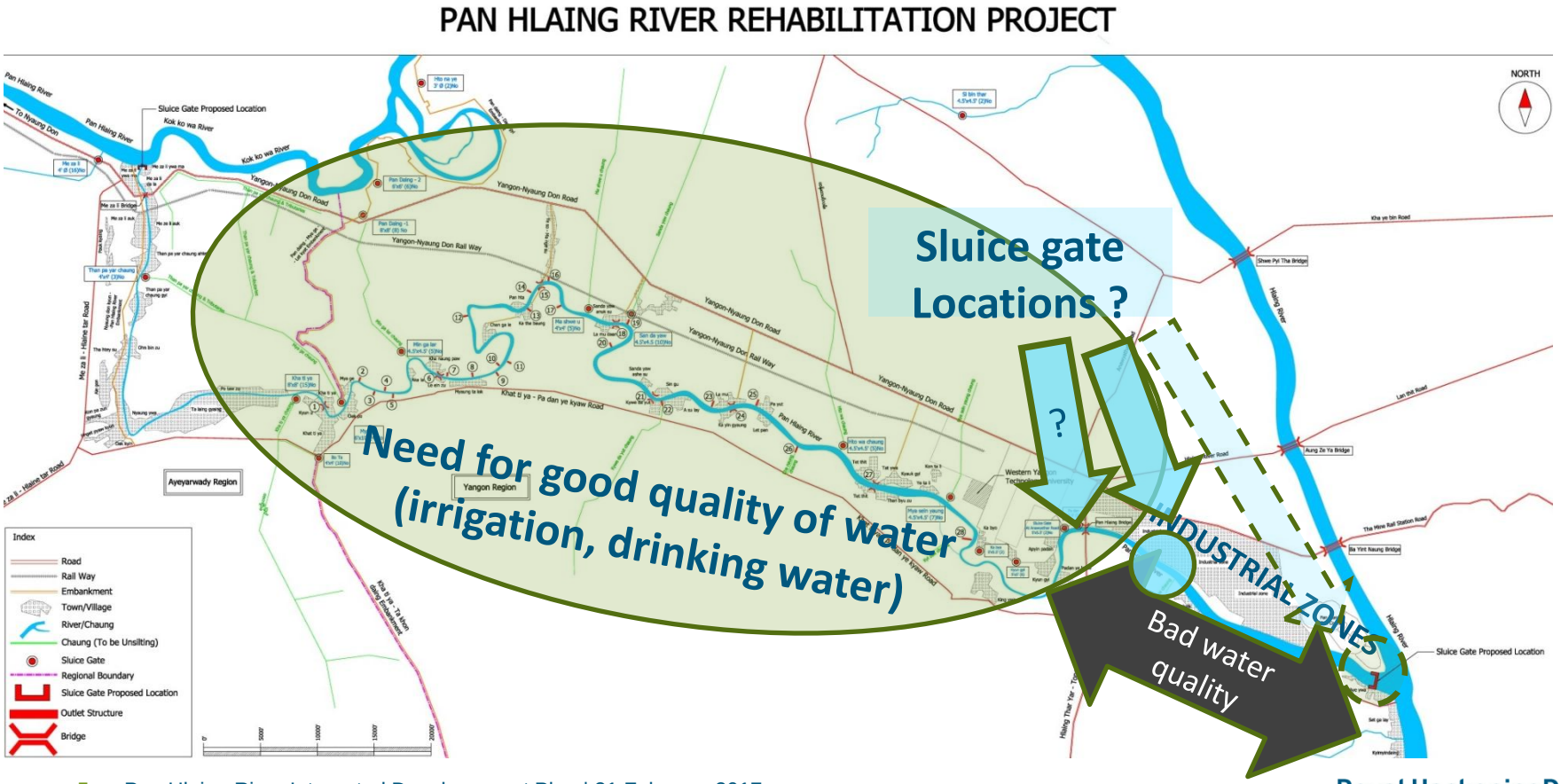
Challenges and Sluice gate locations



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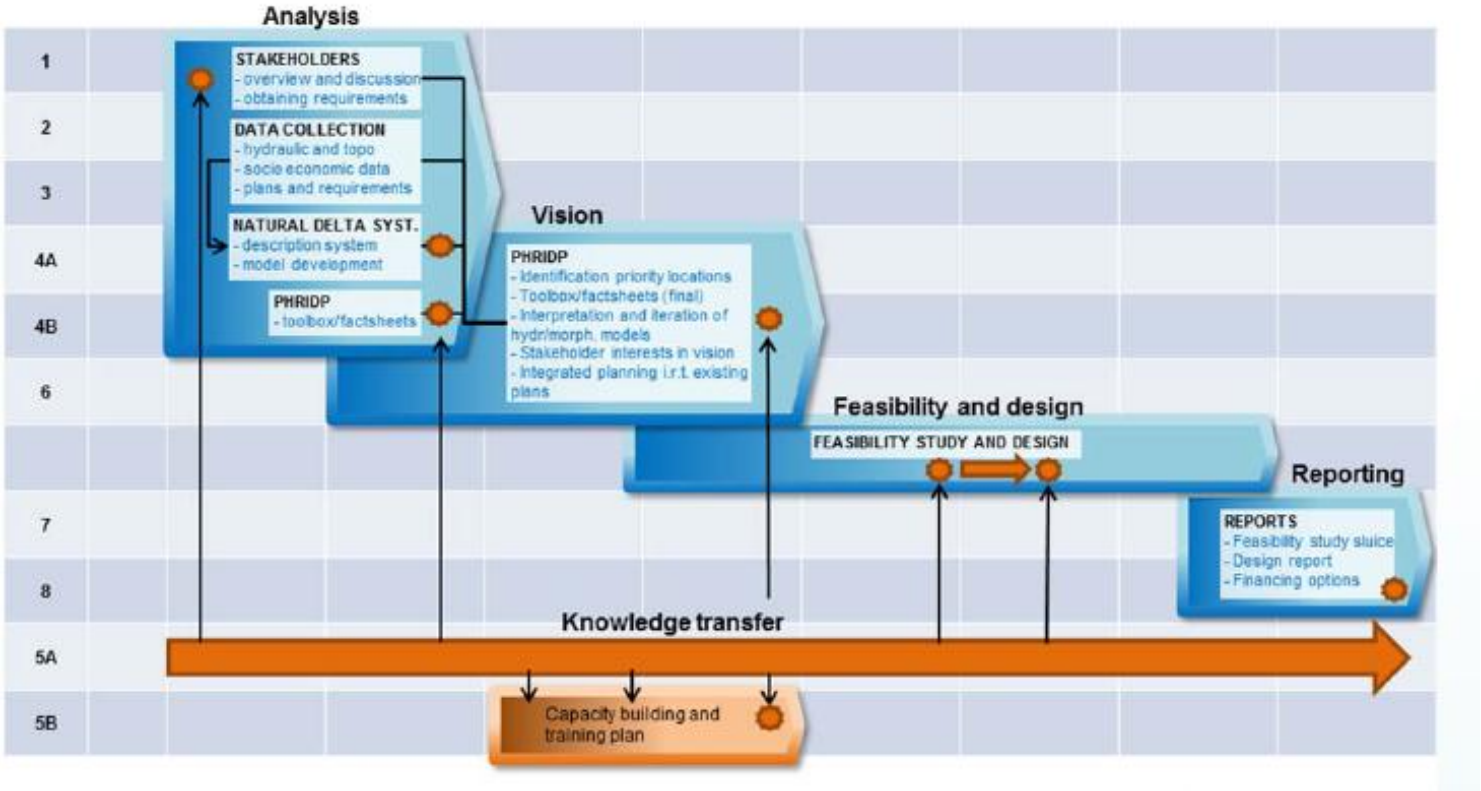
Objectives

