

## 2) *Port Supporting Area*

### a) *Governmental Zone*

**542.** As Bojonegara is a totally new port, not only a branch office of IPC-II with a pilot station but also other governmental function/facilities such as customs clearance, quarantine, police, fire fighting need to be developed in the port area.

**543.** Although another study will be necessary to decide the dimensions of these facilities, an area of around 1ha within the port will be allocated as the governmental zone.

### b) *Port Related Zone*

**544.** Power supply, water supply and drainage system are other key components of infrastructure in the development area. Well-developed access to these facilities will greatly improve the development potential in/around the port.

**545.** In addition, the following functions/facilities should be introduced in/around the port in order to enhance the activity of the new port:

- Empty container stacking area (as mentioned in Table 15-B-2)
- Logistic center such as truck terminal, cargo distribution center with some processing facilities etc.
- Welfare facilities for port workers and seamen
- Port related companies' offices such as shipping agency, stevedoring etc.
- Amenity such as port park, shopping center etc.

**546.** Although another study will be necessary to examine the details dimension of these facilities, the space of around 27ha of the port area will be preliminarily allocated to these function/facilities as a port related zone. (See previous Figure 15-B-1)

## 15-C. ENGINEERING DESIGN AND COST ESTIMATE

### 15-C-1 Engineering Design of Port Facilities

#### 1) *Code and Standards*

**547.** The design criteria of marine and civil works conform to the following design standards and reference:

- Indonesian Standard PBI (Peraturan Beton Indonesia 90-91) 80, Indonesian Concrete Design
- Standards National Indonesia 1991-63 Design Standards of Concrete Structure
- Standards Design Criteria for Ports in Indonesia, 1984
- Technical Standards and Commentaries for Port and Harbor Facilities in Japan, 2002
- Indonesia Highway Capacity Manual in 1997 Ministry of Highway and Public Works,

**548.** The above code and standards are the same as referred in the Tanjung Priok port and is applied for design of port facilities.

## 2) Design Criteria

549. The design criteria for new port facilities applicable to Bojonegara are described below.

### a) Objective Ships

550. As described in the previous chapters, the dimensions of the ships used for the design of new port facilities are summarized below.

**Table 15-C-1 Objective Ships Size of the Bojonegara Port for Urgent Development**

| Type of Vessel     | Class     | LOA (m) | Water Depth (m) |
|--------------------|-----------|---------|-----------------|
| Container ship     |           |         |                 |
| International      | 50,000 GT | 280     | 12.7            |
| Domestic           | 10,000 GT | 144     | 8.4             |
| Middle Ro-Ro Ferry | 10,000 GT | 145     | 7.0             |

### b) Subsoil Conditions for Preliminary Design

551. The criteria and parameters for the preliminary design are determined based on the results of the field surveys, the natural conditions of the West Java province and the project area as described in the Supporting Report of Engineering Study and other references such as Design Manual for Port and Harbor Facilities of the Design Standards and Commentaries of Port Facilities in Japan.

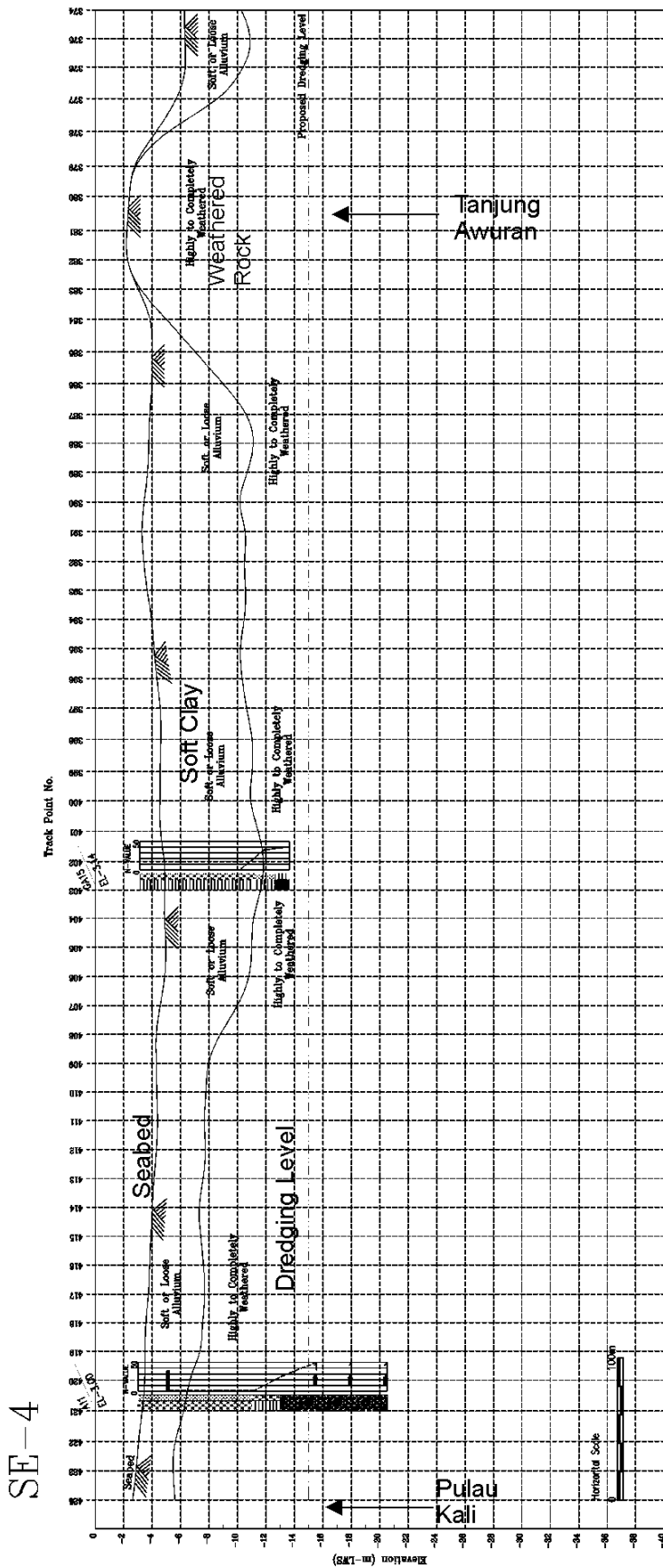
552. The initial soil investigation as carried out in July 2002 indicated the existence of hard rock layer and weathered bed rock from the depth of -12 m to -15 m at the berth construction area, channel/basin area where dredging is required to deepen up to -14 m. Subsequently the geotechnical investigation was carried out.

553. According to the results of the geotechnical investigation, the following parameters together with the previously obtained soil data are used for the preliminary design of the new port facilities.

554.

| Deep Area         |   | Shallow Area    |   |
|-------------------|---|-----------------|---|
| -10.0 m           | Sandy clay<br>N = around 10 or more   | 0 m             | Silty clay N= 1-3   |
| -15.0 m           | Sand clay<br>N = around 10-28<br>c = 30 kPa, $\phi = 25^\circ$ , $\gamma' = 0.9 \text{ tf/m}^3$                             | -5 m            | Silty Clay, N = 12 on average<br>c = 30 kPa, $\phi = 25^\circ$ , $\gamma' = 0.9 \text{ tf/m}^3$                       |
| -20.0 m and below | Bedrock and Clay (Dense to very dense)<br>N = more than 50<br>c = 0 kPa, $\phi = 35^\circ$ , $\gamma' = 1.0 \text{ tf/m}^3$ | -10 m and below | Gravel and Bedrock<br>N = around 30 and more than 50<br>c = 0 kPa, $\phi = 35^\circ$ , $\gamma' = 1.0 \text{ tf/m}^3$ |

555. The Soil Profile of new Bojonegara port area is shown in Figure 15-C-1. The finding by the soil investigation is described in the Supporting Report of Engineering Study.



SE-4

Source: Seismic Geophysical Survey by JICA Study Team (October 2002)

Figure 15-C-1 Subsoil Profile along the Planned Quay wall Line (Bojonegara)

**c) Earthquake and Seismic Coefficient**

**556.** The seismic coefficient is calculated by the following formula of the Indonesian Standard “Pedoman Perencanaan Ketahanan Gempa untuk Rumah dan Gedung”:

$$K_h = K_{h1} \times C_1 \times C_2$$

Where :

$K_h$  = Seismic Coefficient,  $K_{h1}$  = Regional Seismic Coefficient (= 0.1),

$C_1$  = Factor for Subsoil Condition,  $C_2$  = Coefficient of Importance

**557.** The project site of Bojonegara port are located in the boundary of zone 3 and 4 of the classification of seismic zone. The seismic coefficients of stiff soil range from 0.05 to 0.03.

**558.** The seismic coefficient for the proposed port facility and access road structure are computed as follows:

The West Java Province is located in the zone 3 of the regional seismic coefficient under stiff soil,  $C = 0.05$

Stiffness Factor of structures;  $K = 1.0$

Importance Factor;  $I = 1.5$

$$K_h = K \times C \times I = 1.0 \times 0.05 \times 1.5$$

$$= 0.075 \text{ (for the Bojonegara and Tanjung Priok port facility)}$$

$$K_v = \text{not considered} = 0$$

**559.** The seismic coefficient for the proposed port facility and access road structure are reviewed considering present construction works of Container Terminal Development at Tanjung Priok and near the Bojonegara area.

For the Bojonegara Port facilities,

- In case of Merak Ferry Terminal  $K_h$  is 0.1 (Earthquake coefficient 0.05, Importance factor 2.0, Structure type factor 1.0) and
- Merakmas (IKPP Container Terminal)  $K_h$  is 0.18 (Earthquake coefficient 0.09, Importance factor 2.0, Structure factor 1.0).

It is recommended to adopt 0.1 for  $K_h$  at the Bojonegara Port facilities.

**d) Materials**

**560.** Quality of construction materials shall conform to Japan Industrial Standard (JIS) and other applicable standards used in the Indonesia.

**e) Loading conditions****i) Surcharge Loads**

**561.** On the apron of the container and Ro-Ro berths of the port, the following surcharge is considered as a dead load by assuming temporary stack of containers and large trucks parking;

- ◆ Normal condition: 2.5 tf/m<sup>2</sup>
- ◆ Seismic Condition: 1.0 tf/m<sup>2</sup>. (50% of the normal condition)

**ii) Live Loads on the Apron**

**562.** Quay wall structures of container berth is designed to sustain the following container cranes with the provisions of their foundation:

- ◆ Rail Gauge: 30 m
- ◆ Overall Weight: approximately 750 tf/unit;
- ◆ Nominal rated capacity: 41 tf under spreader.

**563.** In the design of the apron, only trailer trucks and standard trucks with full loaded containers are considered as handling equipment.

- ◆ The following wheel loads are considered:
- ◆ Standard Truck (H22 - 44): 8.0 tf/wheel
- ◆ Tractor Trailer (40'): 5.8 tf/wheel

**Table 15-C-2 Loading Conditions on the Wharf**

|   |   |
|---|---|
| Uniform Distributed Load  | 2.50 t / m <sup>2</sup> (without QGC)   |
| Uniform Distributed Load  | 1.35 t / m <sup>2</sup> (with QGC)  |
| The worst possible combination of Live Load generated by cargo handling equipment and transporting equipment. | Loads of equipment is shown in Table 14-C-3 (Impact factor shall be considered) |
| Gantry Crane Load   | 40.0 t rated load x30m span x 36 to 38 m outreach.                              |

*iii) Live Load of Container Handling Equipment on the Container yard and Road*

**564.** Equipment Loads in the pavement at the Container yard, truck parking area in the Ro-Ro terminal and Roads as shown in Table 15-C-3 are adopted in the design of pavements. In operation condition, the load dynamic coefficient is considered for dynamic effect (1.2.)

**Table 15-C-3 Cargo handling Equipment Loads**

| Equipment                                       | Description                   | Outline of Wheel | Load Condition            | Front Wheels                              | Rear Wheels                                 |
|---|-------------------------------|------------------|---------------------------|---|---|
| Top Lifter (Reach Stacker) for Empty Container  | 4.5t under Spreader           | 2.50<br>         | With Load<br>Without Load | 8.6t<br>x4 wheels<br>5.4t<br>x4 wheels    | 3.1 t<br>x 2 wheels<br>7.5 t<br>x 2 wheels  |
| Top Lifter (Reach Stacker) For loaded Container | 4 tiers, 30.5t under Spreader | 2.575<br>        | With Load<br>Without Load | 21.2 t<br>x4 wheels<br>9.7 t<br>x4 wheels | 7.5 t<br>x 2 wheels<br>12.9 t<br>x 2 wheels |
| Tractor Head for Container Chassis Towing       | 40.5 t                        | 2.045<br>        | With Load<br>Without Load | 3.2 t<br>x2 wheels<br>2.0 t<br>x2 wheels  | 2.5t<br>x 8 wheels<br>0.6 t<br>x 8 wheels   |
| Chassis for Container Transport                 | 2 x 20ft or 1 x 40/45 ft      | 2.175<br>        | With Load<br>Without Load | Load on The Tractor Head                  | 3.8 t<br>x 8 wheels<br>0.4 t<br>x 8 wheels  |
| Fork Lift Track for General Use                 | 2.5 t                         |                  | With Load<br>Without Load | 2.9t<br>x2 wheels<br>1.3t<br>x2 wheels    | 0.6 t<br>x 2 wheels<br>0.9 t<br>x 2 wheels  |

iv) *Load of RTG (Rubber Tired Gantry Crane) on the Yard*

565. The Proposed RTG (Rubber Tired Gantry Crane) is 40 tons rated capacity under the spreader, having 23.47 m of gauge span. Live Load of the RTG is shown in Table 15-C-4.

**Table 15-C-4 Load of RTG**

| Conditions                             |                     | Wheel Load (P) |
|--|---------------------|----------------|
| With Rated Load (wind 15m/s condition) | Static              | Pv max=26t     |
|  | During Acceleration | Pv max =32 t   |
| With No Load                           | Static              | Pv max=18t     |
|  | Acceleration        | Pv max=21t     |

Dynamic Coefficient = 1.2 shall be multiplied to the static load

v) *Load of Container Box Storage in the Container Yard*

566. The weight of the containers will be taken as 4 stacking containers weight which is also the height of the RTG. The empty container will be stacked less than 8 tiers height.

**f) Design of Yard Pavement****i) Pavement**

**567.** Based on the operation planning inside the container terminal of the Bojonegara port and selection of the pavement type to be adopted, the following wheel loads are the critical condition for each type and area of the pavements, on which the design will be conducted:

**Table 15-C-5 Critical Wheel Load for Pavement Design**

| Area Particulars          | Access / Service Road/Ro-Ro truck parking | Container Terminal Area |                        | Stock Yard      |                        | Multipurpose Berth      |                        |
|---------------------------|---|-------------------------|------------------------|-----------------|------------------------|-------------------------|------------------------|
|                           |   | Berth / Apron           | Road way               | RTG passage way | Stock yard             | Berth/ Apron            | Yard Area              |
| Critical Wheel Load Type  | Standard Truck (H20-44)                   | Standard Truck (H20-44) | Forklift Truck (25 tf) | RTG (40ft)      | Reach stacker (4.5 tf) | Standard Truck (H20-44) | Forklift Truck (25 tf) |
| Critical Wheel Load (ton) | 8.0                                       | 8.0                     | 12.8                   | 40              | 8.1                    | 8.0                     | 12.8                   |
| Pavement Type             | Concrete                                  | Concrete                | Concrete               | PC slab         | Inter-lock block       | Concrete                | Concrete               |

PC slab: pre-stressed concrete block slab

**568.** Special provision of pre-stressed concrete block slab pavement is adopted for the track of rubber transfer cranes (RTG), whose wheel loads exceed well enough 40 tf/wheel.

The pavement material of the parking lots on the reclaimed land for multipurpose berth, Ro-Ro terminal and container terminal of Bojonegara port are indicated in the table above.

**g) Drainage from container yard and passenger terminal**

**569.** Selection of the drainage type and relevant coefficient for drainage design of the container terminal, multipurpose berth and Ro-Ro terminal in the Bojonegara are summarized in Table 15-C-6.

**Table 15-C-6 Drainage Design**

|  | Service Route                                | Container Yard               | Container Stock Yard                    | Open Stock Yard                         |
|--|--|------------------------------|---|---|
| Drain Type   | L-Type Curb with Catch Basin - Concrete Pipe | U-Type Ditch - Concrete Pipe | Gutter with Catch Basin - Concrete Pipe | Gutter with Catch Basin - Concrete Pipe |
| Concentration time for Surface Water: T <sub>c</sub> (min) | 5  | 5                            | 5                                       | 5                                       |
| Coefficient of Runoff : C                                  | 0.95   | 0.9                          | 0.9                                     | 0.9                                     |

**570.** The drainage system to accommodate the discharging rainy water from the mountains behind the port area is planned in to the open ditch to be constructed along the out skirt of the access road of the Bojonegara port area, which collect to flow to the northwest direction and discharge to the sea The study is described its outline concept in Appendix F.

**h) Buildings and Utility Supply**

**571.** All the buildings inside the container terminal and multipurpose berth will be designed in conformity with relevant national codes and standards, such as National Structural Code for Buildings, National Plumbing Code of the Indonesians, Indonesia Electrical Code, Fire Code of the Indonesians, etc. Requirements of the floor area for each building and other criteria are described here.

*i) Required Area of Buildings for Container Terminal and Multipurpose Berth*

**572.** The required floor space of buildings and office inside the container terminal multipurpose terminal are summarized in Table 15-C-7.

**Table 15-C-7 Office and Building Space Requirement for Short Term Development**

| Building                                      | Floor Area (m <sup>2</sup> ) |
|---|------------------------------|
| Terminal office                               | 1,500                        |
| Container Terminal Building                   | 1,500                        |
| Container Freight Station                     | 2,800 /2 berths              |
| Multipurpose Berth Cargo Shed                 | 4,400                        |
| Maintenance Shop for cargo handling equipment | 1,500                        |
| Container Washing Station                     | 300                          |
| Power Generator House                         | 300                          |
| Water Supply facility                         | 400                          |
| Equipment Yard                                | 2,400                        |
| Fuel Station                                  | 300                          |
| Marine House                                  | 700                          |

*ii) Water Supply*

**573.** The required volume of water demand for the Container terminal and multipurpose berth at Bojonegara is estimated as follows.

**Table 15-C-8 Requirement of Water Supply for New Port Facility**

| Demand   | Design        |
|--|---------------|
| 1) Domestic Consumption                            |               |
| 1-1) Average Domestic Consumption per Capita       | 100 l/day     |
| 1-2) Maximum Daily Consumption                     | + 30 %        |
| 1-3) Losses  | 10 %          |
| 2) Ship Supply                                     |               |
| 2-1) 2% of Full Tank for average 10,000 GWT Vessel | 200 tons/call |
| 3) Fire Fighting                                   |               |
| 3-1) Maximum Reserve                               | 200 tons/day  |

**574.** Water supply system includes the construction of water reservoir, pump house, elevated water tank and distribution system for general purpose of the office, ship, hydrant, and fire fighting inside of the port area.

**575.** The water source should be basically from the main supply line of the public water supply of the province.

*iii) Power Supply*

**576.** Electric power demand for the container terminal of Bojonegara is estimated in the following table: The electric power requirement of the Tanjung Priok port will be supplied from



the National Electric Cooperation (PLN) and of Bojonegara ports is assumed to get from the National Power Corporation (PLN regional office). A standby generator set for emergency purpose of the office use in the port will be installed.

**Table 15-C-9 Requirement of Power Supply at New Port Area**

| Demand Source             | Design Values                    |
|---------------------------|----------------------------------|
| Gantry Cranes per Unit    | 1,000 KVA (demand)<br>4.16 KV, 3 |
| Reefer Container per Unit | 6 KW<br>440 V, 3                 |
| Lighting                  | 230 V, 3                         |
| Others                    | 230 V, 3                         |
| TOTAL DEMAND              | 15 MVA                           |

iv) *Environmental Treatment Facilities*

577. The following environmental treatment facilities will be provided for the new Bojonegara port area.

- ◆ Drainage/sewerage outfall facilities
- ◆ Solid wastes management facilities
- ◆ Ballast and Bilge Waste Treatment System

## 15-C-2 Design Concept and Preliminary Design of Port Facility

### 1) *Design of Berthing Structure*

#### a) *Crown Height*

578. The crown height of the berth is normally determined by the following formula:

For large vessel with a water depth of 4.5 m or more and tidal range smaller than 3.0m:  $H = \text{HWL} + (1.0 \text{ to } 2.0 \text{ m})$ ;

For small vessel with a water depth of less than 4.5 m and tidal range smaller than 3.0m;  $H = \text{HWL} + (0.5 \text{ to } 1.5 \text{ m})$

579. The crown height affects greatly the construction cost of the port. The strength of the quay wall structure and reclamation volume are proportional to the crown height. On the other hand, as it becomes lower, the chance of the berth being flooded by high waves becomes larger. Therefore, this must be studied carefully in consideration of wave conditions.

580. As a preliminary design of the container wharf structure at Bojonegara port, the crown height is fixed at 3.5m from MLLW considering the ship size and required efficiency of cargo handling operation.

$$\text{HWL} + 2.0 + H_{1/3} = + 3.5$$

581. The crown height of multipurpose berth is set + 2.50 m and container terminal wharf is set at +3.5m from MLLW considering ship size and required efficiency of cargo handling operation.

**b) Water Depth along side the Berth and Berth Length**

**582.** Water depth and Berth Length is determined by the following formula:

$$\begin{aligned} \text{Water Depth} &= \text{LWL} - (\text{ship max draft} + 10\% \text{ of ship draft}) \\ \text{Berth Length} &= \text{LOA} + \text{Ship Beam as allowance} \end{aligned}$$

**583.** The required water depths and Berth Length for each berth are set as follows:

|                     | Terminal Berth        | Water Depth (m)  | Berth Length (m) |
|---------------------|-----------------------|------------------|------------------|
| Bojonegara New Port | Multipurpose Terminal |                  |                  |
|                     | For 20,000 GT         | - 10 m from MLLW | 210 m            |
|                     | For 10,000 GT         | - 10 m from MLLW | 170 m            |
|                     | Container Terminal    |                  |                  |
|                     | International         | - 12 m from MLLW | 300 m            |
|                     | Ro-Ro Terminal        | - 8 m from MLLW  | 200 m            |

**c) Berths structures in Bojonegara port**

**584.** The following terminals are planned for the short-term development plan of the Bojonegara port.

- Container Terminal
- Multipurpose Berth
- Ro-Ro Terminal
- Bulk Terminal
- Berthing Facility for Service Crafts

**585.** Based on the above design criteria and berth requirement, the type of berth foundation is determined considering the site, topographic, hydrographic and soil conditions as follows:

*i) Berth Structure for Container Terminal Berth,*

**586.** Two different purpose berths is planned to be constructed. One for multipurpose berth to handle general cargo and other for exclusive container berth. The same type of berth structure is adopted for both berths providing the continuation of longer berth utilization for berthing by number of cargo ships at the same time, and considering the following soil conditions.

The Ro-Ro berth structure and bulk cargo berth are designed a different type of foundation, pile support trestle and dolphin type.

**587.** According to the sub-soil data, the alluvium composed of the upper layer is mainly of fine sandy clay, brown, soft material consisting of sandy clay. There is no indication of broken coral fragment in this layer. The site for container terminal is presently planned along the present coastal line. The soil conditions of the area is indicated in the Figure 15-C-1 and described briefly below.

**588.** The soil profile at new berth structures at Bojonegara site for applying the preliminary design are described as follows:

- The uppermost 5.0 m average thick of alluvium consists of layers of fine sandy clay, brown soft clay and coarse sand and shell fragment. N-value generally ranged from 1 to 3, with higher N-values ranging from 4 to 10.

The thickness of this layer vary from around 5.0 to 9.0 meter. It would indicate that this layer is normally consolidated. Therefore, relatively large consolidation settlement is expected should there be high embankment or fill.

- The second granular layer (below 5.0 – 15.0 m) consists mainly of sandy clay with grey medium to hard clay. The medium to hard, grey sandy clay with varying thickness of 4.0 m to 10.0m was also observed. N-values generally ranged from 23 to more than 50. Higher N-blows exceeding 50 were frequently encountered between 8 to 12 meter depth in the boreholes. The substantial increased in the N-value was probably due to the large amount of gravelly fine sand that was hit during the conduct of SPT. There is no indication of gravel-size broken coral.
- The soil below 9.0 m along the existing coastal shore line is the andesite rock, grey, hard and sandy clay, grey, and hard. There is no indication of gravel-size corals. N-values generally ranged beyond 60 as dense to very dense, may be regarded as bearing layer.

**589.** Considering soil conditions and gentle slope of seabed topography, the caisson type structure is considered more economic and suitable among the other alternatives and is adopted for the preliminary design of the container berth and multipurpose berth foundation. The characteristic of the caisson type berth foundation is summarized below

**Table 15-C-10 Bojonegara Quay Wall of Container Wharf**

|              | Caisson Type Structure   |
|--------------|--|
| Evaluation   | <ul style="list-style-type: none"> <li>• Complicated method, but economical, reasonable construction period.</li> </ul>  |
| Advantage    | <ul style="list-style-type: none"> <li>• Materials are available locally. (Economical)</li> <li>• Relatively suitable to deeper water depth</li> <li>• Maintenance is easy and structure is relatively durable</li> </ul>  |
| Disadvantage | <ul style="list-style-type: none"> <li>• Caisson yard or floating dock is required for fabrication.</li> <li>• Large floating equipment is required during installation.</li> <li>• The construction works are complicated to make level of mound for caisson installation and to set exact position for installation.</li> <li>• Construction period may be longer.</li> <li>• Large volume of rock material is required for dredging before caisson installation.</li> </ul> |

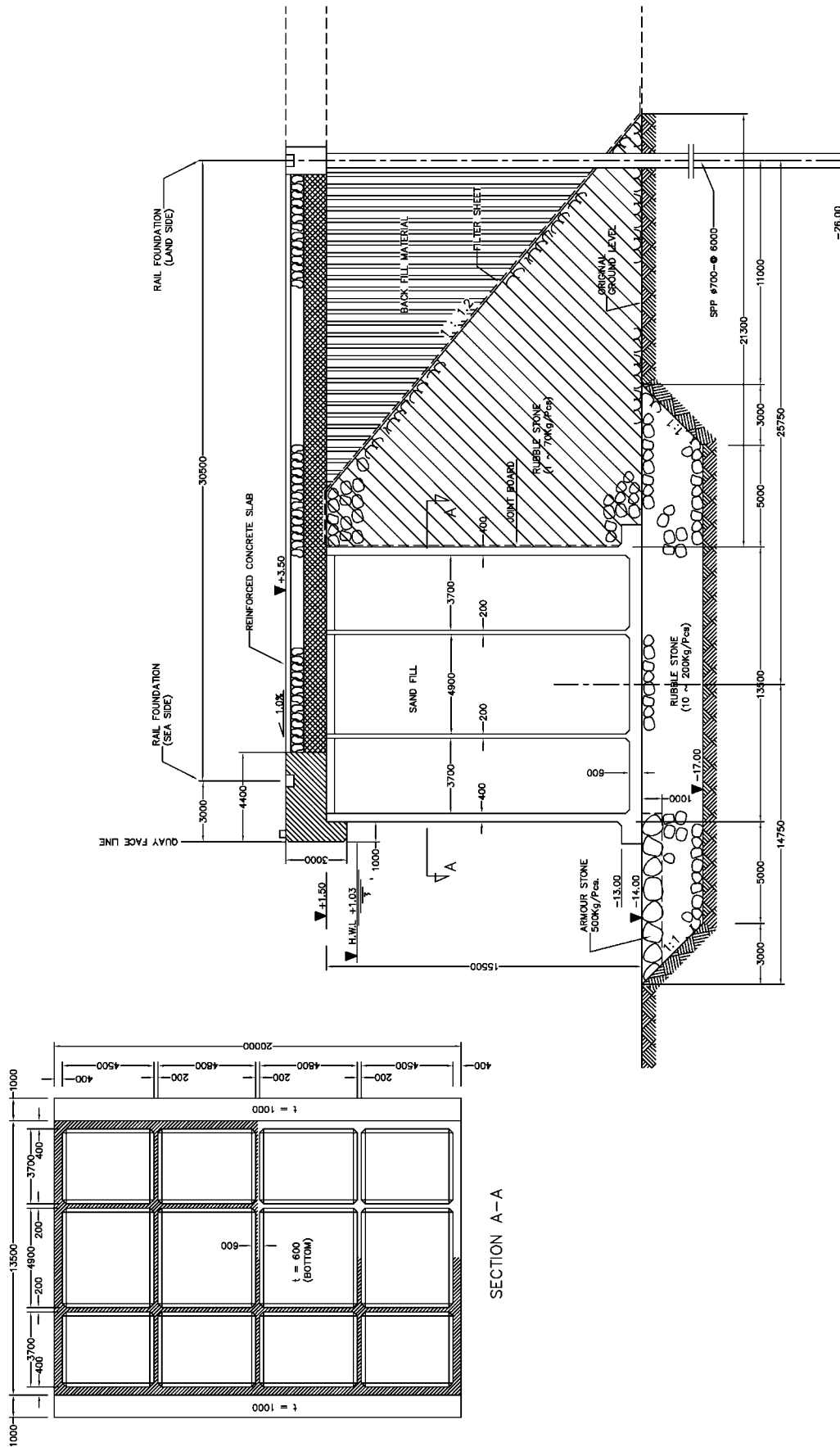


Figure 15-C-2 Typical Cross Section of Container Quay Wall of Bojonegara

ii) Berth Structure of Multi purpose Berth

590. shows the typical section of caisson foundation of the multipurpose berth with a different water depth and crown height from the container berth. The Ro-Ro berth is designed for 5,000 GRT class ferry ship with pile supported concrete dolphin type. The movable bridge for 5,000 GRT class ferry is installed at the most end of the berth for loading and unloading vehicles. The Ro-Ro terminal will require the movable bridge for loading and unloading vehicles from the ferry ships. This equipment should be installed on the deck.

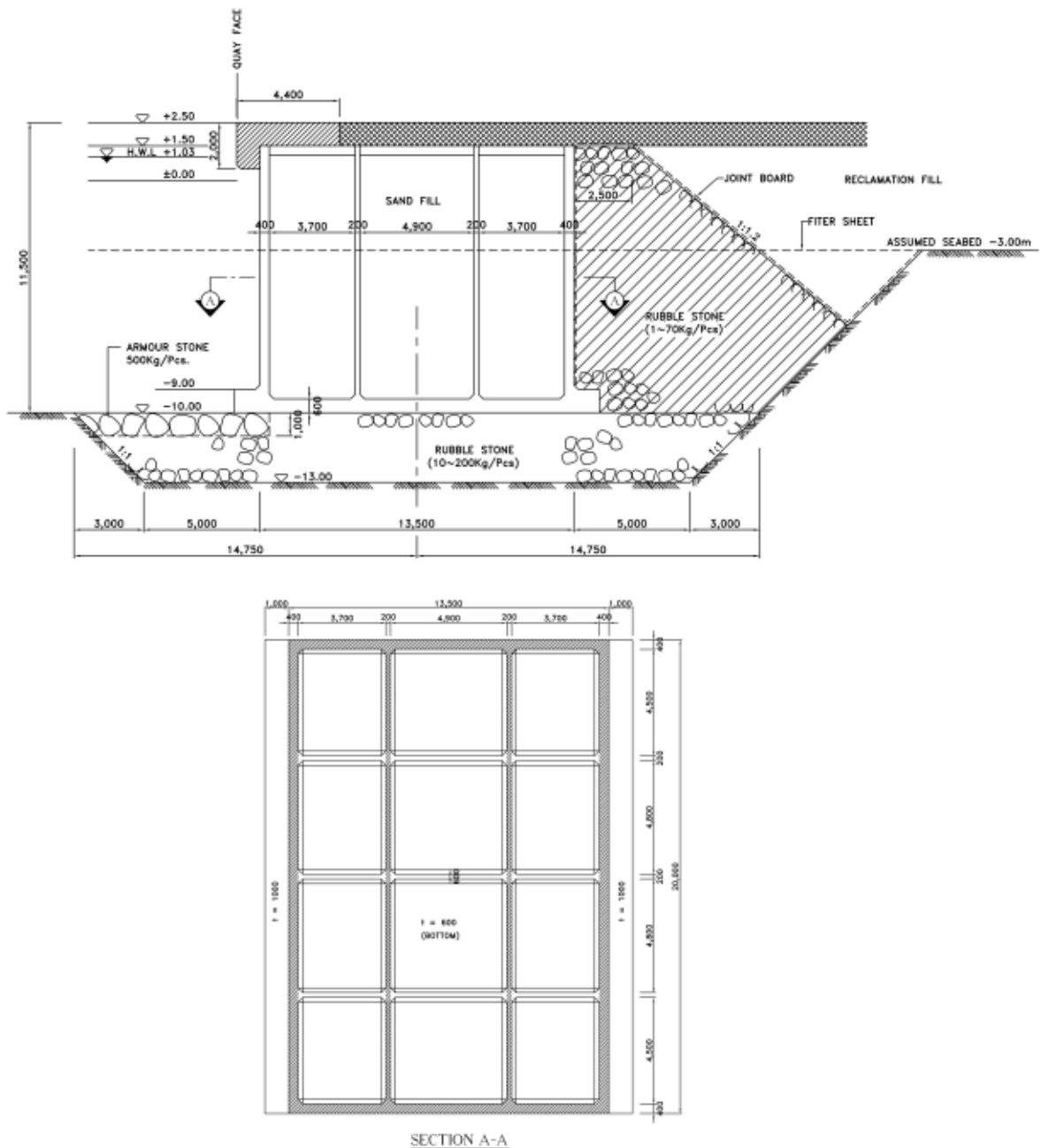


Figure 15-C-3 Typical Cross Section of Multi Purpose Quay Wall of Bojonegara (Concrete Caisson, -10 m)

*iii) Berth Structure of Roll-on/Roll-off berth*

**591.** The car parking area of about 6-8 ha is required for Ro-Ro ferry ship, which is planned on land in parallel to the berthing facilities. The passenger waiting hall is planned inside the car parking area. In case an inbound bulk cargo handling terminal might be required in the Bojonegara, the area of berthing facilities for 30,000 DWT bulk carrier should be provided at the depth of – 12m or deeper area outside of the Kai Island and storage facilities on land. The berthing facilities and on land storage facilities would be connected with belt conveyor with cover. The suction type of cargo handling equipment would be installed on the berth to unloading about 500,000 ton per year.

*iv) Quay Crane Foundation for container berth*

**592.** For the container terminal the rear container crane rail foundation is supported by piles to be installed at 30 m away for the crane wheel gauge from the seaside caisson foundation separately for crane installation.

*d) Pavement of Container Yard and Port Inner Road*

**593.** The surface of the reclaimed area will be paved with interlock concrete block on the cemented treated sand fill for container storage yard, car parking area at the Ro-Ro terminal and parking and walking area in the multipurpose berth.

**594.** For the container stockyard the runway of rubber tired gantry cranes and container trucks are paved with pre stress concrete blocks.

**595.** Special provision of pre-stressed concrete block slab pavement is adopted for the track of rubber transfer cranes (RTG), whose wheel loads exceed well enough 40 tf/wheel.

