IX. IMPLEMENTATION PLAN

9.1 Implementation Schedule

Promising opportunities exist for Sri Lanka to compete in the global market in the IT software/services and hardware industries, especially after a peace agreement is reached to resolve the prolonged ethnic conflict. The recent global economic downturn has exerted competitive pressures on international companies and are forcing them to look for cost effective and high-quality new sources of providers in order to maintain their existing market share or expand on it. These enterprises are increasingly establishing operations in offshore locations where their requirements could be met and are comparatively more advantageous.

The performances of Sri Lankan IT companies in the past few years show that these firms have made a good start as offshore providers. Although the present revenue from exports of software and related services is estimated to be between US$20 million and US$50 million, it is expected that Sri Lanka could achieve a market share of about US$1 billion by 2008. In order to build on the present success and achieve a greater market share, it is important that the proposed Technopark be implemented at the earliest to function as a catalyst for growth of the industry and help it achieve a better position to compete in the information industries market.

The earliest implementation of the Diyagama Technopark requires that financial arrangements be commenced during this year of 2002. The design work should be started in 2003 and construction (Phase 1) of the internal and external infrastructure as well as the SMART Center could be finished in 2004. Investment promotion shall be carried out in parallel with the design and construction work in 2003 and 2004. The IT-related industries can commence activity in the Diyagama Technopark in early 2005 as soon as the Phase 1 development is successfully implemented. The Phase 2 development can be commenced in the light of investment demand.

The implementation schedule of the Diyagama Technopark is now proposed as shown in the following.

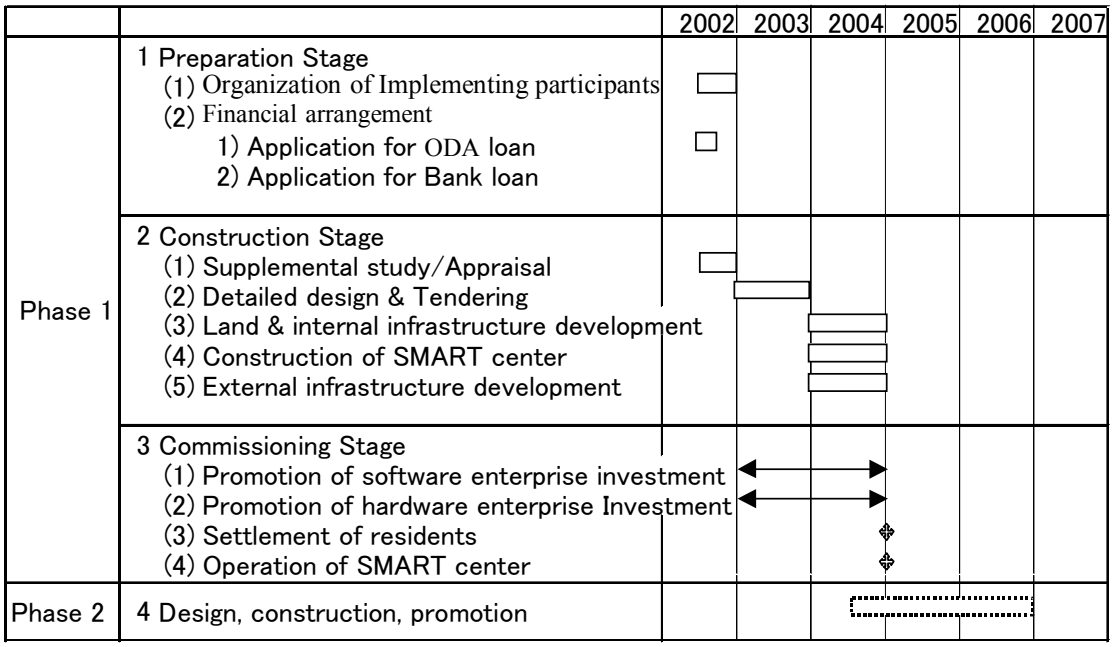


Figure 9.1 Implementation Schedule of Diyagama Technopark

9.2 Implementation Framework

The implementation and management framework of the Technopark has been made within the broad policy framework of committing to operate within a liberalized economic regime supporting continued expansion of the size and competitiveness of the private sector. Private-academic-public partnerships will play an indispensable role in the realization and management of the Technopark.

For the implementation of the Technopark, there are three models that can be considered as follows;

(i) The Ministry of Enterprise Development, Industrial Policy and Investment Promotion could construct the required facilities as a public investment and transfer them to BOI for operation and maintenance (as in the case of the Seethawaka Industrial Estate);

(ii) BOI could construct, operate and manage the facilities, with private sector actively involved in the operation and management of the SMART Center, as well as in development of the internal infrastructure; and

(iii) A domestic or foreign private enterprise could construct, operate and manage the entire complex of the Technopark.

Alternative (i) above does not conform with the Government policy to promote private initiative. Alternative (iii) is desirable in the sense of promoting private initiative, but domestic enterprises capable of implementing this magnitude of investment do not exist. So far as can be gauged, foreign investors are not interested in taking on the entire operation of the Technopark. The best way, at this moment, is alternative (ii) where the implementation is coordinated and managed by BOI. As noted in Chapter 2.3, BOI is an autonomous statutory authority vested with ranging powers to facilitate foreign and domestic investment and to promote export-oriented industries.

It is now proposed that the overall structure for implementation of the Technopark be managed as illustrated in the following diagram.

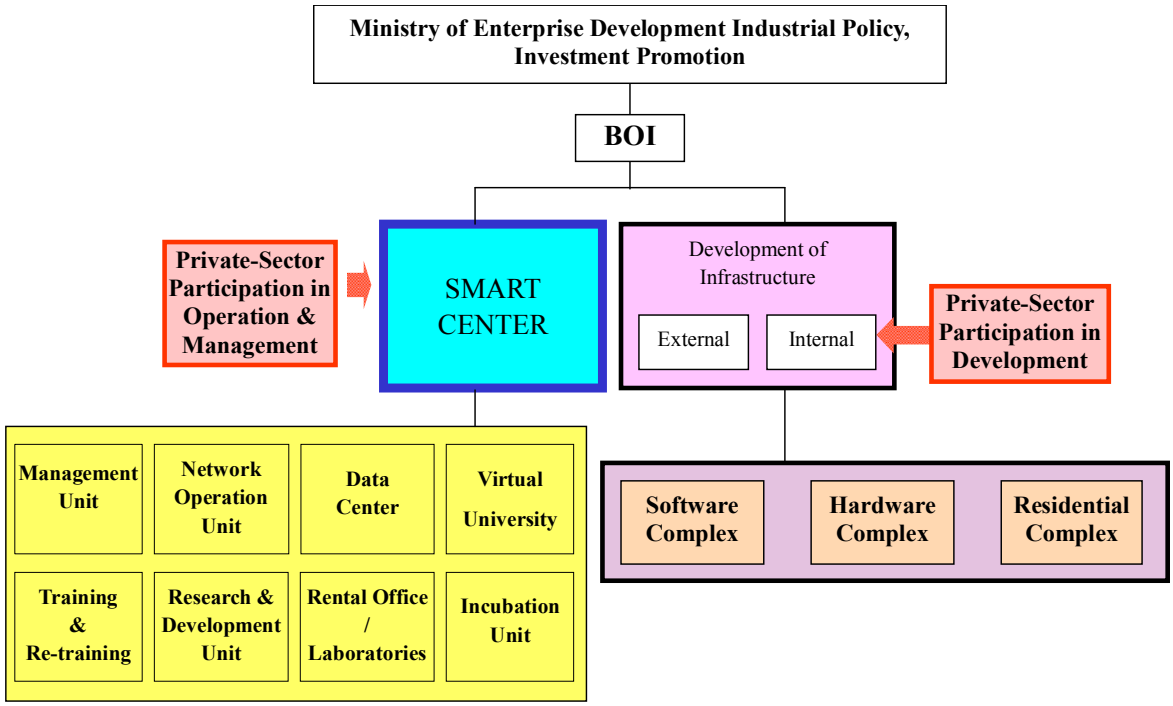


Figure 9.2 Overall Structure for Implementation

It would not be efficient for BOI to implement all the facilities required for the Technopark. The external infrastructure would be better constructed, operated and managed by the respective agencies concerned. It is however proposed that the financing for construction of such external infrastructure would be arranged or facilitated through BOI.

The agencies responsible for construction, operation and management of external infrastructure comprising of roads, telecommunications, electricity, water supply and sewerage will be the respective agencies for such services as shown in the following Table 9.1.

Table 9.1 Agencies Responsible for External Infrastructure

Type of External Infrastructure	Implementing Agency
1. Overall Coordination	BOI
2. Roads	Road Development Authority
3. Telecommunications	Sri Lanka Telecom or other Private Company
4. Electricity	Ceylan Electricity Board
5. Water Suppy and Sewerage	Water Supply and Drainage Board

Development of internal infrastructure such as roads, telecommunications, electricity, water supply and sewerage within the different components of the Technopark would be coordinated and managed by BOI. The operation and maintenance of internal infrastructure will be executed by sub-contractors retained by BOI.

9.3 Management Framework

As noted in the previous Section, the responsibility for operation and management of external infrastructure for the Technopark will be vested in the agencies concerned. They will also be responsible to charge and collect payments for use of the respective services. The operation and management of the internal infrastructure on the other hand, will be managed by BOI. It will charge the operation and maintenance expenses to private enterprises under the lease agreement.

For the management of the SMART Center as a central function of the Technopark, three alternative scenarios are conceived:

Scenario 1: The Center could be operated and managed by BOI, with its system operation subcontracted to the private sector;

Scenario 2: BOI could set up a joint venture (JV) and the JV will operate and manage on a profit sharing basis.

Scenario 3: BOI could set up a JV and it will operate and manage on a revenue sharing basis.

Note: Profit sharing is a scheme that a certain percentage of the net income after tax for the operation would be collected by BOI, while revenue sharing is a scheme that a certain percentage of the proceeds from the operation would be collected by BOI.

An outline of the three alternative scenarios is shown in Table 9.2.

Table 9.2 Alternative Scenarios for Management of SMART Center

	Scenario 1	Scenario 2	Scenario 3
Operation & Management of Technopark	BOI	BOI	BOI
Fund Raising	GOSL & BOI	GOSL & BOI	GOSL & BOI
Operation & Management of Smart Center	Management by BOI System Operation delegated to the private sector	Joint Venture between BOI and a strategic partner of the private sector	Joint Venture between BOI and a strategic partner of the private sector
Equity Allocation	100 % BOI	Ratio of allocation to be negotiated	Ratio of allocation to be negotiated
Fund Management	BOI	Joint Venture	Strategic Partner of the private sector
Profit & Revenue Allocation	Management Fee to Private Sector	Profit sharing	Revenue sharing & Profit sharing
Cost Management	BOI	Joint Venture	Strategic Partner of the Private Sector
Management of Debt Service	BOI	Joint Venture	BOI
Management Concept for the operation of the Smart Center	Full involvement of BOI in the operation	Partial involvement of BOI in the operation	No involvement of BOI in the operation
Risks for Strategic partner of the private sector			
(1) Fund raising & Debt service	Nothing	Nothing	Nothing
(2) Financial Risk	Low	Medium	Medium
(3) Operation Risk	Low	Medium	High

Out of the three alternative scenarios, scenario 3 is proposed for the SMART Center operation for the following reasons:

(i) More management initiative by the private sector and less involvement in management by the public sector (BOI);

(ii) A close and reliable partnership is maintained among the private, public and academic sectors; and

(iii) A non-conventional business model should better be applied in due consideration of the rapid changes inherent in IT and knowledge based industry.

Consequently, BOI is defined to function as an apex agency identifying, promoting and facilitating foreign direct investments and domestic private investments by providing services, transparently and efficiently.

Practically, a Special Purpose Company (SPC) will be established jointly by BOI and a strategic partner that might be a global IT company. The overall management of the "SMART

Center" will be delegated to the private strategic partner. This SPC is tentatively called "JV Main". On the other hand, key operating units such as "Network Operation Unit", "Data Center", "Virtual University" and "Incubation Unit" of the "Smart Center" will be separately managed by other companies to be set-up as joint-venture companies between the JV Main and other private companies. These JVs are tentatively called "JV-1", "JV-2", "JV-3".

