

## **ITEM FOR FINANCE COMMITTEE**

### **CAPITAL WORKS RESERVE FUND**

### **HEAD 710 - COMPUTERISATION**

### **Leisure and Cultural Services Department**

### **New Subhead “Major upgrade of Multimedia Information System for the Hong Kong Public Libraries”**

Members are invited to approve a new commitment of \$93,119,000 for a major upgrade of the Multimedia Information System for the Hong Kong Public Libraries.

### **PROBLEM**

The existing hardware and software of the Multimedia Information System (MMIS) of the Hong Kong Public Libraries (HKPL) are approaching the end of their serviceable life. The MMIS will become inoperable in time as both system support and hardware spare parts are becoming increasingly unavailable. This will impede the HKPL's ability to deliver the fast growing multimedia contents and digital library services to members of the public.

### **PROPOSAL**

2. The Director of Leisure and Cultural Services, with the support of the Secretary for Home Affairs and the Government Chief Information Officer, proposes to create a new commitment of \$93,119,000 to replace the obsolete hardware and software, upgrade the digital library system, extend the scope of service, improve the workflow and enhance the functions of the MMIS.

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## JUSTIFICATION

### Need to Upgrade the MMIS

3. In early 2008, the Leisure and Cultural Services Department (LCSD) commissioned an external consultant to carry out a feasibility study to review the service and operation of the existing MMIS, and examine the feasibility of upgrading or replacing the system to meet anticipated needs.

4. The results of the feasibility study indicate the need for a major upgrade of the existing MMIS since it is incapable of meeting future demands. Upgrade of the existing system is a very complex process which will take about four years to complete. In addition, as we anticipate that the existing MMIS can only cope with the data growth up to mid-2011 and the maintenance support by the existing contractor will cease by that time, it is necessary to start the work now.

### Constraints of the Existing MMIS

5. The existing MMIS encounters the following obsolescence and system limitation problems –

- (a) a number of system components<sup>1</sup> have reached the end of their life cycle. It is not feasible to further enhance them to meet new requirements;
- (b) the official maintenance support from the manufacturer for a number of system components<sup>2</sup> has ended. At present, the contractor concerned tries its best to provide maintenance support. Because of this, it is inevitable that the reliability of the system will deteriorate over time. If the system is not upgraded in a timely manner, the efficiency of our public library service will be seriously affected; and

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<sup>1</sup> Such system components include Video Charger version 2, system software for audio/video streaming; Content Manager version 6.1.3, system software for Content Management System; Tivoli Storage Manager version 4.1.2.3, data backup and recovery software.

<sup>2</sup> Such system components include Advanced Interactive eXecutive version 4.3.3, an operating system for web and database servers; Websphere version 3.0.2.4, a system software for web application; DB2 version 6.1, a database software.

- (c) the system application was custom-built with the use of the technologies almost a decade ago. It is extremely difficult and costly to apply new technologies<sup>3</sup> to the existing MMIS. It presents significant constraints to the existing MMIS in the provision of enhanced and new services to the public.

### **Proposed Upgrade of the MMIS**

6. The proposed upgrade will be a new digital library system integrating a content management sub-system, a multimedia streaming sub-system and various supporting sub-systems based on open standards and best practices of the information technology (IT) and library industries. Commercial off-the-shelf packages that can be customised to meet the HKPL's specific requirements will be considered. The network infrastructure of Hong Kong Central Library (HKCL) will be upgraded for providing more effective data communication service.

7. The existing system functions for the provision of different services to patrons will be examined and only those that support HKPL's missions and are highly welcomed by the public will be implemented in the proposed system.

8. The upgrade is proposed not only to address the problems mentioned in paragraph 5 above through replacing the obsolete system hardware and software, and developing a new application system based on the latest technology, but also to provide enhanced services to the public, improve the overall efficiency of the HKPL's internal operation and optimise the utilisation of its resources. Potential new or enhanced functions to be implemented in the upgraded system include –

#### **(a) Extending the MMIS services**

The MMIS services will be extended from the HKCL and 26 branch libraries to all 73 static libraries (including 66 existing and seven new static libraries under planning) as well as from the existing 16.5 hours per day to round-the-clock for the Internet. As mobile communications have become more and more popular, the MMIS services will be accessible via mobile devices such as mobile phones and personal digital assistants.

