添付資料

添付資料-1

実施細則、協議議事録

実施細則（Scope of Works）

SCOPE OF WORK

FOR

THE PROJECT FOR THE STUDY ON STRENGTHENING COMPETITIVENESS AND DEVELOPMENT OF SIHANOUKVILLE PORT

IN

THE KINGDOM OF CAMBODIA

AGREED UPON BETWEEN

MINISTRY OF PUBLIC WORKS AND TRANSPORT,

SIHANOUKVILLE AUTONOMOUS PORT

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Phnom Penh, February 21, 2011

Koizumi
Leader of Detailed Planning Survey Team
Japan International Cooperation Agency
Japan

Tram Iv Tek
Minister
Ministry of Public Works and Transport
Royal Government of Cambodia

H.E. Lou Kim Chhun
Delegate of the Royal Government in Charge
as Chairman & CEO
Sihanoukville Autonomous Port
Royal Government of Cambodia

I. INTRODUCTION

In response to the official request of the Royal Government of Cambodia (hereinafter referred to as "RGC"), the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, in consultation with the Government of Japan, decided to conduct the technical cooperation for development planning on "The Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port" (hereinafter referred to as "the Project") in accordance with the relevant laws and regulations in force in Japan. Accordingly, JICA will jointly undertake the Project with the authorities concerned of RGC.

On the part of RGC, Ministry of Public Works and Transport (hereinafter referred to as "MPWT") and Sihanoukville Autonomous Port (hereinafter referred to as "PAS") shall act as the counterpart agencies to the Japanese Project team (hereinafter referred to as "the Team") and as the coordinating body in relation to the other concerned organizations for the smooth implementation of the Project.

This document sets forth the Scope of Work of the Project.

II. OBJECTIVES OF THE PROJECT

The objectives of the Project are;

1) to strengthen competitiveness of Sihanoukville Port
2) to develop the Master Plan of Sihanoukville Port.

III. STUDY AREA

The study area is mainly around Sihanoukville Port shown in APPENDIX 1. In addition, in order to conduct the demand forecast, the study area will entail the whole Cambodia and surrounding countries.

IV. SCOPE OF THE PROJECT

In order to achieve the objectives mentioned above, the Scope of Work for the Project shall cover the following items:

1 Analysis of the present status

1.1 Review of the past documents and the relevant studies

1.2 Analysis on the trend of socio-economic situation and trade environment
1.3 Survey on the port hinterland
1.3.1 Analysis on the business and trade trend of the principal shippers
1.3.2 Analysis on the status and development plan of SEZ
1.3.3 Analysis on the status and development plan of the road and railway
1.4 Survey on the surrounding ports
1.4.1 Analysis on the status and development plan of the private port(s)
1.4.2 Analysis on the status and development plan of Phnom Penh Port
1.4.3 Analysis on the status and development plan of Cai Mep - Thi Vai International Port
1.5 Survey on the existing transport industries and service providers including the shipping companies, forwarders and cargo handling companies
1.6 Analysis on the maritime trend including surrounding countries (trunk line/feeder line)
1.7 Analysis on competitiveness of Sihanoukville Port
1.7.1 Analysis on the cost and time on the trade alternative routes
1.7.2 Analysis on the transportation capacity for road, railway and river related to the trade alternative routes
2 Development of strategy to strengthen competitiveness of Sihavoukville Port
2.1 Development of the strategy on port service improvement
2.1.1 Development of the basic principal on cargo inducement
2.1.2 Analysis on the improvement plan of the cargo handling and the gate operation
2.1.3 Analysis on the mitigation plan of the surrounding road congestion
2.1.4 Analysis on the railway utilization plan
2.1.5 Analysis on the linkage and the preferential treatment for SEZ
2.1.6 Development of the improvement plan and the action plan for port procedures
2.1.7 Development of the port sales strategy
2.2 Analysis on the port management and financial strategy
2.2.1 Analysis on the financial condition of PAS
2.2.2 Analysis on the port related cost and the gradual cost revision plan
2.2.3 Analysis on the role sharing of the public and private for port operation
2.2.4 Recommendation on the port management and financial strategy
2.3 Analysis on the organizational strategy
2.3.1 Capacity assessment of PAS (organizational system, staffing and human resource)
2.3.2 Recommendation on the organizational strategy

3 Development of the Master Plan for Sihanoukville Port
- 3.1 Consideration on the vision of Sihanoukville Port
- 3.2 Analysis on the socio-economic framework
- 3.3 Implementation of demand forecast on the cargoes and passengers
- 3.4 Analysis on the capacity of the present port facilities
- 3.5 Analysis on the necessity of improvement for the port facilities
- 3.6 Natural condition survey including topographic survey, geological survey and bathymetry
- 3.7 Social and environmental survey
- 3.8 Consideration on the impact for the residential area for fishermen around Sihanoukville Port
- 3.9 Study on the necessary port facilities
- 3.10 Implementation of Strategic Environmental Assessment (SEA)
- 3.11 Development of the Master Plan for Sihanoukville Port
- 3.12 Planning of the access road and railway
- 3.13 Analysis on port security
- 3.14 Planning of port environment improvement
- 3.15 Preliminary design and cost estimation
- 3.16 Economic and financial analysis
- 3.17 Analysis on the port operation scheme
- 3.18 Planning of the maintenance program on the port facilities and equipment

4 Conclusion and recommendations

V. SCHEDULE OF THE PROJECT

The Project is estimated for twelve (12) months in accordance with the tentative schedule as described below. The schedule is tentative and subject to be modified when both parties agree upon any necessity of the modification that will arise in the course of the Project.

TENTATIVE SCHEDULE

Month	1	2	3	4	5	6	7	8	9	10	11	12
Work in Cambodia												
Work in Japan												
Reports	△ IC/R			△ PR/R				△ IT/R			△ DF/R	△ F/R

IC/R: Inception Report
PR/R: Progress Report

IT/R: Interim Report
DF/R: Draft Final Report
F/R: Final Report

VI. PROJECT IMPLEMENTATION MECHANISM

1.Steering Committee
MPWT will establish the Steering Committee to provide overall policy.

2.Collaboration between JICA Project Team and Counterpart Team of PAS
PAS will assign the counterpart personnel to work together with the Project Team.

3.Technical Committee
Technical Committee which consists of both PAS and the Team is to review the findings by the Project and provide comments for improvement of the Project from time to time. The comments and recommendations suggested by the Technical Committee shall be integrated into the Project.

VII. REPORTS

JICA shall prepare and submit the following reports in English to Cambodia.

1. Inception Report:
Thirty (30) copies, at the time of one month after commencement of the Project

2. Progress Report
Thirty (30) copies, at the time of about four (4) months after the commencement of the Project.

3. Interim Report:
Thirty (30) copies, at the time of about eight (8) months after the commencement of the Project.

4. Draft Final Report:
Forty (40) copies, at the time of about eleven (11) months after the commencement of the Project. The RGC shall provide JICA with its written comments within one (1) month after the receipt of the Draft Final Report.

5. Final Report:
Fifty (50) copies, within one (1) month after the receipt of the written comments on the Draft Final Report. In addition, the final report will be translated into Khmer language for ten (10) copies for a reference.

Ⅷ. UNDERTAKINGS OF JICA

For the implementation of the Project, JICA shall take the following measures;

1. to dispatch, at its own expense, the Team to Cambodia and

2. to pursue technology transfer to the counterpart personnel in the course of the Project

Ⅸ. UNDERTAKINGS OF THE RGC

1. To facilitate the smooth conduct of the Project; the RGC shall take necessary measures:

(1) To permit the members of the Team to enter, leave and sojourn in Cambodia for the duration of their assignments therein and exempt them from foreign registration requirements and consular fees;
(2) To exempt the members of the Team from taxes, duties and any other charges on equipment, machinery and other material brought into Cambodia for the implementation of the Project;
(3) To exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Project;
(4) To provide necessary facilities to the Team for the remittance as well as utilization of the funds introduced into Cambodia from Japan in connection with the implementation of the Project;
(5) To provide necessary arrangement to conduct the field survey to the surrounding countries such as Vietnam, if necessary.

2. RGC shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Project, except when such claims arise from gross negligence or willful misconduct on the part of the Team.

3. MPWT and PAS shall act as counterpart agencies to the Team and also as a coordinating body with other relevant organizations for the smooth implementation of the Project, on behalf of the Cambodian side.

4. MPWT and PAS shall, at its own expense, provide the Team with the following, in cooperation with other organizations concerned:

(1) Security-related information on as well as measures to ensure the safety of the Team;
(2) Information on as well as support in obtaining medical service;
(3) Available data (including maps and photographs) and information related to the Project;
(4) Counterpart personnel;
(5) Suitable office space with necessary equipment and facilities such as telephone line, internet, desks, etc. in PAS; and
(6) Credentials or identification cards.

5. MPWT and PAS would be required to comply with the JICA Guidelines for Environmental and Social Considerations (hereinafter referred to as "the JICA Guidelines"), and to take the JICA Guidelines fully into consideration

X.CONSULTATION

1. MPWT, PAS and JICA shall consult with each other in respect of any matter that may arise from or in connection with the Project.

2. The present document will become valid after authorization by JICA Headquarters and the RGC.

APPENDIX -1

Project area

協議議事録（Minutes of Meeting）

MINUTES OF MEETING

ON

SCOPE OF WORK

FOR

THE PROJECT FOR THE STUDY ON STRENGTHENING COMPETITIVENESS AND DEVELOPMENT OF SIHANOUKVILLE PORT

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AGREED UPON BETWEEN

MINISTRY OF PUBLIC WORKS AND TRANSPORT,

SIHANOUKVILLE AUTONOMOUS PORT

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Phnom Penh, February 21, 2011

Yukihiro Koizumi
Leader of Detailed Planning Survey Team
Japan International Cooperation Agency
Japan

H.E. Tram Iv Tek
Minister
Ministry of Public Works and Transport
Royal Government of Cambodia

H.E. Lou Kim Chhun
Delegate of the Royal Government in Charge as Chairman & CEO
Sihanoukville Autonomous Port
Royal Government of Cambodia

In Response to the official request of the Royal Government of Cambodia (hereinafter referred to as "RGC"), Japan International Cooperation Agency (hereinafter referred to as "JICA") , in consultation with the Government of Japan, dispatched the detailed planning survey team headed by Mr. Yukihiro Koizumi (hereinafter referred to as "the Team") from February 14 to March 12, 2011 to discuss the scope of work for "The Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port" (hereinafter referred to as "the Project").

During the stay in Cambodia, a series of discussions were held with Ministry of Public Works and Transport (hereinafter referred to as "MPWT"), Sihanoukville Autonomous Port (hereinafter referred to as "PAS") and other organizations related to the Project. The list of participants of the meetings is shown in Annex 1.

This document summarizes major items discussed between both sides and is intended to supplement the Scope of Work for smooth implementation of the Project.

1. Project Title

The original requested Project title was "The Study on Next Development of Sihanoukville Port". However, since the scope of work shall cover not only development but also strengthening of competitiveness of Sihanoukville Port, both sides agreed that the Project title is changed to "The Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port".

2. Target Year

The target year of the master plan will be the year of 2030, corresponding to the world maritime market and the development plan of the domestic port sector. In addition to the target year of 2030 as a long term development plan, the middle term target year is set as the year of 2020 for emergent and/or prioritized measures for port development.

3. Steering Committee and Technical Committee

3-1 MPWT will establish the Steering Committee to provide overall policy. The Steering Committee will be set up for effective and efficient implementation of the Project under the chair of MPWT. The Committee will decide on important matters to promote the output of the Project. The Committee will comprise representatives from the following related organizations.

(1) Ministry of Public Works and Transport
(2) Sihanoukville Autonomous Port
(3) Phnom Penh Autonomous Port
(4) Ministry of Economy and Finance
(5) Ministry of Commerce
(6) Council for the Development of Cambodia

(7) Preah Sihanouk Province
(8) JICA Project Team
(9) JICA Cambodia Office

MPWT shall inform JICA Cambodia Office of the members of the Committee before the commencement of the Project.

3-2 PAS will appoint the Technical Committee members and the focal person with the Team before the commencement of the Project.

4. Transfer of Technology

4-1 The Project team will make an effort to transfer skills and technology through On-the-Job Training to the staffs of PAS.

4-2 With regard to the counterpart training in Japan for technology transfer, the Team will convey its necessity to JICA headquarters. After approval of the request, the number of accepted personnel, field and duration of the training shall be discussed after the commencement of the Project. It was agreed tentatively that the number of the personnel shall be three (3) and duration shall be around two (2) weeks.

5. Counterpart

Both sides agreed that the Project should be conducted in close collaboration between the Cambodian side and the Japanese side. In this context, MPWT and PAS agreed to assign an appropriate number of counterpart personnel.

6. Information sharing among the related organizations and companies

Both sides confirmed that it was essential to consider the vision of Sihanoukville port through the information sharing with the major port users such as garment industries, rice industries and shipping companies.

7. Utilization of the Result of the Project

Both sides confirmed that the study result should be reflected on its port sector policy including the functional differentiation of Sihanoukville port and Phnom Penh Port.

8. JICA Guidelines for Environmental and Social Considerations

The Team explained the outline of the JICA Guidelines for Environmental and Social Considerations (hereinafter referred to as "the JICA Guidelines") and notified that the Project might be dealt with Category "A" in accordance with the JICA Guidelines. The Cambodian side agreed to take the JICA Guidelines fully into consideration to implement the Project.

9. Others

9-1 The Cambodian side requested the Team to prepare each report by Khmer to

promote understanding for the Cambodian side. The Team confirmed the necessity and will convey it to JICA headquarters.

9-2 Both sides confirmed that it was significant to coordinate with "The Project for Establishment of National Port Policy and Administration System", which would draft overall National Port Policy, in order to provide the distinctive role to Sihanoukville Port and Phnom Penh Port.

9-3 Both sides confirmed that it was necessary to review "The study on regional development of the Phnom Penh - Sihanoukville Growth Corridor", which was conducted in 2003, in order to investigate the achievement and issues, and to incorporate to the Project.

9-4 PAS pointed out the difficulties to utilize or modify the system of Container Terminal Management System (CTMS). The Team recognized them and will convey the necessity of technical assistance to JICA headquarters.

9-5 The Team notified RGC that they estimated to start discussions of the Inception Report in June, 2011, subject to JICA's internal procedures.

Annex-1

The List of Participants in the Meeting

CAMBODIAN SIDE

Ministry of Public Works and Transport

H.E. Tram Iv Tek
H.E. Leng Thun Yetheu
Mr. Chan Dara
Mr. Soeung Sokong
Mr. Chhim Phalla

Sihanoukville Autonomous Port

H.E. Lou Kim Chhun
H.E. Ma Sunhout
Mr. Sem Kythay
Mr. Chea Yuthdika
Mr. Men Chann
Mr. Ty Sakun
Mr. Ouk Somethy
Mr. Souk Kolchenda
Mr. Srey Narin
Mr. Thay Mengly
Mr. May Marith

JAPANESE SIDE

The Detailed Planning Survey team, JICA

Mr. Yukihiro Koizumi, Leader
Mr. Tomohiro Kobayashi, Port Planning
Mr. Shinya Kawada, Environmental and Social Considerations
Mr. Hiroyuki Yokoi, Project Coordinator

JICA Cambodia Office

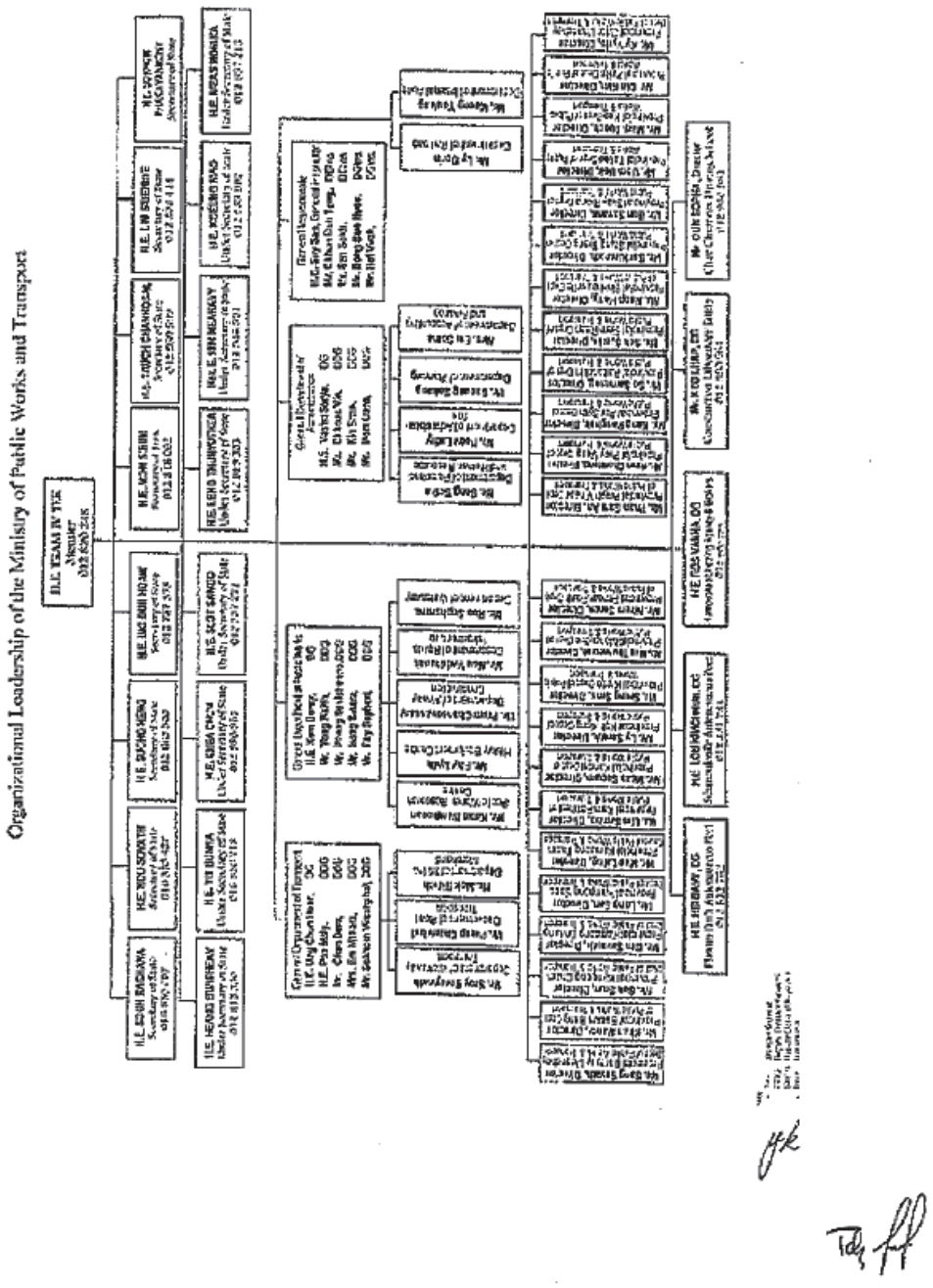
Mr. Yasujiro Suzuki, Chief Representative
Mr. Takanobu Shinodda, Representative

Japanese Expert

Mr. Atsushi Fujii, JICA Expert to MPWT
Mr. Kenji Sosa, JICA Expert to PAS
Mr. Hiroshi Hattori, JODC Expert to Port SEZ

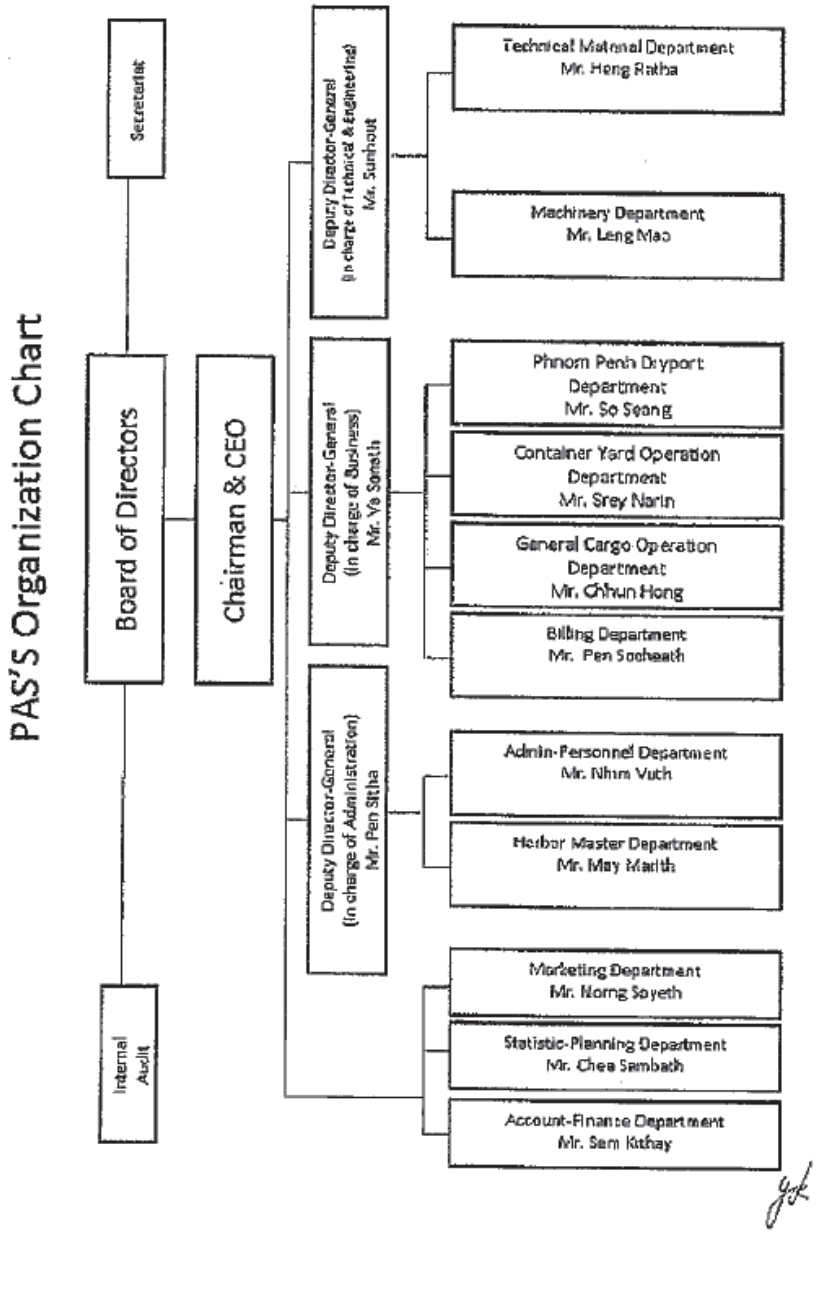
Organization Chart of MPWT

Annex-2



Organization Chart of PAS

Annex-3



添付資料-2

ステアリングコミッティー議事録

RECORD OF DISCUSSION
OF
THE FIRST STEERING COMMITTEE MEETING
FOR
THE PROJECT FOR THE STUDY ON STRENGTHENING COMPETITIVENESS AND DEVELOPMENT OF SIHANOUKVILLE PORT IN THE KINGDOM OF CAMBODIA

I. INTRODUCTION

The First Steering Committee Meeting was held on August 9, 2011, at the Ministry of Public Works and Transport in Phnom Penh. The meeting was chaired by H.E. Tram Iv Tek, Minister of Public Works and Transport.

The objective of the meeting was to discuss and approve the Inception Report for the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port submitted to the Committee by the JICA Project Team.

The list of participants is attached to this record of discussion.

In the opening remark, H.E. Tram Iv Tek appreciated the implementation of the Study Project and emphasized the importance of strengthening the competitiveness of ports in Cambodia.

Then, Mr. Yasujiro Suzuki, the Chief Representative of JICA Cambodia Office, in his remark, stressed the importance of improving efficiency and capacity of Sihanoukville Port and requested the strong commitment of MPWT and PAS toward the achievement of this goal.

Following the speeches, Dr. Tadahiko Yagyu and Mr. Takashi Kadono of the JICA Study Team made a presentation on the contents of the report.

II. CONCLUSIONS

1. The Inception Report was endorsed by the Committee.

2. The Committee decided to invite a representative from the General Department of Customs and Excise of Cambodia as a member of the Committee.

3. The Committee requested the Project Team to implement the Project duly taking into consideration the comments made in the meeting.

4. The major comments are as follows:
   - PAS is ready to reform itself in collaboration with the Project Team in order to strengthen the competitiveness of Sihanoukville Port.
   - "Cooperative competition" is an important concept. Sihanoukville Port and Phnom Penh Port shall complement each other through fair competition.

- The Project is expected to deliberate the port strategy which can be referred in the formulation of the next basic strategy of the country. For example, the idea in which the whole area of a province is defined as a Special Economic Zone shall be examined in the formulation of the port strategy.
- Considering the listing of PAS's stock, the improvement of transparency of PAS is required.
- Security shall also be studied in the Project.
- Efficiency improvement and cost reduction of port access are important issues to be examined in the Project.
- Ideas of stakeholders such as Cambodia Investment Board shall be reflected in the port strategy.
- Precedent studies such as "The Study on National Integrated Strategy of Coastal Area and Master Plan of Sihanoukville for Sustainable Development (JICA, 2010)" and the study on waterborne transport on Mekong River carried out by MRC shall be reviewed and utilized in the Project.

Phnom Penh, August 16 , 2011

H.E Tram Iv Tek
Minister
Ministry of Public Works and Transport

2

RECORD OF DISCUSSION
OF
THE SECOND STEERING COMMITTEE MEETING
FOR
THE PROJECT FOR THE STUDY ON STRENGTHENING COMPETITIVENESS AND DEVELOPMENT OF SIHANOUKVILLE PORT IN THE KINGDOM OF CAMBODIA

I. INTRODUCTION

The Second Steering Committee Meeting was held on November 16, 2011, at the Ministry of Public Works and Transport in Phnom Penh. The meeting was chaired by H.E. Tram Iv Tek, Minister of Public Works and Transport.

The objective of the meeting was to discuss and approve the Progress Report for the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port submitted to the Committee by the JICA Project Team.

The list of participants is attached to this record of discussion.

In the opening remark, H.E. Tram Iv Tek appreciated the implementation of the Study Project and emphasized the importance of strengthening the competitiveness of ports in Cambodia.

Then, Mr. Yasujiro Suzuki, the Chief Representative of JICA Cambodia Office, in his remark, stressed the importance of improving efficiency and capacity of Sihanoukville Port and requested the strong commitment of MPWT and PAS toward the achievement of this goal.

The Project Team submitted the Progress Report to the Committee, and explained the main points of report.

In the presentation, the Project Team, Dr. Tadahiko Yagyu and Mr. Takashi Kadono, stressed the importance of the continuation of early port gate opening initiative and its announcement to port users.

II. CONCLUSIONS

1. The Progress Report was endorsed by the Committee.

2. The Committee requested the Project Team to implement the Project duly taking into consideration the comment made in the Committee Meeting.

3. The major comments are as follows:
   - The Project Team shall analyze in detail the reason why many trucks don't come into the port gate even the gate opens early in the morning.

- The Project Team shall study the difference of total time required for international transport among gateway ports, since time is one of the decisive factors of competitiveness of logistics routes.
- The Project Team shall study the conditions of vehicles which carry containers to/from Sihanoukville Port from the view point of securing transport safety.
- The Project Team shall assess the rationality of toll fee system for trucks carrying very heavy containers.
- The Project Team shall revise the data regarding time required for Customs clearance at border posts.

4. PAS expressed its intension as follows:
   - To conduct further analysis on the competitiveness of the port in cooperation with the Project Team.
   - To study and implement measures for enhancing the competitiveness of the port in cooperation with the Project Team.
   - To continue the early gate opening initiative and to request port users to come in the terminal earlier.

Phnom Penh, December 04, 2011

H.E Tram Iv Tek
Minister
Ministry of Public Works and Transport

RECORD OF DISCUSSION
OF
THE THIRD STEERING COMMITTEE MEETING
FOR
THE PROJECT FOR THE STUDY ON STRENGTHENING COMPETITIVENESS AND DEVELOPMENT OF SIHANOUKVILLE PORT IN THE KINGDOM OF CAMBODIA

1. INTRODUCTION

The Third Steering Committee Meeting was held on March 14, 2012, at the Ministry of Public Works and Transport in Phnom Penh. The meeting was chaired by H.E. Tram Iv Tek, Minister of Public Works and Transport.

The objective of the meeting was to discuss and approve the Interim Report for the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port submitted to the Committee by the JICA Project Team.

The list of participants is attached to this record of discussion.

In the opening speech, H.E. Tram Iv Tek appreciated the implementation of the Study Project and emphasized the importance of strengthening the competitiveness of ports in Cambodia. H.E. Minister mentioned that this project for strengthening competitiveness of Sihanoukville Port is not only beneficial to the PAS but also contributive to All Cambodian as well as to development of international trades.

Then, Mr. Hitoshi Hirata, Senior Representative of JICA Cambodia Office, in his remark, stressed the importance of improving efficiency and capacity of Sihanoukville Port not only for development of Cambodian economy and industry but also Cambodian people's welfare.

The Project Team submitted the Interim Report to the Committee, and explained the main points of report.

In the presentation, the Project Team, Dr. Tadahiko Yagyu stressed Mission, vision and strategic targets of the Project, necessity of service improvement. Members of the Team, Mr. Sumio Suzuki and Mr. Koji Kobune followed to present financial status and issues and demand forecast and concept of the future port development respectively.

II. CONCLUSION

1. The Interim Report was endorsed by the Committee.

2. The Committee requested the Project Team to proceed to the finalization of the Project duly taking into consideration the comments made by the Committee Members.

3. The major comments are as follows:

- PAS is ready to follow the Project Team's recommendation on enhancement of port competitiveness, though by type of recommendation, it takes some time for their realization
- PAS's role is to contribute to the Nation's economic development and PAS has tried to do its best for such direction. In this respect, the Government is expected to consider and take a measure of the surplus interest payment to the Government.
- PAS shall make every effort for rationalization of management through streamlining its organization.
- New practice of gate opening in early Saturday morning is progressing toward expected direction. It is attributable to Customs office's speedy cooperation on this matter.
- The vision of the Port indicated by the Project Team seems too broad. Another vision such as "Green port" proposed by IAPH (International Association of Ports and Harbors) or "Feeder port or Hub port" seems to be worth for consideration.
- Husbandry service should be taken into consideration as one of port services.
- It is urgent to realize legislation of Maritime Code, Inland Waterway Law and Port Act as soon as possible.
- Sihanoukville port has a potential to become an internationally competitive port.

4. PAS expressed its intensions as follows:
   - To implement measures for enhancing the competitiveness of the Port as recommended by the Project Team.
   - To continue implementation of the early gate opening initiative and to request port users to come in the terminal earlier.

5. It was tentatively agreed the fourth Steering Committee Meeting to be held on June 5, 2012 at 8:30 am at MPWT, a Stakeholders Meeting and a Seminar for Technology Transfer to be held on June 6-7, 2012 in Sihanoukville.

6. Finally, in his closing remarks, H.E. Tram Iv Tek, Minister of Public Works and Transport stated that the Study was progressing as scheduled and the Study result was acceptable.

Phnom Penh, March 30, 2012

H.E Tram Iv Tek
Minister
Ministry of Public Works and Transport

Record of Discussion
of
The Fourth Steering Committee
for
The Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port in the Kingdom of Cambodia

1. Proceedings

The Fourth Steering Committee Meeting was held on 05 June, 2012, at the Ministry of Public Works and Transport in Phnom Penh chaired by H.E. Tram Iv Tek, Minister of Public Worked and Transport. The participants list is attached to this record of discussion.

The agenda of the meeting was Draft Final Report of the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port submitted to the Steering Committee by JICA Project Team.

H.E. Minister Tam Iv Tek expressed his appreciation for the implementation of the Study recalling that the Government of Japan and JICA in Cambodia continuously extend technical cooperation and financial assistance to the Royal Government of Cambodia. H.E. Minister also pointed out that it is imperative to make Cambodian ports more competitive to implement the ASEAN agreement on a single market and production base effectively, and declared the opening of the meeting.

Mr. Yasujiro Suzuki, Chief Representative of JICA Cambodia Office, made an opening speech stressing that the emergence of a new port in the South Vietnam changes logistic flow from/to Cambodia, and it is important that Sihanoukville port and Phnom Penh Port shall play each role in accordance with National Port Policy. Sihanoukville port shall implement organizational self-reform to survive from competition with other ports.

The Project Team explained the main points of the Draft Final Report, which was submitted to MPWT and PAS on 17 May 2012.

Through the presentation, Dr. Tadahiko Yagyu recalled the strengths, weakness, threats and opportunities of PAS and emphasized that important actions are strengthening of organization, enhancement of cargo handling operation, improvement of customer's satisfaction, and strengthening financial soundness. Dr. Sumio Suzuki explained necessary actions to improve financial soundness, and Dr. Koji Kobune introduced the concept for future port development.

H.E. Chan Sothy, Ministry of Economy and Finance inquired the amount of annual repayment including interest and principal, and pointed out that payment of PAS is the revenue of the Government which is not a loss of Cambodian people. The Project Team replied that annual repayment for principal and interest is estimated and shown in the DF report, page 4-125, and commented that ODA loans are provided to assist not-profitable but socially important projects, therefore interest rates shall be lowered.

H.E. Minister inquired whether gate congestion was resolved through the pilot project, what was the key factor for the improvement of gate operation, and H.E. Lou Kim Chhun, Chairman of PAS, explained that gate congestion was considerably eased owing to early gate opening and change of customs procedure, i.e. the acceptance of a copy instead of the original document and only checking the customs seal at the gate.

H.E. Chairman, PAS, introduced that the cut-off time for container entry and a loading list submission will be implemented next month, and containers and the list arrived after 10 am will be charged penalty for loading on the same day. Through introducing cut-off time, PAS staff can prepare a loading plan, which improve the operation productivity of PAS.

H.E. Chairman recalled that financial problem of PAS is not only caused by interest rates of sub-loans but also by appreciation of yen, exchange rate of Yen and USD, which is 78 yen/USD today, appreciated from 115 yen/USD when yen loan was agreed. H.E. Chairman, PAS, also recognized needs of reorganization and staff number reduction.

H.E. Minister made closing remarks and expressed appreciation to the JICA Project Team for implementing the Study and reporting important recommendations on strengthening competitiveness and development of Sihanoukville Port, and requested continuous support of JICA.

2. Conclusions

1. The Draft Final Report was accepted by the Steering Committee.

2. The Project Team requested and the Steering Committee agreed to submit comments on the DF Report by 17 June 2012.

3. The Ministry of Economy and Finance will review the situation of sub-loans to state companies and take the recommendation on financial soundness into consideration, from the viewpoint of one standard for all state owned companies.

4. The Project Team will hold the Stakeholders Meeting on 06 June 2012 and the Seminar on Strengthening Competitiveness and Development of Sihanoukville Port on 07 June 2012. The Steering Committee agreed to show a conceptual plan of future development at the Stakeholders Meeting and the Seminar.

