




BUILDING QUALITY STANDARDS HANDBOOK

May 2021





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1

INTRODUCTION

1 INTRODUCTION

1.1 What is the Building Quality Standards Handbook?

The Building Quality Standards Handbook (BQSH) sets the minimum quality criteria for all Department of Education and Training (DET) capital projects, including new construction, refurbishment and maintenance works. Its purpose is to assist architects and designers to create high-quality designs for school facilities across Victoria.

The BQSH reflects the considerable experience of the Victorian School Building Authority (VSBA) and DET, developed over the years from the delivery and subsequent evaluation of school building projects. It therefore allows those involved in the design of

schools to benefit from this experience and knowledge, and to thereby incorporate demonstrated best practice into building projects.

This handbook is reviewed at the beginning of every calendar year following consultation with a range of BQSH users. These annual reviews are informed by the experiences, observations and learnings of external stakeholders and DET staff involved in school construction. Current consultants are able to raise any handbook questions or issues they may have through their VSBA project officer. VSBA staff members can do the same through the VSBA's Strategy, Reform and Operations' Policy Unit.

1.2 Users of the document

The BQSH is primarily used by architects and designers. Where the term 'project consultants' is used, it refers to architects and designers.

Secondary users include VSBA officers, regional offices, portfolio managers and school staff, who may use the BQSH for asset management and planning purposes.

1.3 Structure

The BQSH has five distinct sections. Each is to be read in conjunction with additional and external information referenced in each section, to build a complete understanding of the specific considerations for design of Victorian government schools.

The five sections are:

| | | |
|---|---------------------------------|---|
| 1 | INTRODUCTION | Describes the purpose of this document and how it is to be used by project consultants to develop designs for capital projects at Victorian government schools. |
| 2 | EDUCATION VISION AND PHILOSOPHY | Details DET's vision, values and mission Helps readers understand the core business of DET and the VSBA, and the need for project consultants to support DET's vision. |
| 3 | PLANNING | Details the principles that influence the planning stages of school building design. Provides insight to requirements to be considered before the construction phase of capital projects. |
| 4 | SPECIAL FACTORS | Details special factors that may lead to additional costs or otherwise affect budgets. Special factors should be identified as soon as possible. |
| 5 | TECHNICAL SPECIFICATIONS | Details the minimum performance standards for each element of the building, and describes the execution of key design elements. |

The handbook is appended by a glossary of acronyms and initialisms.

1.3.1 THE WRITING STYLE OF SPECIFICATIONS

All technical specifications have been written in a performance/output-format. This is to encourage project consultants to use their knowledge and expertise in meeting the requirements of the VSBA.

Specifications include at least one of the following four key parts.

SPECIFICATION INTENT

The specification intent is a basic description of what the element/product is. This statement of intent in most cases will only be a sentence. It will be clear whether or not users need to read on.

APPLICABLE STANDARDS

Standards (including international, national and industry standards) reflect best-practice. Where applicable, standards will be quoted in the specification, in which the design **must** follow.

The following is an example of a standard quoted in a technical specification:

All lighting **must** comply with and be installed in accordance with the relevant Australian standard:

| | |
|----------------------|--|
| AS/NZS 1680.1 | Interior and workplace lighting — General principles and recommendations |
|----------------------|--|

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Standards will only include reference to the number, rather than a specific version. **It is implied that the latest version of the standard is to be adhered to.**

As indicated in the standard example, project consultants are required to comply with all associated and necessary standards. The onus is on project consultants to identify any such standards. For the example above, the associated and necessary standard would be AS/NZS 3000 — Electrical installations (known as the Australian/New Zealand Wiring Rules).

PERFORMANCE REQUIREMENTS

Performance requirements are specific requirements of the element/product that need to be reflected in the design developed by project consultants. These requirements are presented as bulleted lists.

HIERARCHY OF REQUIREMENTS AND DEPARTURES

Experience has shown that some designs and products do not work in school environments. '**Must**' and '**should**' qualifiers seek to ensure that these products and designs are not used again, and those that work continue to be used.

BQSH Qualifier: 'must'

Definition: A '**must**' requirement is critical for effective building operation, and/or required under other department policy (for instance, concerning safety, pedagogy or environmentally sustainable design).

How to vary a '**must**' requirement: A request to vary a '**must**' requirement must be submitted for endorsement on a Form 30 form with a costed, design team justification for the variation, based on safety and design, operational and maintenance considerations:

- in all design phases
- at tender documentation
- for approval at (delivery phase) design gateway / Planning Review Evaluation Panel (PREP) meetings.

BQSH Qualifier: 'should'

Definition: A '**should**' requirement is the recommended method for achieving effective building operation, and/or compliance with other department policy (i.e. concerning safety, pedagogy or environmentally sustainable design).

How to vary a '**should**' requirement: A request to vary a '**should**' requirement must be submitted on a Form 30 form with a costed justification for the variation, based on safety and design, operational and maintenance considerations:

- in all design phases
- at tender documentation, and, at minimum,
- project design-level meetings.

1.4 Legislative hierarchy

All work in schools is to be undertaken in accordance with relevant building and safety regulations, codes and standards. In particular, every effort has been made to ensure that the BQSH complies with the National Construction Code (NCC) and applicable Australian standards. All design, materials, workmanship, testing and commissioning **must** comply with the latest revision of the NCC and relevant standards and legislation.

As stated previously, the handbook allows project consultants to benefit from the VSBA and DET's experience and knowledge. It is intended to complement, rather than duplicate, NCC requirements.

Where no guidance has been provided for a particular product, element or design, please refer to relevant building codes, standards and legislation for further details.

1.5 Departmental and government procedures

Project consultants are required to adhere to all applicable VSBA, DET and government procedures and ensure that the requirements of each are reflected in the design and construction.

1.5.1 PROJECT MANAGEMENT FRAMEWORK

The Project Management Framework (PMF) provides schools and their communities, project managers, principal design consultants, cost managers and other consultants with the overall framework within which capital and maintenance projects **must** be delivered.

The PMF is to be used in the delivery of capital and maintenance projects with a value of more than \$200,000. It is applicable to all school-led, partnership and VSBA-led projects.

1.5.2 LOCAL JOBS FIRST - VICTORIAN INDUSTRY PARTICIPATION POLICY

The Local Jobs First Policy is comprised of the Victorian Industry Participation Policy (VIPP) and the Major Projects Skills Guarantee (MPSG). More information can be found at [Local Jobs First](#).

The Local Jobs First - The Victorian Industry Participation Policy (VIPP) ensures that small and medium-sized enterprises are given an opportunity to compete for government contracts valued over \$1 million (if in regional Victoria) or over 3 million (in metropolitan Melbourne or across all of Victoria).

1.5.3 LOCAL JOBS FIRST - MAJOR PROJECTS SKILLS GUARANTEE

Under the Major Project Skills Guarantee, all publicly funded works contracts valued at \$20 million or more **must** use Victorian apprentices, trainees or engineering cadets for at least 10% of the project's total labour hours.

1.5.4 SCHOOL INFRASTRUCTURE POLICIES

The VSBA develops and reviews school infrastructure policies for use by Victorian government schools. These policies assist in delivering and maintaining a high-performing asset base that supports world-leading education and student outcomes for all Victorian government schools.

The VSBA takes a 'whole-of-life-cycle' approach to managing school infrastructure assets. Policies generally fall within four key asset life-cycle stages: 'plan', 'build',

'manage' and 'dispose'. Policies are continually reviewed and developed to ensure the improvement of the operation and condition of Victoria's government school infrastructure.

School infrastructure policies are on the [DET Policy and Advisory Library](#), in the School Facilities and Infrastructure section.

1.5.5 SCHOOL AND KINDERGARTEN AREA SCHEDULES

The required area allocation of each school is determined according to the type of school and its enrolments (both current and projected). Area schedule type information is also provided for kindergartens on school sites.

Based on these criteria, the VSBA's [facilities schedules](#) detail the number and size of general and specialist spaces for teaching, non-teaching, staff work and amenity purposes to which a school is entitled.

Facilities schedules, which are available to DET staff and VSBA-registered contractors, are used to determine built area for new schools or kindergartens, capital and maintenance funding for existing schools, and are relevant to a number of VSBA programs — for example, Relocatable Buildings Program and Response Programs.

1.5.6 SHELTER-IN-PLACE FOR SCHOOLS IN BUSHFIRE-PRONE AREAS

DET maintains a Bushfire-at-Risk Register (BARR) that identifies schools considered to be at the highest risk of fire danger within bushfire-prone areas.

An important aspect of emergency management planning for these schools is the designation of a shelter-in-place. A shelter-in-place or SIP is — a temporary shelter for staff and students from a potential or actual bushfire. The SIP's design and location **must** take into account its bushfire attack level, and proportionately reduce the use of combustible materials, noting that a non-combustible material produces only a limited amount of heat and flame when exposed to temperatures of approximately 750°C, as per the tests outlined in AS 1530. It **must** also support the contingency of needing to leave the SIP and move to a secondary shelter location in the event of the SIP igniting.

Shelter-in-place is not designated with formal status by Emergency Management Victoria, nor does it provide the same bushfire protection as a fire refuge. A shelter-in-place is not intended to provide refuge to the wider community in the event of bushfire nor is it expected that the structure **must** survive a bushfire event.



2

EDUCATION VISION AND PHILOSOPHY

2 EDUCATION VISION AND PHILOSOPHY

2.1 Education vision and principles

Education is fundamental to the development of individuals, families and communities. A quality education is the foundation for a stronger and more resilient Victoria, in which everyone has the skills and knowledge they need to actively participate in and contribute to our rapidly changing economy and society.

The Department of Education and Training (DET) leads the delivery of education and development services to children, young people and adults in Victoria. It does this directly through government schools and indirectly through the regulation and funding of early childhood services, non-government schools and training programs. DET implements Victorian government policy on early childhood services, school education and training, and higher education services — policies that create greater social mobility, enhanced health and wellbeing, strong economic growth, productivity and employment.

DET's Statement of Strategic Intent supports this mission:

Together we give every Victorian the best learning and development experience, making our state a smarter, fairer and more prosperous place.

DET's objectives in achieving this intent are to:

- ensure Victorians have equitable access to quality education and training
- work with providers and partners to build an integrated birth-to-adulthood education and development system
- support children, young people and adults with well-coordinated universal and targeted services close to where they live
- activate excellence, innovation and economic growth.

2.1.1 VICTORIAN PUBLIC SECTOR VALUES

In pursuing the above mission and intent, DET is committed to upholding the Victorian public sector values in every aspect of its work, as follows:

| | |
|-----------------------|--|
| RESPONSIVENESS | We respond in a timely way with our best work |
| INTEGRITY | We are honest, ethical and transparent |
| IMPARTIALITY | We behave in the best interests of the public by making fair and objective decisions |
| ACCOUNTABILITY | We hold ourselves and others to account for the work that we do |
| RESPECT | We value others and accept their differences |
| LEADERSHIP | We are genuine, supportive and do the right thing |
| HUMAN RIGHTS | We uphold and respect the rights of others |

All those involved in the execution of DET's mission and intent — including colleagues and stakeholders — **must** uphold these values, and consider how the values can contribute to the completion of their task.

2.1.2 OUTCOME AREAS

DET uses rigorous processes to gauge the effect of its work on Victorians, and can readily identify progress and areas for improvement. DET has identified four key outcome areas under which it strives for excellence, in all projects and investments:

ACHIEVEMENT Raise standards of learning and development achieved by Victorians using education, training, development and child health services

ENGAGEMENT Increase the number of Victorians actively participating in education, training, development and child health services

WELLBEING Increase the contribution education, training, development and child health services make to good health and quality of life for all Victorians, particularly children and young people

PRODUCTIVITY Increase the productivity of our services

2.2 Education Principles

Schools are required to create a positive climate for learning, generate a culture of high expectations and promote inclusion. DET is committed to providing education and support to all students, and will promote leading practices in the design of education facilities.

Project consultants **must** design and develop buildings that will support the achievement of the vision and values identified above. To assist in this task, four education principles have been identified that capture DET's vision and values.

The purpose of these principles is to ensure, as much as possible, the design of educational environments that are usable by everyone, without adaptation or specialised design.

Each of the four education principles has specific implications for the design of facilities at Victorian government schools. They are to be applied to all Victorian government school capital projects, including new and greenfield developments, new buildings in established areas, and upgrades to existing school infrastructure.

The four Education Principles are identified in Figure 1.

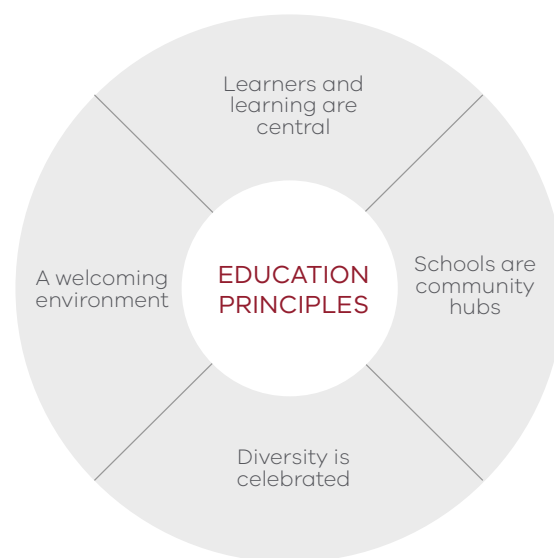


Figure 1 Education Principles

High quality environments promote children's engagement, positive learning experience and inclusive relationships. Physical learning environments should include both indoor and outdoor learning spaces that satisfy the key principles, such as:

- flexibility and accessibility
- a range of developmentally appropriate, open ended activities and sensory experiences
- an environment that is sustainable, fit for purpose and reflects the diversity of families within the local and broader community.

2.2.1 LEARNERS AND LEARNING ARE CENTRAL

Learners and learning are the core focus for any school. School design **should** be centred on providing learning environments that develop the whole person — intellectually, emotionally, socially, physically and culturally.

Project consultants applying this principle **should** consider whether their work:

- promotes a learners and learning-centred approach to develop personal agency and empowerment
- helps students develop confidence as learners through active investigation, inquiry, social interaction and collaboration
- inspires creativity, curiosity, curation and critique
- encourages the development of a sense of identity
- develops critical and creative thinking personal and social capability ethical understanding and intercultural understanding
- enables learning anywhere, anytime, with anyone, by any means, through harnessing digital technologies
- provides opportunities and makes facilities available for community learning.

2.2.2 SCHOOLS ARE COMMUNITY HUBS

All schools are open to communities and provide for local needs. Integrated facilities such as libraries and resource centres can foster greater community engagement and assist schools to develop partnerships with people, organisations and local services.

Project consultants applying this principle **should** aim to:

- promote a sense of community and belonging by promoting human connectedness
- encourage participation and engagement
- develop partnerships and foster networks of partners to break down barriers
- build community by encouraging participation, contribution and engagement in and by the community, at all levels
- express the identity, values and aspirations of the community.

2.2.3 DIVERSITY IS CELEBRATED

Inclusive schools recognise and respond to the diverse needs of their students, accommodating both different styles and rates of learning. School design **should** respect and honour diversity within the school and the wider community.

Project consultants applying this principle **should** aim to:

- ensure all learners will be included
- provide genuine choice for all learners.

In addition, please refer to the section on [Universal design](#) for more information.

2.2.4 A WELCOMING ENVIRONMENT

Schools **should** be welcoming, safe and stimulating environments. The entry of the school **should** reflect the character of the school as a learning community, with accessible pathways that welcome all members of the community.

Project consultants applying this principle **should** aim to:

- promote positive social interaction
- ensure safety and security
- create aesthetically pleasing facilities
- provide a continuum of learning and recreation
- develop both the learners' understanding of personal wellbeing, and their capacity to create personal wellbeing.

2.2.5 EARLY CHILDHOOD FACILITIES

The Department of Education and Training will be delivering a number of new kindergartens on school sites to provide additional infrastructure capacity to support the roll-out of Three Year Old Kindergarten across Victoria. High quality learning is supported through the physical and social environments, and opportunities that early childhood learning facilities, such as kindergartens provide.

2.3 Overview of curriculum and pedagogy requirements

Student learning is shaped and influenced by both curriculum and pedagogy. A curriculum defines *what* it is that students should learn, and the associated progression or continuum of learning. Complementing this, pedagogy describes the method and practice of *how* students will be taught and supported to learn.

This section provides insight to the core business of Victorian government schools. Project consultants **should** be aware of the latest Victorian curriculum, along with the teaching and learning methods practiced at the relevant school.

2.3.1 THE VICTORIAN SCHOOL CURRICULUM

The Victorian school curriculum sets out what all students have the opportunity to learn in their schooling, as well as a supporting series of learning progressions to facilitate that learning. The [Victorian Curriculum and Assessment Authority](#) (VCAA) sets the Victorian school curriculum.

Project consultants **must** consider the curriculum and how it might shape the learning environment required. Below is a detailed description of the various curriculum programs that **must** be taught at Victorian government schools.

VICTORIAN CURRICULUM F–10

The Victorian curriculum F–10 sets out what every student should learn during their first 11 years of schooling. The Victorian Curriculum F–10 incorporates the Australian curriculum and reflects Victorian priorities and standards.

The Victorian curriculum F–10 is a statement of the common set of learning. It is not a doctrine of whole-school teaching and learning programs for every school. Instead, the curriculum is flexible: Victorian schools can meet the curriculum while tailoring their teaching and learning programs to reflect school priorities and specific student interests, and to capitalise on the expertise of teachers and the local community.

The F–10 curriculum is conceptualised as moving through three stages of development. This maintains a focus on the importance of the provision of the whole curriculum to every student, but across stages of schooling rather than at every year level.

At the Foundation stage (Prep–Year 2), schools focus on five curriculum areas: English, Mathematics, the Arts, Health and Physical Education and Personal and Social Capability.

Schools then broaden their focus and ensure that in each two-year band of schooling at the Breadth stage (Years 3–8) student learning includes each of the curriculum areas, with a focus on English, Mathematics and Science.

In the Pathways stage (Years 9–10), schools ensure students receive a broad education while beginning to plan their secondary program of study, which they can start in Year 10.

The Victorian curriculum F–10 identifies knowledge and skills that are defined by learning areas and capabilities. Learning areas are a clear, deliberate reaffirmation of the importance of a discipline-based approach to learning. Capabilities are a set of discrete knowledge and skills that can and should be taught explicitly in and through the learning areas, but are not fully defined by any of the learning areas or disciplines.

The learning areas and capabilities of the Victorian curriculum F–10 are set out below in Table 1.

| LEARNING AREAS | CAPABILITIES |
|--|--|
| The Arts <ul style="list-style-type: none"> Dance Drama Media Arts Music Visual Arts Visual Communication Design | <ul style="list-style-type: none"> Critical and creative thinking Ethical understanding Intercultural understanding Personal and social capability |
| English | |
| Health and Physical Education | |
| The Humanities <ul style="list-style-type: none"> Civics and Citizenship Economics and Business Geography History | |
| Languages | |
| Mathematics | |
| Science | |
| Technologies <ul style="list-style-type: none"> Design and Technologies Digital Technologies | |

Table 1 Design of the Victorian curriculum F–10

SENIOR SECONDARY PROGRAMS

For students in Years 11 and 12, two types of senior secondary certificates may be pursued at schools: the Victorian Certificate of Education (VCE) or the Victorian Certificate of Applied Learning (VCAL).

Students can also undertake a Vocational Education Training (VET) program, for which they can receive credit towards either certificate.

Victorian Certificate of Education

The VCE is undertaken by students in Years 11 and 12, but can be started in Year 10. VCE is the certificate that the majority of students in Victoria receive on satisfactory completion of their secondary education. It provides a range of subjects to meet the needs of students. It provides pathways to further study at university or TAFE, or to employment.

There are about [90 VCE studies courses](#) available across the Arts, Business Studies, English, Health and Physical Education, Humanities, Languages, Mathematics, Science, and Technology, as well as the extended investigation that is an independent research project.

Victorian Certificate of Applied Learning

The VCAL is a hands-on option for students in Years 11 and 12. It aims to provide the knowledge, skills, and attributes students need to make informed choices about pathways to work and further education. Students who do the VCAL are likely to be interested in progressing to training at a TAFE institute, starting an apprenticeship, or seeking employment after completion of their school education.

The VCAL is based on adult learning and youth development principles. VCAL learning programs:

- focus on practical, hands-on opportunities for learning
- encourage personal development and growth
- include opportunities to integrate learning across the learning program
- enable students to learn at their own pace
- enable students to learn in different ways and according to different styles
- build the competence and resilience of young people, including minimising risk factors and enhancing the promotion of protective behaviours
- encourage civic and civil participation and promote active citizenship
- link young people with the broader community.

2.3.2 PEDAGOGY REQUIREMENTS

While the content of the curriculum is mandated by the VCAA, how curriculum is taught is a matter for individual schools. Schools have flexibility in the design of their teaching and learning program. This enables schools to develop specialisations, and areas of expertise and innovation, while ensuring the mandated curriculum is delivered.

School teachers, as facilitators of learning, can apply a range of pedagogies according to subject matter to target improvements in student skills and competencies. Examples of pedagogical approaches include project-based learning, research-based learning, self-directed learning, team collaboration, constructivist learning and discipline speciality.

DET has identified pedagogical principles that have been used throughout Victorian government schools. The principles state that students learn best when:

- the learning environment is supportive and productive
- the learning environment promotes independence, interdependence and self-motivation
- students' needs, backgrounds, perspectives and interests are reflected in the learning program
- students are challenged and supported to develop deep levels of thinking and application
- assessment practices are an integral part of teaching and learning
- learning connects strongly with communities and practice beyond the classroom.

LINKING LEARNING AND TEACHING PRINCIPLES TO PEDAGOGY AND BUILDING DESIGN

Pedagogical activities require specific spatial qualities to be effective. New spaces **must** be adaptable and support a variety of teaching and learning approaches, from 'team teaching' to one-on-one lessons, and encourage collaboration between students and teachers.

Table 2 illustrates the links between principles, approaches and activities undertaken by students, and their implications for school building design.

| PEDAGOGICAL PRINCIPLE | PEDAGOGICAL APPROACH | PEDAGOGICAL ACTIVITY | IMPLICATIONS FOR SCHOOL DESIGN |
|--|--|---|--|
| The learning environment is supportive and productive | Learner-centred pedagogies with multiple learning settings integrated | Delivery Applying Creating Communicating | Design reflects community diversity, respects and values different cultures Students have access to teachers |
| The learning environment promotes independence, interdependence and self-motivation | Peer-to-peer learning, integrated problem learning and resource-based learning | Decision making | Breakout spaces are provided to allow individual student work Furniture is suitable for cooperative learning |
| Students' needs, backgrounds, perspectives and interests are reflected in the learning program | Theory linked to practice, resources used continually and creatively, and integrated curriculum delivery | | Access to ICT Multi-media supports authentic learning |
| Students are challenged and supported to develop deep levels of thinking and application | Integrated problem learning, and resource-based learning | | Quiet spaces Multi-purpose rooms that enable students to work on different subjects over longer periods of time and encourage integrated curriculum Teacher spaces that encourage cross-disciplinary teams of teachers working with groups of students |
| Assessment practices are an integral part of teaching and learning | Continual assessment, and use of a pedagogy of assessment | | Spaces for student-teacher conferencing Intranet facilities enable ongoing monitoring of student progress by students and parents |
| Learning connects strongly with communities and practice beyond the classroom | Project-based learning, and resource-based learning on practical problems | | Buildings and facilities that bring the community into the school ICT facilities that support curriculum links to professional and community practice |

Table 2 Pedagogy and school design

2.3.3 EARLY CHILDHOOD EDUCATION MATTERS

Neurobiology shows how the early years of development establish the basic structures of the brain. A child's relationships, experiences and environment during these years create neural pathways that have a long-lasting influence on health, wellbeing, behaviour and learning.

Children develop skills that help them to manage their emotions and behaviour, build resilience and persistence, form positive relationships and focus their attention. These skills are vital in enabling children to transition into school and help navigate and adapt to the numerous changes they are likely to encounter in their future.

2.4 The role of infrastructure in effective education delivery

Effective school environments demand high-quality infrastructure that supports current models for teaching and learning. Well-designed school buildings create inspirational and engaging environments that foster creativity and a culture of learning.

The infrastructure **must** embody the vision and principles of the school. Upon entering the school, the infrastructure **should** visually create a 'sense of place' that effectively indicates to users the function of each building. The school **must** be welcoming and accessible, and the infrastructure project **should** have a positive effect on students, teachers and the wider community.

Infrastructure **must** be functional for learning. A variety of different spaces are required, easily adapted and suited to a student base with a variety of physical, cognitive, socio-emotional and sensory abilities. The infrastructure design **should** support current learning and teaching practices, and be adaptable to changing pedagogy.

To promote effective educational delivery, infrastructure **should**:

- be 'fit-for-purpose'
- promote health, engagement and wellbeing
- be safe and inclusive
- empower students and build school pride
- encourage intellectual engagement and self-awareness.

2.5 Current context: The Education State

The Education State is an exciting vision for a bright future for Victoria. It is the Victorian Government's commitment to achieve educational excellence and opportunity in every community. The vision is based on a simple but bold promise:

"To build a world-class education system and transform Victoria into the Education State."

The Victorian Government has committed to building an education system that produces excellence and reduces the impact of disadvantage. Every Victorian, regardless of their background, postcode or circumstance should have access to:

- safe, high-quality early childhood services
- a great school with great teachers in every classroom
- world-class training that prepares them for success in the workplaces of the future.

To achieve this, the Victorian Government is continuing to make record levels of investment in school buildings, and the VSBA is delivering more projects than ever.

The Education State is being delivered through investments in programs, policies and infrastructure to address four target areas, shown in Table 3.

| TARGET | AMBITION | GOAL |
|-------------------------------------|--|---|
| Learning for life | More students excel in reading and mathematics | By 2020 for Year 5, and 2025 for Year 9, 25 per cent more students will be reaching the highest levels of achievement in reading and mathematics. |
| | More students excel in scientific literacy | By 2025, there will be a 33 per cent increase in the proportion of 15-year-olds reaching the highest levels of achievement in scientific literacy. |
| | More students excel in the arts | More Victorian students will reach the highest levels of achievement in the arts. |
| | More students develop strong critical and creative thinking skills | By 2025, 25 per cent more Year 10 students will have developed excellent critical and creative thinking skills. |
| Happy, health and resilient kids | More students will be resilient | By 2025, Victorian students reporting high resilience will grow by 20 per cent. |
| | More students will be physically active | By 2025, the proportion of students doing physical activity five times a week will increase by 20 per cent. |
| Breaking the link | Breaking the link | By 2025, there will be a 15 per cent reduction in the gap in average achievement between disadvantaged and other students in Year 5 and Year 9 reading. |
| | More students in education for better pathways | By 2025, the proportion of students leaving education during Years 9 to 12 will halve. |
| Pride and confidence in our schools | Raise the levels of community pride and confidence in Victorian government schools | By 2025, 20 per cent more parents will have high levels of pride and confidence in the Victorian government school system. |

Table 3 Education State targets

These targets give those working on Education State investments insight about what the Victorian Government is aiming to achieve. All those involved in school infrastructure delivery, including consultants and architects, **must** deliver outcomes that will help achieve these targets.

Implementing the Government's vision to make Victoria the Education State is DET's key priority direction. As stewards of the education system and associated infrastructure in Victoria, it is the role of DET's officers and contractors to help equip Victorian children and young people with the skills they need to succeed in a world that is increasingly digital, mobile and global.



3

PLANNING

3 PLANNING

Good design plays an essential role in enabling high-quality education environments that support the learning needs of every student and provide a quality workplace environment for teachers.

Successful school design effectively translates a school's educational vision and philosophy into a set of integrated learning environments and support facilities. Reference is also made to specific site conditions, and the needs of the surrounding community.

This section sets out the principles and minimum requirements for planning school sites, taking into account modern school design, design elements and special accessibility factors.

Innovative designs are encouraged, but at all times project consultants should consider the financial feasibility of approaches, with reference to the whole-of-life costings, to maximise the value of capital investments.

3.1 Education vision and its impact on facility design

The vision for education in Victoria is articulated in [Education Vision and Philosophy](#). All designs **must** support the achievement of this vision.

The education vision of the state, and its anticipated impact on educational facilities design, is translated into the following key principles for project consultants.

3.1.1 LOCAL SCHOOLS ARE ACCESSIBLE TO ALL

Victorian government schools **must** be accessible and maximise inclusion of all members of a given community. Designs **should** facilitate accessibility in to, out of, and around school sites, with preference for pedestrian and non-motorised transport.

3.1.2 RECOGNISE ABORIGINAL CULTURE IN ALL NEW BUILDINGS AND SIGNIFICANT UPGRADES TO VICTORIAN GOVERNMENT SCHOOLS

Establish processes to engage with the local Aboriginal community, through the Victorian Aboriginal Education Association Incorporated (VAEAI), the Victorian Government's primary partner in Aboriginal education, to provide advice regarding appropriate recognition (i.e. Aboriginal and Torres Strait Islander flags, plaques recognising traditional custodians and culturally appropriate physical spaces).

All new buildings and significant upgrades to Victorian government schools recognise Aboriginal culture.

3.1.3 INTEGRATE FACILITIES FOR STUDENTS WITH DISABILITIES

Victorian government schools provide choice for students with a disability. Architects and designers **must** support this, by creating designs that provide opportunities for interaction among students of all abilities, and allow for graduated levels of support, including room for aides and flexible spaces that are sensitive to the needs of all students.

The extent to which this is provided is dependent on the needs of each school community and **must** be determined in consultation with the school.

In addition, please refer to the section on [Universal design](#) for more information.

Please also refer to [School Planning Guidelines for Students with Disabilities](#).

3.1.4 BUILDING FOR EARLY CHILDHOOD LEARNING

The Department of Education will be delivering a number of new kindergartens on school sites to provide additional infrastructure capacity to support the roll-out of Three Year Old Kindergarten. These kindergartens will be delivered on new and existing government school sites.

With Government's new focus on the benefit of integrating early childhood learning into the wider government school system. The new co-located kindergartens can help make drop off time simpler for parents, support smoother transitions between early learning and primary school, and may make kindergarten programs more accessible for some children.

The National Quality Framework (NQF) sets out the standards and legal obligations for approved service providers of early learning services across Australia. The National Quality Standards (NQS) sets out the benchmarks for early childhood education and care, including the ways an early learning facility's environment such as a kindergarten's is designed, equipped and organised to maximise children's engagement and positive relationships.

Early Learning environments must comply with the [National Quality Framework - Quality Area 3 - Physical Environment](#).

3.1.5 DESIGN FACILITIES THAT CAN ADAPT FOR CHANGING PURPOSES

School facilities **must** be capable of being used for different organisational and learning models (from group collaboration to individual reflection), without requiring significant modification. Architects and designers **should** consider that pedagogical approaches will evolve throughout the lifespan of the asset, and that facilities need to have the flexibility to 'evolve'.

The expected lifespan of school facilities is a minimum of 30 years. Architects and designers **should** consider the lifespan of the infrastructure, and how the infrastructure can meet future community requirements without significant future capital investment. Designs **must** also support and cater for changes in technology that enhance the learning experience.

3.2 Universal design

The Victorian Government supports the concept of universal design and its application throughout Victorian government schools and early childhood facilities such as kindergartens. Universal design recognises that there is a wide spectrum of human abilities, including physical, perceptual and cognitive abilities. Designs **must** create environments that ensure access and participation by all.

All architects, designers and project consultants engaged by the VSBA for new schools, school upgrades, and major maintenance projects, **must** demonstrate at a PREP meeting how the seven universal design principles have been realised in a project design:

- equitable use
- flexibility in use
- simple and intuitive use
- perceptible information
- tolerance for error
- low physical effort
- size and spaces for approach and use.

The VSBA acknowledges that the provisions required for compliance may overlap with other legislative requirements. However, the execution of all seven universal design principles by project consultants **should** ensure that facilities can better accommodate a diverse student and staff base with varied needs and abilities.

A detailed description of each universal design principle and its associated execution is provided in Table 4.

| UNIVERSAL DESIGN PRINCIPLE | DESCRIPTION | EXAMPLE |
|---------------------------------|--|---|
| Equitable use | The design is useful and marketable to people with diverse abilities | <ul style="list-style-type: none"> • Having a ramp integrated with stairs, both under cover • Outdoor seating with different arm and back configurations and at different heights so that it may be used by a variety of people • Variety of spaces to accommodate students with a range of abilities • Accessible toilets |
| Flexibility in use | The design accommodates a wide range of individual preferences and abilities | <ul style="list-style-type: none"> • Adjustable workbenches • Bins operable by one hand to accommodate left and right-handed students • Water taps that are easy to grasp and operate • Spaces that can be set up and used in a variety of ways |
| Simple and intuitive use | Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level | <ul style="list-style-type: none"> • 'Wayfinding' with signs, tactile information and other cues, to help people orientate themselves and navigate from place to place • Colour-coding on walls and doors • Continuous pathways (no breaks) to ensure easy travel between buildings • Tactile ground surface indicators and removal of overhanging obstacles for vision-impaired students, who may use a cane |

| UNIVERSAL DESIGN PRINCIPLE | DESCRIPTION | EXAMPLE |
|--|--|--|
| Perceptible information | The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities | <ul style="list-style-type: none"> • Signage at height visible to wheelchair users • PA and emergency communication systems with both auditory and visual cues • Glazing and placement of windows to avoid glare for vision-impaired students • Room acoustics designed to assist hearing-impaired students • Social scripts or pictorials to communicate room function • Adjustable lighting to assist vision-impaired students |
| Tolerance for error | The design minimises hazards and the adverse consequences of accidental or unintended actions. | <ul style="list-style-type: none"> • Column detailing and placement to assist people with vision impairment in differentiating columns • Floor at equal level where possible to eliminate tripping hazards • Stair nosing consistent with AS 1428.1 to promote luminance contrast at the leading edge of step treads |
| Low physical effort | The design can be used efficiently, comfortably and with minimum fatigue. | <ul style="list-style-type: none"> • Loop handles on toilet doors • Doors that automatically open for students with wheelchairs or staff carrying heavy goods • Controls, such as light switches and thermostats, at heights easily accessible for students in wheelchairs • Accessible water points for people of all abilities |
| Size and space for approach and use | Appropriate size and space is provided for approach, reach, manipulation and use, regardless of a user's body size, posture or mobility. | <ul style="list-style-type: none"> • Appropriate circulation space in toilets suitable for students in wheelchairs • Floor surfaces comfortable for students with differing sensory abilities |

Table 4 Universal design principles

As part of the above, project consultants **should** adhere to the following:

- avoid design features that have unintended negative consequences for the accessibility of the school
- **should not** apply universal design in a way that puts students and staff at risk, including removing lines of sight or creating blind spots or hiding places
- create spaces that are non-threatening and non-distracting for students with cognitive disabilities
- place items, such as light poles and bins, at regular intervals to provide sensory cues
- place essential facilities and specialist buildings on the ground floor and near the entry point to the school, easily accessible by all
- create footpath transitions from schools to public spaces by placing accessible pathways that extend beyond school grounds
- use reinforced ceiling support structures in selected spaces that can support rails for students requiring hoists, and contemplate added circulation in those selected spaces
- use noise-reduced hand drying options in bathrooms.

3.3 Master planning

Inter-connected design principles **must** be considered in the master planning process. These principles **must** not be considered in isolation, as there exists a fundamental inter-relationship between the three principles.

3.3.1 URBAN CONTEXT

Project consultants **must** ensure schools and kindergartens complement their community, and eventually be a vital part of the community's broader aims. This **should** be considered before the design process starts.

URBAN CONTEXT ANALYSIS

When undertaking a major school redevelopment or planning a new school, project consultants **must** undertake an urban context analysis including the methodical investigation of the key features and characteristics of the site, its embedded urban fabric and associated opportunities and constraints.

The analysis **should** develop an understanding of:

- key elements of the existing and future proposed urban context and the nature of the surroundings beyond the site
- existing and future connections between the site and surroundings and the patterns of movement of pedestrians and vehicles
- existing patterns of built form on sites and surroundings, including heritage elements and characteristics that make it a unique place
- site topography, hard and soft landscape, and ecology.

The analysis **should** investigate the broader development aims of the local community. Background information such as the community's demographics, growth statistics, history and culture, and strategic objectives, **should** be considered.

URBAN DESIGN CHARTER

Project consultants **should** include principles from the Victorian Government's [Urban Design Charter](#) (shown in Table 5) in creating environments that are valued, functional and significant:

| | |
|--------------------------------------|---|
| STRUCTURE | Organise places so their parts relate well to each other |
| ACCESSIBILITY | Provide ease, safety and choice of access for all people |
| LEGIBILITY | Help people to understand how places work and to find their way around |
| ANIMATION | Stimulate activity and a sense of vitality in public places |
| FIT AND FUNCTION | Support the intended uses of spaces while also allowing for their adaptability |
| COMPLEMENTARY MIXED USES | Integrate complementary activities to promote synergies between them |
| SENSE OF PLACE | Recognise and enhance the qualities that give places a valued identity |
| CONSISTENCY AND VARIETY | Balance order and diversity in the interests of appreciating both |
| CONTINUITY AND CHANGE | Maintain a sense of place and time by embracing change yet respecting heritage values |
| SAFETY | Design spaces that minimise risks of personal harm and support safe behaviour |
| SENSORY PLEASURE | Create spaces that engage the senses and delight the mind |
| INCLUSIVENESS AND INTERACTION | Create places where all people are free to encounter each other as equals |

Table 5 Urban Design Charter principles

3.3.2 A SENSE OF ADDRESS AND LOCATION

Project consultants **must** ensure Victorian government schools are inviting and well-positioned in their local community. The point of entry into the school **should** be clearly identified and all buildings **should** have reference to the locality where possible.

3.3.3 ENTRY AND EXIT REQUIREMENTS

Access to school facilities **must** be prominent and easy to find, and clearly visible from the road. Additional points of access can be provided around school sites, aligned with points of pedestrian access, street parking, and the flow of vehicular traffic to the site.

3.3.4 SITE FEATURES AND CONTEXT

Designs **should** be optimised to take full advantage of a site's natural and physical features including views, orientation and edges. Where possible, designs **should** integrate adjoining community developments. Buildings **should** project a sense of welcome, safety and accessibility, and be cohesive in architectural form and expression.

The site design **should** also consider site drainage, flood overlays, and the sensitivity of the site surface and sub-surface drainage to regular maintenance.

Project consultants **must** ensure that the north facade of a proposed building is not overshadowed by other buildings to the north, and that the proposed building does not overshadow any existing building to its south. Shading diagrams **should** be prepared to accurately establish the extent of shadowing by adjoining features. This is to maximise natural light infiltration.

SUSTAINABLE SITES AND LAND USE ECOLOGY

The project **must** not be sited on land containing old-growth forest, prime agricultural land or wetland of 'high national importance'. It **must not** impact on 'matters of national environmental significance' under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

3.3.5 SITE PLANNING

In general, space planning in Victorian government schools **must**:

- establish a clear hierarchy of open space and with a 'heart' for the school. Open-plan and small-group areas **should** be purposefully arranged in accordance with the needs of teachers, students and curricula

- masterplanning must consider bespoke stick buildings and permanent modular construction solutions, with associated access
- locate spaces with opposing acoustic requirements as far apart as practicable
- consider positioning buildings near services and site access points
- consider the impact of certain school facilities (such as gymnasiums) on neighbouring properties
- develop a variety of outdoor spaces, scaled from larger gathering spaces to medium play spaces and smaller intimate areas, and an appropriate flow between indoor and outdoor space
- consider existing site conditions such as soil, rock, vegetation, flood levels, and contours when determining the location of buildings to maximise the use of existing vegetation
- encourage relationships between activities, their compatibility and flexibility. This **should** include consideration of:
 - the position of multi-purpose/physical education facilities relative to ovals, hard courts and car parks
 - the position of administration facilities to car parks and main school entries
 - the central location of toilet facilities.
- support relationships between subsections of the school by considering:
 - junior/middle/senior school organisation
 - general purpose/specialist facilities
 - departments/faculties
 - indoor and outdoor learning spaces
 - the kindergarten facility, where applicable.

Where a kindergarten is designed on a school site, specific considerations should include:

- northern orientation for indoor and outdoor play spaces
- facility to be directly accessible from the street
- regular shaped building to support supervision
- strong connection with the to/interface with school facilities
- if car parking is included direct access to the kindergarten entry.

A waste disposal area on the site **must** be provided and sized to accommodate waste and recyclables materials, to be collected and stored before collection. This area **should** be screened, contained and located as close as possible to the street boundary of a site, and be as visually discreet as possible.

A separate waste disposal area (minimum 8m²) is to be located within the footprint of any kindergarten facility.

In terms of access, the waste disposal area **should**:

- provide adequate space for waste collection trucks to enter, manoeuvre and leave the site travelling forward
- include a pavement design suitable for the applied loads.

3.3.6 INTEGRATION OF SHARED FACILITIES

In many circumstances, school buildings can be shared with the community and provide spaces for vital community functions. The co-location of community facilities in schools is encouraged. This could include shared use of library facilities, sporting facilities, meeting spaces, performance spaces, co-location of early learning centres, and before and after-school programs on school grounds.

Project consultants **must**:

- maximise links and interactions between community facilities and open spaces adjacent to school sites, to support the cultural, economic and environmental wellbeing of communities
- consider the impact of after-hours use on the surrounding community (including visitor numbers and traffic) and overall security of the school site
- consider security to identify the best entry point to community-shared facilities (either shared with the main entry or from a clearly defined separate entry)
- locate community-use buildings near car parking
- allow for sub-metering of utilities so user-pays principles can be applied.

Where a kindergarten is to be integrated into the school facilities, consideration **should** be given to shared use of (school and kindergarten) administration, meeting and staff breakout spaces, and the creation of gathering areas for parents and carers close to the kindergarten entrance.

3.3.7 EMERGENCY EXITS

Emergency exits **must** be accessible and visible.

Signage **must** comply with the relevant legislative requirements, Australian standards, and requirements for fire safety certification.

Project consultants **must** work with schools to develop an emergency evacuation diagram. The emergency evacuation diagram **must** be designed and permanently installed in accordance with AS 3745. Further information can be found on the [DET website](#).

If stairs are provided, they **must** have a dual function — allowing both general movement for school use and circulation in emergencies. Consultants **must** ensure all emergency egress' in early childhood facilities are designed in accordance with the National Quality Framework and National Construction Code.

3.3.8 SITE CIRCULATION

Schools **must** be designed with safe, equitable and dignified access for all students, staff and the broader community, and **must** comply with all applicable accessibility and amenity requirements stipulated in the NCC.

The main entrance of school facilities **should**:

- be prominent, clearly visible, well-orientated, well-sized, intuitive and easy to find by pedestrians entering the facilities
- be easily accessible from the car-parking area
- include protection from the weather at the entrance to the main door
- provide clear separation between vehicular traffic and pedestrian movement, and
- where a kindergarten includes a car park and vehicular thoroughfares, consideration must be made to younger children and parents with prams as they are more vulnerable to high risk vehicular movement..

Onsite roads and vehicular access **must** be kept to a minimum, while ensuring ease of parking and access to the main entrance doors. The expected flow of vehicular traffic to school sites from surrounding main and connector roads **should** be minimised.

Pedestrian routes **must** take priority over vehicular ones. Where routes intersect, the priority for pedestrians **must** be emphasised. Footpaths **must** be designed with safe and direct access in mind.

3.3.9 WAYFINDING AND SIGNAGE

Signage and inherent wayfinding **should**:

- assist users and visitors to orientate themselves with a site, and to navigate from place to place
- incorporate inherent wayfinding solutions into the design to direct staff, students, visitors and guests
- avoid overuse of signage and repetition of information
- comply with the NCC
- be vandal-proof, informative, stylistically consistent and directional.

Traffic control measures **must** be provided, with appropriate signage, so users and visitors clearly understand how they must proceed and where they should go.

3.3.10 PEDESTRIAN ACCESS

Pedestrian paths and networks **must**:

- follow the intuitive and logical way through the site, enabling students, staff and others to travel efficiently
- provide all users with a safe, functional and direct means of access from boundary entrances to and around buildings on the site, and to external functional and play areas. (All points of access and egress must be clearly defined, identifiable and easily located.)
- be able to move users from entrances to the site and from places such as car parking areas, while avoiding the use of footpaths that cross vehicle pavements where possible
- include crossings where footpaths cross paths of vehicle movement
- include a concrete footpath to the entrances of all buildings
- consider the planned placement of relocatable buildings.

For information on pedestrian paths, please refer to [Landscape architecture](#).

3.3.11 VEHICLE ACCESS

Consideration **should** be given to a single point of vehicle entry/exit into any staff car-parking area. Where car parking is provided for a kindergarten, and site conditions allow, the car park **should** be separate from the school car parking area and provide direct access to the kindergarten entry.

Consideration **should** also be given when planning of site facilities to the access and circulation of emergency vehicles, as per the relevant Australian standards and authority guidelines.

Access for delivery vehicles may be incorporated into the staff car park. Delivery vehicles require access as close as possible to relevant areas, such as the canteen and administration and technology areas. However, direct access to these areas is **not** mandatory: the trolleying of equipment and goods over short distances is acceptable.

Turning areas, hard standing areas and car parking **must** be designed to provide a safe, robust and long-lasting construction suitable for their purpose.

When car parking is provided for a kindergarten and where site conditions allow, the car park should be separate from the school car parking and provide direct access to the kindergarten entry.

3.3.12 ALTERNATIVE TRANSPORT ACCESS

Project consultants **should** focus on encouraging access to the site by non-motorised forms of transport. This can be achieved by considered use of footpaths and bicycle paths, bicycle parking, and links to public transport.

Project consultants **should** also reference closely the surrounding street network and its traffic management infrastructure. Safe vehicular access to school sites is **required**, but disruption to surrounding traffic movement **should** be minimised. If possible, student drop-off and pick-up areas **should** be located a short distance from the school site to facilitate safe pedestrian and bicycle access.

3.3.13 PROVISION OF CAR PARKING

The Victorian Government is **not required** to provide staff car parking at schools. The VSBA decides whether car parking will be provided.

Where car parking is to be provided, it **must**:

- be designed with minimal intrusion
- minimise the extent of access roads
- ensure points of access are kept clear of intersections, pedestrian crossings, curves and other locations where turning traffic impacts on safe traffic movement
- have appropriate paving, kerbs and marking
- be readily accessible to the main facility and staff work areas, and separate from student play and circulation areas
- have provision for disabled parking in the staff areas, with easy, unhindered access to the front entrance of the site (a minimum of one disabled parking bay should be provided)
- carefully consider the layout of pedestrian and vehicular access and movement routes and minimise unnecessary vehicle movement onsite
- avoid crossing vehicle pavements where possible
- ensure any pedestrian routes are clearly marked and provided with sufficient separation from vehicles.

Where site conditions allow, kindergarten car-parking for parents/carers accompanying children to sign them in and out of the kindergarten, the car park **should** be separate from school staff car parking and provide direct access to the kindergarten entry. In addition, please refer to the section on [Car park design](#) for further information.

3.3.14 PROVISION OF BUS PARKING

Onsite bus access, short-term parking and drop-off facilities **must** be provided at special schools and special developmental schools to allow for safe boarding and alighting. Bus facilities **must** be designed in accordance with the Disability Standards for Accessible Public Transport (2002).

Bus parking facilities, including turning circles **must**:

- ensure that all useable doors of the bus can be aligned parallel to the kerb and can accommodate appropriate DDA access in line with the relevant VicRoads, Austroads and other statutory requirements.
- be designed for the range of bus sizes operated at each school.
- designs should consider the size of the bus or buses used at the school. The maximum bus sized used is a 57-seat bus.

Table 6 lists the dimensions of a 57-seat school bus:

| | |
|----------------------------|----------|
| OVERALL LENGTH | 12250 MM |
| Overall width | 2480 mm |
| Overall height | 3580 mm |
| Wheelbase | 6050 mm |
| Wheel track front | 2108 mm |
| Wheel track rear | 1854 mm |
| Minimum lift-off clearance | 200 mm |
| Approach angle (°) | 8.3 |
| Departure angle (°) | 7.5 |
| Front overhang | 2720 mm |
| Rear overhang | 3480 mm |
| Min. turning diameter | 24000 mm |

Table 6 Dimensions of a 57-seat school bus

3.3.15 ACCESS FOR EMERGENCY VEHICLES

The design **must** facilitate access for emergency vehicles to all areas of the facilities, while minimising the length of onsite roads.

