

Annex A: Factsheet on Advanced Digital Solutions (ADS) for the Construction Sector

1. The Advanced Digital Solutions (ADS) scheme, available through the Infocomm Media Development Authority's ("IMDA") SMEs Go Digital programme, help enterprises deepen their digital capabilities, strengthen business continuity measures and build longer term resilience. Solutions supported under ADS address common enterprise-level challenges at scale, help enterprises to adopt cutting-edge technologies and enable enterprises to transact more seamlessly within or across sectors.
2. The types of solutions identified for ADS are those which meet the objectives set out in the Industry Transformation Maps and the Industry Digital Plans that further develop the types of digital solutions that are needed by the industry.

Digitalisation for Safe Re-opening and Resilience

3. IMDA works with sector lead agencies and industry players to identify relevant integrated digital solutions for their respective sectors, that can be supported under ADS. With regard to the construction sector, IMDA is working with the Building and Construction Authority ("BCA") to support construction companies' efforts to safely re-start construction works and accelerate digitalisation to improve productivity. Up to \$20m from ADS will be set aside to provide funding support for enterprises that adopt integrated advanced digital solutions to reduce reliance on manpower, minimise face-to-face contact, enhance productivity and ensure business continuity.
4. These solutions for the construction sector fall under two categories:
 - Category A - Safely Re-open: Digital solutions to meet the COVID-Safe Restart Criteria as defined by BCA (<https://www1.bca.gov.sg/docs/default-source/bca-restart/covid-safe-restart-criteria.PDF>) (e.g. visitor management with

temperature scanning, smart cameras with video analytics and wearables to monitor safe distancing)

- Category B - Build Business Resilience: Digital solutions to digitalise workflows and reduce reliance on manpower (e.g. e-Permit-To-Work, Defect Tracking Management and Quality Inspection).

They will be integrated on the BuildSG-COVIDSafe platform, a single digital platform to facilitate central monitoring and management. Only companies applying for Category A solutions can apply for Category B solutions.

5. Local construction companies can receive funding for up to 80% of the cost of the integrated digital solutions, subject to a cap of \$200,000 per company. Funding caps for Categories A and B also apply:
 - a. Category A: Cap of \$20,000 per site, for up to 5 existing construction sites.
 - b. Category B: Cap of \$24,000 per site, for up to the same 5 existing sites where Category A solutions are implemented.

Eligibility

6. Companies that wish to adopt the above solutions for the construction sector need to fulfil the following criteria to qualify for ADS funding:
 - a. Be registered and operating in Singapore;
 - b. Have a minimum of 30% local shareholding; and
 - c. Be in a financially viable position to start and complete the project.
7. Local construction companies such as developers, main contractors and sub-contractors can apply for the ADS grant support through the project leads of the ADS projects they are interested in. The list of ADS projects and contact information of the respective project leads is available on IMDA's ADS webpage www.imda.gov.sg/advanceddigitalsolutions.

8. The duration of solution implementation per construction site must not be longer than 12 months. The digital solutions have to be implemented by 31 December 2021.

Other Digitalisation Support Measures for the Construction Sector

9. IMDA and BCA launched the Construction and Facilities Management Industry Digital Plan (IDP) in Mar 2020, under the SMEs Go Digital programme. The IDP is a step-by-step guide on useful solutions that SMEs in the Construction and Facilities Management (FM) sectors can adopt at each stage of their growth, and contains information on relevant training schemes for firms to upskill their employees. To make it easy for SMEs to adopt digital solutions, within the IDP, IMDA has provided a list of pre-approved solutions assessed to be market-proven, cost-effective and supported by reliable vendors. SMEs can apply for the Productivity Solutions Grant (PSG) by Enterprise Singapore (ESG) for funding support when they adopt these pre-approved solutions.
10. SMEs that receive funding support from ADS will not be eligible for PSG support for similar solutions and vice versa.