*e) Related Supporting Facilities*

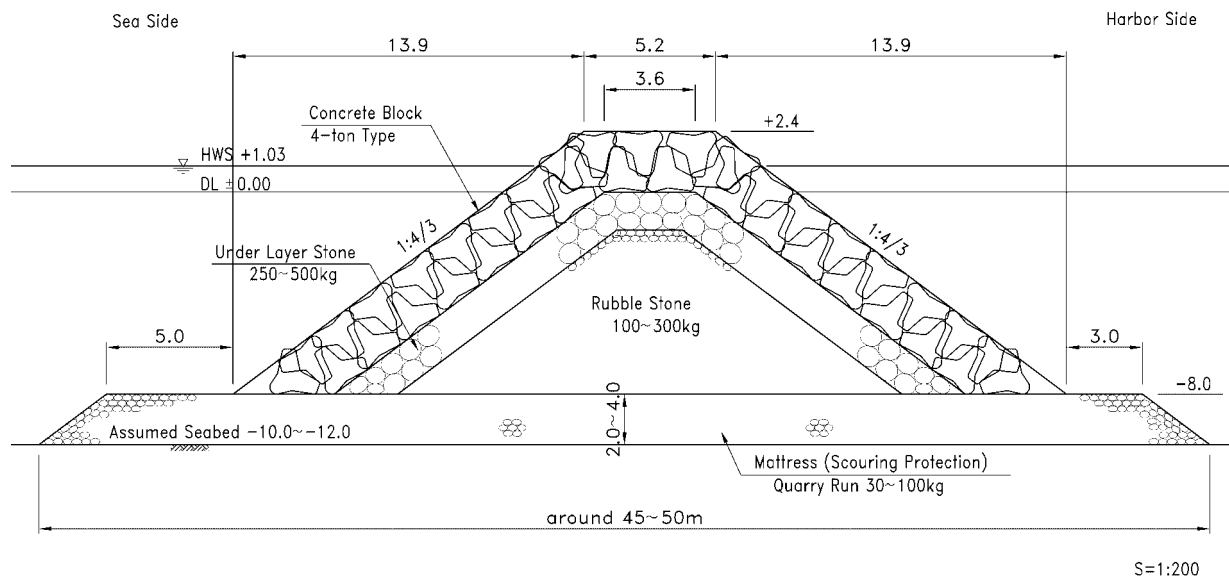
**596.** In addition to the berthing facilities, the breakwater construction and environmental friendly type revetment as retaining wall of the reclamation are also planned. The preliminary design of these facilities is briefly explained below.

*i) Breakwater construction*

**597.** The breakwater is planned to obtain the required calmness of the specified period of container handling under the wave height of 50 cm during the rough weather season. Breakwater dimensions and other details are found in the “Supporting Report of Engineering Study”.

**598.** A breakwater in the initial stage will be positioned so that the port entrance will face the north. Breakwater will be extended to the south-east direction in line with the future container terminal development.

**599.** The breakwater is designed by using the plastic sheet to be placed on the dredged design depth of sea bed, and then gravel and riprap stones are placed thereon, then concrete cup are placed on top of the gravel stone mound and large concrete blocks around 1 ton unit are placed on the sea side as amour stone for protection. The typical section is shown in Figure 15-C-2.



**Figure 15-C-2 Bojonegara Breakwater (Rubble Mound Sloping Type)**

ii) *Channel dredging of the rocky hard soil and reclamation works*

**600.** The existing sea bed depth of the planned berthing area and entrance channel and basin will be increased to – 8 to –12 m. Detailed soil investigation and marine geophysical survey are carried out to determine the suitable type of dredging equipment and methods. As a result, the dredging works are planned to carry out by grab dredgers with hopper barge. (Refer to “Supporting Report of Engineering Study” for details.),

**601.** The soil conditions from the seabed indicate that the dredged material is not suitable for use as reclamation material. It is planned to obtain such reclamation material from out side of the port area.

**15-C-3 Construction Method**

**602.** The construction methods of channel dredging and caisson fabrication and diversion of canal for the flood from the hill behind the port area are described in this section.

**1) Dredging Works**

**a) Dredging Soil**

**603.** According to the results of seismic surveys and off-shore boring surveys at the development site of Bojonegara, the sub-seabed materials were classified into the following 4 layers:

|                |                                |
|----------------|--------------------------------|
| Alluvium       | Soft and loose deposits        |
|                | Medium to stiff or medium      |
| Volcanic Rocks | Highly to completely weathered |
|                | Moderately weathered           |

**604.** The soft and loose deposits consist of ‘very soft to soft’ clay and occasionally ‘very loose to loose’ sand. The sediments were judged to be the recent alluvium deposited on seabed. The soft and loose deposits are distributed over the entire survey area with various thicknesses except at the outcrop of volcanic rock

**605.** The ‘highly to completely weathered’ volcanic rocks consist of silt and sand matrix with gravel and cobble of andesite fragments. The Rock Quality Designation (RQD) in this highly to completely weathered zone is generally less than 20% and the p-wave velocity is 1.6 to 1.8 km/sec.

**606.** The ‘moderately weathered’ zone of rock consists of highly fractured rock with sand and silt matrix as well. The RQD is 20% to 40% and occasionally as high as 60%. The p-wave velocities vary from 2.4 to 3.8 km/sec and occasionally as high as 5.

**607.** The ‘highly to completely weathered’ rocks above LWS-22 m are generally rippable without blasting. Occasionally, chiseling or drilling to loosen the rock masses may be required if there are large size andesite fragments.

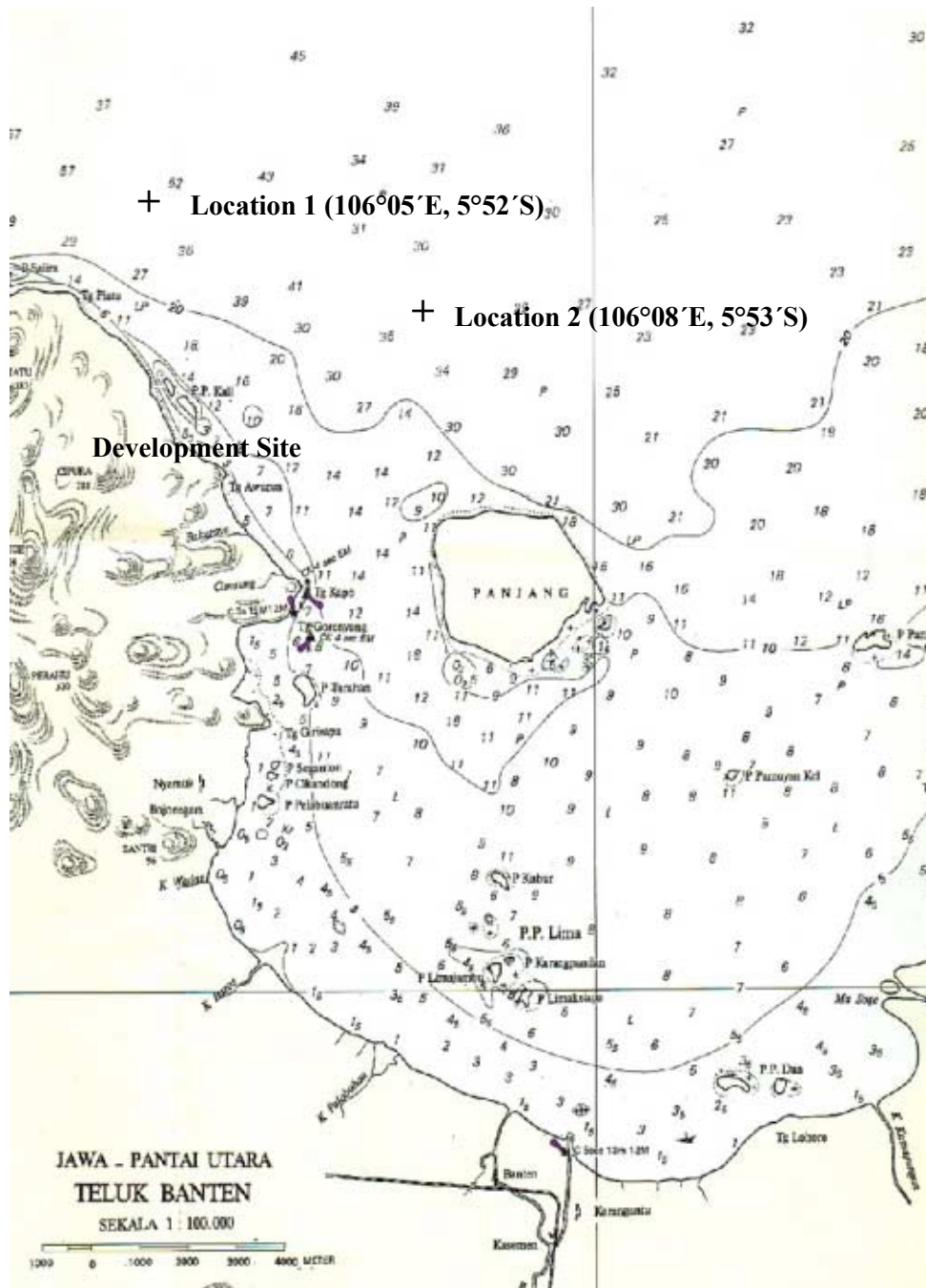
***b) Use of Dredged Material***

**608.** Dredged materials are sometime used as reclamation materials to save transporting and disposal costs. The alluvium at the Bojonegara site consists of silt and clay derived from the soft alluvium. This material have water content several times the liquid limit, and according to the previous soil report, that is not sensitive and may be used as reclamation materials.

***c) Disposal of Dredged Material***

**609.** As for the disposal problem of the dredged material, the two locations of the disposal areas were recommended in the previous process of Bojonegara development and the use of those locations have been already approved by ADPEL (as of 30 May 1997). The location of the disposal area is shown in the Figure 15-C-3.





(Source: Project Office of Bojonegara Development, IPC2)

**Figure 15-C-3 Recommended Disposal Areas for Dredged Material of Bojonegara**

**610.** The two disposal areas are located about 5 km distant from the development site of Bojonegara and the water depth is over 30 m. The planned volume of the disposal soil was estimated as 2.5 million m<sup>3</sup>, the dimension of the disposal area was planned as 500 x 1,000 m.

**611.** According to a rough estimation of the dredging volume within the first phase of the Bojonegara development, the volume of alluvium component amounts to about 2,904,000 m<sup>3</sup> and weathered rock component is about 638,000 m<sup>3</sup> (total 3,542,000 m<sup>3</sup>). The dredging area has extension of about 650,000 m<sup>2</sup>.

**612.** Since the estimate volume exceeds the condition of the previous plan of disposal area, the disposal plan of the dredged material should be examined again from the viewpoint of environmental consideration.

**d) Planned Dredger Fleet**

**613.** Grab or dipper dredgers may be required for the dredging in the ‘highly to completely weathered’ rocks. The efficiency factors of 0.3 to 0.5 are expected for the grab and/or dipper dredger.

**614.** The economical and suitable method of dredging applied in the Bojonegara development is the combination of grab dredger and hopper barges. Lighter weight bucket will be used for dredging of the alluvium component of the seabed material, and heavier weight bucket can be used for dredging of the weathered rock component.

**615.** Dredger fleet for the dredging work at the Bojonegara site is planned to be carried out by grab dredgers with hopper barge. Dredger fleet is assumed to be mobilized from Singapore.

|  |                                  |
|--|----------------------------------|
| Grab Dredger                                       | 800 GT Class, 1,600 HP           |
| Light Bucket for dredging of soft clay (alluvium): | 23 m <sup>3</sup> (weight 38ton) |
| Heavy Bucket for dredging of Weathered Rock:       | 9 m <sup>3</sup> (weight 85ton)  |
| Anchor Boat  | 65 GT Class, 150 HP              |
| Hopper Barge                                       | Capacity: 1,500 m <sup>3</sup>   |
| Tug Boat (Pusher)                                  | 200 GT Class, 1,600 HP           |

**e) Working Period of Dredging Works**

*i) Total period required for Dredging of Alluvium Component*

**616.** Gross dredging volume and total work period are calculated as follows including overdredging volume.

$$\begin{aligned} \text{Gross volume: } & 2,640,000 \text{ m}^3 \times 110 \% = 2,904,000 \text{ m}^3 \text{ for Alluvium} \\ & 2,904,000 / 189,000 = \underline{15.4 \text{ month}} \end{aligned}$$

*ii) Total period required for Dredging of Weathered Rock Component*

**617.** Gross dredging volume and total work period are calculated considering overdredging.

$$\begin{aligned} \text{Gross volume: } & 580,000 \text{ m}^3 \times 110 \% = 638,000 \text{ m}^3 \text{ for Weathered Rock} \\ & 638,000 / 36,120 = \underline{17.7 \text{ month}} \end{aligned}$$

*iii) Total working period for Dredging*

**618.** Considering the rough sea condition of Java Sea in rainy season, the total working period (for both alluvium component and weathered rock component;  $15.4 + 17.7 = 33.1$  months) may be required at least 36 months (3 years).

**2) Caisson Fabrication**

**619.** For fabrication of caisson structure, the following construction methods are considered to fabricate caisson under such site conditions and designed caisson size. i) The water depth at

the new port area about 50 m away from the existing coastal area is -6 to -10 m. ii) The designed caisson structure is 15.5 m high x 20 m long x 13.5 m width.

**620.** a) One method will be to fabricate caisson structure in the floating dock. In case the floating dock is used, it should be brought to the site after dredging works of the channel and basin are progressed till the sea bed depth reach to around -10 to-14 m, so that the fabricated caisson can be easily floated out from the dock and towing to the site. In this method number of floating equipment for logistic supply of construction material, equipment and other daily consumption and towing the fabricated caisson to the position.

**621.** b) Other method will be to construct a temporary caisson fabrication yard on land within the port developing area near the berth alignment. The caisson yard on land will require the slipway to float a caisson fabricated. In case the caisson is fabricated in a temporary caisson yard on land, the area will be exclusively used for caisson fabrication and long slipway from the existing ground level of +2.0 m till minimum depth of -10 to 12 m to float fabricated caisson safely. 2 or 3 caissons may be fabricated on the slipway at the same time and these fabricated caisson can be anchored off shore till the sea bed dredging works and mound leveling with gravel stone are completed.

**622.** The actual construction method of caisson fabrication should be studied more detail in the detail design stage considering the balance of cost and volume of works of caisson fabrication and construction period and availability of required equipment.

### 3) *Diversion of Canal*

**623.** This canal will be important especially after the port facilities to be developed in the project commence operations to avoid flooding of the port area and access road in the neighboring areas. The canal will be constructed as part of the urgent development project.

#### *a) Catchment Area and Rainfall*

**624.** Four mountainous streams flow into the assumed development site of Bojonegara New Port (refer to the figure next page). In order to avoid the flood in rainy seasons on the reclaimed land area, a plan of a series of diversion channels is necessary.

**625.** The catchment area of each stream is measured from the topographic map (scale 1:25,000; map is shown in Figure K-1 of the Appendix K in Supporting Report of Engineering Study) as follows.

**Catchment Area**

|   | Area                | Area named     |
|---|---------------------|----------------|
| 1 | 2.2 km <sup>2</sup> | A <sub>1</sub> |
| 2 | 1.9 km <sup>2</sup> | A <sub>2</sub> |
| 3 | 0.8 km <sup>2</sup> | A <sub>3</sub> |
| 4 | 3.6 km <sup>2</sup> | A <sub>4</sub> |

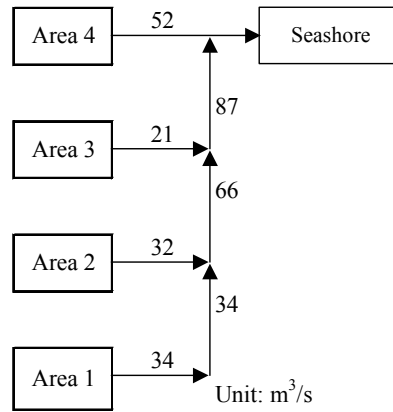
**626.** In order to design the channel sections, run-off calculations are carried out using rational formula.

$$Q = f R A/3.6$$

**627.** where Q (m<sup>3</sup>/s): peak rate of discharge from the catchment area, f: run-off factor of the catchment area, R (mm/hour): rainfall intensity during the time flood approach and A (km<sup>2</sup>): catchment area.

**b) Distribution of Discharge Flow**

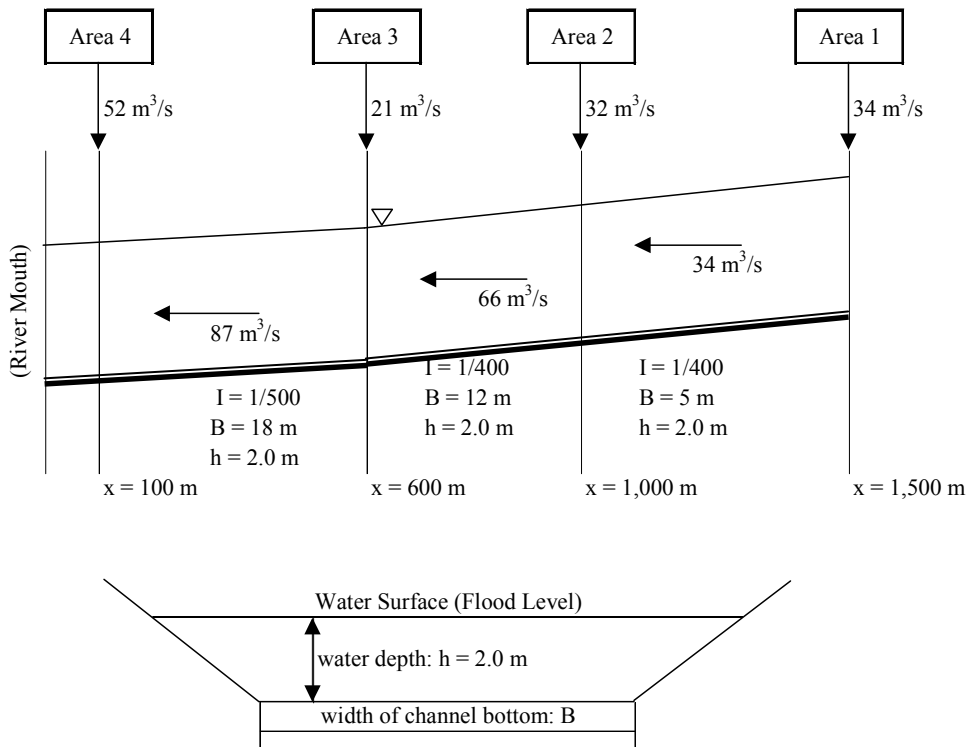
**628.** The run-off flows from the Areas 1 - 3 are to be diverted to Kali Sumur located in the Area 4 by a diversion channel along shoreline. Based on the estimated flood volume indicated below table, it is assumed that the run-off discharge can be distributed to each channel as follows.



**Figure 15-C-4 Distribution of Discharge Flow**

**c) Design Section of Diversion Channel**

**629.** The necessary sections of the diversion channel to allow the flood flow (return period: 5 years) safely are designed by Manning’s formula and assuming uniform flow as follows.



**Figure 15-C-5 Design Section of Diversion Channel**

**630.** Since the diversion channels are located in the low-land, swampy area, the actual river flow is affected by the water level of down stream and, hence, the non-uniform flow theory should be applied for the design of river channel.

**631.** The detailed analysis with the topographic map and estimated flood volume calculation is described in the Appendix K in Supporting Report of Engineering Study. The actual design section should be studied more precisely in the detail design stage based on the detail topography map.

#### 15-C-4 Cost Estimate

##### 1) Assumption of Cost Estimate

**632.** The basic conditions and assumption applied for the cost estimate are as follows: The cost estimate is prepared by using the market price of December 2002 of materials, fuel, labor rates and equipment cost prevailing in Jakarta Metropolitan region. The estimated cost for each item of works and service are comprised a foreign currency portion and a local currency portion computed in Indonesia Rupiah. In this cost estimate, the average exchange rate of December 2002 is used.

$$\text{USD 1.00} = 8,500 \text{ Rupiah} = 120 \text{ yen, } 1 \text{ Rupiah} = 0.0014 \text{ Yen.}$$

##### 2) Capital Cost of the Project

**633.** The capital project cost comprise construction works, equipment procurement, engineering services, administration cost including land acquisition, and contingencies, etc.

**634.** The quantities of works are worked out from the preliminary layout of the urgent development facilities and preliminary design based on the topographic survey charts and soil investigation, which is shown in the drawings of this report.

##### 3) Construction Cost

**635.** The construction cost comprises direct construction cost, indirect construction cost, Project Related Expenses, Administration Cost and Compensation. The classified components of each item are shown in the table below.

|   |  |
|---|--|
| 1.Direct Construction Costs               | 1.1 Mobilization/Demobilization Costs<br>1.2 Labor Cost, Material Cost,<br>Equipment Cost required for the<br>Works. |
| 2.Indirect Construction Costs             | 2.1 Common Temporary Works<br>2.2 Site Office Expenses<br>2.3 Overhead of the Contractor                             |
| 3.Project Related Expenses                | 3.1 Physical Contingencies<br>3.2 Engineering Service  |
| 4.Administration Cost and<br>Compensation | 4.1 Administration Cost<br>4.2 Compensation<br>4.3 Land Acquisition<br>4.4 VAT (Value Added Tax)                     |

##### i) Direct Construction Cost

**636.** The direct construction cost and procurement of container handling equipment cost are estimated based on the unit prices of works and lump sum amounts of comprising labor cost,

material cost, equipment cost and mobilization/demobilization cost. The required cargo handling equipment are planned to be procured by the respective terminal operators, but such cost are considered for the estimate of the total project cost.

**637.** The unit price of the works and procurement cargo handling equipment are calculated based on the data collected from local contractors and consultants own experience in the similar projects of the Jakarta metropolitan region in Indonesia.

*ii) Indirect Construction Cost*

**638.** The above items of work are considered as the direct construction cost. The indirect cost is required and is estimated by assumption of about 8 % for common temporary works and contractor's overhead and 15 % of the Direct Cost for Site Office expenses.

*iii) Project Related Expenses*

**639.** The physical contingencies and engineering services are considered as the project related expenses and is estimated by assumption of 10 % and 8 % of the Total Construction cost combined direct construction cost and indirect cost for the contingency and engineering services respectively. The engineering service for procurement of cargo handling equipment is assumed at 3.5 %. Price contingency is not considered since the estimate is expressed in the fixed price of December 2002.

*iv) Administration Cost and Compensation*

**640.** The administrative cost is estimated at 1 % of the construction cost. This cost is the expenses required for the project preparatory and implementation by the executing agency and expressed in the local currency portion only. The land compensation which is estimated by IPC2 is included for the estimate of the project cost.

**4) Cost Component of Unit Price**

**641.** The unit price of works and service in the direct and indirect cost are divided into local and foreign components based on the composition of each cost items. The proportions of local and foreign components of major works are estimated as follows:

| Major Works item | Local portion | Foreign portion |
|------------------|---------------|-----------------|
| Dredging works   | 10 –12.5 %    | 87.5 % to 90 %  |
| Reclamation      | 95 %          | 5 %             |
| Concrete works   | 40 %          | 60 %            |
| Piling works     | 10 %          | 90 %            |
| Pavement works   | 75 %          | 25 %            |
| Drainage works   | 64 %          | 36 %            |
| Building works   | 45 %          | 55 %            |
| Utility works    | 67 %          | 33 %            |

**5) Summary of Cost Estimate**

**642.** The project cost in each phase described in the next section is estimated as follows: It should be noted that these figures are for the components selected in the feasibility study, and thus they do not include access road.

Table 15-C-11 Cost Estimate for Urgent Development Plan of Bojonegara

|   |                |                  |                  | million Rp             |
|---|----------------|------------------|------------------|------------------------|
|   | Local          | Foreign          | Total            | Remarks                |
| <b>Total Construction Cost (Direct &amp; Indirect) (TC)</b> |                |                  |                  |                        |
| <b>~2008</b>  |                |                  |                  |                        |
| Dredging Channel/Basin (up to -10 m)                        | 15,604         | 119,151          | 134,754          |                        |
| Multi-purpose Terminal (Infrastructure)                     | 49,912         | 28,042           | 77,954           |                        |
| Government Zone   | 10,095         | 6,076            | 16,171           |                        |
| Port-related Zone   | 3,145          | 37               | 3,182            |                        |
| Port-related Road   | 15,301         | 7,280            | 22,582           |                        |
| Building Works  | 6,190          | 4,127            | 10,316           |                        |
| Utility Supply  | 2,165          | 8,200            | 10,365           |                        |
| Diversion Canal   | 5,217          | 2,247            | 7,464            |                        |
| Cargo Handling Equipment (Multi Purpose Terminal)           | 1,034          | 9,306            | 10,340           | Private                |
| <b>Sub Total</b>  | <b>108,663</b> | <b>184,466</b>   | <b>293,129</b>   |                        |
| <b>~2010</b>  |                |                  |                  |                        |
| Breakwater  | 85,888         | 142,603          | 228,491          |                        |
| Dredging Channel/Basin (-10 m~-12 m)                        | 19,807         | 74,245           | 94,052           |                        |
| Container Terminal; B1, B2                                  | 262,551        | 128,348          | 390,899          |                        |
| Infrastructure  | 143,607        | 77,688           | 221,295          |                        |
| Superstructure  | 118,944        | 50,659           | 169,604          | Terminal Operator      |
| Port-related Zone   | 6,155          | 72               | 6,227            |                        |
| Utility Supply  | 8,289          | 32,696           | 40,985           |                        |
| Cargo Handling Equipment (Container Terminal)               | 36,013         | 324,116          | 360,128          | Terminal Operator      |
| <b>Sub Total</b>  | <b>418,702</b> | <b>702,079</b>   | <b>1,120,781</b> |                        |
| <b>Total (FS Components)</b>                                | <b>527,365</b> | <b>886,545</b>   | <b>1,413,910</b> |                        |
| Contingency   | 52,737         | 88,654           | 141,391          | 10% of TC              |
| Consulting Services   | 40,522         | 55,920           | 96,442           |                        |
| VAT (10%)   | 62,062         | 103,112          | 165,174          |                        |
| Administration Cost   | 42,075         |                  | 42,075           | Including Compensation |
| <b>Grand Total</b>  | <b>724,761</b> | <b>1,134,231</b> | <b>1,858,992</b> |                        |

## 15-D. PROJECT IMPLEMENTATION SCHEDULE

**643.** As described in the previous section, the demands of the container cargoes and passengers traffic will exceed the existing facilities of the Tanjung Priok port capacity shortly; particularly the improvement of the navigation channel is essential and urgently required. Therefore immediate actions for development of a new international port at the Bojonegara to support the handling capacity of the Tanjung Priok Port shall be taken. In this program it is assumed that the anticipated procedure of the implementation of the planned urgent / short-term development project will start immediately after the master plan and feasibility study is completed.

### 15-D-1 Master Schedule

**644.** The planned long-term development plans of the Bojonegara port will be developed in three stages. The first stage as the urgent development has to be commenced soon after this study to make operation up to 2008, and second stage as the short-term development has to be completed before the handling capacity of container cargo in the Tanjung Priok will reach to the full capacity. According to the demand forecast, the capacity of container handling in the Tanjung Priok port is anticipated up to 2012.

**645.** It is planned that a part of the third stage facilities will be developed gradually depending on the increase of the cargo demands. This is the general practice of the development that before actually monitoring the first and second stages performance, the third stage project development should not be started because it is too risky to invest a large amount in such uncertainty of demands.

646. It is anticipated that the following agencies and private parties would involve in the development of the major facilities planned in the long-term development of the Bojonegara.

1) *Container Terminal*

647. IPC 2 will develop the infrastructures required for the port, including the minimum required length of the break water construction, channel and basin dredging, and quay wall and back up on land facilities. Superstructure, such as cargo handling equipment and buildings should be developed by the private sector.

2) *Multipurpose terminal*

648. The Multipurpose terminal berth is planned considering that it will function as public infrastructure for the future development of the port for loading/unloading general cargoes by various users. This facility should be developed by IPC2.

3) *Access Road*

649. The port road will be developed as parts of the port development by IPC2. The access road for the existing Jakarta-Merak Toll way to the Bojonegara port area is essential infrastructure for port activities.

650. There is the access road of the provincial arterial road from the Jakarta-Merak Tollway to the Bojonegara port area through the residential and industrial areas. This road must be improved for heavy loaded vehicles transport and developed to round about way from the residential and industrial areas.

651. The Banten province government proposes to the central government to develop the existing provincial arterial road to be the national arterial road. The central government is considering the proposal positively. Under such circumstance, it is considered that the planned access road should be developed by the central government.

652. Based on the above assumptions the implementation of the master schedule of the planned project as the long-term development plan of the Bojonegara Port is shown in Fig. 14-D-1.

653. The required period for implementing the planned project of urgent and short term development is estimated as follows:



| Activities   | Urgent / Short Term Development   | Long Term Development |
|--|---|-----------------------|
| Project formation by IPC2 and other agencies   | 3 months after M/P, F/S   |                       |
| GOI, MOC, Provincial government appraisal  | 6 months  |                       |
| Financial arrangement, Land Acquisition, and Environmental Clearance by executing agency | 12 months   | 12 months             |
| Selection of Consultant  | 9 months  | 9 months              |
| Detailed Design and Tender Documents preparation   | 12 months   | 10 months             |
| Selection of Contractor  | 9 months  | 9 months              |
| Construction works of Urgent/Short term Project  | 60 months   |                       |
| Construction works of long-term project  | Facility will be developed by three stages<br>After 2012, 36 months of each stage |                       |

### 15-D-2 Construction Program

654. Some of the important construction activities and its schedule for the urgent development target of 2008 -2010 are briefly described below:

#### 1) *Dredging works*

655. According to the soil investigation results, the soil to be dredged is weathered and rocky hard material below the depth of –5 to –10 m. Although the number of samples is limited, the dredged soil seems not suitable for the reclamation and may have to be dumped at the site designated by IPC2 or the government environmental agency concerned.

656. The estimated total dredging volume for urgent and short-term development is approximately 3.70 million cum, consisting of 2.3 million cum for urgent development stage and 1.4 million cum for the container terminals berthing between 2008 to 2010.

657. In this implementation plan, 23 cum capacity of light bucket Grab Dredger is considered for soft clay (alluvium) and for weathered rock material 9 cum capacity of heavy bucket Grab Dredger. The average dredging volume by light bucket is 6,750 m<sup>3</sup>/day and by heavy bucket is 1,290 cum /day.

#### 2) *Reclamation Works*

658. The excavated highly or completely weathered rock from the planned channel and basin area in front of the port will probably produce a substantial fraction of fairly hard clay balls in dredged soil. Such material will be useless for fill of the container storage area and other port activities.

659. The dredged material at Bojonegara area is therefore judged not suitable for the use of reclamation filling material. The filling material for reclamation is assumed to be procured from Bangka Island and Belitung Island located in the South Sumatra Province.

#### 3) *Breakwater Construction*

660. The length of breakwater for the development stage of urgent development plan is examined for 500m to secure the required operational performance of 97.5 % at the east most berth of B2.

661. For the short-term development plan, the length of the breakwater is required for 1,040 m to obtain the required operational performance at east most berth of B4.

662. In this implementation program it is planned to construct the breakwater together with the container terminal expansion required for the short-term development. The planned length of breakwater will be constructed in 30 months. The construction schedule is programmed to complete at the same time as the completion of the container terminal construction works.

#### 4) *Quay wall construction*

663. The quay wall structure is designed with caisson foundation. The caisson fabrication yard will be prepared within the port area as a temporary works which will be demolished after all caissons required are fabricated.

664. The placement of caisson mound foundation will be placed immediately after the dredging works along side the berth is completed. It is planned to fabricate two (2) caisson per month and fabrication of all caisson about 30 units will be completed in 15 months and installation of caisson and ancillary works to make quay wall will be processed simultaneously.

665. The quay wall construction will be completed in 30 months from the preparation of caisson yard.

666. The works of the urgent development project consists of Breakwater construction, Channel and basin dredging, Multipurpose berth construction, port related zone and road development. The financial arrangement for implementation of the urgent development project should be commenced from 2003 and engineering study including the design and tender documents preparation should be completed in 2004-2005. The contractor(s) should be selected in 2006 and all the construction works will be started from 2006 and completed in 2007 except the parts of Channel dredging. The required port facilities should be made operational in 2008.

667. The works of the short term development project consists of Breakwater extension, Container terminal development of two berths, Diversion canal development, and Access road to port. The necessary engineering study should be started from 2006 and completed in 2007 so that the planned construction works should be able to start in 2008 and completed in 2009. The required facilities should be made operational by target year.

668. Based on the above assumptions the implementation of the construction schedule of the planned project as the urgent/short-term development plan of the Bojonegara Port is shown in Table 15-D-1 for Urgent Development Project (2006-2008) and for Short – term Development plan (2008-2010) of Bojonegara Port.