The Master Plan provision of access for emergency vehicles **must** be considered carefully in the context of site parking, student hard play areas, and zones where relocatable buildings are to be placed.

3.4 Landscape planning

Landscape design (soft and hard) **must** be integrated with built environment design, and undertaken by a professional landscape architect with current registration Australian Institute of Landscape Architects.

Landscapes spaces within school environments **should** offer shade and shelter from extreme weather and include functional and durable seating and equipment as required.

Project consultants **should** adequately plan for the full utilisation of the surrounding landscape. Design **should** instil students with an appreciation for the natural environment, which can contribute to their physical and mental development.

In general, landscape planning in Victorian government schools **must**:

- establish a hierarchy of open space(s) to provide functional, adaptable and durable landscapes, to support positive learning environments
- conserve and respect the natural vegetation, topography, ecology and heritage of the site
- consider the main entry points, nodes, linkages and gateways for students and the local community
- develop spaces between buildings that foster various modes of recreation, gathering and socialising
- consider age-specific learning and play settings
- integrate seating areas and nooks within the building perimeter to form outdoor gathering areas
- consider how deck and ramp areas can also incorporate in-built furniture and other opportunities for play
- consider the interface between the built form and landscape, and how the building form can define/imply outdoor gathering areas
- have a consistent design intent between the architecture and the landscape
- demonstrate sustainable land management practices and landscape design that reflects the indigenous history, culture and knowledge of the area
- provide high-quality furniture configurations of durable, fit-for-purpose materials, that support outdoor teaching and offer an integrated solution
- integrate interpretive and educational opportunities within the landscape to facilitate active and passive outdoor learning

- consider the requirement for ongoing maintenance of outdoor areas, and minimise seasonal impacts
- ensure that the main structure planting is introduced as early as possible to provide identity, enclosure and shade to outdoor spaces
- consider the specific needs of each different school type and student cohort
- mitigate prevailing winds
- deliver 'spatial experiences' within the landscape
- where possible, enable views of nature and maximise existing features such as mature trees
- consider inclusion of external play equipment and/or sensory gardens suitable to the school pedagogy
- make reasonable effort to retain existing trees and landscape, with reference to the local planning scheme.

Specific regulations and spatial requirements apply to outdoor play spaces in kindergartens, including:

- as for schools, a qualified landscape designer must be consulted to design all aspects of the outdoor areas of kindergartens
- external play spaces must be enclosed by AS1926-compliant fencing / barriers that are, minimum, 1800mm high
- storage sheds, trees and play equipment such as cubby house should not be placed within 100mm of a perimeter fence line
- sandpits with minimum depth of 400mm are provided
- grated stormwater pits are fitted with heel safe lids to avoid finger entrapment.

The execution of landscape architecture is described in [Landscape architecture](#) below.

3.4.1 OUTDOOR SPACES AND FLAGPOLES

The outdoor space is **required** to accommodate an outdoor assembly of the entire school population. This will be subject to significant foot traffic, which will require durable, hard-wearing pavements.

Where possible, a central outdoor space **should** be provided to act as the 'heart' of the school. It **should** be thoughtfully located, including close to classrooms to ensure students can circulate easily. This space **should** provide general protection from the weather using a combination of natural shade, windbreaks and built elements.

Three fixed matching flagpoles **must** be installed in all new Victorian Government schools. Flagpoles and comply with the NCC Section B1.4 Determination of structural resistance of materials and forms of construction.

In the case of vertical schools or capital projects with extreme land restrictions, internal flags are permitted subject to approval from a Delivery Division manager.

| | |
|---------------------------------|---|
| NCC SECTION B1.4 | Determination of structural resistance of materials and forms of construction |
|---------------------------------|---|

3.4.2 OUTDOOR LEARNING SPACES

Outdoor learning spaces **should** be located away from distractions such as traffic noise and traffic movements, equipment noise and play areas.

Soft landscaping and building structures can be used to enhance utility and to create strong visual connection between internal teaching spaces and external learning spaces, ensuring seamless and convenient use.

All landscape architecture **must** consider the impact it may have upon the risk of SIP ignition and the risk to occupants if they need to leave SIP and move to a secondary shelter location. Combustible or classified vegetation **must** be no closer than 10 metres from the SIP.

In addition, please refer to [Landscape architecture](#) for further information.

3.5 School design principles

The following architectural design principles set out the fundamental design requirements needed for each school to support the Victorian Government's education vision. These apply to all capital projects including new schools, upgrade projects and maintenance.

In executing these general architectural design principles, project consultants **must** consider all aspects of the local environment (for example, the NatHERS Climate Zones), and build accordingly.

In addition for kindergartens, the design principles set out in the seven National Quality Standards related to the [Physical Environment Quality Area 3](#).

3.5.1 SAFETY AND SECURITY IN DESIGN

Designs **must** create a safe environment for users, including minimising the risk of [occupational violence](#) against staff, where applicable. This is a legislative obligation under Section 28 of the *Occupational Health and Safety Act 2004 (Vic)* and [Child Safe Standards](#).

Where potential hazards are unavoidable, designs **must** incorporate mitigation strategies (i.e. access restrictions) to minimise safety risks to students, staff, visitors and maintenance contractors.

The design team **must** also provide a site traffic movement plan (for people, vehicles and goods) to ensure safety, and acquit the designer's obligations under the OHS Safety in Design sign off.

Any security measures for mitigating aggression between school staff/ students and visitors **must**:

- maintain a welcoming entry environment that promotes trust and respect
- not prevent egress
- preference surveillance, electronic or non-physical measures, where possible.

Where a physical barrier or intervention is deemed absolutely necessary, it **must**:

- slide rather than drop, and be
- hidden until required
- tamperproof
- ergonomic, and
- safe to use.

Designs **must** consider the location of elements that could be a hazard to occupants, visitors or maintenance contractor. Where unavoidable, designs **should** minimise potential hazards by including risk mitigation strategies such as restricted access to hazards.

The site plan **should** maximise users' safety through the management of pedestrian traffic, and by minimising vehicular traffic. Buildings used outside school operating hours (such as sports facilities and performing arts centres) **should** be designed to restrict access to other buildings and school areas.

Please review both [Designing Safer Buildings and Structures](#), published by WorkSafe Victoria, and the [Preventing and responding to work-related violence: A guide for employers](#) and the [Occupational violence information sheet](#)

Designs **should** discourage vandalism and other wilful damage. The site plan and built form **should** allow for natural and passive surveillance, both from within the school and from outside.

In addition, please refer to [Workplace health and safety](#) and [Security technology](#) for further information.

3.5.2 SUSTAINABILITY

Designs **should** promote environmental and economic sustainability that promote efficient operations, reduced maintenance costs, and resource usage.

PRODUCT TRANSPARENCY AND SUSTAINABILITY

Project consultants **must** demonstrate that no less than 3 per cent of eligible products meet one of the following initiatives, in accordance with the corresponding sections with the same title below:

- Reused products
- Recycled content products
- Environmental product declarations
- Third-party certification
- Stewardship programs

The percentage value of the products that meet one of the specified initiatives is demonstrated by calculating the Project Sustainability Value (PSV) and comparing it with the Project Contract Value (PCV).

Use the Green Star — Design & As Built: Sustainable Products Calculator, developed by the Green Building Council of Australia (GBCA), to determine the percentage of compliant products.

REUSED PRODUCTS

Reused products are those that have been previously used, and that are incorporated in the project without significant changes to their structure or function.

Cleaning, making good, repairs, recovering and resurfacing are permitted.

RECYCLED CONTENT PRODUCTS

Recycled content products are those made with recovered materials. The Sustainability Factor of a recycled content product represents the fraction of pre-consumer and post-consumer recovered content included in the product, by mass. For example, if a product has 75% recycled content, the Sustainability Factor is 0.75.

ENVIRONMENTAL PRODUCT DECLARATIONS (EPD)

There are several independent EPD schemes operating globally, providing services associated with the release and publication of EPDs on behalf of scheme participants. EPD schemes can differ in format and scope, including in life-cycle stages considered, and in whether the EPDs are independently verified.

Only EPDs published by schemes that consider a minimum 'cradle-to-gate' scope and include independent verification are recognised. Published EPDs **should** confirm compliance to listed standards and include the scope considered, and the organisation that verified the EPD.

Two EPD formats are recognised:

1. Products with a product-specific, third party verified EPD

For this format the following minimum requirements apply:

- the EPD is issued in conformance with AS 14025 or EN15804
- the EPD must be independently audited
- the EPD must be based on a cradle-to-gate scope as a minimum.

2. Products with an industry-wide, third party verified EPD

For this format the following minimum requirements apply:

- the EPD is issued in conformance with ISO 14025 or EN 15804
- the EPD must be independently audited
- the EPD must be based on a cradle-to-gate scope as a minimum
- the product manufacturer must be recognised as a participant in the EPD.

THIRD PARTY CERTIFICATION

Third Party Certification levels A, B & C are defined in the GBCA's Framework for Product Certification Scheme.

Several certification schemes have been assessed against the GBCA Framework for Product Certification Scheme and meet the requirements for the Third Party Certification. These schemes are listed on the GBCA website. Other certification schemes can apply for assessment.

STEWARDSHIP PROGRAMS

Product stewardship programs encourage projects and suppliers to share responsibility for the effective reduction, reuse, recycling or recovery of products. Product stewardship also helps manage environmental harm arising from the product when it becomes waste.

Products stewardship programs **must** be demonstrated with a product stewardship contract. The two types of Product Stewardship Contracts, for a leased item and a purchased item, are defined below.

Product Stewardship Contract — leased item

The following minimum requirements apply:

- the contract must be between a supplier and the building owner or tenant
- the supplier must agree to collect the item at the lease end for re-lease, reuse or recycling
- the contract must not include exemptions relating to timing, quality or quantity accepted for collection

Product Stewardship Contract — purchased item

The following minimum requirements apply:

- the contract must be between a supplier and the building owner or tenant
- the supplier must agree to collect the item at the end of use for re-lease, reuse or recycling
- the contract must not include exemptions which relate to timing, quality or quantity that will be accepted for collection.

HEAT ISLAND EFFECT REDUCTION

To reduce 'heat island effect', at least 75% of the whole site area **should** comprise one or a combination of the following, when assessed in plain view:

- vegetation
- roofing materials, including shading structures
- unshaded hard-scaping elements with a three-year SRI of minimum 34 or an initial SRI of minimum 39
- hardscaping elements shaded by overhanging vegetation or roof structures, including solar hot water panels
- water bodies and/or water courses
- areas directly to the south of vertical building elements, including areas shaded by these elements at the summer solstice.

For roofing materials and shade structures:

- roofs pitched <15° require a three-year Solar Reflectance Index (SRI) of minimum 64
- roofs pitched >15° require a three-year SRI of minimum 34.

Only where the three-year SRI for products is not available, use the following:

- roofs pitched <15° — an initial SRI of minimum 82
- For roof pitched >15° — an initial SRI of minimum 39.

3.5.3 LEARNING SPACES

The following details the general principles to be considered in the design of individual learning spaces, which are fundamental for each learning space.

The indoor play space of kindergarten is subject to specific regulatory requirements. Consultants must ensure that designs meet the seven National Quality Standards related to the [Physical Environment Quality Area 3](#), including that indoor child playrooms allow minimum unencumbered indoor space that does not factor in:

- areas such as passageways, bathrooms and nappy change areas, space set aside for the use of storage, staff or administrative rooms, storage areas or
- any space not suitable for children.

CONNECTIONS/RELATIONSHIPS BETWEEN LEARNING SPACES

Learning spaces **should** ensure the overall circulation strategy is safe and legible. The circulation strategy **should** provide shared circulation spaces that encourage interaction and connectivity, and facilitate connections between learning spaces to support the school's pedagogical approach.

The site plan **must** support the overarching circulation of the school: facilities **must** be clustered rationally to support the safe and efficient movement of students and staff.

NATURAL LIGHT AND VIEWS

Learning spaces **must** be designed to maximise natural light infiltration, while including sun and glare control. Access to views that connect the interiors to the surrounding context **should** be maximised.

Views and lines of sight

At least 60% of the nominated area **must** have a clear line of sight to a high-quality internal or external view, demonstrated by drawings showing access to views. All floor areas within 8m of a compliant view meet this requirement.

The line of sight is measured by extending a perpendicular line from the view — be it a window, opening or internal view. A line at 45° can be used at the corners of the view. The thickness of the external walls **must** be taken into account in the calculations. Internal or external columns can be ignored.

Where a lecture theatre or auditorium arrangement is proposed, a sightline analysis **must** be provided. This analysis **must** define and apply to the agreed critical area requiring common visibility. Staggered seating **should** also be considered best practice in auditorium-style areas.

All indoor and outdoor approved areas of a kindergarten **must** be designed in a way that facilitates supervision of children at all times they are being educated and cared for by the service including toilets and nappy change facilities.

NATURAL VENTILATION

Natural ventilation solutions **must** be provided throughout all buildings where external air quality is of a reasonable standard.

Project consultants **must** design a natural and/ or mechanical ventilation approach that results in high indoor air quality outcomes, including consistent thermal comfort for occupants, and considers changing weather patterns. This must be compatible with overall heating or cooling designs.

All ventilation requirements are described in [Mechanical services](#).

INFORMATION AND COMMUNICATIONS TECHNOLOGY

In general, communication services in schools cover data (such as administrative and curriculum data), emergency warning systems, video (including audio-visual), voice (telephone), library automation, public address (PA), television antenna (including satellite dishes), and security.

The overall building design **must** incorporate design requirements of the ICT infrastructure necessary for communication services in schools. This includes an easily accessible, adequately large communication room for the school servers and switches that run the school network.

In addition, please refer to [Information and communication technology](#) for further information.

ACOUSTICS

All acoustic requirements are described in [Acoustic engineering](#).

3.5.4 BUILDING ORIENTATION

Building orientation **must** be addressed in the Master Plan and Schematic Design reports.

Buildings are to be positioned to provide clear lines of sight from the site boundaries to courtyards, and other spaces between buildings.

A prime consideration **should** be to maximise north-facing facades and south light, and minimise east and west-facing facades. To reduce heating and cooling loads, project consultants **must** also consider zoning areas so that the heated/cooled areas are grouped and isolated from other areas by doors.

Heated or cooled areas **should** be separated from the outside by airlocks, and doors **should** be on the eastern side of buildings, to avoid the negative effects of cold southerly winds and hot northerly winds.

Building layout **should** facilitate daylighting. The size and orientation of skylights and clerestory windows **should** be carefully considered to limit overheating and glare. All skylights and clerestory windows **should** be shaded from summer insolation.

To further reduce overheating in summer, window design **should** incorporate adequate shading.

Daylighting and the minimisation of artificial lighting **must** be addressed in the Schematic Design report.

For further site planning considerations, please refer to [Landscape planning](#).

3.5.5 ADJACENCY OF SPACES

Project consultants **should** consider adjacent location of facilities with complementary educational functions. This enhances learning and circulation and facilitates functional patterns across inter-related areas of the site. It also mitigates the need for community users to access other parts of the site.

Examples of facilities that benefit from adjacency include gymnasiums and sporting facilities, performing arts facilities, science and technology spaces and canteens or food technology classrooms. Adjacency can allow for the development of a cafe facility for out-of-hours performances, for example, or for a library functioning as a resource centre, IT zone and conference facility in one.

Where kindergartens are co-located on a school site, outdoor play spaces should be located adjacent to primary school outdoor play areas or school learning spaces to enhance connection. Where kindergartens are integrated into the school facilities, consideration should be given to shared use of administration, meeting and staff breakout spaces.

3.5.6 POTENTIAL FOR GROWTH AND FLEXIBILITY — RELOCATABLE BUILDINGS

Project consultants **must** design the Master Plan taking into consideration the potential for enrolment fluctuations, which can be managed through relocatable provision. The decision to provide relocatable classrooms is made at the master-planning stage, and is made in consultation with the school, region, and at the discretion of the VSBA.

Relocatable buildings **should**:

- be designed in conjunction with the overall design, and with respect to the functionality of the school site. Landscape planning should integrate relocatable classrooms. This includes the layout and levels of roadways, paths and drainage to allow for future development.
- be placed in an area that does not disrupt the normal movement of students and staff among existing buildings
- provide a straight-forward connection to power, water and drainage
- provide safe ingress and emergency egress from the relocatable building, and from any neighbouring buildings affected by the placement of the relocatable building
- be clustered to enable similar permanent learning spaces to be developed
- avoid location along street frontages
- be delivered and positioned in the proposed locations without the need for vehicles to traverse hard-courts or require the removal of site infrastructure, such as covered-ways and playgrounds
- have disability access consistent with legislative requirements, for special purpose relocatable buildings
- have ramps, lifts and other accessibility measures incorporated at the site during delivery (all triple-storey buildings must have a lift).

Multi-storey relocatable buildings are provided to schools that have limited available space for further single-storey relocatable buildings. All multi-storey relocatable buildings need to comply with relevant requirements and legislation for disability access, safety features, balustrades or barriers, fire requirements and emergency exits.

The height of multi-storey buildings can provide concealed spaces that can facilitate vandalism and other damage to school property. Project consultants **should** minimise such concealments created by multi-storey buildings where possible.

3.5.7 CONSTRUCTION PLANNING

For existing school sites, adequate planning is needed to allow for a staged implementation of works within a single project. Stages **should** show resources allocated to the project that enable schools to continue to operate without undue disruption to the learning environment.

3.6 Legislative requirements

All designs **must** comply with relevant Australian standards and legislation. This includes compliance with the latest version of the NCC, Victoria's *Building Act 1993*, and associated regulations including Building Interim Regulations 2017 (Vic) (applicable before 2 June 2018) and Building Regulations 2018 (Vic) (applicable from 2 June 2018).

Other Acts that will influence the design process include:

- Planning and Environment Act 1987 (Vic)
- Safe Drinking Water Act 2003 (Vic)
- Disability Discrimination Act 1992 (Cth)
- Climate Change Act 2017 (Vic)

Regulations that will influence the design process include:

- Planning and Environment Regulations 2015 (Vic)
- Dangerous Goods (Storage and Handling) Regulations 2012 (Vic)
- Occupational Health and Safety Regulations 2017 (Vic)

Policies that will influence the design process include:

- Victorian Climate Change Framework
- Victoria's Climate Change Adaptation Plan 2017–2020
- Victoria's Renewable Energy Action Plan

Standards that will influence the design process include:

- AS/NZS 2982 Laboratory design and construction
- AS 3959 Construction of buildings in bushfire-prone areas

The National Quality Framework (NQF) guides the design of early learning facilities such as kindergartens, and consists of Acts and Regulations. The National Quality Standard (NQS) provides education and care services delivered in early learning facilities certainty about what is expected of them and what they are required to do to comply with the National Quality Framework.

The NQF is underpinned by the following regulatory tools:

- the Education and Care Services National Law Act 2010
- the Education and Care Services National Regulations 2011
- the National Quality Standards and quality rating system

All early childhood facilities such as kindergarten designs must comply with all of the NQF tools and additional requirements laid out in the Building Quality Standards Handbook.

3.6.1 WORKPLACE HEALTH AND SAFETY

Safe design is the integration of hazard identification and risk assessment methods to eliminate or minimise the risks of injury throughout the life of a building or structure. Designs **must** promote universal workplace health and safety, including for construction workers, staff and students, and those who may be involved in the eventual disposal of the asset.

Crucial considerations include hazardous materials, reducing occupational violence against staff and asbestos. Project consultants **must** follow all applicable workplace health and safety laws and regulations, including the *Occupational Health and Safety Act 2004* (Vic).

In addition, please refer to the section on [Safety and security in design](#) for more information.

3.6.2 CHILD SAFE STANDARDS

All school buildings, facilities and grounds **must** comply with all laws that apply to schools. This includes Ministerial Order No. 870 — Child Safe Standards — Managing the risk of child abuse in schools. To comply with this order, project consultants **must** create environments that promote inclusiveness, participation and child empowerment, and that mitigate risks to safety, especially through poor lines of sight in design.

3.6.3 CONSTRUCTION IN BUSHFIRE-PRONE AREAS

Project consultants **must** ensure that a Bushfire Attack Level assessment is undertaken using the method described in AS 3959 — Construction of bushfire buildings in bushfire prone areas. If the project involves a substantial SIP upgrade, a new BAL assessment only needs to be undertaken if the last one was done more than two years ago.

Dependent on the site and its assessed level of hazard, the design of new or refurbished facilities **must** account for this hazard and any consequential fires that may result from adjacent buildings or landscaping elements.

At time of construction, or where substantial renovation to an existing SIP is required, compliance with the current National Construction Code and associated standards, **must** be independently certified by a building surveyor. The consultant **must** organise this certification, unless substantial SIP works are being managed by a school or by the VSBA on its behalf.

In addition to these requirements, the design process **must** include consideration of hard and soft landscaping, vegetation fuel management and plant selection suitable for schools in bushfire prone areas, and refer to the Departmental and government procedures and Landscape planning sections for further information.

Further guidance for schools conducting major upgrades can be found in the following policies:

- [Bushfire Preparedness](#) policy
- [Shelter in Place](#) policy

3.7 Services and maintainability review

During the design stage and prior to construction, project consultants (or an independent commissioning agent, on their behalf) **must** lead and conduct a comprehensive services and maintainability review, summarised in a Service and Maintainability Report. This report **must** be agreed to and signed off by the parties involved. Action items resulting from this review are incorporated in the design intent report.

The services and maintainability review is to facilitate input from the design team, the facilities manager and operations staff (if known), and any relevant suppliers and subcontractors (if engaged). The review **must** address the following aspects for all nominated building systems:

- commissionability
- controllability
- maintainability
- operability, including 'fitness for purpose'
- safety.

In addition, please refer to [Building Handover and Completion](#) for more information.



4

SPECIAL FACTORS

4 SPECIAL FACTORS

Special factors associated with the construction of a facility may lead to additional costs and affect the budget of an otherwise standard building project.

Project consultants **should** conduct investigations that demonstrate that alternatives have been evaluated, and all additions to the budget **must** be supported by estimates and quotations. Approval **must** also be obtained from VSBA before incurring additional costs.

Only in circumstances where an extraordinary item arises (for which no money has been allocated) will approval of additional project funds be considered.

Typical special factors affecting the cost of a building project include:

- existing site conditions
- climatic conditions
- existing conditions impacting on building design
- access and servicing
- multi-storey or higher-than-normal buildings.

4.1 Process

The project budget may be increased at project initiation, or during its development, following a review of submissions and VSBA approval.

Each special factor needs to be quantified, and reasons and/or reports provided, to justify an increase.

During the course of the documentation, the principal consultant **must** supply a detailed confirmation of the cost of each special factor. Budget allocations will be modified and approved during the course of documentation, subject to VSBA review and approval.

4.2 Common special factors

Identification of all special factors is not possible. The most common are defined below.

4.2.1 EXISTING SITE AND BUILDING CONDITIONS

Due to the condition of the site, additional works may be required on an otherwise standard building project. Such works may be generated by factors associated with:

- rock
- soil
- flood-prone land
- slope of site (where the fall across the site is 1:20 or steeper)
- filled sites
- fill provision
- swampy ground
- bulk excavation
- site contamination.

The impact on the construction method and/or the additional works involved **must** be identified, and the likely cost quantified and approved by VSBA.

Additional works involving existing infrastructure may also arise from:

- the need to remove hazardous materials (see [Hazardous materials](#))
- decanting requirements
- poor structural or maintenance condition of existing buildings and facilities
- excessive noise, vibration and fumes (for example, from aeroplanes, trains, heavy traffic and industrial processes).

Consequent additional works **must** be identified and the costs estimated, and submitted for approval to VSBA.

4.2.2 CLIMATIC CONDITIONS

Special provision may be required for climatic factors. For example, snow entrances may be warranted in alpine regions. Proximity to the sea (generally within 1 km) or location in industrial areas may require special coatings, such as hot-dip galvanising.

Note that high rainfall is not a climatic condition requiring design modification: it is normally covered in VSBA's locality allowance.

4.2.3 MAINTENANCE ACCESS AND SERVICING

Adverse site characteristics may mean:

- excessive service runs as a result of current service locations
- the upgrade of existing external works and services as a result of additional 'loads' imposed
- buildings required to house engineering services (for example, pump houses, substations and gas meter enclosures)
- bringing service supplies to the site boundary
- meeting service and local government authority requirements (for example, regarding headworks and outfall charges)
- temporary access only.

Consequent additional works **must** be identified, and their likely cost quantified and approved by VSBA.

4.2.4 HAZARDOUS MATERIALS

Hazardous materials include chemicals, cleaning agents, fuels, oils, asbestos, synthetic mineral fibres (SMFs) and polychlorinated biphenyls (PCBs).

All schools have had asbestos and PCBs audits. If these substances were present, schools received reports detailing their location. (Note that all PCBs have now been removed from school buildings.)

Generally, the audits also identify the presence of other hazardous materials.

Architects **must** ensure that tender documentation identifies the removal of all known hazardous materials where upgrades are planned.

4.2.5 MULTI-STOREY OR HIGHER-THAN-NORMAL BUILDINGS

Limitations imposed by site topography, urban land availability limited to small parcels, or existing buildings may necessitate new facilities that are multi-storey.

Because of requirements such as higher roofs and extra footings, a budget increase for proposed buildings or parts of buildings may be considered. The impact of the additional works **must** be identified, and the likely cost quantified and approved by VSBA.

As a general rule, the acceptable cost increase due to two-storey structures is an additional 15% (that is 115%) of the rate for a new build \$/m². This covers all structural factors in two-storey construction, including increased footing, pad, column sizes, load-bearing walls, suspended slab additional thickness, and band beams. This also allows for an internal staircase within the internal circulation area planned. However, a lift and its necessary supporting structure is specifically excluded.

Every planned vertical school (four or more levels) **must** complete a vertical transportation report to ensure safe and efficient student, staff, visitor and goods movement is achieved. This is to ensure that at least one planned lift core with at least one passenger and one goods lift, both fit for purpose/appropriate to a school's scale and function, are provided. Suitably scaled access pathways to and from the lift **must** also be provided for delivery and maintenance, including periphery gate/s.

Designs, incorporating high internal glass panes, for instance, **must** have resolved and realistic maintenance plans.

Disability access **must** also be provided in accordance with the Building Code of Australia and the Disability (Access to Premises — Buildings) Standards 2010. For example, this may necessitate the substitution of ramps for stairs where practicable. Other factors such as external ramps **should** also be included.

Kindergartens in multi-storey buildings must include the following:

- capture gates to restrict kindergarten children's access to lifts and stairs, and
- upgraded exits, sprinkler and smoke detection systems, as per NCC requirements for kindergartens.

Furthermore, the NQS stipulates that outdoor spaces must allow children to explore and experience the natural environment. While artificial grass and features are suitable for smaller areas only, there must be appropriate access for children to interact with the natural environment and natural vegetation.

Consultants must comply with safety, design and approval requirements for children in multistorey buildings, as set out in the NQF and NQS that are current at time of masterplanning the kindergarten facility.

4.2.6 SPECIALIST AND SPECIAL DEVELOPMENTAL SCHOOLS

Additional factors may apply to specialist and special developmental schools. Air-conditioning is an entitlement in specialist and special developmental schools, and rates will need to be adjusted accordingly. Other special factors will be assessed on a case-by-case basis, but may include:

- the necessity of smoke/fire detection systems to deactivate magnetic locks
- any glazing below 1m to exceed the Australian Standard and achieve greater impact resistance
- automatic opening front door and security issues
- fencing types and security/containment issues.

4.2.7 FURNITURE AND EQUIPMENT

For new schools, project consultants must specify a full list of furniture and equipment, as well as joinery as per section 3.3.12, as part of the building design. Specified furniture should comply with Local Jobs First and the following requirements:

- be flexible, i.e. height adjustable
- sit-stand desks be provided for staff
- small round tables are to be avoided due to unsuitability in many spaces,
- generally, in learning spaces, be conducive to collaborative learning
- specifications must include manufacturer, product and warranty detail (not simply be for generic equipment), however,
- where products are specified, equivalent products may be accepted, subject to review by the VSBA.

All specified furniture, fittings and joinery must comply with the [Engineered wood products](#) section.

4.2.8 INFRASTRUCTURE WORKS AND SERVICES

Costings for all works and services, such as power supply, sewerage systems, stormwater retention, and water and fire services, must be included in the project budget.

4.3 Items not generally considered 'special factors'

The following items are not generally considered special factors and are accommodated by other components of the project budget.

4.3.1 LOCATION ALLOWANCE

In general, projects constructed in some areas outside the metropolitan area bring with them increased costs. Allowances for these additional costs are made within the project budget estimate.

4.3.2 PRICE ESCALATION AND FLUCTUATION DURING DOCUMENTATION AND CONSTRUCTION

Allowances for price escalation and fluctuation during documentation and construction are made when determining the budget for a project.

4.3.3 ABOVE-STANDARD FACILITIES

When projects are documented over and above VSBA's current facilities standards, all additional costs are to be borne by the school. No additional funds will be provided.

4.4 Increased school construction rates

Special factors **should** only be considered for site-specific conditions, as set out in the previous clauses.

Additional ecologically sustainable design (ESD) initiatives will only be considered on an individual project basis, and are subject to approval.

School construction rates have been revised to include:

- allowance for all NCC part J requirements
- physical-barrier termite treatment in all projects
- rainwater storage and rainwater toilet-flushing systems
- daylight-sensing controls for classroom lighting
- external access (one door per general-purpose classroom equivalent)
- low-E glass to north and west facades
- roof insulation at R3.5, wall insulation at R2.5
- fittings and special equipment
- cabling, communications and power
- 80% of travel at an internal rate, and 20% at an external rate
- locker areas and site stores as part internal, part external rate.



5

TECHNICAL SPECIFICATIONS

5 TECHNICAL SPECIFICATIONS

5.1 Landscape architecture

Landscape architecture **should** form part of the overall site design. Careful design of outdoor learning spaces can give students an appreciation of the natural environment, which can contribute to their physical and mental development. Landscape architecture is also a means of maximising the site's features.

This section describes specific aspects in executing landscape architecture that ensures that outdoor environments support learning.

Outdoor play spaces in early childhood learning facilities such as kindergartens must satisfy the following:

- a qualified landscape designer must be consulted on all aspects of outdoor design
- Outdoor Space Minimum Requirements must be met, as outlined in the NQS, and **must not** count:
 - areas such as pathways, thoroughfares, car parks and storage sheds
 - any other space that is unsuitable as outdoor space for children, or
 - any area of veranda included in indoor space calculations.

5.1.1 SOFT LANDSCAPING

Soft landscaping **should** be used to improve the landscape of both the site and surrounding area. Any soft landscaping solution used **should** improve the overall functionality and aesthetics of the school site and require minimal ongoing maintenance.

Project consultants **must** select and satisfy soft landscaping that meet the following requirements:

- suitable drainage provided with falls across the external surface, and adequate subsurface drainage
- soil and mulch prevented from spreading to adjacent pavements or turfed areas
- appropriate selection of native planting to foster longevity and contextual integration.

TURFED AREAS

Areas of the site not required for other purposes may be converted to general grassed areas.

Project consultants **must** select and satisfy turf that meets the following requirements:

- drought tolerant
- minimises the use of any fertilisers
- shade tolerant
- avoid the inclusion of any flowering species (such as clover) to minimise the attraction of bees.

Turf areas are not to be included on slopes greater than 1 in 5 (20% gradient).

Where available, irrigation water is to be sourced from mains-supplied non-potable water.

At sites where mains recycled water is not available, irrigation water **should** be sourced from rainwater harvesting or other sustainable sources. These water sources will also be in demand for toilet flushing. During times of drought, irrigation water should need to be supplemented by mains supply, subject to water restrictions.

In addition, please refer to [Irrigation systems](#) for further information.

SPORTS PLAYING FIELDS

The available stripped topsoil resulting from site building works **should** be utilised and spread to create flat playing areas. These areas **must** be able to accommodate most outdoor sports.

Project consultants **must** select and satisfy sports playing fields that meet the following requirements:

- fills are assessed prior to any use on school sites for contaminants
- playing surfaces **must** be turfed, drained with falls across the playing surface and have adequate sub-surface drainage and topsoil structures, and
- fitted with an irrigation system/s suitable to the site
- fields are orientated and marked in a north-south orientation where possible.

Other significantly sized open spaces should also be turfed with natural grass, rather than synthetic turf, with adequate sub-surface drainage and topsoil structures. All ovals must be subject to a whole of life assessment.

Fill from other sites (including new housing estate developments) is not to be used without Ministerial approval.

Project consultants **should** provide sports playing fields as follows, where possible:

NEW PRIMARY SCHOOLS

Should be a flat, well-drained, natural grass turf, open playing area (notional field/oval dimensions of 110m x 90m) with reasonable run off and buffer distances from the boundaries to reduce risk, and increase park use and property safety, subject to the dictates of topography and available space.

Synthetic turf **should** not be used on sports ovals, due to maintenance and environmental implications, and heat island effect. Ovals must be fitted with irrigation systems, and high quality sub- and topsoil structures suitable to the conditions of the school's location in the State.

NEW SECONDARY COLLEGES

Should be a flat, well-drained, natural grass turf, open playing area (notional field/oval dimensions of 165m x 135m) with reasonable run off and buffer distances from the boundaries to reduce risk, and increase park use and property safety, subject to the dictates of topography and available space.

Synthetic turf **should** not be used on sports ovals due to maintenance and environmental implications, and heat island effect. Ovals must be fitted with irrigation systems, and high quality sub- and topsoil structures suitable to the conditions of the school's location in the State.

Any supporting amenities **must** be female friendly.

Guidance on best practice community AFL oval specifications, where they are required and possible, can be found in the [AFL Preferred Facilities Guidelines for Community Facilities](#).

In addition, please refer to [Turfed areas](#) for further information.

ARTIFICIAL GRASS/SYNTHETIC CARPETS

Project consultants may consider providing artificial grass or synthetic carpets in small spaces and areas subject to frequent pedestrian movement, where grass is difficult to establish and maintain. Such spaces **must** be suitable for small groups to occupy.

Project consultants **should** select and satisfy artificial grass or synthetic carpets that meet the following requirements:

- fit-for-purpose and durable
- a minimum 19mm pile length
- a minimum 1000g/m² pile weight
- sand-filled
- well-drained.

Note that different activities will require different pile length and weight.

MASS GARDEN BEDS

The planting scheme **must** be selected from hardy evergreen and flowering perennial groundcovers, low bushes, plants and shrubs, able to thrive in the given exposure condition, and not adversely affected by dry and windy conditions.

All mass garden beds **must** comply with and be installed in accordance with the relevant Australian standards:

| | |
|----------------|--|
| AS 3743 | Potting mixes |
| AS 4419 | Soils for landscaping and garden use |
| AS 4454 | Compost, soil conditioners and mulches |
| AS 2303 | Australian Tree Standard |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy mass garden beds that meet the following requirements:

- located in less heavily trafficked areas
- use a variety of low-water or drought-tolerant plant species, at a minimum density of four plants per m²
- poisonous plants (flower, seed or leaf) or plants that are known allergens must not be used.

Plants to be avoided

The following species **must not** be used at Victorian government schools:

- hederia helix — English ivy
- kalmia latifolia — kalmia
- laburnum species — golden rain tree
- lantana species — lantana
- ligustrum vulgare — common privet
- melia azedarach — white cedar
- myoporum insulare — boobialla
- nerium species — oleander
- prunus laurocerasus — cherry laurel

- wisteria sinensis — wisteria
- eucalyptus botryoides — mahogany gum
- eucalyptus camaldulensis — river red gum
- eucalyptus cladocalyx — sugar gum
- eucalyptus mannifera — white brittle gum
- eucalyptus viminalis — manna gum (ribbon gum)
- fraxinus species — some ashes
- populus species — poplars
- salix babylonica — weeping willow
- ulmus procera — English elm
- rhododendron ponticum — common rhododendron

SENSORY GARDENS

Sensory gardens are designed to stimulate students' five senses in a safe, accessible environment. They **should** incorporate plants, shade and accessible circulation routes that give students the opportunity to safely interact and engage with the setting by:

- seeing, touching and smelling the planting
- listening to wind, water, birds, insects and other natural-environment noises
- watching the passage of sunlight over planting and through leaf canopies.

Sensory gardens **should** comprise plants that are drought-resistant, where possible.

5.1.2 HARD LANDSCAPING

Hard landscaping **must** be used to provide necessary outdoor educational requirements through the efficient and well-designed location of constructed landscaped sites.

OUTDOOR COURTS

Hard courts are an important physical education facility that can also be used for school assembly purposes.

All hard courts **must** comply with and be installed in accordance with the following Australian standards:

AS 3727 Pavements

and the current [Netball Victoria Facilities Manual](#).

Design **must** follow a geotechnical investigation, interpreted by a geotechnical or civil engineer.

The consultant **must** conduct site supervision of all pavement works, to ensure compliance with all specifications and standards.

Hard courts **must** be safe and playable in wet and dry conditions. Project consultants **must** provide hard courts as follows:

| | |
|-------------------------------|---|
| SCHOOL LEVEL | Hard court requirements |
| NEW PRIMARY SCHOOLS | Two hard courts, sitting side by side where possible, as per Figure 2A. In addition, a paved area equivalent in size to a single hard court is to be provided. |
| NEW SECONDARY COLLEGES | Four hard courts that should be located as side by side pairs, wherever possible, as per Figure 2B. |

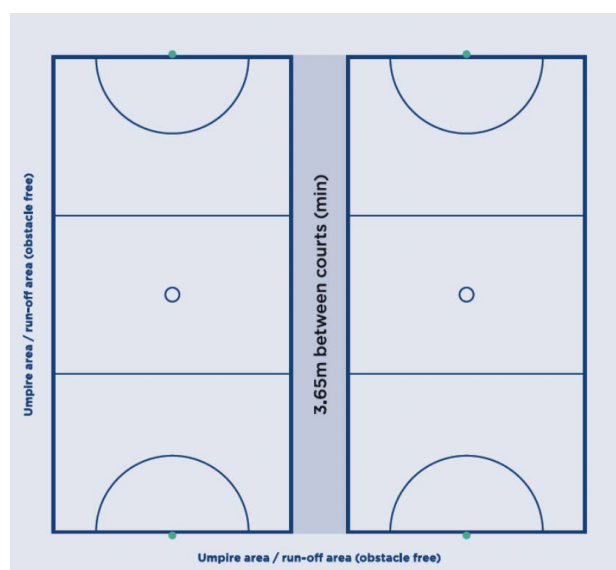


Figure 2A Example arrangement for two hard courts

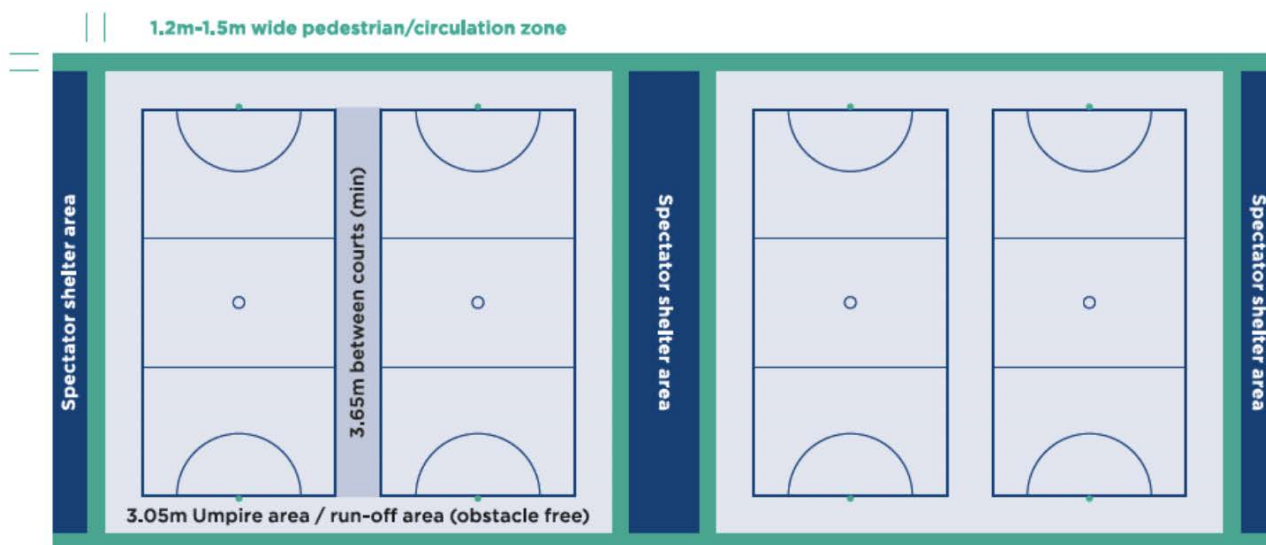


Figure 2B Example arrangement for four hard courts

Where there are more than two courts (whether indoor or outdoor), space **must** be allocated for spectator areas in between banks (i.e. sets of two) of courts, and mobile benches and other mobile furniture and equipment required for school or external state affiliate competitions.

Project consultants **must** select and satisfy hard courts that meet the following minimum requirements:

- constructed of asphalt or concrete (determined after assessing ground conditions) with an acrylic sports coating and an effective and durable edge restraint. This **must** extend for the full depth of the pavement, including the base course
- the edge restraint **must** be set flush with the top of the hard court surfacing
- must be bounded by a subsoil drainage system that will isolate the hard court foundation material from subsoil seepage and the effects of seasonal ground movement
- surface finish **must** direct stormwater run-off to the edges of the paved area without affecting the court's function.
- have a 1% fall as directed per specifications
- must achieve a minimum BPN slip resistance of 75 in the wet using a 55 and 96 slider.

Hard courts **must** have 'order of dominance' markings to accommodate multiple different sports uses and community agreements.

Project consultants **should** refer to guidance from the relevant state sports' peak bodies

(Netball Victoria and Basketball Victoria) to ensure markings are accurate. Textured line markings **should** be made in a water-based paint. Line marking **should** always be undertaken by a trained professional using approved sports' surface products.

For competition-grade courts, consideration **should** be given to avoidance of line confusion as the number of sports' lines on a court can impact on the types of competitions and events that can take place on that court.

Hard courts **should** be sited near gymnasiums and outdoor grassed playing areas. If possible, hard courts **should** be orientated and marked in a north-south orientation, and arranged side-by-side, not end-to-end. All hard court areas **must** incorporate an obstruction-free zone outside the court perimeter of a minimum 3.7m wide.

OUTDOOR HARD COURT MULTI-FUNCTIONALITY - FOR BASKETBALL AND NETBALL

Each outdoor court **must** be provided with both basketball and netball fittings - including backboard, backstops, posts, rings and sleeves - that satisfy school and community partner needs, and the requirements outlined below, at minimum.

It is important to note that best practice, VSBA multifunctionality requirements differ for indoor and outdoor courts, due to considerations such as available space, system durability, and safe, practical operation.

Consultants **must** satisfy the following requirements for outdoor hardcourts, and provide:

- a reversible /rotatable pole and backstop system be installed per court, that:
 - is comprised of hot dip galvanised steel finish only, for long rust-free life
 - has stable steel upright sections of 114-140 mm diameter minimum.
 - have certified independent laboratory testing¹ to EN 1270 standards with registered engineer sign off
 - has solid double rings, with pigtail-less net attachments, for safety and durability
 - has rings attached to a structural part of the system, not just the backboard/frame
 - if the backboard is timber, it has rounded backboard edges that meet international standards (EN1270)
 - backboards that are not attached to a non-structural brick wall
 - has a minimum 5-year warranty against delamination/rot /splintering
 - has fully sealed edges, and

- is FIBA certified² for outdoor systems
- has rings, posts and sleeves that satisfy current FIBA or Netball Victoria regulations, respectively.

- height appropriate solutions, where possible, where courts are to be used by young users (under 11 years old), and older users (11 years and over) and for people who use a wheelchair.

Other recommended long-life backboard materials include: fibreglass, fibreglass coated timber, laminated timber and aluminium.

If courts are designed end to end, additional space **must** be provided within the run-off, with consideration of fences and other building structures, for the rotator arms to turn.

Where an outdoor court is covered, the covering **must** have a minimum clear 7.5m ceiling height at its lowest point. This also includes the area over the umpire / run-off areas.

1

Prototype Load Testing

Equipment shall be prototype load tested for suitable imposed loads. The prototype load test load shall be the imposed load factored by a load factor of 1.5 (this is factored into the 1.8kN) and a test factor of 1.2 giving a load at the backboard of 2.2kN and 1.5kN for the basketball ring. The permanent deformation resulting from prototype testing shall not exceed 10mm. For ease of inspection it is recommended that the testing be carried out on an unpainted structure and that the structure be tested for cracking using the magnetic particle method both prior and following completion of the load testing. The prototype load test shall be supervised, reported and certified by a Registered Professional Engineer. The test report shall detail the equipment tested, the test procedure, test loads and performance.

Cyclic Load Testing (Fatigue Testing)

Cyclic testing of the assembly shall be 100,000 load cycles from zero imposed action to the prototype cyclic test load. The prototype cyclic test load is 1.2kN applied downward at the face of the backboard. The equipment is acceptable after test if the permanent deformation is less than 10mm and no cracks are present. For ease of inspection it is recommended that the testing be carried out on an unpainted structure and that the structure be tested for cracking using the magnetic particle method both prior and following completion of the fatigue testing. The cyclic load test shall be supervised, reported and certified by a Registered Professional Engineer. The test report shall detail the equipment tested, the test procedure, test loads and performance.

2

FIBA Oceania welcomes proposals for independent testers. Current local testers can be discovered or proposed via email through equipmentandvenue@fiba.basketball.

NETBALL/BASKETBALL COURT SPECIFICATIONS (APPLICABLE TO INDOOR AND OUTDOOR)

Project consultants **must** select and satisfy indoor and outdoor courts inclusive of posts, rings and sleeves for both basketball and netball that, respectively, meet Basketball Victoria and Netball Victoria's minimum requirements.

Court size

Netball Courts have a larger footprint than basketball. By using the netball specifications, all basketball and other highball sports dimensions will be met.

Overall court measurements are taken from the outside of the boundary line to the outside of the boundary line (whereas internal measurements, i.e. court thirds, are measured from the outside to the inside).

- 30.50m x 15.25 m = principle play area
- 3.05m minimum run-off (obstacle-free umpire area on all sidelines and baselines)
- minimum total free area 36.6m x 21.35m = 781.41m² total size
- if the facility has multiple courts, allow 3.65m of obstacle-free run-off area between courts
- in accordance with the diagram in Figure 2C

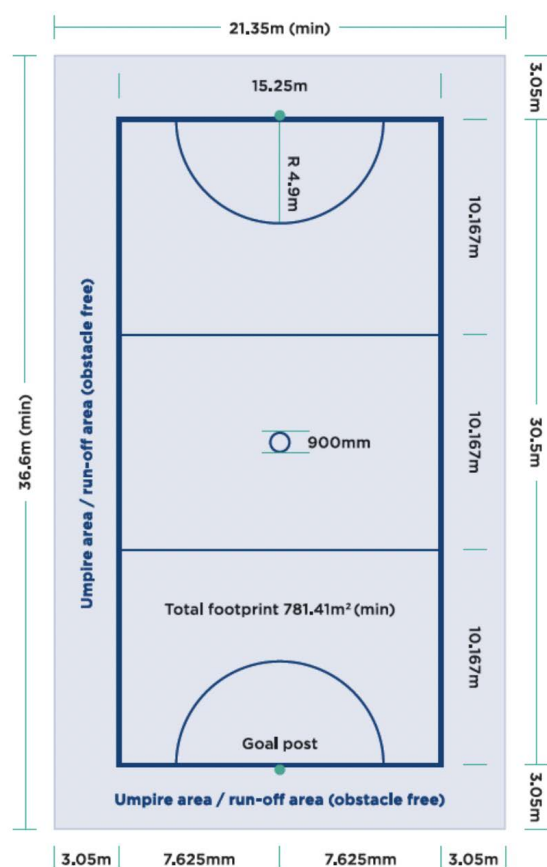


Figure 2C Netball court size dimensions

Scoreboards and shotclocks

Scoreboards **must** be tested to DIN 18032-3 standards. Scoreboards and shotclocks **must** be FIBA-certified at the appropriate level (i.e. Level 3 for community and state-level competition facilities, or Level 2, only where a facility will be used for national competitions). Noting that FIBA Oceania permit smaller digit sizes for non-international.