A revenue sharing method will be adopted to secure the source of funds for the debt service of BOI. The ratio of the revenue sharing will be a critical factor to the establishment of JV Main, and it should be determined through negotiation between BOI and a private company nominated as strategic partner.

Consequently, the management formation is proposed as summarized in the Table 9.3.

9.4 Financial Plan

Based on the implementation framework proposed in Chapter 9.2 and the management framework in Chapter 9.3, as well as the estimated construction cost in Chapter 8.3, a provisional financial plan is to be formulated. The available sources of financing are assumed as follows:

(i) A budget to be generated and earmarked by the Government of Sri Lanka (GOSL).

(ii) A concessional-term loan extended under official development assistance (ODA) through GOSL

(iii) On-lending of a bank loan to be extended by an international bank or banks through the development banks in Sri Lanka (i.e., DFCC or NDB)

(iv) Own finance by the private enterprises.

Table 9.3 Proposed Management Formation

Infrastructure & Facilities	Operation & Management (Private-Public-Academic Partnership)	Remarks
Ownership of Land	BOI	Land leased to BOI by SLB
Ownership of Internal Infrastructure Financed by	BOI Bank Loan + GOSL	Bank Loan through DFCC to BOI
Ownership of External Infrastructure Financed by	Respective Gov't Institutions ODA + GOSL	
O & M of Technopark	BOI	
Investor Promotion	BOI	
Smart Center Owned by Financed by	BOI Bank Loan + GOSL	Bank Loan through DFCC to BOI and Subsidy in part from GOSL
Smart Center SPC established by Managed by	Joint Venture between BOI and Strategic Partner Strategic Partner	*Revenue sharing & Profit sharing Between both parties* SPC: Special Purpose Company JV Main (tentatively called) Fund management during operation
Operation & Management Network Operation Unit Data Center Virtual University Incubation Unit Training & Re-training Unit Rental Office/Lab. R & D Unit	 JV Main + Private Sector JV-1 JV Main + Private Sector JV-1 JV Main + Private Sector JV Main + Private Sector JV Main JV Main JV Main	 (Operation to be delegated to international computer company) JV 2 JV 3
Software Enterprises Owned & managed by	*Lease of lots* Private enterprises	*(Lease agreement with BOI)* (Refer to demand survey)
Hardware Enterprises Owned & managed by	*Lease of lots* Private enterprises	*(Lease agreement with BOI)* (Refer to demand survey)
Housing Complex Owned & managed by	*Lease of lots* Private Sector	*(Lease agreement with BOI)*

For construction of the Technopark facilities, it is planned that financing arrangements would be as shown in Table 9.4.

Table 9.4 Financial Arrangement Plan

	BOI	GOSL
Internal Infrastructure and residential area development	Bank Loan	
External Infrastructure		ODA and Budget (To respective agencies)
SMART Center Facility Building IT Equipment	 Bank Loan	 ODA and Budget (to BOI) Budget (small part or 20%)

From the estimated construction cost (see Chapter 8.3), the estimated amount required to finance construction is summarized in Table 9.5.

Table 9.5 Required Amount of Financing

(Units: US$ 1,000)

		Phase 1	Phase 2	Total
GOSL:	Counterpart financing for external infrastructure and the Center building with small part of the Center IT equipment	4,062	5,800	9,862
ODA:	Financing major part of external infrastructure and the Center building	17,646	0	17,646
Bank Loan:	Financing internal infrastructure and the Center IT equipment	6,992	3,300	10,292
Total		28,700	9,100	37,800

It is planned that financing through ODA would be arranged only for implementation of Phase 1. The financing of external infrastructure for Phase 2 would be arranged by GOSL provisionally.

The loan conditions assumed for the debt service calculation are shown in Table 9.6.

Table 9.6 Assumed Loan Conditions

Loan	Loan Amount (US$ 1,000)	Conditions	
Bank Loan to BOI through DFCC / NDB (Phases 1 and 2)	10,292	Repayment period Grace period Interest	15 years 5 years 12 %
ODA Loan to GOSL (Phase 1)	17,646	Repayment period Grace period Interest	30 years 10 years 3 %

X. PROJECT EVALUATION

10.1 Initial Environmental Examination

An Initial Environmental Examination (IEE) was conducted to identify both positive and negative impacts of the Diyagama Technopark on the environment during construction and after the completion of the project, and to provide relevant mitigation measures if negative impacts are foreseeable by the project activities. The IEE followed the following instruments and/or guidelines:

(i) "National Environmental Act (NEA) of Sri Lanka"

(ii) "Guidance for Implementing the Environmental Impact Assessment Process" by the Central Environmental Authority (CEA)

(iii) "JBIC Environmental Guidelines for ODA Loan"

Referring to these guidelines, the predictable environmental impacts and their countermeasures were compiled as summarized in Table 10.1. It can be concluded that no significant negative impacts are predicted and all negative impacts can be readily mitigated.

Under the National Environmental Act (NEA) of Sri Lanka, any project that includes integrated multi development activities consisting of housing, industry, and commercial infrastructure covering a land area exceeding 10 hectares and all industrial estates exceeding 10 hectares with land clearing exceeding 50 hectares, are subject to EIA. Likewise, according to the JBIC Guideline, the Technopark project is classified as a Category A development, which requires Environmental Impact Assessment (EIA). The purposes of EIA are to ensure that the development options are environmentally sound and sustainable and that environmental consequences are recognized and taken into account early in the project design. It is therefore required that a comprehensive EIA be conducted prior to the commencement of the project. According to the NEA, the Central Environmental Authority (CEA) is the project approving agency, and the CEA specifies the terms of reference for EIA after receiving the application and project documents.

Further, for environmental management, an environmental monitoring plan should be prepared at the pre and post implementation stages. To this end, the project implementation agency should prepare and submit an environmental status report to the agency in order to ensure that the proposed mitigation measures are executed properly.

Table 10.1 Screening of Initial Environmental Examination

	Check Items	Major	Small	None	Not Clear	Problems	Action and Countermeasures Planned	Remarks
Pollution	1. Air pollution by smoke and dust		○			Emission of particulates matters can be anticipated during the construction stage. Air emission from industries cannot be ruled out expect generators.	Enclose the construction area Use water spray while unloading the construction materials Safety equipments should be provided for the workers who deal with particulate matters To ensure compliance with the National Standards periodic air quality monitoring should be done A hydrogen generator is proposed in order to decrease air pollution	The nature of the industries to be allocated and the manufacturing processes to be implemented by the industries should be thoroughly studied. Air emission during the operation of industries cannot be estimated right now.
	2. Offensive Odors		○			Inconvenience to the public.	The sewerage treatment plant could be a source of odor and proper operation and maintenance would eliminate this problem	
	3. Effect of construction of the facility on aquatic organisms, fisheries and other water utilization		○			No impacts on coral reefs, mangroves, wet lands or other aquatic life is anticipated		
	4. Water pollution by effluent		○			Contamination of water body due to sewage and waste water Collection of domestic wastewater Installation of sewerage treatment plant/s Industrial wastewater if generated from the site has to be checked for the National Effluent Discharge standards and treated accordingly	Sewerage Treatment plant is introduced to keep National water quality standards. Encouraging workers to use water efficiently Use settling tanks for turbid water generated from the construction site A source is to be identified in order to discharge water from the construction site. The flow pattern of the water body has to be studied if water is discharged into a water body A temporary man made pond within the site can be used to accumulate water from the construction site but extra precautions to be taken in order to prevent mosquito breeding. The characteristics of industrial wastewater depends on the type of industries to be located and manufacturing processes to be adopted	

Check Items		Major	Small	None	Not Clear	Problems	Action and Countermeasures Planned	Remarks
Pollution	5. Noise and vibration		○			Noise pollution during the construction stage by operation of heavy equipments and transportation of vehicles Noise pollution during the operation stage from the industries Noise pollution from generators	Try to avoid construction works in the night Periodically check the noise levels at boundary during construction stage Hydrogen generator is proposed in order to decrease noise and vibration.	Noise from industries within the Technopark cannot be anticipated without knowing the nature of the industries
	6. Ground subsidence		○				There are no sources causing ground subsidence, since water resource is proposed for surface water of Kelani Ganga.	
	7. Soil contamination		○			Contamination of paddy field lands with sandy matters	This can be minimized by covering the sand heaps on rainy days and introducing sand trap pond.	No record available on soil contamination of the site.
	8. Treatment of industrial waste		○			Disposal of solid waste generated from demolition of existing buildings and construction wastes during the construction period Disposal of solid waste generated during the operation stage as domestic waste from Technopark (except industries), residences and industrial wastes. Hazardous waste disposal (if any)	Possibilities of demolition wastes which can be reused for the construction purposes have to be checked Contact the local authority and identify a suitable disposing site or utilize existing site if any Use the hazardous waste guidelines to identify the type of wastes to be generated from the industries	The quantity of the solid waste from the park can be estimated once the final design is completed Whether the industrial waste is hazardous or not cannot be checked unless the nature of the industry is known
Natural Environment	1. Effect of construction and operation of the factory on the ecology		○			-	Please refer to each item for construction. In operation stage, IT industry including hardware and software is quite clean compared with existing industry.	-
	2. Effect on landscape		○			-	At the design stage, special care should be taken to avoid adverse effects on the landscape	Preservation of greenery existing in the perimeter zone is planned and utilization of topographical features is also proposed.

	Check Items	Major	Small	None	Not Clear	Problems	Action and Countermeasures Planned	Remarks
Human	1. Effect on construction of the facility on historical and cultural heritage			○		No cultural or historical site is located within the site.		-
	2. Effect on existing infrastructure		○			Road, Water Supply, Sewerage, Drainage, Power Supply, and Tele-communications facilities will be introduces The large number of workers involved will be associated with accidents during the construction stage	In the previous chapter, present condition and planning of those facilities are described. Please refer chapter "Location of Technopark" and "Facility Planning ". Keep first aid boxes readily available Setting up a temporary health center would be a pro-active measure Workers should be provided with adequate safety equipments like helmets, earmuffs, goggles etc.	-
	3. Relocation and effect on land-use			○		Resettlement is not an issue now since no one lives within the Diyagama site.	-	-
	4. Effect on traffic		○			Traffic jam and dust generation	The number of vehicles will be comparatively low because the total volume of earthworks is not large Vehicles should be covered or closed. Water can be sprayed to minimize dust.	-
Others	1. Effect on the environment during construction period		○			For Noise and vibration, Turbid water, dust, sanitary	To reduce the impact, night construction would be avoided Construction sites would be enclosed in order to control dust and noise.	Refer each items
	2. Environmental monitoring					-	-	The specific activities to be monitored are given in the section on "Institutional Requirement and Environmental Monitoring Program".

10.2 Financial Analysis

The financial analysis was prepared with a focus on the repayment capability of BOI, the working capital requirement for the strategic partner, and presents indicators such as the return on investment (ROI). The major factors of the analysis applied herein were, among others, as follows:

- Revenue Projection
- Revenue Sharing
- O&M Cost of SMART Center

The repayment capability of BOI was evaluated such that the debt servicing requirement of the Bank Loan could be recovered from the proceeds of the revenue sharing arrangement over the repayment period. Any cash shortage would have to be secured by BOI's own finance. For this analysis, the proceeds from leasing the industrial lots were assumed to accrue through the management of the BOI facilities. On the other hand, the strategic partner will be required to make up for the cash shortage with its own funds to produce positive cumulative cash-flow over the repayment period of the Bank Loan.

The basic conditions assumed for the financial analysis were as follows:

(i) Initial Investment Cost:

The initial investment cost estimated in Chapter 8.3 was applied. Table 10.2 provides a detailed breakdown of the investment and disbursement schedule.

(ii) Maintenance Cost:

The maintenance cost was estimated at 3% of the initial construction cost for the SMART Center building, as well as for the lots of IT software and hardware industry.