- Pan Hlaing River Integral Development Plan (PHRIDP)
  - Flood protection (rainy season)
  - Water supply for agriculture and irrigation (dry season)
  - Socio-economical developments Pan Hlaing River area
  - Sluice complex design in the Pan Hlaing River
  - Actions leading towards PHRIDP implementation
- Stakeholders supported Integral Development Plan (PHRIDP)

Approach



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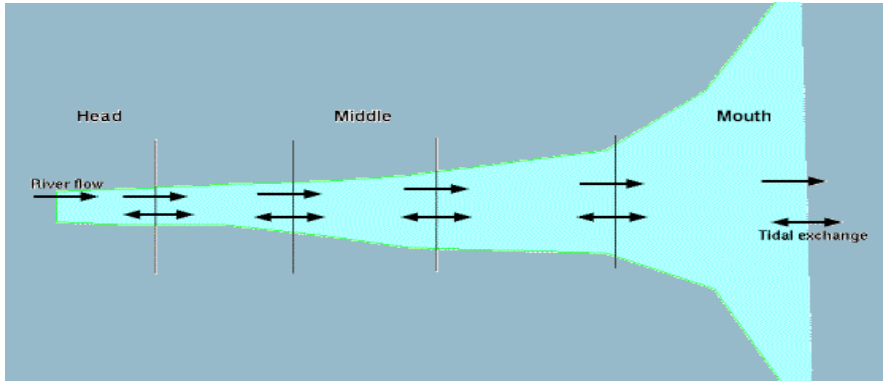
Before Conditions

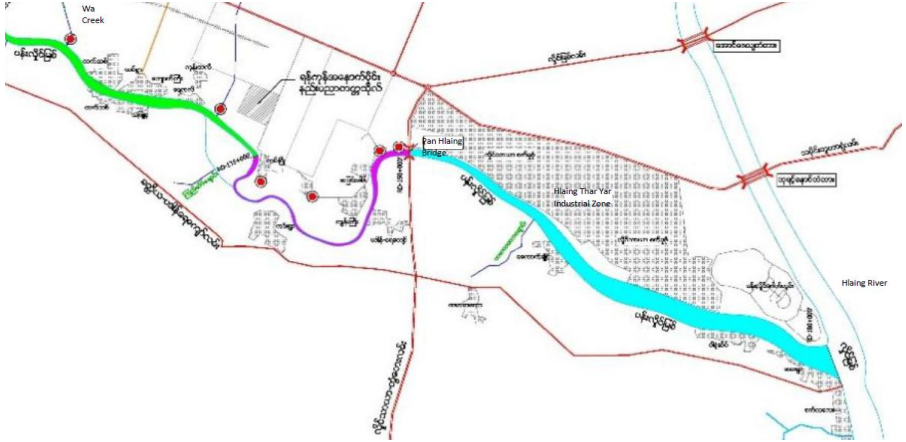
View of PanHlaing River in dry season (R.D-25+000')

Silt deposition in PanHlaing River at U/S of highway bridge (Low tide)

Silt deposition in PanHlaing River at U/S of highway bridge (Low tide)

Sedimentation Process





Pan Hlaing River sediments

Mud deposits (50% clay + 50% silt)

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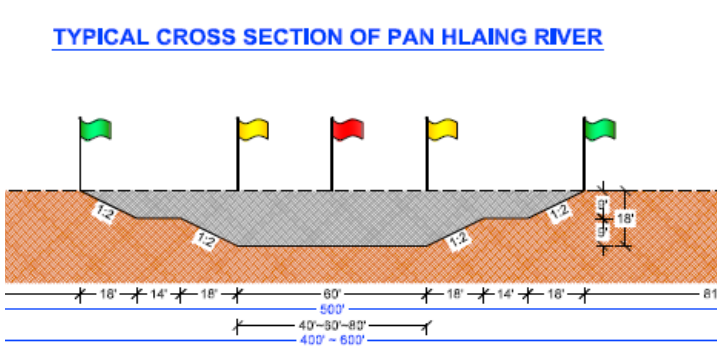
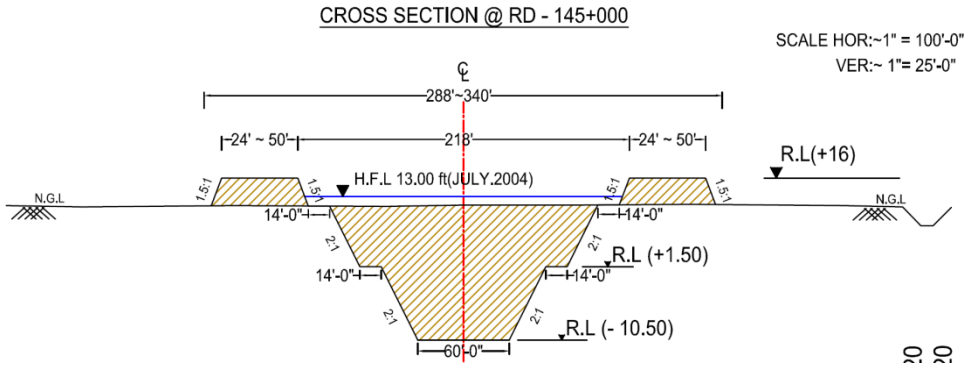
Excavated/ Dredged Channel





