BUILDING QUALITY STANDARDS HANDBOOK

May 2025

VICTORIAN SCHOOL BUILDING AUTHORITY

VICTORIA State Government

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Building Quality Standards Handbook

The Building Quality Standards Handbook ensures high-quality and inclusive designs for school facilities across Victoria.

On this page

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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 (DE) capital projects, including new construction, refurbishment and maintenance works. Its purpose is to assist architects and designers to create high-quality designs for school and early learning facilities across Victoria.

The BQSH uses early learning facilities as an umbrella term covering two facility sub-categories:

1. kindergartens, which include kindergarten on school sites (KOSS) and modular kindergartens for placement on or off school sites, and
2. early learning and childcare centres (ELCCs), which are government-owned and operated childcare facilities.

The BQSH reflects the considerable experience of the Victorian School Building Authority (VSBA) and DE, developed over the years from the delivery and subsequent evaluation of school building projects. It therefore allows those involved in the design of schools and early learning facilities 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 DE staff involved in school and early learning infrastructure 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 Asset Management and Strategy's Policy Unit.

1.2 Users of the document

The BQSH is primarily used by architects, designers and schools. 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 six 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 six 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 DE's vision, values and mission. Helps readers understand the core business of DE and the VSBA, and the need for project consultants to support DE'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.
6	Building handover and completion	Details commissioning, tuning, operations and maintenance information, and training requirements.

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 expected that the latest version of the standard will 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.

BQSH Qualifier: 'where installed'

Definition: The phrase 'where installed' refers to design elements that are not mandatory (such as sensory rooms or vape detectors) and installed on a case-by-case basis. It is used when minimum quality criteria applies to these elements, for instance, for safety or system integration reasons.

1.4 Legislative hierarchy

All work on school sites 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 DE'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.

Designs should be based on National Construction Code Deemed to Satisfy provisions wherever possible. Where a performance solution must be sought, a whole of life cost assessment must be prepared with the performance solution. These must be approved by VSBA Project Delivery Managers.

1.5 Departmental and government procedures

Project consultants are required to adhere to all applicable VSBA, DE 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 <https://localjobsfirst.vic.gov.au/about> .

The Local Jobs First – 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 DE Policy and Advisory Library, in the School Facilities and Infrastructure section <https://www2.education.vic.gov.au/filter-az?filters%5Bfield_pal_category_name%5D%5Btype%5D=term&filters%5Bfield_pal_category_name%5D%5Bvalues%5D=Infrastructure+and+facilities> .

1.5.5 School and early learning facilities area schedules

The required area allocation of each school is determined according to the type of school and its enrolments (both current and projected).

Based on these criteria, the VSBA's facilities schedules <https://edugate.eduweb.vic.gov.au/sc/sites/Infonline/Facilities%20Schedules/Forms/AllItems.aspx> 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 DE staff and VSBA contractors, are used to determine built area for new schools or early learning facilities, capital and maintenance funding for existing schools, and are relevant to a number of VSBA programs – for example, the Modular Classrooms Program and Response Programs.

The Explanatory Brief for Facility Area Schedules, also known as the Design Guide, provides guidance on school types, the area types that comprise them as they are set out in facility area schedules, and the relationships between these areas. It is a companion document to the BQSH. The Guide can be accessed by current principal design consultants through the IPM platform.

Area schedules for early learning facilities are developed on a site-by-site basis because child place numbers, rooms and additional facility scope are determined by the NQF and contingent on agreed outcomes with third party partners and other strategic opportunities. The Early Childhood Strategy and Planning Unit prepares area schedules for each site prior to principal design consultant procurement. Indoor and outdoor space allocations in early learning facility design, including those in multi-storey buildings, must comply with the minimum requirements of the National Quality Framework (NQF) and the Children's Services Act (CS Act). For further details, refer to Space Requirements for Early Childhood Services <https://www.vic.gov.au/space-requirements-early-childhood-service> .

1.5.6 Shelter-in-place for schools in bushfire-prone areas

DE maintains a Bushfire-at-Risk Register (BARR) that identifies schools and early learning facilities considered to be at the highest risk of fire danger within bushfire-prone areas. Inclusion on this register is a trigger for pre-emptive closure or relocation. Details can be found on the Bushfire At-Risk Register (BARR) webpage <https://www.vic.gov.au/bushfire-risk-register-barr> .

An important aspect of emergency management planning for these schools is the designation of 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

2.1 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 (DE) 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 learning services, non-government schools and training programs.

DE's Statement of Strategic Intent supports this mission:

> A great education for every child and young person – so they can thrive now, and into the future, and contribute to a fairer, smarter, and more prosperous state.

2.1.1 Victorian public sector values

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

VPS value	Value description
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 DE'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

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

DE outcome areas	Outcome area descriptions
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

DE outcome areas	Outcome area descriptions
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 and wellbeing, generate a culture of high expectations and promote inclusion. DE is committed to providing education and support to all students, and will promote leading practices in the design of education facilities.

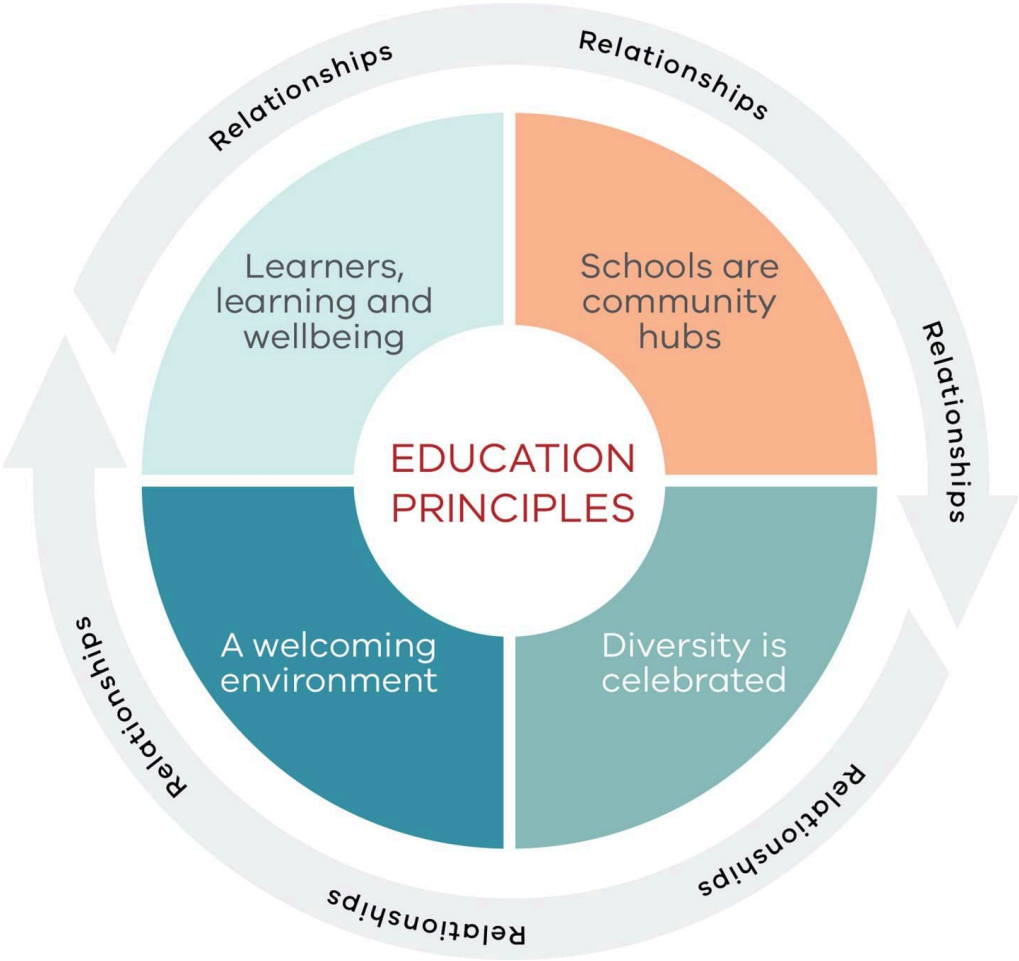
Project consultants **must** design and develop buildings that will support the achievement of the vision and values identified above. To assist in this task, four education principles have been identified that capture DE's vision and values.

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



The image is a circular infographic.

The text in the centre of the circle says 'Education principles'.

This text is surrounded by 4 quadrants with the labels:

1. Learners, learning and wellbeing
2. Schools are community hubs
3. Diversity is celebrated
4. A welcoming environment

Linking arrows run around the outside of the 4 quadrants, with the word 'relationships' repeated 6 times.

Underpinning these 4 design principles is the need to establish and enhance 'Relationships', both within the school and the wider community. This approach follows the VSBA's policy of non-standardised design of Victorian government schools, which encourages innovation and school infrastructure to reflect the local context and each school's educational rationale, community requirements and site-specific conditions.

High quality environments promote children's wellbeing and engagement, positive learning experiences and inclusive relationships. Physical learning environments **must** include both indoor and outdoor learning spaces that satisfy the key principles, including NQF indoor and outdoor requirements, 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, learning and wellbeing

Learners, learning and wellbeing are the core foci for all schools. School design **should** be centred on providing environments that enable educators and other support staff to support the development of young people – intellectually, emotionally, socially, physically and culturally. Relationships are also central to wellbeing and learning for both staff and students. 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

Integrated facilities such gymnasiums, performing arts centres, health service consulting rooms, and libraries can foster greater community engagement and wellbeing and help schools 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, including students with disability, from culturally and linguistically diverse backgrounds, international students, and LGBTIQ+ students. They accommodate different styles and rates of learning. School design **should** respect, welcome and honour the diversity of the school and wider community, and provide culturally safe environments for Aboriginal students. School design enables staff to work collaboratively towards providing every student with the individualised learning and wellbeing support they need to thrive. 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 3.2 Universal design <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#32-universal-design> for more information.

2.2.4 A welcoming environment

Schools **should** be welcoming, safe, secure and stimulating environments. The entry of a school **should** distinguish it as a learning and wellbeing community, with accessible pathways and signage to help everyone feel welcome.

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 learning facilities

The Department of Education will be delivering new early learning facilities to provide additional infrastructure capacity to support the roll-out of Three and Four Year Old Kindergarten and the Best Start, Best Life program across Victoria. High quality learning is supported through the physical and social environments, and opportunities that early learning facilities 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 learn in their schooling, as well as a supporting series of learning progressions to facilitate that learning. The Victorian Curriculum and Assessment Authority <http://www.vcaa.vic.edu.au/> (VCAA) sets the Victorian school curriculum.

Project consultants **must** consider the range of subjects in the curriculum and the specialist facilities and equipment required.

Victorian curriculum F–10

The Victorian Curriculum F–10 sets out the knowledge, skills and attributes every student should learn during their first 11 years of schooling to become lifelong learners, confident individuals, active and informed citizens, and to make a successful transition from school to work, training or further education.

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

Table 1: Design of the Victorian curriculum F–10

Learning areas	Capabilities
The Arts • Dance • Drama • Media Arts • Music • Visual Arts • Visual Communication Design	• Critical and creative thinking • Critical and creative thinking • Ethical understanding • Intercultural understanding
English and EAL Health and Physical Education The Humanities • Civics and Citizenship • Economics and Business • Geography • History Languages Mathematics Science Technologies • Design and Technologies • Digital Technologies	• Critical and creative thinking • Ethical understanding • Intercultural understanding • Personal and social capability

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), and
- students can also undertake a Vocational Education Training (VET) program, for which they can receive credit towards the VCE.

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 <http://www.vcaa.vic.edu.au/Pages/vce/studies/index.aspx> 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.

The VCE Vocational Major (VM) is a vocational and applied learning program within the VCE designed to be completed over a minimum of two years. The VCE VM will give students greater choice and flexibility to pursue their strengths and interests and develop the skills and capabilities needed to succeed in further education, work and life.

It prepares students to move into apprenticeships, traineeships, further education and training, university (via non-ATAR pathways) or directly into the workforce.

The VCE Vocational Major has four main studies:

- VCE VM literacy
- VCE VM Numeracy
- VCE VM Personal and Development Skills
- VCE VM Work-Related Skills

Students **should** also complete 180 nominal hours of a VET program.

More information can be found at About the VCE Vocational Major <https://www.vcaa.vic.edu.au/curriculum/vce/Pages/AboutVCEVocationalMajor.aspx> on the VCAA website.

Victorian Pathways Certificate

The Victorian Pathways Certificate (VPC) is a Year 11 and 12 standards-based certificate that meets the needs of a smaller number of students who are not able or ready to complete the VCE (including the VCE Vocational Major). It provides an enriched curriculum and excellent support for students to develop the skills, capabilities and qualities for success in personal and civic life.

The VPC has four main studies:

- VPC Literacy

- VPC Numeracy
- VPC Work Related Skills
- VPC Personal Development Skills

More information can be found at About the VPC <https://www.vcaa.vic.edu.au/curriculum/VPC/Pages/AboutVPC.aspx> on the VCAA website.

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.

DE 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.

The principles, approach and design implications outlined in the following table apply to all pedagogical activities, namely: Delivery, Applying, Creating, Communicating, and Decision making.

Table 2: Pedagogy and school design

Pedagogical principle	Pedagogical approach	Implications for school design
The learning environment is supportive and productive	Learner-centred pedagogies with multiple learning settings integrated	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	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/carers

Pedagogical principle	Pedagogical approach	Implications for school design
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

2.3.3 Early learning education matters

Contemporary research shows that the early years of a child's life from birth to 8 years of age is the most critical period for brain development. 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. Nurturing relationships, social and emotional development of a child is vital to lifelong learning and setting them up for success in life.

The Victorian Early Years Learning and Development Framework (VEYLDF) adopts a comprehensive approach to children's learning and development. The VEYLDF sets out outcomes and practices to guide early learning professionals in their work with all families and their young children from birth. Supporting children to progress toward these outcomes, in conjunction with their families, is the core of the VEYLDF.

The vision and purpose of the VEYLDF is to guide early learning professionals in a collective effort with families towards the achievements of the nationally agreed Early Years Learning Outcomes. Early learning facilities **should** be designed to support the following principles:

- **Principle 1, Reflective practice:** Creating environments where families and professionals who work in the setting can engage in critical reflection.
- **Principle 2, Partnerships with families:** Designed with children's and family's needs at the forefront and with consideration of local community priorities informed by local consultation.
- **Principle 3, High expectations for every child:** Spaces that support children's agency, sense of capability, goals and aspirations for the future. Spaces that support play-based learning, avoiding locked in expectations about what children are capable of at a certain age or stage.

- **Principle 4, Respectful relationships and responsive engagement:** Spaces allow for creativity of learning and responsiveness to children's changing interests and needs.
- **Principle 5, Equity and diversity:** Showcase First Nations perspective, cultural inclusion, safety and awareness. Spaces support all children to develop a sense of place, identity and a connection to the land and the natural world.
- **Principle 6, Assessment for learning and development:** Creating environments where children are comfortable, have opportunity to engage in everyday experiences, materials and equipment that interest them.
- **Principle 7, Integrated teaching and learning:** Spaces are designed to promote and enhance opportunities for integrated teaching and learning approaches to be embedded into the programming.
- **Principle 8, Partnerships with professionals:** Spaces that facilitate strong partnerships with professionals.

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 and a supportive environment for wellbeing.

The infrastructure **must** embody the vision and principles of the school, where they have been articulated. 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 and supportive of wellbeing. 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 and diverse cultures, genders and abilities.

The infrastructure design **should** support current learning and teaching practices and the provision of health and wellbeing services. Learning spaces **must** be able to adapt to changing trends in technology and teaching over time. To promote effective educational delivery, infrastructure **should** enable, support and promote:

- student wellbeing as well as learning, including onsite provision of health services
- the full inclusion of all students, including Aboriginal and Torres Strait Islander students, students with disabilities, LGBTIQ+ students and students of diverse faith

and community backgrounds

- personalised learning, the supports every student develop their learning from their actual rather than assumed current level of learning attainment
- the provision of culturally safe places and environments
- community access to and use of school infrastructure
- infrastructure that provides a safe and secure work environment for staff and a welcoming environment for families, carers and community members.

2.5 Current context: The Education State – Excellence in Every Classroom

The Education State articulates the Victorian Government's vision for delivering excellence in every classroom, in every corner of the state. The Education State is an exciting vision for a bright future for Victoria. It was developed with input from Victorian students, families, teachers and school leaders, and is guided by five key priorities:

- Excellence in teaching and learning: Informed by the latest evidence, ensuring our dedicated teachers have the most effective teaching tools and support.
- Every student matters: We will ensure safe and welcoming environments – so teachers can do their best work, students can do their best learning, and every school offers a safe and respectful environment.
- Lifting secondary school student engagement and achievement: Strengthen engagement in secondary school, and continue to support every student to embark on a positive post-school pathway.
- Expand, support and recognise our school workforce: Continue to attract, retain and support a highly-skilled, diverse school workforce, including by reducing the administrative burden, delivering professional learning and supporting teaching wellbeing.
- Schools at the centre of communities: Build welcoming, world-class and modern schools, which meet the needs of local communities so every child can have access to a great local school.

These five key priorities are explored in more detail below. See also The Education State <https://www.vic.gov.au/education-state> for more information.

To achieve this, the Victorian Government continues to make record levels of investment in education infrastructure. This means the VSBA has an ongoing program of new schools and upgrades, ensuring every community has a high-quality school.

All those involved in school infrastructure delivery, including consultants and architects, must deliver outcomes which meet these five key priorities.

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 </building-quality-standards-handbook/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 Recognition of First Nations culture in new facilities and major upgrades

First Nations cultural recognition in design

All VSBA-led new school and early learning facilities and significant school upgrades must recognise First Nations culture in line with the commitments in the Dhelk Wukang

2022–2026 Aboriginal Inclusion Plan <https://www.education.vic.gov.au/Documents/about/department/aboriginal-inclusion-plan-dhelk-wukang2022-26.pdf> and the VSBA's public commitment to First Nations engagement </our-commitment-first-nations-engagement> .

All First Nations cultural design elements must be implemented in consultation with Traditional Owners, the Victorian Aboriginal Education Association Incorporation (VAEAI), Local Aboriginal Education Consultative Groups and Marrung Facilitators. There are no restrictions for cultural design, but the project team should be led by First Nations representatives, including Traditional Owners, about what is appropriate to include at the school or early learning facility and available project funding will ultimately determine its final scope. Before starting engagement, VAEAI must confirm the relevant First Nations representatives to include in the meetings. VSBA Communications leads the consultation for new schools in collaboration with the project team. Principal Design Consultants should review the VSBA's public commitment to First Nations engagement </our-commitment-first-nations-engagement> for guidance on the engagement process. For guidance on the First Nations engagement process, contact VSBA Communications via vsba@education.vic.gov.au <mailto:vsba@education.vic.gov.au> .

Aboriginal names for schools and early learning facilities

First Nations cultural design engagements for schools and kindergartens could include language requests, for example, for room names. However, engagement about naming entire schools or early learning facilities is not led by the VSBA.

Under the School and Campus Naming Policy <https://www2.education.vic.gov.au/pal/school-and-campus-naming/policy> , Aboriginal language names are preferred for all new government schools and campuses. Early Learning Victoria (ELV) has also made the same commitment for early learning childcare centre (ELCC) names. When choosing names for schools or ELCCs, Traditional Owners propose Aboriginal language names to ensure the accuracy of language and to support self-determination.

The Priorities Unit of the Operations and Governance Division coordinates the school naming process with Traditional Owner groups, while Early Learning Victoria (ELV) coordinates naming for ELCCs. For school naming queries, please contact the Priorities Unit at srs.priorities.unit@education.vic.gov.au <srs.priorities.unit@education.vic.gov.au> .

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 3.2 Universal design <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#32-universal-design> section on for more information.

3.1.4 Building for early learning

In 2022, the government announced the Best Start, Best Life early learning education reform with three new major initiatives:

- free kinder across the State
- a year of universal Pre-Prep for 4-year-olds, and for the first time,
- the Victorian government will establish and operate 50 childcare centres.

The Department will deliver a number of early learning facilities to provide additional infrastructure capacity to support the roll-out of Three and Four Year Old Kindergarten. Some early learning facilities will be delivered on new and existing government school sites.

The new infrastructure required to deliver on the government's Best Start, Best Life <https://www.vic.gov.au/best-start-best-life-reforms> and Pre-prep reforms <https://www.vic.gov.au/preprep> will include long day care provision. The VSBA **must** be consulted for direction on long day care facility specifications.

The Government is committed to the benefits of integrating early learning into the wider government school system. New co-located early learning facilities can help make drop off time simpler for carers /parents, support smoother transitions between early learning and primary school, and may make early learning 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 learning education and care, including the ways an early learning facility's environment is designed, equipped and organised to maximise children's engagement and positive relationships.

Early Learning environments **must** comply with the National Quality Standard – Quality Area 3 – Physical Environment <https://www.acecqa.gov.au/nqf/national-quality-standard/quality-area-3-physical-environment> .

3.1.5 Victorian early learning reforms

The Victorian Government has made a commitment to overhaul early learning education and care in Victoria.

The Best Start, Best Life reforms are the most significant change to the Victorian early learning sector in a generation.

This includes:

- **Free Kinder:** all children in Victoria who are 3 and 4 years old can access Free Kinder
- **Three-Year-Old Kindergarten:** the roll-out of Three-Year-Old Kindergarten continues, with programs increasing to 15 hours a week across the state, providing Victorian children with 2 years of a quality kindergarten program before school
- **Pre-Prep:** Four-Year-Old Kindergarten in Victoria is in the process of changing to 'Pre-Prep'. This means that every 4-year-old child can go to a play-based learning program for 30 hours per week, and
- **Early Learning and Childcare Centres:** establishing 50 Victorian government-owned and operated early learning and childcare centres.

3.1.6 Design facilities that can adapt for changing purposes

School facilities **must** be capable of being used for different organisational and learning and wellbeing 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 is committed to the concept of universal design and its application throughout Victorian government schools and early learning facilities, as per the whole of government Universal Design Policy. Universal design recognises that there is a wide spectrum of human abilities, including physical, perceptual and cognitive abilities. It affirms that buildings **must** create environments that ensure access and participation by all to the greatest extent possible. Designs **must** create environments that ensure access and participation by all.

Universal design principles **should** be applied across the design, development and delivery of a project, and is most effective when embedded in processes and applied early in the conceptualisation of a project.

Direct engagement with people with diverse abilities is encouraged on all projects from an early planning stage, larger projects **should** consider incorporating the views of people with disability, and co-design principles, at all stages of a project.

All architects, designers and project consultants engaged by the VSBA for new schools or early learning facilities, upgrades, and major maintenance projects, **must** demonstrate in each project planning and design milestone report how the seven universal design principles have been realised in the project design, namely:

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

Each project **must** comply with the Access to Premises Standards and those parts of the AS 1428 suite of standards that are referenced in the National Construction Code or Premises Standards and, therefore, mandatory. All other parts of the AS 1428 **should** be considered in school design to achieve the best possible universal design outcomes.

Some standard design solutions for AS 1428 may not align with the operational objectives and Early Childhood Education and Care Legislative requirements for early learning facilities. This can create a conflict, and thus, consultants **should** highlight all AS 1428 conflicts through the departure process and solution rationale. Additionally, in such cases a DDA/Access consultant engagement is recommended for specialist insight and guidance. For more information, see the section on Hierarchy of requirements and departures (in 1.3.1 The writing style of specifications <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/introduction#131-the-writing-style-of-specifications>).

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

A detailed description of each universal design principle and examples of its associated execution in the school or early learning contexts are provided in Table 3.

Table 3: Universal design principles

Universal design principle	Description	Example
Equitable use	The design is useful and marketable to people with diverse abilities	• Minimise requirement for stairs and ramps, where possible • Where installed, ramp is integrated with stairs, with one or both under cover • Outdoor seating with different arm and back configurations and 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	• 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 • Controls on doors, appliances, equipment, fire alarms and extinguishers, lighting, power outlets and other installations reachable by standing or seated person, and used with a closed fist or open palm.
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	• '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 • Internal door colour contrast with walls to assist identification in emergency and other times • Continuous pathways (no breaks) to ensure easy travel between buildings,

Universal design principle	Description	Example
		carparks, etc. • Tactile ground surface indicators and removal of overhanging obstacles for vision-impaired students, who may use a cane
Perceptible information	The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities	• Signage and window views at height visible to wheelchair users • PA and emergency communication systems with both auditory and visual cues • Provision of portable or fixed hearing augmentation/sound field infrastructure to transmit signals from audio visual equipment and verbal instructions to personal receiver devices, where needed • High quality room acoustics to support hard of hearing and other students • Careful glazing and placement of windows, particularly in relation to light coloured concrete and whiteboards, to avoid glare for vision-impaired students • Room acoustics designed to assist hearing-impaired students • Social scripts or pictorials to communicate room function • Infrastructure for appropriate assistive hearing technology to transmit audio from AV/PA and verbal instructions • All gender toilet signage is in accordance with Commissioner Gender Equity best practice advice • Adjustable lighting to assist vision-impaired students
Tolerance for error	The design minimises hazards and the adverse consequences of accidental or unintended actions.	• Column detailing and placement to assist people with vision impairment in differentiating columns • Equal level floors, wherever possible, to

Universal design principle	Description	Example
		eliminate tripping hazards • Stair nosing consistent with AS 1428.1 to promote luminance contrast at the leading edge of step treads, and other changes in level • Lines of sight are prioritised in all areas and aspects of design, i.e. no supervision blindspots.
Low physical effort	The design can be used efficiently, comfortably and with minimum fatigue.	• Loop handles on toilet doors, other handles **should** be 'D type' where possible and not be slippery and can be operated with a weaker grip • Doors that automatically open for students with wheelchairs or staff carrying heavy goods • Press button or bib taps soft enough for use by young children or those with weaker grips • Avoid pivot or non-automatic swing doors, difficult for wheelchair users and carers • Controls, such as light switches and thermostats, at heights easily accessible for students in wheelchairs • Accessible water points for people of all abilities • If stairs and steps are unavoidable, they **must** incorporate firm, level slip resistant surfaces, edge nosings, opaque risers and handrails on both sides for efficient and comfortable access.
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.	• Appropriate circulation space and door widths in accessible toilets and all other internal and external spaces and walkways suitable for students in wheelchairs

Universal design principle	Description	Example
		• Floor surfaces comfortable for students with differing sensory abilities • Provide a clear line of sight to important elements for any seated or standing user • Make reach to all components comfortable for any seated or standing user

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, for instance, curvilinear lines in paths and buildings are often preferred by individuals with sensory disorders
- 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 mechanical hand drying options and appropriate acoustic measures in bathrooms, where they are installed in close proximity to learning and work spaces.

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 early learning facilities complement their community, and eventually be a vital part of the community's broader aims. This **should** be considered before the design process starts.

It is critical that vertical school facades represent an integrated response to the urban context. Overall designs **should** also promote connections to the outdoors and the broader community.

Urban context analysis

When undertaking a major school redevelopment, planning a new school, or a new early learning facility on a school site, 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.

Where a new early learning facility is to be co-located on a school site, consideration **must** be given to the interface between the early learning facility's children's outdoor play areas with an area of learning or play with primary school, to promote opportunities for connection and learning.

Urban design charter

Project consultants **should** include principles from the Victorian Government's Urban Design Charter <https://www.planning.vic.gov.au/guides-and-resources/guides/urban-design-guidelines-for-victoria> (shown in Table 4) in creating environments that are valued, functional and significant:

Table 4: Urban Design Charter principles

VGUB Charter principle	Principle description
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

For more information on the Urban Design Charter, please visit the Urban Design Guidelines for Victoria webpage <https://www.planning.vic.gov.au/guides-and-resources/guides/urban-design-guidelines-for-victoria>.

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. The minimum number of exits in multi-storey school and early learning infrastructure **must** comply with NCC D2D3 and NQF design considerations for emergency evacuation.

Early learning facilities co-located on school sites **must** have easy to find and accessible entry that is separate to the school entrance. There **should** only be one main entry/exit point into the early learning facility. Where the early learning building will have additional integrated community facilities (such as MCH and or community meeting room) or is integrated under the school roofline/building, alternative requirements for emergency and maintenance points are required.

For early learning facilities in multistorey and vertical buildings, exit numbers for each storey **must** comply with NCC D2D4 and D2D16 requirements. Also see section 3.3.7 Emergency exits <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#337-emergency-exits> for further information on emergency exits.

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.

Orientation and location of outdoor learning spaces **must** be considered in the schematic design and masterplanning phases to maximise comfort and minimise seasonal impacts in these spaces.

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 **should** ensure that the north facade of a proposed building is not overshadowed by other buildings to the north, and that the proposed building considers overshadowing to its south at equinox dates. Vertical school facades **must** be sympathetic to and integrate well with the urban context.

Shading diagrams **should** be prepared to accurately establish the extent of shadowing by adjoining features. This is to maximise natural light infiltration. Where the site contains trees that are locally-native, the site **should** be planned to retain those trees in healthy condition.

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 orientation and location of outdoor learning spaces to reduce seasonal impact and maximise comfort
- 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 early learning facility, where applicable.

Toilet facilities are to be evenly distributed across the school site, ensuring sufficient supervised accessibility during break times. Toilets **should** be located in close proximity to learning areas (ideally adjacent to Prep learning areas) and gymnasiums, so that students and staff can use them during learning activities with minimal interruption.

Where an early learning facility 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 early learning facility 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 early learning 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 facilities, 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 an early learning facility is to be integrated into the school facilities, consideration **should** be given to shared use of (school and early learning) administration, meeting and staff breakout spaces, and the creation of gathering areas for parents and carers close to the early learning facility's entrance. 'Integration' of early learning services within school buildings (under the same roofline) differs from co-location of early learning facilities on school site where typically there is limited shared facilities or amenities under the same roofline, due to separate governance and operational arrangements. In these instances, the design **should** ensure that the early learning facility, in which NQF requirements always apply, has a clear service approval area to meet early learning education and care regulations distinct from the school community use areas.

Designs must mitigate against risks that are specific to multi-use sites, where relevant, including:

- building and site access and security allow only authorised people in and out of the premises and spaces not shared by adjacent entities
- the design minimises risks of children being able to exit independently and unsupervised, e.g. coded doors and capture gates
- entrances/exits are designed to allow appropriate monitoring by staff and avoid potential congestion points that could block sightlines in shared spaces, and
- external exits do not lead directly to unsafe areas (such as roads) without additional safety measures, i.e. secondary barriers, surveillance technology.

3.3.7 Emergency exits

Emergency exits **must** be accessible and visible. Signage **must** comply with the relevant legislative requirements, Australian standards, NCC E4D8 (if the exit sign is photoluminescent), and requirements for fire safety certification. Please refer to Emergency and exit lighting <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#598-lighting-systems> for detailed criteria.

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 Emergency and Critical Incident Management Planning webpage <https://Emergency%20and%20Critical%20Incident%20Management%20Planning> on the DE website.

If stairs are provided, they **must** have a dual function — allowing for both general school / early learning movement and use, and for evacuation in emergencies. Fire and smoke isolated doors **must** include a viewing panel, where this can be supported by required fire resistance level (FRL).

Consultants **must** ensure all emergency egress' in early learning facilities is designed in accordance with the National Quality Framework and the National Construction Code. Early learning facility exits must not lead directly onto busy roads.

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 an early learning facility includes a car park and vehicular thoroughfares, consideration **must** be made to younger children and carers/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
- be easily read by seated and standing readers
- fonts, type size and colour contrast selected for easy reading
- comply with the NCC, universal design principles and other statutory requirements, including provision of evacuation diagrams and occupancy permits

- include signage for room names and numbers
- internal and external wayfinding
- building identification
- allow for structural engineering for external signs, as required
- be vandal-proof, informative, stylistically consistent and directional.

Illuminated signage **should** be minimised, but where necessary **must not** be obtrusive and **must** be time controlled. Traffic control measures **must** be provided, with appropriate signage, so users and visitors clearly understand how they **must** proceed and where they **should** go.

See guidance for all gender toilet signage in the section Toilet facilities (in 5.3.11 Plumbing fixtures) <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5311-plumbing-fixtures> .

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 portable or permanent modular buildings.

For information on pedestrian paths, please refer to 5.1 Landscape architecture <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51-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 an early learning facility, and site conditions allow, the car park **should** be separate from the school car parking area and provide direct access to the early learning facility’s entry. Carparks and access roads

near the early learning site must include effective carpark design considerations to ensure the safety of young children and parents, and minimise and control associated safety risks. The early learning Regulatory Authority will examine these safety risks, including unprotected vehicle access, the possibility of vehicles entering outdoor areas adjacent to the carpark, and unsafe car manoeuvres (such as reversing) near entrances. Physical barriers (e.g., bollards), natural elements like plants and garden beds, or appropriate signage and labelled systems can be used to adequately control the aforementioned safety risks.

Consideration **should** also be given when planning site facilities for access by 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, where staff parking is provided. 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 on regular size campuses: the trolleying of equipment and goods over short distances is acceptable. Whereas, cross campus access roads **must** be provided to very large school campuses, particularly regional ones, that receive regular large deliveries which need to be distributed across the campus.

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

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 accessible parking in the staff areas, with easy, unhindered access to the front entrance of the site (a minimum of one accessible 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 early learning facility car-parking for parents/carers accompanying children to sign them in and out of the early learning facility, the car park **should** be separate from school staff car parking and provide direct access to the early learning facility's entry. In addition, please refer to the section on Car park design (in 5.1.3 Hard landscaping and indoor sports courts <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#513-hard-landscaping-and-indoor-sports-courts>) for further information.

3.3.14 Provision of bus parking

Onsite bus access, short-term parking and covered drop-off and pick up facilities **must** be provided close to entry/administration areas at special schools, special developmental schools and supported inclusion schools to allow for safe boarding and alighting. Bus facilities **must** be designed in accordance with the Disability Standards for Accessible Public Transport (2002) and the schools requirements. In designating a bus zone, it is important that access roads and student bicycle and pedestrian paths are well considered and do not create unnecessary or preventable risk. Suitable access roads **must** be provided and buses **should not** be required to reverse on school grounds.

All 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 size used is a 57-seat bus.)

- ensure that any entry and exit gates and roads allow 3,500mm to accommodate bus or emergency vehicles.

Table 5 lists the indicative dimensions of a 57-seat school bus as a guide.

Table 5: Dimensions of a 57-seat school bus

What	Measure
Overall length	12,250 mm
Overall width	2,480 mm
Overall height	3,580 mm
Wheelbase	6,050 mm
Wheel track front	2,108 mm
Wheel track rear	1,854 mm
Minimum lift-off clearance	200 mm
Approach angle (°)	8.3
Departure angle (°)	7.5
Front overhang	2,720 mm
Rear overhang	3,480 mm
Min. turning diameter	24,000 mm

3.3.15 Access for emergency vehicles

The design **must** facilitate access for emergency vehicles to all buildings and areas of the facilities as per NCC C3D4 and C3D5, and for designated bushfire prone areas as per NCC S43C14 Vehicular Access performance requirements. In particular, access **must** be

provided to first aid rooms, hard courts and sports ovals, and shelter in-place buildings while minimising the length of onsite roads. Hard court gates **should** be a minimum 3,000mm width to accommodate ambulances. All accessways **must** provide a minimum trafficable width of 3.5m and be clear of encroachments to a height of 4m from the ground.

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 portable or permanent modular buildings are to be placed.

3.3.16 Vertical school and early learning facility planning

A vertical school is a school that is, in part or entirely, comprised of buildings that are four or more storeys high.