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<sup>3</sup> Such new technologies include provision of MMIS service using mobile devices; provision of audio/video streaming through the Internet; provision of round-the-clock access to the MMIS materials through the Internet.

**(b) Providing personalised services**

The upgraded MMIS will provide personalised services such as Really Simple Syndication (RSS) services (e.g. automatic online feeds of updated MMIS and e-reference information, etc.) to keep patrons abreast of the latest information.

**(c) Enhancing existing MMIS functions**

The existing functions will be enhanced to support video streaming over the Internet by adopting new digitised video formats and upgrading network infrastructure; provide different search functions with user-friendly features (e.g. including “keyword suggestion” to search for MMIS materials); allow electronic payment functions, such as Octopus, in addition to cash for the existing charged printing service; enable the public to reserve MMIS workstations and audio-visual (A/V) booths through the upgraded system etc.

**(d) Introducing new functions**

The new functions will include live broadcast of events held in the HKCL to branch libraries and over the Internet; integration of MMIS with other information archives and digital libraries of academic institutions by adopting Open Archive Initiative (OAI) standards to share digitised materials; and application of a digital rights management (DRM) system to prevent unauthorised access and copying of digital library materials.

**(e) Improving internal operation**

The upgraded MMIS will also facilitate internal operation of HKPL by automatically preparing content highlights with specific themes, special topics and new additions of library materials and collections, and deploying system management tools for conducting system support and upgrades.

**Anticipated Benefits of the Upgraded MMIS**

9. The upgraded system will bring about the following benefits –

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**(a) Readiness for future development**

The upgraded MMIS which will be built on new technologies and open standards will allow easy integration of different technologies and solutions<sup>4</sup>, resulting in a system that will better meet the changing demands of the public and IT development.

**(b) Improved system accessibility**

The general public, especially those without computers at home, can go to any of the static libraries to enjoy the MMIS services. By making the system accessible by personal mobile devices and extending the servicing hours for the Internet, the role of MMIS as a “Virtual Library” without walls will be strengthened. Moreover, patrons will find the upgraded system more accessible and easier to use with its enhanced content highlights and different search functions.

**(c) Enhanced customer services**

The upgraded MMIS will enhance the customer services such that patrons can personalise webpages to facilitate their access to the MMIS and make use of the RSS to obtain the latest library news of interest. They can make reservation on A/V booths in addition to MMIS workstations by themselves.

**(d) Enriched MMIS content**

The upgraded MMIS will be a gateway for accessing various types of electronic library information. The public will be able to access video programmes in addition to audio programmes and digitised documents over the Internet. It will also facilitate access to more digitised multimedia resources in other digital information archives and digital libraries of academic institutions adopting OAI standards.

**(e) Improved cost effectiveness of library events and programmes**

The upgraded MMIS will provide a high quality live broadcast of regular library events and programmes held at HKCL to other branch libraries and over the Internet. It will increase the number of customers per library event/programme and will thus improve the cost effectiveness in arranging them.

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<sup>4</sup> For example, the upgraded MMIS will be built on new technologies and open standards such as OAI, a standard for digital libraries; RSS, a standard format for delivering up-to-date information regularly; and Motion Picture Experts Group 4, a standard video format.

**(f) Improved library operation**

The DRM system will facilitate LCSD's procurement arrangement with content providers on copyright issues in future content acquisition process. Furthermore, an enhanced booking system can alleviate the manpower requirement for manual handling of reservation requests for MMIS workstations as well as A/V booths, and the system management tool can automatically perform some system supporting tasks that will otherwise require onsite work at HKCL and branch libraries.

**Cost Savings/Avoidance**

10. We anticipate that the proposed system will bring about an annual savings of \$14,418,000 as from 2013-14 onwards, comprising –

**(a) Realisable savings of \$12,652,000 per annum**

The running cost (including the hardware and software maintenance cost, rental of data lines etc.) of the existing MMIS will no longer be required upon its decommissioning. The savings will be ploughed back to cover most of the recurrent costs of the upgraded system.

