E.163 1945 "Emergency Standard Specification for Dwellinghouse Construction" – a forgotten ancestor

Nigel Isaacs

ABSTRACT: The outbreak of World War II led to a focus on the most efficient use of materials within New Zealand. In 1944 the New Zealand Standards Council was requested to develop an "Emergency Standard Specification for Dwellinghouse Construction." Unlike NZSS 95 "New Zealand Standard Model Building By-Law" which was limited to structural stability, public health and other council-controlled issues, this new specification (NZSS E.163) could deal with materials and construction methods. Published in January 1945, only two copies appear extant – a partial copy in Wellington City Archives and a full copy in Auckland City Archives, although the Committee minutes are held in Archives New Zealand.

As well as dealing with house construction (foundations, concrete work, carpentry, etc.) it deals with internal finishing (solid- and fibrous-plaster, terrazzo, painting and paperhanging, etc.) and services (plumbing, drainage and electrical). E.163 was promoted as being of real benefit to occupants (owners or tenants) as they could be assured as to "essential considerations relating to materials, workmanship, and design" – placing quality, not speed at the heart of the then Government's actions. The paper compares the requirements of E.163 with the relevant parts of NZSS95, as well as exploring its relationship to NZS 3604 "Code of Practice for Light Timber Frame Buildings Not Requiring Specific Design" and modern model specifications.

Introduction

On Sunday 3 September 1939, Britain, France, New Zealand and Australia declared war on Germany. The following events, initially on the other side of the world, were to have a huge impact on New Zealand not just in terms of the people and supplies sent to the war, but also on the local ability to build, particularly the buildings required to house the population.

The New Zealand Standards Institute (NZSI), or its predecessor the New Zealand Standards Council, had already developed NZS 95 "New Zealand Standard Model Building By-law." NZS 95 was published as ten sections in a single volume in 1935, and by 1941 it had been adopted by 47 local authorities covering more than two-thirds of the urban population.[1]

With the outbreak of war, NZSI in its 1940 report noted that "the resources of the standardizing bodies of the Empire have been used for the preparation of war-time standards, and it is certain that at its conclusion they will emerge as an indispensable part of the nation's activities."[2] In 1941 NZSI established an "Emergency Standards Divisional committee" which in its first year received 150 "War Emergency Standards" from England and Australia,[3] and later from American Standards Association.[4]

The 1942 NZSI annual report noted that 70 Emergency Standards had been adopted, with 49 original "NZ War Emergency Standards" and the rest from Britain. The number of War Emergency Standards adopted continued to increase, reaching a total of 199 in 1947.[5] These "E" Standards remained in use for some years.

[1] Isaacs "NZSS 1900 Model Building By-Law" p 101.
[2] NZSI "H-44a New Zealand Standards Institute (Department Industries and Commerce) Annual Report for the Year 1939-40" p 1.
[3] NZSI "H-44a New Zealand Standards Institute (Department Industries and Commerce) Annual Report for the Year 1940-41" pp 4-5.
[4] Standards Council "H-44a New Zealand Standards Council (Department of Industries and Commerce) Annual Report for the Year 1941-42" pp 2, 4.
[5] Standards Council "H-44a New Zealand Standards Council Department of Industries and Commerce) Annual Report for the Year 1946-47" p 2.

Even in 1950, five years after the end of WWII, reviewing the "E" Standards was only the third priority of the Standards Council, the first being the consideration of new overseas standards and the second the development of "original New Zealand standard specifications, arranged according to urgency."[6]

While many of these War Emergency Standards dealt with individual items (e.g. "Leather Dress Gloves," "Stamp Pad Ink," "Produce Sacks"),[7] the need for a suitable document to deal with house construction had also become evident.

Why an Emergency Standard for Dwellinghouses and What Became of It?

The tale of the introduction and ultimate withdrawal of NZSS E.163 "NZ Emergency Standard Specification for Dwelling House Construction" can be divided into three broad categories – politics, process and performance.

