ITEM FOR FINANCE COMMITTEE

CAPITAL WORKS RESERVE FUND
HEAD 710 - COMPUTERISATION
Leisure and Cultural Services Department
New Subhead "Replacement of library automation system"

> Members are invited to approve a new commitment of $196,467,000 for replacing the library automation system for the Hong Kong Public Libraries.

PROBLEM

The existing library automation system (LAS) of the Hong Kong Public Libraries (HKPL) is approaching the end of its life cycle. A number of key components of the system have become obsolete and have constrained the HKPL's ability in coping with the anticipated growth of annual lending and renewal transaction volume. Failure to replace the system in a timely manner would jeopardise the efficiency of the public library services.

PROPOSAL

2.   The Director of Leisure and Cultural Services, with the support of the Secretary for Home Affairs (SHA) and the Government Chief Information Officer, proposes to create a new commitment of $196,467,000 to replace the existing LAS with a new library system and to launch a pilot run on a Radio Frequency Identification (RFID) sub-system.

/**JUSTIFICATION** .....

JUSTIFICATION

Need to Replace the Existing LAS

3.	In late 2005, the Leisure and Cultural Services Department (LCSD) commissioned an external consultant to carry out a feasibility study (FS) to assess the need for replacing the existing LAS. The opportunity was also taken to explore the feasibility of adding a RFID sub-system to LAS.

4.	The results of the FS confirmed the need to replace the existing LAS with a new system since the former is no longer capable of meeting future demands. The FS also recommended that, in line with the worldwide trend of self-service and use of RFID technology in libraries, a pilot run on the use of RFID should be carried out in parallel for HKPL with a view to providing a more user-friendly environment for self-service in public libraries in the long run.

5.	Currently, HKPL is facing the following imminent critical system problems and limitations of the existing LAS –

(a)	since a number of system components have reached the end of their serviceable life, it is not feasible to introduce any enhancement in its capacity and functions to cope with new demand from the public such as more flexible searching of library catalogues;

(b)	the core library application development has been ceased as the system vendor has chosen to shift their resources to another new platform of library solutions. Even though LCSD has continuously reviewed and upgraded the capacity of LAS in order to meet its business growth, the obsolescent technology has hindered further upgrade of LAS, both in terms of capacity and library functions; and

(c)	it is forecast that by 2010, the annual circulation transaction volume of HKPL will reach 78 million, representing an increase of about 30% when compared with the present level. If the system is not replaced in a timely manner, the efficiency of the public library services would be seriously affected.

Proposed LAS Replacement

6.	Based on the FS report, the new LAS is proposed to be a commercial off-the-shelf (COTS) library package that is based on open standards and best practices of the information technology (IT) and library industries. The COTS will be customised to include functions to meet HKPL's specific needs, such as compilation of accounting and management reports.

7.   Apart from the existing core library functions, the new LAS will include the following new and customer-oriented functions which are not available in the existing LAS –

(a) **Virtual reference services sub-system**

With a knowledge base of reference questions and answers, the proposed system will allow library staff to handle online enquiries more effectively and efficiently and in turn provide high quality digital reference services.

(b) **Electronic resources management sub-system**

The proposed system will allow libraries to manage subscription and access to online information services so that electronic resources, such as e-books, online databases and e-journals, can be provided to library users more effectively and seamlessly.

(c) **Online reservation sub-system**

The proposed system will allow library users to enjoy the convenience of online booking for the use of Internet workstations in the public libraries.

(d) **Provision of electronic service**

This includes e-Payments that will allow users to enjoy the convenience of settling payments through electronic means such as Octopus and credit cards.

(e) **Customer relationship management capability**

The proposed system will allow library management to identify service gaps (for example, adjusting the procurement policy of new library materials to accommodate changing reading habits of the patrons) for further enhancement so as to ensure customer satisfaction.

(f) **Management information sub-system**

The proposed system will allow library management to capture essential statistics on library service usage rates which will facilitate more effective managerial decision.

8.   In addition, we expect that the new LAS will provide the necessary platform for collaboration with local academic libraries, public libraries in the Pearl River Delta Region and libraries overseas.