Phnom Penh, 15 June, 2012

H.E. Tram Iv Tek
Minister of Public Works and Transport

Steering Committee Participants		
ឯកឧត្តមត្រាំអ៊ីវតឹក H.E. Tram Iv Tek	MPWT	រដ្ឋមន្ត្រី Minister
ឯកឧត្តមលូគឹមឈន់ H.E. Lou Kimchhun	PAS	ប្រតិភូរាជរដ្ឋាភិបាលកម្ពុជាទទួលបន្ទុកជាអគ្គនាយកកំពង់ផែស្វយ័តក្រុងព្រះសីហនុ Chairman&CEO
ឯកឧត្តមឡេងធនយុទ្ធា H.E. LengThunyuthea	MPWT	អនុរដ្ឋលេខាធិការ Under-Secretaty of State
ឯកឧត្តមអៀងវេងសុន H.E. EangVengsun	PPAP	អគ្គនាយករង Deputy Director General
ឯកឧត្តមចាន់សុធី H.E. Chan Sothy	MEF	អគ្គលេខាធិការរង Deputy Secretary General
ឯកឧត្តមសំសំអាត H.E. Sam Samath	Sihanoukville	អភិបាលរងខេត្ត Vice Governor
លោកជំទាវហេងសុគន្ធ H.E.Mrs. HengSokun	CDC	អគ្គលេខាធិការរង Deputy Secretary General of CRDB
លោកឈួនវិន Mr. Chhoun Vin	MPWT	អគ្គនាយករង Deputy Director General
លោកចាន់ហ៊ឹង Mr. Chan Houng	MOC	អគ្គនាយករង Deputy Director General
លោកជា សេងយី Mr. CheaSengyi	MEF	ប្រធានការិយាល័យ Office Chief
លោកល័ស ពិនិត្យ Mr. LorsPinit	MEF	ប្រធានការិយាល័យ Office Chief
JICA Expert to MPWT and PAS		
Mr. Takashi SHIMADA	MPWT	JICA Expert to MPWT
Mr. Takahiro JONISHI	PAS	JICA Expert to PAS
JICA Representative and JICA Study Team		
Mr. Yasujiro Suzuki	JICA Cambodia	Chief Representative
Mr. TakanobuShinoda	JICA Cambodia	Representative
Mr. NhepTinat	JICA Cambodia	Program Officer
Dr. TadahikoYagyu	Project Team	Project Manager
Dr. Koji Kobune	Project Team	Port Planning
Dr. Sumio Suzuki	Project Team	Economic Analysis, Port Management and Finance
Mr. Takeshi Sato	Project Team	Environmental Considerations
Ms. Kumi Saito	Project Team	Social Considerations

添付資料-3

ワーキンググループ組織

Kingdom of Cambodia
Nation Religion King

8/3. from Men Chann

Sihanoukville Autonomous Port

Terak Vithei Samdech Akka Moha Sena Padei Techo Hun Sen, Sangkat N°. 3, Tel: (855) 34 390 456 Fax: (855) 34 933 693
Preah Sihanouk City, Preah Sihanouk Province. Website: www.pas.gov.kh, Email: paspmu@camintel.com/ admin@pas.gov.kh

N°. 210 SSR/PAS.Admin.HM

Preah Sihanouk Province. July 29, 2011

Decision

On

The establishment of a Counterpart Team for Cooperation and Implementation of the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port

Delegate of the Royal Government of Cambodia in Charge as Chairman & CEO of Sihanoukville Autonomous Port

- On the basis of the Royal Decree No. NS/RKT/0808/944 dated August 18, 2008 defining the appointment of H.E Delegate of the Royal Government of Cambodia.
- On the basis of Sub-decree No. 50 ANKr. BK dated July 17, 1998 defining the establishment of Sihanoukville Autonomous Port (PAS).
- Referring to PAS's necessary work proposals.

Hereby Decided

Article 1: Established a counterpart team for cooperation and implementation of the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port with the following components:

1-	**H.E Lou Kim CHHUN**	Delegate of the Royal Government of Cambodia:	Team leader
2-	**Mr. Va Sonath**	Deputy Director General	: Dty.Team leader
3-	**Mr. Pen Sitha**	Deputy Director General	: Member
4-	**H.E Ma Sunhout**	Deputy Director General	: Member
5-	**Mr. Chea Sambath**	Director of Planning	: Permanent Member
6-	**H.E Sem Kythay**	Director of Financial & Accounting	: Member
7-	**Mr. Sam Heng**	Deputy Director of Admin-HM	: Member
8-	**Mr. Pen Socheat**	Director of Billing	: Member
9-	**Mr. Chea Yuthdika**	Director of Technical, Materials & Construction:	Member
10-	**Mr. Norng Soyeth**	Director of Marketing & SEZ	: Member
11-	**Mr. May Marith**	Director of Harbor Master	: Member
12-	**Mr. Srey Narin**	Director of Container Terminal Operation:	Member
13-	**Mr. Chhun Hong**	Director of General Cargo Operation	: Member
14-	**Mr. So Seang**	Director of Internal Audit	: Member

15- **Mr. Leng Mao**	Director of Machinery	: Member
16- **Mr. Sar Satya**	Director of Phnom Penh CWT Dry Port	: Member

This counterpart team has an obligation to cooperate with Japanese work team (OCDI) in order to successfully implement the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port.

Article 2: Established an implementation working group to undertake direct cooperation with Japanese work team (OCDI) with the following components:

1- **Mr. Thay Rithy**	Deputy Director of Billing	: Team leader
2- **Mr. Thong Viro**	Deputy Director of Admin-HM	: Dty. Team leader
3- **Mr. So Seang**	Director of Internal Audit	: Member
4- **Mr. Ty Sakun**	Dty. Director of Technical, Materials & Construction	: Member
5- **Mr. Heang Sophal**	Dty. Director of Container Terminal Operation	: Member
6- **Mr. Chiv Chansophal**	Deputy Director of Internal Audit	: Member
7- **Mr. Thay Mengly**	Dty. Director of Container Terminal Operation	: Member
8- **Ms. Chey Sokunthea**	Deputy Director of Marketing	: Member
9- **Mr. Mean Keung**	Chief of Architect Office	: Member
10-**Mr. Rath Seyla**	Chief of Administration Office	: Member
11- **Mr. Ouk Vannara**	Official of Technical, Materials & Construction	: Member
12-**Mr. Som Kakrona**	Official of Planning & Statistics	: Member
13-**Mr. Men Chann**	Chief of Internal Audit Office	: Secretary
14-**Mr. Pith Prakath**	Chief of Human Resource-IT Office	: Secretary

This implementation working group has an obligation to undertake direct cooperation with Japanese work team (OCDI) and shall file reports to the counterpart team relating to the implementation of the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port.

Article 3: H.E - Deputy Director Generals, Directors of all departments concerned, and the aforesaid titulars shall undertake to cooperate with the work team in order to effectively implement in accordance with the essence of this decision from the signing date onwards.

Delegate of the Royal Government of Cambodia
In Charge as Chairman & CEO

PORT AUTONOME DE SIHANOUKVILLE

Lou Kim CHHUN

CC:
- All departments under PAS's management
- Same as Article 3
  " For implementation"
- File-Chronicle.

添付資料-4

ステークホルダーミーティング議事録

Summary on the 1st Stakeholder Meeting on the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port in Kingdom of Cambodia

Date/time: November 18th, 2011 / 9:30-13:00
Venue: New Beach Hotel
Participants: see Attachment 1
(Summary prepared by JICA Project Team)

1. Opening remarks

Mr. Va Sona, the Deputy Director General of PAS welcomed all the participants for attending this meeting. He explained about the ongoing traffic congestion in front of the port gate, and how PAS is working with the JICA Project Team and local authorities to solve this ongoing problem.

2. Introduction of the Project

Mr. Yagyu, the team leader of the JICA Project Team introduced to the stakeholders the background and objective of the Project.

3. Environmental and social consideration of the Project

Mr. Sato, the environmental expert of the JICA Project Team, made a brief presentation on how this Project will consider environmental and social impacts during the process of formulating the port development plan.

4. Q&A session

Q1: Mr. Benjamin Wilson, MAERSK

Other than the early opening of the gate, what kind of initiatives is the Project Team considering to improve the gate congestion?

Answer from Mr. Yagyu:

Following are some options that are been considered:

- Establishment of traffic rules in the container yard to avoid conflict between cargo trucks and port's cargo handling fleet
- Expansion of coverage area of CTMS
- Speeding up of document clearance process
- Development of truck parking lot outside the port
- Utilization of some sections of the container yard currently under construction

Answer from Mr. Va Sona:

Improvement of port operation will be discussed in the public-private joint meeting of MPWT, and all stakeholders will be invited to express their views and opinions.

Q2: Mr. Lee Pray, Sangkat 2

What is the strategy of the Project Team to alleviate pollution impacts from traffic?

Answer from Mr. Yagyu:

The key strategy is to reduce the current traffic congestion such as by early gate opening, development of truck parking lot, speeding up of document clearance process.

Q3: Mr. Sophal, PAS

How does the local economy improve by strengthening the competitiveness of the port?

Answer from Mr. Yagyu:

There will be a range benefits to the local economy through strengthening the competitiveness of the port, because increase in port cargo will directly and indirectly lead to increase in local economic activities and employment opportunity.

Answer from Mr. Va Sona:

If the port does not strengthen the competitiveness of the port, the port will lose its customers to other ports. So it will be important that the port maintains its competitiveness by providing good services and reasonable rates to the customers. Export and import from the port is also expected to grow (e.g. rice). It is also important, so that the port can accommodate the various ongoing development projects such as port SEZ and multi-purpose terminal.

5. Other comments

Around 30 comments were submitted from the participants after the meeting. The main comments are summarized below:

Comments on traffic congestion:

- Posting of security force or police along Road no.4 so that the trucks move in one line. This may reduce the traffic jam by 50%.
- PAS should take measures so that truck drivers strictly comply with traffic law.
- Opening of gate at 4 am seems to have limited effect.
- Provision of label or map along the gate.
- Reinforce the road from Angkor beer factory to Sihanoukville port in order to reduce the traffic jam.

Comments on port efficiency:

- A key factor to improve the efficiency of the port is the processes and activities of all involved in the cargo handling. This includes customs, port, cam-control, immigration, shipping lines, Kamsab. I feel not all of these stakeholders have a willingness to assist in improve efficiency, particularly some government agencies. Efficiency is not always their primary interest.
- The focus seems to be on yard and gate efficiency, but is crane productivity also considered in scope? The number of moves per crane per hour is a critical measure for port customers [Shipping lines], limited cargo handling facilities and processes are also a concern for future growth.
- Project team should think more about support of the quality of handling by increasing cargo handling equipment such as QC crane that is always broken.
- Maintenance of machinery is important to reduce breakdown time and increase operation time.
- Since the planning of cargo handling is inefficient, it is affecting vessel operation.

Comments on environmental impacts:

- There will be higher risk of shipping accident with the fishing boats.
- Port expansion will affect the fishing village of Tomnob Rolok.
- What are the strategies to reduce impact of truck traffic on the environment.
- The people that live in Tomnob Rolok should be relocated to prevent pollution.
- Please disseminate to the citizens the importance of environmental protection.

Other comments:

- In terms of competitiveness, one key issue that not seems to be addressed by the project is the cost of the port for customers compared to both Phnom Penh Port and other ports in neighboring countries.
- The road and bridges should be reformed so to increase the current maximum loading limit (23

tons)

- Stakeholders need not just to listen and know what the project is, but furthermore they should be encouraged to be more actively involved in the program.
- The next meeting should have more participants from related institution to have a wider range of opinions.
- The duration of the meeting seems to be too short. The documents should also be distributed beforehand.

Attachment 1 Participant list

No.	Name	Organization
1	HAK SOMBO	Representative of Sang Kat 3
2	HOUY VUTHY	Representative of Sang Kat 1
3	UNG CHHALY	Steung Hav district
4	LY PRANG	Steung Hav district
5	SEM KYTHAY	Director of A/C F/N (PAS)
6	VA SONATH	Deputy Director General(PAS)
7	BUN VISET	Dept. of Public Work & Transport
8	CHETHA YUVANNY	Assistance of JICA Expert
9	THAY RITHY	PAS
10	LENG MAO	PAS
11	MAY MARITH	Director of Harbor Master(PAS)
12	YING KOY	Kamsab
13	KORM SOKAN	PAS
14	SOM KOL	Environment Department
15	TEP VISETH	Customs Branch, Sihanoukville
16	CHIN SARIN	Governor of City Hall
17	CHEY SOKUNTHEA	Deputy of Marketing Dept.(PAS)
18	SOM HENG	Deputy of Admin Dept.(PAS)
19	SUM SAROEUN	RCL, Shipping Line
20	HEM VICHEA	UME, University
21	PROM SOPHAN	Agent Benline
22	CHETH VANNA	Min. Social Welfare
23	CHHUN HONG	Director of General Cargo Dept.(PAS)
24	CHIV CHANSOPHAL	Deputy Director of In. Audit Dept(PAS)
25	SO SOK	Land Management Department
26	CHEA SOMBATH	Director of Planning Department(PAS)
27	SENG KHA	Tourism Department
28	TY SAKUN	Technical Department(PAS)
29	SOK NIMOL	APL, Shipping Line
30	SREY NARIN	Director of Con. Ter. Op. Dept.(PAS)
31	PRAK VISAL	Provincial Hall S.H.V
32	HENG SIROEUN	Financial Department
33	CHAO VANRATANAK	Container Terminal(PAS)
34	SEK SOVANNARA	Container Terminal(PAS)

35	MEN CHANN	Internal Audit Department(PAS)
36	PITH PRAKATH	Human Resources/IT manager(PAS)
37	NONG SOYETH	Director of SEZ Department(PAS)
38	MA SUNHUT	Deputy Director Gerneral(PAS)
39	SO KUNVIRAK	ITL, Shipping Line
40	VAN NARITH	Cam control
41	Mann Rathsopanha	BBU, University
42	NOP PHEAN	Deputy Governor. Prey Nop District
43	SO SEANG	Director of Internal Audit Dept.(PAS)
44	BUN CHIV	Customs of S.H.V
45	MEAN KOEUNG	Port
46	CHEAM SATHARITH	Provincial Department Health
47	Chiv Chan Sopheap	Internal Audit Department(PAS)
48	THAY MENGLY	Deputy Director of C.Ter.Op.Dept.(PAS)
49	HEANG SOPHAL	Deputy Director of General Affair.Dept
50	CHEA SOPHAL	Cots Shipping
51	RATH SELA	HMR. Department(PAS)
52	SING SENO	Harbour Department(PAS)
53	NOP SAMBATH	UME/SHP
54	BEN WKSON	MAERSK/MCC
55	OUK SOVANNARA	PAS

2nd Stakeholders Meeting on the
JICA Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port in the Kingdom of Cambodia

Date: March 15, 2012
Venue: New Beach Hotel
Registration: 8:30-9:00
Agenda:

Time	Topic	Presenter
09:00 - 09:05	Opening Remarks	Representative of PAS
09:05 - 09:35	Topic 1: Strategies to strengthen competitiveness of Sihanoukville Port	Dr. Tadahiko Yagyu / Team leader of JICA Project Team
09:35-10:00	Coffee break	
10:00 – 10:30	Topic 2: Master plan of Sihanoukville Port	Dr. Koji Kobune / Planning expert of JICA Project Team
10:30 – 12:00	Q&A session	
12:05 - 12:10	Closing Remarks	Representative of PAS
12:10 -	Lunch	

Outline of presentation topics

Topic 1: Strategies to strengthen competitiveness of Sihanoukville Port (to be presented by Dr. Tadahiko Yagyu/Team leader of JICA Project Team)

1) Future vision and strategies of Sihanoukville Port

- Formulation of mission and future vision of Sihanoukville Port
- Establishment of strategic targets, critical success factors and action plan to achieve the future vision of Sihanoukville Port

2) Competitiveness and role sharing of Sihanoukville Port and Phnom Penh Port

- Comparison of transport cost and time via Sihanoukville Port and Phnom Penh Port
- Roles of Sihanoukville Port and Phnom Penh Port

3) Service improvement of Sihanoukville Port

- Current export procedures of container cargo
- Services that require improvement and improvement methodologies
- Contents and results of Urgent Pilot Project (Early gate opening on Saturday)
- Recent progress in service improvement
- Truck overloading and improvement of transport safety

Topic 2: Master Plan of Sihanoukville Port (to be presented by Dr. Koji Kobune/Planning expert of JICA Project Team)

1) Demand forecast

- Forecast of cargo volume (up to year 2030)

2) Concept of future port development

- Required capacity of port facilities
- Environmental and social consideration
- Potential areas for development

Summary of The 2nd Stakeholders Meeting on the Project for the Study on Strengthening Competiveness and Development of Sihanoukville Port in the Kingdom of Cambodia

Date/Time: March 15, 2012/ 9:00 AM-1:30PM
Venue: New Beach Hotel
Participants: See Attachment 1
(Summary prepared by JICA Project Team)

1. Opening Remarks

H.E. Lou Kim Chhun, Chairman/CEO of PAS welcomed all the participants for attending the meeting. He addressed this was the 2nd Stakeholders Meeting after the first one was done for which issues related to traffic congestion at the port gate and process of entry documentation were raised. Today's presentation will be related to the port vision, competiveness, service improvement, demand forecast and concept of the future port development.

2. Vision, Competitiveness, Role Sharing and Service Improvement

Dr. Tadahiko Yagyu, the team leader of JICA Project Team, explained the study flow of the Project and proposed PAS's mission which is set to provide bases for maritime transport and coastal industries. Under the mission, 3 visions are designed such as international trade public sea port, coastal industries and meeting customer's expectation. To achieve those visions, 11 major strategic targets are proposed. He indicated port dues and charges of PAS is higher than those in neighboring countries and explained transportation advantages and role sharing of PPAP and PAS and listed out the facing problems concerning container handling operation and types of services have to be improved as well as methods to do all those improvements. For urgent pilot project, some progresses and results are notified. Furthermore, he also mentioned the safety transport and over-weight trucks & penalty as well as the substandard container truck for which 10% of containers are carried.

3. Demand Forecast and Concept of the Future Port Development

Dr. Koji Kobune, Port Planning Expert, explained the forecasted increases of import & export compared with GDP growth rate for which it has to be optimistic as well as the shares of container handling volume at PAS and PPAP. He also presented the estimated TEUs by modes and directions at PAS and PPAP as well as estimated TEUs and capacity of PAS's terminal just between forecasted years from 2020 to 2025. He made forecast of general cargo (e.g. container traffic, dry bulk and break bulk) and the number of needed QGCs. Finally, he

explained the concept of the future port development from the viewpoint of well-defined port zone before the project commences, separation of port-related traffic, development of coastal industrial road and port access road, social and environmental consideration as well as revaluation of the port performance by 2020. He suggested solutions for social environmental considerations and proposed ideas of the future port configuration which is integrated not only maritime transport but also industrial zones, for instance, SEZ and EPZ.

4. Q & A Session

1) Comments from Bun Chiv, Chief Officer of Customs, SHV

(1) *Late arrival of garment containers on weekend:* It is not because of the customs procedure at the port gate but the garment manufacturers themselves. Most of them don't own warehouses, thus have to rent. They import materials and accessories for weekly productions for weekly exports – that is from 500 to 600 import containers and 400 to 500 export containers. For exports, sometimes customs documentation is already completed, but the factories request to delay due to either wrong or late container arrangements which cause the delay of arrival of garment containers.

(2) *Scanning:* not all the export containers need to be scanned unless there is an instruction for scanning or in case of dangerous cargoes. For most of garment containers to be exported, scanning is not necessary.

(3) *PAS CTMS:* it is noted that the system is successfully applied in Cambodia but not in other countries such as Vietnam and Lao. With this regards, he wonders if waiting just for 4 or 5 minutes at the port gate for processing is an issue of congestion. The customs inspection only targets at those types of prohibited cargoes. He supports the idea of information exchange among customs, harbor master and CAMCONTROL, and actually such work is being implemented for pilot project in PPAP concerning IT Manifest connecting the port and other organizations as a single window. Serious onboard inspection by customs officers targets at prohibited types of cargoes by government while others are allowed to be discharged for latter inspection in order not to interrupt ship operations as the customs officers try their best to minimize inspection time less than 15 minutes.

(4) *Port gate opening at 4:00am:* the trucks can't go in until 6:30am. The issue is because the stay-up-late of the customs brokers who are required to proceed documentation for gateway entry as early as possible, but they get up sometimes until 7 or 8 am while the containers arrive at the gate. When calling, they rush up until 6:00 am or a little later than that to proceed the document for the truck entry. The drowsiness of the truckers when they have to drive on Friday night from Phnom Penh to Sihanoukville is also a problem. Another issue is the delay of complete customs documents proceeded by customs brokers from Phnom

Penh, which is required by shipping line to arrive before 12:00. If not, penalty of $65 per container ($50 per container box + $15 for documentation) will be charged. For this regard, he makes a request whether JICA study team can find way to discuss this issue with the shipping line to eliminate such penalty because it may affect the business of customs brokers.

(5) *JIR*: actually, this has been implemented so long not just recently. Cargoes such as garments transited from Phnom Penh are not required to apply for any customs procedure at all except verifying seal with related documents from Phnom Penh and the seal is cut after all. Scanning is not necessary unless there is an instruction from GDCE – only seal is checked whether it is a copied or just faxed one, and that is clearly authorized by GDCE for utilization within 3 to 10 days before its original one has to be sent back to the customs. Then, the cargoes can move to the terminal and wait for loading to the vessel. The source of JIR was made under the recommendation of the head of government (premier) and signed by both Customs and CAMCONTROL. With the official signature of any of the two organizations (Customs and CAMCONTROL), the investor can refer it as an official one to proceed his cargo exports. Just before JIR, there was applied Customs Clearance and Authorized Letter from CAMCONTROL, and then investors raised a complaint in PPF regarding the two procedures. Finally, JIR was decided by the head of government. However, several months ago, the World Bank's customs experts who came to assist customs requested to eliminate JIR, but GDCE claimed it was the recommendation of the premier, and it thus could not be eliminated unless the premier did.

(6) *Seal cutting*: this was not applied until after 2004 since there was an instruction from GDCE to cut seals at all port gateways to avoid customs responsibility onboard because there was an event taking place before 2004 in relevance with the allegation of Cambodian customs responsibility of narcotics trafficking.

Answer from Dr. Yagyu:

- He shares common understanding on late arrival of containers of garment products for export due to weekly import for weekly production and for weekly export that the container shipment is much concentrated on Friday night;
- Why trucks can't enter the terminal is that the fact JIR should be processed at PAS and for that processing, general arrival of JIR should wait until morning since proceeding the documentation by customs broker from Phnom Penh to Sihanoukville may take time;
- As indicated, waiting for 3 to 4 minutes is not a problem but the problem is the trucks wait for document processing such as JIR. But recently, it has been proposed to

eliminate that kind of JIR processing, but only allow trucks to enter the gate by checking the seal. If that could be done, many containers can enter the terminal in early time and the container terminal can start making loading plan, and that is made to enhance productivity of the port and this is expected to take effect after 3rd March

- *Scanning:* export containers are subject to scanning, this is common in the world. But regarding imports, all import containers are also scanned, so it takes time for the truck to wait for clearing the scanning process. No truck should wait in the port area, which results in congestion and it becomes another point to be solved to eliminate the traffic jams and to increase container handling efficiency;
- *Penalty of $65 per container by shipping line* for late arrival of container after 12:00; The port should give incentive to the container trucks which enter the gate earlier by the opening time, if late, penalty shall be made. The shipping company penalty is proposed to be replaced by this practice;
- *Seal checking for export containers:* it is a basic scheme that all customs procedures have been completed by only checking seal without additional documentation.

Additional comments by H.E. Lou Kim Chhun, CEO/Chairman of PAS

- *Regarding JIR:* Sometime ago containers could be allowed to enter the port only finishing documentation process at the port with JIR. But later only copied or faxed one was enough for documentation process. And later, it was agreed by customs that after 3rd March, no need of JIR, only seal checking is enough for the gate entry. Thus, it doesn't mean JIR is not needed but just allowed for pre-entrance. However, when clearing for the vessel departure, JIR is needed. Hence, it does not mean to eliminate JIR;
- *Discussion with Mr. Kim Lee:* when the container arrives the port, as applied like PPAP to avoid traffic congestion, only with seal number is noticed – that means the customs brokers when arriving at the port has to record the seal numbers of customs and CAMCONTROL for showing to the customs to proceed permission for the container to enter the port. Entrance is allowed only in the terminal/yard but later until loading to the vessel. However, before the vessel departure, all documents must be made available including original JIR. If any container already loaded to the vessel is not clarified with original JIR, it has to be unloaded to apron and the cost of doing so shall be born by shipping line;
- *Stages of gateway entrance*: responsibilities are incurred in 3 stages. 1) customs brokers record the seal numbers of customs and CAMCONTROL for showing to the

gateway authority/ clerk to check whether it is proper. 2) The container is allowed to enter to the yard but the key issue is about ship planning, which may take time at least 3 or 4 hours. If waiting until receiving all documents to do ship planning, it may waste of time. Anyway, when the container enters without notifying the customs, it is the port's responsibility. 3) However, when the container is onboard, it is attached with proper seal but JIR is not original, original JIR is required before the vessel departure, the container will be unloaded and the cost of doing so is born by the shipping line;

- *Cut-off Time & ship planning:* cuff-off time means the container must arrive at the port at usual time. Unlike Laem Chabang and Bangkok Ports where cut-off time is applied 24 hours before the arrival of the vessel while Japan is between 30-40 hours. In case of PAS, if it is applied 24 hours, none of the containers will use PAS. However, to push this, penalty will be reinforced. The question is who resists (?) the difficulty? Who is in charge of ship planning? Ship planning was previously done by the shipping line, but now among 8 ships, 4 ships are planned by PAS. And in the future, PAS will take over ship planning for all ships. Thus, who will resist (?) the difficulty? Surely will it be PAS. Then, penalty must be done by the port;
- *CTMS, EDI & ASUCUDA System:* CTMS is a computer system which assists with ship planning when it is beyond the ability manually done by people. Concerning EDI and ASUCUDA system, in the future, PAS will apply EDI system and ASUCUDA in practice as a part of EDI.

2) Dr. Koji Kobune: Concerns about the future port expansion plan

Dr. Kobune asked the stakeholders of any concerns regarding the future port expansion plan in terms of livelihood, environment, safety, traffic, water quality and so on.

Comments from Mr. Sin Satharath, Deputy Chief Officer of Marine Fishery Administration, SHV

(1) *Dredged materials:* the port plans to dredge the navigation channel up to -17 m for about 2 km and has contacted the Marine Fishery Administration to study the resource in the coastal areas of Sihanoukville. To avoid damage of marine resources, dredged materials should be considered for landfill for future port development. Dredging activities may affect fisheries, aquaculture and other marine animals up to a distance of 5-10 km. The port is requested to have discussion with the communities to avoid any conflict regarding the development impacts over their fishing activities.

(2) *Fishery port*: the idea of fishery port was proposed by JICA project since 2000, namely Tomnop Rolok port. There should be a project to establish a fishery port next to Tomnop Rolok port under the competency of his administration in terms of fishing vessel movement and safety. The objective of the fishery administration in the future will supervise the fishing vessel of 10-12 meters in depth. Thus, the fishery department also require a large-scale fishery port although currently the fishing vessels are small – just 3-4 meters at most and can berth at Tomnop Rolok port.

(3) *Effects of dredging on fishing activities*: not much affect fishing activity but may affect marine resources in the sea bed such as corals around the islands of Koh Tas and Koh Pos. The dumped dredged materials will spread to other areas and this may lead to the damage of some types of corals in the sea bed, although it may appear normal on the surface. The 2nd-phase dredged materials will be much more than the previous, and as far as he knows the sea bed in the dredged channel is rocky so explosives will be used to assist with dredging work.

Answer from Dr. Koji Kobune

- It is hard to use dredged material for landfilling as the seabed is comprised of silty material. We currently plan to dispose the dredged material in the existing dumping site.
- *Fishery port:* as requested to construct the fishery port of 12-meter deep, it is very different from the existing ones which are just small and already deployed in the breakwater.

Additional comments by Mr. Kim Sitharath, Deputy Chief of Marine Fishery Administration

Currently, Cambodia has the rights to do fishing in international sea. Then, some countries have requested for Cambodian license, using Cambodian-flag vessel to do fishing in international sea. Thus, as mentioned up to 2030, Cambodia will reach that status either. That means Cambodian will be able to have such type of large-scale fishing vessel for fishing in the international sea – this is a vision for the future. When the project is implemented, it should also consider the fishing port.

Additional confirmation by H.E. Lu Kimchhun, CEO/Chairman of PAS

- The depth of the navigation channel will be -13 meters not -17 meters.
- Dumping of dredged material will be conducted during periods of minimum tidal

movement, which is when water currents are not strong. This will reduce the spread of dredged material. The depth of the dumping site is roughly 50 meters and not 20 meters.

- Construction of fishery port should be requested.

5. Other comments

Around 20 comments were submitted from the participants after the meeting. The main comments are summarized below:

Comments on Port Gateway Congestion:

- The port gateway congestion has already been relieved; however, to handle this properly and sustainably, joint taskforce or committee consisting of PAS, Customs, CAMCOTNROL, police, KAMSAB, representative of shipping companies, representative of garment factory association and representative of Chamber of Commerce of Sihanoukville shall be established;
- For enhancement of economic efficiency and quality of PAS as well as the entire SHV province, JICA shall build a detour separating from NR 4 in the point of Yeay Mao (Pech Nil) toward Tonop Rolok and to the port to avoid traffic congestion at the port gateway;
- JICA shall request the shipping companies to find the parking lot themselves in order to avoid parking their trucks along national road;
- In case Japan is not able to build such a detour, the government shall request for financial assistance from Chinese government;
- Elimination of informal charge is a good idea if that could be reinforced, and which will lead to the relief of traffic congestion at the port gateway;
- On Friday evening and Saturday, it is observed that after the expansion of the project some successes have been made meanwhile disruption is not usually avoided (randomly the accident occurs). If possible, another access road should be constructed or just expand the existing one.

Comments on Cut-off-Time & Ship Planning:

- Cooperate together to obtain cut-of-time at 10:00 for export container on Saturday morning or 3 hours prior to loading container to the vessel;
- The Container Dept. makes the vessel plan itself for which the vessels call from

Sunday to Thursday. It tries its best to make ship planning for Friday & Saturday calls but the difficulty is about shipping line who does not provide sufficient information such loading general plan, booking list, list load...etc.;

- PAS, JICA experts and port users have met and discussed many times to find solution of reducing procedures and seeking methods to increase container handling capacity.

Comments on Reduction of Port Tariff:

- Cambodian situation is not like Vietnam and Thai for which its electricity cost is 2 or 3 times different. The handling charge by QC, RTG and truck trailer is 2 times higher than the neighboring countries due to high costs of fuels and electricity supplies.

Comments on other proposed projects & business development:

- The project on development of industrial zones/ EPZ along NR 4 shall be worth a study due to many unutilized land areas and also electricity supplies shall be taken into account. If only solely establishing EPZ in the coastal area, it may fight against the tourism development;
- To achieve the potentialities of economic development of Cambodia, some factors have to be considered such as (1) the port users are required to understand logistic services and the port procedures, (2) improvement of road infrastructure which enables bigger loading capacity, (3) reduction of import/export document procedures as well as steps of cargo clearance process.

Comments on Strengthening the Competiveness of PAS:

- Increase of cargo generation for exports from SHV (mainly from Port SEZ)
- Continue cooperating with the port's stakeholder;
- Continue increasing the container loading and unloading productivities.

Other Comments:

- The time for meeting is very limited, which cannot allow participants to share more comments;
- The meeting materials shall be distributed in advance for possible comments to be prepared;
- It is important for port and stakeholders to exchange ideas and get information of how valuable findings of JICA Study Team has done to strengthen and develop the port in

the future. It is very important to understand and see how the port and other related party have tried to work hard in order to make growth of maritime business of Cambodia;

- Request for training on logistic services and port procedures in any possible seminar/workshop for the port users;
- Changes won't be made unless there is sound cooperation between port users and competent authorities at the port;
- Support and appreciate SEZ of PAS project and consider it is very useful and will be fruitful for city development of Preah Sihanoukville City especially it contributes to urban planning work;
- The meeting has shown that there is a big growth for the port's future. Therefore, they are looking forwards in the future and be their best to support PAS.

ATTACHMENT-01/01

LIST OF ATTENDANTS

2nd Stakeholder Meeting on the Project for the Study on Strengthening Competiveness and Development of Sihanoukville Port in the Kingdom of Cambodia

Date/Time: March 15, 2012/ 9:00 AM-1:30PM

Venue: New Beach Hotel, Preah Sihanoukville Province, Cambodia

No	Names	Positions/Organization
1	**Ly Vannda**	Deputy Governor of Preah Sihanoukville City
2	**Prum Paov**	Chief Officer of Provincial Traffic Police
3	**Sin Satharath**	Deputy Chief of Marine Fishery Administration, SHV
4	**Sok Nimol**	Representative of APL Shipping Line
5	**Kim Heang**	Representative of Provincial Agricultural Dept.
6	**Yeong Sokkeong**	Deputy District Chief of Khan Pey Nop
7	**Khouk Makara**	Staff of Planning and Statistic Dept. of PAS
8	**Pen Socheat**	Director of Commercial Dept. of PAS
9	**Serng Seno**	Deputy Director of Harbor Master Dept. of PAS
10	**Va Sonnath**	Deputy Director-General of PAS
11	**Thai Rithy**	Deputy Director of Commercial Dept. of PAS
12	**Seang Leng**	Chief of Border Immigrant Police Division
13	**Heang Sophal**	Deputy Director of Container Operation Dept. of PAS
14	**Norng Soyeth**	Director of Marketing & SEZ Dept. of PAS
15	**Pen Kim Ieang**	Representative of MCC Shipping Line
16	**Soum Sareon**	Representative of Kos Santhepheap newspaper
17	**Khem Sitha**	Chief of Statistic and Contract Office of PAS

18	**Ban Chethra**	Representative of BEN Shipping Line
19	**Leng Mao**	Director of Machinery Dept. of PAS
20	**Roth Sella**	Chief of Administration and Human Resource Office of PAS
21	**Thong Viro**	Deputy Director of Administration and HR Dept. of PAS
22	**Pith Prakat**	Chief of Administration and IT Office of PAS
23	**Chhun Hong**	Director of General Cargo Operation Dept. of PAS
24	**Ty Sakun**	Deputy Director of Construction and Technique Dept. of PAS
25	**Thai Mengly**	Deputy Director of Container Operation Dept. of PAS
26	**Lim Samean**	Director of Provincial Public Health Dept.
27	**Srey Narin**	Director of Container Operation Dept. of PAS
28	**Ouk Vannara**	Chief of Maintenance Section of PAS
29	**Cheap Sotheary**	Representative of ADHOC
30	**Lou Kim Chhun**	Chairman & CEO of PAS
31	**Hor Sothy**	Chief of Auditing Office of PAS
32	**Thork Reaksa**	Representative of Custom & Excise of Prea Sihanouk Province Branch
33	**Ying Koy**	Representative of Kamsab Sihanoukville Branch
34	**Barim Bakdaphal**	Representative of Immigration Police at PAS International Gate
35	**Bun Chiv**	Representative of GDCE at PAS International Gate
36	**Seng Sopha**	Staff of Administration and Human Resources of PAS
37	**Kanh Loeung**	Chief of Sangkat No. 3 (Commune No. 3)
38	**Huy Virak**	Representative of BBU University

39	**Nop Sambath**	Representative of UME University
40	**Kim Leang vouch**	Representative of Provincial Tourism Dept.
41	**So Kok**	Director of Land Management Dept.
42	**Se Rasmey**	Representative of LICADHO Sihanoukville Branch
43	**Sokun Virak**	Representative of ITL Transportation Company
44	**Ma Sun Hout**	Deputy Director-General of PAS
45	**Chea Sophal**	Representative of COST Shipping Line and Kamsab Sihanoukville Branch
46	**Meng Nhor**	Representative of Camcontrol Sihanoukville Branch
47	**Dem Sothea**	Representative of Derm Am Pil Daily News

Summary on 3rd Stakeholders Meeting on the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port in the Kingdom of Cambodia

Date/Time: June 06, 2012/ 9:00 AM-1:30PM

Venue: New Beach Hotel

Participants: See Attachment 1

(Summary prepared by JICA Project Team)

1. Opening Remarks

Mr. Va Sonath, Deputy Director General of PAS welcomed JICA Study Team as well as other participants as directors of key departments, provincial officers, port users and competent authorities concerned. He addressed the 1st & 2nd Stakeholders Meetings, which were also held here, were provided with some good comments, and for the 3rd Stakeholders Meeting, he hoped the participants would provide more and even better comments to improve the Project for the benefit of the port and country development. The contributions of the participants were to evaluate the preparation for competitiveness and future development of PAS.

