

2015 Exhibition of School Planning and Architecture



West Spring Primary School

at Bukit Panjang, Singapore

Category: New Construction

West Spring Primary School

Engaging Young Minds

The project challenge was to create spaces within the built environment that continually *stimulate students' curiosity* in mathematics, arts and culture, linguistics and sports; to create *FUN* spaces to keep young minds captivated and to *promote lifelong learning*.

For the Ministry of Education of Singapore, the pilot project seeks to advance primary school education in Singapore in terms of *Flexibility in Learning Spaces, Co-Sharing of Facilities, Optimising Land Use and Environmentally Sustainable Initiatives*.



Main Site Plan

1. Block A : Administration Block (4 storey)

- 1a Main Vehicular Drop-Off & Entrance Foyer
- 1b General Office, P3-P6 Staffroom & Heads of Department & Media Resource Library
- 1c Roof : Media Resource Library Deck

2. Block B : Primary 3 – Primary 6 Learning Cluster (6 storey)

- 2a Dedicated P3-P6 Classrooms with Special Teaching Rooms
- 2b Roof : Photovoltaic Panels

3. Block C : Primary 1 – Primary 2 Learning Cluster (4 storey)

- 3a Dedicated P1-P2 Classrooms
- 3b Dedicated P1-P2 Special Teaching Rooms & Reading Room

4. Block D : 'White Cube' Block (5 storey)

- Lower Ground : Parade Square & Basketball Court
- 1st Storey : Canteen
- 2nd Storey : Co-Curricular Activity Rooms, Dental Clinic, Health & Fitness Room
- 3rd Storey : Indoor Sports Hall, Multi-Purpose Hall & Performance Centre
- 4th Storey : Special Teaching Room & Learning Deck
- 5th Storey : IT Hub
- Roof : 80 x 40m Open Play Field

5. Outdoor Learning Facilities

- 5a Outdoor Experiential Learning Garden
- 5b Scented Garden
- 5c Chess Garden
- 5d Kindergarten Playground
- 5e Orchard Garden
- 5f Primary Playground
- 5g Poisonous, Carnivorous & Desert Circle Garden
- 5h Lego Garden

6. Services Buildings

- 6a Guard House with Parent Waiting Area
- 6b Electrical Sub-Station
- 6c Bin Centre