Scoreboards **must** be placed in a position where it is clearly visible to the officials and from player benches)

Level 3 requires one scoreboard only, while level 3 requires two. The scoreboard/s **must** be placed in a position where it is clearly visible to the officials and from player benches).

All scoreboards **must** be upgradable on site to respond to future rule changes, accommodate separate sports modes as appropriate. Scoreboard power consumption **must** be kept to a reasonable minimum and factored into overall power supply needs and capability.

Lighting

Minimum required lux level is determined by the sport level being played at the venue. Schools should consult with the relevant state sporting body to determine a suitable level. As a guide, Netball Victoria recommend the following for indoor and outdoor light levels.

| | |
|-----------------------|---|
| INDOOR COURTS | Required - Lux level 300 minimum |
| OUTDOOR COURTS | Desirable - <ul style="list-style-type: none"> • 100 Lux for training courts • 200 Lux for competition netball courts |

Figure 2D Lux lighting for competition facilities

Other elements

Netball goal posts, sleeves and rings **must** comply with current Netball Victoria Guidelines, found in the [Netball Victoria Facilities Manual](#).

Protective sports foam should be provided to posts.

Basketball facility design **must** mitigate glare through consideration of factors such as usage, orientation and window placement. Wind whistle from openable vents to the north or west must also be avoided.

INDOOR COMPETITION-GRADE SPORTING FACILITIES

The VSBA regularly works with partners, including local councils, professional sports bodies and other community groups, to co-invest in the delivery of competition-grade facilities³ and encourages these types of partnerships.

Competition-grade netball and basketball courts

Where a competition-grade netball court or basketball court is to be provided, it **must** be built in accordance with specifications developed in consultation with Netball Victoria and Basketball Victoria.

In addition to meeting the requirements outlined in the [Netball/Basketball Court Specifications](#) section above, competition-grade courts **must** also meet the requirements outlined in this section. These have been developed in accordance with current Netball Victoria or Basketball Victoria Guidelines and requirements.

- [FIBA Official Basketball Rules](#)
- [Netball Australia National Facilities Policy](#)
- [Netball Victoria Facilities Manual](#)
- [Netball Victoria Compliance factsheet](#)

Indoor court multi-functionality - for basketball and netball (at minimum)

Where an indoor court is to be used for both basketball and netball, project consultants **must** provide a side fold wall- or roof-mounted retractable system with height-adjustable backboard for basketball, and; one height adjustable pole (that can be removed for assemblies), for netball, with associated storage. Noting that the standard post height for 5-10year old players is 2.4m, and 3.05m for players 11 years and over it is

Indoor basketball retractable systems **must** satisfy the following criteria:

- they must be either a sideways folding - wall mounted system or
- a roof mounted system that folds in any direction
- all systems to be electrically powered and key operated from the ground (not manual winch/ power drill operated)
- if a wall mounted system, must not extend beyond 3.5 m for stability, reduced vibration and safe deployment, as per FIBA rule 14.2
- have certified independent laboratory

prototype and fatigue testing⁴ to EN 1270 standards with engineer sign off

- be FIBA certified⁵
- have electrically height adjustable backboard
- have backboards made of glass, fibreglass, steel⁶, aluminium, or sealed timber (with rounded edge), **if being used for (Level 3) community up to and including state competition**, or
- have glass backboards **only, where (Level 2) national-level competition is to be played**
- all backboards must comply with the EN 1270 standard
- be a mechanically braced, stable system, to limit vibration after four seconds as per FIBA rule 14.2.
- have rings with a warranty
- have rings that are positive locking and not fixed or un-controlled spring loaded.
- have net attachment that is through tubes, not hooks.

4

Prototype Load Testing

Equipment shall be prototype load tested for suitable imposed loads. The prototype load test load shall be the imposed load factored by a load factor of 1.5 (this is factored into the 1.8kN) and a test factor of 1.2 giving a load at the backboard of 2.2kN and 1.5kN for the basketball ring. The permanent deformation resulting from prototype testing shall not exceed 10mm. For ease of inspection it is recommended that the testing be carried out on an unpainted structure and that the structure be tested for cracking using the magnetic particle method both prior and following completion of the load testing. The prototype load test shall be supervised, reported and certified by a Registered Professional Engineer. The test report shall detail the equipment tested, the test procedure, test loads and performance.

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5

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6

Note that aluminium and steel backboards generate more noise. Timber generally has inconsistent ball bounce, therefore glass and fiberglass are recommended where budget allows.

³ A 'competition-level space' is one that will be used for any of the following competition activities: (Level 3) school and or community League, Victorian League, regional Victorian, Association Championships/Competition and Training, State Titles, and or School Championship sports activities, or (Level 2) National League, National Titles. In the school setting, Level 3 facilities are usually adequate.

- have backboard pads to meet FIBA rules section 1.5
- where a roof-mounted and or upwards-folding system, must have a safety strap
- must have rings, posts and sleeves that satisfy current FIBA recommendations.

Ceiling height

- Dispensation has been given to the VSBA to allow minimum clear ceiling heights for indoor netball courts of 7.5m acceptable for Victorian Schools (the national standard is 8.3m).

Indoor sports flooring

- **Must** comply with the requirements set out in the [Flooring for indoor physical activity spaces](#) section.

Gymnasium changing bench framing

- A changing bench system must be provided in gymnasium changing rooms, comprising tubular galvanised or powder-coated steel frames and slatted hardwood seat.

Sports equipment storage

- Project consultants should provide sports storage areas with designed racks, bins and open shelving sufficient to allow storage of all sporting and physical education equipment, including for indoor netball poles as required, including the loose fittings required for the gym hall.

Additional facility requirements

- Circulation and spectator seating to be:
 - 2.2m circulation, incorporating two rows of seating for team, coaches and spectators (approx. 50 places)
 - located outside the run-off zones.
- Toilets and/or changing rooms – aligned with VSBA's Facilities Schedule
 - Primary — one changing room area at 351+ students
 - Secondary — one changing room area at 401+ students.

FENCING

The design of fencing should be integrated with the site's landscape design, which must be designed by a registered landscape architect.

Project consultants must consult with both the VSBA and DET Security Unit (SU) for fencing design approval. VSBA and DET considerations for fencing include the safety of staff and students, site isolation, sight lines, external lighting, building heights and community information. .

Where required, fencing can be used to define school sites and identify boundaries to indicate where outsiders are not permitted. Any fencing and associated gates used at Victorian government schools **must** be fit-for-purpose, strong, durable, integrate with the landscape and not present as unwelcoming. Fences **should** discourage climbing, but also be able to withstand it.

Security against unauthorised access can also be achieved through environmental design: for example, landscaping features such as planter boxes, and changes in levels.

When installing any fencing and railings, the topography of the site **should** be considered.

For kindergartens, consultants **must** adhere to specific regulations for barriers and fencing. All outdoor space **must** be enclosed by a fence or barrier that is of a height and design that children of kindergarten age and under (5 years) cannot go through, over or under. Furthermore, solid plinths may need to be provided below fences to ensure children cannot dig out the soil or mulch that increases the gap below the fence to greater than 100mm.

Table 7 identifies the types of fencing to be used (if approved) at Victorian government schools:

| AREA | REQUIREMENT |
|--|--|
| Perimeter fencing (along street frontages) | Palisade fencing Minimum 1200mm (1.2m) Lockable gates at each point of pedestrian and vehicle entry (except at main school entry) |
| Play areas at special schools and special development schools | Palisade fencing Minimum 1800mm (1.8m) Set back from street alignments Screened by planting |
| Play areas of kindergartens | Palisade fencing Minimum 1800mm (1.8m) Set back from street alignments |
| Outdoor sporting fields (within 10m of a site boundary) | Chain mesh fencing Minimum 6000mm (6.0m) |
| Hard courts (within 5m of a site boundary) | Chain mesh fencing Minimum 3600mm (3.6m) |
| Hard courts (adjacent to other sports areas or play areas) | Chain mesh fencing Minimum 3000mm (3.0m) Provided to the perimeter of the hard court run-off |
| Vehicle areas | Only provided where adjacent to an activity area or accessible to students |
| School bus parking | Palisade or chain mesh fencing Minimum 1800mm (1.8m) |
| Pool fencing | Conform to AS 1926.1 Swimming Pool Safety — Safety Barriers for Swimming Pools Latches and controls must be operable by students and staff with a disability |

Table 7 Fencing types

Fencing must also comply with the Department's [Fencing policy](#).

PATHWAYS

Path width **should** suit anticipated use. They **should** comply with the *Disability Discrimination Act 1992 (Cth)* (DDA) access requirements. Paths **should** be free of obstructions such as plants and equipment.

In addition, please refer to [Pedestrian access](#) and [Civil engineering](#) for further information.

BICYCLE SHELTERS

Bicycle shelters can be provided to encourage students and staff to cycle to schools.

Project consultants **must** select and satisfy bicycle shelters that meet the following requirements:

- easily accessible and designed to minimise conflict with concurrent flows of pedestrians and vehicles
- racks are securely fixed to the floor or wall and **must** be non-removable
- racks are the correct height and width to support the bike in two places
- have lighting that promotes good visibility within the bike shelter, and for security
- have appropriate signage indicating procedures for locking bicycles and doors or gates.

In addition, please refer to the section on [Alternative transport access](#) for further information.

CAR PARK DESIGN

Car park layouts are to be designed to meet the requirements of all relevant standards, regulations and laws. Parking bay width and length **must** be designed for User Class 2, as listed under AS/NZS 2890.1 Parking facilities — Off-street car parking. The disabled parking bay **must** be designed in accordance with the minimum dimensions as contained in AS/NZS 2890.6 Parking facilities — off-street parking for people with disabilities.

Where car parking is to be provided, it **should** include or allow for:

- controlled out of hours entry, for instance through bollards, gates or boomgates
- external lighting provisions for safety in design
- speed limit & through traffic / drop off controls i.e. speed humps and signage, and
- integrated landscape design to promote natural environment and shading, and to minimise the heatsink effect.

In addition, please refer to the section on [Provision of car parking](#) for further information.

5.1.3 EXTERNAL EQUIPMENT

SEATING

Adequate formal and informal seating **should** be provided to encourage and facilitate social interaction outdoors. Seating configurations **must** take into account prospect/vista and shade, the ages of users, and their benefit in terms of social development and interaction.

Informal seating or 'perching' spaces for staff and students can be created on the edge of low decks, on sleeper-style timbers, and on low retaining walls.

Small group seating areas **must** be considered at primary schools for storytelling, outside eating and quiet activities. These **should** be pleasant areas with winter sun and summer shade. Ideally, they will be separated from busy parts of the play area. A diameter of about 2.5m is suitable for a small group of young students.

PLAY, ADVENTURE AND OUTDOOR FITNESS EQUIPMENT

Every school **must** be provided with outdoor spaces and equipment, for the purposes of student play, recreation and outdoor learning.

Play facilities within school grounds can be further supplemented by access agreements to public land outside the school, as long as these can be accessed safely.

Play areas **must** be designed around best practice:

- impact areas, fall zones and free heights of fall
- impact attenuating surfacing
- be free from entrapment risks,
- use of non-toxic treatment for timber in new playground equipment. Timber **must** not be treated with pentachlorophenol, chlorinated hydrocarbon pesticides, or copper-chromium-arsenate (CCA), as outlined in the Standards described below
- rubber softfall **must** be comprised of at least 90% recycled rubber and, ideally, be light coloured to minimise fading and heat gain, and
- provide opportunities for development and play
- promote accessibility and inclusiveness through multiple play options for all students and user sizes, regardless of their individual circumstances.

Existing built environment and infrastructure can also be utilised in creative ways to supplement the role traditional play equipment has in encouraging physical activity, recreation and learning.

School and infrastructure spaces can be 'activated' through simple and cost-effective interventions that inspire free or more structured play with or without loose equipment. Some examples include:

- lines, targets, grips or routes installed on the sides of suitable buildings and walls for handball, tag games, or climbing, respectively
- coloured, slip resistant playground markings / block colour to create zones for multiple uses in the same space i.e. hopscotch variations, other games / sports activities, or quiet play
- adding mirrors to walls to create areas for dancing
- landscapes activated through simple games equipment, paths, or panels suggesting exploratory activities
- decks, cubbies or shaded area for dramatic play/role-play and/or imaginative games

Location

The design and installation of play equipment areas **must** be considered within the context of the whole site development, including provision of other locations for organised and free play, and sports and activities.

Note that some equipment types could constitute a suitable and safe choice in a rural location with greater availability of outdoor space, but be unsuitable for a more densely populated urban site.

Play areas within schools **must** be located for general safety as follows:

- where they do not obstruct pedestrian access across the school grounds (compliant with AS 1428)
- away from vehicle traffic and other hazards, such as car parks
- a safe distance from hazards such as adjacent industrial installations
- where there are clear lines of sight, and spaced for clear access/travel routes for supervision by staff on yard duty
- where they receive summer shade and winter sun
- quiet play or contemplation spaces (such as sensory gardens), should be situated away from active areas (especially ball/sports areas).
- away from fixed sports equipment, such as basketball hoops, soccer goals
- in accordance with the general principles of [Crime Prevention through Environmental Design](#)

Drinking water **must** be provided in the context of developing the overall landscape plan.

The base under a play equipment area must be designed for effective drainage, prior to installing any equipment. Drainage (or any other kind of) pits **must** not be located in impact areas.

Planning and departmental approvals

For school-led projects, if play equipment is proposed for installation in a previously undeveloped part of school grounds that has not been factored into previous masterplanning, a school **must** consult with its Regional Office as well as the VSBA (Project Delivery's Central Office) regardless of the project's value, to ensure new works do not conflict with existing infrastructure or planned capital works.

Special, special development or inclusion hub schools **must** seek approval from the Regional Director to install playground items on the basis of specific needs.

Safety and compliance

All outdoor climbing apparatus in schools must be fixed.

All playground equipment **must** comply and be installed in accordance with the relevant, current Australian standards, including:

- AS 4685:2021 Playground equipment and surfacing – Parts 1 to 6
- AS 4685.0: 2017, Development, installation, inspection, maintenance and operation
- AS 4422 Playground surfacing – Specifications, requirements and test method

Other Standards which are applicable in school grounds include:

- AS 16630 Permanently Installed Outdoor Fitness Equipment
- AS 1428 Design for Access and Mobility (applicable, in this context, only to pathways for egress and exit from playgrounds).

Impact attenuating or absorbing surfaces (loose material or a good quality, synthetic impact attenuating system that complies with AS 4422 is required in outdoor plays environments.

For new playgrounds or significant upgrades / replacement works, plans and equipment choices **must** be made by competent playground suppliers and or landscape architects.

As per AS 4685, all new playgrounds and significant rectification and upgrade works **must** be independently audited for compliance by a competent, appropriately qualified and experienced person that is not the designer or supplier. Plans need to be audited prior to installation, and the works inspected and approved following installation /practical completion.

Sandpit design

Sandpits **must** be surrounded by aboveground, planter-box type structures to help contain the sand and reduce the risk of sand spillage and blowing. They **should** be large enough to accommodate the expected number of users within the school, and designed so that children with disabilities can participate in sand play.

In schools, sand **must** be at least 30cm deep (preferably deeper) and must have effective drainage.

Sand pit covers, where utilised, **should** be permeable to sun and rain.

Where rubber softfall is installed, sand **must** be located at least 2.5 – 3 metres away from this softfall so sand does not corrupt the rubber.

Shade **should** be provided externally to cover all play equipment, and designed to offer the greatest protection during peak UV radiation times and peak periods of use. Shade posts **must** not be installed in impact zones.

In Victoria, UV Index levels are highest from September to April, with about 60% of daily UV radiation reaching the earth's surface during the middle of the day. Therefore, sites with high usage at that time have a higher priority for shade provision.

Shade **should** also be provided externally to cover the play equipment area for all facilities. When planning for shade, refer to the SunSmart Shade Guidelines, available on the SunSmart website.

In addition, please refer to Shade areas and Drinking fountains and the [Shade Sail policy](#) for more information.

Kindergarten outdoor play spaces

Kindergarten sandpits **must** be at a minimum 40cm in depth, however, with up to 60cm preferable. Shade should be provided to sandpits.

Outdoor play spaces in early childhood learning facilities **must** comply with the following:

- a qualified landscape designer is consulted on all aspects of their design
- Outdoor Space Minimum Requirements as outlined in the NQS, not counting
 - areas such as pathways, thoroughfares, car parks and storage sheds or any other space that's unsuitable for children as outdoor space, nor
 - any area of veranda included in indoor space calculations in outdoor space calculations.

IRRIGATION SYSTEMS

Appropriate water reticulation **should** be provided to enable maintenance of grassed and garden areas. Systems **should** be carefully chosen using expert advice where appropriate.

Where available, irrigation water **must** be sourced from mains-supplied non-potable water.

At sites where mains non-potable water is not available, irrigation water may be from water harvested from site surfaces such as roofs and impermeable pavements or other sustainable sources, noting that these water sources may also be used for toilet flushing. To maintain turf areas during times of drought, irrigation water may need to be supplemented by mains supply when harvested rainwater is exhausted (subject to water restrictions).

DRINKING FOUNTAINS

Accessible, potable water is a health and safety requirement. Drinking water **should** be provided on the basis of one tap per 30 students. Drinking fountains **must** be dispersed throughout the school in convenient areas, ensuring all students can access them when needed.

Project consultants **must** select and satisfy drinking fountains that meet the following requirements:

- accessible to all users, including specific fountains dedicated for wheelchair accessibility
- be made from lead-free or lead-safe products
- appropriate to the age and height of users (ages 5–12 in primary schools, 12+ in secondary schools)
- be placed near locations where physical activities occur, such as active play and sports areas
- be designed to allow students to fill water bottles.

Consideration **should** also be given in the design process to locating fountains in a way that minimises damage and vandalism.

5.1.4 SHADE AREAS

Project consultants **should** select and satisfy shade areas that meet the following requirements:

- provide a combination of built and natural shade to protect students and staff, particularly when UV radiation reaches damaging levels (3 and above)
- consider patterns of use (time, duration and level of use), activity types, daily and seasonal movements of the sun, safety, structures, windloads, access and maintenance
- provide inviting spaces that students will want to use.

Shade **should** be designed to offer the greatest protection during peak UV radiation times and peak periods of use. In Victoria, UV Index levels are highest from September to April, with about 60% of daily UV radiation reaching the earth's surface during the middle of the day. Therefore, sites with high usage at that time have a higher priority for shade provision. Shade **should** also be provided externally to cover the play equipment area for all facilities.

Shade structures in kindergartens must be located clear of fences and barriers so they do not enable climbing and comply with AS1926.1.

When planning for shade, refer to the SunSmart Shade Guidelines, available on the SunSmart [website](#) and the department's [Shade Sails policy](#).

NATURAL SHADE AND TREES

Natural shade **should** be a major element of shade provision within a school. Natural shade **should** be provided around high-use areas (such as lunch and passive play areas), and **should** take into account the location of the sun and the time of day that the external space will be used. Natural shade **should** be maximised for external areas where possible, excluding provision near sports playing fields.

Where possible, all existing, suitable trees **should** be retained. The management of existing trees **must** be performed in accordance with the following Australian standard:

| | |
|----------------|--|
| AS 4970 | Protection of trees on development sites |
|----------------|--|

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Project consultants **should** include additional tree planting in their designs, where possible, to provide character and definition, and increase natural shade in external areas. Where trees have been removed, they **should** be replaced by new trees: two new trees for every tree removed.

Arborists, horticulturalists and locals councils **should** be consulted to identify the most appropriate species for the area.

Project consultants **should** select and satisfy additional natural shade that meet the following requirements:

- provide advanced specimens that give immediate shade
- trees have broad canopies and dense foliage
- sufficient clearance beneath canopies to allow access
- trees that suit the local soil type and climate
- deciduous trees that permit winter sun (where relevant)
- trees without spiky branches, fruit or seed pods
- trees that do not attract bees or wasps.

Project consultants **should** consider how trees will affect sites when they reach maturity, including by selecting species with a drip-line that will not ultimately encroach the building footprint.

BUILT SHADE

Natural shade can take considerable time to develop, so built shade **should** also be provided throughout school sites. Most built shade consists of two parts: the supporting structure and the primary shading material. The most common materials for built shade are metal sheets, polycarbonate, fabrics and shade cloths.

All built shade **must** comply with and be installed in accordance with the following Australian standards:

| | |
|------------------|---|
| AS 4685.1 | Playground equipment — General safety requirements and test methods |
| AS 4174 | Knitted and woven shade fabrics |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy built shade that meets the following requirements:

- provide high/extreme UV protection (50 UPF or higher) throughout the day and year for students and teachers
- be located with due cognisance of existing services, such as drainage, power lines, gas and water
- withstand a variety of weather conditions and high winds
- have a minimum clearance of 3m in height
- avoid cables and guy ropes where possible (however, if required, these must be located in garden areas and provide marking and padded protection)

- include supports that are clearly visible, with rounded edges and/or padding and placed to minimise risk of collision
- include vertical supports that are not scalable by students, and that do not make fences scalable
- not impede the vision of supervisors.

Built shade structures **must** be installed by an experienced and registered building practitioner in the field of tensioned structures. Each structure **must** be approved by a qualified engineer.

Shade structures **should** be positioned to take account of the daily/seasonal movements of the sun, providing shade during peak UV radiation exposure and high-use times. Shade structures **should** have extensive overhead and side cover, and be located away from any highly reflective surfaces.

5.1.5 LANDSCAPING IN BUSHFIRE-PRONE AREAS

Bushfires are a reality of the Victorian landscape. To better support safety for schools in bush-fire prone areas, project consultants **should** design site vegetation that reduces likelihood and risk.

Project consultants **should** avoid plants or other hard or soft landscaping features, such as combustible retaining walls or ground cover that easily ignite and/or have high oil content. Plants and trees or hard features higher than four metres **should** be located well clear of structures, and not create the potential for a 'fuel ladder' with the existing landscaping.

For more information, [Landscaping for bushfire prone areas](#) please refer to guide.

5.1.6 WETLANDS

Wetlands can be incorporated into school design at any school site for the following uses:

- as a managed natural environment, for use as an educational resource
- as a water-retaining basin for salvage of stormwater and reuse in landscape watering
- for compliance with the requirements of local government or catchment management authorities for onsite stormwater detention and controlled release to the legal point of discharge.

Where the wetlands are intended to be used by a school as an education resource, the following principles are to inform the design.

Project consultants **should** select and satisfy wetland areas that meet the following requirements:

- integrate educationalist expertise in master-planning, to ensure the provision of vegetation suitable for learning, such as seed-bearing trees that attract birdlife
- be part of the school facility landscape, pathways and development masterplan
- have a water level not more than 1m below adjacent ground level
- provide all staff and students with dry, safe and convenient access to the water's edge in accordance with the general principles for inclusion
- provide space for 10–15 students and a staff member to gather on a dry-level landing or decked platform
- permit staff supervision of all areas
- be landscaped and planted with suitable long-lasting ground and water plant species
- have an inlet from the stormwater drainage system and outfall to the legal point of discharge
- be provided with life safety measures commensurate with a water hazard.

Where the design and location of wetlands is also driven by engineering requirements, the wetlands **must**:

- meet local council requirements
- be remote from school buildings
- be designed and constructed to facilitate safe routine maintenance and cleaning of the compound grounds, embankments, water surface, and outfall
- be securely fenced and signposted.

Where wetlands are adjacent to sports fields, screening **should** be provided so that balls do not land inside the secure compound.

Wetlands **must** be securely fenced and include adequate signposting.

Wetlands must not be included in the design of kindergartens.

Should wetlands be included within school grounds that have a kindergarten on site, the design should prevent access to the wetlands by kindergarten children.

5.2 Utilities and associated infrastructure

Schools should be provided with utilities, associated infrastructure and services based on their long-term enrolment projections.

All projects **must**, therefore, take account of downstream load and enrolment growth in the installation of services such as sewerage, power and drainage, for instance; as enrolment numbers increase, utilities and associated supply infrastructure **must** be able to meet the additional demand.

As such, all utility services and associated supply infrastructure **must** be sized to meet the demand requirements of peak student enrolment numbers, non-mandated community facilities (including those not on the Facilities Schedule), plus additional capacity for long-term enrolment numbers. This capacity requirement applies to services for water, sewerage, stormwater drainage, natural gas, electricity and telecommunications.

Project consultants are to liaise with relevant utility service providers and authorities to ensure capacity requirements can be met. Early engagement, particularly during planning stages, is important, as changes to connections following construction may not be technically or economically feasible. Whole-of-life costs **should** be considered in a decision to provide particular services.

Where existing services are installed, capacity **should** be reviewed and used where possible, in order to reduce loads and costs as much as possible. Project consultants **should** clearly identify and communicate the capacity of each service component as part of building handover and completion activities.

Project consultants **should** also ensure utilities and associated supply infrastructure are consistent with performance requirements in the following related sections:

- [Civil engineering](#)
- [Mechanical services](#)
- [Electrical services](#)
- [Information and communication technology](#)
- [Hydraulic services](#)
- [Natural gas](#)

The majority of kindergartens on school sites will be operated by a third party service provider such as the local Council or early childhood providers. Therefore, they **should** be designed with separate utilities infrastructure.

Where separate utilities are not viable, utilities such as water and electricity **must** have capacity for separate metering. The following **should** also be satisfied:

- manual override lighting controls provided to indoor playrooms
- incoming supply pillars and mains switchboards located outside children's areas.

5.2.1 WATER

Victoria's state-owned water sector comprises 19 water corporations constituted under the *Water Act 1989*. These corporations provide water supply (including recycled water) and sewage and trade waste disposal services within their local area. A list of water corporations is provided on the Department of Environment, Land, Water and Planning (DELWP) [website](#).

Project consultants **must** liaise with the relevant local water corporation to determine the location, size, and adequacy of existing water mains within the streets surrounding the site. As a minimum, a metered Grade 2 connection for fire and water services is required to supply the site.

In addition to the requirements above, project consultants **must** select and satisfy water connections that meet the following requirements:

- ensure each tapping consists of a dual valve connection for water supplies for the fire service and the domestic service
- connect to a recycled water main if one is available from the local water corporation
- where existing water mains or tapplings are located on the site and require relocation or removal, arrange for and make application to the relevant local water corporation
- arrange for the upgrade of any water mains as required, to local water corporation requirements.

Recycled water is **NOT** to be connected to the potable water supply system. Where tank water is reticulated to toilets, one-way valves **must** be fitted to ensure no cross-contamination of potable water supply.

Project consultants **should** also consult [Hydraulic services](#) prior to water connections.

5.2.2 SEWERAGE

Project consultants **must** liaise with water corporations regarding sewerage connections to site. Project consultants **must** liaise with the applicable local water corporation to determine the location, size and adequacy of existing sewer mains and available branches within the surrounding streets. A camera **should** be used to evaluate the condition of the existing sewer pipework.

In addition to the requirements above, project consultants **must** select and satisfy sewerage connections that meet the following requirements:

- arrange for any new sewer connection branch or extension of any sewer main to be connected to the existing sewer system according to all requirements of the applicable local water connection
- where existing onsite sewer mains require relocation or removal, arrange for and make an application to the relevant authority to purchase and abandon the sewer, carry-out cut-and-seal of the disused sewer, and arrange for the new sewer main to be installed as required.

Project consultants **should** also consult [Sewer systems and sanitary plumbing](#) prior to sewerage connections.

5.2.3 STORMWATER DRAINAGE

Local councils are responsible for the stormwater drain between the point of discharge, and the kerb and channel, barrel drain or other council asset.

Project consultants **should** liaise with the relevant local council to determine the location, size and adequacy of existing stormwater systems (pipes or open channels) and available branches within the streets or properties adjacent to sites, and confirm the legal point of discharge for sites.

In addition to the requirements above, project consultants **must** select and satisfy connections to the stormwater drainage system that meet the following requirements:

- arrange for any new storm water connection branch or extensions of any existing storm water systems to be constructed to all local council requirements
- where existing storm water systems are located on the site and require relocation or removal, arrange for and make an application to the relevant local council to purchase and abandon the system (pipes) or fill in the system (open channels)
- where the site discharge is restricted to pre-development flow rates, provide suitable onsite retention and detention to the satisfaction of the local council.

Project consultants **should** also consult [Stormwater drainage](#) prior to connections to stormwater drainage systems.

5.2.4 NATURAL GAS

Natural gas, where suitable and available, is supplied to schools by a single gas service provider (retailer) under the State Purchase Contract (SPC) arrangements. An SPC gas service provider is not necessarily a gas distributor that owns and operates gas supply assets, and may be simply a retailer. However, project consultants **should** still firstly contact the SPC service provider to ascertain whether additional gas supply is available from existing gas supply assets.

Project consultants **must** liaise with the SPC gas service provider to determine the location, size and adequacy of existing gas mains and available branches within the streets surrounding the site. Any new gas connection branch, or extension of gas mains, is to be constructed to all SPC service provider requirements.

In addition to the requirements above, project consultants **must** select and satisfy gas connections that meet the following requirements:

- arrange for the upgrade of any gas mains as required, to the SPC gas service provider requirements
- isolate at each branch take-off and provide check meters at each main take-off and at each main plant item
- where existing gas mains are located onsite and require relocation or removal, arrange for and make application to the relevant SPC gas service provider.

Project consultants and gasfitters **must** allow up to 60 days from the date of the initial inquiry to the proposed connection date for gas supply.

Typically, the retailer will contact the gas distributor and if there are any gas infrastructure works required, the gas distributor will provide the gas retailer a quote and supply offer. The retailer will then forward this quote and offer to the party that made the initial inquiry. All quotes and offers **should** be forwarded to the relevant VSBA project officer.

Project consultants **should** consider providing gas sub-meters to high energy use areas and/or equipment (such as trade blocks but not kilns) as well as buildings subject to use agreements, in order to obtain energy-use profiles and/or to assist in splitting energy costs between users.

Project consultants **should** also consult [Gas supply](#) prior to undertaking any connections to gas supply.

5.2.5 ELECTRICITY

Electricity is supplied to schools by retail suppliers contracted under the State Purchase Contract (SPC) arrangements.

The SPC provider for electricity is not necessarily a distributor that owns and operates electricity supply assets. Nonetheless, project consultants **should** firstly contact the SPC electricity provider to ascertain whether additional electricity supply is available from existing electricity supply assets. The SPC electricity supplier **should**, in turn, work with one of the Victorian electricity distributors that services the school site.

If mains upgrades are likely or expected, project consultants **should** investigate early in the project to ascertain likely lead times with the supplier, as these can have a considerable impact on the project timelines.

In addition to the requirements above, project consultants **should** select and satisfy electrical connections that meet the following requirements:

- low-voltage supply from utility mains via underground conduits to service provider requirements
- underground conduits for high voltage (HV) cabling
- coordination with the service provider regarding the provision and siting of electrical substations and/or kiosks
- calculation of maximum demand (per site) to the service provider as the basis for the sizing of local electrical substations (where required).

Consideration **should** be given to additional loadings to allow for future electrical demand.

5.2.6 TELECOMMUNICATIONS

Project consultants are to provide connections to support information and communication technology (ICT) functions at Victorian government schools. Under SPC arrangements, internet services are provided to schools by Telstra through the VicSmart program, and fixed-line services are provided to schools by Optus.

Project consultants **must** select and satisfy telecommunication connections that meet the following requirements:

- using the highest capacity/fastest broadband internet service available locally
- broadband connection **must** support connection to the DET Wide Area Network, which provides internet connectivity for Victorian government schools
- fixed-line services are compatible with the latest (and impending) public telephone network that connects to the school premises.

Early childhood facilities on school sites are not subject to service provider contract arrangements. While the service procures its own separate network provider, the same infrastructure connection requirements apply.

Project consultants **should** also consult [Information and communication technology](#) prior to connections to telecommunication services.

5.2.7 SOLAR POWER SYSTEMS

Solar modules **should** face north and be installed on a structurally sound roof that allow for the installation of racks to mount solar panels at approximately 30 to 35 degrees.

Placement of roof-mounted items **should** consider and mitigate any potential negative impacts (i.e. shadow footprint) to planned or future photovoltaic systems.

All solar power systems (including solar panels, inverters, frames, connectors, cables, isolators, switchboards and protections and all the other associated equipment) **must** comply with the specifications, standards, codes, rules and regulations of all statutory authorities having jurisdiction over the works. This shall include, but not be limited to the latest revision of the following:

| | |
|-----------------------------|---|
| AS/NZS 5033 | Installation and Safety Requirements for Photovoltaic (PV) Arrays |
| AS/NZS 3000 | Wiring Rules |
| AS/NZS 4777.1 AND .2 | Grid connection of energy systems via inverters |
| AS/NZS 1768 | Lightning protection |
| AS 3008 | Electrical installations – Selection of Cables |
| AS 4100 | Steel Structures. |
| AS 3600 | Concrete Structures |
| AS 3700 | Masonry Structures |
| AS 1664 | Aluminium Structures |
| AS/NZS 3013 | Electrical installations – Classification of the fire and mechanical performance of wiring system elements. |
| AS/NZS 3191 | Electric flexible cords |
| AS/NZS 2373 | Electric cables - Twisted pair for control and protection circuits |
| AS/NZS 2053 | Conduits and fittings for electrical installations |
| AS 1074 | Steel tubes and tubulars for ordinary service |
| AS/NZS 61439 | Low-voltage switchgear and control gear assemblies |

| | |
|---|--|
| IEC 61215 | Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval - Protection Class II |
| IEC 61730 / EN 61730 | Photovoltaic (PV) module safety qualifications |
| AS 1657 | Fixed platforms, walkways, stairways and ladders - Design, construction and installation |
| AS/NZS 5000 | Electric cables - Polymeric insulated |
| AS 1319 | Safety signs for the occupational environment |
| AS/NZS 3017 | Electrical installations - Verification guidelines |
| AS 1170 | Structural Design Actions |
| In addition to the above standards, project consultants are required to comply with all associated and necessary standards. | |

In addition to the requirements above, project consultants **must** ensure that the following requirements are met:

- all components **must** be Clean Energy Council accredited at the time of installation
- Photovoltaic (PV) modules and factory installed DC cables and connectors **must** have a minimum 10-year product warranty and 25-year linear power warranty
- **PV modules must** be installed on a structurally sound roof with capacity to handle the weight of PV modules and wind load and be validated by a structural engineer
- **PV modules must not** be installed on buildings planned for demolition in the next ten years, or on buildings **that** have asbestos in the roof, walls or conduits and account for possible and safe penetrations to the building during installation
- Schools installing solar power systems **must** provide system monitoring access to DET/VSBA for the tracking of electricity generation and CO² abatement – access can be coordinated with the VSBA's [Sustainability and Environment Unit \(SEU\)](#)

- Solar power systems installations on heritage buildings **must** take into consideration the guidelines and requirements of any heritage listing or overlay applicable by the relevant authority.

- **Solar power systems must** be designed and validated by dedicated electrical engineers who must provide the following documentation:

- site inspection and dilapidation survey report, including solar irradiance figure
- structural and electrical assessment report
- arrangement drawings showing location of the power mains, meters, PV modules, isolators, cable routes, inverters and switchboards
- yield analysis and shading analysis report
- glint and glare assessment report, if applicable.

Project consultants **should** also consider:

- positioning PV modules to face a northerly direction for optimal efficiency
- provide structural design certificates to assess existing conditions of the buildings and to comment on the suitability of the building for the solar panels installation
- provide certificates for the solar panels and framing system to suit the installation condition and wind loading
- grid connection requirements and connection approvals
- safe and easily accessible location for the inverters and switchboards
- equipment suitable for the installed environment (IP ratings, UV rating, heat dissipation and derating factors)
- safe roof access systems should be installed as per 5.3.1.

In addition, please refer to the [Sustainable Facilities Policy](#).

5.3 Building fabric

This section covers the requirements for every element of building fabric for Victorian government schools.

Every building delivered by project consultants **must** be windproof, watertight, resistant to ingress by animals, birds, insects and vermin, efficient to operate, durable, adaptable, and fit-for-purpose.

Project consultants **must** give due consideration to the potential effects of climate variability on building fabric, and utilise opportunities for building fabric to mitigate such impacts.

When designing any given service, project consultants **must** make use of the most cost-effective materials and installation techniques available, commensurate with appropriate levels of service, buildability and durability, in accordance with the philosophy outlined in this handbook.

Fixtures **should** be of the same model and manufacturer throughout a school where possible. Fixtures for later stages **should** match the first stages where possible. Where alternative types are to be considered, they **should** only be selected if the fixture selection is more cost-effective for the particular application.

5.3.1 ROOF

Simple roof forms are required, with roof guttering outside the line of external walls.

The design **must** incorporate a provision enabling any water outflow to escape outside the building.

Box gutters and internal eaves gutters **must** not be used. Any proposals for exceptions, in the case of vertical schools, **must** be submitted to a VSBA Delivery Division Manager.

All roofing **must** be of continuous sheets wherever possible. When selecting roofing profiles, selection **should** allow for a minimum +3° safety allowance, between the selected profile's recommended minimum pitch and the design pitch.

All roof systems **must** be engineered by hydraulics consultant, and comply with and be installed in accordance with the relevant Australian standard:

| | |
|----------------------|---|
| AS/NZS 3500.3 | Plumbing and drainage — Stormwater drainage |
|----------------------|---|

| | |
|------------------|---|
| AS 1530.1 | Methods for fire tests for building materials, components and structures — Combustibility tests for materials |
|------------------|---|

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy roofing systems and associated work that meet the following requirements:

- are low-maintenance, complete, windproof, watertight and possum, bird and vermin-proof
- remain intact and waterproof under the local and regional ambient climatic conditions
- accommodate the wind loads applicable to the local area and conditions
- provide adequate means of dealing with vapour pressure, condensation, corrosion and thermal movement
- are light in colour (if appropriate for the surrounding environment) to reduce summer overheating
- can accommodate all short and long-term movements and deflections
- support the specific imposed loads and types of roof access without visible damage or impairment of performance, including pooling of water and dinting of roof profiles
- **should** not emit airborne fibres or dust
- all necessary provisions for safe roof access, including access-ways, safety railings, safety anchor joints, fall arrestor systems and the like, **must** be capable of supporting such loads without damage or distortion, failure of fixings, or loss of water-tightness
- provide roof glazing with safe means of access and control of solar gain and glare
- provide opportunities for additional natural lighting, if needed, through skylight and/or clerestory windows, (while maintaining sufficient security)
- prevent unauthorised access to roofs
- prevent the level of rain noise on the roof from exceeding the levels set out in [Acoustic engineering](#)
- allow for the discharge of all water and moisture, including leakage and condensation, outside the line of the building or eaves and into the drainage system
- provide for emergency overflow and relief systems to prevent flooding in the event of blockage or malfunction

- include insulation suitable to local conditions that minimises heat gain or loss from outside
- load rating to be suitable for solar photovoltaic system installation
- placement of roof-mounted items **must** consider and mitigate any potential negative impacts (i.e. shadow footprint) to planned or future solar power systems
- consider downpipes to be connected to water tanks for water harvest
- do not incorporate downpipes that descend within any internal areas. Downpipes **must not** be off-set in ceiling areas
- incorporate appropriately located and sized sump and overflow spout systems.

The design **must** incorporate a provision enabling any water outflow to escape outside the building. Box gutters **must not** be used. Where it is unavoidable, the use of box gutters **must** be approved by the VSBA.

Suitable roof ventilation above the level of ceiling insulation **should** be considered for summer cooling and circulation of air within spaces.

Sandwich panel roof/ceiling combinations **must not** be used. The only exceptions are in cool rooms and lift shafts, where the use of sandwich panels is unavoidable and the panels are fire-rated.

ROOF MATERIALS

All **required** roofing and roof plumbing **must** be fully integrated with adjacent work, including fixings, trims, flashings, sealants and finishes, to include gutters, downpipes, insulation sarking, safety mesh and trims.

Project consultants **must** select and satisfy roof materials that meet the following requirements:

- can withstand damage from intruders walking on the roof
- are free from aluminium composite panels (ACP) with a polyethylene core or expanded polystyrene (EPS)
- light in colour
- are chemically and electrolytically compatible with adjacent materials and/or appropriately separated to avoid galvanic reactions (such as corrosion) with each other, substrates, and adjacent work
- adjacent materials and products do not stain, contaminate, or cause visual or structural defects in adjacent materials.

When selecting roofing materials, consideration **must** be given to the ongoing availability of materials.

Sheets damaged during transit will be rejected.

The use of clip-fixed decking **should** be kept to a minimum to minimise roofing costs.

Project consultants **must** give due consideration to recent trends of more frequent and severe rain and or hail storms, and make necessary adjustments.

For schools near flight paths, additional acoustic insulation in roofs **should** be provided. All acoustic requirements are described in [Acoustic engineering](#).

GUTTERS AND DOWNPIPES

Gutters and downpipes used in roof drainage systems are required to convey and potentially collect stormwater. Systems provide adequate drainage for expected local rainfall events while minimising risk and disruption to site users.

Measures **should** be adopted to pre-empt or minimise damage to gutters and downpipes. This includes minimising low points of gutters where water can pool, using stronger fittings, downpipes that are more robust, use of protection sleeves, and placing downpipes in protected areas away from heavy student traffic. Siting of and connection to water harvest tanks **should** be considered.

Systems **should** provide in-built redundancy in both number (more than one outlet) and type (down-pipes and a gutter that can overflow without nuisance grated stormwater [SW] pits and independent overland flow around the buildings). The back-up **should** be open-ended (that is, of virtually unlimited capacity, if not well in excess of the anticipated design flows — for example, in the case of lower-fronted eaves gutters) and not dependent on ongoing maintenance.

All gutters and downpipes **must** comply and be installed in accordance with relevant Australian standards.

Project consultants **must** select and satisfy gutters and downpipes for use in roof drainage systems to meet the following requirements:

- be of electrolytically similar materials to avoid corrosion
- detailing and arrangements **must** be robust, securely fixed and capable of withstanding damage from maintenance, students, and potential vandalism
- **must not** be scalable or vulnerable to vandalism, through being kicked or otherwise crushed

- utilise standard, commercially available gutter profiles that provide the required capacity
- be constructed to prevent accidental blockages and to direct storm overflow and 'first flush' discharge away from doorways and pedestrian paths
- installed in the longest lengths possible.

AS/NZS 3500.3 is referenced by the NCC. The standard enables calculations to be made regarding quantities of rainwater collected by roofs, as well as the sizing of gutters and downpipes to meet local rainfall conditions within appropriate 'design return' periods.

The design **must** incorporate a provision enabling any water overflow to escape outside the building. Requirements for overflows are provided by AS/NZS 3500.3.

The design **should** include complete levels for the buildings, civil and landscape works, and ground levels around the buildings. These **should** include levels for SW inlets and outfalls, grades around (and away from) buildings, swales and surface drains. Over-sizing of infrastructure, beyond current design standards, is encouraged.

The height of guttering from paving or garden areas **must** be a minimum of 2400mm.

Where roof areas are used as catchment for recycled water, downpipes **must** be fitted with 'first flush'-type debris diverters.

Where mesh covers are fitted to gutters to prevent blockage by leaves, metal mesh compatible with roofs and gutters **should** be used. These **must** be secured in a way that prevents the ingress of leaves. Mesh inserted beneath the roofing is preferred. Plastic mesh is unsatisfactory, as the weight of debris will collapse the gutter. Care **must** be taken that mesh covers do not deflect water across the gutter to discharge onto the ground or path below.

Downpipes **must** not be concealed in wall cavities, where any leak could result in structural and aesthetic damage.

Project consultants **must** give consideration to locating downpipes over grated pits, and stopping downpipes short of the ground level, to prevent balls entering the stormwater system.

In addition, please refer to [Stormwater drainage](#) for further information.

5.3.2 EXTERNAL WALLS AND CLADDING

Any walling and cladding materials **should** be durable and long-lasting. Project consultants **should** consider local risks of corrosion from environmental or industrial sources. Cladding systems **must** be:

- free from aluminium composite panels (ACP) with a polyethylene core and expanded polystyrene (EPS)
- easy to maintain, to avoid future disruptions
- made from environmentally friendly materials
- cost-effective.

External walls **must** be made from an impact resistant material up to a minimum above ground height of 2100mm (door head height).

All cladding **must** comply and be installed in accordance with relevant Australian standards.

Project consultants **must** as a minimum provide a cladding system (and associated works) that:

- does not contain Aluminium Composite Panels (ACP) with a polyethylene core or expanded polystyrene (EPS)
- is watertight and windproof
- is robust, durable, and suitable for long-term performance in high-exposure conditions
- is fire-resistant and will limit the spread of fire
- does not require regular cleaning or maintenance
- can be easily cleaned and replaced if damaged
- accommodates all permanent and temporary loads
- has an appropriate and suitable finish for activities to be conducted in the area
- prevents corrosion
- ensures that adjacent materials and products are chemically and electrolytically compatible with each other, substrates and adjacent work
- discharges all water and moisture, including leakage and condensation into the drainage system
- minimises heat gain or loss from outside
- minimises air leakage and infiltration of buildings
- functions noiselessly under all conditions including substrate movements, temperature changes, wind, maintenance and cleaning operations
- provides continuous electrical conductivity within the framing for connection to the lightning protection system

- prevents access to and existence of breeding places for vermin (concealed or otherwise)
- does not enable the growth of algae, mould or fungus
- enables the removal of graffiti without damage to the appearance, finish and durability of the substrate.

Project consultants **must** also ensure that all adjacent materials and products, including adhesives and sealants, do not stain, contaminate, or cause visual or structural defects in adjacent materials.

The transparency of the external walls, and their permeability to light, heat and air, **must** be controllable and capable of modification, according to local climatic conditions (with solar screening, protection against glare, light deflection, shading, temporary thermal protection and adjustable natural ventilation).

Project consultants **should** avoid concrete block and other materials prone to dirt and scuffing, or which are otherwise difficult to clean or to remove graffiti from.

Externally, pre-coated surfaces **should** be used. External painting **should** be minimised. Existing low maintenance finishes such as brickwork **should** not be painted as they require ongoing maintenance.

Materials **should** provide an appropriate level of insulation to achieve the minimum acoustic performance requirements, as detailed in the [Acoustic engineering](#) section.

In addition, please refer to the section on [Masonry](#) for further information.

5.3.3 INSULATION AND BARRIERS

Thermal insulation, sarking and vapour barriers are required for roofing and cladding. Solutions **should** be installed in accordance with the manufacturer's instructions, and to suit local environmental conditions.

Insulation and barriers **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **must** select and satisfy insulation and barriers that meet the following requirements:

- all sarking vapour barriers are properly lapped and taped to inhibit all wind and vapour penetration
- any bulk insulation used complies with relevant OHS legislation and current accepted industry practice with respect to airborne fibres
- reflective foil **must** be suitable reinforced aluminium foil, suitable for the location and the intended function.

Where internal walls face onto breezeways that are open at both ends, they **must** also be treated as external walls.

Insulation may impact the sound insulation between spaces. For more information on acoustic requirements, please refer to [Acoustic engineering](#).

FLOOR INSULATION

Floors **should** be insulated. The insulation selected **must** be suitable for the local climatic conditions.

An air space **must** be provided between floor boards and any insulation. Sub-floor ventilation natural **should** be minimised.

Thermal insulation to timber sprung floors **must** be designed to suit the selected floor system requirements for moisture and ventilation control and any floor warranty conditions.

INSULATION FOR GYMNASIUMS AND SPORTS HALLS

Gymnasiums and sports halls without ceiling lining concealing the roof insulation **must** have a layer of perforated, white, polythene-coated foil as an outer facing to the visible underside (in addition to foil facing of the insulation blanket).

5.3.4 WINDOWS

All external windows **must** be wind and watertight. The selection of windows **should** focus on standard commercial designs and availability, standard construction techniques and maximum user safety. Windows **should** be orientated so that the majority face north and south; east and west-facing glass **should** be minimised.

