

Pillars

WE SHAPE A **SAFE**, **HIGH QUALITY**, **SUSTAINABLE** AND **FRIENDLY** BUILT ENVIRONMENT | ISSUE 01/JAN—FEB 2013



**A PROMISING OUTLOOK FOR
THE BUILT ENVIRONMENT SECTOR**

Pillars

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LOOKING TOWARDS 2013

Dear Readers,

"Do Something." These two words struck a chord with me when a staff from the National Council of Social Service spoke about corporate social responsibility at a recent BCA staff event.

At the start of each year, BCA organises a communication session for its staff to update them on the agency's key focus areas, and more importantly to thank them for their contribution and dedication. Likewise, my appreciation also goes out to all the industry members – builders, developers, architects, engineers, surveyors, green building professionals, project managers and workers for their relentless contribution towards achieving the best built environment for Singapore.


The industry's efforts have paid off with S\$28.1 billion of contracts awarded last year, whilst maintaining a yearly contribution to Singapore's GDP at 3–5%. There is no doubt that the built environment sector is a promising one, with estimates of between S\$20 billion and S\$28 billion worth of contracts to be awarded annually in 2014 and 2015.

So what's next for 2013? We will continue to press on with our sustainability, productivity and accessibility initiatives, by reaching out to more firms and creating greater public awareness.

And it all starts with a vision.

Despite facing challenges in the industry, we have proved that we can still make strides as long as we are determined to move forward. It could be a new approach towards business operations or pursuing new market opportunities. Regardless of the challenges presented to us, we have to keep trying and remain focused on our targets.

It is my wish that more companies will be inspired to take a leap of faith and look at possibilities rather than limitations. So let us work together in making 2013 an even more memorable year ahead.

On behalf of BCA, I wish you a happy and prosperous new year. 



Dr John Keung
Chief Executive Officer

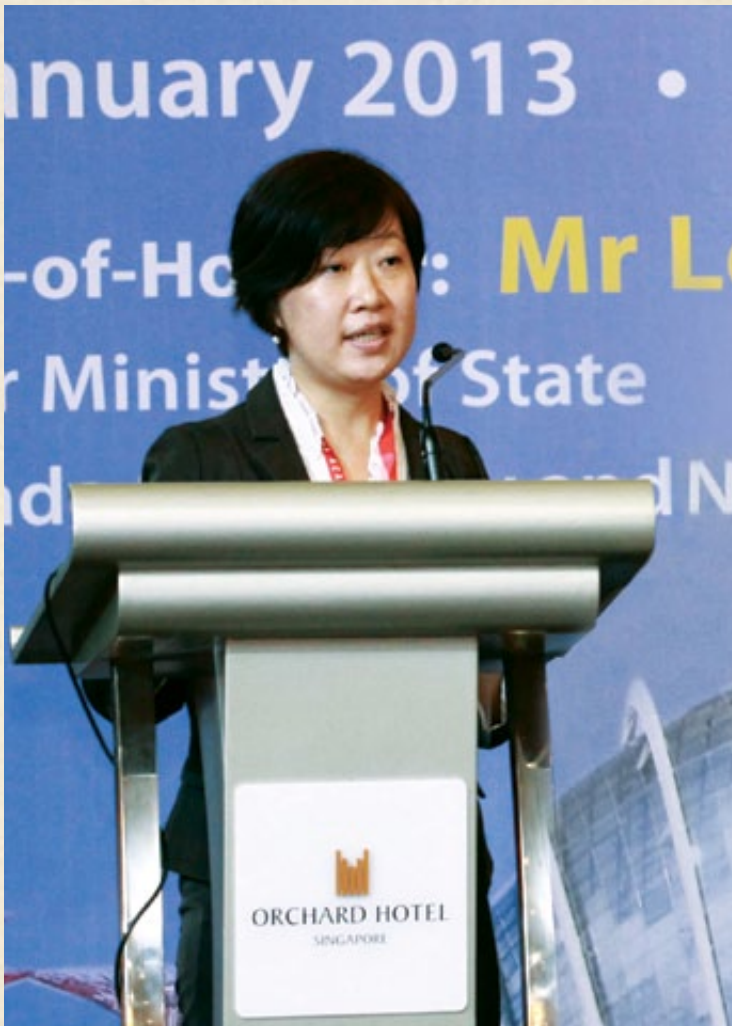


2013: A PROMISING OUTLOOK FOR THE BUILT ENVIRONMENT SECTOR

BCA AND INDUSTRY EXPERTS PRESENTED PROSPECTS, OPPORTUNITIES, AND CHALLENGES FOR THE CONSTRUCTION SECTOR IN SINGAPORE AND THE REGION TO 420 PARTICIPANTS AT THE BCA-REDAS BUILT ENVIRONMENT & PROPERTY PROSPECTS SEMINAR ON 16 JANUARY 2013



At the event, Mr Lee Yi Shyan, Senior Minister of State for Trade & Industry and National Development, noted that the construction sector is having one of its longest growth runs since Singapore gained independence. This growth momentum will likely be sustained into 2013, with total contracts to be awarded, reaching a possible S\$32 billion, fuelled largely by public housing growth and infrastructure construction works such as the Thomson MRT line. The large number of construction contracts that have been awarded mean high construction activity in the coming years. Mr Lee urged the built environment sector to restructure itself for increased productivity, citing two key areas, industry level and firm level, for consideration.