Politics

In 1942 the government's Housing Department set out to erect some experimental houses in Lower Hutt, but the Lower Hutt City Council "complained that by erecting houses which did not comply with its by-laws, the Department was lowering standards."[8] A newspaper report noted issues with interior partitions in the use of 2x2in (50x50mm) studs rather than 3x1½in (76x38mm)), the use of Pinex or 3-ply lining, and a stud height of 8ft (2.4m) rather than 9 ft (2.7m)[9] meant the houses "would comply neither with the Lower Hutt by-laws or the by-laws of any other local body in New Zealand."[10]

It was decided the best way to create co-operation between the Government and Local Authorities was to achieve the "unanimous concurrence of all the interested parties" through the development of "a standard specification for dwelling house construction."[11]

The specification already in use by the Housing Department was used as a base, and after 19 meetings of the "Government Housing Committee" a draft was provided to the NZSI. "Building Code Sectional Committee." This committee met three times and recommended it for adoption.[12] Although E.163 was adopted in the 1945 reporting year[13] and the date on the published NZSS E.163 is "January, 1945,"[14] the press clippings announcing the release are from April 1946.[15] By October 1950, 10,400 copies had been sold, including 7,000 by the Rehabilitation Department for trade training schools. It was cited by the Trade Training Certification Board as a textbook.[16]

The reception of E.163 was not universally

[6] Standards Council "H-44a New Zealand Standards Council (Department of Industries and Commerce) Annual Report for the Year 1949-50" pp 4-5.
[7] Standards Council "H-44a New Zealand Standards Council Department of Industries and Commerce) Annual Report for the Year 1944-45" pp 10-11.
[8] NZSI "Minutes of Special Subcommittee of the Standards Council to Consider the Desirability of Setting Up a Housing Sectional Committee and of the Revising of N.Z.S.S. E.163 - Dwelling House Construction" p 1.
[9] See: Isaacs "Standing Tall" p 69.
[10] "New Type of House" p 3.
[11] McDonald, Memorandum for the Commissioner of Works p 1.
[12] NZSI "Minutes of Special Subcommittee of the Standards Council to Consider the Desirability of Setting Up a Housing Sectional Committee and of the Revising of N.Z.S.S. E.163 - Dwelling House Construction" p 1.
[13] Standards Council "H-44a NZ Standards Council 1945" p 10.
[14] NZSI *War Emergency NZSS E.163 New Zealand Emergency Standard Specification for Dwellinghouse Construction* p 1.
[15] "Standard Specification on House Construction" p 3.
[16] NZSI "Minutes of Special Subcommittee of the Standards Council to Consider the Desirability of Setting Up a Housing Sectional Committee and of the Revising of N.Z.S.S. E.163 - Dwelling House Construction" p 1.

positive. Prior to its release, the Director of Housing Construction, the Government Architect, and the New Zealand Institute Architects (NZIA) were opposed to its issue. In particular, the Director of Housing Construction felt it

> could become an embarrassment to the Department when used as a standard by municipalities in demanding that the Department of Housing Construction should abide strictly to this specification when, in fact, because of the difficulties of material supply and changing ideas of equipment and finish, it may not be in a position to adhere to this specification.[17]

The NZSI response pointed out that the cost of meeting many different local body by-law requirements would be even more disadvantageous.[18]

The sniping continued even after its release. In 1946 the NZIA called for E.163 to be withdrawn as "this specification as a contract document is potentially dangerous and in certain cases wasteful of materials,"[19] the Electric Supply Authority Engineers' Association (ESEAEA) pointed out it was in conflict with statutory electrical regulations,[20] and the New Zealand Counties Association felt it was "more applicable to Boroughs than to Counties."[21]

WWII ended on 2 September 1945 with the formal surrender of Japan, but it took time for those overseas to return and more time for the system of commerce to return to normal.

It was intended that the various War Emergency Standards would be either withdrawn or superseded by regular standards. However, it took until late 1950 for the future of E.163 to be formally considered.

The "Special Subcommittee of the Standards Council to Consider the Desirability of Setting Up a Housing Sectional Committee and of the Revising of N.Z.S.S. E.163 - Dwelling House Construction" voted on 6 October 1950 not only that E.163 was out of date but that it was not necessary to set up a special "Housing Sectional Committee." A range of arguments were made in favour of E.163 being withdrawn, including: "[i]t was not the function of the Standards Institute to write textbooks;" that some of the items included were not relevant to the process of building (e.g. quality of copper for hot water cylinders); and that:

> bringing it continually up to date was hardly practicable when new materials and forms of construction were coming into use every day as well as others disappearing from use.[22]