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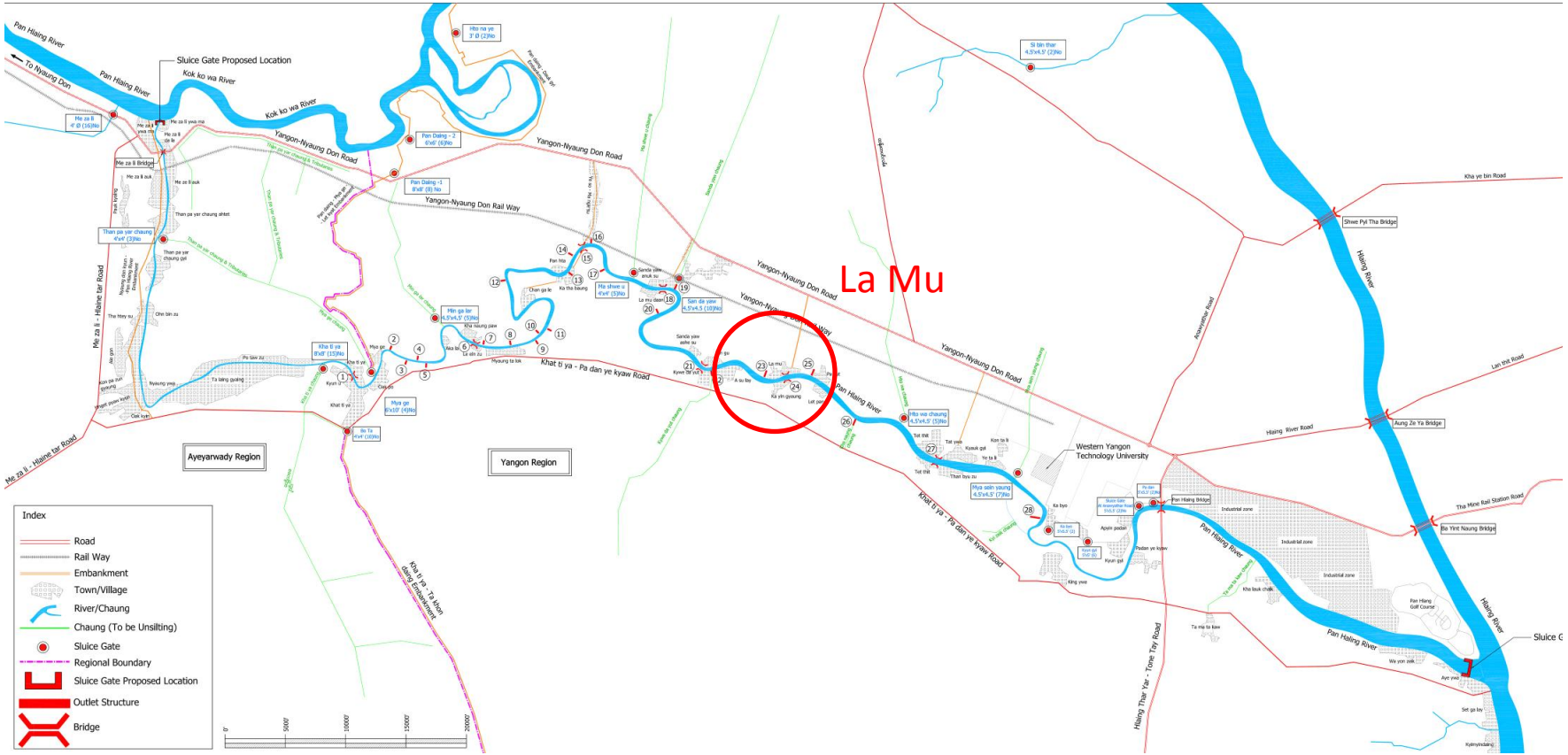
Sedimentation in middle reach



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Sedimentation in middle reach

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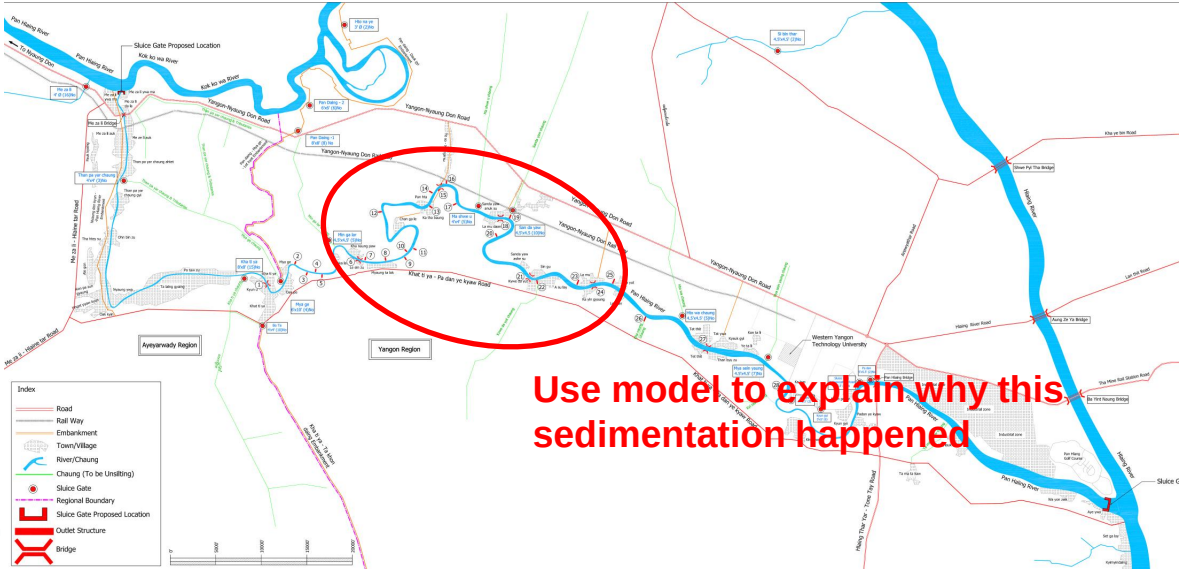