**Table 15-D-1 Construction Schedules of the Urgent and Short Term Development Project**

| Description  | Unit           | Quantity  | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|--|----------------|-----------|------|------|------|------|------|------|------|------|------|------|
| Financial Arrangement, EIA Clearance                     |                |           | ■    |      |      |      |      |      |      |      |      |      |
| Employment of Consultants by executing agency            |                |           | ■    | ■    |      |      |      |      |      |      |      |      |
| Detail Design and Tender Document Preparation            |                |           |      | ■    | ■    |      |      |      |      |      |      |      |
| Tender Process and Contractor Selection                  |                |           |      |      | ■    |      |      |      |      |      |      |      |
| <b>Urgent Development Plan (by 2008)</b>                 |                |           |      |      |      |      |      |      |      |      |      |      |
| (1) Mobilization and Demobilization                      | l.s.           | 1         |      |      | ■    |      |      |      |      |      |      |      |
| (2) Dredging Channel/Basin (up to -10 m)                 | m <sup>3</sup> | 2,320,000 |      |      |      | ■    | ■    | ■    |      |      |      |      |
| (3) Multi-purpose Terminal                               | m              | 220       |      |      |      | ■    | ■    | ■    |      |      |      |      |
| (4) Berthing Facility for Service Crafts at the Governm  | m              | 50        |      |      |      |      | ■    | ■    |      |      |      |      |
| (5) On land facility of Port-related Zone                | m <sup>2</sup> | 80,800    |      |      |      |      | ■    | ■    |      |      |      |      |
| (6) Port-related Road inside port area                   | m <sup>2</sup> | 33,150    |      |      |      | ■    | ■    |      |      |      |      |      |
| (7) Building Works                                       |                |           |      |      |      |      | ■    | ■    |      |      |      |      |
| Transit Shed   | m <sup>2</sup> | 4,500     |      |      |      |      | ■    | ■    |      |      |      |      |
| IPC2 Office  | m <sup>2</sup> | 1,500     |      |      |      |      | ■    | ■    |      |      |      |      |
| (8) Utility Supply                                       |                |           |      |      |      |      |      | ■    | ■    |      |      |      |
| Power Supply   | m <sup>2</sup> | 66,000    |      |      |      |      |      | ■    | ■    |      |      |      |
| Lighting System  | m <sup>2</sup> | 66,000    |      |      |      |      |      | ■    | ■    |      |      |      |
| Water Supply, Sewarage, Firefighting                     | m <sup>2</sup> | 66,000    |      |      |      |      |      | ■    | ■    |      |      |      |
| Environmental Treatment Facilities                       | l.s.           | 1         |      |      |      |      |      | ■    | ■    |      |      |      |
| (9) Diversion Canal                                      | m <sup>3</sup> | 93,060    |      |      |      | ■    | ■    |      |      |      |      |      |
| <b>Direct Construction Cost (Urgent by 2008)</b>         |                |           |      |      |      |      |      |      |      |      |      |      |
| <b>Cargo Handling Equipment</b>                          |                |           |      |      |      |      |      |      |      |      |      |      |
| (1) Mobile Crane   | unit           | 2         |      |      |      |      |      |      |      |      |      |      |
| (2) Reach Stacker  | unit           | 1         |      |      |      |      |      |      |      |      |      |      |
| (3) Forklift   | unit           | 7         |      |      |      |      |      |      |      |      |      |      |
| <b>Procurement of Equipment Direct Cost</b>              |                |           |      |      |      |      |      |      |      |      |      |      |
| Access Road Construction to Port (National Road)         | m              | 12,480    |      |      |      | ■    | ■    |      |      |      |      |      |
| <b>Short-term Development Plan (by 2010)</b>             |                |           |      |      |      |      |      |      |      |      |      |      |
| (1) Mobilization and Demobilization                      | l.s.           | 1         |      |      |      |      | ■    |      |      |      |      |      |
| (2) Breakwater   | m              | 1,040     |      |      |      |      | ■    | ■    | ■    |      |      |      |
| (3) Dredging Channel/Basin (up to -12 m)                 | m <sup>3</sup> | 1,388,000 |      |      |      |      | ■    | ■    |      |      |      |      |
| (5) Container Terminal: B1, B2                           | m              | 600       |      |      |      |      | ■    | ■    | ■    |      |      |      |
| (6) Port-related Zone                                    | m <sup>2</sup> | 275,000   |      |      |      |      |      | ■    | ■    |      |      |      |
| (7) Building Works                                       |                |           |      |      |      |      |      | ■    | ■    |      |      |      |
| Terminal Office  | m <sup>2</sup> | 4,500     |      |      |      |      |      | ■    | ■    |      |      |      |
| Maintenance Shop   | m <sup>2</sup> | 1,500     |      |      |      |      |      | ■    | ■    |      |      |      |
| Equipment Yards  | m <sup>2</sup> | 2,400     |      |      |      |      |      | ■    | ■    |      |      |      |
| Container Freight Station (CFS)                          | m <sup>2</sup> | 2,800     |      |      |      |      |      | ■    | ■    |      |      |      |
| Power Station  | m <sup>2</sup> | 300       |      |      |      |      |      | ■    | ■    |      |      |      |
| Fuel Station   | m <sup>2</sup> | 300       |      |      |      |      |      | ■    | ■    |      |      |      |
| Container Washing Station                                | m <sup>2</sup> | 300       |      |      |      |      |      | ■    | ■    |      |      |      |
| Water Supply Facility                                    | m <sup>2</sup> | 400       |      |      |      |      |      | ■    | ■    |      |      |      |
| Marine House (Seamens Club)                              | m <sup>2</sup> | 700       |      |      |      |      |      | ■    | ■    |      |      |      |
| Gate Building with weight bridge                         | lane           | 10        |      |      |      |      |      | ■    | ■    |      |      |      |
| (8) Utility Supply                                       |                |           |      |      |      |      |      | ■    | ■    |      |      |      |
| Power Supply   | m <sup>2</sup> | 270,000   |      |      |      |      |      | ■    | ■    |      |      |      |
| Lighting System  | m <sup>2</sup> | 270,000   |      |      |      |      |      | ■    | ■    |      |      |      |
| Water Supply, Sewarage, Firefighting                     | m <sup>2</sup> | 270,000   |      |      |      |      |      | ■    | ■    |      |      |      |
| <b>Total Direct Construction Cost (DC) of Short Term</b> |                |           |      |      |      |      |      |      |      |      |      |      |
| <b>Container Handling Equipment</b>                      |                |           |      |      |      |      |      |      |      |      |      |      |
| (1) Gantry Cranes  | unit           | 5         |      |      |      |      |      |      |      |      |      |      |
| (2) Transfer Crane                                       | unit           | 18        |      |      |      |      |      |      |      |      |      |      |
| (3) Prime Mover  |                |           |      |      |      |      |      |      |      |      |      |      |
| Tractors   | uni            | 32        |      |      |      |      |      |      |      |      |      |      |
| Chassis  | uni            | 38        |      |      |      |      |      |      |      |      |      |      |
| (4) Reach Stacker  | uni            | 1         |      |      |      |      |      |      |      |      |      |      |
| (5) Forklift   | uni            | 15        |      |      |      |      |      |      |      |      |      |      |

**15-E. MANAGEMENT AND OPERATION OF THE PORT****15-E-1 General****1) Port Administration****a) Port Management Body**

**669.** Since Bojonegara new port will be established as a commercial port within the jurisdiction of IPC-II, port management body should be IPC-II. A branch office of IPC-II will be located in the new port.

**670.** The roles of the port management body are follows:

- Own basic and necessary port infrastructure as breakwater, channel, public berths and maintain them properly (Excluding some facilities under the concession agreement with private sector)
- Own necessary land for proper port management and lease them to port related entities with a proper control system
- Provide port services such as piloting
- Collect port dues
- Collect data and information of cargo handling in effective manner

**b) Other Governmental Function**

**671.** As Bojonegara is a totally new port, not only a branch office of IPC-II with a pilot station but also other governmental function/facilities such as customs clearance, quarantine, police, fire fighting need to be developed in the port area.

**c) Port Area**

**672.** Port area for the sea side will be defined as a port working area. The boundary of the port working area should be set as the same as described in the Master Plan. (Shown in Figure 15-E-1.

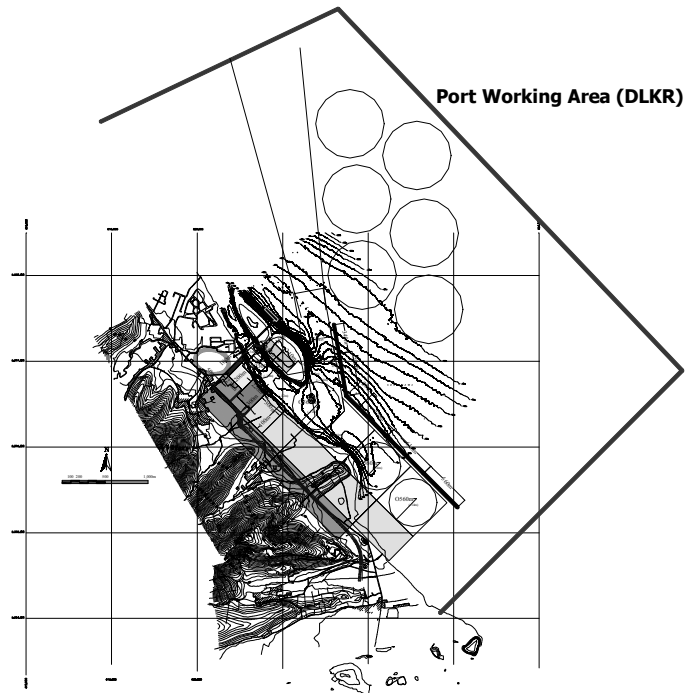


Figure 15-E-1 Proposed Port Working Area (Bojonegara)

673. Port area of the land side is rather difficult to be defined at this moment. However, at least the terminal area including container terminal, multi purpose terminal should be strictly under the control of port management body in terms of security. In this context, gate of the port should be located at the entrance of each terminal as shown in below. Port gate as in Tanjung Priok is undesirable in terms of securing smooth traffic around the port including through traffic. This is common in some major ports in Asian countries such as Japan, Korea etc.

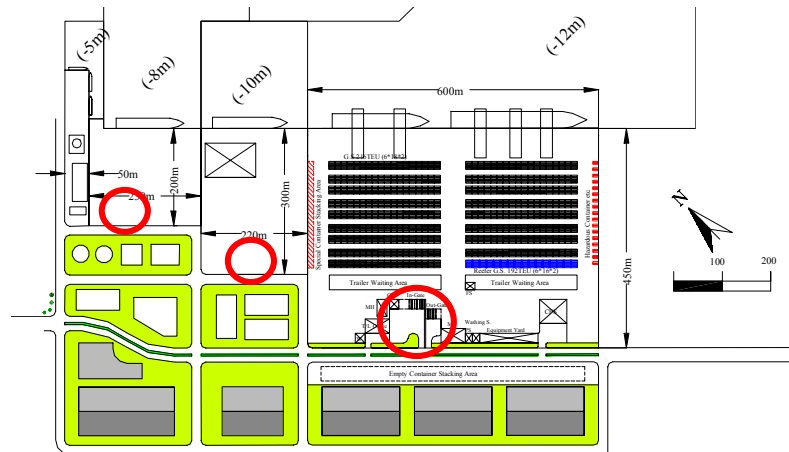


Figure 15-E-2 Location of the Gate

## 2) Security

674. Security of cargoes is a crucial to operate the port. The port sometimes loses its credibility by trivial accidents, which will be a big handicap to attract cargo. Thus, a reliable security system should be introduced by the time of operation.

### 3) *Operational Efficiency*

675. As for terminal operation, especially container terminal, high performance/productivity should be pursued to secure rapid service and cost performance. This is very important to attract cargo especially for new port in Bojonegara because of the weakness in terms of its location, i.e., far from the west Java industrial area.

676. In terms of container cargo, high productivity will be attained by the following measures:

- Reducing container dwelling time in the yard
- Lowering container stacking height for easiness of picking

677. To reduce dwelling time in the container yard, smooth customs clearance is a must. Proper customs clearance system should be established by the time of operation under the cooperation and coordination with customs office. It should be accompanied with the best use of EDI. It is also important to reduce the dwelling time of empty container. Some special area for stacking empty containers should be provided by design.

678. Taking world-wide trend of automation and labor-saving devices which mentioned in Chapter-12, it is recommended to examine minutely the current manning scales in some advanced terminals, not to simply follow the sample scale of JICT and Koja. In a few years from now, technology developments, especially those of container handling technology, will be beyond our imagination. The outlook and vision on how a container terminal should be in the future will decide the failure or success of terminal management. Thus, it is recommended to peruse concession documents by applicants for public bidding for a new terminal focusing on this point. The checking points of a manning scale are as follows:

#### a) *Ship-side Operation ( One gang per shift )*

- ◆ Gantry Crane Operator : One
- ◆ Supervisor : Not needed
- ◆ Yard Clerk : Not needed
- ◆ Rusher : 5-7 ( serve also as Signalman )
- ◆ RTG Operator : 1.5 Operator
- ◆ Yard Tractor Driver : 3

#### b) *Gate side Operation*

- ◆ Gate-clerk : Not needed
- ◆ RTG Operator : 3  
( yard tractor is not needed because highway tractors will proceed into yard )

#### c) *Marshalling in Yard*

- ◆ Auxiliary Handling Equipment : 4
- ◆ RTG Operator : 3
- ◆ Yard Tractor Driver : 3

### 4) *Roll of Public Sector and Private Sector*

679. As examined later in the section of financial analysis, private participation scheme should be introduced to the development and operation of the container terminal. However, the Multi Purpose Terminal should be developed and managed directly by IPC-II for the moment.

### 5) *Institutional Setting*

**680.** To increase the attractiveness of the port as well as to promote better management, the following measures should be taken:

- Introduction of EDI system for speedy document works as well as for easy access to the port
- Providing competitive tariff with the transparent price setting system (This will be examined further in later stage of the study based on the financial analysis.)

### 15-E-2 Framework of Concession for Container Terminal Development/Operation

#### 1) *Concession Scheme as a Means of Private Participation*

**681.** The bidding of the concession agreement for management and operation of container terminals at Bojonegara is a typical way of private participation to the public sector.

**682.** For the success of Bojonegara project, it is hoped that a transparent bidding will be carried out and that the contract will be awarded to the best bidder. For the reference of all who are concerned with the bidding procedure, the framework of a standard concession agreement and how to prepare bidding documents will follow.

#### 2) *Categories of Bidding Procedures*

**683.** Although there are various types of bidding procedures, they can be categorized into the following three types:

- Competitive Bidding
- Competitive Negotiations
- Direct Negotiations

**684.** The main advantages of over and are generally believed to be transparency, and utilization of market mechanism for selecting the best bidder, whereas in , there is possibility to encourage underbidding if re-negotiation is thought possible later. In , it needs to be noted that transparency is ensured only when required bidding conditions and outputs are standardized and clearly defined.

**685.** On the other hand, , a variant of competitive biddings, is generally said to be well suited to projects in which many technical variations are possible, and there is wide scope of innovation, and further it would be difficult to secure project financing on the basis of standardized documents of concession agreement; the proposals are reviewed and selected when they are technically responsive to the request for proposals. is, however, said to have disadvantages of less transparency than a pure competitive bidding approach since the costs and technical variations of different bidders may be difficult to compare.

**686.** occurs most often where a project idea originates with a private sector rather than a public sector.

**687.** In the light of the nature and purpose of the Bojonegara Project, “competitive bidding” is considered to be an appropriate bidding procedure for the selection of a concessionaire.

### 3) *Process of Competitive Bidding*

**688.** A competitive bidding process in case of concession related to an infrastructure project generally has a series of the following steps:

- Public notification of the intention of a public authority ( Pelindo-II in this case ) to seek a private company ( concessionaire ) for management and operations to be surrendered infrastructure to, including a request for expression of interest from private companies
- A formal process of pre-qualification for screening potential bidders and finalizing a short list of pre-qualified bidders
- Distribution of bidding documents to pre-qualified bidders
- A formal public process for presenting proposals, evaluating them, and selecting a winner

**689.** Purpose of pre-qualification mentioned in the above process is a way to ensure that potential bidders have the technical and financial capacity the task demands and a track record in performing similar tasks prior to assessing the quality of bids. Pre-qualification can also reduce the costs of the bidding process. Those involving large numbers of bidders can be complex and costly without necessarily increasing the quality of the winning bid. For this reason, it is recommended Pelindo-II choose to limit the bidding to a few pre-qualified companies. Limiting the number of bidders can also increase their motivation to participate in bidding, because it increases each bidder's chance of winning.

**690.** From the above, pre-qualification is considered to be a preferable procedure for the Bojonegara Project.

**691.** The typical stepwise bidding process including pre-qualification and sample timetable ( see in the following parenthesis, time is counted from a release of EOI ( expression of Interest ) documents of step is shown as follows:

- Release of EOI documents ( 0 days )
- Response submitted by interested registrants ( 40 days )
- Assess EOI submissions ( 60-90 days )
- Release of bidding documents to short listed registrants ( 95 days )
- Submission of proposals by short-listed registrants ( 170 days )
- Evaluation of proposals ( 180-210 days )
- Announcement of preferred bidder(s) ( 210 days )
- Negotiations with a preferred bidder to complete a formal concession agreement
- Award of concession

### 4) *Pre-qualification System*

**692.** As mentioned in 1.2, the purpose of pre-qualification is to assess the technical and financial capacity of potential bidders rather than to assess the quality of bid on what it promises on what terms. In this view, the criteria of pre-qualification generally include the consideration of the following details:

- Share capital of the bidder company



- Length of experience in the business
- Size of the customer base currently served by the bidder company
- Number of countries in which the bidder has similar experience
- Efficiency and performance of recent projects
- Financial statements

**693.** The criteria may be either qualitative or quantitative. Quantitative criteria allow greater flexibility and discretion, but they are also less transparent.

**694.** To keep transparency in bidding process, the criteria of pre-qualification should be clearly indicated in EOI documents in which registrants expressing interest are requested to provide information corresponding to criteria items in the form of an annex. The followings are sample items of pre qualification criteria:

**a) *Financial Viability***

- Financial commitment of the entities supporting the EOI
- Structure and security of financing arrangements proposed

**b) *Industry Experience***

- Proven industry experience of container terminal and/or multi-purpose terminal
- Approach to project delivery as demonstrated in previous projects
- Proven experience in meeting the evolving requirements of the sea transport industry
- Demonstrated ability to attract market share in container and/or conventional cargo stevedoring

**c) *Commercial***

- Understanding of Public-Private Partnerships and/or associated commercial structures in the infrastructure project

**d) *Risk Management***

- Understanding of risk management concepts
- Commitment to, and demonstration of, risk management capabilities
- Level of response to the management and pricing of identified risks in risk allocation in Public-Private Partnerships in the infrastructure project

**e) *Technical***

- Commitment to, and demonstration of, technical capabilities required at all stages of the Project
- Flexibility to incorporate industry development arising over the life of the Project
- Demonstrated innovation in project delivery and management of port facilities
- Demonstrated strength and capability of nominated management structure
- Strength and robustness of any proposed project implementation structure and resources of each phase of the Project

- Pricing Structure
- Demonstrated commercial approach to pricing in a competitive environment

**f) Corporate Standards**

- Demonstrated standing of the Registrant in the business community
- Demonstration that the culture and philosophy of the Registrant and its shareholders are consistent with the policy objectives and goals of the Project

**5) Bidding System**

**a) General**

**695.** Central to the bidding process are decisions about what ( pre-qualified ) bidders should be required to include in their bids and how these bids should be evaluated. The following points are generally taken into account when determining the required items and the criteria of bid evaluation:

- How should the responsiveness of the bid to Bid Inviting Public Organization's ( ex. Port Authority ) requirements be evaluated ?
- How should all the parameters of the proposal be combined into a single variable so that comparing the bids is straightforward ?
- Should there be a two-stage process in which technical characteristics are scored in the first stage and price bids are obtained and compared in the second ? Or should price be weighted against other attributes of the offer ?

**696.** Most infrastructure projects including marine terminal projects use a two-stage bidding system in which bidders submit a technical envelop and a financial envelop. The two-stage bidding system is considered to be suitable to evaluate the quality bids.

**b) Two-stage Bidding System**

**697.** The technical envelop in the two-stage system may have purposes ranging from simply obtaining an indication of firms' fitness and willingness to participate in bidding, to eliciting detailed proposals from bidders on how they would satisfy Bid Inviter's requirements. Assuming the pre-qualification system is adopted, in which willing to participate in bidding is confirmed and firms' fitness is assessed, there are the following two possible options in the evaluation of bids using the two-stage bidding system:

- Option 1

**698.** Bidders are required to include a technical proposal in the technical envelop setting out their proposed business plan including investment and financing plans for meeting the service objectives. The plans are reviewed for consistency with the project specifications and requirements, and proposals either pass or fail. The concession is awarded to the surviving bidder with the best financial bid.

- Option 2

**699.** Technical proposals are required as in Option 1, but rather than passing or failing, the proposals are scored. The financial proposals are also scored, and the concession is awarded on the basis of the weighted technical and financial scores.

**700.** Option 1 might be chosen if Bid Inviter has firm and clear ideas on the minimum technical requirements, whereas Option 2 if there is less clarity about requirements, and if different technical proposals may have different financial implications at different stages of the project's life. The former option has more transparency.

**701.** Taking account of the nature of the Bojonegara Project in which the minimum technical requirements could be clarified, Option 1 with more transparency is considered to be preferable.

**c) Criteria of Bid Evaluation**

**702.** The criteria of bid evaluation on the basis of concession agreement and on the assumption of the adoption of pre-qualification system and two-stage bidding system generally covers the following:

- The credibility of the bid as a whole
- The bidder's detailed proposals for carrying out the mandatory conditions, his proposals, if any, for modified or alternative options, his proposals for desirable conditions and any additional features offered
- The financial return to Bid Inviter

**703.** To evaluate bids, pre-qualified bidders are required to submit information relating to the bidder and to the business of operating marine terminal envelop and a financial envelop, respectively.

**d) Components of Bid**

**704.** Bidders are requested to submit bids after the form of bidding documents. Sample components of bid to be filled in the form are as follows:

- ◆ Statement of Bid
- ◆ Name and address of bidder
- ◆ Options for which bids are submitted
- ◆ Authentication
- ◆ Bid bond
- ◆ Payment to Bid Inviter
- ◆ Statement
- ◆ Details of Bidder
- ◆ Acceptance of Conditions
- ◆ Business Plan

**705.** The business Plan should detail how the bidder proposes to manage, operate, market and develop the marine terminal in Bojonegara. It should consist of a narrative, supported by detailed estimates and projections in tabular form as set forth by Bid Inviter. It should cover the following:

- The Business Arrangements ( where applicable ) of the consortium - including the percentage ownership by the Indonesian and foreign partners, and for each individual partner stated separately.
- A detailed program for establishing management at the marine terminal, the timing for mobilizing, the proposed investment in infrastructure if needed and the major items of equipment required to be provided for operation, and the program for

starting up operation. The commencement must be not later than 6 months from the signing of the concession agreement on the condition that the marine terminal is completed and is ready for use.

- Traffic forecasts-Vessels - detailing the expected traffic volumes ( vessel calls ), including expected size, origin and frequency of vessels, should be supported by a description of the proposed marketing initiatives and the shipping partners and details of how these shipping lines are planning to use the marine terminal and details on which the forecasts are based.
- Traffic forecast-TEUs by LO/LO, and RO/RO - this is to be supported by a description of the proposed marketing initiatives on which the forecasts are to be based. These traffic forecasts are intended to represent the bidder's best estimates, and will be incorporated into the concession agreement to form the basis for minimum guarantees of TEU volumes by the bidder to Bid Inviter.
- Operating Plan – showing the allocation of personnel and equipment to serve the projected traffic on a seven days per week, 365 days per year basis.
- Marketing Plan – identify target markets, their size, and potential market share, describing the method to be used to acquire that market share.
- Revenue Forecast – detailing the charges proposed, the resulting revenue from cargo handling, stevedoring, and other sources of revenue.
- Staffing Requirements – detailing the proposed management structure and the number of personnel engaged in different terminal functions, and whether full or part-time. Curricula vitae of senior management personnel should be attached, including the particulars details in the tables.
- An acquisition plan – for equipment and construction program for operation requirements- setting forth the amount of equipment and type of facilities additional to those provided by Bid Inviter which will be provided by the operator to handle the increasing levels of throughput at the marine terminal. Equipment should be specified by type and capacity. To illustrate, the bidder might specify “ At a throughput of 100,000 TEU expected to be handled during the year \_\_\_\_\_, we will acquire five additional yard stackers, and one 6 x 5 RTG , total valued at US\$\_\_\_\_ .”
- Investment Profile – itemizing the investment that will be needed for handling equipment, container storage facilities ( container yard ), and the berth. The expected unit cost and total value of capital investment by type of equipment should be stated. This profile should clearly list which equipment will be owned by the operator and which will be leased.
- Operating Cost – detailing the costs of operations, staff costs, plant operating costs, infrastructure maintenance costs, and similar items. The proposed throughput return to be paid to Bid Inviter should be excluded.
- Balance Sheet – showing the proposed opening balance and capital structure and closing balance and capital structure at end of each year.
- Cash Flow Statement – showing the flow of cash in the same period of Balance Sheet.

**15-F. ECONOMIC ANALYSIS****15-F-1 Purpose and Methodology of Economic Analysis****1) Objective**

**706.** The purpose of the economic analysis is to appraise the economic feasibility of the Urgent Development Plan for Bojonegara, which will start its initial operation in 2008 (multi Purpose Terminal), from the viewpoint of the national economy. The economic analysis is conducted to study the economic benefits as well as the economic costs arising from this project, and to evaluate whether the benefits of the project exceed those that could be obtained from other investment opportunities in Indonesia.

**2) Methodology**

**707.** Economic analysis will be carried out according to the following method. The Urgent Development Plan will be defined and it will be compared to the “Without the project” case (hereinafter referred to as the “Without” case). All benefits and costs in market price of the difference between “With the project” case (hereinafter referred to as the “With” case) and “Without” case will be calculated and it will be converted to economic price. All benefits and costs are evaluated using economic prices.

**708.** In this study, the economic internal rate of return (EIRR) and the benefit/cost ratio (B/C ratio) based on a cost-benefit analysis are used to appraise the feasibility of the project. The EIRR is a discount rate which makes the costs and the benefits of the project during the project life equal. The benefit/cost ratio is obtained by dividing the benefits by costs based on the present value.

**15-F-2 Prerequisites for Economic Analysis****1) Base Year**

**709.** The “Base Year” here means the standard year in the estimation of costs and benefits. In this study, 2002 is set as the “Base Year”.

**2) Covered Projects in the Analysis**

**710.** The scope of the economic analysis covers the projects in the Urgent Development Plan for Bojonegara. The project major components and their implementing schedule are as follows:

**Table 15-F-1 Development Schedule**

|                        | Development | Operation  |
|------------------------|-------------|--|
| Breakwater             | 2007~2009   | 2010~(500m), 2012~(1,040m)                             |
| Channel and Basin      | 2005~2007   | 2008~(Partly), 2010~(entirely)                         |
| Multi Purpose Terminal | 2005~2007   | 2008~  |
| Container terminal     | 2007~2011   | 2010~(2 berths with 3 GC)<br>2012~(2 berths with 5 GC) |
| Access Road            | 2006~2009   | 2010~  |

### 3) *Project Life*

711. The period of calculation (project life) in the economic analysis is assumed to be 30 years from the starting year, taking into consideration the depreciation period of the main facilities.

### 4) *Foreign Exchange Rate*

712. The exchange rate adopted for this analysis is US\$ 1.00 = Rupiah 8,500, the same rate as used in the cost estimation.

### 5) *“With” Case*

713. As a cost-benefit analysis is conducted on the difference between the “With” case and the “Without” case, it is important to define the “With” case and the “Without” case.

714. In the economic analysis, the three projects, Multipurpose Terminal Project, Container Terminal Project and Access Road Project are assessed simultaneously.

715. In an economic analysis, benefits are mainly brought about by additional cost for midstream operation and transshipment of container cargoes counted in “Without” case.

### 6) *“Without” Case*

716. No investment is made for the Urgent Development Plan. In the “Without” case scenario, the cargo is assumed to be handled by Midstream operation at the coast of Banten Province. Following conditions are adopted as the “Without” case for each project.

#### a) *Multipurpose Terminal Project*

- No investment is made for the port. Therefore, Multipurpose Terminal is not constructed.
- General cargo berths of Ciwandan and Merakmas ports handle with their own cargoes up to the capacity.
- Midstream Operation is conducted at the coast of Banten Province for the general cargo using barge and simple pier. .

#### b) *Container Terminal Project*

- No investment is made for the port. Therefore, New Container Terminal is not constructed.
- The container berth of Merakmas port handles with its own cargo up to the capacity.
- Midstream Operation is conducted at the coast of Banten Province using barge and simple pier for the container cargo

#### c) *Access Road Project*

- No investment is made for the port. Therefore, a new road is not constructed.
- The location of piers for calling of barges is not fixed. The planned site is one of the alternatives. Therefore, the time required for the land transportation is not counted. No benefit can be evaluated on land transportation.

**15-F-3 Economic Prices****1) Conversion Factors****a) Standard Conversion Factor (SCF)**

717. Details are the same as Tanjung Priok Port Development Project.

**b) Conversion Factor for Consumption (CFC)**

718. Details are the same as Tanjung Priok Port Development Project.

**c) Conversion Factor for Skilled Labor (CFSL)**

719. Details are the same as Tanjung Priok Port Development Project.

**d) Conversion Factor for Unskilled Labor (CFUL)**

720. As the wage rate is controlled by a minimum wage system and other regulations despite the existence of a large amount of unskilled labors, the wages paid to unskilled labors by a project are generally above the opportunity cost. Hence, these wages shouldn't be used for calculation of the economic value of the unskilled labors. The Conversion Factor for Unskilled Labor (CFUL) is calculated by the following formula.

$$\begin{aligned} \text{CFUL} &= \frac{\text{Opportunity cost of unskilled labor} \times \text{CFC}}{\text{Nominal wage rate of unskilled labor}} \\ &= \frac{\text{Provincial Minimum Wage in Banten} \times \text{CFC}}{\text{Assumed wage rate of unskilled labor}} \end{aligned}$$

where, *CFC* : Conversion Factor for Consumption (1.00)

721. In this report, the Conversion Factor for Unskilled Labor is calculated as 0.48 (See Table 15-F-2).

**Table 15-F-2 Conversion Factor for Unskilled Labor**

| Year | Provincial Minimum Wage in Banten (Rupiahs/month) | Assumed wage rate of unskilled labor (Rupiahs/month) | CFC  | CFUL |
|------|---|--|------|------|
| 2002 | 360,000   | 750,000<br>(25 working days/month)                   | 1.00 | 0.48 |

722. Transfer cost, which do not actually consume national resources, shall be excluded in a economic analysis. Tax, duties, profit and compensation are recognized as transfer cost in this study. Following values are set for transfer cost.

- ◆ Cost of Land Acquisition                      CLA= 0 billion Rp.
- ◆ Transferable Operating Profit (half) TOP= 3%
- ◆ Value Added Tax                                      VAT= 10% of cost

723. Economic price is computed by the following formula;

$$(1 + TOP) * CCE = (CCM - CLA - VAT) * (0.99 + 0.01 * CFUL)$$

$$CCE = 0.9658 * (CCM - CLA - VAT)$$

where, CCE : Construction Cost by economic pricing

CCM : Construction Cost by market pricing

724. On the contrary, equipment is usually imported and there is no cost of unskilled labour for this. Therefore, economic price of the equipment can be set as follows.

$$(1 + TIM + TOP) * ECE = (ECM - VAT)$$

$$ECE = 0.8850 * (ECM - VAT)$$

where, ECE : Equipment Cost by economic pricing

ECM : Equipment Cost by market pricing

TIM : Import Tax (=10%)

#### 15-F-4 Benefits of the Projects

##### 1) *Benefit Items*

725. As benefits brought about by the Urgent development plan of the study port, the following items are identified.

- ◆ (1) Savings in ship and cargo staying cost for cargo handling
- ◆ (2) Savings in sea transportation cost
- ◆ (3) Savings in handling cost by Midstream Operation for the excess cargoes
- ◆ (4) Reduction of cargo damage and accident at the port
- ◆ (5) Promotion of regional economic development
- ◆ (6) Increase in employment opportunities and income
- ◆ (7) Reduction of the traffic congestion in the port area

726. Item (1), (2) and (3) are considered countable in this study and the monetary benefits of those items are counted.

##### 2) *Calculation of Benefits*

###### a) *Saving in ship staying costs*

727. In the “With” case, total ship staying cost at berths is less than that of the “Without” case owing to the implementation of the Multipurpose Terminal Project and the Container Terminal Project. Actually, operational productivity at wider yard using modern method, is higher than midstream operation. The difference of ship cost and cargo value between the “With” case and the “Without” case during Midstream Operation is counted as a benefit of the projects. Saving in ship staying costs of container cargo at berths is shown in Table 15-F-3 and that of general cargo is shown in Table 15-F-4.



**Table 15-F-3 Saving in Ship Staying Costs of Container Cargo**

(Unit: billion Rp)

| Year No.         | Project | Foreign                       |                               | Domestic                      |                               |
|------------------|---------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|                  |         | Container Vessel Staying Cost | Container Cargo Staying Value | Container Vessel Staying Cost | Container Cargo Staying Value |
| 1-9              |         | 147                           | 60                            | 3                             | 1                             |
| 10-19            |         | 1,427                         | 586                           | 37                            | 14                            |
| 20-29            |         | 1,474                         | 605                           | 38                            | 14                            |
| 30-34            |         | 737                           | 302                           | 19                            | 7                             |
| Total of 1 to 34 |         | 3,786                         | 1,556                         | 99                            | 38                            |

**Table 15-F-4 Saving in staying Costs of General Cargo and Bags**

(Unit: billion Rp)

| Year No.         | Project | Vessel Staying Cost |  | Cargo Staying Value |  |
|------------------|---------|---------------------|--|---------------------|--|
|                  |         |                     |  |                     |  |
| 1-9              |         | 63                  |  | 15                  |  |
| 10-19            |         | 247                 |  | 60                  |  |
| 20-29            |         | 247                 |  | 60                  |  |
| 30-34            |         | 123                 |  | 30                  |  |
| Total of 1 to 34 |         | 681                 |  | 167                 |  |

**b) Saving in sea transportation costs of foreign container**

**728.** At the beginning stage of maritime transport, the loading/unloading of goods is conducted by Midstream Operation, in which case, a ship must be equipped with ship cranes. Some large container ships are not equipped with such cranes, which gives rise to transshipment in Singapore Port, etc. in order to do the midstream operation at destination port. It is possible to add on some portion of the transshipment cost of this as a benefit of “With case”.

**729.** In this case, gear-less vessels, 62% of all, are also taken into account, and for these, a quarter of the transshipment cost at other ports on the maritime route is added.

**Table 15-F-5 Saving in Sea Transportation Costs (Unit: billion Rp)**

| Year No.         | Project | Delayed Transport Of Cargo |     |
|------------------|---------|----------------------------|-----|
|                  |         | Container Handling Charge  |     |
| 1-9              |         | 112                        | 15  |
| 10-19            |         | 1,087                      | 147 |
| 20-29            |         | 1,123                      | 152 |
| 30-34            |         | 561                        | 76  |
| Total of 1 to 34 |         | 2,884                      | 390 |

**c) Saving in cargo handling costs by midstream operation**

**730.** In performing Midstream Operation, barges and loading piers are necessary. The cost of these facilities is added on as a benefit of the “with case”. But the operational cost at the coast is assumed the same as that of the “with case”.

**731.** Assuming that the size of the barge is a 30TEU (self propelled) vessel and the loading pier is around 5-m depth and equipped with two berths, the required number and the cost shall be counted as a benefit of the project.