Withdrawal was recommended and accepted by the Standards Council on 15 November 1950.[23]

Although the NZSI file held by Archives New Zealand, Wellington, includes two marked-up printer's proofs (dated 12 February 1945 and 16 February 1945), there is no final copy. Only two copies of the issued NZSS E.163 appear to be extant – a partial copy in Wellington City Archives and a full copy in Auckland City Archives.[24] This analysis is based on the

[17] Semple, Memorandum for The Hon. Minister of Industries and Commerce from the Minister of Works p 1.
[18] McDonald, Memorandum for the Commissioner of Works pp 2-3.
[19] Secretary, NZIA, Letter to The Secretary NZSI p 1.
[20] Stace, Letter to The Secretary NZSI p 1.
[21] Amos, Letter to The Secretary NZSI p 1.
[22] NZSI, Minutes of Special Subcommittee of the Standards Council to Consider the Desirability of Setting Up a Housing Sectional Committee and of the Revising of N.Z.S.S. E.163: Dwelling House Construction pp 3-4.
[23] NZSI, Minutes of Standards Council pp 8-9.
[24] NZSI *War Emergency NZSS E.163 New Zealand Emergency Standard Specification for Dwellinghouse Construction*.

Auckland copy.

Process

The issuing of NZSS 95 in response to the 1931 Napier earthquake provided the first national New Zealand building code, although councils could, and did, modify it to meet their local requirements and expectations.[25] The initial version of NZSS 95 was published in 1935 as a single volume, divided into 10 "Sections." In 1939 the divisions became "Parts."[26] Of particular interest are Part VIII "Residential Buildings" and Part IX "Light Timber Construction" which were published in 1943 but lacked direct 1935 "Section" equivalents.

Part VIII established minimum requirements for all types of residential buildings, including:

> private dwellinghouses, apartment buildings, boardinghouses, lodginghouses, convalescent homes, residential clubs, institutions, licensed hotels, private hotels, or hostels.

As well as setting out the basic rooms and essential equipment, services, and amenities which must be provided, it also gave minimum requirements relating to air space, lighting, ventilation, and the prevention of dampness, as well as dealing with the overcrowding of rooms. For apartments, it dealt with fire-prevention, means of egress, artificial lighting, laundry and garage accommodation, garbage-disposal, maintenance, cleaning and repair. It also set limits for the number of dwelling units in relation to the size, type, and design of the apartment building.[27]

Part IX was concerned with the construction of "stud framing," regardless of the cladding. As well as establishing minimum requirements for "materials and workmanship," it also dealt with the foundation, wall, floor and roof construction as well as exterior and interior finishes.[28]

The E.163 Preface sets out its role which was to use, but not replace, Parts VIII and IX:

> THIS standard specification supplements the New Zealand Standard Code of Building By-laws (particularly Part VIII, "Residential Buildings," and Part IX, "Light Timber Construction") with the object of providing a complete set of minimum requirements relating to the construction of dwellinghouses.

This was buttressed by the expectation that:

> The specification writer will be further assisted by having at his disposal a reliable trade text-book incorporating a statement of the best trade practice according to the consensus of the most competent opinion.[29]

However, the first New Zealand textbook was published by the Army Education Welfare Service in 1944 but it was not until the publication of *Carpentry in New Zealand* in 1958 that a comprehensive New Zealand house text-book became available.[30] The E.163 guidance would have to have been obtained from a UK or American publication, bringing their "best trade practice" to New Zealand.

E.163 was very much a specification document, as noted in 1944 by the Director of Housing Construction (see above). It provided a smorgasbord of specification clauses under 15 headings, with three supporting schedules (see Table 1). The specification clauses could be selected as desired, while in the schedules:

[25] For example: Auckland City *The Auckland City By-Law No. 27, 1940*.
[26] Isaacs "NZSS 1900 Model Building By-Law" p 101.
[27] NZSI *NZSS 95 New Zealand Standard Code of Building By-Laws. Part VIII. - Residential Buildings* p 4.
[28] NZSI *NZSS 95 Standard Code of Building By-Laws. Part IX - Light Timber Construction* p 5.
[29] NZSI *War Emergency NZSS E.163 New Zealand Emergency Standard Specification for Dwellinghouse Construction* p 2.
[30] Isaacs "*Carpentry in New Zealand*" pp 7-16.