- Original Pan Hlaing River (before excavation)
  - Challenges
  - Sedimentation processes
- Behavior of dredged Pan Hlaing River (canal)
- Verify objectives Feasibility Study Pan Hlaing Sluice:
  - Water supply for agriculture and irrigation (dry season)
  - Flood control / drainage (wet season)
  - Accomodate socio-economical developments Pan Hlaing River area

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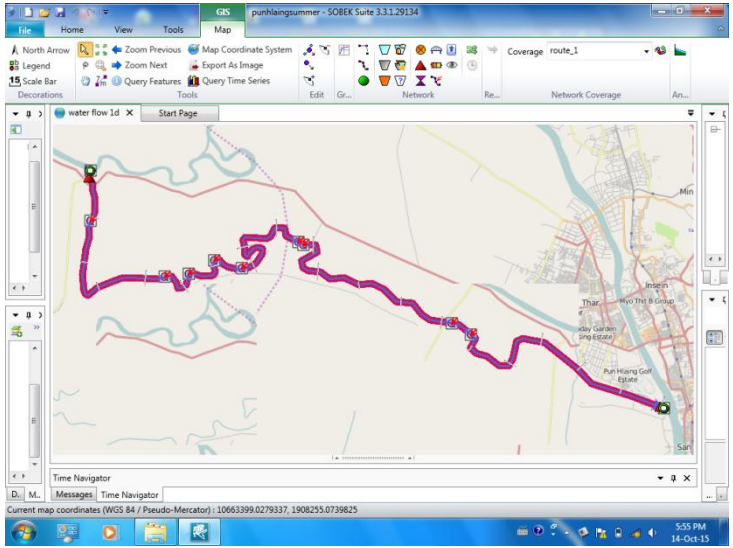
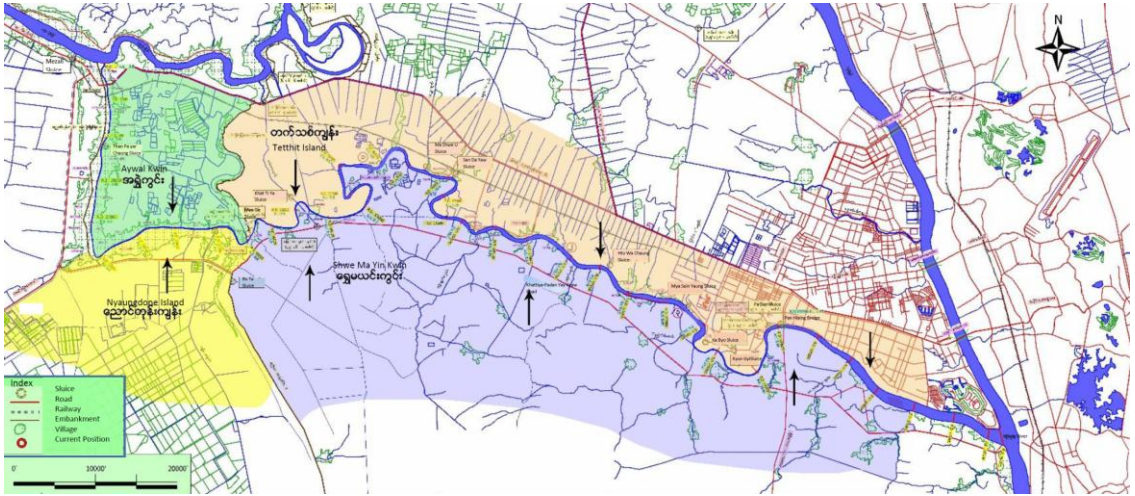
SOBEK model



Lateral inflow (irrigation/drainage)