Annex B: Factsheet on Intelligent National Productivity and Quality Specifications (iNPQS)

1 For construction projects, the tender document comprises the conditions of the contract, tender drawings and specifications. These documents are used to:

- a) Specify the type and quality of materials, workmanship standards and methods of construction for the project;
- b) Assist the builder in the preparation of competitive tender bids;
- c) Assist the quantity surveyor in preparation of the bills of quantities;
- d) Assist site supervisory staff e.g. Resident Engineer/Technical Officer, builder's foreman, etc. in carrying out the works as specified;
- e) Serve as the contract document and basis to resolve any contractual disputes.

2 Currently, there is no standard specification that is used by the Built Environment sector for tendering and contract works in Singapore. The Singapore Institute of Architects (SIA), the Institution of Engineers Singapore (IES) and the Association of Consulting Engineers Singapore (ACES) recognised the need for standard specifications and came together to form a wholly owned subsidiary company "iNPQS Pte Ltd" to co-create iNPQS to provide a common digital platform with standard specification to streamline the specification processes.

3 iNPQS initiative is the first joint industry-led effort supported by the BuildSG Transformation Fund. Beside SIA, IES and ACES, other major TACs (REDAS, SISV and SCAL) and GPE (HDB, JTC and LTA) have also provided valuable input to guide the development of iNPQS.

Objective

4 iNPQS aims to harmonise the industry's building specifications and provide a standard platform for achieving greater efficiency and quality in the design, procurement and construction processes, leading to improve productivity across the value chain. It provides standard specifications for architectural and engineering works

on a cloud-based digital platform that can be used by the industry practitioners in the built environment sector. It allows them to compose their building specifications based on standard specifications which are vetted by a committee of members made up of representatives from government agencies and industry stakeholders. The platform also provides updates on a regular basis to ensure that the specifications are kept relevant.

Key benefits***Support Industry Transformation***

5 iNPQS will support our industry transformation efforts. Over the years, new technologies have been introduced to address challenges related to environmental sustainability, manpower and productivity. This includes game-changing productive technologies like Prefabricated Prefinished Volumetric Construction (PPVC), Mass Engineered Timber (MET), and Building Information Modelling (BIM). The new specifications for these technologies and materials provided in iNPQS will facilitate the industry in adopting such technologies.

Create an Integrated and Productive Value Chain

6 iNPQS is a platform that will benefit all stakeholders of the Built Environment sector (i.e. developers, consultants, quantity surveyors, contractors and suppliers). The system harmonises the industry's building specifications by harnessing the power of ICT/BIM technology. It allows architects, engineers and specification writers to create tender specifications efficiently from standard templates. BIM technology allows linkages to current manufacturers' products, as well as local standards. Designers can therefore consider the specifications at the upstream design stage for improved productivity. These capabilities will create greater efficiency, leading to higher productivity and better outcomes in the design, tender, construction and maintenance stages.