1st Schedule: three tables setting out where the specifier must select the "type or class" of work when using E.163:
(1) the generally used e.g. "Nature of downpipes";
(2) the not so generally used e.g. "Shower, if required"; and
(3) those requiring the specifier to give full details depending on the site, client, etc e.g. "Layout of electrical points"

2nd Schedule: listed the relevant New Zealand and British standard specifications; and the

3rd Schedule: code symbols for standard finishes, for use on the detailed drawings e.g. "a = asbestos-cement battens"

Performance

The Preface to E.163 noted that compared to NZSS 95, it went beyond the minimum:

> Whereas the Standard Code of Building By-laws is necessarily limited to minimum requirements in respect of structural stability, public health, and other matters concerning which local authorities are vested with by-law-making powers, this standard specification covers all aspects of housing construction, with the object of ensuring the maintenance of sound standards of construction, hygiene, and general living-conditions, based upon the most economic use of resources.[31]

Table 1 gives section numbers, titles, page numbers and the number of pages for each section, the number of clauses by section and the section activity – whether construction, interior or exterior finishing, or services. Three of the sections include activity clauses relating to more than one activity (Mixed): "Carpentry" includes construction as well as both interior and exterior finishing; "Plumbing" both exterior finishing and services; and "Painting and Paperhanging" both interior and exterior finishing. Of the 134 clauses, Construction activity is relevant to 46 clauses or 34%; Finishing – exterior to 27 clauses or 20%; Finishing – interior to 33 clauses or 24%; and Services 28 clauses or 21% of the total number

Section	Title	PAGE	#pages	#Clauses	Activity
Preface	Preface	2	1		
I	Preliminaries	3	1	5	Construction
II	Excavation	4	Part	8	Construction
III	Concrete Work	4	1	8	Construction
IV	Brickwork	5	2	13	Construction
V	Carpentry	7	6	18	Mixed (3)
VI	Joinery	13	2	7	Finishing - interior
VII	Roof Coverings	15	1	7	Finishing - exterior
VIII	Plumbing	16	6	20	Mixed (2)
IX	Drainage	22	1	8	Services
X	Electrical Work	23	2	7	Services
XI	Solid Plaster	25	1	9	Finishing - exterior
XII	Fibrous-plaster	26	Part	5	Finishing - interior
XIII	Terrazzo	26	Part	5	Finishing - interior
XIV	Painting and Paperhanging	26	2	12	Mixed (2)
XV	Glazing	28	-	2	Finishing - interior
1st	1st Schedule	28	2	-	
2nd	2nd Schedule	30	5	-	
3rd	3rd Schedule	35	1	-	

Table 1: E.163 Table of Contents, Pages, Clauses and Activity

[31] NZSI *War Emergency NZSS E.163 New Zealand Emergency Standard Specification for Dwellinghouse Construction* p 2.

of clauses. It is important to note that the inclusion (or not) of parts of E.163 in the house specification was up to the designer, so not all would necessarily be used for a house e.g. if there was no terrazzo, then Section XIII would not be required.

Table 1 shows the design of E.163 as a specification resulted in trade-oriented sections, rather than the component focus of NZSS 95. At the same time, at least in part, it depended on the detailed design and construction requirements of NZSS 95 Part VIII and IX. It also included requirements in excess of the NZSS 95 minima.

For example, E.163 Section I "Preliminaries" Clause 5 required a minimum floor height above ground on a level site to be 2ft 3in (69cm) while NZSS 95 Part VIII "Prevention of Dampness" Clause 816(a) required a minimum floor level of 15in. (38cm) and NZSS 95 Part IX "Foundation Ventilation" Clause 920 required not less than 12in (30cm) between the "bottoms of sleeper-plates or stringers and the ground."

As an example, not related to construction, E.163 Section VIII "Plumbing" included two clauses relevant to hot water supply: Clause 14(iii) required a 30 gallon (136 litre) copper electric hot water cylinder but this was accompanied by two-thirds of a page of specifications, for example:

> The copper after annealing at 500° C. shall have an ultimate tensile strength of not less than 14 tons per square inch[32];

and Clause 20 for a wash-house copper ("Insignis pine" modern name is "Pinus Radiata")

> A galvanized - iron - clad reinforced pumice - concrete copper - frame, including an Insignis pine lid, and approved flared flanged 12-gallon (55 litre) copper of 22 S.W.G. (0.71 mm), either drawn, hammered, or with brazed joints.