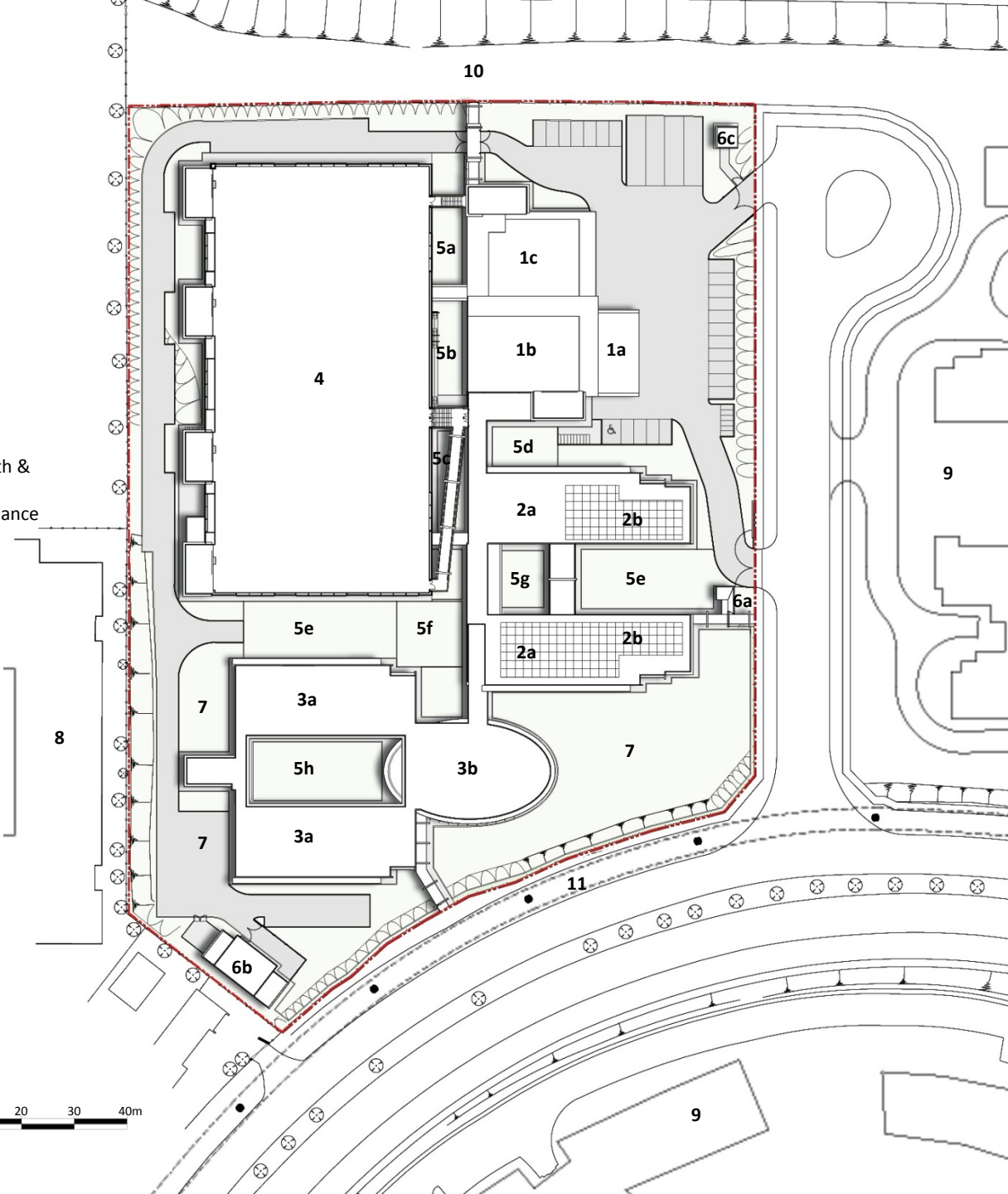
7. Future Expansion Land

8. Zhenghua Secondary School

9. Residential Apartments

10. Park Connector

11. Light Rail Transit (LRT)



Community

Age Focused Building Blocks

The younger students in Primary 1 & 2 experience a more 'Hands On' curriculum compared to Primary 3 to 6 students. Although the learning areas are flexible enough to work for both age groups, each age group functions within a customised dedicated building block planned according to the different curriculum needs.

The Primary 1 & 2 students are placed in a lower building block only 4 storeys high to facilitate ease of movement compared to Primary 3 to 6 students who travel vertically in a 6 storey high building block.

Each age focused block has its own centre of community; the internal corridors look down and open out to a customised outdoor learning courtyard.

For the Primary 1 & 2 students the orange – reddish tone colours of the block are brighter and more exciting with a Lego themed courtyard. A playful elliptical plan creates a landmark at the corner of the site whilst housing dedicated Primary 1 & 2 Programme for Active Learning (PAL) Rooms with PAL Deck and a Reading Room that opens out onto a Contemplation Deck.

A more subdued and mature blueish tone identify the Primary 3 to 6 building block with a Poisonous, Carnivorous & Desert Circle themed garden courtyard at its centre. The dedicated special teaching rooms are spread vertically, punctuated by bridges at the centre of the block on the 3rd and 5th storey that acts as elevated breakout areas.

This differentiation in building blocks provides identity; a strong sense of belong to a community.



Community

Vibrant Heart of the School

The Canteen is a vibrant double volume space with a mezzanine floor above. Student are free to spill over onto the amphitheater steps that connects to the large covered Parade Square & Basketball Court.

Apart from being a full school assembly area the Parade Square & Basketball Court are an all weather covered activity space supporting a 200m running path and netball court.



Community

Green Spine

A Green Spine; a 3.0m wide corridor and an 8.0 meter wide planted green learning activity spaces connect all the building blocks together. Students flow between these blocks and spill out onto the green spine for their collaborative learning activities.



Learning Environment

Flexibility In Learning Spaces

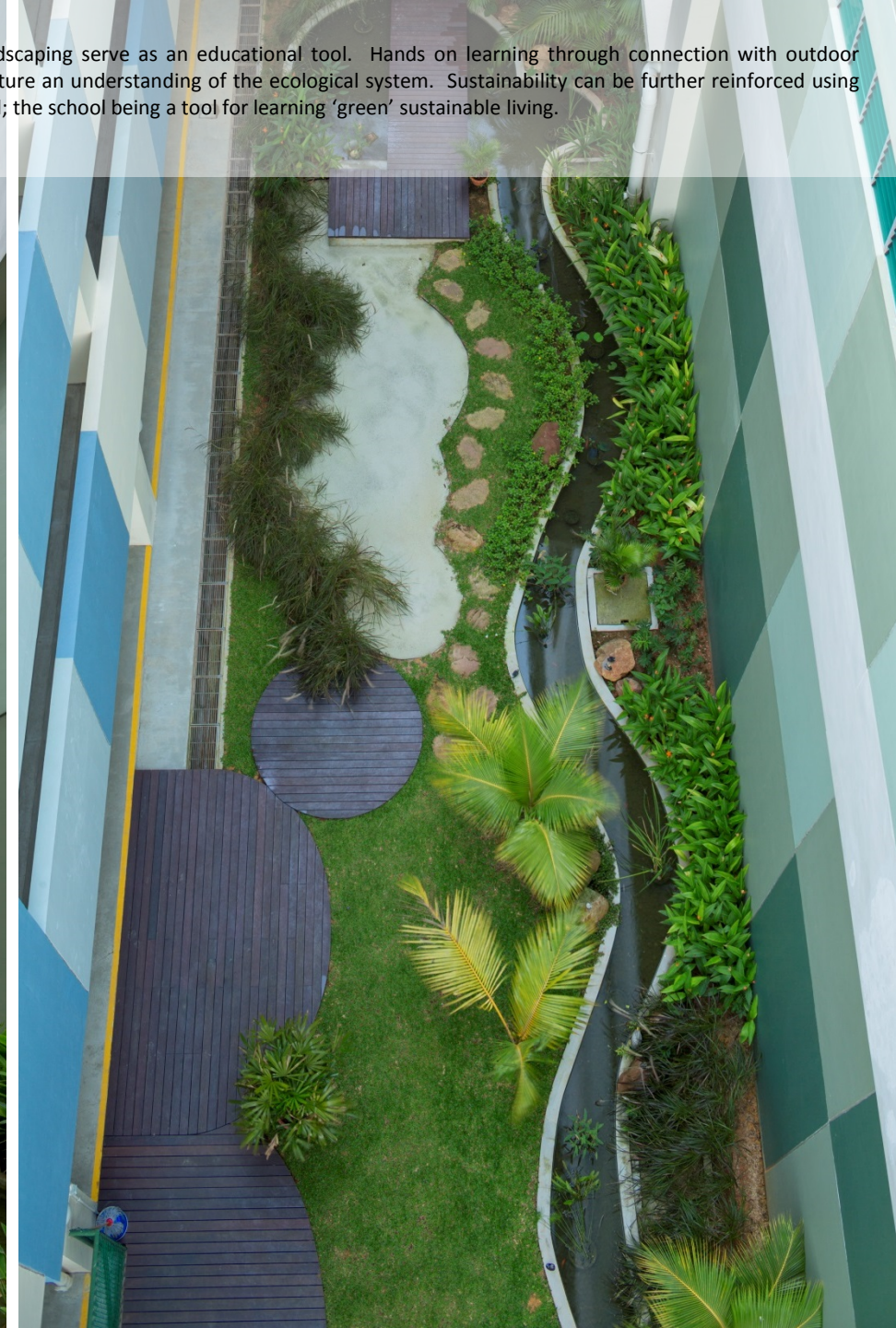
All learning spaces are designed for more than one function. For example in the Media Resource Library (MRL) the original Ministry of Education brief allows for the furniture to be pushed to one side and converted to a Performing Arts Studio. This concept has been expanded. The MRL now also opens out onto an outdoor learning deck. On the deck, the top of four solar tubes protrude within a green landscape providing light to the storey below, while similarly the MRL is brightly lit with solar tubes encouraging students to learn sustainability through the examples in their built environment.