Vertical school design differs from traditional school design in a number of ways. In some respects, it requires building more on less land, as well as greater optimisation of the surrounding urban fabric.

While traditional school and early learning facilities can have classrooms off circulation spaces, vertical schools are more often designed around a central atrium or circulation volume. These central spaces can effectively operate as the school's 'heart' or gathering space, while connecting vertical levels. They can also provide multi-purpose spaces and make surrounding learning spaces more visible.

Further, vertical school and early learning facility design **must** satisfy the following criteria:

- be planned and engineered to accommodate planned growth, i.e. spatial planning and engineering allowances enable anticipated expansion in accordance with the master plan
- design and circulation strategies **must** minimise student need to move between floors during a school day i.e. be based on cluster/learning communities
- distribute amenities (such as toilets and water fountains) appropriately and equitably on each floor
- mass timber or substantial laminated timber construction **must not** be used on vertical schools (i.e. buildings of four or more storeys) or a school campus valued at $100M or more
- the façade **must** be robust, commercial grade, require minimal maintenance and, critically integrate with the surrounding urban context
- generally, promote a sense of connection to the outdoors and the broader community from internal spaces, no matter where students or children are in the building, while preserving neighbour privacy

- not comprise a proliferation of small, separate spaces that create supervision and site cohesion issues and be integrated across the building and site
- early consideration of integrated design of appropriately scaled circulation and plant space for services (greater than in non-vertical schools)
- in the case of vertical schools that include primary schools or early learning facilities, satisfy fire safety and emergency evacuation requirements set out in the NCC and the National Quality Framework
- where an early learning facility is located above ground floor, there must be sufficient outdoor space and access to natural environment on the same floor as education and play spaces
- where early learning facilities are located above ground floor, lift access and operation arrangements **must** differ for at least one lift i.e. lift capacity **should** accommodate efficient, mechanical transport of small children and carers/parents in larger groups and not require key passes, additionally
- early learning designated lift/s **must** have capture gates, and this **must not** impede the DDA-compliance of surrounding circulation spaces
- follow a well-considered Circulation Strategy
- planned access for maintenance needs to be well considered and implemented, particularly for scissor lifts and anchor points.

3.4 Landscape planning

Landscape design (soft and hard) is an essential aspect of every school design and **must** be integrated with built environment design. Landscape design **must** be undertaken by an experienced landscape designer or professional landscape architect with current registration from the Australian Institute of Landscape Architects. Landscape architecture **must** form part of the overall site design. Studies have repeatedly demonstrated that urban greening improves people's health and wellbeing and improves air quality in cities and towns.

Landscaped spaces within school environments **should** facilitate enjoyment of and learning about the natural environment and offer shade and shelter from extreme weather and include functional and durable seating and equipment as required.

Considerable research has shown that urban greening makes people feel happier and healthier and improves air quality in cities and towns.

Project consultants **must** 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** satisfy the following:

- 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, by:
  - maximising tree and vegetation retention
  - minimising tree and vegetation removal and disturbance
  - protecting existing trees and vegetation during construction works
- comply with any obligations set out in a Statements of Planning Policy (SPP) concerning landscape or vegetation on the site that has been identified as unique/distinctive/significant under the Planning and Environment Act
- building footings **must** be designed to be strong and solid enough to withstand root penetration of future trees
- trees planted near a building must be in accordance with geotechnical engineer recommendations and
- **must not** exceed the height of that building and, therefore, obstruct solar panels that are installed or may be installed in the future (in accordance with the Solar Performance Specifications included in the Sustainable Facilities Policy <https://www2.education.vic.gov.au/pal/sustainable-facilities/policy>)
- when planting large trees, or those that will become large, near existing buildings consider planting species whose root spread does not exceed three times their height at maturity
- maximise diverse multi-storey planting on new or reinstated planting areas, where possible
- enhance urban ecology outcomes within the school land, in accordance with the sustainability requirements.
- 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, where possible and viable in the contemporary context
- 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
- provide safe learning places, where required
- provide direction and uniformity, reducing stress and anxiety in children
- reduce sun exposure
- 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/ adventures 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.

Noting that under the Agriculture Legislation Amendment Bill 2022 to the *Catchment and Land Protection Act 1994* (Vic), it is an offense in Victoria to plant or propagate noxious weeds, seeds of noxious weeds or parts of noxious weeds that are capable of growing, without a permit.

Specific regulations and spatial requirements apply to outdoor spaces in early learning facilities, including:

- additional safety measures, such as fencing or barriers, must be installed for early learning facility sites close to potential natural water hazards or swimming pools
- as for schools, a qualified landscape designer **must** be consulted to design all aspects of the outdoor areas of early learning facilities to ensure regulations can

be achieved

- outdoor spaces **must** be enclosed by AS1926.1-compliant fencing / barriers that are, minimum, 1,800mm high and of a design that children cannot go through, climb over or under, or create entrapments. Fencing should not be climbable in its own right or via items (such as outdoor air conditioning condenser units or yarning circle logs) within 1,000mm that children could use to scale
- storage sheds, trees and play equipment such as cubby house **should not** be placed within 1,000mm of a perimeter fence line, care **must** be taken to ensure equipment or landscaping elements do not create footholds onto and over the fence
- sandpits with minimum depth of 400mm are provided
- grated stormwater pits are fitted with heel safe lids or mesh covering to avoid finger entrapment
- provide suitable maintenance gates.

The execution of landscape architecture is described in 5.1 Landscape architecture <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51-landscape-architecture> .

Vertical schools

Vertical school design (four or more levels) **must** incorporate outdoor learning and recreation areas that help to maintain a connection to the outdoors and broader community. It is essential that these spaces are well integrated into the overall school design.

Netting **must** be provided in rooftop recreational outdoor spaces to stop balls of varying dimensions and other objects from going over the edge and falling. All outdoor furniture **must** be bolted down.

Vertical schools **should**, generally, have fewer and larger outdoor gathering spaces that can be supervised with minimal staff, rather than smaller, separate outdoor spaces requiring more staff.

External fencing **must** be two metres high and non-scalable around early learning facilities located above ground level.

See 5.1.4 External equipment <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#514-external-equipment> for a summary of irrigation system requirements in multi-storey early learning facilities and schools.

Existing trees and vegetation

Existing trees and vegetation within school and early learning facility grounds provide important amenity, habitat and environmental services, therefore, removal and disturbance **should** be minimised.

New works **must** develop and implement measures to avoid and minimise, to the extent practicable, impacts on native vegetation and fauna habitat through detailed design and construction, including:

- minimising footprint and surface disturbance to areas of vegetation.
- maximise retention of mature trees, planted and remnant native trees and remnant vegetation, particularly large amenity trees (greater than 30 cm diameter at breast height (DBH)) that contribute to faunal habitat.

Tree retention **must** be maximised so far as reasonably practicable through detailed design and selection of construction methods to minimise canopy loss.

Tree and plant selection

Landscape design and plant selection **must** be undertaken by a qualified landscape designer[1] or AILA Registered Landscape Architect. The information below provides a starting point for designers and a check list for VSBA Delivery Managers to ensure that plants selected for schools or early learning facilities will contribute positively to the school environment and reduce the risk of harm to school assets and communities.

Plant characteristics to be avoided in plant selection:

- medium to high probability of limb drop in local environmental conditions
- poisonous flowers, fruit or seeds
- trees that attract vermin or create excess litter that **must** be maintained by the school or early learning facility
- thorns or spikes
- invasive growth or root systems
- attracts a high number of bees or wasps
- deciduous species in constrained or difficult to access areas
- species that will grow to a size that will block safe sight lines (where relevant) species listed on the advisory list of environmental weeds in Victoria (Victorian Government Department of Environment, Land, Water and Planning 2018)[2]
- short-lived (< 40 years lifespan) tree species
- susceptible to diseases and infestation

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

building footprint. Tree species selections, associations and arrangements **should** be in accordance with Arboricultural requirements.

Plant performance characteristics for consideration in plant selection include:

- contributes positively to school or early learning environment
- tree stock **should** be selected in accordance with AS2303 – Tree stock for landscape use
- trees that provide good shade coverage
- appropriate to changing climate
- locally native to the site, if still viable in a contemporary setting (local Ecological Vegetation Class, soil type, microclimate) without unrealistic maintenance requirements
- drought tolerant once established, with low irrigation requirements
- suitable size and shape at maturity for available space/s
- can be utilised in the school or early learning curriculum, e.g. for food technology, to teach about season changes or food production
- where possible, select species in consultation with Traditional Owners of Country in cultural recognition [see 3.1.2 Recognise Aboriginal culture in all new buildings and significant upgrades to Victorian government schools <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#312-recognise-aboriginal-culture-in-all-new-buildings-and-significant-upgrades-to-schools>]
- provides an element of safety as a visual or physical barrier at maturity
- provide appropriate sensory stimulation for user groups
- maximise habitat value and connectivity for native fauna
- resistant to diseases and infestations
- large tree species **must** attain a minimum mature size of 12.0m height x 8.0m spread 15 years after planting
- plant species **should** generally align with the VicFlora Bioregions and Ecological Vegetation Class associated with the site or nearby vegetation systems
- planting systems and plant selections **must** take into account predicted future changes in climate in accordance with sustainability requirements.

Landscape designers and architects **must** ensure plants selected for schools or early learning facilities contribute positively to the school or early learning environment and minimise the risk of harm to school or early learning assets and communities. Selection is always subject to site location, climate, local Ecological Vegetation Class, geology, soils, orientation and adjacencies.

Where trees are removed, they **should** be replaced by new trees: at a rate of, at least, two new trees for every tree removed and tree removal **must** comply with the Tree Removal and Replacement Policy <https://www2.education.vic.gov.au/pal/tree-removal/policy> . Where practical and possible, the replacement planting of trees **should** start as soon as possible and in stages once the tree removal extent is confirmed and suitable replacement sites have been determined.

Refer to 5.1.5 Shade areas <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#515-shade-areas> for further tree selection performance criteria.

3.4.1 Outdoor assembly 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.

Vertical schools may not have available land at ground level to accommodate a school field that could otherwise be used as an emergency assembly area. In this case, safe external spaces will need to be identified for the purpose of emergency assembly (i.e. a local pocket park) with consideration of safe access and minimisation of the need to cross streets, for example.

Three fixed matching flagpoles **must** be installed in all new Victorian government schools for the Australian, Aboriginal and Torres Strait Islander flags. Flagpoles **must** comply with the NCC B1D4 Determination of structural resistance of materials and forms of construction, and the Department of Education's Flagpoles and Patriotic Ceremonies policy and fact sheet <https://www2.education.vic.gov.au/pal/flag-flying-and-patriotic-ceremonies/policy> .

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.

3.4.2 Outdoor learning spaces

Outdoor learning spaces can provide alternative teaching and learning spaces and contribute to building functions. They can also provide wellbeing benefits due to greater circulation of fresh air and proximity to nature.

Outdoor learning spaces take many forms. They can be comprised of building fabric, tree canopies and other plantings, vegetable gardens connected to food technology

spaces, and or shade sail/s, for instance.

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.

Outdoor learning space design **should** satisfy the following requirements:

- be located away from noise and pollution (for instance, busy roads, industry)
- be easily accessible for all users
- be fit for purpose as a learning environment, if design to be as such
- where possible incorporate elements that reflect the curriculum, including indigenous culture
- design **should** minimise seasonal impacts and maximise comfort (i.e. through orientation and location)
- provide clear sightlines for supervision, appropriate to broader school or early learning context, especially to bathrooms if the site is located on steep ground. If external sightlines are limited in schools, the outdoor space **should** be containable outside teaching and learning times
- design **should** follow consultation with the school, where possible, about outdoor specialist learning space needs, and provide appropriate facilities for the specialist activities that are planned for these spaces, (i.e. troughs, large benches, running water for art spaces, number and location of WAPs)
- design **should** have DDA-compliant paths, corridors and doorways to and from the outdoor learning space, and
- can accommodate the movement of equipment needed for forecast activities, (i.e. wide trollies, robotics)
- trip and fall hazards, including deck edges and non-step level changes, **should** feature nosing and luminance contrast at the leading edge consistent with AS 1428.1
- outdoor learning space ground surfaces and decks **must** be slip resistant
- where possible and appropriate **should** reflect and enhance the character of the broader surrounding environment, and
- consider and minimise ongoing maintenance requirements
- be located within easy access of drinking fountains
- have appropriate drainage and irrigation systems
- provide shade in accordance with 5.1.5 Shade areas <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#515-shade-areas>

Where installed, all covered outdoor learning area (COLA) structures **must**:

- be free standing and **must not** be scalable
- have adequate drainage that allows water run- off, and
- have posts that are appropriately located and designed for safety and access, including:
  - visual elements to assist navigation and safety for students with visual impairment, and
  - have lighting that supports the activities that will be conducted in the space
  - posts/elements that enables adequate control of glare and visual contrast, and
  - any installed luminaires, which **must** be vandalproof and have an impact resistance of IK10 (AS 62262).

COLA design and placement should consider site space constraints and any limitations imposed due to heritage significance, where relevant.

Clear roof sheeting may be considered in full length strips to provide additional daylight, where the design mitigates against glare. Any clear roof sheeting **must** have safety mesh installed underneath it in accordance with AS/NZS 4389 – Safety mesh.

Height requirements for COLA ceilings are determined by use, for instance, if they are to be used for sports practice, play or competition or only for non-sports teaching, learning, or amenity. See the section on Outdoor hard court multi-functionality – for basketball and netball (in 5.1.3 Hard landscaping and indoor sports courts <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#513-hard-landscaping-and-indoor-sports-courts>) for height requirements.

Seating **must** be appropriate to the particular outdoor learning space and comply with the External Seating section.

Outdoor learning spaces and landscape can be good opportunities to represent aboriginal culture and fulfil obligations set out in 3.1.2 Recognise Aboriginal culture in all new buildings and significant upgrades to schools <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#312-recognise-aboriginal-culture-in-all-new-buildings-and-significant-upgrades-to-schools> . For instance, this could be done through interpretation signage and locally native[3], if not pre-colonial, plantings with Indigenous significance, where they are viable in contemporary conditions without high maintenance requirements.

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.

External fencing **must** be two metres high and non-scalable around early learning facilities located above ground level.

In addition, please refer to 5.1 Landscape architecture <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51-landscape-architecture> for further information.

3.5 School and early learning design principles

Good design communicates to both students and staff the esteem in which they are held by the community.

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 early learning facilities, the design principles set out in the seven National Quality Standards related to the Physical Environment Quality Area 3 <https://www.acecqa.gov.au/nqf/national-quality-standard/quality-area-3-physical-environment> .

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 in 3.6.2 Child Safe Standards <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#362-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.

Mitigate possible trip hazards from level changes greater than a standard step on paths, grates, field inlets and other protrusions on intended or potential paths of travel and circulation spaces. This **should** be achieved through lighting, nosing and luminance contrast at the leading edge (consistent with AS 1428.1), and or deterrents, such as plantings.

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 or early learning staff/ students and visitors **must**:

- maintain a welcoming entry environment that promotes trust and respect
- not prevent egress
- preference surveillance/security that is based on electronic or non-physical measures, where possible, and
- include dual doors with a reasonable distance between them, where possible, whether located on opposite or adjacent walls in designated rooms for meetings between senior staff and parents or other external parties. Ideally, one door should lead to the public/foyer zone (with single action egress at all times), and the other to the secure staff zone (access controlled internally from this zone). A secure, access-controlled door must be in place to isolate the public foyer from the secure staff zone.

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

- slide rather than drop, and be
- hidden until required
- tamperproof
- ergonomic
- safe to use, and
- automated where appropriate, noting that
- a clear screen is required at receptions for infection control and as an unthreatening security measure.

Designs **must** consider the location of elements that could be a hazard to occupants, visitors or maintenance contractors. 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.

Vertical school design, in particular, **must** follow careful consideration of the safety of students, staff and parents/ carers (as well as pedestrians and motorists) during peak times. Solutions may include adequately spaced, five-minute drop off zones.

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 and early learning areas not shared by the community after school hours.

It is important that vertical school security and access issues (i.e. zoning and planning of security systems such as alarm, fob/key access systems) are considered early in the design process to clearly determine which areas need to be part of a secure school zone. This ensures unnecessarily complex and expensive retrofitting will not be required.

Early learning facilities are third-party operated and **must** be zoned separately from schools, with separate security systems. This applies to early learning facilities located in vertical and non-vertical schools. For further guidance please review these WorkSafe Victoria publications:

- Designing Safer Buildings and Structures <https://www.worksafe.vic.gov.au/resources/designing-safer-buildings-and-structures>
- Preventing and responding to work-related violence: tipsheet <https://www.worksafe.vic.gov.au/resources/workwell-preventing-and-responding-work-related-violence-tipsheet>
- Occupational Violence Information Sheet <https://www.worksafe.vic.gov.au/resources/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 the 3.6.1 Workplace health and safety <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#361-workplace-health-and-safety> and 5.11 Security technology <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#511-security-technology> sections for further information.

Security and safety in vertical schools

A safety in design process **must** be undertaken for vertical school facades to mitigate, as far as possible, bird nesting, rodent infestation, and risks for cleaning maintenance and contractors and staff.

Addressing safety and security concerns in vertical schools without unduly fencing them off can be a challenge. However, sometimes an element as simple as a low plinth or planting can provide sufficient separation of space and perception of security, while preserving a sense of openness to the urban fabric.

An external key vault and or an alternative means of access **must** be provided for ongoing security access.

3.5.2 Sustainability and climate change

Designs **must** promote environmental and economic sustainability through efficient operations, reduced maintenance costs, and resource usage, and support the Victorian Government's long-term emissions reduction target of net-zero by 2050, established under the *Climate Change Act 2017* (Vic).

Designs **must** consider and respond to current and future climate change impacts to support the Victorian Government's climate change priorities and objectives for the built environment, and actions established under the Education and Training Climate Change Adaptation Action Plan.

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 80
- 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.

The SRI index does not apply to heritage and existing fabric.

3.5.3 Learning spaces

Learning spaces **must** be designed to accommodate the required student and staff capacity for each space and be based on detailed furniture layouts that confirm spatial allocations, including learning activities, presentations, display and storage at appropriate user heights, and circulation. Spaces **should** enable supervision and not be comprised of narrow angles or irregular shapes that prevent practical application and optimal use of space and furniture, unless an alternative is required for a specific function.

For more guidance on space design and layout, current consultants can see the School Facility Area Schedules and Design Explanatory Brief and Design Guideline (Design Guide) on IPM.

Where installed, flexible learning spaces **must** satisfy the following criteria:

- be easily configurable into open plan spaces as well as more traditional, contained learning spaces to support a range of pedagogical styles, including direct instruction and collaborative, project-based work
- all configurations **must** have high acoustic standards, including sound-rated, floor to ceiling, operable walls or sliding doors
- hearing augmentation system solutions **must** be appropriate for all scales and configurations and comply with section 5.10.12 Hearing augmentation and soundfield systems <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51012-hearing-augmentation-and-sound-field-systems>
- include dedicated quiet rooms or pods in close proximity to learning spaces to cater to small groups needing acoustic separation from the main group. These spaces **must** have supervision sightlines from outside.
- where possible and appropriate, learning space design **should** facilitate a greater degree of movement with minimal disruption for students with neurodiversity needing to move to quiet areas or work at different paces or sequences.

Education and play spaces in early learning facilities are subject to specific regulatory requirements. Consultants **must** ensure that designs meet the National Quality Framework (NQF) and the seven National Quality Standards related to the Physical Environment Quality Area 3 <https://www.acecqa.gov.au/nqf/national-quality-standard/quality-area-3-physical-environment> , including that indoor education and play spaces 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 and circulation strategy

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.

An NCC compliant circulation strategy is required to inform the design of each new school or school building. The circulation strategy **must** satisfy the following criteria:

- be based on estimated, capacity student flow rates
- effectively manage circulation pressures, including through minimisation of congestion and pinch-points
- assume that 'mass movement' through travel/circulation pathways involves:
  - the majority of students leaving a classroom in the first minute after a class ends, and
  - these students are often moving to the same destination (i.e. canteen, exit), and that
- a student travel/circulation path has three lanes with a total minimum width of 2.1m, including:
  - one lane movement against the main student flow (only required where there is mass movement)
  - each movement lane is, at least, 0.7m wide clearance, considering furniture fixtures, and accommodating students carrying bags, unless
  - mass movement is not required (i.e. in administration office areas), in which case, the clear width can be reduced to 1,200 mm for short corridor lengths and 1,000mm where it is a ramp or stair up to a raised platform in the hall.
- central stairs (and wherever possible other circulation or mediated spaces) **should** be multi-purpose
- fire stairs are securable at ground level
- school lift selection, planning and design accommodates teachers, visitors and those with a disability that precludes them from using stairs, however
- where an early learning facility is located above ground floor, at least one lift **must** accommodate the efficient, mechanical transportation of groups of children and parents/carers without key passes, and
- early learning designated lift/s **must** have capture gates, and surrounding circulation spaces **must** be DDA-compliant
- in multi-level buildings, a minimum of two full sets of stairs **must** be installed, which may include a fire stair/s that is compliant for daily student circulation. Where

possible these stairways **should** be placed around the lift core with high level glazing to avoid balustrades and falling from height issues.

In addition, for vertical schools:

- consideration **should** also be given to terrace stairs or strategically scattering stairs along the atrium (these have become known as Hellerup stairs)[4] to encourage vertical circulation. As well as connecting levels with staircases, seating that meets NCC and safety and deign expectations **should** be provided by these stairs
- mediated[5] and in-between spaces **should** offer connection and glimpses of the natural environment, through atria and communal spaces wherever possible
- circulation space design **must** be appropriate for the school population's age group/s, for example, consider behavioural risks, such as younger students' impulse to climb
- control interactions between different cohorts (i.e., through multiple entry points) where bullying or safety are risks, as determined by the safety in design process
- vertical school design **must** be informed by a circulation strategy that minimises the need for students to move between floors throughout the school day, i.e. by planning around 'clusters'.[6]

Also see 5.3.10 Stairs and ramps <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5310-stairs-and-ramps> .

Sleeping areas or nooks in early learning education and play spaces

Sleeping areas or nooks where children will sleep must accommodate the required number of cots and sleep mats for planned child occupants, as outlined in the Area Schedules. The designated sleeping area or nook must be safe, conducive to sleep, well-ventilated and flexible enough to accommodate a range of ages and sleep needs.

Sleep areas or nooks must not have blind spots that prevent staff from supervising the whole sleep area. The design of sleeping areas should also balance reduced light for sleeping with adequate light for child supervision.

Sleeping areas must also include provision for storage of, vertically stacked, sleep mats that is accessible to children, noting that dimensions for a standard rest mat are 120x55x5.5 cm. Storage must accommodate the same number of mats as planned child occupants for the room in question (e.g. 12 mats for a 12-place room, 33 mats for a 33-place room).

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. Where possible, staff workspaces, particularly for school leadership and administration staff, **should** have maximum natural daylight infiltration.

In vertical schools, careful consideration **must** be given to:

- opportunities for natural light infiltration into circulation pathways (i.e. circulation space, travel paths, hallways, and stairs) and quality views, and
- reconciling this with the optimisation of deftly-angled shading or high performance shade glazing, and
- façade shading systems **must** be carefully considered to suit window cleaning and minimal maintenance
- where operable windows are nominated, opening dimensions **must** be minimised in line with Safety in Design review
- restrictors **must** be installed in early learning facility windows to limit opening to 125mm.

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.

Refer to 5.3.3 Windows <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#533-windows> for further information.

All learning spaces **should** have a clear line of sight to an external view with minimal distractions for all students.

Schools and early learning facilities must have sightlines from every learning space and children's bathroom to and from the outside for supervision and safety. Special attention must be paid to maintaining supervision sightlines where early learning facilities are situated on steep sites.

Where a lecture theatre or auditorium arrangement is proposed, a sightline analysis **must** be provided. Staggered seating **should** also be considered best practice in auditorium-style areas.

All indoor and outdoor approved areas of an early learning facility **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

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, minimises COVID-19 transmission risk, and considers changing weather patterns. This **must** be compatible with overall heating or cooling designs.

Cross-flow, or double-sided, ventilation occurs when openings are located opposite one another rather than side by side, opening either to the interior or the exterior. Cross-flow openings need to be less than 15 metres apart to be effective.

Where exterior air quality is not compromised i.e. by industry pollution, and exterior openings are structurally possible and practical, they are the best practice option for optimal ventilation.

Rooms with double-sided openings, or cross-flow ventilation, where openings are less than 15 metres apart, provide:

- 2.5 to 5 times higher ventilation rates than single-sided ventilated rooms
- greater airflow distribution movement and coverage
- greater reduction of dead spots
- have higher air change rates.

Consideration **should** also be given to the following factors, which enhance the benefits of cross-flow ventilation above:

- double-hung sash (high level/low level) window selection, over single-sash or side-hung , where appropriate and viable
- locating openings on the North and South orientation, and
- having at least one opening open to the exterior, where air quality is acceptable.

All ventilation requirements are described in 5.8 Mechanical services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#58-mechanical-services> .

Information and communications technology (ICT)

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.

Project consultants **must** refer to 5.10 Information and communication technology <https://www.schoolbuildings.vic.gov.au/building-quality-standards-

handbook/technical-specifications#510-information-and-communication-technology> for further information and requirements specific to early learning facilities.

Acoustics

All acoustic requirements are described in 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-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.

High-traffic external doors **should** be on the eastern side of buildings, to avoid the negative effects of cold southerly winds and hot northerly winds, or where this is not feasible, use adjacent built form (e.g. wing-walls) and/or landscaping elements to protect the entrance.

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 to prevent the absolute majority of direct sunlight penetration during school operating hours.

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 3.4 Landscape planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#34-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 early learning facilities 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 early learning facilities are integrated into the school facilities, consideration **should** be given to shared use of administration, meeting and staff breakout spaces. The associated safety risks of multi-use sites must be addressed through well-considered design as outlined in section 3.3.6 Integration of shared facilities <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#336-integration-of-shared-facilities> .

Where possible, performing arts spaces **should** have independent access, with separate entrances and keys, to enable after hours hire without requiring access to other buildings and the campus.

3.5.6 Potential for growth and flexibility – portable and permanent modular buildings

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

Portable or permanent modular buildings **should**:

- be designed in conjunction with the overall design, and with respect to the functionality of the school site. Landscape planning **should** integrate portable or permanent modular 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
- be placed in an area that does not impede access for emergency vehicles (see 3.3.15 Access for emergency vehicles <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#3315-access-for-emergency-vehicles>)
- provide a straight-forward connection to power, water and drainage

- provide safe ingress and emergency egress from the portable or permanent modular building, and from any neighbouring buildings affected by the placement of the portable or permanent modular 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 portable or permanent modular buildings
- have ramps, lifts and other accessibility measures incorporated at the site during delivery (all triple-storey buildings **must** have a lift).

Multi-storey portable or permanent modular buildings are provided to schools that have limited available space for further single-storey portable or permanent modular buildings. All multi-storey portable or permanent modular 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).

Each project **must** comply with the Access to Premises Standards and those parts of the AS 1428 suite of standards that are referenced in the National Construction Code or Premises Standards and are, therefore, mandatory. All other parts of the AS 1428 **should** be considered in school design to achieve the best universal design standards.

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 2022 (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
- AS 1428 Design for accessibility and mobility (in application of access requirements and universal design)
- Disability (Access to Premises – Buildings) Standards 2010 (Cth)

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 maintenance workers, staff students, and visitors.

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 3.5.1 Safety and security in design <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#351-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 the 11 Child Safe Standards and the Ministerial Order No. 1359 – Child Safety Standards – Managing the risk of child abuse in schools.

While all of the 11 Child Safe Standards **must** be enabled or implemented through design, Standards 1 and 9 are particularly pertinent to school and early learning design:

- **Standard 1:** Organisations establish a culturally safe environment in which the diverse and unique identities and experiences of Aboriginal children and young people are respected and valued.
- **Standard 9:** Physical and online environments promote safety and wellbeing while minimising the opportunity for children and young people to be harmed.

To comply with Standard 9 and Ministerial Order No. 1359, 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.

In particular there **must** be lines of sight:

- from the reception to the outside, including secondary exits located close to the reception area that may be used by students
- from reception to the first aid room, and
- into all learning spaces from outside those spaces for supervision and safety.

When considering design solutions for achieving Standard 9 also refer to section 3.1.2 Recognise Aboriginal culture in all new buildings and significant upgrades to schools <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#312-recognise-aboriginal-culture-in-all-new-buildings-and-significant-upgrades-to-schools> .

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 sections 1.5 Departmental and government procedures <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/introduction#15-departmental-and-government-procedures> and 3.4 Landscape planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#34-landscape-planning> for further information.

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

- Bushfire Preparedness policy <https://www2.education.vic.gov.au/pal/bushfire-and-grassfire-preparedness/policy>
- Shelter in Place policy <https://www2.education.vic.gov.au/pal/shelter-place-buildings/policy>

Schools and early learning facilities located in a designated bushfire prone area **must** satisfy the additional requirements set out in VIC NCC G5P2.

All relevant school or early learning facility constructions in a designated bushfire-prone area **must** also comply with NCC's Additional Bushfire Requirements for Certain Class 9 Buildings at NCC Part G5 <https://ncc.abcb.gov.au/editions/ncc-2022/adopted/volume-one/g-ancillary-provisions/part-g5-construction-bushfire-prone-areas> , and NCC Specification 43 Bushfire protection for certain Class 9 buildings <https://ncc.abcb.gov.au/editions/ncc-2022/adopted/volume-one/g-ancillary-provisions/43-bushfire-protection-certain-class-9-buildings> .

3.6.4 Early learning regulations and policies

The National Quality Framework (NQF) consists of Acts, regulations, and standards that guide the design of early learning facilities.

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 (NQS) and quality rating system.

The NQS provides early learning service providers certainty about what is expected of them and what they are required to do to comply with the National Quality Framework, this includes guidance on the design and development of a facility. The physical environment of an early learning facility **must** be safe, suitable and provide a rich and

diverse range of experiences that promote children's learning and development. Good design of an early learning facility is a major contributor to ensuring these regulations are addressed and fundamentally underpins what needs to be met before an early learning facility gains a service approval to operate.

All early learning facilities designs **must** comply with all of the NQF tools and additional requirements laid out in this Handbook. Any early learning-specific performance criteria in the BQSH relate to licensed areas required under these regulations and legislation, unless otherwise stated.

Indoor and outdoor space allocations in early learning facility design, including those in multi-storey buildings, must comply with the minimum requirements of the National Quality Framework (NQF) and the Children's Services Act (CS Act). For further details, refer to Space Requirements for Early Childhood Services <https://www.vic.gov.au/space-requirements-early-childhood-service> .

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 the Building handover and completion </building-quality-standards-handbook/building-handover-and-completion> section for more information.

Footnotes

[1] Landscape designers must have a minimum qualification of Certificate III in Landscape Construction and minimum five years of experience.

[2] Noting that under the Agriculture Legislation Amendment Bill 2022 to the *Catchment and Land Protection Act 1994* (Vic), it is an offence in Victoria to plant or propagate noxious weeds, seeds of noxious weeds or parts of noxious weeds capable of growing without a permit.

[3] Locally native plant species are species that have historically occurred naturally in the local zone in question but do not necessarily occur throughout Australia.

[4] Hellerup stairs are an expanded staircase that doubles as a sitting area, encouraging connection, learning and relaxation. In Prahran High School, the Gray Puksand's dual stairs offer students with expanded learning and viewing platforms while they move through the school. (Newton, 2019).

[5] Mediated spaces are defined as interaction spaces between indoor and outdoor environments.

[6] Clusters or learning communities may be based on year level/s (primary school) or commonly through grouped specialist areas/streams (secondary school) and be informed by timetabling, where this information is known.

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, and
- current condition of soil/land for building a septic system due to the lack of mains sewer.

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 4.2.4 Hazardous materials <#424-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 vertical schools and early learning facilities

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. Consideration of whole of life maintenance – costs, logistics and safety – is important in all schools, but particularly true to vertical schools. Designs, incorporating high internal glass panes in atria or atypical facades, for instance, **must** have resolved and realistic whole of life maintenance plans that can be safely executed by maintenance contractors.

Vertical schools and early learning facilities **must** be designed and engineered to accommodate anticipated expansion in accordance with master plans. See 5.1.4 External equipment <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#514-external-equipment> for a summary of irrigation system requirements in multi-storey early learning facilities and schools.

Vertical schools **must not** be mass timber or substantial laminated timber construction.

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 report forms part of the broader circulation strategy that informs overall design and meets the criteria set out in 3.5.3 Learning spaces <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#353-learning-spaces>. 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.

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.

Early learning facilities in multi-storey buildings **must** include the following:

- capture gates to restrict children's access to lifts and stairs and surrounding circulation spaces **must** be DDA-compliant
- pin code **and** fob key operable lifts
- handrails are required to meet regulatory requirements, including a low handrail at a height suitable for use by 3 year old children
- upgraded exits, sprinkler and smoke detection systems, as per NCC requirements for early learning facilities, and
- provide separate secure line/access for school and early learning facilities, where relevant.

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. If an early learning facility is located above ground floor, there must be sufficient outdoor space and access to natural environment on the same floor as education and play spaces.

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 early learning facility.

All spaces designated for babies should be on the ground floor. If located above the ground floor, direct exit to the ground floor with an adequate ramp must be provided.

In new guidance from the Australian Children's Education and Care Quality Authority (2021) <https://www.acecqa.gov.au/sites/default/files/2021-09/Evacuation_of_multi-storey_buildings.pdf>, the secretariat for the NQF provides clarity on their expectations in relation to early learning facilities in multi storey buildings to ensure developers, designers and builders understand the increasing stringent service approval process applied to services in multi-level buildings.

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 issues
- onsite bus access, short term parking and covered drop-off and pick up facilities **must** be provided (see 3.3.14 Provision of bus parking <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#3314-provision-of-bus-parking>).

4.2.7 Supported inclusion schools

A Supported Inclusion School (SIS) is an enhanced mainstream primary or secondary school with a physical design and an integrated specialist provision that provides some additional supports to a proportion of students with disability.

While DE designs all new schools to enhance inclusion and participation for all students irrespective of need, these schools have additional specialist facilities and targeted support that allows them to enrol a higher proportion of students with a disability than a typical mainstream school and allow them to be integrated and supported throughout the facility.

SISs contain the following additional or larger spaces:

- a fitness/multipurpose space, dedicated to students with disability for exercise and other therapeutic activities
- an entrance and bus shelter, to accommodate the Students with Disabilities Transport Program
- a larger first aid space, as per what is provided in an SDS.

Additional facilities may include:

- acoustic resources, for example, acoustic wall or ceiling treatments or assistive hearing technology to meet the needs of students who are deaf or hard of hearing
- wider corridors for a greater number of wheelchairs to pass
- a larger allocation of accessible toilets
- change room/s with (with steel reinforcement to accommodate hoist installation, where required)
- storage for specialist equipment such as mobile hoists
- smaller multipurpose spaces suitable for consultations, 1:1, or small group learning
- automatic gates
- covered walkways, and

- laundry facilities.

For more information please refer to the School Facility Area Schedules and Design Explanatory Brief And Design Guideline (Section 4.12 for Primary SIS and Section 5.14 for Secondary SIS) which can be found by current consultants on the IPM platform.

Sensory rooms

A sensory room, within a Victorian government school setting, is a controlled and intentionally created space that provides multi-sensory resources to support a student's sensory needs to enable them to engage in learning.