INDUSTRY LEVEL

“We need to consider how stakeholders in the construction value chain can better integrate with one another to achieve greater efficiency and cost effectiveness upstream and downstream. We ask the questions: Are there better ways to organise ourselves? Will we benefit from merging large numbers of small firms? Can we do with more specialised firms? How can we embrace buildability and constructability methodology faster? Can we adopt more advanced technology such as Building Information Modelling (BIM)? Can we consider using more pre-fabrication, locally or from overseas production bases to lower costs?”

FIRM LEVEL

“Can employers upgrade their workers’ skills? Can workers be trained to be multi-skilled? Can supervisors be trained to be better in workers’ deployment? Can more engineers be hired to improve project planning and execution? Can there be better use of technology, innovative methods, international best practices to reduce non-productive man-hours onsite and speed up construction time?”

Left | Ms Lo Yen Lee, Director, Business Development, BCA presented on Singapore’s construction prospects.



REVIEW AND OUTLOOK FOR CONSTRUCTION DEMAND & OUTPUT (YEAR 2012–2015)

YEAR	CONSTRUCTION DEMAND (VALUE OF CONTRACTS AWARDED)			CONSTRUCTION OUTPUT (PAYMENT MADE FOR WORK DONE)
	PUBLIC	PRIVATE	TOTAL	
2012 _p	S\$9.3 billion	S\$18.8 billion	S\$28.1 billion	≈ S\$31 billion
2013 _f	S\$14–17 billion	S\$12–15 billion	S\$26–32 billion	S\$31–33 billion
2014 _f	S\$11–14 billion per year	—	S\$20–28 billion per year	S\$22–30 billion per year
2015 _f	(60% from building projects & 40% from civil engineering projects)			

p : Preliminary f : Forecast

CONTRACTS AWARDED (EXCLUDING RECLAMATION) BY SECTOR & TYPE OF WORK

	IN BILLION DOLLARS				
	2009	2010	2011	2012 (PRELIMINARY)	2013 (FORECAST)
BOTH SECTORS	22.52	27.56	35.49	28.10	26.0–32.0
Building Work	13.50	24.54	28.75	23.48	19.4–24.3
<i>Residential</i>	6.73	11.49	15.30	10.84	10.3–12.3
<i>Commercial</i>	1.65	3.24	4.21	3.02	2.7–3.0
<i>Industrial</i>	2.04	4.79	6.22	4.71	2.6–4.3
<i>Institutional & Others</i>	3.07	5.03	3.02	4.91	3.7–4.7
Civil Engineering Work	9.02	3.02	6.74	4.63	6.6–7.7
PUBLIC SECTOR	13.90	8.55	15.28	9.33	14.0–17.0
Building Work	5.67	6.36	9.15	7.20	7.9–10.0
<i>Residential</i>	2.81	2.81	6.23	3.11	5.0–6.0
<i>Commercial</i>	0.07	0.18	0.05	0.10	0.1–0.1
<i>Industrial</i>	0.21	1.07	0.48	0.32	0.5–0.9
<i>Institutional & Others</i>	2.58	2.30	2.38	3.67	2.3–3.0
Civil Engineering Work	8.23	2.19	6.13	2.13	6.1–7.0
PRIVATE SECTOR	8.62	19.02	20.21	18.77	12.0–15.0
Building Work	7.83	18.18	19.60	16.27	11.5–14.3
<i>Residential</i>	3.93	8.68	9.07	7.73	5.4–6.3
<i>Commercial</i>	1.58	3.06	4.16	2.93	2.6–2.9
<i>Industrial</i>	1.83	3.72	5.74	4.38	2.1–3.4
<i>Institutional & Others</i>	0.50	2.73	0.64	1.24	1.5–1.7
Civil Engineering Work	0.79	0.83	0.61	2.50	0.5–0.7

Source: Building and Construction Authority, Singapore, as at 16 January 2013.

GOOD CAREER PROSPECTS IN THE BUILT ENVIRONMENT SECTOR



ATTRACTING MORE LOCALS

A recent survey by BCA found that 60% of built environment consultancies and contracting firms plan to increase hires in the next six months. Demand for civil, mechanical, and electrical engineers will be strong. Many vacancies will also be available at the Professional, Managerial, Executive, and Technical (PMET) level. The same survey also showed that over the past six months, wages in the built environment sector increased by 5–10%, and that there will be a further 5–10% wage increase in the next six months for most jobs in the sector, given strong construction demand. Recognising the need for local built-environment professionals to ensure the long-term growth of the industry, BCA looks to partners and industry players in building up the local talent pipeline.