Learning Environment

Outdoor Experiential Learning

The buildings and landscaping serve as an educational tool. Hands on learning through connection with outdoor landscaped spaces nurture an understanding of the ecological system. Sustainability can be further reinforced using the building as a model; the school being a tool for learning 'green' sustainable living.





Learning Environment

Rethinking Large Spaces

The Multi-Purpose Hall and Indoor Sports Hall are divided by a folding sliding door for separation and simultaneous different usages of both spaces. When the folding sliding doors are pushed to the side, the single space offers greater flexibility to cater for larger functions, events and ceremonies.

The previously under utilised Multi-Purpose Hall Backstage is now shared with the Band Room and Dance Room providing another smaller space for more intimate plays and performances.

Physical Environment

Environmentally Sustainable Initiatives

West Spring Primary School is one of four Ministry of Education schools to first achieve **Green Mark Platinum** the highest sustainability award from the *Singapore Building & Construction Authority*.

The responsibility and stewardship for our planet is in everyone's hands. Hence education should nurture understanding, commitment and continual development of future innovations to safeguard the ecological system which we know today.

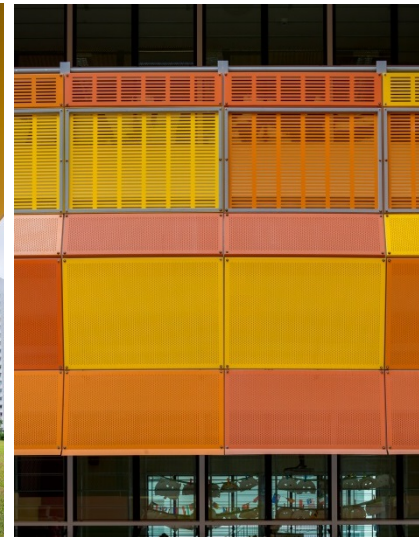


Physical Environment

Environmentally Sustainable Initiatives

Some of the green features incorporated includes:

- **Good Building Orientation** - Planned to minimise west facing façades, with all the naturally ventilated classrooms in an east-west orientation.
- **Enhanced Envelop Thermal Transfer Value** - Using a combination of good u-values to roofs, sun-shading devices to air-conditioned areas & double glazing)
- **Reduced Heat Island Effect** – Through cool paints to external building envelop
- **More Efficient & Sustainable Air Conditioning System** - As air-conditioned spaces only make up 13% of the GFA and the peak building cooling load is <500 RT, hence an efficient VRV system with 0.71 kW/RT is used.
- **Maximising Natural Ventilation** - Using wind simulations 74.5% of classrooms are able to achieve good natural ventilation of 0.6m/s for two opposite wind directions. This improves the classroom environment with less use of mechanical ventilation.
- **Maximising Daylight & Efficient Use of Artificial Lighting** - All spaces extensively use T5 lighting with high frequency ballasts. The classrooms also have photo sensors to assist with energy efficiency. Solar tubes reduce the need for artificial lighting.
- **Sustainable Products** – Through Green labeled products.
- **Sustainable Construction** - Use of green cement, washed copper slag (WCS) & recycled aggregate concrete (RCA).
- **Non-Chemical Termite Protection** - An anti-termite metallic barrier system that is non-chemical & non-poisonous is used throughout the project.
- **Photo-Voltaic Cells** - Sun casting simulations were carried out to ensure minimal shadow from neighbouring buildings and adjacent M&E services. The PV cells generate 58,400 kWh/yr.
- **Water Saving Water Fittings** - With highest possible water saving rating.
- **Green Wall & Planting** - A green wall shelters the main corridor and classroom block from west facing sun.