Where they are installed, sensory rooms **must** be designed, implemented and evaluated in consultation with an occupational therapist who has relevant design experience in sensory room design and student program development. Sensory room design **must** incorporate universal design principles and be based on the needs of the students who will or are likely to use the room, and the school's local context. Student needs may vary over time, so a sensory room **must** be a flexible and adaptable space that can enable modifications when necessary.

A sensory room **should**:

- be physically accessible for its users
- be positioned in a quiet, but not isolated, part of a school
- be adequately sized for its intended various use/s i.e. accommodate different group configurations and adequate in-room supervision, where
- have egress door/s that can remain open while the room is in use, where this causes little or no inconvenience
- provide natural light through glass, skylights or windows
- clear lines of sight into the space
- provide a secure storage space/s for equipment not in use
- not be decorated with pattern or colour for aesthetic purposes
- meet child safety standards at project completion.

More guidance on the design and operations of sensory rooms can be found in the Sensory Rooms and Equipment Policy.

4.2.8 Furniture and equipment

For new schools and refurbishment projects, project consultants **must** specify as part of the building design a full list of furniture, equipment, and joinery as per section 5.3.12 Joinery and fixtures <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5312-joinery-and-fixtures> schedules for existing

schools may include existing furniture. Schools upgrading their furniture as part of a refurbishment are encouraged to donate unwanted furniture and equipment in accordance with the Department of Education's Donating Furniture and Equipment Policy <https://www2.education.vic.gov.au/pal/donating-furniture-equipment/policy> . Specified furniture **should** comply with Local Jobs First as determined by project value and the following requirements:

- be flexible, i.e. height adjustable
- a mix of sit-stand and traditional desks be provided for staff
- small round tables **should** generally be avoided in larger spaces as they do not constitute an efficient use of space,
- 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.

In flexible spaces, proposed joinery **should** generally be installed in central positions in a room and have the ability to be safely moved around on casters.

All specified furniture, fittings and joinery **must** comply with the Engineered wood products section (in 5.3.12 Joinery and fixtures <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5312-joinery-and-fixtures>).

4.2.9 Infrastructure works and services

Costings for all works and services, such as power supply, sewerage systems, or a septic system if there is no mains sewer available, stormwater retention, and water and fire services, **must** be included in the project budget.

4.2.10 Records storage

Schools and DE-operated early learning facilities must create, safeguard and store administrative and student records. Where a school or DE-operated early learning facility does not plan to digitise the majority of its records, permanent hardcopy records must be stored on its premises.

Temporary records must be stored on site or with an Approved Public Record Storage Supplier (APROSS). On site hardcopy records storage must comply with PROS 20/02 Storage Standard <https://prov.vic.gov.au/sites/default/files/files/documents/2002v1.0.pdf> and the Records

Management policy <https://www2.education.vic.gov.au/pal/records-management/policy> .

Records should not be stored in:

- sheds
- shipping containers
- attics
- basements, or
- any space where there is a risk of damage by weather, water leakage, or pests.

The records storage space must not have external windows.

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, but are not limited to:

- allowance for all NCC Section J requirements and 2022 updates
- 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
- gymnasium storage for assembly furniture, such as loose seating
- acoustics for all configurations of adaptable learning spaces to comply with 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-acoustic-engineering>
- thumb instead of key locks for easy use during emergency lockdown procedures
- carpark palisade fencing, and
- 2,100mm fencing where security risks identified
- shading for composite decking
- water-filling stations at troughs and fountains, and
- pre-finished eaves.

5. Technical specifications

5.1 Landscape architecture

Landscape architecture **should** form part of the overall site design. Studies have repeatedly demonstrated that urban greening improves people's health and wellbeing and improves air quality in cities and towns.

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 ensure that outdoor environments support learning, wellbeing and appreciation for nature.

As per the National Quality Framework, all early learning facilities **must** ensure that the minimum outdoor space requirements are met in compliance with the National Education and Care Services Regulations and **must** satisfy the following:

- a qualified landscape designer or landscape architect **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.

Early learning facilities must maintain supervision sightlines between outdoor learning areas and children's bathrooms. Special attention must be paid to maintaining supervision indoor-outdoor sightlines where the facility is located on a steep site. Multiple-level changes should be avoided as they can hinder child supervision, restrict access, and create potential hiding spots.

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, aesthetics and ecological value 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
- all soil and mulch has been assessed by an environmental hygienist. Builders **must** provide clearance certificates prior to fill/mulch being brought onto a school site, in accordance with the Department of Education's Soil, Mulch, or Loose Fill policy <https://www2.education.vic.gov.au/pal/soil-mulch-loose-fill/policy>
- soil and mulch are prevented from spreading to adjacent pavements or turfed areas
- appropriate selection of locally-native[7] plants to foster longevity and contextual integration, and

- appropriate for the intended use. (See 5.1.2 Sports playing fields <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#512-sports-playing-fields> if grassed area is intended as a playing field).

General grassed areas

Areas of the site not required for other purposes may be converted to general grassed areas, consistent with AS 5181 - Use and installation of turf as an erosion, nutrient and sediment control measure.

Grassed areas are not to be included on slopes greater than 1 in 5 (20% gradient). If a playing field, the gradient **should** be between 1 in 70 and 1 in 100. See 5.1.2. Sports playing fields <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#512-sports-playing-fields> for more information.

Local soils can be highly variable from site to site and typically will not support even moderate use without some deterioration or loss of turf cover. Consequently, a robust turf grass **must** be selected which has the capability of regeneration through aggressive and fast-growing stolons and rhizomatous root system (or growth habit) which spread across and through the soil profile to aid recovering if damaged from wear and tear. Warm season turfgrass species such as couch grass and kikuyu are most suited to this situation as they are drought tolerant, self-repairing and hard wearing, provided the soils are decompacted annually to assist with turf growth and recovery and overall performance and long-term sustainability. Both couch and kikuyu grass species will persist (usually survive) during periods of extended drought and can be quick to recover once adequate moisture (irrigation or rainfall) is provided. Renowned for their rapid growth and recovery, both species will survive and provide an acceptable surface with minimal water and fertiliser, thus reducing the maintenance required. Areas of high traffic may require additional inputs to assist with turf recovery and long term sustainability.

Irrigation systems **must** only be provided to these general grassed areas if a non-potable water mains supply is available to the site. At sites where mains recycled water is not available, the school may choose to undertake manual watering (if local water restrictions allow) to maintain the viability of stolons and rhizomes to the extent necessary to suppress dust and ensure recovery once the drought breaks, however irrigation systems **must not** be installed. Other site-collected sources of non-potable water (such as rainwater harvesting) will be in demand for higher value uses such as toilet flushing and sports field irrigation.

Please refer to the Irrigation systems section (in 5.1.4 External equipment <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#514-external-equipment>) for further information.

Artificial grass/synthetic carpets

In schools, project consultants may consider providing artificial grass or synthetic carpets in small spaces only where grass is difficult to establish and maintain (due to constant shade, for example), however this is discouraged. Project consultants **must** instead consider and preference other hard landscaping options, shade-loving indigenous[8] ground cover plants (e.g. dichondra repens, viola hederacea), permeable pavers, or a combination thereof wherever possible.

In early learning facilities, synthetic or non-natural materials, such as artificial grass and rubber soft fall, must not be used in outdoor spaces. Refer to the section on early learning facility outdoor spaces (in 5.1.4 External equipment <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#514-external-equipment>) for further information.

If it **must** be used in a small space in schools, artificial grass or synthetic carpets **should** meet the following requirements:

- fit-for-purpose and durable
- a minimum 19mm pile length
- a minimum 1,000g/m^2 pile weight
- sand-filled, and
- well-drained.

Mass garden beds

The planting scheme **must** be selected from locally native[9] hardy evergreen and flowering perennial groundcovers, low bushes, plants and shrubs, able to thrive in the given exposure condition. Species that are not locally native **must** only be used where there is a compelling cultural heritage reason to do so, or where pre-colonial plantings, for instance, are no longer viable due to landscape modification.

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:** Tree Stock for Landscape Use

> 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 m^2, and
- 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:

- *hedera helix* – common name 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, and
- 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 Sports playing fields

A functional sports oval can become a focal point for any school and local community. Sports ovals can be considered a vital piece of community infrastructure for organised sport, casual play, passive recreation and a venue for hosting a wide array of school and community events. Changes in weather patterns will see increased periods of drought and intense rainfall so close consideration **should** be given to the capacity of a sports oval to cope with these changes and their ability to recover from periods of intense use throughout the year.

Synthetic turf sports surfaces **should** be avoided due to their contribution to urban heat island effect and the production of micro-plastics entering waterways through runoff and drainage from the surface.

Site masterplanning

Masterplanning **should** ensure sports turf surfaces are free of overshadowing from adjacent buildings, and large trees are a sufficient distance away so shade or tree root competition is avoided.

Masterplanning **should** also take into account access to the facility for machinery and equipment, providing easy direct access without complex pathways.

Masterplanning **must** also consider pedestrian movement around the school, and the 'desire lines' that will exist between various buildings and other site features, ensuring they do not go across sports turf areas.

Masterplanning **should** take into account the shading of pedestrian movement corridors with canopy trees.

Constructing sports fields that are resilient and low maintenance involves considerable expense, and as such masterplanning **must** consider whether playing surfaces can be reduced in size and still represent a good design outcome. Smaller, high quality sporting fields are preferred over larger lower quality fields.

Sports field design

The design **must** take into account:

- local soil analysis results to determine the ability of the soil to support natural turf, and promote proper drainage
- other site conditions
- regional weather and climate
- rainfall data and available water
- irrigation and drainage design
- material selection and testing
- profile design
- procured advice from sports field design specialist on the overall design and a geotechnical engineer on drainage profile site analysis, and
- construction specification documentation.

Other factors that **must** be considered include the type of use and sport/s to be played, and expected level of use, including average and maximum hours of weekly usage, and development of a sustainable maintenance program to ensure surfaces can be installed and maintained to a high standard suitable to the school and community's desired use. Key maintenance considerations include:

- how often the oval will be used
- during which seasons the oval will be used (i.e. turf wears quicker in winter), and
- the availability of water, fertiliser, and labour for maintenance.

Choosing the right construction

Developing sports field construction profile whether it be as an upgrade or new facility, **should** be based on the ability to cope with the maximum expected level of use. School sports ovals can receive a significant level of use and need to be designed accordingly to accommodate wear and recovery.

Most damage occurs to a sports turf surface when used during wet conditions. The ability to maintain a dry surface throughout the winter period increases the wear tolerance and potential hours of use without significant deterioration. A well-maintained surface will require less inputs throughout the year.

Desirable surface characteristics

The following characteristics **should** be the basis of any new sports turf surface to ensure the end product is suitable.

- a uniform, even surface free from holes or depressions.
- a suitable turf species selected which provides a full uniform turf coverage, is drought tolerant, hard wearing and shows good recovery potential
- a profile which provides good drainage in winter, is resistant to compaction and retains adequate moisture throughout the summer months.

Turf selection

Turf selected for use on school sporting fields **must** be hard wearing, drought tolerant and have good recovery potential. Warm season grasses such as couch or hybrid couch grass (*Cynodon dactylon x transvaalensis*) are most suited to this application.

Turf can be established either as solid turf or line planting. If the surface is solid turfed, turf **must** be grown on a sand-based profile, or be washed before installation. Purchase turf from a recognised and reputable turf farm.

Hydro-seeding, while cheaper, takes considerably longer as it is grown from seed. It is therefore generally not compatible with the short timeframes of school construction projects.

Table 6: Comparison of turf installation methods

Installation method	Pros	Cons
Hydro-seeding	Far cheaper than solid turf	Takes considerably longer as growing from seed
Solid turf	Pending weather and maintenance, this method results in a fully-functional surface in 6-8 weeks	Expensive
Line planting	Cheaper alternative than solid turf and faster to establish than hydro-seeding	Slower to establish than solid turf

The following guidelines **should** be followed when installing natural turf:

- soil **should** be cultivated to a minimum of 150mm from the surface to break up this soil (allowing root growth)
- surface debris over 25mm in diameter **should** be removed, and
- topsoil **must** be a minimum depth of 200mm, and preferably 300mm.

Turf characteristics

The turf **should** have the following characteristics:

- be of uniform colour, texture and quality
- be of high density. (turf that is thin or has holes in it is unacceptable)
- be free from all major weeds
- be free of all turfgrass diseases and insect pests including couch mite and scarab beetle/cockchafer larvae
- be free of parasitic nematodes
- delivered sod to the site **must** be fresh, green, uniform and show no signs of scald, heat damage, nutrient deficiency or other forms of turfgrass stress
- sod **must** be delivered within 12 hours of harvesting and washing, and installed within 12 hours of delivery, and
- sod to be of sufficient strength so as when held vertically aloft by its end it will not tear under its own weight.

Turf sod laying

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
- fitted with an irrigation system/s suitable to the site
- fields are orientated and marked in a north–south orientation where possible, and
- playing field gradients **should** be between 1 in 70 and 1 in 100.

Consultants **must** consider the effect which field gradient has on drainage and daily and year-round usage of the field.

All significantly sized open spaces **must** also be turfed with natural grass, rather than synthetic turf, with adequate sub-surface drainage and topsoil structures. If synthetic turf is absolutely necessary, it **must** be documented as a departure and formally accepted during the design stage reviews. 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. Fill **must** have been assessed by environmental hygienist

and builders **must** provide clearance certificates prior to bringing it onto a school site, in accordance with the Department of Education's Soil, Mulch or Loose Fill policy <https://www2.education.vic.gov.au/pal/soil-mulch-loose-fill/policy> .

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

School level	Oval requirement
New primary schools	**Should** be an even surface, 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. 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. Field shape and gradient **should** be appropriate for drainage needs and gradient **should** be between 1 in 70 and 1 in 100.
New secondary colleges	**Should** be an even surface, 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. 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. Field shape and gradient **should** be appropriate for drainage needs and gradient **should** be between 1 in 70 and 1 in 100.

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

Guidance on best practice community AFL oval specifications, where conditions are required and possible due to Community Joint Use Agreement contributions, can be found in the AFL Preferred Community Facility Guidelines 2024 <https://play.afl/sites/default/files/2024-04/AFL_PFG-2024_DIGITAL.pdf> .

5.1.3 Hard landscaping and indoor sports courts

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

Consultant **must** liaise with school where possible, or School Reference Group, about preferred rubbish disposal system and install suitable enclosures and access accordingly (i.e. wheelie bins or large industrial bins).

Outdoor hard 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 <https://vic.netball.com.au/facilities-resources>

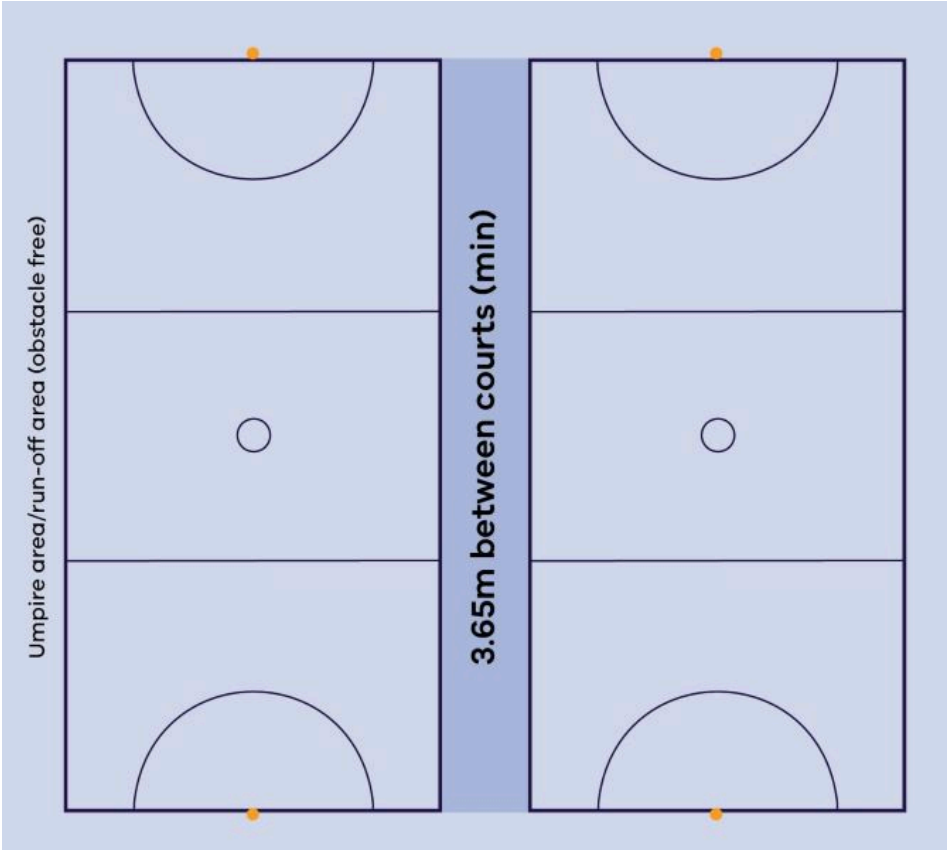
Design **must** follow procured advice from sports field design specialist and a geotechnical investigation, interpreted by a geotechnical or civil engineer.

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

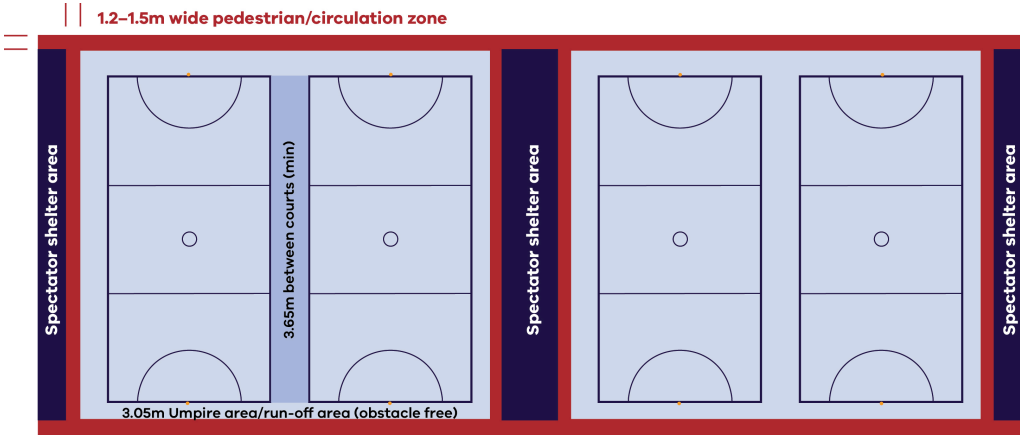


Two hard courts side by side on long edge.

There should be a distance of 3.65m between the courts (minimum).

To the left of the courts there is an umpire/run-off area, which should be obstacle free.

Figure 2B: Example arrangement for four hard courts



Four hard courts in pairs side by side on long edge.

3.65m between each pair of courts (minimum).

3.05m umpire/run-off area around each pair of courts (obstacle free).

Area around run-off area should be 1.2m–1.5m wide pedestrian/circulation zone.

Spectator shelter area to be between pairs of courts and after the circulation zone.

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
- if constructed of asphalt, the acrylic sports coating **must** cover the whole surface area, not just the courts and run-off area
- the acrylic sports coating (except for line markings) **must** have a 39 SRI rating to reduce the urban heat island effect
- 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, and
- **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. In the case of covered outdoor courts, where installed, structural poles **must** be located outside run-off areas. Cover height **must** allow lux standard compliance, and clearance of equipment for maintenance, i.e. cleaning, lighting replacement.

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 testing[10] 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)[11]
- 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
- is FIBA compliant. FIBA certification[12] is strongly encouraged
- has rings, posts, sleeves and padding that satisfy current FIBA or Netball Victoria regulations, respectively[13], and
- pole sleeves **must** be flush with the ground

- 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.

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 and full rotation of adjustable poles.

The ceiling height of a covered outdoor learning area/space, or COLA, is determined by its planned use. Where a COLA is to be used for sports, it **must** be:

- 7m, minimum, where the space has line markings and will be used as a sports practice or play space
- 7.5m, minimum, where a space will be used for any level of competition, and

Where a COLA is not intended to be used for sports (either practice, play, or competition), it **must** be:

- between 5 and 7m minimum, only where the space, and:

- have no sports court markings and be intended as an outdoor classroom or amenity and not for sport e.g. not for netball, basketball or volleyball
- does not have lighting that could be damaged by other ball play, and
- will not be used for sports competitions or hired out for community sports use into the future.

All COLA structures **must**:

- be free standing
- not be scalable
- have adequate drainage that allows water run off, and
- have posts that are appropriately located and designed for safety and access, including
- visual elements to assist navigation and safety for students with visual impairment, and
- have lighting that supports the activities that will be conducted in the space, and
- that enable adequate control of glare and visual contrast, and
- any installed luminaires **must** be vandalproof and have an impact resistance of IK10 (AS 62262).

COLA design and placement should consider site space constraints and any limitations imposed due to heritage significance, where relevant.

Clear roof sheeting may be considered in full length strips to provide additional daylight, where the design mitigates against glare. Any clear roof sheeting **must** have safety mesh installed underneath it in accordance with AS/NZS 4389 – Safety mesh.

Where an outdoor court is covered, the required minimum ceiling height measured from finished floor level of the playing field to the lowest ceiling point (which includes the area over the umpire / run-off areas) is determined by its planned use.

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.

Portable, self-supporting netball or basketball posts **must not** be used.

Court size

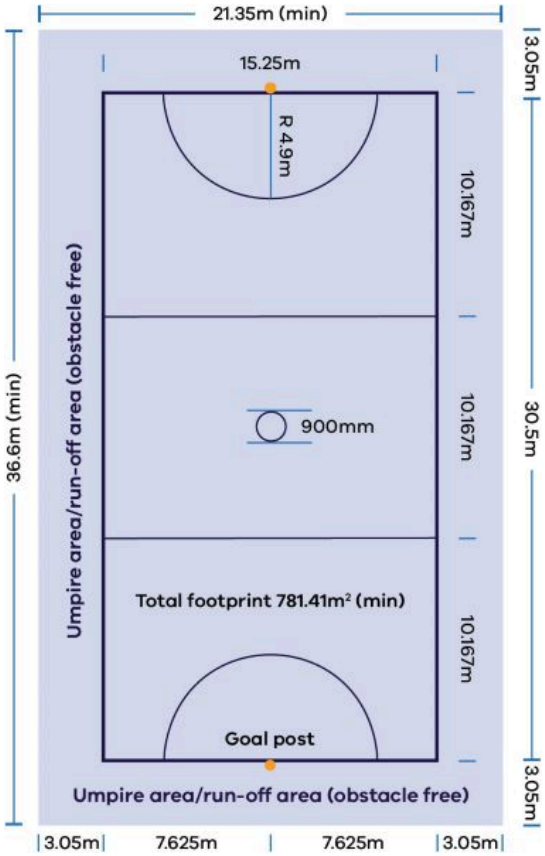
Netball Courts have a larger footprint than basketball. By using the netball specifications, all basketball and other highball sports dimensions will be met.

While all hard and competition court dimensions **must** have a netball court-size footprint, the basketball court dimensions that fit inside this **must** be 28m in length by 15m in width measured from the inner edge of the boundary line, in compliance with FIBA guidance <https://www.fiba.basketball/documents/official-basketball-rules/current.pdf>.

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 15.25m = 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 = 781.41m^2 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



> A drawing of a hard court, showing the required dimensions of each section of the court.

At least one school court **must** be installed with a timber backboard or opaque fibreglass/acrylic backboard with black lines to enable play by those with visual impairment.

Scorer and team benches **must** be outside the 3.05m netball run-off areas. Ideally, scorer benches are located centrally on the court's long side with the team benches located either side of the scorers' bench.

Scoreboards and shotclocks

Scoreboards **must** be tested to DN18032-3 standards. Scoreboards and shotclocks **must** be FIBA compliant. FIBA certification is strongly encouraged. At least one scoreboard **must** be installed at a suitable height and location where it is clearly visible to the officials, players, player benches and spectators, and has a digit size for time and score equal to or greater than 250mm.

All scoreboard controller software **must** be upgradable on site to respond to future rule changes and 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.

Two shotclocks must be provided and located at opposite ends of the court.

Lighting and other elements

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.

Figure 2D: Lux lighting for competition facilities

Court type	Lux level
Indoor (required)	300 Lux minimum

Court type	Lux level
Outdoor (desirable)	100 Lux for training courts 200 Lux for competition netball courts

Maximum Glare Rating (GR) in competition-grade netball courts (non-televised) **must not** exceed 40. Wherever possible, outdoor courts **should** have a maximum GR rating of 45.

Basketball facility design **must** mitigate glare through consideration of factors such as usage, orientation, shading, blinds, and window placement.

Lights **must** be installed outside of the competition clear zone, have an impact resistance of IK10 (IEC 62262) and be vandalproof.

Netball goal posts, sleeves and rings **must** comply with current Netball Victoria Guidelines, found in the Netball Victoria Facilities Manual <https://vic.netball.com.au/facilities-resources>. Noting that pole sleeves **must** be flush with the ground, and protective sports foam **should** be provided to posts.

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 facilities[14] and encourages these types of partnerships. See 5.8.6 Ventilation <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#586-ventilation> for more information on gymnasiums and thermal comfort.

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 the BQSH specifications developed in consultation with Netball Victoria and Basketball Victoria.

In addition to meeting these requirements netball/basketball competition-grade courts specifications **should** also follow the guidance in [noting that the Department has dispensations for lower ceiling heights and Lux ratings as specified in the BQSH] current Netball Victoria or Basketball Victoria Guidelines and requirements:

- FIBA Official Basketball Rules <https://www.basketballvictoria.com.au/resources/competition-resources/rules-of-the-game>
- Netball Australia National Facilities Policy <https://vic.netball.com.au/sites/vic/files/2020-01/PDF-web-version-Netball-Australia-National-Facilities-Policy_mar16.pdf>
- Netball Victoria Facilities Manual <https://vic.netball.com.au/facilities-resources>
- Netball Victoria Compliance factsheet <https://vic.netball.com.au/sites/vic/files/2020-01/NV-Netball-Compliance-Fact-Sheet.pdf>.

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 FIBA compliant 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. FIBA certification is strongly encouraged. Noting that the standard post height for 5-10year old players is 2.4m, and for players 11 years and over it is 3.05m.

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 1.4.2
- have certified independent laboratory prototype and fatigue testing[15] to EN 1270 standards with engineer sign off
- be FIBA compliant. FIBA certification[16] is strongly encouraged
- have electrically height adjustable backboard
- have backboards made of glass, fibreglass[17], steel, 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 1.4.2.

- 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.
- have backboard pads to meet FIBA rules section 1.5[18]
- where a roof-mounted and or upwards-folding system, **must** have a safety strap
- **must** have rings, posts, sleeves and padding that satisfy current FIBA recommendations[19].

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

Indoor sports flooring **must** comply with the requirements set out in the Flooring for indoor physical activity spaces section (in 5.4.2 Internal finishes <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#542-internal-finishes>).

Gymnasium ventilation and thermal comfort

Gymnasiums require versatile ventilation strategies to maintain acceptable thermal comfort, humidity and CO_2 levels. Ventilation strategies for gymnasiums **should** primarily be based on passive design, including high (R4.0) roof and wall insulation values, with augmentation through mechanical cooling, where necessary. Glazing **should** be minimised to the west and north faces.

Gymnasiums may be designed for a broad range of occupancy levels and functions. Ventilation design **must**, therefore, be informed by a thorough understanding of the expected use of the space. For instance, large spaces typically require minimal natural ventilation at low occupancies. When operating at full, strenuous capacity in hotter weather, a mechanical extractive ventilation system may be an appropriate solution to guarantee effective air circulation.

Full use **must** be made of the passive ventilation potential of the building, and surrounding natural elements and conditions. For instance, if the building is exposed to prevailing winds, cross ventilation will be more effective. Thermally driven passive ventilation, or the stack effect, is another effective passive ventilation strategy that can be suited to gymnasiums' typically higher ceiling height. Incorporating opening vents and high-level extraction fans can be an effective passive and active ventilation approach, which introduces and circulates cool air into and through the space. Operable louvres (refer to 5.3.3 Windows <https://www.schoolbuildings.vic.gov.au/building-quality-

standards-handbook/technical-specifications#533-windows>) and night purge systems are also common ventilation solutions, installed at higher levels in gymnasiums and multi-purpose spaces.

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 the loose fittings required for the gym hall. Where a school will be using a gymnasium for assemblies, storage options **must** be provided for temporary seating etc.

Additional facility requirements

- Circulation and spectator seating **should** be:
  - 2.2m circulation, incorporating two rows of seating for team, coaches and spectators (approx. 50 places) which exceeds the Basketball Victoria and Netball Victoria Guidelines suitable circulation recommendations of 1.4m circulation for safety
  - 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.
- Falls **must** be provided on joinery, ledges and AV speaker cages above 1,500mm in the gym to allow balls to roll off.

Fencing

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

The VSBA senior project officer **must** obtain approval for fencing design from both the VSBA and DE Security Unit (SU) during the Design Development phase. The SU will provide a detailed security brief to ensure appropriate security layering and design (including perimeter protection, where applicable) is implemented early. VSBA and DE 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, and safe,
- integrate with the landscape and not present as unwelcoming,
- fences **should** discourage climbing, but also be able to withstand it,
- be designed to relevant standards and allow for any engineering required for designs outside of relevant standards including soil conditions,
- be integrated with pedestrian and vehicle site access gates.

If a sensory wall is also a perimeter fence or boundary, it **must** comply with relevant regulations and standards for the latter.

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 early learning and special, special development and supported inclusion schools, consultants **must** adhere to specific regulations for barriers and fencing. All outdoor space **must** be enclosed by a fence or barrier, with a minimum height of 1,800mm whose design prevents children of early learning age and under (5 years) from passing through, over or under.

In early learning facilities, outdoor gates should be self-closing and self-latching, with a mesh or solid panel on the internal side of the fence to ensure that unauthorised adults cannot reach over and open the gate. A high-level handle must be provided on the internal/early learning side of the fence only.

Capture gates, or other appropriate safety measures, must be provided beside exit doors in early learning facilities that do not have a foyer to prevent children from exiting into unsafe areas unsupervised.

Fences **should not** be scalable by creating footings or have an item (such as outdoor air conditioning condenser units or yarning circle logs) within 1,000mm that could be used to scale the perimeter fence. 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:

Table 7: Fencing types

Area	Requirement
Perimeter fencing (along street frontages)	Palisade fencing 2,100mm (2.1m) high fencing **should** be installed in new schools where significant security concerns have been identified through SSU specialist advice. Fencing design **must** consider community use arrangements, and the need for multiple entrances Lockable gates at each point of pedestrian and vehicle entry (except at main school entry)
Perimeter finish (for fencing wire)	Knuckled, not barbed, on all sides
Fences close to low roof lines	Where fences are close to low rooflines and there is a possibility of unauthorised roof access, palisade non-scalable fencing of adequate height should be used. Refer to 5.3.1 Roof <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#531-roof> for further information.
Play areas at special, supported inclusion and special development schools	Palisade fencing Minimum 1,800mm (1.8m) for perimeter fencing Set back from street alignments Screened by planting
Play areas of early learning facilities	Set back from street alignments
Outdoor sporting fields (within 10m of a site boundary)	Chain mesh fencing Minimum 6,000mm (6.0m)
Hard courts (within 5m of a site boundary)	Chain mesh fencing Minimum 3,600mm (3.6m)

Area	Requirement
Hard courts (adjacent to other sports areas or play areas)	Chain mesh fencing Minimum 3,000mm (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 fencing (not chain mesh fencing Minimum 1,800mm (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
Cyclone fencing	Cyclone fencing **must not** have a barbed top rail finish

Fencing **must** also comply with the Department's Fencing policy <https://www2.education.vic.gov.au/pal/fences/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. Paths **must** be plain unpigmented concrete or lighter in colour, unless they are permanently shaded. Exposed sharp aggregate paving finishes should be avoided in primary schools and early learning facilities.

In addition, please refer to 5.7.3 Pedestrian footpaths <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#573-pedestrian-footpaths> and 5.7 Civil engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#57-civil-engineering> for further information.

Where bike paths are installed they **should** be:

- curved (no straight lines) to prevent children going too fast

- at least 2 metres wide and 75 to 100 millimetres deep to accommodate three-wheel and bike education programs
- between 250 and 700 metres or more in length, depending on the size of the school.

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.

Bicycle lockers and racks **must** comply with AS 2890.3 Standard – Parking facilities.

In addition, please refer to 3.3.12 Alternative transport access <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#3312-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 accessible 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 enhance ecological value and provide shading

Car parking **must** also be permanently shaded or be constructed from materials that are lighter than plain unpigmented concrete in colour (i.e. have a solar reflectance index of 35 or higher) to minimise the urban heat island effect.

In addition, please refer to 3.3.13 Provision of car parking <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#3313-provision-of-car-parking> for further information.

5.1.4 External equipment

Seating

Adequate formal and informal seating **should** be provided to encourage and facilitate social interaction and learning 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.

Outdoor seating with different arm and back configurations and at different heights **should** be provided so it can be used by a variety of people. Seating **should** be well spaced for participation and movement of wheelchair users and others with different access needs.

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 with:

- 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)
- rubber softfall comprised of at least 80% recycled rubber and, ideally, be light coloured to minimise fading and heat gain

- consideration of local weather conditions, especially where rubber softfall surfaces are material options i.e. noting regional areas can have frosty or wet conditions that create fall risks on rubber surfaces
- opportunities for development and play for all children, and
- promote accessibility and inclusiveness through multiple play options for all students and user sizes, regardless of their individual circumstances, i.e. equipment **must** be provided that can safely be used and enjoyed by wheelchair users.

In addition, please refer to 5.15 Sustainable products <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#515-sustainable-products> for further information.

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.

Skylights **must not** be installed in rooftop playgrounds unless they can be fully enclosed to prevent access by students and or installed with anti-fall meshing that is anchored down with tamperproof screws.

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 carparks
- 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 <https://www.police.nsw.gov.au/safety_and_prevention/policing_in_the_community/safer_by_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.

A range of playground equipment must be selected for new schools and early learning facilities to promote accessibility and inclusivity, and to accommodate as many abilities and special needs as possible. PDCs should obtain advice prior to playground equipment installation from relevant specialists as appropriate to the situation, including one or more of the following: allied health specialists, DDA/Access Consultants, or expert playground specialists. Expert advice when selecting equipment for special, special development and supported inclusion schools is particularly important to accommodate a higher percentage of complex needs.

Consideration **must** be given to any additional conditions or infrastructure that are necessary to make operation of specialist equipment safe. (i.e. fenced off area, softfall and buffer zones for special swings).

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: Playground equipment and surfacing – Parts 1 to 6
- AS 4685.0: 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 and be located a sufficient distance from indoor spaces and entrances 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, sandpits **must** be at least 300mm deep (preferably deeper) and **must** have effective drainage.

Sandpits **must** be located outside of building envelopes and **must not** be installed in multi-storey elevated deck areas.

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 <https://www.sunsmart.com.au/downloads/resources/booklets/shade-guidelines.pdf> , available on the SunSmart website.

In addition, please refer to 5.1.5 Shade areas <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#515-shade-areas> and the Drinking fountains section (in 5.1.4 External equipment <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#514-external-equipment>) and the department's Shade Sails policy <https://www2.education.vic.gov.au/pal/shade-sails/policy> for more information.

