



Structural & Geotechnical Requirements (SGR) Summary Sheet

The Structural and Geotechnical Requirements are part of our Designing Schools in New Zealand document suite. They set out the structural and geotechnical requirements and expectations for designing and assessing school buildings.

Introduction

Our requirements that designers must follow are defined in our Structural and Geotechnical Requirements (SGR).

This document is primarily aimed at structural and geotechnical engineers, but it is also important that those who lead and co-ordinate school design work, such as architects, project managers, boards of trustees and NZSPA property personnel, are familiar with the scope and purpose of this document.

Scope

Our requirements apply to all new and existing buildings on state school sites, as well as extensions and additions.

The updated version 3.0 is to be used for all projects that commence from November 2020 onwards.

Compliance with the SGR is to be confirmed and outlined in the Design Features Report and reviewed at a high level as part of the Design Review process.

Key Requirements

Early geotechnical and structural collaboration is critical

Foundation and superstructure systems can have highly variable cost implications and early collaboration between the lead designer, and the geotechnical and structural engineer is required.

Seismic performance criteria and design loadings

School buildings must meet specific performance requirements that are different to normal commercial and residential construction.

In addition to the protection of occupants, school buildings are required to remain usable after a reasonably foreseeable natural disaster, with repairs being able to be carried out within reasonable timeframes (e.g. school holiday periods).

This requirement is not only for the primary structure but extends to non-structural elements (such as the cladding, ceilings, partition walls, and building services.

Geotechnical investigations and reporting

Comprehensive geotechnical assessments and investigations are required prior to the Master Plan design being carried out. This is essential to enable site planning that maximises the geotechnical opportunities and reduces potential future damage to buildings due to hazards (such as flooding, ground movement) resulting in more cost-effective school developments.



All geotechnical data (new and old) must be uploaded to the New Zealand Geotechnical Database (NZGD)



Foundations and settlement-tolerant buildings

Shallow foundations must be considered for all new school buildings and on all sites.

On ground that may not appear suitable for simple shallow foundations, this requirement can often be achieved through ‘settlement tolerant building design’.

While deep foundations or ground improvement may still be the final selected solution, designers should consider and present a range of foundation options as part of a risk-based foundation selection process. This allows the capital and repair costs to be compared for various options, resulting in more cost-effective whole of life solutions.

Design case	SLS1	SLS2	ULS
T (years)	25	200 – 500	1,000
Differential settlement (mm)	15 – 25	80 – 120	>200
Disruption	Some minor ‘cosmetic’ work may be required. No disruption to building operation.	Re-levelling required to 20% of the floor area. Grout injection of foundation pads/beams and mechanical re-levelling of floor area with 1 to 2 months duration. Work able to be planned for a school holiday period. Limited temporary accommodation / decanting costs (could use Hall / Gym as temporary classroom space).	Major repairs required including re-levelling of foundations and floor area (80% of area) with duration of 4 to 6 months. Expected to require temporary accommodation / decanting using MTBs.

Design case	SLS1	SLS2	ULS
Disruption	Cosmetic cracking of wall finishes. Building services operational. Weathertight (no reinstatement work required).	Redecoration of interior space(s) involving replastering and repainting. Sticking doors and windows. Some repairs to non-structural elements. Some cladding repairs. Building services readily reinstated – most located within accessible subfloor. Fire protection systems readily reinstated. Weathertightness readily reinstated.	Foundation re-levelling using mechanical lifting and grout injection. Liquefaction ejecta removal. Replacement of some structural elements. Extensive non-structural repairs. Most service connections to be replaced. Seismic separations reinstated. Significant repairs expected to reinstate weathertightness.
Repair / Opex costs (\$M)	\$0.1m	\$2M – \$3M	\$20M – \$40M

Structural and non-structural systems

We have specific requirements for designing structural and non-structural systems to ensure enhanced resilience and adaptability. These include:

- Provision of additional superimposed load to allow for changes over the building's design life.
- Provision of additional ductility to significant load bearing elements for improved resilience.
- Specific drift limitations for the primary structural system to ensure reparability after a significant event (SLS2 loading) and to allow continued use.
- Specific requirements when using masonry veneer as a cladding system.
- Detailed performance requirements for specific structural and non-structural elements (e.g. foundations, ceilings, partitions, emergency systems).
- Requirement for the design and construction monitoring responsibilities of the various engineering parties involved in non-structural systems are to be clearly documented.

Seismic assessment and strengthening of existing

Our earthquake resilience policy is to have all school buildings strengthened over time, as near as is reasonably practicable, to 67%NBS.



For all projects where structural work is to be undertaken, designers are to review the existing assessments and advise on the suitability of the existing assessment for project purposes. It may be necessary to review and revisit the original assessments based on legislative or technical changes.

All school assessments are to be in line with current national assessment guidance and must use our assessment templates.

Need more information?

For further information visit our earthquake resilience of school buildings webpage which includes the link to download the SGR, as well as a toolbox with related templates and information.

If anything in this guideline requires clarification, please contact us through:
School.Design@schoolproperty.govt.nz