

**For discussion  
on 1 February 2019**

**FCR(2018-19)78**

## **ITEM FOR FINANCE COMMITTEE**

**CAPITAL WORKS RESERVE FUND  
HEAD 710 – COMPUTERISATION  
Buildings Department  
New Subhead “Electronic Submission Hub”**

Members are invited to approve the creation of a new commitment of \$214,390,000 for the development of an electronic submission hub.

### **PROBLEM**

The Buildings Department (BD) needs to develop an Electronic Submission Hub (ESH) for centralised processing of electronic building plans and documents, as well as other applications under the Buildings Ordinance (Cap. 123) (BO) as an alternative to the present paper-based system.

### **PROPOSAL**

2. The Director of Buildings, with the support of the Secretary for Development and the Government Chief Information Officer, proposes that a new commitment of \$214,390,000 for the development of ESH be created.

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## JUSTIFICATION

### Review on the current way of processing plans and submissions

3. At present, any person who intends to carry out building works under BO is required to appoint registered building professionals<sup>1</sup> to prepare and submit plans for the approval of the Building Authority (BA)<sup>2</sup>. BD is the central clearing house to process all building plan submissions from the private sector through the Centralised Processing System (CPS)<sup>3</sup>. Currently, registered building professionals have to produce multiple hard copies of buildings plans and supporting documents to BD. Upon receipt of these hard copies, BD would disseminate them to relevant departments and organisations (CPS participants) for processing. There are up to 36 CPS participants; the number of hard copies required would depend on the types of submissions. Please refer to the list of 36 CPS participants at Enclosure 1.

Encl. 1

4. BD commissioned a feasibility study in 2013 on an electronic submission system of plans and documents under BO. Having regard to the level of maturity of products and technologies in the market, the substantial resources and efforts required to develop such system, as well as the readiness of the industry, the study recommended the development of an electronic forms submission system (EFSS) to pave the way for the implementation of a full-scale electronic submission system in the future. Taking heed of the recommendation, BD launched the EFSS in 2016 which enabled practitioners to download, fill in, sign and submit forms electronically. However, even with the EFSS, practitioners still had to submit building plans and other large-sized documents to BD in hard copies.

5. Subsequently, BD commissioned a review on the feasibility of a full-scale electronic submission system for processing electronic plans and documents in 2017. Apart from the benefits of electronic submission including

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<sup>1</sup> Namely, authorized persons, registered structural engineers and registered geotechnical engineers registered under BO.

<sup>2</sup> Under BO, the BA means the Director of Buildings. Minor works may be carried out under the simplified requirements of the Minor Works Control System whereby minor works submissions including forms, plans and documents are required to be submitted to BA. However, BA's prior approval of plans is not required before the commencement of works. Exempted building works under section 41(3), (3B) and (3C) of BO may also be carried out without obtaining prior approval by BA.

<sup>3</sup> BD operates a CPS for building plans submitted under BO to ensure that all interested government departments and organisations are consulted and that their comments on private development proposals are collated by BD within statutory time limits allowed for processing building plans.

reduction in the use of paper and associated storage space, saving of administrative efforts, etc., the review also identified the tremendous benefits that a full-scale electronic submission system could offer by enabling the acceptance of building plans in Building Information Modelling (BIM) format by BD. BIM is a 3-dimensional (3D) design and modelling process involving the generation and management of digital representations of physical and functional characteristics of a structure. Instead of having numerous plans containing architecture design, construction and installation design, lists of quantities and cost estimates, etc. individually prepared and manually coordinated, BIM will assign all such plans to a 3D model. Users would be able to carry out planning, design and construction in a virtual environment at the early stage of a development project. Besides, BIM could detect clash arising from incompatible designs, facilitate conformity checking of design features against building regulations with custom-developed plug-in modules, assist in coordination of various activities on-site, analyse the use of resources and viability of a project, improve communication amongst different project teams, and provide useful records for future building maintenance. The use of BIM would minimise wastage during the project preparation and construction stages, such as wastage arising from the need to rework, and idling resources during construction stage. This would in turn result in higher productivity and economical use of materials.