SUSTAINING THE TALENT PIPELINE

BCA is expanding its suite of manpower development programmes to increase the breadth and depth of local talent pool. Two new manpower development initiatives were launched at the seminar:

- **BCA-Industry Built Environment Undergraduate Sponsorship (Full-time)**

This full-time undergraduate scholarship programme has been expanded to include sponsorship to reach out a larger pool of local students pursuing built environment courses at local universities, including the National University of Singapore, Nanyang Technological University, and the Singapore University of Technology and Design. Each awardee will receive a minimum of S\$10,000 per year during his/her study.

- **Built Environment ITE Scholarship**

This scholarship may be applied to 10 full-time built environment courses currently offered at ITE. It aims to attract young Singaporeans to pursue careers in the built environment sector at the foreman and junior supervisory levels. BCA will sponsor awardees' full course fees and provide them with a S\$500 monthly stipend. **P**

“The two new programmes are the latest additions to BCA’s comprehensive suite of manpower development programmes to meet the strong demand from the industry, and to attract and retain talents to pursue a meaningful and rewarding career in the built environment sector.”

DR. JOHN KEUNG, CEO OF BCA

GREEN BUILDING RESEARCH CAPABILITIES

NEW TEST-BED FACILITY AT BCA ACADEMY WILL EXPAND GREEN BUILDING RESEARCH CAPABILITIES

On 16 November 2012, BCA inked a partnership with the Lawrence Berkeley National Laboratory (Berkeley Lab) to build a facility for test-bedding green building technologies in Singapore. The new facility will be built at the BCA Academy and be modelled on Berkeley Lab's FLEXLAB (Facility for Low Energy Experiments in Buildings), located at Berkeley Hills. The new test-bedding facility at BCA Academy will be the first rotating research facility in Asia.

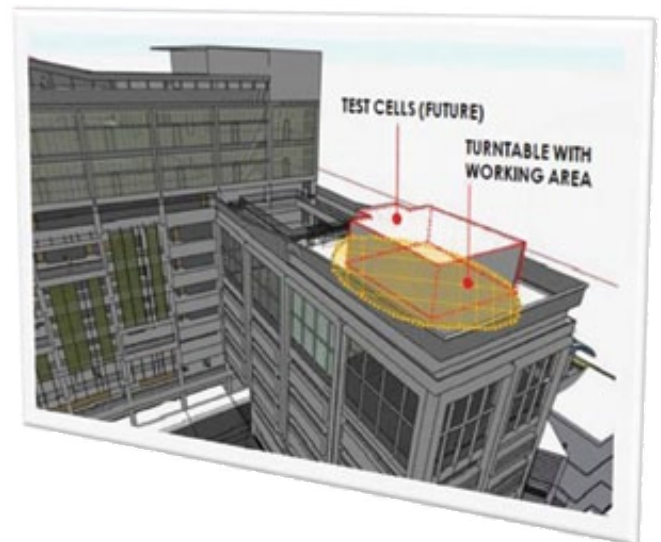
“As a champion of green building research, BCA actively pursues collaborations with world-renowned institutions to lead the region towards sustainable development in the tropics. Berkeley Lab’s scientific expertise has been recognised with 13 Nobel prizes, and we are confident that the collaboration will synergise their expertise in groundbreaking research with our experience in energy efficient buildings in the tropics. **This will further boost Singapore’s status as a leader in sustainable building solutions in this region.**”

DR JOHN KEUNG, CEO OF BCA

ABOUT THE UPCOMING FACILITIES:

- The new facility will allow building systems and components to be tested in “real-world” conditions.
- It will allow researchers and manufacturers to adjust configurations to test key building elements that impact energy consumption and building performance.
- The test-bed’s novel design will allow the solar impact on wall surfaces to be assessed, thus simulating the location of building sites with ease.
- Building elements that may be tested include high-performance building envelopes, advanced cooling and air distribution systems, next-generation lighting, and whole system integration through smart sensing and controls, as well as ventilation, lighting, walls, windows, and shading.

BCA will work closely with Berkeley Lab to tap on their expertise in areas including design and construction, data acquisition, and collaborative research projects in building the new lab. Singapore hopes to collaborate with the best to create more opportunities to develop our green building capabilities.



Top | Artist's impression of the new test-bedding facility.



ZERO ENERGY BUILDING CELEBRATES THIRD YEAR OF NET ZERO ENERGY CONSUMPTION

Launched in October 2009, BCA's Zero Energy Building (ZEB) has just turned three, and has achieved net zero energy use since its launch as well as a cumulated surplus of 40.8 MWh (megawatts-hour) of electricity to-date. As a hub for the study of energy efficiency and green buildings, ZEB has played a key role in test-bedding new green technologies in the region and will continue to do so.