(iii) Renewal/Replacement Cost and Replacement Period

The renewal cost and the replacement period are calculated for respective component of IT equipment in the SMART Center as shown in Table 10.3.

(iv) Revenue Projection

The revenues from industrial lots leased to private hardware and software enterprises, and from the real estate enterprise operating the residential complex were estimated by referring to data available in the BOI guidelines, as shown in Table 10.4. Taking into account that the Technopark will accommodate high-end IT facilities, the tariff is assumed to be 2-3 times as high as for conventional industrial parks.

The revenues from the SMART Center were projected under several assumptions, as shown in Table 10.5. The operating cost was assumed to be 25% of the revenue. The cost allocation to the respective facilities should be fully managed by the strategic partner, and some portion of the allocated cost will be transferred to other JV-1, JV-2 and JV-3 in an appropriate manner.

(v) Revenue Sharing

The revenue sharing ratio is to be determined in due consideration of the conditions to be incorporated in the JV agreement between BOI and the strategic partner. For the purpose of financial analysis, a ratio of 30% is provisionally adopted. This implies that BOI could get 30% of the proceeds from operation of the SMART Center to cover the debt services of the Bank Loan.

Based on the above assumptions, the financial calculation has been conducted in the following manner:

(i) Revenue Forecast: .....(Table 10.6)

(ii) Financial Analysis for BOI:
(including Fund sources, Disbursement and Calculation of ROI) .....(Table 10.7)

(iii) Financial Analysis for Debt Services Calculation .....(Table 10.8)

(iv) Fund Management, Debt Service Management
and Fund Requirement for Strategic Partner ..... (Tables 10.9 and 10.10)

10.3 Financial Evaluation

Based on the analysis above, the financial viability of the Diyagama Technopark was evaluated in terms of ROI. The results are given in Table 10.11. ROI is calculated to be 11.9% as far as the

costs are incurred and revenues accrue as estimated originally. ROI may be reduced to slightly over 10% if revenues decrease to 90% of the original estimate.

Sensitivity to the changes in parameters is also evaluated in Table 10.11, namely:

Table 10.11 (1)	Effects of change in "Revenue"
Table 10.11 (2)	Effects of change in "O & M Cost"
Table 10.11 (3)	Effects of change in "Investment Cost" and "Revenue"
Table 10.11 (4)	Effects of change in "O & M Cost" and "Revenue Sharing"

The sensitivity analysis shows that ROI will be 15.2% if investment cost is lowered to 80% and revenues to 90% of the original estimate. On the contrary, ROI will be 8.9% if investment cost remains as estimated and revenues are lowered to 80% of the original estimate.

Based on this financial analysis, the financial viability of investment in the Diyagama Technopark is further evaluated as follows:

Factors critical to project sustainability

The financial viability depends substantially on the sound and attractive management of the SMART Center, particularly on the operation of the proposed Virtual University. Therefore, a special purpose company (SPC) to be established by BOI and the strategic partner with a strong association with a global IT company, (called the JV Main) should meet the challenge of this task in close cooperation with the nominated universities.

Selection of a strategic partner for BOI

The selection of the strategic partner is vital for the sound and business-like operations of the Technopark, particularly for the management of the SMART Center. The basic principles should be agreed between the strategic partner and BOI, with the tacit approval of the Government, with respect to the following:

- Initial investment by BOI and the Government;
- Working capital and renewal investment by the selected strategic partner;
- Clear and explicit clause on "no involvement of the Government in management of SMART Center", to be incorporated in the JV agreement; and

- Adoption of "revenue sharing" based on the financial analysis and incorporated into the JV agreement.

Major risks affecting project sustainability

The most critical factor will be the reliability of the revenue forecast, particularly the proceeds from the operation of the Virtual University, which is closely related to the operations of the "Network Operation Unit" and "Data Center". In this context, the management policy for the Virtual University should firstly be established among the parties concerned, e.g., the selected JV strategic partner, a JV partner for the Virtual University, BOI, and the universities concerned. Curriculums/courses, type of degrees, selection of academic staff, and selection of tied-up universities should be discussed and agreed by the parties concerned. Further, the JV strategic partner should be responsible for marketing initiatives, while BOI should assist in advertising, in parallel with the promotion of lot lease for industrial use.

Table 10.2 Disbursement Schedule for Development of Diyagama Technopark

		Development Cost (US$ 1,000)			Disbursement Schedule (US$1,000)					Remarks
		Phase 1	Phase 2	Total	2002	2003	2004	2005	2006	
I	Internal Infrastructure	2,300	3,300	5,600	0	200	2,100	300	3,000	
1	Construction Cost	1,900	2,600	4,500			1,900		2,600	
2	Administration Cost	0	100	100	0	0	0	0	100	2 % of 1
3	Engineering Cost	200	300	500		200		300		10 % of 1
4	Physical Contingency	200	300	500	0	0	200	0	300	10% of 1,2,3
II	External Infrastructure	11,300	5,800	17,100	0	1,000	10,300	500	5,300	
1	Construction Cost	9,200	4,700	13,900			9,200		4,700	
2	Administration Cost	200	100	300	0	0	200	0	100	2 % of 1
3	Engineering Cost	900	500	1,400		900		500		10 % of 1
4	Physical Contingency	1,000	500	1,500	0	100	900		500	10% of 1,2,3
III	Center Facility	14,200	0	14,200	0	1,300	12,900	0	0	
1	Construction Cost	11,500	0	11,500	0	0	11,500	0	0	
1A	Building	6,760	0	6,760	0	0	6,760	0	0	
1B	IT Equipment	4,740	0	4,740	0	0	4,740	0	0	
2	Administration Cost	200	0	200	0	0	200	0	0	2 % of 1
3	Engineering Cost	1,200	0	1,200		1,200		0		10 % of 1
4	Physical Contingency	1,300	0	1,300	0	100	1,200	0	0	10% of 1,2,3
IV	Residential Area	900	0	900	0	100	800	0	0	
1	Construction Cost	700	0	700			700		0	
2	Administration Cost	0	0	0	0	0	0	0	0	2 % of 1
3	Engineering Cost	100	0	100		100		0		10 % of 1
4	Physical Contingency	100	0	100	0	0	100	0	0	10% of 1,2,3
V	Total	28,700	9,100	37,800	0	2,600	26,100	800	8,300	
1	Construction Cost	23,300	7,300	30,600	0	0	23,300	0	7,300	
2	Administration Cost	400	200	600	0	0	400	0	200	
3	Engineering Cost	2,400	800	3,200	0	2,400	0	800	0	
4	Physical Contingency	2,600	800	3,400	0	200	2,400	0	800	

Note: Price contingency and land acquisition cost are not included.
US$1.0=135Yen=Rs.93 as of March 2002 US$ = 93 Rs.

Table 10.3 Renewal & Replacement Schedule for SMART Center

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	29	30	Total
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2031	2032	
IT Equipment																		
Renewal & Replacement Disburse Schedule	0	0	0	0	0	711	0	1,896	711	0	0	711	4,029	0	711	0	711	20,145

Initial Cost	4,740	(US$ 1,000)																
Replacement period (years)			Initial cost by category															
		% of Initial Cost																
Catergory A	3	15%	711					711				711				711		6,399
Catergory B	5	40%	1,896						1,896				1,896					9,480
Catergory C	10	45%	2,133										2,133					4,266

Description	Category A	Category B	Category C
1) Optical fiber cable network		5	
2) Computer	3		
3) Multi-media computer	3		
4) Audio Visual System			10
5) Authoring System			10
6) Sound System			10
7) Presentation Equipment			10
8) Lecture Support System			10
9) Electric Library	3		
10) Digital Printing System		5	
11) CD Pre-mastering System			10
12) Desk and Chair			10
13) Decorations			10
14) Office materials			10

Table 10.4 Revenue Breakdown

(excluding GST & NSL)

Target Items

			Annual Revenue at full operation (US$ 1,000)
A	Smart Center		
*1	a	Network Operation & Data center	1,526
	b	Virtual University	2,944
	c	Incubation Unit	45.4
*4	d	Training and Re-training	1.3
	e	Rental Office/Laboratory	15.2
*2	e	Research & Development Unit	4.4
*3	f	Smart Center Common Facilities	9.1
		Total	4,545

(See the details on Table 8 Smart center Revenue)

		Phase 1 Area (ha)	Phase 2 Area (ha)	Soft & Hard Enterprise Lot: Lease Premium for 50 years US$ per acre	Soft & Hard Enterprise Lot: Annual Ground Rent US$ per acre	Housing Lot: Lease Premium for 99 years US$ per acre	Housing Lot: Annual Ground Rent US$ per acre	Soft & Hard Enterprise Lot: Lease Premium for 50 years US$ per m2	Soft & Hard Enterprise Lot: Annual Ground Rent US$ per m2	Housing Lot: Lease Premium for 99 years US$ per m2	Housing Lot: Annual Ground Rent US$ per m2	Phase 1: Lease Premium US$/year	Phase 1: Annual Rent US$/year	Phase 2: Lease Premium US$/year	Phase 2: Annual Rent US$/year
B	Software Enterprises Lots	3.89	4.75	50,000	5,000			12.36	1.24			480,722	48,072	587,000	58,700
C	Hardware Enterprises Lots	3.82	7.2	50,000	5,000			12.36	1.24			472,071	47,207	889,768	88,977
D	Residential Complex	5.66	0			20,000	2,000			4.94	0.49	279,783	27,978	0	0

1 acre = 4,046 m2

1 US = 93 Rs. as at March 2002

* **Maintenance Cost for Internal Infrastructure**

As % of the initial construction cost 3.0%

(US$ 1,000)

		Up to 2006	From 2007 onwards
Phase 1	2,600	78	234
Phase 2	5,200		

* Maintenance Cost for Smart Center Building

As % of the initial construction cost	3%
Initial construction cost	6,760
Maintenance cost	203

Table 10.5 SMART Center Revenue

Component	JV	Service	Unit Price per client per month	Unit Price per MB per day	Clients	Revenue at full operation per year	Remarks
1 Network Operation and Data Center	Operator – Telecommunications Company V-1	a Data communication service					
		Software developers and services (2 Mbps)	US$7,000		10	US$840,000	
		Hardware industry (64 Kbps)	US$954		7	US$80,136	
		b System operation services (Support contracts)	US$4,000		2	US$96,000	20% of software clients
		c Consultancy services	Free of charge				
		d Data storage services					
		Off-line storage	80%	US$0.0001		US$5,475	First 15 GB
		1,600		US$0.00003		US$15,878	Additional GB
		On-line storage	20%	US$0.03		US$110	First GB
		400		US$0.002		US$292,000	Additional MB
		Data storage capacity	Terabyte				
		Phase I	2				
		Phase II					
		e Hosting services (Packages) (*4)		Unit Price/month	Units		
		Economy		US$7.00	1,000	US$84,000	
		Personal		US$14.45	500	US$86,700	
		Small Business		US$19.95	50	US$11,970	
		Corporate		US$34.95	25	US$10,485	
		E-Commerce		US$49.95	5	US$2,997	
					Sub-total	US$1,525,750	
2 Virtual University	Operator – Virtual University Consortium V-3	a Web-based training	Unit Price per year		No. of students		
		Undergraduate (*2)					
		On campus students	US$360		50	US$18,000	
		Off campus students	US$2,000		1,000	US$2,000,000	
		Post graduate					
		On campus students	US$360		25	US$9,000	
		Off campus students	US$2,000		100	US$200,000	
		Instructor training (Phase II) per participant (3 months)	US$2,000		100	US$200,000	
		Refresher course (Phase II) per participant (3 months)	US$3,000		50	US$150,000	
		CPD (Phase II) per participant (3 months)	US$3,000		50	US$150,000	
		b Medium-term training course (Phase I)					
		Instructor training	US$250		200	US$50,000	
		Refresher course	US$500		100	US$50,000	
		CPD	US$500		100	US$50,000	
		c Short-term training course par participant (3 days) (Conducted by expatriate specialists)CPD	US$100		300	US$30,000	
		d Computer center					
		Rs. per hour per terminal (100 terminals) (Similar to internet café with computer terminals to students)	US$15 US$100	US$0.16 70%		US$37,089	70% of occupancy rate from 08:00 to 17:00
					Sub-total	US$2,944,089	
3 Incubation Unit (a) Rental	SPC with V V-2	Rental services per incubatee, inclusive of all services	Unit Price per month US$450	Occupation rate 70%	Unit 12	US$45,360	
4 Training and Re-training (a) Rental	Management by V	Rental services per session	Unit Price US$25		Session 51	US$1,275	
5 Rental Office/Laboratory	Management by V	Rental services (*3) per ft2	Unit Price US$1	Occupation rate 70%	ft2 21,784	US$15,249	Floor area (m^2) 2,000
6 Research and Development (a) Rental	Management by V	Rental services per ft2 (excluding services)	Unit price US$1	Occupation rate 50%	ft2 8,714	US$4,357	Floor area (m^2) 800
7 Smart Center Common Facilities (a) Meeting rooms, Cafeteria, super-marke Auto banking system, Clinic, Bus shuttle services	Management by V	Rental services	Unit price US$1	Occupation rate 70%	ft2 13,071	US$9,149	Floor area (m^2) 1,200
					Grand total	US$4,545,229	