6. All in all, the review recommended the development of a full-scale electronic submission system to improve the operational efficiency of BD and CPS participants in processing building plans and submissions, and to encourage the greater and fuller use of BIM in the industry. This is in fact one of the initiatives in the *Smart City Blueprint for Hong Kong* published in December 2017. BD has accepted the recommendation and decided to develop ESH.

### **Features of ESH**

7. ESH will open up many opportunities to enhance government services. The main features of the proposed ESH include –

- (a) One-stop e-Counter: ESH will be a one-stop e-counter for submission of building plans and documents, as well as applications under BO electronically;
- (b) e-Registration: users may create personalised accounts on ESH for performing subsequent progress tracking of various types of submissions including building plan, consent, permit, licence applications as well as certificates and forms under BO. Users may also receive reminders, notifications and announcements, and access to records of approved submissions or documents;

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- (c) e-Payment: users may make payment electronically to enjoy greater convenience and avoid manual errors;
- (d) e-Referral: ESH, when launched in full, will serve as a portal for BD to refer submissions to relevant CPS participants and for them to provide comments to BD and users;
- (e) e-Processing: plan processing could be carried out concurrently by different CPS participants, with comments by participants shared in the portal. Computer-aided plan checking modules would be developed for compliance check of submissions in BIM format against building regulations; and
- (f) e-Document Management System (DMS): ESH will integrate with DMS to handle large volume of submission data for efficient, reliable and secure retrieval, searching and archiving.

### **Anticipated benefits**

8. The proposed ESH will bring about the following benefits –

(a) *Streamline development approval process*

ESH will enable building professionals to submit their plans and documents electronically. BA and all CPS participants could process such plans and documents via the electronic platforms. ESH will not only save the time and manpower in submitting and resubmitting hard copies of plans or submissions, the corresponding travelling costs and printing costs would also be saved. Through the automatic referral system, ESH will also improve the efficiency in distributing plans and documents from BD to other CPS participants. Through the built-in online application progress tracking and alert system, users could keep track of the progress of their submissions. Useful management data could be generated to relevant departments for monitoring purpose.

(b) *Improve co-ordination between CPS participants*

ESH will facilitate collaboration among BD and CPS participants in processing building plans. Views and comments on the plans made by BD and CPS participants will be shared electronically amongst themselves, allowing early reconciliation of conflicting comments if such arise, thereby compressing plan processing time.

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(c) *Encourage the greater and fuller use of BIM technology*

While building professionals may now submit building plan documents in BIM format to BD as supplementary information to facilitate BD's plan processing<sup>4</sup>, the absence of a full-scale electronic submission system has hindered them and CPS participants from enjoying the full benefits that BIM could offer (paragraph 5 above). ESH will encourage the greater and fuller use of BIM by building professionals in preparing building plan submissions for private development projects. This complements the government's initiative to require the use of BIM in major government capital projects starting from 2018, and help promote the adoption of BIM by the sector which is in line with the global trend.

(d) *Promote smart city development*

The electronic building plans prepared in BIM format received via ESH will be a rich and readily accessible source of information for promoting other smart city initiatives. In particular, building information captured in BIM format would support the development of the Common Spatial Data Infrastructure which facilitates the sharing of geo-spatial data across government departments and various government-to-business applications including 3D digital map.

(e) *Environment friendly*

Currently, building professionals submit an average of ten sets of building plans for each first time submission. This is usually followed by the submission of voluminous plans covering site formation, foundation, drainage and other structural works together with associated calculations and documents, as well as amendment submissions following the first approved plans. ESH will help save paper and associated storage space for such submissions, and reduce the time and cost for printing and delivery of such plans by building professionals as well as recording and searching for such plans.

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<sup>4</sup> Following the launch of EFSS, BD released a practice note in late 2016 providing general guidelines on submissions for building plans in BIM format stored in CD or DVD as supplementary information to facilitate plan processing by BD. However, BD continues to require the plans to be submitted in hard copies, and is processing the plans based on information contained therein.