NZSS 95 included no minimum hot water cylinder or washhouse copper requirements, only in Clause 804(e) that a bath or shower with "wholesome water" be available[33]:

> (e) Bathroom.- The bathroom shall contain an approved slipper or shower bath with an adequate supply of wholesome water.[34]

Where Does E.163 1945 Fit?

Figure 1 places E.163 into the context of New Zealand building controls history. It belongs in the tradition of "model Specifications" – clauses and specifications developed to provide a model for direct or modified use by architects and designers. But where did these originate?

The rise in the UK of the general contractor in the nineteenth century is said to have led to the use of the written specifications.[35] This in turn led to books on specifications starting with Alfred Bartholomew's 1840 *Specifications for Practical Architecture* – the first part being an "essay on the decline of excellence in the structure and in the science of modern English buildings" while the second part of approximately 500 pages provides 54 specifications for different types of buildings.[36] Batholomew's book was revised twice, being reduced in 1893 to specifications for 28 types of buildings.[37] It was not until Frank W Macy's

[32] NZSI *War Emergency NZSS E.163 New Zealand Emergency Standard Specification for Dwellinghouse Construction* p 19.
[33] NZSI *War Emergency NZSS E.163 New Zealand Emergency Standard Specification for Dwellinghouse Construction* p 22.
[34] NZSI *NZSS 1900 New Zealand Standard Model Building Bylaw: Chapter 4:1964 Residential Buildings* p 9.
[35] Hurst "Introduction to Specifications " p 1.
[36] Bartholomew *Specifications for Practical Architecture* pt II.
[37] Bartholomew & Rogers *Specifications for Practical*

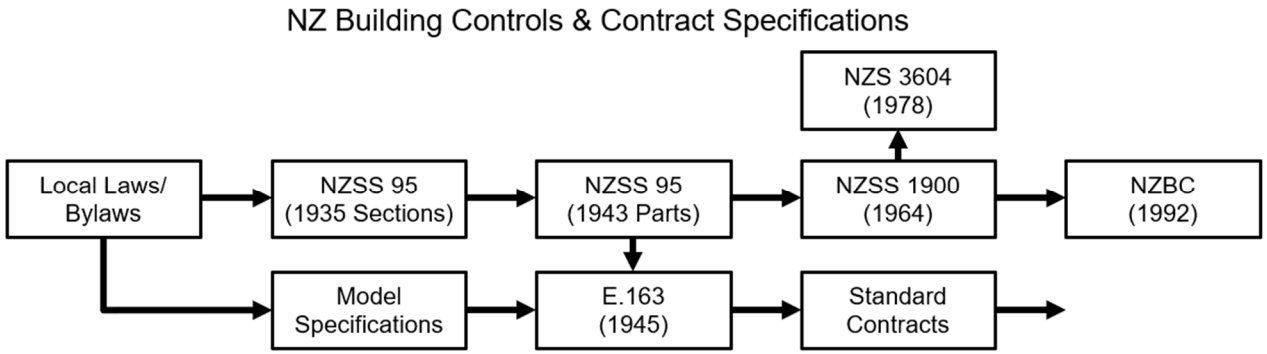

Figure 1: Evolution of NZ Building Controls and Contract Specifications

1898 first edition of *Specifications in Detail*, that model specifications based on trade-based clauses were published.[38]

It seems likely that such specification books were available in New Zealand in the late nineteenth and early twentieth centuries – for example the University of Auckland library currently reports holding the 1840 and 1873 editions of Batholomew.

The approach started for New Zealand with E.163 has continued with the evolution of specifications developed for specific organisations, such as the Ministry of Works 1964 "Standard Specification for Timber-Framed Units up to Two Storeys,"[39] or generic systems such as *Masterspec*.

Conclusion

This paper has examined the short life of E.164 1945 "Emergency Standard Specification for Dwellinghouse Construction." It has explored the politics around the development and publication of the standard specification in 1945, and its withdrawal in 1950.