Key Features

7 Below are some key features of the iNPQS Platform:

- **Cross Reference Singapore Standards**

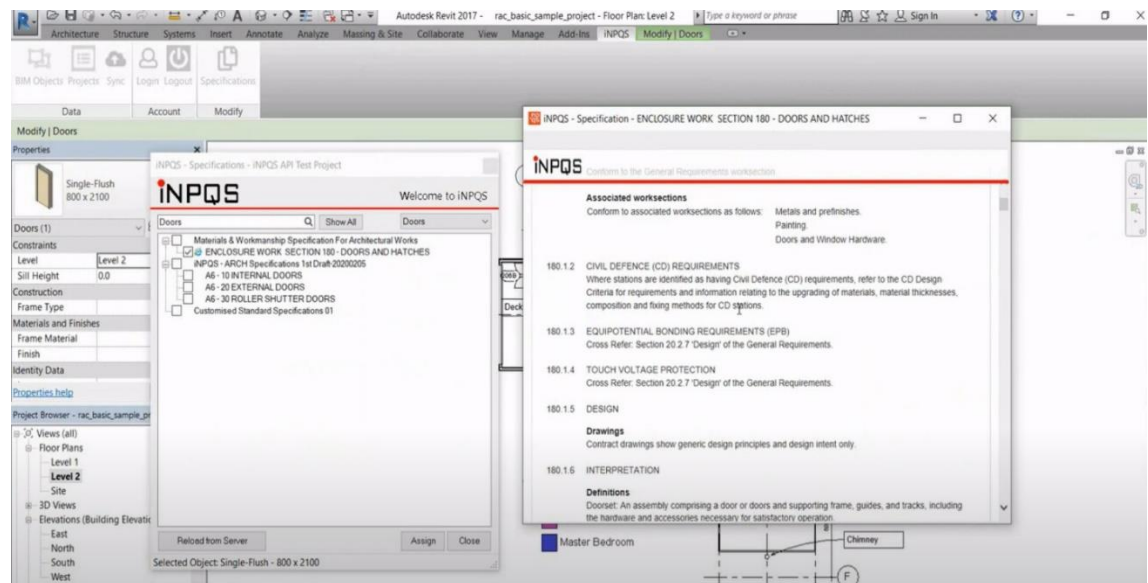
Users can search and view relevant Singapore Standards within the iNPQS platform. Key words in the clauses are also cross referenced within the documents.

The screenshot displays the iNPQS platform interface. On the left is a dark sidebar with navigation links: Dashboard, Projects, GPE Specs, Core Specs, Products, Singapore Standards (highlighted), Messages, Contact Us, Administration, Logout, and Support. The main content area is divided into two panels. The left panel, titled 'Singapore Standards', features a search bar and a 'Document List' table. The table lists various standards, with 'CP 52 : 2004 Code Of Practice For Automatic Fire Sprinkler System' highlighted. The right panel, titled 'Document Contents', shows a preview of the selected document. It includes the Singapore Standards Council logo, the title 'SINGAPORE STANDARD Code of practice for automatic fire sprinkler system', and the reference 'CP 52 : 2004 (ICS 13.220.20)'. The footer contains the copyright notice '© 2020 iNPQS. All Rights Reserved.' and a link to 'TERMS OF USE'.

Document List	
CP 52 : 2004	Code Of Practice For Automatic Fire Sprinkler System Incorporating Erratum No. 1
CP 90 : 2001 (2014)	Code of Practice For Design And Installation Of Partition Walls Incorporating Amendment No. 1
SS 347 : 1990	Specification For Timber Doors
SS 37 : 1998	Specification For Aluminium Paint Amendment No. 1
SS 538 : 2008	Code of Practice For Maintenance of Electrical Equipment of Electrical Installations Formerly CP 17
SS 551 : 2009	Code of Practice For Earthing Formerly CP 16
SS 555 : Part 2 : 2018	Protection Against Lightning Part 2 : Risk management
SS 555 : Part 3 : 2018	Protection Against Lightning Part 3 : Physical damage to structures and life hazard
SS 555 : Part 4 : 2018	Protection Against Lightning Part 4 : Electrical and electronic systems within structures