(*1) http://www.utexas.edu/cc/fsf/answers/charges.html ITS (Information Technological Services)
(*2) http://www.informaticsgroup.com Prices of on-line courses
(*3) http://www.bii.gov.lk/it.html Rental Prices for Technopark in th eWest Tower of World Trade Center without BOI subsidy
(*4) http://www.tierra.net/services/.html
http://www.budgethosting.net/packages.html

Table 10.6 Revenue Forecast for Diyagama Technopark

Revenue Forecast		1 2003	2 2004	3 2005	4 2006	5 2007	6 2008	7 2009	8 2010	9 2011	10 2012	11 2013	12 2014	13 2015	14 2016	15 2017	Total
(Unit: US$)																	
				50%	70%	80%	90%										
Occupation rate				50%	70%	80%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	
(A) Operation of Smart Center	4,545,229			2,272,615	3,181,660	3,636,183	4,090,706	4,090,706	4,090,706	4,090,706	4,090,706	4,090,706	4,090,706	4,090,706	4,090,706	4,090,706	111,358,112
To BOI Revenue sharing	30 -40%			30%	30%	30%	30%	30%	40%	40%	40%	40%	40%	40%	40%	40%	
				681,784	954,498	1,090,855	1,227,212	1,227,212	1,636,282	1,636,282	1,636,282	1,636,282	1,636,282	1,636,282	1,636,282	1,636,282	18,271,821
Advertising charges																	
Management of SPC JV		OK															
Revenue				1,590,830	2,227,162	2,545,328	2,863,494	2,863,494	2,454,424	2,454,424	2,454,424	2,454,424	2,454,424	2,454,424	2,454,424	2,454,424	31,725,699
O & M cost	25%			1,136,307	1,136,307	1,136,307	1,136,307	1,136,307	1,136,307	1,136,307	1,136,307	1,136,307	1,136,307	1,136,307	1,136,307	1,136,307	14,771,994
Maintenance of the bu	3%			202,800	202,800	202,800	202,800	202,800	202,800	202,800	202,800	202,800	202,800	202,800	202,800	202,800	
Gross profit				251,723	888,055	1,206,221	1,524,387	1,524,387	1,115,316	1,115,316	1,115,316	1,115,316	1,115,316	1,115,316	1,115,316	1,115,316	14,317,304
Re-Investment for Renewal & Replacement							711,000	0	1,896,000	711,000	0	0	711,000	4,029,000	0	711,000	8,769,000
Net Cashflow				251,723	888,055	1,206,221	813,387	1,524,387	-780,684	404,316	1,115,316	1,115,316	404,316	-2,913,684	1,115,316	404,316	5,548,304
Accumulated Cashflow				251,723	1,139,778	2,345,999	3,159,386	4,683,773	3,903,089	4,307,406	5,422,722	6,538,039	6,942,355	4,028,672	5,143,988	5,548,304	

For cheking the requirement of working capital input

OK Total amount of working capital = 0 US$ 1,000 over a periof of 15 years

(B) Operation of Industrial Park		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
1 Software enterprises																	
Phase 1				50%	70%	80%	80%	90%	90%	90%	90%	90%	90%	90%	90%	90%	
Lease premium	480,722			240,361	96,144	48,072	0	48,072	0	0	0	0	0	0	0	0	432,650
Annual rent	48,072			24,036	33,651	38,458	38,458	43,265	43,265	43,265	43,265	43,265	43,265	43,265	43,265	43,265	1,172,961
Phase 2						30%	50%	60%	70%	80%	90%	90%	90%	90%	90%	90%	
Lease premium	587,000					176,100	117,400	58,700	58,700	58,700	58,700	0	0	0	0	0	528,300
Annual rent	58,700					17,610	29,350	35,220	41,090	46,960	52,830	52,830	52,830	52,830	52,830	52,830	1,279,659
2 Hardware enterprises																	
Phase 1				50%	70%	80%	80%	90%	90%	100%	100%	100%	100%	100%	100%	100%	
Lease premium	472,071			236,036	94,414	47,207	0	47,207	0	47,207	0	0	0	0	0	0	472,071
Annual rent	47,207			23,604	33,045	37,766	37,766	42,486	42,486	47,207	47,207	47,207	47,207	47,207	47,207	47,207	1,255,709
Phase 2						30%	50%	60%	70%	80%	90%	90%	100%	100%	100%	100%	
Lease premium	889,768					266,930	177,954	88,977	88,977	88,977	88,977	0	88,977	0	0	0	889,768
Annual rent	88,977					26,693	44,488	53,386	62,284	71,181	80,079	80,079	88,977	88,977	88,977	88,977	2,108,749
3 Housing complex																	
Phase 1				50%	70%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Lease premium	279,783			139,891	55,957	55,957	27,978	0	0	0	0	0	0	0	0	0	279,783
Annual rent	27,978			13,989	19,585	25,180	27,978	27,978	27,978	27,978	27,978	27,978	27,978	27,978	27,978	27,978	
Phase 2						50%	70%	90%									
Lease premium	0																
Annual rent	0					0	0	0									0
				2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Lot Revenues				677,916	332,795	739,973	501,372	445,292	364,780	431,476	399,036	251,359	349,234	260,257	260,257	260,257	8,758,186
Operation & Maintenace				78,000	78,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	2,730,000
Phase I	78,000																
Phase II	234,000																

Table 10.7 Financial Analysis for BOI

			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	30	Total
		(1,000 US$)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2032	
	Disbursement	Phase 1	0	2,600	26,100			0	711	0	1,896	711	0	0	711	4,029	0	711	711	28,700
		Phase 2				800	8,300													
0	100%	of Original Estimated Cost																		48,845

Financial Internal Rate on Return for the Project																				
FIRR calculation		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2032	
Revenue	(Unit:US$ 1,000)				2,273	3,182	3,636	4,091	4,091	4,091	4,091	4,091	4,091	4,091	4,091	4,091	4,091	4,091	111,358
O & M cost	25%				568	795	909	1,023	1,023	1,023	1,023	1,023	1,023	1,023	1,023	1,023	1,023	1,023	27,840
Infra. Revenue					678	333	740	501	445	365	431	399	251	349	260	260	260	260	9,178
Infra. Cost					78	78	234	234	234	234	234	234	234	234	234	234	234	234	6,240
Maintenance cost for sma	3%				203	203	203	203	203	203	203	203	203	203	203	203	203	203	5,678
Total					2,102	2,438	3,030	3,133	3,077	2,996	3,063	3,030	2,883	2,980	2,891	2,891	2,891	2,891	80,778
Disbursement		0	1,600	15,800	300	3,000	0	711	0	1,896	711	0	0	711	4,029	0	711	711	
Net Cashflow	10.5%	0	−1,600	−15,800	1,802	−562	3,030	2,422	3,077	1,100	2,352	3,030	2,883	2,269	−1,138	2,891	2,180	2,180	39,933
FIRR =	10.5%																		
(0	(In case of "0", excluding "External Infrastructure")																		

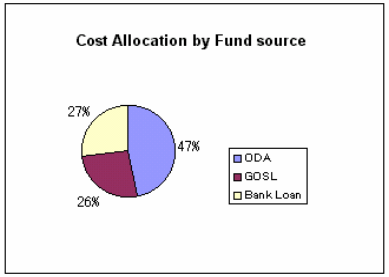
Breakdown of Disbursement										
		2002	2003	2004	2005	2006	2007	Total		% of Initial Investment Cost
Internal Infrastructure	2	0	200	2,100	300	3,000	0	5,600	15%	100%
External Infrastructure	1	0	1,000	10,300	500	5,300	0	17,100	45%	100%
Center Facility		0	1,300	12,900	0	0	0	14,200	38%	
Building	1	0	1,300	8,160	0	0	0	9,460	25%	100%
IT Equipment	2	0	0	4,740	0	0	0	4,740	13%	100%
Residential Area	2	0	100	800	0	0	0	900	2%	100%
Total		0	2,600	26,100	800	8,300	0	37,800		

2	Internal Infrastructure	Bank Loan	0	200	2,100	300	3,000	0			
			0	0	0	0	0	0			
		Total	0	200	2,100	300	3,000	0	5,600	15%	
1	External Infrastructure	ODA	0	850	8,755	0	0	0			
		GOSL	0	150	1,545	500	5,300	0			
		Total	0	1,000	10,300	500	5,300	0	17,100	45%	
	Center Facility										
1	Building	ODA	0	1,105	6,936	0	0	0	8,041		
128		GOSL	0	195	1,224	0	0	0	1,419		
2	128 IT Equipment	Bank Loan	0	0	3,792	0	0	0	3,792		
20%	20% (Subsidy from GOSL)	GOSL	0	0	948	0	0	0	948		
(Leverage Effects)		Total	0	1,300	12,900	0	0	0	14,200	38%	
2	Residential Area	Bank Loan	0	100	800	0	0	0			
			0	0	0	0	0	0			
		Total	0	100	800	0	0	0	900	2%	
		Grand Total	0	2,600	26,100	800	8,300	0		OK	
									37,800		

Leverage Effects			
		BOI	GOSL
Center facility			
	Building	0%	100%
	IT Equipment	80%	20%
Internal Infra.		100%	0%
External Infra.		0%	100%
Residential		100%	0%
		37,800	10,292	27,508
			27%	73%

Disbursement by Fund Source									
ODA		0	1,955	15,691	0	0	0	17,646	
GOSL		0	345	3,717	500	5,300	0	9,862	
Bank Loan	(BOI)	0	300	6,692	300	3,000	0	10,292	
Total		0	2,600	26,100	800	8,300	0	37,800	

ODA/(ODA+GOSL) w/o subsidy from GOSL for Bank Loan		
17,646	66%	
9,862		
10,292		
OK		



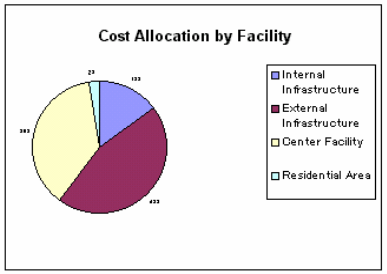


Table 10.8 Financial Analysis for Debt Service Calculation

GOSL		2003	2004	2005	2006	2007		Total
Budget		345	3,717	75	795	0		4,932

OK

ODA Loan		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2032	Total
Loan Amount	22,576	1,955	15,691	425	4,505	0												22,576
Grace period	10																	
Repayment period	30																	
Interest	3%																	
Loan outstandings at beg.		0	1,955	17,646	18,071	22,576	22,576	22,576	22,576	22,576	22,576	22,576	21,447	20,318	19,190	18,061	1,129	
Repayment	1,129	0	0	0	0	0	0	0	0	0	0	1,129	1,129	1,129	1,129	1,129	1,129	22,576
Interest		29	294	536	610	677	677	677	677	677	677	677	643	610	576	542	34	12,644
Debt Service		29	294	536	610	677	677	677	677	677	677	1,806	1,772	1,738	1,704	1,671	1,163	35,220
Loan outstandings at end		1,955	17,646	18,071	22,576	22,576	22,576	22,576	22,576	22,576	22,576	21,447	20,318	19,190	18,061	16,932	0	