**(b) Notional savings of \$1,069,000 per annum**

After the implementation of the proposed system, notional savings in staff cost of LCSD will be achieved as the upgraded system will automate some of the existing manual operation such as handling of patrons' requests in reserving MMIS workstations and A/V booths. As the savings are fragmented and form only a very small portion of the staff time of a number of posts of different grades, no specific post can be identified for deletion. The manpower saved will be used to strengthen the service support for library patrons and man new services.

**(c) Cost avoidance of \$697,000 per annum**

After the implementation of the proposed system, the deployment of additional staff for new services can be avoided as a result of the use of system management tools to streamline the existing workflows. Additional costs for data communication and disk storage for new services can also be avoided due to the use of the latest technologies in the upgraded system.

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**Cost and Benefit Analysis**

Encl. 11. A cost and benefit analysis of the proposed MMIS upgrade is at Enclosure.

**FINANCIAL IMPLICATIONS****Non-recurrent Expenditure**

12. Based on the results of the feasibility study, we estimate that the major upgrade of the MMIS will require a total non-recurrent expenditure of \$93,119,000 over four years from 2009-10 to 2012-13, with breakdown as follows –

	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>	<b>Total</b>
	<b>\$'000</b>	<b>\$'000</b>	<b>\$'000</b>	<b>\$'000</b>	<b>\$'000</b>
(a) Hardware	-	1,208	31,456	-	32,664
(b) Software	-	3,387	10,313	-	13,700
(c) Communication network	-	-	634	290	924
(d) Implementation services	-	6,105	10,464	4,361	20,930
(e) Contract staff	1,441	2,463	3,193	1,331	8,428
(f) Miscellaneous (site preparation, training, data conversion, consumables, etc.)	-	742	6,682	1,680	9,104
(g) Contingency	147	1,179	5,379	664	7,369
<b>Total</b>	<b>1,588</b>	<b>15,084</b>	<b>68,121</b>	<b>8,326</b>	<b>93,119</b>

13. On paragraph 12(a) above, the expenditure of \$32,664,000 is for the acquisition of hardware for the upgraded MMIS. The hardware includes database servers, application servers, web servers, other functional servers, network equipment, workstations, printers and A/V switches.

14. On paragraph 12(b) above, the expenditure of \$13,700,000 is for the acquisition of system software for the servers, client software, multimedia streaming software, library software packages and add-on software for new functions of the upgraded system.

15. On paragraph 12(c) above, the expenditure of \$924,000 is for the installation of data lines and Internet connection.

16. On paragraph 12(d) above, the expenditure of \$20,930,000 is for the acquisition of implementation services of the major upgrade of the MMIS from external service providers. Main implementation activities include system study, application development/customisation, system installation and configuration, system integration and testing, production roll-out and nursing of the system.

17. On paragraph 12(e) above, the expenditure of \$8,428,000 is for the engagement of services of contract librarians and IT professional staff to supplement the in-house project management teams.

18. On paragraph 12(f) above, the expenditure of \$9,104,000 is for the site preparation including trunking and cabling for additional data ports, data conversion and migration services for multimedia contents and application data, training of library staff and IT professional staff and start-up consumables such as backup tapes, etc.

19. On paragraph 12(g) above, the estimate of \$7,369,000 represents an approximately 9% contingency on the cost items set out in paragraphs 12(a) to (f) above.

**Non-recurrent Staff Cost**

20. The implementation of the proposed project will entail an additional non-recurrent staff cost of \$14,611,000 over four years from 2009-10 to 2012-13, with breakdown as follows –

	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>	<b>Total</b>
	<b>\$'000</b>	<b>\$'000</b>	<b>\$'000</b>	<b>\$'000</b>	<b>\$'000</b>
Staff cost	3,682	4,654	4,307	1,968	14,611
<b>Total</b>	<b>3,682</b>	<b>4,654</b>	<b>4,307</b>	<b>1,968</b>	<b>14,611</b>

The staff cost estimated above represents a total of about 260 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 from within its existing resources.