Physical Environment

Environmentally Sustainable Initiatives

The buildings are planned with sufficient separation to maximise natural ventilation while still retaining the school identity.

An Education Corner showcases the cumulative green features that are evident in the building. Signage is also placed around green learning features further explaining the environmental concepts.

Planning Process

Timeline

The inception to completion of the project spanned over a challenging but rewarding 4 year period.

Feb 2010

MOE awards tender with kickoff meeting; providing site & brief.

Apr 2010

Consultants advise the site provided is not suitable due to the steep topography. Other sites are investigated. Project selected as one of two MOE schools for *Pilot Project*.

Oct 2010

2nd Workshop with MOE to test new ideas applied to site context.

Dec 2010

Presentation to MOE for review & approval of new ideas in Pilot Project.



Aug 2010

Concept Design & Cost Proposal Presentation to MOE for approval

Feb 2012

Building Plan Approval process commences

May 2012

Tender Awarded

Dec 2013

School moves in



MOE* Procurement

Change of Site

Feasibility Study / Design

Documentation & Tender

Construction

Operation

Jun 2009

Kick-off meeting with briefing for *Pilot Project – Design Ideas for New Schools*.



Sept 2010

1st Workshop with MOE working group to shape & agree on the new directions for Pilot Project.

Jul 2010

Consultants advise the best boundary configuration of current site. MOE negotiate with other government authorities in obtaining new land site.

Apr 2011

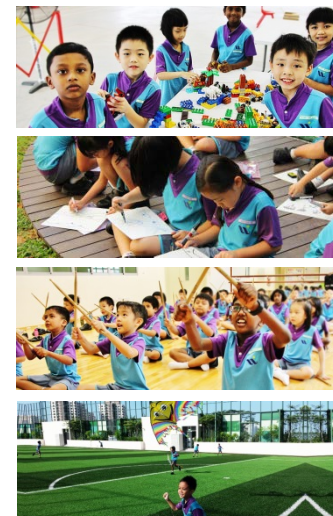
Presentation to Ministry of Finance and Development Projects Advisory Panel to seek design, value management review & funding approval.

Jan 2012

Project tendered with 17 tenders received. Tenders evaluated based on price submitted and track record of the builders.

Oct 2011

Planning Approval process commences



Jan 2014

School Commences

End 2009

MOE seeks project Consultants for new schools on green field sites. Each tender has two schools at different locations.

*Ministry of Education of Singapore

2009

2010

2011

2012

2013

2014

Planning Process

Design Feedback

Throughout the Feasibility Study varying ideas were investigated and developed. Each variation would be explained with pros and cons requiring the working group to voice their opinions and preferences before agreeing to move forward.

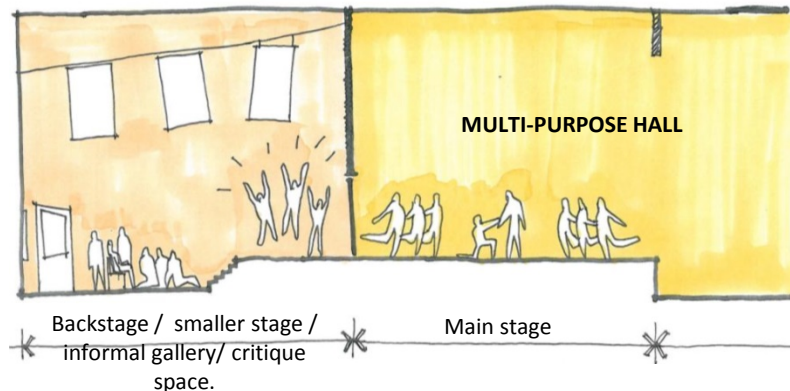
Site Planning

4 options were applied to the site to investigate the various permutations to the new directions:



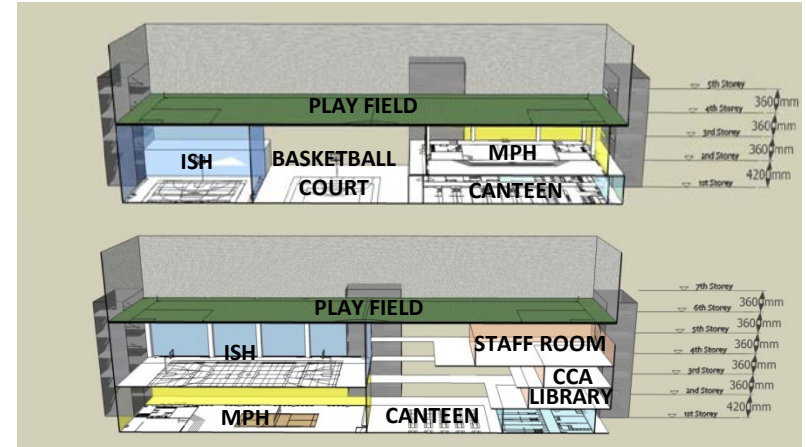
Rethinking the Multi-Purpose Hall

The backstage is used as a smaller stage, an informal gallery and critique space. The backstage was later developed to open into the Band Room to allow even greater flexibility.