Anticipated Benefits of the New LAS

9.   With the new LAS in place, we expect that it will bring about the following benefits through the new customer-focused features for the provision of public library services in Hong Kong –

    (a)   **Enhanced customer services**

        The new LAS will improve customer services through reducing the time required for selection, acquisition and processing of new library materials. In addition, the new LAS will provide statistical information on library service usage rates. This will enable HKPL to provide more customer-focused services by speeding up the decision making process in addressing customer needs and preferences. Moreover, the new LAS will allow easy integration with up-to-date IT technologies to provide more flexible e-service options such as different e-payment methods for settling library fines and charges by Octopus and credit cards.

    (b)   **Enriched online catalogues**

        The new LAS will provide more user-friendly, comprehensive and content-rich online catalogues, together with a robust searching function, that will enable users to conduct more effective searches of library collections and information resources in support of their lifelong learning activities.

    (c)   **Enhanced reference services**

        With the virtual reference services sub-system, the new LAS will enable the public to obtain information more easily from the reference librarian via web forms, e-mails or instant messaging. The service will be further enhanced by the enriched knowledge base of the new system.

    (d)   **Savings in manpower**

        In order to alleviate manpower for the manual handling of requests for reservation of computer workstations, the new LAS will provide online reservation service for the use of library workstations.

RFID Library Applications

10.   Presently, library items of HKPL are attached with paper bar-code labels which enable the identification of the items by bar-code readers.   The information thus read would facilitate processing by LAS for cataloguing and circulation services.   However, this bar-code system has limitation for further enhancement of the library automation services such as self check-in and check-out and in locating the library materials.

11.   The deployment of RFID system, which replaces the paper bar-code labels with RFID tags, is an evolving innovative concept in the present day library service management.   With the progressive advancement in RFID technology, RFID library applications have been gradually deployed in many metropolitan libraries worldwide such as Singapore National Library, Seattle Public Library and given rise to a breakthrough in the use of a self-service model for library services.

12.   Currently, there are still some technical limitations with the RFID technology, for example, lack of open standards for RFID technology for the library industry, and the cost of RFID solutions, as in the price of electronic tags and equipment, is relatively high.   However, we expect affordable RFID solutions for the libraries will be available in the market in the foreseeable future.   Besides, RFID will be a very cost-effective tool in coping with library growth without significant increase in manpower resources.   We consider that it is the right time to assess the new technology, and therefore propose to introduce an add-on RFID sub-system, to be integrated with the new LAS, on a pilot basis.

13.   We will select six libraries including two major libraries, two district libraries and two small libraries for the pilot run.   Major library operations such as self-service environment for lending and returning of library materials, sorting, shelving and inventory management of library items and many other library workflows and processes will be tested out with RFID technology.   We will closely monitor the public feedback and acceptance of the new system.   Based on the experience gained, we will draw up plans for the full implementation of RFID in HKPL, if the pilot run proves that RFID technology is successful and cost effective.   A brief on RFID technology, its application and benefits to the library industry is at Encl. 1   Enclosure 1.

Anticipated Benefits of the Proposed RFID Pilot Run

14.   We expect that the RFID system, though implementing on a pilot basis first, will bring about the following benefits –

/(a) .....

(a)   **Enhanced check-in and check-out of library items**

The RFID system will enable simultaneous check-in or check-out of multiple library items regardless of the orientation or alignment of the items. LCSD plans to promote self-help service by setting up more user-friendly kiosks so that patrons can check in and check out the items by themselves. Moreover, it will help reduce patrons' queuing time through faster check-in and check-out processes.

(b)   **Savings in manpower**

RFID sorters will minimise manual efforts in the sorting of library materials and speed up the return of books to the shelves. The RFID system will also enable efficient reading/checking of books on the shelves. This will assist library staff in stock-taking and locating specific items more efficiently with a view to providing better service to the public.