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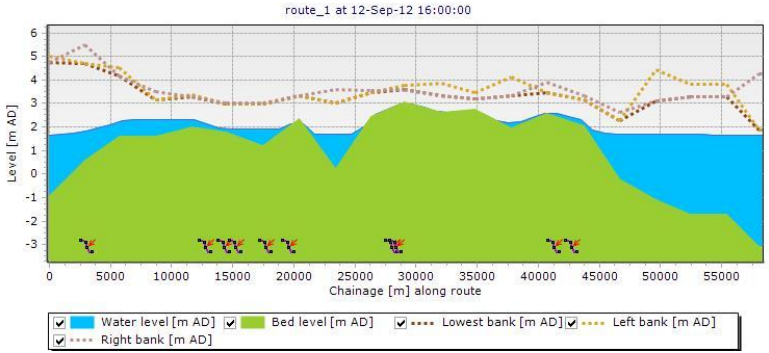
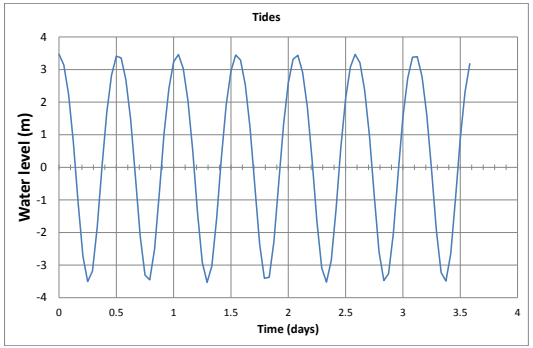
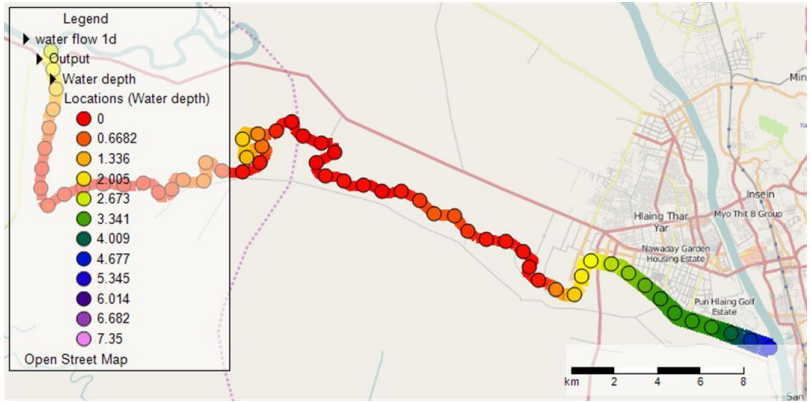
Model Outcomes

Calculated water depths







- Tides dominant force
  - “Sediment pumping” by tides
  - Reduced tidal damping (floods)
- Considerations
  - Impacts of sluices (opening and closing)
  - Input of sediment from Kokowa River / or flushing of deposited sediments

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Natural system

- Significant sedimentation (significant salt intrusion)
- Limited fresh water in dry season
- Significant limitations for agriculture, residential and industry
- Functionalities not aligned with Yangon's ambitions in agriculture and city development
  - **Salt intrusion / sedimentation**
    - Can be addressed by sluice
    - Sedimentation in front of sluice may require flushing/maintenance dredging
    - *Gate location preferred close to river mouth*
  - **Water balance aspects**
    - Estimated water demand may just be met
    - Water supply important
    - Increased water supply will be challenging
    - *Large retention area preferred → sluice closer to river mouth*
  - **Drainage**
    - Controlled water levels expected to limit flood events
    - Drainage capacity sufficient
    - *Large retention area preferred → sluice closer to river mouth*

Stakeholder Analysis

Meeting with officials from Irrigation Department

Irrigation Department (ID)

- ✓ river section designed under the scope of irrigation and drainage functions
- ✓ suggests that by-pass channel and pipe pumping (to Hlaing River) for waste water discharging from industrial zones
- ✓ supply the fresh water for agricultural development scheme and Industrial zone
- ✓ prevent the sea water intrusion (saline water) and siltation problem
- ✓ establish the agricultural production zone targeted for rural area development

Meeting with IZ Management Committee

Hlaing Thar Yar Industrial Zone

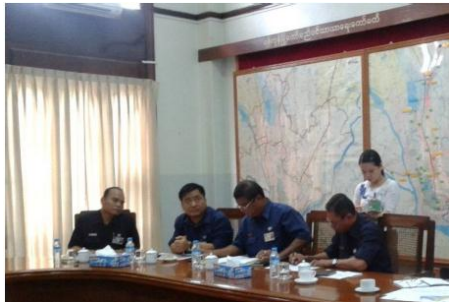
- ✓ want to use Pan Hlaing River as transport route until PH bridge
- ✓ worry about water quality with the lack of proper treatment system from the zone
- ✓ want to have fresh water supply
- ✓ propose to locate the sluice gate near the Pan Haling Bridge with navigability

Meeting with Pan Hlaing Golf Course Estate Management

Pan Hlaing Golf Course Estate

- ✓ Concern thet existing free board of the flood gate would be insufficient later
- ✓ the best location of public access should be at the location of existing coffer dam.

Stakeholder Analysis



The team members in discussion with local residents

Meeting with officials from GAD, RDD and SLRD

Yangon City Development Committee (YCDC)

- ✓ has a conceptual new town plan on 4,745 hectares defined by boundaries between Pan Hlaing River, Twante Canal and Hlaingtharyar -Twante Road.
- ✓ Water supply for this new city from Pan Hlaing River - potential solution.
- ✓ to add bridge in sluice design to link the new town with existing Yangon city
- ✓ treat wastewater from individual factory in Hlaing Thar Yar IZ by own means.