**/Recurrent .....**



**Recurrent Expenditure**

21. Based on the results of the feasibility study, the estimated annual recurrent expenditure of the upgraded MMIS is \$16,416,000 per annum as from 2013-14, with breakdown as follows –

	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14 and onwards</b>
	\$'000	\$'000	\$'000
(a) Hardware and software maintenance	43	7,720	9,789
(b) System maintenance	-	1,694	2,033
(c) Communication network	-	2,523	3,027
(d) Data digitisation	-	519	623
(e) Contract staff services	-	787	944
<b>Total</b>	<b>43</b>	<b>13,243</b>	<b>16,416</b>

22. On paragraph 21(a) above, the annual expenditure of \$9,789,000 is for the hardware and software maintenance (inclusive of existing hardware and software retained) of the upgraded MMIS.

23. On paragraph 21(b) above, the annual expenditure of \$2,033,000 is for the services provided by the external service providers for on-going application maintenance and technical support.

24. On paragraph 21(c) above, the annual expenditure of \$3,027,000 is for rental costs of all types of data lines and Internet connection.

25. On paragraph 21(d) above, the annual expenditure of \$623,000 is for data digitisation of multimedia contents.

26. On paragraph 21(e) above, the annual expenditure of \$944,000 is for the engagement of contract IT professional staff to supplement the in-house support teams.

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27. Since there will be an annual realisable saving of \$12,652,000 as a result of decommissioning of the existing MMIS, the additional recurrent cost is \$3,764,000 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 upgraded MMIS. There will be no additional recurrent staffing requirement for the proposed project.

## **IMPLEMENTATION PLAN**

28. When the required funding is approved, a tendering exercise will commence as soon as possible and a contract for project implementation will be awarded around the third quarter of 2010. The target is to have the upgraded system launched by mid-2012. The proposed implementation plan is as follows –

<b>Activity</b>	<b>Target completion date</b>
(a) Tender preparation and invitation	October 2009
(b) Tender evaluation, negotiation and award of contract	August 2010
(c) Implementation/Development of the upgraded MMIS	November 2011
(d) User acceptance test	February 2012
(e) System roll-out	June 2012

29. In implementing the project, LCSD will ensure that all data stored in existing computer systems are removed permanently by means of demagnetisation 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.

## **WAY FORWARD FOR THE MMIS**

### **Plan for Monitoring and Reviewing the MMIS after the Upgrade**

30. LCSD will continue to monitor the latest development of IT on the upgraded MMIS, and carry out necessary enhancements to ensure that the system will be kept up-to-date and provide quality library services to the community. The life cycle of the personal computers (PC) is, under normal circumstances, much shorter than that of the server systems. When new PC hardware and software are

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launched in the market, LCSD will evaluate the benefits and feasibility and if positive, the hardware and operating system of the MMIS workstations as well as the application system will be upgraded. Moreover, approaching the sixth year after launching the upgraded MMIS, we will consider upgrading the disk storage by expanding its capacity to store the digital contents for the subsequent five years. LCSD will also carry out system upgrades to cope with the ever-changing IT security requirements. It is anticipated that the serviceable lifespan of MMIS after the proposed upgrading is about ten years.

### **Content Development of the MMIS**

31. LCSD will endeavor to develop “library without walls” service. Through MMIS, various kinds of e-resources are provided for the public from all walks of life to facilitate self-learning, research and information search via Internet. In order to further enrich the digitised contents in the MMIS when the new system is launched in 2012, LCSD will speed up the digitisation process in the coming three years. To effectively utilise resources, like other metropolitan library systems worldwide, HKPL will focus on digitising information relating to local history and culture. In addition, HKPL will adjust its budget allocation for the procurement of more digitised A/V materials and e-books available in the market. It is anticipated that the annual growth of digitised collection of the new system will be 7%, which is in line with the policy of the overall library collection development. HKPL will continue to actively co-operate with other libraries in resources sharing, so as to expand the amount of digital library items available for patrons’ access through the upgraded MMIS.

### **Promotion Strategy to Publicise the Upgraded MMIS**

32. To further promote the usage of the upgraded MMIS, LCSD will fully utilise the existing publicity channels including the GovHK (the Government one-stop portal), newsletters, promotional leaflets, posters and brochures to widely publicise the system to libraries, schools, organisations and the general public. Regular user education sessions, school visits and out-reach programmes for organisations will also be conducted. LCSD has also planned to develop new and enhanced application technologies such as automated creation of content highlights and RSS in the upgraded MMIS. These new enhancements will not only serve as effective promotional tools to help publicise the upgraded MMIS and its content, but will also facilitate patrons in navigating the system more effectively.