2. Strategy for Strengthening Competitiveness of Sihanoukville Port

Dr. Tadahiko Yagyu, the team leader of JICA Project, opened his presentation by introducing DRF which will be finalized after obtaining comments for Cambodian side. Then, he presented the objectives of the Project, which focus on economic development, appropriate management and operation of the ports and strengthening competitiveness of SHV port by operational improvement and preparation of concept for future port development. The recommended important actions for strengthening competitiveness of PAS are to improve operation and financial/ managerial soundness, then reduce port charges and enhance shippers/ consignees, shipping line satisfaction. As recommended, short-term action plan covers (1) strengthening of organization, (2) enhancement of cargo handling operation efficiency, (3) enhancement of customer satisfaction, (4) strengthening of financial soundness and (5) promotion of industrial development, as for

long-term action plan such as (1) reinforcement of facilities and equipment and (2) formulation and implementation of the future port development plan.

3. Concept for future development of Sihanoukville Port

Dr. Koji Kobune, Port Planning Expert, explained the forecasted increases of import & export compared with GDP growth rate for which it has to be optimistic as well as the shares of container handling volume at PAS and PPAP. He also presented the demand and capacity of terminal and the number of needed QGCs. He explained the concept of the future port development from the viewpoint of well-defined port zone before the project commences, separation of port-related traffic, access road, initial environmental examination (IEE) by each development concept, potential impacts of channel dredging and disposal of dredged materials. He gave overall evaluation of the alternative plans in terms of social and environmental impacts and finally the recommendations: (1) the proactive approaches PAS should take and (2) avoidance of environmental impacts on the local community.

4. Q & A Session

Q1: Mr. Doung Sambath, Director of Fishery Administration

(1) Dredged materials and disposal area:

- Suggested that the disposal of dredged materials should be done at any appropriate land area rather than water area in order to avoid environmental impacts on biodiversity/ecosystem as well as maritime life in the water area;

(2) Relocation of aquatic area:

- Several years ago, JICA donated USD 10 million for constructing Center of Aquaculture. In case of relocation for port development, the center will be relocated, then it will affect the cost of the construction;

(3) Resettlement of the residential/fishing area along the project site:

- In case of resettlement of residential area to nearby Center of Aquaculture, he is afraid the residents will degrade the water quality.

Answers from Dr. Kobune:

- What has been done so far is just a concept for future development. Still

more actions will be taken in next step for which further studies will be conducted to look for suitable location whether it is in water or land area. However, according to the survey, it is found that condition of subsoil is too soft for reclamation, so it should be dumped to the sea;

- For the outlook of future image, the development is done not only for the port itself but also the whole area as a port town which secures healthy livelihood, business and fishing areas. Even without the development project, livelihood in the planned relocation area is still unhealthy such as in case of fire, all houses will be burned out. So, development should be necessary;
- Relocation of fishing village is required for long future, and it is believed that the development can be achieved without fighting with fishing village and fishing port. The project can provide water area outside or inside the breakwater for the development of export processing zone;
- This is just a concept planning stage. For implementation in the future, the feasibility study will be needed to conduct the methods of dredging and disposal;

Adjustment by Mrs. Saito:

- In terms of development, impacts are inevitable – they can be direct and indirect impacts. However, it is to be notified that the Project does not cause any resettlement. It just provides concept for future port development.

Additional confirmation by Mr. Sato:

- (In case of Slide 19: IEE) Alternative Development Concept-1: A means high risk of water quality degradation, B means potential noise/ vibration and air pollution impacts on local residents. Alternative Development Concept-2: A means high risk of water quality degradation and B means potential noise/vibration and air pollution impacts on local residents.
- There is misunderstanding by Mr. Doung Sambath that the relocation of residential/ fishing village along the coastal area in Development Concept-2 is done to Point B where is a Center of Aquaculture donated by JICA of USD 10 million. Actually, there is no such relocation but only in Point B

which is an access road due to noise/ vibration and air pollution on local residents who are dwelling along the road.

Q2: Mrs. Chim Kalyaney, Deputy Director of Environment Department

(1) Dredging work:

- According to the Law on Environment, sea dredging work is prohibited. Not everybody can do this. How much volume of dredging and how large is the dredged area? Cooperation should be necessary with Department of Environment in order to conduct EIA before dredging and disposal works start operation since (1) dredging will affect ecosystem in the sea and (2) disposal of dredged materials will affect the dumping area;

(2) Disposal area:

- There should be a safe dumping area for the disposal to avoid the impacts on the land, general environment as well as the residents. Technical discussion should be necessary with departments concerned especially Ministry of Environment for sustainable developments in order to minimize impacts on environment such as management of liquid and solid wastes, dredging and construction should be consulted/ discussed with ministries concerned, and all these works shall comply with the laws;

(3) Port expansion plan of -12m depth:

- She notices that presently it is impossible to dredge up to -12m depth. How to achieve such expansion plan?

(4) Zoning Plan:

- She strongly supported the idea of zoning plan as recommended. However, she reminded that CMO (Coastal Management Office) of the city hall as represented by Mr. Prak Visal designed a coastal strategy in 2003, which covered such zoning plan. So, for the development plans up to 2030, certain discussions should be necessary with CMO for the designated areas to avoid some social and environmental impacts.

Answer from Mr. Va Sonath:

- Appreciated for Mr. Sambath's comments of 3 points and Mrs. from Department of Environment in response to the port development request on

purpose to avoid the environmental impacts;

- Ancestors had left the port formerly known as Kampongsom Port since 1950s with combination works of French and Khmer engineers and architectures. They conducted studies on the coastal areas from Koh Kong along border with Thai and Vietnam in order to build a port. The studies were carefully done to build such present port which is productive for all aspects: (1) the deepest sea-port area compared with the coastline stretching hundreds of meters in Cambodia, (2) islands as wind barrier and big wave protection for efficient port operations and (3) it is also politically productive in terms of location when it is not too close to Thai and Vietnamese borders like in Koh Kong and Kampot;
- Many studies had been conducted since the regime of French colony up to Khmer Rough regime, and then State of Cambodia, Russian experts were invited to conduct studies for several months and concluded that the previous studies by the ancestors was the right decision to develop the port here;
- Up to now, with the grants from the government of Japan in 3 to 4 phases, almost USD 200 million is granted for the development in the area. JICA envisages that in order to strengthen the competitiveness of PAS, additional container terminal should be developed. From the 2nd Meeting, multi-purpose terminal was proposed and this time container terminal. Because up to 2030, container throughput will increase 1.2 million TEUs and our capacity is just 400,000 TEUs. So development is envisaged as necessary. All these problems are addressed to obtain the concepts from all the participants so that the Study Team can conclude ideas for future development;
- Please be notified that all the images presented are just the concept of the study team. H.E. Chairman/ CEO and port experts have not approved of Point A, B or C or any other point yet. North breakwater affects the aquaculture, residential area and other private ports while south breakwater is independently under control of the port. Any change of the

development images is subject to the port management's consideration and decision. According to H.E. Lu Kimchhun, any development affects the benefits or feelings of the residents; if possible, it should be avoided.

- All countries wish to be independent on exports, so it has to construction the port. In case of non-maritime countries, they develop roads and airports for imports and exports. Cambodia is a maritime country with a deep seaport. Like in Vietnam, they developed the port -16 m water depth, which can accommodate the large vessels. In Singapore, the vessels of -18 m water depth can be accommodated, and presently, trillion tons of land is reclaimed to expand its country island. In Thailand, Laem Chabang, which has similar seawater condition to us, they have paid lots for the development of container terminal. So, all these constructions always affect environment, benefits of the residents and others including fishing and so on. However, by all means, without development, we just depend on Laem Chabang, is it easy for us to survive or to promote international trade? Or just depend on Cai Mep-Thai Vai or Ho Chi Minh ports for imports and exports without our port expansion, what problems will we face?
- So, such development is to bring independence on trading with the world by not just depending on those neighboring ports. Comments to achieve all these visions are much critical. We don't just finish from this step which starts from the port level but still move forward to the ministry level when all the projects are approved by the government;

<u>Answers from Dr. Yagyu:</u>

- (Coming back to the comments from Mrs. from Department of Environment): Concerning all these points, simply say, we will follow the laws applied in Cambodia. So, if you have EIA system, we will follow. That will be done during the feasibility study. This is only concept job site. So, for actual implementation, maybe sometime years later.....

<u>Q3: Mr. Prak Visal, Coordinator for CMO</u>

(1) Development of Port Town:

- (In Presentation) Reading>>> "In the future, to reduce social and economic

impacts, we want to prepare a modern port area going along with the existing community....” please, all participants especially those from the fishing community, do not confuse with the development of new town of the port, which may cause confusion that later on the port will develops a town so all constructions must move there. People may make up an idea to expand the area further and further...I think this is not a good idea. What the Study Team wants to present is just objectively they must have a well-organized, healthy, sanitary and environmentally preparations;

(2) Recommendations regarding Port Expansion Plan:

- Port expansion does not mean relocation of the residential area is unnecessary. In the recommendation, relocation of the local community to an alternative and more suitable location may be an option, if adverse impacts on the local community are likely to be significant and unavoidable. That means we have to study how to minimize the impacts on relocation. If without relocation at all for port expansion, I think, it is impossible. Relocation somehow will be necessary.

Q4: Mr. Chan Chomroeun, ADHOC

Requests:

- (1) I supported the comments of Mrs. from Department of Environment as well as Mr. from Fishery Department. So, all items in terms of technical aspects shall be published and notified to departments/ ministries concerned in order to seek solutions for minimizing impacts and for sustainable development;
- (2) If affecting the residents, public consensus must be obtained;
- (3) The port needs competitiveness. This is concerned with human resource. Of course, the port has its human resource but it is recommended by the study team to apply the concept of right-person-in-the-place;
- (4) The port should reduce brokerage and be convenient for port users.

Answer from Mr. Va Sonath:

- Thanks to Mr. Representative of Adhoc. I support your comments. To the truth, any development which may affect the residents must be notified and

obtain consensus between the authority and residents. This is what we have done so far. For this matter, we can accept your comments;

- If this project is approved by the government for implementation, the impacts will be discussed. The port will invite civil organization to join the discussion so that all problems can solved among the government, civil organization, residents and authority;
- Regarding the development of human resource, the study team proposes to promote capable young staffs in the right place and reduce labors. For this matter, the port is considering. Presently, H.E Chairman/CEO assigns the specialist team comprising of young staffs with higher degree to assist him and join all ordinary and extraordinary meetings which are necessary and related for contributing ideas and knowledge;

Q5: Mr. Men Chann, PAS Audit Department

- Concerning port dues and charges, in the recommendation, port dues and charges of PAS should be decreased when they are higher in comparison with the ports in neighboring countries like Thailand and Vietnam. However, due to higher fuel price, higher tax on cars and transportation and others, it is hard to decrease port dues and charges. Will there be another option besides the recommended decrease of port dues and charges?

Answer from Dr. Yagyu:

- The Seminar will be held tomorrow joined by all PAS employees. The issue of port dues and charges will be included in the Seminar.

5. Other comments

Around 14 comments were submitted from the participants after the meeting. The main comments are summarized below:

- (1) PAS should be further developed due to the increasing calls of container vessels from year to year especially general cargo vessels but the problem is draft restriction that PAS should dredge up to -13m as a standard of international port;
- (2) Increase of PAS operation productivity is important since it enables

financial soundness. However, not PAS alone can do this but needs cooperation with the stakeholders in order to improve operations step by step;

- (3) Repairing and maintenance of the equipment are necessary. So, more trainings by both software and hardware provided to the maintenance team should be necessary to build capacity for the competitiveness and development of PAS in the future;
- (4) Reconsidering Concept-2 with regards to (1) environmental impact is smaller than the Alternative Concept-1 because the resettlement/ relocation of fishing arms are easier than at the Quarter Tom Nop Rolok (breakwater) and the project cost is cheaper and (2) avoiding the weekend traffic congestion in front of the entrance gate by constructing detour road at Klang Leur as an access road to the new container terminal;
- (5) For strengthening the competitiveness, PAS should set a good strategy, tactics and operation, then to manage and control them, all port users should support and cooperate with PAS for great success, all authorities concerned must join and have good relation with the port and port users in terms of business activities;
- (6) Should find solution for the vessel calls for loading and unloading in early weekdays to avoid weekend traffic congestions on Fridays and Saturdays (*to increase efficiency of cargo handling operation); the vessel crane should stop using for loading/discharging container; sufficient beacons/ spotlights must be equipped in the front of vessel, warehouse and yard...; weekend traffic congestions should be eliminated; additional procurements of handling equipment and machineries...etc.;
- (7) Should establish the business management division of PAS; further trainings for vessel planners and container yard planners; within 24 hours before the vessel arrives, the cargoes must be ready for loading at the yard;
- (8) The same to Point (3);
- (9) According to the presentation, only plan for developing container terminal is raised but not passenger terminal;

- (10) PAS dues and charges are considered highest in the regional countries, but everything is very expensive now. E.g. fuel is very costly and because of this, the actual costs of all kinds of cargoes increase sharply while the port tariff is still in the same status, and if we reduce the price, the port dues and charges will adversely affect the port business especially the indemnification of both interests and principles to Japan. Others than the reduction of port tariff, are there any other options to cope with this sensitive issue?
- (11) Port has to reduce cost and increase profits. However, by reducing personnel expenses or laying off labors which helps reduce lots of cost for the port. But if we look at another point of view, it may demotivate the workers or maybe even affect PAS's reputation. Demotivated workers lead to less productivity and affect the port performance;
- (12) Strengthening competitiveness of PAS against PPAP and other ports, considering the social and environmental impacts;
- (13) Need to improve productivity, encourage stevedores to perform their jobs properly and more accurately, manpower is important, need 1 or 2 more gantry cranes to operate the vessel to increase productivity and reliability, take over ship operation by using the port stevedores, reduce additional cost or non-charge when performed discharge/ load cargo by using gantry cranes; gate must open 24 hours on Fridays and Saturdays to avoid traffic congestions and to have more export containers at terminal;
- (14) Well processing with good organization

ATTACHMENT-01/01

LIST OF PARTICIPANTS

3rd Stakeholders Meeting on the JICA Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port in the Kingdom of Cambodia

Date/Time: June 06, 2012/ 9:00 AM-1:30PM

Venue: New Beach Hotel

No.	Name	Position/ Organization
1	Chea Sambath	Director of Planning Dept., PAS
2	Som Savoern	Operation, RCL
3	Klok Makara	Planning Dept., PAS
4	Sok Nimol	APL
5	Bun Samon	DPWT of SHV
6	Chetha Yuvanny	Assist. to JICA Expert, PAS
7	Chim Kalyaney	Deputy Director of Department of Environment
8	Sao Phin	PAS
9	Cheourn Vibol	Deputy Director of Dept. of Economy and Finance
10	Ouk Sovannarith	Chief of Technical handling
11	Seang Leng	Police (police office of SHV)
12	Leng Mao	Director of Machinery Dept., PAS
13	Ouk Vannara	Technical Department, PAS
14	Rath Sela	Admin-HR Dept., PAS
15	Pith Prakath	Admin-HR Dept., PAS
16	Naoki Kado	NIPPON KOEI
17	Ying Koy	KAMSAB
18	Kong Sophea	PAS
19	Chea Sophal	COTS Shipping
20	Cham Chomrpoeun	Adhoc
21	Prak Visal	City Hall of SHV
22	Som Kolchenpa	PMU, PAS
23	Thay Mengly	CT, PAS
24	Va Sonath	Deputy Director General, PAS
25	Sokun Virak	IIL
26	Srey Narin	Container Terminal, PAS

27	Ban Chetra	Ben Line
28	May Sam-aun	Chief of General Cargo Handling Office, PAS
29	Heang Sophal	Deputy Director of Container Operation, PAs
30	Thay Rithy	Deputy Director of Billing Department, PAS
31	Mean Koeung	PAS
32	Leang Heangchor	NIPPON KOEI
33	Reach Sovan	Provincial Deputy Governor of SHV
34	So Seang	Director of International Audit, PAS
35	Seang Kha	Provincial Department of Tourism, SHV
36	Bun Chiv	Customs, SHV
37	Norng Soyeth	SPSEZ
38	Men Chann	Audit Dept., PAS
39	Keth Sopheak	Deputy Director of Land Traffic Office, SHV
40	Sek Sovannara	Container Terminal Dept., PAS
41	Doung Sam-ath	Director of Fishery Administration, SHV
42	Bros Sameourn	University of Management and Economics
43	Peng NGA	CAMCONTROL, SHV
44	Cheth Solkey	Billing Department, PAS
45	Norng Sinal	Port Security, PAS
46	Jonishi Takhiro	JICA Advisor for PAS
47	Chin Sitha	Warehouse #4, PAS
48	Kong Vibol	PAS
49	San Puth	Maersk Representative
50	You Leng	PAS
51	Prak Chanrasmei	PAS
52	Chhun Hong	PAS
53	Min Sokunthea	Deputy Director of Health Dept., PAS
54	Kim Heang	Fishing Village
55	Seng Sopha	PAS

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LIST OF ATTENDANTS

3rd Stakeholders Meeting on the JICA Project for the Study on Strengthening Competiveness and Development of Sihanoukville Port in the Kingdom of Cambodia

N°	Name	Positions /Organization	Signature
1-	CHEA SAMBATH	PAS. planning Dept.	[signature]
2-	Sam Savean	RCL operation	[signature]
3-	Klok Makara	PAS. Planning Department	[signature]
4-	SOK NIMOL	APL	[signature]
5-	BUN. SAMON	DPWT (Provincial)	[signature]
6-	Chetha Yuvany	Asc. Jica Expert	[signature]
7-	CHIM KALYANEY	Deputy Director of Depart. of Environment	[signature]
8-	SAO PIKIN	PAS	[signature]
9-	[illegible]	[illegible]	[signature]
10-	OUK SOVANNARITH	chief Technich handling [illegible]	[signature]
11-	SEANGLENG	Police(port)	[signature]
12-	Leng Mao	PAS, Director machinery Dept	[signature]
13-	Ouk Vannara	PAS. Technical Dept.	[signature]
14-	Rath Sela	Pas Admin	[signature]
15-	PITH PRAKATH	PAS - Admin - HQ Dept.	[signature]

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LIST OF ATTENDANTS

3rd Stakeholders Meeting on the JICA Project for the Study on Strengthening Competiveness and Development of Sihanoukville Port in the Kingdom of Cambodia

N°	Name	Positions /Organization	Signature
1-	Naoki Kado	Nippon Koei	[signature]
2-	Ying Koy	Kamsab	[signature]
3-	Kong Sophea	PAS	[signature]
4-	CHEA SOPHAL	COTS SHIPPING	[signature]
5-	Chan Chomroeun	ADHOC	[signature]
6-	Prak Visal	Preah Sihanouk provincial Hall	[signature]
7-	Soun Kolchenda	PAS - PMU	[signature]
8-	Thay.mengly	PAS. CT	[signature]
9-	Va Sonath.	Dep. Gen. Dire. of PAS.	[signature]
10-	Sokunvirak	ITL.	[signature]
11-	Srey. Narim	Terminal Container	[signature]
12-	Ban. Chetra	Ben Line	[signature]
13-			
14-			
15-			

(3)

LIST OF ATTENDANTS

3rd Stakeholders Meeting on the JICA Project for the Study on Strengthening Competiveness and Development of Sihanoukville Port in the Kingdom of Cambodia

N°	Name	Positions /Organization	Signature
1-	May Sam Aun	Chief of C. L handling office	
2-	Heang Sophal	D.ty Director of Container operation	
3-	Thay Rithy	D.ty Director. Billing Dpt	
4-	MEAN KOELING	PAS Architect	
5-	LEANG HENG CHE	Nippon Koei	
6-	Reach Sovan		
7-	SO SEANG	Director of Internal Audit of PAS	
8-	SENG KHA	Tourism Department	
9-	BUON CHIV	Costom Off.	
10-	Norng Soyoth	SPSEZ	
11-	Mon Chann	PAS Audit Dept.	
12-			
13-	SEK. SOVANNORA	Container Terminal Dept	
14-			
15-			

(4)

LIST OF ATTENDANTS

3rd Stakeholders Meeting on the JICA Project for the Study on Strengthening Competiveness and Development of Sihanoukville Port in the Kingdom of Cambodia

Nº	Name	Positions /Organization	Signature
1-	Doung Samath	Director Fishery Administration	[signature]
2-	Bros Gamecurn	University of Management and Economics	[signature]
3-	PENG NGA	CAMCONTROL	[signature]
4-	Cheth Sathay	Billing Department	[signature]
5-	Norng Sinal	Port Security	[signature]
6-	Jonishi Takahiro 上西隆広	PAS JICA Advisor	[signature]
7-	CHIN SITHA	WAREHOUSE # 4	[signature]
8-	KONG VIBOL	PAS	[signature]
9-	San Puth	Maersk Representative	[signature]
10-	YOU LENG	PAS	[signature]
11-	PRAK CHAN RASMEI	PAS	[signature]
12-	Chhum Homg	PAS	[signature]
13-	Min Sokuntheа	Deputy Health Deparment	[signature]
14-	KIM HEANG	Fishing Village	[signature]
15-	SENG SOPHA	PAS	[signature]

添付資料-5

経済財務分析

Appendix-5.8.10 Economic Analysis (Alternative 1)

EIRR (Alterative 1) — **in 1,000 USD**

	Capital Cost		Replace & Maintenance		Operation										Benefit - Cost		
	New Container Terminal (Pack 2)	Passenger & General C. Terminal (Pack 3)	Replace-ment of facilities (Pack 2,3)	Mainte-nance (Pack 2,3)	Fuel and Personnel Cost (Pack 2,3)	**Total Cost**	Trnasporta-tion Cost Savings by Larger Ships	Tmasporta-tion Cost/Time Savings*	Savings of Congestion Surcharge**	Savings of breakbulk transporta-tion cost	Passenger Ship Increases	Total Benefit	Benefit - Cost	Cost +10% Benefit 0%	Cost 0% Benefit -10%	Cost +10% Benefit -10%
Year	S7	S7	S7	S7-85	S6-43		S12	S12	S12	S12	S12					
2017																
2018	3,430					3,430							-3,430	-3,773	-3,430	-3,773
2019	0					0							0	0	0	0
2020	56,715					56,715							-56,715	-62,386	-56,715	-62,386
2021	78,596					78,596							-78,596	-86,455	-78,596	-86,455
2022	78,596	915				79,511							-79,511	-87,462	-79,511	-87,462
2023	0	0		4,125	513	4,637	2,720	0	36,597	2,142		41,459	36,822	36,358	32,676	32,212
2024	2,139	19,921		4,125	1,632	27,817	3,006	1,470	36,597	2,289		43,362	15,545	12,763	11,209	8,427
2025	0	19,921		4,125	3,367	27,412	3,325	3,123	36,597	2,436		45,481	18,069	15,328	13,521	10,780
2026	31,582			4,785	5,854	42,221	3,682	4,984	36,597	2,583	314	48,161	5,940	1,718	1,124	-3,098
2027	53,463			4,785	8,623	66,871	4,082	7,081	36,597	2,731	353	50,843	-16,028	-22,715	-21,113	-27,800
2028	53,463			4,785	11,707	69,955	4,529	9,444	36,597	2,878	392	53,840	-16,115	-23,111	-21,499	-28,495
2029				7,701	15,322	23,023	5,030	12,110	42,086	3,025	392	62,645	39,622	37,319	33,357	31,055
2030				7,701	19,441	27,142	5,593	15,120	42,086	3,172	392	66,364	39,222	36,508	32,586	29,872
2031			21,429	7,701	23,846	52,976	6,225	18,519	42,086	3,172	392	70,395	17,419	12,122	10,380	5,082
2032				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2033				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2034				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2035				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2036				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2037			24,567	8,344	27,732	60,642	6,712	21,152	42,086	3,172	392	73,515	12,873	6,809	5,521	-543
2038				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2039				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2040				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2041				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2042				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2043			24,567	8,344	27,732	60,642	6,712	21,152	42,086	3,172	392	73,515	12,873	6,809	5,521	-543
2044				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2045				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2046				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2047			21,429	8,344	27,732	57,504	6,712	21,152	42,086	3,172	392	73,515	16,011	10,260	8,659	2,909
2048				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2049				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2050				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2051				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481
2052			24,567	8,344	27,732	60,642	6,712	21,152	42,086	3,172	392	73,515	12,873	6,809	5,521	-543
2053			21,429	8,344	27,732	57,504	6,712	21,152	42,086	3,172	392	73,515	16,011	10,260	8,659	2,909
2054				8,344	27,732	36,075	6,712	21,152	42,086	3,172	392	73,515	37,440	33,832	30,088	26,481

* Container cargoes over 500,000 TEUs
** Container cargoes up to 500,000 TEUs

EIRR=	EIRR=	EIRR=	EIRR=
9.19%	7.07%	6.84%	4.61%

Economic Analysis (Alternative 2)

EIRR (Alterative 2) — in 1,000 USD

	Capital Cost		Replace & Maintenance		Operation									Benefit - Cost		
	New Container Terminal (Pack 2)	Passenger & General C. Terminal (Pack 3)	Replace-ment of facilities (Pack 2,3)	Mainte-nance (Pack 2,3)	Fuel and Personnel Cost (Pack 2,3)	**Total Cost**	Trnasporta-tion Cost Savings by Larger Ships	Tmasporta-tion Cost/Time Savings*	Savings of Congestion Surcharge**	Savings of breakbulk transporta-tion cost	Passenger Ship Increases	Total Benefit	Benefit - Cost	Cost +10% Benefit 0%	Cost 0% Benefit -10%	Cost +10% Benefit -10%
Year	S7	S7	S7	S7-85	S6-43		S12-48	S12-63	S12-73	S12-84	S12-78					
2017																
2018	4,089					4,089							-4,089	-4,498	-4,089	-4,498
2019	0					0							0	0	0	0
2020	69,555					69,555							-69,555	-76,511	-69,555	-76,511
2021	91,435					91,435							-91,435	-100,579	-91,435	-100,579
2022	91,435	924				92,360							-92,360	-101,595	-92,360	-101,595
2023	0	0		4,911	513	5,424	2,720	0	36,597	2,142		41,459	36,035	35,493	31,889	31,347
2024	2,202	19,921		4,911	1,632	28,667	3,006	1,470	36,597	2,289		43,362	14,695	11,829	10,359	7,492
2025	0	19,921		4,911	3,367	28,199	3,325	3,123	36,597	2,436		45,481	17,282	14,463	12,734	9,914
2026	32,819			5,572	5,854	44,244	3,682	4,984	36,597	2,583	314	48,161	3,916	-508	-900	-5,324
2027	54,699			5,572	8,623	68,894	4,082	7,081	36,597	2,731	353	50,843	-18,051	-24,940	-23,135	-30,025
2028	54,699			5,572	11,707	71,978	4,529	9,444	36,597	2,878	392	53,840	-18,138	-25,335	-23,522	-30,720
2029				8,627	15,322	23,949	5,030	12,110	42,086	3,025	392	62,645	38,696	36,301	32,431	30,036
2030				8,627	19,441	28,068	5,593	15,120	42,086	3,172	392	66,364	38,296	35,489	31,660	28,853
2031			22,573	8,627	23,846	55,046	6,225	18,519	42,086	3,172	392	70,395	15,349	9,845	8,310	2,805
2032				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2033				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2034				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2035				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2036				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2037			26,447	9,270	27,732	63,448	6,712	21,152	42,086	3,172	392	73,515	10,067	3,722	2,715	-3,629
2038				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2039				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2040				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2041				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2042				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2043			25,292	9,270	27,732	62,293	6,712	21,152	42,086	3,172	392	73,515	11,222	4,993	3,870	-2,359
2044				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2045				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2046				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2047			22,573	9,270	27,732	59,574	6,712	21,152	42,086	3,172	392	73,515	13,941	7,984	6,589	632
2048				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2049				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2050				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2051				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462
2052			25,292	9,270	27,732	62,293	6,712	21,152	42,086	3,172	392	73,515	11,222	4,993	3,870	-2,359
2053			22,573	9,270	27,732	59,574	6,712	21,152	42,086	3,172	392	73,515	13,941	7,984	6,589	632
2054				9,270	27,732	37,001	6,712	21,152	42,086	3,172	392	73,515	36,514	32,814	29,162	25,462

EIRR=	EIRR=	EIRR=	EIRR=
7.43%	5.42%	5.20%	3.04%

* Container cargoes over 500,000 TEUs

** Container cargoes up to 500,000 TEUs

Financial Analysis (Alternative 1)

FIRR (Alternative 1) in 1,000 USD

	Capital Cost			Former Investment		Replace & Maintenance			Operation		Revenue	FIRR			
	Present Container Terminal (Pack 1)	New Container Terminal (Pack 2)	Passenger & General C. Terminal (Pack 3)	Depreciation (P3, P4, P10)	Former Investment Interest	Replace-ment (Incl. tug boats)	Mainte-nance (CP-P3, P4, P10)	Mainte-nance (Pakage 1,2,3)	Operation Cost	Total Cost	Total Revenue	Balance	Cost +10% Rev. 0%	Cost 0% Rev. -10%	Cost +10% Rev. -10%
Year	S7	S7	S7	S7-45	S5-21	S7-36	S7-69	S7-84	S6-32		S9-N				
2012				2,530	2,948		1,727		17,708	24,913	30,086	5,173	5,173	5,173	5,173
2013	208			2,530	2,901		1,727		18,136	25,503	31,827	6,324	6,303	6,324	6,303
2014	0			2,530	2,942		1,727		18,610	25,809	33,953	8,144	8,144	8,144	8,144
2015	8,674			2,530	3,551		1,727		19,130	35,612	36,173	560	-307	560	-307
2016	8,327			2,530	4,275		1,727		19,701	36,560	37,724	1,164	331	1,164	331
2017	208			4,034	4,318	3,738	2,855	516	20,325	35,995	41,079	5,085	4,690	5,085	4,690
2018	0	3,605		4,034	4,167	0	2,855	628	21,092	36,382	43,059	6,677	6,317	6,479	6,119
2019	8,674	0		4,034	4,015	0	2,855	628	21,920	42,127	45,943	3,816	2,949	3,330	2,462
2020	8,327	59,610		4,034	3,832	0	2,855	628	23,004	102,290	49,784	-52,506	-59,300	-53,377	-60,171
2021		82,608		4,034	3,617	0	2,855	1,145	20,653	114,912	41,397	-73,515	-81,776	-73,547	-81,808
2022		82,608	989	4,034	3,402	7,477	2,855	1,145	22,014	124,523	44,305	-80,219	-89,326	-80,541	-89,649
2023		0	0	4,034	3,186	0	2,855	5,494	23,559	39,129	46,884	7,755	7,755	7,175	7,175
2024		2,248	21,533	4,034	2,971	16,197	2,855	5,494	25,004	80,335	50,463	-29,872	-33,870	-30,810	-34,808
2025		0	21,533	4,034	2,756	0	2,855	5,979	27,324	64,482	55,167	-9,315	-11,468	-10,724	-12,877
2026		33,194		4,034	2,540	0	2,855	6,640	30,738	80,002	61,497	-18,505	-21,825	-20,547	-23,866
2027		56,192		4,034	2,325	0	2,855	6,640	34,690	106,736	68,425	-38,311	-43,930	-41,045	-46,665
2028		56,192		4,034	2,110	0	2,855	6,640	39,183	111,015	76,297	-34,718	-40,337	-38,240	-43,859
2029				4,034	1,895	0	2,855	9,556	44,619	62,958	84,976	22,018	22,018	17,628	17,628
2030				4,034	1,675	0	2,855	9,556	50,840	68,961	94,782	25,822	25,822	20,452	20,452
2031				4,034	1,538	28,509	2,855	9,556	57,495	103,987	104,760	774	-2,077	-5,594	-8,445
2032				4,034	1,400	0	2,855	10,199	63,414	81,901	111,881	29,980	29,980	22,900	22,900
2033				4,034	1,262	0	2,855	10,199	63,414	81,763	112,871	31,108	31,108	23,929	23,929
2034				4,034	1,124	19,148	2,855	10,199	63,414	100,774	113,361	12,587	10,672	5,359	3,444
2035				4,034	986	7,080	2,855	10,773	63,414	89,142	113,361	24,219	23,511	16,991	16,283
2036				4,034	916	0	2,855	10,773	63,414	81,992	113,361	31,369	31,369	24,141	24,141
2037				3,357	846	28,305	2,855	10,773	63,414	109,551	113,361	3,810	980	-3,418	-6,249
2038				3,357	777	0	2,855	10,773	63,414	81,176	113,361	32,185	32,185	24,957	24,957
2039				3,357	707	16,197	2,855	10,773	63,414	97,303	113,361	16,058	14,438	8,830	7,210
2040				3,357	641	0	2,855	10,773	63,414	81,041	113,361	32,320	32,320	25,092	25,092
2041				3,357	577	9,574	2,855	10,773	63,414	90,551	113,361	22,810	21,853	15,582	14,625
2042				3,357	513	0	2,855	10,773	63,414	80,912	113,361	32,449	32,449	25,220	25,220
2043				3,357	449	24,567	2,855	10,773	63,414	105,415	113,361	7,946	5,489	718	-1,739
2044				3,357	385	0	2,855	10,773	63,414	80,784	113,361	32,577	32,577	25,349	25,349
2045				3,357	321	9,574	2,855	10,773	63,414	90,294	113,361	23,067	22,109	15,839	14,881
2046				3,357	256	7,080	2,855	10,773	63,414	87,736	113,361	25,625	24,917	18,397	17,689
2047				3,357	192	21,429	2,855	10,773	63,414	102,021	113,361	11,340	9,197	4,112	1,969
2048				3,357	128	0	2,855	10,773	63,414	80,528	113,361	32,833	32,833	25,605	25,605
2049				3,357	64	0	2,855	10,773	63,414	80,464	113,361	32,897	32,897	25,669	25,669
2050				3,357	0	7,080	2,855	10,773	63,414	87,479	113,361	25,881	25,173	18,653	17,945
2051				3,357	0	0	2,855	10,773	63,414	80,399	113,361	32,961	32,961	25,733	25,733
2052				3,357	0	28,305	2,855	10,773	63,414	108,704	113,361	4,656	1,826	-2,572	-5,402
2053				3,357	0	21,429	2,855	10,773	63,414	101,828	113,361	11,532	9,390	4,304	2,161
2054				3,357	0	16,197	2,855	10,773	63,414	96,596	113,361	16,765	15,145	9,537	7,917

FIRR=	FIRR=	FIRR=
4.27%	2.93%	1.53%	0.25%

Financial Analysis (Alternative 2)