Design consideration **must** be given to ventilation — preferably cross-flow ventilation. Where possible, designs must provide natural light from opposite sides of an activity area.

Project consultants **must** select and satisfy windows that meet the following requirements:

- are weather-tight, water-tight, and exclude water and moisture from entering the inside of buildings in all weather and rain-fall conditions, with additional protection provided as required
- are suitable for the location and the intended function and accommodate the wind loads applicable to the location
- remain stable without deflection, damage or rattling under normal conditions of use and slamming of doors

- allow thermal movement to occur freely in the plane of the glazing system, and do not cause stressing or induced loading in the installed work, or buckling, failure of joints or other damage
- frames are appropriately coloured to minimise solar radiation absorption and fading
- window balance mechanism is stiff enough to prevent the sash moving under its own weight, but not difficult to open
- are corrosion-resistant
- adjacent materials and products are chemically and electrolytically compatible with each other, substrates, and adjacent work, or are separated by suitable spacers
- allow the discharge of water and moisture, including leakage and condensation, outside the building and into the drainage system
- allow for easy cleaning and maintenance
- use the same window type throughout the design of the entire school
- provide adequate ventilation
- provide adequate security
- achieve a balance of natural lighting, view, heat gain and heat loss
- be appropriately shaded during summer and shoulder seasons through means of external fixed sun-shading devices and systems to suit the orientation, view opportunities and size of the window or windows being shaded, and
- window sill heights in kindergartens must comply with NCC requirements.

Internal and external kindergarten playspaces, children's bathrooms and art preparation areas must be designed for high visibility and supervision at all times.

Full-height glazing and custom glazing (such as circular windows) is to be avoided wherever possible to minimise safety hazards and maintenance requirements.

Where the natural ventilation system depends on opening accessible windows outside of school hours, when the building is not occupied, the windows **must** be fitted with security insect screens to deter intruders, insects and vermin.

Awning windows at ground-level **must** not protrude beyond the external wall line due to safety and security requirements. They can be used at higher levels, however project consultants **must** ensure that the design maintains the security of the overall site.

Adjacent materials and products, including adhesives and sealants, **must not** stain or contaminate, and **must not** cause visual or structural defects in materials.

Frameless louvre windows pose an injury risk and are not permitted at normal levels.

In kindergartens, manual blinds can be installed with cord restraints only if they are fixed to the window frame. Cords must not be accessible to children.

In addition, please refer to the section on [Insect screens](#) for further information.

SHADING AND SUNLIGHT CONTROLS

North, east and west-facing windows **should** be appropriately shaded.

Direct sunlight **must not** to penetrate windows during summer, including 1.5 months either side of the defined summer season.

Generally, when there is too much glare or direct sun penetrating a space, occupants lower blinds and turn on lights.

The use of solar films alone are not an appropriate response. Rather, solar films **should** be used in combination with other solutions such as sun-shading devices, clerestory windows, verandas, covered walkways and building orientation.

In addition, please refer to [Building orientation](#) for further information.

OPERABLE WINDOWS

Operable louvres and windows can be used to provide a supply of outdoor air, and lower the levels of carbon dioxide and Volatile Organic Compounds (VOCs) without compromising indoor air quality. When being used, they **must** have inbuilt window protection, with control mechanisms that can be operated by all potential users, and **must** ensure continued security of the building.

Project consultants **should** select and satisfy operable windows that meet the following requirements:

- fitted with a means of securely limiting the window opening
- fitted with locks keyed to a master-key system
- designed to prevent the unauthorised removal of the window sash
- fitted to prevent the risk of children climbing in or out of the window (or falling out of the window)
- not be hazardous to those passing by windows internally or externally when in use
- be operable by all potential users, including those with a disability.

BLINDS

Windows **must** be designed to permit the installation of internal blinds that cover the full extent of the glazing. When selecting internal blinds or shade solutions, project consultants **must** consider the impact on exterior views from inside the building. Roller blinds with metal components and other robust systems with few moving parts are preferred.

Manual blinds **should** be installed with cord restraints that are fixed to the window frame. The cords **should** be easily accessible; all potential users **must** be able to reach them without leaning over furniture.

Cords must not be accessible to young children.

5.3.5 GLAZING

Glazing **should** take into account site conditions, energy efficiency and user safety.

All glazing in windows **must** comply with and be installed in accordance with the following Australian standard:

| | |
|----------------|---|
| AS 1288 | Glass in buildings — Selection and installation |
|----------------|---|

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Project consultants **should** select and satisfy glazing that meets the following requirements:

- has glass thickness and safety glass materials appropriate to safety risk, performance requirements and local conditions, including wind loads and internal air pressures, deflections and safety
- accommodates all permanent and temporary loads (including human impact, wind, earthquake, maintenance and service loads, as applicable), individually and in combination, without failure, deflection, damage (including cracking, distortion, looseness, dislodgement, or visible movement at any joint) to adjacent or applied work, or risk to human safety, and
- in kindergartens, any glass installed in areas accessible to young children must be safety glass that complies with AS 1288.

Glazing in windows in high-traffic areas and vandal-prone areas **should** provide a level of impact resistance. For windows in playground areas, an appropriate safety glazing **should** be used that enhances the safety of playground users.

The use of glass bricks **should** be limited to the main public entrance(s) of buildings.

Project consultants **should** inform the VSBA where higher window qualities (to reduce noise, sun glare, heat gain or heat loss) are required.

Where east and west-facing windows are necessarily incorporated, the use of high-performance glazing **must** be considered to control sun penetration.

5.3.6 DOORS

All doors **should** be designed for their intended purpose and sized to meet the anticipated movements into and within each building.

Direction of door swings (including non-required exits) should consider path of egress for large gathering spaces.

All doors are **required** to have quality finishes, structure and appearance, while being simple and convenient for all school users, regardless of their ability. Doors and associated infrastructure **should not** create hazards and **should** cope with heavy and constant use without failure or sagging.

Doors comprised of large external glazing, such as sliders, **should** only be used to create outdoor or open learning opportunities, and not for primary access, due to potential weight and accessibility issues (for example, in windy conditions)

No doors are to be undercut or have grills inserted as part of a mechanical system, and doors **must** be designed and used for their intended purpose.

Kindergarten doors and gates, and exits to the perimeter **must** comply with NCC requirements specific to early learning facilities. All doors **must** be designed for anticipated movements into and within the kindergarten.

All door frame junctions in areas accessible by kindergarten-age children must include protection from finger entrapment. For smoke and fire doors, please see [Fire systems](#).

In addition, please refer to [Acoustic engineering](#) for further information.

EXTERNAL DOORS

External doors subject to continual heavy use **must** be constructed both for strength and resilience against wear, and against accidental and deliberate damage. Doors **should not** be so large or heavy that they are difficult for school-age children of all abilities to open. Doors **should** also have appropriate handles and fixtures for school-age children of all abilities.

For special development schools, security latching is required on all external doors (including required exits), so the schools can control access and egress effectively.

External doors **should** have security latching or automatic locking doors installed for activation in the event of a school shutdown. These external doors **must** be single action, free-egress at all times, in compliance with the National Construction Code.

Project consultants **must** select and satisfy external doors that meet the following requirements:

- are water-tight and weather-tight and protected from climatic influences, including rain and strong winds
- are sufficiently robust to provide appropriate building security and to withstand high wind conditions without any stress or damage to the door, glazing or hinges
- have locks keyed to a master-key system
- have restrainers and door stops to prevent impact to adjoining surfaces
- are fire-rated or smoke-sealed where required
- are weather-sealed to prevent ingress of dust and debris
- are provided with internal entry matting at all main entrances
- require only low maintenance, such that there is only minimal disruption to school operation.

Glazed external doors **must** have at least one cross-rail to stiffen the door and reduce the size of glass panels.

If the exit is a required emergency exit, doors **must** be a single-action opening door, operable from the inside only to maintain security.

Door stops **should not** be located close to the hinge. The action of the door striking the stop will break the bottom hinge. If a floor-mounted door stop creates a trip hazard when fixed in the normal location beneath the handle, a door stay can be used, fixed to the head of the door.

In addition, please refer to the section on [Glazing](#) for further information.

INTERNAL DOORS

Where required, project consultants **must** select and satisfy internal doors that meet the following requirements:

- **must** be solid-core to deliver required durability and acoustic isolation
- **must** provide adequate sound reduction for the intended use, as detailed in [Acoustic engineering](#)
- **must** be operable without requiring power assistance for any young/disabled person.

To assist users to identify points of access, internal room entry doors **must** be painted in a contrasting colour to the surrounding walls.

Doors to storage cupboards and service rooms **must** be painted similar to the wall colour.

Glass viewing panels **must** be installed in internal doors where two-way traffic is expected, and where staff may need to check the occupancy and activities in a room, but where a degree of privacy is needed. These locations include: principals' offices, senior personnel offices, bursars' offices, conference and meeting rooms, general offices, airlocks and lobbies, interview rooms, specialist consulting rooms, first aid rooms, and general teaching and learning areas where spaces are accessed via a hinged or sliding door.

In special schools and special development schools, the door/door hinge frame junction **must** include protection against finger injuries.

Air transfer grilles **must not** be used in doors if their installation compromises necessary privacy, or the required acoustic isolation of a space.

The door connecting the reception area with the school internal circulation network **must** be a security door with electric strike, controlled by release button from the general office and by key. The door **must** have an internal after-hours release button (a 'mushroom cap' push-button door release).

If sliding doors are used, they **must** be high-quality, easy to open by students and staff of all abilities, and able to deal with general wear-and-tear.

In addition, please refer to the section on [Security locking](#) for further information.

AUTOMATIC OPERATION DOORS

For all new schools, major upgrades, special schools and special development schools, project consultants **must** provide external entry to the reception lobby via a paired set of automatically operating glazed sliding doors that form a wind lock.

Project consultants **must** select and satisfy automatic doors that meet the following requirements:

- include movement sensors that are not affected by drift or indefinite cut-off points
- have a fail-safe device to open doors during times of power failure
- include an internal after-hours release button (a 'mushroom cap' push-button door release)
- have external after-hours release by electronic key system
- adjustable dwell time for door operation.

Automatic doors **must not** be installed in kindergartens except at external entrances.

OPERABLE WALLS

Project consultants proposing operable walls between spaces **must** provide complete operable walls with support framing, fixings, seals, finishes, hardware and trim, suitably selected and installed to be fit-for-purpose. Operable walls **must** be operable by all potential users without requiring undue strength.

Operable walls **must** have an acoustic performance rating to match adjoining partition systems, as detailed in [Acoustic engineering](#).

ROLLER SHUTTER DOORS

Project consultants **must** select and satisfy external roller shutter doors that meet the following requirements:

- chain-driven planetary geared drum roller
- metalwork to be powder-coated over a galvanised substrate or a protective coating system conforming to AS 2312.1 — Guide to the protection of structural steel against atmospheric by the use of protective coatings — Paint coatings, in a marine or high-atmospheric corrosivity category
- be capable of withstanding both positive and negative wind pressure at school sites without impairing the shutter's ability to function under ambient temperatures
- continuous pressed steel curtain fitted with nylon slide clips and steel tension strips.

A chain drive **should** be used for doors up to 3.0m, with an electric motor drive used for doors in excess of 3.0m high.

The door assembly **must** be complete with all equipment and fixings, guides, locking devices, weather seal at bottom rail, and steel corner guards at door jamb openings.

MULTI-PANEL OVERHEAD LIFT DOORS

Where used, project consultants **must** select and satisfy multi-panel overhead lift doors that meet the following requirements:

- the opening and closing of the door does **not** risk injuring adults or children
- guards are provided around all operating mechanisms below 2.1m high
- structural support framing sufficient for the size and weight of the door panel is provided
- when closed, the door provides a complete seal against wind, rain and wind-blown dust and debris
- the door will have convenient unassisted single-user operation to ensure operability by all potential users
- where an electric motor is **required** to open the door, controls **must** include an accessible emergency stop button.

5.3.7 DOOR AND WINDOW HARDWARE

Project consultants **must** provide all door, window and other finishing hardware and related items. Without limitation, hardware is to include hinges, pivots, locks, latches, padlocks to gates and enclosures, master-key systems, door furniture, door closers, door stops, window latches and locks, weather seals, acoustic seals, fire and smoke seals, and other hardware necessary to the required functionality and security.

Project consultants **must** as a minimum provide all doors and windows hardware and all associated work so that it is:

- keyed-like for window locking
- robust, durable and fit-for-purpose
- suitable for a school environment
- easy to maintain and replace
- of suitable quality for the location and the intended function
- suitable for the mass (of the doors or windows)
- corrosion-resistant or has a protective coating to prevent corrosion.
- must be openable via rain-sensitive, tamper-proof electronic, fixed devices with manual backup, where they are high windows.

In conditions of continual heavy use, lever handles **must not** be relied on as door pulls. Where it is possible for a hinged entry/exit door to be unlatched during the day, push/pull plates in addition to other hardware **must** be provided.

KICK PLATES

Kick plates **should** be provided where the door is at risk of damage in heavy traffic locations. Kick plates **should** be fitted to both sides of flush-panel doors. The material **should** be Type 304 satin finish stainless at 300mm high x width of door.

DOOR STOPS

Metal door stops **must** be provided to prevent doors or door furniture striking adjacent walls, fixtures or other surfaces.

5.3.8 SECURITY LOCKING

Keyed security locking **must** be provided on all external doors. Locking is also required for internal doors where the privacy or security of the room/space function or the room/space contents requires protection and access control. These internal spaces include:

- all private offices, shared staff workrooms, general offices, library workrooms, and interview and conference rooms
- doors that form boundaries to zones that can be isolated for use outside school hours
- secure stores, storage rooms, IT server / switch / core communications rooms, ICT technicians' offices, sports stores, cleaners' stores, music stores, electrical and mechanical switch rooms, service cupboards, plant rooms, and similar
- rooms/spaces that contain expensive equipment
- room/spaces where unsupervised access is not permitted (such as rooms containing computers, music rooms, materials technology rooms, instrument rehearsal rooms, science laboratories and science prep rooms, the gymnasium hall, a theatre)
- rooms/spaces where in-progress or completed student creative work might need to be secured
- the canteen, food storerooms, pantries, and so forth
- rooms/spaces that may contain valuables or controlled substances (for example, the first aid room and chemical storerooms)
- storage cupboards and secure drawers in rooms (keyed identically within a room only).

Project consultants **should** select and satisfy security locks that meet the following requirements:

- ensure that all external perimeter and internal classroom door locks can be secured from the inside, enabling schools to enact their Emergency Management Plan's lockdown protocols, when required, while retaining single action egress at all times in accordance with the National Construction Code
- **must** be part of a site master-key/ access schedule
- selected according to the suitability for the conditions
- cylinders can be interchangeable between different lock manufacturers
- the cylinders are appropriately mounted to allow for particular requirements such as childcare areas
- keys are fitted with identification tags
- keys and key lock cylinders are stamped with relevant key codes

- a keying system that can accommodate any future expansion and, where possible, does not require the replacement of existing locks.

The selection of door hardware (in conjunction with other security features such as perimeter fencing) **must** consider the safety and security of students, staff and other occupants. This is particularly important for special and special developmental schools. Regulatory dispensations relating to design elements that affect egress (for example, design features that restrict the ability of occupants to access or operate required exits) **must** not be sought unless genuinely exceptional circumstances apply. If a dispensation relating to egress is proposed, the project team **must** consult with DET's Inclusive Education Professional Practice prior to seeking the dispensation.

ELECTRONIC ACCESS CONTROL SYSTEM

Electronic access control systems can be used to provide entry and exit for all authorised personnel.

Where the VSBA decides such systems are required, project consultants **must** select and satisfy an electronic access control system that meets the following requirements:

- details agreed user-profile groups
- provides internal and external access-pass readers at all external access/egress doors and internal lockable doors that form boundaries to zones that can be isolated for use outside of school hours
- provides each user with programmed proximity access passes (cards or fobs) as required, for issue to approved personnel
- ensures that the key-card system is secure and cannot be copied by unauthorised people, and
- includes a central lockdown button to enact the school's Emergency Management Plan's lockdown protocols, while maintaining single action egress at all times.

5.3.9 CEILINGS

Ceiling construction and finishes **must** suit the function and use of the space or room. Project consultants **must** return ceiling linings into cupboards, reveals, recess, niches and the like.

Ceilings to teaching, office and staff work zones **must** support simple ceiling space access and reconfiguration of lighting, globe replacement and cabling throughout the life of the building. Ceilings **must** also allow for the inclusion of ceiling fans. Suspended acoustic tile ceiling systems are recommended.

Flush painted plaster ceilings **must** be provided in student toilets, kitchens and changing rooms. Ceilings and installations **must** be durable, serviceable and resistant to vandalism and vapour (where applicable).

Ceiling installations **must** assist in the management of the acoustic performance of the space, including moderating reverberation within a space, and controlling acoustic isolation of a space by controlling noise leakage and noise intrusion.

Ceilings **must** provide light reflection, unless this is inconsistent with the function of the space.

Bulkheads above joinery **should** not be unnecessarily provided. Shelves **must not** be installed above 1800mm for safety and ergonomics.

SUSPENDED CEILINGS

Suspended ceilings can be used to hide ducts, pipes and cables, while keeping these accessible for repair and maintenance. Suspended ceilings can also be used to support acoustic performance within spaces.

Where provided, project consultants **must** select and satisfy suspended ceilings that meet the following requirements:

- be braced against lateral movement and uplift
- do not attach the suspension system to the lip of purlins
- provide space for support members, as required by the loads on the system and the type of ceiling
- allow for the installation of services and accessories throughout the life of the building, including ductwork, light fittings and diffusers, and provide additional back-support or suspension members for the fixing of such items
- incorporate accessories including hatches and curtain tracks
- set out patterned or heavily textured materials to give consistency in direction of pattern or texture
- provide specially sized, purpose-made panels to fill non-standard margins, openings and penetrations.

External eaves and building projections **must** be fitted with linings to eaves that are durable, serviceable and resistant to vermin, vandalism and exposure.

5.3.10 ACCESS HATCHES

Project consultants may be required to include access through flush ceilings to ceiling spaces. If so, they **must** select and satisfy access hatches that meet the following requirements:

- are of a material that matches the adjacent ceiling in appearance

- are a propriety system sufficiently durable to accommodate frequent use
- are fitted with a security latch
- have a surface that is flush with the ceiling surface.

In core communication/switch rooms, the ceiling access panel **must** be located opposite the communications/equipment cabinet, not above it, to avoid damage and static charge issues from dust and debris accumulation.

Access hatches are to be avoided in teaching areas. Their location throughout a school **should** be coordinated as part of a rollout of other services, including electrical, hydraulic, ICT and mechanical services

5.3.11 STAIRS AND RAMPS

All stairs and ramps **must** comply with and be installed in accordance with the following Australian standards:

| | |
|------------------|--|
| AS 1428.1 | Design for access and mobility — General requirements for access — New building work |
| AS 1428.2 | Design for access and mobility — Enhanced and additional requirements — Buildings and facilities |
| AS 1657 | Fixed platforms, walkways, stairways and ladders — Design, construction and installation |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** provide stairs and ramps that comply with the following requirements:

- stair treads to have slip-resistant surface and a luminance contrast
- provide tactile indicators in accordance with relevant standards and legislation
- the selected tactile indicators must not weaken the structural integrity of the stair or ramp (i.e. when drilled into decking)
- all walking surfaces to have safe gradients
- ramps **must** be designed for safe and accessible wheelchair use with a maximum gradient of 1:14 and a preferred gradient of 1:20
- landings in accordance with relevant standards and legislation.

In kindergartens, stairs and ramps should not be located adjacent to kindergarten perimeter fences as the required handrails can be used as a foot hold to scale the fence.

Fire-isolated stairways and fire-isolated ramps **must** be provided where required.

If required, two handrails at different heights **must** be provided to suit comfortable use by both adults and children, in accordance with the conditions of use. Handrails **should** be fixed to adequate frames to support handrail function.

Project consultants **must** ensure at least 2100mm (2.1m) clearance is provided in all accessible areas under stairs and bulkheads.

Areas that are under this 2.1m clearance **should** be barricaded off, and not be trafficable — for example, with the use of bollards.

BALUSTRADES AND BLEACHERS

Balustrades, also referred to as barriers, **must** be provided, in addition to handrails, on stairs and ramps.

All required internal and external balustrades/barriers lacking purchase points (handrails or baseboards) **must** have a minimum height of 1500mm (1.5m) above the finished floor level (FFL). This is in excess of the requirements of the NCC to ensure the safety of all students, staff and visitors.

Where an internal or external balustrade/barrier on a new or refurbished site has a handrail or base board it **must** be 1800mm high above the FFL. In the future, the minimum balustrade height, with or without purchase points, will become 1800mm.

All balustrades and barriers **must** be non-scalable, with no horizontal rails or potential footholds, which could be used for climbing.

No furniture or joinery is to be attached to balustrades/barriers or placed within close proximity.

For balcony seating within an auditorium, balustrades/barriers **should** be consistent with NCC requirements. Seating or any other furniture near a balustrade **must** be fixed, so it cannot be used as a foothold.

Where bleachers are used in buildings or landscapes beside a one meter or greater drop, the following safety features **must** be satisfied:

- handrailing **must** be installed at all stair interfaces/accessways, and
- no more than two consecutive descending bleachers (pair) may be installed, and
- where there is more than one bleacher pair a minimum, 1.5 metre landing must be installed between each pair.

5.3.12 TOILET FACILITIES

Toilet facilities are to be evenly distributed across the school site and located in close proximity to learning areas, so students can use them during learning activities with minimal interruption. The Department intends to move towards toilet facility designs that offer greater flexibility of use through universal design.

Amenities for staff, students and visitors **must** be provided to satisfy the following:

- toilet facilities **must** be safe, equitable and dignified
- the [NCC Volume 1, Table F2.3](#) **must** be used to calculate toilet allocations for each building and, while that allocation of sanitary compartments does not have to be accommodated within that building, it **must** be in reasonable proximity to it
- fully enclosed toilet cubicles are the preferred model for onward flexibility (urinals are not encouraged, but where they **must** be provided only independent urinals with privacy partitions are to be installed)
- where toilet cubicles alone are installed, without urinals, pan numbers for males **should** be based on NCC Volume 1, Table F2.3 allocations for females
- cubicles/ closet pans **must** have full height floor to ceiling walls/partitions, to ensure personal privacy, minimise bullying, and the potential spread of viral droplets. In the case of older buildings with high ceilings, false ceilings may be more appropriate solutions
- cubicle doors **must** be at least head height, and
- in the case of banks of cubicles (that are not standalone, self-contained designs) doors **must** have 100mm gaps at the bottom for supervision and airflow
- the layout of toilet areas **must** provide user privacy while allowing for easy passive supervision of open areas from the entrance door, to discourage anti-social behaviour and vandalism, and encourage care for facility
- where multiple toilet designs are provided they **should** not require entrance doors, for infection control and minimisation of touchpoints
- handwashing facilities for non-accessible toilets banks are to be shared
- toilets **must** not be close to school ground boundaries or be accessible by the public during school hours
- toilet facilities **should** be located so there is a choice of facilities accessible, either from inside or outside the school building
- staff and student toilet and shower facilities **should** be separate from each other

- accessible toilets **must** be provided as per DDA requirements and counted towards the base NCC toilet calculation
- toilet use allocation **must** acknowledge, student age, cultural considerations, and gender balance
- only cold water is to be provided to primary school student hand-wash basins, while tempered water may be provided to other fittings and fixtures
- toilet doors **must** be lockable or fastenable from the inside.

SANITARYWARE

Suitable sanitary fittings and fixtures are to be provided that support and complete the delivery of functional spaces and meet the needs of users. Installation of all sanitary fixtures and fittings connected to service pipework **must** include all required anchorages, fixings, lugged elbows and the like, as necessary for a robust, durable, impact-resistant installation.

Project consultants **should** select and satisfy sanitary fixtures and fittings that meet the following requirements:

- be new, free from defects, damage, corrosion and surface blemishes
- be chemically and electrolytically compatible with adjacent materials and products, substrates, and adjacent work, or separated by suitable spacers
- adjacent materials and products, including adhesives and sealants, will not stain, corrode or contaminate, and **must** not cause visual or structural defects in adjacent materials
- all pans in schools are to be fixed at a standard height to maintain flexibility of use; junior pans are not required [refer kindergarten requirements below]
- use similar models and manufacturers throughout to achieve design coherence
- use recycled water only for toilet flushing, if available
- wall-mounted cisterns are preferred as they are easier to maintain
- press button, self-closing/timeflow taps, that do not need to be manually turned off after use, **must** be installed at handwash basins for infection control (where fitted for junior students the push operation is to be sufficiently 'soft' for them to use).

Specifications for sanitaryware **must** be considered in line with [Hydraulic services](#), and specifications relating to the trapment and drainage of water.

Toilets **must** be wall-mounted vitreous china with wall-backed pan and have a strong vandal-proof fixing between the seat and pan, with anti-vandal fixing accessories. Toilets provided for adults **must** have a double-flap hinged toilet seat w. Single-flap toilet seats will be provided for student toilets. All pans in schools are to be fixed at a standard height to maintain flexibility of use [i.e. junior pans are not required in schools. Refer below for kindergarten requirements].

Where required, accessible toilet pans as specified in the *Disability Discrimination Act* (DDA) **must** be provided, with wall extension pedestal and easily accessible flush button.

SANITARYWARE IN KINDERGARTENS

The design of children's bathrooms in kindergartens **must** enable supervision at all times, while maintaining children's rights and dignity. The following requirements **must** be satisfied:

- a nappy change bench with tempered adult wash basin
- junior toilet pans - toilet roll holders installed at child's arms reach
- barn doors provided to at least one cubicle for each five (5) children's toilets
- barn doors provided to at least one cubicle for each 5 children's toilet
- toilet partitions and wash basin heights in accordance with regulatory requirements
- tempered water is to be provided for children's hand basins
- children's bathrooms are to be located with direct access to indoor and outdoor playrooms so that children using toilets can be observed by staff from indoors and outdoors.

TOILETS

Toilets **must** be wall-mounted vitreous china with wall-backed pan and have a strong vandal-proof fixing between the seat and pan, with anti-vandal fixing accessories. Toilets provided for adults **must** have a double-flap toilet seat. Single-flap toilet seats will be provided for student toilets.

All pans in schools are to be fixed at a standard height to maintain flexibility of use [i.e. junior pans are not required in schools. Refer below for kindergarten requirements].

Where **required**, accessible toilet pans as specified in the *Disability Discrimination Act* (DDA) **must** be provided, wall extension pedestal and easily accessible flush button.

URINALS

Toilet cubicles are the preferred model. Urinals are not encouraged, however, where they **must** be provided they must be independent with privacy partitions.

Automatic water-efficient flushing is recommended in primary schools. Ventilation, flooring and all detailing is to be designed to control odours. Urinals for students and staff can be one of three types:

- wall-mounted vitreous china urinals with concealed in-wall cisterns with anti-vandal fixing accessories
- cistern-less systems with anti-vandal fixing accessories
- type 304 stainless steel, which **must** be provided with 1.6mm thickness, grated platform type (no step) with concealed in-wall cisterns and automatic flushing (student areas only).

Where wall-hung urinals are installed in primary school boys' toilets, installation heights and urinal configuration **must** be suitable for boys aged 5–12.

POTABLE WATER REDUCTION

To encourage building design that minimises consumption of potable water in operations, this item addresses the potable water consumption from the use of sanitary fixtures, appliances, HVAC, irrigation systems and swimming pools (where present).

As a minimum, the final installation **must** meet the following as per the design provisions below for rainwater reuse, sanitary fixture efficiency, landscape irrigation and **either** heat rejection **or** fire protection system test water.

Rainwater reuse

Rainwater tanks **should** be installed within the project's site boundary to collect and reuse rainwater, as deemed appropriate by the project team, following a positive cost benefit analysis and thorough investigation of factors such as location, materials, products, and plumbing system compatibility.

Any installed rainwater tanks **must** comply with the size criteria in Table 8.

| GROSS FLOOR AREA (GFA IN M ²) | RAINWATER TANK VOLUME (KL) |
|--|-------------------------------|
| 2500 | 25 |
| 5000 | 50 |
| 10,000 | 100 |
| 20,000 | 200 |

Table 8 Required rainwater tank volumes

Where the GFA of the building falls between the figures outlined above, or for projects or above or below the area listed, use a ratio of 10 L/m² to determine the minimum tank size required.

The requirements provide a minimum tank size. To achieve the best outcome for the project, the size of the rainwater tank **should** be based on the collection area, local rainfall and the demands for rainwater use on the project.

Sanitary fixture efficiency

All fixtures **must** be within one star of the WELS rating stated in Table 18B.1, Green Star Design and As-Built v1.2 Submission Guidelines:

| FIXTURE/ EQUIPMENT TYPE | WELS RATING |
|-----------------------------|-----------------------------------|
| taps | 6 star |
| urinals | 6 star |
| toilets | 5 star |
| showers | 3 star (> 4.5 star ≤ 6.0l/min) |
| clothes washing machines | 5 star |
| dishwashers | 6 star |

For more detailed information, see:

- AS/NZS 6400 Water Efficient Products — Rating and Labelling
- WELS (Water Efficiency Labelling and Standards) — www.waterrating.gov.au

Landscape irrigation

The landscape and associated systems **should** consider opportunities to reduce the consumption of potable water required for irrigation through the installation of subsoil drip irrigation and moisture sensor controls.

Fire protection system test water

Fire protection systems **must** meet at least one of the following conditions:

- the fire protection system does not expel water for testing
- the fire protection system includes temporary storage for 80% of the routine fire protection system test water, and maintenance drain-downs for reuse on-site, calculated on the basis that any single zone is drained down annually.

If sprinkler systems are installed, each floor **must** be fitted with isolation valves or shut-off points for floor-by-floor testing.

The fire protection system test water requirements are not applicable for projects where:

- a sprinkler system is not required under Part E of the NCC, or
- a sprinkler system is not provided by the project team, and does not include a water-based fire protection system.

HAND WASH BASINS

Basins for hand washing are required throughout the school.

A soap dispenser unit **must** be installed at each handwash basin and positioned to avoid dripping on benchtops.

Project consultants **must** select and satisfy hand wash basins that meet the following requirements:

- vitreous china basins, wall hung
- mounted at an appropriate height for students and staff, with particular basins adjusted for accessibility.

Self-rimming inset hand wash basins into joinery bench tops can be used in staff areas only.

For student areas, basins **must** be fixed into solid substructure and be resistant to damage by vandalism, including climbing.

Basins provided for primary school students **must** use cold water only. Basins in staff-assisted student bathrooms at special schools and special development schools **must** be provided with cold and tempered hot water (45°C) to reduce the risk of scalding.

No plugs are required for all hand wash basins.

HAND WASH TROUGHS

At particular sites, it may be more economical and secure to install hand wash troughs as an alternative to hand wash basins.

Project consultants **must** select and satisfy hand wash troughs that meet the following requirements:

- wall-mounted 1.2mm thick satin-finish type 304 stainless steel troughs with rear upstand skirt to conceal pipework, holed for wash taps
- trough installation **must** be fixed into solid substructure and resist potential damage by vandalism (including climbing)
- provided with cold water only.

Dimensions **must** be notionally 300mm width x 150mm depth, with taps at nominal 450mm centres.

Joinery and vanity units for hand wash troughs and basins **must** be robust and able to withstand high volume usage and the surface impact of a range of soap PHs that could be used in dispenser.

DRINKING TROUGHS AND FOUNTAINS

Drinking troughs and/or fountains **should** be provided around school sites, including specific provision of drinking fountains for users with disabilities. Drinking water **should** be provided on the basis of one tap per 30 students.

Project consultants **must** select and satisfy drinking troughs and fountains that meet the following requirements:

- fountains **must** be stainless steel, wall-mounted and cantilevered with single bubbler
- installation heights **must** suit the ages of students (generally, students aged 5–12 at primary schools and 12+ at secondary schools)
- troughs **must** be wall-mounted, 1.2mm thick satin-finish type 304 stainless steel, with rear upstand skirt to conceal pipework, holed for bubbler faucets
- trough installation **must** be fixed into solid substructure and resist potential vandalism and other damage (including by climbing), and be installed according to manufacturer's instructions.

Trough dimensions **must** be notionally 300mm width x 150mm depth, with taps at nominal 450mm centres.

Consultants **must** consider location/placement of drinking fountains with respect to damage to floors, and potential safety issues arising from splashing.

SINKS

General purpose sinks are required throughout school sites, particularly in kitchens and other food preparation areas (such as staff rooms and food technology classrooms).

Where required, project consultants **must** select and satisfy general purpose sinks that meet the following requirements:

- inset stainless steel sinks **must** be provided with single or dual bowls and integral single or double drainers
- integral tap holes to suit specified tapware.

LABORATORY SINKS

Deep-bowl laboratory sinks are required for science and technology teaching. The number of sinks **should** suit the teaching and learning requirements and the number of students at the school.

Where required, project consultants **must** select and satisfy laboratory sinks that meet the following requirements:

- **must** be acid-resistant
- designed to facilitate cleaning.

EMERGENCY EYEWASH

Where functions and activities present a risk to users' eyes (including secondary science laboratories and materials technology spaces), emergency eyewash stations **must** be provided.

Where required, project consultants **must** select and satisfy emergency eyewash facilities that meet the following requirements:

- a small pedestal stainless steel bowl
- twin eye-drench faucets actuated by a single push-button
- safety warning signage.

CLAY SINKS

Clay is sometimes used in art, science, and technology lessons. To maintain cleanliness and to minimise blockages, specialist clay sinks may be required.

Where required, project consultants **must** select and satisfy clay sinks or troughs that meet the following requirements:

- inset stainless steel, with extended standing drain outlet
- include under-bench clay interceptor traps.

In addition, please refer to [Hydraulic services](#) for further information.

PAINT SINKS OR BOOTHS

Where required, project consultants **must** select and satisfy paint sinks, troughs or booths that meet the following requirements:

- inset stainless steel, with extended standing drain outlet
- include under-bench paint interceptor traps.

LAUNDRY TROUGHES

Laundry troughs are to be provided if the school has a dedicated laundry facility.

Where required, project consultants **must** select and satisfy laundry troughs that meet the following requirements:

- be inset stainless steel 45-litre capacity
- with single tap hole
- rinse bypass co-ordinated with washing machine location.

CLEANERS' SINKS

Cleaners' sinks **should** be provided in a dedicated space, appropriately designed in terms of floor and wall finishes, and ventilation.

Project consultants **must** select and satisfy cleaners' sinks that meet the following requirements:

- be stainless steel or vitreous china
- complete with wall brackets or legs to floor
- hinged chrome-plated brass grate
- chrome-plated trap and waste.

SHOWERS

Showers are to be provided to student changing rooms, staff changing rooms and DDA accessible student toilet/bathroom facilities. Showers **must** be safe, self-draining and designed to allow for privacy for each user.

DDA accessible showers **must** be fitted with stainless steel grab rails, a shower seat and shower curtains, hooks and all other associated and required fittings to meet required Australian Standards. Where shower rooms are fitted with overhead hoists and ceiling-mounted hoist tracking, project consultants **must** provide a curtain solution that does not rely on ceiling support brackets.

Shower heads to general purpose showers **must** be anti-vandal, fixed head type outlets. Shower roses **must** be WELS rated.

Shower heads for DDA accessible showers **must** comprise a vertical wall rail, hand shower on flexible hose, integral soap dish, and wall bracket.

FLOOR WASTE GULLIES

Requisite diameter chrome-plated brass floor waste gullies are to be provided in areas where floor wash down is required, or as required by regulations. Gullies **must** include a clamping rim suitable for installation into sheet vinyl flooring. Where installed, a shower recess gully

integral with the graded floor surface can serve as a floor waste gully. Floor waste gullies **must** be provided in other areas where floor wash down is required, or as required by regulations.

Project consultants **must** select and satisfy floor waste gullies that meet the following requirements:

- be 100mm in diameter and chrome-plated for all toilet blocks with external access
- floors **should** be graded towards them.

TAP FITTINGS AND FIXTURES

Robust, tamper-proof tap fittings and fixtures are required with **either** timed delivery **or** appropriate water-saving requirements.

Project consultants **must** select and satisfy tap fittings and fixtures that meet the following requirements:

- be satin chrome-plate finish on metal
- where possible, use the same model and manufacture throughout a school
- have a maximum flow rate of 3 litres per minute for toilets and small basins, and a higher rate for laboratory sinks.

Tapware for later stages is to match the first stage.

Cold water tapware **must** be coded 'blue' and hot water tapware **must** be coded 'red'. Cold water tapware **must** be fixed on the right hand side of the fixture and hot water tapware **must** be fixed on the left hand side.

Laboratory-type tapware **must** be high goose-neck type, bench-mounted or sink-mounted, and **must** be acid resistant to suit the particular application.

Drinking fountain tapware **must** be lever spring-action drinking cocks with mouthguard and 100mm-long flanged horizontal extension to tap. Location of taps and troughs **must** minimise potential vandalism or other damage.

For hygiene, water conservation and consistency with the principles of inclusion, taps should be press button self-closing systems. Taps in kitchen situations **must** be pillar mixer taps.

Where cleaners' taps are provided, these **must** be positioned at a height to allow a bucket to be easily filled, and be fitted with anti-vandal tap spindles.

External taps that deliver recycled water **must** be fitted with anti-vandal tap spindles.

Hands-free tap operation **must** be provided at hand wash basins where required by local government by-laws for food service areas.

5.3.13 JOINERY AND FIXTURES

Joinery works include finishes, hardware, coordination with services, required fixings, skirtings, mirrors, glass panels and glass doors and associated trims, conduits or recesses, and gaps for electrical equipment, integral lighting, wiring, data cabling and the like, including built-in GPOs, data outlets, audio visual outlets and inputs, and all necessary support and sub-framing necessary to complete the works.

The scope of joinery works **must** include:

- pigeonholes
- built-in student lockers
- custom-fitted joinery
- vanity benches
- kitchen and kitchenette joinery
- other cupboards, storage and display units
- changing room benches, and
- stainless steel and chemical-resistant laminate work benches and cabinets in science and technical areas, and areas with similar functions.

Where joinery is an unincluded tender option, alternative storage solutions **must** be clearly specified.

In kindergarten facilities, each kindergarten children's playroom must be provided with a custom-fabricated rack of mobile lockers/pigeonholes (larger than A4 width) for storage of children's bags, lunch boxes, artwork etc, with keyed locks, magnetic latches or child proof catches to low joinery doors in children's areas to restrict access to children.

Project consultants **must** select and satisfy joinery and fixtures that meet the following requirements:

- cut-outs to accommodate fixtures (such as sinks and hand basins) and equipment (such as fridges, microwave ovens and the like) **must** take into consideration the required equipment size and installation tolerances
- where joinery needs to accommodate roller shutter doors and/or grilles, similar size requirements are to be taken into consideration
- accessories and trims necessary to complete installations are provided
- joinery units are fixed to substructure backgrounds, provide sufficient support to prevent injury from failure of components, and are securely, mechanically fixed to walls.
- all mechanical fixings **should** be concealed from view

- junctions with structures, scribe bench tops, splashbacks, ends of cupboards, kickboards and returns follow the line of structure
- all carcass junctions with walls and floors, and to cable entries, are sealed with silicone beads for vermin-proofing to all food-handling areas and voids at the backs of units to all areas for hygiene requirements
- all screws, nails, bolts, anchors, brackets, adhesives and other fixing devices required for neat and secure fixing throughout are provided and are concealed from sight in the finished work.

Benchtops **must** be constructed of a solid moisture resistant substrate (minimum 25mm thick) and be finished and edged in materials suited to the functional requirements of the installation. The default benchtop **must** be finished with 1.0mm coloured laminate with solid-colour, rigid, high-impact PVC edging to match the selected laminate colour or freeform edge. However, other surfaces which may be used include:

- resilient sheet counter-topping as an accepted alternative to laminate
- stainless steel, as required to suit food preparation or wash areas
- chemical-resistant laminate or chemical resistant, solid acrylic polymer countertops (for science laboratories and the like)
- impact and scratch resistant finished timber or veneer plywood.

Handles **must** be robust, simple, satin chrome-plated metal, and sourced from generally available production lines. Consistent with the principles of inclusion, handles **must** be easy for any user to operate. Door and drawer handles and pulls are to be selected and/or detailed with no sharp edges or protrusions that may cause injury.

Joinery doors and drawer-fronts **must** have common substrate and finishes and be a minimum thickness of 18mm MDF. There **must** be a white melamine finish to all interiors including drawers and shelves in enclosed cupboards. Finishes **must** be applied to all surfaces and edges, including edges facing floors.

Dimensions for bag hutches and or tubs **must** be agreed in consultation with the Design Reference Group or school (as appropriate) so that each hatch/tub can safely accommodate a full school bag.

Shelves **must** be adjustable, suit the intended use, and fixed in place to avoid rolling. Shelf thickness and provision of supports **must** ensure the shelf can support applied loads without excessive deflection (more than 3mm in 1.0m). All loose units **must** be fixed to walls.

Joinery doors **must** be hung on 110° or 180° fully concealed and adjustable hinges with catching action. Doors **must** open and close easily and shut tightly to a neat line and flush finish. The number and type of hinges specified **must** withstand weight of door leaf and anticipated heavy use.

Joinery drawers **must** be fitted with steel and ball bearing full extension sliding drawer runners.

Joinery in bathrooms is to be limited. Impervious splashbacks **must** be provided above benchtops where there is a risk of splashing from sinks or spillage of liquids.

Where possible, storage **must** be incorporated under benchtops, except where accessibility provision is **required**.

ACCESSIBILITY AND INCLUSION

Project consultants **must** provide benchtops and counters (and related and/or ancillary spaces) that will allow and facilitate access and use by students and staff who may use wheelchairs or other disability support. All reception/canteen counters **must** facilitate use by students and visitors who use wheelchairs or other disability support. The wheelchair accessible areas of the reception counters **must** be readily identifiable, easily accessible, and centrally located.

Information about the Inclusive Schools Fund (ISF), its requirements, what is funded through the Fund, and other information can be found on the VSBA's '[About us](#)' page.

SPECIAL JOINERY FITTINGS

Where necessary to deliver or complement the required functionality, project consultants **must** provide special joinery fittings, including:

- cutlery dividers (five-compartment white moulded-plastic drawer inserts, trimmed to suit size of drawer carcass)
- stationery dividers (as for cutlery dividers above, except seven compartments, in four different sizes)
- tea towel rail (two chrome-plated steel arms on slide-out frame fixed to side of cupboard)
- library book return slot and book slide
- adjustable-height computer keyboard ledge
- cable entry caps (moulded-plastic circular sleeve with swivelling cover plate, colour-matched to benchtop colour)
- wardrobe hanging rails
- joinery locks (generally keyed alike to locks on each unit or in each room; keyed to differ for joinery in separate rooms).

ENGINEERED WOOD PRODUCTS

Engineered wood product formaldehyde emission limit values **must** comply with **either**:

- Product certification in accordance with a GBCA-recognised [Product Certification Scheme](#) **or**
- Laboratory testing for formaldehyde emission limit values for engineered wood products outlined in Table 9 in accordance with the following Green Star emissions Table.

| Test Protocol | Emission Limit / Unit of measurement |
|--|--------------------------------------|
| AS/NZS 2269:2004, testing procedure AS/NZS 2098, 11:2005 method 10 for Plywood | ≤1mg/L |
| AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16 | ≤1.5mg/L |
| AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16 | ≤1mg/L |
| AS/NZS 4357.4 - Laminated Veneer Lumber (LVL) | ≤1mg/L |
| Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL | ≤1mg/L |
| JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460 | ≤1mg/L |
| JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460 | ≤1mg/L |
| JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates) | ≤0.1mg/m ² hr* |
| ASTM D5116 (aplicable to high pressure laminates and compact laminates) | ≤0.1mg/m ² hr |
| ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates) | ≤0.1mg/m ² hr (at 3 days) |
| ASTM D6007 | ≤0.12mg/m ³ ** |
| ASTM E1333 | ≤0.12mg/m ³ *** |
| EN 717-1 (also known as DIN EN 717-1) | ≤0.12mg/m ³ |
| EN 717-1 (also known as DIN EN 717-2) | ≤3.5mg/m ² hr |

* mg/m²hr may also be presented as mg/m²/hr

** The test report must confirm that the conditions of Table 3 comply for the particular wood product type, the final results must be presented in EN 717-1 equivalent (as presented in the table) using the correlation ratio of 0.98

*** The final results must be presented in EN 717-1 equivalent (as presented in the table), using the correlation ratio of 0.98.

Table 9: Formaldehyde Emissions for engineered wood (approved extract from Green Star Submission Guidelines V1.2's Table13.2B: Formaldehyde Emission Limit Values for Engineered Wood Products)

STAFF PIGEONHOLES

Each staff lounge **must** be provided with a custom-fabricated rack of named pigeonholes (larger than A4 width) for delivery of mail and messages to staff, based on staff numbers and including additional provision for visiting specialists, counsellors and the like. Project consultants **should** use peak enrolment numbers to determine the appropriate number of pigeonholes.

5.3.14 BIRD-PROOFING

Every building delivered by project consultants **must** be resistant to ingress by animals, birds and insects. Project consultants **must** limit ledges and bird perches at external eaves and undercroft areas.

5.3.15 INSECT SCREENS

Insect screens **must** be fitted on windows or openings used for night purging, to provide protection from mosquitoes and other insects. Screens **should** also be provided in any food preparation areas, including food technology areas. Screens **must** be of commercial quality and fitted with aluminium or stainless steel mesh.

The installation of screens **should** allow for easy cleaning and maintenance. Durable insect screens **should** be included and specified to all other operable windows, to encourage natural ventilation where air quality is good, unless alternative justification is provided.

5.3.16 TERMITE PROTECTION

Termite protection is **required** for all capital projects including new school builds, upgrades and maintenance projects. School construction rates have been adjusted accordingly for project consultants to apply this treatment.

All termite protection **must** comply with and be installed in accordance with the following Australian standards:

| | |
|------------------|--|
| AS 3660.1 | Termite management — New building work |
| AS 3660.2 | Termite management — In and around existing buildings and structures |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy termite protection that meets the following requirements:

- installed under concrete slabs, foundations and for cavity walls to the building perimeter
- pipes, cable conduits and the like are sealed with appropriate termite barriers in accordance with manufacturers' instructions.

The VSBA discourages the use of chemical soil barriers for termite protection, as future reapplication of chemicals may be disruptive and/or costly. As such, the VSBA requires consideration of alternative barrier systems.

5.4 Building finishes

This section advises project consultants about the required internal and external building finishes that suit teaching and learning requirements in Victorian government schools.

Overall, project consultants **must** select and satisfy finishes that meet the following requirements:

- durable, resistant to exposure, weathering and general wear-and-tear
- fire-resistant where required.

In addition to the specific requirements below, project consultants **should** select finishes that are economical.

Project consultants **should** also ensure finishes are consistent with performance requirements in the following related sections:

- [Acoustic engineering](#).

5.4.1 EXTERNAL FINISHES

MASONRY

Where project consultants propose to use masonry executed in clay brickwork or concrete blockwork, materials, detailing and construction work **must** comply with material manufacturers' recommendations and all applicable standards.

Project consultants **must** select and satisfy brickwork and blockwork that meet the following requirements:

- accommodate all permanent and temporary loads
- accommodate all short and long-term movements and deflections in the base-structure (or substrates to which the work is fixed) and within the work, including thermal movements, without failure or damage or the transfer of loads from the base-structure to the work of this section
- provide fire-resistant construction to adjacent and concealed work, where required for continuity
- be corrosion-resistant or coated to prevent corrosion
- use suitable moisture-resistant materials and construction details
- ensure thermal insulation integrated into the dry-wall framing
- prevent the formation of condensation on the inside surfaces of external cladding systems from warm humid air on cold surfaces by the correct selection and location of insulation and continuous vapour barriers, as required
- include an anti-graffiti paint finish on accessible areas that allows the removal of graffiti without adverse impact on the durability or finish of the substrate material.

Where brickwork and/or blockwork is used, consideration **must** be given to the acoustic requirements for the surrounding space. For specific requirements, please see [Acoustic engineering](#).