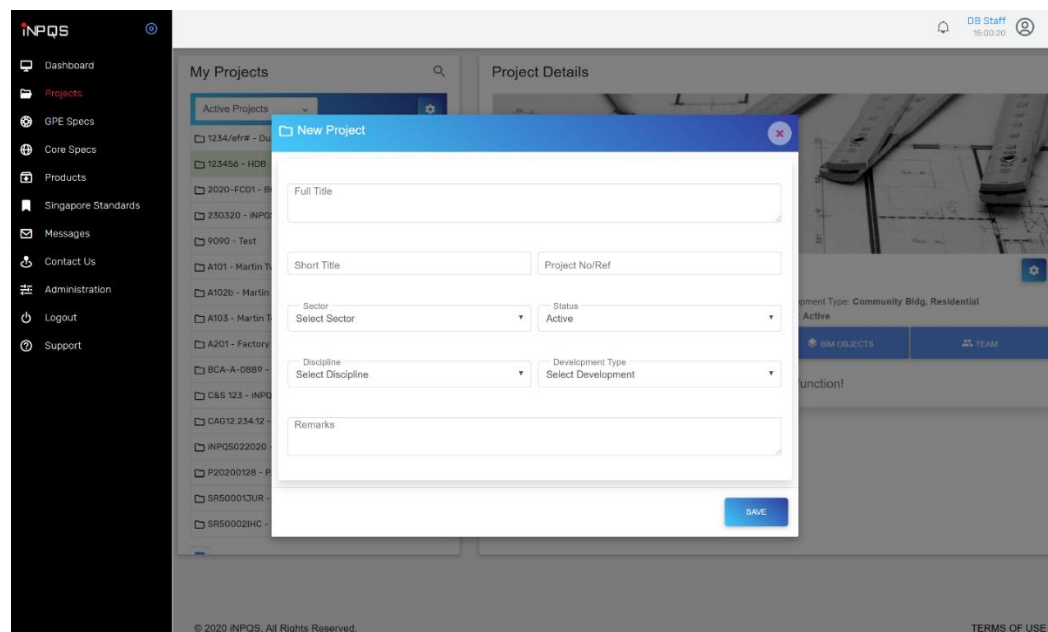
- **BIM Integration**

With the BIM plugin, users can link their BIM Model elements to the specification content in the INPQS platform.



- **Create Projects and Collaborate**

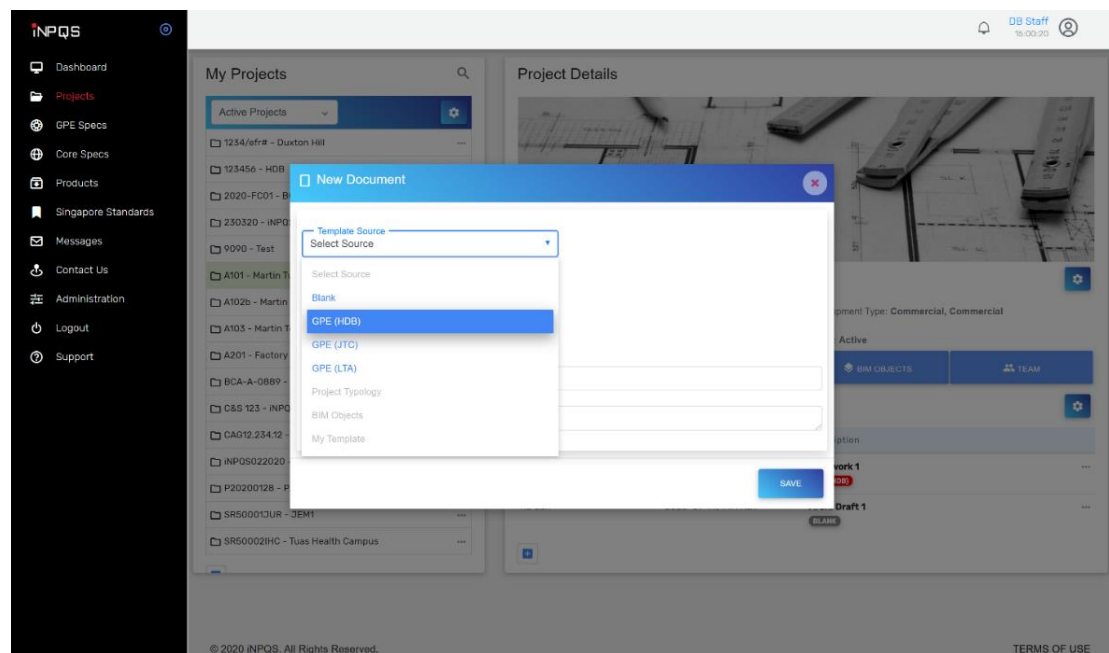
Users can create project specification in the cloud platform and invite other project team members working on the same project to review the specification.