(f) *Enhance communication between BD and users*

ESH will support the use of electronic identity<sup>5</sup> (eID) for user authentication and offers a one-stop shop for registered users (including general public) to receive customised notifications such as BD's publication of new and amended practice notes, circular letters and reports, as well as announcement on seminars, briefings and publicity events organised by BD. It will also allow online registration for and feedback on these events.

**FINANCIAL IMPLICATIONS****Capital expenditure**

9. It is estimated that the implementation of ESH will incur a total capital expenditure of \$214,390,000 over seven financial years from 2019-20 to 2025-26. The breakdown is as follows –

(\$'000)

Item	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	Total
(a) Hardware and software	-	36,960	19,160	19,400	7,500	-	-	83,020
(b) Implementation services	6,800	7,680	7,640	10,580	10,480	8,500	6,530	58,210
(c) Contract staff	3,400	6,890	7,400	7,480	7,480	5,370	3,570	41,590
(d) Others	280	390	4,460	3,490	1,460	1,720	280	12,080
(e) Contingency	-	-	-	-	-	-	19,490	19,490
<b>Total</b>	<b>10,480</b>	<b>51,920</b>	<b>38,660</b>	<b>40,950</b>	<b>26,920</b>	<b>15,590</b>	<b>29,870</b>	<b>214,390</b>

10. On paragraph 9(a) above, the estimate of \$83,020,000 is for the procurement of computer hardware and software, including servers, network facilities, security modules, backup equipment, operating system, migration software and information security software, etc.

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<sup>5</sup> eID is one of the key digital infrastructures for smart city development in Hong Kong to provide local residents with a single digital identity and authentication method to conduct government and commercial online transactions and to sign documents digitally. It will be provided free for all Hong Kong residents on a voluntary basis starting from mid-2020.

11. On paragraph 9(b) above, the estimate of \$58,210,000 is for the procurement of services from an external service provider for conducting system analysis and design, development, testing, installation, system migration, internal training related to ESH operation, security risk assessment and audit in various implementation stages.

12. On paragraph 9(c) above, the estimate of \$41,590,000 is for hiring information technology (IT) contract staff possessing relevant technical skills and experience to assist in the procurement, coordinating and monitoring of the full system development lifecycle including but not limited to system design, installation, testing, implementation and system nursing.

13. On paragraph 9(d) above, the estimate of \$12,080,000 is for other expenditures, including communication network (e.g. equipment rental for providing communication carriers and backbone switches), data centre expenses (e.g. setup for production data centre and disaster recovery data centre), BIM training for BD's staff and procurement of consumables (e.g. backup tapes).

14. On paragraph 9(e) above, the estimate of \$19,490,000 represents a 10% contingency on the items set out in paragraphs 9(a) to (d).

### **Other non-recurrent expenditure**

15. The proposed implementation of ESH will require a project team for project management; procurement of hardware, software and services; system analysis and design; coordination with other departments and organisations; site preparation; user acceptance testing; and implementation support, etc. The non-recurrent staff cost will be around \$31,660,000 from 2018-19 to 2023-24. BD will review the staffing requirements as the project progresses.

### **Recurrent Expenditure**

16. We estimate that the proposal will entail an indicative recurrent expenditure of about \$16,980,000 per annum from 2026-27 onwards. This covers the cost of hardware and software maintenance, and renewal of software licence. The breakdown is as follows –

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	<b>2026-27 onwards</b>
	<b>\$'000</b>
(a) Hardware and software maintenance	7,650
(b) System/application maintenance	9,170
(c) Consumables	160
	<b>Total</b>
	<b>16,980</b>

17. On paragraph 16(a) above, the estimated annual expenditure of \$7,650,000 is for hardware and software maintenance for the new IT system and related licence fees.

18. On paragraph 16(b) above, the estimated annual expenditure of \$9,170,000 is for hiring contract IT staff and procurement of outsourced services for system support and maintenance.

19. On paragraph 16(c) above, the estimated annual expenditure of \$160,000 is for procurement of consumables and supplies for on-going system support services.

20. The proposal will require a net additional recurrent cost of \$15,080,000 per annum after offsetting a realisable savings of \$1,900,000 per annum (mentioned in paragraph 21(b) below) from 2026-27 and onwards. The above recurrent requirements will be included and reflected in the annual estimates of BD in the relevant financial years to meet the requirements.