Early learning facility outdoor spaces

Indoor and outdoor space allocations in early learning facilities, including those in multi-storey buildings, must comply with the minimum requirements of the National Quality Framework (NQF) and the Children's Services Act (CS Act). For further details, refer to Space Requirements for Early Childhood Services <https://www.vic.gov.au/space-requirements-early-childhood-service> .

Outdoor space design must consider access points for maintenance and deliveries. An additional pedestrian emergency egress gate, positioned opposite to the maintenance access points/gates, should also be considered.

Sandpits **must** be at a minimum 40cm in depth, however, with up to 60cm preferable. Shade **must** be provided to sandpits and mud play areas.

Outdoor play spaces in early 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 NQF, 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.

Early learning facilities located in multi-storey buildings **must** include outdoor spaces on each storey to accommodate the number of children on that storey to comply with Education and Care Services National Regulations. The design **must** ensure that minimum requirements for outdoor space are met for each child being educated and cared for by the service.

Outdoor spaces should be no smaller than 4 metres in width or length.

The design of outdoor spaces in early learning facilities must also satisfy the following:

- supports accessibility by children with disabilities, developmental delay or mobility aids
- provides direct access to indoor education and play spaces and children's bathrooms
- includes an undercover veranda to serve as a transition area between outdoor and indoor education and play spaces and to offer outdoor play areas during extreme weather
- facilitates supervision of children, avoids landscaping elements or structures that could impact sightlines and hinder supervision
- include smaller areas for focused play while maintaining open spaces for active play
- if an external storage shed is installed, it should satisfy the following:
  - double doors (with a drop bolt lock for larger doors) for easy access
  - 600mm deep shelving units for storage, along with suitable higher shelving for items such as ladder brackets, and
  - a double GPO positioned at 1500mm high
- must allow children to access, interact with and experience the natural environment and vegetation in accordance with the Education and Care Service National Regulations (regulation 113; outdoor space-natural environment)
- excessive landscaping elements, such as extensive bike paths or unnecessary, large cemented areas, are to be avoided in the interests of maintaining a balance between natural elements like digging areas, vegetable gardens, or soft fall, and essential landscaping features
- include adequate shaded areas to protect children from the sun while also ensuring all other requirements such as supervision are complied with
- rocks, natural logs, and timber used for seating or bordering sandpits are low, free of sharp edges, and positioned to avoid safety risks, and

- exposed sharp aggregate paving finishes are not included in the design.

If structural square poles or pillars are necessary in outdoor areas that are designed for children to run in, they should be padded to reduce risk of impact injury.

When selecting materials and surfaces for outdoor areas, the following requirements apply:

- synthetic or non-natural materials, such as artificial grass, and rubber matting and soft fall, must not be used
- tan bark or mulch should be used as a soft fall option, where required
- soft fall mulch should not be included in areas adjacent to indoor education and play spaces
- metal grating groundcover should not be used in outdoor spaces, and
- surfaces, particularly those adjacent to 0–under 3 education and play spaces, must not include choking hazards, such as materials that may deteriorate over time or contain small parts that could pose choking risks for babies and toddlers.

Irrigation systems

Appropriate water reticulation **should** be provided to enable maintenance of grassed and gardened 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).

Irrigation systems in multi-storey schools and early learning facilities should not be installed in roof garden balconies, to avoid risks of reticulated pipework leaks. Irrigation in these locations should be:

- sourced from local tapware/plumbing fittings
- unconcealed, and
- ideally a timed drip system.

Integrated roof terrace planters should not be installed, due to high risk of long-term waterproofing issues with building envelope. Planters should be free standing.

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.

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, and where students are likely to eat lunch
- be designed to allow students to fill water bottles.

Individual fountains and troughs/banks of fountains **must** have at least one water filling station each.

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

5.1.5 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, children (in early learning facilities) 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 and adventure equipment area/s for all facilities.

Shade structures in early learning facilities **must** be located clear of fences and barriers so they do not enable climbing and comply with AS1926.1. Shade must be provided over static play areas such as sandpits. It should also be provided over areas of soft fall and digging patches. In cases where new plantings need time to grow, temporary shade solutions must be provided to ensure constant adequate sun protection for children.

When planning for shade, refer to the SunSmart Shade Guidelines <https://www.sunsmart.com.au/downloads/resources/booklets/shade-guidelines.pdf>, available on the SunSmart website, and the department's Shade Sails policy <https://www2.education.vic.gov.au/pal/shade-sails/policy>.

Natural shade and trees

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

All existing locally-native[20] species of trees **should** be retained where they are healthy and viable in the contemporary landscape. The management of existing trees **must** be performed in accordance with the following Australian standards:

> **AS 4970:** Protection of trees on development sites
>
> **AS 5181:** Use and installation of turf as an erosion, nutrient and sediment control measure
>
> ---
>
> 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 using locally-native species in their designs, where possible and viable with respect to ongoing maintenance and cost, to provide character and definition, increase natural shade in external areas, and

enhance ecological value. Where trees have been removed, they **should** be replaced by new trees: two new trees for every tree removed.

Arborists, horticulturalists and local councils **should** be consulted by contracted landscape architect/designer 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, except where horticulturalists advise that younger specimens will overtake them in size within two-years.
- sufficient clearance beneath canopies to allow access
- locally-native trees that suit the local soil type and microclimate

Landscape designers/architects **must** ensure plants selected for schools or early learning facilities contribute positively to the school or early learning environment and minimise the risk of harm to school or early learning assets and communities. Selection is always subject to site location, climate, local Ecological Vegetation Class, geology, soils, orientation and adjacencies.

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.

Landscape specialists and schools undertaking school funded capital works **must** also refer to the Tree and Plant Selection in the 3.4 Landscape planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#34-landscape-planning> section for performance criteria for plants and trees.

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 and surfacing – 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, and
- 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 **must** 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 **must** have extensive overhead and side cover and be located away from any highly reflective surfaces.

5.1.6 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, please refer to Landscaping for bushfire prone areas guide <https://www.education.vic.gov.au/Documents/school/principals/infrastructure/bfpronelandsc.pdf> .

Schools and early learning facilities located in a designated bushfire prone area **must** satisfy the additional requirements set out in VIC NCC G5P2.

5.1.7 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, and
- 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 early learning facilities. Should wetlands be included within school grounds that have an early learning facility on site, the design **should** prevent access to the wetlands by early learning 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, 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:

- 5.7 Civil engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#57-civil-engineering>
- 5.9 Electrical services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#59-electrical-services>
- 5.10 Information and communications technology <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#510-information-and-communication-technology>
- 5.13 Hydraulic services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#513-hydraulic-services>
- 5.2.4 Natural gas <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#524-natural-gas>

The majority of early learning facilities on school sites will be operated by a third party service provider such as the local Council or early learning providers. Therefore, they **must** be designed with separate utilities infrastructure and authority meters independent to the schools.

Where separate utilities are not viable, check meters for all utilities including electricity, potable and recycled water **must** be installed. The following **should** also be satisfied:

- manual override lighting controls provided to indoor education and play spaces
- 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 Energy, Environment and Climate Action (DEECA) website, How we work with water corporations <https://www.water.vic.gov.au/about-us/how-we-work-with-water-corporations> .

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.

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 tappings are located on the site and require relocation or removal, arrange for and make application to the relevant local water corporation, and
- 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 5.13 Hydraulic services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#513-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, and
- 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 5.13.8 Sewer systems and sanitary plumbing <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5138-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), and
- 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 5.2.3 Stormwater drainage <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#523-stormwater-drainage> prior to connections to stormwater drainage systems.

5.2.4 Natural gas

In accordance with the Victorian Government's reforms to decarbonise government buildings and facilities, published in Victoria's Gas Substitution Roadmap <https://www.energy.vic.gov.au/renewable-energy/victorias-gas-substitution-roadmap> update, all new schools and early learning buildings **must not** connect to the gas distribution network.

If necessary, bottled or bulk LPG may be used for laboratory, teaching, or other relevant purposes only. Bottled or bulk LPG **must not** be used for space or water heating.

Refer to Section 5.8.5 Gas supply <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#585-gas-supply> for further details on gas infrastructure requirements for school and early learning facilities.

Natural gas, where available and if permitted under the Victorian Government's gas substitution reforms, 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 **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 gas connection branch is to be constructed to all SPC service provider requirements.

In addition to the requirements above, where permitted under the Victorian Government's gas substitution reforms <https://www.energy.vic.gov.au/renewable-energy/victorias-gas-substitution-roadmap> project consultants **must** select and satisfy gas connections that meet the following 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** also consult 5.8.5 Gas supply <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#585-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 DE Wide Area Network, which provides internet connectivity for Victorian government schools, and
- fixed-line services are compatible with the latest (and impending) public telephone network that connects to the school premises.

Project consultants **should** also consult 5.10 Information and communication technology <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#510-information-and-communication-technology> prior to connections to telecommunication services.

5.2.7 Internet of Things

The following devices or systems **must** be on a second, separate circuit from the aggregated Building Management System (BMS) if one is in place:

- vape detectors
- emergency lighting
- boom gates, and
- heating and cooling for communications rooms.

5.2.8 Solar power systems

Where it is installed, rooftop solar photovoltaics **must** be installed in accordance with the criteria included in the Solar Performance Specification in the Sustainable Facilities Policy <https://www2.education.vic.gov.au/pal/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.

Mass timber or substantial laminated timber construction **must not** be used in a school campus valued at $100M or more, or vertical schools i.e. buildings of four or more storeys.

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 concealed or internal eaves/gutters **must not** be installed. Consultants **should** avoid designs which create sitting water in the gutter.

Gutters **must** have sustainable maintenance requirements, long lifecycles, and evacuate water outside the building footprint. Consideration **should** be given to the interface between the roof, external wall construction, gutter, and hardware to avoid water entering the building.

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 standards:

> **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 the Rain noise section (in 5.5.5 External noise <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#555-external-noise>)
- 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, with suitable material and installation as outlined in NCC part 7.4, to be connected to rainwater storage for water harvest
- do not incorporate downpipes that descend within any internal areas. Downpipes **must not** be off-set in ceiling areas, and
- incorporate appropriately located and sized sump and overflow spout systems.

Thermal insulation **must** be installed directly beneath roof sheeting to prevent the formation of condensation.

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.

Project consultants **must** ensure that elements such as short walls, handrails, fences, bin enclosures, water tanks, window boxes, high yarning circle logs, and stacked air-conditioners are not installed **without deterrents** beside low roof lines if they could enable unauthorised roof access. Where fencing is used as a deterrent beside low roof lines, palisade non-scalable fencing should be selected. Cyclone mesh must not be used as it can be easily climbed or cut. In the case of external air conditioner outlets or other mechanical equipment, for safety reasons palisade fencing must be installed at least 1 metre away from the equipment, or non-scalable perforated metal sheets with smaller holes must be used.

Shade sails **must** be installed and located so that they do not enable unauthorised access on to or down from a roof to a shade sail.

A skylight **must not** be installed in a rooftop playground unless it can be fully enclosed to prevent access by students and or installed with anti-fall meshing that is anchored down with tamperproof screws.

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, with a solar reflectance index (SRI) of 80 or higher (e.g. Colorbond Classic Cream®, Surfmist® or Whitehaven®)
- SRI indexes do not apply to heritage and existing fabric
- 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, and
- 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 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-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. Charged downpipes and related underground systems that rely on pressure drainage systems should not be used due to potential NCC compliance issues and increased maintenance risks.

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, and
- installed in the longest lengths possible.

Inspection openings must be provided at the base of all downpipes for testing and maintenance purposes and have a nominal size of not less than the diameter of the downpipe, and made tamperproof where 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 2,400mm.

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 5.7.1 Stormwater drainage <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#571-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, and
- cost-effective.

External walls **must** be made from an impact resistant material up to a minimum above ground height of 2,100mm (door head height) and this impact resistant material **should** be prefinished wherever possible.

Material selection for the low-level surfaces of external walls must consider the following requirements:

- types of activities likely to occur around the wall
- resistance to impact and surface indentation, and
- compliance with the surface indentation test S6C10(d) and the surface indentation criterion S6C11(e) outlined in NCC specification S6C3.

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, and

- 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 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-acoustic-engineering> section.

In addition, please refer to the section on Masonry for further information at 5.4.1 External finishes <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#541-external-finishes> .

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 must be a vapour-permeable wind-tight membrane, properly lapped and taped to inhibit all wind penetration, taped along all edges with window and door frames, floor slabs (install before any damp proof course), and roof sheeting), and taped tightly around any services penetrations (e.g. ducts, cables)
- 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, properly lapped and taped to inhibit all air movement.

Insulation may impact the sound insulation between spaces. For more information on acoustic requirements, please refer to 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-acoustic-engineering> .

All gymnasium cladding systems **must** be approved by a fire engineer prior to installation and comprised of CodeMark registered materials. A system warranty and detailed whole of life maintenance review for 15-20 years **must** be provided for cladding systems for school and VSBA review and acceptance. Polycarbonate cladding **must not** be used below 2,400mm, due to low impact resistance.

Floor insulation and timber floors

An air space **must** be provided between floorboards and any insulation. Sub-floor natural ventilation **should** be maximised to prevent mould.

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

High (R4.0) roof and wall insulation **must** be provided. 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). Glazing **should** be minimised to the west and north faces.

5.3.3 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
- must be operable via rain-sensitive, tamperproof electronic, fixed devices with manual backup, where they are high windows

Window sill heights in early learning facilities **must** comply with NCC requirements.

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

Storerooms in early learning facilities must have a window or other suitable and safe glazing for supervision sightlines and to ensure children do not get trapped inside without the educator’s knowledge.

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 early learning facilities, windows must satisfy the following criteria:

- in education and play spaces, the height of window sills must not exceed 1,100mm AFL to ensure an unimpeded line of sight from the indoor to the outdoor space, enabling supervision by educators
- at least 50% of windows in education and play spaces must have sills no higher than 500mm AFL, in accordance with the NCC F6D3(4), and
- design must enable supervision between the indoor education and play spaces and the bathroom, as well as between outdoor spaces and toilets. This can be achieved through a supervision window, glazed door or other suitable design solution/s.

In addition, please refer to section 5.3.14 Insect screens <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5314-insect-screens> for further information.

Shading and sunlight controls

In new school buildings, all windows to regularly occupied spaces **should** include shading and sunlight controls to prevent glare. This can be achieved by demonstrating that windows are:

- fitted with accessible blinds or other blackout devices including for high level windows; or
- shaded with external shading that prevents direct sunlight penetration to any more than 20% of the floor area within 1.5m of the viewing façade for at least 80% of the school operating hours. This can be demonstrated using sunlight penetration models for the 4 equinox and solstice days.

All shade measures for windows in regularly-occupied spaces **must** comply with NCC Section J Energy Efficiency.

Vertical school design requires balance between the provision of necessary shading with that of quality views, particularly on the western side. In part, this entails careful consideration of the setting of shade angles.

Where skylights are included, they **should** be restricted to:

- vertical glazing facing south, or
- vertical glazing facing north with adequate horizontal shading to prevent direct sunlight penetration, or
- solar tubes with integrated block out devices.

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 is not an appropriate response to glare issues. Rather, solar films **should** be used in combination with other solutions such as sun-shading devices, clerestory windows, verandas, covered walkways and building orientation.

Tinted glazing and solar film **should not** be used on windows for children's rooms and toilets where they impede visibility and supervision between indoor and outdoor play spaces. In which case, other measures, such as shading, **must** be employed to achieve glare and passive energy outcomes.

In addition, please refer to 3.5.4 Building orientation <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#354-building-orientation> for further information.

Operable windows

When operable windows and louvres are 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. Fixed louvres are not considered acceptable practice and **should not** be used.

In the case of vertical schools and early learning facilities, windows **must** be operable to provide natural ventilation and opportunities for night purging. Operable windows **must** be zoned and centrally mechanised through a self-contained smart system for windows or an aggregated Building Management System (BMS). Operable windows **should** be reed switch linked to mechanical HVAC systems to manage energy loss when spaces are in natural ventilation mode.

Operable louvres are commonly installed ventilation solutions at higher levels in gymnasiums and multi-purpose spaces. Frameless louvre windows are not permitted at normal levels, as they pose an injury risk.

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

- fitted with a means of securely limiting above-ground floor window openings in schools (restrictors **must** be installed in early learning facility windows to limit opening to 125mm)
- insect screens as per 5.3.15
- positioned for cross-flow ventilation i.e. opposite another opening, such as a door or window, that is less than 15 metres away, or
- consider additional devices to assist with cross-flow air distribution in wider rooms to improve cross-flow, or
- ventilation through single-sided external openings that are less than six (6) metres apart
- 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, and
- be operable by all potential users, including those with a disability.

All operable windows **must** comply with NCC D3D29.

In addition, please refer to 5.8.6 Ventilation <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#586-ventilation> for further information.

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.

In early learning facilities, blinds for all internal and external windows must be translucent, except for meeting rooms and staff lounges, which should include opaque blinds or frosting for windows. Blinds, particularly in north- and west-facing windows, should effectively manage sunlight and glare, while blinds in sleeping areas must balance adequate lighting with the occupants' needs.

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 or toddlers.

5.3.4 Glazing

Glazing **should** take into account site conditions 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 early learning facilities, 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 or sun glare) are required.

In early learning facilities, if an observation booth is included, the window between it and the indoor education and play space must feature one-way glass to prevent disruption

to the children during observation of practice. Refer to 5.9.8 Lighting Systems <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#598-lighting-systems> for additional requirements for the observation booth.

5.3.5 Doors

All doors and relevant hardware **must** comply with the AS 4145 suite of standards, and be:

- able to withstand heavy and constant use by students without failure or sagging
- high quality commercial grade and construction (residential frames and hardware **must not** be used)
- durable with quality fixtures, finishes, structure, latches, mechanisms and structure
- require low maintenance
- appropriate for intended user groups and volume of use
- fit for purpose generally and, particularly with respect to tolerances, weight ratios, support details, roller requirements, door size, wind load, and appropriate for space and use, including:
- sized to meet the anticipated movements into and within each building
- simple and convenient operation for all users, including wheelchair users and others with disability
- internal doors **should** have glass viewing panels where two-way traffic is expected, or where staff may need to check the occupancy and activities in a room
- no doors are to be undercut or have grilles inserted as part of a mechanical system
- all door thresholds, including those accessing outdoor learning areas, **must** allow wheelchair access and manoeuvring
- a minimum of three (3) heavy duty fixed pin stainless steel hinges to suit weight and size of door to prevent sagging
- door hardware selection **must** take into account the school's preferred door master keying systems, including electronic key control programming, and the existing locking system for expansions or upgrades
- doors other than standard side hung doors, such as bi-fold, sliding or operable doors, **must** be carefully considered by consultants and schools, in particular with regards to quality and durability, future maintenance, ease of operation, and safety
- where sliding doors are deemed safe and appropriate, they **must** be of high quality and allow access to the track without needing to dismantling walls, i.e. allow full use of wall, for instance, to hang posters

- where manual sliding doors are required, solutions to meet the NCC single-action free-egress must be verified with the building surveyor before inclusion in the design
- where sliding doors need to be locked, they must be fitted with robust, secure locking hardware compatible with emergency management plans
- **must** be easy to open by students and staff of all abilities
- indoor sliding or bi-fold doors **should** be top-hung to avoid issues with bottom tracks failure and maintenance burden, and
- manual doors comprised of large external glazing, such as glazed 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)

Direction of door swings (including nonrequired exits) **should** consider path of egress for large gathering spaces.

The maximum force required to operate (i.e. 20N) shall be in accordance with clause 10.4.2(e), as per AS 1428.1.

The following doors **must not** be installed:

- pivot doors in any location due to risk of severe finger injury
- non-automatic doors at external, main campus entrances, as they can be difficult for wheelchair users and carers to navigate
- automatic swing doors in any location, due to risks of failure and high maintenance needs
- hinged doors lacking hydraulic closers at non-main entrance doors in areas exposed to high winds due to slamming risks, and
- frameless glass door systems.

In all schools and early learning services, particularly those located in areas with significant exposure to the elements (i.e. areas with wind tunnels and differential pressures, exposure to sea winds), pedestrian wind comfort assessments **must** be conducted and findings addressed. Solutions may include automatic sliders, protection from buffer walls.

Early learning facility doors

Project consultants **must** consult with the Project Control Group (PCG) on door schedules prior to their finalisation, due to the complex interface between early learning care and education regulations, emergency and fire management building codes, NQF, and DDA and accessibility requirements in early learning facilities.

Further advice **must** be sought from a building surveyor or DDA consultant to determine the appropriate level of considerations have been made to meet the range of regulations and requirements. The key features of doors for early learning facilities include:

- most doors and gates, including exits to the perimeter of the early learning facility, **must** swing inwards, be self-closing and self-latching and have handles installed between 1500-1650mm AFL
- door handles into the children's bathroom and the indoor education and play space leading to the outdoor space **should** be 1000-1200mm AFL, additionally
- doors from children's bathrooms to outdoor and indoor learning and play areas must be able to be locked/pinned open, to allow children easy and quick access to the bathroom
- where double doors between indoor and outdoor spaces are installed to allow large items to be moved between areas, they should:
  - swing 180 degrees
  - be capable of being pinned to an adjacent wall, and
  - be appropriate for three and four years olds to operate, furthermore
- all door hinge frame junctions in the children's indoor and outdoor play spaces **must** include protection against finger injuries.

An airlock must be provided at the entry of early learning facility entrances, as outlined in the Automatic operation doors and airlocks <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#535-doors> section. In addition, consideration **must** always be given to potential conflicts or intersections between DDA and safety regulations door requirements. Airlock doors in early learning facilities should be capable of being disabled to allow manual operation only via a push exit button, if required, to prevent children from exiting unsupervised.

Exit buttons must be located between 1500-1650mm above the floor in accordance with NCC Vic D3D26(6). Sensors should be located at a height suitable for detecting small children. The designated distance between airlock doors should accommodate the movement of prams.

An intercom/bell can be installed as a further accessibility and emergency measure.

Where the early learning facility contains facilities shared by services such as maternal and child health (MCH), all services must be easily accessible to community members with mobility issues. Where an ELCC is co-located with a MCH that operates after hours or weekends, a separate video intercom should be installed between the MCH and the front entrance.

Project consultants **must** consult the VSBA delivery manager to confirm inclusion of additional facilities and services prior to finalising Door Schedules.

Early learning facility 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 early learning facility.

Doors to internal stores/program spaces in early learning facilities must:

- provide direct access to indoor education and play space(s), and be shared between two of these spaces, where possible, for efficiency
- be lockable
- provide flexibility to leave doors safely open, to accommodate child movement in and out of the space, as required
- be sliding door, where possible, and have a soft close device to minimise finger entrapment
- provide easy access for staff but be inaccessible to children and lockable, while providing free egress as required by the NCC for access and egress, and
- have handles at adult height (1500-1650mm AFL) to prevent children from independently accessing the space.

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. External doors **must** be a weatherproof construction with weather seals. In areas exposed to strong prevailing winds, all manually operated external doors must be equipped with hydraulic closers and appropriate safety-in-design solutions.

Manual 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. Where automatic locking systems are used for external doors, they must be fail-secure, such as electric strikes, to ensure that the doors remain locked during a power outage. Magnetic locks, which release when power is lost, must not be used on external doors. However, these external doors **must** be single action, free-egress at all times, in compliance with the National Construction Code.

All external, hinged doors must be installed with a purpose-made blocker plate to prevent latch tampering and increase security.

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.

Where electronic external doors are installed and, on occasion, must be left open, they must meet the following requirements:

- a design solution is provided that considers all safety and security measures and is approved by the Security Unit at Design Development
- door active opening sized to accommodate anticipated movements in and out
- automatic closure and appropriate connection to time clocks, where necessary, is provided, and
- school zoning and access security systems, including alarms, fobs, access cards, or keys are considered.

Doorstops **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 5.3.4 Glazing <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#534-glazing> for further information.

Internal doors

Where required, project consultants **must** select and satisfy internal doors that:

- are solid-core to deliver required durability and acoustic isolation
- provide adequate sound reduction for the intended use, as detailed in 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-acoustic-engineering>, and
- are operable without requiring power assistance for any young/disabled person.

To assist users to identify points of access, internal room entry, and utility space, doors **must** be painted in a contrasting colour to the surrounding walls as per AS 1428.1, while doors to storage cupboards **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 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).

In addition, please refer to 5.3.7 Security locking <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#537-security-locking> for further information.

Automatic operation doors and airlocks

Project consultants **must** satisfy the following, for energy efficiency and thermal comfort:

- the external entry to the reception lobby (main entrance) is via a paired set of automatically operating glazed sliding doors that form an airlock,
- except in bushfire-prone areas, where the external door of the airlock must be of a more robust construction, typically double-hinged.

In schools, consideration should be given to airlock installation at non-reception entrances adjoining large heated or cooled areas, provided an airlock would not create unnecessary congestion between indoor and outdoor areas.

Where non-main entry doors are in areas exposed to strong prevailing wind and they do not have airlocks, at a minimum, they **must** be automatic sliding doors (not automatic or manual swing doors) for safety and ease of operation. Non-main entry doors in these areas can be manual only if installed with hydraulic closers and appropriate safety in design solutions.

The placement and operation of airlock doors **should not** create bottlenecks and impeded traffic flow. The airlock design **should** have:

- appropriate timed programming
- a linear door configuration
- avoid irregular shapes, and
- include accessible surfaces for ease of maintenance and cleaning.

For additional information about airlock design in early learning facilities, refer to Early learning facilities and doors <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#535-doors> .

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, and
- adjustable dwell time for door operation.

Automatic doors **must not** be installed in early learning facilities 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 5.5 Acoustic engineering

<https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-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, and
- 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, and
- where an electric motor is required to open the door, controls must include an accessible emergency stop button.

5.3.6 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:

- compliant with AS 4145 Locksets and hardware for doors and windows
- all door hardware **must** be flush with door and frame edges
- keyed alike for window locking
- hardware selection must take into account the school's preferred door keying systems
- robust, satin chrome plated metal, durable and fit-for-purpose
- door closers hardware, in locations allowable by the NCC, must include hold open capability
- 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
- be consistent with universal design principles, including that they are:
  - handles and fixtures are non-slippery during operation, easy to operate by school-age children of all abilities and those with weaker grips with respect to height, force required and weight
  - 'D' type door handles that are openable with one hand as per AS 1428.1 are preferred
  - door handles and pulls are to have no sharp edges or protrusions that could cause injury
  - flush bolts **must** be installed in double leaf aluminium doors to the top and bottom of secondary leaf
  - flush bolts **must not** be used on timber doors.

Door hardware such as handles, hinges, and stops **must not** enable students to easily lock themselves in rooms. Electronic locks **should** be hardwired where possible. If battery operated, electronic locks **should** be used and have a long battery life.

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.

All accessible doors toilets **must** have impact/scuff plates for protection from wheelchair damage.

Door stops

Metal, vandalproof doorstops **must** be provided to all internal and external doors to prevent doors or door furniture striking adjacent walls, fixtures or other surfaces, and to prevent sliding door derailment. Doorstops **must not** create trip hazards in trafficable areas.

5.3.7 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 theatrette)
- 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), and
- medicine cupboards in first aid rooms.

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

- ensure that all external perimeter, learning spaces, staff work and administration space 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, and
- a keying system that accommodates any future expansion and, where possible, does not require the replacement of existing locks (i.e., the same lock system must be used across the campus).

All door hardware **should** comply with the department's Restraint and Seclusion Policy <https://www2.education.vic.gov.au/pal/restraint-seclusion/policy> .

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, supported inclusion and special developmental schools.

Thumb locks **should** be installed on doors rather than key locks to allow for easy use during emergency lockdown procedures. 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 DE's Inclusive Education Professional Practice prior to seeking the dispensation. If regulatory dispensation is subsequently pursued, it may be achieved through provision of an

alternative performance solution and new building permit in consultation with and with approval from a building surveyor.

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.

5.3.8 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 1,800mm 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, and
- 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. Pre-finished eaves **should** be utilised, where possible, to ensure long-term maintenance and painting.

5.3.9 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, and
- 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.

5.3.10 Stairs and ramps

Where possible, the design should minimise the need for stairs and ramps, to align with Universal Design principles. Where stairs and ramps are necessary, they **must** comply 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
- all stair risers **must** be enclosed as per AS 1428.1
- step risers **should** be between 150mm and 180mm, and preferably 150mm for P-6 schools and early learning facilities
- tread depth **must** be within a range of 300mm to 355mm, with a preference for the lower end of range in primary and early learning facilities, and both **must** comply with the NCC D3D14 tread/riser ratios, and
- landings in accordance with relevant standards and legislation.

Additional requirements apply in vertical schools and early learning facilities:

- stair width **should** be optimised, wherever possible, to manage circulation pressures, which can be more acute in vertical environments, and
- a minimum of two sets of stairs **must** be installed for vertical schools which **should** include fire stairs that are compliant for general student movement and, predicted or known, circulation patterns, as well as emergency evacuation
- where possible these stairways **should** be placed around the lift core with high level glazing to avoid balustrades and falling from height issues, and
- consideration **should** also be given to strategically scattering stairs along an atrium to encourage vertical circulation. Rather than connecting levels with staircases, seating may also be provided by the stairs (these have become known as Hellerup stairs). If installed, Hellerup or central stairs **should** be dual function, i.e. suitable for use as mini theatre spaces, presentation spaces, or spaces for informal gathering or study as well as circulation.

Also see section 3.5.3 Learning spaces <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#353-learning-spaces> .

In early learning facilities, stairs and ramps **should not** be located adjacent to early learning facility perimeter fences as the required handrails can be used as a foothold to scale the fence. In early learning facilities, particularly modular kindergartens where structures are elevated above ground level, special consideration should be given to designing outdoor learning spaces that integrate seamlessly with the rest of the service. Stepped-down connections and abrupt level changes should be avoided, ensuring babies and small children can reach outdoor spaces independently or with minimal support. Uneven hard surfaces in retaining walls or similar landscape elements resulting in drops of more than 150mm pose serious safety and fall risks for babies and small children and must be avoided in outdoor areas of early learning facilities.

Fire-isolated stairways and fire-isolated ramps **must** be provided where required, and comply with NCC D3D27.

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 2,100mm (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.

Project consultants **must not** use decking material for general walkways and steps.

Balustrades and bleachers

All NCC required internal and external balustrades/barriers (i.e. where there is a drop of 1 metre or greater) lacking purchase points (handrails or baseboards) **must** have a minimum height of 1,500mm (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.

With the exception of external ramps, where a handrail or base board is also installed, the balustrade **must** be 1,800mm high above the FFL.

Where ramps have a potential drop of 1 metre or greater, balustrades **must** be 1,500mm above FFL. Stair and ramp handrails in facilities containing primary or early childhood aged children have different handrail requirements, as per NCC D3D22. Handrails, particularly lower ones, must be designed in a way that does not create a climbing risk. Openings in barriers in early learning facilities **must not** exceed 125mm.

All balustrades and barriers **must** be non-scalable, with no horizontal rails or potential footholds, which could be used for climbing. In early learning facilities, in particular, non-scalable mesh screening may be a necessary supplementary measure.

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
- where Hellerup stairs are installed, they **must** have balustrades as per BQSH requirements for all staircase balustrades
- no more than two consecutive descending bleachers (pair) may be installed
- where there is more than one bleacher pair a minimum, 1.5 metre landing **must** be installed between each pair, and
- a minimum 300mm kerb installed at drop points of viewing platforms where designated for wheelchair spaces.

Where a balustrade forms a barrier or fence around the early learning facility (i.e. above ground floor in multilevel buildings or protecting from water or climbing hazards) it **must** be 2,000mm AFL, non-scalable and not have an item within 1,000mm that could be used to scale. In addition, mesh wire fencing **must** form the balustrade to reduce climbing risk and items, such as children's play items, inadvertently passing through the barrier dropping below.

5.3.11 Plumbing fixtures

Toilet facilities

Toilet facilities are to be evenly distributed across the school site, ensuring sufficient, supervised accessibility during break times. Student and staff toilets **should** be located in close proximity to learning areas (ideally adjacent to Prep learning areas) and gymnasiums, so students and staff can use them during learning activities with minimal interruption.

In vertical schools, toilets for both genders **must** be offered on each floor.

The Department intends to move towards toilet facility designs that offer greater flexibility of use through universal design.

Amenities for staff, students, children and visitors **must** be provided to satisfy the following:

- toilet facilities **must** be safe, equitable and respect the dignity of all users
- the NCC Volume 1, Table F4D4f for schools, and Table VIC F4D4g for early learning facilities [found at https://ncc.abcb.gov.au/editions/ncc-2022/preview/volume-one/10-victoria/f4-sanitary-and-other-facilities <https://ncc.abcb.gov.au/editions/ncc-2022/adopted/volume-one/f-health-and-amenity/part-f4-sanitary-and-other-facilities>] **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 should not be installed, except in the case of single sex male schools, in which case only independent urinals with privacy partitions are to be installed)
- where toilet cubicles alone are installed in schools, without urinals, pan numbers for males **should** be based on NCC Volume 1, Table F4D4f [found at https://ncc.abcb.gov.au/editions/ncc-2022/preview/volume-one/f-health-and-amenity/part-f4-sanitary-and-other-facilities <https://ncc.abcb.gov.au/editions/ncc-2022/adopted/volume-one/f-health-and-amenity/part-f4-sanitary-and-other-facilities>] allocations for females
- cubicles/closet pans in schools **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 in schools **must** be at least 1,500mm AFL if primary school children are the principal users, or 1,800mm AFL in other circumstances. For early learning toilet door and partition heights, see Toilets and sanitaryware in early learning facilities <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5311-plumbing-fixtures>
- toilet cubicle doors **must** have 100mm to 150mm 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 and adjacent external spaces, 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, unless a self-contained all gender toilet
- 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
- in ELCCs, tempered water (between 30-35 degrees) is provided to children's handwashing basins/troughs
- in kindergartens, either cold or tempered water (between 30-35 degrees) is provided to children's handwashing basins / troughs, as determined by operator preference
- toilet doors **must** be lockable or fastenable from the inside
- at least one cubicle in each primary school building **must** have dimensions that accommodate easy and safe use of steps by small preps and their carers, including easy closing of doors
- female, accessible and all-gender sanitary compartments should be able to accommodate a period product disposal unit, and
- toilet roll dispensers **must** be vandalproof and **must not** be openable by students. In new buildings on existing schools, dispensers **should** be consistent with those already provided.

Where self-contained all gender toilets are installed, they **must** be located in a way that enables supervision and mitigates against bullying, i.e. off hallways. Where installed, and where it is agreed with the school and relevant students that signage be installed, that signage **should** be easily removable in the future, in the event that more discretion is

needed, and **must** comply with recommendations from the Gender Equity Commissioner as per below.

Figure 3: All gender toilet signage

> Examples of All Gender Toilet signs, with specifications that they be 235mm high and 180mm wide.
>
> There are 3 signs with different labels:
>
> - All Gender Toilet LH
> - All Gender Toilet RH
> - Ambulant All Gender Toilet
>
> The text is in white on a mid blue background. The text is also included on the sign using braille.

The requirement for appropriate signage and terminology where 'all gender'/'gender diverse' toilet cubicle/banks installed is as follows:

- use terminology such as 'inclusive toilet', 'all gender', or 'all gender and all abilities'
- do not use the term 'unisex' on signs, as it focuses on the biological sex of a person and also suggests that a person may have a singular or combined sex/gender, and
- avoid images of figures wearing either pants or skirts (or a combination of both), suggestive that a person's clothing accurately always reflects gender and/or biology.