- **Using Templates**

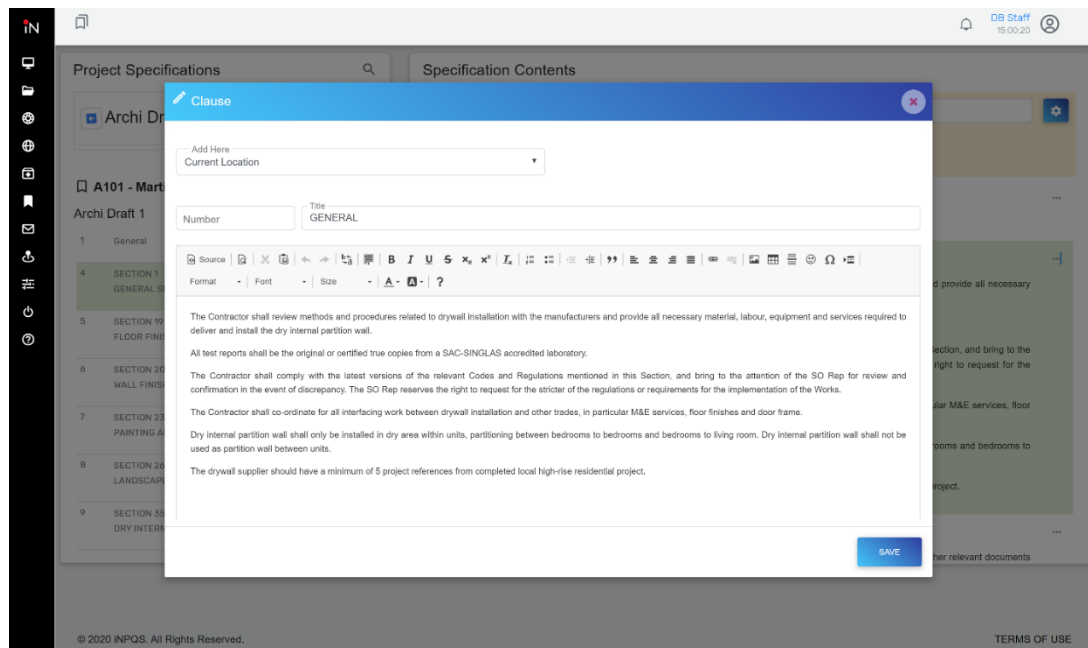
Users can create:

- a specification according to the respective discipline using iCoreSpec;
- a project using GPE specification if one is tendering for a public sector project;
- a specification based on their past project template;
- a specification from iNPQS' building typology template.