Bank Loan (BOI)		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Loan Amount	10,292	300	6,692	300	3,000	0											
Grace period	5																
Repayment period	15																
Interest	12%																
Loan outstandings at beg.		0	300	6,992	7,292	10,292	10,292	9,263	8,234	7,204	6,175	5,146	4,117	3,088	2,058	1,029	
Repayment	1,029	0	0	0	0	0	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	10,292
Interest		18	438	857	1,055	1,235	1,235	1,112	988	865	741	618	494	371	247	124	10,395
Debt Service		18	438	857	1,055	1,235	2,264	2,141	2,017	1,894	1,770	1,647	1,523	1,400	1,276	1,153	20,687
Loan outstandings at end		300	6,992	7,292	10,292	10,292	9,263	8,234	7,204	6,175	5,146	4,117	3,088	2,058	1,029	0	

Financial Plan for Technopark Development							
Disbursement Schedule	2003	2004	2005	2006	2007		Total
GOSL	345	3,717	75	795	0		4,932
ODA	1,955	15,691	425	4,505	0		22,576
Bank Lona	300	6,692	300	3,000	0		10,292
Total	2,600	26,100	800	8,300	0		37,800

Table 10.9 Fund Management (1)

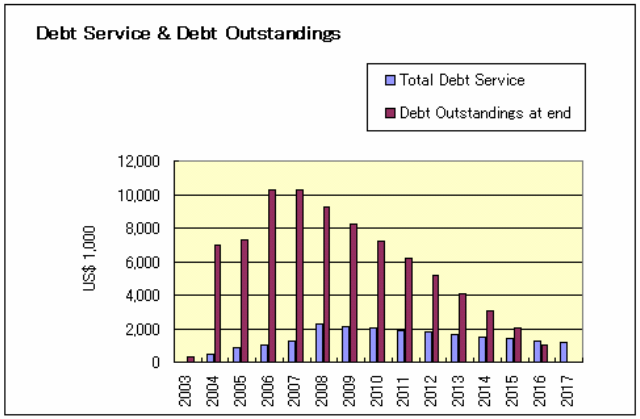
Cash Position for BOI

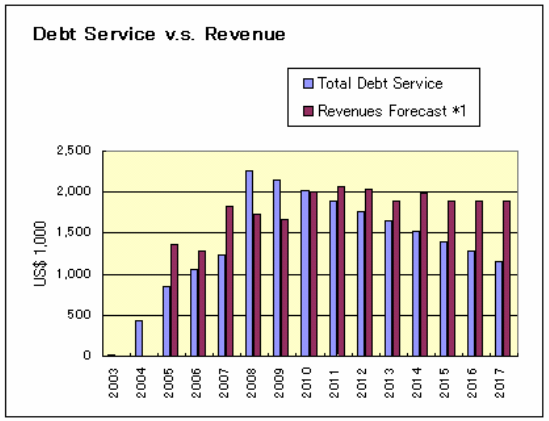
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Borrowing	10,292	300	6,692	300	3,000	0										
Total Debt Service		18	438	857	1,055	1,235	2,264	2,141	2,017	1,894	1,770	1,647	1,523	1,400	1,276	1,153
Debt Outstandings at end		300	6,992	7,292	10,292	10,292	9,263	8,234	7,204	6,175	5,146	4,117	3,088	2,058	1,029	0
Revenues Forecast *1		0	0	1,360	1,287	1,831	1,729	1,673	2,001	2,068	2,035	1,888	1,986	1,897	1,897	1,897
Infra. O & M				78	78	234	234	234	234	234	234	234	234	234	234	234
Balance of cashflow		-18	-438	425	154	362	-770	-702	-250	-60	31	7	228	263	386	510
Accumulated cashflow		-18	-456	-31	123	485	-284	-987	-1,237	-1,297	-1,266	-1,259	-1,031	-768	-381	128

*1 Annual Revenue at full operation of the Smart Center =
4,545,229 US$/year
and lot revenues

Leverage Effects

	BOI	GOSL
Center facility		
Building	0%	100%
IT Equipment	80%	20%
Internal Infra.	100%	0%
External Infra.	0%	100%
Residential	100%	0%





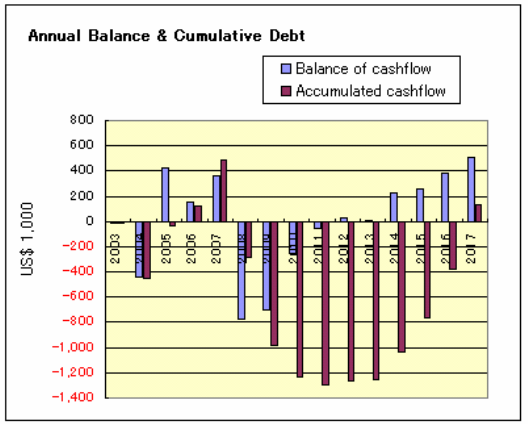
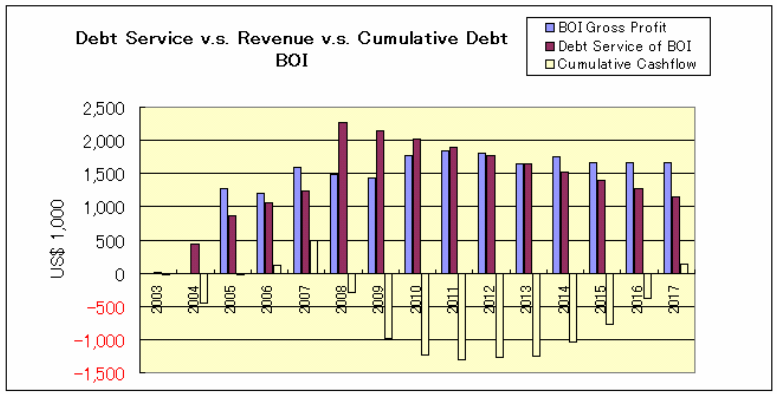
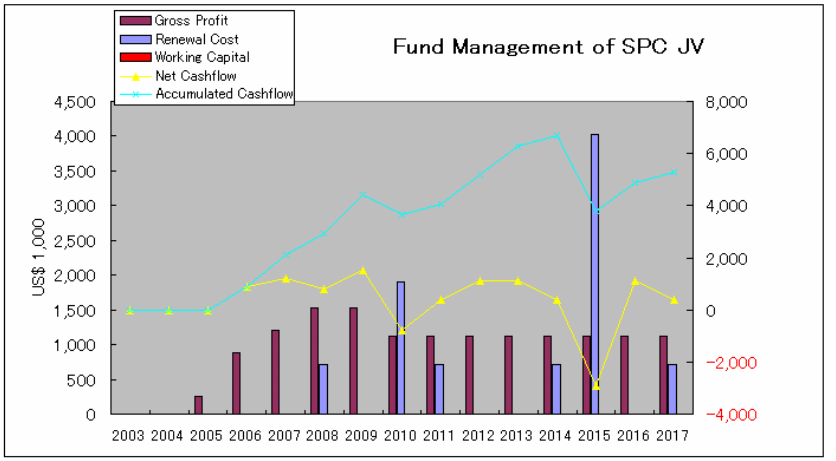


Table 10.10 Fund Management (2)

Fund Management & Debt Service Projection for BOI	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Revenue	0	0	1,359,701	1,287,293	1,830,828	1,728,584	1,672,503	2,001,062	2,067,758	2,035,319	1,887,642	1,985,516	1,896,540	1,896,540	1,896,540	23,545,825
Cost	0	0	78,000	78,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	2,730,000
100% of Original Estimated Cost																
(C) BOI Gross Profit	0	0	1,281,701	1,209,293	1,596,828	1,494,584	1,438,503	1,767,062	1,833,758	1,801,319	1,653,642	1,751,516	1,662,540	1,662,540	1,662,540	20,815,825
Debt Service of BOI	18,000	437,520	857,040	1,055,040	1,235,040	2,264,240	2,140,736	2,017,232	1,893,728	1,770,224	1,646,720	1,523,216	1,399,712	1,276,208	1,152,704	20,687,360
Balance	-18,000	-437,520	424,661	154,253	361,788	-769,656	-702,233	-250,170	-59,970	31,095	6,922	228,300	262,828	386,332	509,836	128,465
Cumulative Cashflow	-18,000	-455,520	-30,859	123,394	485,182	-284,474	-986,707	-1,236,876	-1,296,846	-1,265,752	-1,258,830	-1,030,530	-767,702	-381,371	128,465	

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
BOI Gross Profit	0	0	1,282	1,209	1,597	1,495	1,439	1,767	1,834	1,801	1,654	1,752	1,663	1,663	1,663
Debt Service of BOI	18	438	857	1,055	1,235	2,264	2,141	2,017	1,894	1,770	1,647	1,523	1,400	1,276	1,153
Cumulative Cashflow	-18	-456	-31	123	485	-284	-987	-1,237	-1,297	-1,266	-1,259	-1,031	-768	-381	128





Management of SPC JV (US$ 1,000)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Revenues	0	0	1,591	2,227	2,545	2,863	2,863	2,454	2,454	2,454	2,454	2,454	2,454	2,454	2,454	31,726
O & M Cost	0	0	1,339	1,339	1,339	1,339	1,339	1,339	1,339	1,339	1,339	1,339	1,339	1,339	1,339	17,408
Gross Profit	0	0	252	888	1,206	1,524	1,524	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	14,317
Renewal Cost	0	0	0	0	0	711	0	1,896	711	0	0	711	4,029	0	711	8,769
Working Capital		0	0		0		0	0	0		0	0				0
Net Cashflow	0	0	0	888	1,206	813	1,524	-781	404	1,115	1,115	404	-2,914	1,115	404	5,297
Accumulated Cashflow	0	0	0	888	2,094	2,908	4,432	3,651	4,056	5,171	6,286	6,691	3,777	4,892	5,297	5,297

Table 10.11 Summary Results of Financial Analysis

Basic Conditions for Financial Analysis

1)	Initial Investment Cost *1	20,700	US$ 1,000
	(Inclusive of external infrastructure	37,800	US$ 1,000)
2)	Revenue *2	4,091	90% of the estimated revenue
3)	O & M Cost of Smart Center	25%	% of 2) Revenue
4)	Maintenance of Building of Smart Center	3%	% of Costruction Cost of Smart Center, the amout of which is equal to 6,760
	Return on Investment (ROI)		%
	Subsidy from GOSL *3		% of Bank Loan for Smart Center Facility
	Working Capital Required *4		US$ 1,000 over a period of 15 years

Remarks
*1 Exclusive of External Infrastructure
*2 At full operation, 3 years after commencement 4,545 US$ 1,000
*3 Subsidy from GOSL to make positive the cumulative cashflow at the end of Loan Termination
*4 Amount required to keep positive the cumulative cashflow for the private enterprise, a JV partner of BOI

Table 8.12 (1) Effects of "Revenue" on Subsidy & Working Capital

Initial Investment Cost	100%	100%	100%	
Revenue	90%	80%	70%	
O & M Cost of Smart Center	25%	25%	25%	
Maintenance of Building of Smart Center	3%	3%	3%	
ROI	10.5%	8.9%	6.9%	
Subsidy from GOSL *3	20%	40%	60%	
Corresponding amount (US$ 1,000) *5	948	1,896	2,844	BOI
Working Capital Required *4	0	0	1,500	JV Partner

* 5 BOI shall make up for the cash shortage by himself incurred over a period of 15 years

Table 8.12 (2) Effects of "O & M Cost" on Working Capital

Initial Investment Cost	100%	100%	100%	100%	
Revenue	90%	90%	90%	90%	
O & M Cost of Smart Center	25%	25%	35%	40%	
Maintenance of Building of Smart Center	3%	5%	3%	3%	
ROI	10.5%	9.7%	8.1%	6.8%	
Subsidy from GOSL *3	20%	20%	20%	20%	
Corresponding amount (US$ 1,000) *5	948	948	948	948	BOI
Working Capital Required *4	0	0	1,000	3,100	JV Partner