STRUCTURAL STEEL

Project consultants **must** select and satisfy structural steel finishes that meet the following requirements:

- corrosion-resistant or coated to prevent corrosion
- any decorative coatings are UV-stable and moisture-resistant
- appropriate coating system for the substrates, exposure, required finish (including paint) and prevailing conditions
- continuous, smooth and evenly distributed galvanizing, free from visual and surface defects including dip lines, lumps, blisters, gritty or uncoated areas, spots, dross or flux
- hot-dip galvanizing visible in the installed location **must** be carried out to architectural grade and have uniform patina and texture over the entire visible surface, without defects or rough patches
- painted finishes over hot dipped galvanised steel **should** be avoided
- new painted finishes to prefinished metal **should** be avoided
- where pre-coated materials are subject to welding, cutting or similar work, the applied protective coating **must** be repaired to deliver equal protection, equal durability and performance, and an appearance identical to the undamaged adjacent surfaces.

All exposed steel columns **should** be hot-dipped galvanised, in accordance with the exposure category in AS 2312.2 — Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings — Hot dip galvanizing. For any structures in a C4 category or above (including coastal areas up to 1km from the coast), utilise a protective coating system in lieu of galvanising.

Any visible structural steel **must** be free of defects, smooth, and have a consistent appearance throughout.

In addition, please refer to the section on [Steel](#) for further information.

METALWORK

All metalwork **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **must** select and satisfy metalwork that meet the following requirements:

- provide protection against corrosion
- adjacent materials and products **must** be chemically and electrolytically compatible with each other, substrates, and adjacent work, or be separated by suitable spacers
- adjacent materials and products, including adhesives and sealants, **must** not stain or contaminate, and **must** not cause visual or structural defects in adjacent materials
- be standard pan size suitable for its location to enable flexibility of use. Junior pans are not required in primary or secondary schools; steps and other props can be used by younger students. (See specific kindergarten requirements below)
- fixings and framing **must** accommodate all permanent and temporary loads, individually and in combination, without failure, deflection, damage to adjacent or applied work, or risk to safety
- all visible fixings **must** be evenly and neatly located and aligned
- visible fixings in accessible areas **must** be vandal-resistant
- where required to be finished flush with adjacent surfaces, visible fixings **must** be countersunk
- cut edges, drilled holes, joints and surfaces **must** be finished clean, neat, and free from burrs and indentations. Sharp edges **must** be removed without excessive or uneven radius
- surface finish, colour and texture **must** be continuous and without variation
- free of sharp edges or projections, which could cause injury to users
- exposed fixings that are subject to human contact **must** be recessed, smooth and flush.

Metalwork finishes **should** be applied economically and as appropriate. (Weather protection, for example, is not required for internal metalwork finishes.)

Stainless steel

Project consultants **must** select and satisfy stainless steel finishes and fabricated elements that meet the following requirements:

- resistant to corrosion and staining if in visible, external and/or humid locations
- press button, self-closing / timeflow tapware that does not need to be manually turned off after use, **must** be installed at handwash basins for infection control
- type 316 in food preparation/handling areas
- type 304 in bathrooms, shower rooms, toilets, and similar wet areas.

Schools located near salt water **should** consistently use 316 stainless steel to limit corrosion.

EXTERNAL TIMBER

Project consultants **must** select and satisfy timber finishes that meet the following requirements:

- have durability appropriate to the conditions of use and exposure, or preservative-treated timber of equivalent durability
- free from live borers, insects and other pests, and from rot and fungus infection
- has received preservative treatment and/or water-repellent treatment, where required.

Timber that has been pressure or dip-treated with copper chromium arsenate (CCA) preservative **must not** be used in any circumstances.

Medium-density fireboard skirtings and architraves are not to be used in wet areas.

Recycled timber can be used, however, it **must** not have any visible defects, embedded nails and other metal objects, decay or borer attack.

For timber veneers, use select grade (veneer quality A) for visible surfaces that are required to have a clear finish, or to have no coated finish. For other surfaces, general quality grade (veneer quality B) can be used.

For information on timber finishes for playgrounds, please refer to [Play, adventure and outdoor fitness equipment](#).

Timber flooring and external decking

Project consultants **must** select and satisfy timber flooring and external decking that meet the following requirements:

- is appropriate for its particular use
- is firmly supported on a suitable substrate with strength sufficient for the function
- is durable, heat resistant
- is bushfire resistant appropriate to the site's bushfire zoning (40+ BAL in BARR zones)
- has a minimum P4 wet pendulum slip rating, and
- is selected in consultation with school and consideration of its maintenance obligations for durability and slip resistance in accordance with manufacturer instructions, which must be well-explained to the school
- allows for tactile indicators that do not weaken structural integrity of decking members.

Clip-fix decking **must not** be used on steps or stairs due to the risk of movement.

Where paving, decking or another design feature creates a significant elevation change, an agreed Safety in Design measure **must** be put in place to mitigate the risk of falls.

Further, where a decking is required for egress from a SIP, the following requirements need to be satisfied:

- the support structure **must** be non-combustible
- trafficable surfaces and handrails **must** be non-combustible
- decks involving gapped board trafficable areas **should not** be enclosed at ground level around their periphery, to avoid debris accumulating beneath the deck and being inaccessible for maintenance.

EXTERNAL WALL CLADDING

External wall cladding **should** be chosen from a select range of environmentally friendly materials designed to provide:

- long-term durability (in accordance with the minimum building life identified in [School design principles](#) section)
- low maintenance costs (such as those related to cleaning)
- precoated finishes wherever possible (external painting must be minimised)
- stain and graffiti resistance
- an appropriate level of insulation for acoustic and thermal purposes
- aesthetic appeal
- value for money
- minimal risk of combustibility.

Appropriate surface finishes **must** be selected with regard to the activities to be conducted in the area.

External painting **should** be minimised and restricted to secure areas.

Project consultants **should** only select surface finishes that maintain their character and do not rely on excessive maintenance and cleaning. External cladding **should** be employed in a way that minimises cleaning and repair requirements.

Masonry wall finishes including concrete block, brickwork and concrete surfaces **must** be suited to graffiti removal. Applied treatments **should** be included where required to meet graffiti removal requirements.

Alternatives such as full-height lightweight cladding may be considered in certain circumstances; for example, in low-traffic areas and/or areas of low visual impact.

Externally, pre-coated surfaces **should be** selected as primary cladding system. External painting **should** be minimised and restricted to accessible areas.

Applied paint finished compressed fibre cement (CFC) sheeting **must not** be used.

Any solution recommended **must** be cost-effective and not compromise future maintenance.

Project consultants **must** demonstrate that the selected cladding product complies with the requirements of AS 1530.1 — Methods for fire tests on building materials, components and structures — Combustibility tests for materials.

Cladding **must** not include aluminium composite panels (ACP) with a polyethylene core or expanded polystyrene (EPS).

In addition, please refer to the section on [Insulation](#) for further information.

5.4.2 INTERNAL FINISHES

All internal applications of all types of paints, adhesives, sealants and engineered wood products applied onsite, including both exposed and concealed applications, **must** be selected to safeguard occupant health through the reduction of internal air pollutant levels by meeting the requirements below, based on the type of product.

If exterior-grade products are used in an internal application, they **must** also meet the requirements.

The following items are excluded from this requirement:

- glazing film, tapes, and plumbing pipe cements
- products used in car parks
- paints, adhesives and sealants used offsite (for example, those applied to furniture manufactured offsite and later installed in the fit-out)
- adhesives and mastics used for temporary formwork and other temporary installations.

WALL LININGS

Every space or room **must** be provided with appropriate wall linings suitable for the function, use and equipment of the space. Linings **must** be adequate to cope with normal school usage, without needing constant maintenance or repair.

All wall linings **must** comply with and be installed in accordance with the following Australian standard:

AS 1905 Components for the protection of openings in fire-resistant walls

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy wall linings that meet the following requirements:

- have provision for controlled expansion and contraction
- have fire resistance properties compliant with NCC requirements
- **must** not be damaged by structural building movements and are rigid and safe under all loading and height conditions, including when work is later applied by other trades
- easy to clean.

In addition, project consultants **must** select and satisfy wall linings for wet areas that meet the following requirements:

- impervious resilient or tiled surface finishes to minimum 1800mm height, and
- as required to suit wall-mounted fitments — such as showers, paper towel dispensers etc

Project consultants **must** specify commercially durable finishes that can withstand a harsh school environment.

Painted compressed fibre cement (CFC) sheeting **should** only be used as a last resort.

Walls **should** have acoustic properties appropriate to the function of the space.

In addition, please refer to the section [Splashbacks](#) and [Acoustic engineering](#) for further information.

WALL TILING

All wall tiling **must** comply with and be installed in accordance with the relevant Australian standard:

AS 4654 Waterproofing membranes for external above-ground use

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy wall tiling that meet the following requirements:

- are durable products suitable for the location and the intended function
- can accommodate applicable live and dead loads
- can accommodate movements and deflections in the base structure and substrates, without failure or loss of adhesion, performance or durability

- ensure that all adjacent materials and products are chemically and electrolytically compatible with each other, substrates, and adjacent work, or are separated by suitable spacers. Adjacent materials and products, including adhesives and sealants, **must** not stain or contaminate, and **must not** cause visual or structural defects in adjacent materials
- tiling in wet areas installed with mould-resistant grout.

SPLASHBACKS

All splashbacks **must** comply with and be installed in accordance with relevant Australian standards. Splashbacks are required to be a minimum of 300mm high and **should** be tiles, stainless steel, laminated MDF or a material to match the bench tops.

Joints between splashbacks, benches and walls **should** be sealed using a silicon sealant, or coved. Fillets are not to be used in any circumstances.

RESILIENT FLOOR FINISHES

Project consultants **must** provide flooring (including substrate preparation, adhesives, skirtings, covings and trims) suitable for the intended location within the design, and suitable for the intended use or uses of the space.

Floor finishes **must** be of a suitable standard commercial grade/type; easy to clean and maintain; level and smooth; stable; slip-resistant; free of trip hazards; and suitable for heavy pedestrian traffic and the use of mobile trolleys and wheelchairs.

Division strips **must** be provided at junctions of dissimilar flooring materials. The finish of adjacent floor finishes **must** be to a common surface datum, so that no trip hazard is formed. Metal movement control cover plates **must** be provided in floor finishes where structural control joints have been formed in concrete slabs.

Project consultants **must** select and satisfy resilient floor finishes that meet the following requirements:

- are highly durable and appropriately sealed to minimise dust
- slip-resistant in appropriate areas (such as those where water, oil, grease or sawdust can be spilled) and on steps and stairs
- acoustically compatible with the background and activity noise levels within the space
- join quality that minimises cleaning issues

- thermal and tactile comfort in relation to the use of the space
- installed with minimal undulations, with a preference for set-downs in concrete slabs.

Brickwork laid flat or on-edge is not an acceptable internal floor finish.

Floor tiling

All flooring **must** comply with and be installed in accordance with the following Australian standard:

| | |
|----------------|--|
| AS 4654 | Waterproofing membrane systems for external above-ground use |
|----------------|--|

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy floor tiling that meets the following requirements:

- is durable products suitable for the location and the intended function, including slip resistance
- visual and physical resistance to scuffs and marking
- requires minimal maintenance
- ensures that tiled pedestrian surfaces are stable, safe and minimise risk of slipping or tripping due to slippery or uneven surfaces
- **must** be flush with adjacent work unless stepped level change is indicated or required
- be installed with mould-resistant grout in wet areas
- use no more than two tile types.

Resilient sheet flooring

In storerooms, amenity rooms, and in rooms and spaces within rooms (excluding bathrooms) where wet activities occur, project consultants **must** provide resilient sheet flooring with an upper surface treatment suited to the function or activity. A chemical resistant grade resilient floor finish **must** be used where there is a risk of spilling of staining liquids or corrosive chemicals.

All resilient sheet flooring **must** comply with and be installed in accordance with the relevant Australian standard:

AS 1884 Floor coverings — Resilient sheet and tiles — Installation practices

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy resilient sheet flooring that meet the following requirements:

- are commercial grade
- are capable of easy cleaning and maintenance
- are set-out within a space to minimise the number of joints and seams
- are appropriate for heavy pedestrian traffic
- are stable, safe and minimise risk of slipping or tripping due to slippery or uneven surfaces
- **must** contain junctions between vinyl flooring and other flooring that are finished flush.

Resilient sheet floor coverings **should** be installed over concrete slabs that have been pre-tested to confirm they have maximum moisture content or that are otherwise fully and appropriately sealed prior to installation of the resilient sheet flooring.

Sheet flooring in science areas may need further consideration due to possible chemical spills: these may make their way through non-welded joints.

Plastic junction strips or junction devices that are not flush are not acceptable.

Concrete floor sealers

Where concrete slab floors are provided, project consultants **must** finish the concrete slab with a permanent applied sealer that has an integral colour and non-slip finish, where appropriate.

Project consultants **must** select and satisfy applied epoxy flooring over concrete slab substrates that meet the following requirements:

- are applied in accordance with the material manufacturer's recommendations
- formed to coved integral skirtings
- formed to fall to grated gullies where required
- safe and appropriate for their particular use
- durable and easily cleaned.

FLOORING FOR INDOOR PHYSICAL ACTIVITY SPACES

All installed indoor flooring systems **must** be fit for purpose and suitable to the local climate's moisture and temperature ranges.

All indoor competition-level⁷ sports spaces **must** have timber sprung floors that satisfy FIBA and EN14904 standards. Synthetic flooring is not permitted in competition-level spaces.

Competition sports spaces **must** also meet the competition requirements set out in the [Hard court](#) and [Indoor competition-grade sporting facilities](#) sections.

Where spaces have diverse, non-competition level, physical uses and are not subject to community use agreements for sports (and particularly where a stage is present) competition-level facilities are usually not required and multipurpose flooring systems (as described below) are adequate.

| | |
|---|--|
| COMPETITION SPORTS FLOORING OR PREDOMINANT DANCE USE | Sprung timber systems only (natural or engineered) FIBA CERTIFIED, EN14904 standard compliant |
| MULTIPURPOSE FLOORS | Polyurethane or polypropylene (continuous) Or Timber (natural or engineered) |

Thermal insulation **must** be provided to floors and designed to suit the selected flooring system requirements for moisture and ventilation control, and any floor warranty conditions.

Clear order of dominance line markings, appropriate to agreed sports' uses and community agreements.

7

A 'competition-level space' is a space that will be used for any of the following competition activities: (Level 3) school and or community League, Victorian League, regional Victorian, Association Championships/Competition and Training, State Titles, and or School Championship sports activities, or (Level 2) National League, National Titles. In the school setting, Level 3 facilities are usually adequate.

Schools competition sports facilities will generally be for FIBA competition level 3 equivalent activities, i.e. community competition up to state. All three levels have the same flooring requirements.

Any retractable seating in a sports facility **must** have a weight distribution that does not affect the floor. Floor systems and materials **must** also be chosen for their ability to withstand the weight of seating systems. Batten systems **should** not be used. Where they **must** be installed, following an approved departure/variation, rubber (under joist) cushioning pads **should** be used. Neoprene pads **must** not be used.

Consultants **must** provide indicative costs for a 10 Year maintenance program, including cleaning and total costs.

All flooring **must**:

- have formaldehyde emissions in compliance with EN717-1/ EN ISO 12460-3 (i.e. $\leq 0.12\text{mg}/3\text{mg}/\text{m}^2\text{hr}$),
- a maximum of 0.2- 0.6 Total Volatile Organic Compound (TVOC) after 28 days, and
- come with all relevant fire and smoke compliant testing (BCA C1.10)
- comply with EN 13696's wearability standards.

At least 95% (by cost) of all timber used in hardwood / engineered competition or multipurpose floors **must** be either:

- certified by a forest certification scheme that meets the GBCA's essential criteria for forest certification in accordance with 20.2A Certified timber, or
- from a reuse source, in accordance with 20.2B Reused timber.

When engineered floors are used, the flooring system needs to meet FIBA requirements and be pre-finished, where possible, for maintenance reasons.

Any applied finishes **must** be suitable for the indicated use of the floor, water-based, and not exceed EU TVOC standard of 140 (g/Lt).

Light-coloured timber species are recommended for competition-grade sports flooring systems, where possible, as they lift a stadium's ambience and potentially reduce energy consumption i.e. for lighting.

All competition sports' surfaces **must** be approved and certified by FIBA. The FIBA certificate **must** clearly state that the chosen system/s is correct for the facility in question, and this certificate **must** be provided to the school and the VSBA. Without a certificate, the system will be considered non-compliant. The substitution of sub floor or surface materials will not be acceptable to Basketball Victoria, Basketball Australia, Netball Victoria or the relevant state or territory association.

Multipurpose space flooring

Multipurpose space floors can be comprised of sprung hardwood/engineered timber or polyurethane/propylene systems.

Where the dominant user of a multipurpose space, is a lightweight primary school child, polyurethane flooring systems, are particularly encouraged. Polyurethane/propylene flooring in multipurpose spaces **must**:

- have water based or solvent free, high solid polyurethane adhesives and components
- include at least 80% recycled content
- be fully stuck down
- (ideally) be resurfaced as required and not need replacement
- be continuous with minimal seams / joins, to minimise weak points
- be recyclable at 'end of life' (i.e. not go to landfill)
- have a 10-year warranty
- be installed by an experienced installer, that can ideally maintain the floor through its life.

Dance/drama flooring

Where a space is predominantly used for dance and drama functions, the flooring system **must** be a sprung hardwood or engineered timber system, as per the competition standard sports floor requirements outlined above, with an applied coating or be prefinished suitable for dance, drama and similar activities.

SOFT FLOOR FINISHES

Carpet **must** be graded 'contract extra heavy duty' by the Australian Carpet Classification Scheme (ACCS). Flooring to IT-server (also known as switch or core communications) rooms **must** be provided with an anti-static covering. Carpet is not to be used.

All carpets **must** comply with and be installed in accordance with the relevant Australian standard.

Project consultants **must** select and satisfy carpets, mats and carpet tiles that meet the following requirements:

- have textile dyes and pigments that are colour-fast and fade-resistant to daylight, and resistant to water
- avoid the accumulation of undesirable electrostatic charges
- contain an appropriate substrate to be prepared to receive the carpet installation
- contain a smooth transition between the all-adjacent flooring types

- have edges between carpet and other flooring materials finishing with mouldings suitable for the particular use. Plastic-edge strips or non-flush materials are not acceptable
- are laid in a single area and should come from one manufacturing batch and dye-lot.

Light-coloured carpet tiles **should** be avoided as they show stains easily.

Small cut portions of carpet tiles **should** be avoided. If required, glue-fix into place using construction adhesive **should** be used, not tack adhesive.

Carpet maximum total volatile organic compound (TVOC) levels **must** comply with **either**:

- Product certification in accordance with a GBCEA-recognised product certification scheme **or**
- Laboratory testing in accordance with TVOC limits specified in the Carpet Test Standards and TVOC Emissions Limits in the Green Star Submission Guidelines v1.2.

A combination of methods can be used to demonstrate compliance.

SKIRTINGS

Project consultants **must** select and satisfy skirtings, where they are deemed necessary, that meet the following requirements:

- flat satin anodized aluminium or finished stainless steel sheet skirting a minimum of 1.6mm thick, adhesive-fixed to wall lining
- vinyl skirting profile adhesive-fixed to wall lining
- resilient vinyl flooring material turned up over a shaped coving profile backing and adhesive-fixed to the wall lining to form self-coved flooring. This form of skirting should be used in areas that will be cleaned with a washdown
- timber skirting sections fixed through the wall lining into the subframe, and finished with an applied paint coating
- meet a default 100mm from FFL standard (unless otherwise required), and
- align with the height of kick-rails in adjacent joinery.

The longest possible skirting sections for each situation **must** be used. Skirtings **must** be installed to a level horizontal line fitting flush against floors. Edges **must** butt together to form tight, neat joints showing no visible open seam. Skirtings **must** be sealed at internal corners and at junctions with door frames and vertical abutments.

FLOOR MATS

At entrances, project consultants **must** provide internal walk-off entry mats or matting. The mat, frame and adjacent floor finish **must** finish flush with each other, with no tripping hazards. Mats **must** be equal or greater than the width of the respective entry doorway, and maximise extent from doorway for maximum dirt / moisture removal. Integrated matting systems **should** be used, recessed matt wells **should** be avoided.

Stainless steel

Stainless steel is also used as an internal finish. Technical specifications for stainless steel finishes are detailed in the [Stainless steel](#) item in the External finishes section.

5.4.3 PAINTING AND APPLIED FINISHES

Project consultants **must** select and satisfy paints that meet the following requirements:

- paints approved under the Australian Paint Approval Scheme (APAS)
- paints with low volatile organic compounds (VOC) and free from toxic ingredients
- use the manufacturer's highest grade (or premium grade) of any selected coating product
- paint finishes must be selected from Table 10 – Paint Sheen Levels to suit durability/ high periodic cleaning performance requirements
- products used in each installation area and finish type **should** be from the same product batch
- UV-resistant paints and coating products **must** be used where they are subject to direct and reflected sunlight, including internal locations, to prevent colour fading
- must be durable and suit wash and wear maintenance for all walls, and ceilings in wet areas.

| INTERNAL AREA | SHEEN LEVEL (MINIMUM) | GLOSS % AT 60 DEGREES (APAS STANDARD, MINIMUM) |
|----------------------------------|-----------------------|---|
| Walls - typical | Semi gloss | 20-30% |
| Doors, windows and painted trims | High gloss | 75-80% |
| Flush ceilings - typical | Low gloss | 12% |
| Flush ceilings – student toilets | Semi gloss | 20-30% |

Table 10 – Paint Sheen Levels to suit durability/high periodic cleaning performance requirements

Metal safety rails and barriers, bollards, and columns for external covered ways **must** be painted in high visibility luminance contrast colours. Handrails **should** be galvanised, not painted.

Project consultants **should** consider the exposure categories within certain environments (particularly areas 1km or less from the coast) and use a protective coating system rather than paint. Please refer to

AS 4312 — Atmospheric corrosivity zones in Australia, for more information.

When selecting colours for external walls, colours that increase heat absorption to the detriment of the underlying substrate **should** be minimised.

Paint, adhesive and sealant maximum total volatile organic compound (TVOC) levels **must** comply with **either**:

- Laboratory testing in accordance with Table 13.1.1 in the Green Star Design & As Built Submission Guidelines v1.2 (as detailed in ENGINEERED WOOD PRODUCTS), **or**
- Product certification in accordance with a GBCA-recognised product certification scheme. The certificate **must** be current at the time of project submission and list the relevant product name and model. Details and updates can be found at new.gbca.org.au/product-certification-schemes

Product certification schemes include:

- Carpet Institute of Australia Limited — Environmental Certification Scheme
- Ecospecifier — GreenTag GreenRate
- Australasian Furnishing Research and Development Institute — Green Tick
- Good Environmental Choice Australia
- The Institute for Market Transformation to Sustainability — Sustainable Materials Rating Technology.

5.5 Acoustic engineering

Good acoustic design for general learning and teaching spaces is essential. Unwanted or excessive noise can lead to difficulties with communication and concentration. Designs **should** provide an acoustic environment in which clear communication between teachers and students is achieved, while disturbance from other activities is minimised.

Classrooms and core learning spaces **must** be designed to allow clear verbal communication between teachers and students while minimising noise disturbance. Indoor ambient noise levels **must** be suitable and relevant to the room activity type. Well-designed acoustics can enhance the environmental quality of a space by facilitating communication, improving wellbeing and/or aiding in noise control and speech privacy.

Factors affecting acoustic performance and internal noise levels, which require appropriate acoustic treatment include:

- site location in relation to noise sources, such as roads and industry
- relationship between varying noise levels anticipated in different buildings (such as sport centres, workshops and libraries)
- activity and equipment noise within spaces (such as music, playground activities in covered areas and machinery noise)
- in multi-level buildings, impact and vibration noise from foot traffic and machinery from rooms above and below
- impact noise from rain and hail on roof sheeting
- impact noise, vibration and resonances in light metal framed structures from foot traffic
- sound travel paths through openings, joints or gaps between walls, floors, ceilings and operable joints in operable walls, doors and view panels

- sound travel between rooms over the partitions via the ceiling space, where partitions do not extend full-height
- noise reflection and reverberation within integral spaces larger than 100m² and in large covered areas
- noise from mechanical ventilation and air-conditioning fans and compressors.

From the outset, floor planning **must** consider acoustic performance and whether the spaces are fit-for-purpose.

Spaces with incompatible acoustic requirements **should** be located as far apart as practicable. Where open-plan teaching spaces are proposed, dedicated quiet rooms or pods **should** also be included to cater for small groups needing acoustic separation from the main group. For special schools and special development schools, there are greater requirements, reflecting the increased acoustic sensitivity of some users.

Special conditions to note:

- teaching spaces for students with special hearing needs, learning difficulties and students with English as a second language, **should** have reverberation times lower than the nominated minimum level and **should** have soundfield technology
- learning spaces larger than 100m² where projection of voice and music is critical, (such as open-plan learning spaces and presentation/performance auditoriums), are subject to specialist advice from an acoustic consultant and **may** require soundfield technology.
- in very large spaces such as sports halls, a maximum reverberation time **should** be 1.5 seconds. External covered play areas **should** have roof noise-damping and acoustic absorption ceilings to achieve absorption category as briefed.

The acoustic design of rooms **must** aim to eliminate acoustic defects such as flutter echoes and focussing. The following issues **must** be addressed by project consultants:

- control of sound disturbance and transfer between spaces
- control of room reverberation (echoing) within spaces
- control of ambient noise levels arising from mechanical plant, equipment or external noise (such as transportation)

- meet recommended maximum sound levels according to room type and function as stated in [sound insulation ratings](#) and [sound insulation requirements](#).

Natural ventilation may not be appropriate in areas where the background noise level is high.

Air transfer grilles in any sound-insulating constructions (including doors) **must** be avoided or attenuated.

When windows and doors are closed they **must** seal effectively. These rooms **must** have sufficient internal ventilation to allow windows to be kept closed for extended periods. Ventilation systems may require acoustic treatment to attenuate external noise.

The location of toilet and amenity spaces **must** minimise the impact of hydraulic noise transfer to teaching and staff work spaces. In locations where teaching and staff work spaces are adjacent to walls containing in-wall cisterns or noisy pipework, or where noisy appliances are on the opposite side of the wall, the walls **must** be constructed and insulated to prevent noise intruding on adjacent spaces.

Project consultants **must** ensure that mechanical and electrical services do not undermine sound insulation solutions. Noisy equipment **must** be placed so that it does not cause nuisance and disturbance to users and to neighbours, and so it provides appropriate safe access for maintenance.

All acoustically engineered solutions **must** comply with and be installed in accordance with the following Australian standards:

| | |
|-------------------------|--|
| AS/NZS 2107 | Acoustics — Recommended sound design levels and reverberation times for building interiors |
| AS 2021 | Acoustics — Aircraft noise intrusion — Building siting and construction |
| AS/NZS ISO 717.1 | Acoustics — Rating of sound insulation in buildings and of building elements — Airborne sound insulation |
| AS ISO 2631.2 | Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Vibration in buildings (1 Hz to 80 Hz) |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** design acoustic engineering solutions that meet the following requirements:

- detailing at wall, floor and facade junctions **should** match the acoustic requirements of the room
- appropriate barriers to reduce the noise in adjacent spaces/areas, including using duct-mounted barriers on both the supply and extract systems for noise sensitive-spaces (cross-talk attenuators may be required if ductwork systems serve adjacent noise-sensitive spaces)
- acoustic bounding walls **must** extend to the roof space if the ceiling construction and lining is not effective as an acoustic boundary (note that above ceiling plena may require additional attenuation if walls are full-height)
- all building services penetrations **must** be appropriately sealed (including those in the ceiling cavity barriers)
- avoid flexible ductwork in areas where high levels of sound insulation is required
- all ductwork/pipework/cable penetrations **must** be sealed effectively
- acoustically rated bounding partitions **must** be built 'slab-to-slab' or 'slab-to-roof' unless it can be shown that the overall performance can be achieved with a common ceiling or floor void
- additional acoustic measures **must** be provided if a suspended timber floor is used in lieu of a concrete slab.

Statutory requirements also inform the requirements of acoustic performance of Victorian government schools. Project consultants **must** adhere to the following government policies and guidelines:

- Occupational Health and Safety Regulations 2017
- Environmental Protection Agency — State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP-N-1) — **applicable in metropolitan Melbourne only**
- Environmental Protection Agency — Noise from Industry in Regional Victoria Guidelines (NIRV) — **applicable in areas outside metropolitan Melbourne only.**

Project consultants **must** take into consideration the fact that sound insulation ratings are based on laboratory tests conducted under ideal conditions.

Onsite performance may be lower due to constraints on workmanship and noise-flanking paths.

Project consultants **should** also refer to the following related sections:

- [Master planning](#)
- [School design principles](#)
- [Building fabric](#)

5.5.1 DEMONSTRATION OF PERFORMANCE

Given the importance of the acoustic performance to the functionality of learning spaces, project consultants are **required** to demonstrate compliance with the performance requirements within this section.

As part of the commissioning and handover process, the acoustic engineer **must** verify and demonstrate with onsite acoustic testing and commissioned data that acoustics standards have been met. The consultant **must** also be a member of the Australian Acoustical Society or the Association of Australasian Acoustical Consultants.

5.5.2 AIRBORNE SOUND INSULATION BETWEEN ROOMS

Spaces **must** be designed to avoid noise transmission between rooms and between rooms and open areas. The nominated enclosed spaces between rooms, and between rooms and open areas **must**:

- be built to minimise cross-talk, **or**
- noise transmission in enclosed spaces within the nominated area **must** be addressed.

The sound insulation requirements are based on the activity noise rating in the source room and the noise tolerance rating in the receiving room. The ratings are detailed for each space in Table 6 opposite.

Acoustic isolation achieved by each barrier is the measure of reduction of sound and is defined as a weighted sound reduction index ($R_{w,i}$), in accordance with the relevant Australian Standards, including the rating of sound insulation in buildings and building elements for airborne sound.

Project consultants **must** provide the minimum airborne sound insulation in accordance with Table 9.

The airborne sound insulation requirements are provided in terms of the weighted standardised level difference $D_{nT,w}$ values between spaces.

| TYPE OF ROOM | ACTIVITY NOISE (SOURCE ROOM) | NOISE TOLERANCE (RECEIVING ROOM) |
|--|---------------------------------|-------------------------------------|
| Classrooms, shared learning spaces, seminar rooms, tutorial rooms, language laboratories, small group rooms, library/learning resource centre | Average | Medium |
| Open-plan and learning community areas teaching areas resource/breakout areas | Average | Medium |
| Music classroom Small and large practice/group room/dance Performance/recital room Ensemble room/recording studio | Very high | Low |
| Control room – for recording | High | Low |
| Control room – not for recording | Average | Medium |
| Lecture room | Average | Medium |
| Shared learning spaces specifically for students with special hearing and communication needs | Average | Low |
| Shared learning spaces for special needs students in special schools and special development schools | High | Low |
| Study room (individual learning space, withdrawal, remedial work, teacher preparation) | Low | Medium |
| Quiet study areas | Low | Medium |
| Resource intensive learning areas | Average | Medium |
| Science laboratories | Average | Medium |
| Materials technology | High | High |
| Electronics/control, textiles, food, graphics, design/ resource areas, ICT rooms, art | Average | Medium |
| Drama studios, assembly halls, multi-purpose halls (drama, physical education, dance, audio/visual presentations, assembly, occasional music) | High | Low |
| Atria, circulation spaces used for circulation and socialising (but not teaching and learning) | Average | Medium |
| Sports halls (for sport use only) | High | Medium |
| Hydrotherapy swimming pool (if required) | High | High |
| Meeting rooms, interviewing/counselling rooms, video conference rooms | Low | Medium |
| Canteens, food preparation, dining rooms or laundries | High | High |
| Kitchens, laundries | High | High |
| Offices, medical rooms, staff work areas | Low | Medium |

| TYPE OF ROOM | ACTIVITY NOISE (SOURCE ROOM) | NOISE TOLERANCE (RECEIVING ROOM) |
|--|---------------------------------|-------------------------------------|
| Corridors, stairwells, circulation, coats and locker areas | Average | High |
| Changing room areas | Medium | High |
| Toilets | Average | High |

Table 11 Sound insulation ratings

| MINIMUM D_{NTW} | ACTIVITY NOISE IN SOURCE ROOM | | | |
|-----------------------------------|-------------------------------|---------|------|-----------|
| NOISE TOLERANCE IN RECEIVING ROOM | Low | Average | High | Very High |
| High | N/A | 35 | 45 | 50 |
| Medium | 40 | 45 | 50 | 55 |
| Low | 45 | 50 | 55 | 55 |

Table 12 Sound insulation requirements for noise tolerance

Project consultants **must** note that the:

- $D_{nT,w}$ is calculated according to AS/NZS ISO 717.1. The value of T to be assumed **must** be 0.5s
- prediction of $D_{nT,w}$ between two spaces **must** be conducted in both directions
- values of $D_{nT,w}$ are for fixed partitions only
- $D_{nT,w}$ is an onsite performance and the reduction in laboratory sound insulation performance in which onsite construction **must** be taken into consideration in the selection of appropriate constructions, and
- this is not applicable to operable walls.

As pedagogy evolves, it is expected that schools will use more open-plan and multi-purpose spaces. These spaces **must** adhere to the highest acoustic standard of use. Study nooks may be inserted into corridors/circulation spaces, but the study nook needs to be functional as designed, rather than a space that is unusable due to noise.

WALL CONSTRUCTION

The following provides description of construction systems that are deemed to satisfy the $D_{nT,w}$ performance recommended above.

| MINIMUM $D_{nT,w}$ | BUILDING ELEMENT | SOLUTION |
|--------------------|---------------------------------|---|
| 30 $D_{nT,w}$ | Wall construction | Simple 64mm-wide steel or 90mm-wide timber stud with a single layer of 13mm plasterboard to each side. |
| | Wall extent | Wall may extend to the underside of any ceilings having a Ceiling Attenuation Class (CAC) of greater than 30 (examples include 13mm plasterboard and 15–18mm thick compressed acoustic tiles). |
| | Cavity insulation | Not required |
| | End terminations of other walls | Standard building construction only. Termination to window mullions permitted but should be acoustically sealed. |
| | Glazing | Permitted but must be sealed and should be at least 6mm thick. Composite R_w value of wall and glazing should be at least 35. |
| 35 $D_{nT,w}$ | Wall construction | Simple 64mm-wide steel or 90mm-wide timber stud with a single layer of 13mm plasterboard applied to each side |
| | Wall extent | The wall structure should project through the suspended ceiling, but framing and plasterboard layers need not extend to divide the ceiling cavity. |
| | Cavity insulation | Acoustic grade, 50mm-thick with a minimum density of 14kg/m ³ . |
| | End termination of other walls | Standard building construction only. Termination to window mullions permitted but should be acoustically sealed. |
| | Glazing | Not to make up more than 15% of the wall area, and must be sealed, 10mm laminated glass. Composite R_w value of wall and glazing should be at least 40. |
| | Ceiling | Must have a CAC rating not less than 35. Must be overlaid with a 50mm-thick, 24kg/m ³ (minimum) density acoustic grade insulation for an extent of not less than 1200mm each side of the partition line. |
| 40 $D_{nT,w}$ | Wall construction | Single 64mm steel or 120mm timber stud system lined with 2 x 13mm plasterboard on one side with 1 x 13mm plasterboard on the other side. |
| | Wall extent | Wall system to interrupt the suspended ceiling with not less than a 1 x 13mm plasterboard layer extending across the ceiling cavity and being acoustically sealed around the perimeter. |
| | Cavity insulation | Acoustic-grade, 50mm-thick with a minimum density of 14kg/m ³ . |
| | End terminations | Walls should not abut window mullions, window glazing or simple lightweight partitions. |
| | Glazing | Not recommended in these partitions. |
| | Ceiling | Must have a CAC rating of not less than 30. |

| MINIMUM $D_{nT,w}$ | BUILDING ELEMENT | SOLUTION |
|--------------------|---------------------------------|---|
| 45 $D_{nT,w}$ | Wall construction | Simple 64mm-wide steel or 90mm-wide timber stud with 2 x 13mm plasterboard applied to each side. |
| | Wall extent | All plasterboard layers to interrupt the ceiling and divide the ceiling cavity. |
| | Cavity insulation | Acoustic-grade, 50mm-thick with a minimum density of 14kg/m ³ . |
| | End terminations of other walls | Wall structure should interrupt the flow of the lining of any flanking wall (for example, sheets of plasterboard must not be permitted to pass interrupted past the end of the wall). |
| | Glazing | Not recommended. |
| | Ceiling | No specific requirement relating to sound transmission. |
| 50-55 $D_{nT,w}$ | Wall construction | Two rows of 64mm steel or 90mm timber stud separated by not less than 70mm, and lined with 2 x 16mm plasterboard on both sides. |
| | Wall extent | All plasterboard layers to interrupt the ceiling and divide the ceiling cavity. |
| | Cavity insulation | Acoustic-grade, 50mm-thick with a minimum density of 14kg/m ³ . |
| | End terminations of other walls | Not to form junctions with any lightweight wall or facade system unless the structure of the abutting wall/facade is physically interrupted by the dividing wall. |
| | Glazing | Not permitted |
| | Ceiling | No specific requirement relating to sound transmission |

Table 13 Construction solutions for different acoustic performance requirements

Alternative constructions can be used and, as a guide, **should** have a laboratory rating performance at least 5 dB higher than the nominated minimum $D_{nT,w}$ rating.

In addition, please refer to [Building fabric](#) for further information.

OPERABLE WALLS

End termination of the operable wall **must** be reviewed and approved by the operable wall supplier or a qualified acoustic consultant prior to installation.

When selecting an operable wall based on laboratory ratings, it **should** be noted that, when tested on site, it can perform in the order of 8 rating points lower. Project consultants **should** consider suitability, as operable walls capable of achieving greater than R_w 45- R_w 50 are generally quite costly.

Further, operable walls **should** only be used where acoustic separation is not a critical aspect of the design. They **should not** be used between music spaces unless absolutely necessary for the functionality of the space.

In addition, please refer to [Building fabric](#) for further information.

Doors

To assist with the acoustic performance requirements identified above, project consultants **must** select and satisfy doors that meet the following requirements:

- door-sealing mechanisms allow for the accommodation of building tolerances and floor-level variations, with the capability of being site-adjustable and maintainable
- no air transfer grilles used in any acoustic doors or acoustic-rated walls.

Lobby door-sets can be used to provide a higher level of sound insulation using doors with a lower acoustic performance. Where sliding doors are used, a proprietary system **must** be provided to meet the acoustic performance requirements for interconnecting doors and doors to corridors.

Table 14 provides details of doors suitable for different room types that meet acoustic performance requirements.

| TYPE OF SPACE | MINIMUM RW | |
|---|------------|---------------------------------------|
| | GLAZING | DOORSET (RATHER THAN DOOR LEAF) |
| All spaces except music rooms | 35 | 30 |
| Music rooms | 45 | 33 |
| Spaces separated by sliding doors | 35 | 25 |
| Operable walls | 45 | 45 |
| Bounding walls beside /above an operable wall | 50 | 50 |

Table 14 Doors suitable for different room types

An exception to this table is where it is essential to link a teaching space with another occupied room via an interconnecting door for operational or safety purposes. In such cases a doorset **must** be used with a rating of at least 35 dB RW. The surrounding wall (including any glazing) **should** have a composite sound insulation rating of at least 45 dB RW.

The design of dedicated music areas, especially where they form part of a groups of practice rooms, may require higher acoustic door ratings. In these situations, sound locks and or separating central corridors are recommended. An acoustic rating higher than 50 RW can effectively be achieved with two RW 30 doors and a space between them, designed to suit the site.

5.5.3 INTERNAL NOISE LEVELS

Spaces **must** be designed to achieve the design sound level from AS/NZS 2107 for their use type. Internal ambient noise levels in the nominated area **must** be no more than 5dB(A) above the lower figure in the range recommended in AS/NZS 2107 — Design sound levels and reverberation times for different areas of occupancy in buildings — Table 1.

Spaces **should** be designed to ensure that the transmission of impact noise between occupied spaces on different storeys of a building is kept to acceptable levels. Specialist spaces **should** achieve a minimum LnTw of 55.

All other spaces should achieve a minimum LnTw of 60 (where LnTw is the maximum weighted standard impact sound pressure level in accordance with ISO 717.2, with the value of $t=0.5$ s). Refer to Table 11 for relevant sound sensitivity levels.

5.5.4 REVERBERATION

Spaces **must** be designed to achieve the reverberation time below the maximum stated in the 'recommended reverberation time' from AS/NZS 2107, based on the most relevant space type.

Dedicated teaching space **must** have reverberation times in the lower half of the range specified in AS/NZS 2107 — Design sound levels and reverberation times for different areas of occupancy in buildings — Table 1.

Where note 3 of Table 1 AS/NZ 2107 applies and requires that reverberation times be minimised as far as practical, acoustic absorption **should** be installed in the noise-sensitive space, applied in locations appropriate to the function of the space, and located to maximise the acoustic performance of materials selected.

Alternatively, compliance may be demonstrated by treating 50% of the combined floor and ceiling area with a material with a NRC of at least 0.5.

Reverberation refers to the persistent prolonged reflections of sound in a space. It can impact speech intelligibility. Reverberation is reduced with acoustic absorption, which is achieved by a combination of the absorption properties of all internal surfaces (floor, ceiling, walls, furniture and people).

Acoustic absorption is defined in terms of NRC measured over a range of sound frequencies from 250 to 2000Hz, in accordance with AS ISO 354, AS/NZS 2107 and AS/NZS 1935.1.

Consultants **must** note that:

- teaching spaces for students with special hearing needs or learning difficulties, and for students with English as a second language, have reverberation times lower than the nominated minimum level and need sound-field augmentation systems
- learning spaces larger than 100m² where projection of voice and music is critical, (such as open-plan learning spaces, presentation/performance auditoriums), are subject to specialist advice from an acoustic consultant and may require sound-augmentation PA systems
- for very large spaces, such as sports halls, reverberation times **should** be achieved that align with the table of curves in AS/NZS 2107-Appendix A.

5.5.5 EXTERNAL NOISE

The design of the school building facade **should** meet the recommended ambient noise levels within AS/NZS 2107 with windows and doors closed. External noise **must** be planned for and addressed during the design phase, to ensure internal spaces are functional and fit-for-purpose.

The optimum reverberation time for a particular space is dependent on the room volume and shape. Project consultants designing unique spaces **must** demonstrate that their designs provide the suitable acoustic environment for learning in accordance with the requirements of AS/NZS 2107.

School sites **should** be positioned to mitigate the effect of noise associated with traffic, rail transport and adjacent commercial and industrial activities. School sites that are impacted by external noise from traffic, rail activity, commercial/industrial noise and/or aircraft noise **must** be evaluated according to the proposed design solution. The results of the evaluation **should** be used for the facade designs. Appropriate treatments can include double or triple-glazing, if required.

RAIN NOISE

The roof design **should** control excessive noise from rain in learning and speech-use areas.

The noise effect from rain on a roof **should** not exceed the ambient noise levels within AS/NZS 2107 by more than 5dB(A) during a moderately heavy rain event (up to 10mm/hr rate).

5.6 Structural engineering

This section provides details for the structural engineering elements of projects at Victorian government schools.

All design, materials, workmanship, testing and commissioning are to comply with the latest revision of the NCC and relevant Australian standards. Specified fittings and equipment **should** be sourced from Australian suppliers where possible, so replacement parts and maintenance are easy to access.

Project consultants **must** design and specify structural engineering that:

- suits local environmental conditions
- promotes safety and security of users
- is economical.

Project consultants **should** also refer to the following related sections:

- [Building fabric](#)
- [Building finishes](#)

5.6.1 SITE CONDITIONS AND INVESTIGATION

Before the design process starts, site investigations **must** be carried out to ascertain the relevant properties of the founding material. Project consultants **must** carry out site investigations including:

- land surveys to determine slopes and above-ground site features
- investigations of watercourses, areas subject to inundation and overland flow paths, and water table and levels
- borehole and geotechnical investigations to determine, as best as possible, sub-surface conditions
- an examination of past construction records in the area, sourced from local authorities and schools.

5.6.2 DESIGN LIFE

Structures **should** be designed to have a maintenance-free service life of at least 50 years.

5.6.3 SUBSTRUCTURE

Project consultants **should** carry out trenching, with the trench being reinstated as soon as possible to avoid injuries.

Project consultants **should** select and satisfy service trenches that meet the following requirements:

- provide appropriate service utility clearance
- use suitable reinstatement material and compaction consistent with requirements for soils and fills.

5.6.4 SUPERSTRUCTURE

The structure **should** address future flexibility requirements where possible, providing clear internal spans to allow internal re-planning. Load-bearing structures and the skins of buildings (external envelope) **must** be of a durability appropriate to the nominated design life.

Project consultants **must** select and satisfy a structural system that meets the following requirements:

- reflects the building plan
- is suitable for the local conditions and environment
- aligns with the most appropriate foundation system.

Wherever possible, it is recommended that project consultants use a stiffened concrete raft solution for the floor, where appropriate for the ground conditions. For sites on slopes, or for sites with difficult founding conditions, it may be appropriate to raise the floor structure.

A certificate of structural adequacy for all footing systems and structural members of the building **must** be provided to the responsible VSBA project officer with the final detailed design drawings and documentation.

'Buildability' considerations include speed, market conditions and minimising multiple sequencing of individual trades.

CONCRETE

All concrete structure work **must** comply with the following Australian standards:

| | |
|--------------------|---|
| AS 3600 | Concrete structures |
| AS 3610 | Formwork for concrete |
| AS 3850 | Prefabricated concrete elements |
| AS/NZS 4671 | Steel for the reinforcement of concrete |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

The project team **must** demonstrate how the proposed development will specify concrete to have lower life-cycle impacts and reduce the waste going to landfill based on the pathway options below:

Portland cement reduction

Project teams **must** demonstrate that the Portland cement content is reduced by a minimum of 30%, measured by mass across all concrete used in the project compared to the reference case.

Calculating the reference case

A reference case is used as a basis for calculating the percentage reduction of Portland cement in the building. The reference case represents the amount of Portland cement (in kilograms) that would have been used in the project if no supplementary cementitious materials were used.

The reference case **should** be established by:

- establishing the concrete mixes used in the project, their volume and strength grade
- based on Table 19B.1.1 Portland cement content concrete strength grades (as defined in AS 1379 — Specification and supply of concrete) Green Star Design and As-Built (DAB) v1.2, calculating the total amount of Portland cement in each mix, in kilograms, assuming no supplementary cementitious materials are used
- add all totals of Portland cement in all mixes — this figure is the reference case for the project.

The reference case and the proposed design **must** have the same structural and functional requirements and be in the same location and season.

Water reduction

Project teams **must** demonstrate that the mix water for all concrete used in the project contains at least 50% captured or reclaimed water (measured across all concrete mixes in the project).

Aggregates reduction

At least 40% of coarse aggregate in the concrete is crushed slag aggregate or other alternative materials (measured by mass across all concrete mixes in the project), provided that the use of such materials does not increase the use of Portland cement by more than 5kg/m³ of concrete.

At least 25% of fine aggregate (sand) inputs in the concrete are manufactured sand or other alternative materials (measured by mass across all concrete mixes in the project), provided that use of such materials does not increase the use of Portland cement more than 5kg/m³ of concrete.

Acceptable types of alternative coarse and fine aggregate are listed in the Cement Concrete and Aggregate Australia publications, *Use of recycled aggregates in construction* and *Guide to the specification and use of manufactured sand in concrete*. A worked example is provided in the guidance section of Life Cycle Impacts – Concrete, Green Star DAB Submission Guidelines v1.2.

MASONRY

All masonry structural elements/components and construction **must** comply with relevant Australian standards.

STEEL

All structural steel **must** comply with relevant Australian standards.

For information on finishes for structural steel, please refer to [Building finishes](#).