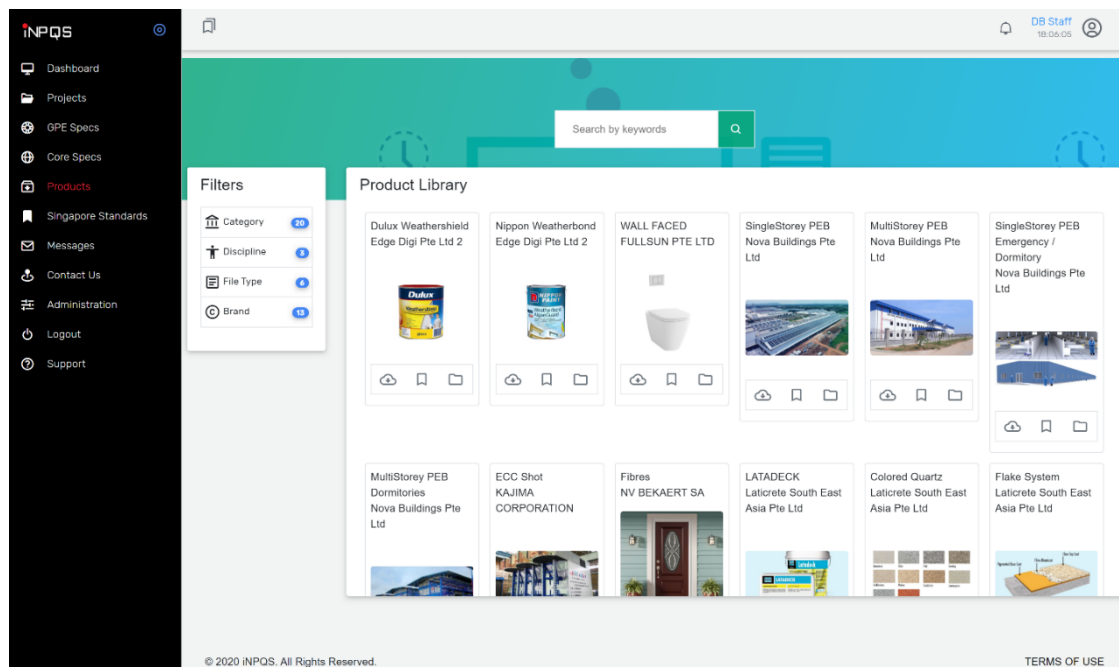
- **Online Editing Tool**

Users can use the Content Editor tool which includes various attachment functions.



- **Search for Manufacturer's Products/System Information**

Users can browse product directories and view the product's technical details.



Annex C: Factsheet on the Smart FM Challenge

Driving transformation in the Facilities Management industry through Adoption of Smart FM Technologies

1 As part of the Real Estate Industry Transformation Map (ITM) launched in February 2018, the tripartite Facilities Management Implementation Committee (FMIC), comprising major public and private stakeholders, has been working to develop and advance the Facilities Management (FM) industry. A key strategy under the FMIC to transform the industry is to enhance its maintenance capabilities through adoption of smart FM to raise productivity and efficiency, reduce labour intensity and enhance FM service delivery. This can be achieved through data analytics, predictive maintenance and smart technology solutions.

2 Smart FM refers to the integration of systems, processes, technologies and personnel to enhance the management of the facilities of a building. On 1 October 2019, the FMIC's Smart FM Taskforce launched a *Guide to Smart FM*¹ which provides building owners and FM managers with key steps to take to adopt smart FM in their buildings.

Launch of the Smart FM Challenge

3 The Smart FM Challenge encourages **service buyers** (developers and building owners) and **service providers** (FM companies and technology providers) to pledge the following:

We pledge to **work together** to:

- Adopt smart FM technology solutions to improve productivity and enhance service delivery²;

¹ The *Guide to Smart FM* can be found here: <https://go.gov.sg/guide-to-smart-fm>.

² This can be done with reference to the 5-step SMART process in the *Guide to Smart FM*. Infographics on the 5-step SMART process can be found here: <https://go.gov.sg/bca-fm-5-step-smart-process>.

- in at least 1 building or portfolio of buildings within the next 3 years; and
- for those who have embarked on smart FM, to review the outcome and explore further areas for continuous improvement.

4 More than 50 organisations have since committed to take up the Smart FM Challenge.

Smart FM Proof-of-Concept Grant

5 BCA will be launching a Grant call under a Smart FM Proof-of-Concept (POC) Grant to promote the adoption of smart FM that ***integrates across FM domains or systems*** and ***aggregates across a portfolio or cluster of buildings***. Proof-of-concept projects under the Grant will help establish a business case for integrated and aggregated smart FM solutions that can be scaled up and replicated in other portfolio or cluster of buildings. The projects can receive support of up to 70% of qualifying costs, capped at S\$800K per project; on the condition that they deliver more than 20% improvement (e.g. in productivity, cost and manpower savings, customer satisfaction, service delivery, etc). More details on the Smart FM POC Grant will be shared with the participants of the Smart FM Challenge later this month.

Benefits of adopting smart FM

6 Some early adopters of smart FM solutions have seen results in at least 15% improvement in productivity, cost or manpower savings, etc. For example, CapitaLand Group's Intelligent Building Platform (IBP) saw a 20% improvement in resolution time and 5% avoidance in electricity consumption – equivalent to the average electricity consumption of about 1,800 four-room HDB flats in a year³.