**Table 15-F-6 Saving in Cost of Infrastructure (Unit: billion Rp)**

| Year No.         | Project | Multipurpose Terminal | Container Terminal |
|------------------|---------|-----------------------|--------------------|
| 1-9              |         | 43                    | 60                 |
| 10-19            |         | 112                   | 308                |
| 20-29            |         | 112                   | 308                |
| 30-34            |         | 56                    | 154                |
| Total of 1 to 34 |         | 323                   | 830                |

**Table 15-F-7 Saving in Cost of Barge Operation**

(Unit: billion Rp)

| Year No.         | Project | Multipurpose Terminal | Container Terminal |
|------------------|---------|-----------------------|--------------------|
| 1-9              |         | 52                    | 57                 |
| 10-19            |         | 201                   | 536                |
| 20-29            |         | 201                   | 554                |
| 30-34            |         | 100                   | 277                |
| Total of 1 to 34 |         | 556                   | 1,426              |

**Table 15-F-8 Benefit in the Urgent Development Plan (unit:million Rp)**

| Year  | Mid Stream operation<br>(Berth Cost) |          | Mid Stream operation<br>(Barge Cost) |          | Foreign Container<br>Transshipment |                   | Delayed Operation<br>(Vessel & Cargo) |          | Total      |
|-------|--------------------------------------|----------|--------------------------------------|----------|------------------------------------|-------------------|---------------------------------------|----------|------------|
|       | Container                            | G.C.+Bag | Container                            | G.C.+Bag | Cargo Stay                         | Cargo<br>Handling | Container                             | G.C.+Bag |            |
| 2004  | 0                                    | 0        | 0                                    | 0        | 0                                  | 0                 | 0                                     | 0        | 0          |
| 2005  | 0                                    | 0        | 0                                    | 0        | 0                                  | 0                 | 0                                     | 0        | 0          |
| 2006  | 0                                    | 0        | 0                                    | 0        | 0                                  | 0                 | 0                                     | 0        | 0          |
| 2007  | 0                                    | 3,500    | 0                                    | 0        | 0                                  | 0                 | 0                                     | 0        | 3,500      |
| 2008  | 0                                    | 1,400    | 0                                    | 2,520    | 0                                  | 0                 | 0                                     | 3,760    | 7,680      |
| 2009  | 7,000                                | 6,300    | 0                                    | 5,040    | 0                                  | 0                 | 0                                     | 8,500    | 26,840     |
| 2010  | 12,600                               | 9,100    | 10,080                               | 10,080   | 2,320                              | 17,134            | 32,350                                | 14,426   | 108,090    |
| 2011  | 18,200                               | 11,900   | 20,160                               | 15,120   | 4,957                              | 36,620            | 69,330                                | 21,782   | 198,070    |
| 2012  | 22,400                               | 11,200   | 27,720                               | 20,160   | 7,959                              | 58,793            | 111,493                               | 30,773   | 290,499    |
| 2013  | 32,900                               | 11,200   | 40,320                               | 20,160   | 11,097                             | 81,975            | 155,797                               | 30,773   | 384,222    |
| 2014  | 29,400                               | 11,200   | 52,920                               | 20,160   | 14,508                             | 107,172           | 203,834                               | 30,773   | 469,968    |
| 2015  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2016  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2017  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2018  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2019  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2020  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2021  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2022  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2023  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2024  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2025  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2026  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2027  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2028  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2029  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2030  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2031  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2032  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2033  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2034  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2035  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2036  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| 2037  | 30,800                               | 11,200   | 55,440                               | 20,160   | 15,204                             | 112,310           | 213,358                               | 30,773   | 489,245    |
| Total | 830,900                              | 323,400  | 1,426,320                            | 556,920  | 390,531                            | 2,884,818         | 5,480,041                             | 848,569  | 12,741,498 |

**15-F-5 Costs of the Projects****1) Construction Costs**

**732.** Construction costs consist of Direct Construction Cost, Indirect Construction Cost, Project Related Cost, Administration Cost and VAT. Total Project Cost is estimated at 1,831(1,365 + 466) billion Rp by market price. Details are shown in the table bellow.

**Table 15-F-9 Construction Costs of Urgent Road Development Plan**

(Unit: billion Rp)

|                                | Port  | Equipment | Total |
|--------------------------------|-------|-----------|-------|
| I. Direct Construction Cost    | 849   | 370       | 1,220 |
| I.a Container Terminal         | 263   | 360       | 623   |
| I.b Multipurpose Terminal      | 57    | 10        | 67    |
| I.c Land Transportation        | 0     | 0         | 0     |
| I.d Others                     | 530   | 0         | 530   |
| II. Indirect Construction Cost | 194   | 0         | 194   |
| III. Project Related Cost      | 188   | 50        | 238   |
| IV. Administration Cost        | 10    | 4         | 14    |
| V. Total Project Cost          | 1,242 | 424       | 1,666 |
| VI. VAT                        | 123   | 42        | 165   |
| VII. Construction Cost         | 1,365 | 466       | 1,831 |

733. Economic price is computed by following formula;

$$CCE = 0.9689 * (CCM - CLA - VAT)$$

where, CCE : Construction Cost by economic pricing

CCM : Construction Cost by market pricing = 1,364.8 billion Rp.

CLA: Cost of Land Acquisition = 0.0 billion Rp.

VAT: 10% of cost = 123.1 billion Rp.

CCE = 1,199.5 billion Rp.

$$ECE = 0.8850 * (ECM - VAT)$$

where, ECE : Equipment Cost by economic pricing

ECM : Equipment Cost by market pricing = 466.2 billion Rp.

VAT: 10% of cost = 42.0 billion Rp.

ECE = 375.4 billion Rp.

## 2) *Maintenance and Operation Costs*

### a) *Maintenance costs*

734. The annual costs of maintaining the port facilities are estimated as a fixed rate, specifically, 1% for structure (excluding dredging and reclamation) and 5% for equipment of the original construction costs.

**Table 15-F-10 Maintenance Costs for Structure and Equipment**

(Unit: billion Rp)

| Year No.          | Project Structure and Equipment |
|-------------------|---------------------------------|
| 1-9               | 37                              |
| 10-19             | 176                             |
| 20-29             | 176                             |
| 30-34             | 88                              |
| Total of 1- to 34 | 478                             |

**b) Re-investment cost and Residual Values**

735. The equipment will be renewed in consideration of the project life and the period of depreciation (gantry crane and scale unit are 20 years). And residual value of equipment shall be counted in the end year of the project.

**Table 15-F-11 Re-investment Costs and Residual Value (Unit: billion Rp)**

|           | Total Re-investment Cost<br>during 2026-2031 | Residual Value in 2037 |
|-----------|--|------------------------|
| Equipment | 375  | -235                   |

**c) Personnel and administration costs**

736. The annual personnel costs are estimated based on the required number of employees to manage and operate the port facilities (see the section “Financial Analysis”). And administration costs are estimated as 115% and 175% of the personnel costs of IPC2 and Container Operator respectively. However, personnel cost of Without Case is assumed to be equal to that of With Case. Therefore administration cost shall be considered.

**Table 15-F-12 Administration Costs (Unit: million Rp)**

| Year No.            | Project | Administration Cost |
|---------------------|---------|---------------------|
| 1-9                 |         | 12                  |
| 10-19               |         | 51                  |
| 20-29               |         | 51                  |
| 30-34               |         | 25                  |
| Total of F-1- to 34 |         | 140                 |

**3) Total Costs**

737. Table 15-F-13 shows total costs at economic prices in the Urgent Development Plan.

**Table 15-F-13 Costs in the Urgent Development Plan (Unit: million Rp)**

| Year  | Administration | Construction | Maintenance | Total     |
|-------|----------------|--------------|-------------|-----------|
| 2004  | 0              | 19,903       | 0           | 19,903    |
| 2005  | 0              | 86,773       | 0           | 86,773    |
| 2006  | 0              | 125,446      | 0           | 125,446   |
| 2007  | 0              | 275,740      | 0           | 275,740   |
| 2008  | 580            | 438,285      | 0           | 438,865   |
| 2009  | 580            | 482,752      | 1,083       | 484,415   |
| 2010  | 2,567          | 30,531       | 1,083       | 34,181    |
| 2011  | 2,567          | 115,432      | 17,640      | 135,639   |
| 2012  | 4,554          | 0            | 17,640      | 22,194    |
| 2013  | 4,554          | 0            | 17,640      | 22,194    |
| 2014  | 4,554          | 0            | 17,640      | 22,194    |
| 2015  | 4,554          | 0            | 17,640      | 22,194    |
| 2016  | 4,554          | 0            | 17,640      | 22,194    |
| 2017  | 4,554          | 0            | 17,640      | 22,194    |
| 2018  | 4,554          | 0            | 17,640      | 22,194    |
| 2019  | 4,554          | 0            | 17,640      | 22,194    |
| 2020  | 4,554          | 0            | 17,640      | 22,194    |
| 2021  | 4,554          | 0            | 17,640      | 22,194    |
| 2022  | 4,554          | 0            | 17,640      | 22,194    |
| 2023  | 4,554          | 0            | 17,640      | 22,194    |
| 2024  | 4,554          | 0            | 17,640      | 22,194    |
| 2025  | 4,554          | 0            | 17,640      | 22,194    |
| 2026  | 4,554          | 160          | 17,640      | 22,354    |
| 2027  | 4,554          | 2,192        | 17,640      | 24,386    |
| 2028  | 4,554          | 53,922       | 17,640      | 76,116    |
| 2029  | 4,554          | 173,148      | 17,640      | 195,342   |
| 2030  | 4,554          | 30,531       | 17,640      | 52,725    |
| 2031  | 4,554          | 115,432      | 17,640      | 137,626   |
| 2032  | 4,554          | 0            | 17,640      | 22,194    |
| 2033  | 4,554          | 0            | 17,640      | 22,194    |
| 2034  | 4,554          | 0            | 17,640      | 22,194    |
| 2035  | 4,554          | 0            | 17,640      | 22,194    |
| 2036  | 4,554          | 0            | 17,640      | 22,194    |
| 2037  | 4,554          | -235,361     | 17,640      | -213,167  |
| Total | 124,708        | 1,714,886    | 478,446     | 2,318,040 |

**15-F-6 Evaluation of Projects****1) Calculation of the EIRR**

**738.** The economic internal rate of return (EIRR) based on a cost-benefit analysis is used to appraise the economic feasibility of the project. The EIRR is the discount rate which makes the costs and benefits of a project during the project life equal.

**739.** It is calculated by using the following formula.

$$\sum_{i=1}^n \frac{Bi - Ci}{(1+r)^{i-1}} = 0$$

where,  $n$  : Period of economic calculation (project life = 34 years)  
 $Bi$  : Benefits in i-th year  
 $Ci$  : Costs in i-th year  
 $r$  : Discount rate

740. The results of the EIRR calculation are shown below.

**Table 15-F-14 Result of EIRR Calculation**

| Project | Whole  |
|---------|--------|
| EIRR    | 17.9 % |

2) **Calculation of the Benefit/Cost Ratio**

741. The benefit/cost ratio is obtained by dividing the benefit by the cost. The results of the B/C are shown below. The discount rate adopted for calculation of B/C is 15% in this study.

**Table 15-F-15 Result of B/C Calculation (unit: billion Rp)**

| Items | Cost | Benefit | B/C  |
|-------|------|---------|------|
| PV    | 862  | 1,074   | 1.25 |

3) **Calculation of the Net Present Value (NPV)**

742. The Net Present Value is calculated by using the following formula.

$$NPV = \sum_{i=1}^n \frac{Bi - Ci}{(1+r)^{i-1}}$$

where,  $n$  : Period of economic calculation (project life = 34 years)  
 $Bi$  : Benefits in  $i$ -th year  
 $Ci$  : Costs in  $i$ -th year  
 $r$  : Discount rate = 15%

743. The results of the NPV calculation are shown below.

**Table 15-F-16 Result of NPV Calculation (Unit: billion Rp)**

| Item | Net |
|------|-----|
| PV   | 212 |

4) **Sensitivity Analysis**

744. In order to see whether the project is still feasible when some conditions change, a sensitivity analysis is made for the following three alternatives.

- Case A: The costs increase by 10%
- Case B: The benefits decrease by 10%
- Case C: The costs increase by 10% and the benefits decrease by 10%

745. The results of the sensitivity analysis are shown below.

**Table 15-F-17 Sensitivity Analysis for EIRR**

| Project   | Whole |
|-----------|-------|
| Base Case | 17.9% |
| Case A    | 16.6% |
| Case B    | 16.4% |
| Case C    | 15.2% |

### 5) Evaluation

746. In general, it is said that a project with an EIRR of more than 15% is economically feasible considering the opportunity cost of capital in Indonesia. As for this study, the resulting EIRRs of all cases are larger than 15%.

747. This means that the planned project is economically feasible.

**Table 15-F-18 Cost and Benefit of Urgent Port Project (unit:million Rp)**

| Year  | Cost      | Benefit    | Net Value  |
|-------|-----------|------------|------------|
| 2004  | 21,907    | 0          | -21,907    |
| 2005  | 88,778    | 0          | -88,778    |
| 2006  | 127,452   | 0          | -127,452   |
| 2007  | 277,747   | 3,500      | -274,247   |
| 2008  | 440,873   | 7,680      | -433,194   |
| 2009  | 486,424   | 26,840     | -459,584   |
| 2010  | 36,191    | 108,090    | 71,899     |
| 2011  | 137,650   | 198,070    | 60,419     |
| 2012  | 24,206    | 290,499    | 266,293    |
| 2013  | 24,207    | 384,222    | 360,015    |
| 2014  | 24,208    | 469,968    | 445,759    |
| 2015  | 24,209    | 489,245    | 465,035    |
| 2016  | 24,210    | 489,245    | 465,034    |
| 2017  | 24,211    | 489,245    | 465,033    |
| 2018  | 24,212    | 489,245    | 465,032    |
| 2019  | 24,213    | 489,245    | 465,031    |
| 2020  | 24,214    | 489,245    | 465,030    |
| 2021  | 24,215    | 489,245    | 465,029    |
| 2022  | 24,216    | 489,245    | 465,028    |
| 2023  | 24,217    | 489,245    | 465,027    |
| 2024  | 24,218    | 489,245    | 465,026    |
| 2025  | 24,219    | 489,245    | 465,025    |
| 2026  | 24,380    | 489,245    | 464,864    |
| 2027  | 26,413    | 489,245    | 462,831    |
| 2028  | 78,144    | 489,245    | 411,100    |
| 2029  | 197,371   | 489,245    | 291,873    |
| 2030  | 54,755    | 489,245    | 434,489    |
| 2031  | 139,657   | 489,245    | 349,587    |
| 2032  | 24,226    | 489,245    | 465,018    |
| 2033  | 24,227    | 489,245    | 465,017    |
| 2034  | 24,228    | 489,245    | 465,016    |
| 2035  | 24,229    | 489,245    | 465,015    |
| 2036  | 24,230    | 489,245    | 465,014    |
| 2037  | -211,130  | 489,245    | 700,375    |
| Total | 2,388,740 | 12,741,498 | 10,352,759 |



**15-G. FINANCIAL ANALYSIS****15-G-1 Objective of the Financial Analysis**

**748.** The purpose of the financial analysis is to evaluate the financial feasibility of the project. The analysis focuses on the viability of the project itself and the financial soundness of the Bojonegara project during the project life assuming as implementation scheme based on the concept of cost allocation. The result of the analysis will feedback to the implementation scheme.

**15-G-2 Methodology****1) General**

**749.** Details are the same as Tanjung Priok Port Development Project.

**2) Base Year**

**750.** All costs and revenues are indicated in price as of 2002, when the price survey was conducted (US \$ 1.00= 9,000 Rp). We call this year the "Base Year".

**3) Covered Projects in the Analysis**

**751.** The scope of the financial analysis covers the projects in the Urgent Development Plan for Bojonegara. The project major components and their implementing schedule are as follows:

**Table 15-G-1 Development Schedule**

|                        | Development | Operation  |
|------------------------|-------------|--|
| Breakwater             | 2007~2009   | 2010~(500m), 2012~(1,040m)                             |
| Channel and Basin      | 2006~2008   | 2008~(Partly), 2010~(entirely)                         |
| Multi Purpose Terminal | 2006~2007   | 2008~  |
| Container terminal     | 2007~2011   | 2010~(2 berths with 3 GC)<br>2012~(2 berths with 5 GC) |
| Access Road            | 2006~2007   | 2008~  |

**4) Project Life**

**752.** Considering the long-term loans and service lives of the port facilities, the project life in the financial analysis is assumed to be 30 years from the initial operation year 2008. Neither inflation nor an increase in nominal wages is considered during the project life.

**15-G-3 Assumption****1) Capital Cost and Operating Revenue****a) Capital Cost**

**753.** The roles of IPC2 and private sector are as follows based on the concept of cost allocation.

**Table 15-G-2 Implementation Scheme**

| Facility                |                        | Central Government | IPC2 | Private Sector |
|-------------------------|------------------------|--------------------|------|----------------|
| Breakwater              |                        |                    |      |                |
| Access Channel          |                        |                    |      |                |
| Inner Channel and Basin |                        |                    |      |                |
| Container Terminal      | Quay                   |                    |      |                |
|                         | Reclamation            |                    |      |                |
|                         | Pavement               |                    |      |                |
|                         | Utility and Facilities |                    |      |                |
|                         | Gantry Crane           |                    |      |                |
|                         | Equipment              |                    |      |                |
| Multi Terminal          |                        |                    |      |                |
| Port-related Road       |                        |                    |      |                |

754. Capital cost is summarized as follows.

**Table 15-G-3 Capital Cost (000Rp)**

| Year  | Central Government | IPC2        | Terminal Operator | Total         |
|-------|--------------------|-------------|-------------------|---------------|
| 2004  | 0                  | 26,062,000  | 0                 | 26,062,000    |
| 2005  | 0                  | 98,732,000  | 0                 | 98,732,000    |
| 2006  | 0                  | 142,551,000 | 199,000           | 142,750,000   |
| 2007  | 98,952,000         | 197,971,000 | 17,053,000        | 313,976,000   |
| 2008  | 140,785,000        | 226,200,000 | 149,052,000       | 516,037,000   |
| 2009  | 59,129,000         | 167,710,000 | 340,484,000       | 567,323,000   |
| 2010  | 0                  | 0           | 37,922,000        | 37,922,000    |
| 2011  | 0                  | 0           | 143,367,000       | 143,367,000   |
| Total | 298,866,000        | 859,226,000 | 688,077,000       | 1,846,169,000 |

**b) Operating Cost**

755. Study team estimated operating cost based on Tg.priok branch office and Koja terminal.

**Table 15-G-4 Operating Cost**

|                     | IPC   | Terminal Operator         |
|---------------------|---|---------------------------|
| Number of Person    | 100 Persons   | 150 / Berth               |
| Personnel Cost      | 36,000,000 Rp/person/year   | 54,000,000 Rp/person/year |
| Administration Cost | 115% of Personnel cost  | 175% of Personnel cost    |
| Other Cost          | 30% of Personnel cost   | 80% of Personnel cost     |
| Maintenance Cost    | Infrastructure : 1% of the original construction cost<br>Equipment : 5% of the original construction cost |                           |
| Depreciation        | Civil structure : 40 year<br>Equipment : 20 year  |                           |

**2) Revenues**

756. Traffic forecast is summarized in Table 15-G-5. Multi purpose terminal will start to be operated in 2008, first container terminal will start to be operated in 2010, second one in 2012. Demand will reach to capacity in 2013. Therefore, after 2013 are the same as 2013.

**Table 15-G-5 Traffic Forecast**

|      | Foreign Container |             | Domestic Container |             | General & Bag<br>(000ton) |
|------|-------------------|-------------|--------------------|-------------|---------------------------|
|      | FCL (TEU)         | Empty (TEU) | FCL (TEU)          | Empty (TEU) |                           |
| 2008 | 0                 | 0           | 0                  | 0           | 92                        |
| 2009 | 0                 | 0           | 0                  | 0           | 208                       |
| 2010 | 126,000           | 26,000      | 7,000              | 3,000       | 353                       |
| 2011 | 268,000           | 57,000      | 15,000             | 8,000       | 533                       |
| 2012 | 428,000           | 93,000      | 25,000             | 14,000      | 753                       |
| 2013 | 607,000           | 121,000     | 37,000             | 20,000      | 818                       |

757. Study team estimated future average vessel as follows.

**Table 15-G-6 Average vessel**

|                    | Year | GRT    | U/L Box | U/L TEU | U/L (ton) |
|--------------------|------|--------|---------|---------|-----------|
| Foreign Container  | 2010 | 14,000 | 650     | 1,001   | -         |
|                    | 2014 | 18,000 | 730     | 1,132   | -         |
| Domestic Container | 2010 | 4,000  | 198     | 305     | -         |
|                    | 2014 | 4,000  | 198     | 305     | -         |
| General Cargo      | 2010 | 4,700  | -       | -       | 2,437     |
|                    | 2014 | 4,700  | -       | -       | 2,437     |

758. Future calling vessel is calculated as follows.

**Table 15-G-7 Calling Vessel**

|      | Container |          | General |
|------|-----------|----------|---------|
|      | Foreign   | Domestic |         |
| 2008 | 0         | 0        | 41      |
| 2009 | 0         | 0        | 93      |
| 2010 | 153       | 27       | 157     |
| 2011 | 326       | 62       | 238     |
| 2012 | 522       | 105      | 336     |
| 2013 | 727       | 153      | 365     |

759. As for revenue, the study team gave due consideration on the following matters;

- Port tariff should be discounted from the current tariff so that Bojonegara holds competitiveness among ASEAN's major ports. Here, the study team set the tariff in Bojonegara new port as around 60% of the current tariff.
- Private sector who operates container terminal pays royalty to IPC2 according to the gross annual revenue.
- Average revenue per TEU including handling and storage are set as 117% of container handling charge at quay side considering the real situation in Tg.Priok.
- Annual maintenance cost is estimated that infrastructure is 1% of the original construction cost and equipment is 5% of it.
- Depreciation is estimated that civil structure is 40 years and equipment is 20 years.
- Tax is 20% of income.

**Table 15-G-8 Port tariff**

|                 |         | Rate  |   | Charge Unit               | Paid to        |
|-----------------|---------|---|---|---------------------------|----------------|
|                 |         | Domestic  | Foreign   |                           |                |
| Berthage Fee    |         | 48Rp × 60%=28.8Rp                               | 0.111\$ × 60%=0.0666 \$                           | Per GRT per Etmal         | IPC2           |
| Pilot Fee       |         | (28,000Rp+8 × GRT) × 60%<br>=16,800Rp+4.8 × GRT | (34\$+0.01 × GRT) × 60%<br>=20.4\$+0.0066\$ × GRT | Per GRT per ship movement | IPC2           |
| Ship Towage Fee |         | 625,000Rp × 60%<br>=375,000Rp                   | 770\$ × 60%=<br>=462\$                            | Per ship-hour             | IPC2           |
| Handling Charge | 20'     | 240,000Rp × 60% × 117%<br>168,480Rp             | 93\$ × 60% × 117%<br>=65.3\$                      | Per Box (FCL)             | Private Sector |
|                 | 40'     | 360,000Rp × 60% × 117%<br>252,720Rp             | 139\$ × 60% × 117%<br>97.6\$                      | Per Box (FCL)             |                |
|                 | Empty   | 90% of FCL Container                            |   | Per Box                   |                |
|                 | General | 13,694Rp × 60%=8,216Rp                          |   | Per ton                   |                |

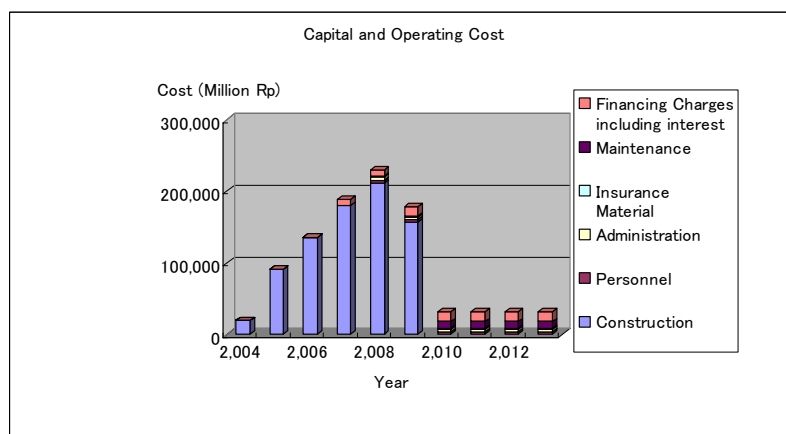
**15-G-4 Public Sector**

**1) Cost**

**760.** Capital and operating cost is shown in Table 15-G-9 and Figure 15-G-1. Operating costs are comprised of salaries and wages, maintenance, insurance, administration.

**Table 15-G-9 Capital and Operating Cost (000,000Rp)**

|       | Construction | Personnel | Administration | Insurance Material | Maintenance | Financing Charges including interest | Sub-total |
|-------|--------------|-----------|----------------|--------------------|-------------|--------------------------------------|-----------|
| 2004  | 19,706       | 0         | 0              | 0                  | 0           | 0                                    | 19,706    |
| 2005  | 91,752       | 0         | 0              | 0                  | 0           | 0                                    | 91,752    |
| 2006  | 135,212      | 0         | 0              | 0                  | 0           | 0                                    | 135,212   |
| 2007  | 180,685      | 0         | 0              | 0                  | 0           | 7,557                                | 188,242   |
| 2008  | 211,786      | 3,600     | 4,140          | 1,080              | 782         | 8,547                                | 229,935   |
| 2009  | 156,843      | 3,600     | 4,140          | 1,080              | 782         | 12,783                               | 179,228   |
| 2010  | 0            | 3,600     | 4,140          | 1,080              | 9,313       | 13,532                               | 31,664    |
| 2011  | 0            | 3,600     | 4,140          | 1,080              | 9,313       | 13,532                               | 31,664    |
| 2012  | 0            | 3,600     | 4,140          | 1,080              | 9,313       | 13,532                               | 31,664    |
| 2013  | 0            | 3,600     | 4,140          | 1,080              | 9,313       | 13,532                               | 31,664    |
| Total | 795,984      | 21,600    | 24,840         | 6,480              | 38,814      | 83,014                               | 951,025   |



**Figure 15-G-1 Capital and Operating Cost**

### a) Debt for Capital Cost

761. Fund raising is divided into foreign and equity. In this study, referring to funding conditions of soft loan by international financial institute, the upper limit of finance for foreign funds is assumed to be the total amount of foreign portion or 85% of initial investment costs, whichever is higher. In the proposal projects, eighty-five percent of initial investment costs is assumed to be raised by foreign fund. The remaining initial investment costs (15%) and all renewal investment are assumed to be raised by equity of self-fund. Conditions of loans are assumed as follows.

➤ Foreign fund

|               |  |
|---------------|--|
| Amount        | : 85% of total cost                              |
| Loan period   | : 30 years, including a grace period of 10 years |
| Interest rate | : 2.0%   |
| Repayment     | : Fixed amount repayment of principal            |

➤ Equity (self-fund)

|        |                     |
|--------|---------------------|
| Amount | : 15% of total cost |
|--------|---------------------|

➤ Weighted average interest rate

$$1.7\% \quad 2.0\% \times 0.85$$

762. Based on capital and operating cost, funding resource is set out as follows. IPC2 should prepare self-fund around 60,000 million Rp to help cashflow shortage during the operating period.

**Table 15-G-10 Financing Schedule (000,000Rp)**

|       | Foreign Loan | Equity  | Revenue | Fund Total | Cost    | Difference |
|-------|--------------|---------|---------|------------|---------|------------|
| 2004  | 19,706       | 0       | 0       | 19,706     | 19,706  | 0          |
| 2005  | 91,752       | 0       | 0       | 91,752     | 91,752  | 0          |
| 2006  | 135,212      | 0       | 0       | 135,212    | 135,212 | 0          |
| 2007  | 180,685      | 0       | 0       | 180,685    | 188,242 | -7,557     |
| 2008  | 211,786      | 0       | 29      | 211,815    | 229,935 | -18,120    |
| 2009  | 37,445       | 119,398 | 67      | 156,910    | 179,228 | -22,318    |
| 2010  | 0            | 0       | 26,505  | 26,505     | 31,664  | -5,159     |
| 2011  | 0            | 0       | 56,645  | 56,645     | 31,664  | 24,980     |
| 2012  | 0            | 0       | 92,374  | 92,374     | 31,664  | 60,709     |
| 2013  | 0            | 0       | 129,244 | 129,244    | 31,664  | 97,580     |
| Total | 676,586      | 119,398 | 304,863 | 1,100,847  | 970,731 | 130,116    |

## 2) Revenue

763. Revenue is calculated by calling ship, cargo volume and tariff. It is assumed that IPC2 receives royalty of 30% of the gross revenue from private sector.

**Table 15-G-11 Revenue of IPC2 (000,000Rp)**

|      | Berthage | Pilot Fee | Ship towage<br>Fee | Royalty | Total   |
|------|----------|-----------|--------------------|---------|---------|
| 2008 | 5        | 3         | 21                 | 0       | 29      |
| 2009 | 12       | 7         | 48                 | 0       | 67      |
| 2010 | 1,341    | 308       | 2,047              | 22,808  | 26,505  |
| 2011 | 2,856    | 652       | 4,327              | 48,810  | 56,645  |
| 2012 | 5,867    | 1,276     | 6,927              | 78,304  | 92,374  |
| 2013 | 8,186    | 1,776     | 9,628              | 109,655 | 129,244 |

### 3) *Evaluation of FIRR*

764. Result of FIRR by the fluctuation is summarized in Table 15-G-12. Since the FIRR exceeds the weighted averaged interest rate in all cases, this project is deemed to be financially viable using foreign soft loan.

**Table 15-G-12 Sensitivity Analysis (Public Sector)**

| Case |         | IPC2<br>(%) |
|------|---------|-------------|
| Cost | Revenue |             |
| 0%   | 0%      | 5.99        |
| 0%   | -10%    | 5.05        |
| +10% | 0%      | 5.29        |
| +10% | -10%    | 4.38        |

### 4) *Financial Statement*

765. Projected financial statements and financial indicators for IPC2 are shown in Table 15-G-13.

**Table 15-G-13 Projected Financial Statement for IPC2**

766. In case of projected IPC2's financial statement, the indicators of cash balance in 2006-2011 are not satisfied. As mentioned above, IPC2 should prepare self-fund to help cashflow shortage in initial stage of the project. On the other hand, in case of projected Terminal operator's financial statement, they are satisfied.

**Bojonegurn Projected  
IPC2**

**Financial Statements (Query is constructed by IPC2)**

| Income Statement            | 2,004 | 2,005 | 2,006 | 2,007 | 2,008  | 2,009  | 2,010  | 2,011  | 2,012  | 2,013  | 2,014  | 2,015  | 2,016  | 2,017   | 2,018   | 2,019   | 2,020   | 2,021   | 2,022   |
|-----------------------------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| Operating Revenue(1)        | 0     | 0     | 0     | 0     | 18,468 | 18,468 | 18,468 | 18,468 | 18,468 | 18,468 | 18,468 | 18,468 | 18,468 | 18,468  | 18,468  | 18,468  | 18,468  | 18,468  | 18,468  |
| Operating Expense(2)        | 0     | 0     | 0     | 0     | 7,740  | 7,740  | 7,740  | 7,740  | 7,740  | 7,740  | 7,740  | 7,740  | 7,740  | 7,740   | 7,740   | 7,740   | 7,740   | 7,740   | 7,740   |
| Personnel & Administration  | 0     | 0     | 0     | 0     | 782    | 782    | 782    | 782    | 782    | 782    | 782    | 782    | 782    | 782     | 782     | 782     | 782     | 782     | 782     |
| Maintenance                 | 0     | 0     | 0     | 0     | 8,866  | 8,866  | 8,866  | 8,866  | 8,866  | 8,866  | 8,866  | 8,866  | 8,866  | 8,866   | 8,866   | 8,866   | 8,866   | 8,866   | 8,866   |
| Depreciation                | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       |
| Others                      | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       |
| Net Operating Income(3=1-2) | 0     | 0     | 0     | 0     | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728  | 10,728  | 10,728  | 10,728  | 10,728  | 10,728  |
| Non Operating Income(d)     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       |
| Non Operating Expense(5)    | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       |
| Bank Interest               | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       |
| Others                      | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       |
| Before Income Tax(6=3+4-5)  | 0     | 0     | 0     | 0     | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728  | 10,728  | 10,728  | 10,728  | 10,728  | 10,728  |
| Dividend Paid(7)            | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       |
| Net Surplus(6-7)            | 0     | 0     | 0     | 0     | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728  | 10,728  | 10,728  | 10,728  | 10,728  | 10,728  |
| Accumulated Earnings        | 0     | 0     | 0     | 0     | 10,728 | 21,456 | 32,184 | 42,912 | 53,640 | 64,368 | 75,096 | 85,824 | 96,552 | 107,280 | 118,008 | 128,736 | 139,464 | 150,192 | 160,920 |

**Cash Flow**

| Year                        | 2,004  | 2,005  | 2,006   | 2,007   | 2,008   | 2,009   | 2,010   | 2,011   | 2,012   | 2,013   | 2,014     | 2,015     | 2,016     | 2,017     | 2,018     | 2,019     | 2,020     | 2,021     | 2,022     |
|-----------------------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Cash Beginning              | 0      | 0      | 0       | 0       | 52,443  | 52,443  | 52,443  | 52,443  | 52,443  | 52,443  | 52,443    | 52,443    | 52,443    | 52,443    | 52,443    | 52,443    | 52,443    | 52,443    | 52,443    |
| Cash Inflow                 | 19,706 | 91,752 | 135,212 | 240,685 | 202,214 | 266,705 | 8,372   | 38,512  | 74,241  | 111,112 | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   |
| Net Operating Income        | 0      | 0      | 0       | 0       | 10,728  | 10,728  | 10,728  | 10,728  | 10,728  | 10,728  | 10,728    | 10,728    | 10,728    | 10,728    | 10,728    | 10,728    | 10,728    | 10,728    | 10,728    |
| Depreciation                | 0      | 0      | 0       | 0       | 8,866   | 8,866   | 8,866   | 8,866   | 8,866   | 8,866   | 8,866     | 8,866     | 8,866     | 8,866     | 8,866     | 8,866     | 8,866     | 8,866     | 8,866     |
| Long-term Loans             | 19,706 | 91,752 | 135,212 | 180,685 | 211,786 | 156,843 | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Equity                      | 0      | 0      | 0       | 0       | 0       | 19,398  | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Net Cash Inflow             | 19,706 | 91,752 | 135,212 | 180,685 | 211,786 | 156,843 | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Investment                  | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Repayment of principal      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Interest on Long-term Loans | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Tax                         | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Dividend Paid               | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Cash Balance                | 0      | 0      | 0       | 0       | 52,443  | 181,220 | 316,932 | 497,517 | 671,758 | 852,870 | 1,033,982 | 1,215,094 | 1,396,206 | 1,577,318 | 1,758,430 | 1,939,542 | 2,120,654 | 2,301,766 | 2,482,878 |
| Cash Ending                 | 0      | 0      | 0       | 0       | 52,443  | 181,220 | 316,932 | 497,517 | 671,758 | 852,870 | 1,033,982 | 1,215,094 | 1,396,206 | 1,577,318 | 1,758,430 | 1,939,542 | 2,120,654 | 2,301,766 | 2,482,878 |

**Balance Sheet**

| Year                          | 2,004  | 2,005  | 2,006   | 2,007   | 2,008   | 2,009   | 2,010  | 2,011  | 2,012  | 2,013  | 2,014  | 2,015  | 2,016  | 2,017  | 2,018  | 2,019  | 2,020  | 2,021  | 2,022  |
|-------------------------------|--------|--------|---------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Current Assets                | 0      | 0      | 0       | 0       | 52,443  | 52,443  | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 |
| Cash & Deposit                | 0      | 0      | 0       | 0       | 52,443  | 52,443  | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 | 52,443 |
| Dividend Advance              | 0      | 0      | 0       | 0       | 0       | 0       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Others                        | 0      | 0      | 0       | 0       | 0       | 0       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Fixed Assets                  | 19,706 | 91,752 | 135,212 | 180,685 | 211,786 | 156,843 | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Total Assets                  | 19,706 | 91,752 | 135,212 | 180,685 | 211,786 | 156,843 | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Liabilities                   | 0      | 0      | 0       | 0       | 0       | 0       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Short-term Loans              | 0      | 0      | 0       | 0       | 0       | 0       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Long-term Loans               | 0      | 0      | 0       | 0       | 0       | 0       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Others                        | 0      | 0      | 0       | 0       | 0       | 0       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Equity                        | 0      | 0      | 0       | 0       | 0       | 0       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Net Worth                     | 0      | 0      | 0       | 0       | 0       | 0       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Total Liabilities & Net Worth | 19,706 | 91,752 | 135,212 | 180,685 | 211,786 | 156,843 | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |