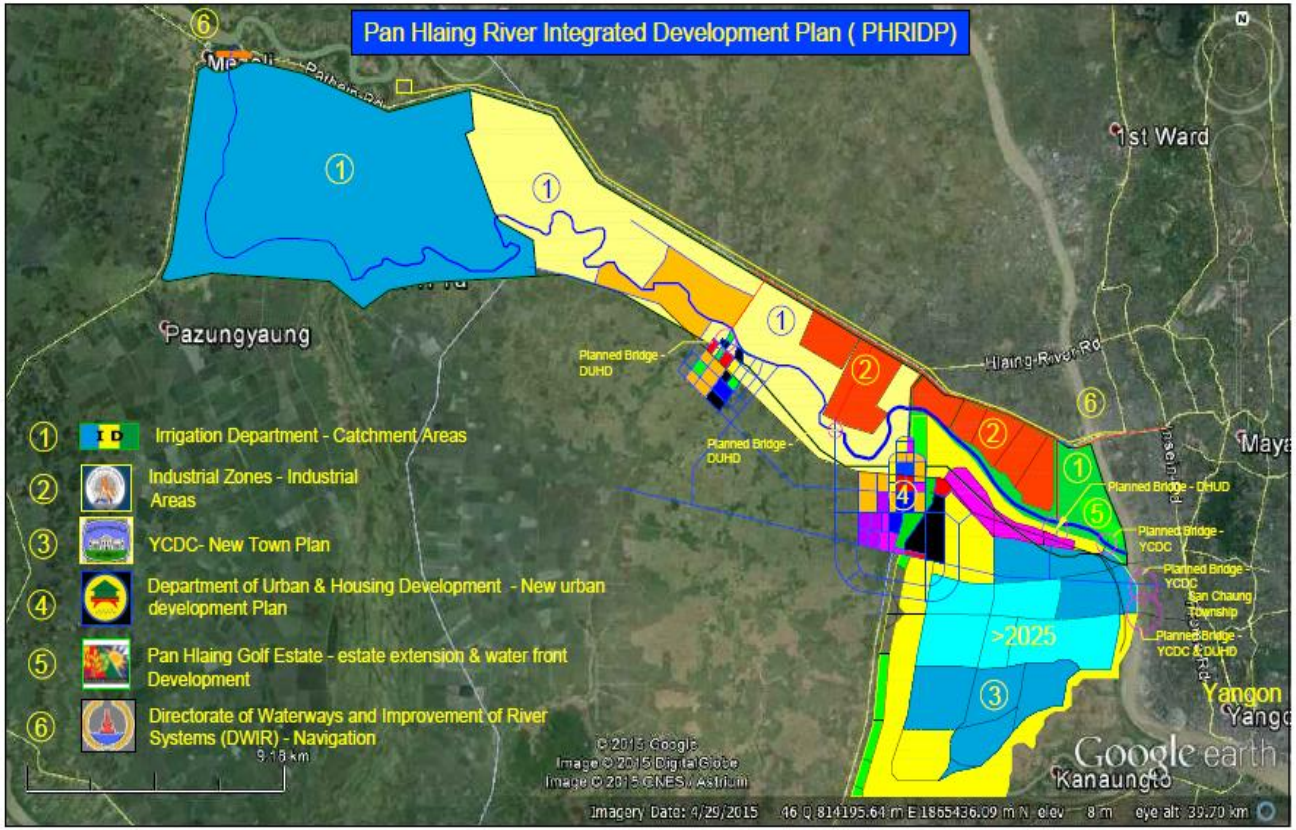
Farmers and Residents living along the River

- ✓ generally satisfied with the excavation works
- ✓ continuous access to fresh water improves their well-being
- ✓ worry that high river stages and the drainage may cause flooding around their houses
- ✓ willing to continue to use the river for transportation after the project
- ✓ want to get fresh water for drinking and domestic uses
- ✓ expect that the proposed projects will increase their agricultural produce together with their income.

Other Stakeholders

- ✓ General Administration Department - provide the requested data and information
- ✓ Settlement and Land Record Department (Htantapin)- propose on behalf of the farmers to store the fresh water of Pan Hlaing in a possible way
- ✓ concerned of degradation of land and pollution of the Pan Hlaing River water, leading to reduction of fish production.

PHRIDP



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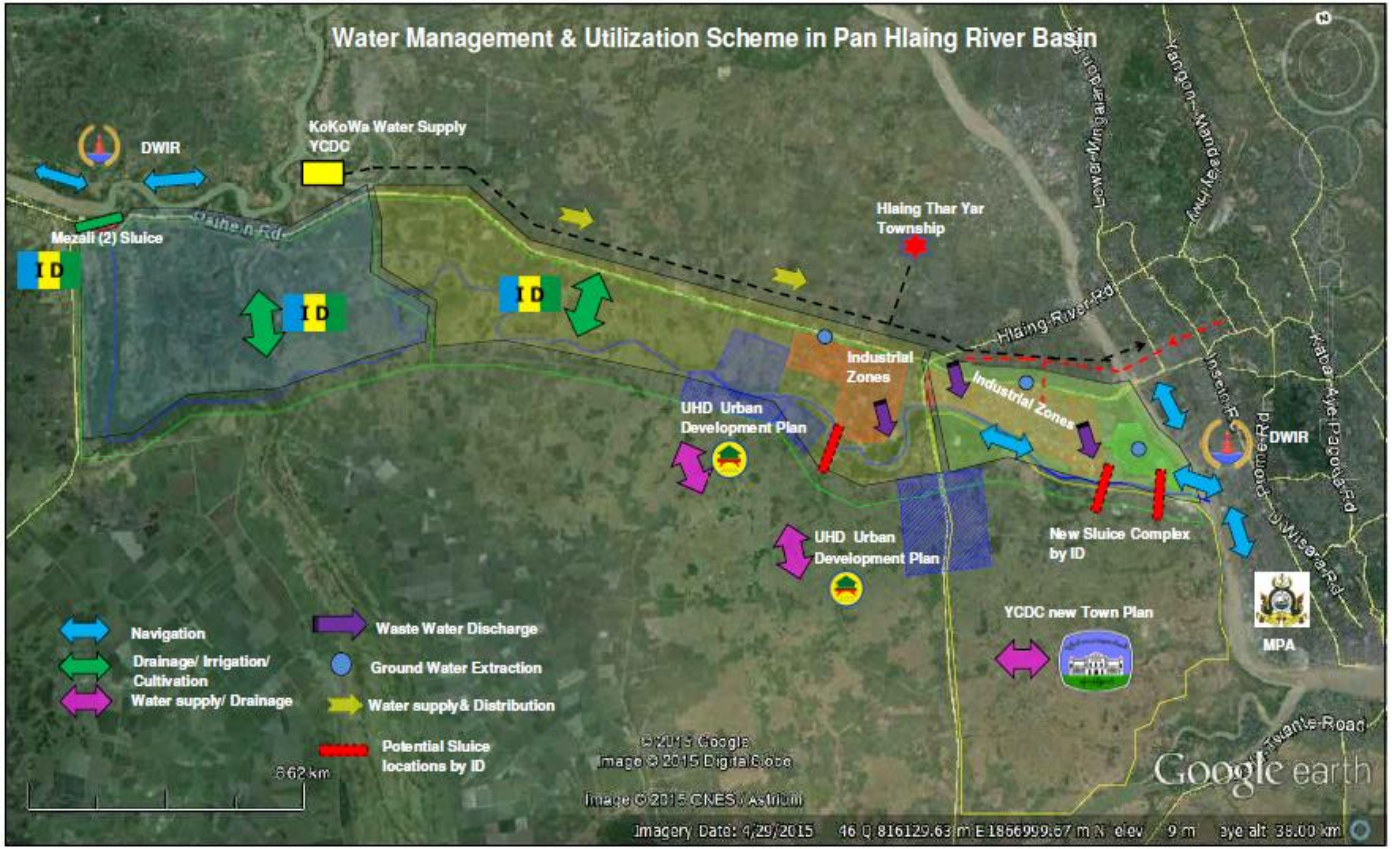