FIRR (Alternative 2) in 1,000 USD

	Capital Cost			Former Investment		Replace & Maintenance			Operation		Revenue	FIRR			
	Present Container Terminal (Pack 1)	New Container Terminal (Pack 2)	Passenger & General C. Terminal (Pack 3)	Depreciation (P3, P4, P10)	Former Investment Interest	Replace-ment (Incl. tug boats)	Maintenance (CP-P3, P4, P10)	Maintenance (Pakage 1,2,3)	Operation Cost	Total Cost	Total Revenue	Balance	Cost +10% Rev. 0%	Cost 0% Rev. -10%	Cost +10% Rev. -10%
Year	S7	S7	S7	S7-42	S5-21	S7-36	S7-66	S7-84	S6-32		S9-N				
2012				2,530	2,948		1,727		17,708	24,913	30,086	5,173	5,173	5,173	5,173
2013	208			2,530	2,901		1,727		18,136	25,503	31,827	6,324	6,303	6,324	6,303
2014	0			2,530	2,942		1,727		18,610	25,809	33,953	8,144	8,144	8,144	8,144
2015	8,674			2,530	3,551		1,727		19,130	35,612	36,173	560	-307	560	-307
2016	8,327			2,530	4,275		1,727		19,701	36,560	37,724	1,164	331	1,164	331
2017	208			4,034	4,318	3,738	2,855	516	20,325	35,995	41,079	5,085	4,690	5,085	4,690
2018	0	4,298		4,034	4,167	0	2,855	628	21,092	37,075	43,059	5,984	5,555	5,786	5,357
2019	8,674	0		4,034	4,015	0	2,855	628	21,920	42,127	45,943	3,816	2,949	3,330	2,462
2020	8,327	73,106		4,034	3,832	0	2,855	628	23,004	115,786	49,784	-66,002	-74,146	-66,873	-75,016
2021		96,103		4,034	3,617	0	2,855	1,145	20,653	128,407	41,397	-87,010	-96,620	-87,042	-96,652
2022		96,103	989	4,034	3,402	7,477	2,855	1,145	22,014	138,018	44,305	-93,714	-104,170	-94,036	-104,493
2023		0	0	4,034	3,186	0	2,855	6,280	23,559	39,915	46,884	6,969	6,969	6,388	6,388
2024		2,314	21,533	4,034	2,971	14,050	2,855	6,280	25,004	79,042	50,463	-28,578	-32,368	-29,517	-33,307
2025		0	21,533	4,034	2,756	0	2,855	6,702	27,324	65,204	55,167	-10,037	-12,191	-11,446	-13,599
2026		34,494		4,034	2,540	0	2,855	7,363	30,738	82,024	61,497	-20,528	-23,977	-22,569	-26,019
2027		57,491		4,034	2,325	0	2,855	7,363	34,690	108,758	68,425	-40,332	-46,081	-43,067	-48,816
2028		57,491		4,034	2,110	0	2,855	7,363	39,183	113,036	76,297	-36,740	-42,489	-40,261	-46,010
2029				4,034	1,895	0	2,855	10,417	44,619	63,820	84,976	21,156	21,156	16,767	16,767
2030				4,034	1,675	0	2,855	10,417	50,840	69,822	94,782	24,960	24,960	19,590	19,590
2031				4,034	1,538	28,509	2,855	10,417	57,495	104,848	104,760	-88	-2,939	-6,456	-9,307
2032				4,034	1,400	0	2,855	11,060	63,414	82,763	111,881	29,118	29,118	22,038	22,038
2033				4,034	1,262	0	2,855	11,060	63,414	82,625	112,871	30,246	30,246	23,067	23,067
2034				4,034	1,124	19,148	2,855	11,060	63,414	101,635	113,361	11,726	9,811	4,498	2,583
2035				4,034	986	7,080	2,855	11,635	63,414	90,003	113,361	23,358	22,650	16,129	15,421
2036				4,034	916	0	2,855	11,635	63,414	82,854	113,361	30,507	30,507	23,279	23,279
2037				3,357	846	28,305	2,855	11,635	63,414	110,412	113,361	2,948	118	-4,280	-7,110
2038				3,357	777	0	2,855	11,635	63,414	82,038	113,361	31,323	31,323	24,095	24,095
2039				3,357	707	14,050	2,855	11,635	63,414	96,018	113,361	17,343	15,938	10,114	8,709
2040				3,357	641	0	2,855	11,635	63,414	81,902	113,361	31,459	31,459	24,231	24,231
2041				3,357	577	9,574	2,855	11,635	63,414	91,412	113,361	21,949	20,991	14,721	13,763
2042				3,357	513	0	2,855	11,635	63,414	81,774	113,361	31,587	31,587	24,359	24,359
2043				3,357	449	24,567	2,855	11,635	63,414	106,277	113,361	7,084	4,627	-144	-2,601
2044				3,357	385	0	2,855	11,635	63,414	81,646	113,361	31,715	31,715	24,487	24,487
2045				3,357	321	9,574	2,855	11,635	63,414	91,156	113,361	22,205	21,248	14,977	14,020
2046				3,357	256	7,080	2,855	11,635	63,414	88,597	113,361	24,763	24,055	17,535	16,827
2047				3,357	192	21,429	2,855	11,635	63,414	102,882	113,361	10,479	8,336	3,250	1,108
2048				3,357	128	0	2,855	11,635	63,414	81,389	113,361	31,972	31,972	24,744	24,744
2049				3,357	64	0	2,855	11,635	63,414	81,325	113,361	32,036	32,036	24,808	24,808
2050				3,357	0	7,080	2,855	11,635	63,414	88,341	113,361	25,020	24,312	17,792	17,084
2051				3,357	0	0	2,855	11,635	63,414	81,261	113,361	32,100	32,100	24,872	24,872
2052				3,357	0	28,305	2,855	11,635	63,414	109,566	113,361	3,795	964	-3,433	-6,264
2053				3,357	0	21,429	2,855	11,635	63,414	102,690	113,361	10,671	8,528	3,443	1,300
2054				3,357	0	14,050	2,855	11,635	63,414	95,311	113,361	18,050	16,644	10,821	9,416

FIRR=	FIRR=	FIRR=	FIRR=
2.97%	1.79%	0.36%	-0.81%

Financial Analysis (Alternative 1': Private Superstructure and Operation)

FIRR (Alternative 1': Private Superstructure & Operation) in 1,000 USD

	Capital Cost			Former Investment		Replace & Maintenance			Operation			Revenue	FIRR			
	Present Container Terminal (Pack 1)	New Container Terminal (Pack 2)	Passenger & General C. Terminal (Pack 3)	Depreciation (P3, P4, P10)	Former Investment Interest	Replace-ment (Incl. tug boats)	Mainte-nance (CP-P3, P4, P10)	Mainte-nance (Pakage 1,2,3)	Operation Cost	Total Cost	Total Revenue	Balance	Cost +10% Rev. 0%	Cost 0% Rev. -10%	Cost +10% Rev. -10%
Year	S7	S7	S7	S7-45	S5-22	S7-36	S7-69	S7-84	S6-35		S9-N				
2012				2,530	2,948		1,727		17,708	24,913	30,086	5,173	5,173	5,173	5,173
2013	208			2,530	2,901		1,727		18,136	25,503	31,825	6,322	6,301	6,322	6,301
2014	0			2,530	2,942		1,727		18,610	25,809	33,934	8,125	8,125	8,125	8,125
2015	8,674			2,530	3,551		1,727		19,130	35,612	36,122	510	-357	510	-357
2016	8,327			2,530	4,275		1,727		19,701	36,560	37,625	1,065	232	1,065	232
2017	208			4,034	4,318	3,738	2,855	516	20,325	35,995	41,079	5,085	4,690	5,085	4,690
2018	0	2,281		4,034	4,167	0	2,855	628	21,092	35,058	42,986	7,928	7,700	7,738	7,509
2019	8,674	0		4,034	4,015	0	2,855	628	21,920	42,127	45,775	3,648	2,781	3,179	2,311
2020	8,327	44,408		4,034	3,832	0	2,855	628	23,004	87,088	49,324	-37,764	-43,038	-38,589	-43,862
2021		44,408		4,034	3,617	0	2,855	1,145	20,653	76,712	41,397	-35,315	-39,756	-35,347	-39,788
2022		44,408	989	4,034	3,402	7,477	2,855	1,145	21,880	86,190	44,012	-42,178	-47,465	-42,471	-47,758
2023		0	0	4,034	3,186	0	2,855	3,402	17,436	30,913	36,134	5,221	5,221	5,716	5,716
2024		924	21,533	4,034	2,971	16,197	2,855	3,402	15,832	67,748	33,734	-34,014	-37,879	-34,961	-38,827
2025		0	21,533	4,034	2,756	0	2,855	3,887	15,062	50,127	33,572	-16,556	-18,709	-17,683	-19,837
2026		17,992		4,034	2,540	0	2,855	4,548	15,385	47,355	34,875	-12,480	-14,279	-13,778	-15,577
2027		17,992		4,034	2,325	0	2,855	4,548	19,194	50,949	42,205	-8,744	-10,543	-10,252	-12,052
2028		17,992		4,034	2,110	0	2,855	4,548	23,545	55,085	50,569	-4,516	-6,315	-7,034	-8,834
2029				4,034	1,895	0	2,855	5,372	25,768	39,924	55,307	15,383	15,383	12,116	12,116
2030				4,034	1,675	0	2,855	5,372	28,435	42,371	60,301	17,929	17,929	13,966	13,966
2031				4,034	1,538	7,080	2,855	5,372	28,898	49,777	60,876	11,100	10,392	6,851	6,143
2032				4,034	1,400	0	2,855	5,372	30,966	44,627	63,379	18,753	18,753	14,183	14,183
2033				4,034	1,262	0	2,855	5,372	30,966	44,489	64,369	19,881	19,881	15,113	15,113
2034				4,034	1,124	19,148	2,855	5,372	30,966	63,499	64,859	1,360	-554	-3,505	-5,420
2035				4,034	986	7,080	2,855	5,946	30,966	51,867	64,859	12,992	12,284	8,126	7,418
2036				4,034	916	0	2,855	5,946	30,966	44,717	64,859	20,142	20,142	15,276	15,276
2037				3,357	846	3,738	2,855	5,946	30,966	47,709	64,859	17,150	16,776	12,284	11,911
2038				3,357	777	0	2,855	5,946	30,966	43,901	64,859	20,958	20,958	16,092	16,092
2039				3,357	707	16,197	2,855	5,946	30,966	60,029	64,859	4,831	3,211	-35	-1,655
2040				3,357	641	0	2,855	5,946	30,966	43,766	64,859	21,093	21,093	16,228	16,228
2041				3,357	577	9,574	2,855	5,946	30,966	53,276	64,859	11,583	10,626	6,718	5,760
2042				3,357	513	0	2,855	5,946	30,966	43,638	64,859	21,222	21,222	16,356	16,356
2043				3,357	449	0	2,855	5,946	30,966	43,574	64,859	21,286	21,286	16,420	16,420
2044				3,357	385	0	2,855	5,946	30,966	43,509	64,859	21,350	21,350	16,484	16,484
2045				3,357	321	9,574	2,855	5,946	30,966	53,020	64,859	11,840	10,882	6,974	6,017
2046				3,357	256	7,080	2,855	5,946	30,966	50,461	64,859	14,398	13,690	9,532	8,824
2047				3,357	192	0	2,855	5,946	30,966	43,317	64,859	21,542	21,542	16,677	16,677
2048				3,357	128	0	2,855	5,946	30,966	43,253	64,859	21,606	21,606	16,741	16,741
2049				3,357	64	0	2,855	5,946	30,966	43,189	64,859	21,670	21,670	16,805	16,805
2050				3,357	0	7,080	2,855	5,946	30,966	50,205	64,859	14,654	13,946	9,789	9,081
2051				3,357	0	0	2,855	5,946	30,966	43,125	64,859	21,734	21,734	16,869	16,869
2052				3,357	0	3,738	2,855	5,946	30,966	46,863	64,859	17,996	17,623	13,131	12,757
2053				3,357	0	0	2,855	5,946	30,966	43,125	64,859	21,734	21,734	16,869	16,869
2054				3,357	0	16,197	2,855	5,946	30,966	59,322	64,859	5,538	3,918	672	-948

FIRR=	FIRR=	FIRR=
7.42%	5.47%	4.26%	2.75%

Cash Flow, Profit Loss Statement, Balance Sheet

PROFIT AND LOSS STATEMENT

	2011	2012	2013	2014	2015	2016	2017	2018
Operating Revenue (excl. VAT)								
Operating Revenue	28,025	30,086	31,827	33,953	36,173	37,724	41,079	43,059
Operating Expenses	23,560	24,291	24,334	24,422	24,558	24,743	29,008	29,689
Fuel and motor oil for operation	3,125	3,423	3,628	3,845	4,076	4,321	4,581	4,858
Supplies for Workshop & Spare-parts	2,526	2,768	2,933	3,109	3,296	3,494	3,704	3,928
Salaries and Bonus	5,615	5,683	5,393	5,103	4,813	4,522	4,232	4,028
Depreciation	5,241	4,856	4,471	4,085	3,700	3,315	5,311	5,112
Repair and maintenance	1,727	1,727	1,727	1,727	1,727	1,727	3,372	3,484
Fuel for administration & maintenance	1,440	1,577	1,672	1,772	1,878	1,991	2,111	2,239
Miscellaneous administrative others	3,885	4,256	4,511	4,781	5,068	5,373	5,697	6,040
Net Operating Income	4,465	5,795	7,493	9,531	11,615	12,980	12,072	13,370
Non-operating revenues								
Interest gains, Exchange gains	0	0	0	0	0	0	0	0
Non-operating Expenses								
Interest on long-term-loans (MEF Int.)	3,029	2,948	2,901	2,942	3,551	4,275	4,318	4,167
Interest on loans for Package #1,#2,#3							688	654
Interest on short-term loans	0	0	0	0	0	0	0	0
Net Income Before Tax	1,437	2,847	4,591	6,588	8,064	8,705	7,066	8,550
Income tax	287	569	918	1,318	1,613	1,741	1,413	1,710
Net income after tax	1,149	2,277	3,673	5,271	6,451	6,964	5,652	6,840
Dividend payments								
Retained Earnings	6,609	8,887	12,560	17,830	24,282	31,246	36,898	43,738

CASH FLOW STATEMENT

	2011	2,012	2013	2,014	2015	2,016	2017	2,018
Cash at Beginning	5,459	10,205	15,694	22,194	28,016	34,633	41,378	44,209
Cash Inflow	9,707	12,038	16,943	41,536	57,646	32,085	17,591	22,087
Net operating income	4,465	5,795	7,493	9,531	11,615	12,980	12,072	13,370
Depreciation cost (All)	5,241	4,856	4,471	4,085	3,700	3,315	5,311	5,112
Long-term loans (Package #1,#2,#3)			208	0	8,674	8,327	208	3,604
Accumulated Principal of Longterm Loans				208	208	8,882	17,209	16,557
Long-term loans (Package P3,P4,P10)		1,387	4,771	27,920	33,657	7,463		
Accumulated Principal of Longterm Loans	71,798	70,153	69,896	73,024	97,410	127,532	131,461	127,927
Interest on deposits	0	0	0	0	0	0	0	0
Cash Outflow (excluding G. Funds)	4,960	6,549	10,443	35,714	51,028	25,340	14,760	14,529
Investment (Package #1,#2,#3)			**208**	**0**	**8,674**	**8,327**	**208**	**3,604**
Investment (CP-P10)		**1,387**	**4,771**	**27,920**	**33,657**	**7,463**		
Replacement of existing assets							**3,738**	**0**
Repayment new long-term loans principal							860	860
Repayment P3,P4,P10 loan principal	1,644	1,644	1,644	3,534	3,534	3,534	3,534	3,534
Interest on long-term loans (New)				0	0	0	688	654
Interest on former MEF long-term loans	3,029	2,948	2,901	2,942	3,551	4,275	4,318	4,167
Income tax+ Transfer	287	569	918	1,318	1,613	1,741	1,413	1,710
Interest on short-term loans	0	0	0	0	0	0	0	0
Cash Inflow - Cash Outflow	4,746	5,489	6,500	5,822	6,617	6,745	2,831	7,558
Cash at End	10,205	15,694	22,194	28,016	34,633	41,378	44,209	51,767

Cash Flow, Profit Loss Statement, Balance Sheet (2)

PROFIT AND LOSS STATEMENT

	2019	2020	2021	2022	2023	2024	2025	2026
Operating Revenue (excl. VAT)								
Operating Revenue	45,943	49,784	41,397	44,305	46,884	50,463	55,167	61,497
Operating Expenses	30,131	30,829	29,872	31,233	43,656	45,100	48,986	53,942
Fuel and motor oil for operation	5,152	5,518	5,911	6,332	6,783	7,266	8,034	9,177
Supplies for Workshop & Spare-parts	4,165	4,462	4,780	5,120	5,484	5,875	6,496	7,420
Salaries and Bonus	3,823	3,619	3,414	3,548	3,779	3,815	3,894	3,974
Depreciation	4,727	4,342	5,219	5,219	11,747	11,747	12,827	13,708
Repair and maintenance	3,484	3,484	4,000	4,000	8,349	8,349	8,835	9,496
Fuel for administration & maintenance	2,374	2,543	1,771	1,897	2,032	2,176	2,406	2,749
Miscellaneous administrative others	6,406	6,862	4,778	5,118	5,482	5,872	6,493	7,418
Net Operating Income	15,812	18,955	11,525	13,072	3,228	5,363	6,180	7,555
Non-operating revenues								
Interest gains, Exchange gains	0	0	0	0	0	0	0	0
Non-operating Expenses								
Interest on long-term-loans (MEF Int.)	4,015	3,832	3,617	3,402	3,186	2,971	2,756	2,540
Interest on loans for Package #1,#2,#3	620	585	1,239	1,170	5,670	5,601	5,532	6,345
Interest on short-term loans	0	0	0	0	0	0	0	0
Net Income Before Tax	11,177	14,537	6,669	8,500	-5,628	-3,209	-2,108	-1,330
Income tax	2,235	2,907	1,334	1,700	0	0	0	0
Net income after tax	8,942	11,630	5,335	6,800	-5,628	-3,209	-2,108	-1,330
Dividend payments								
Retained Earnings	52,680	64,310	69,645	76,445	70,816	67,607	65,499	64,169

CASH FLOW STATEMENT

	2019	2,020	2021	2,022	2023	2,024	2025	2,026
Cash at Beginning	51,767	58,535	67,605	70,398	67,178	65,536	50,116	53,073
Cash Inflow	29,213	91,234	99,352	101,888	14,976	40,891	40,541	54,457
Net operating income	15,812	18,955	11,525	13,072	3,228	5,363	6,180	7,555
Depreciation cost (All)	4,727	4,342	5,219	5,219	11,747	11,747	12,827	13,708
Long-term loans (Package #1,#2,#3)	8,674	67,937	82,608	83,597	0	23,780	21,533	33,194
Accumulated Principal of Longterm Loans	19,300	27,114	94,190	175,077	256,953	255,232	277,291	297,103
Long-term loans (Package P3,P4,P10)								
Accumulated Principal of Longterm Loans	124,393	118,352	112,312	106,271	100,230	94,190	88,149	82,108
Interest on deposits	0	0	0	0	0	0	0	0
Cash Outflow (excluding G. Funds)	22,445	82,163	96,559	105,107	16,618	56,311	37,583	49,841
Investment (Package #1,#2,#3)	**8,674**	**67,937**	**82,608**	**83,597**		**23,780**	**21,533**	**33,194**
Investment (CP-P10)								
Replacement of existing assets	**0**	**0**	**0**	**7,477**	**0**	**16,197**	**0**	**0**
Repayment new long-term loans principal	860	860	1,721	1,721	1,721	1,721	1,721	1,721
Repayment P3,P4,P10 loan principal	6,041	6,041	6,041	6,041	6,041	6,041	6,041	6,041
Interest on long-term loans (New)	620	585	1,239	1,170	5,670	5,601	5,532	6,345
Interest on former MEF long-term loans	4,015	3,832	3,617	3,402	3,186	2,971	2,756	2,540
Income tax+ Transfer	2,235	2,907	1,334	1,700	0	0	0	0
Interest on short-term loans	0	0	0	0	0	0	0	0
Cash Inflow - Cash Outflow	6,768	9,071	2,792	-3,220	-1,642	-15,420	2,958	4,616
Cash at End	58,535	67,605	70,398	67,178	65,536	50,116	53,073	57,690

Cash Flow, Profit Loss Statement, Balance Sheet (3)

PROFIT AND LOSS STATEMENT

	2027	2028	2029	2030	2031	2032	2033	2034
Operating Revenue (excl. VAT)								
Operating Revenue	68,425	76,297	84,976	94,782	104,760	111,881	112,871	113,361
Operating Expenses	57,894	62,387	75,280	81,502	88,157	95,576	95,576	95,576
Fuel and motor oil for operation	10,484	11,976	13,680	15,627	17,851	19,593	19,593	19,593
Supplies for Workshop & Spare-parts	8,477	9,683	11,061	12,635	14,434	15,842	15,842	15,842
Salaries and Bonus	4,116	4,259	4,723	5,266	5,435	6,274	6,274	6,274
Depreciation	13,708	13,708	18,251	18,251	18,251	19,108	19,108	19,108
Repair and maintenance	9,496	9,496	12,411	12,411	12,411	13,054	13,054	13,054
Fuel for administration & maintenance	3,140	3,587	4,098	4,681	5,347	5,869	5,869	5,869
Miscellaneous administrative others	8,473	9,679	11,057	12,630	14,428	15,836	15,836	15,836
Net Operating Income	10,532	13,909	9,696	13,281	16,603	16,305	17,295	17,785
Non-operating revenues								
Interest gains, Exchange gains	0	0	0	0	0	0	0	0
Non-operating Expenses								
Interest on long-term-loans (MEF Int.)	2,325	2,110	1,895	1,675	1,538	1,400	1,262	1,124
Interest on loans for Package #1,#2,#3	6,276	6,207	9,095	8,797	8,500	8,203	7,906	7,564
Interest on short-term loans	0	0	0	0	0	0	0	0
Net Income Before Tax	1,931	5,592	-1,294	2,808	6,566	6,703	8,128	9,097
Income tax	386	1,118	0	562	1,313	1,341	1,626	1,819
Net income after tax	1,545	4,474	-1,294	2,246	5,253	5,362	6,502	7,278
Dividend payments								
Retained Earnings	65,714	70,188	68,894	71,140	76,393	81,755	88,258	95,536

CASH FLOW STATEMENT

	2027	2,028	2029	2,030	2031	2,032	2033	2,034
Cash at Beginning	57,690	65,181	75,602	73,376	76,222	53,566	60,385	66,143
Cash Inflow	80,432	83,809	27,946	31,531	34,854	35,413	36,403	36,893
Net operating income	10,532	13,909	9,696	13,281	16,603	16,305	17,295	17,785
Depreciation cost (All)	13,708	13,708	18,251	18,251	18,251	19,108	19,108	19,108
Long-term loans (Package #1,#2,#3)	56,192	56,192	0	0	0	0	0	0
Accumulated Principal of Longterm Loans	328,576	383,047	437,519	424,376	411,234	398,091	384,949	369,603
Long-term loans (Package P3,P4,P10)								
Accumulated Principal of Longterm Loans	76,068	70,027	63,986	57,946	53,438	48,930	44,421	39,913
Interest on deposits	0	0	0	0	0	0	0	0
Cash Outflow (excluding G. Funds)	72,941	73,389	30,172	28,685	57,510	28,594	30,646	49,509
Investment (Package #1,#2,#3)	**56,192**	**56,192**						
Investment (CP-P10)								
Replacement of existing assets	**0**	**0**	**0**	**0**	**28,509**	**0**	**0**	**19,148**
Repayment new long-term loans principal	1,721	1,721	13,142	13,142	13,142	13,142	15,345	15,345
Repayment P3,P4,P10 loan principal	6,041	6,041	6,041	4,508	4,508	4,508	4,508	4,508
Interest on long-term loans (New)	6,276	6,207	9,095	8,797	8,500	8,203	7,906	7,564
Interest on former MEF long-term loans	2,325	2,110	1,895	1,675	1,538	1,400	1,262	1,124
Income tax+ Transfer	386	1,118	0	562	1,313	1,341	1,626	1,819
Interest on short-term loans	0	0	0	0	0	0	0	0
Cash Inflow - Cash Outflow	7,491	10,421	-2,226	2,846	-22,656	6,820	5,757	-12,616
Cash at End	65,181	75,602	73,376	76,222	53,566	60,385	66,143	53,527

Cash Flow, Profit Loss Statement, Balance Sheet (4)

PROFIT AND LOSS STATEMENT

	2035	2036	2037	2038	2039	2040	2041	2042
Operating Revenue (excl. VAT)								
Operating Revenue	113,361	113,361	113,361	113,361	113,361	113,361	113,361	113,361
Operating Expenses	96,239	96,239	96,239	96,239	96,239	96,239	96,239	96,239
Fuel and motor oil for operation	19,593	19,593	19,593	19,593	19,593	19,593	19,593	19,593
Supplies for Workshop & Spare-parts	15,842	15,842	15,842	15,842	15,842	15,842	15,842	15,842
Salaries and Bonus	6,274	6,274	6,274	6,274	6,274	6,274	6,274	6,274
Depreciation	19,197	19,197	19,197	19,197	19,197	19,197	19,197	19,197
Repair and maintenance	13,628	13,628	13,628	13,628	13,628	13,628	13,628	13,628
Fuel for administration & maintenance	5,869	5,869	5,869	5,869	5,869	5,869	5,869	5,869
Miscellaneous administrative others	15,836	15,836	15,836	15,836	15,836	15,836	15,836	15,836
Net Operating Income	17,121	17,121	17,121	17,121	17,121	17,121	17,121	17,121
Non-operating revenues								
Interest gains, Exchange gains	0	0	0	0	0	0	0	0
Non-operating Expenses								
Interest on long-term-loans (MEF Int.)	986	916	846	777	707	641	577	513
Interest on loans for Package #1,#2,#3	7,223	6,734	6,245	5,790	5,335	4,880	4,426	4,005
Interest on short-term loans	0	0	0	0	0	0	0	0
Net Income Before Tax	8,913	9,472	10,031	10,555	11,079	11,600	12,119	12,603
Income tax	1,783	1,894	2,006	2,111	2,216	2,320	2,424	2,521
Net income after tax	7,130	7,577	8,024	8,444	8,864	9,280	9,695	10,083
Dividend payments								
Retained Earnings	102,666	110,243	118,267	126,711	135,575	144,855	154,550	164,633

CASH FLOW STATEMENT

	2035	2,036	2037	2,038	2039	2,040	2041	2,042
Cash at Beginning	53,527	47,419	48,839	23,261	26,408	13,778	17,873	13,669
Cash Inflow	36,319	36,319	36,319	36,319	36,319	36,319	36,319	36,319
Net operating income	17,121	17,121	17,121	17,121	17,121	17,121	17,121	17,121
Depreciation cost (All)	19,197	19,197	19,197	19,197	19,197	19,197	19,197	19,197
Long-term loans (Package #1,#2,#3)	0	0	0	0	0	0	0	0
Accumulated Principal of Longterm Loans	354,258	331,521	308,785	286,909	265,033	243,157	221,281	200,265
Long-term loans (Package P3,P4,P10)								
Accumulated Principal of Longterm Loans	35,405	32,787	30,169	27,550	24,932	22,314	19,807	17,301
Interest on deposits	0	0	0	0	0	0	0	0
Cash Outflow (excluding G. Funds)	42,426	34,899	61,896	33,172	48,949	32,224	40,523	30,561
Investment (Package #1,#2,#3)								
Investment (CP-P10)								
Replacement of existing assets	**7,080**	**0**	**28,305**	**0**	**16,197**	**0**	**9,574**	**0**
Repayment new long-term loans principal	22,737	22,737	21,876	21,876	21,876	21,876	21,016	21,016
Repayment P3,P4,P10 loan principal	2,618	2,618	2,618	2,618	2,618	2,507	2,507	2,507
Interest on long-term loans (New)	7,223	6,734	6,245	5,790	5,335	4,880	4,426	4,005
Interest on former MEF long-term loans	986	916	846	777	707	641	577	513
Income tax+ Transfer	1,783	1,894	2,006	2,111	2,216	2,320	2,424	2,521
Interest on short-term loans	0	0	0	0	0	0	0	0
Cash Inflow - Cash Outflow	-6,107	1,420	-25,578	3,147	-12,630	4,095	-4,204	5,758
Cash at End	47,419	48,839	23,261	26,408	13,778	17,873	13,669	19,426

Cash Flow, Profit Loss Statement, Balance Sheet (5)

PROFIT AND LOSS STATEMENT

	2043	2044	2045	2046	2047	2048	2049	2050
Operating Revenue (excl. VAT)								
Operating Revenue	113,361	113,361	113,361	113,361	113,361	113,361	113,361	113,361
Operating Expenses	96,239	96,239	96,239	96,239	96,239	96,239	96,239	96,239
Fuel and motor oil for operation	19,593	19,593	19,593	19,593	19,593	19,593	19,593	19,593
Supplies for Workshop & Spare-parts	15,842	15,842	15,842	15,842	15,842	15,842	15,842	15,842
Salaries and Bonus	6,274	6,274	6,274	6,274	6,274	6,274	6,274	6,274
Depreciation	19,197	19,197	19,197	19,197	19,197	19,197	19,197	19,197
Repair and maintenance	13,628	13,628	13,628	13,628	13,628	13,628	13,628	13,628
Fuel for administration & maintenance	5,869	5,869	5,869	5,869	5,869	5,869	5,869	5,869
Miscellaneous administrative others	15,836	15,836	15,836	15,836	15,836	15,836	15,836	15,836
Net Operating Income	17,121	17,121	17,121	17,121	17,121	17,121	17,121	17,121
Non-operating revenues								
Interest gains, Exchange gains	0	0	0	0	0	0	0	0
Non-operating Expenses								
Interest on long-term-loans (MEF Int.)	449	385	321	256	192	128	64	0
Interest on loans for Package #1,#2,#3	3,585	3,165	2,744	2,324	1,904	1,483	1,063	871
Interest on short-term loans	0	0	0					
Net Income Before Tax	13,088	13,572	14,057	14,541	15,025	15,510	15,994	16,250
Income tax	2,618	2,714	2,811	2,908	3,005	3,102	3,199	3,250
Net income after tax	10,470	10,858	11,245	11,633	12,020	12,408	12,795	13,000
Dividend payments								
Retained Earnings	175,103	185,961	197,206	208,839	220,859	233,267	246,062	259,062

CASH FLOW STATEMENT

	2043	2,044	2045	2,046	2047	2,048	2049	2,050
Cash at Beginning	19,426	1,004	7,537	4,883	5,111	-8,622	-1,833	17,784
Cash Inflow	36,319	36,319	36,319	36,319	36,319	36,319	36,319	36,319
Net operating income	17,121	17,121	17,121	17,121	17,121	17,121	17,121	17,121
Depreciation cost (All)	19,197	19,197	19,197	19,197	19,197	19,197	19,197	19,197
Long-term loans (Package #1,#2,#3)	0	0	0					
Accumulated Principal of Longterm Loans	179,249	158,234	137,218	116,203	95,187	74,171	53,156	43,562
Long-term loans (Package P3,P4,P10)								
Accumulated Principal of Longterm Loans	14,794	12,288	9,781	7,274	4,768	2,261	0	
Interest on deposits	0	0	0					
Cash Outflow (excluding G. Funds)	54,741	29,786	38,973	36,091	50,052	29,529	16,702	20,795
Investment (Package #1,#2,#3)								
Investment (CP-P10)								
Replacement of existing assets	**24,567**	**0**	**9,574**	**7,080**	**21,429**	**0**	**0**	**7,080**
Repayment new long-term loans principal	21,016	21,016	21,016	21,016	21,016	21,016	9,594	9,594
Repayment P3,P4,P10 loan principal	2,507	2,507	2,507	2,507	2,507	2,507	2,507	
Interest on long-term loans (New)	3,585	3,165	2,744	2,324	1,904	1,483	1,063	871
Interest on former MEF long-term loans	449	385	321	256	192	128	64	0
Income tax+ Transfer	2,618	2,714	2,811	2,908	3,005	3,102	3,199	3,250
Interest on short-term loans	0	0	0	0	0	1,293	275	0
Cash Inflow - Cash Outflow	-18,422	6,533	-2,654	228	-13,734	6,789	19,617	15,523
Cash at End	1,004	7,537	4,883	5,111	-8,622	-1,833	17,784	33,307

Cash Flow, Profit Loss Statement, Balance Sheet (6)

PROFIT AND LOSS STATEMENT

	2051	2052	2053	2054
Operating Revenue (excl. VAT)				
Operating Revenue	113,361	113,361	113,361	113,361
Operating Expenses	96,239	96,239	96,239	96,239
Fuel and motor oil for operation	19,593	19,593	19,593	19,593
Supplies for Workshop & Spare-parts	15,842	15,842	15,842	15,842
Salaries and Bonus	6,274	6,274	6,274	6,274
Depreciation	19,197	19,197	19,197	19,197
Repair and maintenance	13,628	13,628	13,628	13,628
Fuel for administration & maintenance	5,869	5,869	5,869	5,869
Miscellaneous administrative others	15,836	15,836	15,836	15,836
Net Operating Income	17,121	17,121	17,121	17,121
Non-operating revenues				
Interest gains, Exchange gains	0	0	0	0
Non-operating Expenses				
Interest on long-term-loans (MEF Int.)	0	0	0	0
Interest on loans for Package #1,#2,#3	679	488	296	148
Interest on short-term loans				
Net Income Before Tax	16,442	16,634	16,826	16,974
Income tax	3,288	3,327	3,365	3,395
Net income after tax	13,154	13,307	13,461	13,579
Dividend payments				
Retained Earnings	272,216	285,523	298,984	312,562

CASH FLOW STATEMENT

	2051	2,052	2053	2,054
Cash at Beginning	33,307	56,064	50,670	54,507
Cash Inflow	36,319	36,319	36,319	36,319
Net operating income	17,121	17,121	17,121	17,121
Depreciation cost (All)	19,197	19,197	19,197	19,197
Long-term loans (Package #1,#2,#3)				
Accumulated Principal of Longterm Loans	33,968	24,374	14,780	7,388
Long-term loans (Package P3,P4,P10)				
Accumulated Principal of Longterm Loans				
Interest on deposits				
Cash Outflow (excluding G. Funds)	13,562	41,713	32,481	27,131
Investment (Package #1,#2,#3)				
Investment (CP-P10)				
Replacement of existing assets	**0**	**28,305**	**21,429**	**16,197**
Repayment new long-term loans principal	9,594	9,594	7,391	7,391
Repayment P3,P4,P10 loan principal				
Interest on long-term loans (New)	679	488	296	148
Interest on former MEF long-term loans	0	0	0	0
Income tax+ Transfer	3,288	3,327	3,365	3,395
Interest on short-term loans	0	0	0	0
Cash Inflow - Cash Outflow	22,757	-5,395	3,838	9,188
Cash at End	56,064	50,670	54,507	63,695

Cash Flow, Profit Loss Statement, Balance Sheet (7)