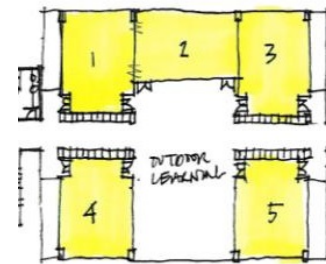
White Cube

Various configurations were investigated for the 'White Cube':



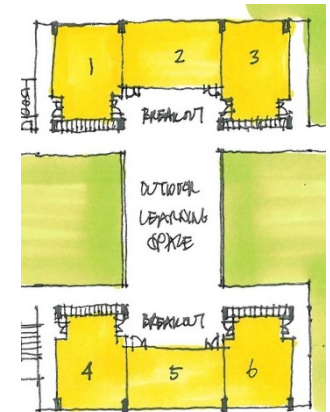
Community Within A Cluster

Planning ideas were bettered for natural ventilation, daylight and noise whilst still retaining the conceptual ideas.



Initial Approach:

- 2 cluster blocks required for 6 storey block
- Limited cross ventilation for rooms 1, 3, 4 & 5
- Limited daylight to corridor



Improved Approach:

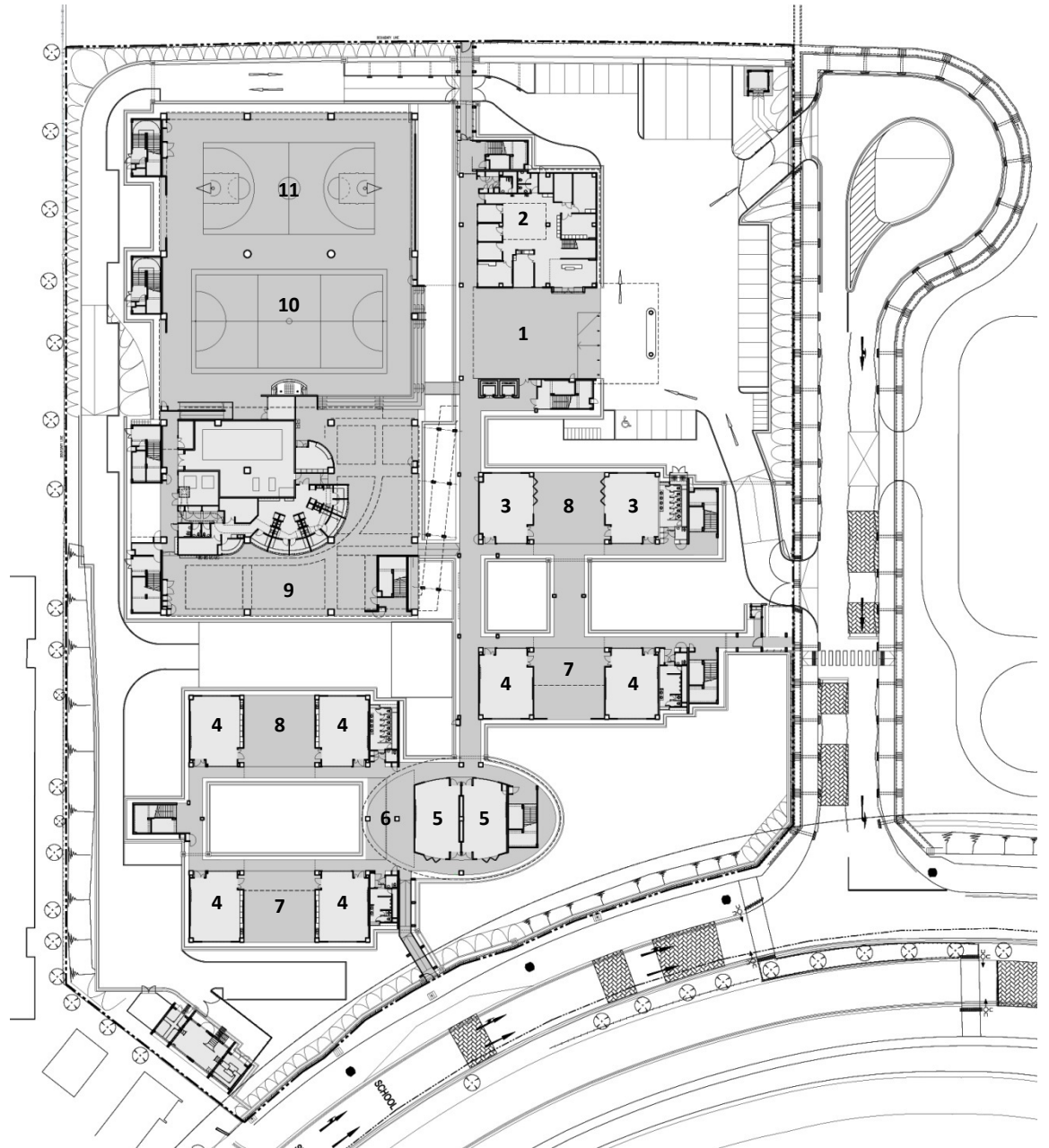
- 2 cluster blocks required for 6 storey block
- Cluster with separation for natural ventilation, daylight and noise separation