Cost Savings/Avoidance

15.   We anticipate that the proposed system, i.e. the new LAS together with the pilot run on RFID, will bring about annual savings of $14,208,000 as from 2012-13 onwards, comprising –

(a)   **Realisable savings of $8,839,000 per annum**

This represents the running costs of the existing LAS to be decommissioned, which includes the hardware and software maintenance cost, disaster recovery subscription fee, rental of data lines and training, etc. The savings will be ploughed back to cover part of the recurrent costs of the proposed replacement system.

(b)   **Notional savings of $5,013,000 per annum**

After the implementation of the proposed system, notional savings in staff cost of LCSD will be achieved through deployment of fewer staff for acquisition processing, compilation of reports and statistics, circulation of library materials (as a result of adopting RFID) and public requests on reservation of library workstations.

(c)   **Cost avoidance of $356,000 per annum**

This represents the avoidance of additional staff efforts which would otherwise be required to provide the new services such as receiving patrons' reference enquiries and conducting surveys via web forms as a result of using the new system to streamline existing workflows in reference service and management of electronic resources.

/Cost .....

Cost and Benefit Analysis

Encls. 2 - 4   16.   A cost and benefit analysis of the proposed LAS replacement with the add-on RFID sub-system in six pilot libraries is at Enclosure 2, with separate analysis on the LAS replacement and the RFID pilot run at Enclosure 3 and Enclosure 4 respectively.

FINANCIAL IMPLICATIONS

Non-recurrent Expenditure

17.   We estimate that the implementation of the proposed replacement project will require a total non-recurrent expenditure of $196,467,000 over a period of six years from 2007-08 to 2012-13, broken down as follows –

	2007-08 $ '000	2008-09 $ '000	2009-10 $ '000	2010-11 $ '000	2011-12 $ '000	2012-13 $ '000	Total $ '000
(a) Hardware	-	2,320	47,976	29,065	4,160	2,600	86,121
(b) Software	-	13,590	4,241	6,640	88	-	24,559
(c) Implementation services	-	5,996	11,865	18,272	4,005	5,633	45,771
(d) Contract staff services	1,233	3,564	5,138	4,338	665	-	14,938
(e) Miscellaneous (site preparation, data lines installation, training, consumables, etc.)	-	-	4,135	1,820	256	255	6,466
(f) Contingency	123	2,784	7,660	6,245	951	849	18,612
Total	**1,356**	**28,254**	**81,015**	**66,380**	**10,125**	**9,337**	**196,467**

/18. .....

18. On paragraph 17(a), the expenditure of $86,121,000 is for the acquisition of hardware for the new LAS and the RFID pilot run. The hardware includes database servers, application servers, web servers, other functional servers, network equipment, self-service kiosks, workstations, printers, RFID tags and RFID equipment.

19. On paragraph 17(b), the expenditure of $24,559,000 is for the acquisition of system software for the servers, client software, the library software package and add-on software for new library functions.

20. On paragraph 17(c), the expenditure of $45,771,000 is for the acquisition of implementation services of the new LAS and the RFID pilot run from external service providers. Main implementation activities include system study and customisation, system installation and configuration, system integration and testing, data migration, production rollout, nursing and FS for a full implementation of RFID.

21. On paragraph 17(d), the expenditure of $14,938,000 is for hiring of contract library and IT professional staff services to supplement the in-house project management teams.

22. On paragraph 17(e), the expenditure of $6,466,000 is for the site preparation including trunking and cabling for additional data ports, installation of data lines, training for in-house library and IT professional staff and consumables such as backup tapes etc.

23. On paragraph 17(f), the estimate of $18,612,000 represents an approximately 10% contingency on the cost items set out in paragraphs 17(a) to (e) above.

Other Non-recurrent Cost

24. The implementation of the proposed project will also entail an additional non-recurrent staff cost of $17,645,000, with breakdown as follows –

/Staff .....

	2007-08 $ '000	2008-09 $ '000	2009-10 $ '000	2010-11 $ '000	2011-12 $ '000	Total $ '000
Staff cost	3,110	3,873	6,765	3,315	582	17,645
Total	**3,110**	**3,873**	**6,765**	**3,315**	**582**	**17,645**

25.   The staff cost estimated above represents a total of 330 man-months of Librarian and IT professional grades staff for tendering, managing the project, quality control and conducting acceptance tests. LCSD will absorb the requirement within its existing resources.