Table 8.12 (3) Effects of "Investment Cost & Revenue" on Subsidy from GOSL

Initial Investment Cost	100%	100%	80%	80%	
Revenue	90%	100%	90%	70%	
O & M Cost of Smart Center	25%	25%	25%	25%	
Maintenance of Building of Smart Center	3%	3%	3%	3%	
ROI	10.5%	11.9%	15.2%	6.8%	
Subsidy from GOSL *3	20%	5%	0%	5%	
Corresponding amount (US$ 1,000) *5	948	237	0	190	BOI
Working Capital Required *4	0	0	0	0	JV Partner

Table 8.12 (4) Effects of "O & M Cost & Revenue Sharing" on Subsidy from GOSL and Working Capital

Initial Investment Cost	100%	100%	100%	100%	100%	100%	
Revenue	90%	90%	90%	90%	90%	90%	
O & M Cost of Smart Center	25%	25%	30%	35%	40%	40%	
Maintenance of Building of Smart Center	3%	3%	3%	3%	3%	3%	
Revenue Sharing (2005-09, 2010-)	30%, 40%	40%, 40%	30%, 40%	30%, 40%	30%, 40%	40%, 40%	
ROI	10.5%	10.5%	15.2%	8.1%	6.8%	6.8%	
Subsidy from GOSL *3	20%	5%	0%	20%	20%	20%	
Corresponding amount (US$ 1,000) *5	948	237	0	948	948	948	BOI
Working Capital Required *4	0	0	0	1,000	3,100	4,600	JV Partner

XI. RECOMMENDATIONS

The IT-related software and hardware industry is a relatively new industry in Sri Lanka, but it has been growing steadily in recent years with the globalization of the national economy, contributing increasingly to the creation of employment and the expansion of exports. The IT-related industry is expected to grow further as one of the leading industries in Sri Lanka and to contribute to a shift from the dependence on traditional resource-based industrialization to the new paradigm of knowledge-based industrialization. However, there are several constraints to further promoting IT-related industry in Sri Lanka. The proposed Technopark is one of the solutions needed to break through such constraints and allow the IT-related industry to lead the economic development of the country in the first decade of the 21st century.

Within the global economy, competitiveness is a key to industrial development. One of the strategies to enhance competitiveness is to locate industries in clusters and attain collective efficiency. The proposed Technopark is therefore designed to be a cluster for the IT-related software and hardware industry in Sri Lanka.

Actual demand for industries to locate in the proposed Technopark is to some extent uncertain, as the prolonged ethnic conflict in Sri Lanka has significantly impacted on domestic and foreign investment demands. However, the investment demand survey has revealed that some latent demand exists for locating IT-related industries in the Technopark on a moderate scale of development at the beginning. It is expected that demand would certainly expand when a peace agreement is reached that would deliver an end to the ethnic conflict.

The proposed Technopark has been evaluated to be financially viable as long as it is well managed. According to the initial environmental examination (IEE), it would have little impact on the natural and social environment. It is therefore recommended that the Technopark be implemented stage-wise as a “flagship project” for the development of IT-related software and hardware industries in Sri Lanka. It is further recommended that the following aspects be taken into account for implementation of the Technopark:

1) The Technopark is to be located at Diyagama (about 20 km to the south of Colombo) with a total land area of about 64 ha (158 acres). The Diyagama site is State-owned land previously used by SLBC. It is currently accessible by National Routes A4 and B5, and is located besides the new Southern Highway, which is now under construction. The site is quite suitable for location of the IT software and hardware industries.

2) The Technopark is recommended to have multi functions and to serve as a cluster development. Three functions are envisaged; i.e., (i) a central unit called the SMART Center, (ii) as a location for IT software industries, and (iii) as a location for IT hardware industries. The Technopark should provide the facilities and services to meet global standards. It is recommended that the SMART Center be designed to serve not only for the management and network operations of the Technopark, but also for the operation of a virtual university, as a center for training and retraining IT instructors and professionals, as an IT research and development (R&D) facility, and as a center to promote and incubate SMEs in the IT business. In this context, the SMART Center would have some public functions.

3) It is recommended that the Technopark be implemented under a private-academia-public partnership. The public participation as a development facilitator is necessary, because infrastructure is not adequately provided yet at the Diyagama site and the Technopark has some public functions as noted above. The partnership with the academia is also required to promote linkages between private industries and R&D functions at universities. Further, it is recommended that the Technopark be linked to the international research centers to keep up with the day-to-day advances in IT technology.

4) For implementation of the Technopark, it is recommended that the initiative be taken by BOI. It is desirable that the Technopark be constructed by BOI and its overall management be directed by BOI as an apex agency. However, BOI should not be a single player. BOI is recommended to set up a joint venture with a strategic partner to set up a special purpose company (SPC) for operation and management of the SMART Center. BOI or the SPC may establish, if required, other joint ventures for the management of other SMART Center functions, like the data center, virtual university and incubation unit. Since the establishment of the SPC would be critical to the successful implementation of the Technopark, BOI is recommended to find a competent global IT company as a strategic partner.

5) The land use right of the Diyagama site should be transferred from SLBC to the Ministry of Enterprise Development, Industrial Policy and Investment Promotion (MEII) or directly to BOI. The procedures required for this transfer should be taken immediately. (Even if the Technopark is not implemented, the Diyagama site is recommended to remain reserved for industrial use as few blocks of sizable land are available for the collective location of industries in the Greater Colombo area.)

6) Although the Diyagama Technopark is evaluated by IEE to have low environmental impact, it is recommended that the environmental impact assessment (EIA) be executed at the earliest possible stage. MEII or BOI is suggested to apply to the Central Environmental Agency (CEA) for project approval, and to obtain the terms of reference for EIA.

7) For implementation of Phase 1, financial arrangements should be initiated as soon as the decision is made on the implementation of the Diyagama Technopark. Phase 1 will require a total investment cost of US$28.7 million. Out of this estimated cost, about US$17.7 million would be required for the improvement of external facilities and infrastructure (e.g., improvement of roads, power supply, water supply and telecommunications outside the Technopark) and for the construction of buildings for the SMART Center that has partly public functions. It is recommended that financial assistance be requested from international financial institutions in the form of a concessional term loan. As a counterpart fund for this loan, the Government of Sri Lanka should earmark US$4.1 million for the Phase 1 implementation.

8) BOI, on the other hand, should earmark a budget of US$7.0 million for private investment in the Phase 1 implementation. This investment is required for the construction of internal infrastructure (roads, water distribution pipelines, sewer systems, and power distribution line within the compound of the Technopark) and for the procurement of IT equipment for the SMART Center. In the event of a lack of such funds being at hand, BOI is recommended to borrow a commercial term loan from DFCC or NDB that may in turn be used to seek a bank loan from the international banks.

9) Financial analysis has shown that the Diyagama Technopark is financially viable. Furthermore, the project will bring about social and economic benefit to the country. Socially, it is estimated that the project would create around 2,000 employment in Phase 1 and about 3,000 employment in Phase 2, totally about 5,000 employment. Economically, it is estimated that Gross Value Added (GVA) of about Rs. 900 million would be generated in Phase 1 and about Rs. 1,100 million would be generated in Phase 2. The total amount of GVA would be about Rs. 2,000 million.

10) In March 2002, it was agreed that negotiations for a peace agreement would start soon to settle the prolonged ethnic conflict. The national and international expectation is that domestic and foreign investments would boom once the peace agreement is reached. The proposed Technopark could be a catalyst for such investments. It is therefore recommended that the required actions be taken immediately by the authorities concerned so that the Diyagama Technopark is implemented at the earliest possible time to serve as a saucer for domestic and foreign investments and to promote industrialization and economic development for the people of Sri Lanka.

Appendix I

Natural Condition Survey

Summary of
Natural Condition Survey

1. Introduction

The natural condition survey at the Diyagama site was carried out under subcontract by local consultants (Ground Engineering Consultant Ltd.) during the period from February to March 2002. The natural condition survey covered:

(i) Topographic survey and mapping at the scale of 1:2,500, covering the land area of 67 ha;
(ii) Geological and geotechnical survey, including the drilling of three bore holes and the carrying out of standard penetration tests (SPT); and
(iii) Hydrogeological and geophysical investigation, including carrying out of pump tests and electrical soundings.

The results of the surveys are reported by the local consultants in a final report, and are summarized herein. The results have been used to formulate and analyse the plan for the Diyagama Technopark.

2. Topographic Survey

Topographic survey was carried out by three licensed surveyors and levelers in the following manner:

(i) Available information, relevant topographic maps and aerial photographs were collected from the Department of Survey, Sri Lanka;
(ii) As there is no survey benchmark of the National Survey Grid available in the Diyagama site, temporary monuments were set up through survey from the closest benchmark;
(iii) A topographic map at a scale of 1:2,500 was prepared for the mapped area of 67 ha; and
(iv) Not all of the spot elevations obtained were annotated on the drawing, but peak points, lowest points and some elevations along the Kottawa-Horana road are shown.

A 1:2,500 scaled map was prepared as shown in Figure A.1 at a reduced scale. As seen on the map, the Diyagama site has undulating topography with elevation ranging from EL.10 m to 25 m above mean sea level.

The information obtained through the topographic survey is sufficient for planning requirements. The temporary monuments established at the site are accurate enough for utilization as base stations for any further survey. For the detailed design, however, cross sections on a suitable grid should be carried out to obtain more accurate quantification.

3. Geological and Geotechnical Survey

The geological and geotechnical survey was conducted in the following manner:

(i) A thorough field inspection was conducted by a qualified geologist in and around the site, including surface inspection of soil overburden, rock outcrops, and morphological features;
(ii) A literature survey was conducted at the Department of Survey and the Geological Survey and Mine Bureau of Sri Lanka, obtaining relevant data and geological maps. The data and information were checked on site;
(iii) Three bore holes were drilled at locations specified by the JICA Team to the basement rock (with N value of more than 50). A SPT was conducted every 1 m in accordance with ASTM-D 1586.
(iv) The bore hole data obtained were analyzed and compiled.

In general, the Diyagama site is covered by Precambrian metamorphic rocks belonging to the Highland Series of Sri Lanka. The main rock types are cordierite gneiss, coarse grained marble, and undifferentiated Protozoic gneisses. The paragneisses are granoblastic and contain cordierite, K-feldspar, biotite quartz and garnet. These Protozoic metamorphic rocks are overlain by Quaternary laterite deposits. These are mottled, deep red to reddish brown ferruginous material.

The locations and depth of the three bore holes were as follows:

Location and Depth of Bore Hole

	Bore hole No.01	Bore hole No.02	Bore hole No.03
Location :North (m)	478,717.537	478,363.890	478,516.888
:East (m)	413,760.762	413,274.980	413,537.890
Collar elevation (m.AMSL)	27.46	24.95	12.72
Drilled depth (m)	14.19	13.06	15.22
Water table (m)	12.46	11.05	3.95
Basement rock (m)	14.19	13.06	15.22

Drilling logs are presented in Figure A.2. In general, a stiff sandy soil with N-value of more than 20 exists to approximately 15 m in depth below the ground level and hard base rock appears below 15 m.

For shallow foundations, the allowable bearing capacities will be assumed as tabulated below. This recommendation is a generalized version evaluated from the bore holes, and the exact capacities should be tested at the structure site when the detailed design is prepared.

Recommended allowable bearing capacity (Unit :kN/m$^{2)}$

Depth (m)	BH 01	BH 02	BH 03
1.0	150	150	100
2.0	150	175	125
3.0	175	150	100
4.0	125	100	100
5.0	100	100	100

Through the geological survey, it can be concluded that:

(i) No adverse geological and geotechnical condition is anticipated for development of the Technopark at the Diyagama site:
(ii) For the detailed design of structures, a geotechnical survey should be conducted at each structure site:

4. Hydrogeological and Geophysical Survey

Hydrogeological and geophysical surveys were carried out to verify the availability of groundwater for use at the Diyagama Technopark as follows:

(i) Inspection of the existing wells in and around the Diyagama site;
(ii) Study on morphology and hydrogeology around the site;

(iii) Geophysical survey including two horizontal electrical profiles and six vertical electrical soundings; and
(iv) A pumping test at Bore Hole No.03 to determine the groundwater yield capacity.