While not mandated, where vape detectors are proposed for toilets, the school or VSBA delivery manager **must**:

- ensure the selected detector model is designed to detect vapor, and
- liaise with Information Management and Technology Division (IMTD) about integration/networking with existing security systems, where possible.

Vinyl flooring **should not** be installed in toilets unless it is very high commercial grade and has minimum P3 wet pendulum slip rating, to avoid durability and maintenance issues.

Where mechanical hand drying options are installed, they **must** have a maximum 60db and be installed in suitable locations to address noise concerns. Additionally, consultants **must** predict and implement appropriate acoustic and isolation measures and material finishes in bathrooms, where they are installed in close proximity to learning and working spaces.

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
- **must** be robust, vandalproof and suitable for high volume student use
- 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 to early learning facility requirements below]
- use similar models and manufacturers throughout to achieve design coherence
- wall-mounted cisterns are preferred as they are easier to maintain (if unconcealed wall mounted, they **must** be made as tamperproof as possible)
- press button, self-closing/timeflow taps, or top lever timeflow bib 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 operation is to be sufficiently 'soft' for them to use)

- pans and toilet pipes **must** be of an appropriate capacity and durability for school use
- plumbing fixtures **must** drain adequately and not create blockages, and
- low flushing toilets **must** only be used if gradients include a safety allowance to allow for low flushing.

Specifications for sanitaryware **must** be considered in line with 5.13 Hydraulic services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#513-hydraulic-services> , and specifications relating to the trapment and drainage of water.

Toilets **must** be floor-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. See below for early learning facility-specific toilet 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.

Toilets and sanitaryware in early learning facilities

The design of children's bathrooms in early learning facilities **must** enable supervision at all times, while maintaining children's rights and dignity. The following requirements **must** be satisfied:

- children's bathrooms are located with direct access to indoor education and play spaces and outdoor spaces, and
- in multi-storey buildings, toilets are provided on each floor, allowing children to access toilets reasonably quickly
- design must enable supervision between the indoor education and play spaces and the bathroom, as well as between outdoor spaces and toilets. This can be achieved through a supervision window, glazed door or other suitable design solution/s
- the private areas of children's bathrooms are not visible to people in the foyer or beyond the play space fence
- junior toilet pans and roll holders are installed at child height and within child-arm reach, respectively, i.e. roll holders should be no more than 300mm from the edge of pan and large toilet roll holders must not be used as they are challenging for child access and use

- the minimum number of wash basins required by NCC VIC Table F4D4g, at least, are provided, noting that a continuous sink or trough type washbasin is another acceptable option
- wash basin heights comply with regulatory requirements, including that rim heights are accessible to children and no more than 600mm AFL
- taps and soap dispensers are child-friendly (i.e. heights, complexity, required pressure)
- in ELCCs, tempered water (between 30-35 degrees) is provided to children's handwashing basins/troughs
- in kindergartens, either cold or tempered water (between 30-35 degrees) is provided to children's handwashing basins/troughs, as determined by operator preference
- mirrors are installed at child height (base of mirror no higher than 600mm)
- closet pans situated in a bank must be separated from each other by opaque partitions, between 900-1200mm AFL
- single partition doors have sufficient gaps on either long side to avoid finger entrapment (double barn-style doors must not be used due to entrapment risk)
- lower height doors, up to 900-1200mm AFL, to provide children with adequate privacy and dignity while still enabling visual supervision
- partition front edges are rounded to reduce injury risk
- the required number of DDA-compliant toilet/s, at minimum, provided for wheelchair and mobility scooter access
- hand dryers:
  - (ELCCs) electric hand dryers must not be installed in children's bathrooms, instead hooks must be installed for hand towels at an appropriate child height and paper towel dispensers installed at adult height, and
  - (kindergartens) hooks for hand towels at children's height and paper towel dispensers at adult height are preferred, however
  - (all early learning facilities) where hand dryers are provided, they **must** be temperature controlled, and
  - blade type hand dryers **must not** be used
- shower/baby bath:
  - (ELCCs) a minimum of one recessed baby bath to be provided, and one additional recessed baby bath where the facility has more than two rooms for children under 3 years old
  - (kindergartens) an additional shower bath (not more than 300mm deep) with a flexible handheld shower head, located in the bathroom servicing the education

and play spaces

Laundries in early learning facilities

Early learning facilities **must** include dedicated laundry rooms that provide:

- secure storage for cleaning equipment and supplies
- infrastructure for a washing machines and dryers, and
- a wet area.

These rooms **must** be lockable and not be accessible from early learning play spaces.

Nappy changing facilities

When an early learning facility accommodates children under 3 years old, and a nappy changing bench to be installed, the following requirements must be satisfied:

- design complies with NCC VIC F4D4(9)(c), including proximity to a baby bath
- positioned to allow supervision sightlines between the bathroom, adjoining indoor education and play spaces and/or outdoor space
- adult hand washing basin is located in proximity to nappy changing bench with tempered water
- bench to be a minimum of 1,200mm length and 800mm depth to allow educators to lay babies either vertically or horizontally for access and ergonomics
- design considers the placement of overhead hazards
- overhead cabinetry is considered that:
  - is not located directly over the nappy changing area or baby bath where it poses a head injury risk, but rather directly adjacent over bench/hand wash basin space
  - is ergonomically accessible by staff, and
  - has open pigeonhole storage and closed cupboards
- under bench storage with child proof latches are included
- design considers waste strategy for nappy change including ergonomics and utility in terms of location, access and type of bin
- steps beneath the nappy changing bench are included that:
  - enable child access to the bench without staff having to lift them
  - withstand a minimum load of 40kg
  - include side handrails, and
  - lock into a fixed position

- nappy changing bench and steps are not positioned near a door in a way that impedes access to and from the room or poses a risk of tripping.

Toilets

Toilets **must** be floor-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 early learning facility 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, and
- 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.

Water efficiency

All fixtures and appliances **must** comply with the following table:

Fixture/Equipment type	WELS rating
Basin taps	6 star (≤ 3.0 L/min)
Urinals	6 star

Fixture/Equipment type	WELS rating
Toilets	5 star
Showers	4 star
Clothes washing machines	5 star
Dishwashers	5 star

Toilets and urinals **must** be connected to the non-potable water supply.

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 or floors.

Project consultants **must** select and satisfy hand wash basins that meet the following requirements:

- vitreous china basins, wall hung, and
- 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, supported inclusion and special development schools **must** be provided with cold and tempered hot water (45°C) to reduce the risk of scalding.

Basins in first aid rooms must be provided with cold and hot water.

Basin plugs **should** be avoided for student hand wash basins to avoid the risk of flooding.

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), and
- 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, and
- individual fountains and troughs / banks of fountains **must** have at least one water filling station each.

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, and
- 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, and
- 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, and
- 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, and
- include under-bench clay interceptor traps.

In addition, please refer to 5.13 Hydraulic services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#513-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, and
- include under-bench paint interceptor traps.

Laundry troughs

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, and
- 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, and
- chrome-plated trap and waste.

Showers

Where installed, student changing rooms, staff changing rooms and DDA accessible student toilet/bathroom facilities **must** provide showers that are 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 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, and
- 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, and
- where possible, use the same model and manufacture throughout a school or early learning facility.

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 or top lever timeflow bib taps. 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.

In schools, external taps that deliver recycled water **must** be fitted with anti-vandal tap spindles.

In early learning facilities, external taps must meet the following requirements:

- separate taps are provided for both children's water play activities and facility gardening/maintenance
- hose taps for children's play activities are:
  - provided at multiple points
  - installed at a child accessible height, and
  - not connected to recycled water
- external taps for maintenance and gardening purposes are fitted with vandal-resistant handles.

Hands-free tap operation **must** be provided at hand wash basins where required by local government by-laws for food service areas.

Food preparation

Class 1 commercial kitchens (ELCCs)

Where an ELCC is operating on a full-time basis and providing a daily meal service (i.e. 3 meals per day) for enrolled children, a Class 1 commercial kitchen must be installed and registered with the local authorities.

Class 1 commercial kitchens in ELCCs must satisfy the following requirements:

- comply with State Government Environmental Health Standards for Class 1 Level Kitchen, Food Standards Australia New Zealand (FSANZ), and the Food Act 1984

- satisfy all local government/council requirements to ensure compliance and prevent licensing delays
- be designed in accordance with the ELCC Functional Design Brief, and
- commercial kitchen design specialist advice, wherever possible, and
- include an appropriately sized grease trap, and
- natural and mechanical ventilation.

Indoor program kitchen (ELCCs)

Indoor program kitchens must have direct access to and line of sight into the children's room. A child-safe gate must be installed between the kitchen and children's room.

Kitchens must contain a sink, bar fridge, bench space, overhead cupboards, and simple joinery/pantry to store a small amount of ingredients, utensils and tableware. The sink must have tempered (between 30-35 degrees) and cold water, with a mixer tap to control water temperature.

An oven should be considered with a slide in door and other safety features such as a lockable and induction cooktop with a child lock function. Kitchens with open electric cooktops must have an adult height switch mounted near the appliance in a visible and readily accessible position, to ensure the safety of children in the room. A sliding or double-hung window should serve as a servery to the external veranda area, and a hand-wash basin must be provided.

Outdoor program kitchen (ELCCs)

An outdoor program kitchen is sometimes installed as a supplement to an indoor program kitchen. It is a simplified version of an indoor program kitchen, however, outdoor kitchens must include a sink with tempered (between 30-35 degrees) and cold water access, bench space with under-bench storage, and secure outdoor power outlet. A cavity for a permanent fridge or oven is not required. Where site conditions allow, the landscape design should include a safe area for a portable fire pit near the outdoor kitchen, ensuring it does not pose a fire risk to the building or decking. The kitchen must provide space and power for bench-top appliances such as plug-in stoves, portable ovens, and toasters. The design should also include storage for these appliances, either in the kitchen or a nearby internal store. The joinery should feature a pantry for storing a small amount of ingredients, utensils, and tableware, designed to prevent access by animals.

5.3.12 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 (in vertical schools and early learning facilities, locker numbers **must** reflect floor number i.e. 4.1, 4.2)
- 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 excluded tender option, alternative storage solutions, as agreed between the VSBA and school, **must** be clearly specified for realisation at a later date. These specifications may or may not include existing furniture.

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

- lockable or securable, where joinery or furniture will be used to store personal or valuable items in areas accessible to students
- 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, and

- 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), and
- impact and scratch resistant finished timber or veneer plywood.

Silica or engineered stone benchtops or surfaces, including wall and floor tiling, **must not** be installed.

In addition, please refer to section 5.15 Sustainable products <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#515-sustainable-products> for further information.

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 hutch/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**.

Wired control devices **should** be provided rather than battery powered devices wherever possible (i.e. clocks **should** be hard wired rather than battery operated).

Fixtures in high-risk locations (such as gymnasiums) **must** be impact resistant.

Early learning joinery

Each indoor education and play space in an early learning facility **must** be provided with a custom fabricated rack of joinery pigeon-holes or mobile locker units with caster wheels. The number is determined by the number of places per rooms.

For example, a 33-place room **should** have 33 pigeon-holes. Children's lockers or pigeon-holes, whether located within an education and play or a circulation space, must meet the following requirements:

- heavy-set and stable to prevent tripping hazards
- positioned to allow direct staff observation
- each is approximately 350 x 450mm
- washable materials are used, and where located in circulation space
- the design and placement keep the circulation path unobstructed, and
- the minimum required width of the circulation path is maintained.

(Indoor education and play spaces) Should include wet/art troughs with soap dispensers above troughs, along with bench and under-bench storage cupboards—one at adult height (900mm) and one at child height (no more than 600mm).

Cabinetry above sinks must be avoided.

All low-height joinery doors must be fitted with keyed locks (with same key for all), magnetic latches, or childproof catches to restrict access by children.

(ELCCs) Joinery design in the children's program space and internal store should meet the following criteria:

- comply with Occupational Health and Safety (OH&S) standards and ergonomic principles
- maximise built-in sturdy shelving with a recommended depth of approximately 620mm
- incorporate flexible usage features, including large storage spaces, drawers, adjustable shelving, and closed cupboards with lockable options, and
- include at least one overhead cupboard equipped with a key lock for secure storage.

(ELCCs) Joinery in the baby bottle preparation area should include:

- at least one overhead cupboard (not above sink) with a key lock, and shelves
- bench space for safe and hygienic preparation, including a soap dispenser and paper towel dispenser
- a hand wash basin and a separate sink with an integrated drainer, and
- space for a microwave and a small under-bench fridge.

(KOSS) Joinery design in children's internal store must also include maximum built-in sturdy shelving to a recommended depth of approximately 620mm.

(Maternal child health (MCH) consulting rooms) Fixed joinery must be designed in consultation with the council/ third-party providers. It should generally include the following features:

- drawers and cupboards with childproof and lockable doors
- nappy bin drawers
- pull-out stairs for mobile children to climb onto the change bench, and
- an examination bench, which includes a measuring ruler of minimum 1m, positioned under natural light with vinyl flooring.

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 in school and early learning facilities **must** facilitate use by students, children 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 </about-us> webpage.

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 carcase)
- 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, and
- 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 products used in all applications (not just joinery - e.g. cubicle partitions, door jambs) **must** have formaldehyde emissions that comply with either:

- Product certification in accordance with a GBCA-recognised Product Certification Scheme <https://new.gbca.org.au/product-certification-schemes/> or
- Laboratory testing for formaldehyde emission limit values for engineered wood products outlined in Table 8 in accordance with the following Green Star Emissions Table (approved extract from Green Star Buildings Submission Guidelines V1.2's Table13.2B: Formaldehyde Emission Limit Values for Engineered Wood Products <https://www.gbca.org.au/uploads/147/35475/IEQ_Reduced%20Exposure%20to%20Pollutants_DRAFT_D1_distributed.pdf>)

Table 8: Formaldehyde Emissions for engineered wood

Test protocol	Emission limit/Unit of measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1mg/ L

Test protocol	Emission limit/Unit of measurement
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/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 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1mg/L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr*
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m²hr (at 3 days)
ASTM D6007	≤0.12mg/m³**
ASTM E1333	≤0.12mg/m³***
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m³
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m²hr

* mg/m²hr may also be represented as mg/m²/hr 2

** The test report **must** confirm that the conditions of Table 1 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.

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.

5.3.13 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.

5.3.14 Insect screens

Durable insect screens **must** be fitted on all operable windows and any openings used for night purging, unless alternative justification is provided, to encourage natural ventilation where air quality is good and 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 high commercial quality and fitted with aluminium or stainless steel mesh.

Insect screens should be:

- installed internally and facilitate easy removal and reinstallation, especially for screens at height, to enable convenient cleaning and maintenance, and
- securely fitted within the frames so children cannot push the mesh out of the frame.

In early learning facilities, insect screens on windows that open between approved and non-approved spaces must withstand a force of 300N in any direction without breaking, deforming more than 10mm along their length, or showing signs of fracture, as per AS1926.1. This includes insect screens on windows that open to outdoor areas not enclosed by children's playgrounds.

5.3.15 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, and
- pipes, cable conduits and the like are sealed with appropriate termite barriers in accordance with manufacturers' instructions.

Chemical soil barriers for termite protection **should** not be used, as future reapplication of chemicals may be disruptive and/or costly, and minimisation of synthetic chemicals in student areas is desirable.

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, and
- 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 section 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-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, and
- 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 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-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 a have uniform patina and texture over the entire visible surface, without defects or rough patches
- painted finishes over hot dipped galvanised steel **must** address concerns relating to adhesion
- new painted finishes to prefinished metal **should** be avoided, and
- 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 Steel (in 5.6.4 Superstructure <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#564-superstructure>) 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 early learning facility 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, and
- 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 or top lever bib 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, and
- 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, and
- 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, including for garden beds or retaining walls.

Medium-density fireboard skirtings and architraves are not to be used in wet areas.

In addition, please refer to section 5.15 Sustainable Products <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#515-sustainable-products> for further information.

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 the section Playground, adventure and outdoor fitness equipment (in 5.1.4 External equipment <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#514-external-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, and

- allows for tactile indicators that do not weaken structural integrity of decking members.

Composite decking should have low PVC content and low heat gains. 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, and
- 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 3.5 School and early learning design principles <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#35-school-and-early-learning-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
- minimum combustibility risk, and
- value for money.

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 insulation and barriers requirements <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#532-external-walls-and-cladding> 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), and
- 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, and
- easy to clean.

In addition, project consultants **must** select and satisfy wall linings for wet areas that meet the following requirement:

- impervious resilient or tiled surface finishes to minimum 1,800mm 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 early learning facilities, wall lining in indoor education and play spaces must be made of durable, washable materials, while also considering the room's acoustic requirements to control reverberation. Additionally, neutral colours and textures should be used to minimise sensory overload.

In addition, please refer to the section Splashbacks (in 5.4.2 Internal finishes <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#542-internal-finishes>) and 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-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, and
- 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, stairs and at building entry points. In multi-use and project spaces where floors are likely to become wet, floors **should** have minimum P3 wet pendulum slip rating
- 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, and
- 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.

In early learning facilities, resilient, washable and non-slip sheets such as vinyl/linoleum flooring **must** be installed in indoor education and play spaces. The floor finishes must also have a soft-touch surface to ensure comfort for toddlers who may play on or touch the flooring directly. The materials should also contribute to a welcoming and child-friendly environment.

Floor tiling

All flooring **must** comply with and be installed in accordance with the following 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 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, and
- 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, and
- **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 are 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.

Vinyl flooring **should not** be installed in toilets unless it is very high commercial grade and has minimum P3 wet pendulum slip rating, to avoid durability and maintenance issues.

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, and
- 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-level[21] 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 Outdoor hard courts and Indoor competition-grade sporting facilities sections (in 5.1.3

Hard landscaping and indoor sports courts <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#513-hard-landscaping-and-indoor-sports-courts>).

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/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.

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. ≤0.12mg /3mg/m^2hr)
- 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 C2D11)
- comply with EN 13696's wearability standards.

In addition, please refer to the sections on 5.15 Sustainable products <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#515-sustainable-products> for further information.

When engineered timber 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**:

- use water-based 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 must not be used.

All carpets **must** comply with and be installed in accordance with the relevant Australian standard.

Project consultants **must** select and satisfy 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.

Carpets **should not** be used in high use areas where liquid spills are likely (i.e. food preparation and art-making spaces).

Broadloom carpets **should not** be used because replacement of worn or stained sections is more costly and environmentally damaging.

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 GBCA-recognised product certification scheme <http://new.gbca.org.au/product-certification-schemes/> or
- Laboratory testing in accordance with TVOC limits specified in the Carpet Test Standards and TVOC Emissions Limits in the Green Star Submission Guidelines

(version which is current at the time of schematic design).

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 mat 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 section (in 5.4.1 External finishes <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#541-external-finishes>).

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 9 – 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.

Table 9: Paint sheen levels to suit durability/high periodic cleaning performance requirements

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%

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 **must** consider the exposure categories within certain environments (particularly areas 1km or less from the coast). In coastal environments, consultants **should** use a protective coating system other than paint for both internal and external surfaces vulnerable to corrosion, or avoid coated materials altogether. 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**:

- The ready-to-apply TVOC content limits, including colour tints, in the current version of Green Star, 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 Product Certification Initiatives <https://new.gbca.org.au/product-certification-schemes/> on the Green Building Council Australia website.

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.

There **must** be acoustic separation between staff workspaces and student areas. Staff spaces **should** have the capacity to be enclosed with doors or operable walls for work or confidential discussions as needed, whilst providing visual connection to the learning communities.

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 openable 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 adaptable/flexible teaching spaces are configurable to open plan, they **must**:

- be easily configurable, i.e. opened up to open plan and closed down to more contained traditional spaces, to enable a range of pedagogies
- ensure all space configurations have verified acoustic standards that comply with this section 5.5, including through sound-rated, operable walls, and
- include hearing augmentation system solutions that are suitable for all scales and configurations and comply with section 5.10.12 Hearing augmentation and sound field systems <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51012-hearing-augmentation-and-sound-field-systems> .

Dedicated quiet rooms or pods **should** also be included to cater for small groups needing acoustic separation from the main group. Where possible and appropriate, learning space design **should** facilitate a greater degree of movement with minimal disruption for students with neurodiversity needing to move to quiet areas or work at different paces or sequences. For most special schools and special development schools, and some supported inclusion schools as determined on a case by case basis, there are greater

requirements, reflecting the increased acoustic sensitivity of some users. This may also be necessary in supported inclusion schools.

Special conditions to note:

- The following spaces, at a minimum, **must** have reverberation times lower than the nominated minimum level and **must** be installed with hearing augmentation and fixed sound field technology that transmits directly to personal hearing device receivers and amplification systems (as defined in the 5.10.12 Hearing augmentation and sound field system <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51012-hearing-augmentation-and-sound-field-systems> section:
  - all teaching spaces designated for students with special hearing needs and hearing difficulties, and
  - spaces for students with English as a second language
  - learning spaces larger than 100m^2 where projection of voice and music is critical (such as open-plan learning spaces and presentation/performance auditoriums), **must** be subject to specialist advice from an acoustic engineer and have fixed sound field system installed
- in very large spaces such as sports halls, a maximum reverberation time **must** be 1.5 seconds
- external covered play and learning areas **must** 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 the sections on Sound insulation ratings and Sound insulation requirements for general spaces (in 5.5.2 Airborne sound insulation between rooms <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#552-airborne-sound-insulation-between-rooms>).

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.

In special schools, as many additional reverberation controls **should** be provided over and above acoustic standards (i.e. with acoustic pinboards) as the budget allows.

In early learning facilities, indoor or partially enclosed education and play areas should have as many sound-absorbing panels as possible, such as pinboards, on ceilings or walls (but not cupboard doors). These can also display children's work, posters, or regulatory notices while helping to reduce noise. In addition, education and play areas in early learning facilities should have a ceiling with a noise reduction coefficient (NRC) of at least 0.7.[22]

Vertical building acoustics

In vertical schools and early learning facilities, acoustic measures **must** be well-considered in school circulation spaces such as hallways and stairwells to mitigate excessive noise generated through student travel between levels. See required sound insulation ratings at 5.5.1 Demonstration of performance <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#551-demonstration-of-performance> .

Acoustics in vertical schools and early learning facilities, particularly in atria and other circulation areas close to learning spaces, **must** be closely considered in early tender work and sequenced with design. Children and educators in early learning facilities must be able to speak and be heard without strain.

Acoustics, together with design, **should** enable and foster interaction, collaboration and flexibility.

Learning areas and circulation spaces **must** be separated to avoid acoustic and visual distraction in learning spaces. Flexible partitions **should** be avoided between these spaces to reduce echo and excess noise from atria and other circulation spaces for the same reasons.

Project consultants **must** ensure that mechanical and electrical services do not undermine sound insulation solutions. Noisy equipment **must** be located in a way 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 design sound 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 **must** also ensure that staff work areas are acoustically separated from adjacent areas, such as meeting rooms.

Project consultants **should** also refer to the following related sections:

- 3.3 Master planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#33-master-planning>
- 3.5 School and early learning design principles <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#35-school-and-early-learning-design-principles>
- 5.3 Building fabric <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#53-building-fabric>

Also see 5.10.12 Hearing augmentation and sound field systems <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51012-hearing-augmentation-and-sound-field-systems> .

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** submit a report demonstrating with onsite acoustic testing and commissioned data (based on methods and acceptance criteria outlined in AS/NZS 2107 sections 6 and 7) that

acoustics standards have been met in anticipation of peak student enrolment numbers. In the case of flexible learning spaces that can be made open plan, testing and reporting **must** cover all design configurations. 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 10 below.

Acoustic isolation achieved by each barrier is the measure of reduction of sound and is defined as a weighted sound reduction index (R_w), 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 11. The airborne sound insulation requirements are provided in terms of the weighted standardised level difference $D_{nT,w}$ values between spaces.

Table 10: Sound insulation ratings

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	Very high	Low

Type of room	Activity noise (source room)	Noise tolerance (receiving room)
Small and large practice/group room/dance Performance/recital room Ensemble room/recording studio		
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

Type of room	Activity noise (source room)	Noise tolerance (receiving room)
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
Education and play space (early learning), program kitchen, prep. area (bottles etc.), program space & internal store	Average	High
Observation booth (early learning)	High	Medium
Meeting rooms, interviewing/counselling rooms, video conference rooms	Low	Medium
Canteens, food preparation, dining rooms	High	High
Kitchens (community/program/commercial), laundries, cleaner's room	High	High
Offices, medical rooms, staff work areas, staff planning/meeting/lounge, reception/centre director office	Low	Medium
MCH/consulting (Early Learning)	Average	Medium
Community room	Average	High
Corridors, stairwells, circulation, coats and locker areas, foyer/gathering space, licenced foyer, waiting area	Average	High
Changing room areas	Average	High

Type of room	Activity noise (source room)	Noise tolerance (receiving room)
Students/staff toilets, children's bathroom	Average	High

Table 11: Sound insulation requirements for noise tolerance

Minimum $D_{nT,w}$	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

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 petitions 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.

Adaptable and multi-purpose spaces **must** have verified, high acoustic standards as per section 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-acoustic-engineering>. These spaces **must** adhere to the highest acoustic standard of use. Study nooks may be inserted into travel paths/circulation spaces, but the study nook needs to be functional as designed, rather than a space that is unusable due to noise.

In vertical schools and early learning facilities, special consideration **must** be given to ambient noise from specialist classrooms, such as wood workshops, where they are located near atria. Due to reverberation through these spaces, additional acoustic

measures **must** be provided to meet standards for open-plan and circulation spaces adjacent, open and accessible to atria.

Building elements (to satisfy sound insulation requirements)

The following provides description of construction systems that are deemed to satisfy the $D_{nT,w}$ performance recommended above.

Table 12: Construction solutions for different acoustic performance requirements

Minimum $D_{nT,w}$	BUILDING ELEMENT	SOLUTION
30 $D_{nT,w}$	Wall construction	Simple 64mm-wide steel or 90mmwide 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 Rw 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/m3.

Minimum $D_{nT,w}$	BUILDING ELEMENT	SOLUTION
	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 Rw 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/m3 (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/m3.
	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.
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.

Minimum $D_{nT,w}$	BUILDING ELEMENT	SOLUTION
	Cavity insulation	Acoustic-grade, 50mm-thick with a minimum density of 14kg/m3.
	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/m3.
	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

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 5.3 Building fabric <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#53-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 Rw 45-Rw50 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 5.3 Building fabric <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#53-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 13 provides details of doors suitable for different room types that meet acoustic performance requirements.

Table 13: Doors suitable for different room types

Type of space	Minimum RW	
	Glazing	Doorset (rather than door leaf)
All spaces except music rooms	35	30

Type of space	Minimum RW	
Music rooms	45	33
Spaces separated by sliding doors	35	25
Operable walls	45	45
Bounding walls beside/above an operable wall	50	50

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 maximum 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 10 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 100m^2 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 and wellbeing 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 25mm/hr rate).

See SS EN ISO 140-18: Acoustics – Measurement of sound insulation in buildings and of building elements Part 18: Laboratory measurement of sound generated by rainfall on building elements for potential testing methods.

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, and
- is economical.

Project consultants should also refer to the following related sections:

- 5.3 Building fabric <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#53-building-fabric>
- 5.4 Building finishes <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#54-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
- extensive number of borehole for geotechnical investigations to determine, as best as possible, sub-surface conditions and the presence of contaminants
- 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, and
- use suitable reinstatement material and compaction consistent with requirements for soils and fills, as per the Department of Education's Soil, Mulch or Loose Fill policy <https://www2.education.vic.gov.au/pal/soil-mulch-loose-fill/policy> .

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, and
- 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.

Please also refer to 5.15.3 Sustainable concrete <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5153-sustainable-concrete> for further information.

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 5.4 Building finishes <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#54-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, and
- 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.

Mass timber or substantial laminated timber construction **must not** be used in a school campus valued at $100M or more, or vertical schools i.e. buildings of four or more storeys.

In addition, please refer to the sections on 5.15 Sustainable products <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#515-sustainable-products> for further information.

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/1,000, 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 and supported inclusion 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:

- 3.3 Master planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#33-master-planning>
- 5.1 Landscape architecture <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51-landscape-architecture>
- 5.3 Building fabric <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#53-building-fabric>
- 5.13 Hydraulic services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#513-hydraulic-services>
- 5.15.3 Sustainable concrete <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5153-sustainable-concrete>

Project consultants **should** ensure that portable or permanent modular 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 <https://www.ccaa.com.au/>
- Australian rainfall and runoff guidelines <http://arr.ga.gov.au/arr-guideline> .

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, and
- 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 14 and **must** have sufficient capacity to accommodate the design flow, in accordance with the drainage condition requirements.

Table 14: Appropriate drainage systems for design storm event

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

A stormwater management plan **should** be created and maintained during the construction period. The use of sandbags 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
>
> **WSA 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, and
- 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, and
- 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 portable or permanent modular classrooms (due primarily to risk of damage from excessive weight).

Rainwater collection

For information on tanks, please refer to 5.13 Hydraulic services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#513-hydraulic-services> .

For information on wetlands, please refer to 5.1 Landscape architecture <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51-landscape-architecture> .

5.7.2 Access roads

Access roads provide functional, safe vehicle access onto sites. Large campus designs **must** enable roads and pathways for the easy transportation of supplies and items across the site. Access for buses, cars, delivery vehicles, emergency vehicles and rubbish collection vehicles is **required**, and **must** comply with NCC requirements for acceptable access paths, particularly in bushfire-prone areas. Refer to 3.3.11 Vehicle access <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#3311-vehicle-access> and 3.3.15 Access for emergency vehicles <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#3315-access-for-emergency-vehicles> for more information. Additional access at special, supported inclusion and special development schools is **required** for student buses.

Before construction, project consultants **must** consult the planning considerations in the 3.3.11 Vehicle access <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#3311-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, and
- Cement Concrete & Aggregates Australia Guidelines.

Project consultants **must** select and satisfy access road construction that meets the following requirements:

- uses asphalt or other surface material with a solar reflectance index (SRI) of 35 or higher, if not permanently shaded
- kerb ramps or other access features provided where required

- edged with the kerb and channel (unless integrated into a water-sensitive urban design strategy)
- designed with appropriate base course (sub-base material placement to meet design-life requirements)
- caters for appropriate traffic loads including heavy vehicles where applicable, and
- 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 Surfacings.

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 3.3.10 Pedestrian access <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#3310-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), and
- 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.

Exposed sharp aggregate paving finishes should be avoided in primary schools and early learning facilities.

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, and
- **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 user-friendly controls that are intuitive and easy to operate
- can be connected to a self-contained smart system or broader building management system (BMS), that has user-friendly operation for the entire control system
- are economical to operate
- are easy to reset in the event of a power failure

- local controls to adjust temperature (within the centrally-set 18°C and 26°C range, that allows heating to operate below 18°C and cooling to operate above 26°C) for classrooms and permanently occupied space
- 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), and
- 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 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:

- 3.3 Master planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#33-master-planning>
- 5.2 Utilities and associated infrastructure <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#52-utilities-and-associated-infrastructure>
- 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-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.

Gas heating systems **must not** be used in new schools and early learning buildings. Refer to 5.8.5 Gas supply <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#585-gas-supply> for further details on permitted gas infrastructure in school and early learning facilities. Mechanical heating (and cooling) units **must** be provided in the following rooms of an early learning facility:

- office, planning and staff rooms
- foyers, and

- children's indoor play spaces.

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:

- are robust, durable, highly efficient and easy to operate and 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
- in new buildings, any piped water/liquid service routes **must not** run over classrooms, staff offices, IT server rooms, electrical and or mechanical plant rooms or other areas where leaks would cause disruption to school operation
- 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 for convenient temperature control
- remote wired thermostats that are tamper-proof, robust, located 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 3.3 Master planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#33-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 in new schools and school buildings where they are located within the 2008 Nationwide Housing Energy Rating Scheme (NatHERS) climate zones 20 and 27. To identify the climate zone applicable for each project, please see Appendix B – Air conditioning eligible postcodes <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/appendix#82-appendix-2-postcode-areas-eligible-for-air-conditioning-nathers-2008-climate-zones-20-and-27> .

Regardless of a school's location, air conditioning **must** be 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
- all vertical schools
- early learning facilities
- portable or permanent modular buildings
- special development and supported inclusion schools
- buildings designated as community fire refuges by Emergency Management Victoria.

Mechanical heating and cooling solutions in vertical schools **must** be:

- commercial grade solutions
- fit for purpose for the context and school design in question, and
- zoned and coordinated with natural ventilation strategies to avoid energy loss.

Safely operable windows **should** be installed in vertical schools and early learning facilities to provide opportunities for natural ventilation and night purging. Where a vertical school has operable windows, they **must** be zoned and centrally mechanised

through an aggregated Building Management System (BMS) or a separate, smart monitoring control system for windows.

In early learning 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.

When planning to install an air conditioning system—whether self-funded by the school or funded by the VSBA—a life-cycle analysis must be undertaken to:

- calculate total ownership costs (over at least 7-10 years), including
- capital costs associated with electric sub-mains
- maintenance and energy costs (on the basis of likely energy tariff rates and envisaged usage requirements), and
- compare the financial implications of potential active mechanical versus passive solutions (such as orientation, insulation, and natural ventilation) or combinations thereof
- highlighting both the upfront investment and long-term operational costs.

This analysis is to ensure that the installed air conditioning system is necessary, fit for purpose, requires minimal maintenance, and provides value for money for the design in question. Passive design solutions should be fully explored and utilised where appropriate and effective.

All air-conditioning systems **must** comply with and be installed in accordance with relevant Australian standards.

Where provided, project consultants **must** select and satisfy air-conditioning systems that meet 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 and **should not** be disposable

- have programmable thermostats to set temperatures and operating times
- thermostat setting **must** be locally adjustable and the thermostat located in an appropriate area, not affected by direct sun, draughts, and close to heating or cooling sources, and
- temperatures are adjustable 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 3.3 Master planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#33-master-planning> sections 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 standards.

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 per hour 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 stablished 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, and
- 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 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-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
- where units are eligible for the Energy Rating Labelling scheme, have a rating within ±0.5 stars of the most efficient equivalent model on the market
- 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
- a suitable insulated uPVC drain for condensate is provided that provides drainage to the nearest suitable stormwater or sewerage connection and allows for easy and clear inspection of damage
- wiring and refrigerant pipework is protected from weather by Colorbond steel metal top hat sections
- temperature controls **should** be set such that no cooling occurs below 26°C and no heating above 18°C, and
- condensers and other external components **should** be rated to 50°C dry bulb.

In addition, please refer to 5.8.12 Refrigeration <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5812-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, and
- is an inverter drive type.

In addition, please refer to 5.10 Information and communication technology <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#510-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 electronically commutated (EC) 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, and
- 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 5.2.5 Electricity <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#525-electricity> for further information.

5.8.5 Gas supply

The VSBA is phasing out gas usage and installation in schools and early learning facilities in accordance with the Victorian Government's gas substitution reforms. All new school buildings and early learning facilities **must not** connect to the gas distribution network.

When necessary, bottled or bulk LPG may be used for laboratories and trade workshops or teaching in new schools as a substitute for natural gas. LPG **must not** be used for heating or hot water.

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 **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 portable or permanent modular 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, and
- 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 portable or permanent modular buildings described in the initial design, as well as branch take-offs for future additions. If gas is to be provided to portable or permanent modular 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.