**Financial Indicators**

| Year                        | 2,004   | 2,005   | 2,006   | 2,007   | 2,008  | 2,009  | 2,010 | 2,011 | 2,012 | 2,013 | 2,014 | 2,015 | 2,016 | 2,017 | 2,018 | 2,019 | 2,020 | 2,021 | 2,022 |
|-----------------------------|---------|---------|---------|---------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Rate of Return Fixed Assets | 0.00    | 0.00    | 0.00    | 0.00    | -0.03  | -0.02  | -0.02 | 0.01  | 0.06  | 0.11  | 0.11  | 0.11  | 0.12  | 0.13  | 0.13  | 0.14  | 0.15  | 0.15  | 0.16  |
| Debt Service Coverage Ratio | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 1.12   | 0.75   | 0.62  | 2.85  | 5.49  | 8.21  | 8.21  | 7.65  | 5.82  | 4.32  | 3.22  | 2.49  | 2.42  | 2.46  | 2.49  |
| Operating Ratio             | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 627.68 | 277.68 | 1.78  | 0.83  | 0.51  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  |
| Working Ratio               | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 591.09 | 261.44 | 1.74  | 0.81  | 0.50  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  | 0.36  |

**Bojonegara Projected  
IPC2**

| Income Statement            | Year    |         |         |         |         |         |         |         |           |           |           |           |           |           |           |
|-----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                             | 2023    | 2024    | 2025    | 2026    | 2027    | 2028    | 2029    | 2030    | 2031      | 2032      | 2033      | 2034      | 2035      | 2036      | 2037      |
| Operating Revenue(1)        | 129,244 | 129,244 | 129,244 | 129,244 | 129,244 | 129,244 | 129,244 | 129,244 | 129,244   | 129,244   | 129,244   | 129,244   | 129,244   | 129,244   | 129,244   |
| Operating Expenses(2)       | 47,085  | 47,085  | 47,085  | 47,085  | 47,085  | 47,085  | 47,085  | 47,085  | 47,085    | 47,085    | 47,085    | 47,085    | 47,085    | 47,085    | 47,085    |
| Personnel & Administration  | 7,740   | 7,740   | 7,740   | 7,740   | 7,740   | 7,740   | 7,740   | 7,740   | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     |
| Maintenance                 | 9,313   | 9,313   | 9,313   | 9,313   | 9,313   | 9,313   | 9,313   | 9,313   | 9,313     | 9,313     | 9,313     | 9,313     | 9,313     | 9,313     | 9,313     |
| Depreciation                | 28,952  | 28,952  | 28,952  | 28,952  | 28,952  | 28,952  | 28,952  | 28,952  | 28,952    | 28,952    | 28,952    | 28,952    | 28,952    | 28,952    | 28,952    |
| Others                      | 1,080   | 1,080   | 1,080   | 1,080   | 1,080   | 1,080   | 1,080   | 1,080   | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     |
| Net Operating Income(3=1-2) | 82,160  | 82,160  | 82,160  | 82,160  | 82,160  | 82,160  | 82,160  | 82,160  | 82,160    | 82,160    | 82,160    | 82,160    | 82,160    | 82,160    | 82,160    |
| Non Operating Income(4)     | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Non Operating Expenses(5)   | 10,058  | 9,381   | 8,704   | 8,028   | 7,351   | 6,675   | 5,998   | 5,322   | 4,645     | 3,968     | 3,292     | 2,615     | 1,939     | 1,262     | 717       |
| Bank Interest               | 10,058  | 9,381   | 8,704   | 8,028   | 7,351   | 6,675   | 5,998   | 5,322   | 4,645     | 3,968     | 3,292     | 2,615     | 1,939     | 1,262     | 717       |
| Others                      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Before income Tax(6=3+4-5)  | 71,102  | 72,779  | 73,455  | 74,132  | 74,808  | 75,485  | 76,162  | 76,838  | 77,515    | 78,191    | 78,868    | 79,544    | 80,221    | 80,898    | 81,443    |
| Dividend Paid(7)            | 14,420  | 14,556  | 14,691  | 14,826  | 14,962  | 15,097  | 15,232  | 15,368  | 15,503    | 15,638    | 15,774    | 15,909    | 16,044    | 16,179    | 16,309    |
| Net Surplus(8)              | 57,682  | 58,223  | 58,764  | 59,305  | 59,847  | 60,388  | 60,929  | 61,470  | 62,012    | 62,553    | 63,094    | 63,636    | 64,177    | 64,702    | 65,154    |
| Accumulated Earnings        | 534,458 | 592,681 | 651,445 | 710,751 | 770,597 | 830,985 | 891,914 | 953,385 | 1,015,397 | 1,077,950 | 1,141,044 | 1,204,679 | 1,268,856 | 1,333,559 | 1,398,713 |

| Cash Flow                   | Year    |         |         |         |           |           |           |           |           |           |           |           |           |           |           |
|-----------------------------|---------|---------|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                             | 2023    | 2024    | 2025    | 2026    | 2027      | 2028      | 2029      | 2030      | 2031      | 2032      | 2033      | 2034      | 2035      | 2036      | 2037      |
| Cash Beginning              | 757,184 | 809,988 | 863,334 | 917,221 | 971,649   | 1,026,619 | 1,082,130 | 1,138,182 | 1,194,776 | 1,251,910 | 1,309,586 | 1,367,804 | 1,426,562 | 1,486,847 | 1,552,246 |
| Cash Inflow                 | 111,112 | 111,112 | 111,112 | 111,112 | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   | 111,112   |
| Net Operating Income        | 82,160  | 82,160  | 82,160  | 82,160  | 82,160    | 82,160    | 82,160    | 82,160    | 82,160    | 82,160    | 82,160    | 82,160    | 82,160    | 82,160    | 82,160    |
| Non Operating Income        | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Depreciation                | 28,952  | 28,952  | 28,952  | 28,952  | 28,952    | 28,952    | 28,952    | 28,952    | 28,952    | 28,952    | 28,952    | 28,952    | 28,952    | 28,952    | 28,952    |
| Long-term Loans             | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Equity                      | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Cash Outflow                | 58,307  | 57,766  | 57,225  | 56,684  | 56,142    | 55,601    | 55,060    | 54,518    | 53,977    | 53,436    | 52,895    | 52,353    | 51,812    | 51,271    | 50,730    |
| Investment                  | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Repayment of principal      | 33,829  | 33,829  | 33,829  | 33,829  | 33,829    | 33,829    | 33,829    | 33,829    | 33,829    | 33,829    | 33,829    | 33,829    | 33,829    | 33,829    | 33,829    |
| Interest on Long-term Loans | 10,058  | 9,381   | 8,704   | 8,028   | 7,351     | 6,675     | 5,998     | 5,322     | 4,645     | 3,968     | 3,292     | 2,615     | 1,939     | 1,262     | 717       |
| Tax                         | 14,420  | 14,556  | 14,691  | 14,826  | 14,962    | 15,097    | 15,232    | 15,368    | 15,503    | 15,638    | 15,774    | 15,909    | 16,044    | 16,179    | 16,309    |
| Dividend Paid               | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                      | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Cash Balance                | 52,805  | 53,346  | 53,887  | 54,428  | 54,970    | 55,511    | 56,052    | 56,593    | 57,135    | 57,676    | 58,217    | 58,759    | 59,299    | 60,398    | 61,443    |
| Cash Ending                 | 809,988 | 863,334 | 917,221 | 971,649 | 1,026,619 | 1,082,130 | 1,138,182 | 1,194,776 | 1,251,910 | 1,309,586 | 1,367,804 | 1,426,562 | 1,486,847 | 1,552,246 | 1,624,856 |

| Balance Sheet                 | Year      |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                               | 2023      | 2024      | 2025      | 2026      | 2027      | 2028      | 2029      | 2030      | 2031      | 2032      | 2033      | 2034      | 2035      | 2036      | 2037      |
| Current Assets                | 809,988   | 863,334   | 917,221   | 971,649   | 1,026,619 | 1,082,130 | 1,138,182 | 1,194,776 | 1,251,910 | 1,309,586 | 1,367,804 | 1,426,562 | 1,486,847 | 1,552,246 | 1,624,856 |
| Cash & Deposit                | 809,988   | 863,334   | 917,221   | 971,649   | 1,026,619 | 1,082,130 | 1,138,182 | 1,194,776 | 1,251,910 | 1,309,586 | 1,367,804 | 1,426,562 | 1,486,847 | 1,552,246 | 1,624,856 |
| Dividend Advance              | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                        | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Fixed Assets                  | 472,612   | 445,660   | 414,707   | 385,755   | 356,803   | 327,850   | 298,898   | 269,946   | 240,993   | 212,041   | 183,089   | 154,137   | 125,184   | 96,232    | 67,280    |
| Total Assets                  | 1,282,600 | 1,309,994 | 1,331,928 | 1,357,404 | 1,383,422 | 1,409,980 | 1,437,080 | 1,464,722 | 1,492,903 | 1,521,627 | 1,550,893 | 1,580,699 | 1,611,031 | 1,641,478 | 1,672,136 |
| Liabilities                   | 568,744   | 534,915   | 501,086   | 467,256   | 433,427   | 399,598   | 365,768   | 331,939   | 298,110   | 264,280   | 230,451   | 196,622   | 162,793   | 128,964   | 95,135    |
| Short-term Loans              | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Long-term Loans               | 568,744   | 534,915   | 501,086   | 467,256   | 433,427   | 399,598   | 365,768   | 331,939   | 298,110   | 264,280   | 230,451   | 196,622   | 162,793   | 128,964   | 95,135    |
| Others                        | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Equity                        | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   | 179,398   |
| Net Worth                     | 534,458   | 592,681   | 651,445   | 710,751   | 770,597   | 830,985   | 891,914   | 953,385   | 1,015,397 | 1,077,950 | 1,141,044 | 1,204,679 | 1,268,856 | 1,333,559 | 1,398,713 |
| Total Liabilities & Net Worth | 1,282,600 | 1,309,994 | 1,331,928 | 1,357,404 | 1,383,422 | 1,409,980 | 1,437,080 | 1,464,722 | 1,492,903 | 1,521,627 | 1,550,893 | 1,580,699 | 1,611,031 | 1,641,478 | 1,672,136 |

| Financial Indicators        | Year |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                             | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 |
| Rate of Return Fixed Assets | 0.17 | 0.19 | 0.20 | 0.21 | 0.23 | 0.25 | 0.27 | 0.30 | 0.34 | 0.39 | 0.45 | 0.53 | 0.66 | 0.85 | 1.23 |
| Debt Service Coverage Ratio | 2.53 | 2.57 | 2.61 | 2.65 | 2.70 | 2.74 | 2.79 | 2.84 | 2.89 | 2.94 | 2.99 | 3.05 | 3.19 | 3.70 | 5.00 |
| Operating Ratio             | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 |
| Working Ratio               | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 |



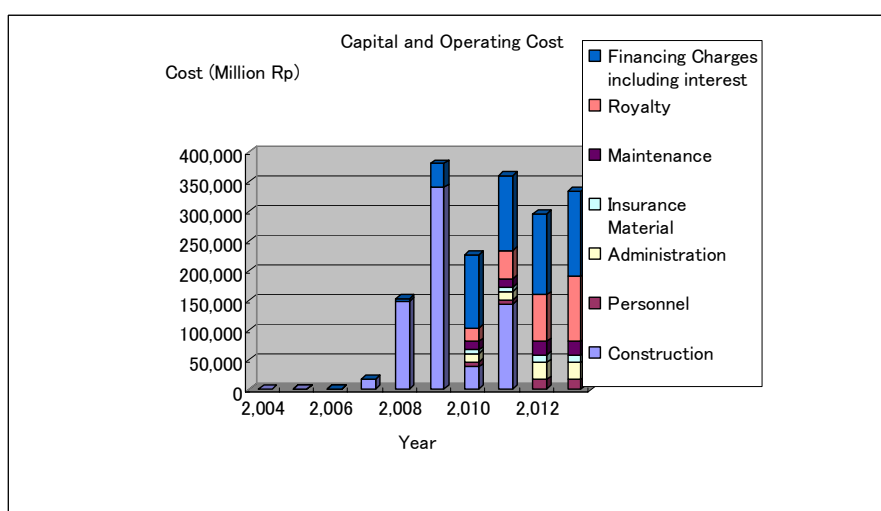
**15-G-5 Private Sector**

**1) Cost**

767. Capital and operating cost is shown in Table 15-G-14 and Figure 15-G-2. Operating costs are comprised of salaries and wages, maintenance, insurance, administration and royalty. Private sector pays royalty of 30% of gross revenue to IPC2.

**Table 15-G-14 Capital and Operating Cost (000,000Rp)**

|       | Construction | Personnel | Administration | Insurance Material | Maintenance | Royalty | Financing Charges including interest | Sub-total |
|-------|--------------|-----------|----------------|--------------------|-------------|---------|--------------------------------------|-----------|
| 2004  | 0            |           |                |                    |             |         |                                      | 0         |
| 2005  | 0            | 0         | 0              | 0                  | 0           | 0       | 0                                    | 0         |
| 2006  | 199          | 0         | 0              | 0                  | 0           | 0       | 0                                    | 199       |
| 2007  | 17,053       | 0         | 0              | 0                  | 0           | 0       | 20                                   | 17,073    |
| 2008  | 149,052      | 0         | 0              | 0                  | 0           | 0       | 4,310                                | 153,362   |
| 2009  | 340,484      | 0         | 0              | 0                  | 0           | 0       | 41,314                               | 381,798   |
| 2010  | 37,922       | 8,100     | 14,175         | 6,480              | 14,205      | 22,808  | 123,941                              | 227,631   |
| 2011  | 143,367      | 8,100     | 14,175         | 6,480              | 14,205      | 48,810  | 125,819                              | 360,956   |
| 2012  | 0            | 16,200    | 28,350         | 12,960             | 23,205      | 78,304  | 137,752                              | 296,770   |
| 2013  | 0            | 16,200    | 28,350         | 12,960             | 23,205      | 109,655 | 144,951                              | 335,321   |
| Total | 688,077      | 48,600    | 85,050         | 38,880             | 74,819      | 259,576 | 578,107                              | 1,773,110 |



**Figure 15-G-2 Capital and Operating Cost**

**2) Equity and Debt for Capital Cost**

768. Initial investment cost is assumed to be raised by domestic fund. Condition of loans are assumed as follows.

- Domestic fund
  - Amount : 90% of total cost
  - Loan period : 10 years
  - Interest rate : 15.0%
  - Repayment : Fixed amount repayment of principal
- Equity (self-fund)

Amount : 10% of total cost

➤ Weighted average interest rate

13.5 % 15.0% × 0.90

**Table 15-G-15 Financing Schedule (000,000Rp)**

|       | Domestic Loan | Equity | Revenue | Fund Total | Cost      | Difference |
|-------|---------------|--------|---------|------------|-----------|------------|
| 2004  | 0             | 0      | 0       | 0          | 0         | 0          |
| 2005  | 0             | 0      | 0       | 0          | 0         | 0          |
| 2006  | 199           | 0      | 0       | 199        | 199       | 0          |
| 2007  | 17,053        | 0      | 0       | 17,053     | 17,073    | -20        |
| 2008  | 149,052       | 0      | 0       | 149,052    | 153,362   | -4,310     |
| 2009  | 340,484       | 0      | 0       | 340,484    | 381,798   | -41,314    |
| 2010  | 37,922        | 0      | 76,028  | 113,950    | 227,631   | -113,681   |
| 2011  | 74,559        | 68,808 | 162,698 | 306,065    | 360,956   | -54,890    |
| 2012  | 0             | 0      | 261,012 | 261,012    | 296,770   | -35,758    |
| 2013  | 0             | 0      | 365,515 | 365,515    | 335,321   | 30,195     |
| Total | 619,269       | 68,808 | 865,253 | 1,553,330  | 1,773,110 | -219,779   |

769. it is assumed that private sector prepares equity. The purpose of this fund is to help cashflow shortage during operating period. The equity is set 250,000 million Rp as 40% of capital cost.

### 3) Revenue

770. Revenue is calculated by calling ship, cargo volume and tariff.

**Table 15-G-16 Revenue of Private Sector (000,000Rp)**

| Year | Handling Charge |
|------|-----------------|
| 2010 | 76,028          |
| 2011 | 162,698         |
| 2012 | 261,012         |
| 2013 | 365,515         |

### 4) Evaluation of FIRR

771. Result of FIRR by the fluctuation is summarized in Table 15-G-17. Since the FIRR exceeds the weighted averaged interest rate in all cases, this project is deemed to be financially viable.

**Table 15-G-17 Sensitivity Analysis (Private Sector)**

| Case |         | Private Sector (%) |
|------|---------|--------------------|
| Cost | Revenue |                    |
| 0%   | 0%      | 18.68              |
| 0%   | -10%    | 15.12              |
| +10% | 0%      | 17.22              |
| +10% | -10%    | 13.91              |

### 5) Financial Statement

772. Projected financial statements and financial indicators for Private sector are shown in Table 15-G-18.

**Table 15-G-18 Projected Financial Statement for private sector**

**Rojomegara Projected  
Private Sector  
Income Statement**

Financial Statements (Query is constructed by PC2)  
000,000Rp

| Year                        | 2,005 | 2,006 | 2,007 | 2,008 | 2,009  | 2,010   | 2,011    | 2,012    | 2,013   | 2,014   | 2,015   | 2,016   | 2,017   | 2,018   | 2,019   | 2,020   | 2,021   | 2,022   |
|-----------------------------|-------|-------|-------|-------|--------|---------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Operating Revenue(1)        | 0     | 0     | 0     | 0     | 76,028 | 162,698 | 261,012  | 365,515  | 365,515 | 365,515 | 365,515 | 365,515 | 365,515 | 365,515 | 365,515 | 365,515 | 365,515 | 365,515 |
| Operating Expenses(2)       | 0     | 0     | 0     | 0     | 85,183 | 111,184 | 179,333  | 210,684  | 210,684 | 210,684 | 210,684 | 210,684 | 210,684 | 210,684 | 210,684 | 210,684 | 210,684 | 210,684 |
| Personnel & Administration  | 0     | 0     | 0     | 0     | 22,275 | 22,275  | 44,550   | 44,550   | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  |
| Maintenance                 | 0     | 0     | 0     | 0     | 19,415 | 19,415  | 20,315   | 20,315   | 20,315  | 20,315  | 20,315  | 20,315  | 20,315  | 20,315  | 20,315  | 20,315  | 20,315  | 20,315  |
| Depreciation                | 0     | 0     | 0     | 0     | 6,480  | 6,480   | 12,960   | 12,960   | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  |
| Royalty                     | 0     | 0     | 0     | 0     | 22,808 | 48,810  | 78,304   | 109,655  | 109,655 | 109,655 | 109,655 | 109,655 | 109,655 | 109,655 | 109,655 | 109,655 | 109,655 | 109,655 |
| Net Operating Income(3=1-2) | 0     | 0     | 0     | 0     | -9,155 | 51,514  | 81,679   | 154,831  | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 |
| Non Operating Income(4)     | 0     | 0     | 0     | 0     | 0      | 0       | 0        | 0        | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Non Operating Expenses(5)   | 0     | 0     | 0     | 0     | 2,585  | 24,684  | 73,262   | 65,073   | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  |
| Bank Interest               | 0     | 0     | 0     | 0     | 2,585  | 24,684  | 73,262   | 65,073   | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  | 65,073  |
| Others                      | 0     | 0     | 0     | 0     | 0      | 0       | 0        | 0        | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Before income Tax(6=3+4-5)  | 0     | 0     | 0     | 0     | -2,585 | -24,684 | -82,417  | -99,788  | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 |
| Income Tax(7)               | 0     | 0     | 0     | 0     | 0      | 0       | 0        | 0        | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Net Surplus(6-7)            | 0     | 0     | 0     | 0     | -2,585 | -24,684 | -82,417  | -99,788  | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 | -99,788 |
| Accumulated Earnings        | 0     | 0     | 0     | 0     | -2,585 | -27,269 | -120,520 | -123,666 | -51,859 | 27,379  | 114,048 | 208,148 | 309,686 | 418,641 | 534,825 | 656,446 | 780,310 | 904,175 |

**Cash Flow**

| Year                        | 2,005 | 2,006 | 2,007   | 2,008   | 2,009   | 2,010   | 2,011   | 2,012   | 2,013   | 2,014   | 2,015   | 2,016   | 2,017   | 2,018   | 2,019   | 2,020   | 2,021   | 2,022   |
|-----------------------------|-------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Cash Beginning              | 0     | 0     | 0       | 0       | 249,980 | 245,670 | 204,356 | 90,675  | 30,221  | 67,846  | 112,903 | 165,392 | 225,331 | 294,404 | 385,607 | 516,294 | 653,018 | 797,197 |
| Cash Inflow                 | 0     | 199   | 267,051 | 149,052 | 340,484 | 48,182  | 214,296 | 101,994 | 175,146 | 175,146 | 175,146 | 175,146 | 175,146 | 175,146 | 175,146 | 175,146 | 175,146 | 175,146 |
| Net Operating Income        | 0     | 0     | 0       | 0       | -9,155  | 51,514  | 81,679  | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 | 154,831 |
| Depreciation                | 0     | 0     | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Long-term Loans             | 0     | 199   | 17,053  | 149,052 | 340,484 | 37,922  | 74,559  | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Equity                      | 0     | 0     | 250,000 | 0       | 0       | 0       | 68,808  | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Cash Outflow                | 0     | 199   | 17,073  | 153,362 | 381,798 | 161,863 | 269,186 | 137,732 | 144,951 | 137,520 | 130,089 | 122,657 | 115,206 | 106,072 | 83,943  | 44,459  | 38,422  | 30,966  |
| Investment                  | 0     | 199   | 17,053  | 149,052 | 340,484 | 37,922  | 143,367 | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Repayment of principal      | 0     | 0     | 20      | 0       | 1,725   | 16,630  | 50,679  | 54,471  | 61,927  | 61,927  | 61,927  | 61,927  | 61,907  | 60,202  | 45,297  | 11,248  | 7,456   | 0       |
| Interest on Long-term Loans | 0     | 0     | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Dividend Paid               | 0     | 0     | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Tax                         | 0     | 0     | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Others                      | 0     | 0     | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Cash Balance                | 0     | 0     | 249,980 | -4,310  | -11,314 | -13,681 | -54,890 | -35,758 | 30,195  | 37,626  | 45,057  | 52,448  | 59,939  | 69,074  | 91,203  | 130,687 | 136,724 | 144,180 |
| Cash Ending                 | 0     | 0     | 249,980 | 245,670 | 204,356 | 90,675  | 35,784  | 26      | 30,221  | 67,846  | 112,903 | 165,392 | 225,331 | 294,404 | 385,607 | 516,294 | 653,018 | 797,197 |

**Balance Sheet**

| Year                          | 2,005 | 2,006 | 2,007   | 2,008   | 2,009   | 2,010   | 2,011   | 2,012   | 2,013   | 2,014   | 2,015   | 2,016   | 2,017   | 2,018   | 2,019   | 2,020   | 2,021     | 2,022     |
|-------------------------------|-------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|
| Current Assets                | 0     | 0     | 249,980 | 245,670 | 204,356 | 90,675  | 35,784  | 26      | 30,221  | 67,846  | 112,903 | 165,392 | 225,331 | 294,404 | 385,607 | 516,294 | 653,018   | 797,197   |
| Cash & Deposit                | 0     | 0     | 249,980 | 245,670 | 204,356 | 90,675  | 35,784  | 26      | 30,221  | 67,846  | 112,903 | 165,392 | 225,331 | 294,404 | 385,607 | 516,294 | 653,018   | 797,197   |
| Dividend Advance              | 0     | 0     | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         |
| Others                        | 0     | 0     | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         |
| Fixed Assets                  | 0     | 0     | 17,053  | 166,105 | 506,589 | 525,096 | 649,049 | 628,734 | 608,419 | 588,104 | 567,790 | 547,475 | 527,160 | 506,845 | 486,531 | 466,216 | 445,901   | 425,587   |
| Total Assets                  | 0     | 0     | 267,033 | 411,775 | 710,945 | 615,771 | 684,833 | 628,668 | 638,640 | 655,951 | 680,693 | 712,867 | 752,491 | 801,250 | 872,138 | 982,510 | 1,098,919 | 1,222,784 |
| Liabilities                   | 0     | 0     | 17,033  | 164,300 | 488,214 | 475,457 | 495,545 | 433,618 | 371,691 | 309,764 | 247,837 | 185,910 | 124,003 | 63,802  | 18,505  | 7,257   | 0         | 0         |
| Short-term Loans              | 0     | 0     | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         |
| Long-term Loans               | 0     | 0     | 17,033  | 164,300 | 488,214 | 475,457 | 495,545 | 433,618 | 371,691 | 309,764 | 247,837 | 185,910 | 124,003 | 63,802  | 18,505  | 7,257   | 0         | 0         |
| Others                        | 0     | 0     | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         |
| Equity                        | 0     | 0     | 250,000 | 250,000 | 250,000 | 250,000 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808   | 318,808   |
| Net Worth                     | 0     | 0     | 250,000 | 250,000 | 250,000 | 250,000 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808 | 318,808   | 318,808   |
| Total Liabilities & Net Worth | 0     | 0     | 267,033 | 411,775 | 710,945 | 615,771 | 684,833 | 628,668 | 638,640 | 655,951 | 680,693 | 712,867 | 752,491 | 801,250 | 872,138 | 982,510 | 1,098,919 | 1,222,784 |

**Financial Indicators**

|                             | 2,005 | 2,006 | 2,007 | 2,008 | 2,009 | 2,010 | 2,011 | 2,012 | 2,013 | 2,014 | 2,015 | 2,016 | 2,017 | 2,018 | 2,019 | 2,020 | 2,021 | 2,022 |
|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Rate of Return/Fixed Assets |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Debt Service Coverage Ratio |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Operating Ratio             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Working Ratio               |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |

**Bojonegara Projected  
Private Sector**

| Year                        | 2023      | 2024      | 2025      | 2026      | 2027      | 2028      | 2029      | 2030      | 2031      | 2032      | 2033      | 2034      | 2035      | 2036      | 2037      |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Operating Revenue(1)        | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   | 365,515   |
| Operating Expenses(2)       | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   | 210,684   |
| Personnel & Administration  | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    |
| Maintenance                 | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    | 23,205    |
| Depreciation                | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    | 20,315    |
| Others                      | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    |
| Royalty                     | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   | 109,655   |
| Net Operating Income(3=1-2) | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   |
| Non-Operating Income(4)     | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Non-Operating Expenses(5)   | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Bank Interest               | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                      | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Before Income Tax(6=3+4-5)  | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   |
| Income Tax(7)               | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    |
| Net Surplus(8=7)            | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   | 123,865   |
| Accumulated Earnings        | 1,028,040 | 1,151,905 | 1,275,770 | 1,399,634 | 1,523,499 | 1,647,364 | 1,771,229 | 1,895,094 | 2,018,958 | 2,142,823 | 2,266,688 | 2,390,553 | 2,514,418 | 2,638,282 | 2,762,147 |

| Year                        | 2023    | 2024      | 2025      | 2026      | 2027      | 2028      | 2029      | 2030      | 2031      | 2032      | 2033      | 2034      | 2035      | 2036      | 2037      |
|-----------------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Cash Beginning              | 797,197 | 941,377   | 1,085,556 | 1,229,736 | 1,373,915 | 1,518,095 | 1,662,275 | 1,806,454 | 1,950,634 | 2,094,813 | 2,238,993 | 2,383,172 | 2,527,352 | 2,671,531 | 2,815,711 |
| Cash Inflow                 | 175,146 | 175,146   | 175,146   | 175,146   | 175,146   | 175,146   | 175,146   | 175,146   | 175,146   | 175,146   | 175,146   | 175,146   | 175,146   | 175,146   | 175,146   |
| Net Operating Income        | 154,831 | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   | 154,831   |
| Depreciation                | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Long-term Loans             | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Equity                      | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Cash Outflow                | 30,966  | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    |
| Investment                  | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Repayment of principal      | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Interest on Long-term Loans | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Dividend Paid               | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Tax                         | 30,966  | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    | 30,966    |
| Others                      | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Cash Balance                | 144,180 | 144,180   | 144,180   | 144,180   | 144,180   | 144,180   | 144,180   | 144,180   | 144,180   | 144,180   | 144,180   | 144,180   | 144,180   | 144,180   | 144,180   |
| Cash Ending                 | 941,377 | 1,085,556 | 1,229,736 | 1,373,915 | 1,518,095 | 1,662,275 | 1,806,454 | 1,950,634 | 2,094,813 | 2,238,993 | 2,383,172 | 2,527,352 | 2,671,531 | 2,815,711 | 2,959,890 |

| Year                          | 2023      | 2024      | 2025      | 2026      | 2027      | 2028      | 2029      | 2030      | 2031      | 2032      | 2033      | 2034      | 2035      | 2036      | 2037      |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Current Assets                | 941,377   | 1,085,556 | 1,229,736 | 1,373,915 | 1,518,095 | 1,662,275 | 1,806,454 | 1,950,634 | 2,094,813 | 2,238,993 | 2,383,172 | 2,527,352 | 2,671,531 | 2,815,711 | 2,959,890 |
| Cash & Deposit                | 941,377   | 1,085,556 | 1,229,736 | 1,373,915 | 1,518,095 | 1,662,275 | 1,806,454 | 1,950,634 | 2,094,813 | 2,238,993 | 2,383,172 | 2,527,352 | 2,671,531 | 2,815,711 | 2,959,890 |
| Dividend Advance              | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                        | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Fixed Assets                  | 485,272   | 384,957   | 364,642   | 344,328   | 324,013   | 303,698   | 283,384   | 263,069   | 242,754   | 222,439   | 202,125   | 181,810   | 161,495   | 141,180   | 120,865   |
| Total Assets                  | 1,346,649 | 1,470,513 | 1,594,378 | 1,718,243 | 1,842,108 | 1,965,973 | 2,089,838 | 2,213,702 | 2,337,567 | 2,461,432 | 2,585,297 | 2,709,161 | 2,833,026 | 2,956,891 | 3,080,756 |
| Liabilities                   | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Short-term Loans              | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Long-term Loans               | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                        | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Equity                        | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   | 318,808   |
| Net Worth                     | 1,028,040 | 1,151,905 | 1,275,770 | 1,399,634 | 1,523,499 | 1,647,364 | 1,771,229 | 1,895,094 | 2,018,958 | 2,142,823 | 2,266,688 | 2,390,553 | 2,514,418 | 2,638,282 | 2,762,147 |
| Total Liabilities & Net Worth | 1,346,648 | 1,470,713 | 1,594,577 | 1,718,442 | 1,842,307 | 1,966,172 | 2,090,037 | 2,213,901 | 2,337,766 | 2,461,631 | 2,585,496 | 2,709,360 | 2,833,225 | 2,957,090 | 3,080,955 |

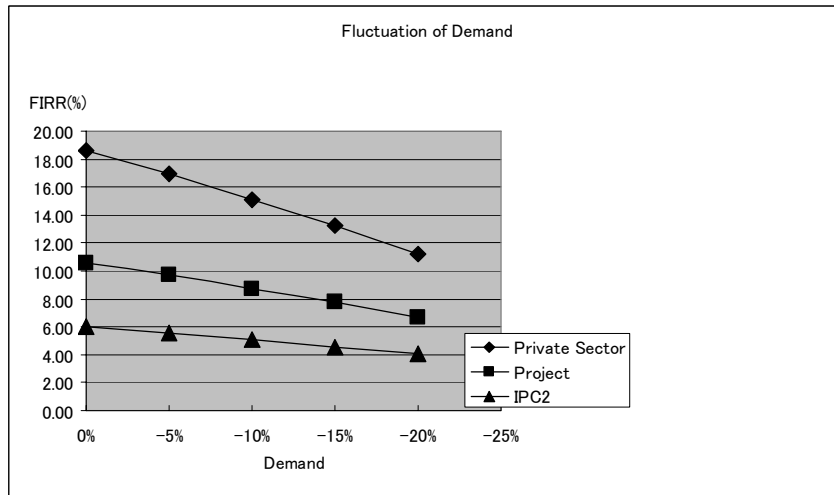
| Financial Indicators        | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Rate of Return Fixed Assets | 0.38 | 0.40 | 0.42 | 0.45 | 0.48 | 0.51 | 0.55 | 0.59 | 0.64 | 0.70 | 0.77 | 0.84 | 0.91 | 0.98 | 1.04 |
| Debt Service Coverage Ratio | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 |
| Operating Ratio             | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 |
| Working Ratio               | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 |

773. In case of projected Terminal operator’s financial statement, they are also satisfied. As mentioned above, the financial condition will be satisfactory regarding Bojonegara project.

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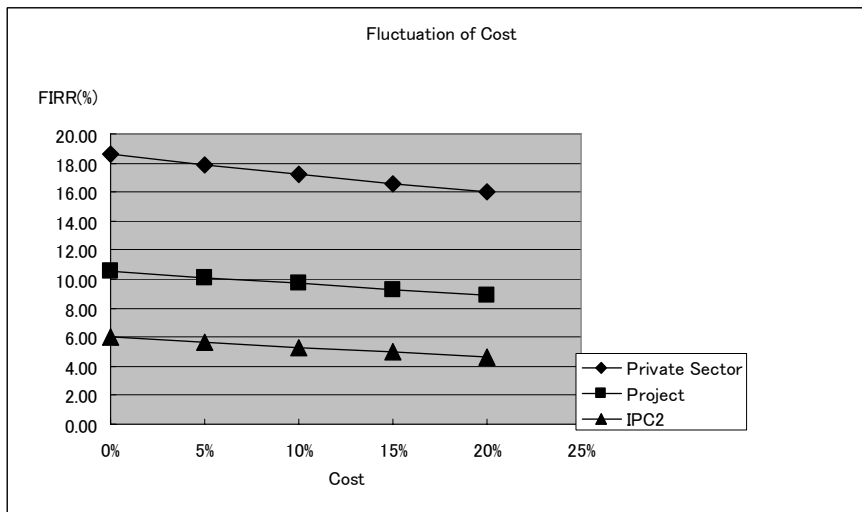
**15-G-6 Sensitivity Analysis**

775. Result of fluctuation of demand, cost and royalty are shown in as follows.



776.

**Figure 15-G-3 Fluctuation of Demand**



**Figure 15-G-4 Fluctuation of Cost**

**15-G-7 Optional Case**

**1) Assumption**

777. The study team examined an alternative implementation scheme as shown in , Table 15-G-19 in which the responsibility for quay construction and reclamation for the container terminal would be in the hands of the in private sector.