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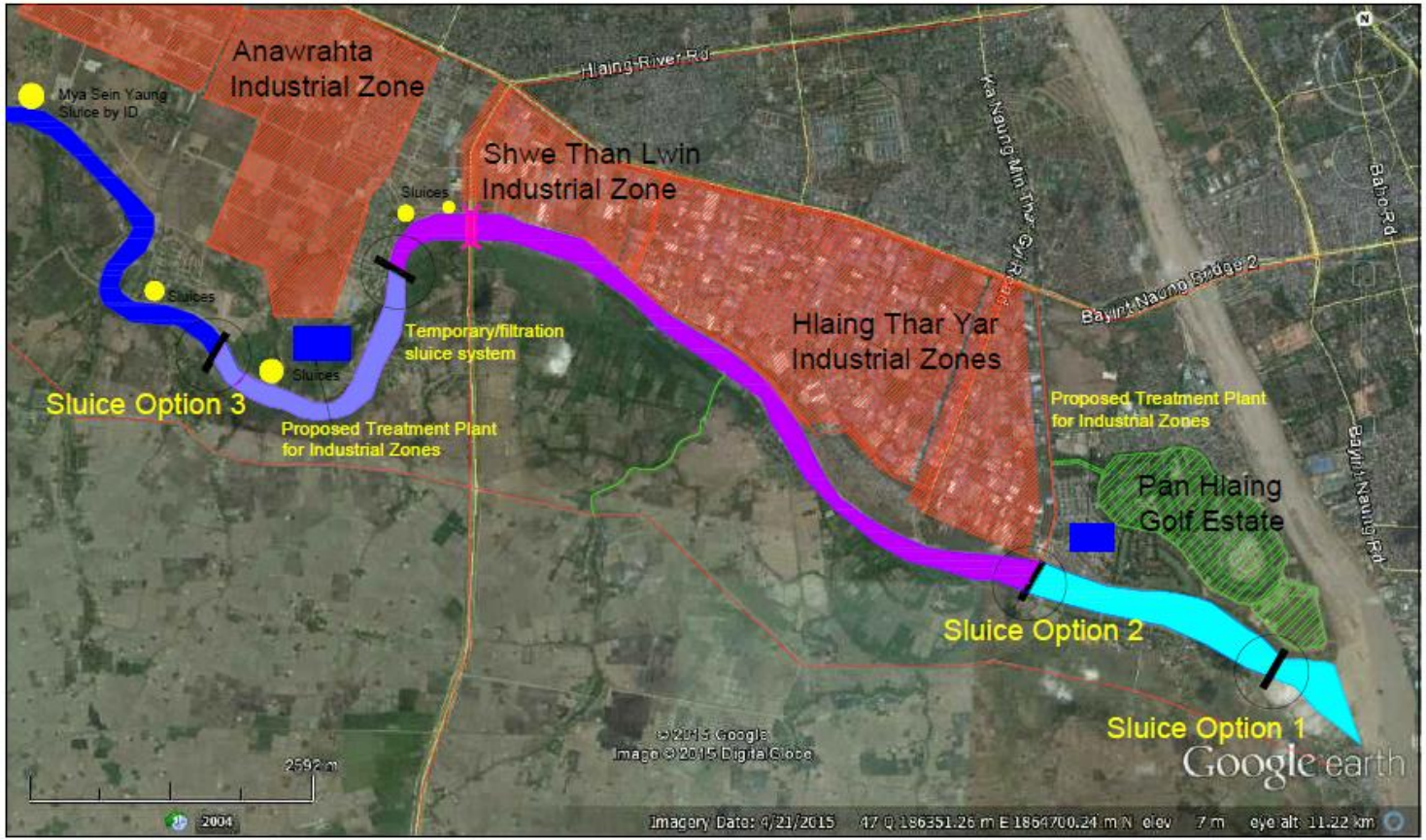
Sluice Scenarios



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Sluice Scenarios

Evaluation sluice gate location					
Evaluation criteria	**Weighing factor**		**Sluice location 1**	**Sluice location 2**	**Sluice location 3**
Amount of water in system	5 Most important for the total system	Score Score with weight factor	3 15 This sluice location gives the biggest volume of fresh water in the system.	2 10	1 5 This sluice location gives the smallest volume of fresh water in the system.
Costs	4	Score Score with weight factor	1 4 The sluice at location 1 will be more expensive	2 8	3 12 The sluice at location 3 will be least expensive
Planning	2	Score Score with weight factor	2 4 Duration for all the option is similar	2 4 Duration for all the option is similar	2 4 Duration for all the option is similar
Sedimentation in front of the sluice	3	Score Score with weight factor	3 9 Smaller area available for sedimentation in front of the gates	2 6	1 3 Biggest area available for sedimentation in front of the gates
Water quality	5	Score Score with weight factor	2 10 The water quality will be similar after measures are taken to catch industry water and throw this in the main river	2 10 The water quality will be similar after measures are taken to catch industry water and throw this in the main river	2 10
Total score	Highest score is the best option		42	38	34
Location 1 best only if measures are taken to treat industry water or divert it to the river.		**Legend:**	Positive element Neutral element Negative element Worst element	More points in a subject is a beter score	