BALANCE SHEET

	2011	2,012	2013	2,014	2015	2,016	2017	2,018
(Assets)								
Current Assets	10,205	15,694	22,194	28,016	34,633	41,378	44,209	51,767
Cash & Deposit	10,205	15,694	22,194	28,016	34,633	41,378	44,209	51,767
Fixed Assets (Package #1,#2,#3 & P3,P4,P10)	66,627	66,240	69,445	95,591	136,148	150,164	149,955	149,217
Construction costs (Package #1,#2,#3)	0	0	208	0	8,674	8,327	3,946	3,604
Fixed assets (Package #1,#2,#3)	0	0	0	208	208	8,882	17,209	21,155
Depreciation (Package #1,#2,#3) S6	0	0	0	0	0	0	877	1,064
Net fixed assets (Package #1,#2,#3)	0	0	208	208	8,882	17,209	20,278	22,818
Construction (CP-P3, P4, P10)		1,387	4,771	27,920	33,657	7,463		
Fixed assets (CP-P3, P4, P10)	71,798	71,798	73,185	77,956	105,876	139,533	146,996	146,996
Depreciation (CP-P3, P4, P10)	1,774	1,774	1,774	1,774	1,774	1,774	3,278	3,278
Net fixed assets (CP-P3, P4, P10)	66,627	66,240	69,237	95,383	127,266	132,955	129,677	126,399
Total Assets (Package 1,2,3 & P3,P4,P10)	76,832	81,934	91,639	123,607	170,781	191,542	194,164	200,984
(Liabilities and Capital)								
Liabilities	71,798	70,153	69,896	73,232	97,618	136,414	148,670	144,483
Short-term loans	0	0	0	0	0	0	0	0
Long-term loans (Package #1,#2,#3)	0	0	0	208	208	8,882	17,209	16,557
Long-term loans (Package P3,P4,P10)	71,798	70,153	69,896	73,024	97,410	127,532	131,461	127,927
Capital (Package #1,#2,#3 & P3,P4,P10))	5,034	11,781	21,743	50,376	73,164	55,128	45,494	56,501
Total Liabilities and Capital	76,832	81,934	91,639	123,607	170,781	191,542	194,164	200,984

FINANCIAL INDICATORS

	2011	2,012	2013	2,014	2015	2,016	2017	2,018
Working Ratio	65%	65%	62%	60%	58%	57%	58%	57%
Operating Ratio	84%	81%	76%	72%	68%	66%	71%	69%
Rate of Return on Net Fixed Assets			6.6%	6.9%	5.9%	5.8%	4.7%	5.7%
Debt Service Coverage ratio	2.08	2.32	2.63	2.10	2.16	2.09	1.85	2.01

Cash Flow, Profit Loss Statement, Balance Sheet (8)

BALANCE SHEET								
	2019	**2,020**	**2021**	**2,022**	**2023**	**2,024**	**2025**	**2,026**
(Assets)								
Current Assets	58,535	67,605	70,398	67,178	65,536	50,116	53,073	57,690
Cash & Deposit	58,535	67,605	70,398	67,178	65,536	50,116	53,073	57,690
Fixed Assets (Package #1,#2,#3 & P3,P4,P10)	153,549	217,144	294,533	380,388	368,641	396,870	405,576	425,061
Construction costs (Package #1,#2,#3)	8,674	67,937	82,608	91,074	0	39,977	21,533	33,194
Fixed assets (Package #1,#2,#3)	24,759	33,433	101,370	183,978	275,052	275,052	315,029	336,562
Depreciation (Package #1,#2,#3) S6	1,064	1,064	1,941	1,941	8,470	8,470	9,549	10,430
Net fixed assets (Package #1,#2,#3)	30,428	97,301	177,967	267,100	258,631	290,138	302,122	324,885
Construction (CP-P3, P4, P10)								
Fixed assets (CP-P3, P4, P10)	146,996	146,996	146,996	146,996	146,996	146,996	146,996	146,996
Depreciation (CP-P3, P4, P10)	3,278	3,278	3,278	3,278	3,278	3,278	3,278	3,278
Net fixed assets (CP-P3, P4, P10)	123,121	119,844	116,566	113,288	110,010	106,732	103,454	100,176
Total Assets (Package 1,2,3 & P3,P4,P10)	212,084	284,749	364,931	447,566	434,176	446,985	458,649	482,751
(Liabilities and Capital)								
Liabilities	143,693	145,466	206,502	281,348	357,183	349,422	365,440	379,212
Short-term loans	0	0	0	0	0	0	0	0
Long-term loans (Package #1,#2,#3)	19,300	27,114	94,190	175,077	256,953	255,232	277,291	297,103
Long-term loans (Package P3,P4,P10)	124,393	118,352	112,312	106,271	100,230	94,190	88,149	82,108
Capital (Package #1,#2,#3 & P3,P4,P10))	68,391	139,284	158,429	166,218	76,993	97,564	93,209	103,539
Total Liabilities and Capital	212,084	284,749	364,931	447,566	434,176	446,985	458,649	482,751

FINANCIAL INDICATORS								
	2019	**2,020**	**2021**	**2,022**	**2023**	**2,024**	**2025**	**2,026**
Working Ratio	55%	53%	60%	59%	68%	66%	66%	65%
Operating Ratio	66%	62%	72%	70%	93%	89%	89%	88%
Rate of Return on Net Fixed Assets	7.3%	6.7%	2.3%	2.2%	-1.5%	-0.8%	-0.5%	-0.3%
Debt Service Coverage ratio	1.78	2.06	1.33	1.48	0.90	1.05	1.18	1.28

Cash Flow, Profit Loss Statement, Balance Sheet (9)

BALANCE SHEET								
	2027	**2,028**	**2029**	**2,030**	**2031**	**2,032**	**2033**	**2,034**
(Assets)								
Current Assets	65,181	75,602	73,376	76,222	53,566	60,385	66,143	53,527
Cash & Deposit	65,181	75,602	73,376	76,222	53,566	60,385	66,143	53,527
Fixed Assets (Package #1,#2,#3 & P3,P4,P10)	467,545	510,029	491,778	473,527	483,785	464,678	445,570	445,610
Construction costs (Package #1,#2,#3)	56,192	56,192	0	0	28,509	0	0	19,148
Fixed assets (Package #1,#2,#3)	369,756	425,948	482,140	482,140	482,140	510,649	510,649	510,649
Depreciation (Package #1,#2,#3) S6	10,430	10,430	14,973	14,973	14,973	15,830	15,830	15,830
Net fixed assets (Package #1,#2,#3)	370,647	416,408	401,435	386,463	399,999	384,169	368,339	371,657
Construction (CP-P3, P4, P10)								
Fixed assets (CP-P3, P4, P10)	146,996	146,996	146,996	146,996	146,996	146,996	146,996	146,996
Depreciation (CP-P3, P4, P10)	3,278	3,278	3,278	3,278	3,278	3,278	3,278	3,278
Net fixed assets (CP-P3, P4, P10)	96,898	93,620	90,342	87,065	83,787	80,509	77,231	73,953
Total Assets (Package 1,2,3 & P3,P4,P10)	532,726	585,631	565,154	549,749	537,351	525,063	511,712	499,137
(Liabilities and Capital)								
Liabilities	404,644	453,074	501,505	482,322	464,671	447,021	429,370	409,517
Short-term loans	0	0	0	0	0	0	0	0
Long-term loans (Package #1,#2,#3)	328,576	383,047	437,519	424,376	411,234	398,091	384,949	369,603
Long-term loans (Package P3,P4,P10)	76,068	70,027	63,986	57,946	53,438	48,930	44,421	39,913
Capital (Package #1,#2,#3 & P3,P4,P10))	128,082	132,556	63,649	67,428	72,680	78,042	82,342	89,620
Total Liabilities and Capital	532,726	585,631	565,154	549,749	537,351	525,063	511,712	499,137

FINANCIAL INDICATORS								
	2027	**2,028**	**2029**	**2,030**	**2031**	**2,032**	**2033**	**2,034**
Working Ratio	65%	64%	67%	67%	67%	68%	68%	67%
Operating Ratio	85%	82%	89%	86%	84%	85%	85%	84%
Rate of Return on Net Fixed Assets	0.4%	1.1%	-0.3%	0.6%	1.4%	1.4%	1.8%	2.0%
Debt Service Coverage ratio	1.48	1.72	0.93	1.12	1.26	1.30	1.25	1.29

Cash Flow, Profit Loss Statement, Balance Sheet (10)

BALANCE SHEET								
	2035	**2,036**	**2037**	**2,038**	**2039**	**2,040**	**2041**	**2,042**
(Assets)								
Current Assets	47,419	48,839	23,261	26,408	13,778	17,873	13,669	19,426
Cash & Deposit	47,419	48,839	23,261	26,408	13,778	17,873	13,669	19,426
Fixed Assets (Package #1,#2,#3 & P3,P4,P10)	433,493	414,296	423,403	404,206	401,206	382,008	372,385	353,188
Construction costs (Package #1,#2,#3)	7,080	0	28,305	0	16,197	0	9,574	0
Fixed assets (Package #1,#2,#3)	529,797	536,877	536,877	565,182	565,182	581,379	581,379	590,953
Depreciation (Package #1,#2,#3) S6	16,596	16,596	16,596	16,596	16,596	16,596	16,596	16,596
Net fixed assets (Package #1,#2,#3)	362,141	345,545	357,254	340,658	340,259	323,663	316,642	300,046
Construction (CP-P3, P4, P10)								
Fixed assets (CP-P3, P4, P10)	146,996	146,996	146,996	146,996	146,996	146,996	146,996	146,996
Depreciation (CP-P3, P4, P10)	2,601	2,601	2,601	2,601	2,601	2,601	2,601	2,601
Net fixed assets (CP-P3, P4, P10)	71,352	68,750	66,149	63,548	60,946	58,345	55,744	53,142
Total Assets (Package 1,2,3 & P3,P4,P10)	480,912	463,135	446,665	430,614	414,984	399,881	386,054	372,614
(Liabilities and Capital)								
Liabilities	389,663	364,308	338,954	314,459	289,965	265,471	241,088	217,566
Short-term loans	0	0	0	0	0	0	0	0
Long-term loans (Package #1,#2,#3)	354,258	331,521	308,785	286,909	265,033	243,157	221,281	200,265
Long-term loans (Package P3,P4,P10)	35,405	32,787	30,169	27,550	24,932	22,314	19,807	17,301
Capital (Package #1,#2,#3 & P3,P4,P10))	91,249	98,826	107,711	116,155	125,019	134,410	144,966	155,048
Total Liabilities and Capital	480,912	463,135	446,665	430,614	414,984	399,881	386,054	372,614

FINANCIAL INDICATORS								
	2035	**2,036**	**2037**	**2,038**	**2039**	**2,040**	**2041**	**2,042**
Working Ratio	68%	68%	68%	68%	68%	68%	68%	68%
Operating Ratio	85%	85%	85%	85%	85%	85%	85%	85%
Rate of Return on Net Fixed Assets	2.1%	2.3%	2.4%	2.6%	2.8%	3.0%	3.3%	3.6%
Debt Service Coverage ratio	1.08	1.10	1.15	1.17	1.19	1.21	1.27	1.30

Cash Flow, Profit Loss Statement, Balance Sheet (11)

BALANCE SHEET								
	2043	**2,044**	**2045**	**2,046**	**2047**	**2,048**	**2049**	**2,050**
(Assets)								
Current Assets	1,004	7,537	4,883	5,111	-8,622	-1,833	17,784	33,307
Cash & Deposit	1,004	7,537	4,883	5,111	-8,622	-1,833	17,784	33,307
Fixed Assets (Package #1,#2,#3 & P3,P4,P10)	358,558	339,360	329,737	317,620	319,852	300,655	281,457	269,340
Construction costs (Package #1,#2,#3)	24,567	0	9,574	7,080	21,429	0	0	7,080
Fixed assets (Package #1,#2,#3)	590,953	615,520	615,520	625,094	632,174	653,603	653,603	653,603
Depreciation (Package #1,#2,#3) S6	16,596	16,596	16,596	16,596	16,596	16,596	16,596	16,596
Net fixed assets (Package #1,#2,#3)	308,017	291,421	284,399	274,883	279,716	263,120	246,524	237,009
Construction (CP-P3, P4, P10)								
Fixed assets (CP-P3, P4, P10)	146,996	146,996	146,996	146,996	146,996	146,996	146,996	146,996
Depreciation (CP-P3, P4, P10)	2,601	2,601	2,601	2,601	2,601	2,601	2,601	2,601
Net fixed assets (CP-P3, P4, P10)	50,541	47,940	45,338	42,737	40,135	37,534	34,933	32,331
Total Assets (Package 1,2,3 & P3,P4,P10)	359,562	346,898	334,621	322,731	311,229	298,822	299,241	302,647
(Liabilities and Capital)								
Liabilities	194,044	170,521	146,999	123,477	99,955	76,433	53,156	43,562
Short-term loans	0	0	0	0	0	0	0	0
Long-term loans (Package #1,#2,#3)	179,249	158,234	137,218	116,203	95,187	74,171	53,156	43,562
Long-term loans (Package P3,P4,P10)	14,794	12,288	9,781	7,274	4,768	2,261	0	0
Capital (Package #1,#2,#3 & P3,P4,P10))	165,519	176,376	187,621	199,254	211,275	222,389	246,085	259,086
Total Liabilities and Capital	359,562	346,898	334,621	322,731	311,229	298,822	299,241	302,647

FINANCIAL INDICATORS								
	2043	**2,044**	**2045**	**2,046**	**2047**	**2,048**	**2049**	**2,050**
Working Ratio	68%	68%	68%	68%	68%	68%	68%	68%
Operating Ratio	85%	85%	85%	85%	85%	85%	85%	85%
Rate of Return on Net Fixed Assets	3.7%	4.0%	4.3%	4.6%	4.7%	5.2%	5.7%	6.0%
Debt Service Coverage ratio	1.32	1.34	1.37	1.39	1.42	1.45	2.75	3.47

Cash Flow, Profit Loss Statement, Balance Sheet (12)

BALANCE SHEET				
	2051	**2,052**	**2053**	**2,054**
(Assets)				
Current Assets	56,064	50,670	54,507	63,695
Cash & Deposit	56,064	50,670	54,507	63,695
Fixed Assets (Package #1,#2,#3 & P3,P4,P10)	250,143	259,251	261,482	258,482
Construction costs (Package #1,#2,#3)	0	28,305	21,429	16,197
Fixed assets (Package #1,#2,#3)	660,683	660,683	688,988	710,417
Depreciation (Package #1,#2,#3) S6	16,596	16,596	16,596	16,596
Net fixed assets (Package #1,#2,#3)	220,413	232,122	236,955	236,556
Construction (CP-P3, P4, P10)				
Fixed assets (CP-P3, P4, P10)	146,996	146,996	146,996	146,996
Depreciation (CP-P3, P4, P10)	2,601	2,601	2,601	2,601
Net fixed assets (CP-P3, P4, P10)	29,730	27,129	24,527	21,926
Total Assets (Package 1,2,3 & P3,P4,P10)	306,207	309,920	315,989	322,177
(Liabilities and Capital)				
Liabilities	33,968	24,374	14,780	7,388
Short-term loans	0	0	0	0
Long-term loans (Package #1,#2,#3)	33,968	24,374	14,780	7,388
Long-term loans (Package P3,P4,P10)	0	0	0	0
Capital (Package #1,#2,#3 & P3,P4,P10))	272,239	285,546	301,210	314,789
Total Liabilities and Capital	306,207	309,920	315,989	322,177
FINANCIAL INDICATORS				
	2051	**2,052**	**2053**	**2,054**
Working Ratio	68%	68%	68%	68%
Operating Ratio	85%	85%	85%	85%
Rate of Return on Net Fixed Assets	6.6%	6.4%	6.4%	6.6%
Debt Service Coverage ratio	3.54	3.60	4.72	4.82

添付資料-6

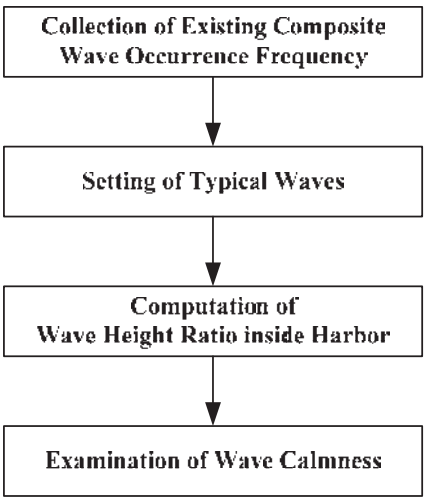
港内波浪静穏度検討結果

1. 検討概要

シハヌークビル港では、JICA カンボジア国シハヌークビル港 M/P 及び F/S 調査（1996-1997 年）及びカンボジア国シハヌークビル港多目的ターミナル開発計画詳細設計業務（2011 年-現在進行中）の 2 案件において、既に港内静穏度検討が実施されている。

JICA M/P 及び F/S 調査では、旧軍用空港にて観測されていた 1983~1996 年の風観測データを港口波浪に換算した波浪出現頻度表を基に港内静穏度検討が行われている。また、多目的ターミナル開発計画詳細設計業務では、この JICA M/S 及び F/S 調査で作成された波浪出現頻度表と、新たにシアヌークビル測候所より入手した 2000-2010 年までの 10 年間の風観測データを港口波浪に換算した波浪出現頻度表とを結合した複合頻度表を基に港内静穏度検討が行われている。

本検討では、上記の内、多目的ターミナル開発計画詳細設計業務で取りまとめられた複合頻度表を用いて、図 1-1 に示すフローの通り港内静穏度検討を行った。



出典：プロジェクトチーム

図 1-1　港内静穏度検討フロー

2. 港内静穏度算定手法

(1)　回折・反射計算

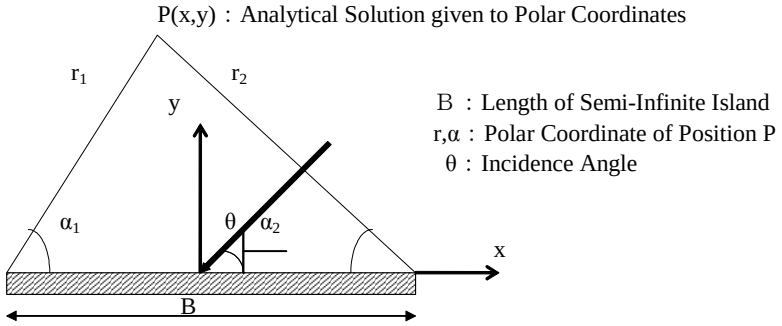
静穏度計算の数値モデルは，高山ら（1981）が提案しているモデルを用いた。以下に高山らのモデルにおける計算の概要を示す。

1)　港口部からの進入波の計算

Penny and Price (1944) は，半無限堤に入射する波の回折波を Sommerfeld (1896)の光の回折理論を用いて解析解を得ている．港口部からの侵入波の計算はこの解析解を準用し，防波堤の港内側の面で反射した波がさらに港内に侵入する場合や２次回折が起こる場合についても計算可能としている。

2)　岸壁等による反射率の計算

港口部から侵入してきた回折波は岸壁などで反射する。岸壁による反射波は再度他の岸壁で反射する場合もある。この岸壁による反射波の計算としては，図 2-1 に示した通り、岸壁を一つの島堤と考えて計算を行う。このとき島堤の反射は，半無限堤の解を重ね合わせた近似解を用いるものとした。

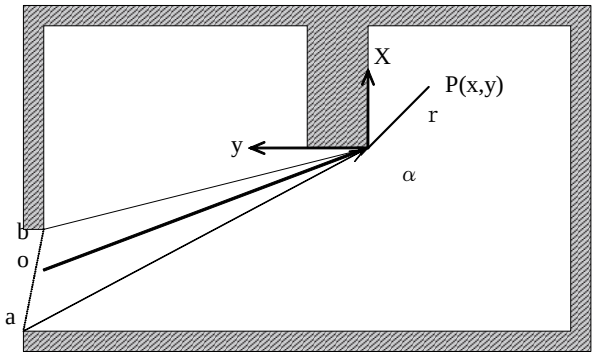


出典：プロジェクトチーム

図 2-1　島堤による反射の計算

3)　岸壁による回折波の計算

港口で回折した波は，岸壁や港内の突堤などで遮られると直接到達できない領域が存在する場合がある。このような場合には，図 2-2 に示すように岸壁や突堤を半無限堤とみなして回折計算を行うものとした。



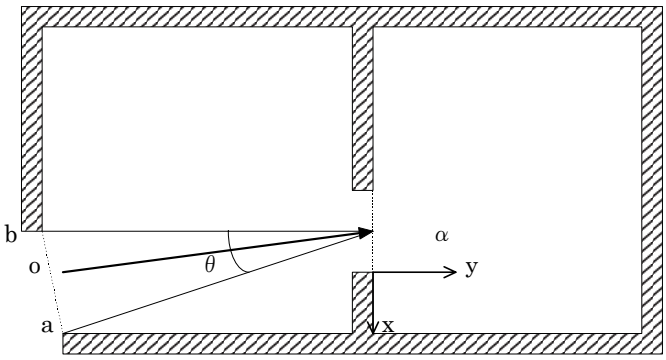
出典：プロジェクトチーム

図 2-2　岸壁による回折

4)　港内開口防波堤による回折の計算

港によっては港内に旧港があって，その旧港が防波堤で遮蔽されている場合がある。このように港内に開口防波堤が存在する場合には，港口からの回折侵入波を再度回折させることが必要と

なるため、図 2-3 に示す通り、港口中央から港内開口部中央の角度 θ_0 を波の主方向，港内開口部中央から港口の両端の角度 θ を波向の範囲として 1) と同様の計算を行うものとした。



出典：プロジェクトチーム

図 2-3　港内開口部による回折

5)　合成波の計算法

1)から 4)の方法で求めた i 番目の波群の有義波高をHi とすると，港内波高比Kd は各有義波高のエネルギー合成によって式（2-1）より求めた。

$$Kd = \sqrt{(\sum_{i=1}^{n} H_i^2 / n)} \Big/ H_{1/3} \qquad \text{式(2-1)}$$

ここに，n は港口侵入波や岸壁等による反射波などの波群の数，H1/3 は港口入射波の有義波高である。

6)　反射率の設定

表 2-1 に港湾施設の反射率概略値を示す。

表 2-1　反射率の概略値

Item	Reflection Coefficient
Upright wall	0.7 - 1.0
Submerged upright breakwater	0.5 - 0.7
Rubble mound	0.3 - 0.6
Wave-dissipating blocks	0.3 - 0.5
Upright wave-dissipating structure	0.3 - 0.8
Natural beach	0.05 - 0.2

出典：港湾の施設の技術上の基準・同解説（2007）

表中の反射率概略値を参考に、本検討で対象となる港湾施設の反射率を表 2-2 の通り設定した。

表 2-2　反射率の概略値

Item	Reflection Coefficient
Upright wall	0.9
Rubble mound	0.4
Wave-dissipating blocks	0.4
Natural beach	0.2

出典：プロジェクトチーム

(2)　静穏率算定手順の概要

岸壁の静穏率の算定は、以下に示す手順に従って実施した。

- 港口部（港湾前面）における波向別複合波浪頻度表の入手（既存資料）
- 代表波の設定
- 検討港形の波高比分布を波向別に算定（回折・反射計算）
- 岸壁前面における目標波高（荷役限界波高及び係留限界波高）の設定
- 波向別波高頻度表より限界波高以上の非静穏率を集計
- 非静穏率を 1.0（全波高出現率）より減じ静穏率を算定

3.　代表波浪の設定

(1)　港口における波浪出現頻度表

表 3-1 及び 3-2 に多目的ターミナル開発計画詳細設計業務で取りまとめられた波高・波向別、周期・波向別の複合出現頻度表をそれぞれ示す。これらの頻度表は、1983～1996 年の風観測データに基づく頻度表に比べ、波高、周期ともに大きくなっているが、本件検討では、風観測期間の長さや波浪の経年変化等を考慮しこれらの頻度表を用いるものとした。

(2)　代表波の設定

表 3-1 及び 3-2 の複合頻度表より、代表波向は港湾前面の波向から 1 波向毎、代表波高は累積頻度が 97.5%を含む波高ランクの上限値、更に代表周期は代表波高ランクにおける最頻値周期ランクの上限値をそれぞれ選定した。本検討における代表波は以下に示す通りとした。

- 対象風観測期間：1985-1996 年、2000-2010 年
- 波向：SW、W、NW、N
- 波高：1.00 m
- 周期：4.0 sec

4.　港内波高比の算定

(1)　検討ケース

静穏度検討は、シハヌークビル港の将来計画配置案、各案に対する新規防波堤の設置有無、岸壁断面案（直立壁または直立消波岸壁）、卓越波向等を考慮して、表 4-1 の通り検討ケースを設定した。また、図 4-1～4-5 にそれぞれ各検討ケースの港形図を示す。

表 3-1　港口における波高・波向別複合出現頻度（1983-1996＆2000-2010）

Sihanoukville　　ERR ; 0.02

H(m) \ Deg.	NE	E	SE	S	SW	W	NW	N	CALM	Occurrence Frequency (%)	Exceeding Ocurrence Frequency (%)
CALM									27.10	27.10	27.10
～ 0.25	0.00	0.00	0.00	0.00	7.64	15.46	8.29	16.77		48.17	75.27
～ 0.50	0.00	0.00	0.00	0.00	1.15	7.84	4.95	2.66		16.60	91.87
～ 0.75	0.00	0.00	0.00	0.00	0.29	1.84	2.28	0.94		5.34	97.21
～ 1.00	0.00	0.00	0.00	0.00	0.04	0.38	0.86	0.05		1.33	98.54
～ 1.25	0.00	0.00	0.00	0.00	0.02	0.10	0.62	0.00		0.73	99.27
～ 1.50	0.00	0.00	0.00	0.00	0.00	0.04	0.13	0.00		0.17	99.44
～ 1.75	0.00	0.00	0.00	0.00	0.00	0.02	0.24	0.00		0.26	99.69
～ 2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00		0.16	99.86
～ 2.25	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00		0.13	99.98
～ 2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	99.98
～ 2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00		0.02	100.00
～ 3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	100.00
3.00 ～	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	100.00
Total (%)	0.00	0.00	0.00	0.00	9.14	25.66	17.68	20.42	27.10	100.00	

出典：多目的ターミナル開発計画詳細設計業務検討静穏度資料

表 3-2　港口における周期・波向別複合出現頻度（1983-1996＆2000-2010）

Sihanoukville　　ERR ; 0.02

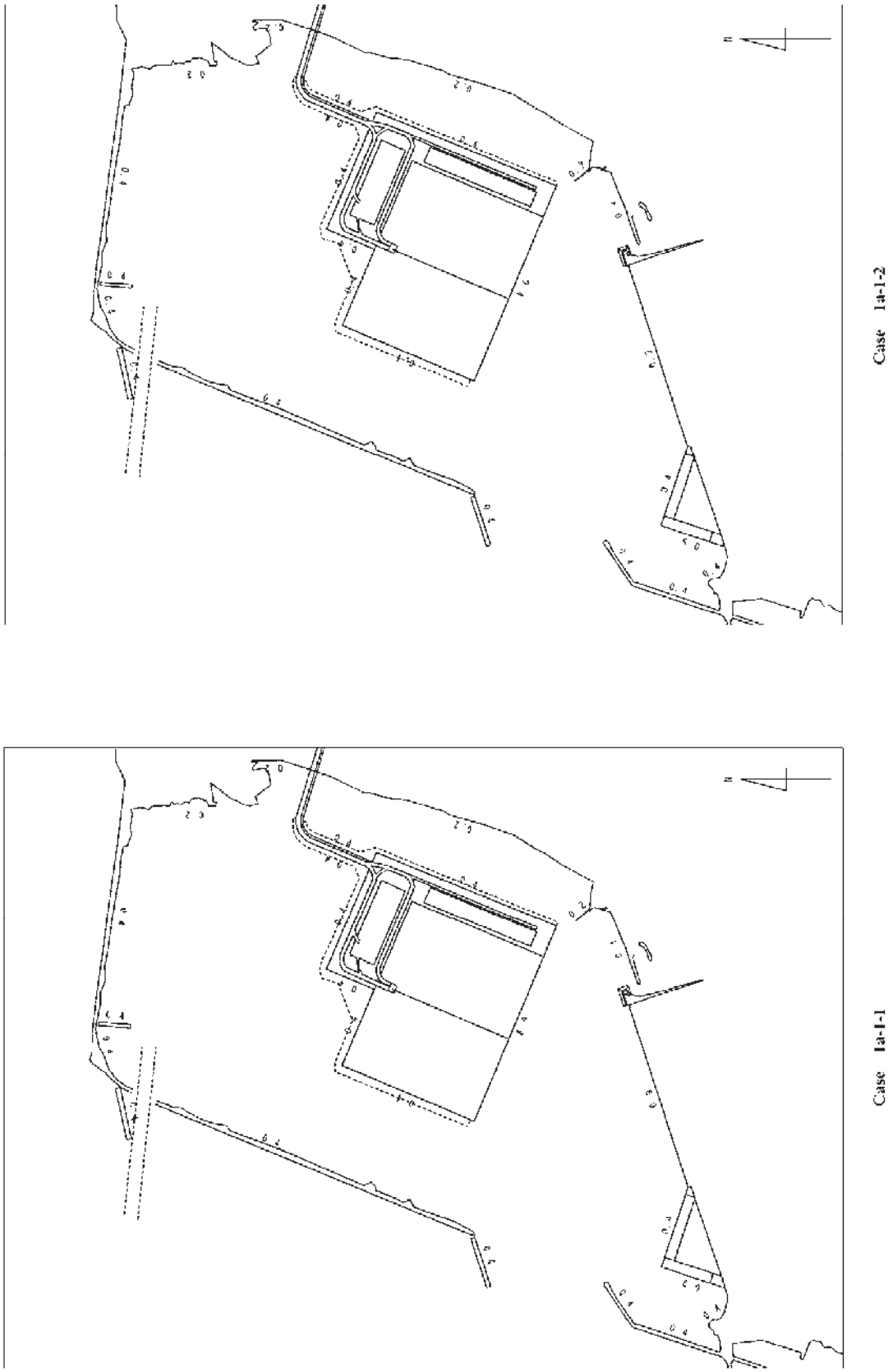
T(sec) \ Deg.	NE	E	SE	S	SW	W	NW	N	CALM	Occurrence Frequency (%)	Exceeding Ocurrence Frequency (%)
CALM									27.10	27.10	27.10
～ 1.0	0.00	0.00	0.00	0.00	5.58	2.88	1.34	10.22		20.02	47.12
～ 2.0	0.00	0.00	0.00	0.00	2.88	10.09	7.71	6.91		27.59	74.70
～ 3.0	0.00	0.00	0.00	0.00	0.62	11.39	5.88	3.20		21.09	95.80
～ 4.0	0.00	0.00	0.00	0.00	0.06	1.22	2.09	0.09		3.45	99.25
～ 5.0	0.00	0.00	0.00	0.00	0.00	0.08	0.58	0.00		0.66	99.91
～ 6.0	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00		0.09	100.00
～ 7.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	100.00
～ 8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	100.00
～ 9.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	100.00
～ 10.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	100.00
Total (%)	0.00	0.00	0.00	0.00	9.14	25.66	17.68	20.42	27.10	100.00	

出典：多目的ターミナル開発計画詳細設計業務静穏度検討資料

表 4-1　静穏度検討ケース

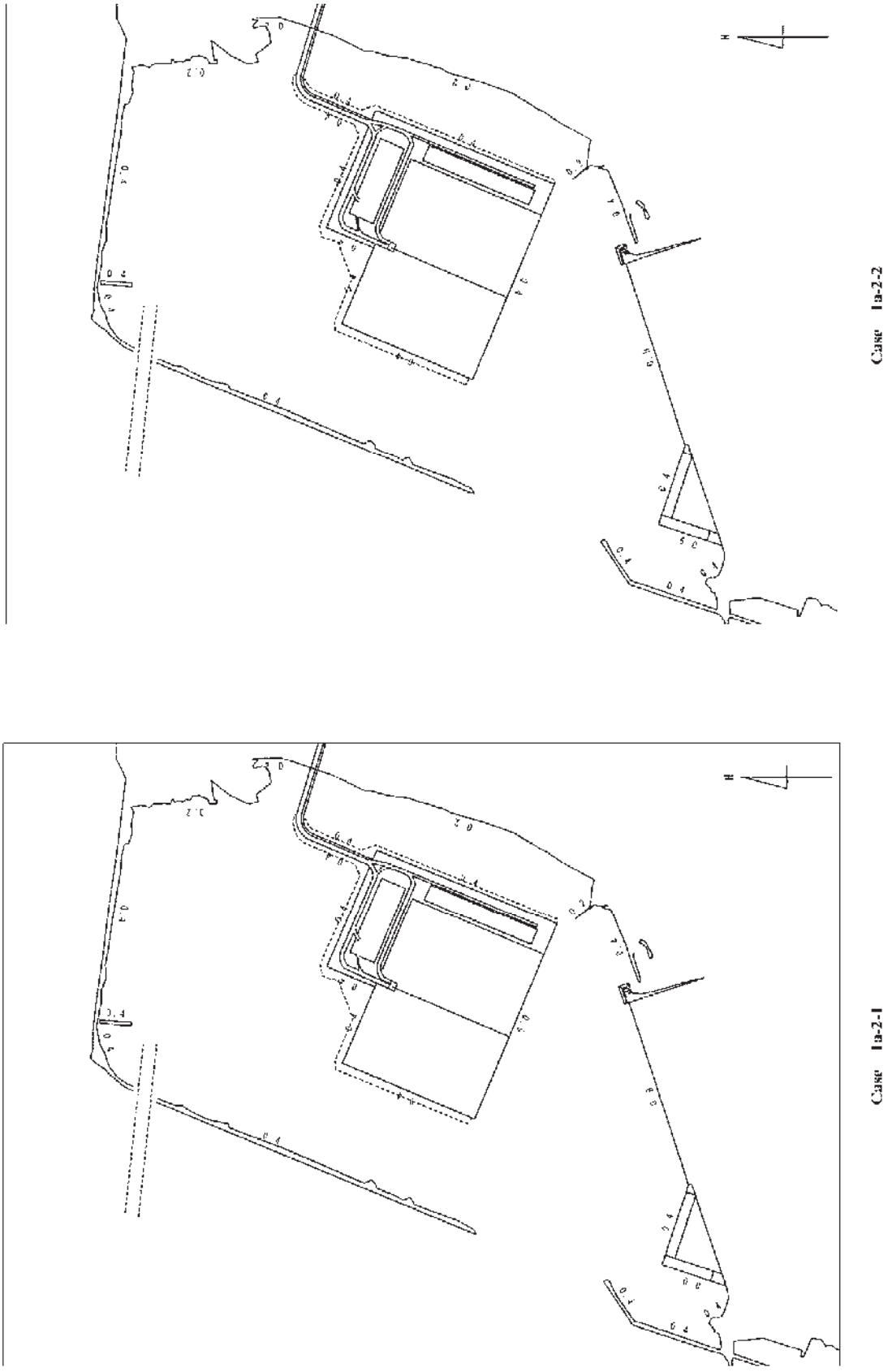
Case	Faciltiy Formation				Wave Direction	Wave Distribution	Wave Calmness	Formation Drawing
	New Breakwater ①	New Breakwater ②	New Breakwater ③	Quay Type				
1a-1-1	○	○	-	Vertical Wall	W,NW	○	○	Fig. 1.4-1
1a-1-2	○	○	-	Wave Dissipating Block	W,NW	○	○	
1a-2-1	×	×	-	Vertical Wall	W,NW	○	○	Fig. 1.4-2
1a-2-2	×	×	-	Wave Dissipating Block	W,NW	○	○	
1b-1-1	○	-	○	Vertical Wall	NW	○		Fig. 1.4-3
1b-2-1	○	-	×	Wave Dissipating Block	NW	○		
2a-1-1	○	○	-	Vertical Wall	W,NW	○	○	Fig. 1.4-4
2a-1-2	○	○	-	Wave Dissipating Block	W,NW	○	○	
2a-2-1	×	○	-	Vertical Wall	W,NW	○	○	Fig. 1.4-5
2a-2-2	×	○	-	Wave Dissipating Block	W,NW	○	○	