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

- **must** have electronic ignition and include a flame safeguard system
- **must** be room sealed appliances
- **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 plants **should** have modulating heat output in response to changing load requirements

- liquid petroleum gas (LPG) **must not** be used for hot water or heating systems
- appliance controls **must** 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) are high-efficiency condensing units.

Allow 10% spare capacity in pipe work sizing.

LPG **must** only be used for laboratory, teaching, or other relevant purposes only, such as turrets or stove burners in science areas and **must** be:

- 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 5601.1 – 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 section 5.8.5 Gas supply <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#585-gas-supply> .

Gasfitting work **must** be carried out by licensed/registered gasfitters and **must** be approved by Energy Safe Victoria prior to use.

Where LPG is to be used and natural gas is likely to be available within five years, allow for natural gas in pipework design.

In addition, please refer to 5.2.4 Natural gas <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#524-natural-gas> and 5.8.5 Gas supply <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#585-gas-supply> sections for further information.

5.8.6 Ventilation

Appropriate ventilation is required for heating and cooling systems. Please consult the requirements of Energy Safe Victoria <http://www.esv.vic.gov.au/> and the Australian Institute for Refrigeration, Air Conditioning and Heating <http://www.airah.org.au/> (AIRAH).

Ventilation **should** be provided to all chemical and flammable stores, in accordance with the *Dangerous Goods Act 1985* (Vic).

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 (including drop-off zones), and fume discharges
- air intakes **must** be arranged to minimise the risk of air recirculation under prevailing wind conditions
- natural ventilation **must** be provided throughout all areas where adjacent external air quality is of a reasonable standard
- permanent vents **must** be provided independent of the window systems in all areas, and
- 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.

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.

Natural ventilation

A minimum of one window and one door, **must** be installed in each general learning space to enable views to the outside. Wherever possible, both window and door **should** open to the exterior to enable cross-ventilation of the space.

Project consultants **must** select and satisfy natural ventilation solutions that meet the following requirements:

- openings **must** comprise a minimum 7.5% of habitable room area (which surpasses the 5% minimum requirement set out in NCC F6D7) and is achieved through
- openings installed for cross-flow or single-sided ventilation as per the Operable windows section (in 5.3.3 Windows <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#533-windows>)
- a minimum of one window and one door to be installed in each learning space to enable views to the outside and ventilation
- 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
- natural ventilation openings **must** be of a type, of a size, and in locations that facilitate effective ventilation in a range of external wind conditions, and
- consider cross ventilation, low and high level openings, wing walls. Also consider types of openings other than awning windows that provide a larger aperture area when open.

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 and **should not** be used.

Chemical store ventilation

Ventilation **should** be provided to all chemical and flammable stores, in accordance with the *Dangerous Goods Act 1985* (Vic).

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, and
- 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
- rangehood products **should** be selected to avoid head strikes and other injury risks, and not unreasonably obscure views to the teacher, and
- 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, and
- 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 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-acoustic-engineering> .

Exhaust fans

Project consultants **should** select exhaust fans that satisfy 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, and
- 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, and
- 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, and
- 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, and
- 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 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-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 <https://www.ashrae.org/home> 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, and
- 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, and
- dampers and visible ductwork behind the grilles is painted black.

Outlets and grilles are **required** to be consistent with the performance requirements identified in 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-acoustic-engineering> and 5.8.6 Ventilation <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#586-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 5.5 Acoustic engineering <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#55-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, and
- 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 are sometimes installed in schools for students with physical disability, special development schools and some dual-mode special schools, where funding is available and these pool facilities can support suitable physical therapies.

Pools **must** include all necessary ventilation, temperature control and water filtration and sanitisation systems needed to support pool operation.

All hydrotherapy pools **must** comply with and be installed in accordance with AS 3979 Hydrotherapy Pools.

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

- water filtration system provided in accordance with AS 3979 and AS 1926.3, 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
- water circulation system provided in accordance with AS 3979
- water sterilisation system provided comprising UV sterilisation and chlorine dosage, to maintain water quality and safety for human exposure
- water heating and temperature control with high degrees of accuracy and capacity to maintain temperatures to pre-set range of 33.5-35 degrees, and where possible a second backup thermostat installed for back up in cases of emergency or malfunction, and
- pool area temperature settings no more than 10°C below the water temperature and ideally around 5°C below
- pipework for water temperature control systems is kept as short and direct as possible, without dead legs/dead ends in pipework
- indoor ventilation and air-conditioning systems complying with the use of ventilation and air conditioning in buildings as per AS 1668.1, AS 1668.2 and AS 1668.4
- have 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
- plant room, electrical installations located in close proximity to the pool area and beneath the water's surface level, and

- compliant safety equipment including a spinal board or similar poolside rescue equipment, resuscitation equipment, and an alarm system and/or telephone in compliance with AS 3979.

A pool cover **should** be installed to help maintain optimum water temperature and reduce heating costs. Hydrotherapy pools also require appropriate fencing for users. Please refer to 5.11.4 Fencing <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5114-fencing> for further information.

5.8.14 Kilns

There **should** be at least 800mm free space around the point of use of any kiln.

However, the operation of a specific plant **should** be taken into account when determining appropriate spacing; a kiln may require additional adjacent space due to heating or other hazards.

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 to refer to the performance requirements in the following related sections:

- 3.3 Master planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#33-master-planning>
- 5.2 Utilities and associated infrastructure <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#52-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.

Where the implementation of the Victorian government's gas substitution reforms necessitates any augmentation of electrical supply, project consultants **must** consider future increases to electrification loads required at the site. This includes from the electrification of space heating and hot water at other buildings in the vicinity and the increased use of electric vehicles. In some circumstances it may be economical to phase the supply augmentation.

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.

Electrical design **must** consider the internal materials palette and school day to day use. A review **must** be completed by Information Management and Technology Division (IMTD), the school, PDC and VSBA following electrical rough in. The review **should** consider the location and type of outlets, data points, phone points, and overhead projection interfaces.

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
- 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, and
- 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.

Power industry locks **must** be provided for external switchboards.

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.

Where a school includes spaces for shared use with external parties, for instance, a competition sports court or gymnasium, or canteen, metering arrangements **must** be determined and agreed with a school for any shared use areas. In some cases, utilities arrangements will be agreed through a Community Joint Use Agreement, and not require regular reference to bills. In other cases, either a 'check meter' (which requires the checking of each bill to allocate costs) or a 'billing meter' (which is more costly) will better meet the needs of a school, depending on:

- school preference and operation, and
- whether a space will be used exclusively by an external entity, in which case separate metering **must** be provided for these areas.

Meter requirements **must** be stipulated in the electrical design plan.

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 portable or permanent modular buildings 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, and
- 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.

Pipes containing liquid (water and waste) **must not** run above distribution boards, switchboards and classrooms, to avoid leakage into critical services and learning spaces.

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 1.5mm^2
- minimum sized power sub circuit 20A with a minimum cable size of 2.5mm^2
- 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, and
- 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 **must** be installed to all distribution boards in new school buildings. 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 meters that have accuracy declarations or certificates that demonstrate they meet the following requirements:

- power factor meters with leading and lagging indicators
- accuracy of ± 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, and
- 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.

All meters and the monitoring system **must** be commissioned and validated as per the most current 'Validating Non-Utility Meters for NABERS Ratings' protocol to demonstrate accurate data is being collected.

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.

Any installed utility meters that will be used for billing **must** legally be Power Authority, NMI-approved meter.

More information can be found at Utility meters <https://www.industry.gov.au/national-measurement-institute/trade-and-industry/instruments-industry/utility-meters> on the Australian Government website.

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 portable or permanent modular buildings.

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), and
- 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. For example, in early learning facilities, GPOs must be installed in appropriate locations to support check-in/check-out devices at the reception area.

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), and
- 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.

Light switches and general power outlets should not be installed within 3 metres of where hazardous material is stored. Light switches and lights that are installed within 3 metres of hazardous materials are stored **must** be rated for a hazardous environment, in accordance with: AS/NZS 3000 – Electrical installations (Wiring Rules).

For ceiling-mounted equipment such as overhead hoists and projectors, outlets **must** be mounted on the ceiling or high on the adjacent wall.

In early learning facilities, general power outlets **must** be located at 1,500mm 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, and potentially supported inclusion 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.

In staff work areas, two double GPOs **must** be provided per staff member for work spaces accommodating up to two staff members (i.e. 4 x GPOs). For larger staff work spaces one additional GPO **should** be provided for every additional staff member. One data point **must** also be provided per staff member.

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

Project consultants **must** select lighting that meets 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
- in regularly occupied spaces, occupants **must** be able to control the lighting in their immediate environment. This includes turning the lights on and off and adjusting light levels
- circuit loading to be designed in accordance with the sizing of the control system circuit protective devices and spare capacities
- all lighting **must** be LED (or a newer technology in future) with a flicker frequency no less than 200 Hz in all operating conditions (including at all levels of dimming and in all grid voltage variations)
- in early learning facilities, indoor education and play spaces must include 0-100% dimming lights to enable lighting to be adjusted
- in early learning facilities, if an observation booth is included, an indicator light must be installed in the indoor education and play space, with its switch located inside the booth, to inform educators that the observation booth is in use
- 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 in areas affected by window or ceiling fan draughts **must** have an extrusion type and length that prevents draughts from moving the light fixture, as confirmed by the project structural engineer
- connections (including fasteners) of suspended luminaires must be able to withstand minimum horizontal and vertical earthquake forces as set out in Section 8 (Design of Parts and Components) of AS 1170.4
- 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
- where motion sensors are proposed, regard **should** be given to room occupancy and activity to ensure sensors are fit for purpose and sensitive enough to detect occupants, and
- 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, sodium-vapour, tungsten and incandescent lamps **must not** be used internally or externally.

Existing fluorescent lighting **should** be replaced with LED lighting where the fittings are near end-of-life. If linear LED replacement tubes are used, the existing fitting **must** be in good condition. The existing fluorescent ballast **must** be removed or by-passed by a qualified electrician and a suitable LED replacement tube used.

Where higher illuminance is required for specific tasks, provide suitable local task-lighting or provide suspended luminaires over the task.

Downlights **should not** be installed in flexible learning spaces unless they have strong diffusion. Downlights **should** only be installed in appropriate areas noting that they can be too bright for some spaces or create unnecessary shadows.

Theatres **should** have three-phase power, where the switchboard and electrical system can accommodate this. Power and lighting rigs **must** be sufficient for studying lighting design and use as part of the VCE subject curriculum.

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 principles
>
> **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, and
- 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 15 summarises the design criteria for performing arts spaces:

Table 15: Performance arts lighting

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

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**:

- 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 85, 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.

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, luminaries 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 luminaries on the project produces a maximum initial point illuminance value no greater than:

- 0.5 Lux to the site boundary, and
- 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, supported inclusion 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, and
- all switches **must** be large-format rocker switches.

It **should** be determined on a case by case basis for supported inclusion schools, whether and to what extent these lighting system requirements **should** be applied.

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, and
- **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 365-day timing devices configured for seasonal variation in daylight hours, or photo-electric (PE) cells, 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.

As some HVAC systems have their own inbuilt systems, for example, this **should** involve building-specific, cost benefit analyses and discussions considering local solutions, where appropriate.

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 NCC E4D8 and relevant Australian standards.

Project consultants **must** select and satisfy emergency and exit lighting that meets the following requirements:

- luminaires are sourced from proven production runs with demonstrated performance levels
- are attractive in appearance to suit the ambience
- photoluminescent exit signs comply with the NCC Specification 25 – Photoluminescent exit signs, while non-photoluminescent exit signage systems must satisfy the following:
  - incorporates either central or local monitoring and testing facilities
  - contain either a cabled or wireless communication network
  - incorporate central monitoring and testing facilities
  - are capable of accommodating additional luminaires anywhere within the systems network
  - include non-maintained tubes for the emergency lighting function
  - emergency and exit luminaires contain a localised battery source of a minimum 5-year life
  - battery and control circuitry are modular in design to enable quick replacement techniques
  - exit signs contain low-energy lamp sources comprising cold cathodes or LED sources, and
  - the system is 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 including at building entries and perimeters, changes of direction to external pathways, carparks, and internal and external stairs, ramps and covered corridors. Lighting **must** be adequate between buildings for security purposes including deterrence, and to create a safe level of visibility at night to avoid trips and falls. 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, and
- 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 Guide <https://www.education.vic.gov.au/Documents/school/teachers/management/infrastructure/ICT-Design-Model-for-Schools.pdf> detailing the design and installation requirements and specifications for ICT in schools to ensure school networks are reliable, scalable and manageable. Consultants should contact IMTD via schools.technical.planning@education.vic.gov.au <mailto:schools.technical.planning@education.vic.gov.au> about any ICT planning questions or issues they have after reading the ICT Design Models for Schools guide. Consultants **must** satisfy these guidelines, which follow appropriate infrastructure and industry standards.

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 DE ICT standards and goes into greater detail than this handbook.

ICT in early learning facilities

The VSBA delivery manager **must** facilitate IMTD's review of ICT design documentation and plans, including for power and data point schedules for all new early learning facilities.

Communications rooms in early learning facilities that are co-located on school sites **must** be treated as 'satellite' communications rooms as per DE ICT Design Models for

Schools Guide, however, they **must** have two separate communications cabinets in order to provide the following facilities:

- conduit connection to the school network designed to connect to a separate rack that will not be accessible by the early learning facility operator, and
- a new NBN connection from the street connected to a separate rack for the early learning facility service provider to install their own equipment and connection.

Project consultants **should** refer to the early learning facility functional brief for information on the number and location of wireless access data points.

Where early learning facilities are to be leased to external service providers, all data points in these spaces must connect to a secondary communications rack dedicated exclusively to the external service provider infrastructure. For this purpose, sufficient space for a separate (external service provider) rack in the communications room should be allocated. External service providers are responsible for installing their own active IT equipment such as WAPs, switches, audio visual and telephone equipment.

Project consultants **should** also refer to the performance requirements in the following related sections:

- 3.3 Master planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#33-master-planning>
- 5.8 Mechanical services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#58-mechanical-services>
- 5.9 Electrical services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#59-electrical-services>
- 5.12 Fire systems <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#512-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 in the schematic design phase (via schools.technical.planning@education.vic.gov.au

<mailto: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.

Early learning facilities 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 portable or permanent modular buildings 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), and
- 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 <http://www.telstra.com.au/smart-community> . Where cavities are created from running data cabling, they must have finishes that do not expose the empty cavity.

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 early learning facilities 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 16 is based on a learning space of 25 students and one staff member.

Table 16: Data points required

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)

A school or early learning facility 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
- not situated behind doors, and
- 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.

Ceiling or wall mounted WAPS are the preferred solution in many cases for safety and versatile accessibility. In certain instances, however, a recessed floor box is a more suitable safety in design option i.e. for scoring areas in gymnasiums, certain STEM robotics settings. Where floor boxes are deemed the most suitable option, designs **must** mitigate against the risk of trips, cable shearing and finger entrapment. Recessed floor boxes **must not** be installed in early learning contexts. If power or data is required in the centre of the room, it **should** be provided through the roof cavity.

In early learning facilities, 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 early learning facilities. 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), and
- 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 early learning facilities **should** comply with specifications in the ICT Design Models for Schools <https://www.education.vic.gov.au/Documents/school/teachers/management/infrastructure/ICT-Design-Model-for-Schools.pdf> . To support adequate coverage, 1 WAP should be provided per 25 learners at a minimum.

WAPs **should** be appropriately placed throughout a school or early learning facilities 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 in 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 portable or permanent modular 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 based on the current masterplan for additional cables that may be installed in the future
- are routed directly to the equipment rack and frame
- have appropriate protection from vandalism, and
- ensure separation for incoming service providers via the pit duct system (noting NBN and Telstra do not share pits and conduits).

Where there are concrete slabs installed in a location, cable conduits **must** be cast under these slabs.

The cable path to each portable or permanent modular classroom **must** be no greater than 60m from the nearest communications rack to ensure that data outlets installed in portable or permanent modular 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 fame, 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. Communication rooms and cabinets must not be located immediately adjacent to student toilets for safety reasons.

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 must not 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.

Any new early learning facilities located on a school site **must** have separate ICT service in addition to a conduit back to the school network. Consultants **must** allow for two suitably sized and ventilated service cupboards to accommodate the IT equipment and communications cabinet in the early learning facility.

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 1,000mm 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
- glass windows to the exterior must not be installed in communications rooms for security reasons
- insulated and away from direct light sources, and
- **must** have appropriate cooling-sized cooling systems and ventilation. All air conditioning systems provided for the purpose of cooling communications rooms must be individually temperature-controlled, and not part of the Building Management System.

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 the section on Server room cooling (in 5.8.2 Cooling <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#582-cooling>) and 5.9 Electrical services <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#59-electrical-services> for further information.

5.10.7 Voice communications (phones)

Phones are required for teacher workspaces (staff rooms), administrative areas, staff lounges, meeting/conference rooms, and consulting rooms. Handsets or cordless extensions **should** be accessible to teachers without having to leave teaching and learning areas. Provision of handsets in teaching spaces **should** be determined in consultation with the school.

The provision of telephone handsets **should** be determined by the space use and in consultation with the school, where possible. Telephone handsets and network points **should** be:

- wall mounted at a suitable height close to AV or lighting controls in learning spaces, or
- desk mounted within safe and convenient reach of staff in staff rooms, and
- not located behind doors, in narrow access routes or below fixed joinery.

In the case of refurbishments and major upgrade projects, schools or consultants **must** assess whether an existing phone system is still fit for purpose to support the school's

voice communication needs. In some cases, a new system will need to be installed and the benefits of IP **should** be assessed.

Where the project scope determines a complete replacement of an existing phone system or where a new school is being built, the project **must** ensure a contemporary phone is provided with the following specifications:

- can be delivered via a broadband internet connection instead of traditional telephony infrastructure
- can support any voice over internet protocol (VoIP) phone system
- is scalable to accommodate future growth in staff, student enrolments and facilities; with capacity not exceeding the masterplan's maximum extension requirements, including for any future portable or permanent modular classrooms, and
- all commissioning.

The same system **must** be used in all facilities utilising Voice over Internet Protocol (VoIP), 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. The Telstra IP Telephony (TIPT) solution is compatible with the VicSmart WAN. Project teams are responsible for raising NBN relocation or new service applications for school telephony systems. It **should** be noted, however, that while TIPT may be used, IMTD/DE do not support it.

Where possible, the project **should** consider cloud telephony solutions over on-premises solutions.

Schools are responsible for any operational expenses to maintain, upgrade or replace the phone system and handsets.

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 portable or permanent modular buildings 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 <https://www.education.vic.gov.au/Documents/school/teachers/management/infrastructure/ICT-Design-Model-for-Schools.pdf> .

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, and
- install all cabling in concealed, continuous lengths.

Information Management and Technology Division (IMTD) must be engaged via schools.technical.planning@education.vic.gov.au <mailto:schools.technical.planning@education.vic.gov.au> for any public address system which requires the school to supply network connectivity.

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 portable or permanent modular 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 meets the following requirements:

- is simple and logical to operate for staff

- is capable of providing a minimum sound level in all normally occupied areas of not less than 65db(A)
- has Rapid Speech Transmission Index (RATSI) not 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
- provides school bell services
- provides an automatic announcement facility for making routine, situational and emergency announcements
- provides all cabling infrastructure which supports PA system equipment
- includes pre-wiring leads and installation of sealed buried conduits to facilitate future extensions, and
- enables the selection of zones and de-selection of zones simply and efficiently.

Multiple PA control points in staff areas such as reception **should** be separate from public areas and from each other, i.e. one control **should** be away from the public facing reception area. If there is a designated 'safe' room in the main administration area, one of the control points **should** be located in that room.

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 <https://www.worksafe.vic.gov.au/noise-safety-basics> .

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 5.12 Fire systems <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#512-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, and
- speaker horns and visual warning devices in all plant areas and services areas throughout the building where ambient noise levels exceed +75dB.

While not mandatory, where visual warning devices are integrated with emergency evacuation alarms in new schools, to alert deaf or hearing-impaired occupants of an evacuation, they must:

- be standalone from the IT network
- comply with AS 1670.4 and AS ISO 7240.23
- integrate with the PA system
- be located adjacent to all exit signs, and in toilets
- have a flash rate equal to or less than 3 Hz
- emit a minimum strobe light output of 4.2 Joules, and
- flash at a pattern distinctly different from the evacuation pattern, where visible signals are provided for other emergencies not requiring immediate evacuation.

In addition, please refer to 5.12.8 Fire indicator panel <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5128-fire-indicator-panel> for further information.

5.10.12 Hearing augmentation and sound field systems

Hearing augmentation and sound field systems help meet the learning needs of students with hearing impairments.

Hearing augmentation is the process of collecting audio from amplification systems such as public address or audio-visual systems for transmission to receivers built into the personal hearing devices worn by hard of hearing or deaf learners, teachers and visitors.

All hearing augmentation systems **must** comply with and be installed in accordance with the relevant Australian standard.

Approved hearing augmentation systems require permanent cabling between amplification systems and devoted on-wall interfaces for transmitters (to personal hearing devices or receivers) to be safely mounted and connected.

Hard of hearing or deaf children and young people are supplied with personal hearing devices by Hearing Australia. The vast majority of primary school students use Hearing Australia-supplied devices. Secondary age students are also supplied by Hearing Australia, but often opt for alternative devices that provide more autonomy. Different

brands and types of personal hearing devices use different transmission platforms and methods.

Sound field technology utilises microphone and speakers to project and protect teachers' and speakers' voices and assist all students to hear verbal instruction. This can be of particular benefit to students with English as a second language, auditory processing disorders as well as those who are deaf and hard of hearing.

A quality, dual hearing augmentation and sound field solution provides hard of hearing and deaf learners with the audio input their fellow students are able to access for learning.

Any installed sound field technology **must** be installed in addition to a hearing augmentation solution.

Assistive hearing technologies are constantly evolving, which means that installed hearing augmentation and sound field solutions **must** be as agile as possible.

Hearing augmentation and sound field system performance criteria

Project consultants **must** select and satisfy hearing augmentation systems that meet the following performance requirements:

- all teaching and gathering spaces with fixed amplification systems (see definition below) **must** be equipped with an agnostic, devoted on-wall interface, together with
- a minimum of one hearing augmentation transmitter per 10 learning spaces (primary schools), or per learning community (secondary schools)[23] that is appropriate to the learning population's devices to enable hearing augmentation (i.e. transmission from fixed amplification systems to personal hearing device receivers)
- each building **must** also be supplied with at least one sound field system[24] for transmitting verbal instructions, noting that
- fixed amplification systems requiring hearing augmentation include installed or mounted:
  - public address or paging systems (excluding PA systems used exclusively for emergency warnings)
  - voice capture technologies
  - ceiling or wall mounted data projectors
  - LCD screens, or
  - interactive whiteboards within a contained or open plan teaching space
  - any sound source with mounted speakers, or
  - video conferencing systems

- hearing augmentation and sound field systems **must** be fixed, rather than portable, in gymnasiums, multipurpose areas and libraries
- system selection **must** follow consultation with the school and its deaf and hard of hearing students, wherever possible, and
- **must** be specified in consultation with a suitably qualified disability access consultant and/or expert in the field of assistive hearing technology, and
- installed by specialist assistive hearing technology suppliers
- assistive hearing systems are not required in utility and small administrative spaces
- all installed systems **must** provide consistent and clear auditory signals
- be appropriate to the scale and use of a space, and
- **should not** require additional proprietary technology
- all primary schools, teaching and gathering spaces with fixed amplification systems **must** be equipped with a high quality, devoted on-wall interface and a portable or fixed transmitter to ensure native[25] transmission from all fixed amplifications systems to the Hearing Australia-supplied hearing aid receivers worn by young hard of hearing/deaf students[26]
- all secondary school teaching and gathering spaces with fixed amplification systems **must** be equipped with a high quality, devoted on-wall interface and a portable or fixed transmitter with capacity to natively transmit from amplification systems to hearing aid receivers commonly used by adolescent hard of hearing/ deaf students
- fixed sound field technology, in addition to hearing augmentation system/s, **must** be installed in any teaching space designated primarily for use by:
  - hard of hearing or deaf students
  - students with English as a second language
- any hearing augmentation and sound field hardware **must** be connected as an add-on to a PA or audiovisual system (as defined above), and
- have appropriate Braille Tactile signage that is:
  - consistent with relevant section of AS 1428.5 and universal design principles (i.e. in properly spaced Braille and standard type; clearly visible, located at the main entrance to the teaching space; accessible at wheelchair height)
  - advises of the system type/s in use, and where visitor receivers can be accessed
- permanent cabling for devoted on-wall interfaces **must** terminate to practical locations for effective operation and be free from trip risk (i.e. have no unsecured cables to power supplies or general power outlets)

- hearing augmentation interfaces **must** be appropriately labelled and mounted at an accessible height for use by hard of hearing /deaf users of the space, and
- contracts **must** include staff training to support staff understanding and use of technology
- all installed (sound field and hearing augmentation) systems **must** 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 sound field systems.

Hearing augmentation system-specific criteria

- a minimum of two (2) external receivers with neck loops **must** be provided per campus[27]
- a minimum of one transmitter **must** be provided for every ten (10) rooms (primary school) or learning community (secondary school) that is operative with any and all aids worn by learners to be used with fixed on-wall interface, where the selected system requires such an interface
- hearing augmentation systems that require the following **must not** be installed in spaces that will be used in part or entirely for learning and/or instruction:
  - WiFi primary transmission. IMTD will **not** support these systems[28]
  - induction loops in ceilings or underfloor coverings[29]
  - infrared systems (noting infrared sound field is permissible subject to above criteria)[30]

In the case of school upgrades, where a hearing augmentation system already exists in a school, it complies with the BQSH (2022 or later version) and is operating to users' satisfaction, the same system type **should** be replicated in upgrade works. If this is not possible, a patch **must** be installed between new and existing platforms. And school staff **must** always be consulted about their needs.

Sound field-specific criteria:

- sound field systems **should not** be installed in foyers or offices, and
- infrared sound field (as distinct from infrared hearing augmentation) can be installed in teaching spaces, if native transmission to commonly used student devices and a consistent, high quality signal can be achieved.

Further information on different assistive hearing system types can be found in the department's Equipment Boost for Schools – Professional Practice Guide: Portable Soundfield Systems <https://www.education.vic.gov.au/Documents/school/teachers/learningneeds/SoundfieldProfessionalpracticeguide.pdf> .

All hearing augmentation and or sound field systems **must** be delivered through a NCC D1P9 performance solution that satisfies the departmental performance criteria above and complies with:

- NCC D1P9 – Communication systems for people with hearing impairment (performance solution)[31]
- AS 1428.5 – Communication for people who are deaf or hearing impaired, and
- Disability Discrimination Act 1992.

5.11 Security technology

Schools **must** provide a safe and secure environment for students, staff and visitors, including parents/ carers 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:

- 3.5 School and early learning design principles <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#35-school-and-early-learning-design-principles>
- 5.3 Building fabric <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#53-building-fabric>

5.11.1 Security design

The DE 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, and
- other physical security infrastructure, strategies and protocols.

The VSBA senior project officer **must** gain Security Unit (SU) (school.security@education.vic.gov.au <mailto:school.security@education.vic.gov.au>) approval for all security specifications, including for electronic security systems, during

Design Development (DD) to ensure compliance with departmental security requirements in each facility.

Project consultants **should** also refer to VSBA and Security Unit Factsheets for further guidance on when to engage the Security Unit. Project consultants **should** also refer to SU guidance material for additional information, found in the Securing your school <https://edugate.eduweb.vic.gov.au/sc/sites/Infonline/Health%20and%20Safety/Securing%20Your%20School%20(March%202015).pdf> guidelines.

5.11.2 Physical security

Project consultants **must** provide, at minimum, the following physical security measures:

- installation of a duress button in high-risk meeting space/s as identified in the security specification. The duress button by default must activate a suitable alarm, preferably a strobe light in an administration or staff areas in the event of an emergency. Other supplementary security measures may include frosted windows between a meeting and reception space or CCTV
- provide security cabling (for duress button) to secondary locations for future expansion as identified in the security specification
- 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
- offices and teaching spaces in open circulation corridors or non-secure areas must be lockable from the inside with a snib lock, allowing single action egress
- enclosures to protect outdoor equipment, such as air-conditioning units and pumps, against theft and vandalism. Gaps or holes in these enclosures must be small enough to ensure the safety of children by preventing them from accessing the equipment, or the enclosures must be installed at least 1 metre away from the equipment
- an external key vault and/or an alternative **must** be installed near the administration building for ongoing security access
- 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, and
- where a new early learning facility is to be delivered on a school site with additional community facilities, such as maternal child and health (MCH) consulting rooms or community meeting spaces, consultants **must** consult with the Project Control Group and early learning facility service provider about the design of barriers and gates to ensure access to the community facilities while maintaining secure early learning facility boundaries that only authorised early learning staff and registered users can access.

Early learning facilities on school sites **must** be designed to restrict public access to all areas. A fence **must** define the early learning facility's perimeter to prevent school users and members of the public from accessing the early learning facility without permission and supervision.

Advice from the service provider **should** be obtained to determine where keypad entry systems **should** be installed within the early learning facility.

Careful consideration **must** be given to physical security so that latches and controls are operable by people with disabilities, without compromising security and safety.

Clear, non-scalable screens **must** also be installed at reception counters as an infection control measure and to maintain public-facing security. The screen design must be developed in consultation with school or Design Reference Group and prioritise safety and address school-specific needs, such as over-counter deliveries, speech transmission and accessibility. Refer to 3.5.1 Safety and security in design <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#351-safety-and-security-in-design> for further information on performance criteria for reception security measures.

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 the section on Security lighting (in 5.9.8 Lighting systems <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#598-lighting-systems>).

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 5.1 Landscape architecture <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51-landscape-architecture> and to the Security fencing standard found in the department's Crime Prevention in Schools policy <https://www2.education.vic.gov.au/pal/crime-prevention-schools/policy> .

All perimeter gates and the paths leading to them **should** be wheelchair friendly and DDA compliant. Perimeter gates **should** have openable ranges to 180 degrees and **should** hold open by securing to the ground with drop bolts.

5.11.5 Intruder alarm system functional requirements

The VSBA senior project officer **must** liaise with the SU during design development 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.

The VSBA senior project officer **must** seek information from SU during design development concerning the potential impact on alarm systems from alterations or additions to facilities.

The scope of the installation **must** include all portable or permanent modular 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 portable or permanent modular classrooms.

5.11.6 Electronic access control system

Electrical design **must** consider the internal materials palette and school day to day use. A review **must** be completed by IMTD, the school, PDC and VSBA following electrical rough in. The review **should** consider the location and type of outlets, data points, phone points, and overhead projection interfaces.

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, the VSBA senior project officer **must** liaise with the SU during design development 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/NZS 62676 1.2 and the DE CCTV Policy <https://www2.education.vic.gov.au/pal/crime-prevention-schools/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 DE CCTV Policy <https://www2.education.vic.gov.au/pal/crime-prevention-schools/policy> .

CCTV **should not** be installed in early learning facilities, unless explicitly requested by the agreed provider and approved through the Project Control Group.

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:

- 3.5 School and early learning design principles <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#35-school-and-early-learning-design-principles>
- 3.3 Master planning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#33-master-planning>
- 5.3 Building fabric <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#53-building-fabric>
- 6.1 Commissioning and tuning <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/building-handover-and-completion#61-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
>
> **WSA 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, and
  - actual site flow and pressure data obtained from an accredited fire services test (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, and
- external hydrant placement and coverage **must** consider possible and planned portable or permanent modular 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, and
- 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.

When installing fire reels and internal hydrants consultants **should** secure them (in lockable fire cabinets, vandalproof covers or with a fire hydrant security device) to minimise vandalism or misuse in compliance with in compliance with AS 2419.1 and AS/NZS 1221.

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, and
- 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, and

- 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. In early learning facilities, automatic smoke detection and alarm systems **must** be provided throughout the whole building in accordance with NCC E2D20 requirements.

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 portable or permanent modular classrooms.

5.12.7 Smoke and fire doors

The number of smoke and fire doors **must** be minimised to what is absolutely necessary, due to their restricted use and supervision and ongoing maintenance implications.

Design proposals **must** include door locations, operational restrictions and allowances for vision, such as glazed panels. If glazed panel cut-outs are provided, they **must** conform to NCC Specification 12 Fire doors, smoke doors, fire windows and shutters. Proposals and their impact on school supervision, restricted door operation and ongoing maintenance are to be carefully reviewed with the VSBA and School for acceptance at each planning stage.

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 section 5.3.5 Doors <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#535-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.

5.12.9 Water efficiency

Fire protection systems **must** meet at least one of the following conditions:

- the fire protection system does not expel water for testing, and
- 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. Early learning sprinkler system requirements **must** comply with E1D11.

The fire protection system test water requirements are not applicable for projects where:

- a sprinkler system is not required under NCC Section E, or
- a sprinkler system is not provided by the project team, and does not include a water-based fire protection system.

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:

- 5.2 Utilities and associated infrastructure <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#52-utilities-and-associated-infrastructure>
- 5.3 Building fabric <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#53-building-fabric>
- 5.2.4 Natural gas <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#524-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 portable or permanent modular buildings.

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:

- supplied in the form of mains pressure directly served from authority mains in compliance with AS 2118
- 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, and
- 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 5.13.7 Heated water systems <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5137-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 ± 50kPa
- 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, and
- 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, general facility use, and, in early learning facilities, also for children's water play activities.

All tapware and associated fixtures are described within the section on Tap fittings and fixtures (in 5.3.11 Plumbing fixtures <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5311-plumbing-fixtures>).

For information on gardening irrigation systems, please refer to 5.1 Landscape architecture <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#51-landscape-architecture> .

5.13.3 Water storage

Rainwater **should** be harvested from onsite rooftops for reuse through the use of pipework and 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 to ensure no blockages in drip irrigation systems and the like
- have signage and purple hose bibs to reduce the risk of accidental ingestion
- have automatic mains potable water back-up to ensure continuity of operation, with a strategy in place to prevent irrigation using mains water during periods when it is forbidden by water restrictions.
- be connected to all irrigation systems, toilets and urinals as a minimum
- all pumps/fittings/valves are tamperproof and secure from unauthorised access, and
- be easily controlled/trouble shot with a simple operation guide not a series of pump manufacturer documents.

Bladder-type tanks can be used beneath floors and decks but **must** be accessible for maintenance and repairs.

The total capacity of the installed rainwater tanks **should** comply with the size criteria in Table 17.

Table 17: Recommended rainwater tank volumes

Gross floor area (GFA in m^2)	Rainwater tank volume (kL)
2,500	25
5,000	50
10,000	100
20,000	200

Where the GFA of the building falls between the figures outlined above, or for projects or above or below the area listed, projects **should** use a ratio of 10 L/m² to determine the minimum tank size required.

These recommendations 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.

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, and
- where reticulated reclaimed water is available, this **must** be used for non-potable purposes.

For information on water storage and tanks, please refer to 5.13.3 Water storage <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5133-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, tempered water is generally supplied to staff and administration areas, student showers, canteens, art room, food technology rooms, 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, and
- all boiling water units **must** be energy efficient. 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 portable or permanent modular buildings.

The following systems **must** be used in new schools and early learning buildings:

- electric systems (i.e., heat pump systems are commonly used in traditionally designed schools and early learning facilities)
- solar hot water panels with electric boosting, and
- a 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 ± 50kPa
- 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, and
- 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 portable or permanent modular buildings.