/Usage .....

### Usage of the Upgraded MMIS

33. In 2007, about 1.5 million patrons used the system to get access to about 1.8 million items of library materials. These materials can be broadly classified as audio, video, compact disc read-only memory (CD-ROM) and digitised documents. The access time of individual items varies depending on their nature and format. For items such as video materials, it may be as long as over two hours. The usage of the MMIS items in libraries in 2007 is tabulated below –

Item	Number of items used	Estimated usage time (hour)
Audio	540 000	201 000
Video	270 000	190 000
CD-ROM	310 000	155 000
Digitised Documents <sup>5</sup>	680 000	27 000
<b>Total</b>	<b>1 800 000</b>	<b>573 000</b>

34. One of the main purposes of MMIS is to support the conservation of local history and culture. In terms of functionality, the system furnishes the general public with one-stop interactive multimedia service which allows efficient and extensive access to different types of information. It is anticipated that there will be an annual growth of 16% in the use of library materials through MMIS, taking into account the average growth rate in the past, until the launch of the upgraded system in 2012. By then, it is estimated that there will be 3.2 million patrons accessing about 3.8 million items from the upgraded MMIS. Upon completion of the major upgrade, the MMIS will facilitate a more extensive digitised content development to tie-in with the plan of overall library collection development. The upgraded MMIS will be widely publicised to appeal to the public at large. The provision of new and enhanced functions and the extension of the services to round-the-clock will allow a higher patronage of the upgraded MMIS and the annual growth in usage rate is expected to rise beyond the current rate of 16% after 2012.

### PUBLIC CONSULTATION

35. The initiative to upgrade the MMIS is supported by the Public Libraries Advisory Committee that advises the Government on the overall development strategy of the HKPL. Furthermore, views of library users on the proposed system upgrade were sought through a user survey conducted during the feasibility study. Users in general welcome the upgrade, which is expected to

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<sup>5</sup> Digitised documents refer to those valuable old Hong Kong newspapers, maps, manuscripts, photos, posters, etc., which are available for public use through the Internet.

enable them to enjoy better and more effective library services. Moreover, users' comments and suggestions on system features collected through regular channels such as Customer Liaison Groups meetings and readers' suggestion forms will be included in the specifications for the proposed system.

36. We consulted the Legislative Council Panel on Home Affairs (HA Panel) on the proposal on 12 December 2008. Members of HA Panel were generally supportive of the proposal for submission to the Finance Committee (FC) for funding approval. Some Members have asked us to provide supplementary information, such as further details of the proposed upgrade, measures to enhance and publicise the usage of the MMIS, the usage of the upgraded MMIS and the plan for monitoring and reviewing the MMIS after the proposed upgrade. We have incorporated the required information in this paper.

37. To enhance Legislative Council Members' understanding of the functions and operation of the existing MMIS, we arranged for Members a demonstration of the MMIS at HKCL on 6 January 2009. Apart from hands-on use of the MMIS, Members were briefed on the functions of the existing and the proposed upgraded MMIS, and visited the Audio-visual Library of HKCL to see how the public used the existing system. In addition, we addressed Members' enquiries regarding the usage of the system and the plan for developing the MMIS content. We have incorporated the related information in this paper.

## **BACKGROUND**

38. In late 1999, FC approved, inter alia, a non-recurrent commitment of \$143,596,000 for the implementation of the existing MMIS. It was the first of its kind when launched in the HKCL in 2001 and it was subsequently extended to branch libraries in 2003.

39. MMIS is one of the few digital library systems in the world that provides access to both digital and analogue A/V materials as well as digitised documents through a single unified user interface. It serves as one of the HKPL's important tools in meeting the needs of the community for knowledge, information, cultural enrichment, intellectual stimulation and life-long learning. The system also plays an important role in the use of digitisation as a solution for preservation as well as dissemination of historical and heritage materials related to Hong Kong.