It has examined the process of its use, and the essential links to NZSS 95 Parts VIII and IX, and explored some of the performance aspects of its different clauses. Finally, it placed E.163 in the generations of New Zealand building controls, linking not to *NZS 3604 Code of Practice for Light Timber Frame Buildings Not Requiring Specific Design* but rather to generic specification tools.

From its beginnings, E.163 was promoted as being of real benefit to occupants (owners or tenants) as they could be assured as to "essential considerations relating to materials, workmanship, and design" – placing quality, not speed at the heart of the then government's actions. It dealt with all types of frame housing, whether clad in weatherboard, brick veneer or cement sheet, roofing whether corrugated iron, earthenware tiles, fabric or asbestos cement sheet. It ensured adequate supplies of hot water and a building envelope fit-for-purpose.

E.163 may have been hidden for many years, but it still offers a range of lessons as to what really matters in the house building process – and that is to ensure that the entire building is fit for purpose. To achieve this takes more than just a specification. It requires a wide view of the industry – from the designer, the product suppliers, the buildings and the many sub-trades, the inspectors (more than just consents

Architecture pp 75–406.

[38] Macey *Specifications in Detail*.

[39] For example: MWD, Housing Division *Standard Specification for Timber-Framed Units up to Two Storeys*.

officers) and ultimately an occupant who not only enjoys (or maybe, loves) the building but also is prepared to ensure it is maintained in a condition that will ensure it remains to service them and the future occupiers and/or owners.

ACKNOWLEDGEMENTS

The assistance of Auckland City Archives and Wellington City Archives is gratefully acknowledged.

REFERENCES

Amos, H., Letter to The Secretary NZSI: House Construction from Secretary NZCA (1946), Archives New Zealand Wellington, AEKP Series 19012 Ref ST7 Record 163

Auckland City *The Auckland City By-Law No. 27, 1940. Building By-Laws. Being Parts I-VI of the New Zealand Standard Code of Building By-Laws (N.Z.S.S. 95) with Local Amendments* (1944)

Bartholomew, Alfred *Specifications for Practical Architecture, Preceded by an Essay on the Decline of Excellence in the Structure and in the Science of Modern English Buildings; with the Proposal of Remedies for Those Defects.* London: J. Williams, 1840 https://hdl.handle.net/2027/nyp.3343306638490471

Bartholomew, Alfred and Frederick Rogers *Specifications for Practical Architecture; a Guide for the Architect, Engineer, Surveyor and Builder, to Which Is Prefixed an Essay on the Structure and Science of Modern Buildings upon the Basis of the Work of Alfred Bartholomew* London: Crosby Lockwood & Son, 1893 https://hdl.handle.net/2027/nnc1.2004221974

Hurst, Lawrance "Introduction" Macey, Frank William *Specifications in Detail 1904 2nd Revised Edition with an Introduction by Lawrance Hurst* Shaftsbury: Donhead Publishing Ltd, 2009.

Isaacs, Nigel P. "*Carpentry in New Zealand*: a Text Book for Use by Apprentices" *Architectural History Aotearoa* (2015) 12:34-42. doi:https://doi.org/10.26686/aha.v12i.7685

Isaacs, Nigel P. "NZSS 1900 Model Building By-Law: A Planned Evolution" *Architectural History Aotearoa* (2022), 19:100-110. doi:https://doi.org/10.26686/aha.v19i.8052

Isaacs, Nigel P. "Standing Tall: The Evolution of Habitable Room Height Limits in New Zealand Building Controls" *Architectural History Aotearoa* (2021) 18:66-73, doi:https://doi.org/10.26686/aha.v18i.7369

McDonald, L.J., Memorandum for the Commissioner of Works, Wellington. New Zealand Standard Specification for Dwellinghouse Construction from New Zealand Standards Institute (1945), Archives New Zealand Wellington, AEKP Series 19012 Ref ST7 Record 163

Macey, Frank William *Specifications in Detail* London: E. & F. N. Spon, 1898 http://archive.org/details/specificationsin00macerich

Masterspec https://masterspec.co.nz/.

Ministry of Works (MWD), Housing Division *Standard Specification for Timber-Framed Units up to Two Storeys* Wellington: Ministry of Works, Housing Division, 1964.

"New Type of House" *Dominion* (13 October 1942): 3.