出典：プロジェクトチーム



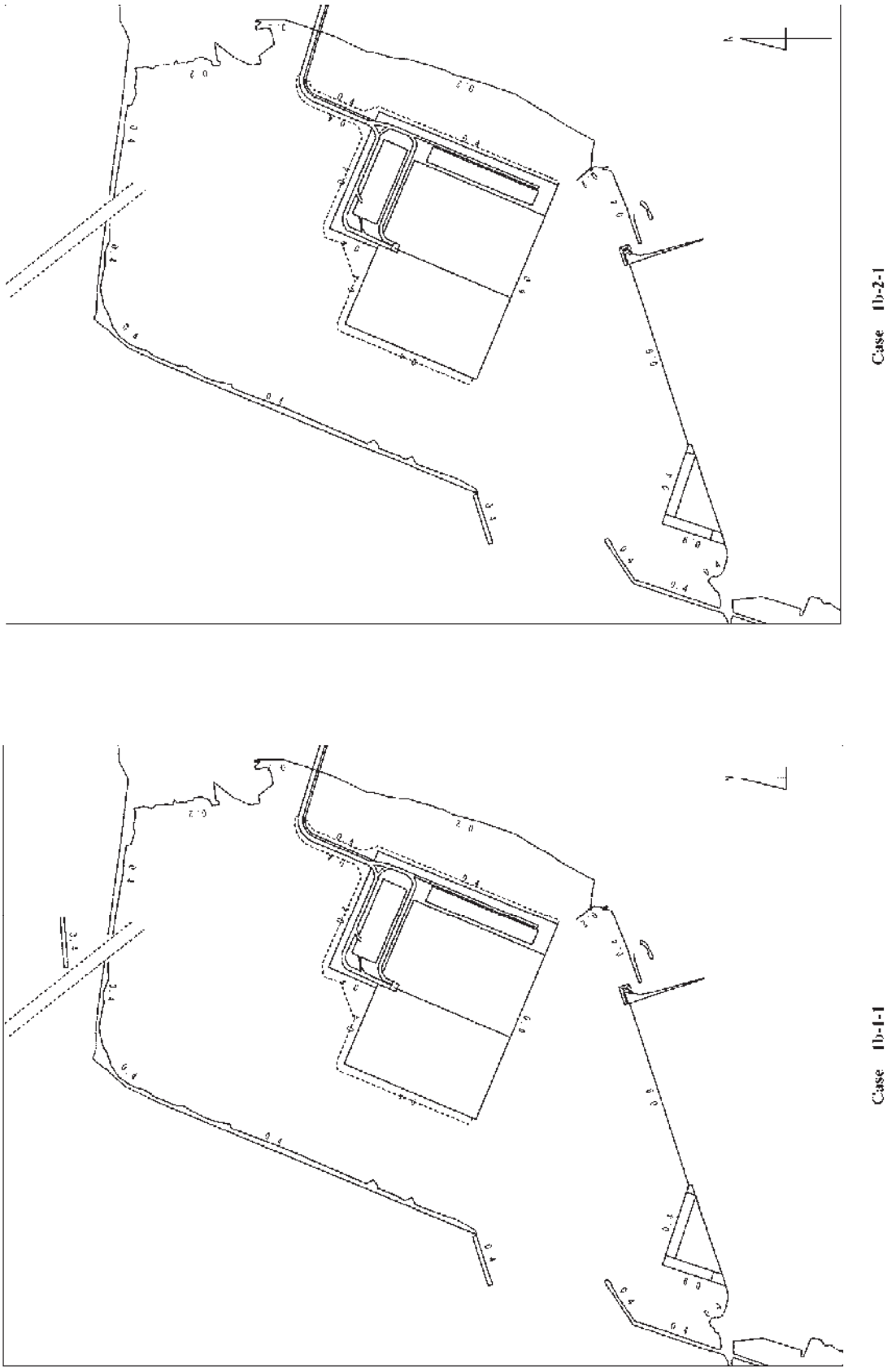
出典：プロジェクトチーム

図 4-1　静穏度検討港形図（1a-1-1 & 1a-1-2）



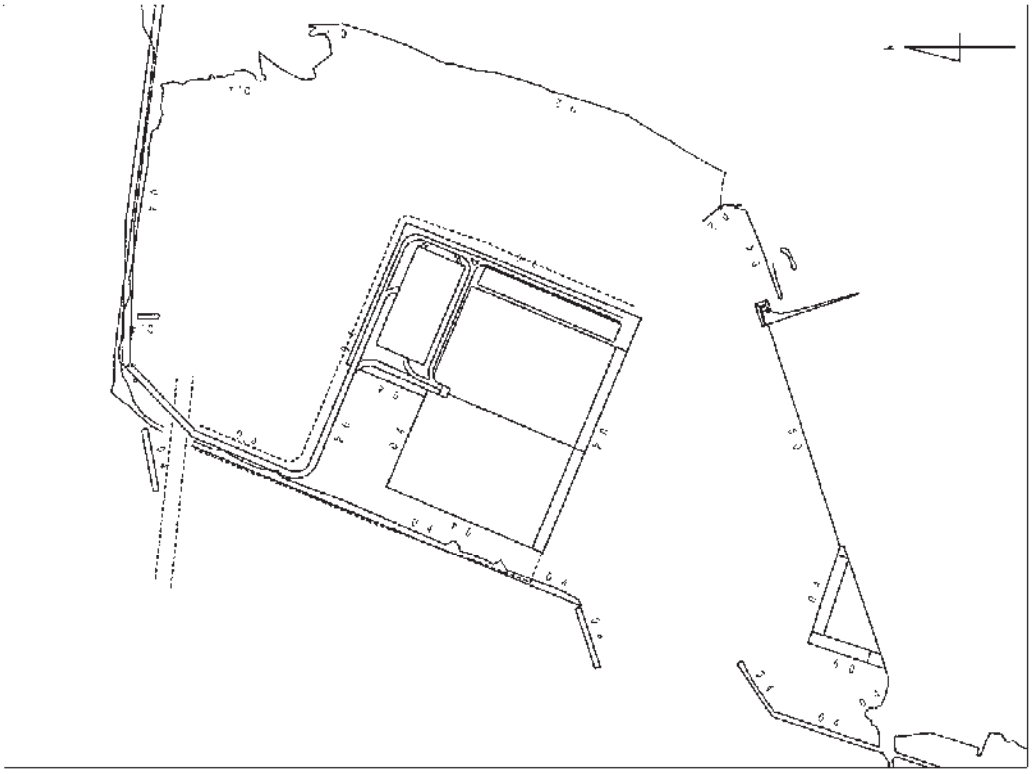
出典：プロジェクトチーム

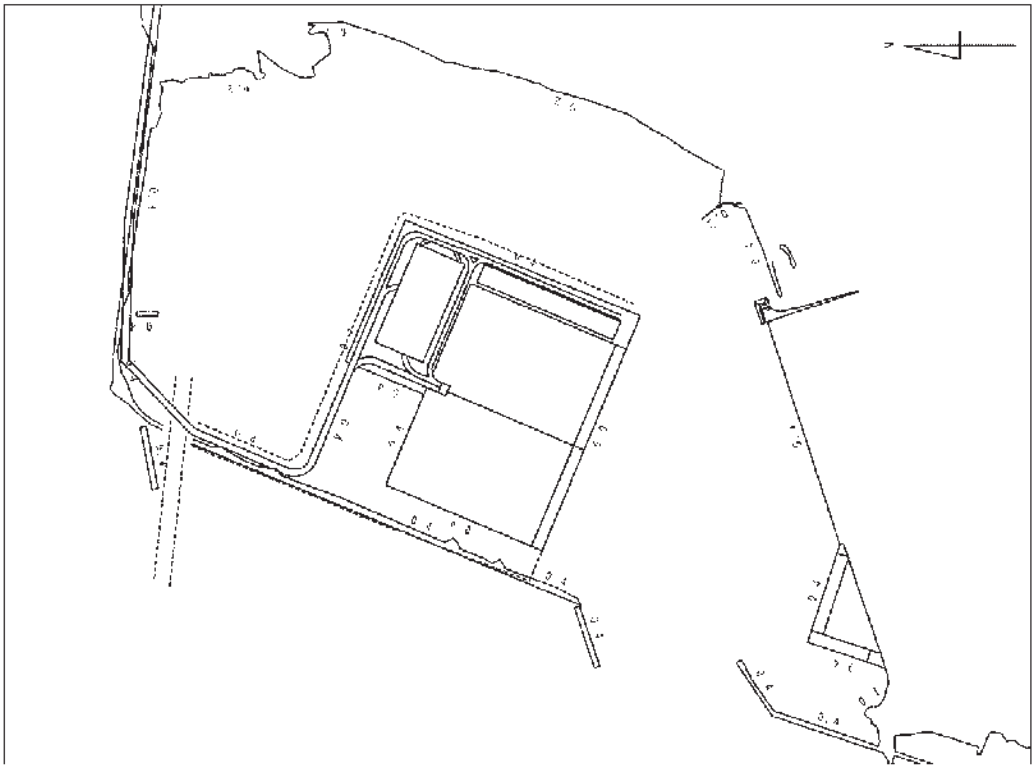
図 4-2　静穏度検討港形図（1a-2-1 & 1a-2-2）



出典：プロジェクトチーム

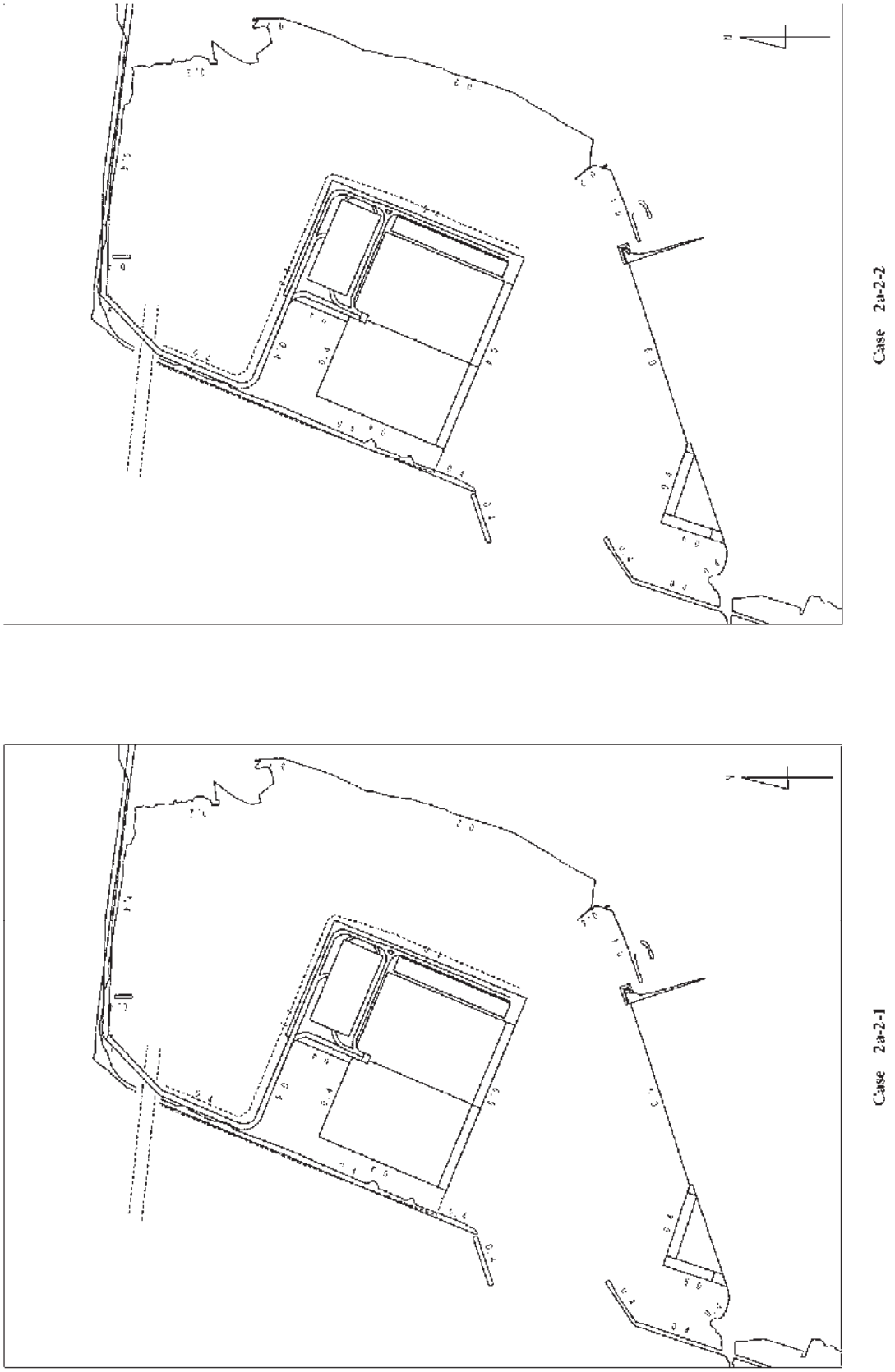
図 4-3　静穏度検討港形図（1b-1-1 & 1b-2-1）





出典：プロジェクトチーム

図 4-4　静穏度検討港形図（2a-1-1 & 2a-1-2）



出典：プロジェクトチーム

図 4-5　静穏度検討港形図（2a-2-1 & 2a-2-2）

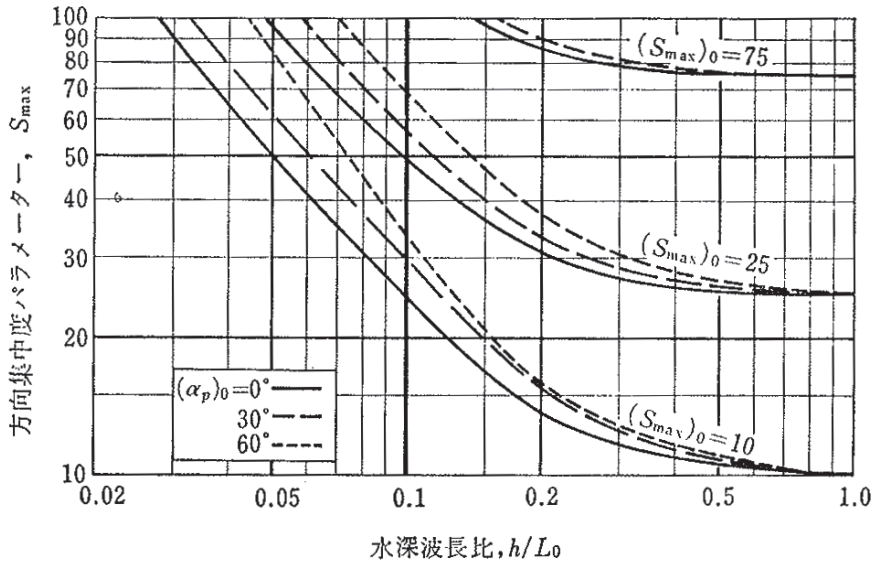
(2) 計算条件

表 4-2 に波高比算定のための回折・反射計算条件、また、図 4-6 に浅海域における方向集中度パラメーターSmax の推定図表を示す。

表 4-2 回折・反射計算条件一覧

Description			Selected Condtion
Representing Wave Condtion	Wave Direction		W, NW
		degree	270.0, 315.0
	Wave Height	H (m)	1
	Wave Period	T (sec)	4
	Wave Length	L(m)	24.96
	Depth	(m)	14
	Tide	(m)	±0.00
	Ratio of Depth and Wave Length	h/L0	0.561
	Smax		10 (Fig. 4-6)
Number of Partted Frequency			3
Number of Partted Wave Direction			50
Formation and Reflection Coefficient			Fig. 4-1 - 4-5
Degree of Reflection			1
Computation Mesh（⊿X×⊿Y）		(m)	10

出典：プロジェクトチーム



出典：港湾の施設の技術上の基準・同解説（2007）

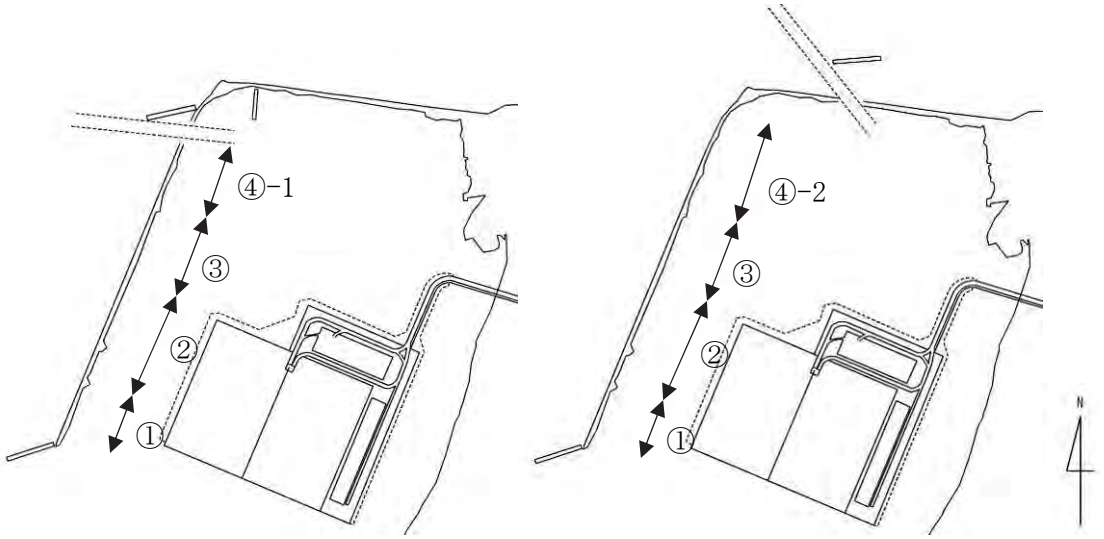
図 4-6 浅海域における方向集中度パラメーターSmax の推定図

(3) 北側防波波高の算定

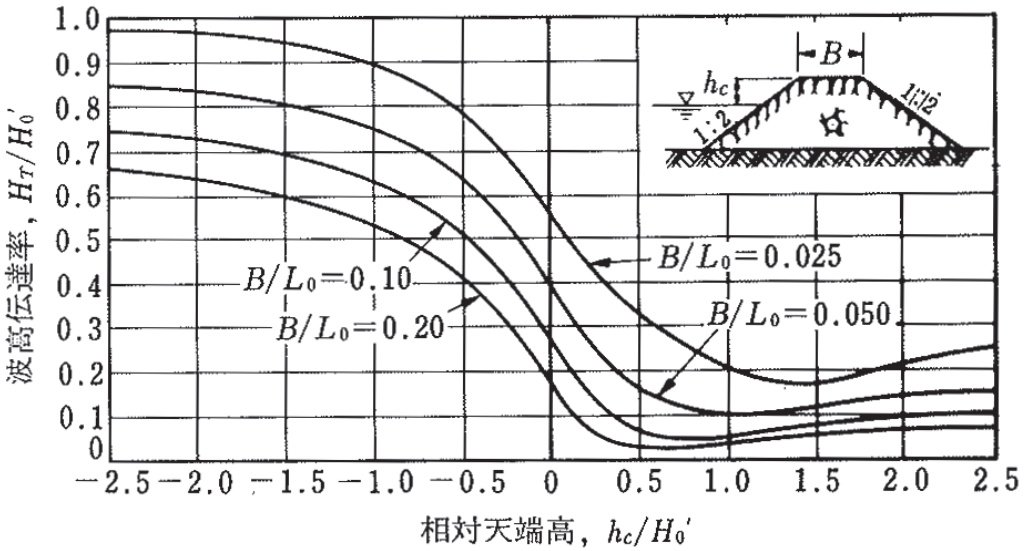
北側防波堤は、その断面うち未完工のまま放置されている断面があることが確認されている。そのため、新規ターミナルが陸側に計画されている 1a および 1b の港形では、代表波が防波堤を伝達するものと考え、その代表波高における伝達波を算定し、静穏度検討に考慮するものとした。表 4-3、図 4-7 に伝達波の算定結果を示す。

表 4-3　北側防波堤の伝達波算定結果

Area Nr.	Length	Equivalent Offshore Waves		Wave Length	Width of Breakwater	Height above Water	B/L_0	Correlated Height	Transmission Ratio	Transmitted Wave Height
		Height	Period							
	(m)	H_0'(m)	T_0(s)	L_0(m)	B(m)	hc(m)		hc/H_0'	Ht/H_0'	Ht(m)
①	52.3	1	4	24.96	11	2.1	0.4407	1.68	0.071	0.07
②	647.5				14	0.5	0.5609	0.4	0.028	0.03
③	316.6				11	2.1	0.4407	1.68	0.071	0.07
④-1	344.7				14	0.5	0.5609	0.4	0.028	0.03
④-2	557.4				14	0.5	0.5609	0.4	0.028	0.03



出典：プロジェクトチーム

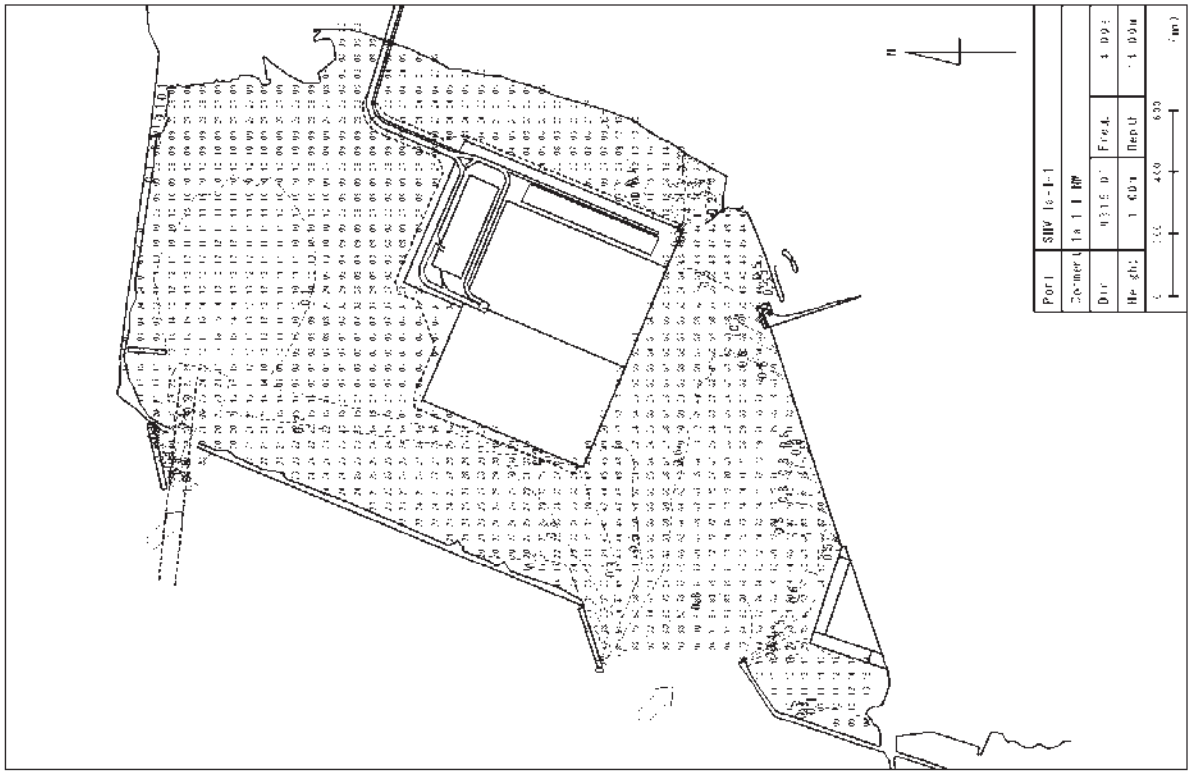


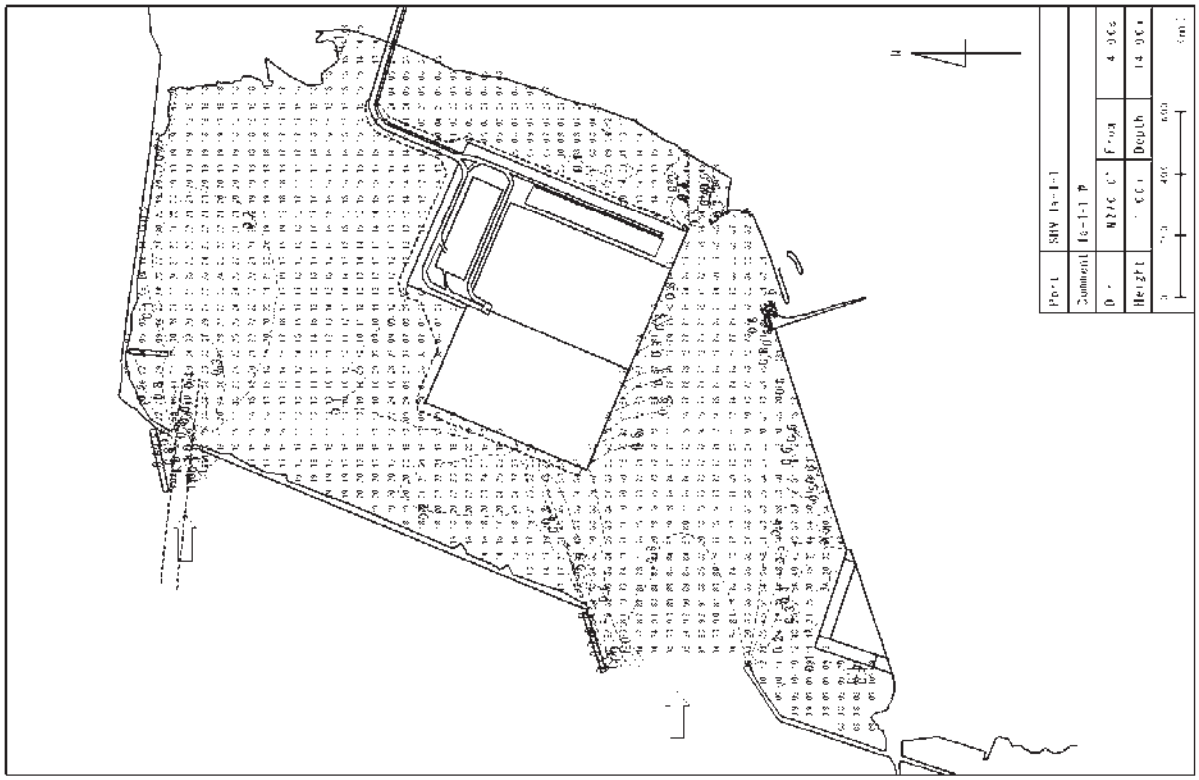
出典：(田中則夫，第 23 回海岸工学論文集，1976 年，P154 による)

図 4-7　広幅天端幅捨石堤の波高伝達率

(4)　港内波高比算定結果

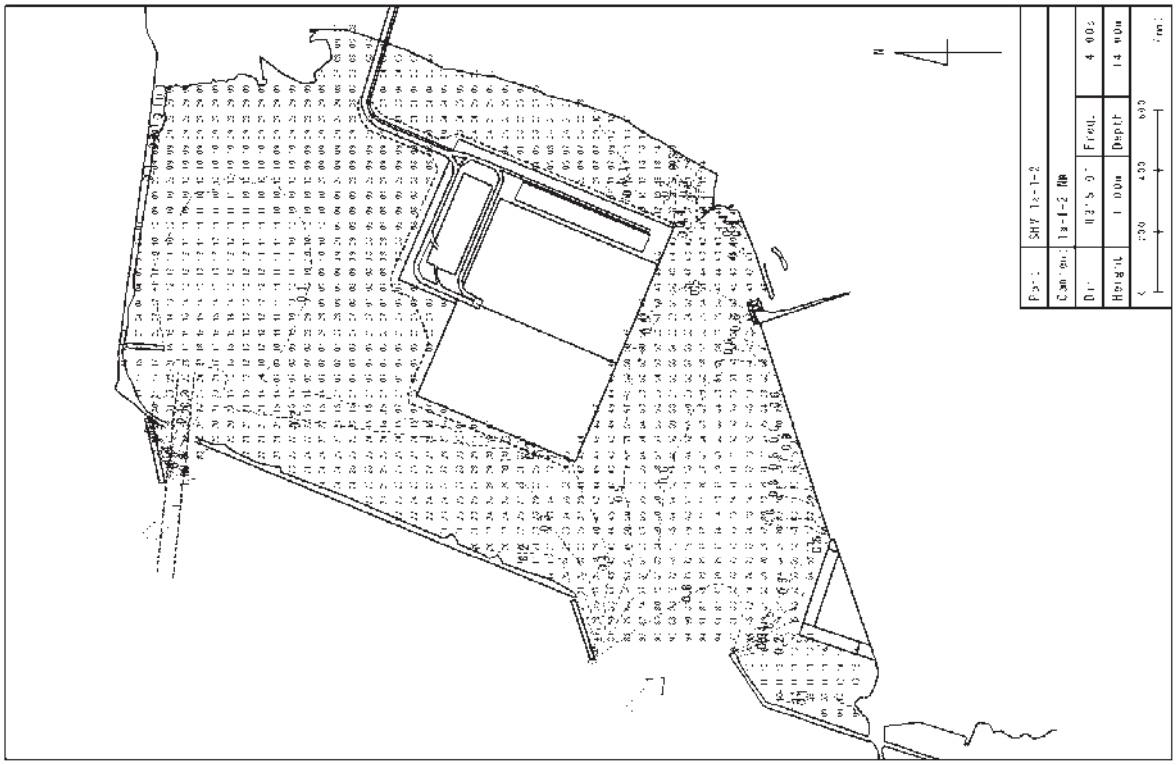
図 4-8～4-16 に各検討ケースに対する港内波高比算定結果を示す。また現況との対比のため、図 4-17 に多目的ターミナル岸壁の波高比算定結果を示す。