**Savings and Cost Avoidance**

21. It is estimated that the full implementation of ESH will bring about the following annual cost savings and avoidance upon full implementation of the system –

- (a) notional savings of \$12,700,000 in staff efforts (being the staff cost of man-hours saved) for processing of plans and submissions;
- (b) cost savings of \$1,900,000 in the cost for scanning and storage of paper submissions; and

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- (c) cost avoidance of \$7,760,000,000 on social benefit for reduction of construction costs including labour and materials, and a benefit of \$68,000,000 for reduction of green-house gas emissions as a result of the use of BIM (paragraph 5 above).

Encl. 2 22. A cost and benefit analysis for ESH is at Enclosure 2.

### IMPLEMENTATION PLAN

23. The estimated schedule for the implementation of ESH is as follows –

	<b>Activity</b>	<b>Target Completion</b>
(a)	Tendering and Award of Contract	Second quarter 2019
(b)	Systems Development and Implementation	
	Stage 1 – for plans not requiring cross-department referral	Third quarter 2019 to first quarter 2022
	Stage 2 – for plans not requiring cross-department referral and plans requiring referrals to works departments only <sup>6</sup>	First quarter 2022 to fourth quarter 2023
	Stage 3 – for all types of plans	Fourth quarter 2023 to second quarter 2025

### PUBLIC CONSULTATION

24. BD consulted the Building Sub-Committee of the Land and Development Advisory Committee and the Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers Committee in June 2018 as well as the Land and Development Advisory Committee in December 2018 on the proposal. Members of these committees, comprising representatives of academia, professional bodies and trade associations, etc. welcomed and supported the proposal.

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<sup>6</sup> These include the Architectural Services Department, Civil Engineering and Development Department, Drainage Services Department, Highways Department, Transport Department and Water Supplies Department.

25. We consulted the Legislative Council Panel on Development on the above proposal on 19 December 2018. Members supported the submission of the proposal to the Finance Committee for funding approval. Some members enquired whether BD would mandate electronic submission upon the full implementation of ESH, and whether ESH could be implemented earlier in view of its benefits. We note that the industry would need time to adapt to electronic submission and some might not be technically ready for full migration from the current paper-based mode of submission. While full migration is our long-term vision, given that ESH is still in the planning stage, we do not have a deadline for mandating electronic submission. We will nonetheless keep in view the trend of adopting electronic submission in the industry and ascertain their readiness for mandatory e-submission. As for the implementation timetable, given that the development of the entire ESH involves complex coordination between BD and 36 CPS participants, we consider it necessary to implement ESH by stages and roll out services to participants in a gradual manner. We will endeavour to implement the first stage of ESH, which will enable the submission of plans not requiring inter-departmental referrals (e.g. superstructure plan, cladding works plan, curtain wall system plan and glass canopy works plan) by the first quarter of 2022.

26. Regarding a Member's suggestion to host ESH on the next generation Government Cloud, BD will actively explore this approach when designing and implementing ESH.

## **BACKGROUND**

27. The Chief Executive stated in the 2018 Policy Agenda that BD was spearheading the development of an ESH. ESH will not only allow the industry to submit building plans and applications electronically, but will also enable relevant authorities to process various kinds of plans and applications via the hub, thus facilitating the adoption of new technologies in processing development applications and substantially streamlining the approval process.

**Departments and Organisations involved in the  
Centralised Processing System of Building Plan Submissions**

**Departments**

1. Agriculture, Fisheries and Conservation Department
2. Antiquities and Monuments Office, Leisure and Cultural Services Department
3. Architectural Services Department
4. Civil Aviation Department
5. Civil Engineering and Development Department (including Geotechnical Engineering Office)
6. Tourism Commission
7. Department of Health
8. Drainage Services Department
9. Education Bureau
10. Electrical and Mechanical Services Department
11. Environmental Protection Department
12. Fire Services Department
13. Food and Environmental Hygiene Department
14. Highways Department
15. Home Affairs Department (including the Office of Licensing Authority)
16. Hong Kong Observatory
17. Hongkong Post
18. Housing Department
19. Labour Department
20. Lands Department
21. Marine Department
22. Office of the Communications Authority
23. Planning Department
24. Rating and Valuation Department
25. Social Welfare Department
26. Transport Department
27. Water Supplies Department
28. Hong Kong Police Force
29. Leisure and Cultural Services Department