Project consultants **should** also consult the 5.2.2 Sewerage <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#522-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 portable or permanent modular 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 portable or permanent modular buildings, and
- 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, and

- 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, and
- 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, and
- 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, and
- **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 (i.e. for food science, canteen, art and STEM spaces)
- a common apparatus only for groups of smaller facilities, and
- 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 5.13.8 Sewer systems and sanitary plumbing

<https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#5138-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, and
- 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:

- be detailed in a vertical transport report, as part of the overall circulation strategy
- lifts (in buildings without early learning facilities above the ground floor) **must** be key-protected, providing controlled access and use for students, visitors, and members of staff only
- where an early learning facility is located above ground level, lift capacity, access and operational arrangements for at least one lift **must** accommodate the efficient, mechanical transportation of groups of children and parents/carers without the need for key passes, in addition
- the lift/s designated for this purpose **must** have capture gates, and the surrounding circulation space **must** be DDA-compliant
- 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
- 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, noting that
- suitably scaled access pathways to and from the lift **must** also be provided for delivery and maintenance, including periphery gate/s

- lifts **must** comply with NCC Part E3 to ensure emergency egress and specified fire safety provisions are provided
- all lifts must be supplied by an established and reputable lift manufacturer and have universal maintenance requirements, meaning qualified firms other than the manufacturer can maintain them, if necessary, into the future, and
- SIM card/s **must** be provided for lift phones/emergency devices

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 (notional maximum 1,200mm difference), such platform lifts **must** comply with AS 1735.14, the relevant DDA legislation, and the requirements of NCC E3D7.

Please see section 3.5.3 Learning spaces <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/planning#353-learning-spaces> for further circulation criteria for vertical schools.

5.15 Sustainable products

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

5.15.1 Sustainable timber

At least 95% (by cost) of all timber used (in permanent applications and temporary applications) **must** either be plantation timber with Chain of Custody certification by FSC or PEFC, or be from reused sources, or wind-fall outside of forests.

No distinction is made between temperate, tropical, hardwood and softwood timbers and engineered wood products.

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, and
- furniture items made from timber or including timber components.

FSC stands for the Forest Stewardship Council, and PEFC stands for the Programme for the Endorsement of Forest Certification (PEFC) – which incorporates national schemes like AFS (the Australian Forestry Standard).

5.15.2 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:

a. Reused products

b. Recycled content products

c. Environmental product declarations

d. Third-party certification

e. 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 Buildings: Sustainable Products Calculator, developed by the Green Building Council of Australia (GBCA), to determine the percentage of compliant products.

Calculations **must** include all permanent products and materials – including building services, architectural, civil, structural, landscaping, fixtures and furniture.

The project's Cost Planner or Quantity Surveyor **must** take responsibility for completing these calculations, with input from and feedback to other project consultants.

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

Recycled content products are those made with recovered materials. The value of such a product that counts towards the Total Sustainable Materials Value is its cost multiplied by the fraction of post-consumer and post-industrial recycled content by mass, or the recyclable content by mass. whichever is lower. For example, if a $100 product contains 75% post-consumer recycled content, and is 85% recyclable at end of life, the value counted towards Total Sustainable Materials Value is $75.

Third party certification

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.

'Living Product' and 'Cradle to Cradle' certified products can also be counted towards the Total Sustainable Materials Value.

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 claimed towards Total Sustainable Materials Value, whether purchased or leased, **must** have a project-specific product stewardship contract in place which:

- is between the supplier or manufacturer and the Department or School
- the supplier agrees to collect the item for re-lease, reuse or recycling at no cost, or at an agreed cost, and
- does not include any exemptions relating to timing, quality or quantity accepted for collection.

5.15.3 Sustainable concrete

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 Buildings 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, and
- 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/m^3 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/m^3 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 Buildings Submission Guidelines v1.2.

Footnotes

[7] Locally native plant species are species that have historically occurred naturally in the local zone in question and do not necessarily occur across Australia.

[8] Indigenous plant species occur naturally in an area, but can be found in other areas in the state or across the country.

[9] Locally native plant species are species that have historically occurred naturally in the local zone in question and do not necessarily occur throughout Australia.

[10] **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 1.8 kN) and a test factor of 1.2 giving a load at the backboard of 2.2 kN and 1.5 kN for the basketball ring. The permanent deformation resulting from prototype testing shall not exceed 10 mm. 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 1.2 kN 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.

[11] Noting that timber backboards have a shorter life and can splinter.

[12] FIBA Oceania welcomes proposals for independent testers. Current local testers can be discovered or proposed via email through equipmentandvenue@fiba.basketball <mailto:equipmentandvenue@fiba.basketball> .

[13] See requirements for rings, posts and sleeves in Section 1 of the 2022 Official Basketball Rules: Basketball Rules & Basketball Equipment

<https://%20www.fiba.basketball/documents/official-basketball-rules/2022/equipment.pdf> .

[14] 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.

[15] **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 1.8 kN) and a test factor of 1.2 giving a load at the backboard of 2.2 kN and 1.5 kN for the basketball ring. The permanent deformation resulting from prototype testing shall not exceed 10 mm. 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 1.2 kN 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.

[16] FIBA Oceania welcomes proposals for independent testers. Current local testers can be discovered or proposed via email through equipmentandvenue@fiba.basketball <mailto:equipmentandvenue@fiba.basketball> .

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

[18] https:// www.fiba.basketball/documents/official-basketball-rules/2022/equipment.pdf <https://%20www.fiba.basketball/documents/official-basketball-rules/2022/equipment.pdf>

[19] See requirements for rings, posts and sleeves in Section 1 of the 2022 Official Basketball Rules: Basketball Rules & Basketball Equipment

<https://%20www.fiba.basketball/documents/official-basketball-rules/2022/equipment.pdf> .

[20] Locally native plant species are species that have historically occurred naturally in the local zone in question but do not necessarily occur throughout Australia.

[21] 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. School competition sports facilities will generally be for Level 3 equivalent activities, i.e. community competition up to state. All levels have the same flooring requirements.

[22] Association of Australasian Acoustical Consultants, Guideline for Child Care Centre Acoustic Assessment.

[23] This ratio only applies to new builds and upgrades involving entire new buildings or precincts.

[24] One recommended best practice approach is to wire all classrooms for hearing augmentation, and provide a portable sound field system per building. Once a hard of hearing or deaf child is enrolled the sound field and a hearing augmentation system can be set up for that year in that child's home room, enabling a per room cost for hearing augmentation coverage of PA and AV and a per school/building cost for portable sound field systems (1 or 2 per building being usually adequate), making the installed hearing augmentation more valuable for hard of hearing/deaf and other students.

[25] Native transmission means without the use of personal neck loops.

[26] The vast majority of primary school students use personal receiver devices supplied by Hearing Australia, while many secondary school students reject these devices for alternatives that provide autonomy.

[27] Neck loop receivers are not necessary when system selection provides native transmission to the majority of student personal receiver devices, making D4D8 (2)(b) inapplicable. A school's main occupants, students and staff, will also have their own transmitters and receivers in aids. Students can request compatible microphone from Hearing Australia. Visitors also usually use their own receiver devices/headphones. Two neck loop receivers are sufficient for visitors/students/staff who are unable to connect natively or have not brought their own receiver.

[28] The department's enterprise network is designed for laptops, PCs and networking. External servers are not subject to service agreements protecting voice traffic. Current Wifi systems have latency issues that interfere with lipreading and often require supplementary devices.

[29] Induction systems require activated t-switches in personal receivers, which are not a feature of contemporary paediatric receivers.

[30] Infrared systems require line of sight to transmitter, conspicuous receivers, even light/no direct sunlight. They have dropout issues, and are not practical in irregular shaped rooms or as a retrofit option.

[31] A performance solution is proposed because school and early learning students are provided with their own listening systems by Hearing Australia's paediatric program, and do not need additional neck loops given system performance criteria; the NCC D4D8 does not recognise that most young people/students' personal receiver devices do not have telecoil activated, as required for induction systems; nor does the NCC recognise the importance of transmitting a teacher's voice, i.e. via sound field systems, which has benefits not only for hard of hearing students but those with auditory or undiagnosed hearing needs, and students with special needs.

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, and
- certification and notices are provided.

Smoking is banned within four metres of all entrances to early learning facilities, 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 can be found on the Department of Health's Resources and factsheets – tobacco reform <https://www.health.vic.gov.au/tobacco-reform/resources-and-factsheets-tobacco-reform> webpage.

Completion and handover timeframes differ for early learning facility delivery than from schools. In the case of early learning facilities, third party service providers are appointed approximately six to nine months prior to start of the new school year i.e. April–June. The service provider is the only entity that can apply to the regulator for approval to operate an early learning service.

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 outcome
- copy of planning permits if required, and other planning related permits, and
- a certified DE area measurement form <https://www.vic.gov.au/space-requirements-early-childhood-service> .

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 VSBA Project Manager will work with consultants to gain these documents prior to practical completion.

Furthermore, as practical completion is reached the early learning facility service provider is required to submit an Occupancy Permit, a Building Permit, As Built plans and evidence of a lease agreement.

The approval process includes a site visit by the regulator. This occurs after practical completion once the service provider has installed all equipment and connected services for operations. Where the regulator identifies non-compliant elements that

must be rectified prior to service approval the VSBA Project Manager will have to determine the process to rectify the elements prior to the start of the early learning term which aligns with school terms.

6.1 Commissioning and tuning

Commissioning, handover and tuning initiatives ensure all building services in new school and early learning buildings operate to their full potential and as designed. Contractors **must** undertake appropriate commissioning activities before building handover for the following building systems:

- mechanical services
- Building Management and Control System (BMCS), sub-meter monitoring systems, and/or smart monitoring and or control systems for individual services.
- automated lighting controls
- electrical systems (such as photovoltaic systems or other electrical generation, electrical supply, distribution systems),
- security systems (such as access systems and alarm systems)
- hydraulic systems (such as sensor-controlled fixtures, emergency shut-off valves, emergency showers, rainwater or stormwater harvesting systems, pumps, and septic systems)
- 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, and
- operable building envelope components that are mechanically actuated or interfaced with HVAC systems or the BMS (including automatic doors)

Projects **must** undertake tuning, including meetings between relevant designers and trades and the sustainability consultant (if one has been appointed), review of feedback from the school, and review of energy and water sub-metering data, on a quarterly basis, for 12 months for the following building systems:

- mechanical services
- Building Management and Control System (BMCS) or smart monitoring and or control systems for individual services
- automated lighting controls
- rainwater or stormwater harvesting systems, and
- operable building envelope components that are mechanically actuated or interfaced with HVAC systems or the BMCS (including automatic doors)

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 that is 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.

6.3.1 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, and
- authority consents.

6.3.2 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, and

- 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 on how to operate mechanical, electrical and fire systems
- 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
- inform teachers on the pedagogical design intent of spaces, and
- 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, and
- 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

Acronym/ Initialism	Description
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

Acronym/ Initialism	Description
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
DE	Department of Education
$D_{nT,w}$	Weighted Standardised Level Difference
D_w	Weighted Level Difference
DN	Diameter Nominal
EER	Energy Efficiency Ratio

Acronym/ Initialism	Description
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

Acronym/ Initialism	Description
IP	Ingress Protection
IP	Internet Protocol
ISDN	Integrated Services for Digital Network
ISO	International Organisation for Standardization
IMTD	Information Management and Technology Division
IT	Information Technology
LED	Light-emitting Diode
LPG	Liquid Petroleum Gas
MATS	Master Antenna Television System
MATV	Multiple Access Television
MCH	Maternal and Child Health
MFDs	Multi-functional Devices
MIMS	Mineral Insulated Metal Sheath
MSB	Main Switchboard
N_2O	Nitrous Oxide
NatHERS	Nationwide House Energy Rating Scheme
NBN	National Broadband Network
NCC	National Construction Code

Acronym/ Initialism	Description
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

Acronym/ Initialism	Description
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

Acronym/ Initialism	Description
uPVC	Unplasticised Polyvinyl Chloride
UV	Ultraviolet
VBA	Victorian Building Authority
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

8. Appendix

8.1 Appendix A: Summary of design requirements specific to early learning facilities

Appendix A is a summary of BQSH early learning-specific performance criteria only. It should be noted that the BQSH includes many requirements and criteria that apply to both schools and early learning facilities, so this summary list should not be treated as exhaustive.

Section	Sub-category	Early learning facility-specific criterion
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 (DE) capital projects, including new construction, refurbishment and maintenance works. Its purpose is to assist architects and designers to create high-quality designs for school and early learning facilities across Victoria. The BQSH uses early learning facilities as an umbrella term covering two facility sub-categories: • kindergartens, which include kindergarten on school sites (KOSS) and modular kindergartens for placement on or off school sites, and • early learning and childcare centres (ELCCs), which are government-owned and operated childcare facilities.
Introduction	1.5.5 School and early learning area schedules	Area schedules for early learning facilities are developed on a site by site basis because child place numbers, rooms and additional facility scope are determined by the NQF and contingent on agreed outcomes with third party partners and other strategic opportunities. The Early Childhood Strategy and Planning Unit prepares area schedules for each site prior to principal design consultant procurement. Indoor and outdoor space allocations in early learning facility design, including those in multi-storey buildings, must comply with the minimum requirements of the National Quality Framework (NQF) and the Children's Services Act (CS Act). For further details, refer to Space requirements for early childhood services

Section	Sub-category	Early learning facility-specific criterion
		<https://www.vic.gov.au/space-requirements-early-childhood-service> .
Introduction	1.5.6 Shelter In-Place for schools in bushfire-prone areas	DE maintains a Bushfire-at-Risk Register (BARR) that identifies schools and early learning facilities considered to be at the highest risk of fire danger within bushfire-prone areas. Inclusion on this register is a trigger for pre-emptive closure or relocation. Details can be found at the Bushfire At-Risk Register (BARR) webpage <https://www.vic.gov.au/bushfire-risk-register-barr> .
Education vision and philosophy	2.2.5 Early learning facilities	**2.2.5 Early learning facilities** The Department of Education will be delivering new early learning facilities to provide additional infrastructure capacity to support the roll-out of Three and Four Year Old Kindergarten and the Best Start, Best Life program across Victoria. High quality learning is supported through the physical and social environments, and opportunities that early learning facilities provide.
Education vision and philosophy	2.2 Education principles	High quality environments promote children's wellbeing and engagement, positive learning experiences and inclusive relationships. Physical learning environments **must** include both indoor and outdoor learning spaces that satisfy the key principles, including NQF indoor and outdoor requirements, such as: • flexibility and accessibility • a range of developmentally appropriate, open ended activities and sensory experiences, and • an environment that is sustainable, fit for purpose and reflects the diversity of families within the local and broader community.

Section	Sub-category	Early learning facility-specific criterion
Education vision and philosophy	2.3.3 Early learning education matters	**2.3.3 Early learning education matters** Contemporary research shows that the early years of a child's life from birth to 8 years of age is the most critical period for brain development. 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. Nurturing relationships, social and emotional development of a child is vital to lifelong learning and setting them up for success in life. The Victorian Early Years Learning and Development Framework (VEYLDF) adopts a comprehensive approach to children's learning and development. The VEYLDF sets out outcomes and practices to guide early learning professionals in their work with all families and their young children from birth. Supporting children to progress toward these outcomes, in conjunction with their families, is the core of the VEYLDF. The vision and purpose of the VEYLDF is to guide early learning professionals in a collective effort with families towards the achievements of the nationally agreed Early Years Learning Outcomes. Early learning facilities **should** be designed to support the following principles: **Principle 1, Reflective practice:** Creating environments where families and professionals who work in the setting can engage in critical reflection. **Principle 2, Partnerships with families:** Designed with children's and family's needs at the forefront and with consideration of local community priorities informed by local consultation. **Principle 3, High expectations for every child:** Spaces that support children's agency, sense of capability, goals and aspirations for the future. Spaces that support play-based learning, avoiding locked in expectations

Section	Sub-category	Early learning facility-specific criterion
		about what children are capable of at a certain age or stage. **Principle 4, Respectful relationships and responsive engagement:** Spaces allow for creativity of learning and responsiveness to children's changing interests and needs. **Principle 5, Equity and diversity:** Showcase First Nations perspective, cultural inclusion, safety and awareness. Spaces support all children to develop a sense of place, identity and a connection to the land and the natural world. **Principle 6, Assessment for learning and development:** Creating environments where children are comfortable, have opportunity to engage in everyday experiences, materials and equipment that interest them. **Principle 7, Integrated teaching and learning:** Spaces are designed to promote and enhance opportunities for integrated teaching and learning approaches to be embedded into the programming. **Principle 8, Partnerships with professionals:** Spaces that facilitate strong partnerships with professionals.
Planning	3.1.2 Recognition of First Nations culture in new facilities and major upgrades; First Nations cultural recognition in design	All VSBA-led new school and early learning facilities and significant school upgrades must recognise First Nations culture in line with the commitments in the Dhelk Wukang 2022–2026 Aboriginal Inclusion Plan and the VSBA's public commitment to First Nations engagement </our-commitment-first-nations-engagement> . All First Nations cultural design elements must be implemented in consultation with Traditional Owners, the Victorian Aboriginal Education Association Incorporation (VAEAI), Local Aboriginal Education Consultative Groups and Marrung Facilitators. There are no restrictions for cultural design, but the project team should be led by First Nations representatives, including Traditional Owners, about what is appropriate to include at the

Section	Sub-category	Early learning facility-specific criterion
		school or early learning facility and available project funding will ultimately determine its final scope. Before starting engagement, VAEAI must confirm the relevant First Nations representatives to include in the meetings. VSBA Communications leads the consultation for new schools in collaboration with the project team. Principal Design Consultants should review the VSBA's public commitment to First Nations engagement </our-commitment-first-nations-engagement> for guidance on the engagement process. For guidance on the First Nations engagement process, contact VSBA Communications via vsba@education.vic.gov.au <mailto:vsba@education.vic.gov.au> .
Planning	3.1.2 Recognition of First Nations culture in new facilities and major upgrades; Aboriginal names for schools and early learning facilities	First Nations cultural design engagements for schools and kindergartens could include language requests, for example, for room names. However, engagement about naming entire schools or early learning facilities is not led by the VSBA. Under the School and Campus Naming Policy <https://www2.education.vic.gov.au/pal/school-and-campus-naming/policy> , Aboriginal language names are preferred for all new government schools and campuses. Early Learning Victoria (ELV) has also made the same commitment for early learning childcare centre (ELCC) names. When choosing names for schools or ELCCs, Traditional Owners propose Aboriginal language names to ensure the accuracy of language and to support self-determination. The Priorities Unit of the Operations and Governance Division coordinates the school naming process with Traditional Owner groups, while Early Learning Victoria (ELV) coordinates naming for ELCCs. For school naming queries, please contact the Priorities Unit at srs.priorities.unit@education.vic.gov.au <mailto:srs.priorities.unit@education.vic.gov.au> .

Section	Sub-category	Early learning facility-specific criterion
Planning	3.1.4 Building for early learning	**3.1.4 Building for early learning** In 2022 the government announced the Best Start, Best Life early learning education reform with three new major initiatives: • free kinder across the State • a year of universal Pre-Prep for 4-year-olds, and for the first time, • the Victorian government will establish and operate 50 childcare centres. The Department will deliver a number of early learning facilities to provide additional infrastructure capacity to support the roll-out of Three and Four Year Old Kindergarten. Some early learning facilities will be delivered on new and existing government school sites. The new infrastructure required in order to deliver on the government's Best Start, Best Life and Pre-prep reforms <https://www.vic.gov.au/best-start-best-life-reforms> will include long day care provision. The VSBA **must** be consulted for direction on long day care facility specifications. The Government is committed to the benefits of integrating early learning into the wider government school system. New co-located early learning facilities can help make drop off time simpler for family and carers, support smoother transitions between early learning and primary school, and may make early learning 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 learning education and care, including the ways an early learning facility's environment is designed, equipped and organised to maximise children's engagement and positive relationships.

Section	Sub-category	Early learning facility-specific criterion
		Early Learning environments **must** comply with the National Quality Framework – Quality Area 3 – Physical Environment <https://www.acecqa.gov.au/nqf/national-quality-standard/quality-area-3-physical-environment> .
Planning	3.1.5 Victorian early learning reforms	The Victorian Government has made a commitment to overhaul early learning education and care in Victoria. The Best Start, Best Life reforms are the most significant change to the Victorian early learning sector in a generation. This includes: • **Free Kinder:** all children in Victoria who are 3 and 4 years old can access Free Kinder • **Three-Year-Old Kindergarten:** the roll-out of Three-Year-Old Kindergarten continues, with programs increasing to 15 hours a week across the state, providing Victorian children with 2 years of a quality kindergarten program before school • **Pre-Prep:** Four-Year-Old Kindergarten in Victoria is in the process of changing to 'Pre-Prep'. This means that every 4-year-old child can go to a play-based learning program for 30 hours per week, and • **Early Learning and Childhood Centres:** establishing 50 Victorian government-owned and operated early learning and childhood centres.
Planning	3.2 Universal design	Some standard design solutions for AS 1428 may not align with the operational objectives and Early Childhood Education and Care Legislative requirements for early learning facilities. This can create a conflict, and thus, consultants **should** highlight all AS 1428 conflicts through the departure process and solution rationale. Additionally, in such cases a DDA/Access consultant engagement is

Section	Sub-category	Early learning facility-specific criterion
		recommended for specialist insight and guidance. For more information, see the section on Hierarchy of requirements and departures (in 1.3.1 The writing style of specifications <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/introduction#131-the-writing-style-of-specifications>).
Planning	3.3.1 Urban Context	Project consultants **must** ensure schools and early learning facilities complement their community, and eventually be a vital part of the community's broader aims. This **should** be considered before the design process starts.
Planning	3.3.1 Urban context	Where a new early learning facility is to be co-located on a school site, consideration **must** be given to the interface between the early learning facility's children's outdoor play areas with an area of learning or play with primary school, to promote opportunities for connection and learning.
Planning	3.3.3 Entry and Exit requirements	The minimum number of exits in multi-storey school and early learning infrastructure must comply with NCC D2D3 and NQF design considerations for emergency evacuation. Early learning facilities co-located on school sites **must** similarly have easy to find and accessible entry that is separate to the school entrance. There **should** only be one main entry/exit point into the early learning facility. Where the early learning building will have additional integrated community facilities (such as MCH and or community meeting room) or is integrated under the school roofline/building, alternative requirements for emergency and maintenance points are required. For early learning facilities in multistorey and vertical buildings, exit numbers for each storey **must** comply with NCC D2D4 and D2D16 requirements. Also see section 3.3.7 Emergency exits <https://www.schoolbuildings.vic.gov.au/buildin

Section	Sub-category	Early learning facility-specific criterion
		g-quality-standards-handbook/planning#337-emergency-exits> .
Planning	3.3.5. Site Planning	Where an early learning facility 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 to /interface with school facilities, and • if car parking is included direct access to the early learning facility entry.
Planning	3.3.5 Site planning	A separate waste disposal area (minimum 8m^2) **must** be located within the footprint of any early learning facility.
Planning	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 facilities, and before and after-school programs on school grounds. [...] Where an early learning facility is to be integrated into the school facilities, consideration **should** be given to shared use of (school and early learning) administration, meeting and staff breakout spaces, and the creation of gathering areas for family and carers close to the early learning facility's entrance. 'Integration' of early learning facilities services within school buildings (under the same roofline) differs from co-location of early learning facilities on school site where typically there is limited shared facilities or

Section	Sub-category	Early learning facility-specific criterion
		amenities under the same roofline, due to separate governance and operational arrangements. In these instances, the design **should** ensure that the early learning facility, in which NQF requirements always apply, has a clear service approval area to meet early learning education and care regulations distinct from the school community use areas. Designs must mitigate against risks that are specific to multi-use sites, where relevant, including: • building and site access and security allow only authorised people in and out of the premises and spaces not shared by adjacent entities • the design minimises risks of children being able to exit independently and unsupervised, e.g. coded doors and capture gates • entrances/exits are designed to allow appropriate monitoring by staff and avoid potential congestion points that could block sightlines in shared spaces, and • external exits do not lead directly to unsafe areas (such as roads) without additional safety measures, i.e. secondary barriers, surveillance technology.
Planning	3.3.7 Emergency exits	Consultants **must** ensure all emergency egress' in early learning facilities are designed in accordance with the National Quality Framework and National Construction Code. Early learning facility exits must not lead directly onto busy roads.
Planning	3.3.8 Site circulation	• where an early learning facility includes a car park and vehicular thoroughfares, consideration **must** be made to younger children and parents and carers with prams as they are more vulnerable to high risk vehicular movement.

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Planning	3.3.11 Vehicle Access	Where car parking is provided for an early learning facility and where site conditions allow, the car park **should** be separate from the school car parking and provide direct access to the early learning facility's entry. Carparks and access roads near the early learning site must include effective carpark design considerations to ensure the safety of young children and parents, and minimise and control associated safety risks. The early learning Regulatory Authority will examine these safety risks, including unprotected vehicle access, the possibility of vehicles entering outdoor areas adjacent to the carpark, and unsafe car manoeuvres (such as reversing) near entrances. Physical barriers (e.g., bollards), natural elements like plants and garden beds, or appropriate signage and labelled systems can be used to adequately control the aforementioned safety risks.
Planning	3.3.13 Provision of Car parking	Where site conditions allow early learning facility car-parking for parents/carers accompanying children to sign them in and out of the early learning facility, the car park **should** be separate from school staff car parking and provide direct access to the early learning facility's entry.
Planning	3.3.16 Vertical school and early learning facility planning	• Further, vertical school and early learning facility design must satisfy the following criteria: • in the case of vertical schools that include primary schools or early learning facilities, satisfy fire safety and emergency evacuation requirements set out in the NCC and the National Quality Framework • where an early learning facility is located above ground floor, there must be sufficient outdoor space and access to natural environment on the same floor as education and play spaces • where early learning facilities are located above ground floor, lift access

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		and operation arrangements **must** differ for at least one lift (i.e. lift capacity **should** accommodate efficient, mechanical transport of small children and parents/carers in larger groups and not require key passes), additionally • early learning designated lift/s **must** have capture gates, and this **must not** impede the DDA-compliance of surrounding circulation spaces
Planning	3.4 Landscape planning	External fencing **must** be two metres high and non-scalable around early learning facilities located above ground level.[...] Specific regulations and spatial requirements apply to outdoor play spaces in early learning facilities, including: • additional safety measures, such as fencing or barriers, must be installed for early learning facility sites close to potential natural water hazards or swimming pools • as for schools, a qualified landscape designer **must** be consulted to design all aspects of the outdoor areas of early learning facilities in order to ensure regulations can be achieved • outdoor spaces **must** be enclosed by AS1926-compliant fencing / barriers that are, minimum, 1800mm high and of a design that children cannot go through, climb over or under, or create entrapments. Fencing should not be climbable in its own right or via items (such as outdoor air conditioning condenser units or yarning circle logs) within 1000mm that children could use to scale • storage sheds, trees and play equipment such as cubby house **should not** be placed within 100mm of a perimeter fence line, care **must** be taken to ensure equipment or landscaping

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		elements do not create footholds onto and over the fence • sandpits with minimum depth of 400mm with shade are provided • grated stormwater pits are fitted with heel safe lids or mesh covering to avoid finger entrapment, and • provide suitable maintenance gates.
Planning	3.4 Landscape planning; Vertical schools	External fencing must be two metres high and non-scalable around early learning facilities located above ground level. See External equipment for a summary of irrigation system requirements in multi-storey early learning facilities and schools.
Planning	3.4.2 Outdoor learning space	Outdoor learning space design should satisfy the following requirements: [...] • provide clear sightlines for supervision, appropriate to broader school or early learning context, especially to bathrooms if the site is located on steep ground. If external sightlines are limited in schools, the outdoor space should be containable outside teaching and learning times [...] External fencing **must** be two metres high and non-scalable around early learning facilities located above ground level.
Planning	3.5 School and early learning design principles	In addition for early learning facilities, the design principles set out in the seven National Quality Standards related to the Physical Environment Quality Area 3 <https://www.acecqa.gov.au/nqf/national-quality-standard/quality-area-3-physical-environment> .
Planning	3.5.1 Safety and security in design	Early learning facilities are third-party operated and **must** be zoned separately from schools, with separate security systems. This applies to early learning facilities located in vertical and non-vertical schools. Please review both Designing Safer Buildings and

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		Structures <https://www.worksafe.vic.gov.au/resources/designing-safer-buildings-and-structures> , which is published by WorkSafe Victoria; the Preventing and responding to work-related violence: A guide for employers <https://www.worksafe.vic.gov.au/work-related-violence-guide-employers> , and the Occupational Violence Information Sheet <https://www.worksafe.vic.gov.au/resources/occupational-violence-information-sheet> for further guidance.
Planning	3.5.3. Learning Spaces; Connections/Relationships between learning spaces and circulation strategy	• where an early learning facility is located above ground floor, at least one lift **must** accommodate the efficient, mechanical transportation of groups of children and parents/carers without key passes, and • early learning designated lift/s **must** have capture gates, and surrounding circulation spaces **must** be DDA-compliant
Planning	3.5.3. Learning Spaces; Sleeping areas or nooks in early learning education and play spaces	• Sleeping areas or nooks where children will sleep must accommodate the required number of cots and sleep mats for planned child occupants, as outlined in the Area Schedules. The designated sleeping area or nook must be safe, conducive to sleep, well-ventilated and flexible enough to accommodate a range of ages and sleep needs. • Sleep areas or nooks must not have blind spots that prevent staff from supervising the whole sleep area. The design of sleeping areas should also balance reduced light for sleeping with adequate light for child supervision. • Sleeping areas must also include provision for storage of, vertically stacked, sleep mats that is accessible to children, noting that dimensions for a standard rest mat are 120x55x5.5 cm. Storage must accommodate the same number of mats as planned child

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		occupants for the room in question (e.g., 12 mats for a 12-place room, 33 mats for a 33-place room).
Planning	3.5.3 Learning Spaces	Education and play spaces in early learning facilities are subject to specific regulatory requirements. Consultants **must** ensure that designs meet the National Quality Framework (NQF) and the seven National Quality Standards related to the Physical Environment Quality Area 3 <https://www.acecqa.gov.au/nqf/national-quality-standard/quality-area-3-physical-environment> , including that indoor education and play spaces 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.
Planning	3.5.3 Learning spaces; Natural light and views	All indoor and outdoor approved areas of an early learning facility **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	3.5.3 Learning spaces; Views and lines of sight	Schools and early learning facilities must have sightlines from every learning space and children's bathroom to and from the outside for supervision and safety. Special attention must be paid to maintaining supervision sightlines where early learning facilities are situated on steep sites.

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Planning	3.5.3 Learning spaces; Information and communications technology	Project consultants **must** refer to 5.10 Information and communication technology <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#510-information-and-communication-technology> specific to early learning facilities.
Planning	3.5.5 Adjacency of spaces	Where early learning facilities 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 early learning facilities are integrated into the school facilities, consideration **should** be given to shared use of administration, meeting and staff breakout spaces. The associated safety risks of multi-use sites must be addressed through well-considered design as outlined in the Integration of shared facilities section.
Planning	3.6.3 Construction in bushfire-prone areas	All relevant school or early learning facility constructions in a designated bushfire prone area must also comply with NCC's Additional Bushfire Requirements for Certain Class 9 Buildings at NCC Part G5, and NCC Specification 43 Bushfire protection for certain Class 9 buildings.
Planning	3.6.4 Early learning regulations and policies	The National Quality Framework (NQF) consists of Acts, regulations, and standards that guide the design of early learning facilities. 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, and • the National Quality Standards (NQS) and quality rating system. The NQS provides early learning service providers certainty about what is expected of

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		them and what they are required to do to comply with the National Quality Framework, this includes guidance on the design and development of a facility. The physical environment of an early learning facility **must** be safe, suitable and provide a rich and diverse range of experiences that promote children's learning and development. Good design of an early learning facility is a major contributor to ensuring these regulations are addressed and fundamentally underpins what needs to be met before an early learning facility gains a service approval to operate. All early learning facilities designs **must** comply with all of the NQF tools and additional requirements laid out in this Handbook. Any early learning-specific performance criteria in the BQSH relate to licensed areas required under these regulations and legislation, unless otherwise stated. Indoor and outdoor space allocations in early learning facility design, including those in multi-storey buildings, must comply with the minimum requirements of the National Quality Framework (NQF) and the Children's Services Act (CS Act). For further details, refer to Space requirements for early childhood services <https://www.vic.gov.au/space-requirements-early-childhood-service> .
Special Factors	4.2.5 Multi-storey or higher than normal buildings	Early learning facilities in multi-storey buildings **must** include the following: • capture gates to restrict early learning children's access to lifts and stairs and surrounding circulation spaces must be DDA-compliant • pin code **and** fob key operable lifts • handrails are required to meet regulatory requirements, including a low handrail at a height suitable for use by 3 year old children • upgraded exits, sprinkler and smoke detection systems, as per NCC

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		requirements for early learning facilities, and • provide separate secure line/access for school and early learning facilities, where relevant Furthermore, the NQS stipulates that outdoor spaces **must** allow children to explore and experience the natural environment. There **must** be appropriate access for children to interact with the natural environment and natural vegetation. If an early learning facility is located above ground floor, there must be sufficient outdoor space and access to natural environment on the same floor as education and play spaces. 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 early learning facility. All spaces designated for babies should be on the ground floor. If located above the ground floor, direct exit to the ground floor with an adequate ramp must be provided. New guidance from the Australian Children's Education and Care Quality Authority (2021) <https://www.acecqa.gov.au/sites/default/files/2021-09/Evacuation_of_multi-storey_buildings.pdf> , the secretariat for the NQF provides clarity on their expectations in relation to early learning facilities in multi storey buildings to ensure developers, designers and builders understand the increasing stringent service approval process applied to services in multi-level buildings.
Technical Specifications	5.1 Landscape Archit..	Per the NQF, all early learning facilities **must** ensure that the minimum outdoor space requirements are met in compliance with the National Education and Care Services Regulations and **must** satisfy the following: • a qualified landscape designer or landscape architect **must** be consulted on all aspects of outdoor design

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		• 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. Early learning facilities must maintain supervision sightlines between outdoor learning areas and children's bathrooms. Special attention must be paid to maintaining supervision indoor-outdoor sightlines where the facility is located on a steep site. Multiple-level changes should be avoided as they can hinder child supervision, restrict access, and create potential hiding spots.
Technical Specifications	5.1 Landscape Archit..	Schools and DE-operated early learning facilities must create, safeguard and store administrative and student records. Where a school or DE-operated early learning facility does not plan to digitise the majority of its records, permanent hardcopy records must be stored on its premises. Temporary records must be stored on site or with an Approved Public Record Storage Supplier (APROSS). On site hardcopy records storage must comply with PROS 20/02 Storage Standard <https://prov.vic.gov.au/sites/default/files/files/documents/2002v1.0.pdf> and the Records Management policy <https://www2.education.vic.gov.au/pal/records-management/policy> . Records should not be stored in: • sheds • shipping containers • attics • basements, or

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		• any space where there is a risk of damage by weather, water leakage, or pests. The records storage space must not have external windows.
Technical Specifications	5.1.1 Soft landscaping	In early learning facilities, synthetic or non-natural materials, such as artificial grass and rubber soft fall, must not be used in outdoor spaces. Refer to the section on early learning outdoor spaces for further information.
Technical Specifications	5.1.3 Hard landscaping and indoor sports courts: Fencing	For early learning and special, special development and supported inclusion schools, consultants **must** adhere to specific regulations for barriers and fencing. All outdoor space **must** be enclosed by a fence or barrier, with a minimum height of 1800mm whose design prevents children of early learning age and under (5 years) from passing through, over or under. In early learning facilities, outdoor gates should be self-closing and self-latching, with a mesh or solid panel on the internal side of the fence to ensure that unauthorised adults cannot reach over and open the gate. A high-level handle must be provided on the internal/early learning side of the fence only. Capture gates, or other appropriate safety measures, must be provided beside exit doors in early learning facilities that do not have a foyer to prevent children from exiting into unsafe areas unsupervised. Fences **should not** be scalable by creating footings or have an item (such as outdoor air conditioning condenser units or yarning circle logs) within 1000mm that could be used to scale the perimeter fence. 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.