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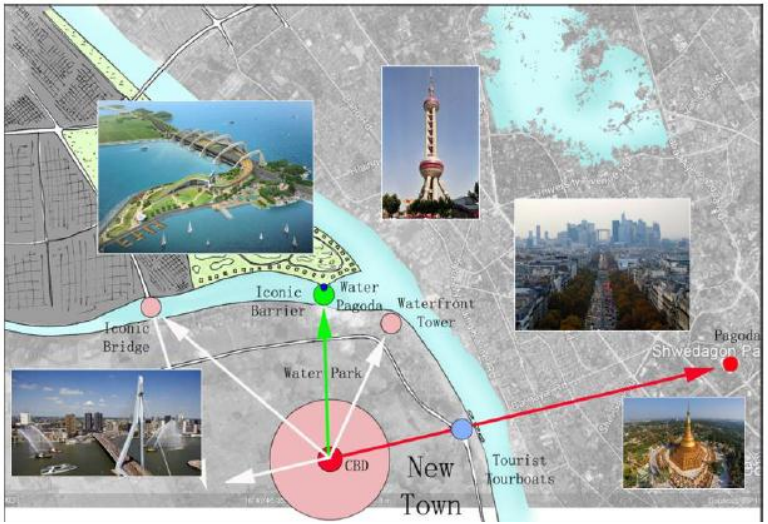
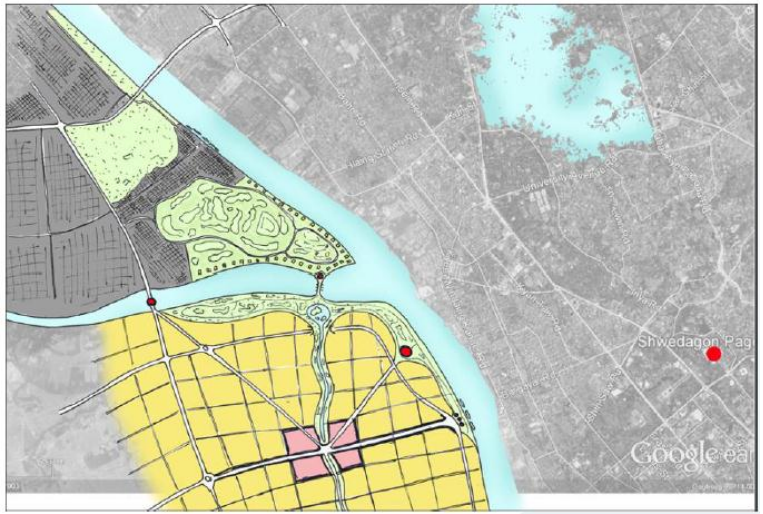


Schematic approach.



Schematic integrated design.

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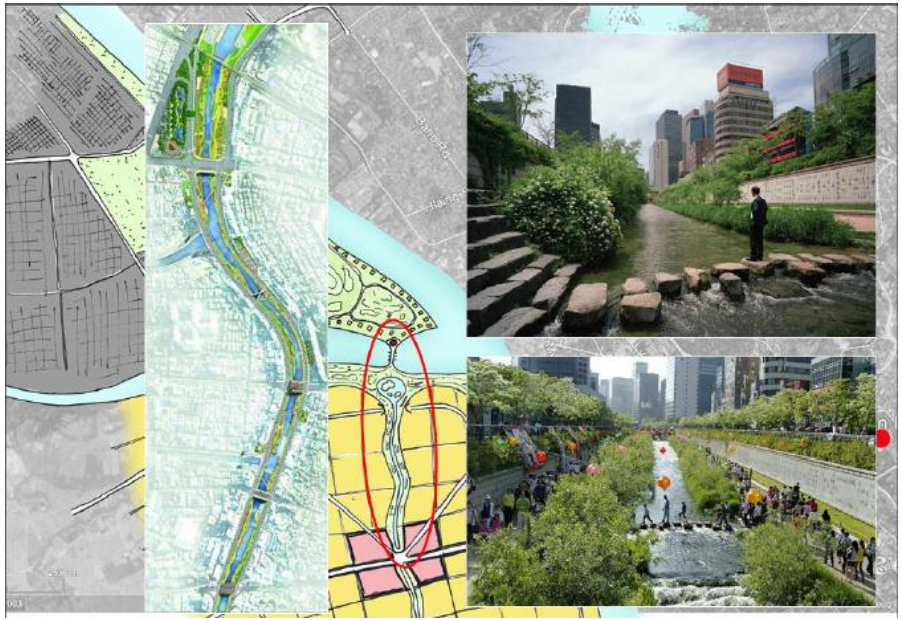
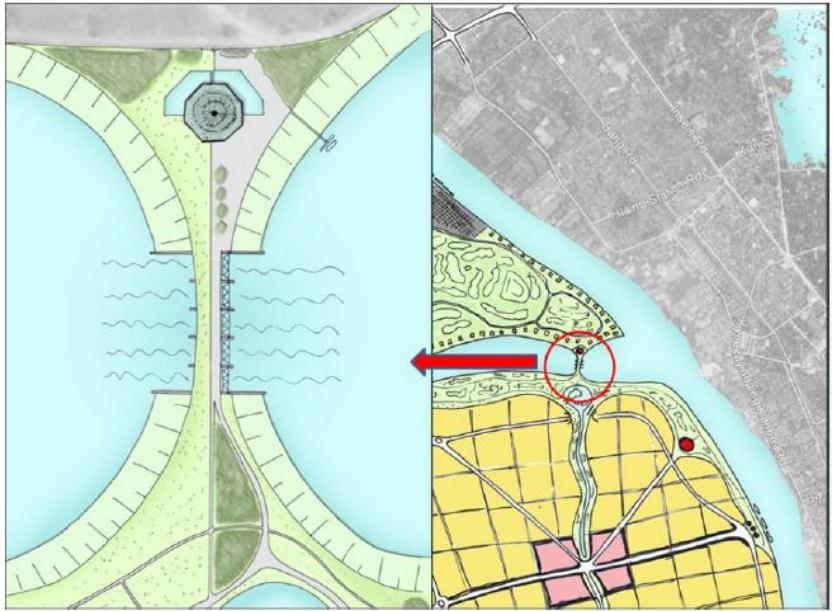


Visualization of schematic integrated design



Visualization of schematic integrated design at the location of the sluice