**Table 15-G-19 Implementation Scheme**

| Facility                |                        | Central Government | IPC2 | Private Sector |
|-------------------------|------------------------|--------------------|------|----------------|
| Breakwater              |                        |                    |      |                |
| Access Channel          |                        |                    |      |                |
| Inner Channel and Basin |                        |                    |      |                |
| Container Terminal      | Quay                   |                    |      |                |
|                         | Reclamation            |                    |      |                |
|                         | Pavement               |                    |      |                |
|                         | Utility and Facilities |                    |      |                |
|                         | Gantry Crane           |                    |      |                |
|                         | Equipment              |                    |      |                |
| Multi Terminal          |                        |                    |      |                |
| Port-related Road       |                        |                    |      |                |

778. Capital cost is summarized as follows.

**Table 15-G-20 Capital Cost (000Rp)**

| Year  | Central Government | IPC2        | Terminal Operator | Total         |
|-------|--------------------|-------------|-------------------|---------------|
| 2004  | 6,356,000          | 19,706,000  | 0                 | 26,062,000    |
| 2005  | 6,980,000          | 91,752,000  | 0                 | 98,732,000    |
| 2006  | 7,339,000          | 135,212,000 | 199,000           | 142,750,000   |
| 2007  | 110,055,000        | 139,544,000 | 64,376,000        | 313,975,000   |
| 2008  | 146,348,000        | 83,315,000  | 286,375,000       | 516,038,000   |
| 2009  | 63,342,000         | 58,689,000  | 445,292,000       | 567,323,000   |
| 2010  | 0                  | 0           | 37,922,000        | 37,922,000    |
| 2011  | 0                  | 0           | 143,367,000       | 143,367,000   |
| Total | 340,420,000        | 528,218,000 | 977,531,000       | 1,846,169,000 |

## 2) *Public Sector (IPC2)*

### a) *Cost*

779. Capital and operating cost is shown in Table 15-G-21 and Figure 15-G-5. Operating costs are comprised of salaries and wages, maintenance, insurance, administration.

**Table 15-G-21 Capital and Operating Cost (000,000Rp)**

|       | Construction | Personnel | Administration | Insurance Material | Maintenance | Financing Charges including interest | Sub-total |
|-------|--------------|-----------|----------------|--------------------|-------------|--------------------------------------|-----------|
| 2004  | 19,706       | 0         | 0              | 0                  | 0           | 0                                    | 19,706    |
| 2005  | 91,752       | 0         | 0              | 0                  | 0           | 0                                    | 91,752    |
| 2006  | 135,212      | 0         | 0              | 0                  | 0           | 0                                    | 135,212   |
| 2007  | 139,544      | 0         | 0              | 0                  | 0           | 7,557                                | 147,101   |
| 2008  | 83,315       | 3,600     | 4,140          | 1,080              | 2,962       | 7,724                                | 102,821   |
| 2009  | 58,689       | 3,600     | 4,140          | 1,080              | 2,962       | 8,980                                | 79,451    |
| 2010  | 0            | 3,600     | 4,140          | 1,080              | 8,426       | 8,980                                | 26,225    |
| 2011  | 0            | 3,600     | 4,140          | 1,080              | 8,426       | 8,980                                | 26,225    |
| 2012  | 0            | 3,600     | 4,140          | 1,080              | 8,426       | 8,980                                | 26,225    |
| 2013  | 0            | 3,600     | 4,140          | 1,080              | 8,426       | 8,980                                | 26,225    |
| Total | 528,218      | 21,600    | 24,840         | 6,480              | 39,627      | 60,179                               | 680,944   |

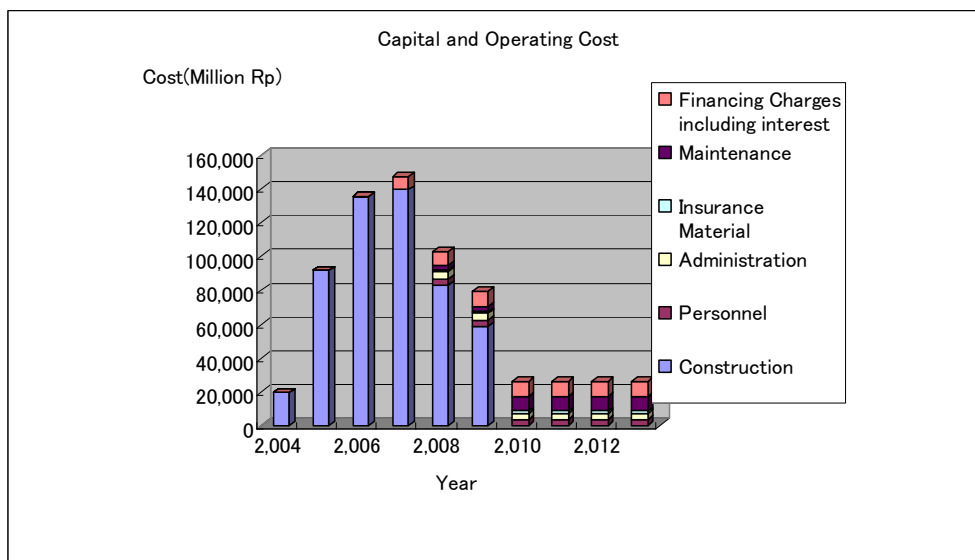


Figure 15-G-5 Capital and Operating Cost

780. Based on capital cost, funding resource is set out as follows. IPC2 should prepare self-fund around 50,000 million Rp to help cashflow shortage during the operating period. The amount of the self-fund is smaller than that in the basic implementation scheme, however, not considerable amount.

Table 15-G-22 Financing Schedule (000,000Rp)

|       | Foreign Loan | Equity | Revenue | Fund Total | Cost    | Difference |
|-------|--------------|--------|---------|------------|---------|------------|
| 2004  | 19,706       | 0      | 0       | 19,706     | 19,706  | 0          |
| 2005  | 91,752       | 0      | 0       | 91,752     | 91,752  | 0          |
| 2006  | 135,212      | 0      | 0       | 135,212    | 135,212 | 0          |
| 2007  | 139,544      | 0      | 0       | 139,544    | 147,101 | -7,557     |
| 2008  | 62,771       | 20,544 | 28      | 83,343     | 102,821 | -19,478    |
| 2009  | 0            | 58,689 | 64      | 58,753     | 79,451  | -20,697    |
| 2010  | 0            | 0      | 25,646  | 25,646     | 26,225  | -580       |
| 2011  | 0            | 0      | 54,809  | 54,809     | 26,225  | 28,583     |
| 2012  | 0            | 0      | 89,311  | 89,311     | 26,225  | 63,086     |
| 2013  | 0            | 0      | 124,955 | 124,955    | 26,225  | 98,730     |
| Total | 448,985      | 79,233 | 294,814 | 823,032    | 680,944 | 142,087    |

b) Evaluation of FIRR

781. Result of FIRR by the fluctuation is summarized in Table 15-G-23. Since the FIRR exceeds the weighted averaged interest rate in all cases, this project is deemed to be financially viable.

Table 15-G-23 Sensitivity Analysis (Public Sector) (Optional Case)

| Case |         | IPC2 (%) |
|------|---------|----------|
| Cost | Revenue |          |
| 0%   | 0%      | 7.78     |
| 0%   | -10%    | 6.79     |
| +10% | 0%      | 7.04     |
| +10% | -10%    | 6.08     |

c) *Financial Statement*

782. Projected financial statements and financial indicators for IPC2 are shown in Table 15-G-24.

**Table 15-G-24 Projected Financial Statement for IPC2**

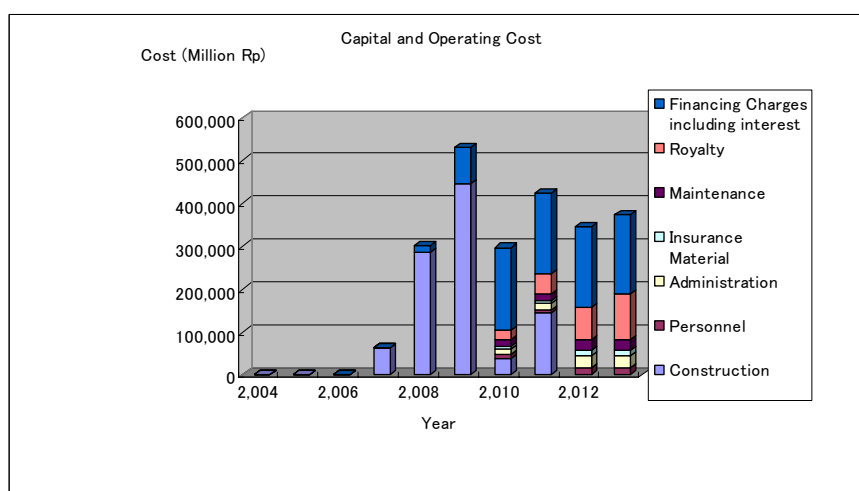
3) *Private Sector*

a) *Cost*

783. Capital cost is shown in Table 15-G-25 and Figure 15-G-6. It is assumed that private sector pays royalty of 30% of the annual gross revenue to IPC2.

**Table 15-G-25 Operating Cost (000,000Rp)**

|       | Construction | Personnel | Administration | Insurance Material | Maintenance | Royalty | Financing Charges including interest | Sub-total |
|-------|--------------|-----------|----------------|--------------------|-------------|---------|--------------------------------------|-----------|
| 2004  | 0            | 0         | 0              | 0                  | 0           | 0       | 0                                    | 0         |
| 2005  | 0            | 0         | 0              | 0                  | 0           | 0       | 0                                    | 0         |
| 2006  | 199          | 0         | 0              | 0                  | 0           | 0       | 0                                    | 199       |
| 2007  | 64,376       | 0         | 0              | 0                  | 0           | 0       | 0                                    | 64,376    |
| 2008  | 286,375      | 0         | 0              | 0                  | 0           | 0       | 16,094                               | 302,469   |
| 2009  | 445,292      | 0         | 0              | 0                  | 0           | 0       | 86,722                               | 532,014   |
| 2010  | 37,922       | 8,100     | 14,175         | 6,480              | 15,253      | 22,073  | 192,784                              | 296,786   |
| 2011  | 143,367      | 8,100     | 14,175         | 6,480              | 15,253      | 47,235  | 190,324                              | 424,934   |
| 2012  | 0            | 16,200    | 28,350         | 12,960             | 24,253      | 75,716  | 189,218                              | 346,697   |
| 2013  | 0            | 16,200    | 28,350         | 12,960             | 24,253      | 106,028 | 186,688                              | 374,478   |
| 2014  | 0            | 16,200    | 28,350         | 12,960             | 24,253      | 106,028 | 176,133                              | 363,923   |
| Total | 977,531      | 48,600    | 85,050         | 38,880             | 79,012      | 251,052 | 861,829                              | 2,341,953 |



**Figure 15-G-6 Capital and Operating Cost**



**Bojonegara Projected  
IPC2**

Financial Statements (Copy is constructed by Private Sector)

| Income Statement            | 2004 | 2005 | 2006 | 2007   | 2008    | 2009    | 2010    | 2011    | 2012    | 2013    | 2014    | 2015    | 2016    | 2017    | 2018    | 2019    | 2020    | 2021    | 2022    |
|-----------------------------|------|------|------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Operating Revenue(1)        | 0    | 0    | 0    | 20,648 | 20,648  | 20,648  | 54,809  | 40,107  | 40,107  | 124,955 | 124,955 | 124,955 | 124,955 | 124,955 | 124,955 | 124,955 | 124,955 | 124,955 | 124,955 |
| Operating Expenses(2)       | 0    | 0    | 0    | 7,740  | 7,740   | 7,740   | 40,107  | 40,107  | 40,107  | 40,107  | 40,107  | 40,107  | 40,107  | 40,107  | 40,107  | 40,107  | 40,107  | 40,107  | 40,107  |
| Personnel & Administration  | 0    | 0    | 0    | 2,962  | 2,962   | 2,962   | 8,426   | 8,426   | 8,426   | 8,426   | 8,426   | 8,426   | 8,426   | 8,426   | 8,426   | 8,426   | 8,426   | 8,426   | 8,426   |
| Maintenance                 | 0    | 0    | 0    | 8,866  | 8,866   | 8,866   | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  |
| Depreciation                | 0    | 0    | 0    | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Others                      | 0    | 0    | 0    | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Net Operating Income(3=1-2) | 0    | 0    | 0    | 12,908 | 12,908  | 12,908  | 14,701  | 14,701  | 14,701  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  |
| Non Operating Expenses(4)   | 0    | 0    | 0    | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Bank Interest               | 0    | 0    | 0    | 7,537  | 7,537   | 7,537   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   |
| Others                      | 0    | 0    | 0    | 1,734  | 1,734   | 1,734   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   |
| Before Income Tax(6=3+4)    | 0    | 0    | 0    | -5,557 | -5,557  | -5,557  | 23,441  | 23,441  | 23,441  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  |
| Income Tax(7)               | 0    | 0    | 0    | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Net Surplus(6-7)            | 0    | 0    | 0    | -5,557 | -5,557  | -5,557  | 23,441  | 23,441  | 23,441  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  | 75,868  |
| Accumulated Earnings        | 0    | 0    | 0    | -5,557 | -28,344 | -57,997 | -81,348 | -75,626 | -35,401 | 40,467  | 116,335 | 192,303 | 268,091 | 344,091 | 420,337 | 496,969 | 574,050 | 651,580 | 729,560 |

**Cash Flow**

| Year                        | 2004   | 2005   | 2006    | 2007    | 2008    | 2009    | 2010    | 2011    | 2012   | 2013    | 2014    | 2015    | 2016    | 2017    | 2018    | 2019    | 2020    | 2021    | 2022    |
|-----------------------------|--------|--------|---------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Cash Beginning              | 0      | 0      | 0       | -7,557  | -27,034 | -47,732 | -88,311 | -19,728 | 43,358 | 142,087 | 240,817 | 339,546 | 433,708 | 521,221 | 602,003 | 680,032 | 758,511 | 837,438 | 916,815 |
| Cash Inflow                 | 19,706 | 91,752 | 135,212 | 139,544 | 71,562  | 46,971  | 8,400   | 37,563  | 72,066 | 107,709 | 107,709 | 107,709 | 107,709 | 107,709 | 107,709 | 107,709 | 107,709 | 107,709 | 107,709 |
| Net Operating Income        | 0      | 0      | 0       | -20,619 | -20,583 | -20,583 | -14,461 | 14,701  | 40,204 | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  | 84,848  |
| Net Operating Income        | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Depreciation                | 0      | 0      | 0       | 8,866   | 8,866   | 8,866   | 22,861  | 22,861  | 22,861 | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  | 22,861  |
| Long-term Loans             | 19,706 | 91,752 | 135,212 | 139,544 | 83,115  | 58,689  | 0       | 0       | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Others                      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Cash Outflow                | 19,706 | 91,752 | 135,212 | 147,101 | 91,039  | 67,669  | 8,980   | 8,980   | 8,980  | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   |
| Investment                  | 19,706 | 91,752 | 135,212 | 139,544 | 83,115  | 58,689  | 0       | 0       | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Repayment of principal      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Interest on Long-term Loans | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Dividend Paid               | 0      | 0      | 0       | 7,537   | 7,724   | 8,980   | 8,980   | 8,980   | 8,980  | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   | 8,980   |
| Tax                         | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Others                      | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Cash Balance                | 0      | 0      | 0       | -7,557  | -19,478 | -20,697 | -580    | 28,583  | 63,086 | 98,730  | 98,730  | 98,730  | 94,162  | 87,513  | 80,782  | 78,030  | 78,479  | 78,938  | 79,377  |
| Cash Ending                 | 0      | 0      | 0       | -7,557  | -27,034 | -47,732 | -88,311 | -19,728 | 43,358 | 142,087 | 240,817 | 339,546 | 433,708 | 521,221 | 602,003 | 680,032 | 758,511 | 837,438 | 916,815 |

**Balance Sheet**

| Year                          | 2004   | 2005   | 2006    | 2007    | 2008    | 2009    | 2010    | 2011    | 2012    | 2013    | 2014    | 2015    | 2016    | 2017    | 2018    | 2019    | 2020      | 2021      | 2022      |
|-------------------------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|-----------|
| Current Assets                | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 43,358  | 142,087 | 240,817 | 339,546 | 433,708 | 521,221 | 602,003 | 680,032 | 758,511   | 837,438   | 916,815   |
| Cash & Deposit                | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 43,358  | 142,087 | 240,817 | 339,546 | 433,708 | 521,221 | 602,003 | 680,032 | 758,511   | 837,438   | 916,815   |
| Dividend Advance              | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         |
| Others                        | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         |
| Fixed Assets                  | 19,706 | 91,752 | 226,964 | 366,931 | 445,792 | 495,615 | 472,754 | 448,893 | 427,031 | 404,170 | 381,309 | 358,447 | 335,586 | 312,725 | 289,863 | 267,002 | 244,140   | 221,279   | 198,418   |
| Plant Assets                  | 19,706 | 91,752 | 226,964 | 366,931 | 445,792 | 495,615 | 472,754 | 448,893 | 427,031 | 404,170 | 381,309 | 358,447 | 335,586 | 312,725 | 289,863 | 267,002 | 244,140   | 221,279   | 198,418   |
| Long-term Loans               | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         |
| Liabilities                   | 19,706 | 91,752 | 226,964 | 374,065 | 476,857 | 556,244 | 556,244 | 538,240 | 508,512 | 508,512 | 508,512 | 508,512 | 503,924 | 492,576 | 474,251 | 452,787 | 431,323   | 409,859   | 388,395   |
| Short-term Loans              | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         |
| Long-term Loans               | 19,706 | 91,752 | 226,964 | 366,508 | 449,821 | 508,512 | 508,512 | 508,512 | 508,512 | 508,512 | 508,512 | 508,512 | 503,924 | 492,576 | 474,251 | 452,787 | 431,323   | 409,859   | 388,395   |
| Others                        | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         |
| Equity                        | 0      | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         |
| Net Worth                     | 0      | 0      | 0       | -7,557  | -28,344 | -57,997 | -81,348 | -75,626 | -35,401 | 40,467  | 116,335 | 192,303 | 268,091 | 344,091 | 420,337 | 496,969 | 574,050   | 651,580   | 729,560   |
| Total Liabilities & Net Worth | 19,706 | 91,752 | 226,964 | 366,508 | 448,514 | 498,337 | 475,476 | 452,614 | 473,111 | 448,979 | 624,847 | 700,135 | 772,016 | 846,667 | 894,587 | 969,736 | 1,065,373 | 1,161,439 | 1,177,954 |

**Financial Indicators**

| Year                        | 2004 | 2005 | 2006 | 2007 | 2008   | 2009   | 2010  | 2011 | 2012 | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  | 2020  | 2021  | 2022  |
|-----------------------------|------|------|------|------|--------|--------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Rate of Return Fixed Assets |      |      |      |      | -0.05  | -0.04  | -0.03 | 0.03 | 0.12 | 0.21  | 0.22  | 0.24  | 0.25  | 0.27  | 0.29  | 0.32  | 0.35  | 0.38  | 0.43  |
| Debt Service Coverage Ratio |      |      |      |      | 1.30   | 1.30   | 0.94  | 4.18 | 8.03 | 11.99 | 11.99 | 11.99 | 11.99 | 11.99 | 11.99 | 11.99 | 11.99 | 11.99 | 11.99 |
| Operating Ratio             |      |      |      |      | 320.81 | 320.81 | 1.36  | 0.73 | 0.45 | 0.32  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  |
| Working Ratio               |      |      |      |      | 687.37 | 687.37 | 1.52  | 0.71 | 0.44 | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  |

**Bojonegara Projected  
IPC2**

| Income Statement            |         | (Unit: L,000Rp/Year) |         |           |           |           |           |           |           |           |           |           |           |           |           |
|-----------------------------|---------|----------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Year                        | 2,023   | 2,024                | 2,025   | 2,026     | 2,027     | 2,028     | 2,029     | 2,030     | 2,031     | 2,032     | 2,033     | 2,034     | 2,035     | 2,036     | 2,037     |
| Operating Revenue(1)        | 124,955 | 124,955              | 124,955 | 124,955   | 124,955   | 124,955   | 124,955   | 124,955   | 124,955   | 124,955   | 124,955   | 124,955   | 124,955   | 124,955   | 124,955   |
| Operating Expenses(2)       | 40,107  | 40,107               | 40,107  | 40,107    | 40,107    | 40,107    | 40,107    | 40,107    | 40,107    | 40,107    | 40,107    | 40,107    | 40,107    | 40,107    | 40,107    |
| Personnel & Administration  | 7,740   | 7,740                | 7,740   | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     | 7,740     |
| Maintenance                 | 8,426   | 8,426                | 8,426   | 8,426     | 8,426     | 8,426     | 8,426     | 8,426     | 8,426     | 8,426     | 8,426     | 8,426     | 8,426     | 8,426     | 8,426     |
| Depreciation                | 22,861  | 22,861               | 22,861  | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    |
| Others                      | 1,080   | 1,080                | 1,080   | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     | 1,080     |
| Net Operating Income(3=1-2) | 84,848  | 84,848               | 84,848  | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    |
| Non Operating Expenses(5)   | 6,420   | 5,971                | 5,522   | 4,624     | 4,175     | 3,726     | 3,277     | 2,828     | 2,379     | 1,930     | 1,481     | 1,032     | 603       | 265       | 0         |
| Bank Interest               | 0       | 0                    | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                      | 6,420   | 5,971                | 5,522   | 4,624     | 4,175     | 3,726     | 3,277     | 2,828     | 2,379     | 1,930     | 1,481     | 1,032     | 603       | 265       | 0         |
| Before Income Tax(6=3+4-5)  | 78,428  | 78,877               | 79,326  | 79,775    | 80,224    | 80,673    | 81,122    | 81,571    | 82,020    | 82,469    | 82,918    | 83,367    | 83,816    | 84,265    | 84,714    |
| Income Tax(7)               | 78,428  | 78,877               | 79,326  | 79,775    | 80,224    | 80,673    | 81,122    | 81,571    | 82,020    | 82,469    | 82,918    | 83,367    | 83,816    | 84,265    | 84,714    |
| Net Surplus(6-7)            | 0       | 0                    | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Accumulated Earnings        | 807,988 | 886,865              | 966,191 | 1,045,966 | 1,126,190 | 1,206,863 | 1,287,985 | 1,369,556 | 1,451,577 | 1,534,046 | 1,616,964 | 1,700,331 | 1,784,147 | 1,868,392 | 1,952,975 |

| Cash Flow                   |         | (Unit: L,000Rp/Year) |           |           |           |           |           |           |           |           |           |           |           |           |           |
|-----------------------------|---------|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Year                        | 2,023   | 2,024                | 2,025     | 2,026     | 2,027     | 2,028     | 2,029     | 2,030     | 2,031     | 2,032     | 2,033     | 2,034     | 2,035     | 2,036     | 2,037     |
| Cash Beginning              | 916,815 | 996,641              | 1,076,915 | 1,157,639 | 1,238,811 | 1,320,433 | 1,402,503 | 1,485,023 | 1,567,991 | 1,651,409 | 1,735,275 | 1,819,590 | 1,904,355 | 1,989,568 | 2,075,127 |
| Cash Inflow                 | 107,709 | 107,709              | 107,709   | 107,709   | 107,709   | 107,709   | 107,709   | 107,709   | 107,709   | 107,709   | 107,709   | 107,709   | 107,709   | 107,709   | 107,709   |
| Net Operating Income        | 84,848  | 84,848               | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    | 84,848    |
| Non Operating Income        | 0       | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Depreciation                | 22,861  | 22,861               | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    | 22,861    |
| Long-term Loans             | 0       | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                      | 0       | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Cash Outflow                | 27,884  | 27,435               | 26,986    | 26,537    | 26,088    | 25,639    | 25,190    | 24,741    | 24,292    | 23,843    | 23,394    | 22,945    | 22,496    | 22,047    | 21,598    |
| Investment                  | 0       | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Repayment of principal      | 21,464  | 21,464               | 21,464    | 21,464    | 21,464    | 21,464    | 21,464    | 21,464    | 21,464    | 21,464    | 21,464    | 21,464    | 21,464    | 21,464    | 21,464    |
| Interest on Long-term Loans | 6,420   | 5,971                | 5,522     | 4,624     | 4,175     | 3,726     | 3,277     | 2,828     | 2,379     | 1,930     | 1,481     | 1,032     | 603       | 265       | 0         |
| Dividend Paid               | 0       | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Tax                         | 0       | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                      | 0       | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Cash Balance                | 79,826  | 80,275               | 80,724    | 81,173    | 81,622    | 82,070    | 82,519    | 82,968    | 83,417    | 83,866    | 84,315    | 84,764    | 85,213    | 85,662    | 86,111    |
| Cash Ending                 | 996,641 | 1,076,915            | 1,157,639 | 1,238,811 | 1,320,433 | 1,402,503 | 1,485,023 | 1,567,991 | 1,651,409 | 1,735,275 | 1,819,590 | 1,904,355 | 1,989,568 | 2,075,127 | 2,177,127 |

| Balance Sheet                 |           | (Unit: L,000Rp/Year) |           |           |           |           |           |           |           |           |           |           |           |           |           |
|-------------------------------|-----------|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Year                          | 2,023     | 2,024                | 2,025     | 2,026     | 2,027     | 2,028     | 2,029     | 2,030     | 2,031     | 2,032     | 2,033     | 2,034     | 2,035     | 2,036     | 2,037     |
| Current Assets                | 996,641   | 1,076,915            | 1,157,639 | 1,238,811 | 1,320,433 | 1,402,503 | 1,485,023 | 1,567,991 | 1,651,409 | 1,735,275 | 1,819,590 | 1,904,355 | 1,989,568 | 2,075,127 | 2,177,127 |
| Cash & Deposit                | 996,641   | 1,076,915            | 1,157,639 | 1,238,811 | 1,320,433 | 1,402,503 | 1,485,023 | 1,567,991 | 1,651,409 | 1,735,275 | 1,819,590 | 1,904,355 | 1,989,568 | 2,075,127 | 2,177,127 |
| Dividend Advance              | 0         | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                        | 0         | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Fixed Assets                  | 175,556   | 152,695              | 129,834   | 106,972   | 84,111    | 61,250    | 38,388    | 15,527    | -7,334    | -30,196   | -53,057   | -75,918   | -98,780   | -121,641  | -144,503  |
| Total Assets                  | 1,172,197 | 1,229,610            | 1,287,472 | 1,345,783 | 1,404,544 | 1,463,753 | 1,523,411 | 1,583,518 | 1,644,074 | 1,705,079 | 1,766,533 | 1,828,437 | 1,890,788 | 1,953,686 | 2,017,624 |
| Liabilities                   | 366,931   | 345,467              | 324,003   | 302,539   | 281,075   | 259,611   | 238,147   | 216,683   | 195,219   | 173,755   | 152,290   | 130,827   | 109,363   | 87,899    | 66,435    |
| Short-term Loans              | 0         | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Long-term Loans               | 366,931   | 345,467              | 324,003   | 302,539   | 281,075   | 259,611   | 238,147   | 216,683   | 195,219   | 173,755   | 152,290   | 130,827   | 109,363   | 87,899    |           |
| Others                        | 0         | 0                    | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Equity                        | 805,266   | 884,143              | 963,469   | 1,043,244 | 1,123,469 | 1,204,142 | 1,285,264 | 1,366,835 | 1,448,855 | 1,531,324 | 1,614,584 | 1,697,610 | 1,781,425 | 1,865,787 | 1,951,189 |
| Net Worth                     | 807,988   | 886,865              | 966,191   | 1,045,966 | 1,126,190 | 1,206,863 | 1,287,985 | 1,369,556 | 1,451,577 | 1,534,046 | 1,616,964 | 1,700,331 | 1,784,147 | 1,868,392 | 1,952,975 |
| Total Liabilities & Net Worth | 1,174,191 | 1,232,432            | 1,290,194 | 1,348,039 | 1,406,474 | 1,465,474 | 1,525,133 | 1,585,240 | 1,646,096 | 1,707,801 | 1,769,255 | 1,831,158 | 1,893,510 | 1,955,879 | 2,018,346 |

| Financial Indicators        |       | (Unit: L,000Rp/Year) |       |       |       |       |       |       |        |       |       |       |       |       |       |
|-----------------------------|-------|----------------------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|
| Year                        | 2,023 | 2,024                | 2,025 | 2,026 | 2,027 | 2,028 | 2,029 | 2,030 | 2,031  | 2,032 | 2,033 | 2,034 | 2,035 | 2,036 | 2,037 |
| Rate of Return Fixed Assets | 0.48  | 0.56                 | 0.65  | 0.79  | 1.01  | 1.39  | 2.21  | 5.46  | -11.57 | -2.81 | -1.60 | -1.12 | -0.86 | -0.70 | -0.50 |
| Debt Service Coverage Ratio | 3.86  | 3.93                 | 3.99  | 4.06  | 4.13  | 4.20  | 4.28  | 4.35  | 4.42   | 4.52  | 4.60  | 4.69  | 4.79  | 4.86  | 4.93  |
| Operating Ratio             | 0.32  | 0.32                 | 0.32  | 0.32  | 0.32  | 0.32  | 0.32  | 0.32  | 0.32   | 0.32  | 0.32  | 0.32  | 0.32  | 0.32  | 0.32  |
| Working Ratio               | 0.31  | 0.31                 | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31   | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  | 0.31  |

**Table 15-G-26 Financing Schedule (000,000Rp)**

|       | Foreign Loan | Domestic Loan | Equity | Revenue | Fund Total | Cost      | Difference |
|-------|--------------|---------------|--------|---------|------------|-----------|------------|
| 2004  | 0            | 0             | 0      | 0       | 0          | 0         | 0          |
| 2005  | 0            | 0             | 0      | 0       | 0          | 0         | 0          |
| 2006  | 0            | 199           | 0      | 0       | 199        | 199       | 0          |
| 2007  | 0            | 64,376        | 0      | 0       | 64,376     | 64,376    | 0          |
| 2008  | 0            | 286,375       | 0      | 0       | 286,375    | 302,469   | -16,094    |
| 2009  | 0            | 445,292       | 0      | 0       | 445,292    | 532,014   | -86,722    |
| 2010  | 0            | 37,922        | 0      | 73,575  | 111,497    | 296,786   | -185,289   |
| 2011  | 0            | 45,614        | 97,753 | 157,450 | 300,817    | 424,934   | -124,117   |
| 2012  | 0            | 0             | 0      | 252,388 | 252,388    | 346,697   | -94,309    |
| 2013  | 0            | 0             | 0      | 353,425 | 353,425    | 374,478   | -21,053    |
| 2014  | 0            | 0             | 0      | 353,425 | 353,425    | 363,923   | -10,498    |
| Total | 0            | 879,778       | 97,753 | 836,839 | 1,814,370  | 2,341,953 | -527,584   |

784. It is assumed that private sector prepares equity around 530,000 million Rp as 55% of capital cost.

**b) Evaluation of FIRR**

785. Result of FIRR by the fluctuation is summarized in Table 15-G-27.

**Table 15-G-27 Sensitivity Analysis (Private Sector) (Optional Case)**

| Case |         | Private Sector (%) |
|------|---------|--------------------|
| Cost | Revenue |                    |
| 0%   | 0%      | 12.63              |
| 0%   | -10%    | 9.91               |
| +10% | 0%      | 11.55              |
| +10% | -10%    | 8.96               |

**c) Financial Statement**

786. Projected financial statements and financial indicators for Private sector is shown in Table 15-G-28

**Table 15-G-28 Projected Financial Statement for private sector**

**4) Evaluation**

787. This scheme is deemed not to be financially viable, since the FIRR exceeds the weighted averaged interest rate. To make this scheme financing viable, the tariff should be raised.