TIMBER

All timber structural members **must** comply with and be installed in accordance with the relevant Australian standards:

AS 1720 Timber structures

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select structural timberwork that meets the following requirements:

- timber appropriate to the conditions of use and exposure (or preservative-treated timber of equivalent durability)
- free from live borers, insects and other pests, and from rot and fungus infection
- where required, has had preservative treatment and/or water-repellent treatment
- accommodates all permanent and temporary loads, individually and in combination, without failure, deflection, damage to adjacent or applied work, or risk to safety
- accommodates all short and long-term movements and deflections in the base-structure, substrates to which the work is fixed, and within the work, including thermal movements, without failure or the transfer of loads from the base structure to the work of this trade
- adequate dimensional stability for the ambient conditions, and **must** not change size or shape in a manner that will detract from appearance, performance and durability of the work, or damage adjacent or applied work.

Responsible building materials

At least 95% (by cost) of all timber used in the building and construction works is **either**:

- certified by a forest certification scheme that meets the GBCA's 'essential' criteria for forest certification in accordance with 20.2A Certified timber **or**
- from a reused source, in accordance with 20.2B Reused timber.

This requirement applies to all timber applications within the building and construction works. No distinction is made between temperate, tropical, hardwood and softwood timbers and engineered wood products.

Where the cost of timber in the project is less than 0.1% of the project contract value, this requirement is not applicable.

Typical timber uses include:

- formwork and other temporary installations of timber (for example, hoardings)
- structural and non-structural timber, including internal walls, floors and roof structures
- external and internal cladding
- flooring, wall and ceiling finishes
- internal and external joinery, windows, doors and other specialist uses of timber, such as installed furnishings and balustrades/barriers
- furniture items made from timber or including timber components.

Certified timber

Timber **must** be sourced from forests that have been certified by forest certification schemes that are deemed to satisfy the minimum requirements of the GBCA's 'essential criteria' for forest certification.

In Australia, two schemes met the GBCA's essential criteria at the time of publication: the Forest Stewardship Council (FSC) International scheme and the Programme for the Endorsement of Forest Certification (PEFC) scheme.

Reused timber

'Reused timber' includes pre-existing timbers in school buildings, and second-hand timber procured elsewhere. As well as structural timber, it includes timber products such as flooring, cladding timbers, ceiling finishes and timber joinery.

Reused timber sources include second-hand retailers, removalists, auction houses and demolition sites. New painting or coating may be applied to a reused item.

'Virgin timber' refers to timber and wood-derived products that are not recycled. Sawmill co-products fall in the category of virgin timber.

5.6.5 DEFLECTION

Structures **must** be designed so that deflections, vibrations and resonances do not adversely affect performance, serviceability, stability or appearance. The in-service deflections of structure-supporting operable walls **must** not exceed 5mm or span/1000, whichever is smaller.

Where there is a possibility of wind or machine-induced vibration, structural elements **must** be designed to withstand the loadings and movements without adversely affecting the building's use or the experience of users.

5.6.6 STRUCTURAL PROVISION FOR ACCESS AIDS

The roof structure of selected bathrooms at special development schools **must** be capable of supporting overhead rail-mounted electric-lifting hoists and overhead tracking rails.

5.7 Civil engineering

This section details specific requirements for stormwater management, roads and paths.

Project consultants **should** ensure civil engineering work is consistent with the performance requirements in the following related sections:

- [Master planning](#)
- [Landscape architecture](#)
- [Building fabric](#)
- [Hydraulic services](#)

Project consultants **should** ensure that relocatable classrooms also adhere to the following civil engineering elements.

5.7.1 STORMWATER DRAINAGE

A stormwater drainage system **must** be provided to fully drain each school site and reduce the risk of flooding. The drainage system **must** take into account all contributing catchments.

For general information on how to undertake appropriate stormwater drainage at Victorian government schools, please refer to:

- Cement Concrete & Aggregates Australia guidelines
- [Australian rainfall and runoff guidelines](#).

Project consultants **must** select and satisfy stormwater drainage systems that meet the following requirements:

- drainage design is fully coordinated with other external designs to ensure that all areas are adequately drained and help avoid erosion on sites
- designs are in accordance with Australian Rainfall and Runoff guidelines
- give due consideration to the potential impacts of climate variability on flooding events
- have sediment traps and trash screens that cannot be accessed by students
- be easily accessible for maintenance and cleaning when required
- avoid ponding
- overland flows do not damage the school's functionality.

Drainage systems near buildings and paved areas **must** be a combination of open inverts, kerb and channel and underground drains, as appropriate. Surface drainage in grassed areas may be collected by swale drains. Drainpipes under floors **should** be avoided as they often leak, create unpleasant odours, and cause damage to other structures.

Project consultants **must** obtain the legal point(s) of discharge and comply with all stipulated discharge requirements from the relevant local authority.

DESIGNING FOR STORM EVENTS

Drainage systems **must** cater for the design storm event listed in Table 15 and **must** have sufficient capacity to accommodate the design flow, in accordance with the drainage condition requirements.

| DRAINAGE SYSTEM | DESIGN STORM EVENT (ARI) | DRAINAGE CONDITION |
|----------------------|--------------------------|--|
| Underground drainage | 20 | Pipes flowing full but not under pressure. Minimum freeboard to pit cover = 0.2m |
| Kerbs and channels | 20 | Maximum flow width = refer "Pavement design for light traffic - A supplement to Austroads pavement design guide - Part 5A" |
| Swale drains | 20 | Freeboard 20% of the flow depth |
| Overland flow path | 100 | No flooding to school buildings |

Table 15 Appropriate drainage systems for design storm event

A stormwater management plan **should** be created and maintained during the construction period. The use of sand bags or alternative earth drains are **required** to avoid sediment run-off and concentrated water flow into areas that would create property damage or injury.

FLOOR LEVELS

Project consultants **should** consult with local governments and stormwater authorities to ascertain whether the site is affected by land subject to inundation overlays or overland flow, or if it is in an area predicted to be impacted by flooding.

If the site is affected, local governments can mandate floor levels. In such circumstances, project consultants **must** firstly verify that the design sets floor levels at or above the mandated levels, and then verify that the as-constructed floor levels conform to the design and the mandated requirements.

If the relevant local authorities do not have designated criteria for setting floor levels, floor levels **must** be set at least 600mm above the 100-year average recurrence interval (ARI) flood level.

PIPEWORK

All pipework **must** comply with and be installed in accordance with the relevant standards and codes:

| | |
|--------------------|---|
| AS/NZS 1260 | PVC-U pipes and fittings for drain, waste and vent applications |
| AS/NZS 4058 | Pre-cast concrete pipes (pressure and non-pressure) |
| AS 4139 | Fibre-reinforced concrete pipes and fittings |
| WSAA 03 | Water Supply Code of Australia, Water Services Association of Australia |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards

Pipe sizes

Pipe sizes **must not** be less than:

- DN (diameter nominal) 100 for connection direct to downpipes
- DN150 downstream of any grated pit
- DN225 downstream of any side entry pit.

Junction of pipes DN300 or smaller **must** be made **either** with oblique or sweep junction proprietary fittings, **or** at pits.

Junctions of DN100 or DN150 pipes with DN375 or larger pipes may be made with saddle-type fittings.

Junctions of pipes DN225 or larger with DN375 or larger pipes **must** be made at pits.

Pipe materials

Pipe work materials **must** be:

- for DN100 and DN150 — solvent-jointed uPVC sewer-grade minimum (except as noted below)
- for DN225 and greater on straight runs without junction fittings — rubber ring jointed reinforced concrete or rubber ring jointed fibre-reinforced cement
- for DN225 and DN300 straight runs with junction fittings – solvent jointed uPVC sewer-grade minimum or rubber ring jointed fibre-reinforced cement.

In areas of expansive soils, uPVC pipes **must** be rubber ring jointed.

The pipe class **must** be appropriate to the design loading conditions.

STORMWATER PITS

Stormwater pits may be constructed from in-situ reinforced concrete or pre-cast concrete units. Project consultants proposing use of other materials, such as plastic for pit construction, **must** heed any restrictions imposed by local governments.

Pit covers and grates **must** be of a tight-fitting, bolted-down design or have sufficient weight to prevent easy removal. The classification of the cover or grate **must** meet the loading expected for the pit location.

Heel proof type grated pit lids **must** be adopted for stormwater pits set into footpaths and pavements subject to pedestrian traffic. Pit spacing **must** be no more than 50m.

Consideration **should** be given to damage of stormwater pit covers when located in the expected path of the movement of relocatable classrooms (due primarily to risk of damage from excessive weight).

RAINWATER COLLECTION

For information on tanks, please refer to [Hydraulic services](#).

For information on wetlands, please refer to [Landscape architecture](#).

5.7.2 ACCESS ROADS

Access roads provide functional, safe vehicle access onto sites. Access for cars, delivery vehicles, emergency vehicles and rubbish collection vehicles is **required**. Additional access at special and special development schools is **required** for student buses.

Before construction, project consultants **must** consult the planning considerations in the [Vehicle access](#) section.

For general information on how to complete access road construction at Victorian government schools, please refer to the following documents:

- VicRoads Codes of Practice, and Standard sections
- Austroads Pavement Structural Design Guide
- Austroads Guide to Road Design
- Austroads — Guide to the Design of New Pavements for Light Traffic
- Cement Concrete & Aggregates Australia Guidelines.

Project consultants **must** select and satisfy access road construction that meets the following requirements:

- uses asphalt, concrete or segmental pavers
- kerb ramps or other access features provided where required
- edged with the kerb and channel
- designed with appropriate base course (sub-base material placement to meet design-life requirements)
- caters for appropriate traffic loads including heavy vehicles where applicable
- surface texture **must** be appropriate for use and ensure safe passage of pedestrians and vehicles.

Concrete pavement **must** be thick enough to meet design-life requirements, with appropriate reinforcement.

Recycled concrete aggregate and asphalt can be used where feasible, but **must** comply with the requirements of VicRoads Technical Note TN107.

Where the subgrade material is classed as expansive (high-swell potential), the pavement design **must** take into consideration the requirements of VicRoads Code of Practice, RC500.22: Selection and Design of Pavements and Surfacing.

Appropriate subsoil (agricultural) drainage pipes **must** be used to avoid pavement failure due to water infiltration. In situations where there is expansive subgrade, the subsoil drainage pipes **must not** be permitted

to come into contact with the expansive subgrade material, and not less than 100mm of capping material **must** be provided around the floor of the subsoil drainage trench.

Speed traps, signage and bollards **should** be considered in the interests of safety.

5.7.3 PEDESTRIAN FOOTPATHS

Before installing, please refer to [Pedestrian access](#).

All pedestrian footpaths **must** comply with and be installed in accordance with the following Australian standards:

| | |
|----------------|--------------------------------|
| AS 3600 | Concrete structures |
| AS 3727 | Pavements |
| AS 1428 | Design for access and mobility |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy pedestrian footpaths that meet the following requirements:

- provides tactile ground surface indicators and tread nosings where required
- provides a continuous even surface free from trip hazards
- is of appropriate thickness, jointing and reinforcement to meet design-life requirements, without excessive cracking
- allows for surface-water run-off, both on and across the footpath surface
- protects from root growth
- surface texture is appropriate for intended use of the footpath and to ensure safe passage of pedestrians (and vehicles, if required)
- provide adequate lighting.

Footpaths **must** include an isolation joint between the footpath and the buildings to cater for differential movement and to prevent water ingress. The upper edge of the joint **must** be sealed with silicon sealant (colour to match concrete pavement). The footpath surface **must** grade away from the buildings.

Paths with gradients greater than 1:14 **must** be provided with handrails.

Appropriate subsoil (agricultural) drainage pipes **must** be used to avoid pavement failure due to water infiltration. In situations where there is expansive subgrade, the subsoil drainage pipes **must not** be permitted to come into contact with the expansive subgrade material, and not less than 100mm of capping material **must** be provided around the floor of the subsoil drainage trench.

At building entrances, ensure there is adequate drainage to minimise water ingress.

Surfaces such as gravel and granitic sand are not recommended due to associated maintenance problems and the creation of tripping hazards. The use of gravel/sand **must** be avoided in high traffic areas and **must not** be used anywhere near a building entry point, for safety, accessibility and to avoid floor damage. Where used to save costs, it **must not** create tripping hazards.

COVERED FOOTPATHS

Covered footpaths can be used to provide protection to students and staff moving throughout a school. A covered footpath can be a simple structure comprising a frame, roof decking and associated guttering.

Project consultants **must** select and satisfy covered pathways that meet the following requirements:

- be stable, robust and durable — can provide protection against extreme events
- the roof **must** be drained to gutters and downpipes connected to the stormwater drainage system
- include the provision of lighting along the length of each covered way to facilitate safe travel during poor light conditions
- **must** not facilitate any unauthorised access to roofs throughout the school site.

5.8 Mechanical services

Project consultants **must** provide mechanical services to accommodate all school buildings and community joint-use facilities. These services can include heating, ventilation, cooling, natural gas, compressed air and extraction systems.

All services **should** enhance the overall design and deliver user comfort and functional spaces. Passive design solutions are to be fully explored and utilised, with mechanical services to complement the design where required.

Where passive ventilation systems are being proposed, external noise and outdoor air quality **must** be assessed to confirm a natural solution is preferable to a mechanical one. But where high levels of external noise (i.e. from traffic or industry) or air quality is poor, due to pollution or pollen, mechanical systems **should** be selected.

In general, project consultants **should** select and satisfy mechanical services that meet the following requirements:

- take into account the climate of each site, the building form and orientation, thermal performance characteristics, occupancy trends, emissions restrictions, and equipment heat gains
- operate efficiently
- mechanical equipment appropriately protected and only permits access to authorised personnel
- have adequate plant space for mechanical equipment
- have appropriate controls that are easy to use, can be connected to a broader building management system, and that are easy to reset in the event of a power failure
- considers the noise produced from mechanical services and its impact on school users, neighbours and the local community, with appropriate insulation measures taken as required
- is compatible with non-mechanical services (such as natural ventilation)
- makes allowances for the future installation/ expansion of mechanical services. (This additional allowance is not only applicable to systems and plants, but for the supply of electricity and gas services.)

Project consultants **must** take into account the possibility that areas within the facilities may be used outside school hours, and design mechanical services that support zoned use outside school hours. These areas include the gymnasium, learning and teaching areas, specialist rooms, library/ learning resource areas, staff work areas, performing arts spaces and ancillary areas and associated corridors.

Project consultants **should** ensure all mechanical services are consistent with the performance requirements set out in the following related sections:

- [Master planning](#)
- [Utilities and associated infrastructure](#)
- [Acoustic engineering](#)

5.8.1 HEATING

All Victorian government schools are entitled to heating systems. Project consultants **must** install the most suitable heating system for a particular space, considering the purpose and nature of the space to be heated together with broader system choices for the facility in question.

Heating is not provided to gymnasiums.

VSBA intends to phase-out natural gas to school sites in the future, and this **should** be considered when determining the best method of heating within the school.

Heating systems selection **should** take into account required amenity levels and employ a life-cycle process over at least 7-10 year period to determine the most appropriate model/s based on total ownership costs.

Project consultants **must** select and satisfy heating systems that meet the following requirements:

- comply with the sustainability system specifications by zone in NCC J5.9, in particular, and the rest of the Code
- are robust, durable, highly efficient and easy to maintain
- provide consistent thermal comfort
- are appropriate size, to ensure efficient and effective operation
- have a minimum 4.5 star energy rating label or better for smaller units, and 2-3 star rating for large units, where schools are eligible for reverse cycle systems or self-funding them
- are secure, not complex in operation, flexible enough to achieve multi-functional use without loss of energy efficiency and the use of complex control and operating systems
- out-of-hours use can be minimised through local timer control systems
- routing of natural gas, refrigeration and condensate pipes **must** be visually satisfactory and not cause disruptions during consequences of minor failures or routine maintenance
- piped water or gas main service routes **must** avoid rooms or areas where leaks would cause disruption

- surface temperatures of heat emitters and associated pipework **must** be safe and not cause injury when in contact with exposed skin
- provide zoned systems matched to occupancy areas (these **should** also permit use to areas used outside school hours) control panels are robust and located at convenient locations, i.e. at room entrance, and
- where warranted, remote thermostats are positioned at room perimeters to ensure appropriate room temperature control.
- remote wired, adjustable thermostats that are tamper-proof, robust, located away from sunlight, and only accessible to staff.

Control system reset **should** also be a simple procedure after a power failure. If a building management system is used, the system selected **must** be compatible with the system and temperature sensors.

Unflued gas space heaters are not permitted.

Only unflued overhead radiant gas heaters are permitted, provided they are installed in accordance with AS / NZS 5601.

New installation of open flued heaters is prohibited.

The provision of wall/ceiling insulation and shading devices will impact the performance of heating systems. Please refer to [Insulation and barriers](#) and [Master planning](#) for further information.

PASSIVE HEATING OF SPACES

Some spaces within a school site can be heated passively, such as toilet blocks, storerooms and enclosed corridors. In these spaces, project consultants can use **either** passive solar energy **or** draw heated air from adjacent occupied spaces.

5.8.2 COOLING

Air conditioning is provided to teaching, staff and administrative spaces only in schools identified within the Nationwide Housing Energy Rating Scheme (NatHERS) climate zones 20 and 27. To identify the climate zone applicable for each project, please visit www.nathers.gov.au.

Regardless of a school's location, air conditioning is also provided to the following facilities:

- IT server / switch /core communications rooms, meaning, spaces whose sole function is to continuously store, power and operate a computer server
- relocatable buildings
- special development schools
- buildings designated as community fire refuges by Emergency Management Victoria.

In kindergartens facilities, air conditioning units **must** be provided in the following spaces:

- office, planning and staff rooms
- foyer, and
- children's indoor playspaces.

The VSBA may consider air-conditioning provision for some new multi-storey buildings with three levels or more that are subject to adverse environmental factors.

If a facility does not meet the above criteria, a school may still choose to self-fund an active cooling system. The VSBA will not provide funding for installation, operation and maintenance of the system in these circumstances. Schools who self-fund **should** employ a life-cycle analysis process to consider total ownership costs (over at least 7-10 years). Life-cycle analysis **should** include consideration of capital costs (including associated infrastructure such as electric sub-mains), maintenance costs and energy costs (on the basis of likely energy tariff rates and envisaged usage requirements).

All air-conditioning systems **must** comply with and be installed in accordance with relevant Australian standards.

Where an air conditioning system is installed, in accordance with departmental policy, it **must** be fit for purpose and constitute value for money for the design in question.

Where provided, project consultants **must** select and satisfy air-conditioning systems that meets the following requirements:

- size is appropriate for the space and its nature/purpose
- are not reliant on pumped condensate drains
- filters are easily removable for cleaning
- have programmable thermostats to set temperatures and operating times
- thermostat setting **must** be adjustable and the thermostat located in a representative area, not affected by direct sun, draughts, and proximity to or near heating or cooling sources
- local override and adjustment on a zoned basis.

A cost benefit analysis **must** be conducted to determine whether a local control system is sufficient, or centralisation (via a self-contained smart system for HVAC services or an aggregated BMS) is warranted (i.e. in the case of vertical schools). Design notes **must** explain system decisions and rationale for them.

An outdoor unit **must** be located to account for noise, visibility, clear air path, minimisation of air recycling, occupational health and safety, and potential vandalism. For some systems, outdoor units may require sun protection to ensure efficient operation.

Once systems are installed, the installer **must** provide a servicing schedule to the school in accordance with legislative requirements.

The provision of wall/ceiling insulation and shading devices will impact the performance of cooling systems. Please refer to [Insulation and barriers](#) and [Master planning](#) for further information.

SYSTEM SELECTION

The choice of system depends on the nature and purpose of the space to be cooled. The VSBA recommends **either** evaporative cooling systems **or** room and packaged plant systems be used at Victorian government schools.

The VSBA discourages placing air conditioning condenser units on the roof, where avoidable.

Evaporative cooling

Evaporative coolers are recommended in locations where there is reticulated town water and suitable environmental conditions. If these conditions do not exist, room and packaged plant systems **can** be used.

Evaporative cooling systems **must** comply with and be installed in accordance with the relevant Australian standard.

In addition to the general requirements for cooling systems above, project consultants **must** select and satisfy evaporative cooling systems that meet the following requirements:

- cooler capacity **should** be based on a minimum of 35 air changes of the room volume served, with design air change rates tailored for local environmental conditions
- have variable or multiple fan-speed controllers, an ON/OFF pump controller and an automatic dump valve operation
- unit casing **should** be **either** stainless steel, marine-grade aluminium, **or** stabilised UV-resistant polymer with a suitably matched fibreglass or polymer water sump
- all components non-corrosive and suitable for operation in a moist environment
- a hose spigot point is placed adjacent to the unit for cleaning
- internal duct insulation is moisture-resistant or has a moisture-resistant membrane
- flexible duct external insulation is of glass or mineral fibre, and is a minimum of 25mm thick

- the length of ductwork **should** be minimised
- automatic dampers to close units when not in operation are provided
- time-delay and time-control switches are provided.

The thermostat setting **should not** be lower than 24°C.

The design of the building **must** provide sufficient openings to discharge the large volumes of introduced air.

Smaller downwards discharge coolers may be supported off the rigid supply air duct. A suitable corrosion-resistant support frame off building members for large units **should** be supplied.

Noise generation **should** be considered when selecting an axial or centrifugal fan unit. Where ductwork is required, the use of attenuated ductwork **should** be considered. For further information, please refer to [Acoustic engineering](#).

Evaporative coolers **should** be serviced a minimum four times a year for health considerations.

Room and packaged plant systems

Packaged air-conditioning units include reverse cycle split-systems and packaged unitary systems. The units come complete with replaceable filters, insulation sufficient to prevent condensation in all operating conditions, and operating and safety controls. For non-ducted systems, an inverter-type model **should** be selected.

In addition to the general requirements identified above for cooling systems, project consultants **must** select and satisfy room and packaged plant systems that meet the following requirements:

- be from a reputable brand manufacturer with a well-established service and parts network in Victoria
- have a high energy efficiency ratio for the chosen unit size/s
- capable of operating continuously at the ambient operating temperature from 10°C to 46°C in cooling and -15°C to +15.5°C in heating mode, without excessive head pressure, unstable operation or icing
- include a fully automatic electronic control system that allows year-round operation to meet specified conditions without manual adjustment
- include time-delay and time-control switches that can be linked to a central clock

- have an automatic de-icing cycle
- anti-vibration mounts are provided under all outdoor units
- wiring and refrigerant pipework is protected from weather by Colorbond steel metal top hat sections.
- temperature controls **should** be set such that that no cooling occurs below 26°C and no heating above 18°C
- condensers should be rated to 46 °C dry bulb.

In addition, please refer to [Refrigeration](#).

SERVER ROOM COOLING

Mechanical cooling is required for all spaces whose sole function is to store and to continuously power and operate a computer server/s, to provide a climate-controlled environment for ICT equipment.

In addition to the general requirements identified above for cooling systems, project consultants **must** select and satisfy server/switch/core communications room mechanical cooling that meets the following requirements:

- is a standalone system and
- a wall-mounted reverse cycle unit
- is set at the nominal operating temperature range for core communications rooms, i.e. between 18 and 26 degrees Celsius
- have automatic return to operation if power is lost and restored
- has capacity to function continuously, regardless of actual external temperature
- has a suitable insulated uPVC drain for condensate provided that allows drainage to the nearest suitable stormwater or sewerage connection to a tundish and allows for easy and clear inspection of damage
- is an inverter drive type.

In addition, please refer to [Information and communication technology](#) for further information.

5.8.3 CEILING FANS

When provided as part of the design solution, project consultants **must** select and satisfy ceiling fans that meet the following requirements:

- are highly-efficient models that ensure adequate air movement and circulation
- have one robust control station per fan with a minimum of three speed settings
- are mounted clear of lights to avoid stroboscope effect
- are at least 2.4m from the finished floor level.

Fans in high ceiling spaces **must** have an extended mounting pole, to facilitate air movement around the space.

Ceiling fans are discouraged in food preparation areas.

5.8.4 ELECTRICAL SUPPLY

Electrical supply for all mechanical services is derived from the building's electrical distribution board. Project consultants **must** ensure there is adequate electrical capacity to support all proposed and future mechanical services.

Air conditioning and fan systems are to be supplied via dedicated circuit breakers located in the electrical distribution board. In the event of a power failure, after reinstatement of power, all equipment **should** automatically return to its operational state prior to failure.

Where possible, a mechanical services switchboard **should** be considered to provide power for all mechanical services equipment.

In addition, please refer to [Electricity](#) for further information.

5.8.5 GAS SUPPLY

Natural gas or liquid petroleum gas (LPG) can be used for heating, hot water and teaching needs. The availability of mains gas supply is varied. Project consultants **should** consult both the VSBA and the applicable gas supply authority to determine both availability and suitability.

VSBA's intention is to phase out reliance on gas in schools and this **should** be considered when determining the preferred method of heating.

Where natural gas is both available and suitable, connections **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **must** select and satisfy natural gas infrastructure that meet the following requirements:

- an independent gas distribution system to areas with outlet points in accordance with the requirements of the mechanical heating plant, domestic hot water plant, heating and cooking appliances, catering equipment, teaching labs and workshops
- the gas distribution pipe work **must** be arranged so that there is one single entry point for the building
- consumer piping **must** be located (in compliance with the ventilation requirements) within the building to the various areas
- all joints for pipework are to be brazed where practicable
- pipework is to be concealed from view where practicable, with additional protection provided where concealment is not possible
- provide visible and accessible ¼ turn isolation valves at each floor-level take-off
- each teaching space supplied with gas (for purposes other than heating) **must** be fitted with its own e-stop valve with integral emergency gas isolation adjacent to the teaching position/demonstrator's bench, with a second emergency gas isolation located exit points. The e-stop valve **must** be in a readily accessible location with a sign adjacent to the e-stop valve indicating its purpose
- emergency shut-off system **must** include a manual reset key switch system
- isolation valves **must** be student tamperproof
- test mode operation must operate via a key system and **must** not require the operator to maintain pressure on a test button, with the maximum test time of each system being 35 seconds
- include provision for natural gas connections for future relocatable buildings in accordance with the master development plan for each facility
- gas booster devices **must** not be used
- all underground piping **must** be adequately protected from damage from vehicular traffic.

Allow 10% spare capacity in pipework sizing. Where LPG is to be used and natural gas is likely to be available within five years, allow for natural gas in pipework design.

Where mains gas is provided to the site, consider a natural gas reticulation system to relocatable buildings described in the initial design, as well as branch take-offs for future additions. If gas is to be provided to relocatable buildings, consider positioning the reticulation system common services trenches with storm lines.

Gas booster devices are to be avoided where possible. Where required, locate carefully and ensure that adequate acoustic measures are provided to meet acceptable ambient and internal noise criteria.

SELECTION OF GAS APPLIANCES

Some types of gas appliances require specialist knowledge for selection, installation, operation and maintenance. Where required, project consultants **should** consult with qualified technicians (including installers, manufacturers, component suppliers or Energy Safe Victoria) who can help select the most appropriate gas appliance for the function required.

Overall, project consultants **should** select and satisfy gas appliances that meet the following requirements:

- gas appliances **must** have electronic ignition and include a flame supervision device
- **must not be** sealed combustion units
- **must not** have atmospheric burners or permanent pilot lights
- **must** be installed in compliance with AS/NZS 5601.1
- where relevant, central plant **should** have modulating heat output in response to changing load requirements
- liquid petroleum gas (LPG) **should not** be used for hot water or heating systems
- appliance thermostats **should** be locked off from user alteration
- units **should** operate by simple on/off control or by time duration and
- local gas-heating appliances (ducted/ space) **should** be high-efficiency condensing units.

Allow 10% spare capacity in pipe work sizing.

- LPG can be used for turrets or stove burners in science areas, only if
- they are piped to under bench from an external cylinder, located on an outside wall in a low or no traffic area
- tamperproof in a school setting
- comply with:
 - AS/NZS 1596 - Storage and handling of LPG, where applicable
 - AS/NZS 5601 – Gas installations
 - AS 1668.2 - The use of ventilation and air conditioning in buildings - Ventilation design for indoor air contaminant control, and the safety requirements set out in 5.8.5.

In addition, please refer to [Natural gas](#) and [Gas supply](#) sections for further information.

5.8.6 VENTILATION

Ventilation **should** be provided to all chemical and flammable stores, in accordance with the *Dangerous Goods Act 1985* (Vic). Appropriate ventilation is also required for heating and cooling systems. Please consult the requirements of [Energy Safe Victoria](#) and the [Australian Institute for Refrigeration, Air Conditioning and Heating \(AIRAH\)](#).

All ventilation solutions **must** comply with and be installed in accordance with the following Australian standards:

| | |
|-----------------------|--|
| AS 1668.1 | The use of ventilation and air conditioning in buildings — Fire and smoke control in buildings |
| AS 1668.2 | The use of ventilation and air conditioning in buildings — Mechanical ventilation in buildings |
| AS 1668.4 | The use of ventilation and air conditioning in buildings — Natural ventilation in buildings |
| AS/NZS 2243.1 | Safety in laboratories — Planning and operational aspects |
| AS/NZS 2243.8 | Safety in laboratories — Fume cupboards |
| AS/NZS 2243.10 | Safety in laboratories — Storage of chemicals |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

All ventilation solutions **must** comply with and be installed in accordance with the relevant Australian standards.

Project consultants **must** select and satisfy ventilation solutions that meet the following requirements:

- there is no need for treatment of supplied air
- the location of fresh air intakes **must** avoid proximity to obnoxious vents and exhausts, loading areas, vehicle exhausts, heating exhausts, and fume discharges
- air intakes **must** be arranged to minimise the risk of air recirculation under prevailing wind conditions
- permanent vents **must** be provided independent of the window systems in all areas
- extract ventilation **must** be via wall or ceiling grills.

Systems **must** be localised with minimum ducting and local exhaust louvres. The extract ducting from one teaching space or habitable room **must not** route through adjacent teaching spaces and habitable rooms. Any ducting **must** be formed and installed neatly and, where exposed, **must** be aesthetically acceptable.

NATURAL VENTILATION

Natural ventilation solutions **must** be provided throughout all buildings where external air quality is of a reasonable standard.

Project consultants **must** design a natural and/ or mechanical ventilation approach that results in high indoor air quality outcomes, including consistent thermal comfort for occupants, and considers changing weather patterns. This must be compatible with overall heating or cooling designs.

Project consultants **must** select and satisfy natural ventilation solutions that meet the following requirements:

- easy operation at low level for high window openings
- out-of-hours operated ventilation openings **must** be secure against vermin and unauthorised access
- ventilation air speeds **must not** cause disturbance to normal activities in functional areas
- consideration **must** be given to seasonal use of natural ventilation to ensure that heating and cooling loads are not increased.

The design of natural ventilation **should** consider minimising the entry of dust and other pollutants into buildings. Consideration **must** be given to the provision of limited areas of higher volume to act as hot-air drains.

Fixed louvres are not considered acceptable practice.

TOILET AND CHANGING ROOM EXHAUST SYSTEMS

All toilet and changing areas **must** have both natural ventilation and mechanical ventilation. Ventilation is required over each shower cubicle and each group of two sanitary fixtures.

Project consultants **must** select ventilation exhaust systems for toilets and changing rooms that meet the following requirements:

- control systems are to be tamper-proof
- fans are linked with lighting operation, presence detection, or controlled via a clock
- air should be extracted to an exterior space.

Where practicable, make up air to the changing rooms and toilets in physical

education halls **must** be drawn from the main hall area, via high-level wall transfer grilles and ducting if necessary. Air should be extracted to an exterior space.

Appropriate acoustic treatment **should** be provided to ensure that noise does not transfer to nearby classrooms, offices and libraries.

KITCHEN EXHAUST SYSTEMS

Exhaust hoods are **required** in all kitchen areas where cooking units (such as stoves and fryers) are used. These areas include staff rooms, canteens, and food technology classrooms.

Project consultants **must** select and satisfy kitchen exhaust systems that meet the following requirements:

- include integral fans
- hood **must** be of cross-sectional size at least equal to the equipment it is serving below
- exhaust flowrate to be not less than 200L/s
- appropriate grease filters with easy access for cleaning and maintenance.

FUME CUPBOARDS

Fume cupboards **should** be installed where there is a risk associated with the use of appliances, flammable gases, chemicals and dangerous processes.

All fume cupboards **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **must** select and satisfy fume cupboards that meet the following requirements:

- provide an adequate supply of replacement air to compensate for the volume exhausted
- provide suitable resistance against chemicals handled
- sliding sashes with toughened glass or clear acrylic
- adequate corrosion-resistant counter weights
- suitable lighting luminaire with separate light and fan controls
- emergency isolation switches for electricity/ gas supply, labelled appropriately
- automatic isolation switches in the event of inadequate airflow
- access to water supply and appropriately sized sink
- appropriate chemical waste disposal
- fume discharge **must** be 3m above the roof.

Fume cupboard extract fans are not to be located in teaching spaces. Noises from fans **must not** exceed the requirements identified in [Acoustic engineering](#).

EXHAUST FANS

Project consultants **should** select and satisfy exhaust fans that meet the following requirements:

- fans are located with regard to adequate security, maintenance access and acoustic performance
- all components are corrosion and weather-resistant
- fans are statically and dynamically balanced
- motors **should** be rated to a minimum of IP54
- fans can be effectively sealed off when not in use to eliminate unwanted infiltration and exfiltration where the fan serves a conditioned space.

Project consultants **should** specify direct drives and avoid belt drives where possible. Project consultants **should** also provide phase failure, and over and under-voltage protection relays, with auto reset to all fans requiring three-phase power supplies.

KILN EXHAUST SYSTEMS

Project consultants **must** select and satisfy kiln exhaust systems that meet the following requirements:

- ensure an adequate make-up of exhaust air quantity
- hoods sized to cover kiln openings and discharge points
- are made of at least 1.6mm-thick galvanised mild steel sheet
- are provided with a local manual control station adjacent to the hood, complete with a LED-run indicator.

OTHER VENTILATION

Project consultants **should** provide appropriate ventilation for the following spaces:

- above locations where medium and high-capacity photocopiers will be placed
- gymnasiums and physical education halls.

5.8.7 DUST EXTRACTION SYSTEMS

Dust extraction systems may be specifically required to remove dust and fibres within particular learning spaces. Systems **must** be self-contained mechanical-clean type, located with regard to acoustic performance, equipment security and serviceability.

Project consultants **must** select and satisfy dust extraction systems that meet the following requirements:

- statically and dynamically balanced centrifugal mild steel fan, direct driven by a 415V, three-phase totally enclosed fan cooled (TEFC) motor rated to a minimum of IP54 (maximum fan speed 1440 rpm)
- woven fabric media with abrasive-resistant properties, selected for optimal performance with regard to operating cost, collection efficiency and service life
- electrical-driven shaker assembly to clean filter media
- bin-type dust collector with robust sealing assembly
- explosion relief vent with minimal ductwork and changes in direction to a safe discharge area
- ductwork **should** be of circular-type galvanised steel, suitable for 'high-pressure' application, sized appropriately for transport velocities not less than 18m/sec, with radiused bends and angled take-offs to main ductwork
- steel flange type bolt clamps on duct joints enabling easy removal for clean-out, with additional access panels and removable caps at end of duct runs, where required.

Acoustic attenuation of the fan assembly and discharge ductwork may be required. Please consult [Acoustic engineering](#).

Where located externally, the dust extraction plant **must** be contained within a security cage.

5.8.8 DUCTWORK

Project consultants **must** provide ductwork system design based on design parameters relating to pressure drop and velocity ranges, as recommended in the [American Society of Heating, Refrigerating and Air-Conditioning Engineers Guidelines](#) and as required to help achieve efficient and effective energy performance of all heating and cooling systems used.

All ductwork **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **should** select and satisfy rigid ductwork that meets the following requirements:

- has no burrs and sharp edges, and there are no protrusions into the airways
- appropriate supports are provided adjacent all changes in direction to fix the ductwork in position and prevent noticeable sag
- all exposed ductwork joints are sealed through the use of watertight protective shields with all reinforcement attachments sealed so that moisture cannot be retained in any gap or crevice
- profile or cover the top side of ductwork exposed to weather to shed water.

5.8.9 AIR GRILLES

Air grilles **should** be mounted with secure and concealed fixings, with flanges lining corners neatly mitred and buffered, and with no joint gaps.

All grilles **must** comply with and be installed in accordance with the relevant Australian standard.

Project consultants **must** select and satisfy air grilles that meet the following requirements:

- are commercially proven, free from distortion, bends, surface defects, irregular joints, exposed fastenings and operation vibration
- dampers and visible ductwork behind the grilles is painted black.

Outlets and grilles are **required** to be consistent with the performance requirements identified in [Acoustic engineering](#) and [Ventilation](#).

5.8.10 PIPEWORK RETICULATION SYSTEMS

Project consultants **must** provide a pipework system based on design parameters relating to pressure-drop and velocity ranges listed in the AIRAH Technical Handbook. The systems **must** be fit-for-purpose and **must** include isolation and balancing valves at each branch take-off, and at each floor, where a multi-storey design is proposed.

5.8.11 NOISE AND VIBRATION

All mechanical services **must** be consistent with the performance requirements identified in [Acoustic engineering](#).

5.8.12 REFRIGERATION

All refrigeration systems **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **must** select and satisfy refrigeration systems that meet the following requirements:

- use refrigerants that are zero ozone depleting and low hydrocarbon global warming potential
- pipework **should** be refrigerant-quality deoxidised phosphorus copper tube with brazed connections, with appropriate insulation, galvanised mild steel brackets and tagged and labelled appropriately
- refrigerant circuit includes an accumulator, liquid, equalising and gas-shut off valves, and solenoid valves
- have appropriate safety devices.

Any electrical supply upgrade **should** allow for all proposed and foreseeable future air-conditioning installations.

All cooling/heating systems **should** consider the use of electricity sub-metering (by blocks) for cooling/heating in order to carry out energy cost audits, as well as the costing of out-of-hours use.

All electrical services works **should** be carried out in accordance with all relevant Australian guidelines and standards, including but not limited to AS/NZS 3000, those of the relevant power authority, and those of the Office of Electrical Safety.

5.8.13 HYDROTHERAPY POOL MECHANICAL SERVICES

Hydrotherapy pools can be found in schools for the physically disabled, special development schools and some dual-mode special schools, and where additional funding is available.

Pools **must** include all necessary ventilation systems and water filtration/sanitisation systems needed to support pool operation.

All hydrotherapy pools **must** comply with and be installed in accordance with the following Australian standard.

Project consultants **must** select and satisfy hydrotherapy pools that meet the following requirements:

- water filtration system provided comprising membrane filters and/or sand filter beds, and backwash, with the designed capacity suited to manage the filtration load of users who wear high amounts of skin lotions and skin creams
- water sterilisation system provided comprising UV sterilisation and chlorine dosage, with the system maintaining water quality and safety for human exposure, and having the ability to provide quick recovery to safe use levels in the event of a major contamination incident

- water heating and temperature control with high degrees of accuracy and capacity to maintain temperatures to pre-set levels
- systems to eliminate the risk of legionella in warm water and humid air
- indoor ventilation and air-conditioning systems with the capacity to manage high levels of humidity, to maintain air temperatures to pre-set levels, and to manage air for aerosol contaminant and bacterial and fungal control.

Hydrotherapy pools require appropriate fencing for users. Please refer to [Fencing](#) for further information.

5.9 Electrical services

Electrical services comprise electrical supply, main switchboard(s), power distribution services, lighting services, infrastructure services, earthing, and protective services. The design of the electrical services **must** take into account the built form, the characteristics of the building, the occupancy trends, and orientation of spaces.

Project consultants **should** also refer to the performance requirements in the following related sections:

- [Master planning](#)
- [Utilities and associated infrastructure](#)

5.9.1 INCOMING ELECTRICAL SUPPLY

The electrical infrastructure, including the mains incoming from the substation to the main switchboard, **must** be sized to the load maximum demand for the site. The incoming supply for new sites **should** be trenched underground and outside any area identified for future expansion on the site. For existing schools, the condition of the incoming supply **should** be discussed with the electricity distributor.

Project consultants **must** provide incoming supply and electrical substations in accordance with the following requirements:

- a full design load based on estimated load for peak student enrolments and non-mandated community facilities
- located in relation to new and future loads, to minimise energy transmission losses
- located as a stand-alone proprietary unit near the site boundary and not as an integral part of the facility
- electrical supply parameters **must** be in accordance with the relevant supply authority regulations and requirements (generally 400/230V +10%/-6%) and
- maximum total harmonics distortion (THDi) acceptable for the installation **must** not exceed 5%.

5.9.2 MAIN SWITCHBOARDS

The main electrical switchboard **must** be in a dedicated room or cupboard. The space **must** be located so that it provides ease of access from adjoining plant spaces and **must** be located to provide economical distribution of services.

All main switchboards **must** comply with relevant Australian standards.

Project consultants **must** design and satisfy the following main switchboard requirements:

- be a minimum of Form 3B type
- be sized to the full rated capacity of transformers
- load is arranged to suit the different load types within the facilities
- type test certificate **must** be provided for each form rating
- full discrimination curves **must** be provided from the supply authority protective device to the final sub-circuit protection
- full-sized neutral and earth bars **must** be provided in all compartments
- neutral bars **must** be located within the same compartment as the active bars
- designed to accommodate an additional switchboard for future photovoltaic arrays
- energy meters **must** be digital multi-functional meters (discrete meters are **not** to be used) and
- connected to either an aggregated building management system or a smart, separate (per service) monitoring system that stores lighting and power consumption data for review and analysis [Meter data is also used to report on the environmental performance of Victorian government schools]
- each low-voltage main switchboard to be fitted with an energy meter
- to be separated from an adjoining switchboard
- all busbars passing through insulation barriers to be provided with a secondary layer of insulation on the busbars
- located in the room to allow 1m switchboard extensions at each end
- to be modular design
- 30% spare space **must** be provided for circuit breaker/protective fuse installation within enclosure and busbar arrangements, in anticipation of future circuit breaker requirements
- laminated site distribution schematics and main switchboard schematics to be installed on the switch-room wall
- laminated site distribution schematics and main switchboard schematics to be installed on the switch-room wall
- all escutcheon panels to be hinged
- all localised energy metering to be provided and monitored by the energy management/monitoring system
- all main switch positions to be provided and capable of remote monitoring by VSBA
- all equipment to be provided with durable labels, with clearly marked details of the equipment's function and designation

- switchgear to be capable of being padlocked in the 'off' position
- all panels on the switchboard to be accessed via lift-off hinges or knurled or crowned nuts, to enable ready removal by inspection
- all critical air circuit breaker (ACB) main switches to be capable of being removed/replaced while the load is being supported by an alternative source.

Each switchgear assembly to have a minimum 25% spare capacity, over and above that required for peak student enrolment numbers. Electronic surge protection **must** be provided on incoming mains.

Equipment and conductors to have a short-circuit rating of not less than the maximum symmetrical RMS short-circuit current values on incoming terminals at the operational voltage. The short-circuit rating **should** withstand fault currents for a minimum of one second.

Main switch-rooms to be two-hour fire-rated and contain smoke detectors (no sprinklers). An emergency luminaire can be provided above switchboards to facilitate safe viewing in the event of partial power failure.

DISTRIBUTION SWITCHBOARDS

Distribution switchboards **must** be placed in appropriately sized, centrally located cupboards within each building or compartment served, are not to protrude into circulation spaces, and are to be complete with lockable door cover. Distribution boards **must** be located within the building being served with separate distribution boards provided for each building. They **must** be accessible from common areas. Distribution boards **must** not require access from within offices or teaching spaces as they need to be close to the area they are servicing and may need to be accessed out of school hours during community activity.

Provision **must** be made on local Distribution Boards (DBs) for isolation of external power outlets.

All distribution switchboards **must** comply with the relevant Australian standards. Project consultants **must** design and satisfy distribution switchboards that meet the following requirements:

- all floor distributor switchboards to be Form 2 when the main isolator is rated at, or greater than, 200 Amps
- all floor distribution switchboards to be Form 1 when the main isolator is rated less than 200 Amps

- boards to be split into power and lighting sections
- have a digital electronic energy meter
- sized to support forecast building power demand, unless the distribution board is designed to also support additional demand from relocatable units necessary to satisfy a facility's peak enrolment. In either case, distribution boards **must** be provided with 35% spare capacity over forecast demand (10% spare fitted, 25% spare)
- all outgoing circuits to have circuit breakers (minor control circuits can be fuses)
- the fault current to be calculated, with appropriately rated circuit breakers selected
- no other services are to be located in or cross over the electrical distribution board cupboards
- have a lockable door covering all control and protection devices with hinged escutcheon cover
- separate specialised load equipment to be served by dedicated distribution boards (for facilities such as canteens, food technology areas and materials technology areas)
- have separate enclosed chassis for alternative load types
- a minimum circuit breaker busbar rating of 250 Amps
- a minimum fault interrupting capacity of 6 kA
- labelled with the incoming sub-main number, rating of the circuit protective devices and the size of the incoming sub-mains
- an accurate circuit schedule **must** be housed within a proprietary holder and securely fixed to the inside of the door. Related lighting and power plans to be housed within the distribution board
- provide a label on the switchboard door indicating MSB numbers, main circuit breaker size, cable size, approximate length, and cable description of sub-main
- labelling **must** be traffolyte, securely fixed to the doors (sticky labels not acceptable)
- provide localised surge protection
- switchgear to be of common manufacture supply for ease of maintenance and adequacy for circuit discrimination
- loads to be balanced as evenly as possible
- dog tags to be provided on critical circuits that **must** not be accidentally turned off.

Dedicated computer rooms and data communications rooms are to have a distribution panel dedicated to that room only. No more than four stations (12 sockets) are to be powered per Residual Current Device (RCD) with appropriate miniature circuit breaker protection, or whichever number of stations is recommended by respective manufacturers, so as to eliminate the risk of nuisance tripping. All data communications rooms are to have a dedicated distribution panel.

The number of stations provided **must** eliminate the risk of tripping and **should** be in accordance with manufacturers' recommendations.

In all areas, power for fridges and freezers is to be supplied on a separate circuit.

5.9.3 CABLE RETICULATION

The distribution system between the main switchboard and distribution switchboards **must** be concealed as much as practicable, and be accessible for its entire length without disturbing the building fabric. As teaching spaces may alter from time-to-time, consideration **should** be given to designing a flexible support system for cabling in a variety of configurations.

Cable distribution **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **must** select and satisfy cable reticulation that meets the following requirements:

- cables are to be double-insulated, mineral-insulated metal sheathed, or fire-resistant polymer insulated and sheathed
- the maximum volt drop acceptable from the point of supply to the final outlet **must** be a maximum of 5%
- galvanised cable trays, cable ducts or conduits are to be used to carry electrical distribution cables or final sub-circuit cabling and include 30% additional capacity **must** be included for future tray capacity
- sub-main cabling are to be fully supported on cable ladder and/or Unistrut systems
- all cables are to be run internally with their origin and destination within the same building
- sub-main cables from the main switchboards to be sized in accordance with the maximum demand calculation
- sub-main cables **must** incorporate neutral-sized cables, the same size as the active conductors or the maximum current generated by the harmonics, whichever is the greater

- take-off boxes **must** indicate the circuit protection device capacity and rating
- circuit breakers are to contain adjustable current capacity
- positioned to avoid cross-talk to other cabling systems
- high capacity power cables **must** be located and configured to avoid emitting high levels of electromagnetic interference
- sub-main distribution systems are to use copper-only conductors
- an electrical earthing bar is to be provided adjacent to each main switchboard
- minimum sized lighting sub circuit 16A with a minimum cable size of 1.5mm²
- minimum sized power sub circuit 20A with a minimum cable size of 2.5mm²
- all outgoing sub-mains are to be tagged at the original and at the local point with the sub-main number, cable size, approximate length and the originating MSB
- white thermoplastic sheathed (TPS) cables are to be provided for lighting circuits
- black TPS cables are to be provided for power circuits
- no cabling is to be laid on the ceiling support system, even for inaccessible ceilings
- sub-main cables to mechanical services equipment **must** be designed to the full connected load of the mechanical services equipment, with the neutral cable sized as the active conductor.

Where high levels of electromagnetic interference exist, project consultants **must** provide protection from the offending source. All areas **must** be less than 5mG maximum, or consistent with normal school environment levels, whichever is the lower.

Single-insulated building wire is **not** acceptable. Aluminium conductors **must not** be used.