40. The MMIS currently provides services to patrons through some 530 workstations at HKCL and 26 branch libraries. It also provides services through the Internet. Patrons are provided with multiple search functions for effective access to the rich array of digitised library materials and enjoyment of A/V programmes on demand. The MMIS holds about 3 300 hours of digitised A/V materials, around 40 000 A/V CD-ROMs that are housed and played by jukeboxes, over 100 000 A/V materials that are played by conventional players such as compact disc, video compact disc, digital video disc, laser disc, video home system, U-matic, audio cassette tapes, gramophone records, and over two million digitised documents of valuable old Hong Kong newspapers, maps, manuscripts, photos, posters, etc. Patrons can easily reserve MMIS workstations and/or library materials through the system.

41. In addition to serving the MMIS workstations, the network infrastructure installed at the HKCL also supports HKPL's three other IT systems. These include more than 1 000 workstations at HKCL and 65 branch libraries for public Internet access, around 150 workstations at HKCL for the check-in and check-out of library materials and some 250 PCs for daily office automation work of the HKPL's staff.

42. Contributions of the MMIS to the public have been duly recognised through the winning of various IT awards<sup>6</sup>. Its role in preserving local heritage and culture is globally recognised through the incorporation of the MMIS into the United Nations Educational, Scientific and Cultural Organisation's Archive Portal since 2003.

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Home Affairs Bureau  
January 2009

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<sup>6</sup> The MMIS received a Silver Award in the Application Category of the IT Excellence Awards 2001 organised by the Hong Kong Computer Society. It was further honoured with the Asia Pacific Information and Communication Technology Awards 2002 under the "E-Government & Services" category. The system also received a Merit Award in the Innovation/Application of Technology Category of the Civil Service Outstanding Service Award Scheme in 2005.

### Cost and Benefit Analysis for MMIS Major Upgrade

	Cash flow (\$'000)											
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Total
<b>Cost</b>												
Non-Recurrent												
- Expenditure	1,588	15,084	68,121	8,326	-	-	-	-	-	-	-	93,119
- Staff Cost	3,682	4,654	4,307	1,968	-	-	-	-	-	-	-	14,611
Sub-total	5,270	19,738	72,428	10,294	-	-	-	-	-	-	-	107,730
Recurrent												
-Expenditure	-	-	43	13,243	16,416	16,416	16,416	16,416	16,416	16,416	16,416	128,198
Sub-total	-	-	43	13,243	16,416	16,416	16,416	16,416	16,416	16,416	16,416	128,198
<b>Total cost</b>	<b>5,270</b>	<b>19,738</b>	<b>72,471</b>	<b>23,537</b>	<b>16,416</b>	<b>16,416</b>	<b>16,416</b>	<b>16,416</b>	<b>16,416</b>	<b>16,416</b>	<b>16,416</b>	<b>235,928</b>
<b>Savings</b>												
Realisable savings	-	-	-	9,444	12,652	12,652	12,652	12,652	12,652	12,652	12,652	98,008
Notional savings	-	-	-	891	1,069	1,069	1,069	1,069	1,069	1,069	1,069	8,374
Staff cost avoidance	-	-	-	8	9	9	9	9	9	9	9	71
Cost avoidance	-	-	-	573	688	688	688	688	688	688	688	5,389
<b>Total savings</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>10,916</b>	<b>14,418</b>	<b>14,418</b>	<b>14,418</b>	<b>14,418</b>	<b>14,418</b>	<b>14,418</b>	<b>14,418</b>	<b>111,842</b>
<b>Net Shortfall</b>	<b>5,270</b>	<b>19,738</b>	<b>72,471</b>	<b>12,621</b>	<b>1,998</b>	<b>1,998</b>	<b>1,998</b>	<b>1,998</b>	<b>1,998</b>	<b>1,998</b>	<b>1,998</b>	<b>124,086</b>
<b>Net Cumulative Shortfall</b>	<b>5,270</b>	<b>25,008</b>	<b>97,479</b>	<b>110,100</b>	<b>112,098</b>	<b>114,096</b>	<b>116,094</b>	<b>118,092</b>	<b>120,090</b>	<b>122,088</b>	<b>124,086</b>	

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

- (a) the existing MMIS will not be able to handle the workload in the coming years and needs to be enhanced in a timely and well-planned manner to meet user demands having regard to its obsolete system components; and
- (b) the proposed upgraded MMIS will have a number of benefits/improvements as stated in paragraph 9 above of the main paper.

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