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Technical Specifications	5.1.3 Hard landscaping and indoor sports courts: Pathways	Exposed sharp aggregate paving finishes should be avoided in primary schools and early learning facilities.
Technical Specifications	5.1.3 Hard landscaping and indoor sports courts: Planning and departmental approvals	A range of playground equipment must be selected for new schools and early learning facilities to promote accessibility and inclusivity, and to accommodate as many abilities and special needs as possible. PDCs should obtain advice prior to playground equipment installation from relevant specialists as appropriate to the situation, including one or more of the following: allied health specialists, DDA/Access Consultants, or expert playground specialists. Expert advice when selecting equipment for special, special development and supported inclusion schools is particularly important to accommodate a higher percentage of complex needs.
Technical Specifications	5.1.4 External Equipment: Early learning facility outdoor spaces	Indoor and outdoor space allocations in early learning facilities, including those in multi-storey buildings, must comply with the minimum requirements of the National Quality Framework (NQF) and the Children's Services Act (CS Act). For further details, refer to Space requirements for early childhood services <https://www.vic.gov.au/space-requirements-early-childhood-service> . Outdoor space design must consider access points for maintenance and deliveries. An additional pedestrian emergency egress gate, positioned opposite to the maintenance access points/gates, should also be considered. Sandpits **must** be at a minimum 40cm in depth, however, up to 60cm is preferable. Shade **must** be provided to sandpits and mud play areas. Outdoor play spaces in early learning facilities must comply with the following:

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		• a qualified landscape designer is consulted on all aspects of their design
		• Outdoor Space Minimum Requirements as outlined in the NQF, 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.
		
		Early learning facilities located in multi-storey buildings **must** include outdoor spaces on each storey to accommodate the number of children on that storey to comply with the Education and Care Services National Regulations. Their design **must** ensure that the requirements for outdoor space are met for each child being educated and cared for by the service. Outdoor spaces should be no smaller than 4 metres in width or length.
		
		Outdoor spaces in early learning facilities must also satisfy the following:
		
		• supports accessibility by children with disabilities, developmental delay or mobility aids
		• provides direct access to indoor education and play spaces and children's bathrooms
		• includes an undercover veranda to serve as a transition area between outdoor and indoor education and play spaces and to offer outdoor play areas during extreme weather
		• facilitates supervision of children, avoids landscaping, elements, or structures that could impact sightlines and hinder supervision
		• include smaller areas for focused play while maintaining open spaces for active play

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		• if an external storage shed is installed, it should satisfy the following: - double doors (with a drop bolt lock for larger doors) for easy access - 600mm deep shelving units for storage, along with suitable higher shelving for items such as ladder brackets, and - a double GPO positioned at 1500mm high • **must** allow children to access, interact with and experience the natural environment and vegetation, in accordance with the Education and Care Service National Regulations (regulation 113; outdoor space-natural environment) • excessive landscaping elements, such as extensive bike paths or unnecessary, large cemented areas, are **to be** avoided in the interests of maintaining a balance between natural elements like digging areas, vegetable gardens, or soft fall, and essential landscaping features • include adequate shaded areas to protect children from the sun while also ensuring all other requirements such as supervision are complied with • rocks, natural logs, and timber used for seating or bordering sandpits are low, free of sharp edges, and positioned to avoid safety risks, and • exposed sharp aggregate paving finishes are not included in the design. If structural square poles or pillars are necessary in outdoor areas that are designed for children to run in, they should be padded to reduce risk of impact injury. When selecting materials and surfaces for outdoor areas, the following requirements apply: • synthetic or non-natural materials, such as artificial grass and rubber matting and soft fall, must not be used

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		• tan bark or mulch should be used as a soft fall option, where required • soft fall mulch should not be included in areas adjacent to indoor education and play spaces • metal grating groundcover should not be used in outdoor spaces, and • surfaces, particularly those adjacent to 0–under 3 education and play spaces, must not include choking hazards, such as materials that may deteriorate over time or contain small parts that could pose choking risks for babies and toddlers.
Technical Specifications	5.1.4 External Equipment: Irrigation systems	Irrigation systems in multi-storey schools and early learning facilities should not be installed in roof garden balconies, to avoid risks of reticulated pipework leaks. Irrigation in these locations should be: • sourced from local tapware/plumbing fittings • unconcealed, and • ideally a timed drip system. Integrated roof terrace planters should not be installed, due to high risk of long-term waterproofing issues with building envelope. Planters should be free standing.
Technical Specifications	5.1.5 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, children (in early learning facilities), and staff, particularly when UV radiation reaches damaging levels (3 and above) […] Shade structures in early learning facilities **must** be located clear of fences and barriers so they do not enable climbing and comply with AS1926.1. Shade must be provided over

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		static play areas such as sandpits. It should also be provided over areas of soft fall and digging patches. In cases where new plantings need time to grow, temporary shade solutions must be provided to ensure constant adequate sun protection for children.
Technical Specifications	5.1.7 Wetlands	**Wetlands must not be included in the design of early learning facilities.** Should wetlands be included within school grounds that have an early learning facility on site, the design **should** prevent access to the wetlands by early learning facility children.
Technical Specifications	5.2 Utilities and associated infrastructure	The majority of early learning facilities on school sites will be operated by a third party service provider such as the local Council or early learning providers. Therefore they **must** be designed with separate utilities infrastructure and authority meters independent to the schools. Where separate utilities are not viable, check meters for all utilities including electricity, potable and recycled water **must** be installed. The following **should** also be satisfied: • manual override lighting controls provided to indoor education and play spaces, and • incoming supply pillars and mains switchboards located outside children's areas.
Technical Specifications	5.3.4 Windows: Shading and sunlight controls	Tinted glazing and solar film **should not** be used on windows for children's rooms and toilets where they impede visibility and supervision between indoor and outdoor play spaces. In which case, other measures, such as shading, **must** be employed to achieve glare and passive energy outcomes.
Technical Specifications	5.3.4 Windows	Window sill heights in early learning facilities **must** comply with NCC requirements. Internal and external early learning facility play spaces, children's bathrooms and art

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		preparation areas **must** be designed for high visibility and supervision at all times. Storerooms in early learning facilities must have a window or other suitable and safe glazing for supervision sightlines and to ensure children do not get trapped inside without the educator's knowledge.[...] In early learning facilities, windows must satisfy the following criteria: • in education and play spaces, the height of window sills must not exceed 1100mm AFL to ensure an unimpeded line of sight from the indoor to the outdoor space, enabling supervision by educators • at least 50% of windows in education and play spaces must have sills no higher than 500mm AFL, in accordance with the NCC F6D3(4), and • design must enable supervision between the indoor education and play spaces and the bathroom, as well as between the outdoor spaces and the toilets. This can be achieved through a supervision window, glazed door or other suitable design solution/s. In addition, please refer to the section on Blinds and insect screens for further information
Technical Specifications	5.3.4 Windows: Operable Windows	In the case of vertical schools and early learning facilities, windows **must** be operable to provide natural ventilation and opportunities for night purging. Operable windows **must** be zoned and centrally mechanised through a self-contained smart system for windows or an aggregated Building Management System (BMS). Operable windows should be reed switch linked to mechanical HVAC systems to manage energy loss when spaces are in natural ventilation mode. [...] Project consultants **should** select and satisfy operable windows that meet the following

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		requirements: • fitted with a means of securely limiting above-ground floor window openings in schools (restrictors **must** be installed in early learning facility windows to limit opening to 125mm)
Technical Specifications	5.3.4 Windows: Blinds	• In early learning facilities, blinds for all internal and external windows must be translucent, except for meeting rooms and staff lounges, which should include opaque blinds or frosting for windows. Blinds, particularly in north- and west-facing windows, should effectively manage sunlight and glare, while blinds in sleeping areas must balance adequate lighting with the occupants' needs. • […] Cords must not be accessible to young children or toddlers.
Technical Specifications	5.3.5 Glazing	• in early learning facilities, any glass installed in areas accessible to young children **must** be safety glass that complies with AS 1288. […] • In early learning facilities, if an observation booth is included, the window between it and the indoor education and play space must feature one-way glass to prevent disruption to the children during observation of practice. Refer to Lighting Systems for additional requirements for the observation booth.
Technical Specifications	5.3.6 Doors: Early learning facility doors	Project consultants **must** consult with the Project Control Group (PCG) on door schedules prior to their finalisation, due to the complex interface between early learning care and education regulations, emergency and fire management building codes, NQF, and DDA and accessibility requirements in early learning facilities.

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		Further advice **must** be sought from a building surveyor or DDA consultant to determine the appropriate level of considerations have been made to meet the range of regulations and requirements. The key features of doors for early learning facilities include: • most doors and gates, including exits to the perimeter of the early learning facility **must** swing inwards, be self closing and self latching and have handles installed between 1500-1650mm AFL • door handles into the children's bathroom and the indoor education and play space leading to the outdoor play space **should** be at 1000-1200mm AFL, additionally • doors from children's bathrooms to outdoor and indoor learning and play areas must be able to be locked/pinned open, to allow children easy and quick access to the bathroom • where double doors between indoor and outdoor spaces are installed to allow large items to be moved between areas, they should: - swing 180 degrees - be capable of being pinned to an adjacent wall, and - be appropriate for three and four years olds to operate, furthermore • all door hinge frame junctions in the children's indoor and outdoor play spaces **must** include protection against finger injuries. An airlock **must** be provided at early learning facility entrances, as outlined in the Automatic Operation Doors and Airlocks section. In addition, consideration must always be given to potential conflicts or intersections between DDA and safety regulation door requirements. Airlock doors in early learning facilities should be capable of being disabled to allow manual operation only via a push exit button, if

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		required, to prevent children from exiting unsupervised. Exit buttons must be located between 1500-1650mm above the floor in accordance with NCC Vic D3D26(6). Sensors should be located at a height suitable for detecting small children. The designated distance between airlock doors should accommodate the movement of prams. An intercom/bell can be installed as further accessibility and emergency measure. Where the early learning facility has additional community facilities shared by services such as maternal and child health (MCH), all services must be easily accessible to community members with mobility issues. Where an ELCC is co-located with a MCH, that operates after hours or weekends, a separate video intercom should be installed between the MCH and the front entrance. Project consultants **must** consult the VSBA delivery manager to confirm inclusion of additional facilities and services prior to finalising Door Schedules. Early learning 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 early learning facility. Doors to internal stores/program spaces in early learning facilities must: • provide direct access to indoor education and play space(s), and be shared between two of these spaces, where possible, for efficiency • be lockable • provide flexibility to leave doors safely open, to accommodate child movement in and out of the space, as required • be sliding door, where possible, and have a soft close device on them to

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		minimise finger entrapment • provide easy access for staff but be inaccessible to children and be lockable, while providing free egress as required by the NCC for access and egress, and • have handles at adult height (1500-1650mm AFL) to prevent children from independently accessing the space.
Technical Specifications	5.3.6 Doors: Automatic operation doors	Automatic doors **must not** be installed in early learning facilities except at external entrances.
Technical Specifications	5.3.10 Stairs and ramps	Project consultants must provide stairs and ramps that comply with the following requirements: […] • step risers should be between 150mm and 180mm, and preferably 150mm for P-6 schools and early learning facilities • tread depth must be within a range of 300mm to 355mm, with a preference for the lower end of range in primary and early learning facilities, and both must comply with the NCC D3D14 tread/riser ratios, and […] Additional requirements apply in vertical schools and early learning facilities: • stair width **should** be optimised, wherever possible, to manage circulation pressures, which can be more acute in vertical environments, and • a minimum of two sets of stairs **must** be installed for vertical schools which **should** include fire stairs that are compliant for general student movement and, predicted or known, circulation patterns, as well as emergency evacuation. • consideration **should** also be given to strategically scattering stairs along an atrium to encourage vertical circulation. Rather than connecting levels with

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		staircases, seating may also be provided by the stairs (these have become known as Hellerup stairs). If installed, Hellerup or central stairs **should** be dual function, i.e. suitable for use as mini theatre spaces, presentation spaces, or spaces for informal gathering or study as well as circulation. [...] In early learning facilities, stairs and ramps **should not** be located adjacent to early learning facility perimeter fences as the required handrails can be used as a foothold to scale the fence. In facilities, particularly modular kindergartens where structures are elevated above ground level, special consideration should be given to designing outdoor learning spaces that integrate seamlessly with the rest of the service. Stepped-down connections and abrupt level changes should be avoided, ensuring access is designed to allow babies and small children to reach outdoor spaces independently or with minimal support. Uneven hard surfaces in retaining walls or similar landscape elements resulting in drops of more than 150mm pose serious safety and fall risks for babies and small children and must be avoided in outdoor areas of early learning facilities.
Technical Specifications	5.3.10 Stairs and ramps; Balustrades and bleachers	Stair and ramp handrails in facilities containing primary or early learning aged children have different handrail requirements, as per NCC D3D22. Handrails, particularly lower ones, must be designed in a way that does not create a climbing risk. Openings in barriers in early learning facilities **must not** exceed 125mm. All balustrades and barriers must be non-scalable, with no horizontal rails or potential footholds, which could be used for climbing. In early learning facilities, in particular, non-scalable mesh screening may be a necessary supplementary measure. [...]

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		Where a balustrade forms a barrier or fence around the early learning facility (i.e. above ground floor in multilevel buildings or protecting from water or climbing hazards) it **must** be 2000mm AFL, non-scalable and not have an item within 1000mm that could be used to scale. In addition, mesh wire fencing **must** form the balustrade to reduce climbing risk and items, such as children's play items, inadvertently passing through the barrier dropping below.
Technical Specifications	5.3.12 Plumbing fixtures; Toilet facilities	• Amenities for staff, students, children and visitors must be provided to satisfy the following: [...] • the NCC Volume 1, Table F4D4f for schools, and Table VIC F4D4g <https://ncc.abcb.gov.au/editions/ncc-2022/adopted/volume-one/f-health-and-amenity/part-f4-sanitary-and-other-facilities> **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
Technical Specifications	5.3.12 Plumbing fixtures: Toilets and sanitaryware in early learning facilities	The design of children's bathrooms in early learning facilities **must** enable supervision at all times, while maintaining children's rights and dignity. The following requirements **must** be satisfied: • children's bathrooms are located with direct access to indoor education and play spaces and outdoor spaces, and • in multi-storey buildings, toilets are provided on each floor, allowing children to access toilets reasonably quickly • design must enable supervision between the indoor education and play spaces and the bathroom, as well as between outdoor spaces and toilets. This can be achieved through a supervision window,

Section	Sub-category	Early learning facility-specific criterion
		glazed door or other suitable design solution/s • the private areas of children's bathrooms are not visible to people in the foyer or beyond the play space fence • junior toilet pans and toilet roll holders are installed at child height and within child-arm reach, respectively, i.e. (toilet roll holders should be no more than 300mm from the edge of the pan and large toilet roll holders must not be used as they are challenging for child access and use • the minimum number of wash basins required by NCC VIC Table F4D4g, at least, are provided, noting that a continuous sink or trough type washbasin is another acceptable option • wash basin heights comply with regulatory requirements, including that rim heights are accessible to children and no more than 600mm AFL • taps and soap dispensers are child-friendly (i.e. heights, complexity, required pressure) • in ELCCs, tempered water (between 30-35 degrees) is provided to children's handwashing basins/troughs • in kindergartens, either cold or tempered water (between 30-35 degrees) is provided to children's handwashing basins/troughs, as determined by operator preference • mirrors are installed at child height (base of mirror no higher than 600mm) • closet pans situated in a bank must be separated from each other by opaque partitions between 900-1200mm AFL • single partition doors have sufficient gaps on either long side to avoid finger entrapment (double barn-style doors

Section	Sub-category	Early learning facility-specific criterion
		must not be used due to entrapment risk) • lower height doors, up to 900-1200mm AFL, to provide children with adequate privacy and dignity while still enabling visual supervision • partition front edges are rounded to reduce injury risk • the required number of DDA-compliant toilet/s, at minimum, provided for wheelchair and mobility scooter access • hand dryers: - (ELCCs) electric hand dryers must not be installed in children's bathrooms, instead hooks must be installed for hand towels at an appropriate child height and paper towel dispensers installed at adult height, and - (kindergartens) hooks for hand towels at children's height and paper towel dispensers at adult height are preferred, however - (all early learning facilities) where hand dryers are provided, they must be temperature controlled, and - blade type hand dryers must not be used • shower/baby bath: - (ELCCs) a minimum of one recessed baby bath to be provided, and one additional recessed baby bath where the facility has more than two rooms for children under 3 years old - (kindergartens) an additional shower bath (not more than 300mm deep) with a flexible handheld shower head, located in the bathroom servicing the education and play spaces
Technical Specifications	5.3.12 Plumbing fixtures;	Early learning facilities **must** include dedicated laundry rooms that provide:

Section	Sub-category	Early learning facility-specific criterion
	Laundries in early learning facilities	• secure storage for cleaning equipment and supplies • infrastructure for a washing machines and dryers, and • a wet area. These rooms **must** be lockable and not be accessible from early learning play spaces.
Technical Specifications	5.3.12 Plumbing fixtures; Nappy changing facilities	When an early learning facility accommodates children under 3 years old, and a nappy changing bench to be installed, the following requirements must be satisfied: • design complies with NCC VIC F4D4(9)(c), including proximity to a baby bath • positioned to allow supervision sightlines between the bathroom, adjoining indoor education and play spaces and/or outdoor space • adult hand washing basin is located in proximity to nappy changing bench with tempered water • bench to be a minimum of 1200 mm length and 800 mm depth to allow educators to lay babies either vertically or horizontally for access and ergonomics • design considers the placement of overhead hazards • overhead cabinetry is considered that: - is not located directly over the nappy changing area or baby bath where it poses a head injury risk, but rather directly adjacent over bench/hand wash basin space - is ergonomically accessible by staff, and - has open pigeonhole storage and closed cupboards • under bench storage with child proof latches are included

Section	Sub-category	Early learning facility-specific criterion
		• design considers waste strategy for nappy change including ergonomics and utility in terms of location, access and type of bin • steps beneath the nappy changing bench are included that: - enable child access to the bench without staff having to lift them - withstand a minimum load of 40kg - include side handrails, and - lock into a fixed position • nappy changing bench and steps are not positioned near a door in a way that impedes access to and from the room or poses a risk of tripping
Technical Specifications	5.3.12 Plumbing fixtures; Tap fittings and fixtures	• where possible, use the same model and manufacture throughout a school or early learning facility. […] In early learning facilities, external taps must meet the following requirements: • separate taps are provided for both children's water play activities and facility gardening/maintenance • hose taps for children's play activities are: - provided at multiple points - installed at a child accessible height, and - not connected to recycled water • external taps for maintenance and gardening purposes are fitted with vandal-resistant handles.
Technical Specifications	5.3.12 Plumbing fixtures; Food preparation	Class 1 Commercial Kitchens (ELCCs) Where an ELCC is operating on a full-time basis and providing a daily meal service (i.e. 3 meals per day) for enrolled children, a Class 1 commercial kitchen must be installed and registered with the local authorities.

Section	Sub-category	Early learning facility-specific criterion
		Class 1 commercial kitchens in ELCCs must satisfy the following requirements: • comply with State Government Environmental Health Standards for Class 1 Level Kitchen, Food Standards Australia New Zealand (FSANZ), and the Food Act 1984 • satisfy all local government/council requirements to ensure compliance and prevent licensing delays • be designed in accordance with the ELCC Functional Design Brief, and • commercial kitchen design specialist advice, wherever possible, and • include an appropriately sized grease trap, and • natural and mechanical ventilation.
Technical Specifications	5.3.12 Plumbing fixtures; Food preparation	Indoor Program Kitchen (ELCCs) Indoor program kitchens must have direct access to and line of sight into the children's room. A child-safe gate must be installed between the kitchen and children's room. Kitchens must contain a sink, bar fridge, bench space, overhead cupboards, and simple joinery/pantry to store a small amount of ingredients, utensils and tableware. The sink must have tempered (between 30-35 degrees) and cold water, with a mixer tap to control water temperature. An oven should be considered with a slide in door and other safety features such as a lockable and induction cooktop with a child lock function. Kitchens with open electric cooktops must have an adult height switch mounted near the appliance in a visible and readily accessible position, to ensure the safety of children in the room. A sliding or double-hung window should serve as a servery to the external veranda area, and a hand-wash basin must be provided.

Section	Sub-category	Early learning facility-specific criterion
Technical Specifications	5.3.12 Plumbing fixtures; Food preparation	Outdoor Program Kitchen (ELCCs) An outdoor program kitchen is sometimes installed as a supplement to an indoor program kitchen. It is a simplified version of an indoor program kitchen, however, outdoor kitchens must include a sink with tempered (between 30-35 degrees) and cold water access, bench space with under-bench storage, and secure outdoor power outlet. A cavity for a permanent fridge or oven is not required. Where site conditions allow, the landscape design should include a safe area for a portable fire pit near the outdoor kitchen, ensuring it does not pose a fire risk to the building or decking. The kitchen must provide space and power for bench-top appliances such as plug-in stoves, portable ovens, and toasters. The design should also include storage for these appliances, either in the kitchen or a nearby internal store. The joinery should feature a pantry for storing a small amount of ingredients, utensils, and tableware, designed to prevent access by animals.
Technical Specifications	5.3.13 Joinery and fixtures	The scope of joinery works **must** include: [...] • built-in student lockers (in vertical schools and early learning facilities, locker numbers **must** reflect floor number i.e. 4.1, 4.2)
Technical Specifications	5.3.13 Joinery and fixtures; Accessibility and inclusion	All reception/canteen counters in school and early learning facilities must facilitate use by students, children 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.
Technical Specifications	5.3.13 Joinery and fixtures; Early learning joinery	Each indoor education and play space in an early learning facility must be provided with a custom fabricated rack of joinery pigeon holes or mobile locker units with caster wheels. The

Section	Sub-category	Early learning facility-specific criterion
		number is determined by the number of places per rooms For example a 33-place room should have 33 pigeon holes. Children's lockers or pigeon-holes, whether located within an education and play or a circulation space, must meet the following requirements: • heavy-set and stable to prevent tripping hazards • positioned to allow direct staff observation • each is approximately 350 x 450mm • washable materials are used, and (where located in circulation space) • the design and placement keep the circulation path unobstructed, and • the minimum required width of the circulation path is maintained. (Indoor education and play spaces) Should include wet/art troughs with soap dispensers above troughs, along with bench and under-bench storage cupboards—one at adult height (900mm) and one at child height (no more than 600mm). Cabinetry above sinks must be avoided. All low-height joinery doors must be fitted with keyed locks (with same key for all), magnetic latches, or childproof catches to restrict access by children. (ELCCs) Joinery design in the children's program space and internal store should meet the following criteria: • comply with Occupational Health and Safety (OH&S) standards and ergonomic principles • maximise built-in sturdy shelving with a recommended depth of approximately 620mm • incorporate flexible usage features, including large storage spaces, drawers,

Section	Sub-category	Early learning facility-specific criterion
		adjustable shelving, and closed cupboards with lockable options, and • includes at least one overhead cupboard equipped with a key lock for secure storage. (ELCCs) Joinery in the baby bottle preparation area should include: • overhead cupboards and shelves, including • at least one overhead cupboard with a key lock (not above sink) • bench space for safe and hygienic preparation, including a soap dispenser and paper towel dispenser • a hand wash basin and a separate sink with an integrated drainer, and • space for a microwave and a small under-bench fridge. (KOSS) Joinery design in children's internal store must also include maximum built-in sturdy shelving to a recommended depth of approximately 620mm. (Maternal child health (MCH) consulting rooms) Fixed joinery must be designed in consultation with the council/ third-party providers. It should generally include the following features: • drawers and cupboards with childproof and lockable doors • nappy bin drawers • pull-out stairs for mobile children to climb onto the change bench, and • an examination bench, which includes a measuring ruler of minimum 1m, positioned under natural light with vinyl flooring.
Technical Specifications	5.3.14 Insect screens	Durable insect screens must be fitted on all operable windows and any openings used for night purging, unless alternative justification

Section	Sub-category	Early learning facility-specific criterion
		is provided, to encourage natural ventilation where air quality is good and 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 high commercial quality and fitted with aluminium or stainless-steel mesh. Insect screens should be: • installed internally and facilitate easy removal and reinstallation, especially for screens at height, to enable convenient cleaning and maintenance, and • securely fitted within the frames so children cannot push the mesh out of the frame. In early learning facilities, insect screens on windows that open between approved and non-approved spaces must withstand a force of 300N in any direction without breaking, deforming more than 10mm along their length, or showing signs of fracture, as per AS1926.1. This includes insect screens on windows that open to outdoor areas not enclosed by children's playgrounds.
Technical Specifications	5.4.2 Internal Finishes; Wall linings	In early learning facilities, wall lining in indoor education and play spaces must be made of durable, washable materials, while also considering the room's acoustic requirements to control reverberation. Additionally, neutral colours and textures should be used to minimise sensory overload.
Technical Specifications	5.4.2 Internal Finishes; Resilient floor finishes	In early learning facilities, resilient, washable and non-slip sheets such as vinyl/linoleum flooring **must** be installed in indoor play spaces. The floor finishes must also have a soft-touch surface to ensure comfort for toddlers who may play on or touch the flooring directly. The materials should also contribute to a welcoming and child-friendly environment.

Section	Sub-category	Early learning facility-specific criterion
Technical Specifications	5.5 Acoustic engineering	In early learning facilities, indoor or partially enclosed education and play areas should have as many sound-absorbing panels as possible, such as pinboards, on ceilings or walls (but not cupboard doors). These can also display children's work, posters, or regulatory notices while helping to reduce noise. In addition, education and play areas in early learning facilities should have a ceiling with a noise reduction coefficient (NRC) of at least 0.7. [footnote: Association of Australasian Acoustical Consultants, Guideline for Child Care Centre Acoustic Assessment]
Technical Specifications	5.5 Acoustic engineering; Vertical school acoustics	In vertical schools and early learning facilities, acoustic measures **must** be well-considered in school circulation spaces such as hallways and stairwells to mitigate excessive noise generated through student travel between levels. See required sound insulation ratings at 5.5.1 Demonstration of performance <https://www.schoolbuildings.vic.gov.au/building-quality-standards-handbook/technical-specifications#551-demonstration-of-performance> . Acoustics in vertical schools and early learning facilities, particularly in atria and other circulation areas close to learning spaces, **must** be closely considered in early tender work and sequenced with design. Children and educators in early learning facilities must be able to speak and be heard without strain. [...] In vertical schools and early learning facilities, special consideration **must** be given to ambient noise from specialist classrooms, such as wood workshops, where they are located near atria. Due to reverberation through these spaces, additional acoustic measures **must** be provided to meet standards for open-plan and circulation spaces adjacent, open and accessible to atria.

Section	Sub-category	Early learning facility-specific criterion
Technical Specifications	5.7.3 Pedestrian footpaths	Exposed sharp aggregate paving finishes should be avoided in primary schools and early learning facilities.
Technical Specifications	5.8.1. Heating	Mechanical heating (and cooling) units **must** be provided in the following rooms of an early learning facility: • office, planning and staff rooms • foyers, and • children's indoor play spaces.
Technical Specifications	5.8.2 Cooling	Regardless of a school's location, air conditioning **must** be provided to the following facilities: […] • early learning facilities […] Safely operable windows **should** be installed in vertical schools and early learning facilities to provide opportunities for natural ventilation and night purging. Where a vertical school has operable windows, they **must** be zoned and centrally mechanised through an aggregated Building Management System (BMS) or a separate, smart monitoring control system for windows. In early learning facilities, air conditioning units **must** be provided in the following spaces: • office, planning and staff rooms • foyer, and • children's indoor play spaces. […] When planning to install an air conditioning system—whether self-funded by the school or funded by the VSBA—a life-cycle analysis must be undertaken to: • calculate total ownership costs (over at least 7–10 years), including capital costs associated with electric sub-mains • maintenance and energy costs (on the basis of likely energy tariff rates and

Section	Sub-category	Early learning facility-specific criterion
		envisaged usage requirements), and • compare the financial implications of potential active mechanical versus passive solutions (such as orientation, insulation, and natural ventilation) or combinations thereof • highlighting both the upfront investment and long-term operational costs. This analysis is to ensure that the installed air conditioning system is necessary, fit for purpose, requires minimal maintenance, and provides value for money for the design in question. All air-conditioning systems must comply with and be installed in accordance with relevant Australian standards.
Technical Specifications	5.9.6 General power outlets	For example, in early learning facilities, GPOs must be installed in appropriate locations to support check-in/check-out devices at the reception area. […] In early learning facilities, general power outlets **must** be located at 1500mm AFL in spaces that are accessible to children.
Technical Specifications	5.9.8 Lighting systems	Project consultants must select lighting that meet the following requirements: […] • in early learning facilities, if an observation booth is included, an indicator light must be installed in the indoor education and play space, with its switch located inside the booth, to inform educators that the observation booth is in use […] • in early learning facilities, indoor education and play spaces must include 0-100% dimming lights to enable lighting to be adjusted

Section	Sub-category	Early learning facility-specific criterion
Technical Specifications	5.10 Information and communication technology: ICT in early learning facilities	The VSBA Delivery Manager **must** facilitate IMTD's review of ICT design documentation and plans, including for power and data point schedules for all new early learning facilities. Communications rooms in early learning facilities that are co-located on school sites **must** be treated as 'satellite' communications rooms as per DE ICT Design Models for Schools Guide, however, they **must** have two separate communications cabinets in order to provide the following facilities: • conduit connection to the school network designed to connect to a separate rack that will not be accessible by the early learning facility operator. • a new NBN connection from the street connected to a separate rack for the early learning facility service provider to install their own equipment and connection. Project consultants **should** refer to the early learning facility functional brief for information on the number and location of wireless access data points. Where early learning facilities are to be leased to external service providers, all data points in these spaces must connect to a secondary communications rack dedicated exclusively to the external service provider infrastructure. For this purpose, sufficient space for a separate (external service provider) rack in the communications room should be allocated. External service providers are responsible for installing their own active IT equipment such as WAPs, switches, audio visual and telephone equipment.

Section	Sub-category	Early learning facility-specific criterion
Technical Specifications	5.10.1 ICT design and information management and technology division	Early learning facilities 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.
Technical Specifications	5.10.3 - Network points required	Recessed floor boxes **must not** be installed in early learning contexts. [...] In early learning facilities, data outlets (and GPOs) **must** be installed at 1500mm AFL in spaces that are accessible to children.
Technical Specifications	5.10.6 - Server room and IT equipment cabinets	Any new early learning facilities located on a school site **must** have separate ICT service in addition to a conduit back to the school network. Consultants **must** allow for two suitably sized and ventilated service cupboards to accommodate the IT equipment and communications cabinet in the early learning facility.
Technical Specifications	5.11.2 Physical security	where a new early learning facility is to be delivered on a school site with additional community facilities, such as maternal child and health (MCH) consulting rooms or community meeting spaces, consultants must consult with the Project Control Group and early learning service provider service provider about the design of barriers and gates to ensure access to the community facilities while maintaining secure early learning facility boundaries that only authorised early learning staff and registered users can access. Early learning facilities on school sites, **must** be designed to restrict public access to all areas. A fence **must** define the early learning facility's perimeter to prevent school users and members of the public from accessing the early learning facility without permission and supervision.

Section	Sub-category	Early learning facility-specific criterion
		Advice from the service provider **should** be obtained to determine where keypad entry systems **should** be installed within the early learning facility.
Technical Specifications	5.11.7 CCTV monitoring	CCTV **should not** be installed in early learning facilities, unless explicitly requested by the agreed provider and approved through the Project Control Group.
Technical Specifications	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. In early learning facilities, automatic smoke detection and alarm systems **must** be provided throughout the whole building in accordance with NCC E2D20 requirements.
Technical Specifications	5.12.9 Water efficiency	• If sprinkler systems are installed, each floor **must** be fitted with isolation valves or shut-off points for floor-by-floor testing. Early learning sprinkler system requirements **must** comply with E1D11.
Technical Specifications	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, and, in early learning facilities, also for children's water play activities.
Technical Specifications	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: [...] • where an early learning facility is located above ground level, lift capacity, access and operational arrangements for at least one lift **must** accommodate the efficient, mechanical transportation

Section	Sub-category	Early learning facility-specific criterion
		of groups of children and parents/carers without the need for key passes
Building Completion and Handover	Building Completion and Handover	Completion and handover timeframes differ for early learning facility delivery than from schools. In the case of early learning facilities, third party service providers are appointed approximately six to nine months prior to start of the new school year i.e. April-June. The service provider is the only entity that can apply to the regulator for approval to operate an early learning service.[...] Furthermore, as practical completion is reached the early learning service provider is required to submit an Occupancy Permit, a Building Permit, As Built plans and evidence of a lease agreement. The approval process includes a site visit by the regulator. This occurs after PC once the service provider has installed all equipment and connected services for operations. Where the regulator identifies non-compliant elements that **must** be rectified prior to service approval the VSBA Project Manager will have to determine the process to rectify the elements prior to the start of the early learning term which aligns with school terms.
Building Completion and Handover	Building Completion and Handover	Smoking is banned within four metres of all entrances to early learning facilities, primary and secondary schools in Victoria, and within the school grounds, under an amendment to the Tobacco Act 1987.

8.2 Appendix B: Postcode areas eligible for air conditioning (NatHERS 2008 climate zones 20 and 27)

NatHERS Zone 20

3310	3424	3563	3641
3311	3453	3564	3644
3315	3463	3565	3646
3317	3464	3570	3647
3318	3465	3571	3649
3319	3472	3572	3666
3380	3475	3573	3669
3381	3478	3607	3670
3384	3480	3608	3672
3385	3482	3610	3673
3387	3483	3612	3675
3388	3485	3613	3677
3390	3515	3614	3678
3391	3516	3616	3682
3392	3517	3617	3683
3393	3518	3618	3685
3395	3520	3620	3687
3396	3523	3621	3688
3399	3525	3622	3690
3400	3527	3623	3691
3401	3535	3624	3693
3407	3536	3629	3694
3409	3539	3630	3695
3412	3550	3631	3701
3413	3551	3633	3725
3414	3555	3634	3726
3415	3556	3635	3727

NatHERS Zone 20

3418	3557	3636	3728
3419	3558	3637	3730
3420	3559	3638	3732
3422	3561	3639	3733
3423	3562	3640	3746

NatHERS Zone 27

3487	3580
3488	3581
3489	3583
3490	3584
3491	3585
3494	3588
3496	3589
3498	3590
3500	3591
3501	3594
3505	3595
3506	3597
3507	3599
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NatHERS Zone 27
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