5.9.4 CHECK AND ENERGY METERING

Energy meters are to be installed to all power and lighting sections of all distribution boards. Electronic multifunctional meters **must** be provided and **must** have volt, amp, MD pF, V and I harmonic distortion and kWh data functions.

The design team **must** conduct a cost benefit analysis to decide whether power and lighting meters **should** connect to an aggregated BMS or a separate, smart monitoring and or monitoring and control system for air conditioning services alone. The solution **should** be fit for purpose and constitute value for money. At minimum, energy consumption data **must** be captured for air conditioning, heating, lighting and electricity for storage and analysis. Design notes **must** include decisions and rationale for system decisions.

Metering is also used to report on the environmental performance of Victorian government schools.

All meters **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **must** select and satisfy meters that meet the following requirements:

- power factor meters with leading and lagging indicators
- accuracy of $\pm 1\%$ over 20 to 105% working range
- current transformer metering **must** be provided for all loads in excess of 100 Amps
- all current transformer units and protection devices **must** be readily removable for maintenance
- statutory supply authority metering at the low-voltage entry to a site **must** be provided, in a location in accordance with the relevant supply authority.

Sub-metering of facilities commonly used by the community will allow schools to pass on the utility costs of this use to users.

Sub-meters **should** have their face visible from the metering cabinet.

5.9.5 UNDERGROUND PITS AND DUCT SYSTEM

Project consultants **must** provide underground pits and conduits to allow for cable pathways between buildings. A pit and conduit system **must** also be provided to the planned location of relocatable units.

Project consultants **must** select and satisfy underground pits and conduits that meet the following requirements:

- conduits **must** be a minimum of 100mm diameter and of the orange rigid heavy duty PVC type suitable for installation to carry incoming power cabling as required by the supply authority
- the conduit provision **must** be sufficient for peak enrolment demand, plus 25% spare capacity to accommodate future growth
- all conduit joins **must** be glued into place to prevent water entering the conduits
- all conduits installed in a building that has a concrete floor slab **must** be installed under the slab, directly to the main switchboard or distribution board they are supplying
- the conduit system **must** link to all buildings
- the conduit **must** be marked 'power cabling' along the length of the conduit
- tracing wiring is to be embedded within the in-ground conduit to facilitate future detection after installation
- all conduit sections **must** have a minimum of two draw ropes, installed within the conduit
- a pit **must** be provided for each change in direction greater than 45°
- a minimum of one pit every 50m **must** be provided, or as required to easily install sub-main cabling at a later stage
- the pit lids **must not** allow debris to drop into the pit
- all underground pits **must** be of the heavy-duty and trafficable type (as a minimum)
- all underground conduits **should** be clearly identified above-ground with acceptable cable markers.

Only pre-manufactured bends **must** be used: 90° bends **must not** be used.

5.9.6 GENERAL POWER OUTLETS

Project consultants **must** provide general power outlets (GPOs) to support intended functions and user requirements. Provision of the appropriate number and distribution of GPOs **must** meet the functionality and flexibility requirements of each space.

Project consultants **must** select and satisfy GPOs that meet the following requirements:

- protected by an ELCB (RCD) rated at no more than 30mA for all socket outlets
- mounted 300mm above the finished floor level, or 150mm above benchtops
- for ceiling-mounted equipment such as projectors, outlets **must** be on the ceiling or high on the adjacent wall
- minimise interference to computers caused by electrical faults or failures
- positioned safely away from potential dangers
- be corrosion resistant and weather-proof in wet areas (such as kitchens, laundries and external applications)
- be weather-proof where installed in plant-rooms and external areas.

In science laboratories, applied science rooms, and technology and design studios, power outlets can be mounted on **either** wall-mounted multiple compartment cable-ducting, ceiling suspended outlets, **or** on benchtop-mounted pedestals.

For ceiling-mounted equipment such as overhead hoists and projectors, outlets **must** be mounted on the ceiling or high on the adjacent wall.

In kindergartens, general power outlets must be located at 1500mm AFL in spaces that are accessible to children.

Additional power outlets are required in special development schools for electric changing tables.

In physical education halls, outlets **must** be flush-mounted and protected from impact damage.

In changing rooms, water heaters and water-boiling units **must** be suitably rated and switched with neon indicators. Seven-day timers can be provided in these areas to eliminate standing losses outside core hours. In special schools and special development schools, outlets will be required for electric changing tables.

All fume cupboards **must** incorporate a double GPO on the external top or side of the unit.

5.9.7 ELECTRICAL SAFETY

Project consultants **must** ensure that designs incorporate appropriate electrical safety measures that ensure the safety of students, staff and visitors.

POWER EMERGENCY STOP

Project consultants **must** provide emergency stop (off) push-buttons adjacent to each exit door for specialist rooms such as materials technology, science laboratories and food technology areas.

Project consultants **must** select and satisfy power emergency stop capabilities that meet the following performance requirements:

- push buttons that trip off all power circuits within the respective room/laboratory and
- are of the 'latched on' type and require unlatching on completion.

For science laboratories and food technology areas, the emergency stop button **must not** isolate power circuits that serve separate adjacent spaces where power interruption is not needed (for example, spaces containing refrigerators, fume cupboards or freezers).

PERMANENTLY CONNECTED EQUIPMENT

Project consultants **must** provide isolating switches for each item of permanently connected equipment.

Project consultants **must** select and satisfy isolating switches that meet the following requirements:

- rated at not less than the circuit protective device
- mounted adjacent to each item of equipment
- flush mounted for internal installations and surface-mounted weatherproof for external installations.

EARTHING SYSTEMS

Earthing systems **must** be provided to all sub-mains, sub-circuits, metallic wall-framing systems, electrical cabling, electrical cable support systems and communications systems.

5.9.8 LIGHTING SYSTEMS

All spaces, including plant rooms, **must** be supplied with artificial lighting (project consultants **can** seek an exemption). The lighting design **must** suit the environment and conditions where luminaires will be installed, and the luminaire **must** maintain its performance throughout its life. The accessibility and ease-of-replacement of luminaires **should** be considered, and processes formally identified if non-standard access is expected (such as, for high access). The expected service life of a typical luminaire is 15 years.

For renovations, consideration **should** be given to relocating existing luminaires into less-used areas (in conjunction with motion sensors) and the installation of new technology luminaires that are more energy-efficient and require less maintenance.

The lighting design, lamp selection and system **must** be based on best-available energy performance to suit the application, with efficient lumen output and lumen maintenance considered, in accordance with applicable lighting standards.

All lighting **must** comply with the following standards:

| | |
|------------------------|--|
| AS/NZS 1680.0 | Interior lighting — safe movement |
| AS/NZS 1680.1 | Interior and workplace lighting — General principles and recommendations |
| AS/NZS 1680.2.1 | Interior and workplace lighting — Specific applications — Circulation spaces and other general areas |
| AS/NZS 1680.2.2 | Interior and workplace lighting — Specific applications — Office and screen-based tasks |
| AS/NZS 1680.2.3 | Interior and workplace lighting — Specific applications — Educational and training facilities |
| AS/NZS 1680.2.4 | Interior and workplace lighting — Industrial tasks and processes |
| AS/NZS 1680.3 | Interior and workplace lighting — Measurement, calculation and presentation of photometric data |
| AS/NZS 1680.4 | Interior and workplace lighting — Maintenance of electric lighting systems |
| AS/NZS 1680.5 | Interior and workplace lighting — Outdoor workplace lighting |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select lighting that meet the following requirements:

- lighting products are type-tested
- luminaires **must** be sourced from proven production runs with demonstrated performance levels, be of good quality and be easy to maintain
- the specific lighting **must** suit the relevant intended task and **must** control luminaire glare
- custom-made luminaires **must** be avoided, with the exception of suspended extrusion lighting
- luminaire locations requiring access machinery **must** be avoided
- standardisation and minimisation of lamp-types is preferred
- external luminaires **must** be resistant to weather, insects and vandalism, and appropriately IP54-rated
- internal luminaires in high-moisture environments **must** be water-resistant
- devices that are zoned to turn on and off and reduce artificial illumination when daylight is present or the space is unoccupied
- motion/occupancy sensors **must** be used to detect space usage and control luminaires
- circuit loading to be designed in accordance with the sizing of the control system circuit protective devices and spare capacities
- electronic control gear incorporating high-frequency ballasts **must** be used in preference to iron core devices
- linear luminaires in general learning and teaching areas, circulation areas and science rooms **must** be quality products and of the prismatic diffuser type, with ultra-low brightness (ULB) diffusers installed in all computer-based areas
- feature lighting for noticeboards, display cabinets and other specialist display areas **must** be provided in accordance with the design
- luminaires **must** have an Ingress Protection (IP) rating appropriate for the installation location
- suspended luminaires **must** be rigidly suspended (for example, Unistrut), especially in areas affected by draughts from windows or ceiling fans
- luminaires in high-risk locations (such as gymnasiums) **must** be protected from impact damage
- internal security lighting **must** be provided for building entries, for changes of direction to external pathways, and for stairs in corridors

- adequate external security lighting to the perimeter of all buildings **must** be provided to ensure safe access
- controls and switches **must** be of robust construction with appropriate protection.

Lighting switches to all accessible toilets **must** be automatic-sensor, to allow for use by people with limited dexterity and strength.

Mercury-vapour and sodium-vapour lamps **must not** be used internally or externally. Tungsten and incandescent lamps **must not** be used.

If linear LED replacement tubes are used, the existing fitting **must** be in good condition. Existing fluorescent tube type fittings need to be modified by a qualified electrician for the LED replacement tube to work.

Where higher illuminance is required for specific tasks, provide suitable local task-lighting or provide suspended luminaires over the task.

DESIGN AND PERFORMANCE

Lighting design and performance **must** comply with and be installed in accordance with the relevant Australian standards:

| | |
|------------------------|--|
| AS/NZS 1680.1 | Interior and workplace lighting — General principles and recommendations |
| AS/NZS 1680.2.1 | Interior and workplace lighting — Specific applications — Circulation spaces and other general areas |
| AS/NZS 1680.2.2 | Interior and workplace lighting — Specific applications — Office and screen-based tasks |
| AS/NZS 1680.2.3 | Interior and workplace lighting — Specific applications — Educational and training facilities |
| AS 2560.1 | Sports lighting — General principals |
| AS 2560.2 | Guide to sports lighting |

In addition to the above standards, projects consultants are required to comply with all associated and necessary standards.

Project consultants **should** note:

- depending on the ceiling type, suspended mounting may be required
- assume maintained illuminance lux levels in areas other than performing arts spaces to comply with the relevant AS/NZS 1680.1 — Interior and workplace lighting — General principles and recommendations, and AS/NZS 1680.2 — Interior and workplace lighting — Specific applications
- food preparation and canteen areas lux level required to comply with local council requirements.

Performing arts lighting

The design and performance of lighting for performing arts spaces is a specialist field not included in the scope of Australian standards. Table 16 summarises the design criteria for performing arts spaces:

| AREA TYPE | LUX LEVEL | UNIFORMITY | GLARE RATING | MOUNT OPTIONS | FITTING / LAMP TYPES | DIFFUSER TYPES | COMMENTS |
|------------------------------|-----------|------------|--------------|---------------|----------------------|----------------|-----------------------------|
| Performing arts — lobby | 160 lx | 0.5 | 19 | SM or R | T5 or LED | | 0-100% dimming required |
| Performing arts — Auditorium | 80 lx | 0.5 | 19 | SM or R | T5 or LED | | 0-100% dimming required |
| Performing arts — Stage | 240 lx | 0.5 | 19 | S or SM | T5 or LED | Guard | For set-up not performance |
| Performing arts — Make-up | 320 lx | 0.5 | 19 | R | T5 or LED | L/P | May require mirror lighting |

Table 16 Performance arts lighting

MINIMUM LIGHTING COMFORT

Lights in the nominated area **must** be flicker-free and accurately address the perception of colour in the space.

Flicker-free lighting

Flicker-free lighting refers to luminaires that have **either**:

- a minimum Class A1 and A2 ballast for all fluorescent lighting
- electronic ballasts for all high-intensity discharge (HID) lighting
- electronic drivers that feature 12-bit or greater resolution for all LED lighting **or**
- high-frequency ballasts for all other lighting types, including incandescent (including halogen), dichroic (such as low-voltage downlights), and HID (such as metal halide, low/high pressure sodium).

Colour quality

To address the perception of colour, light sources **must** have a minimum colour rendering index (CRI) of 80, unless project consultants can demonstrate that, in a particular area, the activity is not impeded by a lower CRI. Project consultants will support their justification by ensuring their selection complies with the guidance provided in Table 7.2 in AS/NZS 1680.1.

GENERAL ILLUMINANCE AND GLARE REDUCTION

Project consultants **must** demonstrate that for 95% of the nominated area, lighting levels comply with best-practice guidelines for general illuminance, and that glare from lamps is eliminated in accordance with the following requirements.

General illuminance

Best-practice lighting levels for each task within each space type is defined as lighting with a maintained illuminance that meets the levels recommended in AS/NZS 1680.1 in Table 3.1. Where recommended maintained illuminance values for a particular space are not specified, the values used **must** relate to the closest type of task as defined in the standard.

Compliance can be demonstrated through modelling or measuring of the whole nominated area, or a representative floor or section. Assessment (**either** modelling **or** measuring) **must** be carried out in accordance with appendix B of AS/NZS 1680.1.

The maintained illuminance values **must** achieve a uniformity of no less than that specified in Table 3.2 of AS/NZS 1680.1, with an assumed standard maintenance factor of 0.8.

Glare reduction from lamps

Glare from lamps **must** be limited within the nominated area. Three options are provided for demonstrating compliance with this requirement — a performance method, and two prescriptive methods. (A combination of methods can be used to demonstrate compliance.)

PREScriptive METHOD 1

For this option, bare light sources **must** be fitted with baffles, louvers, translucent diffusers, ceiling design, or other means that obscures the direct light source from all viewing angles of occupants, including occupants looking directly upwards.

PREScriptive METHOD 2

For this option, the lighting system **must** comply with the luminaire selection system as detailed in clause 8.3.4 of AS/NZS 1680.1.

PERFORMANCE METHOD

For this option, the unified glare rating (UGR) calculated for the lighting on a representative floor **must not** exceed the maximum values listed in Table 8.2 of AS/NZS 1680.1.

The UGR rating **must** be calculated in accordance with the procedure outlined in clause 8.3.3 of AS/NZS 1680.1.

LOCALISED LIGHTING CONTROL

For 95% of the nominated area, occupants **must** be able to control the lighting in their immediate environment. This includes turning the lights on and off, and adjusting light levels.

LIGHT POLLUTION TO NIGHT SKY

Specified reductions in light pollution and horizontal light spill **must** be achieved by the project. This requirement covers all external lighting of a project. In addition to other types of external lighting, luminaires inside glazed atria and those on the uppermost (uncovered) decks of outdoor car parks are considered to be external.

One of the following pathways **must** be used:

Control of upward light output ratio (ULOR), in accordance with 27.1A Control of upward light output ratio

For this option, the project team **must** demonstrate that no external luminaire on the project has a ULOR that exceeds 5%, relative to its actual mounted orientation.

Project teams **must** demonstrate that the ULOR provided or calculated in the documentation is relevant to the as-installed orientation of the luminaire. A luminaire with a ULOR as nominated in the manufacturer's data sheet will have a different ULOR when the mounting orientation of the luminaire is changed. In the event that any external luminaire is mounted in an orientation other than the one nominated by the manufacturer, the ULOR **must** be recalculated and provided by project teams.

Awnings

Awnings can be used as a means of achieving compliance with the 5% ULOR requirement, where a section drawing showing the light output of the luminaire can be provided, and where the awning has the effect of blocking 95% of the output of the lamp above the horizontal.

Where external lights face or are fixed to a building, 90% of these lights **must** be LED. Where external lights are fixed to or face a building, 90% of these lights **must** be LED. The design team **must** complete a night lighting study on properties adjacent to / across from all school buildings and spaces, with particular attention to areas, such as ovals, that require external lighting.

| | |
|--------------------|--|
| AS/NZS 4282 | Control of the obtrusive effects of outdoor lighting |
|--------------------|--|

Control of direct illuminance, in accordance with 27.1B Control of Direct Illuminance

For this option, the project team **must** demonstrate that direct illuminance from external luminaires on the project produces a maximum initial point illuminance value no greater than:

- 0.5 Lux to the site boundary
- 0.1 Lux to 4.5 metres beyond the site into the night sky, when modelled using a calculation plane set at the highest point of the building.

Calculations **should** be in accordance with AS/NZS 4282.

The calculation plane **must** cover the area between the site boundary and building facade or vertical service to be illuminated. The horizontal calculation plane **should** be set at the top of the building fabric, excluding spires. Calculation plane grid points **should** have a 0.5m spacing. All illumination results **should** be reported to within 2 decimal places.

LIGHTING SYSTEMS AT SPECIAL AND SPECIAL DEVELOPMENT SCHOOLS

In addition to the performance requirements above, for special and special development schools, project consultants **must** select and satisfy lighting systems that meet the following requirements:

- fluorescent luminaires **must** not be used
- all switches **must** be large-format rocker switches.

LIGHTING SWITCHING

In general, arrange local switching to each room. Lighting switching to be suitably rated to carry the switched load.

Project consultants **must** select and satisfy lighting switching that meet the following requirements:

- suit the operational requirements of each space
- clearly label which lights they serve where multiple switches are provided
- have two-way switching at both doors for larger rooms, such as libraries, that have two entry points
- be of the unbreakable polycarbonate rocker flush mounted type and located adjacent to closing side of the door
- **must** not be able to be 'pushed in' from the front of the switch.

LIGHTING CONTROL

The lighting system **must** be fit for purpose and constitute value for money for the design in question. To this end, a cost benefit analysis **must** be undertaken with consideration of:

- manual override facilities to any automatic lighting controls
- pre-set control panels' clocks, motion/sensors and daylight control facilities
- control via timing devices with manual overrides for external lighting, and
- whether or not the system should be centrally programmable via an aggregated BMS or a self-contained, smart system for lighting services only.

Design notes **must** explain system decisions and the rationale for these.

EMERGENCY AND EXIT LIGHTING

Emergency lighting **must** be provided to ensure safe evacuation in an emergency and/or in the event of mains failure, to be integrated with escape routes and doors.

All emergency and exit lighting **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **must** consider selecting and satisfying emergency and exit lighting that meets the following requirements:

- incorporates either central or local monitoring and testing facilities
- luminaires **must** be sourced from proven production runs with demonstrated performance levels
- the system **must** contain **either** a cabled **or** wireless communication network
- the system **must** incorporate central monitoring and testing facilities
- be attractive in appearance to suit the ambience
- the system **must** be capable of accommodating additional luminaires anywhere within the systems network
- non-maintained tubes for the emergency lighting function are preferred
- emergency and exit luminaires **must** contain a localised battery source of a minimum 5-year life
- battery and control circuitry **must** be modular in design to enable quick replacement techniques
- exit signs **must** contain low-energy lamp sources comprising cold cathodes or LED sources
- the system **must** be designed to enable alterations and additions at any point in the network.

SECURITY LIGHTING

Security lighting **must** be provided to both internal and external areas. Internal security lighting **should** be located at building entries, at changes of direction to external pathways, and for stairs and corridors. External security lighting **should** be located at car parks, pathways and the perimeter of all buildings. Project consultants **must** consider the needs and uses of the site, including for out-of-hours tuition and community use, as well as the potential for vandalism.

All security lighting **must** comply with and be installed in accordance with the relevant Australian standard.

Project consultants **must** select and satisfy security lighting that meet the following requirements:

- be controlled by a photoelectric cell in conjunction with a time controller
- use high-efficiency light sources
- be vandal-resistant and have suitable ingress protection.

Motion detectors **may** be used to activate security and access lighting, provided that consideration is given to avoidance of nuisance activation. These **should** be controlled by a daylight (photoelectric) sensor in conjunction with a clock. Motion detector switching is not appropriate for any lighting that has start-up and re-strike periods.

5.10 Information and communication technology

This section details information and communication technology (ICT) requirements for Victorian government schools, including data, emergency warning systems, audio-visual (AV) equipment, telephony, public address and television antennae.

The Department's Information Management and Technology Division (IMTD) has produced the ICT Design Models for Schools detailing the design and installation requirements and specifications for ICT in schools to ensure school networks are reliable, scalable and manageable. Consultants **must** satisfy these guidelines, which follow appropriate infrastructure and industry standards ([ICT Design Models for Schools Guide](#)).

The ICT Design Models for Schools **must** be studied before existing schools embark upon capital works, or a new school is designed. This document provides more information on all aspects of DET ICT standards and goes into greater detail than this handbook

Project consultants **should** also refer to the performance requirements in the following related sections:

- [Master planning](#)
- [Mechanical services](#)
- [Electrical services](#)
- [Fire systems](#)

5.10.1 ICT DESIGN AND INFORMATION MANAGEMENT AND TECHNOLOGY DIVISION

Information Management and Technology Division (IMTD) are responsible for the provision of:

- school business systems, applications and supporting core technology infrastructure
- operational and technical support and
- assist with the technical design, procurement, build and implementation of school networks.

Consultants **should** consult with IMTD in the schematic design phase (via schools.technical.planning@education.vic.gov.au) about any ICT planning questions or issues they have after reading the Guide.

All design documentation and plans, including for power and data, **must** comply with the ICT Design Models for Schools.

Kindergartens are typically operated by the local council or third party providers and not subject to State Purchase Contract (SPC) arrangements. The service provider is therefore responsible for the facility's ICT equipment and services.

5.10.2 STRUCTURED CABLING SYSTEMS

A single structured integrated cabling system (and associated infrastructure) is to be provided, capable of supporting ICT functions (including voice, video, security, audio-visual and building automation) for existing and future technologies. The system **must** extend throughout all school buildings and be capable of extension to relocatable units as required.

All cabling **must** comply with and be installed in accordance with the relevant Australian standard.

Project consultants **must** provide structured cabling systems for ICT that meet the following requirements:

- choice of cable **should** cater for future expansion and technology development
- have appropriate compliance certification
- cable distribution cabinets and communication rooms **must** be sized to allow for future expansion (at least 25% for cable distribution cabinets and 40% for communication rooms)
- copper cable runs (possibly utilised for communications) have maximum lengths between panels and outlets.

Where copper cable is required, the minimum standard is category 6A. Where fibre is required, the minimum standard is 12-core OM3 grade multimode external grade cable.

Cables **must** not be overly bent — requiring the design of suitable cable pathways within a building.

Optical fibre is required between buildings, within buildings where copper distance limitations are exceeded, or where communications devices require fibre connections. When being used between buildings, VSBA recommends 12-core OM3 grade, multimode outdoor-rated cable terminated to the core communications room.

Lead-in trenching, cable trenching and distribution frames **must** be undertaken in accordance with Telstra guidelines. These guidelines can be found at telstra.com.au/smart-community.

The horizontal copper cabling links **must not** exceed 90m at any point.

5.10.3 NETWORK POINTS REQUIRED

Network points are required at schools and in kindergartens to support networked devices such as computers, interactive whiteboards, audio-visual projectors, display screens and printers.

The provision of cabled power and data points (including ceiling mounts, wall points and wireless access) **should** meet the learning requirements of each space.

The following guide in Table 17 is based on a learning space of 25 students and one staff member.

| OPTIMAL NO. OF DATA POINTS | USAGE |
|----------------------------|---|
| 2 | Peripheral use (i.e. printers) or specialised student use |
| 1 | Wireless access points (WAP) on ceiling central to the room. 1 per 25 learners, spread for best room coverage |
| 2 | Network data projector outlet at each data projector or television, allowing for streaming IP appliances. |
| 1 | Telephone placed at a convenient area for staff and/or student use based on school direction |
| 1 | Staff use (0.5–2m left or right from interactive whiteboard) |

Table 17 Data points required

A school or kindergarten may consider it necessary to increase (or decrease) the number of data points for students per learning space. This decision **should** be based on learning space design, student wireless devices and access to fixed wired devices.

Project consultants **must** provide network points for ICT that meet the following requirements:

- correctly IP-rated and damage-resistant for their installed area and application
- outlets are fit-for-purpose and at an appropriate height for the function required
- labelling must be clearly numbered and securely fixed using traffolyte (sticky labels are not acceptable).

All mounted projects, televisions and multi-functional devices (MFDs) **must** have a wired network point connection.

Outlets for ceiling-mounted projectors **must** be mounted on the ceiling where reasonably accessible; or, for equipment mounted on high ceilings, the data outlets **must** be installed concealed within the vertical wall space and provided with suitable labelled access.

Recessed floor boxes supplying power and data are not to be used. If power or data is required in the centre of the room, it **should** be provided through the roof cavity.

In kindergartens, data outlets (and GPOs) must be installed at 1500mm AFL in spaces that are accessible to children.

5.10.4 WIRELESS ACCESS POINTS

A wireless network is to be provided that will support the current and expected increasing use of mobile devices at Victorian government schools and kindergartens. These networks do not replace cable systems but complement and add flexibility to the learning environment.

WAP placement **should** be determined by coverage (all areas **should** be covered) and density (that is, how many users will be connecting).

Project consultants **must** satisfy that WAPs meet the following requirements:

- readily accessible
- compliant with IMTD specifications, and
- ceiling mounted (unless located in gymnasiums, external areas, or those with very high ceilings)
- support future growth requirements for wireless connectivity.

When WAPs are located in gymnasiums, external areas, or those with very high ceilings they **must** be vertical, wall mounted, and in IMTD-approved protective cages. All WAPs in schools and kindergartens should comply with specifications in the [ICT Design Models for Schools Guide](#). To support adequate coverage, 1 WAP **should** be provided per 25 learners at a minimum.

WAPs **should** be appropriately placed throughout a school or kindergarten to ensure a successful system, considering the amount of devices to be used in spaces at the same time and construction materials within a building. WAPs **should not** be installed higher than 3m.

WAPs may be required in external locations depending on the intended use of outdoor areas. WAPs **must not** be installed within ceiling spaces.

5.10.5 PITS AND DUCT SYSTEM

Project consultants **must** provide a pit and conduit system between all buildings and the proposed locations of the relocatable classrooms to support ICT.

Project consultants **must** select and satisfy a pit and duct system for ICT that meet the following requirements:

- provide a lead-in pathway that is appropriately sized from the property boundary to the main distribution frame
- have spare capacity for additional cables that may be installed in the future
- are routed directly to the equipment rack and frame
- have appropriate protection from vandalism.
- ensure separation for incoming service providers via the pit duct system.

Where there are concrete slabs installed in a location, cable conduits **must** be cast under these slabs.

The cable path to each relocatable classrooms **must** be no greater than 60m from the nearest communications rack to ensure that data outlets installed in relocatable classrooms are no more than 90m from the rack.

5.10.6 SERVER ROOM AND IT EQUIPMENT CABINETS

The main server room (also referred to as the switch, or core communications rooms) **must** be a dedicated room for ICT and associated equipment only. The room **must** house the site distributor, main distribution frame, building distributor for that building, VicSmart cabinet, and associated active data equipment. Smaller spaces are **required** throughout a school site to house associated IT equipment.

Switch/server/Core Communications rooms **must** have floor to ceiling walls to provide insulation from sound and dust.

All Communications Rooms **must** be provided with an anti-static covering. Carpet is not to be used.

The ceiling access panel **must** be located opposite the communications/equipment cabinet, not above it, to avoid damage and static charge issues from dust and debris accumulation.

Level concrete floors that have been polished and sealed are also acceptable

In addition to any architectural, structural or engineering considerations, the design of the server room **must** meet incoming voice

and data needs with regard to the provision of sufficient space to accommodate any equipment associated with the IP PBX VoIP system. It **must** also allow the carrier's staff to work on the equipment in accordance with health and safety guidelines.

Kindergartens must have separate ICT service. Consultants must allow for a full height services cupboard suitably sized and ventilated to accommodate the IT equipment and communications cabinet in the kindergarten. The kindergarten will not be connected to the DET Wide Area Network, the early childhood provider will procure their own preferred provider.

All communication rooms and cabinets **must** comply with and be installed in accordance with the following Australian standard:

| | |
|--------------------|---|
| AS/NZS 3084 | Telecommunications installations - Telecommunications pathways and spaces for commercial buildings |
|--------------------|---|

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy communication rooms and cabinets that meet the following requirements:

- appropriately sized to meet current and growth requirements (space is required for at least 2 x 45 RU server cabinets 800mm x 1000mm with 1m clearance around cabinets)
- allow easy access to the rear and front of machines
- provided with suitable power supply, power outlets and breakers, and if possible be provided with a backup
- are suitably located, taking account of environmental and security considerations
- insulated and away from direct light sources
- **must** have appropriate cooling-sized cooling systems and ventilation.

The ICT technician workspaces **must** be adjacent to, but **not** located within, the server room.

Designed growth space **should** be a minimum of 40% of the original installation.

In addition, please refer to [Server room air conditioning](#) and [Electrical services](#) for further information.

5.10.7 VOICE COMMUNICATIONS (PHONES)

Schools can be provided with phone handsets or cordless extensions that can be accessed without having to leave teaching and learning areas. Phones are also required for administrative and support staff within their designated work areas or offices, and provided in teachers' staff workspaces, staff lounges, conference rooms, meeting rooms and consulting rooms.

These services are currently provided through public switched telephone network (PSTN) copper wiring from Telstra, or optic-fibre integrated services for digital network (ISDN). As technology changes and communication projects — such the National Broadband Network (NBN) — roll out, project consultants **should** select the most appropriate long-term solution for voice services in consultation with the school, or design reference group in the case of new schools.

Voice communications for telephones and faxes are to meet the following requirements:

- voice mail for all staff with central indication of mail-waiting for individuals
- an expansion capacity to meet the maximum extension requirements of the masterplan, including future relocatable classrooms
- coordinated provision of voice services from the telecommunications service provider
- active equipment to support any IP phone system
- all commissioning.

The same system **must** be used in all facilities.

ISDN is also able to support VoIP (Voice over Internet Protocol), where the voice cables are the same as data cables and can perform either function. The VicSmart Wide Area Network (WAN) does not support VoIP traffic.

5.10.8 TELEVISION DISTRIBUTION

A master antenna television system (MATS), which distributes free-to-air television to a school, **must** be provided to a nominated staff area only where the Design Reference Group / school (as appropriate) elects to have it installed.

Where installed, all master antenna television systems **must** comply with and be installed in accordance with the relevant Australian standard.

Project consultants **must** select and satisfy a master antenna television system that meet the following requirements:

- include all associated cabling infrastructure for distribution to rooms requiring television points

- provide fly leads for each multiple access television (MATV) outlet and
- coverage can be expanded to relocatable units when required.

5.10.9 AUDIO-VISUAL SYSTEMS

Audio visual specifications and compatibility **must** be agreed between the VSBA, consultants, and the Design Reference Group or school technology staff, as appropriate. They **must** comply with the [ICT Design Models for Schools Guide](#).

Audio-visual projection systems can be installed as a permanent feature of learning spaces. Systems can be installed either during or after construction with appropriate connectors, brackets and AV wall plates. In addition to the cabling and digital display screens, cabling and telecommunications outlets **should** be provided for digital displays in the circulation and foyer areas where required.

Project consultants **must** select and satisfy audio-visual project systems that meet the following requirements:

- provide cable pathways that allow for easy installation and maintenance
- positioned to obtain a 100° (diagonal) viewing area and accessible for easy maintenance
- install all cabling in concealed, continuous lengths.

5.10.10 PUBLIC ADDRESS SYSTEM

A public address (PA) system is to be installed that covers all facilities and the entire site, including the (existing and future) location of relocatable classrooms, and sports fields and outdoor areas. The system is required to make public broadcasts of routine, situational, important and emergency announcements.

Three types of microphones are required for the PA system: desk paging microphone, cardioid microphone with a floor-stand, and radio microphone.

Project consultants **must** select and satisfy a PA system that meet the following requirements:

- be simple and logical to operate for staff
- **must** be capable of providing a minimum sound level in all normally occupied areas of not less than 65db(A)
- the Rapid Speech Transmission Index (RATSI) **must not** be less than 0.5 in at least 75% of each area of coverage and **should not** fall below 0.45 for the remaining 25% of each area

- provide school bell services
- provide an automatic announcement facility for making routine, situational and emergency announcements
- provide all cabling infrastructure which supports PA system equipment
- include pre-wiring leads and installation of sealed buried conduits to facilitate future extensions
- enable the selection of zones and de-selection of zones simply and efficiently.

In high volume environments (such as machine rooms), PA systems **should** be interconnected to a strobe light to be activated when the bell or PA system is in operation. The PA system volume **must** not exceed the noise exposure standard outlined in the Occupational Health and Safety Regulations 2017. For more information see [WorkSafe Victoria's guidance](#).

5.10.11 SOUND SYSTEM AND INTERCOM SYSTEM FOR EMERGENCY PURPOSES

A sound alert system and intercom system is required for emergency purposes throughout all buildings. The system **must** be capable of automatic voice-messaging, manual announcements from trained fire wardens, and transmitting evaluation signals throughout buildings.

Project consultants **must** select and satisfy a sound and intercom system for emergency purposes that meet the following requirements:

- is compatible of communication with the fire indicator panel (FIP) requirements identified in [Fire systems](#)
- a network of signposted warden intercom phones, in secure metal cabinets
- ceiling-mounted speakers installed in all finished ceiling areas and speaker horns in all non-ceiling areas
- sufficient speakers to achieve a minimum average volume of +75dB over the floor area
- speaker horns and visual warning devices in all plant areas and services areas throughout the building where ambient noise levels exceed +75dB.

In addition, please refer to [Fire indicator panel](#) for further information.

5.10.12 HEARING AUGMENTATION

Hearing Augmentation is the process of collecting audio in learning spaces, and allowing it to be transmitted to receivers built into hearing aids worn by learners, teachers and visitors whether these are supplied by Government(s), or procured by learners, teachers and visitors independently.

A hearing augmentation system helps meet the learning needs of students with hearing impairments. The system will need to extend to learning areas and areas likely to be used by the community, such as gymnasiums, office and staff work areas, theatres and lecture rooms. The system **should** be entirely distinct from the PA system.

All hearing augmentation systems **must** comply with and be installed in accordance with the relevant Australian standard.

Project consultants **must** select and satisfy hearing augmentation systems that meet the following performance requirements:

- is compatible with all personal hearing devices used by students and staff
- have appropriate signage that is:
 - consistent with AS 1428.5 and universal design principles (i.e. in properly spaced Braille and standard type; clearly visible; at wheelchair height)
 - advises of the HAS type/s in use, and
 - where transmitters or additional neck hearing receivers / loops can be accessed
- other visual notification systems synchronised with the PA system, as deemed appropriate and necessary.

Hearing augmentation systems must not be infrared systems. All installed systems should achieve a good signal to noise level of at least +20dB.

Acoustic conditions set out in section 5.5, particularly 5.5.4, must be in place to ensure optimal performance of hearing augmentation and soundfield systems.

5.11 Security technology

Schools **must** provide a safe and secure environment for students, staff and visitors, including parents and service personnel. Security technology encompasses both proactive and reactive mechanisms to deter, detect, delay and support the response to unlawful activity whilst appropriately protecting school assets.

Security technology equipment and infrastructure **must** comply with and be installed in accordance with the relevant Australian standards.

Project consultants **should** also refer to the performance requirements in the following related sections:

- [School design principles](#)
- [Building fabric](#)

5.11.1 SECURITY DESIGN

The DET Security Unit (SU) delivers a range of services to schools on security issues and crime prevention strategies. SU officers are responsible for providing expert advice on crime prevention, security risk management strategies and physical security infrastructure, such as:

- security alarm system design, installation and maintenance
- closed-circuit television (CCTV) systems
- Electronic Access Control and secure locking mechanisms
- other physical security infrastructure, strategies and protocols.

Project consultants **must** liaise with the Security Unit (SU) (school.security@edumail.vic.gov.au) at all stages of the project to support the integration of security requirements in the design, development and construction of the facility. Project consultants **must** prepare and submit a design for the electronic security system for each facility that complies with SU design requirements, so that the proposed security system can be reviewed and amended as necessary.

Project consultants **should** also refer to VSBA and Security Unit Factsheets for further guidance on when to engage the Security Unit, as well as to provide SU guidance material for additional information, can be found in the [Securing your school](#) guidelines.

Project consultants **should** also refer to SU guidance material for additional information, found in the [Securing your school](#) guidelines.

5.11.2 PHYSICAL SECURITY

Project consultants **must** provide, at minimum, the following physical security measures:

- secure locking to external doors and openable windows, including the capability to lock all lockable doors from inside the building/room while retaining single action egress
- enclosures to protect outdoor equipment such as air-conditioning units and pumps against theft and vandalism
- an external key safe
- a secure and master-keyed keying system for all locks and locking cylinders used in each facility. If the school is implementing an Electronic Access Control System (Smart Reader technology), all external doors must have a key override. This key should be limited issue to ensure access cards/fobs are used.

Early learning facilities, such as kindergartens on school sites, **must** be designed to restrict public access to all areas. A fence **should** define the kindergarten perimeter to prevent school users and members of the public from accessing the kindergarten without permission and supervision.

Doors into and out of the children's playrooms **should** be designed to ensure children cannot operate the doors without supervision.

Advice from the service provider **should** be obtained to determine where keypad entry systems should be installed within the kindergarten facility.

Careful consideration **must** be given to physical security so that latches and controls are operable by people with disabilities, without compromising security.

Clear screens must also be installed at reception counters as an infection control measure.

5.11.3 LIGHTING

Well-designed lighting forms an important security technology measure for schools. For information on lighting for security purposes, please refer to [Security lighting](#).

5.11.4 FENCING

Where required, fencing can be used to define school sites and identify boundaries to indicate where outsiders are not permitted. Any fencing and associated gates used at Victorian government schools **must** be strong, durable, and fit-for-purpose. For information, please refer to Landscape architecture and to the [Security fencing standard](#).

5.11.5 INTRUDER ALARM SYSTEM FUNCTIONAL REQUIREMENTS

Project consultants **must** liaise with the SU regarding the design for electronic security systems for each facility so that SU can prepare the relevant documentation and specifications. This documentation will take into consideration the use of buildings and facilities for each site and project. Detectors **must** be positioned based on the design of the alarm specification provided by the Alarm, Installation and Maintenance Coordinator for each individual facility, including the number of smart readers and the configuration of internal spaces.

The security systems **must** be configured to enable non-technical staff to perform all necessary operational parameter changes, and to interpret alarms and events following minimal training.

Project consultants **must** seek information from SU concerning the potential impact on alarm systems from alterations or additions to facilities.

The scope of the installation **must** include all relocatable classrooms scheduled for installation on each site, and **must** include pre-wiring leads and installation of sealed buried conduits to facilitate extension of the electronic security system to the locations of future long-term and peak relocatable classrooms.

5.11.6 ELECTRONIC ACCESS CONTROL SYSTEM

Proximate card access technology can be installed at schools, but project consultants **must** liaise with SU for guidance on their design and installation.

If an EACS is in scope, the installation **must** comply with the following requirements:

- the intruder alarm system and the access control system **must** operate as two fully separated systems with no integration. The access control system must not arm, disarm, or override the intruder alarm system
- the access control system **must** be scalable
- the access control system **must** interface with the fire panel to automatically release controlled doors along fire evacuation paths during a fire emergency
- the external electronic door locks **must** be configured as single handed egress functionality to provide free egress during power supply failure (including backup battery failure), or alternatively

- an emergency door release (break-glass unit) can be installed at the secure side (inside) of a door. The break-glass unit must be connected directly in series with the power supply unit of the electronic door lock. When the unit is activated, it **must** cut off power supply to the electronic door lock and release the lock immediately. The status of the break-glass unit **must** trigger an alarm event on the access control system.

5.11.7 CCTV MONITORING

CCTV monitoring is not mandated for facilities. Where installed they are an effective way to deter, detect and support the response to unlawful activity.

If CCTV is to be installed as an additional security measure, project consultants **must** liaise with the SU to provide expert guidance on the design and installation of these systems. All system proposals **must** be approved by SU and comply with and be installed in accordance with AS 4806 and [DET CCTV Policy](#).

If installed, CCTV **must** use video motion detection, pre-event and post-event recording, and **must** locally record CCTV images at each site. Recorded images **must** be able to be retrieved for post-incident review.

Cameras **must not** be installed in areas such as toilets, showers, changing rooms and staff rooms, or to monitor student and staff performance, as stipulated. This is compliant with the restrictions on the use of CCTV systems set out in the Surveillance Devices Act 1999 (Vic) and the [DET CCTV Policy](#).

To minimise Occupational Health and Safety risks associated with working at height and other relevant risks, the selection of cameras and connections **must** aim for, as reasonably practicable, to be low maintenance without the need for continuous access for maintenance, adjustment or cleaning.

5.12 Fire systems

This section describes the mandatory fire systems requirements in Victorian government schools. Project consultants **must** provide a system that complies with legislative requirements and the NCC.

All fire systems **must** be appropriately designed to minimise intentional misuse of the fire systems and fire protection equipment. Project consultants **should** also consider the capability of systems to cater for any future expansion of school facilities.

Project consultants **should** also refer to the following related sections:

- [School design principles](#)
- [Master planning](#)
- [Building fabric](#)
- [Commissioning and tuning](#)

5.12.1 FIRE HYDRANTS

All fire hydrants **must** comply with and be installed in accordance with the relevant Australian standards and code:

| | |
|------------------|--|
| AS 2419.1 | Fire hydrant installations — System design, installation and commissioning |
| AS 2419.2 | Fire hydrant installations — Fire hydrant valves |
| AS 2419.3 | Fire hydrant installations — Fire brigade booster connections |
| WSAA 03 | Water Supply Code of Australia, Water Services Association of Australia |

In addition to the above standards and code, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy a fire hydrant system that meets the following requirements:

- designed using water supply design data obtained from the following:
 - water authority flow and pressure information
 - actual site flow and pressure data obtained from an accredited fire services tester (Note that the requirement to obtain actual site flow and pressure data will be waived if project consultants can demonstrate that the water authority flow and pressure information is reliable.)

- consideration may be given to the use of street hydrants where appropriate, and where agreed to by the relevant authority
- external hydrants **must** be appropriately secured to prevent unauthorised use
- external hydrants located near sports fields and active play areas can present an injury hazard to students who are running, and **must** be contained in metal cabinets
- external hydrant placement and coverage **must** consider possible and planned relocatable classroom locations.

Preferred hydrant installations are external dual-head individually controlled outlets, with access and hard standing for a fire appliance to connect to the hydrant.

A valid fire hydrant system testing report providing the results of the hydrostatic, pressure and flows testing is to be obtained before handover of the asset. If no valid fire hydrant system report is available, an investigation including hydrostatic, pressure and flows testing **must** be obtained.

Any upgrade requirements for the fire hydrant system **must** be identified and a cost estimate included in the cost plan.

5.12.2 FIRE HOSE REELS

All fire hose reels **must** comply with and be installed in accordance with the relevant Australian standards:

AS/NZS 1221 Fire hose reels

AS 2441 Installation of fire hose reels

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy fire hose reels that meet the following requirements:

- provide individually controlled outlets within a cabinet or cupboard that suits the building architecture
- adjacent to building egress and other suitable shortfall locations that provide adequate protection.

Where the effectiveness of hose reels may be restricted by locked rooms, appropriate operational measures **should** be arranged with the relevant building surveyor.

5.12.3 PIPEWORK, VALVES AND FITTINGS

All pipework, valves and fittings for fire systems **must** comply with and be installed in accordance with the following standard:

AS 2419.1 Fire hydrant installations — System design, installation and commissioning

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

Project consultants **must** select and satisfy pipework, valves and fittings that meet the following requirements:

- construct a site ring main pipework system to provide reliability of continuity of supply
- valves and fittings **must** be located to ensure control of supply to buildings, and to all hydrants and hose reel outlets, to enable shutdown of all sections of the ring main for maintenance purposes, and to enable new branches to be 'cut in'
- hose couplings **must** be compatible with relevant local fire authority requirements
- the provision of all necessary signage and notices.

5.12.4 FIRE EXTINGUISHERS

All fire extinguishers **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **must** select and satisfy fire extinguishers that meet the following requirements:

- be installed fully charged and mounted on appropriate brackets throughout the school site in accordance with the requirements under the NCC
- Extinguishing agent and extinguisher capacity is suited to the risk profile of the location
- provision and installation of appropriate signage with identifications and instructions.

5.12.5 FIRE BLANKETS

All fire blankets **must** comply with and be installed in accordance with relevant Australian standards.

Fire blankets **must** be close to any stoves or cooking appliances. Installation **must** include provision of appropriate location and instruction-use signage.

5.12.6 SMOKE DETECTORS AND SOUND ALARMS

Where required, all smoke detectors and sound alarms **must** comply with and be installed in accordance with relevant Australian standards.

Thermal detectors **must** be installed in locations where normal activities may generate false alarm signals at smoke detectors. Project consultants **should** ensure that alarms and associated connections can be connected to relocatable classrooms.

5.12.7 SMOKE AND FIRE DOORS

Where required, all smoke and fire doors **must** comply with and be installed in accordance with the relevant Australian standard.

Magnetic hold-open devices **must** be provided to smoke and fire doors, where required. These devices **must** deactivate on a fire alarm signal.

In addition, please refer to the section on [Doors](#) for more information.

5.12.8 FIRE INDICATOR PANEL

Where required all, fire indicators panels (FIP) **must** comply with and be installed in accordance with the following standards:

| | |
|------------------|--|
| AS 7240.2 | Fire Detection and Alarm Systems – Fire detection control and indicating equipment |
| AS 1670 | Fire detection, warning control and intercom systems — System design, installation and commissioning |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

Project consultants proposing the installation of FIP **must** ensure that they are analogue addressable type, comprising a site master FIP and sub-building mimic or sub-indicator panels in outlier buildings, networked to the master FIP to suit multi-building design.

Each FIP is to have capacity to allow for future changes and possible additional circuits. Every FIP is to identify all connected alarm circuits, and is to be equipped with auto-testing and check alarm facilities.

5.13 Hydraulic services

Hydraulic services **must** satisfy the requirements of the Victorian Building Authority (VBA) and those of the relevant local water authority and local government. Project consultants **must** provide hydraulic services (including sewer and sanitary plumbing systems) to accommodate all school buildings and community joint-use facilities.

Project consultants **must** ensure all hydraulic plant, equipment, controls and meters are connected to an aggregated BMS or separate smart centralised system for hydraulic services only to enable remote monitoring and control of the hydraulic systems. Project consultants **should** also refer to:

- [Utilities and associated infrastructure](#)
- [Building fabric](#)
- [Natural Gas](#)

5.13.1 DOMESTIC WATER SERVICES

Domestic water services **must** be provided and appropriately sized for all school buildings and community joint-use facilities. Project consultants **must** also provide additional water services capacity for the potential installation of relocatable units.

Each domestic water tapping from the mains **should** extend individually to each site complete with all necessary isolation valves, backflow prevention and pressure-limiting valve systems, and be interconnected at the boundary of each site with appropriate control valve in accordance with the requirements of the local water authority.

Project consultants **must** select and satisfy domestic water services that meet the following requirements:

- be of Grade 2 alternative supply type in the form of mains pressure directly served from authority mains
- where water supply is inadequate for domestic water supply purposes, an alternative supply comprising storage tanks and pumps **must** be installed
- domestic water supply pumps of sufficient capacity **must** be installed to supplement water supply pressure where inadequate pressure is available, with supply pumps sized for 120% of maximum simultaneous demand
- provide bypass lines around storage tanks and pumps
- provide valved potable water points to allow for temporary supplies to mobile vans, such as dental vans and the like.

In addition, please refer to the section on [Heated water systems](#) for more information.

LEAD CONTENT IN SCHOOL PLUMBING

Any piping, tapware or fittings that hold or distribute potable water, or form part of a water source where a child could fill a cup or drink bottle for consumption, **must** be comprised of products that either:

- do not contain lead, or
- do not allow contact between brass-containing lead and water (referred to here as 'lead-safe' products), where appropriate products are available on the Australian market.

In scope are all tapware, fittings, piping systems and infrastructure that form part of a drinking water service. Pipe fittings, breeches and thermostatic mixing valves, hot and cold tapware, and boiling water units are subject to this requirement. These elements can be made from stainless steel, copper, cross-linked polyethylene and copper tubing, lead-safe and plastic plumbing products.