Some of the new solutions that it is test-bedding include **Natflow's Passive Displacement Ventilation (PDV)**, **Inflector's thermal barrier for windows**, **Redwood System's advanced lighting control solutions**, **SinBerBEST's wireless sensing system**, and **3M's daylight redirecting film**. These green building solution providers have leveraged on ZEB's pro-enterprise platform to test-bed and fine-tune their solutions for the local market or to showcase actual product performances to prospective industry clients. **P**



Based on the national monthly average electricity consumption by HDB 5-room household of 465 kWh (kilowatts-hour), the power surplus translates to savings of S\$126.80 per month for 87 units of HDB 5-room flats at residential electricity tariffs at 27.27 cents/kWh.

Top | Zero Energy Building at BCA Academy.



Top | Zero Energy Building's green roof.

Bottom | Photovoltaic panels.

NEW TECHNOLOGIES TO BE TEST-BEDDED AT ZEB

PASSIVE DISPLACEMENT VENTILATION (PDV)

- Natflow's innovative solution delivers air-conditioning to occupants using buoyancy without the use of fans.
- A classroom test-bedding found that the technology required further improvement to induce more air movement and increase comfort and circulation in the space.
- Natflow's PDV won the Asean Energy Award 2012, and it used the lessons learnt from tests at ZEB to improve their product, which subsequently gained acceptance for deployment by the Nanyang Technological University.

WIRELESS SENSING SYSTEM

- SinBerBEST has begun remote environment sensing trials at the ZEB test chambers.
- The trial is meant to connect remote test-labs like ETH BubbleZero and ZEB test chambers to a central monitoring server at CREATE Campus, so that building technology researchers can share data and align future research activities on facades or Indoor Environment Quality.

INFLECTOR THERMAL BARRIER

- Inflector is an innovative film developed by NASA for space travel.
- Incorporating a magnetic strip that enables it to be easily installed onto existing metal windows provides a reduction in heat absorption and glare.
- Test-bedding revealed that while it helps to reduce some glare, penetrating glare still occurs when the sun is at a very low angle (e.g. in the late evening).
- No significant impact to heat reduction was detected.

LIGHTING CONTROL SYSTEM

- Redwood's lighting control system stands out for its innovative use of data cables to power and control lights, thus saving on wiring costs.
- Each light fitting comes with its own sensor and can be dimmed according to the amount of natural light a space receives to reduce energy consumption.
- The energy performance, financial savings, and visual comfort afforded by the Redwood lighting system will continue to be observed during its installation in the Centre for Sustainable Buildings and Construction.

DAYLIGHT REDIRECTING FILM

- 3M's daylight redirecting film has an engraved edge that redirects external daylight upwards, reducing the glare to room occupants.
- This film has been installed in one of ZEB's classrooms and is currently being analysed.

TRANSFORMING SINGAPORE INTO A GREENOPOLIS

BCA WILL HAVE TRANSFORMED ALMOST 131 HA OF LAND INTO GREEN DISTRICTS UNDER ITS GREEN MARK FOR DISTRICTS SCHEME INCLUDING THE LATEST AWARD TO JTC CORPORATION, FOR ITS CLEANTECH PARK



Right | Artist's impression of CleanTech Park.

The latest development to clinch BCA's Platinum Green Mark for Districts Award, JTC's eco-business park has been recognised for its energy-efficient infrastructure and public amenities that have the potential to cut energy consumption by 40% or more and potable water usage by 25%. This translates to about an annual 40% cost savings for utilities.

ABOUT CLEANTECH PARK

- Specially designed with a "blue network" of water bodies including streams, bioswales, and ponds running through the park.
- An estimated 150,000 litres of storm water will be stored yearly for sanitary flushing, resulting in a 25% reduction in potable water usage.
- A central Green Core will be the "green lung" of the eco-business park, allowing visitors to enjoy local flora and fauna. The Green Core was the first development in Singapore to achieve the BCA-NParks Green Mark Platinum award in the New Parks category in May 2011.
- Compact and pedestrian-friendly district pattern with sheltered walkways that enable ease of mobility within the eco-business park. Secure bicycle parking facilities will be installed to encourage eco-friendly modes of transportation via green cyclist tracks within the park.

ABOUT BCA GREEN MARK FOR DISTRICTS

- Launched on 29 October 2009.
- A green rating scheme that promotes and recognises environmentally friendly and sustainable practices in master planning, design, and implementation of district developments.
- Emphasises energy and water efficiency in infrastructure, public amenities, environmental planning, green buildings, and green transportation.

The Green Mark for Districts complements other BCA Green Mark schemes such as the Green Mark for Residential Buildings, Green Mark for Non-Residential Buildings, Green Mark for Parks, and Green Mark for Office Interiors, among others.