New Zealand Standards Institute (NZSI) "H-44a New Zealand Standards Institute (Department Industries and Commerce) Annual Report for the Year 1939-40" *Appendix to the Journals of the House of Representatives: 1940 Session I* Wellington: Government Printer, 1940. https://paperspast.natlib.govt.nz/parliamentary/AJHR1940-I.2.3.2.51

New Zealand Standards Institute (NZSI) "H-44a New Zealand Standards Institute (Department Industries and Commerce) Annual Report for the Year 1940-41" *Appendix to the Journals of the House of Representatives: 1941 Session I* Wellington: Government Printer, 1941. https://paperspast.natlib.govt.nz/parliamentary/AJHR1941-I.2.2.5.39

New Zealand Standards Institute (NZSI), Minutes of Special Subcommittee of the Standards Council to Consider the Desirability of Setting Up a Housing Sectional Committee and of the Revising of N.Z.S.S. E.163: Dwelling House Construction (1950) Archives New Zealand Wellington, AEKP Series 19012 Ref ST7 Record 163.

New Zealand Standards Institute (NZSI), Minutes of Standards Council (1950), Archives New Zealand Wellington, AEKP Series 19012 Ref ST7 Record 163.

New Zealand Standards Institute (NZSI) *NZSS 95 New Zealand Standard Code of Building By-Laws. Part VIII: Residential Buildings* Wellington, N.Z.: New Zealand Standards Institute, 1943.

New Zealand Standards Institute (NZSI) *NZSS 95 Standard Code of Building By-Laws. Part IX - Light Timber Construction* Wellington: New Zealand Standards Institute, 1944.

New Zealand Standards Institute (NZSI) *NZSS 1900 New Zealand Standard Model Building Bylaw: Chapter 4:1964 Residential Buildings. Incorporating Amendments*

No. 1 and No. 2 (Superseding NZSS 95, Part VIII) Wellington: New Zealand Standards Institute, 1973.

New Zealand Standards Institute (NZSI) *War Emergency NZSS E.163 New Zealand Emergency Standard Specification for Dwellinghouse Construction* (New Zealand Standards Institute, 1945) Auckland Council Archives, ACC 219/43-121 Standards Institute of N.Z. 1943-1947, Part 1.

Secretary, New Zealand Institute of Architects (NZIA). Letter to The Secretary NZSI: N.Z. Emergency Standard Specification for Dwelling Houses - War Emergency N.Z.S.S. E.163 from N.Z.I.A. (1946) Archives New Zealand Wellington, AEKP Series 19012 Ref ST7 Record 163.

Semple, Robert, Memorandum for The Hon. Minister of Industries and Commerce from the Minister of Works (1944) Archives New Zealand Wellington, AEKP Series 19012 Ref ST7 Record 163.

Stace, F.N., Letter to The Secretary NZSI: N.Z.S.S. E.163 Dwelling House Construction from Secretary ESAEA (1946) Archives New Zealand Wellington, AEKP Series 19012 Ref ST7 Record 163.

Standards Council "H-44a New Zealand Standards Council (Department of Industries and Commerce) Annual Report for the Year 1941-42" *Appendix to the Journals of the House of Representatives: 1942 Session I*, vol. II. Wellington: Government Printer, 1942. https://paperspast.natlib.govt.nz/parliamentary/AJHR1942-I.2.1.9.34

Standards Council "H-44a New Zealand Standards Council (Department of Industries and Commerce) Annual Report for the Year 1944-45" *Appendix to the Journals of the House of Representatives: 1945 Session I* Wellington: Government Printer, 1945. https://paperspast.natlib.govt.nz/parliamentary/AJHR1945-I.2.2.5.41

Standards Council "H-44a New Zealand Standards Council (Department of Industries and Commerce) Annual Report for the Year 1946-47" *Appendix to the Journals of the House of Representatives: 1947 Session I* Wellington: Government Printer, 1947. https://paperspast.natlib.govt.nz/parliamentary/AJHR1947-I.2.4.2.46

Standards Council "H-44a New Zealand Standards Council (Department of Industries and Commerce) Annual Report for the Year 1949-50" *Appendix to the Journals of the House of Representatives: 1950 Session I*, vol IV Wellington: Government Printer, 1950. https://paperspast.natlib.govt.nz/parliamentary/AJHR1950-I.2.4.2.6

"Standard Specification on House Construction" *Dominion* (5 April 1946): 3.