Floor Plans

1st Storey Plan

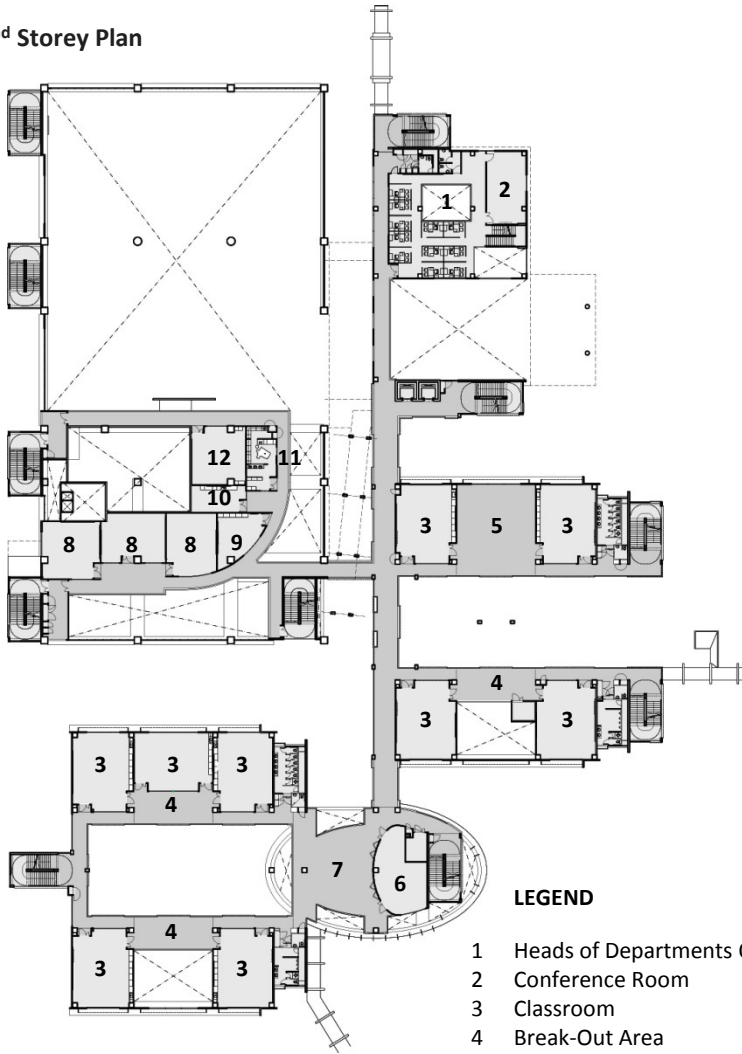
LEGEND

- 1 Entrance Foyer
- 2 General Office
- 3 Student Care Centre
- 4 Classroom
- 5 P1-P2 Programme for Active Learning (PAL)
- 6 PAL Deck
- 7 Break-Out Area
- 8 Void Space for Future Expansion
- 9 Canteen
- 10 Parade Square
- 11 Covered Basket Ball Court



Floor Plans

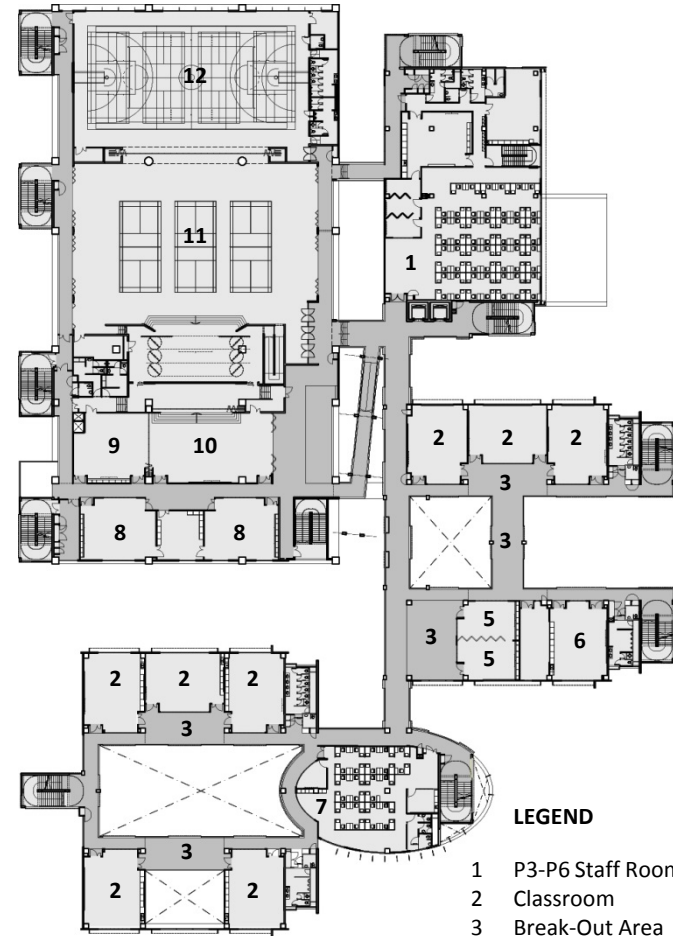
2nd Storey Plan



LEGEND

- 1 Heads of Departments Office
- 2 Conference Room
- 3 Classroom
- 4 Break-Out Area
- 5 Void Space for Future Expansion
- 6 Reading Room
- 7 Contemplation Deck
- 8 Co-curricular Activity Room
- 9 Pastoral Care Room
- 10 Counselling Room
- 11 Dental Care Room
- 12 Health & Fitness Room