KEY BENEFITS

- Enables individual buildings to leverage on a more sustainable platform, leading to better environmental performance and cost effectiveness.
- Based on data from past certified projects, Green Mark for District projects can achieve 10–40% energy savings and water savings of more than 40%.

WHO IT IS FOR?

District developments, typically districts with mixed uses and a land area of at least 20 ha (200,000m²). Examples include residential districts, commercial districts, and industrial districts/business parks.

EXAMPLES OF GREEN FEATURES

- Site planning and building orientation that minimises heat gain or loss with passive solar strategies to reduce the energy demand.
- Energy-efficient fittings for infrastructure and public amenities such as the use of LEDs as streetlights.
- District level energy monitoring and automated control through the Intelligent Energy Management System (iEMS) minimises the energy consumption during off-peak hours.
- Masterplan layout that optimises and enhances natural characteristics of the site including a road layout planned with the current topography in mind, minimising need for cut-and-fill.
- Holistic storm water management for entire district aligned with PUB's ABC Water Design Guidelines. **P**




OBSERVE WINDOWS SAFETY IN 3 EASY STEPS: CLEAN, CHECK, & CHANGE

WINDOWS CAN DETERIORATE OVER TIME AS THEY ARE SUBJECT TO WEAR AND TEAR DUE TO FREQUENT USAGE. IF NOT MAINTAINED PROPERLY, THEY MAY FALL OUT, POSING DANGER TO PUBLIC SAFETY



To drive home the message of window safety in three easy steps, BCA has earmarked 6 June and 12 December as dates for the observance of window safety, better known as “6/6 and 12/12 Window Safety Days”.

Since 2009, the campaign has made its presence felt through roving exhibitions at various town councils, advertisements on buses and in newspapers, and the distribution of toolkits for window maintenance. This year, BCA was featured on a morning talk show on MediaCorp Channel 8, educating and reminding homeowners to check and maintain their windows at least once every six months.

Roving exhibitions showcase a booth with simulated sliding and casement windows as well as tips on window maintenance in the four national languages. 

Left | BCA distributed windows maintenance toolkits to encourage homeowners to check their windows.



NOTE:

Since 2012, BCA has conducted 10 roving exhibitions at various housing estates in Haig Road, HDB Hub, Kallang, Bukit Gombak, Fajar Square, Yishun, Clementi, Woodlands, and Bedok South. The recent one took place at Braddell Heights. Mr Seah Kian Peng, MP for Marine Parade GRC was the Guest of Honour for this event.

Top | BCA's windows safety exhibition booth at Serangoon Central.

Left | At the exhibition, BCA officers demonstrated window maintenance techniques and addressed queries from homeowners on window safety and maintenance.

HOUSEHOLD AND STOREY SHELTERS

300,000 HOMES IN SINGAPORE ARE EQUIPPED WITH HOUSEHOLD OR STOREY SHELTERS



Since 1 May 1998, the Civil Defence Shelter Act requires mandatory household or storey shelters to be fitted in new residential developments. One of the earliest flats built with household shelters were those in Choa Chu Kang.

PROVISION OF A HS OR A SS

Household shelters (HS) are provided in landed houses whereas either household and/or storey shelters (SS) can be provided in non-landed residential developments.

The Household Shelter is provided in a dwelling unit and is typically the store-cum-pantry. The Storey Shelter is located in a common area of every storey and serves the residents residing on that storey.

QUICK FACTS ABOUT HS AND SS

- HS and SS provide protection against weapon effects.
- HS and SS must be located such that their walls are at required setback distance from the building line.
- Walls, floor, and ceiling are strengthened with increased thickness.
- Protective steel door is used.

BCA'S CONTRIBUTION TO HS AND SS IN SINGAPORE

BCA is the technical authority that provides technical advice on technical requirements for HS, SS, and public shelters (PS). In regulating of design and construction of shelters, BCA processes and issues notices of approval for shelter plans and commissioning.

TECHNICAL REQUIREMENTS FOR HOUSEHOLD SHELTERS 2012

BCA and SCDF jointly reviewed and launched the "Technical Requirements for Household Shelters 2012 (TR HS 2012)" on 15 August 2012. Several initiatives were implemented in the TR HS 2012 in an effort to raise design efficiency and construction productivity.

Feedback and ideas gathered from dialogue and consultation sessions with architects and professional engineers were studied, refined and incorporated (where relevant and feasible) as part of the technical requirements without compromising the protection levels of household shelters. **P**

Top | Dialogue session with Qualified Persons on 20 November 2012.