Recurrent Expenditure

26.   Based on the results of the FS, the estimated recurrent expenditure is $19,502,000 per annum as from 2013-14, with breakdown as follows –

	2009-10 $ '000	2010-11 $ '000	2011-12 $ '000	2012-13 $ '000	2013-14 and onwards $ '000
(a) Hardware and software maintenance	350	6,577	10,131	10,561	10,821
(b) Communication network	-	1,980	1,980	1,980	1,980
(c) System maintenance	-	-	-	-	4,403
(d) Contract staff services	-	-	816	816	816
(e) Miscellaneous (disaster recovery service, training, etc.)	-	1,179	1,482	1,482	1,482
Total	**350**	**9,736**	**14,409**	**14,839**	**19,502**

27.   On paragraph 26(a), the annual expenditure of $10,821,000 is for hardware and software maintenance of the new LAS and the RFID pilot run.

28.   On paragraph 26(b), the annual expenditure of $1,980,000 is for rental of all kinds of data lines and Internet connection.

29.   On paragraph 26(c), the annual expenditure of $4,403,000 is for procuring services provided by external service providers for ongoing application and technical support.

30.   On paragraph 26(d), the annual expenditure of $816,000 is for hiring of contract IT professional staff services to supplement the in-house support teams.

31.   On paragraph 26(e), the annual expenditure of $1,482,000 is for the subscription of disaster recovery service and ongoing training.

32.   Since there will be an annual realisable saving of $8,839,000 as a result of decommissioning the existing LAS, the additional recurrent cost is $10,663,000 per annum and will be absorbed from within LCSD's existing resources. Furthermore, the existing pool of support resources including both the Librarian and IT professional grades staff will continue to serve as the in-house support teams for providing daily support to the new LAS and the RFID sub-system. There will be no additional recurrent staffing requirement for the proposed project.

IMPLEMENTATION PLAN

33.   The new LAS will be implemented in two phases. The first phase will mainly consist of the core library functions with the aim to minimise the impact of the system migration on public services. The second phase will consist of the new or enhanced functions. RFID will be implemented in parallel and launched shortly after the first phase of the new LAS has been put in place. The proposed implementation plan is as follows –

Activity	**Target Completion Date**
(a) Tender preparation and invitation	June 2007
(b) Tender evaluation, negotiation and award of contract	May 2008
(c) Customisation of the new LAS – Phase 1	April 2009
(d) System acceptance test of the new LAS – Phase 1	September 2009
(e) Launch of the new LAS - Phase 1	December 2009
(f) Launch of Pilot RFID study	June 2010
(g) Review of Pilot RFID study	January 2011
(h) Customisation of the new LAS – Phase 2	March 2011
(i) System acceptance test of the new LAS – Phase 2	May 2011
(j) Launch of new LAS - Phase 2	July 2011

34.   In carrying out the migration plan, LCSD will ensure that all data stored in existing computer systems will be removed by means of de-magnetisation and the hard disks physically destroyed before they are disposed of. We will ensure that these physically destroyed hard disks and other unserviceable microcomputers and accessories like printers, monitors, routers and modems will be disposed of in accordance with the relevant government procedures.

PUBLIC CONSULTATION

35.   The proposed project was supported by the Committee on Libraries whose terms of reference are to advise SHA on the formulation of strategies and plans for the development of HKPL's library facilities and services. In addition, HKPL has obtained library users' views through the regular Customer Liaison Group meetings. In general, users welcomed the enhancement of LAS which will provide better and more effective library services.

36.   We consulted the Legislative Council Panel on Home Affairs on the proposal on 12 January 2007. Members were generally supportive of the proposal and raised no objection to submission of the proposal to the Finance Committee (FC) for funding approval.

BACKGROUND

37.   LAS was first launched for libraries under the ex-Regional Council in 1993. Two years later, the same library system was separately commissioned for libraries under the ex-Urban Council. In late 1999, FC approved, inter alia, a non-recurrent commitment of $122,750,000 for the upgrade of LAS of the two former Provisional Municipal Councils. The two library systems were then merged by phases starting from late 1999 till early 2001 to serve the libraries under the new LCSD.