3rd Storey Plan

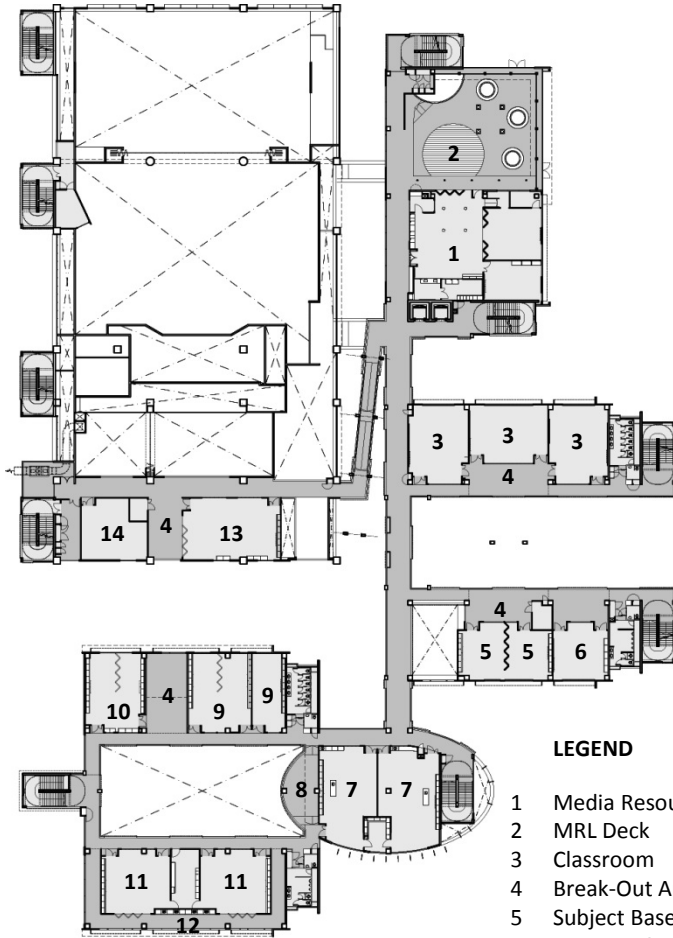


LEGEND

- 1 P3-P6 Staff Room
- 2 Classroom
- 3 Break-Out Area
- 4 Void Space for Future Expansion
- 5 Modular Chinese Language Room
- 6 Teaching Laboratory
- 7 P1-P2 Staff Room
- 8 Music Room
- 9 Dance Studio
- 10 Band Room
- 11 Multi-Purpose Hall (MPH)
- 12 Indoor Sports Hall (ISH)

Floor Plans

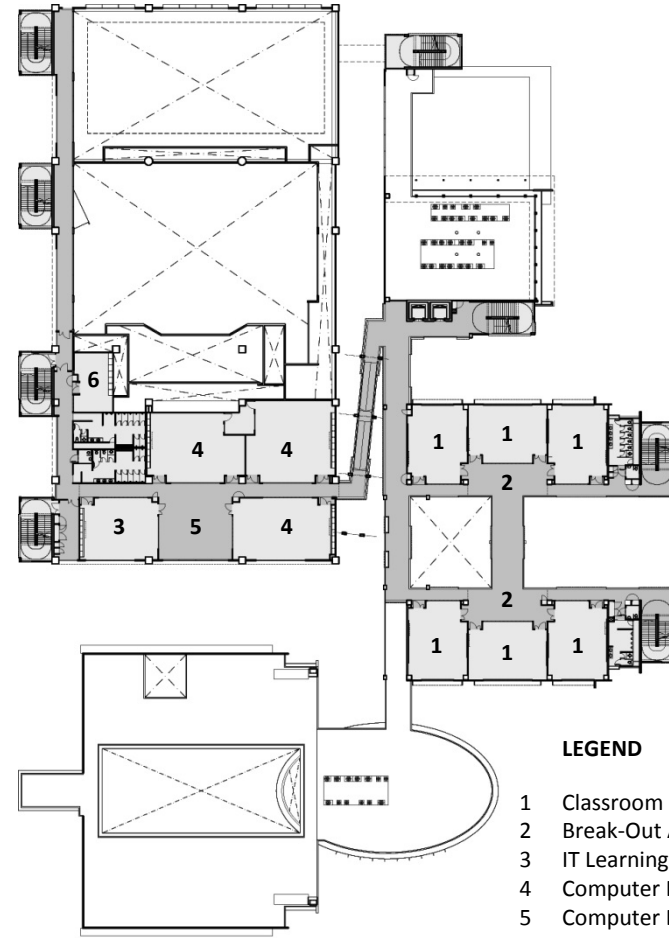
4th Storey Plan



LEGEND

- 1 Media Resource Library (MRL)
- 2 MRL Deck
- 3 Classroom
- 4 Break-Out Area
- 5 Subject Based Banding Room
- 6 Learning & Behavioural Support Intervention Room
- 7 Science Room
- 8 Science Deck
- 9 Mother Tongue Room
- 10 Learning Support Programme Room
- 11 Art & Craft Room
- 12 Drying Deck
- 13 Mathematics Room
- 14 Furniture Store
- 15 MPH Control Room