**/Organisations .....**

**Organisations**

30. Airport Authority
31. Hospital Authority
32. Mass Transit Railway Corporation Ltd
33. Urban Renewal Authority
34. Hong Kong Tramways
35. The Peak Tram
36. Ngong Ping 360 Limited

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### Cost and Benefit Analysis for the Implementation of Electronic Submission Hub

		Cash Flow (\$'000)												
		2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
1	<b>Non-Recurrent</b>													
	Expenditure	-	10,480	51,920	38,660	40,950	26,920	15,590	29,870	-	-	-	-	214,390
	Staff Cost	1,850	6,280	6,380	5,910	5,560	5,680	-	-	-	-	-	-	31,660
	<b>Total Non-Recurrent Cost</b>	<b>1,850</b>	<b>16,760</b>	<b>58,300</b>	<b>44,570</b>	<b>46,510</b>	<b>32,600</b>	<b>15,590</b>	<b>29,870</b>	-	-	-	-	<b>246,050</b>
2	<b>Recurrent</b>													
	Expenditure	-	-	-	-	-	-	-	-	16,980	16,980	16,980	16,980	84,900
	<b>Total Recurrent Cost</b>	-	-	-	-	-	-	-	-	<b>16,980</b>	<b>16,980</b>	<b>16,980</b>	<b>16,980</b>	<b>84,900</b>
	<b>Total Non-Recurrent and Recurrent Cost (A)</b>	<b>1,850</b>	<b>16,760</b>	<b>58,300</b>	<b>44,570</b>	<b>46,510</b>	<b>32,600</b>	<b>15,590</b>	<b>29,870</b>	<b>16,980</b>	<b>16,980</b>	<b>16,980</b>	<b>16,980</b>	<b>330,950</b>
3	<b>Savings</b>													
	Realisable Savings <sup>Note 1</sup>	-	-	-	-	-	-	-	-	1,900	1,900	1,900	1,900	9,500
	Notional Savings <sup>Note 2</sup>	-	-	-	-	-	-	-	-	12,700	12,700	12,700	12,700	63,500
	Cost Avoidance <sup>Note 3</sup>	-	-	-	-	-	-	-	-	7,828,000	7,828,000	7,828,000	7,828,000	39,140,000
	<b>Total Savings (B)</b>	-	-	-	-	-	-	-	-	<b>7,842,600</b>	<b>7,842,600</b>	<b>7,842,600</b>	<b>7,842,600</b>	<b>39,213,000</b>
	<b>Net Savings (C) = (B) - (A)</b>	<b>(1,850)</b>	<b>(16,760)</b>	<b>(58,300)</b>	<b>(44,570)</b>	<b>(46,510)</b>	<b>(32,600)</b>	<b>(15,590)</b>	<b>(29,870)</b>	<b>7,825,620</b>	<b>7,825,620</b>	<b>7,825,620</b>	<b>7,825,620</b>	<b>7,825,620</b>
<b>Net Cumulative Savings</b>	<b>(1,850)</b>	<b>(18,610)</b>	<b>(76,910)</b>	<b>(121,480)</b>	<b>(167,990)</b>	<b>(200,590)</b>	<b>(216,180)</b>	<b>(246,050)</b>	<b>7,579,570</b>	<b>15,405,190</b>	<b>23,230,810</b>	<b>31,056,430</b>	<b>38,882,050</b>	

Notes –

1. This represents the cost for scanning and storage of paper submissions.
2. Notional savings will be achieved through reduction in staff efforts (being the staff cost of man-hours saved) for processing of plans and submissions.
3. This represents the social benefit for reduction of construction costs and green-house gas emissions as a result of the use of Building Information Modelling.

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