SOME HIGHLIGHTS OF THE ENHANCEMENTS ARE:

- Reduce setback distance by expanding the range of the storey height to between 3100mm and 3400mm (Figure 1).
- Add more figures to illustrate acceptable designs e.g. household shelters with adjacent air wells in landed properties or adjacent lift wells/ service ducts for buildings (Figure 2).
- Revise the clearance height of household shelters so that the minimum wall thickness and reinforcement bar requirements can be standardised for both private and public housing.
- Provide acceptable structural layouts for shielded or unshielded transfer structures supporting household shelter towers.
- Use welded steel mesh (Figure 3) in place of hot-rolled rebars for the wall and slab of household shelter to speed up the reinforcement bar fabrication process and raise construction productivity.

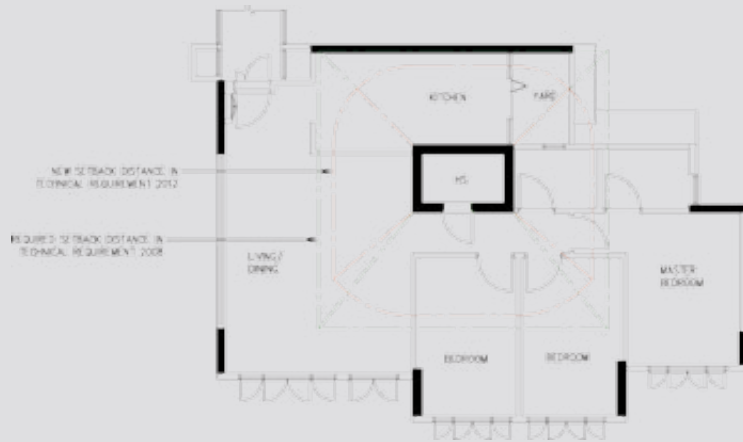


FIGURE 1

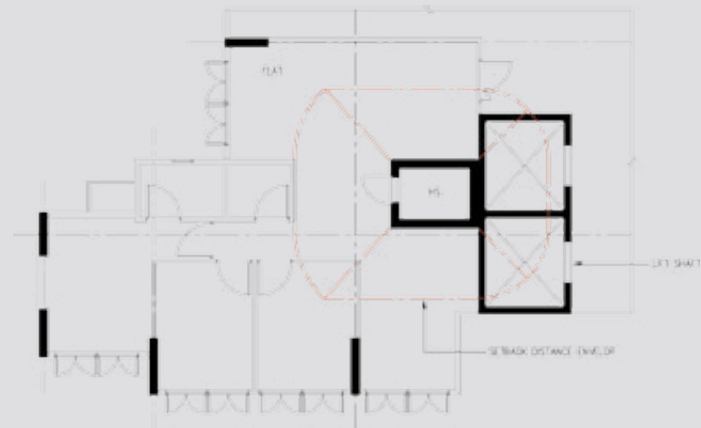


FIGURE 2

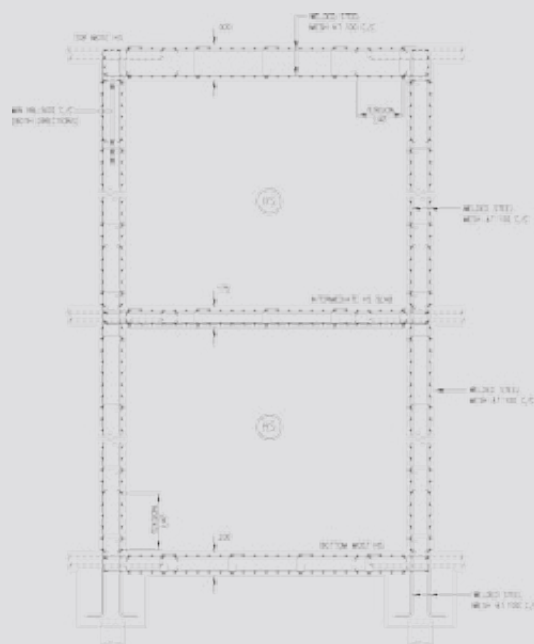


FIGURE 3

Top | Figure 1: Household Shelter with reduced setback distance.

Left | Figure 2: Household Shelter with adjacent lift well/service duct for non-landed buildings.

Right | Figure 3: Welded steel mesh detail for household shelter wall and slab.

COMMENCEMENT OF THE BUILDING CONTROL (AMENDMENT) ACT 2012

AMENDMENTS TO THE BUILDING CONTROL ACT (CHAPTER 29) WERE PASSED BY PARLIAMENT IN SEPTEMBER 2012. FIND OUT HOW AND IF THESE AMENDMENTS AFFECT YOUR PROJECTS