The horizontal electrical profiles were conducted first to identify the shallow and deep aquifer systems. Pinpoints for the vertical electrical sounding were decided after analysis of the horizontal profile curves. On the other hand, the pumping test was conducted as shown on the pump test record in Figure A.3.

The pump test at the Bore Hole Nol03 revealed that the rate of groundwater yield is as low as 5 L/min. This yield is much smaller than the water demand at the Technopark (about 1,000 cubic meters per day). It is noted that the groundwater yield was only tested in the soil overburden, and the crystalline basement rocks generally contains fractured layers with larger water bearing bodies.

The geophysical survey revealed that the thickness of the overburden soil formation varies from 10 to 15 m. The overburden consists of a reddish brown lateritic soil. The survey also indicates that the hard rock formation underneath is moderately fractured, generally having considerable groundwater potential. It is noted, however, that the water bearing fractures could be associated with the deeper levels of hard rock.

It is concluded that the water supply system for the Diyagama Technopark should better be designed at this stage to depend on the NWSDB water purification plant located at Horana, though there might be a possibility of obtaining groundwater from the deeper aquifers below the levels of hard rocks at the Diyagama site. It is recommended that further hydrogeological survey be conducted at the time of detailed design for construction of the Technopark.

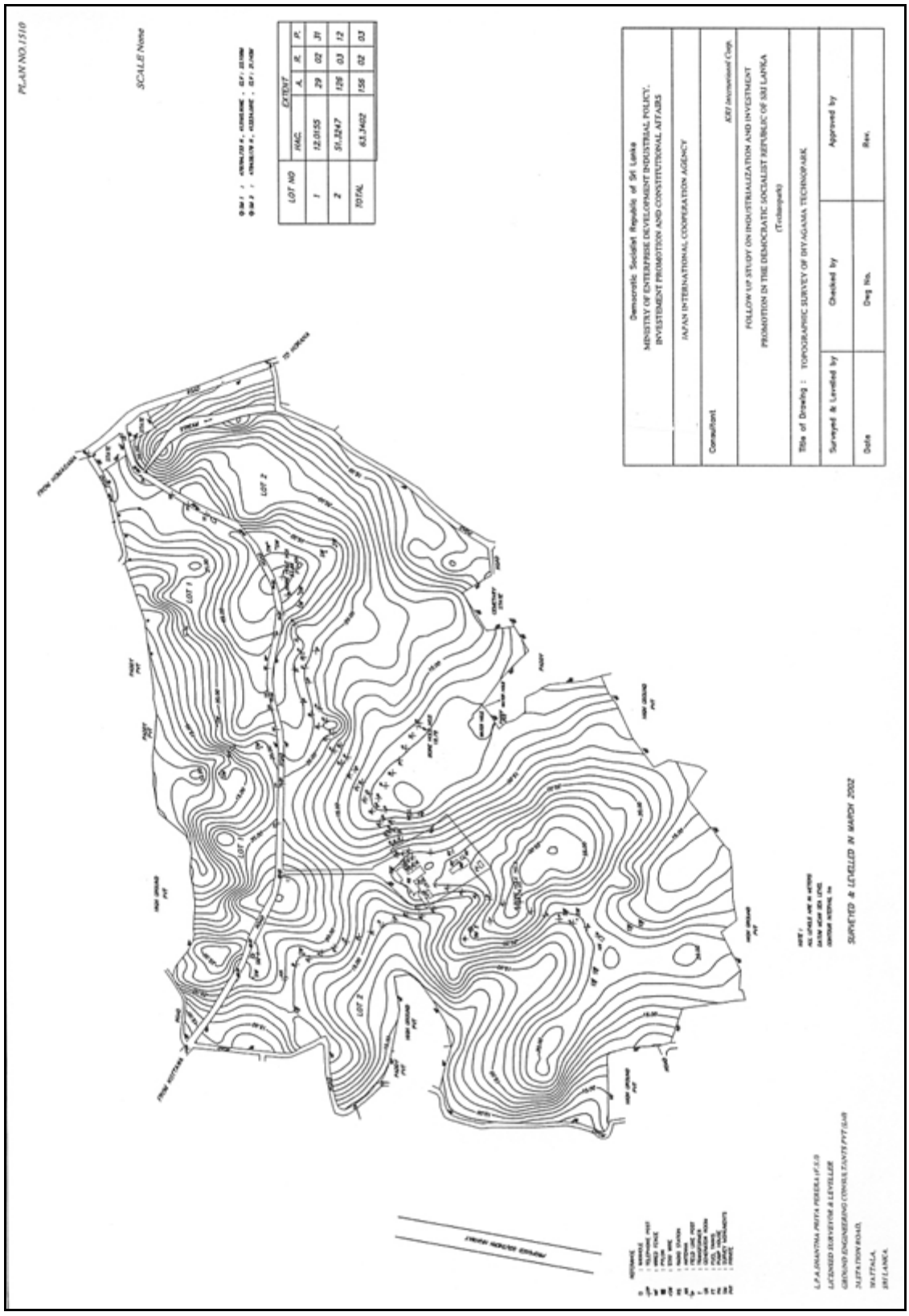


Figure A.1 Topographic Map

GEOLOGICAL RECORD OF BORING

Project	:	Technopark project, Diyagama	Date of Drilling:	15 - 16/03/2002	
Client	:	KRI, Tokyo	Angle from the vertical:	0	
Bore Hole Number	:	BH 01	Depth of Hole (m):	14.19	
Ground Elevation	:	27.46m MSL	Depth to the ground water level:	12.46	m below the ex. gr. level
Dia. of the hole (mm)	:	100	Logged By:	BSY	

Elevation (m)	Depth (m)	Thickness (m)	Field Observations: Column Section	Soil / Rock Classifn.	Colour	Description
27.46						
26.85	0.61	0.61		SC / GC	Yellowish brown	Dense, fine o coarse sansd and gravel with approx. 15% plasic fines.
23.46	4.00	3.39		SC / GC	Reddish brown	Medium to extremely dense, fine to coarse sand and gravel with approx. 20% plastic fines.
18.46	9.00	5.00		SC	- do -	Medium dense, fine to coarse sand with approx. 20% plastic fines.
17.86	9.60	0.86		SC / GC	- do -	Medium dense, fine to coarse sand with approx. 15% plastic fines
13.27	14.19	4.59		SM	Yellowish brown	Completely decomposed rock in the form of dense to extremely dense silty sand mixed with partially decomposed mica and highly weathered friable rock fragments.
						Bore hole terminated at 14.19m below the existing ground level on highly weathered bed rock

Standard Penetration Test

Depth (m)	(N)
1.00	>50 / 25 cm
2.00	18
3.00	15
4.00	10
5.00	09
6.00	11
7.00	08
8.00	12
9.00	13
10.00	18
11.00	15
12.00	18
13.00	19
14.00	>50 / 5cm

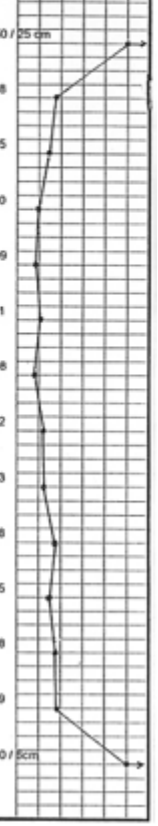


Figure A.2 (1) Result of Boring

GEOLOGICAL RECORD OF BORING

Project	:	Technopark project, Diyagama	Date of Drilling:	16 - 17/03/2002	
Client	:	KRI, Tokyo	Angle from the vertical:	0	
Bore Hole Number	:	BH 02	Depth of Hole (m):	13.06	
Ground Elevation	:	24.95m MSL	Depth to the ground water level:	11.05	m below the ex. gr. level
Dia. of the hole (mm)	:	100	Logged By:	BSY	

Elevation (m)	Depth (m)	Thickness (m)	Field Observations: Column Section	Soil / Rock Classifn.	Colour	Description
24.95						
24.32	0.63	0.63		SC / GC	Yellowish brown	Medium dense, fine to coarse sand and gravels.
22.06	2.89	2.26		SC / GC	Reddish brown	Medium dense densefine to coarse sand and gravel with approx. 20% plastic fines.
20.95	4.00	1.11		CL	Yellowish brown	Stiff, moderately plastic clay mixed with sand and gravels.
18.95	6.00	2.00		SC / GC	Reddish brown	Loose / medium dense, sandy silt / silty fine to coarse sand with approx. 20% plastic fines.
17.95	7.00	1.00		CL / ML	Dark reddish brown	Stiff, slightly plstic clay mixed with considerable ammount of partially decomposed mica and sand.
16.99	7.96	0.96		SM	Reddish brown	Dense, fine to coarse sand with silt and partially decomposed mica.
12.95	12.00	4.04		SM	Yellowish brown	Highly decomposed rock in the form of extremely dense, fine to coarse sand with considerable amount of partially decomposed mica and sand.
11.89	13.06	1.06		ML	Reddish brown	Completely decomposed rock in the form of stiff, slightly plastic clayey silt .
						Bore hole terminated at 13.06m below the existing ground level on highly weathered bed rock

Standard Penetration Test

Depth (m)	(N)
1.00	18
2.00	15
3.00	12
4.00	08
5.00	10
6.00	13
7.00	20
8.00	31
9.00	30
10.00	>50 / 28cm
11.00	>50 / 19cm
12.00	11
13.00	>50 / 4cm

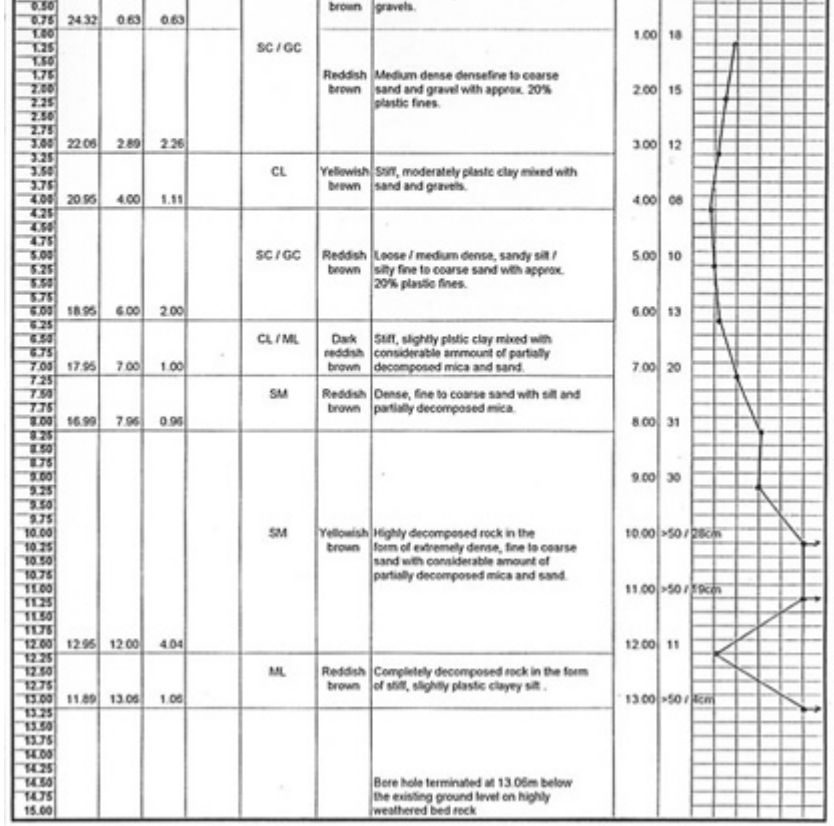


Figure A.2 (2) Result of Boring

GEOLOGICAL RECORD OF BORING

Project :	Technopark project, Diyagama	Date of Drilling:	17 - 18/03/2002
Client :	KRI, Tokyo	Angle from the vertical:	0
Bore Hole Number :	BH 03	Depth of Hole (m):	15.22
Ground Elevation :	12.72	Depth to the ground water level:	3.95 m below the ex. gr. level
Dia. of the hole (mm) :	100	Logged By:	BSY