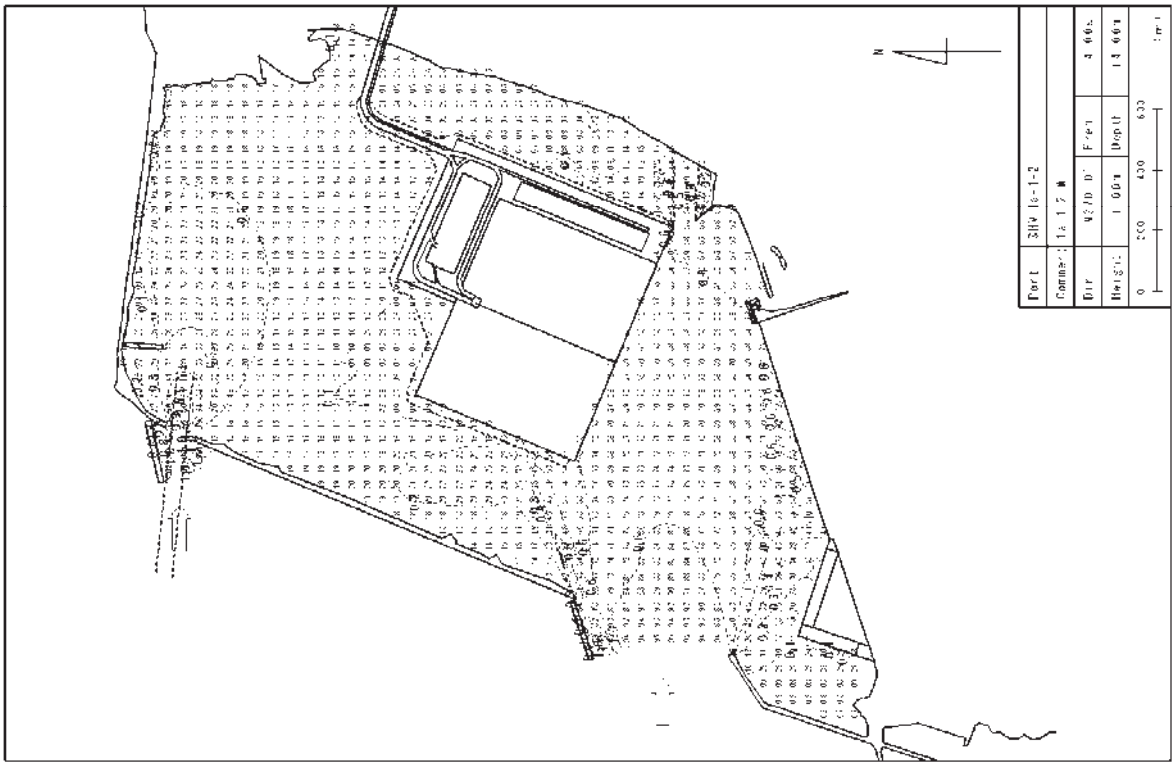




出典：プロジェクトチーム

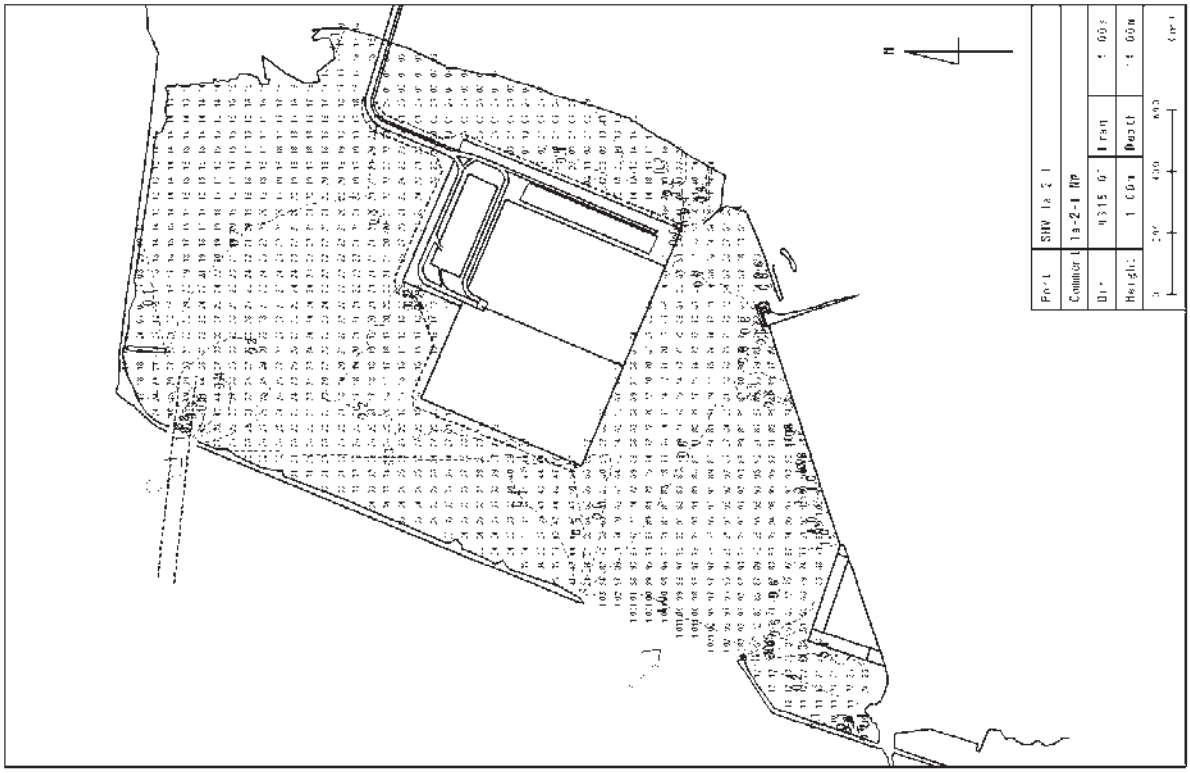
図 4-8　港内波高比算定結果（1a-1-1:W & 1a1-1:NW）

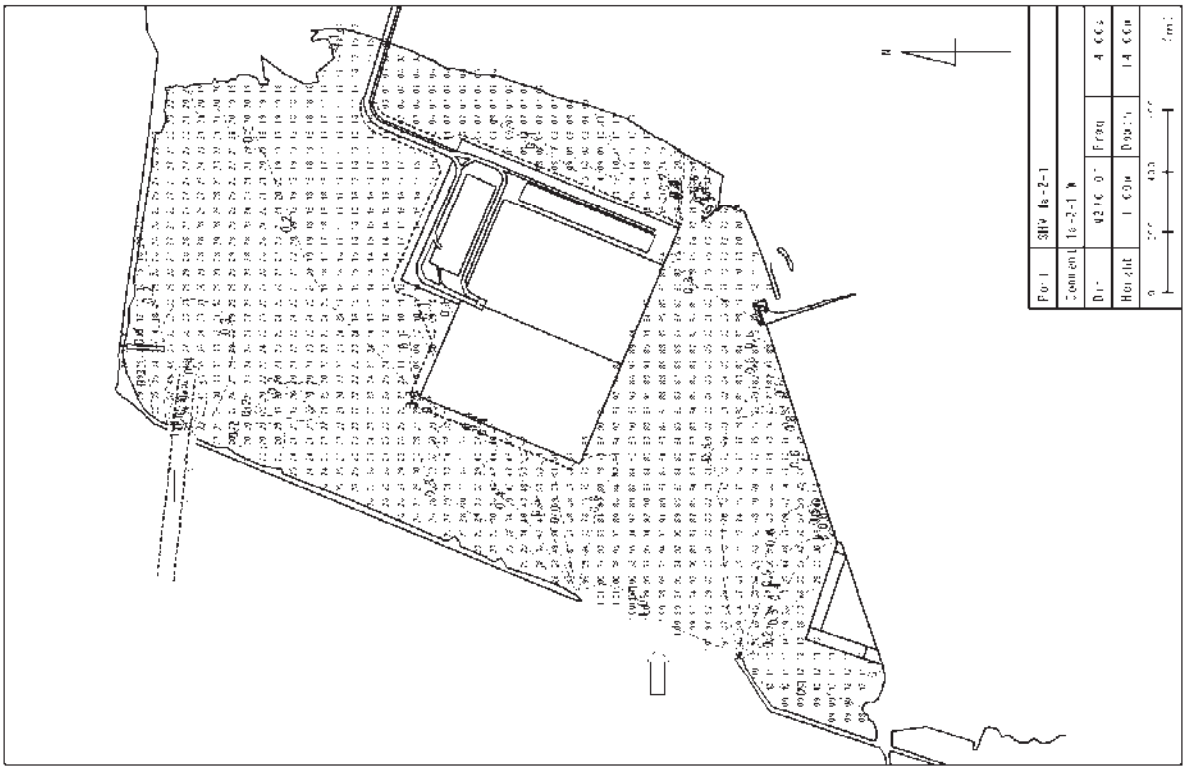




出典：プロジェクトチーム

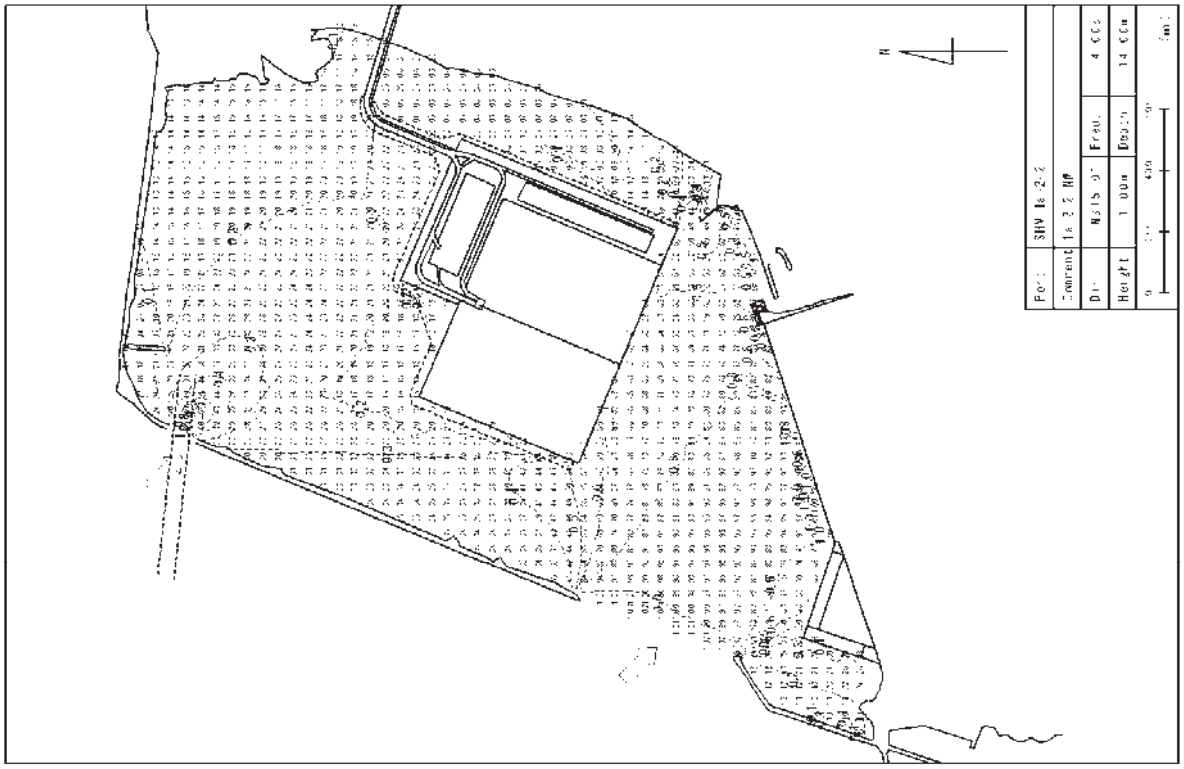
図 4-9　港内波高比算定結果（1a-1-2:W & 1a-1-2:NW）

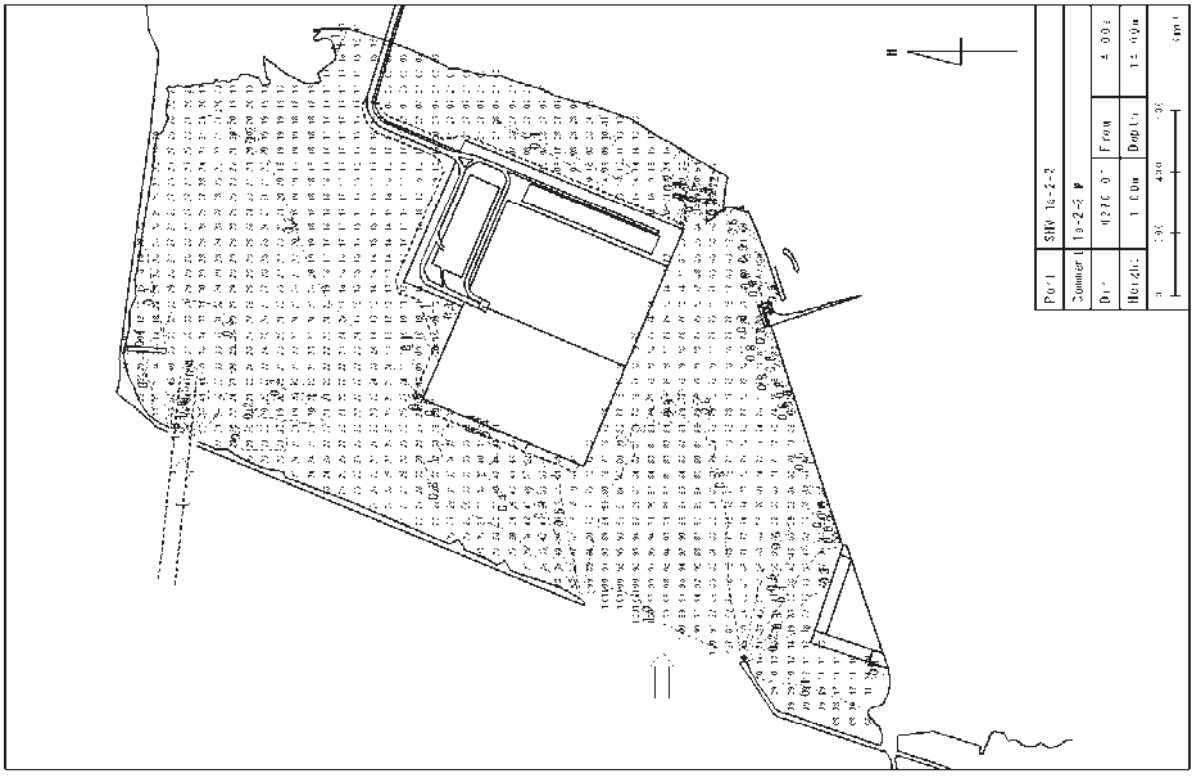




出典：プロジェクトチーム

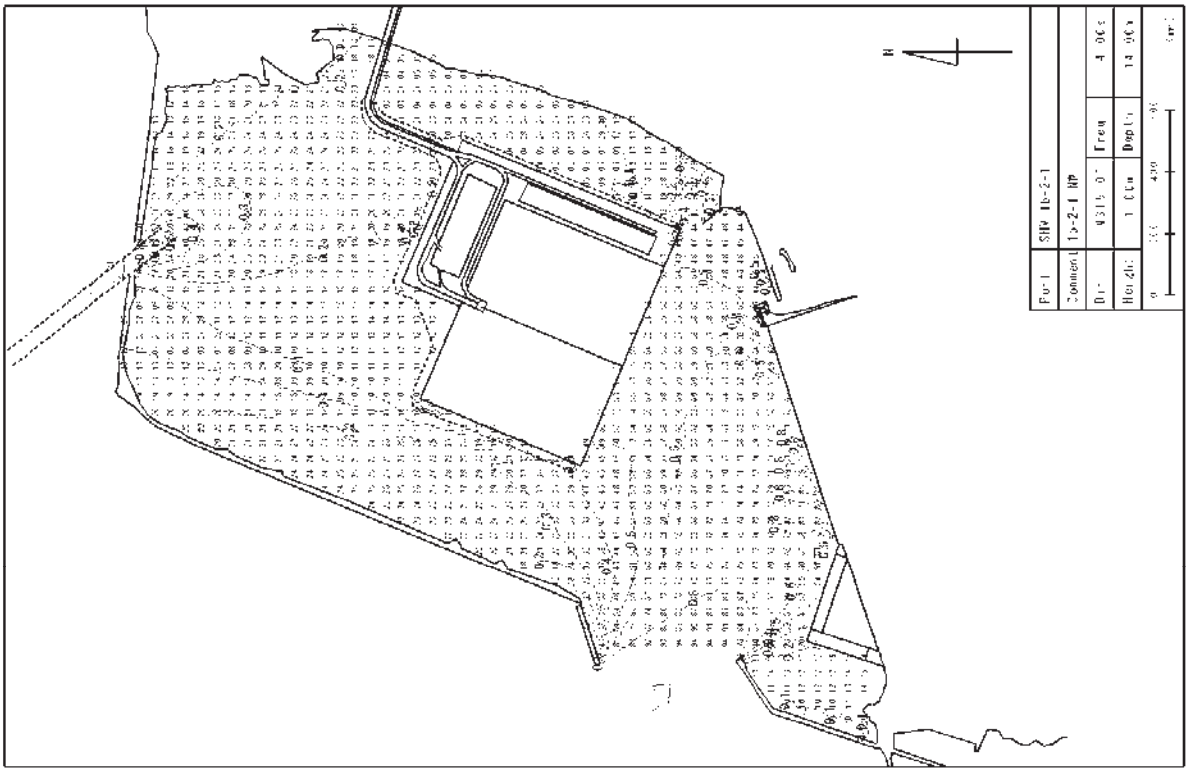
図 4-10　港内波高比算定結果（1a-2-1:W & 1a-2-1:NW）

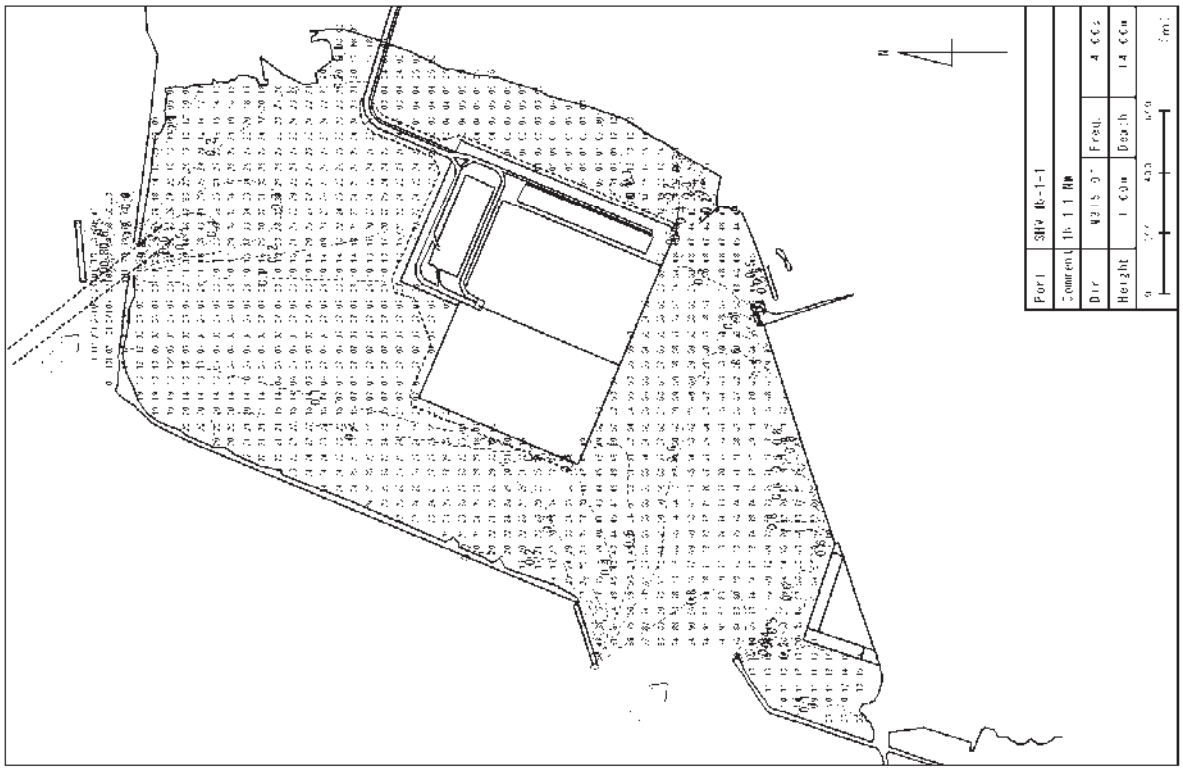




出典：プロジェクトチーム

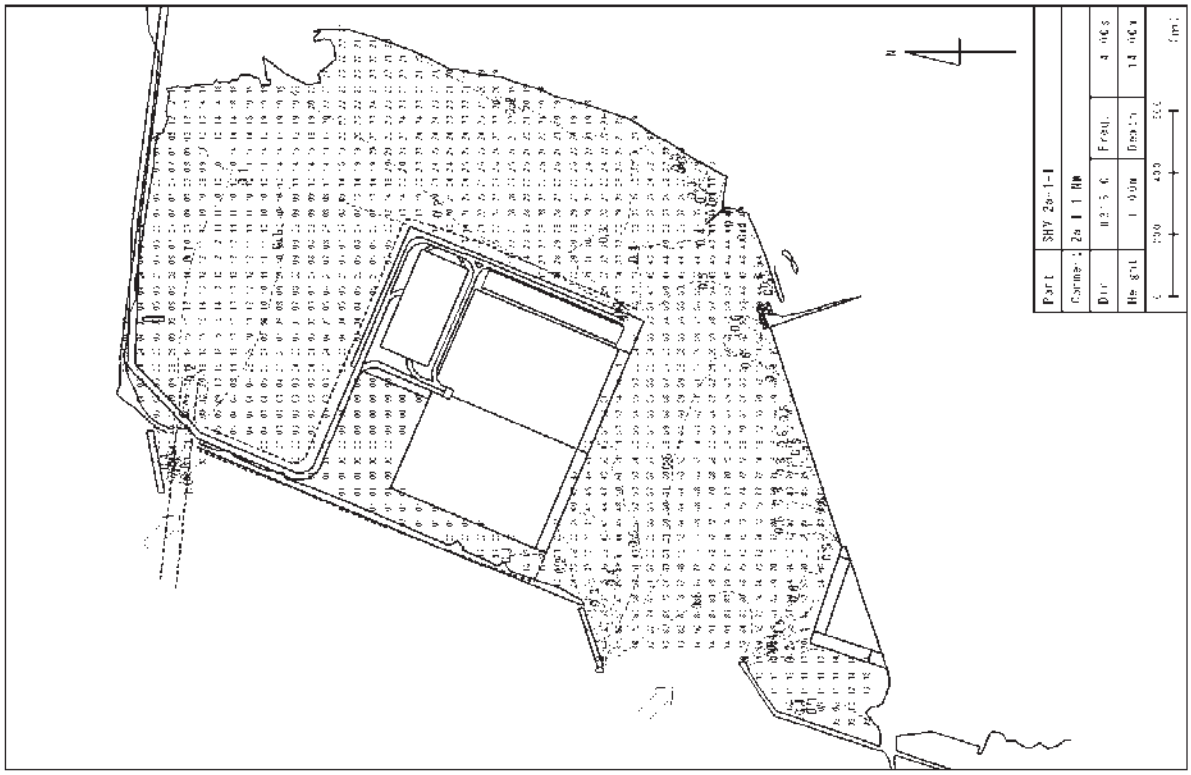
図 4-11　港内波高比算定結果（1a-2-2:W & 1a-2-2:NW）

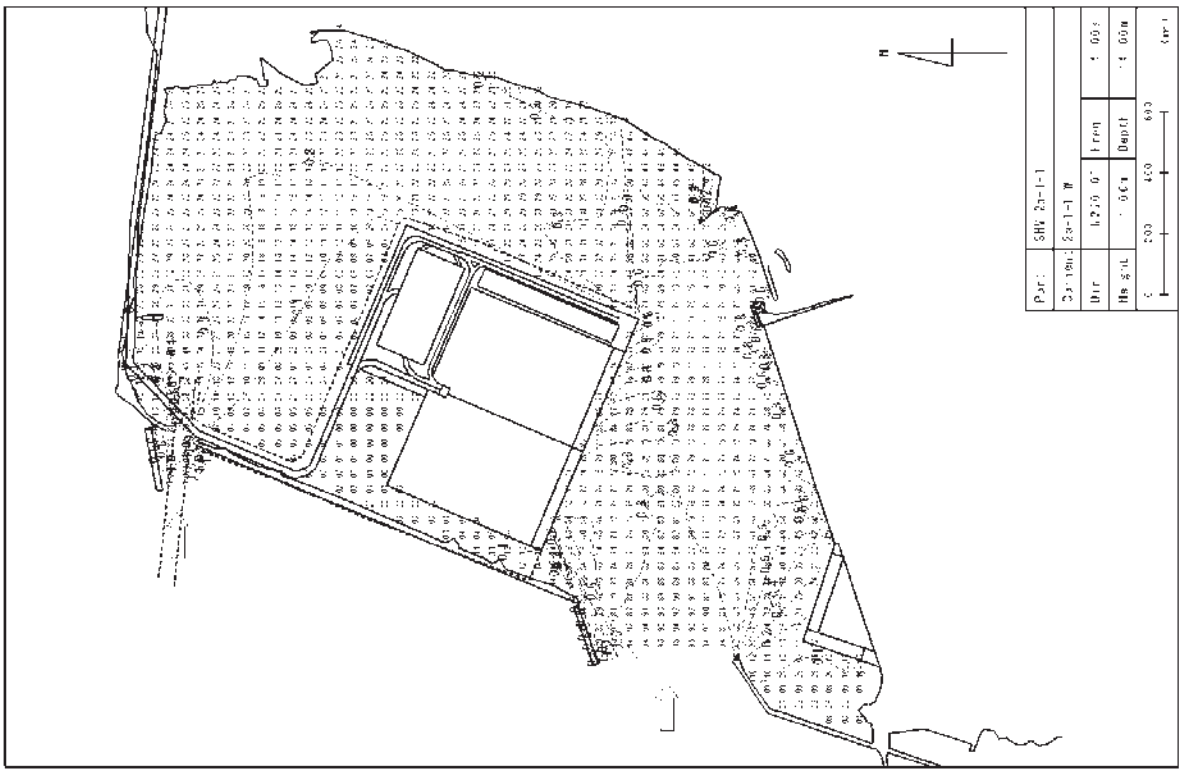




出典：プロジェクトチーム

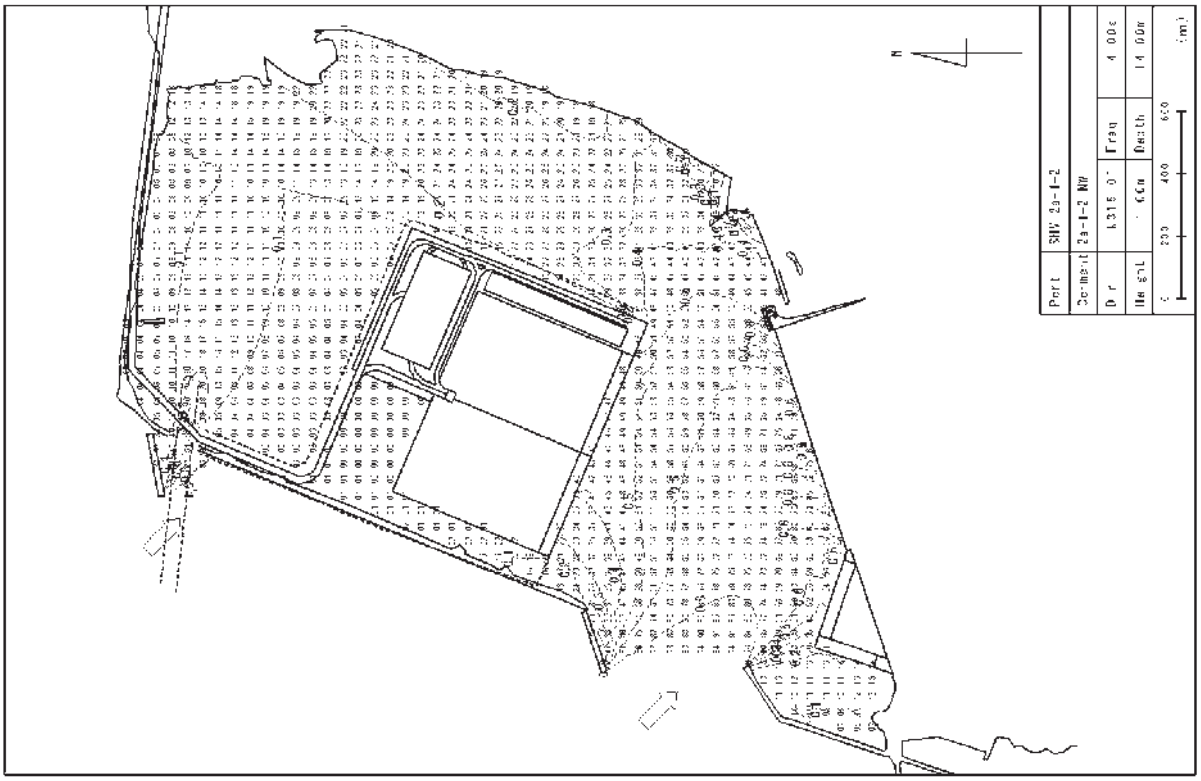
図 4-12　港内波高比算定結果（1b-1-1:W & 1b-2-1:NW）

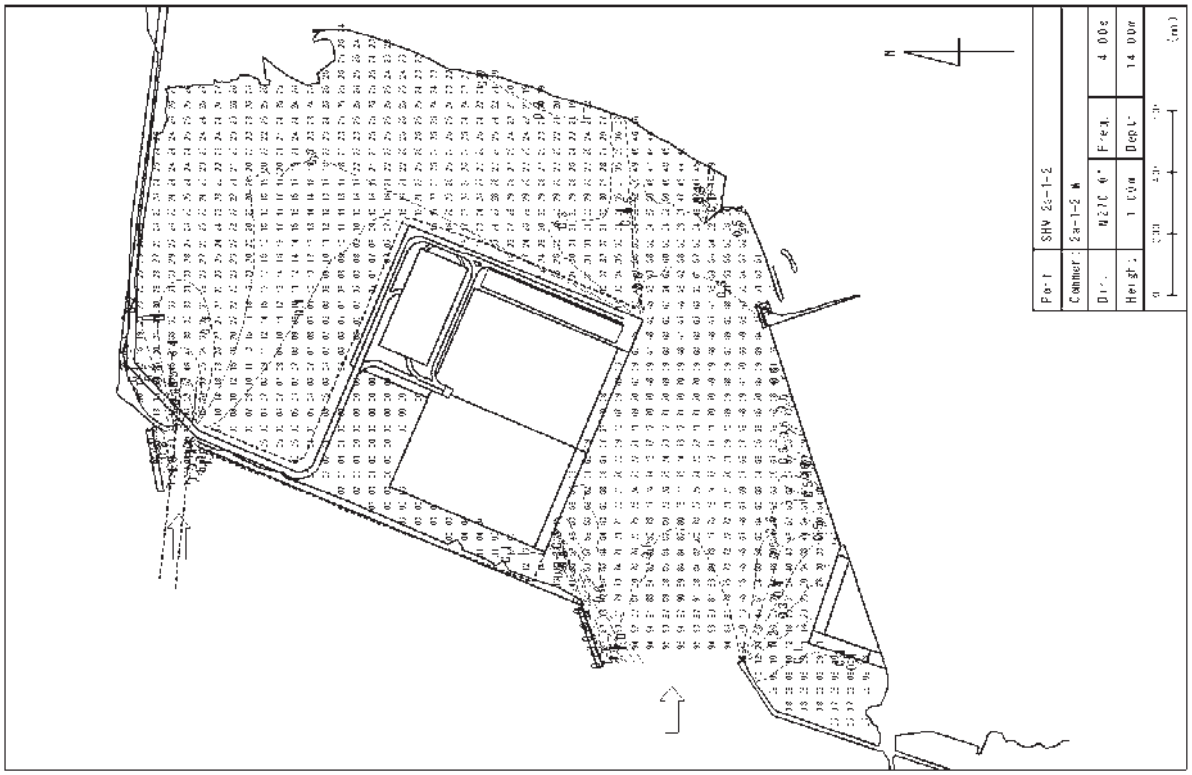




出典：プロジェクトチーム

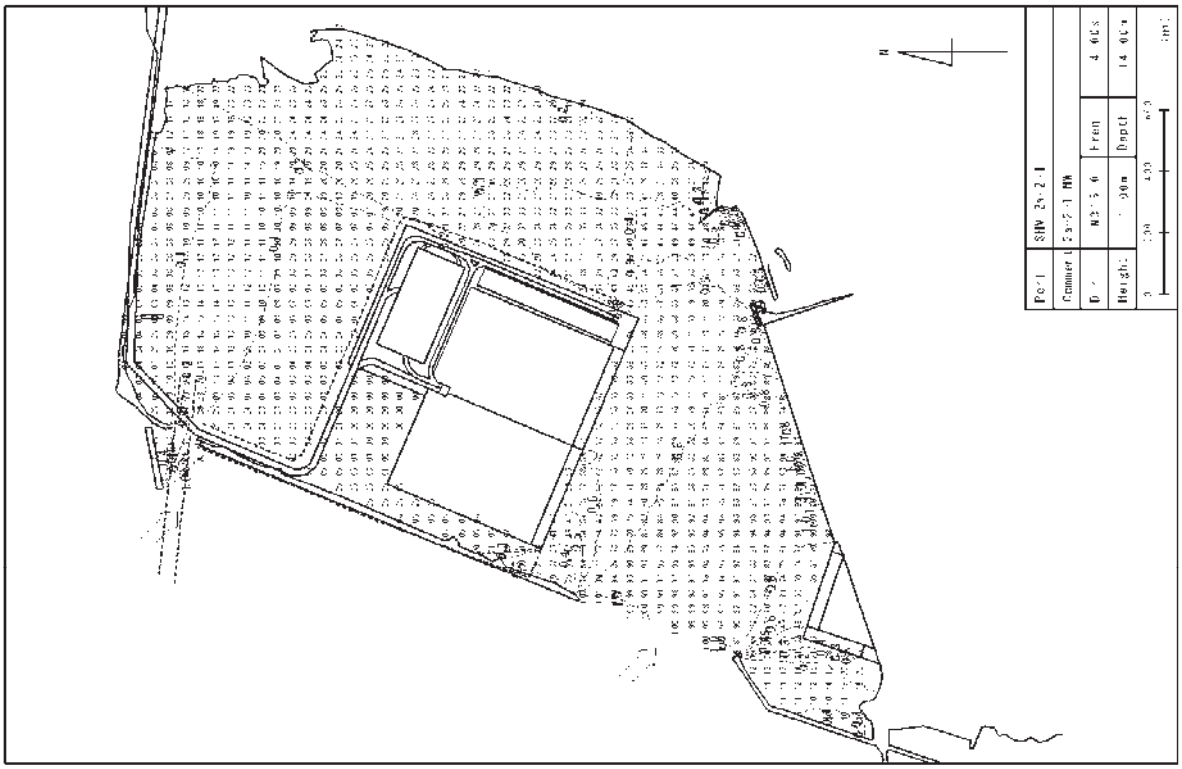
図 4-13　港内波高比算定結果（2a-1-1:W & 2a-1-1:NW）

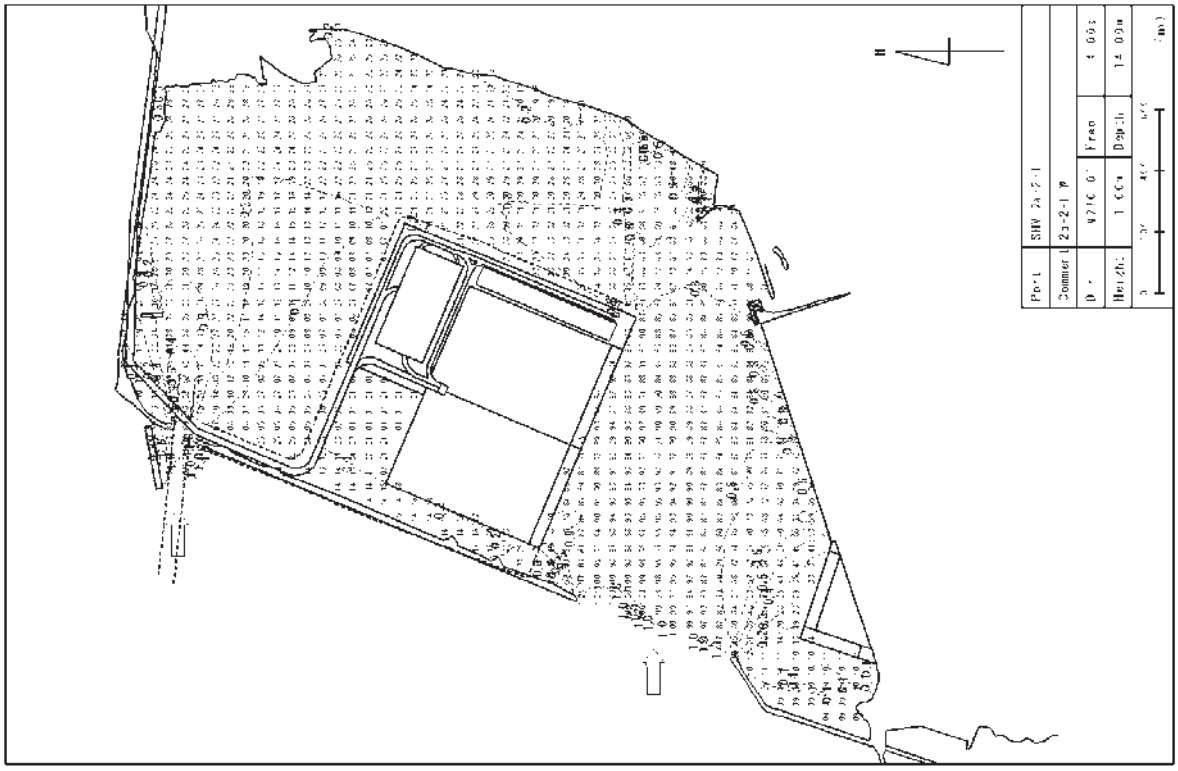




出典：プロジェクトチーム

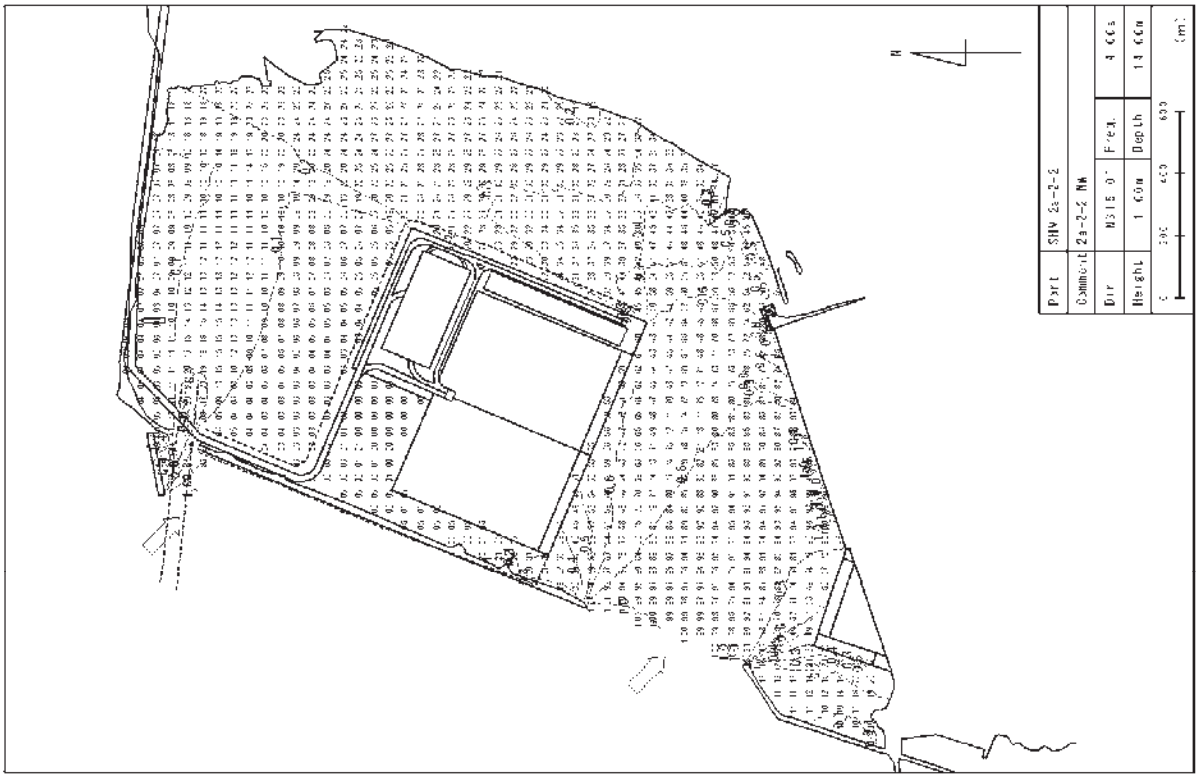
図 4-14　港内波高比算定結果（2a-1-2:W & 2a-1-2:NW）

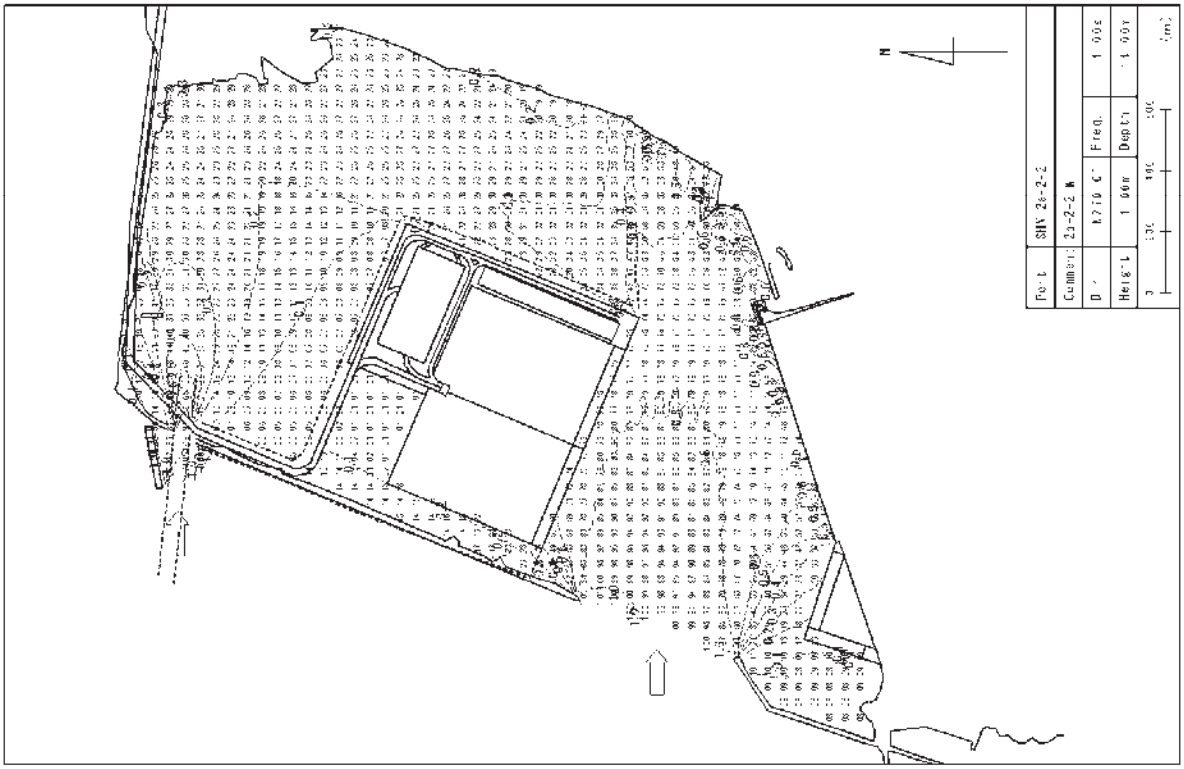




出典：プロジェクトチーム

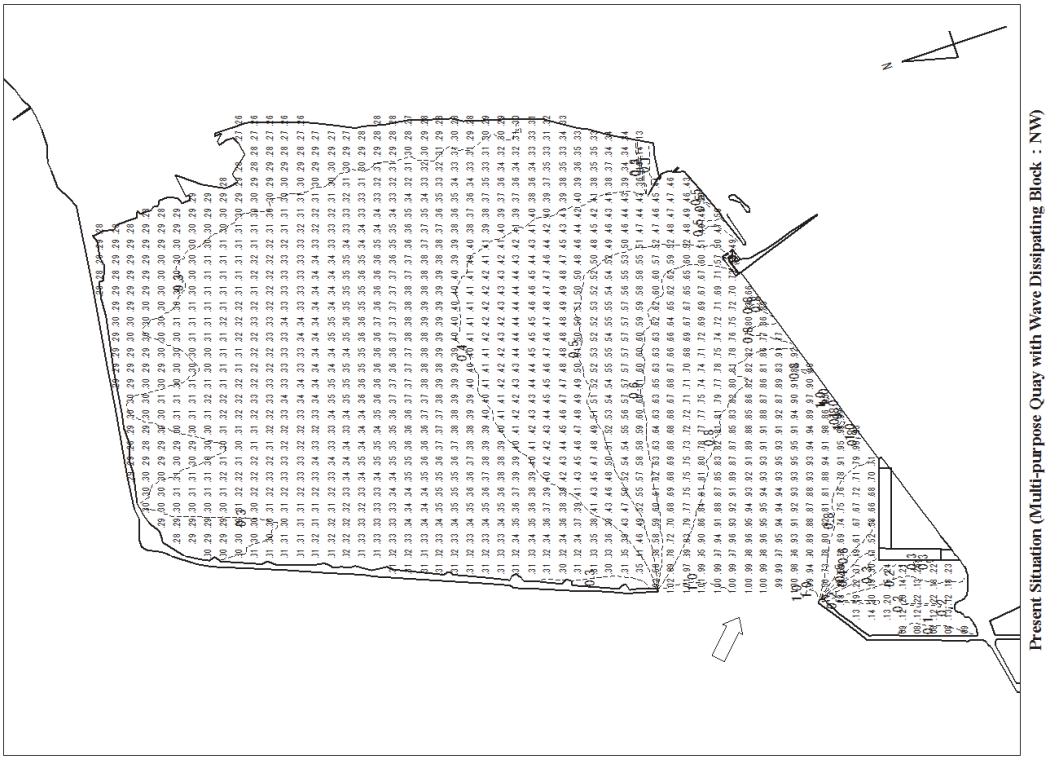
図 4-15　港内波高比算定結果（2a-2-1:W & 2a-2-1:NW）

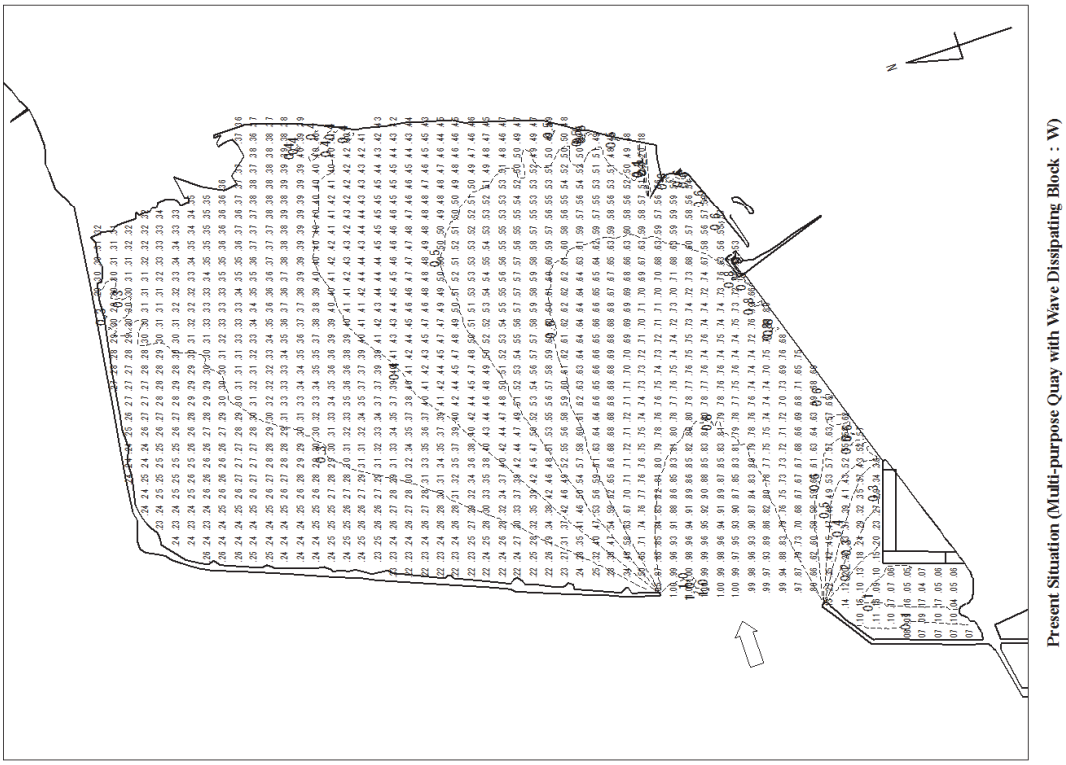




出典：プロジェクトチーム

図 4-16　港内波高比算定結果（2a-2-2:W & 2a-2-2:NW）





出典：多目的ターミナル開発計画詳細設計業務検討資料

図 4-17　港内波高比算定結果（現況：N&NW）

5. 港内波高比の算定

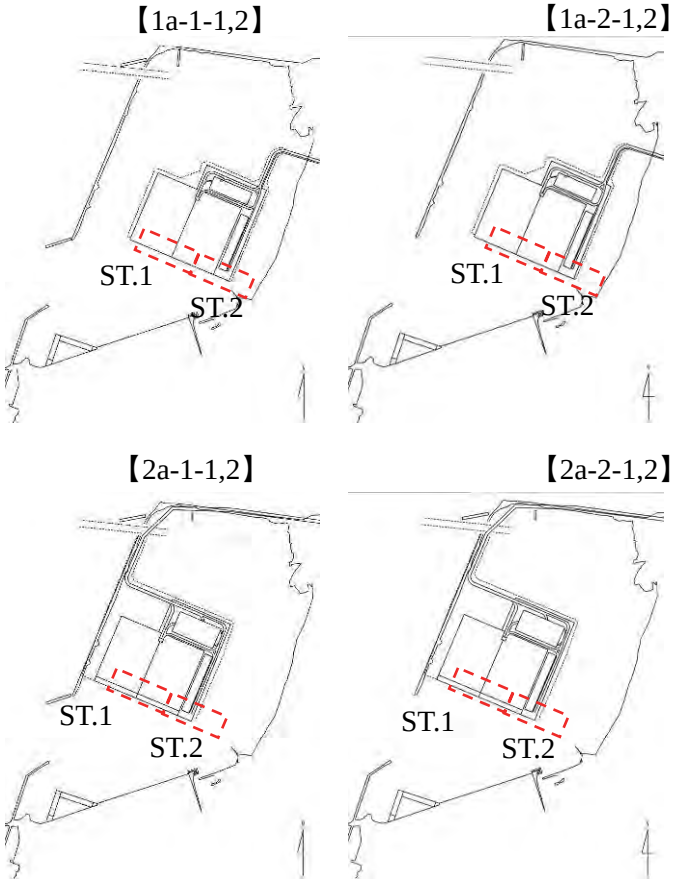
(1) 目標波高、検討ケース及び検討位置

目標波高は、計画されている対象船舶の内、最小サイズと想定される 20,000DWT 級の中型船舶に適用される H＝0.50m とした。静穏率の検討ケースは表 5.1 に示す 8 ケースとし、静穏率算定位置を図 5.1 に示した。

表 5-1 港内静穏率検討ケース

Formation Case	Case Combination			
	New Breakwater ①	New Breakwater ②	New Breakwater ③	Quay Type
1a-1-1	○	○	-	Vertical Wall
1a-1-2	○	○	-	Wave Dissipating Block
1a-2-1	×	×	-	Vertical Wall
1a-2-2	×	×	-	Wave Dissipating Block
2a-1-1	○	○	-	Vertical Wall
2a-1-2	○	○	-	Wave Dissipating Block
2a-2-1	×	○	-	Vertical Wall
2a-2-2	×	○	-	Wave Dissipating Block

出典：プロジェクトチーム



出典：プロジェクトチーム

図 5-1 静穏率算定位置

(2) 港内静穏率算定結果

検討港形における図 4.8～4.16 に示した波向別波高比分布を基に、各計画配置案のコンテナターミナル前面 2 地点（バース 1 及び 2）における静穏率を求めた。

表 5.2 に静穏率検討結果概要、表 5.3～5.10 に各検討ケースに対する静穏性検討結果をそれぞれ示す。これらより、各静穏率算定結果より、防波堤　が無いケースにおいては、構造断面形式に問わず、静穏率が目標静穏率 97.5%を満足しない結果となった。また防波堤　が有るケースにおいてもコンテナターミナル前面岸壁の構造が直立岸壁の場合、静穏率は目標静穏率を満足しないが、直立消波の場合は目標静穏率を満足する結果となった。

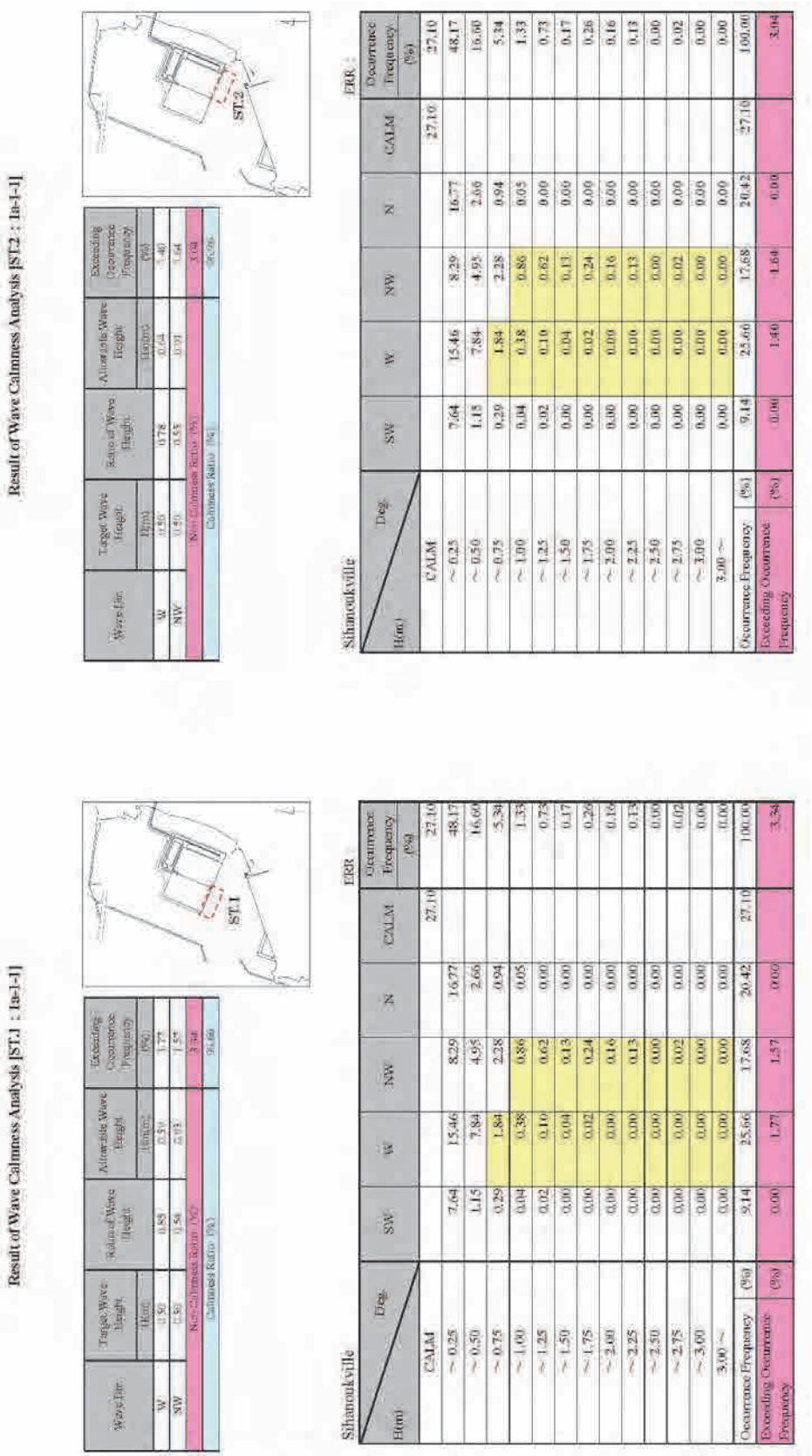
以上より防波堤①有りかつコンテナターミナル前面の岸壁が直立消波構造になっている 1a-1-2、2a-1-2 が目標静穏率を満たす結果となった。更に、配置案の違いによる比較では、防波堤に遮蔽されている配置案 2 の方が、陸側に位置する配置案 1 よりも若干静穏率が良くなる傾向となった。

表 5-2　港内静穏率計算結果概要

Formation Case	Case Combination				Wave Direction	Wave Calmness	
	New Breakwater ①	New Breakwater ②	New Breakwater ③	Quay Type		ST.1	ST.2
1a-1-1	○	○	-	Vertical Wall	W,NW	96.66	96.96
1a-1-2	○	○	-	Wave Dissipating Block	W,NW	97.84	98.07
1a-2-1	×	×	-	Vertical Wall	W,NW	95.46	95.76
1a-2-2	×	×	-	Wave Dissipating Block	W,NW	96.61	96.75
2a-1-1	○	○	-	Vertical Wall	W,NW	97.43	96.58
2a-1-2	○	○	-	Wave Dissipating Block	W,NW	98.56	97.91
2a-2-1	×	○	-	Vertical Wall	W,NW	96.01	95.55
2a-2-2	×	○	-	Wave Dissipating Block	W,NW	97.03	96.65

出典：プロジェクトチーム

表 5-3　静穏率検討結果（ST.1 & ST.2: 1a-1-1）



Result of Wave Calmness Analysis [ST.2 : 1a-1-1]

Wave Dir.	Target Wave Height	Relative Wave Height	Allowable Wave Height	Exceeding Occurrence Frequency
	Hm0		Hm0	
W	0.50	0.89	0.64	5.40
NW	0.50	0.55	0.91	1.64
Non-Calmness Ratio (%)				3.04
Calmness Ratio (%)				96.96

Sihanoukville　ERR :

Hm0 \ Deg.	SW	W	NW	N	CALM	Occurrence Frequency (%)
CALM					27.10	27.10
~ 0.25	7.64	15.46	8.29	16.77		48.17
~ 0.50	1.15	7.84	4.95	2.66		16.60
~ 0.75	0.29	1.84	2.28	0.94		5.34
~ 1.00	0.04	0.38	0.86	0.05		1.33
~ 1.25	0.02	0.10	0.62	0.00		0.73
~ 1.50	0.00	0.04	0.13	0.00		0.17
~ 1.75	0.00	0.02	0.24	0.00		0.26
~ 2.00	0.00	0.00	0.16	0.00		0.16
~ 2.25	0.00	0.00	0.13	0.00		0.13
~ 2.50	0.00	0.00	0.00	0.00		0.00
~ 2.75	0.00	0.00	0.02	0.00		0.02
~ 3.00	0.00	0.00	0.00	0.00		0.00
3.00 ~	0.00	0.00	0.00	0.00		0.00
Occurrence Frequency (%)	9.14	25.66	17.68	20.42	27.10	100.00
Exceeding Occurrence Frequency (%)	0.00	1.77	1.57	0.00		3.34

Result of Wave Calmness Analysis [ST.1 : 1a-1-1]

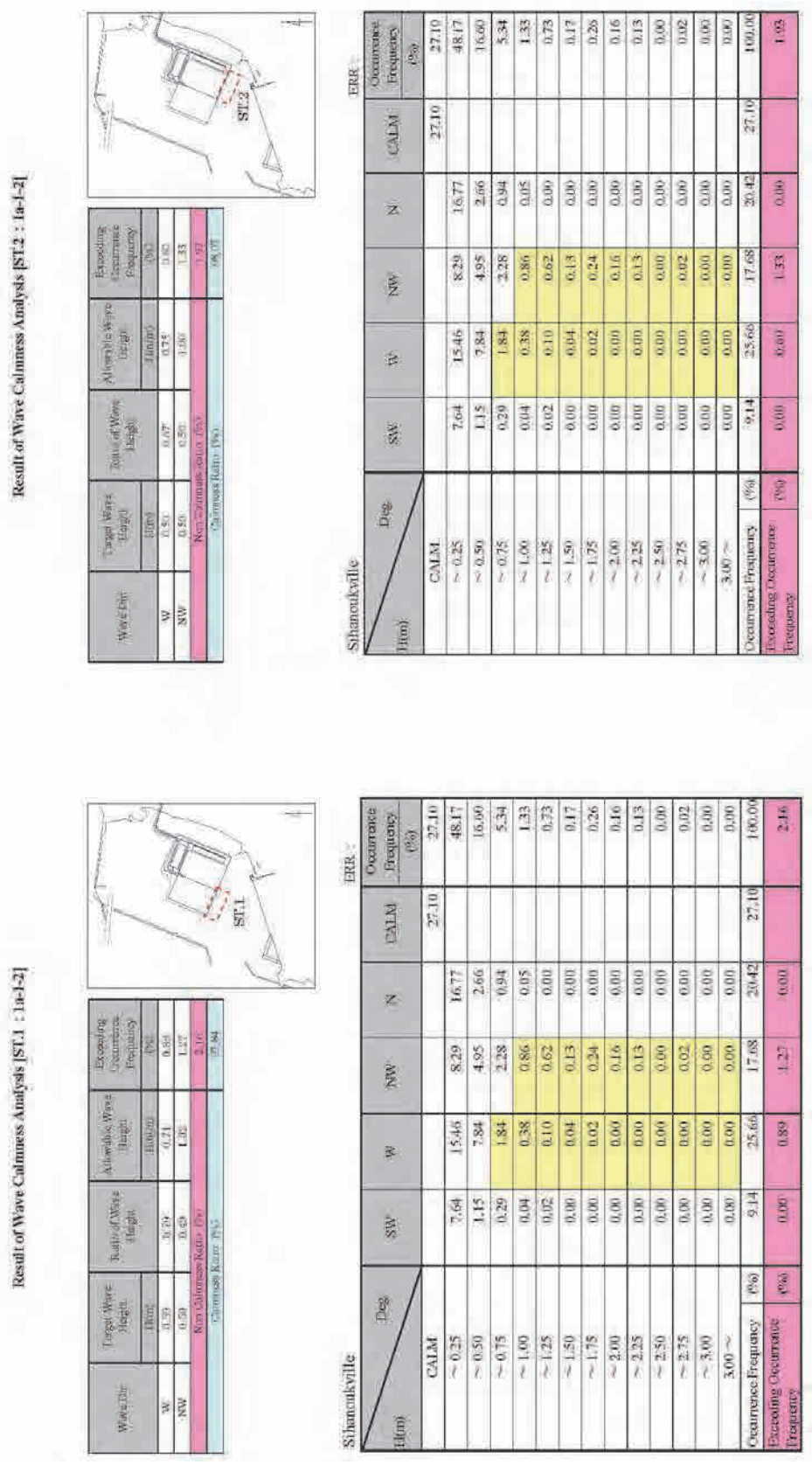
Wave Dir.	Target Wave Height	Relative Wave Height	Allowable Wave Height	Exceeding Occurrence Frequency
	Hm0		Hm0	
W	0.50	0.83	0.59	1.73
NW	0.50	0.54	0.93	1.54
Non-Calmness Ratio (%)				3.34
Calmness Ratio (%)				96.66

Sihanoukville　ERR :

Hm0 \ Deg.	SW	W	NW	N	CALM	Occurrence Frequency (%)
CALM					27.10	27.10
~ 0.25	7.64	15.46	8.29	16.77		48.17
~ 0.50	1.15	7.84	4.95	2.66		16.60
~ 0.75	0.29	1.84	2.28	0.94		5.34
~ 1.00	0.04	0.38	0.86	0.05		1.33
~ 1.25	0.02	0.10	0.62	0.00		0.73