**Bojonegara Projected  
Private Sector  
Income Statement**

Financial Statements (Query is constructed by Private Sector)  
600,000Rp

| Year                        | 2,005 | 2,006 | 2,007 | 2,008 | 2,009 | 2,010  | 2,011   | 2,012   | 2,013   | 2,014   | 2,015   | 2,016   | 2,017   | 2,018   | 2,019   | 2,020   | 2,021   | 2,022   |         |
|-----------------------------|-------|-------|-------|-------|-------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Operating Revenue(1)        | 0     | 0     | 0     | 0     | 0     | 73,575 | 157,450 | 252,388 | 353,425 | 353,425 | 353,425 | 353,425 | 353,425 | 353,425 | 353,425 | 353,425 | 353,425 | 353,425 | 353,425 |
| Operating Expenses(2)       | 0     | 0     | 0     | 0     | 0     | 99,330 | 115,492 | 181,729 | 212,040 | 212,040 | 212,040 | 212,040 | 212,040 | 212,040 | 212,040 | 212,040 | 212,040 | 212,040 | 212,040 |
| Personnel & Administration  | 0     | 0     | 0     | 0     | 0     | 22,275 | 22,275  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  | 44,550  |
| Maintenance                 | 0     | 0     | 0     | 0     | 0     | 15,253 | 15,253  | 24,253  | 24,253  | 24,253  | 24,253  | 24,253  | 24,253  | 24,253  | 24,253  | 24,253  | 24,253  | 24,253  | 24,253  |
| Depreciation                | 0     | 0     | 0     | 0     | 0     | 24,249 | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  |
| Others                      | 0     | 0     | 0     | 0     | 0     | 6,480  | 6,480   | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  | 12,960  |
| Royalty                     | 0     | 0     | 0     | 0     | 0     | 22,073 | 47,235  | 75,716  | 106,028 | 106,028 | 106,028 | 106,028 | 106,028 | 106,028 | 106,028 | 106,028 | 106,028 | 106,028 | 106,028 |
| Net Operating Income(3=1-2) | 0     | 0     | 0     | 0     | 0     | 16,755 | 41,958  | 70,659  | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 |
| Non Operating Income(4)     | 0     | 0     | 0     | 0     | 0     | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Non Operating Expense(5)    | 0     | 0     | 0     | 0     | 0     | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Bank Interest               | 0     | 0     | 0     | 0     | 0     | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Others                      | 0     | 0     | 0     | 0     | 0     | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Before Income Tax(6)        | 0     | 0     | 0     | 0     | 0     | 16,755 | 41,958  | 70,659  | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 |
| Income Tax(7)               | 0     | 0     | 0     | 0     | 0     | 0      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Net Surplus(6-7)            | 0     | 0     | 0     | 0     | 0     | 16,755 | 41,958  | 70,659  | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 |
| Accumulated Earnings        | 0     | 0     | 0     | 0     | 0     | -9,656 | -51,647 | -51,647 | -51,647 | -51,647 | -51,647 | -51,647 | -51,647 | -51,647 | -51,647 | -51,647 | -51,647 | -51,647 | -51,647 |

**Cash Flow**

| Year                        | 2,005 | 2,006 | 2,007  | 2,008   | 2,009   | 2,010   | 2,011    | 2,012    | 2,013    | 2,014    | 2,015    | 2,016    | 2,017    | 2,018    | 2,019    | 2,020    | 2,021    | 2,022    |         |
|-----------------------------|-------|-------|--------|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------|
| Cash Beginning              | 0     | 0     | 0      | 0       | 0       | 102,816 | 288,195  | -412,722 | -506,531 | -527,584 | -538,082 | -538,082 | -527,413 | -506,247 | -468,087 | -391,508 | -264,054 | -131,257 | 0       |
| Cash Inflow                 | 0     | 199   | 64,376 | 286,375 | 445,292 | 45,417  | 209,574  | 94,909   | 105,635  | 165,635  | 165,635  | 165,635  | 165,635  | 165,635  | 165,635  | 165,635  | 165,635  | 165,635  | 165,635 |
| Depreciation                | 0     | 0     | 0      | 0       | 0       | 16,755  | 41,958   | 70,659   | 141,385  | 141,385  | 141,385  | 141,385  | 141,385  | 141,385  | 141,385  | 141,385  | 141,385  | 141,385  | 141,385 |
| Long-term Loans             | 0     | 0     | 0      | 0       | 0       | 24,249  | 24,249   | 24,249   | 24,249   | 24,249   | 24,249   | 24,249   | 24,249   | 24,249   | 24,249   | 24,249   | 24,249   | 24,249   | 24,249  |
| Equity                      | 0     | 0     | 0      | 0       | 0       | 37,922  | 45,614   | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0       |
| Cash Outflow                | 0     | 199   | 64,376 | 286,375 | 445,292 | 302,409 | 333,691  | 180,218  | 186,688  | 176,133  | 165,578  | 155,023  | 143,468  | 127,476  | 89,056   | 38,180   | 32,838   | 28,277   | 0       |
| Investment                  | 0     | 0     | 0      | 0       | 0       | 445,292 | 37,922   | 143,367  | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0       |
| Repayment of principal      | 0     | 0     | 0      | 0       | 0       | 6,438   | 35,075   | 79,604   | 83,397   | 87,958   | 87,958   | 87,958   | 87,958   | 87,958   | 87,958   | 87,958   | 87,958   | 87,958   | 87,958  |
| Interest on Long-term Loans | 0     | 0     | 0      | 0       | 0       | 0       | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0       |
| Dividend Advance            | 0     | 0     | 0      | 0       | 0       | 0       | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0       |
| Tax                         | 0     | 0     | 0      | 0       | 0       | 0       | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0       |
| Others                      | 0     | 0     | 0      | 0       | 0       | 0       | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0       |
| Cash Balance                | 0     | 0     | 0      | 0       | 0       | -16,094 | 86,722   | -185,289 | -124,117 | -94,009  | -21,033  | -10,498  | 57       | 38,150   | 76,579   | 127,454  | 132,796  | 132,796  | 132,796 |
| Cash Ending                 | 0     | 0     | 0      | 0       | 0       | -16,094 | -102,816 | -288,195 | -412,722 | -506,531 | -527,584 | -538,082 | -527,413 | -506,247 | -468,087 | -391,508 | -264,054 | -131,257 | 0       |

**Balance Sheet**

| Year                          | 2,005 | 2,006 | 2,007 | 2,008 | 2,009 | 2,010    | 2,011    | 2,012    | 2,013    | 2,014    | 2,015    | 2,016   | 2,017   | 2,018   | 2,019   | 2,020   | 2,021   | 2,022   |         |
|-------------------------------|-------|-------|-------|-------|-------|----------|----------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Current Assets                | 0     | 0     | 0     | 0     | 0     | 0        | 0        | 0        | 0        | 0        | 0        | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Cash & Deposit                | 0     | 0     | 0     | 0     | 0     | 0        | 0        | 0        | 0        | 0        | 0        | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Dividend Advance              | 0     | 0     | 0     | 0     | 0     | 0        | 0        | 0        | 0        | 0        | 0        | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Others                        | 0     | 0     | 0     | 0     | 0     | 0        | 0        | 0        | 0        | 0        | 0        | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Fixed Assets                  | 0     | 0     | 0     | 0     | 0     | 809,716  | 928,833  | 904,584  | 880,334  | 856,085  | 831,835  | 807,586 | 783,336 | 759,087 | 734,837 | 710,588 | 686,338 | 662,089 | 662,089 |
| Liabilities                   | 0     | 0     | 0     | 0     | 0     | 809,716  | 928,833  | 904,584  | 880,334  | 856,085  | 831,835  | 807,586 | 783,336 | 759,087 | 734,837 | 710,588 | 686,338 | 662,089 | 662,089 |
| Total Assets                  | 0     | 0     | 0     | 0     | 0     | 809,716  | 928,833  | 904,584  | 880,334  | 856,085  | 831,835  | 807,586 | 783,336 | 759,087 | 734,837 | 710,588 | 686,338 | 662,089 | 662,089 |
| Share-term Loans              | 0     | 0     | 0     | 0     | 0     | 16,094   | 102,816  | 288,195  | 412,722  | 506,531  | 527,584  | 538,082 | 527,413 | 506,247 | 468,087 | 391,508 | 264,054 | 131,257 | 0       |
| Long-term Loans               | 0     | 0     | 0     | 0     | 0     | 712,848  | 712,848  | 587,108  | 499,150  | 411,192  | 323,234  | 235,276 | 147,318 | 65,798  | 12,915  | 4,561   | 0       | 0       | 0       |
| Others                        | 0     | 0     | 0     | 0     | 0     | 0        | 0        | 0        | 0        | 0        | 0        | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| Equity                        | 0     | 0     | 0     | 0     | 0     | -191,238 | -256,207 | -286,808 | -244,153 | -160,942 | -137,177 | -52,857 | 33,018  | 127,449 | 232,661 | 344,220 | 457,328 | 570,436 | 570,436 |
| Net Worth                     | 0     | 0     | 0     | 0     | 0     | -191,238 | -256,207 | -286,808 | -244,153 | -160,942 | -137,177 | -52,857 | 33,018  | 127,449 | 232,661 | 344,220 | 457,328 | 570,436 | 570,436 |
| Total Liabilities & Net Worth | 0     | 0     | 0     | 0     | 0     | 809,716  | 831,080  | 806,830  | 782,581  | 756,331  | 730,082  | 709,852 | 685,383 | 661,333 | 637,084 | 612,835 | 588,585 | 570,436 | 570,436 |

**Financial Indicators**

|                             | 2,005   | 2,006   | 2,007   | 2,008   | 2,009   | 2,010 | 2,011 | 2,012 | 2,013 | 2,014 | 2,015 | 2,016 | 2,017 | 2,018 | 2,019 | 2,020 | 2,021 | 2,022 |       |
|-----------------------------|---------|---------|---------|---------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Rate of Return Fixed Assets | #DIV/0! | #DIV/0! | 0.00    | 0.00    | 0.00    | -0.02 | 0.05  | 0.08  | 0.16  | 0.17  | 0.17  | 0.18  | 0.18  | 0.19  | 0.19  | 0.20  | 0.21  | 0.21  | 0.21  |
| Debt Service Coverage Ratio | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 0.80  | 0.25  | 0.44  | 0.88  | 0.95  | 1.03  | 1.13  | 1.25  | 1.49  | 2.46  | 15.00 | 33.94 | 33.94 | 33.94 |
| Operating Ratio             | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 1.23  | 0.73  | 0.72  | 0.69  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  |
| Working Ratio               | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 1.14  | 0.69  | 0.67  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  |

**Bojonegara Projected  
Private Sector  
Income Statement**

| Year                        | 2,023   | 2,024   | 2,025   | 2,026     | 2,027     | 2,028     | 2,029     | 2,030     | 2,031     | 2,032     | 2,033     | 2,034     | 2,035     | 2,036     | 2,037     | 2,038     | 2,039     |
|-----------------------------|---------|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Operating Revenue(1)        | 353,425 | 353,425 | 353,425 | 353,425   | 353,425   | 353,425   | 353,425   | 353,425   | 353,425   | 353,425   | 353,425   | 353,425   | 353,425   | 353,425   | 353,425   | 353,425   | 353,425   |
| Operating Expenses(2)       | 212,040 | 212,040 | 212,040 | 212,040   | 212,040   | 212,040   | 212,040   | 212,040   | 212,040   | 212,040   | 212,040   | 212,040   | 212,040   | 212,040   | 212,040   | 212,040   | 212,040   |
| Personnel & Administration  | 44,550  | 44,550  | 44,550  | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    | 44,550    |
| Maintenance                 | 24,253  | 24,253  | 24,253  | 24,253    | 24,253    | 24,253    | 24,253    | 24,253    | 24,253    | 24,253    | 24,253    | 24,253    | 24,253    | 24,253    | 24,253    | 24,253    | 24,253    |
| Depreciation                | 24,249  | 24,249  | 24,249  | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    |
| Others                      | 12,960  | 12,960  | 12,960  | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    | 12,960    |
| Royalty                     | 106,028 | 106,028 | 106,028 | 106,028   | 106,028   | 106,028   | 106,028   | 106,028   | 106,028   | 106,028   | 106,028   | 106,028   | 106,028   | 106,028   | 106,028   | 106,028   | 106,028   |
| Net Operating Income(3=1-2) | 141,385 | 141,385 | 141,385 | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   |
| Non Operating Income(4)     | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Non Operating Expenses(5)   | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Bank Interest               | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                      | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Before Income Tax(6=3+4-5)  | 141,385 | 141,385 | 141,385 | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   |
| Income Tax(7)               | 28,277  | 28,277  | 28,277  | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    |
| Net Surplus(6-7)            | 113,108 | 113,108 | 113,108 | 113,108   | 113,108   | 113,108   | 113,108   | 113,108   | 113,108   | 113,108   | 113,108   | 113,108   | 113,108   | 113,108   | 113,108   | 113,108   | 113,108   |
| Accumulated Earnings        | 683,541 | 796,653 | 909,761 | 1,022,869 | 1,135,977 | 1,249,086 | 1,362,194 | 1,475,302 | 1,588,410 | 1,701,519 | 1,814,627 | 1,927,735 | 2,040,844 | 2,153,952 | 2,267,060 | 2,380,168 | 2,493,277 |

**Cash Flow**

| Year                        | 2,023   | 2,024   | 2,025   | 2,026   | 2,027   | 2,028   | 2,029   | 2,030     | 2,031     | 2,032     | 2,033     | 2,034     | 2,035     | 2,036     | 2,037     | 2,038     | 2,039     |
|-----------------------------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Cash Beginning              | 6,101   | 143,458 | 280,816 | 418,174 | 555,532 | 692,889 | 830,247 | 967,605   | 1,104,963 | 1,242,320 | 1,379,678 | 1,517,036 | 1,654,394 | 1,791,751 | 1,929,109 | 2,066,467 | 2,203,825 |
| Cash Inflow                 | 165,635 | 165,635 | 165,635 | 165,635 | 165,635 | 165,635 | 165,635 | 165,635   | 165,635   | 165,635   | 165,635   | 165,635   | 165,635   | 165,635   | 165,635   | 165,635   | 165,635   |
| Net Operating Income        | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385 | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   | 141,385   |
| Depreciation                | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249  | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    | 24,249    |
| Long-term Loans             | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Equity                      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Cash Outflow                | 28,277  | 28,277  | 28,277  | 28,277  | 28,277  | 28,277  | 28,277  | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    |
| Investment                  | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Repayment of principal      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Interest on Long-term Loans | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Dividend Advance            | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Tax                         | 28,277  | 28,277  | 28,277  | 28,277  | 28,277  | 28,277  | 28,277  | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    | 28,277    |
| Others                      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Cash Balance                | 137,358 | 137,358 | 137,358 | 137,358 | 137,358 | 137,358 | 137,358 | 137,358   | 137,358   | 137,358   | 137,358   | 137,358   | 137,358   | 137,358   | 137,358   | 137,358   | 137,358   |
| Cash Ending                 | 143,458 | 280,816 | 418,174 | 555,532 | 692,889 | 830,247 | 967,605 | 1,104,963 | 1,242,320 | 1,379,678 | 1,517,036 | 1,654,394 | 1,791,751 | 1,929,109 | 2,066,467 | 2,203,825 | 2,341,183 |

**Balance Sheet**

| Year                          | 2,023   | 2,024   | 2,025     | 2,026     | 2,027     | 2,028     | 2,029     | 2,030     | 2,031     | 2,032     | 2,033     | 2,034     | 2,035     | 2,036     | 2,037     | 2,038     | 2,039     |
|-------------------------------|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Current Assets                | 143,458 | 280,816 | 418,174   | 555,532   | 692,889   | 830,247   | 967,605   | 1,104,963 | 1,242,320 | 1,379,678 | 1,517,036 | 1,654,394 | 1,791,751 | 1,929,109 | 2,066,467 | 2,203,825 | 2,341,183 |
| Cash & Deposit                | 143,458 | 280,816 | 418,174   | 555,532   | 692,889   | 830,247   | 967,605   | 1,104,963 | 1,242,320 | 1,379,678 | 1,517,036 | 1,654,394 | 1,791,751 | 1,929,109 | 2,066,467 | 2,203,825 | 2,341,183 |
| Dividend Advance              | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                        | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Fixed Assets                  | 637,839 | 613,590 | 589,340   | 565,091   | 540,841   | 516,592   | 492,342   | 468,093   | 443,843   | 419,594   | 395,344   | 371,095   | 346,845   | 322,596   | 298,346   | 274,097   | 249,847   |
| Total Assets                  | 781,297 | 894,406 | 1,007,514 | 1,120,622 | 1,233,731 | 1,346,839 | 1,459,947 | 1,573,055 | 1,686,164 | 1,799,272 | 1,912,380 | 2,025,488 | 2,138,597 | 2,251,705 | 2,364,813 | 2,477,921 | 2,591,030 |
| Liabilities                   | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Short-term Loans              | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Long-term Loans               | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Others                        | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Equity                        | 0       | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Net Worth                     | 683,541 | 796,653 | 909,761   | 1,022,869 | 1,135,977 | 1,249,086 | 1,362,194 | 1,475,302 | 1,588,410 | 1,701,519 | 1,814,627 | 1,927,735 | 2,040,844 | 2,153,952 | 2,267,060 | 2,380,168 | 2,493,277 |
| Total Liabilities & Net Worth | 683,541 | 796,653 | 909,761   | 1,022,869 | 1,135,977 | 1,249,086 | 1,362,194 | 1,475,302 | 1,588,410 | 1,701,519 | 1,814,627 | 1,927,735 | 2,040,844 | 2,153,952 | 2,267,060 | 2,380,168 | 2,493,277 |

**Financial Indicators**

| Year                        | 2,023 | 2,024 | 2,025 | 2,026 | 2,027 | 2,028 | 2,029 | 2,030 | 2,031 | 2,032 | 2,033 | 2,034 | 2,035 | 2,036 | 2,037 | 2,038 | 2,039 |
|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Rate of Return Fixed Assets | 0.22  | 0.23  | 0.24  | 0.25  | 0.26  | 0.27  | 0.29  | 0.30  | 0.31  | 0.32  | 0.33  | 0.34  | 0.35  | 0.36  | 0.37  | 0.38  | 0.39  |
| Debt Service Coverage Ratio | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  |
| Operating Ratio             | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  |
| Working Ratio               | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  | 0.56  |

## 15-H. ENVIRONMENTAL IMPACT ASSESSMENT

### 15-H-1 Introduction

#### 1) *Purpose of the EIA*

**788.** The Environmental Impact Assessment for Urgent Development plan for Bojonegara new port consists of three portions, 1) existing condition of natural and social environment, 2) evaluation of environmental impact, and 3) environmental management and mitigation measures. This section focuses on impact description and environmental mitigation and management plan for the proposed projects.

**789.** It contains specific measures that will enhance potential positive impacts for the purpose of maximizing the beneficial impacts of the proposed project. Likewise, it contains mitigation measures to minimize and lessen adverse effects at different stages of project implementation.

**790.** From the result of IEE, important environmental parameters affected by the project items are listed up as follows:

- Seawater quality during construction (Dredging, Reclamation, Breakwater Construction) and operation stage
- Change of coastal zone and current condition as affect from land reclamation and construction of Breakwater.
- Air quality during construction and operation stage as affect from increasing of traffic volume.
- Noise and vibration as affect from heavy traffic volume.
- Disturbance to the sea biological condition including fisheries as affect from increase of turbidity during construction stage and marine pollution during operation stage.
- Risk/ safety as affect from raise traffic and ship volume.
- Waste and garbage during construction and operation stage.
- Public health condition as affect from aggravation of air quality.
- People income during construction and operation stage.
- Resettlement activity.

#### 2) *Study Area and Covered Projects in the Analysis*

**791.** Study area and covered projects in the environmental analysis described in 15-A.

### 15-H-2 Methodology

**792.** Data and information's that will be used in the EIA Study Report is Primary and Secondary Data. Primary Data will be obtained by conducting Field Survey, Direct Observation and Measurements in the site, taking samples to be analyzed in laboratories, collecting the information by Interview with related person such as residents, also with obtaining Public Hearing. Secondary Data will be obtained from relevant Study Result, Library Study, Regular Report of Port, and Information from related Institution such as District Government, PT. IPC II, Regional Planning and Development Agency (Province and District Level), etc.

**793.** The following environmental aspects were studied by the phases of Pre-Construction: Construction and Operation,

- Physicochemical Environment
  - Geology and Geomorphology
  - Hydrology and Hydrogeology
  - Sea Water Quality
  - Oceanography (Current and Tidal)
  - Seabed Material
  - Meteorology (Air Temperature, Humidity, Rainfall, Rain Day, Wind Direction and Velocity)
  - Air Quality (CO, SO<sub>2</sub>, NO<sub>2</sub> and Suspended Particle Material (SPM))
  - Noise and Vibration
- Biological Environment
  - Terrestrial Biotic (Flora and Fauna)
  - Aquatic Biotic (Plankton, Benthos, Nekton (Fish) and Coral Reefs)
- Socio-economic and Cultural Environment
  - Demography (Populations, Resident, Household Distribution, Population Structure and People Mobilization)
  - Socio Economy (Source of Livelihood and Infrastructure of Economy)
  - Social Culture (Education, Religion, Public Health, Securities and Criminal Condition, Government Administration, Structure of Ethnic, Social Institution, Custom and Tradition, Environment Sanitation Condition)
  - Community Perception and Aspiration
  - Land Use
  - Fishery Condition

**794.** The prediction of impact on environmental is presented from the impact that has been occurred, which is constitutes from the previous study then combined with this study. The evaluation of impact prediction on environment in this EIA study. Both for magnitude and impact period are carried out by applying and /or combination the following method/approach:

**a) Analog**

**795.** The impact prediction based on the analog method is carried out with understanding impact and problem caused by similar activities. This approach is used in impact prediction on hydro-oceanography, water quality, water biotic, social economy and culture.

**b) Mathematical Model**

**796.** The available mathematical model will give figure of the influence activity to the plan to the certain environmental component changes. With this model the impact magnitude and intensity can be understood. This approach is used for impact prediction to the air quality and noise, hydro-oceanography, water quality (sediment transport) and social economy and culture.

**c) Environmental Standard**

**797.** Impact prediction is analyzed by using environmental standard and other standard from the government that valid for each aspect. The standard include those published by Environmental State Minister Office, Health Department and Local Regulation. This approach is used in impact prediction on air quality and noise, and water quality.

**d) Professional Judgment**

**798.** Professional judgment that experience in related aspect is required, when the detailed data and information are very limited or not yet have specific environmental standard or regulation value for environmental component affected by impact. This approach is used for impact prediction on water biotic, and fishery, social economy and culture.

**e) Evaluation of Significant Impact**

**799.** Every impact that has been predicted would be analyzed based on the environmental significant impact criteria according to Head of Environmental Impact Management Agency (BAPEDAL) No. Kep-056 of 1994, as follow:

- a. Number of people affected by the impact;
- b. Area extent of the impact;
- c. Duration of the impact;
- d. Intensity of the impact;
- e. Other environmental components affected by the impact;
- f. Cumulative nature of the impact; and
- g. Reversibility/irreversibility of the impact.

**800.** In this EIA Study, environmental impact prediction was conducted based on quantitative approach for hydro-oceanography, water quality, biology and social-economy components. Whereas, analogy and professional judgment approach have been used for the environmental component, which could not predicted by quantitative approach.

**801.** Based on the above criteria, the potential impact will be classified significant or non-significant. Then characteristic of impact will be classified negative or positive impact. Impact analysis process was conducted according to phased activity.

**802.** In addition, the JICA Study Team carried out the Public Hearing at February 5, 2003 as a part of environmental consideration. The objectives are:

- Explanation of Master Plan;
- Explanation of current environmental condition and preliminary assessment; and
- Community perception and aspiration

**803.** For implementation of the Public Hearing, the JICA Study Team discussed with IPC2, agreed that the Master Plan for Bojonegara project would be introduced in the Public Hearing. The record of the public hearing and member list are attached in Appendix.

**804.** The following 3 villages, which is closed the Project Site, were selected as target area:



- Desa Pulo Ampel
- Desa Sumuranja
- Desa Margasari

**805.** General components of activity are:

- Construction
  - Construction of Breakwater and Quay Wall
  - Concrete Paving
- Dredging
  - Dredging of Channel/Basin
  - On Land Excavation
- Reclamation and Cutting/Filling/Grading
- Open Cut and Slope Protection of Division Canal
- Road Construction
  - Port Access Road Construction
  - Pavement

### **15-H-3 Current Condition**

#### **1) Social Environmental**

**806.** Three villages are located close to the Bojonegara Project Site; these are Desa Puloampel, Sumuranja and Margasari. Total population number was 8,600 persons; and population density was 760 persons/km<sup>2</sup>. this number is 80% of average of Serang.

**807.** Dominant business type was farmer; it occupied 36 to 48 %. Principal agricultural productions are Peanut and rice. Number of fishermen in 2002 was total 280 persons; these occupied 10%.

**808.** Along Jl. Sumuranja Mejid, which is closed to the Project Site, is main road. Many type of facilities exist along the road.

**809.** Most of the resident are obedient Moslem; they have total 29 units of Mosque. Mosque and Mushila are one of the most important symbols for Moslem. Hence, they require to relocate them. Residents have close religious relation ship each other, especially Desa Puloampel. For example Desa Puloampel has 2 units of deep well facility for water supply. Residents use deep well unit with pipeline system. These deep well facilities are operated by the society of village Mosque.

**810.** Solid management system does not operate systematically; each household individually carries out. Usually they burn their collecting waste in their yard; or some of them are dumped into the river.

**811.** There are 3 big canals around the Project Site; these are used for drainage. Discharge water flows into the water area of the Project Site. And gutters are constructed along the roadside; connected to the canals. In rainy season, flood problems often occur at some gutters because of poor management.

**812.** Concerning fishery condition, total 280 fishermen stay in the 3 villages; and one small fishery port exists. According to the interview with fishermen, average fish catching amount was approximately 60 – 100kg/trip; principal fish types were Tuna, Kakap e.g. Fishing activity is mainly traditionally operated; and principal fishing area is far from the project Site. However, several small fishing activity around Pulau Kali was observed. And small seaweed activity also observed near Tanjung Awran.

**813.** Proposed alternate fishing port will be constructed in Desa Argawana.

**814.** The JICA Study Team carried out interview survey with residents in the Project Site concerning community perception and aspiration. Residents expect increasing job opportunities, acceleration of business chance. Dominant negative opinion was complaining of land acquisition process.

## 2) *Natural Environment*

**815.** Concerning water quality, distribution of salinity were 31.9 – 32.4‰; it means that impact to the coastal water area from inland water such as canals is not so high. Concentrations of TSS were showed 2 – 7mg/L at upper layer and 1 – 18mg/L at bottom layer. Near shore area tended to give higher TSS concentration.

**816.** Concentration of organic pollution (COD and Nutrients), heavy metals and bacteriological pollution were still low; these values were below the environmental standard. Hence it is concluded that coastal water condition at Bojonegara Project Site is still good.

**817.** There are several factories around the Project Site; sometimes offensive odor is smelled close to some factories. However according to the last field survey, broadly speaking, air quality has still good condition. Concentrations of CO, NO<sub>2</sub>, SO<sub>2</sub> and SPM did not exceed the environmental standard.

**818.** Domestic flora and fauna are common at Bojonegara because the Project Area is man made ecosystem. Any protected/endangered species were not observed.

**819.** However it is important to remember that there are small coral Reef offshore Pulau Kali. Coral living coverage around Pulau Kali estimated 31.3 – 35.3%; however these values could not indicate condition of whole coral reef because JICA's survey were carried out 2 line transects and it could not cover whole area. Principal coral where living at shallow water were *Porites lobata* and *Tubipora Musica* e.g.

**820.** Existing mangrove forest is also important environmental aspect. Mangrove forests exist along the coastal area and around Pulau Kali. Especially mangrove around Pulau Kali is still good condition. 3 dominant species were observed at the Project site, *Rhizophora*, *Avicennia* and *Sonneratia*. Mangrove density range were 0.01 – 0.42ind/m<sup>2</sup>; and the highest range was composed by seeding of *Rhizophora*. Hence mangrove ecosystem has been potentiality of recovery.

**821.** Chief of each village as listed above selected attendance to invite the public hearing with assistance of IPC2 Cilegon office. Total Attendances are 43 persons including IPC2, DGSC staff and the JICA Study Team. The results are shown in the following table.

**15-H-4 Results of Environmental Impact and Evaluation****1) Pre-Construction Phase****a) Socio Culture and Economy****Land Use {Impact is categorized: (+C)}**

**822.** People affected by the impact are in Desa Pulo Ampel, Sumuranja, and Margasari and surrounding. Area extent of the impact is around 1,135ha where are Pulo Ampel Sumuranja and Margasari.

**823.** Duration of the impact will continue, and intensity of the impact will be small.

**824.** Land use is predicted to change from dwelling/ housing, business area, paddy field, social/ public facilities to port area and related facilities. Based on General Land Use Plan of Banten Province, especially Kabupaten Serang and Local District, Pulo Ampel government hopes Bojonegara Port Project can be one of Banten Province's central growth areas. Suitable land use plan of the project in harmony with local development plan gives positive impact to area development orientation.

**825.** The impact will not affect other environment. The impact characteristic is cumulative and irreversible.

**Resettlement {Impact is categorized: (-B)}**

**826.** People affected by the impact are around 50 households or 7.5ha in Desa Pulo Ampel. Area extent of the impact is around 62.5ha where are Pulo Ampel.

**827.** Duration of the impact is temporary until land acquisition finish. And intensity of the impact is Medium.

**828.** IPC2 has already purchased most of land of the planning area toward 2010, however, some residents have not given up their land and complain of the proposed relocation site because it is far from the port area and/or complain of the standard of compensation. If these complaints are continued as they are, social conflicts would be generated between the residents and IPC2.

**829.** The impact will affect to dwelling and job structure. The impact characteristic is cumulative and irreversible.

**2) Construction Phase****a) Off Shore Work****i) Physical Chemical Condition****Air Pollution {Impact is categorized: (-C)}**

**830.** People affected by the impact are construction workers in off shore work. Area extent of the impact is around the Project Area. Duration of the impact will be during construction phase. And intensity of the impact is small.

**831.** Construction tools such as vehicles and heavy equipment including vessels for dredging and reclamation that use diesel or gasoline will generate the exhaust gas such as SO<sub>x</sub>, CO, NO<sub>x</sub>.

And such as unloading process of reclamation material will generate particulate and suspended dust. The impact may spread to the nearest project activity.

**832.** The impact will affect to public health. Air pollution will cause health problems such as difficulty in breathing and asthma, especially to the workers. The impact characteristic is not cumulative and irreversible.

**Sea Water Quality {Impact is categorized: (-B)}**

**833.** Fishermen may be affected by the impact.

**834.** Duration of the impact will be during construction phase. And intensity of the impact is small. Area extent of the impact is around the Project Area. According to the water current simulation, existing water current condition and spreading turbid water caused by dredging/reclamation activities can be described Figure 15-H-1.

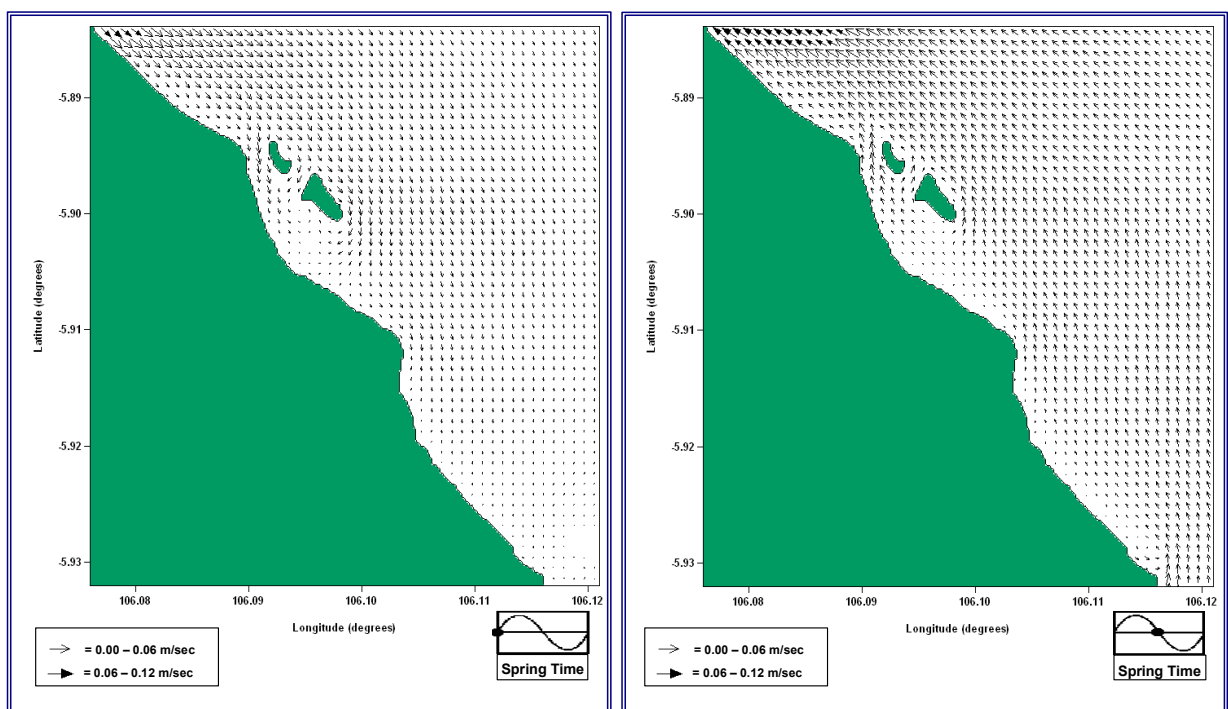


Figure 15-2159204022 Existing Water Current Condition by-

Figure 15-H-1 Existing Water Current Condition by Simulation

**835.**

**836.** Based on local current, the activity of dredging and reclamation during construction stage will generate turbid water (see Figure 15-H-2). According to the simulation, turbid water may spread around 1km long the coastal line (Figure 15-H-3). Briefly speaking, turbid water likely spread toward north-west further than toward south-east. Breakwater can block off turbid water to spread toward off shore, however, sedimentation may occur just outside breakwater. Figure 15-H-2 and Figure 15-H-3 show the distribution of spreading turbid water by dredging work. Simulated concentration of TSS in seawater was calculated under the condition that dredging work continently carried out for 30 days at the whole planned dredging area so that the figures do not explain the actual concentration itself.

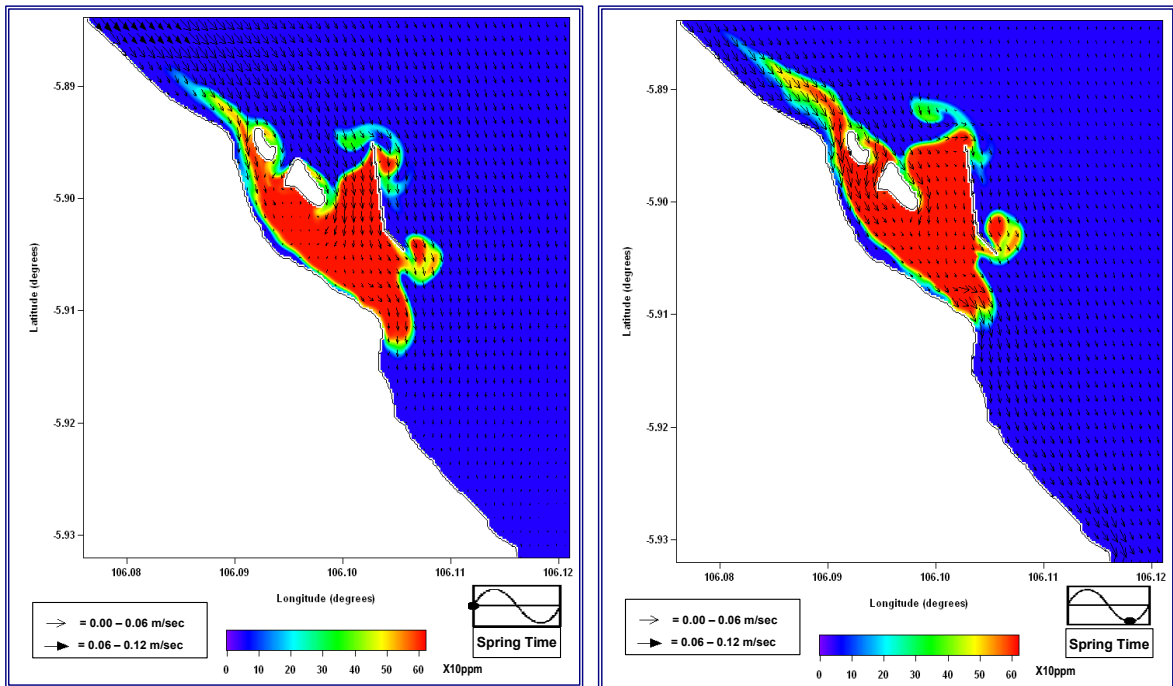


Figure 15-H-2 Simulated Water Current Condition in Case toward 2010  
(Colored drawing describes Maximum Spreading Turbid Water)

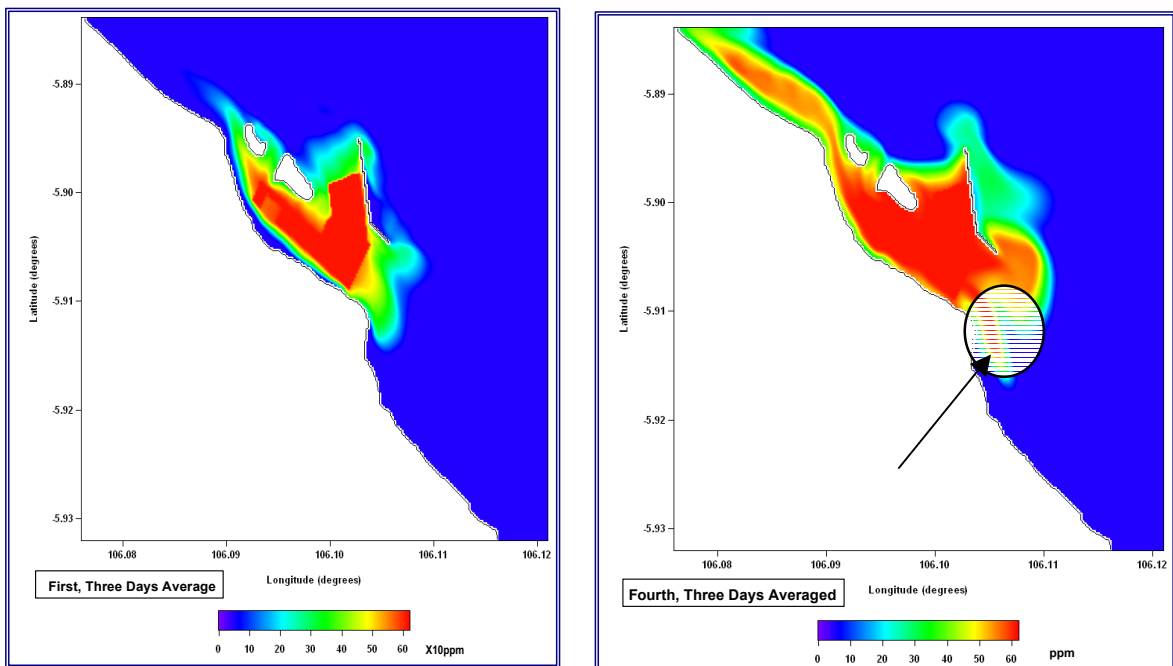


Figure 15-H-3 Simulated Spreading Turbid Water in Case toward 2010  
(Left Fig.: 3 Days after Starting Dredging, Right Fig.: 12 Days after Starting Dredging)

837. The impact will affect to biological condition especially because of decreasing transparency. The impact characteristic is not cumulative and irreversible.