HIGHLIGHTS

WHAT	PROVISION
Section 2(1) Underground building works	<ul style="list-style-type: none"> • Renamed “geotechnical building works”. • This category of works now includes any earthworks or other building works for constructing or stabilising a slope with a height of more than six metres (measured as the vertical distance between the highest and lowest levels of the slope).
Owner	<ul style="list-style-type: none"> • “Owner” now includes any person named in the valuation list or any person registered in the land register.
Plans	<ul style="list-style-type: none"> • “Plans”, in relation to any building works, include digital representations that are generated from Building Information Modelling (BIM).
Section 7(1)(c) <i>For Small-Scale Building Works</i> (building works with a project value of less than S\$7.5 million)	<p>All critical structural works such as concreting, piling, pre-stressing or tightening of high-friction grip bolts must be supervised by at least a resident technical officer.</p> <p>These critical structural works now also include the construction of earth retaining and stabilising structures (ERSS).</p>

CONSTRUCTION OF EARTH RETAINING AND STABILISING STRUCTURES


Scope of works that require immediate supervision by a qualified site supervisor

NO.	TYPE OF ERSS WORKS	REQUIRING IMMEDIATE SUPERVISION
1.	Construction of an earth retaining wall	All installation works of the earth retaining wall, including capping beams.
2.	Construction of lateral support systems	All installation works of the elements to support the excavation, including: <ul style="list-style-type: none"> • struts and walers; • king posts; • soil nails; • ground anchors and walers; • ring beams; • temporary and permanent slabs, or any other type of lateral support element.
3.	Excavations	All excavation works (including slope cutting) for any area where the instrumentation readings (lateral movements, support loads, or settlement) have exceeded the alert level.

ELABORATION ON IMMEDIATE SUPERVISION

In performing immediate supervision of ERSS works, the qualified site supervisor is required to ensure that the following are carried out:

- (1) **Ground improvement or strengthening works**
Works are carried out in full compliance with the specifications shown in the approved drawings.
- (2) **Instrumentation and monitoring**
Instrumentation readings are taken in accordance with the frequency as stated in the approved drawings.
- (3) **Protective measures associated with ERSS works**
Protective measures are taken in accordance with the details specified in the approved drawings.
- (4) **Daily inspection of ERSS works**
No less than one inspection per day to ensure the works and activities associated with the construction of the ERSS (including excavation) are being carried out in accordance with the approved plans, including the sequence of any excavation.

For clarifications, please email bca_enquiry@bca.gov.sg or call 1800 342 5222. 

BREEF SCHEME

THE BUILDING RETROFIT ENERGY EFFICIENCY FINANCING (BREEF) SCHEME WAS LAUNCHED IN OCTOBER 2011 TO HELP BUILDING OWNERS WITH OBTAINING THE UPFRONT CAPITAL REQUIRED FOR ENERGY-EFFICIENCY RETROFITTING PROJECTS

Under this scheme, BCA partners with financial institutions such as Standard Chartered Bank, United Overseas Bank, Orix Leasing Singapore, and IFS Capital to provide building owners or Energy Services Companies (ESCOs) with credit facilities to fund the retrofitting under an Energy Performance Contract (EPC) arrangement.

North Bridge Centre’s managing agent, Mr Lim Hian Yew commented, “BREEF helps to offset the project’s [initial] costs. The project enjoys better cash flow from the onset, and energy cost savings can be used to fund the instalment plan.” G-Energy Global, the consultant behind North Bridge Centre’s retrofitting works, finds the arrangement to be a win-win situation for its client. **P**

SCHEME DETAILS

Maximum Loan Quantum per Loan	Up to S\$5 million
Interest Rate	Financial Institution to decide. Minimum at 3.5%
Maximum Loan Tenure	>18 months, < 8 years
Validity	2 years or 15 approved loans; whichever is earlier

“With BREEF, the building enjoys energy savings, new equipment, and improved indoor air quality with minimal initial cash outlay.”

MR VINCENT LOW, VICE PRESIDENT OF G-ENERGY GLOBAL.

Some of the successful case studies:

			
Building	North Bridge Centre	Tong Eng Building	Bukit Timah Plaza
Annual Energy Savings	816,000 kWh or approx S\$212,000	1.2 million kWh or approx S\$312,000	1 million kWh or approx S\$260,000
Improvement in Efficiency (kW/RT)	From 1.5 to 0.65	From 1.5 to 0.58	From 1.5 to 0.58

BCA-SMU-WDA ADVANCED MANAGEMENT PROGRAMME ON PRODUCTIVITY AND LEADERSHIP DEVELOPMENT



CAN FIRMS FAIL BY GROWING TOO FAST? HOW DO COMPANIES BECOME INDUSTRY LEADERS? HOW CAN COMPANIES IMPROVE THEIR PRODUCTIVITY AND INNOVATION CAPABILITIES?

Using industry-specific case studies, industry-leading firms will share answers to these questions at the programme's next intake on 22 March 2013.

Spread over 10 weeks, the 12-day programme is tailored for the built environment industry. It aims to provide participants with a broader strategic vision of the construction business environment, especially at a time when the industry is experiencing growing complexity and increased competition.