7 CapitaLand's IBP aggregates 42 buildings⁴ and integrates various mechanical and electrical systems (e.g. monitoring of chiller plant and air handling units) and FM-related systems (e.g. video analytics for security, car park management and other 3rd

³ Average annual electricity consumption of a four-room HDB household is based on Singapore's Energy Market Authority's 2019 Singapore Energy Statistics.

⁴ 25 business park buildings, 14 retail malls and 3 offices

party platforms) into a single platform. A fault detection and diagnostic analytics engine built in the IBP helps to identify faults in equipment operation, sensor or setting, sending early SMS notification to the relevant personnel to resolve the issue, thereby reducing energy wastage and system down-time.

8 CBM Pte Ltd, a subsidiary of City Developments Limited (CDL), has also embarked on smart FM to harness data, unite siloed systems and optimise the deployment of resources. It is currently carrying out asset monitoring through Internet-of-Things (IoT) sensors and data analytics to enable predictive maintenance with a dashboard and alert functionality. The integrated platform is targeted to achieve an approximate 20% in manpower savings. There are also plans to expand smart FM to other buildings within its portfolio in the future.

Join the Smart FM Challenge

9 Service buyers (developers and building owners) and service providers (FM companies and technology providers) are encouraged to join the Challenge by registering at <https://go.gov.sg/smartfmchallenge>. Moving forward, BCA will continue to explore opportunities to facilitate dialogues and foster collaboration between the service buyers and service providers.

List of Participating Organisations to the Smart FM Challenge

– Listed in alphabetical order

Service Buyers

Private Sector Developers and Building Owners

1. CapitaLand Group
2. City Developments Limited (CDL)
3. Frasers Property
4. Keppel Land
5. Lendlease
6. Mapletree Investments Pte Ltd
7. Mercatus Co-operative Limited
8. Shangri-La Group
9. United Overseas Bank (UOB)

Ministries, Public Agencies and Institutions

1. BCA Academy
2. KK Women's and Children's Hospital
3. Ministry of Education
4. Nanyang Polytechnic
5. Nanyang Technological University
6. Ngee Ann Polytechnic
7. People's Association
8. Republic Polytechnic
9. Singapore Management University
10. Singapore Polytechnic
11. Temasek Polytechnic
12. Yale-NUS College

Service Providers

Facilities Management Companies

1. C&W Services Pte Ltd
2. CBM Pte Ltd
3. CBRE GWS Pte Ltd

4. CPG Facilities Management Pte Ltd
5. EM Services Pte Ltd
6. ENGIE Services Singapore Pte Ltd
7. Fonda Global Engineering Pte Ltd
8. Guthrie FMC Pte Ltd
9. Indeco Engineers (Pte) Ltd
10. ISS Facility Services Pte Ltd
11. Jardine Engineering (Singapore) Pte Ltd
12. Jones Lang LaSalle (JLL)
13. Raffles Quay Asset Management Pte Ltd
14. SMM Pte Ltd, a member of Surbana Jurong Group
15. Synergy FMI, a subsidiary of Certis

Technology Providers

1. Barghest Building Performance Pte Ltd
2. Carrier Singapore (Pte) Ltd
3. Combuilder FMIT Pte Ltd
4. Daikin Airconditioning (Singapore) Pte Ltd
5. Echol Tech Pte Ltd
6. Eutech Cybernetic Pte Ltd
7. FacilityBot Pte Ltd
8. Gabkotech Innovations Pte Ltd
9. Habitap Pte Ltd
10. IBASE Technology Pte Ltd
11. Johnson Controls
12. Measurement & Verification Pte Ltd
13. Natflow Pte Ltd
14. Really Pte Ltd
15. Schneider Electric Singapore Pte Ltd
16. Singapore Telecommunications Ltd
17. Swipetask Pte Ltd
18. Tachyon Tech Solutions Pte Ltd
19. V3 Smart Technologies Pte Ltd