38.   LAS is an integral part of the daily operation of HKPL. Presently, it is serving 66 static libraries and ten mobile libraries with a registered patron population of over three million, a library stock of over ten million and an annual lending and renewal transaction volume of over 61 million. In addition to provision of core library functions, such as patron registration, library material acquisition, cataloguing and circulation, inter-library loan and the return of borrowed items to

any library in the system, the system also makes 24-hour library services on the Internet possible. Commensurate with the increasing demand and expectations from the public in recent years, LAS has enabled efficient lending services by providing online searching of library catalogues, reservation of books, renewal of library materials borrowed as well as telephone renewal services for borrowed library items.

Home Affairs Bureau
February 2007

RFID technology, its application in library industry and benefits

RFID technology

Radio frequency identification, or RFID, is a generic term for technologies that use radio waves to automatically identify objects. The most common way of identifying an object using RFID is to store a unique number and perhaps other information relating to the object, on a RFID electronic tag.

2. Related RFID equipment includes RFID reader, RFID sorter, RFID drop-in box, RFID tagging workstation, etc.

RFID application in library industry and its benefits

3. In a RFID solution for libraries, a RFID tag which stores bibliographic information unique to each library item, will be physically attached on the library item. Unlike the existing bar-code technology that requires line-of-sight precision reading and on item basis, RFID offers reading of multiple library items with RFID tags in one-go and hence improves overall performance for both check-in and check-out of library materials. Without the need of line-of-sight reading and proper alignment of library items for check-in/check-out, patrons will experience more user-friendly self-help services offered by the self-service kiosks.

4. Apart from enhancing the self-help services, a library can also introduce novel services such as round-the-clock return service using drop-in box so that patrons can return library items at anytime even after the library is closed.

5. RFID sorters can be installed alone or together with the drop-in box in different libraries for sorting returned items from patrons which not only save staff effort in sorting, but will speed up the return of library materials to the shelves.

6. With the use of RFID to support library operations, efficiency of staff operations on check-in and check-out of library items are anticipated to be further improved. Furthermore, labour intensive processes such as inventory management and stock development will be assisted with portable RFID readers.

7. Savings in staff effort after applying RFID can be re-deployed to provide value-added services which require library expertise.

Cost and Benefit Analysis for the LAS Replacement and RFID Pilot Run

	Cash flow ($'000)											
	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Cost												
Non-Recurrent												
- Expenditure	1,356	28,254	81,015	66,380	10,125	9,337	-	-	-	-	-	196,467
- Staff Cost	3,110	3,873	6,765	3,315	582	-	-	-	-	-	-	17,645
Sub-total	4,466	32,127	87,780	69,695	10,707	9,337						214,112
Recurrent												
-Expenditure	-	-	350	9,736	14,409	14,839	19,502	19,502	19,502	19,502	19,502	136,844
Sub-total	-	-	350	9,736	14,409	14,839	19,502	19,502	19,502	19,502	19,502	136,844
Total cost	**4,466**	**32,127**	**88,130**	**79,431**	**25,116**	**24,176**	**19,502**	**19,502**	**19,502**	**19,502**	**19,502**	**350,956**
Savings												
Realisable savings	-	-	-	8,839	8,839	8,839	8,839	8,839	8,839	8,839	8,839	70,712
Notional savings	-	-	1,669	3,904	4,710	5,013	5,013	5,013	5,013	5,013	5,013	40,361
Staff cost avoidance	-	-	-	-	238	356	356	356	356	356	356	2,374
Total savings	-	-	**1,669**	**12,743**	**13,787**	**14,208**	**14,208**	**14,208**	**14,208**	**14,208**	**14,208**	**113,447**
Net Shortfall	**4,466**	**32,127**	**86,461**	**66,688**	**11,329**	**9,968**	**5,294**	**5,294**	**5,294**	**5,294**	**5,294**	**237,509**
Net Cumulative Shortfall[Note]	**4,466**	**36,593**	**123,054**	**189,742**	**201,071**	**211,039**	**216,333**	**221,627**	**226,921**	**232,215**	**237,509**	