5th Storey Plan

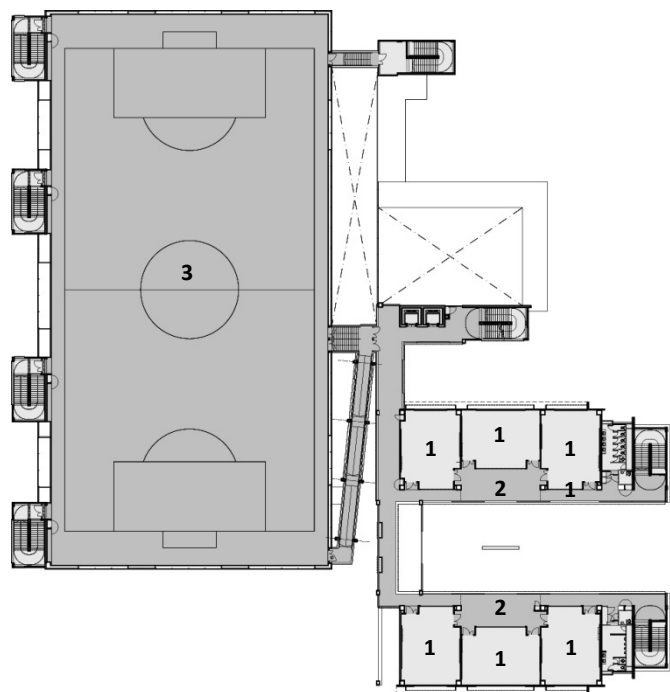


LEGEND

- 1 Classroom
- 2 Break-Out Area
- 3 IT Learning Resource Room
- 4 Computer Room
- 5 Computer Deck
- 6 Games Equipment Room

Floor Plans

6th Storey Plan



LEGEND

- 1 Classroom
- 2 Break-Out Area
- 3 80mx40m Play Field

Project Data

Submitting Firm :	CPG Consultants Pte Ltd
Project Role	Architectural, Mechanical & Electrical and Quantity Surveying Consultants
Project Contact	Yong Fen Bok
Title	Senior Principal Architect
Address	238B Thomson Road, Novena Square, Tower B, #12-00, Singapore 307685
City, State or Province, Country	Singapore, Singapore
Phone	+65 6357 4743

Joint Partner Firm:	Beca Carter Hollings & Ferner (S.E Asia) Pte Ltd
Project Role	Civil & Structural Consultants
Project Contact	Koh Kok Keang
Title	Technical Director
Address	1 Gateway Drive, #12-01 Westgate Tower, Singapore 608531
City, State or Province, Country	Singapore, Singapore.
Phone	+65 62207588

Other Firm:	Project Innovations Pte Ltd
Project Role	Project Manager
Project Contact	Lim Weng Kien
Title	Director
Address	510 Thomson Road, #11-00 SLF Building, Singapore 298135
City, State or Province, Country	Singapore, Singapore.
Phone	+65 62598648

Construction Firm:	Hytech Builders Pte Ltd
Project Role	Builder
Project Contact	Guo Shu Ting
Title	Project Manager
Address	Blk 165 Bukit Merah Central, #05-3685/7
City, State or Province, Country	Singapore, Singapore.
Phone	+65 6395 6333

Project Data

Project Name	West Spring Primary School
City	Singapore
State	Singapore
District Name	Bukit Panjang
Supt/President	Ms Jacintha Lim
Occupancy Date	December 2013
Grades Housed	Primary 1 – Primary 6
Capacity	1380 students
Site Size	4.520 acres (1.829 Ha)
Gross Area	285330 sq. ft. (26,508 sq. meter)
Per Occupant	207 sq.ft per pupil (19.2 sq. meter per pupil)
gross/net please indicate	Gross
Design and Build?	No
If yes, Total Cost:	Not Applicable
Includes:	Not Applicable
If no,	
Site Development:	Not Applicable
Building Construction:	SGD \$31,540,000
Fixed Equipment:	SGD \$535,000
Other:	Learning Resources SGD \$425,800 IT Equipment SGD \$723,500
Total:	SGD \$33,224,300

Optimising Land Use

As land becomes scarcer in Singapore due to an increasing population, competition from industrial & commercial sectors and the need to balance our ecological system the Ministry of Education is ready to adopt new strategies that will *optimise land use*. Landed facilities are prioritised based on importance and function; this includes spaces like the reception, general office and spaces serving lower primary students. The large size Play Field, Parade Square and Basketball Court not previously covered are placed into a mega 'White Cube' block freeing up land on the 1st storey. This planning initiative frees up precious land for future expansion.



Co-Sharing of Facilities

The stakeholders of a school are not just the Ministry of Education, principal, teachers, students and parents. Stakeholders can be expanded to include other schools, adjacent residents and the greater community. The school keeps to the current status quo of Ministry Of Education's policy to allow the Play Field and Indoor Sports Hall to be used by the public. As both areas are elevated, planning strategies are put in place to segregate and secure the school while these spaces are used. Through synergy with the neighbouring Zhenghua Secondary School the younger students can be inspired by their older *siblings* and have a clear visible direction from primary to secondary schooling. Also to be the centre of community, the school is connected by covered link-ways to the main road, bus stop, park connector and Light Rail Transit system(LRT).