If time is a constraint, participants have the option to sign up for individual modules based on their needs. **P**



COURSE DETAILS

PARTICIPANTS' PROFILES

Builders, Consultants, Developers, and Owners, Architects, Building Materials/Equipment Suppliers

COURSE FEE SUBSIDY

The Singapore Workforce Development Agency (WDA) will provide a course fee subsidy, capped at S\$6,000, to participants of the full programme who have attained the Certificate of Successful Completion of the BCA-SMU-WDA Advanced Management Programme on Productivity and Leadership Development. Terms and Conditions apply.

CERTIFICATE OF COMPLETION

Participants who achieve at least a 75% class attendance will receive a Certificate of Completion.

VENUE

Singapore Management University

For more information, please visit BCA Academy at www.bcaa.edu.sg

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Top 1 Graduates of 2012 with Dr John Keung, CEO of BCA (first row, fifth from right) and Mr Lee Chuan Seng, Deputy Chairman of BCA.

EVENT LINE UP

Sustainable Hot Water & Heat Recovery Systems (3rd Run)

23 FEB

Green Mark Professional (GMP) 2013 Programme

25 FEB–20 AUG

(Registration closes on 18 FEB)

Pile Foundations Design and Construction for Engineers (20th Run)

26, 28 FEB, 5 & 7 MAR

Internal Audit (QEHS) Course based on Quality ISO 9001, Environmental 14001 & Health & Safety OHSAS 18001 (13th Run)

26, 28 FEB, 5, 7, 12 & 14 MAR

BizSAFE Workshop for Company CEO/Top Management (19th Run)

26 FEB

Behavioural Safety for the Construction Industry (9th Run)

28 FEB & 1 MAR

Workshop on Programme Risk Management – Technical Use of Programmes to Control, Manage and Optimise the Project (3rd Run)

28 FEB

Requirements for Environmental Sustainability in Buildings and The Green Mark Scheme (22nd Run)

1 MAR

Workshop on Indoor & Outdoor Lighting with Light Emitting Diode (7th Run)

4 & 5 MAR

Certification Course in BIM Modelling (Structure Track) (29th Run)

4–7 MAR

Graduate Certificate in Workplace Safety and Health (5th Run)

4 MAR–19 AUG

(Registration closes on 7 FEB)

Workshop on Site Management of Precast Concrete Construction (9th Run)

11–14 MAR

Understanding the Green Mark Criteria for Existing Building and Office Interior (20th Run)

6 MAR

Certification Course for Universal Design Assessors (3rd Run)

7, 8, 11 & 12 MAR

(Assesment date: TBC)

Code of Practice on Buildable Design

8 MAR

GMP-ELECTIVE – Maximising Green Design Through Building Automation (11th Run)

11 MAR

Certification Course in BIM Modelling (Architecture Track) (30th Run)

4–7 MAR

Develop A Risk Management Implementation Plan (bizSAFE Level 2) (66thRun)

14 & 15 MAR

Refresher Course for Licensed Electrical Workers (Electrical Technicians/Electrical Engineers) (17th Run)

19 MAR

SMU-BCA-WDA Productivity and Leadership Development Programme 2012 (5th Intake)

22 MAR–18 MAY

2-Day BIM Planning Course (Building Developers and Facility Managers) (4th Run)

26–26 MAR

Essential Knowledge in Local Regulations and Construction Practices (18th Run)

25, 26 & 27 MAR

GMP-CORE – Efficient Building Envelope Design, ETTV & RETV (11th Run)

27 & 28 MAR

Master of Science in Sustainable Building Design by The University of Nottingham (5th Intake)

Starting in SEP

(Registration closes on 30 APR)

Master of Science in Facility and Environment Management by University College London (4th Intake)

Starting in SEP

(Registration closes on 17 MAY)

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Master of Science in

2013 INTAKE

FACILITY & ENVIRONMENT MANAGEMENT

ADVANCE WITH WORLD CLASS EDUCATION



Partnering with the University College London (UCL) to deliver the first global postgraduate Master of Science degree in Facility and Environment Management, UCL at the BCA Academy provides an outstanding and distinctive environment for graduate study. Guided by principles of excellence and innovation, this programme offers a unique opportunity enabling you to achieve your personal goals.

For more details, please call **6248 9824** or visit www.bcaa.edu.sg/MScFEM.aspx.



Master of Science in

2013 INTAKE

SUSTAINABLE BUILDING DESIGN

A POSTGRADUATE PROGRAMME FOR GREEN PROFESSIONALS IN SINGAPORE



The Master of Science in Sustainable Building Design is a 2-year part-time programme jointly organised by the University of Nottingham, UK, one of the top universities in the world, and the BCA Academy. This programme aims to build up a talent pool of green building professionals with expertise and capabilities in the area of green building design.

For more details, please call **6248 9824** or visit www.bcaa.edu.sg/MScSBD.aspx.