Note   The project is recommended despite the net cumulative shortfall for the following reasons –

(a)   the existing system will not be able to handle the workload of HKPL by 2010 and cannot be enhanced to meet user demands having regard to its obsolete system components. The consequence will be disastrous if a new system is not in place in time since the current system has a registered user base of over three million; and

(b)   the proposed replacement system will have a number of benefits/improvements as stated in paragraphs 9 and 14 of the main paper. The proposed system will provide better customer services to the public and streamline the internal operation of HKPL.

Cost and Benefit Analysis for the LAS Replacement only

	Cash flow ($'000)											
	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Cost												
Non-Recurrent												
- Expenditure	1,356	28,254	76,342	38,691	10,125	9,337	-	-	-	-	-	164,105
- Staff Cost	3,110	3,873	3,716	2,328	582	-	-	-	-	-	-	13,609
Sub-total	4,466	32,127	80,058	41,019	10,707	9,337	-	-	-	-	-	177,714
Recurrent												
-Expenditure	-	-	350	9,736	12,245	12,675	17,338	17,338	17,338	17,338	17,338	121,696
Sub-total	-	-	350	9,736	12,245	12,675	17,338	17,338	17,338	17,338	17,338	121,696
Total cost	**4,466**	**32,127**	**80,408**	**50,755**	**22,952**	**22,012**	**17,338**	**17,338**	**17,338**	**17,338**	**17,338**	**299,410**
Savings												
Realisable savings	-	-	-	8,839	8,839	8,839	8,839	8,839	8,839	8,839	8,839	70,712
Notional savings	-	-	1,669	2,225	2,832	3,135	3,135	3,135	3,135	3,135	3,135	25,536
Staff cost avoidance	-	-	-	-	238	356	356	356	356	356	356	2,374
Total savings	**-**	**-**	**1,669**	**11,064**	**11,909**	**12,330**	**12,330**	**12,330**	**12,330**	**12,330**	**12,330**	**98,622**
Net Shortfall	**4,466**	**32,127**	**78,739**	**39,691**	**11,043**	**9,682**	**5,008**	**5,008**	**5,008**	**5,008**	**5,008**	**200,788**
Net Cumulative Shortfall	**4,466**	**36,593**	**115,332**	**155,023**	**166,066**	**175,748**	**180,756**	**185,764**	**190,772**	**195,780**	**200,788**	

Cost and Benefit Analysis for the RFID Pilot Run only

	Cash flow ($'000)											
	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Cost												
Non-Recurrent												
- Expenditure	-	-	4,673	27,689	-	-	-	-	-	-	-	32,362
- Staff Cost	-	-	3,049	987	-	-	-	-	-	-	-	4,036
Sub-total	-	-	7,722	28,676	-	-	-	-	-	-	-	36,398
Recurrent												
-Expenditure	-	-	-	-	2,164	2,164	2,164	2,164	2,164	2,164	2,164	15,148
Sub-total	-	-	-	-	2,164	2,164	2,164	2,164	2,164	2,164	2,164	15,148
Total cost	**-**	**-**	**7,722**	**28,676**	**2,164**	**2,164**	**2,164**	**2,164**	**2,164**	**2,164**	**2,164**	**51,546**
Savings												
Notional savings	-	-	-	1,679	1,878	1,878	1,878	1,878	1,878	1,878	1,878	14,825
Total savings	**-**	**-**	**-**	**1,679**	**1,878**	**1,878**	**1,878**	**1,878**	**1,878**	**1,878**	**1,878**	**14,825**
Net Shortfall	**-**	**-**	**7,722**	**26,997**	**286**	**286**	**286**	**286**	**286**	**286**	**286**	**36,721**
Net Cumulative Shortfall	**-**	**-**	**7,722**	**34,719**	**35,005**	**35,291**	**35,577**	**35,863**	**36,149**	**36,435**	**36,721**	