**Noise and Vibration {Impact is categorized: (-C)}**

**838.** Construction workers may be affected by the impact. Duration of the impact will be during construction phase. Area extent of the impact is around the Project Area.

**839.** Intensity of the impact will be small. Noise level caused by operation of construction equipment is estimated around 111dBA. Noise level simulated to be attenuated below 70dBA (Port area standard) 112m far from the construction area, and to be attenuated below 55dBA (Residential area standard) 355m far from the construction area.

**840.** The other environmental component affected by this impact is public health. The impact characteristic is cumulative and reversible Impact.

**Waste and Garbage {Impact is categorized: (-B)}**

**841.** Construction waste should be disposed properly.

*ii) Biological Condition***Aquatic Flora and Fauna {Impact is categorized: (-B)}**

**842.** The Fishermen boat will be affected by the impact that causes to marine ecosystem. Duration of the impact will be during construction phase. Area extent of the impact is around the Project Area.

**843.** Intensity of the impact is medium. Dredging activity will clear some part of Mangrove bush at Ambaru, removing the habitat of Benthos fauna along the dredged area. Seabed materials as well as clay particles from dredging areas will be suspended in water column. The activity will also generate suspended solid in the seawater. High turbidity and siltation may affect aquatic biology.

**844.** Environmental components affected by this impact is disturbing fishing activity. The impact characteristic is cumulative and reversible Impact.

*iii) Socio-Culture and Economy***Traffic Activity {Impact is categorized: (-C)}**

**845.** The fishermen Boat will be affected by the impact. Area extent of the impact is around project area. The duration of impact will continue during dredging and reclamation activity.

**846.** Intensity of the impact is small. Construction activity will increase sea traffic. The impact would be predicted in increasing of sea accidents especially with fisherman's boat.

**847.** Other environmental components will be affected by the impact. The impact characteristic is cumulative and reversible Impact.

**b) On Land Work***i) Physical Chemical Condition***Air Pollution {Impact is categorized: (-C)}**

**848.** The construction workers and residents will be affected by the impact. Area extent of the impact is in/around the project area. The duration of impact is during construction phase especially On Land excavation.

**849.** Intensity of the impact is small. On Land work as excavation of much volume of material will spread particulate material at a maximum of  $5.27 \mu\text{g}/\text{m}^3$  (ground level, 100m from source of impact),  $4.87 \mu\text{g}/\text{m}^3$  in 2m from ground level. Initial concentration of SPM (field survey =  $97 \mu\text{g}/\text{m}^3$ ). Additional material spread will be increased SPM concentration, but still below the standard ( $230 \mu\text{g}/\text{m}^3$ ).

**850.** The operation of construction machines also generates air pollution. The impact may spread to the nearby project area during sea wind blowing toward land. The other environmental components affected by this impact are public health.

**851.** Air pollution will cause public health disturbance to construction worker and residents nearest project activity. The impact characteristic is cumulative and reversible Impact.

***Noise and Vibration {Impact is categorized: (-C)}***

**852.** Construction workers may be affected by the impact. Duration of the impact will be during construction phase. Area extent of the impact is around the Project Area.

**853.** Intensity of the impact will be small. Noise level caused by operation of excavation equipment is estimated around 111dBA. Noise level simulated to be attenuated below 70dBA (Port area standard) 112m far from the construction area, and to be attenuated below 55dBA (Residential area standard) 355m far from the construction area. Concerning Access Road development, noise level is estimated around 106dBA. Especially dump trucks generate 72-95dBA of noise level. This condition will spread up until 56m far from the access road project site.

**854.** The other environmental component affected by this impact is public health. The impact characteristic is cumulative and reversible Impact.

***Hydrological Situation (Run Off) {Impact is categorized: (-C)}***

**855.** The construction workers and residents will be affected by the impact. Area extent of the impact is around project area, estimated 70ha, and the nearest residents, especially Kampung Gondara, Desa Pulo Ampel and Sumuranja. The duration of impact will continue from construction of terminal Facilities and access road construction activity.

**856.** Intensity of the impact is small. Terminal Facility Development and Government Area and all port facilities occupy around 70ha until 2010, it will cause increasing run-off, around  $0.6\text{m}^3/\text{sec}$ . It is necessary to have a suitable drainage design to avoid overflow or flood.

**857.** This impact does not affect other environmental components. The impact characteristic is cumulative and reversible impact.

*ii) Biological Condition*

***Terrestrial Flora and Fauna {Impact is categorized: (-C)}***

**858.** Only farmers will be affected by the impact. Area extent of the impact is around 70ha that will be changed land utilization. This area includes Mangrove forest. The duration of impact will continue from construction phase.

859. Intensity of the impact is small. If farmers can change their work and their demands satisfied, negative impact will decrease. Mangrove forest may disappear.

860. Other environmental component affected by the impact will be decreasing fishing activity around Pulau Kali such as shrimp production. The impact characteristic is cumulative and irreversible impact.

**c) Mobilization/Demobilization of Materials and Equipment**

*i) Physical Chemical Condition*

**Air Quality {Impact is categorized: (-C)}**

861. The resident who live along the local road either from/to Bojonegara or Merak, and construction workers will be affected by the impact. Area extent of the impact is around local road either from/to Bojonegara or Merak. The duration of impact is during the mobilization and demobilization material and equipment, especially in the dry season.

862. Intensity of the impact is small. The increasing traffic may also increase air pollution especially particulate (dust) during dry season. Machine and vehicle combustion will also generate pollutants such as SO<sub>x</sub>, CO, NO<sub>x</sub>.

863. The other environmental component affected by this impact is public health. The increase air pollution from traffic will continue to health problem. The impact characteristic is cumulative and reversible Impact.

*ii) Socio-Culture and Economy*

**Traffic Activity {Impact is categorized: (-B)}**

864. The resident who live along the local road either from/to Bojonegara or Merak, and construction workers will be affected by the impact. Area extent of the impact is around local road either from/to Bojonegara or Merak. The duration of impact is during the mobilization and demobilization material and equipment.

865. Intensity of the impact is medium. Mobilization and demobilization of heavy vehicles, material transport, will increase traffic density, especially to local road that crosses community activity either from/to Bojonegara or Merak.

866. The other environmental components affected by this impact are air pollution, noise disturbance and damage to the public health. The impact characteristic is cumulative and reversible Impact.

**d) Manpower Mobilization**

*i) Physical Chemical Condition*

**Water Supply {Impact is categorized: (-C)}**

867. The number of people affected by impact is around 500 persons of construction workers and the residents. Area extent of the impact is around project area and the nearest residential area especially *Kampung Gondara, Desa Pulo Ampel* and *Sumuranja*. The duration of impact is during the construction phase.

868. Intensity of the impact is small. The port development will need around 500 workers. They will demand approximately 66.3 m<sup>3</sup>/day of water supply. If the contractor uses deep well



to supply their demand, it will affect residents' ground water resources because of limitation of ground water capacity, especially in dry season.

**869.** The other environmental component affected by this impact is public health. Lack of water supply will damage environmental sanitation and cause health disturbance to the workers and residents. The impact characteristic is cumulative and reversible Impact.

***Domestic Water Pollution {Impact is categorized: (-C)}***

**870.** The number of people affected by impact is around 500 persons of construction workers and the residents. Area extent of the impact is around project area and the nearest residential area especially *Kampung Gondara, Desa Pulo Ampel* and *Sumuranja*. The duration of impact is during the construction phase.

**871.** Intensity of the impact is small. The worker will also produce domestic wastewater, which is estimated approximately 50m<sup>3</sup>/day. If this wastewater is uncontrolled or untreated, this condition will degrade the working environment, make it unhealthy, or affect the surrounding project area, i.e., canal, river or seawater, by decreasing water quality. The next impact is health problems to residents and workers.

**872.** The other environmental components affected by this impact are water quality and public health. The impact characteristic is cumulative and reversible Impact.

***Waste and garbage {Impact is categorized: (-C)}***

**873.** The number of people affected by the impact is around 500 persons of construction workers. Area extent of the impact is around project area. The duration of impact is during construction phase.

**874.** Intensity of the impact is small. The worker will also produce solid waste/ garbage, approximately 45 m<sup>3</sup>/day. If waste is not treated well by the contractor, it will damage environmental sanitation. Solid/Liquid garbage will generate disease vectors such as flies, rats, and cockroaches to live there.

**875.** The other environmental component affected by this impact is public health. If the contractor wouldn't treat solid waste/garbage well, this condition will decrease environmental sanitation and continue to health disturbance to workers and residents. The impact characteristic is cumulative and reversible Impact.

*ii) Socio-Culture and Economy*

***Economic Activity {Impact is categorized: (+C)}***

**876.** The Fishermen will be affected by the impact, however, Increasing around 340 persons of construction workers are expected by the Project. Also Port project will be expected to accelerate increasing business chance caused by related business. Area extent of the impact is around project area. The duration of impact will be during construction phase, and will continue after starting operation phase.

**877.** Intensity of the impact is small. If fishermen depend on the fishing activity around P. Kali, their income may reduce. However, according to the interview survey, their main fishing area is not near the project site so that only if their fishing port is relocated to the appropriate location port project will not damage to the fishermen. Meanwhile, increasing job opportunity and business chance can improve the economic activity.

**878.** Other environmental components affected by the impact will be social conflict in case their demand cannot be satisfied. The impact characteristic is cumulative and reversible Impact.

***Social Interaction and Culture {Impact is categorized: (-C)}***

**879.** The people in Pulo Ampel will be affected by the impact. Area extent of the impact is in Pulo Ampel. The duration of impact is during construction.

**880.** Intensity of the impact is medium. The outside workers may affect resident manner to be consumptive people. But the workers usually stay in the base camp. The local residents have a close relation each other. If their demand cannot be satisfied or if they have to scramble to get job with the newcomers, residents may feel social jealously or frictions.

**881.** This impact will not affect other environmental components. The impact characteristic is cumulative and reversible impact.

**3) Operation Phase**

**a) Operation of Port Facilities**

**i) Physical-Chemical Condition**

***Air Pollution {Impact is categorized: (-C)}***

**882.** The operation workers and residents will be affected by the impact. Area extent of the impact is in/around port area. The duration of impact is during operation phase.

**883.** Intensity of the impact is small. Increasing traffic volume may generate air pollution and may be cumulative with fuel combustion from ship and other port facility machinery. This condition may generate air pollution.

**884.** The other environmental component affected by this impact is public health. The increase of air pollution will affect environmental sanitation and health problem. The impact characteristic is cumulative and reversible Impact.

***Sea Water Quality {Impact is categorized: (-C)}***

**885.** The fisherman will be affected by the impact. Area extent of the impact is in/around port area. Duration of the impact is during operation phase.

**886.** Intensity of the impact is small. Oil or fuel leaking from ship activity and leachate will also degrade seawater quality or canal.

**887.** Other environmental component affected by this impact is biological condition (aquatic flora and fauna). The impact characteristic is cumulative and irreversible Impact.

***Noise and Vibration {Impact is categorized: (-C)}***

**888.** The operation workers and residents will be affected by the impact. Area extent of the impact is in/around port area. The duration of impact is during operation phase.

**889.** Intensity of the impact is small. Port operation such as ship machinery and port tools and the traffic will increase noise level, approximately 70-80dBA. This noise level exceeds

port activity standard (< 70dBA), so it will affect workers. This condition at community (< 550dBA) will also affect the nearest housing to port activity.

**890.** The other environmental component affected by this impact is public health. High level of noise will damage to the workers, and also to the residents especially night time. The impact characteristic is cumulative and reversible Impact.

***Water Supply {Impact is categorized: (-C)}***

**891.** The number of people affected by impact are around 300 persons of operation workers and around 8500 passengers per day, and residents. Area extent of the impact is in/around port area and the nearest residential zone, especially *Kampung Gondara*, *Desa Pulo Ampel* and *Sumuranja*. The duration of impact is during operation phase especially dry season.

**892.** Intensity of the impact is small. The port workers, passengers and other related activity demand around 400m<sup>3</sup>/day of water supply. In this time, Bojonegara area is still outside PAM's service area. If port activity uses Deep Well in order to fulfill water demands, this condition will decrease groundwater capacity.

**893.** The other environmental component affected by this impact is public health. The lack of water supply will decrease environmental sanitation and damage public health problem to the workers and residents. The impact characteristic is cumulative and reversible Impact.

***Domestic Water Pollution {Impact is categorized: (-C)}***

**894.** The number of people affected by impact are around 300 persons of operation workers and around 8500 passengers per day, and residents. Area extent of the impact is in/around port area and the nearest residential zone, especially *Kampung Gondara*, *Desa Pulo Ampel* and *Sumuranja*. The duration of impact is during operation phase especially dry season.

**895.** Intensity of the impact is small. Bojonegara port activity will also produce domestic waste water, it will be estimated around 270 m<sup>3</sup>/day (with quality BOD: 350 ppm and COD: 400 ppm).

**896.** The other environmental component affected by this impact is public health. The lack of water supply will decrease environmental sanitation and damage public health problem to the workers, passengers and residents. The impact characteristic is cumulative and reversible Impact.

***Waste and Garbage {Impact is categorized: (-C)}***

**897.** The number of people affected by impact are around 300 persons of operation workers and around 8500 passengers per day, and residents. Area extent of the impact is in/around port area and the nearest residential zone, especially *Kampung Gondara*, *Desa Pulo Ampel* and *Sumuranja*. The duration of impact is during operation phase especially dry season.

**898.** Intensity of the impact is small. Port activity will also produce solid waste/garbage, around 1500kg/day. If port management does not adequately control the treatment system for waste, the negative impact will occur. Sanitation condition will deteriorate. Garbage dumping will invite disease vectors such as rats, cockroaches, etc. and also produce leachate (BOD 30ppm; COD: 60ppm, :Source: Daur Magazine).

**899.** The other environmental component affected by this impact is public health. The lack of water supply will decrease environmental sanitation and damage public health problem to the

workers, passengers and residents. The impact characteristic is cumulative and reversible Impact.

ii) *Biological Condition*

***Aquatic Flora and Fauna {Impact is categorized: (-C)}***

**900.** The Fishermen will be affected by the impact. Area extent of the impact is around port area. The duration of impact is during operation phase.

**901.** Intensity of the impact is small. Marine pollution, likely domestic/sewage pollutant, leachate and oil spills and discharge from ship ballast etc, will be promoted during operation phase. Sewage discharge contains organic matter-composed of high levels of nitrogen and phosphorus-and suspended solid. This nutrient enrichment may trigger eutrophication.

**902.** Other environmental component affected by this impact is decreasing fish production. The impact characteristic is cumulative and reversible Impact.

iii) *Socio-Culture and Economy*

***Economic Activities {Impact is categorized: (+B)}***

**903.** Port operation work is expected to increase around 400 persons of skilled workers. Area extent of the impact is near the residential zone such as Desa Pulo Ampel. The duration of impact is during operation phase.

**904.** Intensity of the impact is medium. This job opportunity will open chance to residents who expect to work for the port, however most residents are unskilled workers. Even the cannot get job, they have various business chance such as food services, transportation services or other individual business. These business chances are expected to increase their income.

**905.** Other environmental components are not affected by this impact. The impact characteristic is cumulative and reversible Impact.

***Traffic Activity {Impact is categorized: (-C)}***

**906.** The resident who live along the local road either from/to Bojonegara or Merak, and construction workers will be affected by the impact. Area extent of the impact is around local road either from/to Bojonegara or Merak. The duration of impact is during the mobilization and demobilization material and equipment.

**907.** Intensity of the impact is small. Port activity may increase traffic volume. The impact would be predicted in increasing of traffic accidents as well as sea accidents.

**908.** The other environmental components affected by this impact are air pollution, noise disturbance and damage the public health. The impact characteristic is cumulative and reversible Impact.

***Socio Interaction, Culture and Security {Impact is categorized: (-C)}***

**909.** The people in Pulo Ampel will be affected by the impact. Area extent of the impact is in Pulo Ampel. The duration of impact is during construction.

**910.** Intensity of the impact is medium. The outside workers may affect resident manner to be consumptive people. But the workers usually stay in the base camp. The local residents

have a close relation each other. If their demand cannot be satisfied or if they have to scramble to get job with the newcomers, residents may feel social jealousy or frictions.

**911.** This impact will not affect other environmental components. The impact characteristic is cumulative and reversible impact.

***Split of Community {Significant impact is categorized: (-C)}***

**912.** The resident surrounding the Port will be affected by the impact. Area extent of the impact is near the communities located surrounding the Port. The duration of impact is during operation phase.

**913.** Intensity of the impact is small. Increasing traffic density will split the community. High density and heavy volume of vehicles passing the community will make crossing roads difficult for the residents, especially the children, so people feel disturbing close communication each other.

**914.** Other environmental component affected by this impact is social Interaction. The impact characteristic is cumulative and reversible Impact.

***b) Maintenance Dredging***

*i) Physical-Chemical Condition*

***Sea Water Quality {Impact is categorized: (-C)}***

**915.** The Port workers will be affected by the impact. Area extent of the impact is inside of breakwater and navigation root. Duration of the impact is during operation phase.

**916.** Intensity of the impact is small. If sedimentation happened and disturbed port activity, maintenance dredging should be done. Dredging activity will cause sea traffic disturbance, and also degrade seawater quality at port area, dumping area and its surroundings.

**917.** The other environmental component affected by this impact is biological (aquatic flora and fauna). The impact characteristic is cumulative and irreversible Impact.

*ii) Biological Condition*

***Aquatic Flora and Fauna {Impact is categorized: (-C)}***

**918.** The Fishermen will be affected by the impact. Area extent of the impact is around port area especially near the existing coral reef. The duration of impact is just temporary, during dredging activity.

**919.** Intensity of the impact is small. Turbid water may affect aquatic flora and fauna, however this impact will be temporary.

**920.** Other environmental component will not be affected by this impact. The impact characteristic is cumulative and reversible Impact.

***4) Summary***

**921.** Overall Evaluation can be summarized in Table 15-H-1.

**Table 15-H-1 Summarized Overall Evaluation**

|                               |  | Pre-Construction | Construction   |            |             |  |                              |  | Operation and Maintenance                             |                        |  |    | Overall Evaluation |                     |                      |                  |
|-------------------------------|--|------------------|----------------|------------|-------------|--|------------------------------|--|---|------------------------|--|----|--------------------|---------------------|----------------------|------------------|
|                               |  |                  | Off Shore Work |            |             | On Land Work                                 |                              |  | Mobilization/Demobilization of Material and Equipment | Man Power Mobilization | Container/Multi Purpose Terminal Development |    |                    | Existing Breakwater | Maintenance Dredging | Port Access Road |
|                               |  |                  | Dredging       | Breakwater | Reclamation | Container/Multi Purpose Terminal Development | Port Access Road Development | Container/Multi Purpose Terminal Development |   |                        | Container/Multi Purpose Terminal Development |    |                    |                     |                      |                  |
| Physical-Chemical Environment | (1) Air Pollution                            |                  | -C             | -C         | -C          | -C   | -C                           | -C   |   | -C                     |  | -C | -C                 | -C                  |                      |                  |
|                               | (2) Sea Water Quality                        |                  | -B             | -C         | -C          |  |                              |  | -C  |                        |  |    |                    | -C                  |                      |                  |
|                               | (3) Noise and Vibration                      |                  | -C             | -C         | -C          | -C   | -C                           |  | -C  |                        |  |    | -C                 | -C                  |                      |                  |
|                               | (4) Water Supply                             |                  |                |            |             |  |                              | -C   | -C  |                        |  |    |                    | -C                  |                      |                  |
|                               | (5) Domestic Water Pollution                 |                  |                |            |             |  |                              | -C   | -C  |                        |  |    |                    | -C                  |                      |                  |
|                               | (6) Waste and Garbage                        |                  | -B             |            |             |  |                              | -C   | -C  |                        |  |    |                    | -C                  |                      |                  |
|                               | (7) Hydrological Situation (Run Off)         |                  |                |            |             | -C   | -C                           |  |   |                        |  |    |                    | D                   |                      |                  |
| Biological Environment        | (1) Aquatic Flora and Fauna                  |                  | -B             | -C         | -C          |  |                              |  |   | -C                     |  | -C |                    | -C                  |                      |                  |
|                               | (2) Terrestrial Flora and Fauna              |                  |                |            |             | -C   |                              |  |   |                        |  |    |                    | -C                  |                      |                  |
| Social Environment            | (1) Land Use                                 | +C               |                |            |             |  |                              |  |   |                        |  |    |                    | +C                  |                      |                  |
|                               | (2) Resettlement                             | -B               |                |            |             |  |                              |  |   |                        |  |    |                    | -C                  |                      |                  |
|                               | (3) Economic Activity                        |                  |                |            |             |  |                              | +C   | +B  |                        |  | +B |                    | +B                  |                      |                  |
|                               | (4) Traffic activity                         |                  | -C             | -C         |             |  |                              | -B   | -C  |                        |  |    |                    | -C                  |                      |                  |
|                               | (5) Social Interaction, Culture and Security |                  |                |            |             |  |                              | -C   | -C  |                        |  |    | -C                 | -C                  |                      |                  |
|                               | (6) Split of Community                       |                  |                |            |             |  |                              |  |   |                        |  |    | -C                 | -C                  |                      |                  |

**15-H-5 Environmental Management/Monitoring Plan**

**1) Introduction**

922. The Environmental Management Plan is prepared:

- To prevent, to mitigate and to control significant negative impact.
- To increase positive impact.

923. For fulfill the above purpose, IPC2 and each contractor shall establish Environmental Management Plan, the environmental monitoring plan should be prepared for evaluating whether the Environmental Management Plan is properly and effectively carried out and enforced its plan.

924. DGSC has responsibility of supervising the project, they shall inspect the activities of Environmental Management/Monitoring Plan especially during construction phase.

925. The responsibility of each organization will be explained below:

- IPC2: IPC2 will have responsibility to control Environmental Management/Monitoring Plan, mainly to coordinate with Stakeholders, Local Government and others. IPC2 can instruct the contractors to follow with Environmental management Plan.
- DGSC: DGSC also have responsibility to control Environmental Management/Monitoring Plan. IPC2 will act as an executing organization of the

project, DGSC supervises IPC2's activity.

- Contractor: Contractor shall pay full attention to the environmental consideration by following with Environmental Management Plan. They are obligated to report their activities concerning environmental impacts as specified in Environmental Management/Monitoring Plan to IPC2 and other management organizations. And they shall carry out some of Monitoring Survey by themselves.
- Local Government: Local Government (Banten Province, Bojonegara District or each Village such as Desa Pulo Ampel) shall cooperate with IPC2 and DGSC, to fulfill the Management Plan so that Implementation process of the Port Project shall be harmonized with Local Government Policies/Strategies especially for land utilization plan, environmental sanitation, waste/garbage control or water supply.
- Residents and NGOs: the Port Project affects the residents directly. They are interested in the Project. So IPC2 and related organization shall inform to them concerning the Project such as working schedule, result of monitoring survey, information of job opportunity e.g.

## 2) **Proposed Environmental management Plan**

### a) **Pre-construction Phase**

#### i) *Social Environment*

**926.** The following plans are necessary to manage for solving land acquisition, social confliction:

- To solve land acquisition process cooperation with Nine Committee (*Panitia Sembilan*) who coordinates and supervises the Land Acquisition process such as resettlement program, evaluating reasonable land price or compensation between Developer and Residents.
- To prepare reasonable relocation area for the residents in Pulo Ampel. They expects to relocate near the port area.
- To conduct public hearing with stakeholders especially residents.

### b) **Construction Phase**

#### i) *Physical-Chemical Environment*

**927.** The following plans are necessary to manage for solving water pollution:

- To arrange schedule of off shore work especially dredging work in order to minimizing to spread turbid water.  
According to the simulation, turbid water spreads along the coastal line, breakwater will block off turbid water. To monitor whether turbid water reach surrounding fishery area like toward south-east is necessary.
- If concentration of suspended solid (TSS) exceeds environmental standard (< 80mg/L) outside the project area., dredging way and schedule shall be changed to reduce turbid water.
- To control the possibility of oil leakage from construction tools.  
If oil leakage accident happens, contractor shall minimize to spread oil, and recover it.
- Contractor shall prepare the emergency program to prevent accident.

- 928.** The following plans are necessary to manage solving air pollution:
- Contractor should select environmental friendly equipment for example gasoline powered vehicle which more friendly than diesel powered vehicle.
  - To maintain the construction equipment properly to minimize exhaust gas such as heavy vehicle, following with the regulation.
  - Contractor ,IPC2 and DGSC should use covering sheet on bulk construction material during transportation.
  - To place construction materials and reclamation material properly in construction land area, far from residential area.
  - To spray water to prevent dust to spread.
- 929.** The following plans are necessary to manage solving noise disturbance:
- Contractor should consider the construction tools used to minimize this impact.
  - Contractor should give ear protector to the workers for noise prevention.
  - Noisy Equipments should be stationed further (around 355m) from residents area
- 930.** The Contractor should design and construct the drainage dimension to avoid flood. Design of port access road and utilization of port related area should be designed not to disturb discharge.
- 931.** The following plans are necessary to manage providing water supply:
- Contractor should consider the worker and port water supply.
  - Contractor should consider the capacity and quality of water supply.
  - Contractor should cooperate with Local Public Water Supply (PDAM) to supply by pipeline or movable tank truck.
- 932.** The following plans are necessary to manage controlling domestic water pollution:
- Contractor should give attention to the worker to keep clean condition by announce or training.
  - Contractor should prepare sufficient toilet and the treatment (septic tank), for temporary use. If necessary, contractor should prepare movable toilet.
- 933.** The following plans are necessary to manage controlling waste and garbage:
- Contractor should give attention to the worker to keep clean condition by announce or training.
  - Contractor should prepare waste bag.
  - All domestic refuse bins should be with appropriate cover.
  - The Contractor should cooperate with Banten Environment Department for solid waste management.
  - The domestic waste should be transported out from bins and temporary dumping area (TPS) inside the Port area, routinely within 24 hours to hinder bad smell and leachate.
  - Construction wastes such as formwork woods, material wastes, rubbles, as far as



possible should be recycled by the contractor or salvagers (pemulung).

ii) *Biological Environment*

**934.** The following plans are necessary to manage conserving ecosystem:

- To minimize turbid water to spread outside the project area.
- The Contractor and Bojonegara Port Management should consider with mangrove plantation program to compensate disappearance of mangrove by the project.
- Protection of existing mangrove and coral reef around P. Kali is necessary to conserve marine ecosystem.

iii) *Social Environment*

**935.** The following plans are necessary to manage controlling traffic condition:

- Contractor must cooperate with POLSEK (policeman); prepares 1) access road by fixing a sign, 2) road mark at in/out the gates and 3) local road that cross community.
- Contractor should prepare a parking area and loading/unloading facility for construction materials and equipment vehicles within the project area to minimize or avoid traffic congestion.
- Contractor arranges mobilization and demobilization of equipments at night.
- Contractor should instruct the drivers/workers to follow the traffic regulation and to drive safely.

**936.** Also for controlling sea traffic:

- To strengthen the rule for navigation, and to inform the working schedule to the fishermen surrounding project activity.
- Contractor should instruct the ship captains to follow with the traffic regulation and to drive safely.
- Contractor cooperates with Port Administration give a sea traffic sign and decide navigation roots, and announce to the users.
- Contractor cooperates with Port Administration announce their regulation to other activity (fisherman activity).
- To establish Safety Manual and Prevention Guideline for accident.

**937.** The following plans are necessary to manage improving economic condition:

- Contractor should inform job opportunity and business chance to the residents and local Government (especially *Kelurahan Pulo Ampel*). If necessary, contractor should ensure that qualified workers come from local residents.
- Contractor and project port provide open space for residential companies and people who work for various business such as food stand or transportation services.

**938.** Contactor, port management and local government should control domestic wastewater, waste/garbage and water supply in order to minimize to damage public health condition.

**c) Operation Phase**

**939.** Briefly speaking, almost same management plan necessary during operation phase. That to say:

**940.** For preventing water pollution:

- When the dredging work, if concentration of suspended solid (TSS) exceeds environmental standard (< 80mg/L) outside the project area., dredging way and schedule shall be changed to reduce turbid water.
- To control the possibility of oil leakage from vessels.  
If oil leakage accident happens, contractor shall minimize to spread oil, and recover it.

**941.** For Preventing air pollution:

- To select environmental friendly equipment.
- To maintain the equipment properly to minimize exhaust gas such as heavy vehicle, following with the regulation.

**942.** For solving noise disturbance:

- To construct sound barrier boundary of residential zone

**943.** The following plans are necessary to manage for providing water supply:

- Improvement of water supply system in cooperation with PDAM.

**944.** The following plans are necessary to manage for controlling domestic water pollution:

- Improvement of waste/garbage and domestic water treatment system.

**945.** The following plans are necessary to manage for conserving ecosystem:

- To minimize turbid water to spread outside the port area during maintenance dredging.
- Protection of existing mangrove and coral reef around Pulau Kali is necessary to conserve marine ecosystem.

**946.** The following plans are necessary to manage for controlling traffic condition:

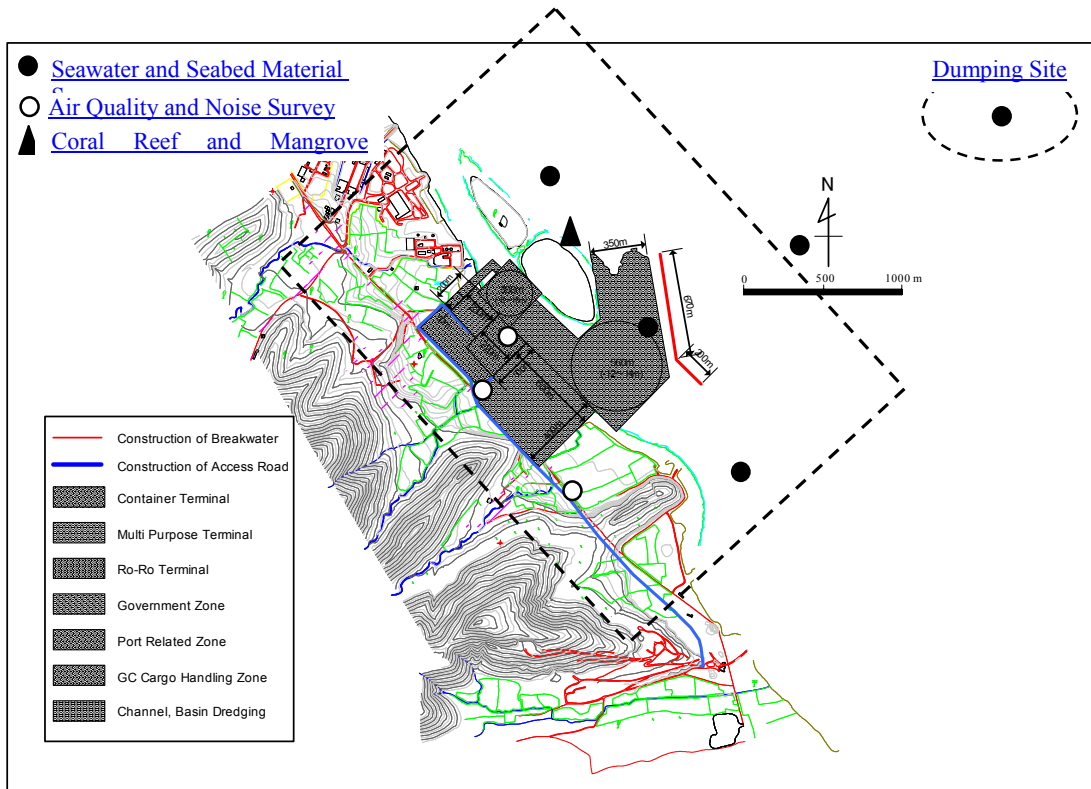
- Port Management must cooperate with POLSEK (policeman); prepares 1) access road by fixing a sign, 2) road mark at in/out the gates and 3) local road that cross community.

**947.** The following plans are necessary to manage for improving economic condition:

- Port management and related organizations should inform job opportunity and business chance to the residents and local Government (especially *Kelurahan Pulo Ampel*).
- To provide open space for residential companies and people who work for various business such as food stand or transportation services.

3) **Proposed Environmental Monitoring Plan**

948. Proposed Environmental Monitoring Plan can be explained in Table 15-H-2. Proposed monitoring Points are shown in Figure 15-H-4.



**Figure 15-H-4 Proposed Monitoring Points for Seawater Quality, Seabed Materials, Air Quality, Noise and Coral/Mangrove Survey**

**Table 15-H-2 Proposed Environmental Monitoring Plan**

| Target Environmental Impact   | Method of Monitoring Survey  | Monitoring Period   |
|---|--|---|
| Social Environmental Impact (Land Acquisition Process, Land Use e.g.) | Public Hearing with Stakeholders.<br>Interview Survey with Residents and Local Government  | Pre-Construction to Operation Phase<br>One time a Year  |
| Traffic Condition   | Traffic Survey, Counting Traffic volume and Vehicle Type   | Construction to Operation Phase<br>One time a Year  |
| Water Quality   | Water/Sediment Sampling and Observation Survey. Locations are around Port Development Area and Dumping Area for Dredging Materials.<br>Sea Water<br>Domestic Pollutant: COD, Nutrient, TSS<br>Oil and Grease<br>Heavy Metals: Hg, Cd, Pb, As,<br>Harmful Substance: PCBs,<br>Other Items following Regulation.<br>Sediment:<br>Soil Condition, COD,<br>Heavy Metals: Hg, Cd, Pb, As,<br>Harmful Substance: PCBs,<br>Other Items following Regulation.<br>Sedimentation | Construction Phase<br>Sea water quality Survey;<br>Domestic Pollutant and Oil and Grease:<br>One time a month<br>Other parameters:<br>One time a year<br>Seabed Materials (Sediment) Survey:<br>One time a year, and before starting<br>Dredging work<br>Operation Phase; All parameters shall be surveyed one time a year. |
|   | Turbid Water by Observation Survey   | Every time during Off Shore Work especially Dredging  |
|   | Monitoring Survey for Discharge Water from Port Facilities<br>By Water sampling or Observation Survey  |   |
| Air Quality   | SO <sub>2</sub> , NO <sub>2</sub> , CO, SPM and Others following with regulation.  | Continues measuring Survey during Construction Phase.<br>One time a Year during Operation Phase   |
| Noise and Vibration   | Noise Level and Traffic Condition  | One time a Year during Construction to Operation Phase  |
| Hydrological Situation (Run Off)                                      | Monitoring drainage condition by Observation Survey.<br>Interview Survey with residents or Local Government  | One time a Year in Rainy Season during Construction to Operation Phase  |
| Water Supply, Waste and Garbage                                       | Observation Survey or Interview Survey with Residents and Local Government.  | One time a Year during Construction to Operation Phase  |
| Biological Condition  | Observation Survey for Mangrove area and Coral Reef.<br>Sampling phyto/zoo plankton and benthos.   | One time a Year during Construction Phase<br>One time every 3 or 4 Years during Operation Phase.  |
| Social Conflict, Security, Public Health                              | Interview Survey with residents and Local Government including Police and medical personnel.<br>Public Hearing   | One time a Year during Construction to Operation Phase  |