This requirement does not apply to fixtures such as sinks, troughs and basins, external vandal-proof taps or infrastructure associated with fire, waste or sewerage plumbing systems, however, tapware for troughs, sinks and basins that is not vandal-proof **must** comply with above lead-safe or -free requirements.

Deadlegs **must** be avoided in all parts of a plumbing system. The design team **must** log any departures and rationale for these during the design phase.

Additionally, all plumbing fixtures, materials and fittings installed in new Victorian schools or in upgrades to existing schools **must** be certified under the WaterMark Certification Scheme.

PIPEWORK, VALVES AND FITTINGS

All pipework, valves and fittings that are used for the provision of domestic water services **must** comply with and be installed in accordance with relevant Australian standards.

Project consultants **must** select and satisfy pipework, valves and fittings for domestic water services that meet the following requirements:

- valves and fittings **must** be located to ensure control of supply to all buildings, control all sections of the ring main for shutdown for maintenance, and to enable for new branches to be 'cut in'
- **must** be capable of not less than 1.5 times the working pressure of the systems
- service valves **must** be located where the risk of tampering by users and/or visitors is minimised

- valves **must** be installed at a safe working height and appropriately labelled
- valves **must** be provided on all systems to control the supply to groups of outlets as well as each individual points of demand to allow isolation or service
- maintain water pressure between 250–500kPa
- minimise differences in cold and hot water pressure at any item to ± 50 kPa
- supply **must** be calculated to provide flows and pressures with pipe sizing based on a maximum water velocity at design flow of 2.0m/sec for pipework
- capacity of pipework **must** meet the design load for peak student enrolments, plus 20% spare capacity
- pipes **must** be supported to reduce structure-borne noise levels and lagged to provide protection to piping from elements or other damage, with compliant acoustic and thermal properties
- pipework **must not** be cast in concrete and water pipe work must be designed to eliminate any risk of 'blue water'.

5.13.2 TAP OUTLETS AND FIXTURES

Project consultants **must** provide a general distribution of external taps for garden watering, irrigation and general facility use.

All tapware and associated fixtures are described within [Tap fittings and fixtures](#).

For information on gardening irrigation systems, please refer to [Landscape architecture](#).

5.13.3 WATER STORAGE

Consideration **should** be given to the retention of rainwater onsite through the use of tanks.

All water storage tanks **must** comply with and be installed in accordance with the relevant Australian standard.

Where storage tanks are to be installed, the system **must** incorporate the following:

- storage tanks **must** be constructed in durable high-impact material of potable water supply quality heavy-duty PVC, galvanised, epoxy coated steel, or reinforced concrete tanks that may be installed and fitted with heavy duty liner specifically designed for potable water
- have filtration and disinfection to remove health risks from water spray or accidental ingestion, and ensure water quality is visually clear.

Bladder-type tanks can be used beneath floors and decks, but **must** be accessible for maintenance and repairs.

5.13.4 NON-POTABLE WATER SERVICES

Each school site **must** be provided with a separate pipe system for non-potable water for uses including toilet and cistern flushing and irrigation. Sources include reticulated neighbourhood supply or water reclamation tanks.

Project consultants **must** select and satisfy non-potable water systems that meet the following requirements:

- safety warning signage **must** be installed on all controllable points of use
- pipes are identified by a purple colour, in accordance with AS/NZS 3500 Plumbing and drainage, and AS 2700 Colour standards for general purposes
- storage tanks installed for flush valve supply **must** have 100% capacity plus domestic water make-up, based on tanks assumed empty
- where reticulated reclaimed water is available, this **must** be used for non-potable purposes.

For information on water storage and tanks, please refer to [Water storage](#).

5.13.5 POTABLE AND NON-POTABLE PRESSURE-BOOSTING PUMPS

If being used, project consultants **must** select and satisfy pressure-boosting pumps for potable and non-potable water that meet the following requirements:

- pump sets **must** comprise dual multi-stage variable speed constant pressure pumps of stainless steel construction connected in parallel with 316 stainless steel inlet and outlet manifolds
- control panels **must** be touch-screen programmable logic controllers (PLC) interface mounted on front panel showing operational and alarms status
- pumps **must** have integrated variable speed drives
- minimum functions **must** include:
 - manual override outside control panel
 - low and over-pressure shut down
 - standby pump redundancy with automatic changeover
 - separate transducer for each pump
 - automatic alternating duty-standby operation with manual override
 - dry-running protection for each pump
 - status and alarm monitoring to the BMS
 - bypass valve assembly
 - positive suction head
 - stainless steel non-return valve to each pump

- isolation valves on each valve for removal of pump and non-return valve from manifolds
- duplicate diaphragm tanks
- vibration dampers on each pump
- safety switch on individual pumps
- phase failure protection on each pump
- voltmeter, ammeter on key pad interface
- fault light for each pump
- emergency operation switch
- radio frequency interference (RFI) filters on each pump
- shield cables from motors to control.
- duty pumps **must** be capable of system demand based on peak enrolments plus 20% spare capacity, and capable of the capped speed increase for potential future duty.

5.13.6 HEATED WATER

Schools and the VSBA will nominate which fixtures are cold-only, and which are hot and cold. In primary schools, hot water is generally supplied to staff and administration areas, student showers, canteens, art room, and accessible toilets. In secondary schools, heated water is to be provided to basins, sinks and wash fixtures in all areas except hand wash facilities in student toilets.

Project consultants **must** select and satisfy heated water that meet the following requirements:

- flow and return circulating loops extending from central hot water plant systems aligned throughout the building to ensure that pipe dead legs to outlets are no longer than 5m
- single-leg systems extending from stand-alone hot water generation systems
- hot water supplies **must** be generated and delivered through main pipelines at a minimum of 60°C to inhibit the growth of legionella bacteria
- maximum supply temperature of 45°C **must** be provided at all outlets used for personal hygiene purposes including all other outlets that are likely to be used where temperature control is required to minimise the risk of scalding to users. Thermal mixing valves (TMVs) **must** be used, with TMVs being accessible for testing and maintenance
- maximum supply temperature to outlets of 50°C may be provided to other areas where a minimal scalding risk may be demonstrated and a higher temperature is required for delivery purposes
- warm or tepid water systems may be considered subject to adequate legionella controls being installed

- provide wall-mounted or under-bench boiling water units as appropriate, with capacity to suit the particular application and featuring a clock device for energy efficiency. Boiling water units **must** have a 5L maximum capacity. Boiling water units are to be for hot drinks for staff areas and other areas not normally accessible to students, and deliver water at 95°C
- all boiling water units **must** be energy efficient and gas units **must** have a five-star energy rating label or better. Timers for shut-down for night-time, and for holidays, weekends and other non-school days, **must** be considered.

5.13.7 HEATED WATER SYSTEMS

Project consultants **must** determine the most suitable method of generating heated water at each site. Systems are to be appropriately sized, with adequate capacity for the expected use in all school buildings and community joint-use facilities. Systems **must** also have additional capacity for the potential installation of relocatable units.

The following systems are to be used:

- standalone electric or gas for systems
- solar hot water panels
- base heating plant **must** be sized to provide full capacity without solar contribution.

Circulating pumps **must** comprise mechanical seals, be fitted with variable speed drives (VSD), and have high-efficiency motors.

All external hot water plants and flues **must** be provided with appropriate protection to prevent injury or theft.

PIPEWORK VALVES AND FITTINGS

Project consultants **must** provide pipe work, valves and fittings for heated water systems that meet the following requirements:

- valves and fittings **must** be located to ensure control of supply to all buildings also enabling new branches to be 'cut in'. Valves **must** be selected to be capable of not less than 1.5 times the working pressure of the systems
- service valves **must** be located to minimise the risk of tampering by users and visitors. Valves **must** be installed at a safe working height above in locations that meet all relevant OHS legislation, principles and guidelines, and be appropriately labelled
- valves **must** be provided on all systems to control the supply to groups of outlets, as well as to each individual point of demand, fixture, item of plant and FF&E, to allow isolation or service

- maintain water pressure between 250–500kPa at each item of plant or FF&E, fixture outlet and point of demand, as a general minimum requirement
- minimise differences in cold and hot water-pressure at any item of plant or FF&E, fixture and/or outlet to ± 50 kPa
- supply **must** be calculated to provide flows and pressures in accordance with the Institute of Plumbing Australia — Selection and Sizing of Copper Tubes for Water Piping Systems guidebook and with pipe sizing based on a maximum water velocity at design flow of 2m/sec for pipework. Capacity **must** meet peak enrolment numbers load plus 20%
- temperature control valves/thermostatic mixing valves installed where supplies **must** be delivered at 45°C, and with tempering valves acceptable in other areas
- the balancing valve **must** include the capability of measuring and confirming circulating pump water flows on each return loop, and the return from each building level to validate adequate circulation
- all main pipework reticulation **must** be fully accessible
- where heated water systems are to generate and deliver a warm-water system, UV disinfection and other similar measures that are considered acceptable legionella control systems for warm-water delivery **must** be installed.

5.13.8 SEWER SYSTEMS AND SANITARY PLUMBING

Sewer drains are to be provided and appropriately sized for all school buildings and community joint-use facilities. Project consultants **must** also provide additional sewer drainage capacity for the potential installation of relocatable buildings.

Project consultants **should** also consult the [Sewerage](#) section before designing the sewerage system.

Project consultants **must** select and satisfy sewerage systems that meet the following requirements:

- sewer drainage design **must** provide connections for all proposed and future relocatable buildings
- that the drainage system is to connect into the authority system in accordance with water authority requirements
- main drains **must** be ventilated to atmosphere in accordance with AS/NZS 3500 — Plumbing and drainage, with consideration of the nuisance to users
- provide inspection openings for maintenance purposes

- secured grates that can be easily accessed
- all inspection openings under pavements **must** have inspection shafts
- inspection openings at the end of each pipeline in each building **must** be extended to surface level, with sealed risers to act as clear-out points. Openings **must** be located in accessible locations to allow clearing of blockages with minimum disruption to the operation of a facility
- inspection chambers to the sewerage systems at the end of lines outside buildings, at changes of direction and at regular intervals for cleaning and maintenance purposes
- additional sealed branches and system adequacy to allow for the future installation of relocatable units
- sealed drainage points to allow for temporary discharges from transportable buildings such as dental vans and the like.

Where sewer drains cannot gravitate to the boundary point, a local pump well system **must** be installed, complete with dual sewerage pumps of sufficient capacity to suit the volume to be discharged. The pumps **must** operate in automatic reciprocal duty. The pump discharge **must** be directed via pressure line to the site boundary point or other gravity drain, with sufficient capacity for the discharge from the pump chamber.

Grates **must not** allow students to insert or drop debris into drains.

SEWERAGE TREATMENT SYSTEM

A sewerage treatment system **must** be provided where a sewerage authority system is not available.

Project consultants **must** select and satisfy sewerage treatment systems that meet the following requirements:

- **must** be of sufficient capacity to cater for the entire sewerage volume that may be generated from a site
- the treatment plant **must** include all necessary chambers, filters and the like to ensure that the sewerage discharge is treated correctly
- discharge from the plant **must** outfall via appropriate measures that comply with all requirements of the local council and EPA Victoria.

SANITARY PLUMBING

Project consultants **must** select and satisfy sanitary plumbing systems that meet the following requirements:

- sewer stacks to ensure that a gravity connection can be made to a stack or waste pipe riser from any part of the floor. The gravity connection **must** consider gradients of pipes, avoiding services and structural obstructions
- a minimum pipe size of 100mm diameter for the dedicated connection of water closets
- shower outlets **must** be a minimum of 80mm in diameter
- all sewer stacks **must** be fitted with at least one branch connection at each floor level as low as possible in the false ceiling (where multi-storey construction is proposed)
- sewer stacks (including stacks only serving sullage fixtures) **must** be not less than 100mm diameter
- connect ground and above-ground fixtures that are unable to be connected by gravity to the authority sewer to dedicated ground-level and above-sewer pump stations.

PIPEWORK AND FITTINGS

Suitable pipework and fittings **must** be used for sewerage, sewerage treatment and sanitary plumbing. Preferred pipework material is PVC unless noted otherwise. Pipework **should** be concealed if possible. Any exposed pipework **should** be of copper alloy (70/30) brass).

All pipework and fittings for use in sewerage, sewerage treatment and sanitary plumbing systems **must** be installed and comply with the relevant Australian standard.

Project consultants **must** select and satisfy pipework and fittings for use in sewerage, sewerage treatment and sanitary plumbing systems that meet the following requirements:

- pipework material **should** be PVC unless noted otherwise
- an overflow relief gully included for each major building with vandal-proof hose tap above to enable charging
- all sanitary drainage pipework **must** be acoustically treated when passing through sound-sensitive areas
- traps provided for wastes on fixtures requiring treatment apparatus
- vents **must** not be flush with or at the building facade
- tundishes **must** be visible for inspection.

5.13.9 TRADE WASTE SYSTEM

Trade waste is liquid wastewater from a commercial or industrial entity that enters the sewer system. To protect the sewer system, trade waste may need to be treated (to remove harmful chemicals and/or fats) before it is discharged. Project consultants **must** provide a trade waste plumbing system that is appropriately sized for areas and community joint-use facilities that require such facilities (such as commercial kitchens, hospitality facilities and canteens).

Project consultants **must** select and satisfy a trade waste treatment system that meets the following requirements:

- be based on gravity design wherever possible
- be fitted with 'full-way' inspection openings and, where concealed, **must** be accessible through access panels
- pumps arranged to allow isolation or removal without disruption to the operation of the system
- are accessible to allow clearing of blockages with minimum disruption to the operation of a facility — for example, access panels **must not** be located in teaching or staff work areas
- should provide neutralisers as a minimum requirement, and automatic dosing plant if required, in accordance with local water authority trade waste requirements.

TRADE WASTE APPARATUS

Project consultants **must** select and satisfy trade waste system apparatus that meet the following requirements:

- neutralising tanks as 'treatment' apparatus (in lieu of mixing tanks) located in dedicated plant room or other secure locations for maintenance purposes
- grease and chemical treatment apparatus
- a common apparatus only for groups of smaller facilities
- separators to minimise the risk of extraneous material entering the waste system.

PIPEWORK AND FITTINGS

For pipework and fittings for trade waste systems, project consultants **should** review [Sewer systems and sanitary plumbing](#).

Project consultants **must** select and satisfy pipework and fittings for use in trade waste systems that meet the following requirements:

- pipework formed in suitable materials to meet the discharge requirements

- pipework requiring an acoustic rating **must** be acoustically lagged to meet the requirements
- pipework **must** not be cast-in concrete
- incorporate the principles for pumping and overflow relief as described for the sanitary plumbing and sewerage system and sewerage infrastructure system.

Air admittance valves (AAVs) **must not** be installed in trade waste installation where chemicals are to be discharged.

5.14 Vertical transportation

Project consultants **must** provide vertical transportation if required to ensure that the facilities delivered are accessible and compliant with all relevant regulations. If vertical transportation is provided, it **must** meet the following requirements:

- the lifts **must** be key-protected, providing controlled access and use for disabled students, visitors, and members of staff only
- the lifts **must** contain alarm communication devices so school staff are aware of a trapped person, and communication can be made with a 24-hour help line via a direct link to notify an appropriate party of their location and thereby initiate their release
- lift capacity **must** be appropriate for its intended use.

Where used, lifts **must** comply with and be installed in accordance with the following Australian standards:

| | |
|-------------------|--|
| AS 1428.2 | Design for access and mobility — Enhanced and additional requirements — Buildings and facilities |
| AS 1735.12 | Lifts, escalators and moving walks — Facilities for persons with disabilities |
| AS 1735.14 | Lifts, escalators and moving walks — Low rise for passengers |

In addition to the above standards, project consultants are required to comply with all associated and necessary standards.

If any design relies on a low-rise wheelchair platform lift to provide an accessible transition between split floor levels (nominal maximum 1200mm difference), such platform lifts **must** comply with AS 1735.14, the relevant DDA legislation, and the requirements of the Building Code of Australia Section E 3.6.

6 BUILDING HANDOVER AND COMPLETION

Handover, commissioning, tuning and completion activities ensure the building and all services operate effectively, efficiently and as intended.

At the completion of a build, project consultants are required to complete activities that ensure functionality and induct users.

Project consultants are responsible for ensuring that:

- practical completion under the contract is achieved
- contract and design documents are complied with
- workmanship is up to standard
- regulatory requirements have been met
- inspections have been completed
- commissioning reports, testing, validation of system performance and completion statements have been obtained
- authority sign-off has been obtained (for example, from the fire brigade)
- warranty information has been identified, checked and provided
- Occupancy Permit or Certificate of Final Inspection has been obtained
- Essential Safety Measure (ESM) requirements have been specified and understood
- statutory signage and component identification has been completed
- termite protection is in place
- certification and notices are provided.

Smoking is banned within four metres of an entrance to all primary and secondary schools in Victoria, and within the school grounds, under an amendment to the Tobacco Act 1987. It is a legislative requirement that each school installs suitable 'No smoking' signs at all entrances to the school grounds. [Downloadable templates](#) are available.

Completion and handover timeframes differ for kindergarten delivery than from schools. In the case of kindergartens on school sites, third party service providers are appointed approximately nine months prior to start of the school year ie. March to April. The service provider is the only entity that can apply to the regulator for approval to operate an early childhood service from the kindergarten.

The appointed service provider will undertake service establishment activities that may include submitting an application to become an approved service provider prior to practical completion of the facility. Information that **must** be included in an application in relation to the physical environment include the following plans prepared by a building practitioner:

- a soil assessment or statement about the soil assessment,
- copy of planning permits if required, and other planning related permits, and
- a certified [DET area measurement form](#).

The Principal Design Consultant (or Project Manager where appointed) is responsible for providing all documents pertaining to the built form and site conditions required for registration. Where these documents are prepared by the builder, the Principal Design Consultant (or Project Manager where appointed) **must** ensure the requirement to prepare and provide all documents required for registration is captured adequately in the building contract.'

The approval process includes a site visit by the regulator. This occurs after practical completion once the service provider has installed all equipment for operations. Where the regulator identifies non-compliant elements that **must** be rectified prior to service approval, the Principal Design Consultant (or Project Manager where appointed) is responsible for ensuring the rectification is completed by the builder under the building contract'.

6.1 Commissioning and tuning

Commissioning, handover and tuning initiatives ensure all building services operate to their full potential and as designed. Project consultants **should** undertake appropriate commissioning and tuning activities before building handover for the following building systems:

- mechanical services
- Building Management and Control System (BMCS) or smart monitoring and or control systems for individual services.
- lighting and associated controls
- electrical systems (such as electrical generation, electrical supply, distribution systems, security and access systems, and alarm systems)
- hydraulic systems (such as gas and water supply distribution systems, sewage collection and distribution systems, stormwater collection and distribution systems, and pumps)
- fire detection systems, smoke alarm systems and emergency warning systems
- fire protection systems, including pumps and other equipment
- lifts and any other vertical transport devices
- building envelope, such as facades, roofs and glazing systems.

6.2 Essential safety measures

ESM are fire and life safety items installed or constructed in a building. When correctly maintained, ESM support students and staff to evaluate safety in the event of a fire or other emergency.

The details of ESM features are specified on occupancy permits, and the maintenance schedules for ESM items **must** also reflect these details. Fire systems **must** be regularly maintained to ensure their performance and function. At the completion of capital projects, project consultants **must** provide maintenance instructions and logbooks that allow school asset managers to perform required essential safety maintenance.

Fire system maintenance procedures **must** comply with the following standard:

AS 1851 Routine service of fire protection systems and equipment

In addition to the above standard, project consultants are required to comply with all associated and necessary standards.

A valid fire hydrant system testing report providing the results of the hydrostatic, pressure and flows testing is to be obtained prior to the handover of the asset. If no valid fire hydrant system report is available, an investigation including hydrostatic, pressure and flows testing **must** be obtained.

6.2.1 MANUAL AND LOGBOOK

Project consultants **must** provide an applicable building manual logbook for essential safety measures. This will provide details for all asset items that require:

- inspection and testing under the Building Regulations for essential safety measures, and production of these records as specified in the Occupancy Permit or Certificate of Final inspection
- inspection and testing required by any authority
- preventative maintenance to prolong life.

6.3 Building operations and maintenance

Building operations and maintenance information for all buildings systems and structures **must** be provided by project consultants at project completion. The information **must** address the intended use of the building. It **must** allow operators and users to understand a building's systems, and their operation and maintenance requirements.

Information required from project consultants includes:

- preventative maintenance to prolong life including procedures, tests and schedules
- corrective maintenance requirements, including repair requirements
- maintenance to ensure the facility's warranty status
- links or references to all relevant operations and maintenance information
- descriptions of building systems, including their use and performance
- descriptions of activities for ongoing compliance
- re-commissioning procedures
- building tuning protocols
- guidance on keeping information up-to-date
- a summary sheet of relevant building service contacts
- operating parameters and procedures
- service contacts, and any warranties and certificates
- up-to-date drawings incorporating at least:
 - mechanical, electrical and hydraulic drawings and schematics covering all associated nominated building systems
 - architectural, facade/building envelope drawings
 - architectural layout of the base building
 - digital photographic records to underground services
 - safety data sheets (SDS)
- trouble-shooting
 - examples of potential faults, and how to repair them
 - frequently occurring faults or adjustments
 - issues found and resolved during commissioning.

CERTIFICATES

Project consultants **must** provide the following certificates during building handover:

- development approval
- building approval
- determinations
- fire engineering reports
- occupancy certificates
- registrations and licences
- engineer certificates
- utility providers
- authority consents.

SUSTAINABLE OPERATIONS

In addition, information aimed at assisting the facilities management team to operate the building for optimal sustainability outcomes **should** be provided. While there are no specific requirements for the content that **must** be presented, the following typical information can be provided:

- details on targets or operational benchmarks for energy use, greenhouse gas emissions, potable water, and indoor environment quality including air quality and thermal comfort indices. These **should** be SMART (specific, measurable, achievable, relevant and timebound) goals aimed at assisting the facilities management team to optimise performance of the building
- details on the metering and sub-metering strategy employed by the building, including any instructions for data collection and analysis
- description and location of a sustainable procurement framework (if available)
- description of basic function and operation of any nominated building systems that building users may come in direct contact with, including any occupant-activated controls
- description of initiatives designed to enhance energy efficiency and minimise greenhouse gas emissions, and measures that **must** be taken by users during day-to-day operation to maximise their effectiveness
- description of initiatives intended to enhance and minimise water use and the measures that **must** be taken by users during day-to-day operation to maximise their effectiveness
- description of the operational waste requirements for the building users, including which waste streams can or cannot be collected for recycling at the premises

- list of relevant contacts for maintenance information, operational issues, complaints or other feedback (such as relevant facilities management team contact details and online request/feedback forms)
- description of alternative transport initiatives promoted within premises (such as bicycle facilities, end-of-trip facilities, car-pooling or car-sharing) and the location of a transport plan (if available)
- information on how to maximise the efficiency potential offered by base building services and nominated building systems
- information on how to best maximise daylighting, sights and views.

6.4 Training

Onsite training **should** be provided by project consultants for all systems, and **should** include basic theory about systems' operation, routine maintenance, identification of faults and recommended courses for rectification. Training **should** be provided at two levels: basic operational training for routine users of facility and systems, and more detailed technical training for facility maintenance staff.

Project consultants **must** perform the following training activities as part of the handover process:

- submit a program for training well before the proposed date of the training, include detailing the contents of the training program and the minimum time necessary for the formal instruction
- training session times **should** suit the principals' nominated representatives. Training sessions **should** allow sufficient time and be sufficiently detailed to ensure that staff unfamiliar with the equipment or systems will be able to operate them competently
- respond to queries and provide additional advice and support to the principals' representatives throughout the defect liability period
- provide a schedule of completed training, including evidence of original attendees and content covered during respective training sessions
- Minimum of two training sessions **should** be provided, one at practical completion and another one-and-a-half months after practical completion.

6.5 Update triggers

Project consultants, as part of the handover process **must** identify triggers for updating operations and maintenance information. Triggers for updating operations and maintenance (O&M) manuals and information **should** include:

- refurbishment of a base building space
- recommissioning, retro-commissioning, or replacement of nominated building systems
- change to building owner targets or benchmarks
- when a new operational process is introduced or an existing one is changed
- when a new tenant fit-out is finalised (if applicable).

6.6 Termites

All school projects **should** now incorporate protective measures against termite attack on the buildings forming part of the project. These measures create barriers to concealed access, but do **not** ensure permanent protection without active and ongoing maintenance. Maintenance requirements applying to the selected system of protection **should** be communicated to the school and its operation and maintenance manuals.

7 GLOSSARY

| | |
|------------------------------|--|
| AAVS | Air Admittance Valves |
| ACB | Air Circuit Breaker |
| ACCS | Australian Carpet Classification Scheme |
| AIRAH | Australian Institute for Refrigeration, Air Conditioning and Heating |
| ARI | Average Recurrence Interval |
| AS | Australian Standard |
| AS/NZS | Australian Standard/New Zealand Standard |
| AV | Audio-visual |
| BARR | Bushfire at Risk Register |
| BMCS | Building Management and Control System |
| BMS | Building Management System |
| BQSH | Building Quality Standards Handbook |
| BS | British Standard |
| CAC | Ceiling Attenuation Class |
| CAD | Computer Aided Design |
| CCA | Copper-chromium-arsenate |
| CCTV | Closed Circuit Television |
| CFC | Compressed Fibre Cement |
| CIBSE | Chartered Institution of Building Services Engineers |
| CRI | Colour Rendering Index |
| DAB | Design & As-Built |
| DB | Decibel |
| DBS | Distribution Boards |
| DDA | Disability Discrimination Act 1992 (Cth) |
| DELWP | Department of Environment, Land, Water and Planning |
| DET | Department of Education and Training |
| $D_{NT,W}$ | Weighted Standardised Level Difference |
| D_w | Weighted Level Difference |
| DN | Diameter Nominal |
| EER | Energy Efficiency Ratio |
| ELCB | Earth Leakage Circuit Breaker |
| EMAS | Eco-Management and Audit Scheme |
| EMP | Environmental Management Plan |
| EMS | Environmental Management System |
| EPA | Environmental Protection Agency |
| EPD | Environment Product Declarations |
| EN | European Norms |
| ESM | Essential Safety Measure |

| | |
|-----------------------|---|
| FF&E | Fixtures, Fittings and Equipment |
| FIP | Fire Indicator Panel |
| FSC | Forest Stewardship Council |
| GBCA | Green Building Council of Australia |
| GPOS | General Purpose Outlets |
| HID | High Intensity Discharge |
| HV | High Voltage |
| HVAC | Heating, Ventilation and Air Conditioning |
| HZ | Hertz |
| ICT | Information and Communications Technology |
| IP | Ingress Protection |
| IP | Internet Protocol |
| ISDN | Integrated Services for Digital Network |
| ISO | International Organisation for Standardization |
| IT | Information Technology |
| LED | Light-emitting Diode |
| LPG | Liquid Petroleum Gas |
| MATS | Master Antenna Television System |
| MATV | Multiple Access Television |
| MFDS | Multi-functional Devices |
| MIMS | Mineral Insulated Metal Sheath |
| MSB | Main Switchboard |
| N₂O | Nitrous Oxide |
| NATHERS | Nationwide House Energy Rating Scheme |
| NBN | National Broadband Network |
| NCC | National Construction Code |
| NIRV | Noise from Industry in Regional Victoria |
| NRC | Noise Reduction Coefficient |
| O&M | Operations and Maintenance |
| OHS | Occupational Health and Safety |
| PA | Public Address |
| PBX | Private Branch Exchange |
| PCB | Polychlorinated Biphenyls |
| PCV | Project Contract Value |
| PEFC | Programme for the Endorsement of Forest Certification |
| PMF | Project Management Framework |
| PLC | Programmable Logic Controllers |
| PSTN | Public Switched Telephone Network |
| PSV | Project Sustainability Value |
| PVC | Polyvinyl Chloride |

| | |
|----------------------|--|
| R_w | Weighted Sound Reduction Index |
| RATSI | Rapid Speech Transmission Index |
| RCD | Residual Current Device |
| RFI | Radio Frequency Interference |
| RMS | Root Mean Square |
| RPM | Revolutions Per Minute |
| SDS | Safety Data Sheet |
| SEPP | State Environment Protection Policy |
| SMART | Specific, Measurable, Achievable, Relevant and Timebound |
| SMF | Synthetic Mineral Fibres |
| SPC | State Purchase Contract |
| SRI | Solar Reflectance Index |
| SU | Security Unit |
| TAFE | Technical and Further Education |
| TEFC | Totally Enclosed Fan Cooled |
| THDI | Total Harmonic Distortion |
| TM | Technical Memoranda |
| TMVS | Thermal Mixing Valves |
| TPS | Thermoplastic Sheathed |
| TVOC | Total Volatile Organic Compound |
| UGR | Unified Glare Rating |
| ULOR | Upward Light Output Ratio |
| UPVC | Unplasticised Polyvinyl Chloride |
| UV | Ultraviolet |
| VBA | Victorian Building Authority |
| VCAL | Victorian Certificate of Applied Learning |
| VCE | Victorian Certificate of Education |
| VCAA | Victorian Curriculum and Assessment Authority |
| VIPP | Victorian Industry Participation Policy |
| VET | Vocational Education Training |
| VOC | Volatile Organic Compounds |
| VOIP | Voice over Internet Protocol |
| VSBA | Victorian School Building Authority |
| VSD | Variable Speed Drive |
| WAN | Wide Area Network |
| WAPS | Wireless Access Points |
| WSAA | Water Services Association of Australia |

APPENDIX

| SECTION | SUB-CATEGORY | PG. NO. | ISSUE / CURRENT RELEVANT CONTENT | BQSH AMENDMENT [ADDITIONS IN RED] |
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| Education vision and philosophy | 2.2 | 13 | ISSUE: Add early childhood learning overview sub-section to Planning section. | [ADD subsection] 2.2.5 Early childhood facilities The Department of Education and Training will be delivering a number of new kindergartens on school sites to provide additional infrastructure capacity to support the roll-out of Three Year Old Kindergarten across Victoria. High quality learning is supported through the physical and social environments, and opportunities that early childhood learning facilities, such as kindergartens provide. |
| Education vision and philosophy | 2.2 | 12 | ISSUE: Add early childhood learning key principles. | High quality environments promote children's engagement, positive learning experience and inclusive relationships. Physical learning environments should include both indoor and outdoor learning spaces that satisfy the key principles, such as: <ul style="list-style-type: none"> • flexibility and accessibility • a range of developmentally appropriate, open ended activities and sensory experiences • an environment that is sustainable, fit for purpose and reflects the diversity of families within the local and broader community |
| Education vision and philosophy | 2.3.3 | 17 | ISSUE: Add early childhood learning 2.3.3 with lines on value of early childhood education. | [new subsection - 2.3.3] Early childhood education matters Neurobiology shows how the early years of development establish the basic structures of the brain. A child's relationships, experiences and environment during these years create neural pathways that have a long-lasting influence on health, wellbeing, behaviour and learning. Children develop skills that help them to manage their emotions and behaviour, build resilience and persistence, form positive relationships and focus their attention. These skills are vital in enabling children to transition into school and help navigate and adapt to the numerous changes they are likely to encounter in their future. |

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| Planning | 3.1.4 (NEW SECTION) | 21 | ISSUE: Overview of early childhood learning facilities such as kindergartens and co-location. | <p>[new sub-section 3.1.4]</p> <p>Building for early childhood learning</p> <p>The Department of Education will be delivering a number of new kindergartens on school sites to provide additional infrastructure capacity to support the roll-out of Three Year Old Kindergarten. These kindergartens will be delivered on new and existing government school sites.</p> <p>With Government's new focus on the benefit of integrating early childhood learning into the wider government school system. The new co-located kindergartens can help make drop off time simpler for parents, support smoother transitions between early learning and primary school, and may make kindergarten programs more accessible for some children.</p> |
| Planning | 3.1.4 (NEW) | 21 | ISSUE: Need to indicate legal obligations around design on early childhood learning facilities such as kindergartens. | <p>The National Quality Framework (NQF) sets out the standards and legal obligations for approved service providers of early learning services across Australia. The National Quality Standards (NQS) sets out the benchmarks for early childhood education and care, including the ways an early learning facility's environment such as a kindergarten's is designed, equipped and organised to maximise children's engagement and positive relationships.</p> <p>Early Learning environments must comply with the National Quality Framework - Quality Area 3 - Physical Environment</p> |
| Planning | 3.2 UNIVERSAL DESIGN | 22 | ISSUE: Extend to kindergartens. | <p>The Victorian Government supports the concept of universal design and its application throughout Victorian government schools - ADD "and early childhood facilities such as kindergartens"</p> |
| Planning | 3.3 MASTER PLANNING 3.3.1 URBAN CONTEXT | 24 | ISSUE: Extend universal design to kindergarten design. | <p>Project consultants must ensure schools and kindergartens complement their community</p> |
| Planning | 3.3.5. SITE PLANNING | 24 | ISSUE: Include planning for integrated or co-located kindergartens. | <p>~ the kindergarten facility, where applicable</p> |
| Planning | 3.3.5. SITE PLANNING | | ISSUE: Include planning principle requirements for integrated or co-located kindergartens. | <p>Where a kindergarten is designed on a school site specific considerations should include:</p> <ul style="list-style-type: none"> • northern orientation for indoor and outdoor play spaces • facility to be directly accessible from the street • regular shaped building to support supervision • strong connection to /interface with school facilities • if car parking is included direct access to the kindergarten entry |

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| Planning | 3.3.5 | 25 | ISSUE: Indicate requirement for separate waste collection for kindergarten service. | A separate waste disposal area (minimum 8m ²) must be located within the footprint of any kindergarten facility. |
| Planning | 3.3.6 INTEGRATION OF SHARED FACILITIES | 26 | ISSUE: Recommended criteria for integration of kindergartens and school facilities. | Where a kindergarten is to be integrated into the school facilities, consideration should be given to shared use of (school and kindergarten) administration, meeting and staff breakout spaces, and the creation of gathering areas for parents and carers close to the kindergarten entrance. |
| Planning | 3.3.7 EMERGENCY EXITS | 26 | ISSUE: Indicate required kindergarten compliance with NCC and NQF for emergency exits. | Consultants must ensure all emergency egress' in early childhood facilities are designed in accordance with the National Quality Framework and National Construction Code. |
| Planning | 3.3.8 SITE CIRCULATION | 26 | ISSUE: Indicate carpark design considerations for kindergartens. | Where a kindergarten includes a car park and vehicular thoroughfares, consideration must be made to younger children and parents with prams as they are more vulnerable to high risk vehicular movement. |
| Planning | 3.3.11 VEHICLE ACCESS | 27 | ISSUE: Indicate car park design considerations for kindergartens, including staff and parent/carer car parking. | When car parking is provided for a kindergarten and where site conditions allow, the car park should be separate from the school car parking and provide direct access to the kindergarten entry. |
| Planning | 3.3.13 PROVISION OF CAR PARKING | 26 | ISSUE: Indicate preferred provision of some car parking for parents/ carers using the kindergarten. | Where site conditions allow, kindergarten car-parking for parents/carers accompanying children to sign them in and out of the kindergarten, the car park should be separate from school staff car parking and provide direct access to the kindergarten entry. |
| Planning | 3.4 LANDSCAPE PLANNING | 28 | ISSUE: Indicate specific requirements for landscape design for early childhood learning facilities as it forms part of the outdoor play licensed space. | Specific regulations and spatial requirements apply to outdoor play spaces in kindergartens, including: <ul style="list-style-type: none"> • as for schools, a qualified landscape designer must be consulted to design all aspects of the outdoor areas of kindergartens • external play spaces must be enclosed by AS1926-compliant fencing / barriers that are, minimum, 1800mm high • storage sheds, trees and play equipment such as cubby house should not be placed within 100mm of a perimeter fence line • sandpits with minimum depth of 400mm are provided • grated stormwater pits are fitted with heel safe lids to avoid finger entrapment. |

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| Planning | 3.5 SCHOOL DESIGN PRINCIPLES | 29 | ISSUE: Indicate standards for the design of early childhood learning facilities such as kindergartens. Enclosure height best practice. | In addition for kindergartens, the design principles set out in the seven National Quality Standards related to the Physical Environment Quality Area 3 |
| Planning | 3.5.3 LEARNING SPACES | 32 | ISSUE: Indicate specific requirements for the design of indoor spaces in early childhood learning facilities such as kindergartens. | <p>The indoor play space of a kindergarten is subject to specific regulatory requirements. Consultants must ensure that designs meet the seven National Quality Standards related to the Physical Environment Quality Area 3 including that:</p> <ul style="list-style-type: none"> indoor child playrooms allow minimum unencumbered indoor space that does not factor in: <ul style="list-style-type: none"> areas such as passageways, bathrooms and nappy change areas, space set aside for the use of storage, staff or administrative rooms, and any space not suitable for children are not counted as unencumbered play space. |
| Planning | 3.5.3 LEARNING SPACES: VIEWS AND LINES OF SIGHT | 32 | ISSUE: Indicate specific requirements for design for constant supervision in early childhood learning facilities such as kindergartens. | All indoor and outdoor approved areas of a kindergarten must be designed in a way that facilitates supervision of children at all times they are being educated and cared for by the service including toilets and nappy change facilities. |
| Planning | 5.10.6 AND 5.10.3 | 120–121 | ISSUES: 1. Indicate specific kindergarten requirements for ICT i.e. kindergartens should not share/ use school internet or communication services. 2. Specified heights for data outlets and GPOs are best practice, for children's safety. | <p>[5.10.6] Kindergartens must have separate ICT service. Consultants must allow for a full height services cupboard suitably sized and ventilated to accommodate the IT equipment and communications cabinet in the kindergarten. The kindergarten will not be connected to the DET Wide Area Network, the early childhood provider will procure their own preferred provider.</p> <p>[5.10.3] Additionally, in kindergartens, data outlets (and GPOs) must be installed at 1500mm AFL in spaces that are accessible to children.</p> |

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| Planning | 3.5.5 ADJACENCY OF SPACES | 33 | ISSUE: Indicate preference for the design on early childhood learning facilities such as kindergartens to facilitate relationship with the school children and their future progression to primary school. | Where kindergartens are co-located on a school site, outdoor play spaces should be located adjacent to primary school outdoor play areas or school learning spaces to enhance connection. Where kindergartens are integrated into the school facilities, consideration should be given to shared use of administration, meeting and staff breakout spaces. |
| Planning | 3.6 LEGISLATIVE REQUIREMENTS | 34 | ISSUE: Indicate specific legislative instruments that influence and guide the design of early childhood learning facilities such as kindergartens. | <p>The National Quality Framework (NQF) consists of Acts and Regulations that guide the design of early learning facilities such as kindergartens. The National Quality Standard (NQS) provides education and care services delivered in early learning facilities certainty about what is expected of them and what they are required to do to comply with the National Quality Framework.</p> <p>The NQF is underpinned by the following regulatory tools:</p> <ul style="list-style-type: none"> • the Education and Care Services National Law Act 2010 • the Education and Care Services National Regulations 2011 • the National Quality Standards and quality rating system <p>All early childhood facilities such as kindergarten designs must comply with all of the NQF tools and additional requirements laid out in the Building Quality Standards Handbook.</p> |
| Special Factors | "4.2.5 MULTI-STOREY OR HIGHER THAN NORMAL BUILDINGS" | 38 | ISSUE: Indicate specific issues for the design of early childhood learning facilities such as kindergartens. NQS/F update on this issue expected in 2022. | <p>Kindergartens in multi-storey buildings must include the following: - capture gates to restrict kindergarten children's access to lifts and stairs, and - upgraded exits, sprinkler and smoke detection systems as per NCC requirements for kindergartens./ Furthermore, the NQS stipulates that outdoor spaces must allow children to explore and experience the natural environment. While artificial grass and features are suitable for smaller areas only, there must be appropriate access for children to interact with the natural environment and natural vegetation.</p> <p>Consultants must comply with safety, design and approval requirements for children in multi-storey buildings, as set out in the NQF and NQS that are current at time of masterplanning the kindergarten facility.</p> |
| Technical Specifications | 5.1 LANDSCAPE ARCHITECTURE | 41 | ISSUE: Need for qualified landscape designer to be consulted on all aspects of outdoor design. | <p>Outdoor play spaces in early childhood learning facilities such as kindergartens must satisfy the following:</p> <ul style="list-style-type: none"> • a qualified landscape designer must be consulted on all aspects of outdoor design |

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| Technical Specifications | 5.1.2 FENCING | 48 | ISSUE: Indicate specific requirements for the fencing/barrier design on early childhood learning facilities such as kindergartens. Best practice / higher than code / NQF for safety. | Consultants must comply with kindergarten-specific requirements for barriers and fencing. All outdoor spaces must be enclosed by a fence or barrier whose height and design prevents children of kindergarten age and under (5 years) from passing through, over or under. Solid plinths may need to be provided below fences to ensure children cannot dig out the soil or mulch and increase the gap below the fence to greater than 100mm. [Add item in table 7] Play areas of kindergartens Palisade fencing Minimum 1800mm (1.8m) Set back from street alignments |
| Technical Specifications | "5.1.3 EXTERNAL EQUIPMENT PLAY, ADVENTURE AND OUTDOOR FITNESS EQUIPMENT" | 52 | ISSUE: Indicate requirement for sandpit design on early childhood learning facilities such as kindergartens. | Kindergarten sandpits must be at a minimum 400mm in depth, and preferably 600mm. Shade should be provided to sandpits. |
| Technical Specifications | "5.1.4 SHADE AREAS" | 53 | ISSUE: Need to indicate specific requirements for the design on early childhood learning facilities such as kindergartens. | Shade structures in kindergartens must be located clear of fences and barriers so they do not enable climbing and comply with AS1926.1. |
| Technical Specifications | 5.1.6 WETLANDS | 54 | ISSUE: Indicate specific requirement for the design on early childhood learning facilities such as kindergartens on wetland sites. | Wetlands must not be included in the design of kindergartens. Should wetlands be included within school grounds that have a kindergarten on site, the design should prevent access to the wetlands by kindergarten children. |
| Technical Specifications | 5.2 UTILITIES AND ASSOCIATED INFRASTRUCTURE | 51 | ISSUE: Indicate preference for the lighting/switchboard design on early childhood learning facilities such as kindergartens. | "A majority of kindergartens on school sites will be operated by a third party service provider such as the local Council or early childhood providers. Therefore they should be designed with separate utilities infrastructure. Where separate utilities are not viable, utilities such as water and electricity must have capacity for separate metering. The following should also be satisfied: <ul style="list-style-type: none"> • manual override lighting controls provided to indoor playrooms • incoming supply pillars and mains switchboards located outside children's areas. |

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| Technical Specifications | 5.2.6 TELECOMMUNICATIONS | 57 | ISSUE: Indicate service provider contract arrangement variation. | Early childhood facilities on school sites are not subject to service provider contract arrangements. While the service procures its own separate network provider, the same infrastructure connection requirements apply. |
| Technical Specifications | 5.3.4 WINDOWS | 57 | ISSUE: Kindergarten sill heights and design for supervision at all times. | Window sill heights in kindergartens must comply with NCC requirements. Internal and external kindergarten playspaces, children's bathrooms and art preparation areas must be designed for high visibility and supervision at all times. |
| Technical Specifications | 5.3.4 WINDOWS BLINDS | 59 | ISSUE: Indicate specific requirements for blinds in early childhood learning facilities such as kindergartens. | In kindergartens, manual blinds can be installed with cord restraints only if they are fixed to the window frame. Cords must not be accessible to children. |
| Technical Specifications | 5.3.5 GLAZING | 59 | ISSUE: Safety glass requirement. | ~ Any glass installed in areas accessible to young children must be safety glass that complies with AS 1288 |
| Technical Specifications | 5.3.6 DOORS | 62 | ISSUE: Door gate and entrance safety requirements | Kindergarten doors and gates, and exits to the perimeter must comply with NCC requirements specific to early learning facilities. All doors must be designed for anticipated movements into and within the kindergarten. All door frame junctions in areas accessible by kindergarten-age children must include protection from finger entrapment. |
| Technical Specifications | 5.3.6 DOORS AUTOMATIC OPERATION DOORS | 62 | ISSUE: Indicate automatic door restrictions in early childhood learning facilities such as kindergartens. | Automatic doors must not be installed in kindergartens except at external entrances. |
| Technical Specifications | 5.3.11 STAIRS AND RAMPS BALUSTRADES AND BLEACHERS | 68 | ISSUE: Indicate stair, ramp limitations in kindergartens. | In kindergartens, stairs and ramps should not be located adjacent to kindergarten perimeter fences as the required handrails can be used as a foot hold to scale the fence. |

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| Technical Specifications | 5.3.12 SANITARYWARE IN KINDERGARTENS | 70 | ISSUE: Indicate specific bathroom requirements for the design on early childhood learning facilities such as kindergartens. | <p>The design of children's bathrooms in kindergartens must enable supervision at all times, while maintaining children's rights and dignity. The following requirements must be satisfied:</p> <ul style="list-style-type: none"> • a nappy change bench with tempered adult wash basin • junior toilet pans • toilet roll holders installed at child's arms reach • barn doors provided to at least one cubicle for each 5 children's toilet • toilet partitions and wash basin heights in accordance with regulatory requirements • tempered water is to be provided for children's hand basins. • children's bathrooms are to be located with direct access to indoor and outdoor play rooms so that children using toilets can be observed by staff from indoors and outdoors. |
| Technical Specifications | 5.8.2 COOLING | 101 | ISSUE: Indicate specific air conditioning requirements for the design on early childhood learning facilities such as kindergartens. | <p>Air conditioning units must be provided in the following rooms of a kindergarten facility:</p> <ul style="list-style-type: none"> • office, planning and staff rooms • foyers, and • children's indoor playspaces |
| Technical Specifications | 5.10 INFORMATION AND COMMUNICATION TECHNOLOGY | 119 | ISSUE: Indicate specific SPC arrangements for the design on early childhood learning facilities such as kindergartens. | <p>Kindergartens are typically operated by the local council or third party providers and not subject to State Purchase Contract (SPC) arrangements. The service provider is responsible for the facility's ICT equipment and services.</p> |
| Technical Specifications | 5.11 SECURITY TECHNOLOGY 5.11.2 PHYSICAL SECURITY | 125 | ISSUE: Indicate specific access requirements and limitations for the design on early childhood learning facilities such as kindergartens. | <p>Early learning facilities, such as kindergartens on school sites, must be designed to restrict public access to all areas. A fence should define the kindergarten perimeter to prevent school users and members of the public from accessing the kindergarten without permission and supervision.</p> <p>Doors into and out of the children's play rooms should be designed to ensure children can not operate the doors without supervision.</p> <p>Advice from the service provider should be obtained to determine where keypad entry systems should be installed within the kindergarten facility.</p> |

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| Building Completion and Handover | BUILDING COMPLETION AND HANDOVER | 134 | ISSUE: Need to indicate specific requirements for the completion and handover of early childhood learning facilities such as kindergartens. | <p>Completion and handover timeframes differ for kindergarten delivery than from schools. In the case of kindergartens on school sites, third party service providers are appointed approximately nine months prior to start of the school year ie. March to April . The service provider is the only entity that can apply to the regulator for approval to operate an early childhood service from the kindergarten.</p> <p>The appointed service provider will undertake service establishment activities that may include submitting an application to become an approved service provider prior to practical completion of the facility. Information that must be included in an application in relation to the physical environment include the following plans prepared by a building practitioner:</p> <ul style="list-style-type: none"> • a soil assessment or statement about the soil assessment, • copy of planning permits if required, and other planning related permits, and • a certified DET area measurement form. <p>The Principal Design Consultant (or Project Manager where appointed) is responsible for providing all documents pertaining to the built form and site conditions required for registration. Where these documents are prepared by the builder, the Principal Design Consultant (or Project Manager where appointed) must ensure the requirement to prepare and provide all documents required for registration is captured adequately in the building contract.</p> <p>The approval process includes a site visit by the regulator. This occurs after practical completion once the service provider has installed all equipment for operations. Where the regulator identifies non-compliant elements that must be rectified prior to service approval, the Principal Design Consultant (or Project Manager where appointed) is responsible for ensuring the rectification is completed by the builder under the building contract.</p> |
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