~ 1.50	0.00	0.04	0.13	0.00		0.17
~ 1.75	0.00	0.02	0.24	0.00		0.26
~ 2.00	0.00	0.00	0.16	0.00		0.16
~ 2.25	0.00	0.00	0.13	0.00		0.13
~ 2.50	0.00	0.00	0.00	0.00		0.00
~ 2.75	0.00	0.00	0.02	0.00		0.02
~ 3.00	0.00	0.00	0.00	0.00		0.00
3.00 ~	0.00	0.00	0.00	0.00		0.00
Occurrence Frequency (%)	9.14	25.66	17.68	20.42	27.10	100.00
Exceeding Occurrence Frequency (%)	0.00	1.77	1.57	0.00		3.34

出典：プロジェクトチーム

表 5-4　静穏率検討結果（ST.1 & ST.2: 1a-1-2）



Result of Wave Calmness Analysis [ST.2 : 1a-1-2]

Wave Dir	Target Wave Height	Ratio of Wave Height	Allowable Wave Height	Exceeding Occurrence Frequency
	H(m)		H(m)	(%)
W	0.50	0.67	0.75	0.83
NW	0.50	0.50	1.00	1.33
Non Calmness ratio (%)				1.93
Calmness Ratio (%)				98.07

Shamoukville

H(m) \ Deg	SW	W	NW	N	CALM	Occurrence Frequency (%)
CALM					27.10	27.10
~ 0.25	7.64	15.46	8.29	16.77		48.17
~ 0.50	1.15	7.84	4.95	2.66		16.60
~ 0.75	0.29	1.84	2.28	0.94		5.34
~ 1.00	0.04	0.38	0.86	0.05		1.33
~ 1.25	0.02	0.10	0.62	0.00		0.73
~ 1.50	0.00	0.04	0.13	0.00		0.17
~ 1.75	0.00	0.02	0.24	0.00		0.26
~ 2.00	0.00	0.00	0.16	0.00		0.16
~ 2.25	0.00	0.00	0.13	0.00		0.13
~ 2.50	0.00	0.00	0.00	0.00		0.00
~ 2.75	0.00	0.00	0.02	0.00		0.02
~ 3.00	0.00	0.00	0.00	0.00		0.00
3.00 ~	0.00	0.00	0.00	0.00		0.00
Occurrence Frequency (%)	9.14	25.66	17.68	20.42	27.10	100.00
Exceeding Occurrence Frequency (%)	0.00	0.89	1.27	0.00		2.16

ERR :

Result of Wave Calmness Analysis [ST.1 : 1a-1-2]

Wave Dir	Target Wave Height	Ratio of Wave Height	Allowable Wave Height	Exceeding Occurrence Frequency
	H(m)		H(m)	(%)
W	0.50	0.71	1.06	0.69
NW	0.50	0.69	1.38	1.27
Non Calmness Ratio (%)				2.16
Calmness Ratio (%)				97.84

Shamoukville

H(m) \ Deg	SW	W	NW	N	CALM	Occurrence Frequency (%)
CALM					27.10	27.10
~ 0.25	7.64	15.46	8.29	16.77		48.17
~ 0.50	1.15	7.84	4.95	2.66		16.60
~ 0.75	0.29	1.84	2.28	0.94		5.34
~ 1.00	0.04	0.38	0.86	0.05		1.33
~ 1.25	0.02	0.10	0.62	0.00		0.73
~ 1.50	0.00	0.04	0.13	0.00		0.17
~ 1.75	0.00	0.02	0.24	0.00		0.26
~ 2.00	0.00	0.00	0.16	0.00		0.16
~ 2.25	0.00	0.00	0.13	0.00		0.13
~ 2.50	0.00	0.00	0.00	0.00		0.00
~ 2.75	0.00	0.00	0.02	0.00		0.02
~ 3.00	0.00	0.00	0.00	0.00		0.00
3.00 ~	0.00	0.00	0.00	0.00		0.00
Occurrence Frequency (%)	9.14	25.66	17.68	20.42	27.10	100.00
Exceeding Occurrence Frequency (%)	0.00	0.89	1.27	0.00		2.16

ERR :

出典：プロジェクトチーム

表 5-5　静穏率検討結果（ST.1 & ST.2: 1a-2-1）

Result of Wave Calmness Analysis [ST.1 : 1a-2-1]

Wave Dir	Target Wave Height	Ratio of Wave Height	Allowable Wave Height	Exceeding Occurrence Frequency
	H(m)		Ha(m)	(%)
W	0.50	0.96	0.52	2.29
NW	0.50	0.67	0.75	2.25
Non Calmness Ratio (%)				4.54
Calmness Ratio (%)				95.46

Sihanoukville　ERR :

H(m) \ Deg.		SW	W	NW	N	CALM	Occurrence Frequency (%)
CALM						27.10	27.10
～0.25		7.64	15.46	8.29	16.77		48.17
～0.50		1.15	7.84	4.95	2.66		16.60
～0.75		0.29	1.84	2.28	0.94		5.34
～1.00		0.04	0.38	0.86	0.05		1.33
～1.25		0.02	0.10	0.62	0.00		0.73
～1.50		0.00	0.04	0.13	0.00		0.17
～1.75		0.00	0.02	0.24	0.00		0.26
～2.00		0.00	0.00	0.16	0.00		0.16
～2.25		0.00	0.00	0.13	0.00		0.13
～2.50		0.00	0.00	0.00	0.00		0.00
～2.75		0.00	0.00	0.02	0.00		0.02
～3.00		0.00	0.00	0.00	0.00		0.00
3.00～		0.00	0.00	0.00	0.00		0.00
Occurrence Frequency	(%)	9.14	25.66	17.68	20.42	27.10	100.00
Exceeding Occurrence Frequency	(%)	0.00	2.29	2.25	0.00		4.54

Result of Wave Calmness Analysis [ST.2 : 1a-2-1]

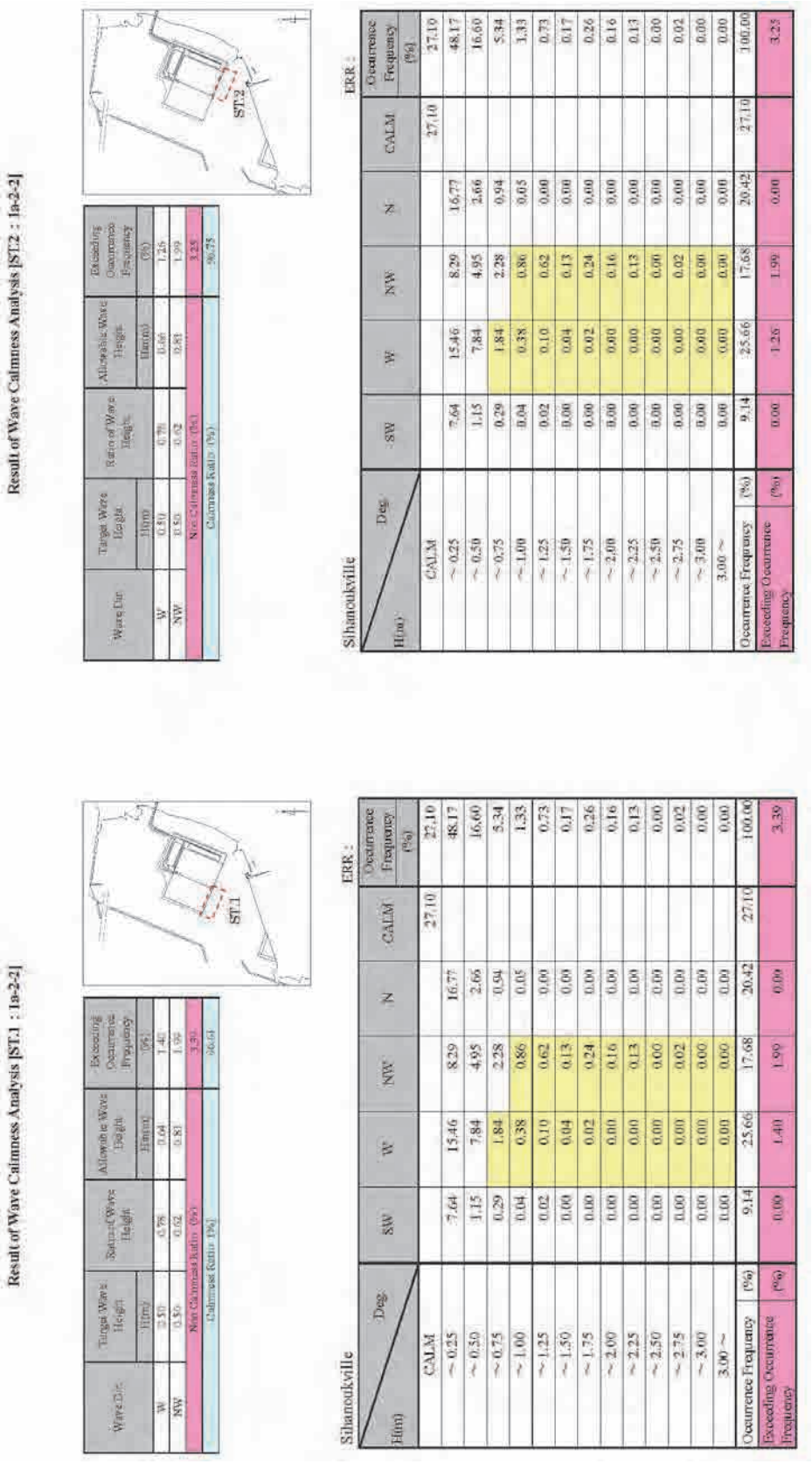
Wave Dir	Target Wave Height	Ratio of Wave Height	Allowable Wave Height	Exceeding Occurrence Frequency
	H(m)		Ha(m)	(%)
W	0.50	0.80	0.36	1.99
NW	0.50	0.67	0.75	2.25
Non Calmness Ratio (%)				4.24
Calmness Ratio (%)				95.76

Sihanoukville　ERR :

H(m) \ Deg.		SW	W	NW	N	CALM	Occurrence Frequency (%)
CALM						27.10	27.10
～0.25		7.64	15.46	8.29	16.77		48.17
～0.50		1.15	7.84	4.95	2.66		16.60
～0.75		0.29	1.84	2.28	0.94		5.34
～1.00		0.04	0.38	0.86	0.05		1.33
～1.25		0.02	0.10	0.62	0.00		0.73
～1.50		0.00	0.04	0.13	0.00		0.17
～1.75		0.00	0.02	0.24	0.00		0.26
～2.00		0.00	0.00	0.16	0.00		0.16
～2.25		0.00	0.00	0.13	0.00		0.13
～2.50		0.00	0.00	0.00	0.00		0.00
～2.75		0.00	0.00	0.02	0.00		0.02
～3.00		0.00	0.00	0.00	0.00		0.00
3.00～		0.00	0.00	0.00	0.00		0.00
Occurrence Frequency	(%)	9.14	25.66	17.68	20.42	27.10	100.00
Exceeding Occurrence Frequency	(%)	0.00	1.99	2.25	0.00		4.24

出典：プロジェクトチーム

表 5-6　静穏率検討結果（ST.1 & ST.2: 1a-2-2）



出典：プロジェクトチーム

表 5-7　静穏率検討結果（ST.1 & ST.2: 2a-1-1）

出典：プロジェクトチーム

表 5-8　静穏率検討結果（ST.1 & ST.2: 2a-1-2）

出典：プロジェクトチーム

表 5-9　静穏率検討結果（ST.1 & ST.2: 2a-2-1）

出典：プロジェクトチーム

表 5-10　静穏率検討結果（ST.1 & ST.2: 2a-2-2）

出典：プロジェクトチーム