Elevation (m)	Depth (m)	Thickness (m)	Column Section	Soil / Rock Classifn.	Colour	Description
12.72 (at 0.00)						
12.11	0.61	0.61		SC / GC	Brown	Medium dense, fine to coarse sand and gravel with approx. 20% plastic fines.
10.72	2.00	1.39		CL / SC	Reddish brown	Stiff / medium dense, slightly to moderately plastic, clay mixed with considerable amount of sand and gravel.
8.86	3.86	1.86		CL	Reddish brown	Medium stiff to stiff, moderately plasic clay mixed with sand and gravel.
4.72	8.00	4.14		CL / ML	Reddish brown / Whitish brown	Soft to medium stiff, slightly plastic clay mixed with silt and sand.
3.04	9.68	1.68		ML	Yellowish brown / Brown	Stiff, slightly plastic clayey silt mixed with small amount of partially decomposed mica.
1.72	11.00	1.32		ML / SM	Yellowish brown	Completely decomposed rock in the form of very stiff / dense, slightly plastic claye silt / silty fine sand mixed with small amount of mica.
0.72	12.00	1.00		SM	Whitish brown	Completely decomposed rock in the form of extremely dense, silty sand.
-0.28	13.00	1.00		ML / SM	Grayish brown	Completely decomposed rock in the form of very stiff / dense slightly plasic clayey silt / silty fine sand.
-2.50	15.22	2.22		ML	Dark gray	Highly decomposed rock in the form of hard slightly plastic clayey silt mixed with small amount of partially decomposed mica.
						Bore hole terminated at 13.06m below the existing ground level on highly weathered bed rock

Depth scale (m): 0.00, 0.25, 0.50, 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25, 2.50, 2.75, 3.00, 3.25, 3.50, 3.75, 4.00, 4.25, 4.50, 4.75, 5.00, 5.25, 5.50, 5.75, 6.00, 6.25, 6.50, 6.75, 7.00, 7.25, 7.50, 7.75, 8.00, 8.25, 8.50, 8.75, 9.00, 9.25, 9.50, 9.75, 10.00, 10.25, 10.50, 10.75, 11.00, 11.25, 11.50, 11.75, 12.00, 12.25, 12.50, 12.75, 13.00, 13.25, 13.50, 13.75, 14.00, 14.25, 14.50, 14.75, 15.00, 15.25, 15.50, 15.75

Standard Penetration Test

Depth (m)	(N)
1.00	10
2.00	11
3.00	05
4.00	06
5.00	07
6.00	05
7.00	04
8.00	09
9.00	13
10.00	35
11.00	>50 / 28cm
12.00	26
13.00	18
14.00	48
15.00	>50 / 15cm

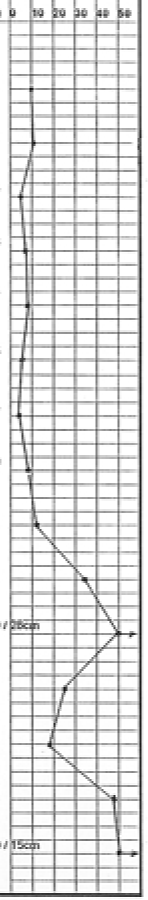


Figure A.2 (3) Result of Boring

BORE HOLE PUMP TEST RECORD

PROJEC : Technopark follow-up study by KRI
LOCATI : Diyagama
B H NO. : 03
DEPTH TO WATER TABLE (m) :
DEPTH OF SCREEN FROM 2.00 TO 14.50

DATE : 21.03.2002
FLOW RATE : 20.00 Lit / Min
DEPTH TO THE TIP 13.50 m

DATE	TIME Min	PERIOD ELAPSED Min	DRAWDOWN WRT RM m	ACTUAL DRAWDOWN m	ELEVATION OF WATER LEVEL m	REMARKS
21.03.2002	1330	0	3.50	0.00	9.52	
		1	3.89	0.39	9.13	
		2	4.28	0.78	8.74	
		3	4.72	1.22	8.3	
		4	5.14	1.64	7.88	
		5	7.63	4.13	5.39	
		6	8.49	4.99	4.53	
		7	9.16	5.66	3.86	
		8	9.83	6.33	3.19	
		9	10.37	6.87	2.65	
		10	10.83	7.33	2.19	
		15	13.03	9.53	-0.01	
	1346	16	13.50	10.00	-0.48	Water level has drawn down below the pump position. After the test the recovery test was commenced.

PLOT OF TIME VS DRAWDOWN

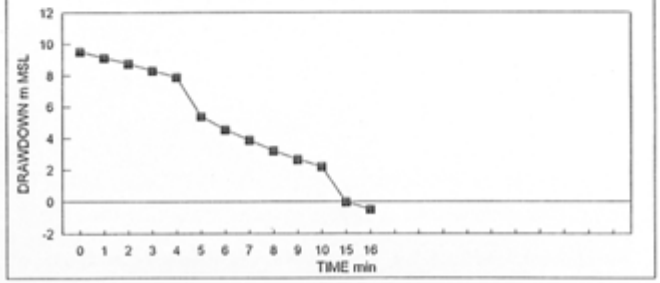


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Figure A.3 (1) Results of Pumping Test

BORE HOLE PUMP TEST RECORD

PROJEC : Technopark Follow-up study by KRI
LOCATI : Diyagama
B H NO. : 03
DEPTH TO WATER TABLE (m) :
DEPTH OF SCREEN FROM 2.00 TO 14.50

DATE : 21.03.2002
FLOW RATE : 10.00 Lit / Min
DEPTH TO THE TIP 13.50 m

DATE	TIME Min	PERIOD ELAPSED Min	DRAWDOWN WRT RM m	ACTUAL DRAWDOWN m	ELEVATION OF WATER LEVEL m	REMARKS
21.03.2002	1450	0	4.62	0.00	8.4	
		1	5.42	0.80	7.6	
		2	6.22	1.60	6.8	
		3	6.75	2.13	6.27	
		4	7.35	2.73	5.67	
		5	7.95	3.33	5.07	
		6	8.35	3.73	4.67	
		7	9.09	4.47	3.93	
		8	9.49	4.87	3.53	
		9	9.95	5.33	3.07	
	1500	10	10.29	5.67	2.73	
	1515	15	12.89	8.27	0.13	
	1518	18	13.50	8.88	-0.48	Water level has drawn down below the pump position.

PLOT OF TIME VS DRAWDOWN

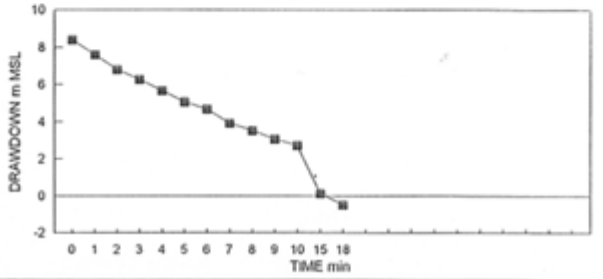

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Figure A.3 (2) Results of Pumping Test

BORE HOLE PUMP TEST RECORD

PROJEC : Technopark Follow-up Study by KRI
LOCATI : Diyagama
B H NO. : 03
DEPTH TO WATER TABLE (m) :
DEPTH OF SCREEN FROM 2.00 TO 14.50

DATE : 21.03.2002
FLOW RATE : 5.00 Lit / Min
DEPTH TO THE TIP 13.50 m

DATE	TIME Min	PERIOD ELAPSED Min	DRAWDOWN WRT RM m	ACTUAL DRAWDOWN m	ELEVATION OF WATER LEVEL m	REMARKS
21.03.2002	1610	0	4.01	0.00	9.01	
		1	4.34	0.33	8.68	
		2	4.61	0.60	8.41	
		3	4.88	0.87	8.14	
		4	5.14	1.13	7.88	
		5	5.54	1.53	7.48	
		6	5.68	1.67	7.34	
		7	5.88	1.87	7.14	
		8	6.14	2.13	6.88	
		9	6.27	2.26	6.75	
	1620	10	6.40	2.39	6.62	
		15	7.21	3.20	5.81	
		20	7.81	3.80	5.21	
		25	8.34	4.33	4.68	
		30	8.88	4.87	4.14	
		35	9.21	5.20	3.81	
	1700	40	9.54	5.53	3.48	
		45	9.88	5.87	3.14	
		50	10.08	6.07	2.94	
		55	10.28	6.27	2.74	
		60	10.48	6.47	2.54	
		65	10.51	6.50	2.51	
		70	10.51	6.50	2.51	
	1740	75	10.51	6.50	2.51	Water level has come to a constant stable position.

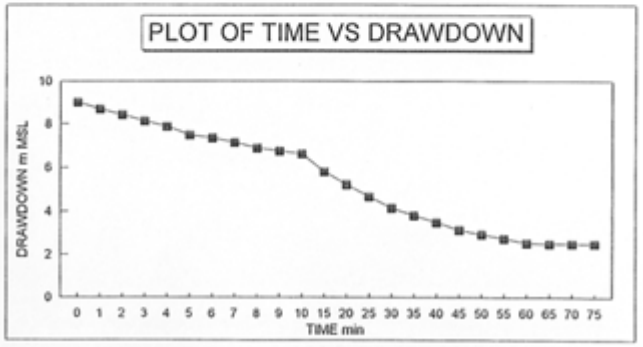

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Figure A.3 (3) Results of Pumping Test

BORE HOLE RECOVERY TEST (AFTER PUMPING OUT) RECORRD

PROJEC : Technopark Follow-up Study by KRI
LOCATI : Diyagama
B H NO. : 03
DEPTH TO WATER TABLE (m) :
DEPTH OF SCREEN FROM 2.00 TO 14.50

DATE : 21.03.2002
FLOW RATE : - Lit / Min
DEPTH TO THE TIP - m

DATE	TIME Min	PERIOD ELAPSED Min	WATER LEVEL WRT RM m	ACTUAL WATER LEVEL m	ELEVATION OF WATER LEVEL m	REMARKS
21.03.2002	1346	0	13.50	13.20	-0.48	
		1	12.76	12.46	0.26	
		2	12.23	11.93	0.79	
		3	11.83	11.53	1.19	
		4	11.50	11.20	1.52	
		5	11.23	10.93	1.79	
		6	11.03	10.73	1.99	
		7	10.83	10.53	2.19	
		8	10.57	10.27	2.45	
		9	10.37	10.07	2.65	
	1356	10	10.17	9.87	2.85	
		15	9.29	8.99	3.73	
		20	8.63	8.33	4.39	
		25	7.97	7.67	5.05	
	1416	30	7.37	7.07	5.65	
		35	6.97	6.67	6.05	
		40	6.53	6.23	6.49	
		45	6.09	5.79	6.93	
		50	5.83	5.33	7.39	
		55	5.17	4.87	7.85	
		60	4.83	4.53	8.19	
		61	4.62	4.32	8.40	
		62	4.62	4.32	8.40	
		63	4.62	4.32	8.40	Water leve has come to a constant stable position.
		64	4.62	4.32	8.40	

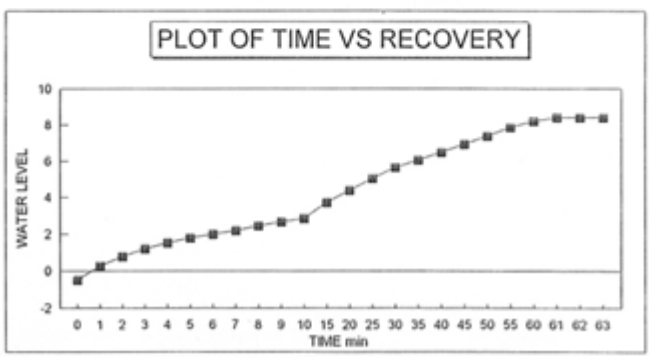

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Figure A.3 (4) Results of Pumping Test