

A-9-3 Economic Analysis for Site 3

In this chapter, the economic analysis is conducted to evaluate the economic feasibility of the Grain Terminal located at site 3.

A-9-3-1 Method

The various factors and conditions used in the economic analysis for the Grain Terminal located at site 3 are the same as mentioned in chapter 7 in part II except construction cost.

A-9-3-2 Construction Cost

Construction costs at economic Prices of the Grain Terminal located at site 3 are shown in Table A-9-3-1.

Table A-9-3-1 Construction costs at Economic Prices

Item	Market Price (US\$ '000)	Economic Price (US\$ '000)
Civil Work		
Dredging		
Transfer Station	10,697	7,105
Foreport	825	548
Ancap Channel	1,749	1,162
Approach Chanel	16,092	10,689
Reclamation		
Silo Area	4,897	4,367
Access Road Area	1,457	1,397
Slope Protection	3,346	2,227
Mooring Facilities		
Breasting Dolphin	2,792	2,211
Mooring Dolphin A	915	629
Unloading Pier	4,013	3,181
Approach Jetty	556	425
Mooring Dolphin B	698	553
Pavement		
Silo Area	186	124
Access Road Area	538	359
Break Water	15,348	10,616
Mechanical Work		
Load/Unloading Equip.	17,194	16,197
Silo	25,584	20,041
Engineering Services	5,415	4,595
Physical Contingency	3,654	2,628
Total	115,956	89,053

A-9-3-3 Result of Cost Benefit Analysis

Table A-9-3-2 shows the calculated results of the cost-benefit analysis of the Grain Terminal located at site 3.

EIRR of this project is calculated at 7.7%.

The sensitivity analysis for EIRR yealds 6.1% for case A, 6.0% for case B, and 4.4% for case C.

Case A: The costs increase by 10%.

Case B: The benefits decrease by 10%.

Case C: The costs increase by 10% and the benefits decrease by 10%.

Table A-9-3-2 Cost-Benefit Analysis

No	Year	Benefit - Cost	Net Present Value (NPV)		
			Benefit	Cost	Benefit - Cost
1	1994	(14,247)	0	14,247	(14,247)
2	1995	(12,504)	0	11,609	(11,609)
3	1996	(31,380)	0	27,050	(27,050)
4	1997	(30,922)	0	24,748	(24,748)
5	1998	47,470	37,673	2,399	35,274
6	1999	2,470	3,932	2,228	1,704
7	2000	2,470	3,650	2,068	1,582
8	2001	2,470	3,389	1,920	1,469
9	2002	2,470	3,147	1,783	1,364
10	2003	2,470	2,922	1,655	1,266
11	2004	2,470	2,713	1,537	1,176
12	2005	2,470	2,519	1,427	1,092
13	2006	2,470	2,338	1,325	1,014
14	2007	2,470	2,171	1,230	941
15	2008	47,470	17,932	1,142	16,790
16	2009	2,470	1,871	1,060	811
17	2010	2,470	1,738	984	753
18	2011	2,470	1,613	914	699
19	2012	2,470	1,498	849	649
20	2013	2,470	1,391	788	603
21	2014	2,470	1,291	731	560
22	2015	2,470	1,199	679	520
23	2016	2,470	1,113	631	482
24	2017	(13,726)	1,033	3,522	(2,489)
25	2018	47,470	8,535	544	7,992
26	2019	2,470	891	505	386
27	2020	2,470	827	469	358
28	2021	2,470	768	435	333
29	2022	2,470	713	404	309
30	2023	17,359	(1,429)	(3,445)	2,016
Total		108,866	105,437	105,437	0

EIRR = 7.7%

A-9-4 Financial Analysis for the Grain Terminal Located at Site 3

In this chapter, the financial analysis is conducted to evaluate the financial feasibility of the grain terminal located at site 3.

A-9-4-1 Methodology

The viability of the project is analyzed using the Discount Cash Flow Method and appraised by the FIRR (financial internal rate of return), which is the same method used in chapter 8 Financial Analysis of part II.

A-9-4-2 Prerequisites

The various factors and conditions used in this analysis are the same as mentioned in chapter 8 except investment costs and maintenance and repair costs including maintenance dredging costs. These costs are estimated in A-9-2-4. The initial investment costs and annual administration costs of the grain terminal located at site 3 are shown in Table A-9-4-1 and A-9-4-2.

Table A-9-4-1 Investment Costs of Grain Terminal Located at Site 3

	(Unit 1000US\$)				
	1994	1995	1996	1997	Total
Dredging	5,349		4,588	19,426	29,363
Reclamation		2,926	3,428		6,354
Slope Protection			3,346		3,346
Mooring Facilities	6,237	2,737			8,974
Pavement				724	724
Breakwater	6,139	9,209			15,348
Loading/Unloading Equipment			13,755	3,439	17,194
Silo			10,234	15,350	25,584
Sub-Total	17,725	14,872	35,351	38,939	106,887
Engineerig Services	887	743	1,930	1,855	5,415
Physical Contingency	1,198	881	568	1,007	3,654
Tax	2,810	3,317	3,398	2,490	12,015
Grand Total	22,620	19,813	41,247	44,291	127,971

Table A-9-4-2 Administration Costs of Grain Terminal Located at Site 3

(Unit \$)		
Kinds of Costs	Amount	Remarks
Maintenance, Repair Costs	4,097,410	
Mooring Facilities, etc.	597,450	Original Construction Cost x 1%
Handling Facilities	399,960	Original Construction Cost x 2%
Dredging	3,100,000	
Personnel Costs	807,240	
Manager	55,800	1person x \$3000/m x 12 x 1.55
Superintendent	33,480	1person x \$1800/m x 12 x 1.55
Shift Superintendent	44,640	2persons x \$1200/m x 12 x 1.55
Operator	167,400	12persons x \$750/m x 12 x 1.55
Programmer	29,760	2persons x \$800/m x 12 x 1.55
Clerk	27,900	2persons x \$750/m x 12 x 1.55
Inspector	29,760	2persons x \$800/m x 12 x 1.55
Tallyman	55,800	4persons x \$750/m x 12 x 1.55
Laborer	297,600	32persons x \$500/m x 12 x 1.55
Administration Clerk	65,100	5persons x \$700/m x 12 x 1.55
Electricity Bill	366,000	\$0.061/KW x 6,000,000KW
Other Administration Costs	403,620	Personnel Costs x 50%
Total	5,674,270	

A-9-4-2 Appraisal

(1) Scenarios

To examine the impact on the FIRR, the following conditions are established;

- 1) Case A: The grain terminal shares the total maintenance dredging cost.
- 2) Case B: The grain terminal shares two-third of it.
- 3) Case C: The grain terminal shares half of it.

(2) Appraisal

The results are shown in Table A-9-4-3. The FIRR does not exceed the interest rate of the funds of 8% in every case.

Judging from the above analysis, the grain terminal project located at site 3 cannot be regarded as financially feasible.

Table A-9-4-3 FIRR of the Grain Terminal Located at Site 3

	FIRR
Case A	5.5%
Case B	6.4%
Case C	6.8%

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